San Diego Unified Port District
Document No. 57791
Filed JUN 14 2011
Office of the District Clerk

(727)

Part IV of V

Sunroad Harbor Island Hotel Project

&

East Harbor Island Subarea Port Master Plan Amendment

DRAFT ENVIRONMENTAL IMPACT REPORT

TECHNICAL APPENDICES E-I Volume 3 of 3

Unified Port of San Diego

December 2009

State Clearinghouse Number 2006021027
UPD Number 83356-EIR-783

Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment Draft Environmental Impact Report Volume 3: Technical Appendices E–I

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December 2009

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ICF Jones & Stokes. 2009. Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment, Draft Environmental Impact Report. December. (ICF J&S 00977.08.) San Diego, CA. Prepared for: San Diego Unified Port District.

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Appendix E

Traffic Impact and Parking Analysis

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LINSCOTT
LAW &
GREENSPAN
engineers

TRAFFIC IMPACT STUDY & PARKING STUDY

HARBOR ISLAND

San Diego, California
January 16, 2009

Prepared for:

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EXECUTIVE SUMMARY

Linscott, Law & Greenspan, Engineers (LLG) has prepared this *Traffic Impact and Parking Analysis* to determine the potential traffic impacts on the local circulation system and determine parking requirements for the *Harbor Island* project in the City of San Diego. The project site is located along the eastern strip of Harbor Island Drive on Harbor Island and currently contains a 600-slip marina.

At the time of this study, the project included the construction of a *210-room limited service hotel* while maintaining the existing 600-slip marina. The analyses for both the Traffic Impact Study and the Parking Study (contained in ***Appendix E***) considered this project.

Analysis at eleven intersections and several street segments in the study area were performed under near-term and long-term conditions. In the Near-Term, the project is calculated to have no significant impacts. In the Long-Term (Year 2030), the project is calculated to have significant cumulative impacts at the following intersections:

- N. Harbor Dr./Harbor Island Dr./Terminal 1
- N. Harbor Dr./Rental Car Access Road
- N. Harbor Dr./Laurel Street

Mitigation measures recommended in Section 13.0 of this report would reduce the project impacts listed above to a level of 'not significant'. For the purposes of this report, a level of 'not significant' reflects allowable delay increases within the defined thresholds.

A "reduced project" alternative that would avoid any significant impacts is contained in ***Appendix H.***

Since the time of this study, the project description has been revised to consider a *175-room limited service hotel* while maintaining the existing 600-slip marina. LLG prepared a subsequent sensitivity analysis, which concluded that no changes in the traffic analyses results are warranted. However, a reduction in the total required parking supply and fair share contributions is warranted. The results of the sensitivity analysis are presented in a *Letter Report* dated October 27, 2009, which is included as ***Appendix G.***

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TRAFFIC IMPACT & PARKING ANALYSIS

HARBOR ISLAND

San Diego, California
January 16, 2009

1.0 INTRODUCTION

This Traffic Impact and Parking Analysis has been prepared to determine the potential traffic impacts on the local circulation system and determine parking requirements for the *Harbor Island* project in the City of San Diego. The project site is located along the eastern strip of Harbor Island Drive on Harbor Island. ***Figure 1–1*** shows a vicinity map, and a more detailed project area map is depicted in ***Figure 1–2***. The additional traffic generated by the project has been added to the existing on-street traffic volumes and the traffic impacts were analyzed at eleven key intersections and several street segments within the project area under both Near-Term and Long-Term conditions. In addition, the parking demand/supply was assessed for the project.

Included in this traffic assessment are the following:

- Project Description
- Existing Conditions Assessment
- Project Traffic Generation/Distribution/Assignment
- Cumulative Projects Discussion
- Near-Term and Long-Term (Year 2030) Intersection/Street Segment Analyses
- Parking Demand/Supply Analysis
- Significance Of Impacts/Mitigation Measures

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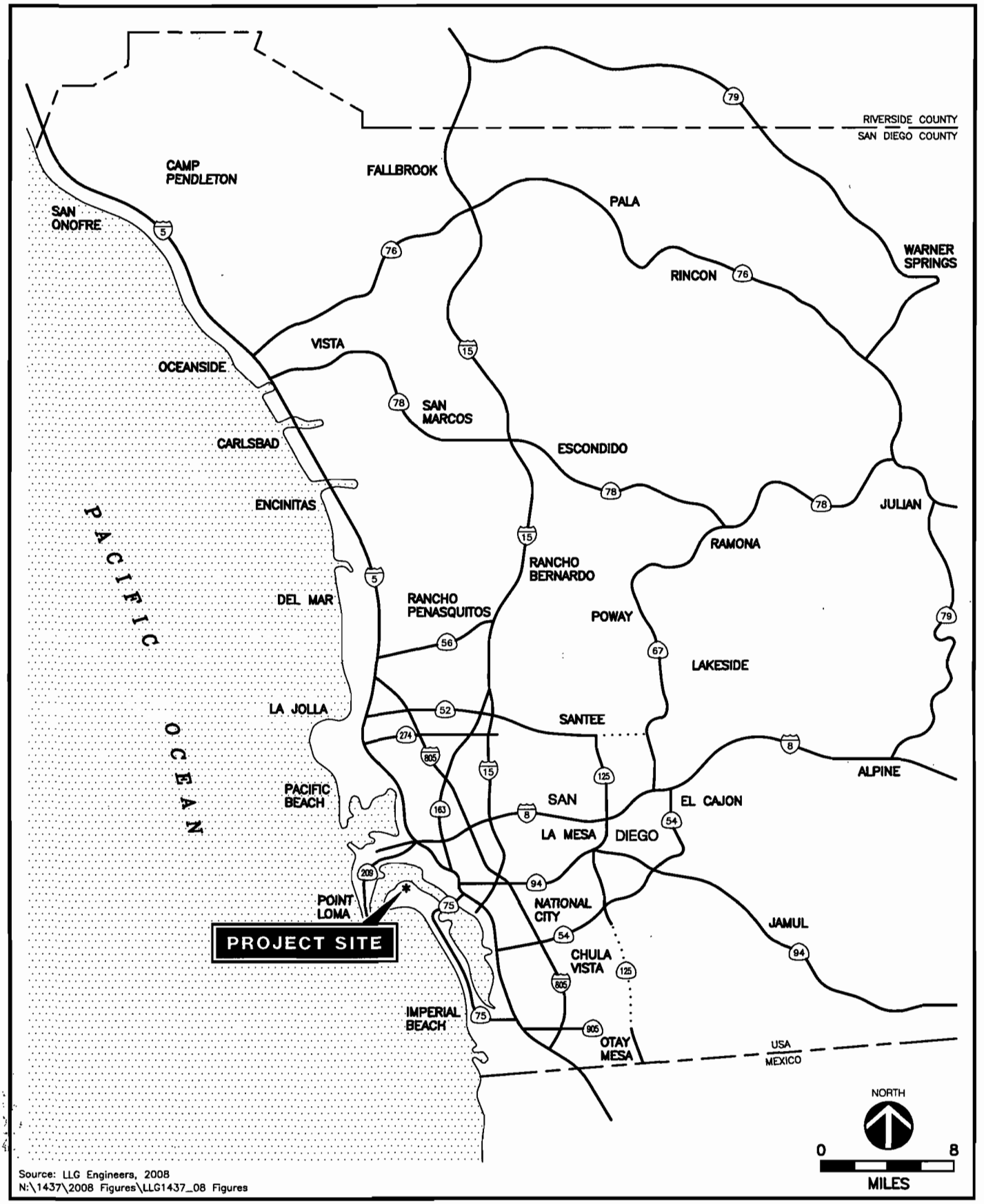

Source: LLG Engineers, 2008
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Figure 1-1

Vicinity Map

HARBOR ISLAND

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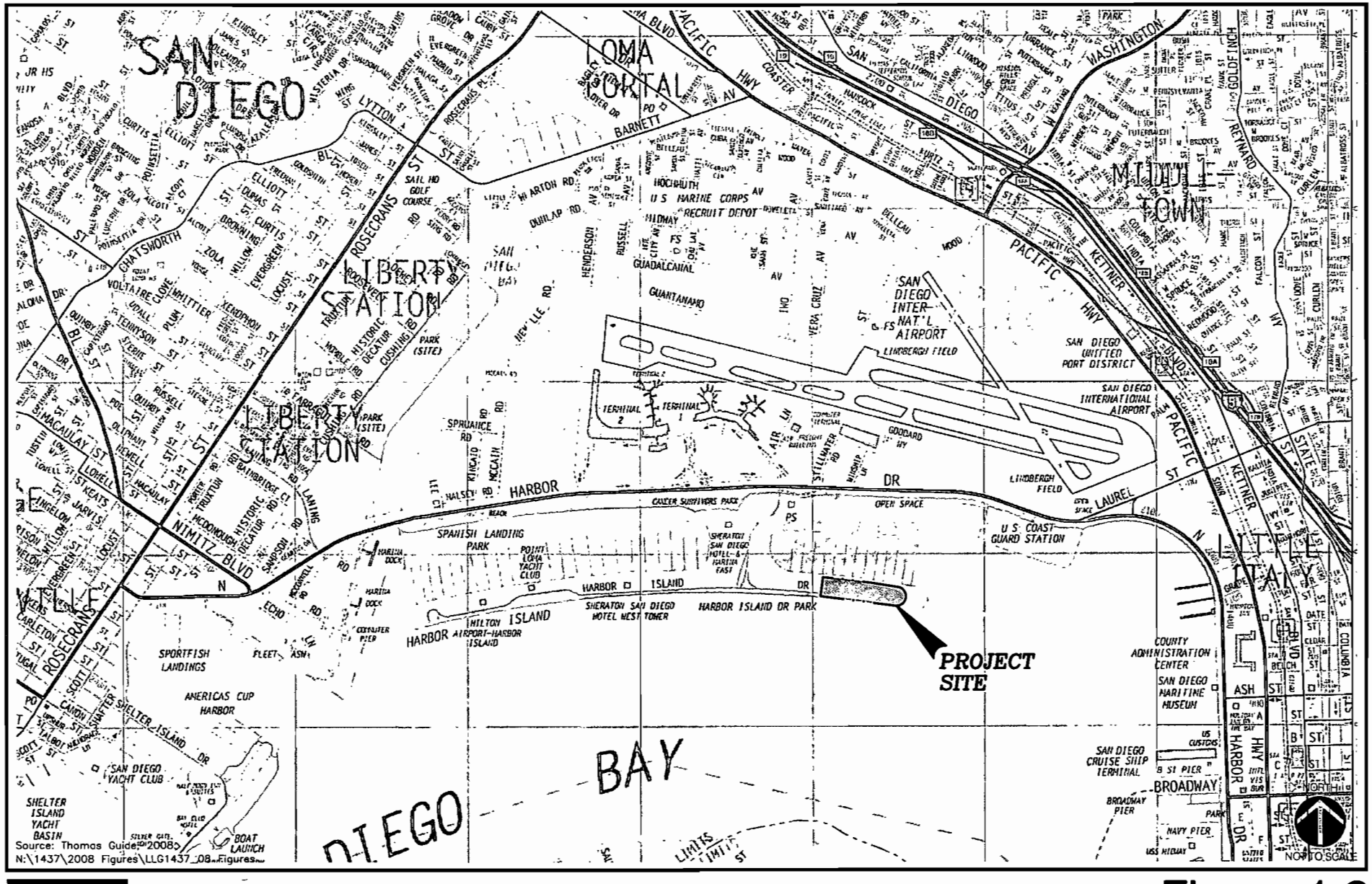

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Figure 1-2

Project Area Map

HARBOR ISLAND

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2.0 PROJECT DESCRIPTION

2.1 Project Location

The *Harbor Island* project is located along the eastern strip of Harbor Island Drive on Harbor Island in the City of San Diego. The existing site contains a 600-slip marina with a clubhouse. Just east of the project site, at the terminus of the eastern strip of Harbor Island Drive, are two other land uses, including a quality stand-alone restaurant called *Island Prime* and a non-functioning entity called the *Reuben E. Lee*. The *Reuben E. Lee*, a 250-foot-long craft that served as a restaurant, is located in the water at the eastern end of the island. The restaurant closed its doors in 2003, but is currently planned to re-open as a restaurant in Fall 2009. Two gate controlled parking lots currently serve the marina site, providing a total of 568 parking spaces.

2.2 Project Description

The proposed project plans to build a limited service hotel of approximately 210 rooms. The project will be located at the east end of the Sunroad leasehold and will replace an existing locker building and some parking associated with the marina. The project will be approximately 95,000 square feet consisting of hotel rooms, limited meeting space (approximately 5,000 square feet), and common areas. Construction is expected to be enclosed within a four story structure with a projected "Opening Day" in April 2012. No changes are proposed for the 600-slip marina and clubhouse. Direct parking access to the marina and the proposed hotel will be provided.

As part of the development, the project proposes to remove the existing traffic circle currently located at the terminus of Harbor Island Drive. The project also proposes to narrow the eastern portion of Harbor Island Drive along the property frontage from four lanes to three lanes (1 westbound and 2 eastbound lanes). These actions are not in line with the Port Master Plan, and as such an amendment to the Port Master Plan is required.

Figure 2–1 depicts the site plan.

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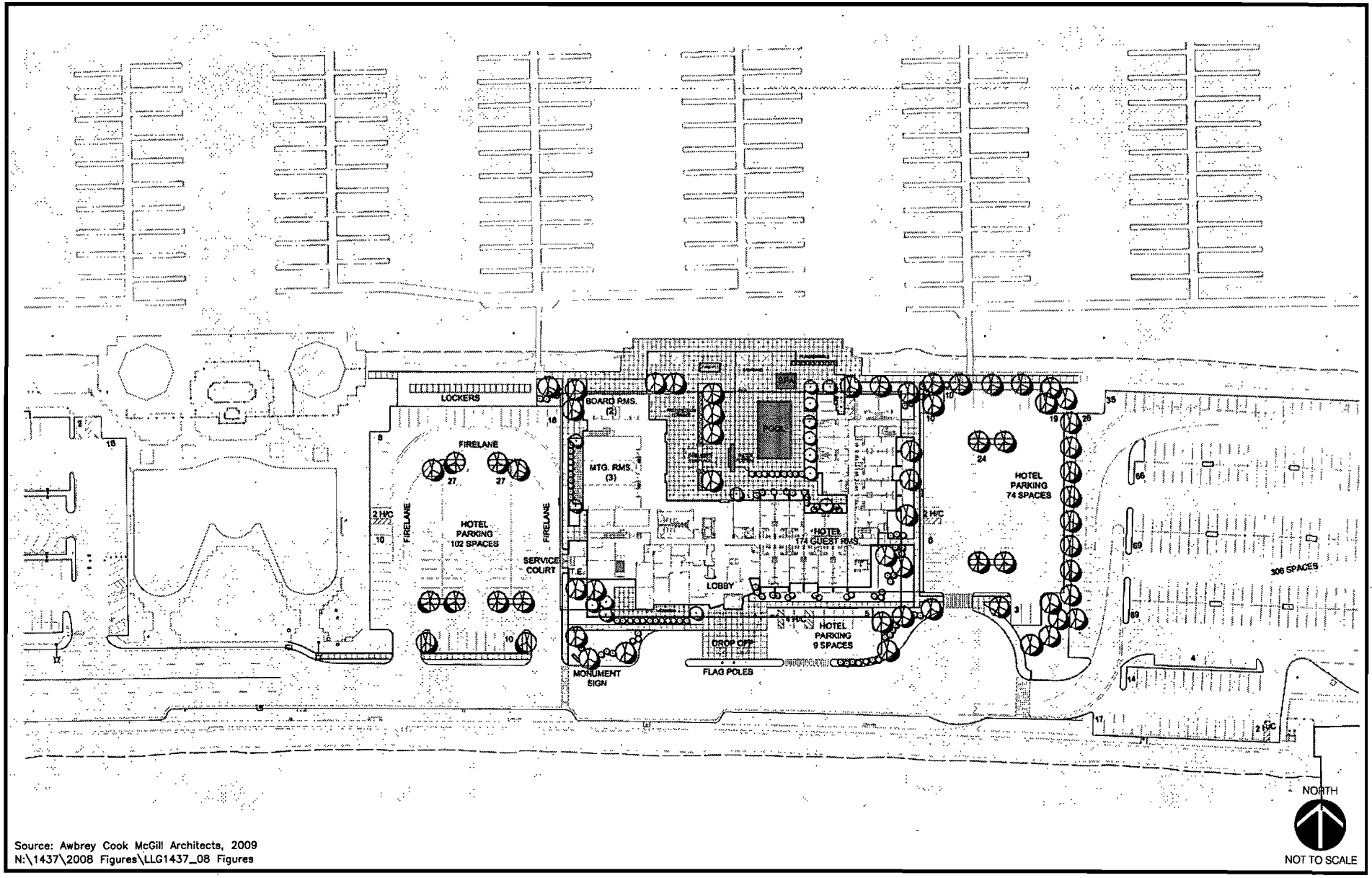

Source: Awbrey Cook McGill Architects, 2009
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Figure 2-1

Site Plan

HARBOR ISLAND

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3.0 EXISTING CONDITIONS

Figure 3–1 shows an existing conditions diagram, including signalized intersections and lane configurations.

3.1 Existing Street Network

According to the City of San Diego Street Design Manual (November 2002) *Six-Lane Primary Arterials* should be 98 feet wide in 142 feet of Right-of-Way (R/W), providing six through lanes, bike lanes, a raised median, and left-turn lanes. An additional 10 feet of roadway and R/W are needed at approaches intersecting 4 and 6-lane streets to provide dual left-turn lanes. *Six-Lane Major Streets* should be 112 feet wide in 140 to 152 feet of R/W, providing six through lanes, bike lanes, a raised median, left-turn lanes and curbside parking. An additional 10 feet of roadway and R/W are needed at approaches intersecting 4 and 6-lane streets to provide dual left-turn lanes. *Four-Lane Major Streets* should be 76 feet wide in 120 feet of R/W, providing four through lanes, bike lanes, a raised median, and left-turn lanes. An additional 10 feet of roadway and R/W are needed at approaches intersecting 4 and 6-lane streets to provide dual left-turn lanes. *Four-Lane Collectors with a Two-Way Left-Turn Lane* should be 82 feet wide in 110 to 122 feet of R/W, providing four through lanes, bike lanes, left-turn lanes, and curbside parking. *Two-Lane Collectors* should be 36 feet wide in 60 to 86 feet of R/W and provide two through lanes and curbside parking.

The following is a brief description of the streets in the project area.

North Harbor Drive is classified as a Six-Lane Primary Arterial. Currently, North Harbor Drive is a six-lane divided roadway in the project area with the exception of the following segments: west of Nimitz Boulevard, North Harbor Drive is a four-lane divided roadway; between Harbor Island Drive and the Coast Guard Station and between Hawthorn Street and Grape Street, North Harbor Drive is a seven-lane divided roadway. The speed limit ranges between 40 and 45 mph. Parking is generally prohibited. Bus stops are provided at regular intervals. Bike lanes are also provided between Nimitz Boulevard and the entrance to Terminal 2 at the San Diego International Airport.

Pacific Highway is classified as a Six-Lane Major Arterial. Currently, Pacific Highway is a six-lane divided roadway in the project area. The speed limit ranges between 35 and 40 mph. Bus stops and bike lanes are provided. Parking is generally allowed south of Laurel Street, but is prohibited north of Laurel Street.

Laurel Street is classified as a local Collector. Currently, Laurel Street is a five-lane undivided roadway between North Harbor Drive and Pacific Highway. However, the third westbound lane (along the airport frontage) is not functional because of the two lane end conditions; therefore, the analysis presented later in this report considered this segment as having only four lanes. East of Pacific Highway, Laurel Street is a four-lane undivided roadway. The speed limit is 40 mph. Bus stops are provided. There are no bike lanes, and parking is prohibited.

Hawthorn Street is a one-way westbound roadway in the project area and is classified as a Three-Lane Major Arterial. Currently, Hawthorn Street provides three travel lanes from North Harbor

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Drive to just east of State Street. The speed limit is 30 mph. Parking is generally allowed except between North Harbor Drive and Pacific Highway. There are no bus stops or bike lanes.

Grape Street is a one-way eastbound roadway in the project area and is classified as a Three-Lane Major Arterial. Currently, Grape Street provides three travel lanes from North Harbor Drive to just east of State Street. There is no posted speed limit in the project area. There are no bus stops or bike lanes, and parking is generally allowed.

Harbor Island Drive operates as a Major Arterial between North Harbor Drive and the Harbor Island waterfront. For this portion of the roadway four lanes of divided roadway are provided. Harbor Island Drive along the waterfront operates as a local Collector. For this portion of the roadway, four lanes of undivided roadway are provided. The speed limit in the project area is 35 mph. No curbside parking is allowed; however, three-hour parking pullouts are provided along the south side of the street at regular intervals.

3.2 Existing Traffic Volumes

Table 3–1 is a summary of the most recent available average daily traffic volumes (ADTs) from LLG counts conducted by Traffic Data Services Southwest in August 2008 as well as counts obtained from the City of San Diego *Machine Count Traffic Volumes–City Streets dated 1/1/2003 to 3/28/2008* records. Manual hand counts at the study area intersections were conducted in August 2008.

Figure 3–2 shows the Existing Traffic Volumes. ***Appendix A*** contains the manual count sheets.

1.6

TABLE 3–1
EXISTING TRAFFIC VOLUMES

Street Segment	ADT[a]	Date	Source[b]
N. Harbor Drive			
West of Terminal 2 (West Airport Entrance)	27,730[c]	Aug 2008	LLG
Terminal 2 (West Airport Entrance) to Harbor Island Drive	29,750	Aug 2008	LLG
Harbor Island Drive to Rental Car Access Road	81,000	Aug 2008	LLG
Rental Car Access Road to Laurel Street	82,790	Aug 2008	LLG
Laurel Street to Hawthorn Street	54,260	Aug 2008	LLG
Hawthorn Street to Grape Street	37,830	Aug 2008	LLG
South of Grape Street	17,690[c]	Aug 2008	LLG
Pacific Highway			
North of Laurel Street	18,150[c]	Aug 2008	LLG
Laurel Street to Hawthorn Street	9,760[c]	Aug 2008	LLG
Hawthorn Street to Grape Street	18,460	Jun 2007	City of San Diego
South of Grape Street	16,940[c]	Aug 2008	LLG
Laurel Street			
N. Harbor Dr. to Pacific Highway	36,390	Aug 2008	LLG
East of Pacific Highway	27,620	Mar 2007	City of San Diego
Hawthorn Street			
N. Harbor Dr. to Pacific Highway	25,770	Aug 2008	LLG
East of Pacific Highway	23,480	Mar 2008	City of San Diego
Grape Street			
N. Harbor Dr. to Pacific Highway	23,130	Aug 2008	LLG
East of Pacific Highway	20,330[c]	Aug 2008	LLG
Harbor Island Drive			
N. Harbor Drive to Harbor Island Drive	16,330	Aug 2008	LLG
West of Harbor Island Drive	8,610[c]	Aug 2008	LLG
East of Harbor Island Drive	6,940	Aug 2008	LLG

Footnotes:

a. Average Daily Traffic Volumes.

b. LLG commissioned counts conducted by Traffic Data Services Southwest in August 2008.
City of San Diego counts obtained from *City of San Diego's Machine Count Traffic Counts—City Streets 1/1/2003 to 3/28/2008.*

c. ADT was derived from LLG conducted AM/PM peak hour counts in August 2008.

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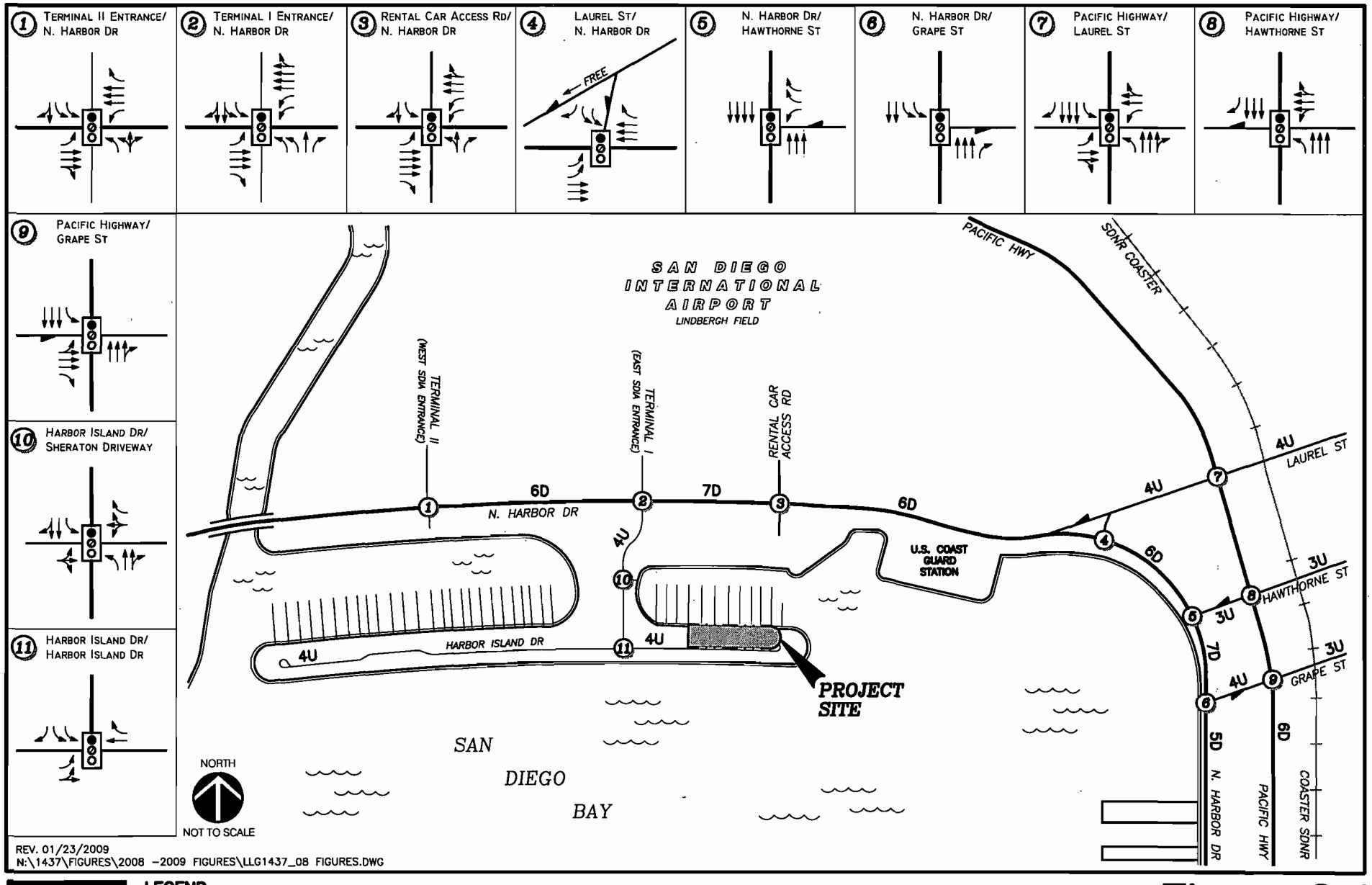

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LEGEND

- Traffic Signal
- BL – Bike Lane
- BS – Bus Stop
- NP – No Parking
- TWLTL – Two-Way Left-Turn Lane
- 2U – Two lane undivided roadway
- 4D – Four lane divided roadway

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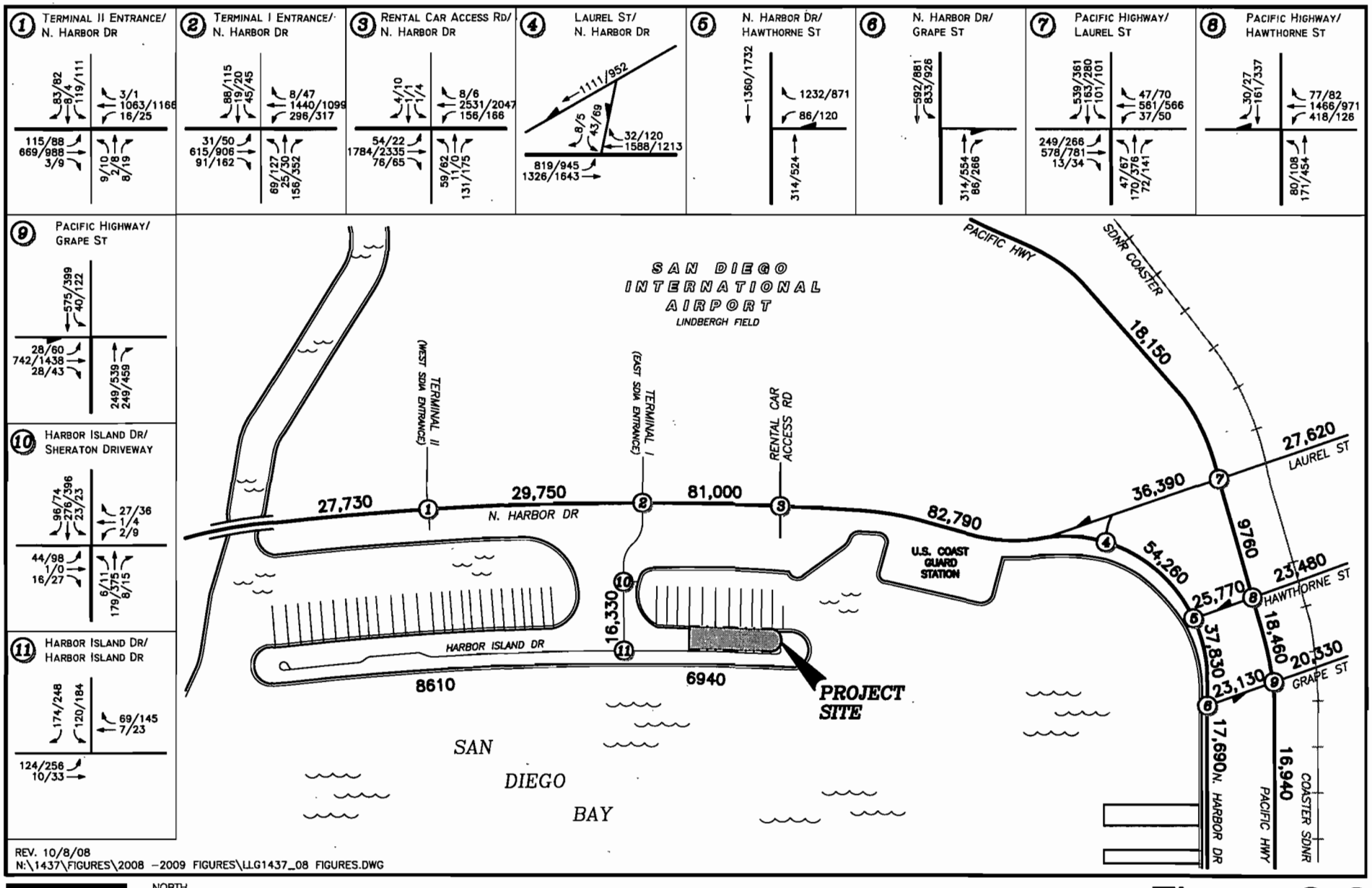
Figure 3-1

Existing Conditions Diagram

HARBOR ISLAND



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NOT TO SCALE

Figure 3-2

Existing Traffic Volumes AM/PM Peak Hours & ADT

HARBOR ISLAND

4.0 ANALYSIS APPROACH AND METHODOLOGY

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

4.1 Intersections

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 6) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection Level of Service (LOS). Signalized intersection calculation worksheets and a more detailed explanation of the methodology are attached in ***Appendix B.***

4.2 Street Segments

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of San Diego's *"Standard" and "Modified" Roadway Classification, Level of Service, and ADT Tables*. Both tables provide segment capacities for various street classifications, but the "modified" table takes into account traffic volumes and roadway characteristics that are specific to an airport location (i.e. traffic is distributed more uniformly throughout the day). The "modified" table, which is from the *Draft Environmental Impact Report for the SDIA Master Plan dated October 2001*, was used in analyzing N. Harbor Drive, Laurel Street, Hawthorn Street, and Grape Street. The "standard" table was used in analyzing Pacific Highway and Harbor Island Drive. Both the *"Standard"* and *"Modified" City of San Diego Roadway Classification Capacity Standards Tables* are attached in ***Appendix C.***

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5.0 SIGNIFICANCE CRITERIA

According to the *City of San Diego Traffic Impact Manual, July 1998* and consultation with City staff, a project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a City defined threshold. The City defined threshold by roadway type or intersection is shown in ***Table 5–1***.

The impact is designated either a "direct" or "cumulative" impact. When these criteria are applied to the near-term analyses, a calculated impact is considered a "direct" (or project) impact. When applied to the long-term analyses, the calculated impact is considered a "cumulative" impact.

If the project exceeds the thresholds in *Table 5–1*, then the project may be considered to have a significant "direct" or "cumulative" project impact. A significant impact can also occur if a project causes the Level of Service to degrade from D to E, even if the allowable increases in *Table 5–1* are not exceeded. A feasible mitigation measure will need to be identified to return the impact within the City thresholds, or the impact will be considered significant and unmitigated.

TABLE 5–1
CITY OF SAN DIEGO
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project	Allowable Increase Due to Project Impacts[a]				
	Freeways	Roadway Segments		Intersections	Ramp Metering
	V/C	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
E[b] & F[b]	0.01	0.02	1	2	2[c]

Footnotes:

a. If a proposed project's traffic impacts exceed the values shown in the table, then the impacts are deemed "significant." The project applicant shall identify "feasible mitigations" to achieve LOS D or better.

b. The acceptable Level of Service (LOS) standard for roadways and intersections in San Diego is LOS D. However, for undeveloped locations, the goal is to achieve a LOS C.

c. The impact is only considered significant if the total delay exceeds 15 minutes.

General Notes:

1. Delay = Average stopped delay per vehicle measured in seconds
2. V/C = Volume to Capacity Ratio (capacity at LOS E should be used)
3. Speed = Arterial speed measured in miles per hour for Congestion Management Program (CMP) analyses

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6.0 ANALYSIS OF EXISTING CONDITIONS

The following is a discussion of the existing Intersection and Street Segment operations in the project area.

6.1 Peak Hour Intersection Levels of Service

Table 6–1 shows that all of the key intersections in the project area are currently operating at acceptable LOS D or better.

6.2 Daily Street Segment Levels of Service

Table 6–2 shows that the street segments in the project area are currently operating at acceptable LOS D or better.

TABLE 6–1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Delay[a]	LOS[b]
N. Harbor Drive / Terminal 2 (West Airport Entrance)	Signal	AM	17.7	B
		PM	17.2	B
N. Harbor Dr. / Harbor Island Dr. / Terminal 1 (East Airport Entrance)	Signal	AM	20.1	C
		PM	22.3	C
N. Harbor Drive / Rental Car Access Road	Signal	AM	23.8	C
		PM	20.0	C
N. Harbor Drive / Laurel Street	Signal	AM	23.0	C
		PM	39.2	D
N. Harbor Drive / Hawthorn Street	Signal	AM	25.2	C
		PM	30.0	C
N. Harbor Drive / Grape Street	Signal	AM	22.9	C
		PM	20.7	C
Pacific Highway / Laurel Street	Signal	AM	27.8	C
		PM	35.9	D
Pacific Highway / Hawthorn Street	Signal	AM	15.8	B
		PM	12.6	B
Pacific Highway / Grape Street	Signal	AM	10.3	B
		PM	19.0	B
Harbor Island Drive / Sheraton Driveway	Signal	AM	12.7	B
		PM	14.1	B
Harbor Island Drive / Harbor Island Drive	Signal	AM	7.4	A
		PM	7.6	A

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service. See *Appendix B* for delay thresholds.

SIGNALIZED
DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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TABLE 6–2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Classification [b]	Existing Capacity (LOS E) [b]	ADT[c]	V/C[d]	LOS[e]
N. Harbor Drive					
Nimitz Blvd. to Terminal 2 (West Airport Entrance)	6-ln Prime	94,000	27,730	0.295	A
Terminal 2 (West Airport Entrance) to Harbor Island Dr.	6-ln Prime	94,000	29,750	0.316	A
Harbor Island Dr. to Rental Car Access Road	7-ln Prime	108,000	81,000	0.750	C
Rental Car Access Road to Laurel Street	6-ln Prime	94,000	82,790	0.881	D
Laurel Street to Hawthorn Street	6-ln Prime	94,000	54,260	0.577	B
Hawthorn Street to Grape Street	7-ln Prime	108,000	37,830	0.350	A
South of Grape Street	6-ln Prime	94,000	17,690	0.188	A
Pacific Highway					
North of Laurel Street	6-ln Major [a]	50,000[a]	18,150	0.363	A
Laurel Street to Hawthorn Street	6-ln Major [a]	50,000[a]	9,760	0.195	A
Hawthorn Street to Grape Street	6-ln Major [a]	50,000[a]	18,460	0.369	A
South of Grape Street	6-ln Major [a]	50,000[a]	16,940	0.339	A
Laurel Street					
N. Harbor Dr. to Pacific Highway	4-ln Major	60,000	36,390	0.607	C
East of Pacific Highway	4-ln Collector	45,000	27,620	0.614	C
Hawthorn Street					
N. Harbor Dr. to Pacific Highway	3-ln Major (one-way)	38,000	25,770	0.678	C
East of Pacific Highway	3-ln Major (one-way)	38,000	23,480	0.618	C
Grape Street					
N. Harbor Dr. to Pacific Highway	3-ln Major (one-way)	38,000	23,130	0.609	C
East of Pacific Highway	3-ln Major (one-way)	38,000	20,330	0.535	B
Harbor Island Drive					
N. Harbor Dr. to Harbor Island Dr.	4-ln Major [a]	40,000[a]	16,330	0.408	B
West of Harbor Island Dr.	4-ln Collector [a]	30,000[a]	8,610	0.287	A
East of Harbor Island Dr.	4-ln Collector [a]	30,000[a]	6,940	0.231	A

Footnotes:

a. Classifications and Capacities based on City of San Diego's Roadway Classification & LOS table (See Appendix C).
b. Classifications and Capacities based on City of San Diego's Roadway Classification & LOS table—Modified Version for the Airport (See Appendix C).
c. Average Daily Traffic
d. Volume to Capacity ratio
e. Level of Service

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7.0 CUMULATIVE PROJECTS

To account for the extensive development occurring near the project area in downtown San Diego, LLG derived a growth factor, based on Year 2030 volumes obtained from SANDAG, to account for near-term background traffic. By comparing existing volumes to Year 2030 volumes, LLG calculated a percentage of growth over a span of 22 years (Year 2008 to Year 2030). Assuming the Year 2012 as "Opening Day", LLG determined what portion of this growth would occur by this year, and calculated a "growth factor" for the eight corridors in the project area—N. Harbor Drive, Pacific Highway, Laurel Street, Hawthorn Street, Grape Street, Harbor Island Drive (connecting N. Harbor Drive to Harbor Island Drive), and Harbor Island Drive. The growth factors range from 2.6% to 14.8% for the four years. The growth factors were applied to the existing turn movements and ADTs in order to generate the cumulative projects volumes.

Appendix D contains the Cumulative Growth Factor Calculation Sheets.

Figure 7–1 shows the Existing + Cumulative Projects traffic volumes.

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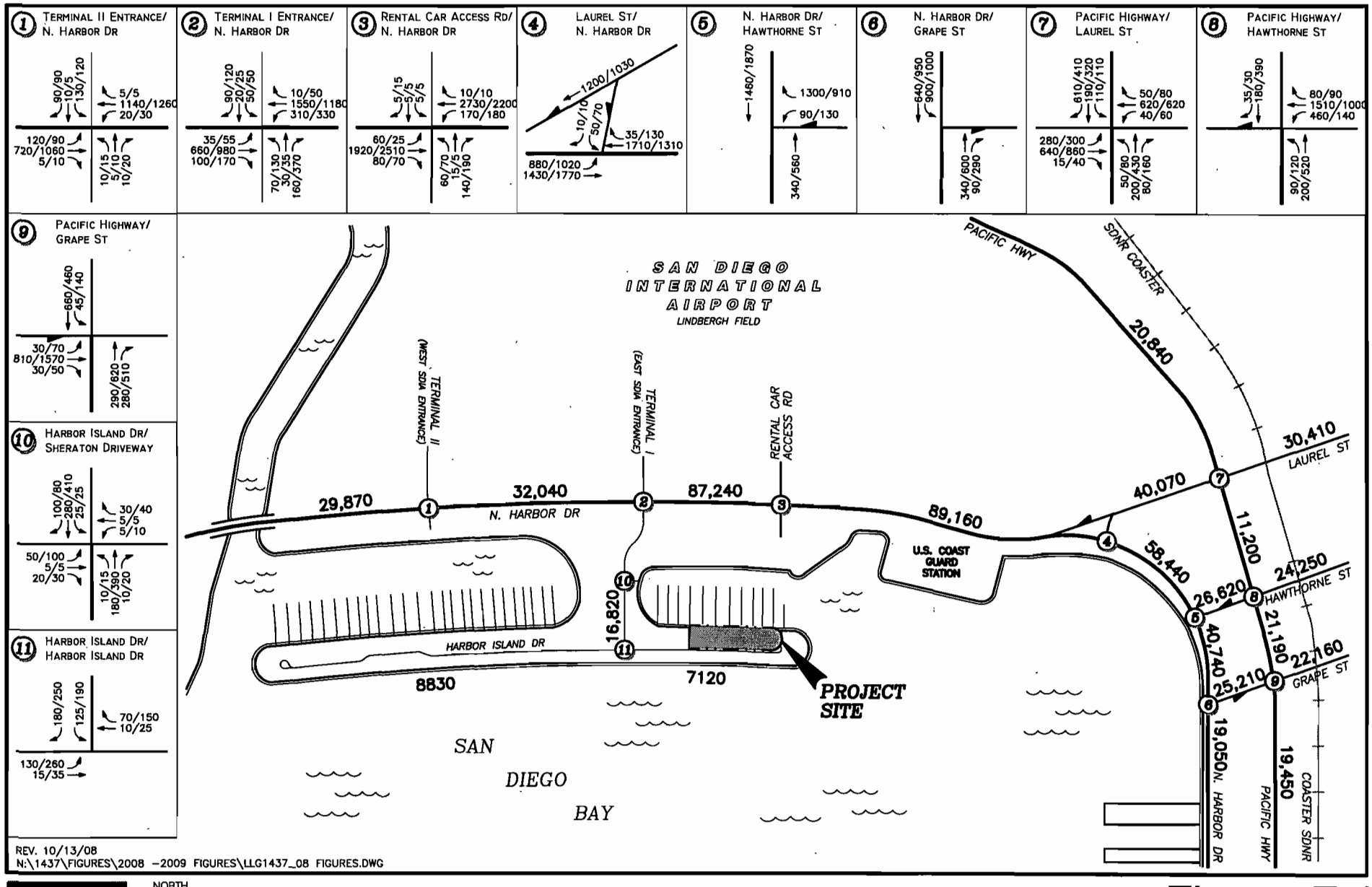

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Figure 7-1

Existing + Cumulative Projects Traffic Volumes AM/PM Peak Hours & ADT

8.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

8.1 Trip Generation

Trip generation estimates for the proposed development were based on *The City of San Diego Trip Generation Manual, May 2003* and *SANDAG's (Not So) Brief Guide of Vehicular Traffic Generation Rates*. The active component of the existing site includes a 600-slip marina with an ancillary building. The project proposes no changes in land use intensity for the 600-slip marina. The City of San Diego "Marina" rate was used to calculate the traffic generation for the marina. In addition to the existing marina, the project plans to construct a 210-room limited service hotel. SANDAG's "Business Hotel" Rate was used to calculate the traffic generated by the hotel as it best fits the description of the type of hotel proposed by the project.

Table 8–1 tabulates the total net project traffic generation. The existing marina is calculated to generate approximately 2,400 ADT with 22 inbound / 50 outbound trips during the AM peak hour and 101 inbound / 67 outbound trips during the PM peak hour. These trips were subtracted from the total trips calculated for the development, resulting in a total net project trips for the project of approximately 1,470 ADT with 47 inbound / 71 outbound trips during the AM peak hour and 79 inbound / 53 outbound trips during the PM peak hour.

TABLE 8–1
PROJECT TRIP GENERATION

Use	Size	Daily Trip Ends (ADTs)		AM Peak Hour				PM Peak Hour			
		Rate	Volume	% of ADT[c]	In:Out Split	Volume In	Volume Out	% of ADT	In:Out Split	Volume In	Volume Out
Proposed Project											
Hotel	210rooms	7 /room[a]	1,470	8%	40:60	47	71	9%	60:40	79	53
Marina	600berths	4 /berth[b]	2,400	3%	30:70	22	50	7%	60:40	101	67
Subtotal (proposed project):		—	**3,870**	—	—	**69**	**121**	—	—	**180**	**120**
Existing Marina (600 berths)		—	*-2,400*	—	—	*-22*	*-50*	—	—	*-101*	*-67*
Net Project Trips:		—	**1,470**	—	—	**47**	**71**	—	—	**79**	**53**

Footnotes:

a. Rate is based on SANDAG's (*Not So*) Brief Guide of Vehicular Traffic Generation Rates, "*Business Hotel.*"

b. Rate is based on City of San Diego's Trip Generation Rate Summary Table and includes "ancillary uses".

c. ADT = Average Daily Traffic

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8.2 Trip Distribution/Assignment

Project-generated traffic was distributed and assigned to the study area network. The directional distribution of the development traffic approaching and departing the site is a function of access parameters, roadway system characteristics (i.e. project's proximity to the San Diego International Airport), near-term and future travel patterns, and the efficiency of the study area roadways.

Project trip distribution for the *Harbor Island* project was based on the *SANDAG Series 11* Select Zone Assignment with a 2030 horizon year. The Model distributes project trips to the surrounding network on a regional level based on network zone trip productions and attractions.

Figure 8–1 depicts the estimated project traffic distribution in the site environs. ***Figure 8–2*** shows the Project traffic volumes. ***Figure 8–3*** shows the resultant Existing + Cumulative Projects + Project traffic volumes.

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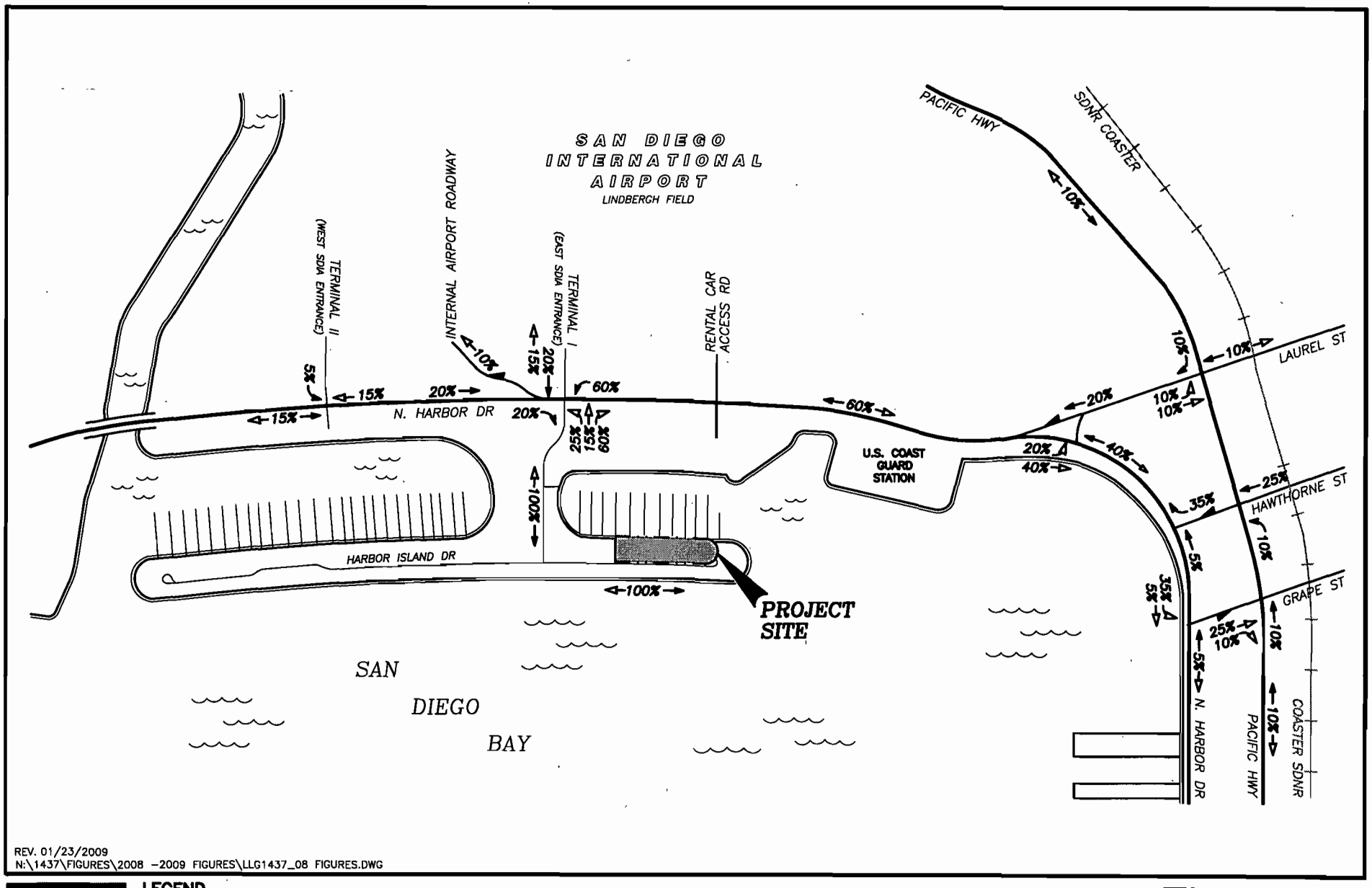

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XX% ⟷ – Regional Trip Distribution
XX%→ – Outbound Distribution
XX%→ – Inbound Distribution

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Figure 8-1

Regional Traffic Distribution

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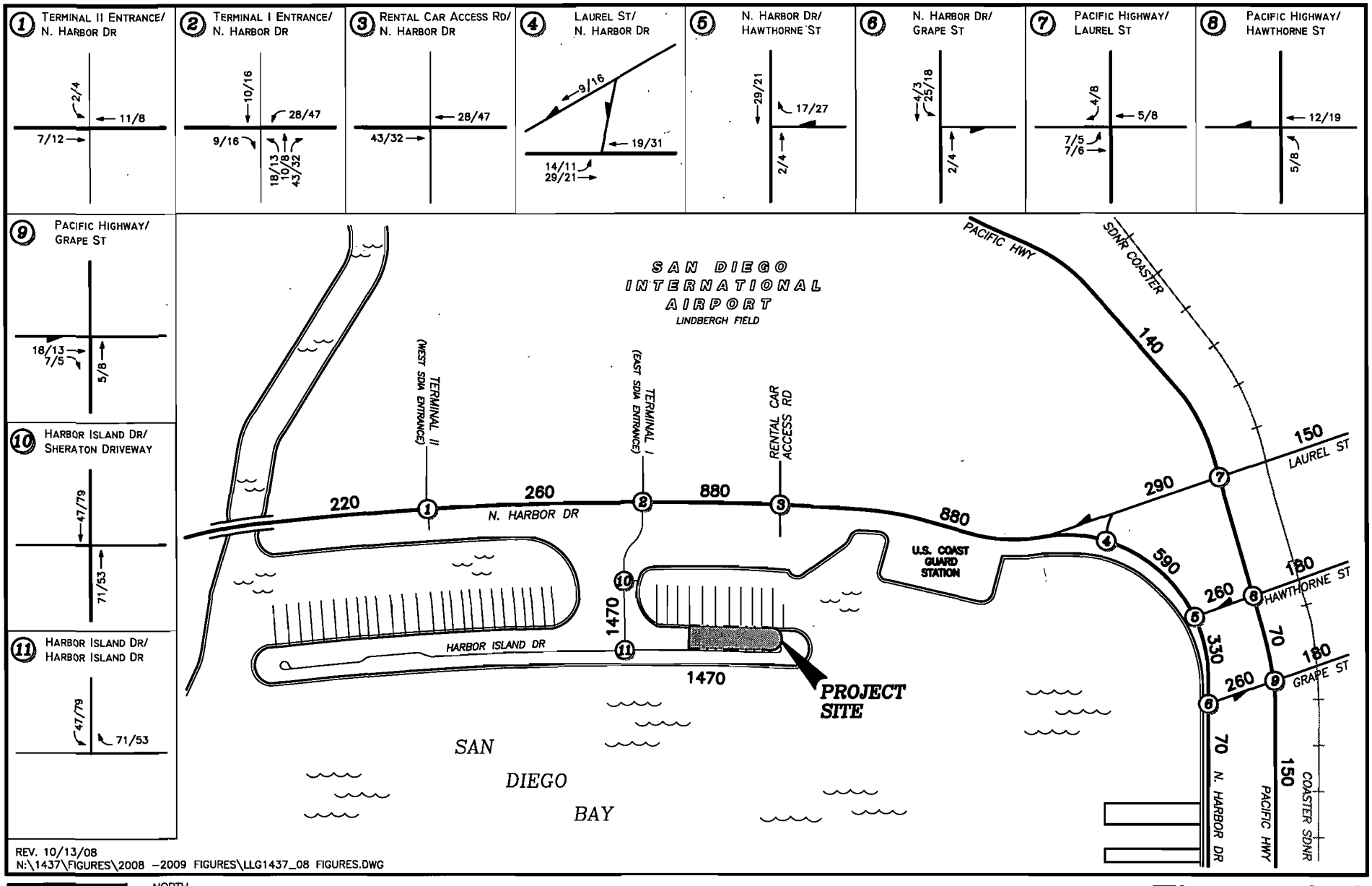

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Figure 8-2

Project Traffic Volumes AM/PM Peak Hours & ADT

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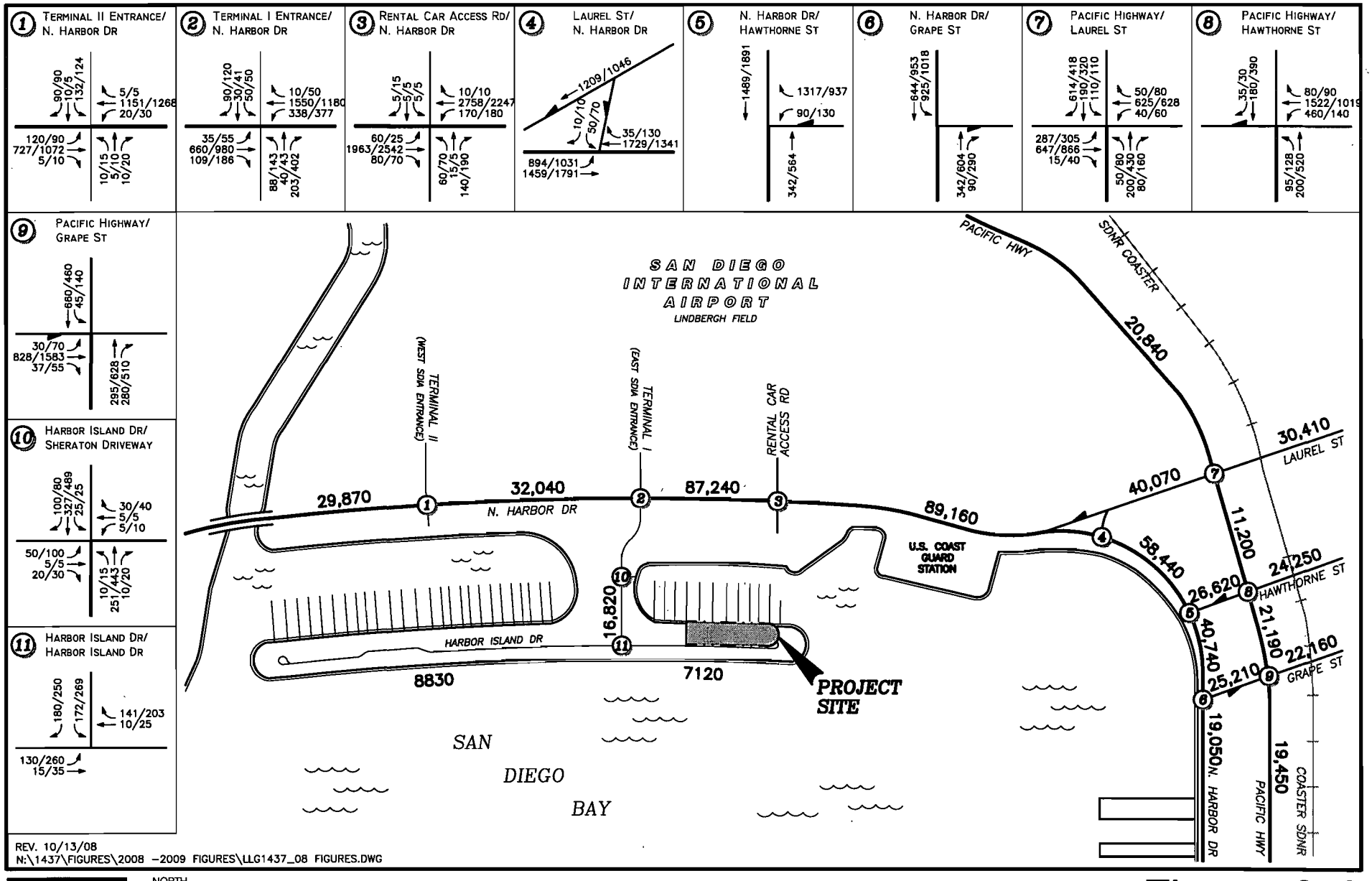

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Figure 8-3

Existing + Cumulative Projects + Project Traffic Volumes AM/PM Peak Hours & ADT

HARBOR ISLAND

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9.0 ANALYSIS OF NEAR-TERM SCENARIOS

The following is a discussion of the results of the intersection and segment analyses for the Near-Term scenario. ***Tables 9–1*** and ***9–2*** summarize the Near-Term Intersection Operations and Near-Term Street Segment Operations, respectively.

9.1 Existing + Cumulative Projects

9.1.1 *Intersection Analysis*

With the addition of cumulative projects traffic volumes, *Table 9–1* shows that the intersections in the project area continue to operate at acceptable LOS D or better.

9.1.2 *Segment Operations*

Similarly, with the addition of cumulative projects traffic volumes, *Table 9–2* shows that the street segments in the project area are calculated to continue operating at acceptable LOS D or better with the exception of the following:

- N. Harbor Drive, Rental Car Access Road to Laurel Street—LOS E

9.2 Existing + Cumulative Projects + Project

9.2.1 *Intersection Analysis*

With the addition of the project traffic volumes, minor changes in delays and no changes in levels of service at the study intersections are calculated as compared to the Existing + Cumulative Projects scenario. *Table 9–1* shows that the intersections in the project area are calculated to continue operating at acceptable LOS D or better.

The project is calculated to have no significant impacts at the study intersections in the Near-Term.

9.2.2 *Segment Operations*

With the addition of project traffic volumes, the changes in volume-to-capacity values is minimal as compared to the Existing + Cumulative Projects scenario. *Table 9–2* shows that the street segments in the project area are calculated to continue operating at acceptable LOS D or better with the exception of the following:

- N. Harbor Drive, Rental Car Access Road to Laurel Street—LOS E

The project is calculated to have no significant impacts at the street segments in the Near-Term.

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TABLE 9–1
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + Cumulative Projects		Existing + Cumulative Projects + Project			Sig?[d]
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS	Δ[c]	
N. Harbor Dr./Terminal 2 (West Airport Entrance)	Signal	AM	17.7	B	18.4	B	18.5	B	0.1	No
		PM	17.2	B	17.5	B	17.6	B	0.1	No
N. Harbor Dr./Harbor Island Dr./ Terminal 1 (East Airport Entrance)	Signal	AM	20.1	C	29.7	C	30.9	C	1.2	No
		PM	22.3	C	31.4	C	36.3	C	4.9	No
N. Harbor Drive/Rental Car Access Road	Signal	AM	23.8	C	30.4	C	32.0	C	1.6	No
		PM	20.0	C	25.9	C	27.1	C	1.2	No
N. Harbor Drive/Laurel Street	Signal	AM	23.0	C	27.1	C	29.1	C	2.0	No
		PM	39.2	D	45.3	D	48.3	D	3.0	No
N. Harbor Drive/Hawthorn Street	Signal	AM	25.2	C	35.2	D	36.4	D	1.2	No
		PM	30.0	C	41.3	D	42.4	D	1.1	No
N. Harbor Drive/Grape Street	Signal	AM	22.9	C	32.5	C	33.6	C	1.1	No
		PM	20.7	C	36.3	D	38.6	D	2.3	No
Pacific Highway/Laurel Street	Signal	AM	27.8	C	36.1	D	37.1	D	1.0	No
		PM	35.9	D	44.6	D	46.4	D	1.8	No
Pacific Highway/Hawthorn Street	Signal	AM	15.8	B	18.4	B	18.8	B	0.4	No
		PM	12.6	B	13.1	B	13.2	B	0.1	No
Pacific Highway/Grape Street	Signal	AM	10.3	B	11.4	B	11.6	B	0.2	No
		PM	19.0	B	21.8	C	22.1	C	0.3	No
Harbor Island Drive/Sheraton Driveway	Signal	AM	12.7	B	14.1	B	14.3	B	0.2	No
		PM	14.1	B	14.2	B	14.3	B	0.1	No
Harbor Island Drive/Harbor Island Drive	Signal	AM	7.4	A	7.6	A	7.9	A	0.3	No
		PM	7.6	A	8.2	A	8.3	A	0.1	No

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service. See *Appendix B* for delay thresholds.
c. Δ denotes an increase in delay due to project.
d. Sig? denotes "Significant Impact"

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DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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TABLE 9–2
NEAR-TERM STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E)[b]	Existing			Existing + Cumulative Projects			Existing + Cumulative Projects + Project				Sig?[g]
		ADT[c]	V/C[d]	LOS[e]	ADT	V/C	LOS	ADT	V/C	LOS	Δ[f]	
N. Harbor Drive												
West of Terminal 2 (SDIA)	94,000	27,730	0.295	A	29,870	0.318	A	30,090	0.320	A	0.002	No
Terminal 2 (SDIA) to Harbor Island Dr.	94,000	29,750	0.316	A	32,040	0.341	A	32,300	0.344	A	0.003	No
Harbor Island Dr. to Rental Car Access Rd.	108,000	81,000	0.750	C	87,240	0.808	C	88,120	0.816	C	0.008	No
Rental Car Access Road to Laurel St.	94,000	82,790	0.881	D	89,160	0.949	E	90,040	0.958	E	0.009	No
Laurel Street to Hawthorn Street	94,000	54,260	0.577	B	58,440	0.622	C	59,030	0.628	C	0.006	No
Hawthorn Street to Grape Street	108,000	37,830	0.350	A	40,740	0.377	A	41,070	0.380	A	0.003	No
South of Grape Street	94,000	17,690	0.188	A	19,050	0.203	A	19,120	0.203	A	0.000	No
Pacific Highway												
North of Laurel Street	50,000[a]	18,150	0.363	A	20,840	0.417	B	20,980	0.420	B	0.003	No
Laurel Street to Hawthorn Street	50,000[a]	9,760	0.195	A	11,200	0.224	A	11,200	0.224	A	0.000	No
Hawthorn Street to Grape Street	50,000[a]	18,460	0.369	A	21,190	0.424	B	21,260	0.425	B	0.001	No
South of Grape Street	50,000[a]	16,940	0.339	A	19,450	0.389	A	19,600	0.392	A	0.003	No
Laurel Street												
N. Harbor Dr. to Pacific Highway	60,000	36,390	0.607	C	40,070	0.668	C	40,360	0.673	C	0.005	No
East of Pacific Highway	45,000	27,620	0.614	C	30,410	0.676	D	30,560	0.679	D	0.003	No
Hawthorn Street												
N. Harbor Dr. to Pacific Highway	38,000	25,770	0.678	C	26,620	0.701	C	26,880	0.707	C	0.006	No
East of Pacific Highway	38,000	23,480	0.618	C	24,250	0.638	C	24,430	0.643	C	0.005	No
Grape Street												
N. Harbor Dr. to Pacific Highway	38,000	23,130	0.609	C	25,210	0.663	C	25,470	0.670	C	0.007	No
East of Pacific Highway	38,000	20,330	0.535	B	22,160	0.583	C	22,340	0.588	C	0.005	No
Harbor Island Drive												
N. Harbor Dr. to Harbor Island Dr.	40,000[a]	16,330	0.408	B	16,820	0.421	B	18,290	0.457	B	0.036	No
West of Harbor Island Dr.	30,000[a]	8,610	0.287	A	8,830	0.294	A	8,830	0.294	A	0.000	No
East of Harbor Island Dr.	30,000[a]	6,940	0.231	A	7,120	0.237	A	8,590	0.286	A	0.049	No

Footnotes:

a. Capacities based on City of San Diego's Roadway Classification & LOS table (See *Appendix C*).
b. Capacities based on City of San Diego's Roadway Classification & LOS table—Modified Version for the Airport (See *Appendix C*).
c. Average Daily Traffic
d. Volume to Capacity ratio
e. Level of Service
f. Δ denotes a project-induced increase in the Volume to Capacity ratio.
g. Sig? denotes "Significant Impact"

10.0 ANALYSIS OF LONG-TERM SCENARIOS

The following is a discussion of the Year 2030 without and with project operations. It is necessary to estimate future traffic volumes in order to determine if the planned circulation system could accommodate project traffic volumes.

The source for the Year 2030 traffic volumes is the Series 11 Forecast Model from SANDAG. The San Diego International Airport is assumed at its current location for the Year 2030.

Figure 10–1 illustrates the Year 2030 without Project Traffic Volumes. ***Figure 10–2*** illustrates the Year 2030 with Project Traffic Volumes.

10.1 Year 2030 Without Project

10.1.1 *Intersection Analysis*

Table 10–1 summarizes the future intersection operations for the Year 2030. As shown, intersection operations degrade considerably in the long-term as compared to the near-term, with some of the study area intersections calculated to operate at LOS D or better, but many operating at LOS E or F as outlined below:

- N. Harbor Dr./Harbor Island Dr./Terminal 1—LOS F in the PM peak hour
- N. Harbor Dr./Rental Car Access Road—LOS F in the AM and PM peak hours
- N. Harbor Dr./Laurel Street—LOS F in the AM and PM peak hours
- N. Harbor Dr./Hawthorn Street—LOS F in the AM and PM peak hours
- Pacific Highway/Laurel Street—LOS F in the AM and PM peak hours
- Pacific Highway/Hawthorn Street—LOS F in the AM and LOS E in the PM peak hours
- Pacific Highway/Grape Street—LOS F in the PM peak hour

10.1.2 *Segment Operations*

Table 10–2 summarizes the future street segment operations for the Year 2030. As shown, all study area segments are calculated to operate at LOS D or better, with the exception of the following segments:

- N. Harbor Drive, Harbor Island Drive to Rental Car Access Road—LOS F
- N. Harbor Drive, Rental Car Access Road to Laurel Street—LOS F
- Pacific Highway, North of Laurel Street—LOS F
- Laurel Street, N. Harbor Drive to Pacific Highway—LOS F
- Laurel Street, Pacific Highway to Kettner Boulevard—LOS E
- Grape Street, Pacific Highway to Kettner Boulevard—LOS F

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10.2 Year 2030 With Project

10.2.1 *Intersection Analysis*

With the addition of the project traffic volumes, intersection operations are similar to Year 2030. *Table 10–1* shows that the following intersections in the project area are calculated to operate at LOS E or F:

- N. Harbor Dr./Harbor Island Dr./Terminal 1—LOS E in the AM & LOS F in the PM peak hours
- N. Harbor Dr./Rental Car Access Road—LOS F in the AM and PM peak hours
- N. Harbor Dr./Laurel Street—LOS F in the AM and PM peak hours
- N. Harbor Dr./Hawthorn Street—LOS F in the AM and PM peak hours
- Pacific Highway/Laurel Street—LOS F in the AM and PM peak hours
- Pacific Highway/Hawthorn Street—LOS F in the AM and LOS E in the PM peak hours
- Pacific Highway/Grape Street—LOS F in the PM peak hour

The project is calculated to have significant impacts at the following intersections in the Long-Term (Year 2030):

- N. Harbor Dr./Harbor Island Dr./Terminal 1—AM and PM peak hours
- N. Harbor Dr./Rental Car Access Road—AM and PM peak hours
- N. Harbor Dr./Laurel Street—PM peak hour

The significance of these impacts is discussed later in Section 14.0 of this report.

10.2.2 *Segment Operations*

With the addition of project traffic volumes, *Table 10–2* shows that the following street segments in the project area are calculated to continue operating at LOS E or F:

- N. Harbor Drive, Harbor Island Drive to Rental Car Access Road—LOS F
- N. Harbor Drive, Rental Car Access Road to Laurel Street—LOS F
- Pacific Highway, North of Laurel Street—LOS F
- Laurel Street, N. Harbor Drive to Pacific Highway—LOS F
- Laurel Street, Pacific Highway to Kettner Boulevard—LOS E
- Grape Street, Pacific Highway to Kettner Boulevard—LOS F

With the addition of project traffic, there is only a minimal increase in volume-to-capacity ratio as compared to the Year 2030 without Project scenario. All increases are within the significance thresholds as defined in Section 5.0. As a result, ***no significant street segment impacts are calculated in the Long-Term.***

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TABLE 10–1
LONG-TERM (YEAR 2030) INTERSECTION OPERATIONS

Intersection	Peak Hour	Year 2030		Year 2030 + Project			Sig?[d]
		Delay[a]	LOS[b]	Delay[a]	LOS[b]	Δ[c]	
N. Harbor Drive / Terminal 2 (West Airport Entrance)	AM	45.9	D	46.4	D	0.5	No
	PM	41.5	D	41.8	D	0.3	No
N. Harbor Dr. / Harbor Island Dr. / Terminal 1 (East Airport Entrance)	AM	51.2	D	58.0	E	**6.8**	**Yes**
	PM	86.6	F	90.8	F	**4.2**	**Yes**
N. Harbor Drive / Rental Car Access Road	AM	169.8	F	172.3	F	**2.5**	**Yes**
	PM	159.0	F	164.7	F	**5.7**	**Yes**
N. Harbor Drive / Laurel Street	AM	98.1	F	99.3	F	1.2	No
	PM	124.1	F	127.4	F	**3.3**	**Yes**
N. Harbor Drive / Hawthorn Street	AM	96.8	F	98.2	F	1.4	No
	PM	110.9	F	112.7	F	1.8	No
N. Harbor Drive / Grape Street	AM	42.0	D	45.2	D	3.2	No
	PM	44.3	D	47.3	D	3.0	No
Pacific Highway / Laurel Street	AM	159.0	F	160.6	F	1.6	No
	PM	183.8	F	185.4	F	1.6	No
Pacific Highway / Hawthorn Street	AM	86.1	F	88.0	F	1.9	No
	PM	55.9	E	56.2	E	0.3	No
Pacific Highway / Grape Street	AM	16.8	B	16.9	B	0.1	No
	PM	161.4	F	163.0	F	1.6	No
Harbor Island Drive / Sheraton Driveway	AM	14.5	B	14.7	B	0.2	No
	PM	14.5	B	15.2	B	0.7	No
Harbor Island Drive / Harbor Island Drive	AM	8.6	A	9.0	A	0.4	No
	PM	10.6	B	12.0	B	1.6	No

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service. See *Appendix B* for delay thresholds.
c. Δ denotes an increase in delay due to project.
d. Sig? denotes "Significant Impact"

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DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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TABLE 10–2
LONG-TERM (YEAR 2030) STREET SEGMENT OPERATIONS

Street Segment	Buildout Capacity (LOS E)[b]	Year 2030			Year 2030 + Project				Sig?[g]
		ADT[c]	V/C[d]	LOS[e]	ADT	V/C	LOS	Δ[f]	
N. Harbor Drive									
Nimitz Blvd. to Terminal 2 (SDIA)	94,000	64,280	0.684	C	64,500	0.686	C	0.002	No
Terminal 2 (SDIA) to Harbor Island Dr.	94,000	39,540	0.421	B	39,800	0.423	B	0.002	No
Harbor Island Dr. to Rental Car Access Rd.	108,000	112,020	1.037	F	112,900	1.045	F	0.008	No
Rental Car Access Road to Laurel Street	94,000	161,620	1.719	F	162,500	1.729	F	0.010	No
Laurel Street to Hawthorn Street	94,000	71,910	0.765	C	72,500	0.771	C	0.006	No
Hawthorn Street to Grape Street	108,000	38,970	0.361	A	39,300	0.364	A	0.003	No
South of Grape Street	94,000	33,530	0.357	A	33,600	0.357	A	0.000	No
Pacific Highway									
North of Laurel Street	50,000[a]	63,660	1.273	F	63,800	1.276	F	0.003	No
Laurel Street to Hawthorn Street	50,000[a]	23,600	0.472	B	23,600	0.472	B	0.000	No
Hawthorn Street to Grape Street	50,000[a]	29,330	0.587	C	29,400	0.588	C	0.001	No
South of Grape Street	50,000[a]	41,950	0.839	D	42,100	0.842	D	0.003	No
Laurel Street									
N. Harbor Dr. to Pacific Highway	60,000	76,210	1.270	F	76,500	1.275	F	0.005	No
East of Pacific Highway	45,000	41,550	0.923	E	41,700	0.927	E	0.004	No
Hawthorn Street									
N. Harbor Dr. to Pacific Highway	38,000	30,840	0.812	D	31,100	0.818	D	0.006	No
East of Pacific Highway	38,000	28,120	0.740	C	28,300	0.745	C	0.005	No
Grape Street									
N. Harbor Dr. to Pacific Highway	38,000	32,340	0.851	D	32,600	0.858	D	0.007	No
East of Pacific Highway	38,000	40,020	1.053	F	40,200	1.058	F	0.005	No
Harbor Island Drive									
N. Harbor Dr. to Harbor Island Dr.	40,000[a]	19,230	0.481	B	20,700	0.518	B	0.037	No
West of Harbor Island Dr.	30,000[a]	11,000	0.367	B	11,000	0.367	B	0.000	No
East of Harbor Island Dr.	30,000[a]	7,230	0.241	A	8,700	0.290	A	0.049	No

Footnotes:

a. Capacities based on City of San Diego's Roadway Classification & LOS table (See *Appendix C*).
b. Capacities based on City of San Diego's Roadway Classification & LOS table—Modified Version for the Airport (See *Appendix C*).
c. Average Daily Traffic
d. Volume to Capacity ratio
e. Level of Service
f. Δ denotes a project-induced increase in the Volume to Capacity ratio
g. Sig? denotes "Significant Impact".

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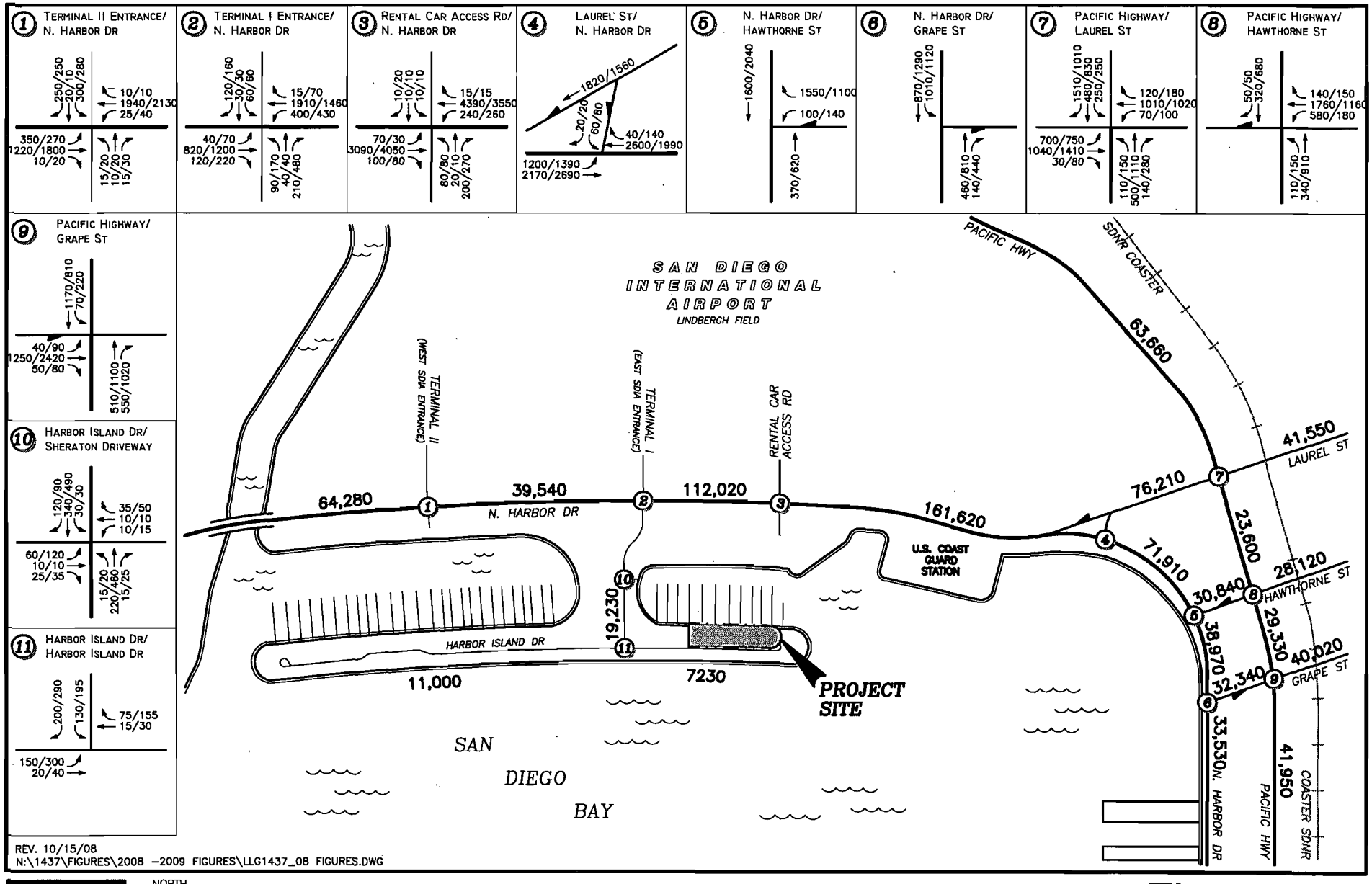

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Figure 10-1

Year 2030 Without Project Traffic Volumes AM/PM Peak Hours & ADT

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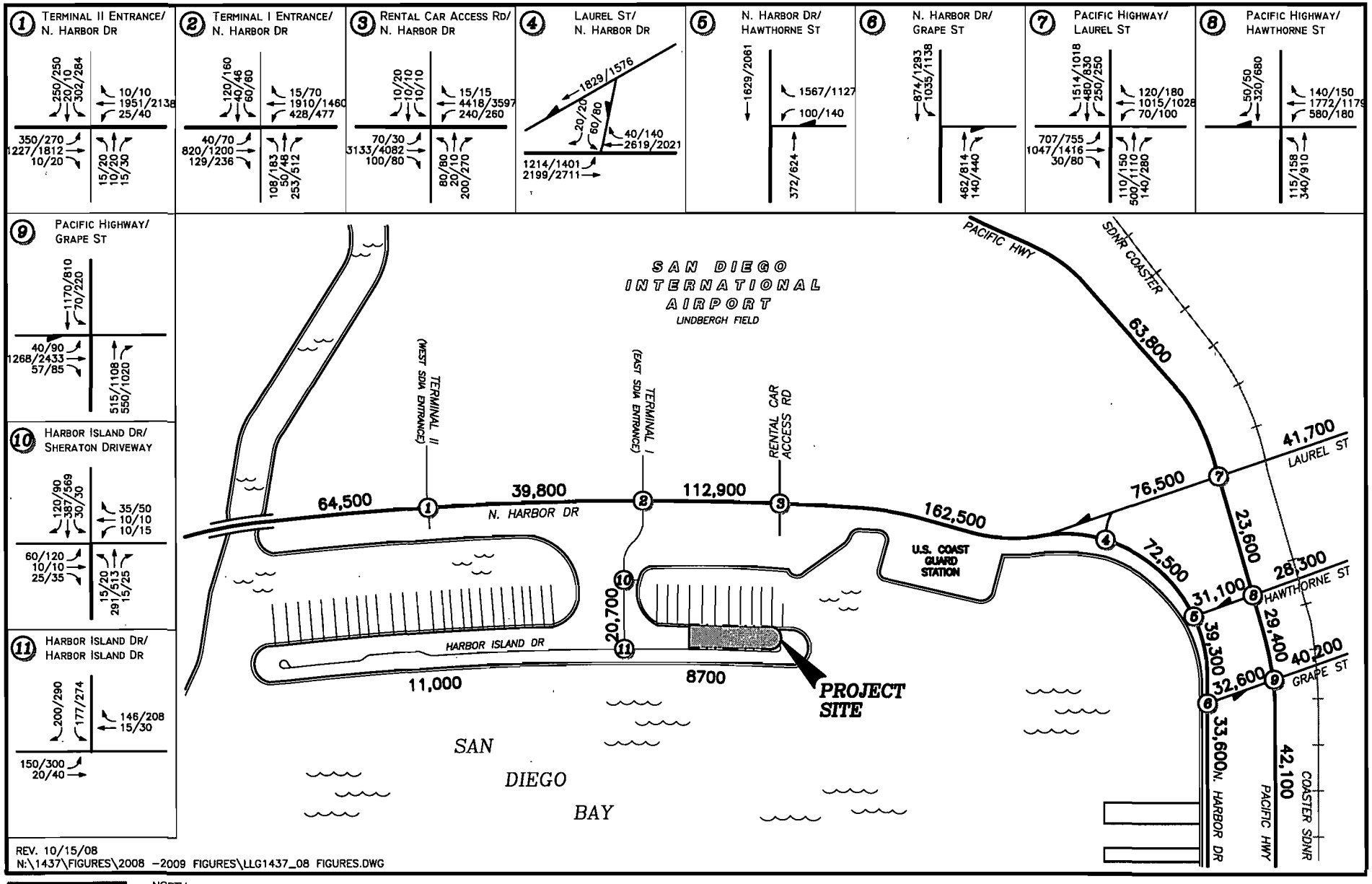

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NORTH

NOT TO SCALE

Figure 10-2

Year 2030 With Project Traffic Volumes AM/PM Peak Hours & ADT

HARBOR ISLAND

11.0 SITE PLAN ASSESSMENT

The site plan contained in *Figure 2–1* was evaluated for access and circulation issues. Based on this evaluation, LLG offers the following observations.

The site plan shows several driveways on Harbor Island Drive, two serving the westerly parking lot, one serving the easterly parking lot, and two serving the hotel drop-off. No operational problems are anticipated with the proposed driveway locations.

A cul-de-sac is proposed at the east end of the site, providing a turn-around for the general public. The easterly parking lot and the parking field for Island Prime and the Rueben E. Lee are accessed off the turn-around.

The parking lots have no dead-end aisles, which is good. The drop-off area is sufficiently large.

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12.0 PARKING DEMAND/SUPPLY ANALYSIS

A parking assessment was undertaken to determine the required parking supply for the *Harbor Island* project. The analysis was performed in two parts. First, a required parking supply was calculated based on the project description with no shared parking considered. Then, a shared parking analysis was performed to account for the different peak parking demands between the marina and hotel land uses of the proposed project.

Without shared parking, a net parking requirement of 306 spaces for the marina and 120 spaces for the hotel is calculated. Since shared parking between the two land uses of the proposed project is expected, a shared parking analysis was performed, using the net parking requirements. The analysis was done for both weekday and weekend scenarios. The calculations show a peak parking demand occurring on a *Weekday* at 7:00PM with 396 spaces required for the development. Therefore, ***a net shared parking requirement of 396 spaces is needed for the Harbor Island project.***

The project proposes 457 spaces of surface parking, which will meet the 396-space shared-parking calculated demand for the project.

The Parking Study, dated January 16, 2009, is contained in ***Appendix E***.

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13.0 SIGNIFICANCE OF IMPACTS AND MITIGATION MEASURES

13.1 Significance of Impacts

13.1.1 *Intersection Impacts*

In the Near-Term, the project is calculated to have no significant impacts at the study intersections.

In the Long-Term (Year 2030), the project is calculated to have significant impacts at the following intersections:

- N. Harbor Dr./Harbor Island Dr./Terminal 1—AM and PM peak hours
- N. Harbor Dr./Rental Car Access Road—AM and PM peak hours
- N. Harbor Dr./Laurel Street—PM peak hours

13.1.2 *Street Segment Impacts*

The project is calculated to have no significant impacts at the street segments under both Near-Term and Long-Term conditions.

13.2 Mitigation Measures and Analyses

The project is calculated to have significant impacts at three study intersections. The following summarizes the recommended mitigation measures and project cost participation. ***Table 13–1*** reports the results of intersection mitigation analysis for the Long-Term (Year 2030). ***Table 13–2*** contains the fair-share calculations. The recommended intersection mitigation measures are illustrated in ***Figure 13–1.*** The mitigation intersection calculation sheets are contained in ***Appendix F.***

As shown in the tables, the proposed mitigation would reduce the project impacts to a level of 'not significant'. For the purposes of this report, a level of 'not significant' reflects allowable delay increases within the defined thresholds. Mitigation feasibility would also need to be verified by the Civil Engineer.

LLG reviewed the *San Diego Airport Master Plan–Final Environmental Impact Report* dated April 2008. As part of the Master Plan, there are several segments along North Harbor Drive that are impacted and require mitigation. The specific mitigation includes the widening of North Harbor Drive to nine (9) lanes between Terminal 1 and Rental Car Access Road and seven (7) lanes between Rental Car Access Road and Hawthorn Street. The *Harbor Island* project has three impacted intersections contained within this corridor. The following suggested mitigation measures take into account the planned improvements for North Harbor Drive and would mitigate the long-term intersection impacts.

LLG recommends the *Harbor Island* project contribute a fair share towards the intersection improvements as part of the San Diego Master Plan planned segment improvements for North Harbor Drive, and that the intersection configuration/improvements described below be specifically included with the North Harbor Drive widening improvements.

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13.2.1 *Intersection Mitigation*

For the Long-Term intersection impacts, the following mitigation measures are suggested:

- ***N. Harbor Dr./Harbor Island Dr./Terminal 1 (East Airport Entrance):*** The applicant will contribute a fair share percentage of 10.7% towards restriping the northbound approach to provide a left-turn lane, a shared left-turn/thru lane, a thru lane, and a right-turn lane. Remove the northbound right-turn lane from a "free" movement and introduce right-turn "overlap" phasing. Retain the north/south "split" signal phasing. Restripe the eastbound approach to convert the right-turn lane to a shared thru/right-turn lane. Modifications to the triangular median in the southeast portion of the intersection are expected. Modifications to the traffic signal timing in conjunction with the change in lane designations are also recommended.

- ***N. Harbor Drive/Rental Car Access Road:*** The applicant will contribute a fair share percentage of 2.1% towards the reconfiguration of the westbound approach to provide an additional thru lane. To accommodate the additional lane, widening and modifications to the median/roadway will be required. Modifications to the traffic signal timing in conjunction with the change in lane destination are also recommended

- ***N. Harbor Drive/Laurel Street:*** The applicant will contribute a fair share percentage of 1.9% towards the reconfiguration of the eastbound approach to provide a third left-turn lane and restriping the southbound approach to provide a single shared left-turn/right-turn lane. To accommodate the additional lane, widening and modifications to the median/roadway will be required. It is recommended that all three eastbound lanes on Laurel Street continue to Pacific Highway, where the number one lane would trap into the left-turn lane(s). An overhead sign bridge(s) may be needed to instruct drivers of the trap lane. Modifications to the traffic signal timing in conjunction with the change in lane destination are also recommended.

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TABLE 13–1
LONG-TERM (YEAR 2030) INTERSECTION MITIGATION ANALYSIS

Intersection	Peak Hour	Year 2030		Year 2030 With Project		Year 2030 With Project and Mitigation		Mitigation
		Delay[a]	LOS[b]	Delay	LOS	Delay	LOS	
N. Harbor Dr./Harbor Island Dr./Terminal 1	AM PM	51.2 86.6	D F	58.0 90.8	E F	24.5 55.9	C E	Restripe NB Approach and change RT movement from "free" to "overlap" (LT, LT/Thru, Thru, RT) Restripe EB Approach (LT, 3 Thru, Thru/RT)
N. Harbor Dr./Rental Car Access Road	AM PM	169.8 159.0	F F	172.3 164.7	F F	96.5 97.6	F F	Add 1 WB Thru Lane
N. Harbor Dr./Laurel St.	AM PM	98.1 124.1	F F	99.3 127.4	F F	49.8 49.2	D D	EB Triple LT and Restripe SB approach (Shared LT/RT)

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.

SIGNALIZED
DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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Table 13–2 shows the preliminary fair-share calculations for the intersections where the *Harbor Island* project has cumulative impacts. Cumulative impacts are long-term by definition and require a financial contribution as mitigation, proportional to the project percentage of traffic growth over existing conditions. The traffic volumes for the fair share calculations can be found on *Figures 3–2, 8–2,* and *10–2*.

TABLE 13–2
FAIR SHARE CALCULATIONS

Facility	Formula[a] (Peak Hour Volumes)	Project Percentage
Intersections		
N. Harbor Drive/Harbor Island Drive/Terminal 1	$\frac{250}{8,495 - 6,153}$	10.7%
N. Harbor Drive/Rental Car Access Road	$\frac{150}{16,770 - 9,709}$	2.1%
N. Harbor Drive/Laurel Street	$\frac{150}{15,525 - 7,811}$	1.9%

Footnotes:
a. Formula = Project Trips / (Future Traffic with Project – Existing Traffic without Project). Calculations are based on combined AM & PM peak hour volumes.

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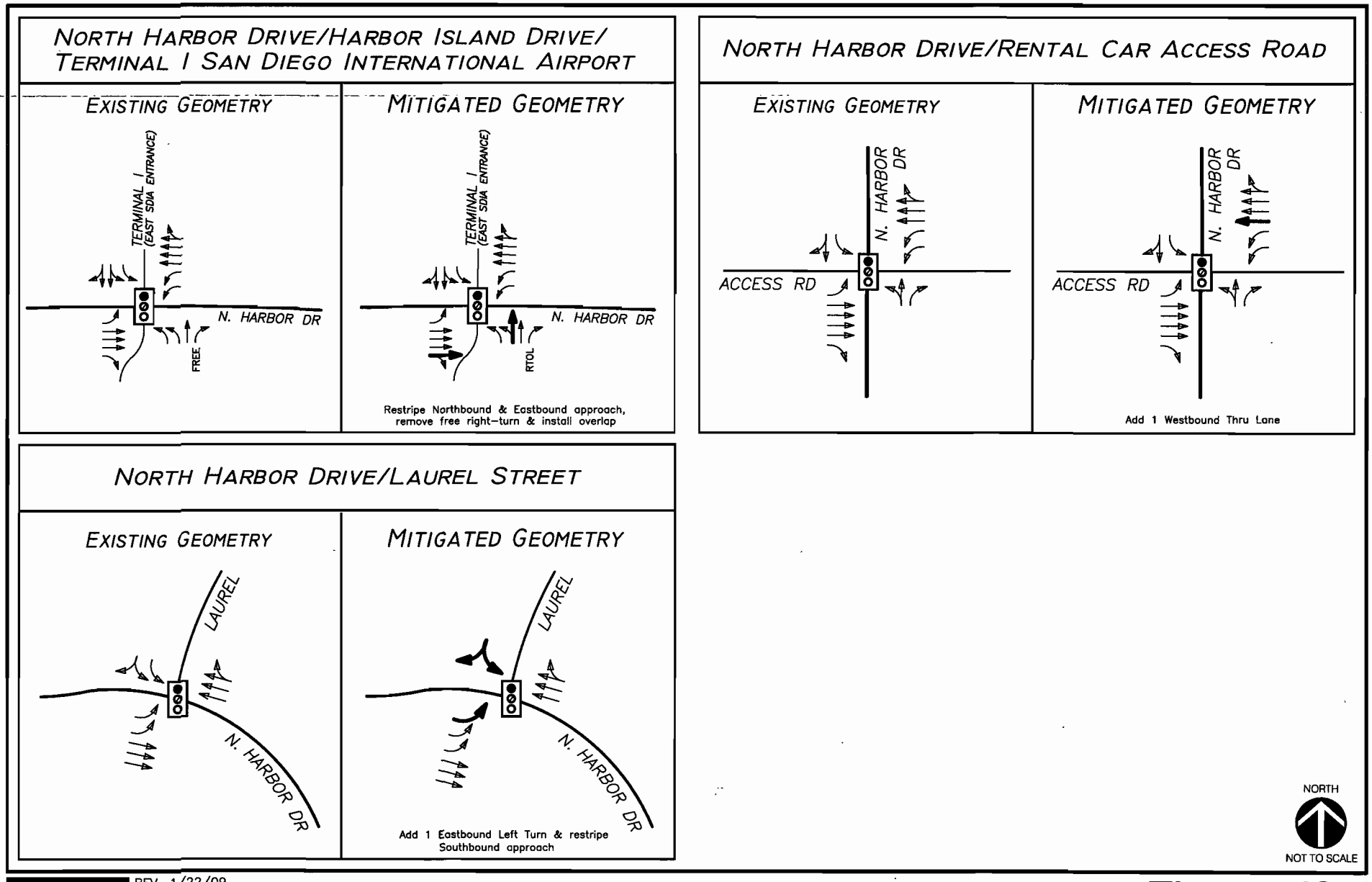

LINSCOTT LAW & GREENSPAN engineers

REV. 1/22/09
N:\1437\Figures\2008-2009 Figures\LLG1437-2 FIG13-1

Figure 13-1

Intersection Mitigation Diagram

HARBOR ISLAND

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14.0 CONCLUSIONS

This *Traffic Impact and Parking Analysis* has been prepared to determine the potential traffic impacts on the local circulation system and determine parking requirements for the *Harbor Island* project in the City of San Diego. The project site is located along the eastern strip of Harbor Island Drive on Harbor Island.

The proposed project plans to build a limited service hotel of approximately 210 rooms. The project will be located at the east end of the Sunroad leasehold and will replace an existing locker building and some parking associated with the marina. The project will be approximately 95,000 square feet consisting of hotel rooms, limited meeting space (approximately 5,000 square feet), and common areas. Construction is expected to be enclosed within a four story structure with a projected "Opening Day" in April 2012. No changes are proposed for the 600-slip marina and clubhouse. Direct parking access to the marina and the proposed hotel will be provided.

As part of the development, the project proposes to remove the existing traffic circle currently located at the terminus of Harbor Island Drive. The project also proposes to narrow the eastern portion of Harbor Island Drive along the property frontage from four lanes to three lanes (1 westbound and 2 eastbound lanes). These actions are not in line with the Port Master Plan, and as such an amendment to the Port Master Plan is required.

The total net project trip calculation is approximately 1,470 ADT with 47 inbound / 71 outbound trips during the AM peak hour and 79 inbound / 53 outbound trips during the PM peak hour.

A parking assessment was undertaken to determine the required parking supply for the *Harbor Island* project. Both a "non-shared" and a "shared' parking analysis were conducted. Ultimately, 396 parking spaces are recommended for the development. Since the project proposes 457 spaces of surface parking, the 396-space calculated demand for the project will adequately be met.

Analysis at eleven intersections and several street segments in the study area were performed under near-term and long-term conditions. In the Near-Term, the project is calculated to have no significant impacts. In the Long-Term (Year 2030), the project is calculated to have significant cumulative impacts at the following intersections:

- N. Harbor Dr./Harbor Island Dr./Terminal 1
- N. Harbor Dr./Rental Car Access Road
- N. Harbor Dr./Laurel Street

Mitigation measures recommended in Section 13.0 of this report would reduce the project impacts listed above to a level of 'not significant'. For the purposes of this report, a level of 'not significant' reflects allowable delay increases within the defined thresholds.

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APPENDIX A

MANUAL STREET SEGMENT AND INTERSECTION COUNT SHEETS

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Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17401] N. Harbor Dr - Just E/O of Terminal II**
Input A:	2 - East bound. - Added to totals. (1)
Input B:	4 - West bound. - Excluded from totals. (0)
Survey Duration:	3:25 Monday, August 18, 2008 => 8:39 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\1740122Aug2008.EC0 (Plus)
Identifier:	A5558BK6 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**4:00 Monday, August 18, 2008 => 0:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 118277 / 118517 (99.80%)

*** Monday, August 18, 2008=13682 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	119	363	486	710	705	750	812	929	872	907	950	1027	1103	849	674	604	559	463	543	257	
-	-	-	-	18	73	102	129	167	175	205	249	191	270	243	221	300	223	177	170	141	141	109	91	42
-	-	-	-	24	94	96	187	168	192	210	221	230	206	221	223	299	237	159	144	135	118	132	87	23
-	-	-	-	28	106	148	198	184	181	204	212	208	215	238	289	275	202	172	158	169	99	163	51	15
-	-	-	-	49	90	140	196	186	202	193	247	243	216	248	294	229	187	166	132	114	105	139	28	22

PM Peak 1530 - 1630 (1182), PM PHF=0.98

*** Tuesday, August 19, 2008=13711, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
102	47	28	42	127	321	465	687	737	716	736	875	944	912	905	998	1047	867	822	631	577	464	460	201	
42	8	12	6	16	61	89	162	180	161	182	229	222	237	216	218	242	241	225	165	166	111	170	59	34
23	10	7	11	23	87	116	149	197	165	175	202	245	226	229	266	257	215	189	158	130	121	133	55	26
15	24	4	13	27	90	116	199	200	196	171	223	230	249	219	248	276	197	195	153	161	119	85	52	26
22	5	5	12	61	83	144	177	160	194	208	221	247	200	241	266	272	214	213	155	120	113	72	35	16

AM Peak 1145 - 1245 (918), AM PHF=0.94 PM Peak 1600 - 1700 (1047), PM PHF=0.95

*** Wednesday, August 20, 2008=14377, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
102	47	28	39	141	290	467	677	725	801	824	976	1042	992	923	1078	1080	979	829	665	557	471	405	239	
34	17	4	7	18	50	97	127	168	160	199	214	246	269	209	244	286	265	228	161	146	121	110	81	41
26	14	11	9	22	56	88	167	174	222	196	221	241	231	251	253	271	264	199	154	149	123	124	64	23
26	8	9	9	39	98	121	184	186	211	181	279	259	239	241	286	246	222	222	181	143	119	72	52	18
16	8	4	14	62	86	161	199	197	208	248	262	296	253	222	295	277	228	180	169	119	108	99	42	17

AM Peak 1130 - 1230 (1028), AM PHF=0.92 PM Peak 1530 - 1630 (1138), PM PHF=0.96

*** Thursday, August 21, 2008=14598, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
99	47	39	44	137	314	463	668	804	814	815	922	922	951	1010	1045	1097	993	843	784	623	531	357	276	
41	14	13	7	26	67	87	137	203	184	194	217	219	258	257	265	303	249	220	219	164	164	93	99	-
23	14	8	12	28	86	100	163	191	215	194	226	199	220	275	233	274	245	219	194	147	140	80	82	-
18	8	9	8	29	80	107	195	198	198	210	222	240	247	246	285	270	251	211	203	155	112	91	50	-
17	11	9	17	54	81	169	173	212	217	217	257	264	226	232	262	250	248	193	168	157	115	93	45	-

AM Peak 1115 - 1215 (924), AM PHF=0.90

EB Avg. 14230
WB Avg. 15520
total : 29,750

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TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17401] N. Harbor Dr - Just E/O of Terminal II**
Input A:	2 - East bound. - Excluded from totals. (0)
Input B:	4 - West bound. - Added to totals. (1)
Survey Duration:	3:25 Monday, August 18, 2008 => 8:39 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\1740122Aug2008.EC0 (Plus)
Identifier:	A5558BK6 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**4:00 Monday, August 18, 2008 => 0:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 118277 / 118517 (99.80%)

*** Monday, August 18, 2008=15336 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	135	427	760	956	877	897	896	974	1174	946	881	942	950	1064	844	783	639	515	407	269	
-	-	-	-	17	71	131	225	228	224	217	230	307	272	225	255	228	260	234	213	168	128	109	70	30
-	-	-	-	41	110	176	247	227	247	196	243	281	235	204	229	237	301	237	199	162	143	97	85	19
-	-	-	-	25	113	224	253	187	214	235	259	280	228	218	242	236	259	168	208	157	121	102	64	20
-	-	-	-	52	133	229	231	235	212	248	242	306	211	234	216	249	244	205	163	152	123	99	50	16

PM Peak 1200 - 1300 (1174), PM PHF=0.96

*** Tuesday, August 19, 2008=15014, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
85	39	26	48	145	360	776	990	838	804	804	878	996	934	846	910	1007	1104	929	706	620	502	453	214	
30	9	8	6	18	61	134	227	213	216	160	216	240	266	201	232	257	254	232	205	165	151	128	79	24
19	12	8	12	39	97	166	271	241	182	228	235	265	228	249	194	235	313	199	191	155	113	121	60	30
20	10	5	9	34	75	214	258	164	200	204	218	235	220	200	240	264	299	250	163	143	138	116	40	33
16	8	5	21	54	127	262	234	220	206	212	209	256	220	196	244	251	238	248	147	157	100	88	35	19

AM Peak 0645 - 0745 (1018), AM PHF=0.94 PM Peak 1645 - 1745 (1117), PM PHF=0.89

*** Wednesday, August 20, 2008=15484, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
106	33	28	47	134	352	718	1074	825	862	829	973	1088	1056	896	928	1004	1045	840	734	687	514	475	236	
24	15	10	10	20	49	122	283	233	225	214	204	290	296	227	247	221	274	215	213	184	150	139	95	30
30	5	6	8	38	72	166	300	213	222	206	244	285	263	241	208	253	292	205	197	185	132	127	65	30
33	8	4	7	30	99	186	250	171	202	188	263	260	286	203	220	261	252	204	171	167	124	106	46	21
19	5	8	22	46	132	244	241	208	213	221	262	253	211	225	253	269	227	216	153	151	108	103	30	10

AM Peak 1130 - 1230 (1100), AM PHF=0.95 PM Peak 1245 - 1345 (1098), PM PHF=0.93

*** Thursday, August 21, 2008=16074, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
91	56	35	58	136	364	749	1025	799	851	878	1007	1065	1078	1003	981	1122	1124	920	723	664	583	475	287	
30	13	11	10	18	59	124	215	199	214	229	267	238	282	243	234	256	262	247	214	169	185	152	89	-
30	16	10	10	42	82	168	271	209	217	213	258	278	232	259	236	312	311	248	192	166	140	138	81	-
21	11	6	17	35	96	201	292	192	200	218	240	269	291	250	260	263	287	192	155	160	128	103	73	-
10	16	8	21	41	127	256	247	199	220	218	242	280	273	251	251	291	264	233	162	169	130	82	44	-

AM Peak 0645 - 0745 (1034), AM PHF=0.89

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TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17402W] N. Harbor Dr - Just W/O of Rental Car Road**
Input A:	4 - West bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	3:46 Monday, August 18, 2008 => 9:01 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17402W22Aug2008.EC0 (Plus)
Identifier:	M280P4JB MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**4:00 Monday, August 18, 2008 => 0:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 167412 / 167622 (99.87%)

*** Monday, August 18, 2008=42444 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	1060	2569	2383	2662	2577	2461	2483	2652	2684	2308	2299	2316	2132	2076	2018	1844	2161	1718	1356	685	
-	-	-	-	145	554	520	676	700	627	601	643	657	600	536	624	560	514	528	453	530	435	316	243	77
-	-	-	-	203	698	586	664	616	607	590	675	666	575	567	562	531	527	490	466	533	445	322	174	42
-	-	-	-	290	742	627	677	600	609	633	691	720	562	589	544	517	504	491	487	563	452	369	164	45
-	-	-	-	422	575	650	645	661	618	659	643	641	571	607	586	524	531	509	438	535	386	349	104	49

PM Peak 1200 - 1300 (2684), PM PHF=0.93

*** Tuesday, August 19, 2008=40163, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
213	105	86	211	1037	2322	2310	2480	2377	2252	2304	2494	2420	2197	2171	2139	2129	2201	2095	1710	1760	1463	1166	521	
77	34	18	15	162	504	472	643	589	557	564	612	615	574	533	540	536	548	519	412	432	422	363	197	61
42	38	21	35	187	597	594	627	602	552	580	626	613	547	568	495	559	546	579	428	480	374	316	136	60
45	21	27	67	261	637	581	609	568	595	592	621	632	544	539	543	498	564	519	412	419	382	251	100	68
49	12	20	94	427	584	663	601	618	548	568	635	560	532	531	561	536	543	478	458	429	285	236	88	24

AM Peak 0645 - 0745 (2542), AM PHF=0.96 PM Peak 1200 - 1300 (2420), PM PHF=0.96

*** Wednesday, August 20, 2008=41737, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
213	66	70	225	1143	2331	2260	2651	2458	2434	2484	2540	2556	2272	2135	2213	2122	2169	2071	1822	2053	1608	1264	577	
61	21	18	27	170	418	482	679	651	595	651	654	648	588	515	587	510	568	521	512	577	412	358	231	81
60	9	18	40	218	656	537	672	637	577	589	594	659	615	525	542	537	551	532	468	549	458	344	153	53
68	21	14	69	299	673	563	664	548	653	622	644	623	537	569	557	542	521	510	453	461	367	310	94	46
24	15	20	89	456	584	678	636	622	609	622	648	626	532	526	527	533	529	508	389	466	371	252	99	27

AM Peak 0645 - 0745 (2693), AM PHF=0.99 PM Peak 1200 - 1300 (2556), PM PHF=0.97

*** Thursday, August 21, 2008=43067, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
207	100	93	252	997	2243	2137	2477	2369	2487	2435	2621	2638	2268	2318	2358	2413	2414	2349	1915	2230	1731	1261	754	
81	25	18	26	162	490	443	598	551	641	665	635	629	589	551	546	612	569	619	519	544	501	328	266	-
53	29	23	36	181	602	508	626	569	633	537	675	708	580	594	546	620	607	619	469	572	452	316	197	-
46	22	23	80	277	599	563	612	624	576	603	624	678	565	580	598	587	617	556	385	550	427	295	153	-
27	24	29	110	377	552	623	641	625	637	630	687	623	534	593	668	594	621	555	542	564	351	322	138	-

AM Peak 1145 - 1245 (2702), AM PHF=0.95

WB Avg. 41660
EB Avg. 39340

total : 81,000

52291

5P

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17402E] N. Harbor Dr - Just W/O of Rental Car Road**
Input A:	2 - East bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	3:45 Monday, August 18, 2008 => 11:55 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17402E22Aug2008.EC0 (Plus)
Identifier:	A6483S3X MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**4:00 Monday, August 18, 2008 => 2:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 157961 / 157986 (99.98%)

* Monday, August 18, 2008=39614 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	383	1628	1546	1939	2030	2175	2281	2444	2410	2290	2399	2447	2642	2163	1894	1834	2124	1924	1794	1267	
-	-	-	-	35	293	393	464	485	497	602	580	575	658	572	644	755	593	458	541	521	585	393	453	130
-	-	-	-	75	391	341	476	494	530	537	627	608	542	621	614	699	567	489	453	454	461	381	404	100
-	-	-	-	103	512	411	481	494	596	546	616	622	545	589	598	637	498	402	408	568	462	537	241	48
-	-	-	-	170	432	401	518	557	552	596	621	605	545	617	591	551	505	545	432	581	416	483	169	58

PM Peak 1545 - 1645 (2682), PM PHF=0.89

* Tuesday, August 19, 2008=37663, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
336	221	59	69	348	1443	1487	1667	1845	1852	2093	2252	2399	2274	2260	2362	2410	2076	2296	1636	2046	1712	1660	860	
130	63	18	16	20	280	345	427	407	419	505	598	604	568	535	606	613	526	541	394	522	471	466	315	136
100	57	12	14	49	354	382	417	468	433	468	540	547	552	549	564	577	473	566	405	477	422	439	200	105
48	70	12	15	86	412	372	443	466	496	553	546	595	588	579	563	648	498	601	392	571	411	417	192	115
58	31	17	24	193	397	388	380	504	504	567	568	653	566	597	629	572	579	588	445	476	408	338	153	72

AM Peak 1145 - 1245 (2314), AM PHF=0.96 PM Peak 1545 - 1645 (2467), PM PHF=0.95

* Wednesday, August 20, 2008=39630, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
428	120	54	71	466	1536	1472	1716	1769	1979	2154	2515	2598	2296	2334	2556	2438	2275	2210	1915	2221	1737	1819	951	
136	28	20	12	42	303	362	416	427	473	557	580	610	608	589	698	648	597	482	516	474	400	526	385	165
105	30	15	11	70	330	333	390	448	491	494	657	647	592	573	604	591	591	532	489	611	402	433	238	129
115	41	11	16	133	459	392	473	435	478	502	613	656	580	577	579	595	544	637	492	645	492	423	197	85
72	21	8	32	221	444	385	437	459	537	601	665	685	516	595	675	604	543	559	418	491	443	437	131	74

AM Peak 1145 - 1245 (2576), AM PHF=0.97 PM Peak 1200 - 1300 (2598), PM PHF=0.95

* Thursday, August 21, 2008=40733, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
453	129	62	97	391	1399	1364	1606	1788	2050	2253	2171	2494	2431	2505	2511	2801	2397	2454	2079	2403	2224	1514	1157	
165	37	15	27	36	277	351	375	413	465	581	546	614	626	634	672	775	642	649	624	574	669	386	384	235
129	41	15	20	69	364	306	434	452	516	496	557	589	588	586	584	669	533	637	517	600	589	334	388	84
85	27	12	26	106	393	327	393	436	533	538	573	634	635	605	593	682	594	577	451	659	471	366	208	0
74	24	20	24	180	365	380	404	487	536	638	495	657	582	680	662	675	628	591	487	570	495	428	177	0

AM Peak 1145 - 1245 (2332), AM PHF=0.92 PM Peak 1600 - 1700 (2801), PM PHF=0.90

* Friday, August 22, 2008=319 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
319	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
235	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

52291

52

TDSSW, Inc.
Event Counts

EventCount-19 -- English (ENU)

Datasets:

Site:	**[17404] IN. Harbor Dr - Btwn Laurel St & Hawthorn St**
Input A:	3 - South bound. - Excluded from totals. (0)
Input B:	1 - North bound. - Added to totals. (1)
Survey Duration:	4:12 Monday, August 18, 2008 => 7:47 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\UM17404822.EC0 (Base)
Identifier:	A56563M0 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 7:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 168286 / 169153 (99.49%)

Subtotals

*** Monday, August 18, 2008=26530 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	1543	1687	1793	1561	1531	1548	1657	1763	1548	1616	1546	1473	1399	1320	1104	1249	1016	758	418	
-	-	-	-	-	354	343	435	385	382	374	390	424	421	419	402	394	381	351	268	319	271	194	138	47
-	-	-	-	-	443	420	470	460	392	354	431	428	370	387	386	366	352	312	296	302	268	179	108	25
-	-	-	-	-	406	469	474	355	384	410	411	469	383	410	393	373	339	330	287	338	244	206	108	31
-	-	-	-	-	340	455	414	361	373	410	425	442	374	400	365	340	327	327	253	290	233	179	64	41

PM Peak 1200 - 1300 (1763), PM PHF=0.94

*** Tuesday, August 19, 2008=26282, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
144	72	76	193	790	1475	1626	1685	1471	1450	1444	1560	1641	1535	1529	1493	1548	1521	1296	1106	1068	888	666	5	
47	21	10	16	126	335	298	455	399	359	346	408	412	386	405	388	412	362	355	304	251	242	184	5	0
25	23	21	36	142	387	420	429	393	330	381	389	388	394	396	353	377	406	333	255	277	205	191	0	0
31	15	23	59	223	374	451	410	350	389	360	386	422	389	380	364	353	396	307	261	264	228	175	0	0
41	13	22	82	299	379	457	391	329	372	357	377	419	366	348	388	406	357	301	286	276	213	116	0	0

AM Peak 0630 - 0730 (1792), AM PHF=0.98 PM Peak 1200 - 1300 (1641), PM PHF=0.97

*** Wednesday, August 20, 2008=106, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	0	0	2	6	17	5	9	8	6	4	4	9	5	4	5	5	2	5	3	3	2	2	0	
0	0	0	0	0	3	2	3	2	0	1	2	4	2	2	3	0	1	1	1	2	0	0	0	0
0	0	0	0	1	7	0	3	4	1	0	0	2	1	0	1	4	0	0	0	1	0	0	0	0
0	0	0	1	4	4	2	0	2	4	3	1	0	1	2	0	0	1	2	2	0	0	0	0	0
0	0	0	1	1	3	1	3	0	1	0	1	3	1	0	1	1	0	2	0	0	2	2	0	0

AM Peak 0500 - 0600 (17), AM PHF=0.61 PM Peak 1200 - 1300 (9), PM PHF=0.56

NOT USABLE DATA

*** Thursday, August 21, 2008=64, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	0	0	0	2	1	8	2	1	0	10	2	10	4	6	2	3	2	7	1	0	3	0	0	
0	0	0	0	0	0	0	0	0	0	1	0	6	1	0	2	1	0	4	0	0	0	0	0	0
0	0	0	0	0	0	0	2	0	0	9	1	1	1	2	0	0	1	1	0	0	1	0	0	0
0	0	0	0	0	1	2	0	1	0	0	1	3	2	2	0	1	1	2	1	0	2	0	0	0
0	0	0	0	2	0	6	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0

AM Peak 0630 - 0730 (10), AM PHF=0.42 PM Peak 1200 - 1300 (10), PM PHF=0.42

*** Friday, August 22, 2008=1 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	1	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0	1	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SB 26282 + 418 = 26,700

NB Avg. = 28,920

total : 55,620

57791

53

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17404] !N. Harbor Dr - Btwn Laurel St & Hawthorn St**
Input A:	3 - South bound. - Added to totals. (1)
Input B:	1 - North bound. - Excluded from totals. (0)
Survey Duration:	4:12 Monday, August 18, 2008 => 7:47 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\UM17404822.EC0 (Base)
Identifier:	A56563M0 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	*Axle sensors - Separate (Count)*

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 7:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 168286 / 169153 (99.49%)

* Monday, August 18, 2008=28149 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	955	959	1243	1354	1535	1735	1877	1923	1830	1779	1908	2073	1580	1397	1248	1358	1268	1230	897	
-	-	-	-	-	166	248	284	310	359	458	466	470	508	418	508	486	406	354	364	326	393	287	293	90
-	-	-	-	-	244	180	297	333	365	445	498	472	461	473	522	598	407	347	324	299	303	254	285	85
-	-	-	-	-	290	253	302	338	403	411	457	487	441	458	444	494	396	328	289	368	292	369	183	50
-	-	-	-	-	255	278	360	373	408	421	456	494	420	430	434	495	371	368	271	365	280	320	136	39

PM Peak 1600 - 1700 (2073), PM PHF=0.87

* Tuesday, August 19, 2008=27086, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
264	160	54	50	229	905	930	1115	1267	1284	1535	1716	1802	1787	1672	1846	1838	1519	1665	1153	1325	1195	1130	645	
90	44	14	13	15	170	240	289	283	281	374	440	425	483	428	464	491	386	381	311	362	341	305	222	100
85	33	17	11	27	227	214	294	319	285	351	439	432	410	381	475	427	362	470	281	314	275	290	158	69
50	57	11	10	51	268	248	283	335	345	399	428	453	465	420	473	450	355	401	287	355	297	288	147	83
39	26	12	16	136	240	228	249	330	373	411	409	492	429	443	434	470	416	413	274	294	282	247	118	47

AM Peak 1145 - 1245 (1719), AM PHF=0.95 PM Peak 1515 - 1615 (1873), PM PHF=0.95

* Wednesday, August 20, 2008=29605, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
299	90	45	56	318	1027	983	1240	1304	1459	1696	1966	2084	2128	1829	1994	1877	1682	1616	1419	1464	1119	1201	709	
100	28	18	10	29	212	259	297	305	330	439	435	491	574	452	519	489	443	373	410	323	289	342	270	116
69	20	9	11	44	231	210	306	321	376	423	511	521	560	474	504	509	455	385	350	372	278	304	189	91
83	25	10	11	88	282	260	315	325	361	405	521	534	542	471	456	434	395	449	392	383	297	259	153	68
47	17	8	24	157	302	254	322	353	392	429	499	538	452	432	515	445	389	409	267	386	255	296	97	58

AM Peak 1145 - 1245 (2045), AM PHF=0.96 PM Peak 1245 - 1345 (2214), PM PHF=0.96

* Thursday, August 21, 2008=30058, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
333	107	63	70	239	863	881	1088	1229	1496	1668	1757	1934	2115	1932	2071	2101	1899	1804	1516	1550	1504	1038	800	
116	33	18	15	24	174	229	251	274	322	392	499	459	537	478	516	509	560	467	422	339	440	278	244	151
91	30	13	18	48	211	203	286	303	366	392	396	434	521	477	553	539	484	487	429	379	426	241	279	84
68	28	12	19	63	249	202	244	305	397	399	455	499	497	497	501	553	431	405	346	424	322	251	154	56
58	16	20	18	104	229	247	307	347	411	485	407	542	560	480	501	500	424	445	319	408	316	268	123	81

AM Peak 1045 - 1145 (1835), AM PHF=0.92 PM Peak 1615 - 1715 (2152), PM PHF=0.96

* Friday, August 22, 2008=404 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
372	32	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
151	32	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

52291

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TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17403] N. Harbor Dr - Btwn Coast Guard Station & Laurel St**
Input A:	2 - East bound. - Added to totals. (1)
Input B:	4 - West bound. - Excluded from totals. (0)
Survey Duration:	4:03 Monday, August 18, 2008 => 4:35 Thursday, August 21, 2008
File:	Z:\mcdata\LLG\2008\174\1740322Aug2008.EC0 (Base)
Identifier:	A56374S4 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 4:00 Thursday, August 21, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 251267 / 253323 (99.19%)

*** Monday, August 18, 2008=41825 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	1563	1511	1878	2097	2343	2496	2706	2642	2579	2542	2736	2854	2321	2031	1937	2218	2070	1903	1398	
-	-	-	-	-	273	389	429	484	543	638	655	621	723	606	736	**785**	632	510	581	536	648	423	474	141
-	-	-	-	-	370	329	464	500	576	615	717	650	616	652	742	**766**	589	511	468	475	458	411	447	117
-	-	-	-	-	504	398	460	517	618	585	652	683	653	640	663	**704**	587	467	442	611	497	562	282	59
-	-	-	-	-	416	395	525	596	606	658	682	688	587	644	595	**599**	513	543	446	596	467	507	195	61

PM Peak 1600 - 1700 (2854), PM PHF=0.91

*** Tuesday, August 19, 2008=39729, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
378	232	62	66	322	1397	1430	1665	1893	1958	2267	2427	2521	2502	2393	2613	2583	2222	2440	1708	2131	1824	1758	937	
141	71	22	16	18	255	355	429	410	451	537	**625**	620	656	595	696	**717**	588	562	467	577	520	464	333	149
117	57	12	14	42	352	354	402	467	427	503	**631**	590	583	574	653	**607**	510	619	391	500	425	475	218	107
59	73	13	13	81	410	367	449	515	535	**611**	596	613	669	582	627	**678**	532	653	415	583	452	451	213	123
61	31	15	23	181	380	354	385	501	545	**616**	575	698	594	642	**637**	581	592	606	435	471	427	368	173	70

AM Peak 1030 - 1130 (2483), AM PHF=0.98 PM Peak 1545 - 1645 (2639), PM PHF=0.92

*** Wednesday, August 20, 2008=41887, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
449	128	53	70	434	1467	1433	1700	1854	2076	2345	2700	2757	2672	2512	2814	2583	2380	2291	2084	2326	1807	1897	1055	
149	33	21	10	35	282	364	420	446	467	608	597	629	701	653	780	690	654	534	601	486	426	543	435	176
107	34	14	13	56	305	315	404	472	504	561	715	**711**	**743**	607	685	630	595	542	486	582	425	488	270	146
123	40	10	15	125	452	368	427	449	546	547	696	**706**	642	636	626	642	588	641	558	673	525	425	221	93
70	21	8	32	218	428	386	449	487	559	629	**692**	**711**	586	616	723	621	543	574	439	585	431	441	129	80

AM Peak 1145 - 1245 (2738), AM PHF=0.96 PM Peak 1230 - 1330 (2861), PM PHF=0.96

*** Thursday, August 21, 2008=836 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
495	155	84	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
176	43	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
146	44	19	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	39	16	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	29	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EB Avg. 40810
WB Avg. 41980
total: 82,790

S7291

5.5

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17403] N. Harbor Dr - Btwn Coast Guard Station & Laurel St**
Input A:	2 - East bound. - Excluded from totals. (0)
Input B:	4 - West bound. - Added to totals. (1)
Survey Duration:	4:03 Monday, August 18, 2008 => 4:35 Thursday, August 21, 2008
File:	Z:\mcdata\LLG\2008\174\1740322Aug2008.EC0 (Base)
Identifier:	A56374S4 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 4:00 Thursday, August 21, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 251267 / 253323 (99.19%)

*** Monday, August 18, 2008=42343 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	2600	2533	2734	2625	2643	2500	2752	2726	2353	2403	2413	2178	2139	2098	1868	2193	1695	1265	625	
-	-	-	-	-	556	498	664	682	671	592	672	667	635	557	619	593	570	538	450	547	435	324	214	71
-	-	-	-	-	697	641	694	692	638	573	700	684	591	629	578	510	530	524	472	559	439	281	163	41
-	-	-	-	-	756	678	692	631	651	655	702	703	531	578	594	546	492	505	492	579	448	334	146	44
-	-	-	-	-	591	716	684	620	683	680	678	672	596	639	622	529	547	531	454	508	373	326	102	47

PM Peak 1200 - 1300 (2726), PM PHF=0.97

*** Tuesday, August 19, 2008=40959, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
203	102	85	237	1132	2357	2493	2526	2393	2366	2292	2514	2526	2270	2256	2182	2214	2195	2085	1742	1768	1466	1068	487	
71	31	17	21	169	510	466	667	584	557	546	615	652	580	560	534	591	540	567	434	446	406	275	178	58
41	36	19	39	201	610	653	630	638	600	587	675	619	584	568	548	580	558	552	421	478	361	312	135	52
44	21	28	80	309	603	644	589	581	592	564	581	636	554	572	553	495	583	499	427	426	360	239	88	58
47	14	21	97	453	634	730	640	590	617	595	643	619	552	556	547	548	514	467	460	418	339	242	86	20

AM Peak 0615 - 0715 (2694), AM PHF=0.92 PM Peak 1200 - 1300 (2526), PM PHF=0.97

*** Wednesday, August 20, 2008=43009, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
188	64	69	254	1249	2388	2432	2706	2522	2518	2590	2667	2648	2376	2322	2298	2167	2248	2086	1853	2057	1587	1187	533	
58	16	18	29	186	438	496	700	679	616	679	645	685	613	548	579	539	607	548	514	595	420	348	218	76
52	11	18	45	253	665	586	700	646	618	650	638	663	618	543	577	564	534	503	469	540	460	322	143	49
58	21	14	76	326	703	593	660	589	648	634	702	670	591	610	581	538	569	498	459	471	352	290	83	40
20	16	19	104	484	582	757	646	608	636	627	682	630	554	621	561	526	538	537	411	451	355	227	89	26

AM Peak 0645 - 0745 (2817), AM PHF=0.93 PM Peak 1200 - 1300 (2648), PM PHF=0.97

*** Thursday, August 21, 2008=678 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
191	97	103	287	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
76	24	20	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	28	23	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	20	28	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	25	32	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

52261

56

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17404] N. Harbor Drive Btwn Laurel St. & Hawthorn St.**
Input A:	1 - North bound. - Excluded from totals. (0)
Input B:	3 - South bound. - Added to totals. (1)
Survey Duration:	14:19 Monday, August 25, 2008 => 10:20 Friday, August 29, 2008
File:	Z:\mcdata\LLG\2008\174\1740429Aug2008.EC0 (Plus)
Identifier:	M280P4JB MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**19:00 Monday, August 25, 2008 => 8:00 Friday, August 29, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 172300 / 172814 (99.70%)

*** Monday, August 25, 2008=3993 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	999	1038	879	775	302	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	273	255	240	199	120	31
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	263	262	212	231	72	31
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	247	264	224	177	67	26
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	216	257	203	168	43	16

*** Tuesday, August 26, 2008=25242, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
104	39	58	232	797	1404	1587	1666	1417	1428	1375	1478	1484	1389	1348	1341	1340	1463	1215	1021	1006	974	743	333	
31	14	10	21	118	315	324	423	361	368	331	370	357	335	341	352	356	380	335	275	234	242	230	112	39
31	8	9	38	158	341	412	432	371	363	351	321	368	361	383	348	330	391	318	242	273	238	224	93	14
26	6	25	87	235	375	443	404	331	355	354	383	385	360	304	329	321	356	245	270	237	248	147	69	22
16	11	14	86	286	373	408	407	354	342	339	404	374	333	320	312	333	336	317	234	262	246	142	59	17

AM Peak 0630 - 0730 (1706), AM PHF=0.96 PM Peak 1200 - 1300 (1484), PM PHF=0.96

*** Wednesday, August 27, 2008=26359, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
92	37	65	205	962	1576	1659	1698	1601	1436	1395	1592	1667	1517	1415	1490	1480	1325	1257	1000	1132	872	613	273	
39	11	13	16	155	376	359	444	415	360	311	377	437	361	382	369	398	375	329	236	302	222	192	102	38
14	8	16	43	172	387	397	444	402	362	356	381	444	400	361	378	355	331	326	256	300	218	165	64	25
22	12	17	72	278	387	438	414	387	361	386	421	407	382	318	367	365	322	237	234	251	231	132	55	33
17	6	19	74	357	426	468	396	397	353	342	413	379	374	354	376	362	297	365	274	279	201	124	52	19

AM Peak 0630 - 0730 (1791), AM PHF=0.96 PM Peak 1200 - 1300 (1667), PM PHF=0.94

*** Thursday, August 28, 2008=27708, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
115	48	64	259	838	1464	1645	1721	1538	1534	1559	1703	1702	1699	1478	1573	1500	1562	1300	1066	1153	970	874	343	
38	11	17	22	136	311	336	446	330	367	382	365	443	417	404	396	386	408	369	279	303	236	231	128	34
25	8	14	53	174	409	398	461	462	388	367	437	445	446	372	401	359	419	336	271	284	249	263	102	1
33	12	18	88	239	367	454	441	407	387	426	462	414	437	353	388	364	372	310	258	289	244	196	54	0
19	17	15	96	289	377	457	373	339	392	384	439	400	399	349	388	391	363	285	258	277	241	184	59	0

AM Peak 0630 - 0730 (1818), AM PHF=0.99 PM Peak 1200 - 1300 (1702), PM PHF=0.96

*** Friday, August 29, 2008=35 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
35	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
34	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SB Avg. 26440

NB Avg. 27820

total: 54260

5791

57

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17404] N. Harbor Drive Btwn Laurel St. & Hawthorn St.**
Input A:	1 - North bound. - Added to totals. (1)
Input B:	3 - South bound. - Excluded from totals. (0)
Survey Duration:	14:19 Monday, August 25, 2008 => 10:20 Friday, August 29, 2008
File:	Z:\mcdata\LLG\2008\174\1740429Aug2008.EC0 (Plus)
Identifier:	M280P4JB MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**19:00 Monday, August 25, 2008 => 8:00 Friday, August 29, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 172300 / 172814 (99.70%)

*** Monday, August 25, 2008=5432 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1270**	**1223**	**1164**	**1002**	**773**	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	346	281	351	237	282	89
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	305	270	322	216	221	59
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	311	288	297	312	165	60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	308	384	194	237	105	46

*** Tuesday, August 26, 2008=26216, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
254	**98**	**32**	**43**	**248**	**800**	**914**	**1053**	**1150**	**1356**	**1487**	**1557**	**1670**	**1690**	**1617**	**1762**	**1594**	**1707**	**1932**	**1369**	**1101**	**1127**	**991**	**664**	
89	41	9	4	30	198	237	201	278	316	332	432	**430**	425	430	474	437	436	**479**	350	241	273	241	244	126
59	27	6	6	41	195	216	291	263	342	344	389	**426**	400	364	451	439	442	**515**	321	283	314	216	173	91
60	13	8	14	72	215	213	299	308	335	389	347	**391**	395	426	419	364	381	**445**	379	304	276	309	120	54
46	17	9	19	105	192	248	262	301	363	422	**389**	423	470	397	418	354	448	**493**	319	273	264	225	127	31

AM Peak 1145 - 1245 (1636), AM PHF=0.95 PM Peak 1800 - 1900 (1932), PM PHF=0.94

*** Wednesday, August 27, 2008=27235, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
302	**92**	**38**	**68**	**308**	**949**	**998**	**1129**	**1236**	**1364**	**1568**	**1519**	**1774**	**1680**	**1706**	**1893**	**1834**	**1580**	**1569**	**1336**	**1336**	**1209**	**1090**	**657**	
126	31	16	16	28	232	269	267	281	345	360	366	**421**	394	473	492	**424**	417	356	378	284	396	289	247	101
91	23	9	13	40	245	243	280	278	335	381	391	**438**	408	422	443	**474**	477	415	314	371	352	281	174	79
54	24	7	18	95	240	228	302	343	318	405	370	**438**	446	403	443	**488**	338	412	329	349	240	304	116	42
31	14	6	21	145	232	258	280	334	366	422	**392**	477	432	408	**515**	448	348	386	315	332	221	216	120	25

AM Peak 1145 - 1245 (1689), AM PHF=0.96 PM Peak 1545 - 1645 (1901), PM PHF=0.92

*** Thursday, August 28, 2008=30019, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
247	**86**	**40**	**79**	**247**	**859**	**915**	**1119**	**1192**	**1414**	**1589**	**1804**	**1934**	**2128**	**2102**	**2144**	**2039**	**1829**	**2041**	**1377**	**1419**	**1220**	**1274**	**921**	
101	29	15	11	38	171	223	253	264	291	378	468	**488**	553	**614**	525	541	470	445	381	320	339	317	306	60
79	16	11	22	34	220	218	286	271	335	404	415	**468**	461	**528**	614	522	459	451	375	335	350	312	286	0
42	22	7	23	72	248	210	274	344	365	379	446	**456**	474	**520**	497	532	565	581	274	390	242	336	218	0
25	19	7	23	103	220	264	306	313	423	428	475	522	**640**	440	508	444	335	564	347	374	289	309	111	0

AM Peak 1145 - 1245 (1887), AM PHF=0.97 PM Peak 1345 - 1445 (2302), PM PHF=0.90

*** Friday, August 29, 2008=60 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
60	**0**	**0**	**0**	**0**	**0**	**0**	**0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
60	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

52291

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17405] N. Harbor Dr - Btwn Hawthorn St & Grape St**
Input A:	2 - South bound. - Excluded from totals. (0)
Input B:	4 - North bound. - Added to totals. (1)
Survey Duration:	4:28 Monday, August 18, 2008 => 1:17 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17405A22Aug2008.EC0 (Plus)
Identifier:	A573BVAY MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 1:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 150622 / 150879 (99.83%)

*** Monday, August 18, 2008=7179 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	154	231	327	315	390	485	496	565	439	470	518	473	537	435	359	343	295	219	128	
-	-	-	-	-	40	47	73	63	101	104	112	134	120	110	151	109	160	127	97	90	77	57	38	21
-	-	-	-	-	26	58	86	85	100	98	124	157	116	117	125	123	137	108	96	91	80	59	36	8
-	-	-	-	-	40	63	91	64	103	160	122	135	107	132	129	110	125	91	86	79	65	54	31	8
-	-	-	-	-	48	63	77	103	86	123	138	139	96	111	113	131	115	109	80	83	73	49	23	8

PM Peak 1200 - 1300 (565), PM PHF=0.80

*** Tuesday, August 19, 2008=7545, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
45	30	19	11	57	178	274	309	295	339	421	517	541	501	527	512	536	588	478	386	371	271	230	109	
21	8	5	2	5	47	62	71	78	78	107	139	139	126	148	140	130	150	136	121	100	78	69	40	9
8	10	6	5	8	42	55	76	57	82	104	121	126	134	134	113	132	158	137	92	97	58	70	28	12
8	6	5	2	9	47	75	87	86	81	116	142	125	120	140	116	115	147	99	75	75	64	56	17	17
8	6	3	2	35	42	82	75	74	98	94	115	151	121	105	143	159	133	106	98	99	71	35	24	7

AM Peak 1130 - 1230 (522), AM PHF=0.92 PM Peak 1645 - 1745 (614), PM PHF=0.97

*** Wednesday, August 20, 2008=9248, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
45	21	8	17	180	361	431	484	493	484	564	628	618	603	570	557	556	632	443	471	411	324	242	105	
9	8	5	5	14	91	97	109	157	117	132	170	161	151	151	164	135	168	120	127	132	81	72	33	25
12	3	3	3	34	89	111	134	108	115	144	139	158	172	144	130	134	182	95	122	100	96	66	33	15
17	7	0	5	60	91	103	125	115	123	161	171	137	142	151	141	164	143	112	129	91	82	54	26	5
7	3	0	4	72	90	120	116	113	129	127	148	162	138	124	122	123	139	116	93	88	65	50	13	7

AM Peak 1130 - 1230 (638), AM PHF=0.93 PM Peak 1630 - 1730 (637), PM PHF=0.88

*** Thursday, August 21, 2008=8483, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
52	39	19	13	92	167	244	329	313	408	485	566	614	578	584	587	612	639	515	429	415	336	282	165	
25	8	4	2	7	35	53	78	72	102	111	142	159	137	137	156	158	161	147	109	108	91	90	49	27
15	8	7	2	19	47	41	73	65	99	106	144	163	142	146	135	165	187	140	114	93	90	102	44	18
5	10	3	3	23	40	74	98	88	98	134	148	124	162	173	160	146	165	117	112	108	89	41	41	14
7	13	5	6	43	45	76	80	88	109	134	132	168	137	128	136	143	126	111	94	106	66	49	31	14

AM Peak 1130 - 1230 (602), AM PHF=0.92 PM Peak 1645 - 1745 (656), PM PHF=0.88

*** Friday, August 22, 2008=73 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NB Avg. 8430

SB Avg. 29400

total: 37830

57791

59

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17405] N. Harbor Dr - Btwn Hawthorn St & Grape St**
Input A:	2 - East bound. - Added to totals. (1)
Input B:	4 - West bound. - Excluded from totals. (0)
Survey Duration:	4:28 Monday, August 18, 2008 => 1:17 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17405A22Aug2008.EC0 (Plus)
Identifier:	A573BVAY MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 1:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 150622 / 150879 (99.83%)

*** Monday, August 18, 2008=29494 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	983	1031	1299	1480	1674	1943	2023	1970	1986	1865	1926	1821	1690	1493	1398	1393	1326	1255	938	
-	-	-	-	-	172	266	295	350	394	500	514	463	572	459	456	417	428	364	403	319	408	296	314	93
-	-	-	-	-	257	198	318	351	398	488	485	501	488	470	566	508	422	390	363	328	330	224	294	90
-	-	-	-	-	287	263	323	380	444	456	515	508	486	444	435	427	447	365	302	369	279	385	186	52
-	-	-	-	-	267	304	363	399	438	499	509	498	440	492	469	469	393	374	330	377	309	350	144	40

PM Peak 1215 - 1315 (2079), PM PHF=0.91

*** Tuesday, August 19, 2008=28295, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
275	164	54	53	229	910	994	1175	1320	1396	1621	1878	1865	1814	1845	1834	1756	1631	1747	1269	1402	1184	1225	654	
93	45	15	14	16	169	259	303	302	318	387	457	447	495	515	418	436	429	432	351	371	340	338	226	101
90	37	14	11	25	223	221	306	334	329	376	472	473	437	405	490	464	408	453	292	340	273	335	161	75
52	55	12	10	51	277	264	295	349	360	404	466	484	474	440	458	458	375	424	324	357	310	297	148	86
40	27	13	18	137	241	250	271	335	389	454	483	461	408	485	468	398	419	438	302	334	261	255	119	48

AM Peak 1145 - 1245 (1887), AM PHF=0.97 PM Peak 1215 - 1315 (1913), PM PHF=0.97

*** Wednesday, August 20, 2008=29850, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
310	92	47	57	325	1050	1029	1311	1410	1599	1799	1953	1922	2014	1820	1755	1779	1731	1587	1543	1581	1158	1235	743	
101	29	19	10	28	203	276	305	327	383	423	439	432	543	448	406	437	457	413	448	353	285	352	285	114
75	18	11	11	48	244	221	328	337	415	494	531	519	476	439	486	451	385	411	395	395	297	303	190	95
86	28	9	12	87	285	274	336	361	393	419	457	483	516	476	425	430	454	321	401	410	287	279	165	73
48	17	8	24	162	318	258	342	385	408	463	526	488	479	457	438	461	435	442	299	423	289	301	103	57

AM Peak 1145 - 1245 (1960), AM PHF=0.93 PM Peak 1215 - 1315 (2033), PM PHF=0.94

*** Thursday, August 21, 2008=30055, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
339	110	67	79	255	851	930	1156	1313	1580	1808	1869	1891	1944	1896	1876	1884	1857	1768	1583	1612	1499	1076	812	
114	30	20	17	31	177	253	255	282	361	446	494	411	471	521	419	451	493	459	422	362	376	281	255	158
95	34	14	20	48	216	202	312	316	365	445	468	482	506	437	521	455	506	494	399	411	402	255	276	94
73	31	11	22	62	229	213	257	347	413	444	442	485	490	445	492	494	433	385	373	383	374	257	168	65
57	15	22	20	114	229	262	332	368	441	473	465	513	477	493	444	484	425	430	389	456	347	283	113	82

AM Peak 1030 - 1130 (1879), AM PHF=0.95 PM Peak 1315 - 1415 (1994), PM PHF=0.96

*** Friday, August 22, 2008=399 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
399	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
158	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

57791
60:

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17406E] Laurel St - Btwn N. Harbor Dr & Pacific Hwy**
Input A:	2 - East bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	6:18 Monday, August 18, 2008 => 8:45 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17406E22Aug2008.EC0 (Base)
Identifier:	A5922K3W MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**7:00 Monday, August 18, 2008 => 8:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 66275 / 66693 (99.37%)

*** Monday, August 18, 2008=15819 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	773	823	976	953	1078	1049	983	1068	1083	1174	1005	794	834	964	899	765	598	
-	-	-	-	-	-	-	163	214	251	263	272	247	270	242	275	310	288	201	249	222	264	178	216	50
-	-	-	-	-	-	-	204	178	237	226	262	251	219	310	301	297	259	210	190	232	213	163	183	37
-	-	-	-	-	-	-	203	199	250	232	266	276	289	245	257	289	242	181	204	240	218	223	126	13
-	-	-	-	-	-	-	203	232	238	232	278	275	205	271	250	278	216	202	191	270	204	201	73	32

PM Peak 1600 - 1700 (1174), PM PHF=0.95

*** Tuesday, August 19, 2008=15543, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
132	80	15	21	95	531	566	651	718	820	904	918	955	921	939	1049	1023	886	923	692	899	760	705	340	
50	31	7	4	2	87	152	162	146	206	212	245	250	228	244	307	259	242	202	205	226	211	190	130	65
37	22	1	2	17	145	136	151	165	175	202	213	225	223	205	235	274	196	200	146	206	166	192	72	40
13	20	4	6	21	153	146	181	204	230	257	256	221	258	237	222	250	192	266	163	256	175	180	89	47
32	7	3	9	55	146	132	157	203	209	233	204	259	212	253	285	240	256	255	178	211	208	143	49	31

AM Peak 1030 - 1130 (948), AM PHF=0.92 PM Peak 1545 - 1645 (1068), PM PHF=0.94

*** Wednesday, August 20, 2008=16722, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
183	49	10	18	120	518	498	604	642	797	828	1006	1076	1055	1020	1246	1107	1008	932	861	1086	806	811	441	
65	11	4	0	10	92	110	143	160	188	222	238	245	250	251	325	296	265	184	236	262	180	230	190	59
40	14	5	2	16	81	121	135	163	178	179	235	278	293	259	341	248	289	218	197	246	167	206	106	56
47	17	0	5	35	175	129	175	152	201	194	262	258	270	258	257	297	231	237	222	318	238	194	99	30
31	7	1	11	59	170	138	151	167	230	233	271	295	242	252	323	266	223	293	206	260	221	181	46	33

AM Peak 1130 - 1230 (1056), AM PHF=0.95 PM Peak 1500 - 1600 (1246), PM PHF=0.91

*** Thursday, August 21, 2008=17844, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
178	60	30	37	116	535	490	626	758	894	952	941	1070	1143	1115	1176	1192	1123	1107	950	1082	1023	699	547	
59	20	8	8	8	89	135	152	177	197	245	215	244	294	273	319	327	296	297	281	259	297	193	192	105
56	13	9	8	15	144	97	160	189	227	230	232	273	272	259	296	291	300	292	284	268	285	165	176	42
30	15	6	10	32	159	124	163	190	231	232	258	255	305	293	286	296	256	272	210	309	221	141	106	36
33	12	7	11	61	143	134	151	202	239	245	236	298	272	290	275	278	271	246	175	246	220	200	73	35

AM Peak 1130 - 1230 (1011), AM PHF=0.93 PM Peak 1430 - 1530 (1198), PM PHF=0.94

*** Friday, August 22, 2008=345 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
218	127	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
105	38	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	52	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	32	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	5	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EB Avg. 16700
WB Avg. 19690
total: 36,390

57791
19

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17406W] Laurel St - Btwn N. Harbor Dr & Pacific Hwy**
Input A:	4 - West bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	6:19 Monday, August 18, 2008 => 12:01 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17406W22Aug2008.EC0 (Plus)
Identifier:	1387F8VW MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**7:00 Monday, August 18, 2008 => 3:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 77333 / 78077 (99.05%)

* Monday, August 18, 2008=18093 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	1219	1299	1374	1275	1464	1333	1149	1134	1142	1036	1019	1003	919	1094	775	596	262	
-	-	-	-	-	-	-	286	328	341	304	396	310	296	241	307	283	268	271	222	270	203	169	101	27
-	-	-	-	-	-	-	284	321	348	295	369	361	308	290	258	258	251	249	230	304	194	130	71	19
-	-	-	-	-	-	-	289	321	317	343	371	338	241	294	270	250	241	227	257	273	221	149	48	17
-	-	-	-	-	-	-	360	329	368	333	328	324	304	309	307	245	259	256	210	247	157	148	42	16

PM Peak 1200 - 1300 (1333), PM PHF=0.92

* Tuesday, August 19, 2008=18491, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
79	42	17	55	376	1027	1047	1041	1155	1130	1147	1271	1169	1011	1039	1015	946	1010	952	804	833	663	458	204	
27	18	6	4	49	222	200	270	248	246	265	308	296	261	251	238	226	264	246	186	220	173	115	74	32
19	12	4	7	58	267	273	258	316	323	288	325	329	271	252	268	278	246	255	204	225	168	133	57	18
17	7	6	24	101	275	248	236	291	267	310	298	271	250	267	253	231	249	243	212	192	173	81	44	15
16	5	1	20	168	263	326	277	300	294	284	340	273	229	269	256	211	251	208	202	196	149	129	29	13

AM Peak 1100 - 1200 (1271), AM PHF=0.93 PM Peak 1200 - 1300 (1169), PM PHF=0.89

* Wednesday, August 20, 2008=19406, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
78	26	11	51	384	970	974	1032	1111	1216	1230	1334	1200	1128	1102	1111	950	1032	1089	890	928	781	511	267	
32	4	4	5	50	129	184	252	274	287	333	344	328	288	242	265	242	270	258	222	259	239	160	113	30
18	7	2	14	71	299	229	264	274	318	294	308	299	287	272	287	260	266	251	227	225	219	149	72	19
15	6	3	10	90	313	227	251	279	300	284	339	276	270	282	302	221	244	265	221	235	158	118	29	21
13	9	2	22	173	229	334	265	284	311	319	343	297	283	306	257	227	252	315	220	209	165	84	53	10

AM Peak 1100 - 1200 (1334), AM PHF=0.97 PM Peak 1200 - 1300 (1200), PM PHF=0.91

* Thursday, August 21, 2008=21169, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
80	35	36	69	361	1085	965	1082	1201	1313	1267	1397	1365	1109	1141	1243	1207	1204	1215	1050	1101	799	537	307	
30	11	9	4	57	242	213	263	245	337	316	347	317	298	271	324	313	269	329	267	265	225	148	114	41
19	13	8	8	47	278	225	285	327	306	302	331	375	260	268	279	297	308	312	250	282	227	115	78	24
21	6	14	23	101	313	248	241	315	334	316	344	346	298	310	316	296	306	279	224	248	200	125	66	27
10	5	5	34	156	252	279	293	314	336	333	375	327	253	292	324	301	321	295	309	306	147	149	49	25

AM Peak 1145 - 1245 (1413), AM PHF=0.94 PM Peak 1200 - 1300 (1365), PM PHF=0.91

* Friday, August 22, 2008=173 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
117	56	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
41	20	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	20	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	11	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	5	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17407] Hawthorn St - Btwn N. Harbor Dr & Pacific Hwy** ONE-WAY STREET
Input A:	4 - West bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	5:17 Monday, August 18, 2008 => 8:56 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\1740722Aug2008.EC0 (Plus)
Identifier:	M278T7ZB MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**6:00 Monday, August 18, 2008 => 1:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 99573 / 100784 (98.80%)

*** Monday, August 18, 2008=22151 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	1908	1814	1508	1374	1386	1501	1628	1518	1399	1210	1167	1045	1063	909	1030	786	621	284	
-	-	-	-	-	-	364	460	366	321	349	362	423	407	380	296	318	249	264	222	261	210	166	100	28
-	-	-	-	-	-	472	489	483	335	331	387	368	377	342	305	296	262	252	243	250	199	147	78	22
-	-	-	-	-	-	529	453	346	352	324	386	439	363	335	327	299	266	264	223	281	200	160	65	27
-	-	-	-	-	-	543	412	313	366	382	366	398	371	342	282	254	268	283	221	238	177	148	41	21

PM Peak 1200 - 1300 (1628), PM PHF=0.93

*** Tuesday, August 19, 2008=23659, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
98	44	62	232	818	1479	1752	1630	1356	1350	1335	1385	1538	1381	1377	1211	1168	1111	1126	916	836	729	518	207	
28	16	8	23	137	327	307	466	339	348	327	317	366	379	347	291	324	254	300	226	199	198	129	78	26
22	13	11	39	148	396	466	426	397	301	360	393	379	339	339	308	285	283	309	212	210	171	164	51	34
27	9	20	76	230	362	481	362	314	352	311	323	452	305	347	311	294	284	257	243	207	181	131	41	25
21	6	23	94	303	394	498	376	306	349	337	352	341	358	344	301	265	290	260	235	220	179	94	37	6

AM Peak 0615 - 0715 (1911), AM PHF=0.96 PM Peak 1215 - 1315 (1551), PM PHF=0.86

*** Wednesday, August 20, 2008=25843, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
91	25	60	243	858	1494	1660	1838	1474	1496	1513	1615	1830	1577	1374	1280	1254	1191	1278	1059	1060	756	581	236	
26	7	12	28	147	288	318	496	418	357	410	349	428	416	324	300	304	320	363	336	332	203	161	106	24
34	2	14	40	175	398	375	475	389	364	375	401	412	384	358	343	277	249	308	252	302	199	152	58	18
25	9	13	75	216	417	427	462	306	383	360	447	564	405	331	327	346	322	301	245	218	175	141	40	20
6	7	21	100	320	391	540	405	361	392	368	418	426	372	361	310	327	300	306	226	208	179	127	32	9

AM Peak 0645 - 0745 (1973), AM PHF=0.91 PM Peak 1200 - 1300 (1830), PM PHF=0.81

*** Thursday, August 21, 2008=27807, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
71	41	59	273	832	1516	1758	1768	1531	1576	1638	1845	2163	1795	1659	1383	1376	1303	1336	1110	1111	807	565	291	
24	12	5	30	141	347	338	472	361	365	383	404	542	482	446	333	342	342	355	317	297	211	135	100	32
18	10	12	43	157	395	421	442	382	377	403	491	556	506	408	345	352	357	353	256	297	226	147	80	35
20	8	15	92	233	382	498	405	415	424	373	459	552	415	409	336	372	293	333	251	277	192	135	58	29
9	11	27	108	301	392	501	449	373	410	479	491	513	392	396	369	310	311	295	286	240	178	148	53	16

AM Peak 1145 - 1245 (2141), AM PHF=0.96 PM Peak 1200 - 1300 (2163), PM PHF=0.97

*** Friday, August 22, 2008=112 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Avg. = 25,770

S7291

63

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17408] Grape St - Btwn N. Harbor Dr & Pacific Hwy** ONE-WAY STREET
Input A:	2 - East bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	4:50 Monday, August 18, 2008 => 11:49 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\1740822Aug2008.EC0 (Plus)
Identifier:	A594KV0T MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**5:00 Monday, August 18, 2008 => 1:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 93783 / 93901 (99.87%)

*** Monday, August 18, 2008=24023 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	812	791	930	1053	1314	1512	1578	1546	1608	1650	1697	1511	1365	1097	1117	1166	1195	1170	911	
-	-	-	-	-	144	201	247	222	303	369	431	388	456	392	428	353	392	241	333	252	345	288	314	85
-	-	-	-	-	206	168	214	257	302	368	368	365	373	388	466	386	325	286	294	266	336	181	295	70
-	-	-	-	-	249	203	204	281	356	355	368	420	407	393	395	396	356	288	248	308	239	370	170	53
-	-	-	-	-	213	219	265	293	353	420	411	373	372	477	408	376	292	282	242	340	275	331	132	35

PM Peak 1445 - 1545 (1766), PM PHF=0.93

*** Tuesday, August 19, 2008=22486, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
243	157	47	50	192	706	742	783	935	950	1202	1336	1432	1510	1554	1592	1484	1265	1380	959	1176	986	1213	592	
85	47	11	13	13	145	171	214	221	201	286	315	339	434	426	364	370	366	345	285	319	289	357	206	89
70	39	11	8	24	167	166	210	213	223	291	353	346	334	389	468	381	320	350	211	284	227	333	142	70
53	44	13	9	45	204	225	191	246	246	279	335	372	384	353	383	392	267	342	250	295	271	291	134	85
35	27	12	20	110	190	180	168	255	280	346	333	375	358	386	377	341	312	343	213	278	199	232	110	41

AM Peak 1145 - 1245 (1390), AM PHF=0.93 PM Peak 1445 - 1545 (1601), PM PHF=0.86

*** Wednesday, August 20, 2008=23005, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
285	72	41	48	201	670	620	837	836	1058	1194	1319	1440	1651	1585	1603	1463	1383	1215	1147	1370	1084	1174	709	
89	21	16	10	19	127	153	215	211	248	291	296	314	418	406	423	394	383	346	336	278	245	345	262	101
70	15	8	7	35	133	146	199	181	262	297	335	374	365	373	425	361	340	302	294	378	262	285	186	84
85	22	7	10	57	215	171	205	222	269	277	326	383	433	404	398	337	372	246	305	357	281	287	164	68
41	14	10	21	90	195	150	218	222	279	329	362	369	435	402	357	371	288	321	212	357	296	257	97	52

AM Peak 1145 - 1245 (1433), AM PHF=0.94 PM Peak 1430 - 1530 (1654), PM PHF=0.97

*** Thursday, August 21, 2008=23913, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
305	93	57	67	198	639	702	807	931	1057	1280	1440	1445	1569	1660	1628	1483	1492	1336	1189	1332	1400	1084	719	
101	32	18	13	23	142	190	192	187	219	311	389	329	391	425	392	365	433	346	265	292	330	287	213	140
84	23	11	23	41	154	166	217	239	264	322	351	393	396	396	444	369	402	390	328	332	361	281	249	82
68	24	11	19	46	185	151	171	234	278	295	351	361	403	408	414	389	351	291	271	315	394	260	158	57
52	14	17	12	88	158	195	227	271	296	352	349	362	379	431	378	360	306	309	325	393	315	256	99	76

AM Peak 1045 - 1145 (1443), AM PHF=0.93 PM Peak 1445 - 1545 (1681), PM PHF=0.95

*** Friday, August 22, 2008=355 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
355	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Avg. = 23,130

52281
64

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17409] Harbor Island Dr - Btwn N. Harbor Dr & Sheraton Drwy**
Input A:	1 - North bound. - Added to totals. (1)
Input B:	3 - South bound. - Excluded from totals. (0)
Survey Duration:	5:37 Monday, August 18, 2008 => 9:08 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\1740922Aug2008.EC0 (Base)
Identifier:	A564FEQH MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**6:00 Monday, August 18, 2008 => 7:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 62504 / 62633 (99.79%)

*** Monday, August 18, 2008=6903 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	129	204	267	361	369	372	442	566	578	477	505	437	442	394	380	338	372	270	
-	-	-	-	-	-	24	52	55	77	91	99	100	171	163	133	134	142	112	99	106	104	96	93	44
-	-	-	-	-	-	24	48	59	87	99	82	108	126	145	106	108	96	127	106	98	68	89	75	29
-	-	-	-	-	-	36	35	76	98	79	91	134	130	132	124	133	91	94	86	90	78	96	54	19
-	-	-	-	-	-	45	69	77	99	100	100	100	139	138	114	130	108	109	103	86	88	91	48	10

PM Peak 1345 - 1445 (579), PM PHF=0.89

*** Tuesday, August 19, 2008=7513, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
102	48	26	33	53	100	148	245	252	326	382	387	443	652	548	515	510	450	472	412	405	390	381	233	
44	16	6	15	5	27	28	48	56	78	104	103	115	198	144	125	126	114	127	103	116	88	93	80	43
29	18	6	5	11	24	29	68	65	72	71	91	95	146	137	126	122	119	111	109	89	99	94	49	32
19	10	7	6	21	21	45	64	60	90	92	89	117	163	131	149	148	105	125	90	103	118	120	55	21
10	4	7	7	16	28	46	65	71	86	115	104	116	145	136	115	114	112	109	110	97	85	74	49	31

AM Peak 1145 - 1245 (431), AM PHF=0.92 PM Peak 1300 - 1400 (652), PM PHF=0.82

*** Wednesday, August 20, 2008=8429, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
127	44	29	30	53	88	133	219	225	316	342	677	650	683	647	564	544	463	497	502	447	431	435	283	
43	8	9	9	9	13	29	52	49	81	91	100	183	153	176	168	109	102	111	120	115	95	97	100	64
32	8	5	3	13	25	20	62	64	74	66	165	155	221	175	116	115	124	129	124	125	93	117	83	44
21	10	9	5	14	19	41	58	60	84	90	198	162	182	150	149	167	116	150	134	109	140	118	58	31
31	18	6	13	17	31	43	47	52	77	95	214	150	127	146	131	153	121	107	124	98	103	103	42	23

AM Peak 1115 - 1215 (760), AM PHF=0.89 PM Peak 1245 - 1345 (706), PM PHF=0.80

*** Thursday, August 21, 2008=8738, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
162	66	43	40	50	107	146	246	221	340	387	403	533	799	695	628	637	514	561	492	482	465	394	327	
64	13	9	12	9	24	35	52	56	68	105	109	114	170	176	164	141	123	138	133	125	112	93	112	48
44	25	11	10	12	24	30	71	58	76	81	115	123	170	165	174	159	128	137	114	129	114	90	95	47
31	18	10	12	11	27	39	59	44	98	93	88	142	263	182	152	178	137	154	140	110	131	104	70	42
23	10	13	6	18	32	42	64	63	98	108	91	154	196	172	138	159	126	132	105	118	108	107	50	37

AM Peak 1145 - 1245 (470), AM PHF=0.83 PM Peak 1315 - 1415 (805), PM PHF=0.77

*** Friday, August 22, 2008=270 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
174	88	8	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
48	23	8	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	27	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	22	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	16	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NB Avg. 8230
SB Avg. 8100
total: 16,330

57791

65

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17409] Harbor Island Dr - Btwn N. Harbor Dr & Sheraton Drwy**
Input A:	1 - North bound. - Excluded from totals. (0)
Input B:	3 - South bound. - Added to totals. (1)
Survey Duration:	5:37 Monday, August 18, 2008 => 9:08 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\1740922Aug2008.EC0 (Base)
Identifier:	A564FEQH MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**6:00 Monday, August 18, 2008 => 7:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 62504 / 62633 (99.79%)

*** Monday, August 18, 2008=6207 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	222	363	335	319	351	407	456	508	494	382	427	393	372	310	318	272	182	96	
-	-	-	-	-	-	46	58	88	65	79	99	100	134	131	88	101	95	102	89	85	63	50	42	15
-	-	-	-	-	-	39	102	73	86	82	104	121	107	119	84	115	91	86	80	79	73	53	15	7
-	-	-	-	-	-	58	116	80	76	110	85	107	125	132	94	120	102	94	74	77	83	33	24	14
-	-	-	-	-	-	79	87	94	92	80	119	128	142	112	116	91	105	90	67	77	53	46	15	13

PM Peak 1345 - 1445 (524), PM PHF=0.92

*** Tuesday, August 19, 2008=7380, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
49	22	35	128	317	291	252	356	375	332	373	455	493	529	481	437	480	435	416	317	269	240	196	102	
15	4	7	13	89	74	34	72	106	69	84	79	111	139	135	106	110	125	116	102	69	58	71	34	21
7	8	9	16	58	69	56	86	96	75	88	103	122	115	134	88	122	100	105	80	63	60	50	31	11
14	6	13	40	85	60	79	94	79	98	88	127	126	145	97	120	108	112	93	72	76	69	41	20	14
13	4	6	59	85	88	83	104	94	90	113	146	134	130	115	123	140	98	102	63	61	53	34	17	8

AM Peak 1130 - 1230 (506), AM PHF=0.87 PM Peak 1330 - 1430 (544), PM PHF=0.94

*** Wednesday, August 20, 2008=8349, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
54	36	34	135	325	260	247	427	431	453	539	550	591	549	502	412	476	495	533	405	300	260	211	124	
21	11	6	11	72	55	45	87	99	104	137	124	129	146	132	110	95	113	155	128	85	49	64	42	29
11	7	11	19	72	64	47	92	99	108	141	128	142	153	124	97	130	110	139	97	74	77	56	36	18
14	12	7	43	81	63	79	132	112	121	147	153	161	117	133	104	131	121	114	101	79	66	46	25	7
8	6	10	62	100	78	76	116	121	120	114	145	159	133	113	101	120	151	125	79	62	68	45	21	8

AM Peak 1145 - 1245 (577), AM PHF=0.90 PM Peak 1230 - 1330 (619), PM PHF=0.96

*** Thursday, August 21, 2008=8583, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
62	47	45	155	313	291	258	396	452	434	394	613	595	534	543	516	546	514	533	380	301	310	189	162	
29	6	11	14	83	71	53	73	114	89	82	98	162	148	124	112	126	129	155	105	83	85	56	51	27
18	16	15	25	71	79	51	98	84	121	92	133	149	146	132	114	150	143	134	104	80	77	49	44	21
7	12	10	46	71	58	61	96	132	106	115	128	141	141	154	125	142	117	126	74	75	91	46	36	18
8	13	9	70	88	83	93	129	122	118	105	254	143	99	133	165	128	125	118	97	63	57	38	31	9

AM Peak 1145 - 1245 (706), AM PHF=0.69 PM Peak 1200 - 1300 (595), PM PHF=0.92

*** Friday, August 22, 2008=132 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
75	47	10	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27	11	10	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	14	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	12	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	10	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

57791

66

TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17410E] Harbor Island Dr - E/O Harbor Island Dr**
Input A:	2 - East bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	5:47 Monday, August 18, 2008 => 8:59 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17410E22Aug2008.EC0 (Base)
Identifier:	A570G7NP MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**6:00 Monday, August 18, 2008 => 2:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 12437 / 12445 (99.94%)

*** Monday, August 18, 2008=2381 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	72	87	109	123	101	161	193	236	199	126	170	190	154	123	124	102	69	42	
-	-	-	-	-	-	20	22	23	25	21	29	36	62	43	28	38	43	36	33	35	28	20	16	7
-	-	-	-	-	-	15	17	21	35	24	43	50	49	58	27	45	44	40	36	28	21	20	9	4
-	-	-	-	-	-	14	22	34	40	31	34	52	75	52	33	49	45	44	26	30	33	17	10	5
-	-	-	-	-	-	23	26	31	23	25	55	55	50	46	38	38	58	34	28	31	20	12	7	5

PM Peak 1245 - 1345 (241), PM PHF=0.80

*** Tuesday, August 19, 2008=3052, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
21	12	21	100	233	144	99	92	114	120	119	179	211	230	186	169	191	203	177	146	86	98	61	40	
7	2	4	6	70	39	19	22	36	22	32	29	48	64	52	45	44	71	42	41	19	29	21	10	9
4	5	5	13	43	40	22	28	22	28	27	45	49	52	41	33	51	43	39	42	20	22	17	13	3
5	2	8	33	51	31	35	17	20	40	21	49	56	60	42	38	40	52	43	36	25	33	11	8	7
5	3	4	48	69	34	23	25	36	30	39	56	58	54	51	53	56	37	53	27	22	14	12	9	2

AM Peak 0400 - 0500 (233), AM PHF=0.83 PM Peak 1245 - 1345 (234), PM PHF=0.91

*** Wednesday, August 20, 2008=3510, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
21	14	22	105	224	135	80	113	139	194	254	295	265	243	220	148	175	184	202	167	93	125	51	41	
9	4	3	7	65	37	13	20	37	41	76	48	57	66	64	33	43	35	58	50	26	32	15	13	7
3	4	8	12	49	30	24	24	29	35	56	83	72	64	54	38	44	38	57	50	24	34	11	12	7
7	4	5	33	48	29	20	29	32	59	48	86	70	62	42	39	44	48	50	35	23	27	12	8	3
2	2	6	53	62	39	23	40	41	59	74	78	66	51	60	38	44	63	37	32	20	32	13	8	6

AM Peak 1115 - 1215 (304), AM PHF=0.88 PM Peak 1215 - 1315 (274), PM PHF=0.95

*** Thursday, August 21, 2008=3445, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
23	14	23	125	206	157	86	121	123	152	133	185	236	241	224	184	213	212	227	180	130	126	70	54	
7	2	7	10	61	48	15	33	27	34	40	46	54	75	53	33	45	48	52	57	34	32	20	17	9
7	5	5	23	50	32	20	33	22	58	26	45	64	55	52	48	50	65	58	44	37	35	21	16	9
3	3	6	36	41	38	23	21	34	30	33	36	62	64	63	51	51	46	70	40	29	34	16	11	7
6	4	5	56	54	39	28	34	40	30	34	58	56	47	56	52	67	53	47	39	30	25	13	10	6

AM Peak 1145 - 1245 (238), AM PHF=0.93 PM Peak 1215 - 1315 (257), PM PHF=0.86

*** Friday, August 22, 2008=49 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
31	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EB Avg. 3340

WB Avg. 3600

total: 6940

57291

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TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17410W] Harbor Island Dr - E/O Harbor Island Dr**
Input A:	4 - West bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	5:48 Monday, August 18, 2008 => 8:59 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17410W22Aug2008.EC0 (Plus)
Identifier:	M293M05F MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**6:00 Monday, August 18, 2008 => 2:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 13898 / 13920 (99.84%)

*** Monday, August 18, 2008=2970 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	46	48	68	120	113	112	192	292	273	190	214	182	201	164	166	186	234	169	
-	-	-	-	-	-	12	3	25	19	34	24	35	86	88	58	69	47	50	28	41	50	59	57	28
-	-	-	-	-	-	8	12	6	38	29	30	48	55	74	43	46	44	60	53	37	41	51	48	16
-	-	-	-	-	-	13	12	16	35	22	27	56	61	56	47	50	37	44	41	47	48	67	30	6
-	-	-	-	-	-	13	21	21	28	28	31	53	90	55	42	49	54	47	42	41	47	57	34	6

PM Peak 1330 - 1430 (313), PM PHF=0.87

*** Tuesday, August 19, 2008=3352, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
56	29	20	20	38	46	63	54	83	115	129	126	198	362	258	212	197	190	180	197	202	205	233	139	
28	11	5	12	3	13	11	16	18	26	36	33	44	110	73	55	60	54	42	51	48	53	51	46	17
16	15	4	1	6	12	15	15	23	22	28	22	41	79	69	62	48	58	33	50	52	47	60	32	15
6	1	3	4	14	7	19	8	19	40	15	38	61	91	43	45	48	36	53	52	55	70	82	25	10
6	2	8	3	15	14	18	15	23	27	50	33	52	82	73	50	41	42	52	44	47	35	40	36	20

AM Peak 1145 - 1245 (179), AM PHF=0.73 PM Peak 1300 - 1400 (362), PM PHF=0.82

*** Wednesday, August 20, 2008=3780, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
62	24	13	23	25	35	38	52	93	148	183	321	330	364	290	252	203	141	205	214	190	216	206	152	
17	5	3	6	7	7	8	13	19	31	54	48	94	72	86	72	56	34	48	48	49	56	47	45	30
15	5	4	3	6	6	10	11	23	33	51	76	83	125	74	57	36	37	54	64	57	48	53	51	21
10	7	3	4	6	7	6	11	18	46	36	78	71	104	65	57	58	35	56	48	33	64	52	29	19
20	7	3	10	6	15	14	17	33	38	42	119	82	63	65	66	53	35	47	54	51	48	54	27	13

AM Peak 1130 - 1230 (374), AM PHF=0.79 PM Peak 1245 - 1345 (383), PM PHF=0.77

*** Thursday, August 21, 2008=3673, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
83	33	25	24	30	32	48	57	69	139	148	162	196	320	308	265	255	204	244	215	197	198	243	178	
30	1	5	8	7	6	10	13	22	29	47	42	37	88	76	71	45	38	61	54	49	45	50	53	28
21	16	5	7	7	6	7	15	12	33	26	45	56	84	86	72	69	52	62	57	45	46	52	63	16
19	10	7	6	8	10	16	15	13	47	38	42	43	89	59	62	65	55	62	68	50	56	53	39	13
13	6	8	3	8	10	15	14	22	30	37	33	60	59	87	60	76	59	59	36	53	51	88	23	23

AM Peak 1145 - 1245 (169), AM PHF=0.75 PM Peak 1245 - 1345 (321), PM PHF=0.90

*** Friday, August 22, 2008=122 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
80	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
28	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

57791

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TDSSW, Inc.
Event Counts

EventCount-17 -- English (ENU)

Datasets:

Site:	**[17411W] Laural Street Merge to Harbor Drive** ONE-WAY
Input A:	4 - West bound. - Added to totals. (1)
Input B:	0 - Unused or unknown. - Excluded from totals. (0)
Survey Duration:	6:30 Monday, August 18, 2008 => 9:06 Friday, August 22, 2008
File:	Z:\mcdata\LLG\2008\174\17411W22Aug2008.EC0 (Base)
Identifier:	A5613NK0 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Event Count
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**7:00 Monday, August 18, 2008 => 7:00 Friday, August 22, 2008**
Name:	Factory default profile
Scheme:	Count events divided by two.
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Events = 72605 / 72999 (99.46%)

*** Monday, August 18, 2008=17081 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	1189	1260	1325	1178	1335	1213	1049	1058	1081	971	950	926	869	1071	767	581	258	
-	-	-	-	-	-	-	275	324	335	278	355	288	272	217	285	274	245	245	200	266	200	167	96	27
-	-	-	-	-	-	-	287	309	335	271	342	323	285	273	249	235	228	234	216	296	193	125	73	19
-	-	-	-	-	-	-	281	314	300	311	342	306	226	270	247	225	233	211	247	262	218	141	47	14
-	-	-	-	-	-	-	346	313	355	318	296	296	266	298	300	237	244	236	206	247	156	148	42	15

PM Peak 1200 - 1300 (1213), PM PHF=0.94

AM PK Hr.

PM PK Hr.

*** Tuesday, August 19, 2008=17571, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
75	40	18	55	370	1024	1028	1025	1111	1083	1070	1171	1075	930	972	948	871	952	905	755	811	641	445	196	
27	17	6	4	49	217	193	262	243	238	251	288	281	245	236	221	211	251	236	165	212	172	112	73	30
19	13	4	7	56	266	266	253	304	314	273	299	293	251	240	252	262	230	242	190	223	166	125	54	16
14	7	7	24	98	277	253	236	274	257	281	271	253	227	240	232	201	233	237	200	186	159	83	40	14
15	3	1	20	167	264	316	274	290	274	265	313	248	207	256	243	197	238	190	200	190	144	125	29	11

AM Peak 1100 - 1200 (1171), AM PHF=0.94 PM Peak 1200 - 1300 (1075), PM PHF=0.92

*** Wednesday, August 20, 2008=18049, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
71	25	11	51	379	958	940	993	1065	1114	1115	1209	1083	1000	1010	1011	883	951	975	811	888	756	497	253	
30	4	4	6	50	128	184	243	269	261	304	314	292	246	226	233	225	252	234	208	248	228	154	112	30
16	7	2	14	69	298	226	254	267	294	280	276	271	267	238	260	239	235	227	205	217	213	146	67	16
14	6	3	10	88	309	211	239	264	282	244	304	253	246	264	278	204	227	243	200	219	155	116	26	18
11	8	2	21	172	223	319	257	265	277	287	315	267	241	282	240	215	237	271	198	204	160	81	48	9

AM Peak 1100 - 1200 (1209), AM PHF=0.96 PM Peak 1200 - 1300 (1083), PM PHF=0.93

*** Thursday, August 21, 2008=19736, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
73	32	33	69	354	1076	941	1044	1168	1236	1138	1256	1230	980	1003	1145	1122	1119	1117	966	1056	761	520	297	
30	10	9	4	54	240	212	251	244	316	293	313	292	269	229	291	300	253	302	249	252	217	141	114	41
16	12	6	9	46	277	217	278	319	294	273	301	328	228	233	259	275	287	290	232	270	213	114	73	24
18	5	13	22	98	306	236	235	305	317	286	303	316	257	280	292	269	278	262	205	242	189	122	63	25
9	5	5	34	156	253	276	280	300	309	286	339	294	226	261	303	278	301	263	280	292	142	143	47	25

AM Peak 1145 - 1245 (1275), AM PHF=0.94 PM Peak 1200 - 1300 (1230), PM PHF=0.94

*** Friday, August 22, 2008=167 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
115	51	0	0	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
41	16	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	20	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	10	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	5	0	0	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ADT Avg. = 18,450

57791

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TDSSW, Inc.
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: S. Tillman
Board No.: D1-2172
Loc: Terminal II Entrance & Harbor Dr.

File Name : 08174010
Site Code : 00174010
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Terminal II Entrance Southbound					Harbor Drive Westbound					Spanish Landing Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	41	1	31	0	73	4	206	0	0	210	1	1	3	0	5	31	121	1	3	153	3	441	444
07:15	24	3	20	1	47	4	322	0	0	326	2	0	4	0	6	30	124	0	3	154	4	533	537
07:30	32	4	14	1	50	3	260	1	0	264	2	1	2	0	5	38	170	0	3	208	4	527	531
07:45	27	0	25	0	52	2	257	2	0	261	2	0	0	0	2	27	153	1	2	181	2	496	498
Total	124	8	90	2	222	13	1045	3	0	1061	7	2	9	0	18	126	568	2	11	696	13	1997	2010
08:00	36	1	24	0	61	7	224	0	0	231	3	1	2	2	6	20	152	2	11	174	13	472	485
08:15	22	4	17	1	43	8	244	1	0	253	1	1	1	0	3	28	182	2	3	212	4	511	515
08:30	35	5	27	0	67	7	175	0	0	182	2	0	3	0	5	39	172	1	4	212	4	466	470
08:45	19	3	25	0	47	2	232	0	0	234	5	1	4	0	10	32	139	5	9	176	9	467	476
Total	112	13	93	1	218	24	875	1	0	900	11	3	10	2	24	119	645	10	27	774	30	1916	1946
Grand Total	236	21	183	3	440	37	1920	4	0	1961	18	5	19	2	42	245	1213	12	38	1470	43	3913	3956
Apprch %	53.6	4.8	41.6			1.9	97.9	0.2			42.9	11.9	45.2			16.7	82.5	0.8					
Total %	6.0	0.5	4.7		11.2	0.9	49.1	0.1		50.1	0.5	0.1	0.5		1.1	6.3	31.0	0.3		37.6	1.1	98.9	

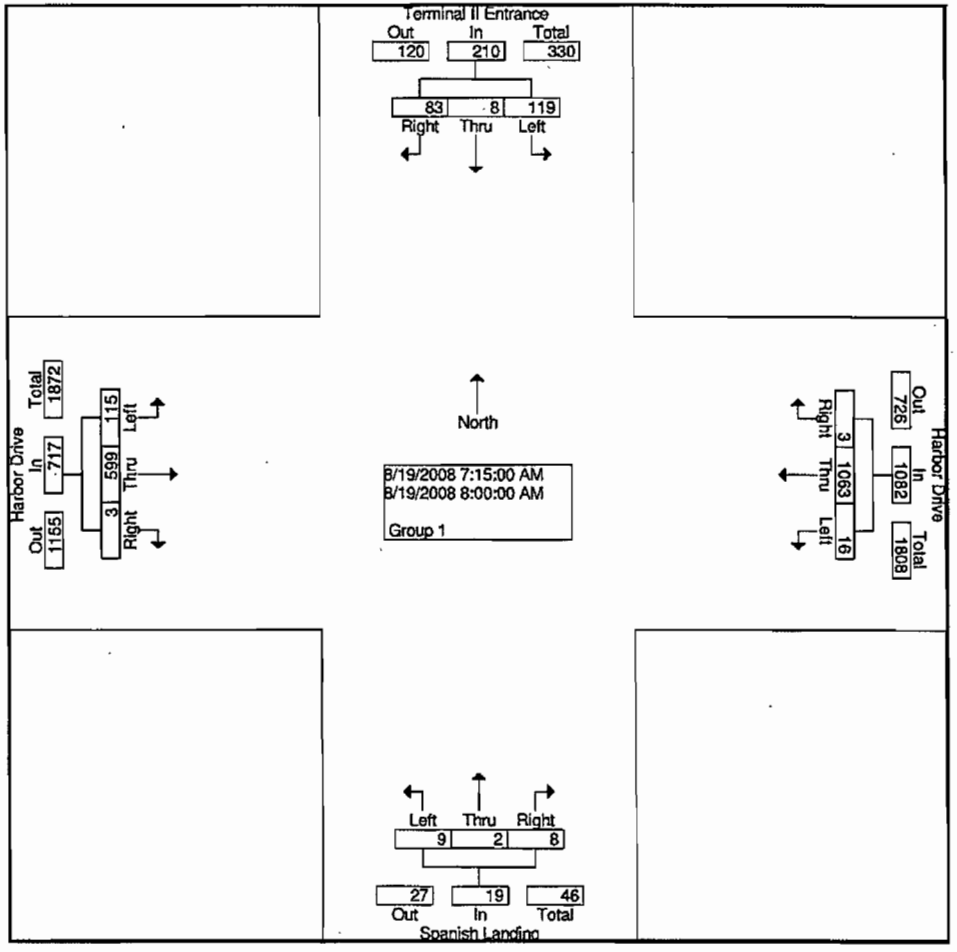
	Terminal II Entrance Southbound				Harbor Drive Westbound				Spanish Landing Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	07:15																
Volume	119	8	83	210	16	1063	3	1082	9	2	8	19	115	599	3	717	2028
Percent	56.7	3.8	39.5		1.5	98.2	0.3		47.4	10.5	42.1		16.0	83.5	0.4		
07:15 Volume	24	3	20	47	4	322	0	326	2	0	4	6	30	124	0	154	533
Peak Factor																	0.951
High Int.	08:00				07:15				07:15				07:30				
Volume	36	1	24	61	4	322	0	326	2	0	4	6	38	170	0	208	
Peak Factor				0.861				0.830				0.792				0.862	

57791 70

TDSSW, Inc.
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: S. Tillman
Board No.: D1-2172
Loc: Terminal II Entrance & Harbor Dr.

File Name : 08174010
Site Code : 00174010
Start Date : 8/19/2008
Page No : 2



TDSSW, Inc.
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: S. Tillman
Board No.: D1-2172
Loc: Terminal II Entrance & Harbor Dr.

File Name : 08174011
Site Code : 00174011
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Terminal II Entrance Southbound					Harbor Drive Westbound					Spanish Landing Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	34	5	29	1	68	6	267	2	0	275	2	3	8	1	13	21	217	1	10	239	12	595	607
16:15	23	2	20	0	45	3	257	2	0	262	2	6	5	0	13	24	247	4	1	275	1	595	596
16:30	29	4	18	0	51	3	275	0	0	278	1	3	3	0	7	15	262	2	2	279	2	615	617
16:45	25	0	17	0	42	7	271	1	0	279	5	3	10	1	18	24	253	4	4	281	5	620	625
Total	111	11	84	1	206	19	1070	5	0	1094	10	15	26	2	51	84	979	11	17	1074	20	2425	2445
17:00	38	0	26	0	64	7	286	0	0	293	2	0	4	1	6	31	215	1	5	247	6	610	616
17:15	19	0	21	1	40	8	334	0	0	342	2	2	2	1	6	18	202	2	2	222	4	610	614
17:30	31	6	17	0	54	9	292	0	0	301	1	4	3	0	8	50	189	5	6	244	6	607	613
17:45	26	1	20	0	47	5	270	1	0	276	1	6	6	0	13	33	197	2	6	232	6	568	574
Total	114	7	84	1	205	29	1182	1	0	1212	6	12	15	2	33	132	803	10	19	945	22	2395	2417
Grand Total	225	18	168	2	411	48	2252	6	0	2306	16	27	41	4	84	216	1782	21	36	2019	42	4820	4862
Apprch %	54.7	4.4	40.9			2.1	97.7	0.3			19.0	32.1	48.8			10.7	88.3	1.0					
Total %	4.7	0.4	3.5		8.5	1.0	46.7	0.1		47.8	0.3	0.6	0.9		1.7	4.5	37.0	0.4		41.9	0.9	99.1	

	Terminal II Entrance Southbound				Harbor Drive Westbound				Spanish Landing Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:30																
Volume	111	4	82	197	25	1166	1	1192	10	8	19	37	88	932	9	1029	2455
Percent	56.3	2.0	41.6		2.1	97.8	0.1		27.0	21.6	51.4		8.6	90.6	0.9		
16:45 Volume	25	0	17	42	7	271	1	279	5	3	10	18	24	253	4	281	620
Peak Factor																	0.990
High Int.	17:00				17:15				16:45				16:45				
Volume	38	0	26	64	8	334	0	342	5	3	10	18	24	253	4	281	
Peak Factor				0.770				0.871				0.514				0.915	

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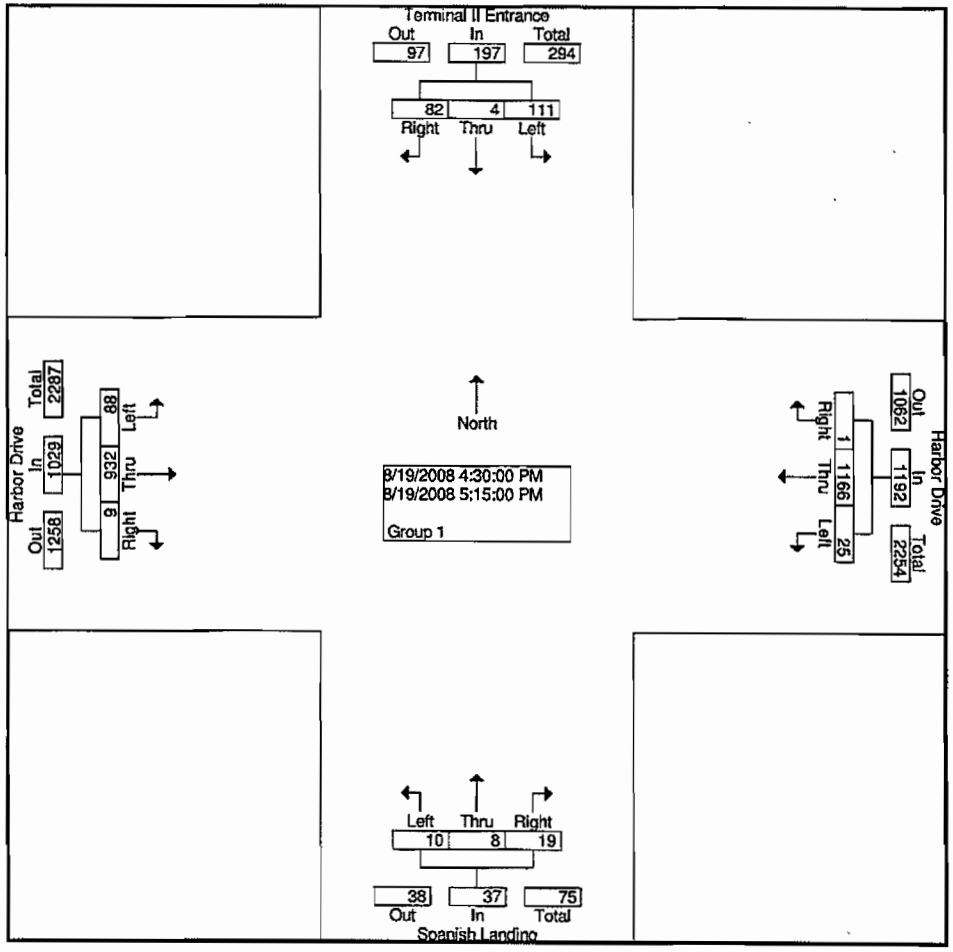
TDSSW, Inc.
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: S. Tillman
Board No.: D1-2172
Loc: Terminal II Entrance & Harbor Dr.

File Name : 08174011
Site Code : 00174011
Start Date : 8/19/2008
Page No : 2



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Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: D. Wellman & G. Scalice
Board No.: D1-1426 & D1-1427
Loc: Harbor Island Dr. & Harbor Dr.

File Name : 08174020
Site Code : 00174020
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Island Drive Southbound					Harbor Drive Westbound					Harbor Island Drive Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	11	3	25	11	39	47	383	2	15	432	12	4	28	21	44	14	124	20	0	158	47	673	720
07:15	15	3	22	0	40	86	399	2	6	487	18	9	42	8	69	2	144	17	0	163	14	759	773
07:30	7	5	24	3	36	58	326	1	6	385	19	4	42	11	65	15	151	21	0	187	20	673	693
07:45	11	4	19	0	34	81	382	5	3	468	19	4	38	11	61	4	164	25	0	193	14	756	770
Total	44	15	90	14	149	272	1490	10	30	1772	68	21	150	51	239	35	583	83	0	701	95	2861	2956
08:00	12	7	23	0	42	71	333	0	3	404	13	8	34	5	55	10	156	28	0	194	8	695	703
08:15	15	4	34	0	53	54	323	4	3	381	21	5	38	6	64	8	166	31	0	205	9	703	712
08:30	14	2	22	0	38	52	259	0	6	311	20	7	33	4	60	13	151	25	0	189	10	598	608
08:45	16	0	31	0	47	65	332	1	5	398	20	6	40	6	66	10	130	31	0	171	11	682	693
Total	57	13	110	0	180	242	1247	5	17	1494	74	26	145	21	245	41	603	115	0	759	38	2678	2716
Grand Total	101	28	200	14	329	514	2737	15	47	3266	142	47	295	72	484	76	1186	198	0	1460	133	5539	5672
Apprch %	30.7	8.5	60.8			15.7	83.8	0.5			29.3	9.7	61.0			5.2	81.2	13.6					
Total %	1.8	0.5	3.6		5.9	9.3	49.4	0.3		59.0	2.6	0.8	5.3		8.7	1.4	21.4	3.6		26.4	2.3	97.7	

	Harbor Island Drive Southbound				Harbor Drive Westbound				Harbor Island Drive Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	07:15																
Volume	45	19	88	152	296	1440	8	1744	69	25	156	250	31	615	91	737	2883
Percent	29.6	12.5	57.9		17.0	82.6	0.5		27.6	10.0	62.4		4.2	83.4	12.3		
07:15 Volume	15	3	22	40	86	399	2	487	18	9	42	69	2	144	17	163	759
Peak Factor																	0.950
High Int.	08:00				07:15				07:15				08:00				
Volume	12	7	23	42	86	399	2	487	18	9	42	69	10	156	28	194	
Peak Factor				0.905				0.895				0.906				0.950	

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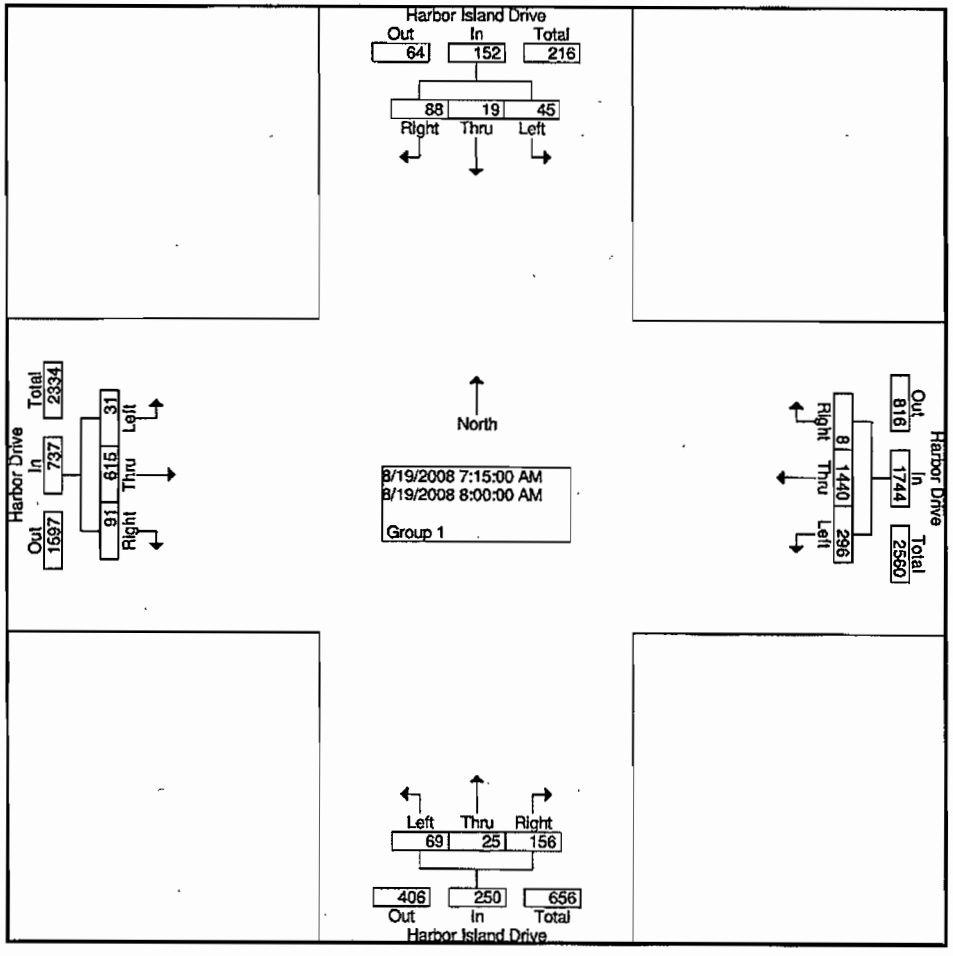
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: D. Wellman & G. Scalice
Board No.: D1-1426 & D1-1427
Loc: Harbor Island Dr. & Harbor Dr.

File Name : 08174020
Site Code : 00174020
Start Date : 8/19/2008
Page No : 2



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P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: D. Wellman & G. Scalice
Board No.: D1-1426 & D1-1427
Loc: Harbor Island Dr. & Harbor Dr.

File Name : 08174021
Site Code : 00174021
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Island Drive Southbound					Harbor Drive Westbound					Harbor Island Drive Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	14	2	29	0	45	72	317	1	4	390	41	9	76	20	126	18	216	34	0	268	24	829	853
16:15	15	5	23	2	43	84	275	0	8	359	25	8	90	4	123	8	235	32	0	275	14	800	814
16:30	10	4	40	0	54	79	276	2	12	357	43	5	105	8	153	14	223	53	0	290	20	854	874
16:45	12	4	25	1	41	64	225	44	9	333	24	5	91	12	120	18	224	45	0	287	22	781	803
Total	51	15	117	3	183	299	1093	47	33	1439	133	27	362	44	522	58	898	164	0	1120	80	3264	3344
17:00	8	7	27	1	42	90	323	1	8	414	35	12	66	5	113	10	224	32	0	266	14	835	849
17:15	8	5	28	0	41	68	342	0	2	410	29	7	77	14	113	19	172	36	0	227	16	791	807
17:30	9	5	44	0	58	66	316	4	3	386	27	9	64	2	100	17	155	38	0	210	5	754	759
17:45	11	6	26	1	43	74	304	3	3	381	30	10	77	4	117	11	198	26	0	235	8	776	784
Total	36	23	125	2	184	298	1285	8	16	1591	121	38	284	25	443	57	749	132	0	938	43	3156	3199
Grand Total	87	38	242	5	367	597	2378	55	49	3030	254	65	646	69	965	115	1647	296	0	2058	123	6420	6543
Apprch %	23.7	10.4	65.9			19.7	78.5	1.8			26.3	6.7	66.9			5.6	80.0	14.4					
Total %	1.4	0.6	3.8		5.7	9.3	37.0	0.9		47.2	4.0	1.0	10.1		15.0	1.8	25.7	4.6		32.1	1.9	98.1	

	Harbor Island Drive Southbound				Harbor Drive Westbound				Harbor Island Drive Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:15																
Volume	45	20	115	180	317	1099	47	1463	127	30	352	509	50	906	162	1118	3270
Percent	25.0	11.1	63.9		21.7	75.1	3.2		25.0	5.9	69.2		4.5	81.0	14.5		
16:30 Volume	10	4	40	54	79	276	2	357	43	5	105	153	14	223	53	290	854
Peak Factor																	0.957
High Int.	16:30				17:00				16:30				16:30				
Volume	10	4	40	54	90	323	1	414	43	5	105	153	14	223	53	290	
Peak Factor				0.833				0.883				0.832				0.964	

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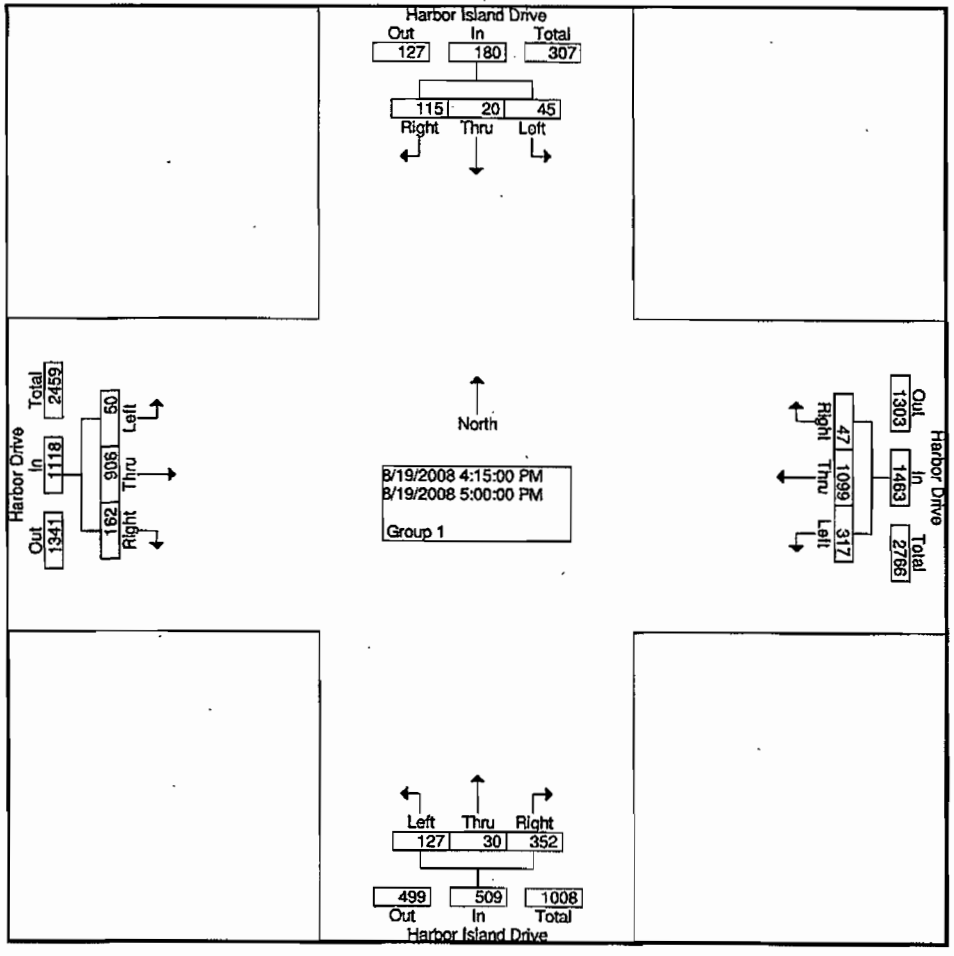
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: D. Wellman & G. Scalice
Board No.: D1-1426 & D1-1427
Loc: Harbor Island Dr. & Harbor Dr.

File Name : 08174021
Site Code : 00174021
Start Date : 8/19/2008
Page No : 2



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P.O. Box 1544
Lakeside, CA 92040
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Weather: Clear & Dry
Counted By: B. Reid & J. Shelton
Board No.: D1-2173 & D1-1430
Loc: Rental Car Road & Harbor Dr.

File Name : 08174030
Site Code : 00174030
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Parking Lot Southbound					Harbor Drive Westbound					Rental Car Road Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	0	0	1	0	1	39	677	1	2	717	11	0	19	20	30	3	425	16	0	444	22	1192	1214
07:15	0	0	1	0	1	48	656	6	1	710	7	0	11	16	18	6	410	17	0	433	17	1162	1179
07:30	0	1	0	0	1	15	646	4	0	665	12	0	17	21	29	3	455	12	0	470	21	1165	1186
07:45	1	0	2	0	3	31	700	2	0	733	9	0	17	20	26	5	377	13	0	395	20	1157	1177
Total	1	1	4	0	6	133	2679	13	3	2825	39	0	64	77	103	17	1667	58	0	1742	80	4676	4756
08:00	0	1	1	0	2	36	666	1	0	703	12	1	30	15	43	4	402	19	0	425	15	1173	1188
08:15	0	0	1	0	1	40	614	2	0	656	16	0	27	13	43	5	480	14	0	499	13	1199	1212
08:30	0	0	0	1	0	45	601	3	1	649	13	0	42	10	55	3	474	22	0	499	12	1203	1215
08:45	1	0	2	0	3	35	650	2	0	687	18	10	32	18	60	42	428	21	0	491	18	1241	1259
Total	1	1	4	1	6	156	2531	8	1	2695	59	11	131	56	201	54	1784	76	0	1914	58	4816	4874
Grand Total	2	2	8	1	12	289	5210	21	4	5520	98	11	195	133	304	71	3451	134	0	3656	138	9492	9630
Apprch %	16.7	16.7	66.7			5.2	94.4	0.4			32.2	3.6	64.1			1.9	94.4	3.7					
Total %	0.0	0.0	0.1		0.1	3.0	54.9	0.2		58.2	1.0	0.1	2.1		3.2	0.7	36.4	1.4		38.5	1.4	98.6	

	Parking Lot Southbound				Harbor Drive Westbound				Rental Car Road Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	08:00																
Volume	1	1	4	6	156	2531	8	2695	59	11	131	201	54	1784	76	1914	4816
Percent	16.7	16.7	66.7		5.8	93.9	0.3		29.4	5.5	65.2		2.8	93.2	4.0		
08:45 Volume	1	0	2	3	35	650	2	687	18	10	32	60	42	428	21	491	1241
Peak Factor																	0.970
High Int.	08:45				08:00				08:45				08:15				
Volume	1	0	2	3	36	666	1	703	18	10	32	60	5	480	14	499	
Peak Factor				0.500				0.958				0.838				0.959	

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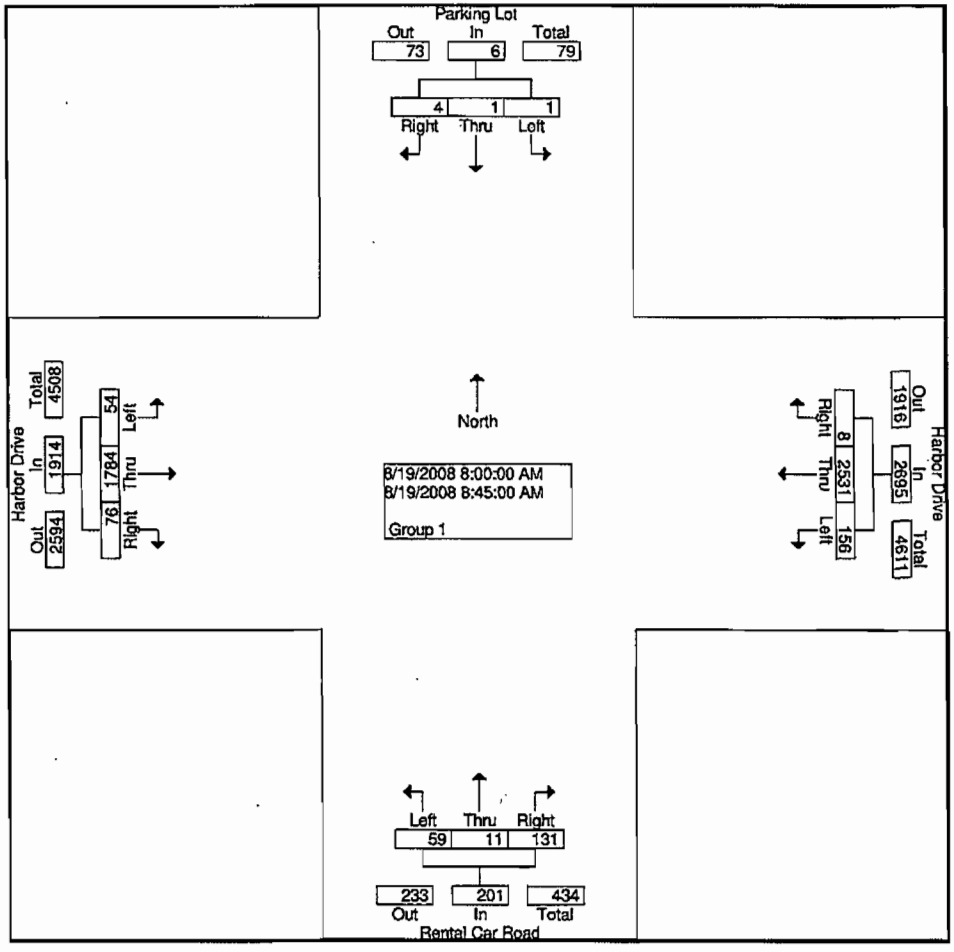
TDSSW, Inc.
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Reid & J. Shelton
Board No.: D1-2173 & D1-1430
Loc: Rental Car Road & Harbor Dr.

File Name : 08174030
Site Code : 00174030
Start Date : 8/19/2008
Page No : 2



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P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Reid & J. Shelton
Board No.: D1-2173 & D1-1430
Loc: Rental Car Road & Harbor Dr.

File Name : 08174031
Site Code : 00174031
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Parking Lot Southbound					Harbor Drive Westbound					Rental Car Road Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	2	0	1	0	3	34	501	1	0	536	13	0	55	20	68	5	600	16	0	621	20	1228	1248
16:15	0	0	3	0	3	47	545	1	0	593	16	0	34	27	50	2	566	16	0	584	27	1230	1257
16:30	1	0	5	0	6	41	448	2	0	491	17	0	44	21	61	11	627	17	0	655	21	1213	1234
16:45	1	1	1	0	3	44	553	2	0	599	16	0	42	11	58	4	542	16	0	562	11	1222	1233
Total	4	1	10	0	15	166	2047	6	0	2219	62	0	175	79	237	22	2335	65	0	2422	79	4893	4972
17:00	2	0	3	1	5	57	518	2	1	577	14	0	27	15	41	3	502	20	0	525	17	1148	1165
17:15	4	0	2	0	6	24	553	1	0	578	12	0	42	24	54	4	457	14	0	475	24	1113	1137
17:30	3	0	2	0	5	45	543	1	0	589	14	0	33	21	47	1	492	14	0	507	21	1148	1169
17:45	1	0	2	1	3	38	546	0	1	584	19	0	38	27	57	4	553	14	0	571	29	1215	1244
Total	10	0	9	2	19	164	2160	4	2	2328	59	0	140	87	199	12	2004	62	0	2078	91	4624	4715
Grand Total	14	1	19	2	34	330	4207	10	2	4547	121	0	315	166	436	34	4339	127	0	4500	170	9517	9687
Apprch %	41.2	2.9	55.9			7.3	92.5	0.2			27.8	0.0	72.2			0.8	96.4	2.8					
Total %	0.1	0.0	0.2		0.4	3.5	44.2	0.1		47.8	1.3	0.0	3.3		4.6	0.4	45.6	1.3		47.3	1.8	98.2	

	Parking Lot Southbound				Harbor Drive Westbound				Rental Car Road Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:00																
Volume	4	1	10	15	166	2047	6	2219	62	0	175	237	22	2335	65	2422	4893
Percent	26.7	6.7	66.7		7.5	92.2	0.3		26.2	0.0	73.8		0.9	96.4	2.7		
16:15 Volume	0	0	3	3	47	545	1	593	16	0	34	50	2	566	16	584	1230
Peak Factor																	0.995
High Int.	16:30				16:45				16:00				16:30				
Volume	1	0	5	6	44	553	2	599	13	0	55	68	11	627	17	655	
Peak Factor				0.625				0.926				0.871				0.924	

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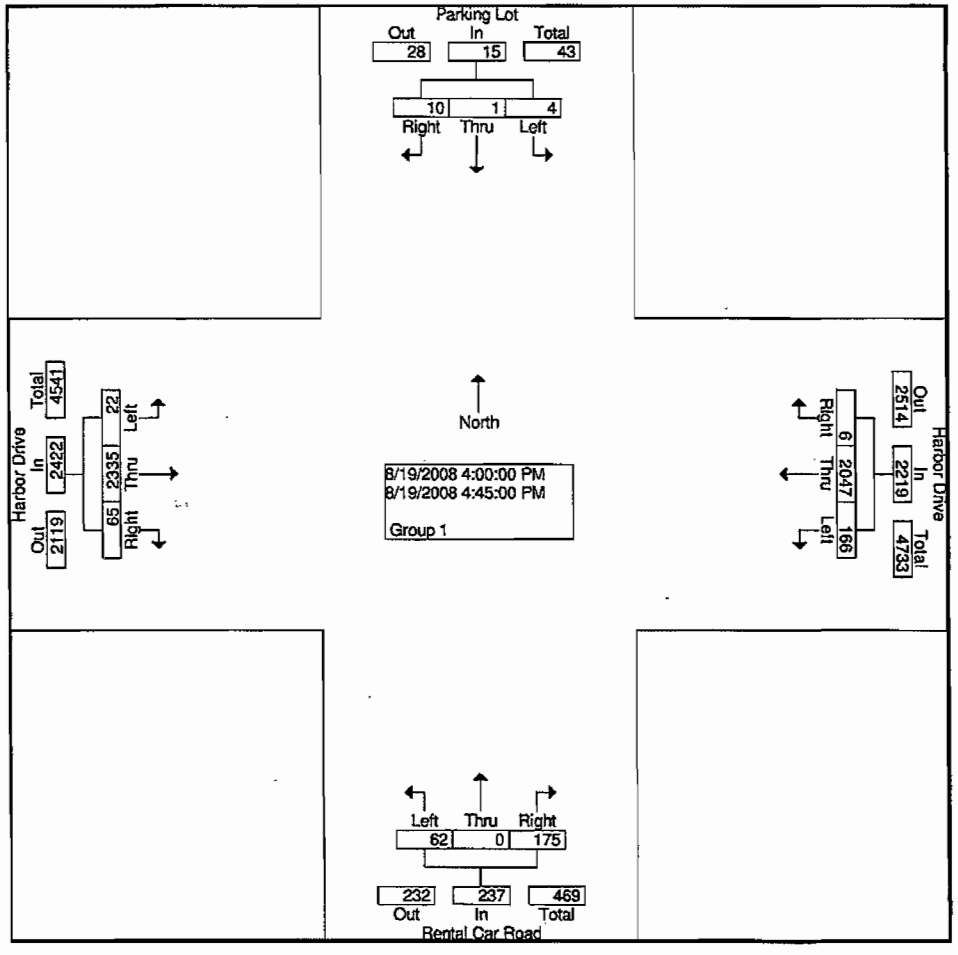
TDSSW, Inc.
P.O. Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Reid & J. Shelton
Board No.: D1-2173 & D1-1430
Loc: Rental Car Road & Harbor Dr.

File Name : 08174031
Site Code : 00174031
Start Date : 8/19/2008
Page No : 2



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Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: C. Niggel
Board No.: D1-1424
Loc: Laurel Street & Harbor Dr.

File Name : 08174040
Site Code : 00174040
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Laurel Street Southbound					Harbor Drive Westbound					Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	6	0	3	2	9	0	470	13	3	483	0	0	0	0	0	156	302	0	0	458	5	950	955
07:15	1	0	1	2	2	0	448	10	0	458	0	0	0	0	0	138	262	0	0	400	2	860	862
07:30	1	0	1	26	2	0	429	15	1	444	0	0	0	0	0	183	309	0	0	492	27	938	965
07:45	5	0	0	15	5	0	422	9	0	431	0	0	0	0	0	161	261	0	0	422	15	858	873
Total	13	0	5	45	18	0	1769	47	4	1816	0	0	0	0	0	638	1134	0	0	1772	49	3606	3655
08:00	8	0	1	18	9	0	408	13	1	421	0	0	0	0	0	163	298	0	0	461	19	891	910
08:15	9	0	2	10	11	0	438	6	1	444	0	0	0	0	0	188	328	0	0	516	11	971	982
08:30	13	0	4	14	17	0	385	7	4	392	0	0	0	0	0	237	352	0	0	589	18	998	1016
08:45	13	0	1	3	14	0	357	6	1	363	0	0	0	0	0	231	348	0	0	579	4	956	960
Total	43	0	8	45	51	0	1588	32	7	1620	0	0	0	0	0	819	1326	0	0	2145	52	3816	3868
Grand Total	56	0	13	90	69	0	3357	79	11	3436	0	0	0	0	0	1457	2460	0	0	3917	101	7422	7523
Apprch %	81.2	0.0	18.8			0.0	97.7	2.3			0.0	0.0	0.0			37.2	62.8	0.0					
Total %	0.8	0.0	0.2		0.9	0.0	45.2	1.1		46.3	0.0	0.0	0.0		0.0	19.6	33.1	0.0		52.8	1.3	98.7	

	Laurel Street Southbound				Harbor Drive Westbound				Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	08:00																
Volume	43	0	8	51	0	1588	32	1620	0	0	0	0	819	1326	0	2145	3816
Percent	84.3	0.0	15.7		0.0	98.0	2.0		0.0	0.0	0.0		38.2	61.8	0.0		
08:30 Volume	13	0	4	17	0	385	7	392	0	0	0	0	237	352	0	589	998
Peak Factor																	0.956
High Int.	08:30				08:15				6:45:00 AM				08:30				
Volume	13	0	4	17	0	438	6	444	0	0	0	0	237	352	0	589	
Peak Factor				0.750				0.912								0.910	

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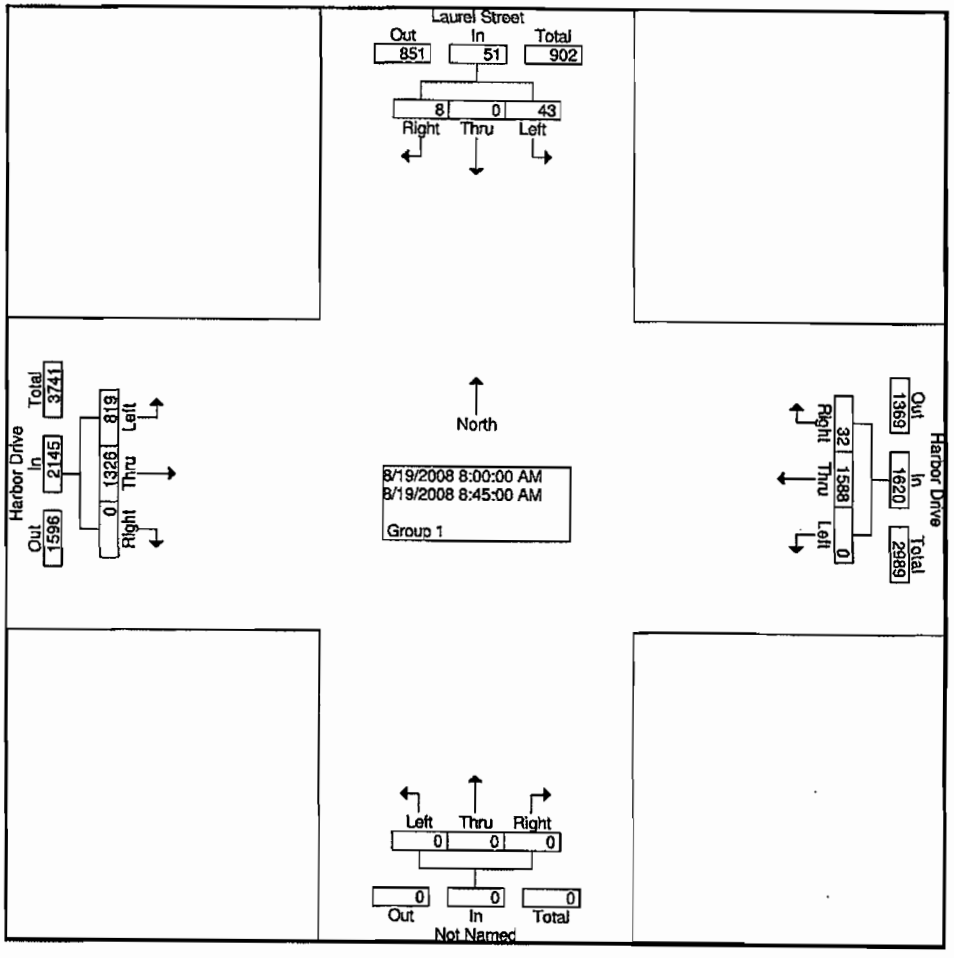
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: C. Niggel
Board No.: D1-1424
Loc: Laurel Street & Harbor Dr.

File Name : 08174040
Site Code : 00174040
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: C. Niggel
Board No.: D1-1424
Loc: Laurel Street & Harbor Dr.

File Name : 08174041
Site Code : 00174041
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Laurel Street Southbound					Harbor Drive Westbound					Northbound					Harbor Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	18	0	2	4	20	0	300	28	2	328	0	0	0	0	0	261	419	0	0	680	6	1028	1034
16:15	14	0	1	9	15	0	320	29	0	349	0	0	0	0	0	229	409	0	0	638	9	1002	1011
16:30	19	0	2	9	21	0	260	27	1	287	0	0	0	0	0	265	416	0	0	681	10	989	999
16:45	18	0	0	5	18	0	333	36	2	369	0	0	0	0	0	190	399	0	0	589	7	976	983
Total	69	0	5	27	74	0	1213	120	5	1333	0	0	0	0	0	945	1643	0	0	2588	32	3995	4027
17:00	11	0	1	9	12	0	314	15	0	329	0	0	0	0	0	220	352	0	0	572	9	913	922
17:15	16	0	0	11	16	0	356	23	2	379	0	0	0	0	0	186	334	0	0	520	13	915	928
17:30	13	0	1	9	14	0	324	20	2	344	0	0	0	0	0	193	324	0	0	517	11	875	886
17:45	12	0	0	14	12	0	319	11	2	330	0	0	0	0	0	246	396	0	0	642	16	984	1000
Total	52	0	2	43	54	0	1313	69	6	1382	0	0	0	0	0	845	1406	0	0	2251	49	3687	3736
Grand Total	121	0	7	70	128	0	2526	189	11	2715	0	0	0	0	0	1790	3049	0	0	4839	81	7682	7763
Apprch %	94.5	0.0	5.5			0.0	93.0	7.0			0.0	0.0	0.0			37.0	63.0	0.0					
Total %	1.6	0.0	0.1		1.7	0.0	32.9	2.5		35.3	0.0	0.0	0.0		0.0	23.3	39.7	0.0		63.0	1.0	99.0	

	Laurel Street Southbound				Harbor Drive Westbound				Northbound				Harbor Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:00																
Volume	69	0	5	74	0	1213	120	1333	0	0	0	0	945	1643	0	2588	3995
Percent	93.2	0.0	6.8		0.0	91.0	9.0		0.0	0.0	0.0		36.5	63.5	0.0		
16:00 Volume	18	0	2	20	0	300	28	328	0	0	0	0	261	419	0	680	1028
Peak Factor																	0.972
High Int.	16:30				16:45				3:45:00 PM				16:30				
Volume	19	0	2	21	0	333	36	369	0	0	0	0	265	416	0	681	
Peak Factor				0.881				0.903								0.950	

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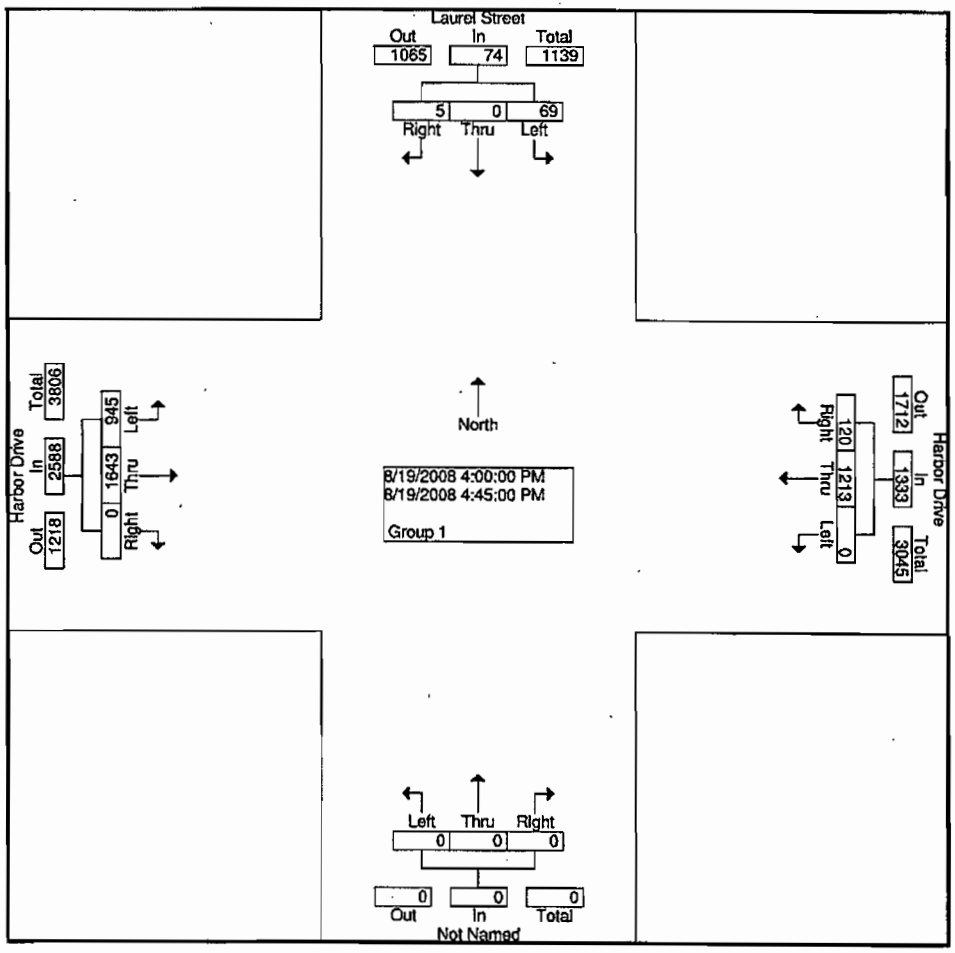
Weather: Clear & Dry
Counted By: C. Niggel
Board No.: D1-1424
Loc: Laurel Street & Harbor Dr.

File Name : 08174041
Site Code : 00174041
Start Date : 8/19/2008
Page No : 2



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(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: L. McCoy
Board No.: D1-2279
Loc: Hawthorn St. & Harbor Dr.

File Name : 08174050
Site Code : 00174050
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Drive Southbound					Hawthorne Street Westbound					Harbor Drive Northbound					Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	0	295	0	0	295	13	0	402	3	415	0	81	0	7	81	0	0	0	0	0	10	791	801
07:15	0	293	0	0	293	19	0	370	4	389	0	72	0	4	72	0	0	0	0	0	8	754	762
07:30	0	294	0	0	294	15	0	328	5	343	0	89	0	3	89	0	0	0	0	0	8	726	734
07:45	0	259	0	0	259	15	0	326	1	341	0	81	0	2	81	0	0	0	0	0	3	681	684
Total	0	1141	0	0	1141	62	0	1426	13	1488	0	323	0	16	323	0	0	0	0	0	29	2952	2981
08:00	0	300	0	0	300	20	0	317	3	337	0	90	0	7	90	0	0	0	0	0	10	727	737
08:15	0	354	0	0	354	23	0	359	4	382	0	64	0	1	64	0	0	0	0	0	5	800	805
08:30	0	365	0	0	365	25	0	283	0	308	0	91	0	2	91	0	0	0	0	0	2	764	766
08:45	0	341	0	0	341	18	0	273	3	291	0	69	0	4	69	0	0	0	0	0	7	701	708
Total	0	1360	0	0	1360	86	0	1232	10	1318	0	314	0	14	314	0	0	0	0	0	24	2992	3016
Grand Total	0	2501	0	0	2501	148	0	2658	23	2806	0	637	0	30	637	0	0	0	0	0	53	5944	5997
Apprch %	0.0	100.0	0.0			5.3	0.0	94.7			0.0	100.0	0.0			0.0	0.0	0.0					
Total %	0.0	42.1	0.0		42.1	2.5	0.0	44.7		47.2	0.0	10.7	0.0		10.7	0.0	0.0	0.0		0.0	0.9	99.1	

	Harbor Drive Southbound				Hawthorne Street Westbound				Harbor Drive Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	08:00																
Volume	0	1360	0	1360	86	0	1232	1318	0	314	0	314	0	0	0	0	2992
Percent	0.0	100.0	0.0		6.5	0.0	93.5		0.0	100.0	0.0		0.0	0.0	0.0		
08:15 Volume	0	354	0	354	23	0	359	382	0	64	0	64	0	0	0	0	800
Peak Factor																	0.935
High Int.	08:30				08:15				08:30				6:45:00 AM				
Volume	0	365	0	365	23	0	359	382	0	91	0	91					
Peak Factor				0.932				0.863				0.863					

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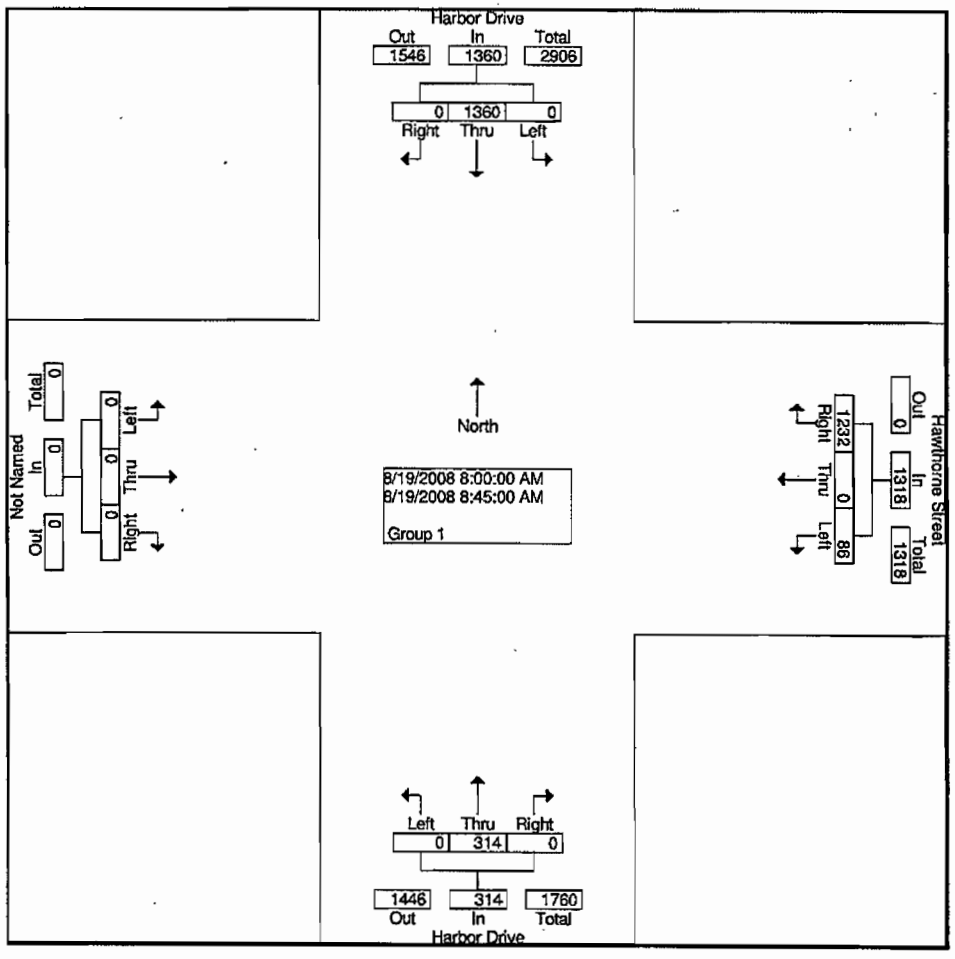
Weather: Clear & Dry
Counted By: L. McCoy
Board No.: D1-2279
Loc: Hawthorn St. & Harbor Dr.

File Name : 08174050
Site Code : 00174050
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: L. McCoy
Board No.: D1-2279
Loc: Hawthorn St. & Harbor Dr.

File Name : 08174051
Site Code : 00174051
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Drive Southbound					Hawthorn Street Westbound					Harbor Drive Northbound					Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	0	441	0	0	441	32	0	244	2	276	0	135	0	0	135	0	0	0	0	0	2	852	854
16:15	0	432	0	0	432	36	0	197	4	233	0	125	0	5	125	0	0	0	0	0	9	790	799
16:30	0	441	0	0	441	34	0	213	2	247	0	111	0	6	111	0	0	0	0	0	8	799	807
16:45	0	418	0	0	418	18	0	217	5	235	0	153	0	7	153	0	0	0	0	0	12	806	818
Total	0	1732	0	0	1732	120	0	871	13	991	0	524	0	18	524	0	0	0	0	0	31	3247	3278
17:00	0	410	0	0	410	27	0	196	1	223	0	155	0	2	155	0	0	0	0	0	3	788	791
17:15	0	355	0	0	355	27	0	215	0	242	0	163	0	3	163	0	0	0	0	0	3	760	763
17:30	0	331	0	0	331	27	0	215	3	242	0	134	0	4	134	0	0	0	0	0	7	707	714
17:45	0	384	0	0	384	30	0	213	4	243	0	128	0	9	128	0	0	0	0	0	13	755	768
Total	0	1480	0	0	1480	111	0	839	8	950	0	580	0	18	580	0	0	0	0	0	26	3010	3036
Grand Total	0	3212	0	0	3212	231	0	1710	21	1941	0	1104	0	36	1104	0	0	0	0	0	57	6257	6314
Apprch %	0.0	100.0	0.0			11.9	0.0	88.1			0.0	100.0	0.0			0.0	0.0	0.0					
Total %	0.0	51.3	0.0		51.3	3.7	0.0	27.3		31.0	0.0	17.6	0.0		17.6	0.0	0.0	0.0		0.0	0.9	99.1	

	Harbor Drive Southbound				Hawthorn Street Westbound				Harbor Drive Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:00																
Volume	0	1732	0	1732	120	0	871	991	0	524	0	524	0	0	0	0	3247
Percent	0.0	100.0	0.0		12.1	0.0	87.9		0.0	100.0	0.0		0.0	0.0	0.0		
16:00 Volume	0	441	0	441	32	0	244	276	0	135	0	135	0	0	0	0	852
Peak Factor																	0.953
High Int.	16:00				16:00				16:45				3:45:00 PM				
Volume	0	441	0	441	32	0	244	276	0	153	0	153					
Peak Factor				0.982				0.898				0.856					

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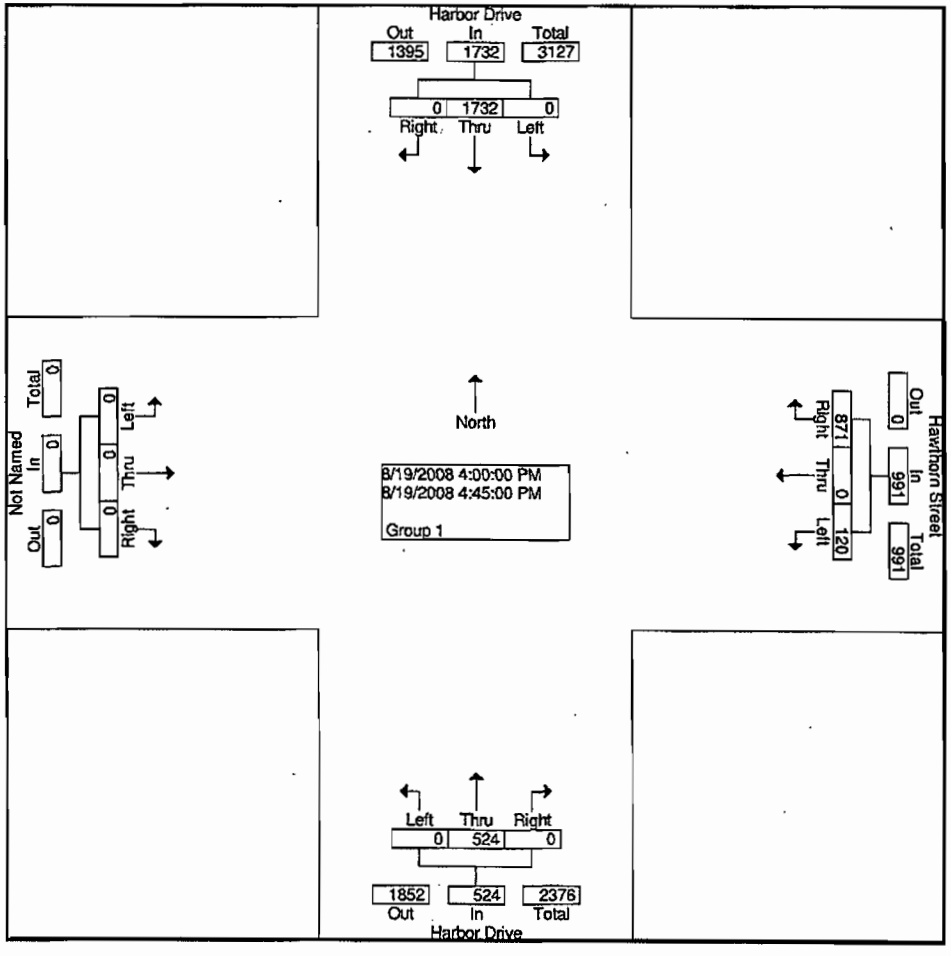
Weather: Clear & Dry
Counted By: L. McCoy
Board No.: D1-2279
Loc: Hawthorn St. & Harbor Dr.

File Name : 08174051
Site Code : 00174051
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: J. Hanna
Board No.: D1-2278
Loc: Grape St. & Harbor Dr.

File Name : 08174060
Site Code : 00174060
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Drive Southbound					Grape Street Westbound					Harbor Drive Northbound					Parking lot exit Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	214	106	0	0	320	0	0	0	0	0	0	74	14	5	88	0	1	0	21	1	26	409	435
07:15	184	133	0	0	317	0	0	0	2	0	1	69	8	4	78	2	2	0	26	4	32	399	431
07:30	181	131	0	0	312	0	0	0	1	0	0	94	18	7	112	0	0	0	35	0	43	424	467
07:45	151	131	0	0	282	0	0	0	2	0	0	76	10	9	86	0	5	0	31	5	42	373	415
Total	730	501	0	0	1231	0	0	0	5	0	1	313	50	25	364	2	8	0	113	10	143	1605	1748
08:00	191	129	0	0	320	0	0	0	3	0	0	90	21	6	111	0	0	1	21	1	30	432	462
08:15	206	153	0	0	359	0	0	0	1	0	0	62	20	3	82	0	0	0	18	0	22	441	463
08:30	220	159	0	0	379	0	0	0	2	0	0	93	20	6	113	0	2	0	29	2	37	494	531
08:45	216	151	0	0	367	0	0	0	3	0	0	69	25	5	94	1	0	0	30	1	38	462	500
Total	833	592	0	0	1425	0	0	0	9	0	0	314	86	20	400	1	2	1	98	4	127	1829	1956
Grand Total	1563	1093	0	0	2656	0	0	0	14	0	1	627	136	45	764	3	10	1	211	14	270	3434	3704
Apprch %	58.8	41.2	0.0			0.0	0.0	0.0			0.1	82.1	17.8			21.4	71.4	7.1					
Total %	45.5	31.8	0.0		77.3	0.0	0.0	0.0		0.0	0.0	18.3	4.0		22.2	0.1	0.3	0.0		0.4	7.3	92.7	

	Harbor Drive Southbound				Grape Street Westbound				Harbor Drive Northbound				Parking lot exit Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	08:00																
Volume	833	592	0	1425	0	0	0	0	0	314	86	400	1	2	1	4	1829
Percent	58.5	41.5	0.0		0.0	0.0	0.0		0.0	78.5	21.5		25.0	50.0	25.0		
08:30 Volume	220	159	0	379	0	0	0	0	0	93	20	113	0	2	0	2	494
Peak Factor																	0.926
High Int.	08:30				6:45:00 AM				08:30				08:30				
Volume	220	159	0	379	0	0	0	0	0	93	20	113	0	2	0	2	
Peak Factor				0.940								0.885				0.500	

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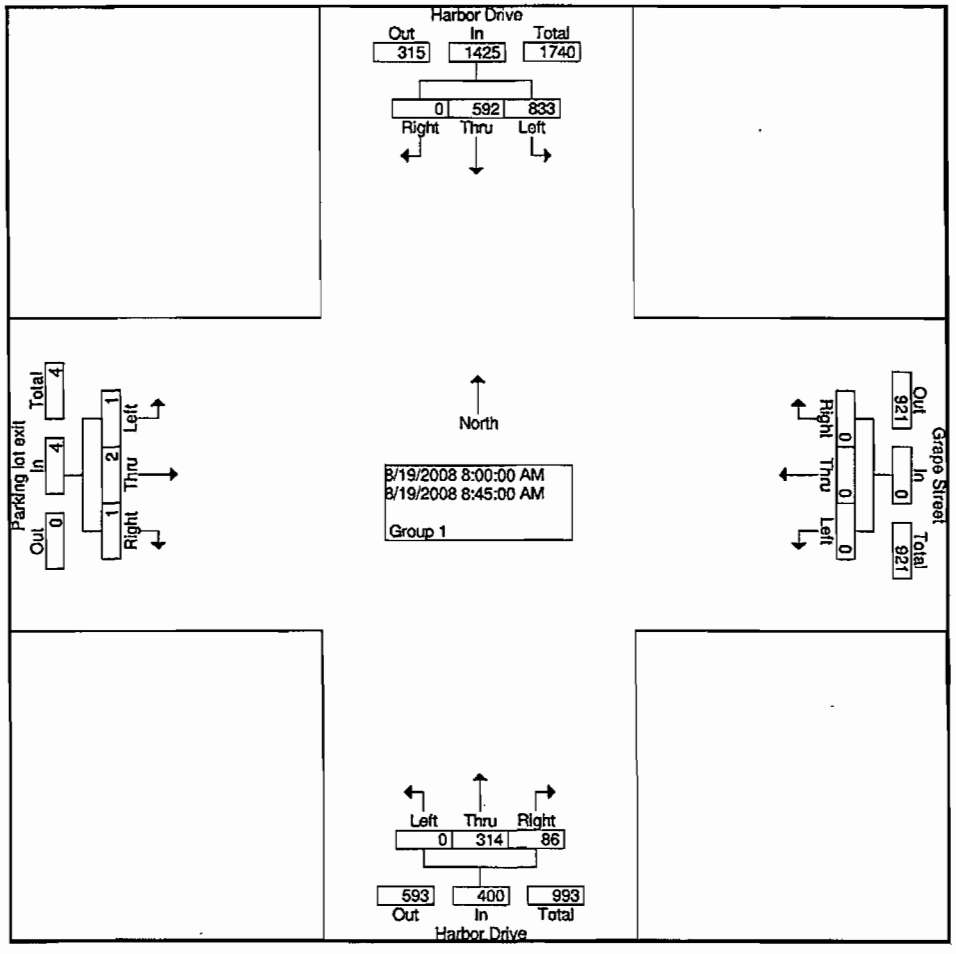
Weather: Clear & Dry
Counted By: J. Hanna
Board No.: D1-2278
Loc: Grape St. & Harbor Dr.

File Name : 08174060
Site Code : 00174060
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: J. Hanna
Board No.: D1-2278
Loc: Grape St. & Harbor Dr.

File Name : 08174061
Site Code : 00174061
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Drive Southbound					Westbound					Harbor Drive Northbound					Grape Street Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	238	181	0	0	419	0	0	0	0	0	0	146	66	6	212	0	32	1	0	33	6	664	670
16:15	242	203	0	0	445	0	0	0	1	0	0	128	63	18	191	1	36	0	0	37	19	673	692
16:30	234	235	0	0	469	0	0	0	0	0	0	114	66	25	180	2	24	0	0	26	25	675	700
16:45	207	213	0	0	420	0	0	0	1	0	0	156	66	16	222	0	32	2	0	34	17	676	693
Total	921	832	0	0	1753	0	0	0	2	0	0	544	261	65	805	3	124	3	0	130	67	2688	2755
17:00	243	190	0	0	433	0	0	0	2	0	0	156	71	11	227	2	10	0	0	12	13	672	685
17:15	237	166	0	0	403	0	0	0	3	0	0	167	53	5	220	1	2	0	0	3	8	626	634
17:30	202	165	0	0	367	0	0	0	2	0	0	143	59	22	202	0	3	1	0	4	24	573	597
17:45	255	188	0	0	443	0	0	0	0	0	0	135	59	21	194	0	0	1	0	1	21	638	659
Total	937	709	0	0	1646	0	0	0	7	0	0	601	242	59	843	3	15	2	0	20	66	2509	2575
Grand Total	1858	1541	0	0	3399	0	0	0	9	0	0	1145	503	124	1648	6	139	5	0	150	133	5197	5330
Apprch %	54.7	45.3	0.0			0.0	0.0	0.0			0.0	69.5	30.5			4.0	92.7	3.3					
Total %	35.8	29.7	0.0		65.4	0.0	0.0	0.0		0.0	0.0	22.0	9.7		31.7	0.1	2.7	0.1		2.9	2.5	97.5	

	Harbor Drive Southbound				Westbound				Harbor Drive Northbound				Grape Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:15																
Volume	926	841	0	1767	0	0	0	0	0	554	266	820	5	102	2	109	2696
Percent	52.4	47.6	0.0		0.0	0.0	0.0		0.0	67.6	32.4		4.6	93.6	1.8		
16:45 Volume	207	213	0	420	0	0	0	0	0	156	66	222	0	32	2	34	676
Peak Factor																	0.997
High Int.	16:30				3:45:00 PM				17:00				16:15				
Volume	234	235	0	469	0	0	0	0	0	156	71	227	1	36	0	37	
Peak Factor				0.942								0.903				0.736	

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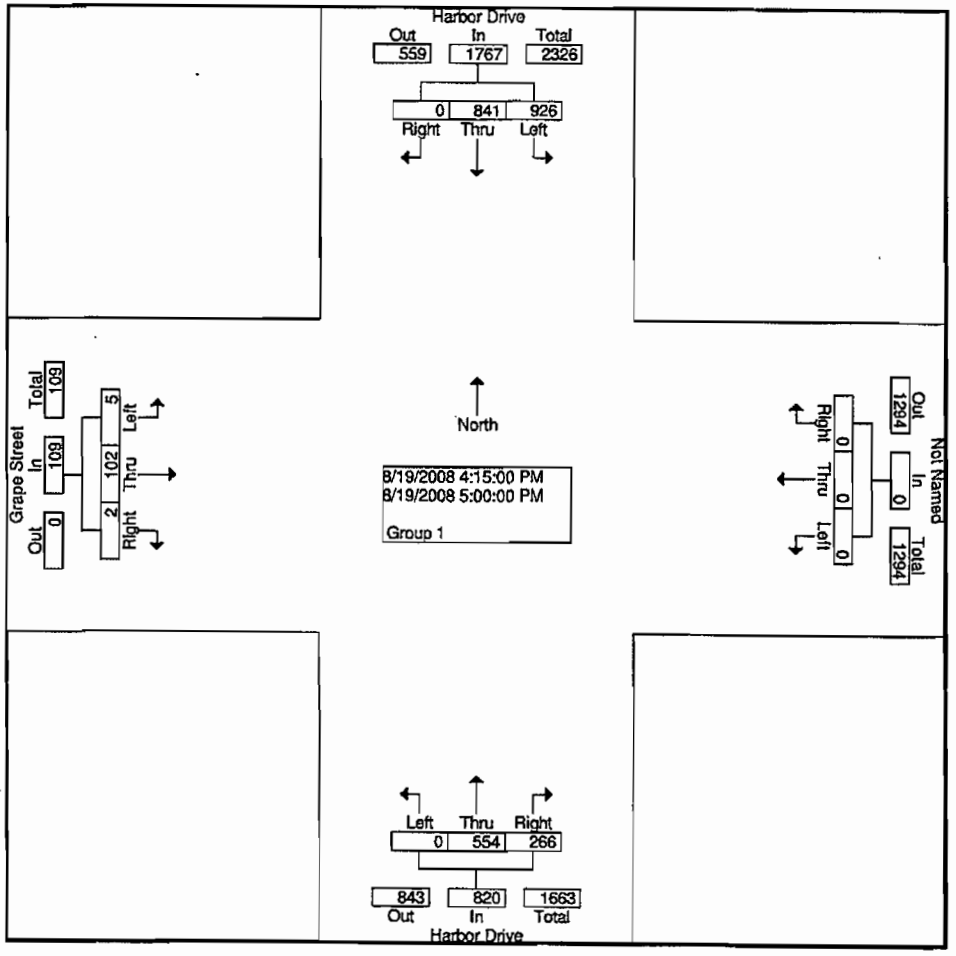
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: J. Hanna
Board No.: D1-2278
Loc: Grape St. & Harbor Dr.

File Name : 08174061
Site Code : 00174061
Start Date : 8/19/2008
Page No : 2



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Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Vockeroth
Board No.: D1-1432
Loc: Laurel St & Pacific Hwy

File Name : 08174070
Site Code : 00174070
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Pacific Hwy Southbound					Laural Street Westbound					Pacific Hwy Northbound					Laural Street Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	3	31	116	14	150	7	139	9	7	155	14	28	11	2	53	58	107	2	5	167	28	525	553
07:15	11	30	114	4	155	10	127	7	1	144	16	43	7	1	66	55	88	2	1	145	7	510	517
07:30	6	38	102	5	146	7	111	11	0	129	13	38	11	1	62	53	112	4	0	169	6	506	512
07:45	15	57	138	2	210	9	135	8	1	152	13	49	5	1	67	65	106	3	0	174	4	603	607
Total	35	156	470	25	661	33	512	35	9	580	56	158	34	5	248	231	413	11	6	655	45	2144	2189
08:00	7	41	122	2	170	6	118	4	0	128	8	46	11	0	65	41	117	1	0	159	2	522	524
08:15	27	37	156	2	220	8	155	15	4	178	16	29	20	4	65	44	146	3	0	193	10	656	666
08:30	33	54	110	0	197	10	133	9	0	152	16	44	16	0	76	87	119	3	1	209	1	634	635
08:45	34	31	151	1	216	13	155	19	0	187	7	51	25	1	83	77	196	6	1	279	3	765	768
Total	101	163	539	5	803	37	561	47	4	645	47	170	72	5	289	249	578	13	2	840	16	2577	2593
Grand Total	136	319	1009	30	1464	70	1073	82	13	1225	103	328	106	10	537	480	991	24	8	1495	61	4721	4782
Apprch %	9.3	21.8	68.9			5.7	87.6	6.7			19.2	61.1	19.7			32.1	66.3	1.6					
Total %	2.9	6.8	21.4		31.0	1.5	22.7	1.7		25.9	2.2	6.9	2.2		11.4	10.2	21.0	0.5		31.7	1.3	98.7	

	Pacific Hwy Southbound				Laural Street Westbound				Pacific Hwy Northbound				Laural Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	08:00																
Volume	101	163	539	803	37	561	47	645	47	170	72	289	249	578	13	840	2577
Percent	12.6	20.3	67.1		5.7	87.0	7.3		16.3	58.8	24.9		29.6	68.8	1.5		
08:45 Volume	34	31	151	216	13	155	19	187	7	51	25	83	77	196	6	279	765
Peak Factor																	0.842
High Int.	08:15				08:45				08:45				08:45				
Volume	27	37	156	220	13	155	19	187	7	51	25	83	77	196	6	279	
Peak Factor				0.913				0.862				0.870				0.753	

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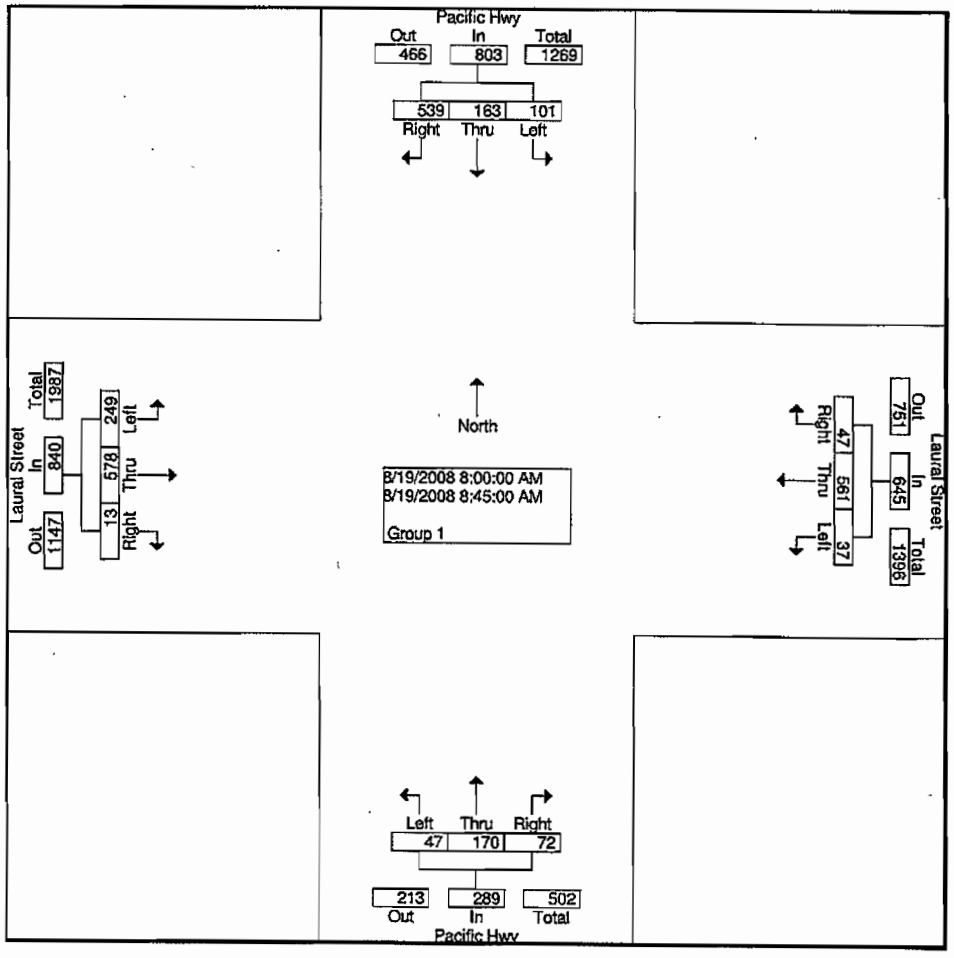
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Vockeroth
Board No.: D1-1432
Loc: Laurel St & Pacific Hwy

File Name : 08174070
Site Code : 00174070
Start Date : 8/19/2008
Page No : 2



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Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Vockeroth
Board No.: D1-1432
Loc: Laurel St & Pacific Hwy

File Name : 08174071
Site Code : 00174071
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Pacific Hwy Southbound					Laural Street Westbound					Pacific Hwy Northbound					Laural Street Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	22	63	88	0	173	8	145	22	0	175	13	71	26	0	110	79	210	12	3	301	3	759	762
16:15	19	70	107	1	196	17	157	16	0	190	19	110	32	4	161	79	188	11	0	278	5	825	830
16:30	27	84	75	0	186	9	128	25	0	162	18	90	54	0	162	59	220	10	2	289	2	799	801
16:45	32	59	71	5	162	14	138	9	0	161	15	84	20	3	119	73	186	8	1	267	9	709	718
Total	100	276	341	6	717	48	568	72	0	688	65	355	132	7	552	290	804	41	6	1135	19	3092	3111
17:00	23	67	108	0	198	10	143	20	0	173	15	92	35	1	142	55	187	5	2	247	3	760	763
17:15	40	84	80	0	204	13	128	21	0	162	14	108	21	0	143	54	152	6	0	212	0	721	721
17:30	39	73	74	6	186	8	161	14	0	183	23	108	25	0	156	44	149	5	0	198	6	723	729
17:45	34	78	74	1	186	10	144	15	0	169	16	71	14	0	101	51	190	1	1	242	2	698	700
Total	136	302	336	7	774	41	576	70	0	687	68	379	95	1	542	204	678	17	3	899	11	2902	2913
Grand Total	236	578	677	13	1491	89	1144	142	0	1375	133	734	227	8	1094	494	1482	58	9	2034	30	5994	6024
Apprch %	15.8	38.8	45.4			6.5	83.2	10.3			12.2	67.1	20.7			24.3	72.9	2.9					
Total %	3.9	9.6	11.3		24.9	1.5	19.1	2.4		22.9	2.2	12.2	3.8		18.3	8.2	24.7	1.0		33.9	0.5	99.5	

	Pacific Hwy Southbound				Laural Street Westbound				Pacific Hwy Northbound				Laural Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:15																
Volume	101	280	361	742	50	566	70	686	67	376	141	584	266	781	34	1081	3093
Percent	13.6	37.7	48.7		7.3	82.5	10.2		11.5	64.4	24.1		24.6	72.2	3.1		
16:15 Volume	19	70	107	196	17	157	16	190	19	110	32	161	79	188	11	278	825
Peak Factor																	0.937
High Int.	17:00				16:15				16:30				16:30				
Volume	23	67	108	198	17	157	16	190	18	90	54	162	59	220	10	289	
Peak Factor				0.937				0.903				0.901				0.935	

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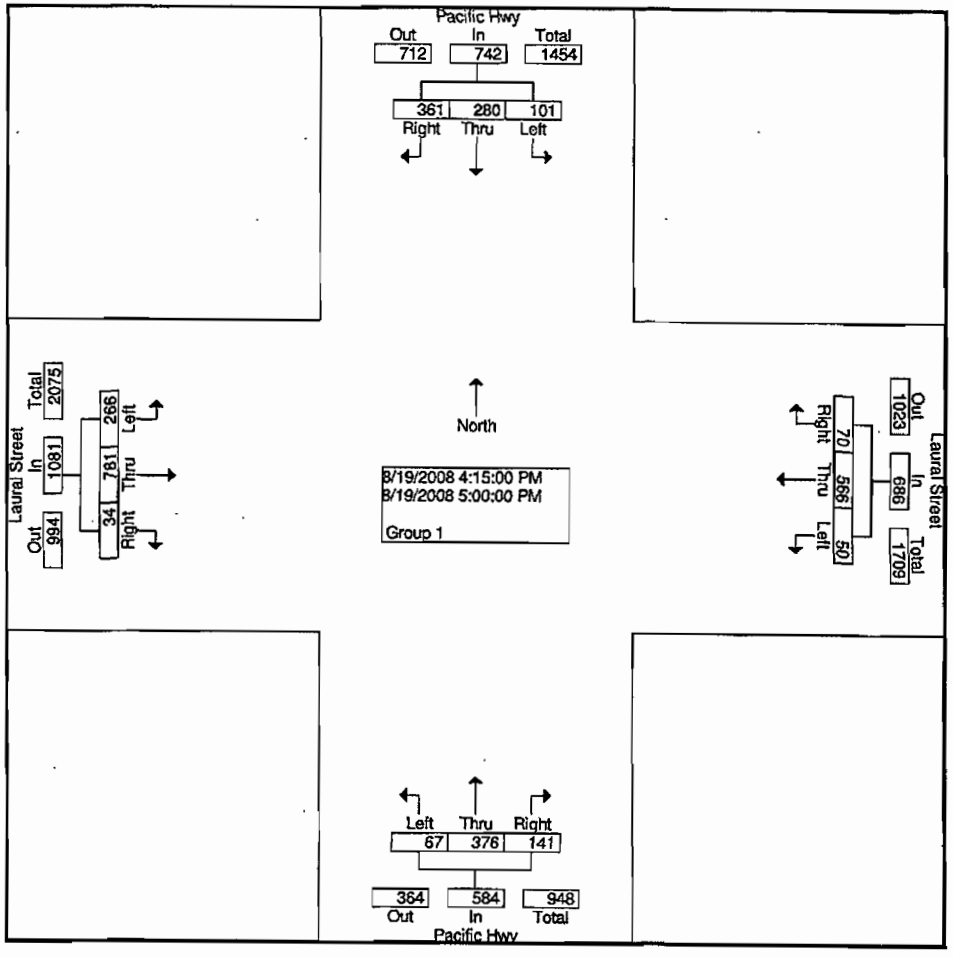
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Vockeroth
Board No.: D1-1432
Loc: Laurel St & Pacific Hwy

File Name : 08174071
Site Code : 00174071
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: J. Fort
Board No.: D1-1431
Loc: Hawthorn St & Pacific Hwy

File Name : 08174080
Site Code : 00174080
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Pacific Hwy Southbound					Hawthorne Street Westbound					Pacific Hwy Northbound					Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	0	31	9	2	40	72	422	14	1	508	16	33	0	4	49	0	0	0	19	0	26	597	623
07:15	0	37	7	3	44	94	390	20	2	504	14	49	0	0	63	0	0	0	12	0	17	611	628
07:30	0	40	5	1	45	107	325	24	0	456	25	46	0	1	71	0	0	0	6	0	8	572	580
07:45	0	53	9	0	62	145	329	19	2	493	25	43	0	0	68	0	0	0	13	0	15	623	638
Total	0	161	30	6	191	418	1466	77	5	1961	80	171	0	5	251	0	0	0	50	0	66	2403	2469
08:00	0	47	9	3	56	74	309	22	1	405	28	54	0	6	82	0	0	0	3	0	13	543	556
08:15	0	45	7	1	52	93	355	23	2	471	23	36	0	0	59	0	0	0	2	0	5	582	587
08:30	0	49	2	3	51	55	281	30	0	366	26	57	0	5	83	0	0	0	7	0	15	500	515
08:45	0	51	5	3	56	54	271	25	2	350	17	50	0	0	67	0	0	0	2	0	7	473	480
Total	0	192	23	10	215	276	1216	100	5	1592	94	197	0	11	291	0	0	0	14	0	40	2098	2138
Grand Total	0	353	53	16	406	694	2682	177	10	3553	174	368	0	16	542	0	0	0	64	0	106	4501	4607
Apprch %	0.0	86.9	13.1			19.5	75.5	5.0			32.1	67.9	0.0			0.0	0.0	0.0					
Total %	0.0	7.8	1.2		9.0	15.4	59.6	3.9		78.9	3.9	8.2	0.0		12.0	0.0	0.0	0.0		0.0	2.3	97.7	

	Pacific Hwy Southbound				Hawthorne Street Westbound				Pacific Hwy Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	07:00																
Volume	0	161	30	191	418	1466	77	1961	80	171	0	251	0	0	0	0	2403
Percent	0.0	84.3	15.7		21.3	74.8	3.9		31.9	68.1	0.0		0.0	0.0	0.0		
07:45 Volume	0	53	9	62	145	329	19	493	25	43	0	68	0	0	0	0	623
Peak Factor																	0.964
High Int.	07:45				07:00				07:30				6:45:00 AM				
Volume	0	53	9	62	72	422	14	508	25	46	0	71					
Peak Factor				0.770				0.965				0.884					

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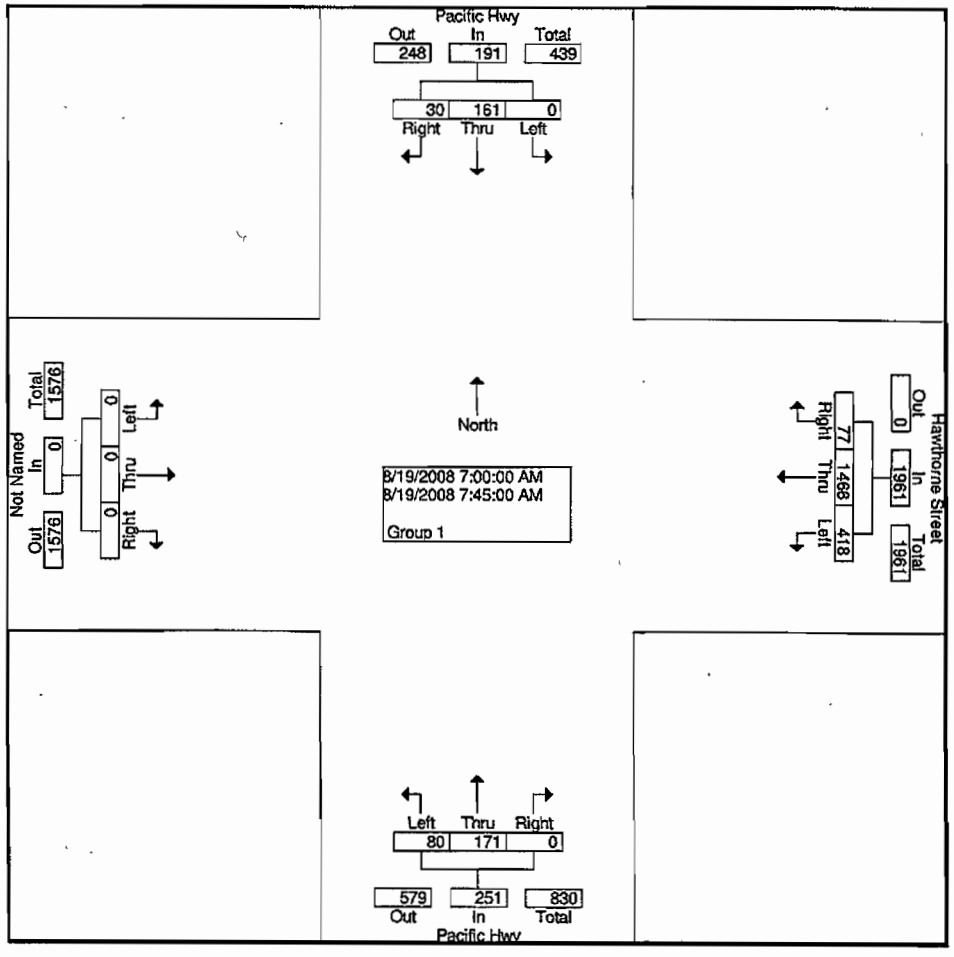
Weather: Clear & Dry
Counted By: J. Fort
Board No.: D1-1431
Loc: Hawthorn St & Pacific Hwy

File Name : 08174080
Site Code : 00174080
Start Date : 8/19/2008
Page No : 2



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Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: J. Fort
Board No.: D1-1431
Loc: Hawthorn St & Pacific Hwy

File Name : 08174081
Site Code : 00174081
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Pacific Hwy Southbound					Hawthorne Street Westbound					Pacific Hwy Northbound					Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	0	87	6	1	93	28	277	19	2	324	25	105	0	0	130	0	0	0	12	0	15	547	562
16:15	0	81	7	2	88	25	234	22	1	281	28	118	0	0	146	0	0	0	5	0	8	515	523
16:30	0	84	7	5	91	40	245	17	0	302	24	123	0	1	147	0	0	0	14	0	20	540	560
16:45	0	85	7	0	92	33	215	24	0	272	31	108	0	0	139	0	0	0	8	0	8	503	511
Total	0	337	27	8	364	126	971	82	3	1179	108	454	0	1	562	0	0	0	39	0	51	2105	2156
17:00	0	74	11	2	85	30	208	25	0	263	27	131	0	6	158	0	0	0	11	0	19	506	525
17:15	0	88	4	4	92	36	233	20	0	289	28	107	0	2	135	0	0	0	4	0	10	516	526
17:30	0	80	6	2	86	31	241	23	2	295	24	126	0	5	150	0	0	0	4	0	13	531	544
17:45	0	68	15	2	83	25	243	25	6	293	12	93	0	3	105	0	0	0	4	0	15	481	496
Total	0	310	36	10	346	122	925	93	8	1140	91	457	0	16	548	0	0	0	23	0	57	2034	2091
Grand Total	0	647	63	18	710	248	1896	175	11	2319	199	911	0	17	1110	0	0	0	62	0	108	4139	4247
Apprch %	0.0	91.1	8.9			10.7	81.8	7.5			17.9	82.1	0.0			0.0	0.0	0.0					
Total %	0.0	15.6	1.5		17.2	6.0	45.8	4.2		56.0	4.8	22.0	0.0		26.8	0.0	0.0	0.0		0.0	2.5	97.5	

	Pacific Hwy Southbound				Hawthorne Street Westbound				Pacific Hwy Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:00																
Volume	0	337	27	364	126	971	82	1179	108	454	0	562	0	0	0	0	2105
Percent	0.0	92.6	7.4		10.7	82.4	7.0		19.2	80.8	0.0		0.0	0.0	0.0		
16:00 Volume	0	87	6	93	28	277	19	324	25	105	0	130	0	0	0	0	547
Peak Factor																	0.962
High Int.	16:00				16:00				16:30				3:45:00 PM				
Volume	0	87	6	93	28	277	19	324	24	123	0	147					
Peak Factor				0.978				0.910				0.956					

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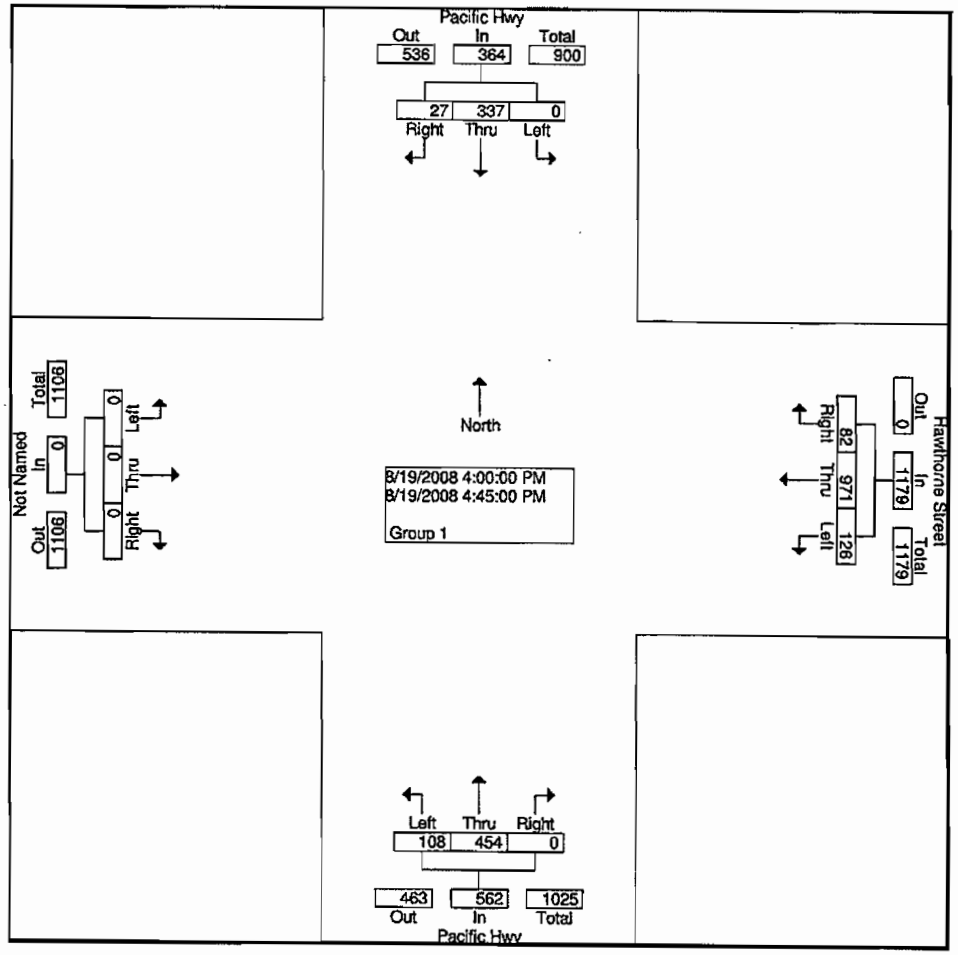
Weather: Clear & Dry
Counted By: J. Fort
Board No.: D1-1431
Loc: Hawthorn St & Pacific Hwy

File Name : 08174081
Site Code : 00174081
Start Date : 8/19/2008
Page No : 2



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Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Tymick
Board No.: D1-1429
Loc: Grape St & Pacific Hwy

File Name : 08174090
Site Code : 00174090
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Pacific Hwy Southbound					Grape Street Westbound					Pacific Hwy Northbound					Grape Street Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	12	96	0	0	108	0	0	0	2	0	0	35	34	5	69	13	199	9	7	221	14	398	412
07:15	4	120	0	1	124	0	0	0	2	0	0	57	52	6	109	8	187	8	2	203	11	436	447
07:30	5	141	0	0	146	0	0	0	0	0	0	70	57	5	127	10	186	11	2	207	7	480	487
07:45	15	181	0	1	196	0	0	0	4	0	0	51	74	5	125	3	166	3	4	172	14	493	507
Total	36	538	0	2	574	0	0	0	8	0	0	213	217	21	430	34	738	31	15	803	46	1807	1853
08:00	13	118	0	0	131	0	0	0	3	0	0	76	72	0	148	9	181	8	5	198	8	477	485
08:15	7	135	0	1	142	0	0	0	7	0	0	52	46	6	98	6	209	6	1	221	15	461	476
08:30	12	105	0	3	117	0	0	0	4	0	0	73	47	14	120	9	224	10	1	243	22	480	502
08:45	16	94	0	2	110	0	0	0	6	0	0	62	67	4	129	10	226	12	0	248	12	487	499
Total	48	452	0	6	500	0	0	0	20	0	0	263	232	24	495	34	840	36	7	910	57	1905	1962
Grand Total	84	990	0	8	1074	0	0	0	28	0	0	476	449	45	925	68	1578	67	22	1713	103	3712	3815
Apprch %	7.8	92.2	0.0			0.0	0.0	0.0			0.0	51.5	48.5			4.0	92.1	3.9					
Total %	2.3	26.7	0.0		28.9	0.0	0.0	0.0		0.0	0.0	12.8	12.1		24.9	1.8	42.5	1.8		46.1	2.7	97.3	

	Pacific Hwy Southbound				Grape Street Westbound				Pacific Hwy Northbound				Grape Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	07:30																
Volume	40	575	0	615	0	0	0	0	0	249	249	498	28	742	28	798	1911
Percent	6.5	93.5	0.0		0.0	0.0	0.0		0.0	50.0	50.0		3.5	93.0	3.5		
07:45 Volume	15	181	0	196	0	0	0	0	0	51	74	125	3	166	3	172	493
Peak Factor																	0.969
High Int.	07:45				6:45:00 AM				08:00				08:15				
Volume	15	181	0	196	0	0	0	0	0	76	72	148	6	209	6	221	
Peak Factor				0.784								0.841				0.903	

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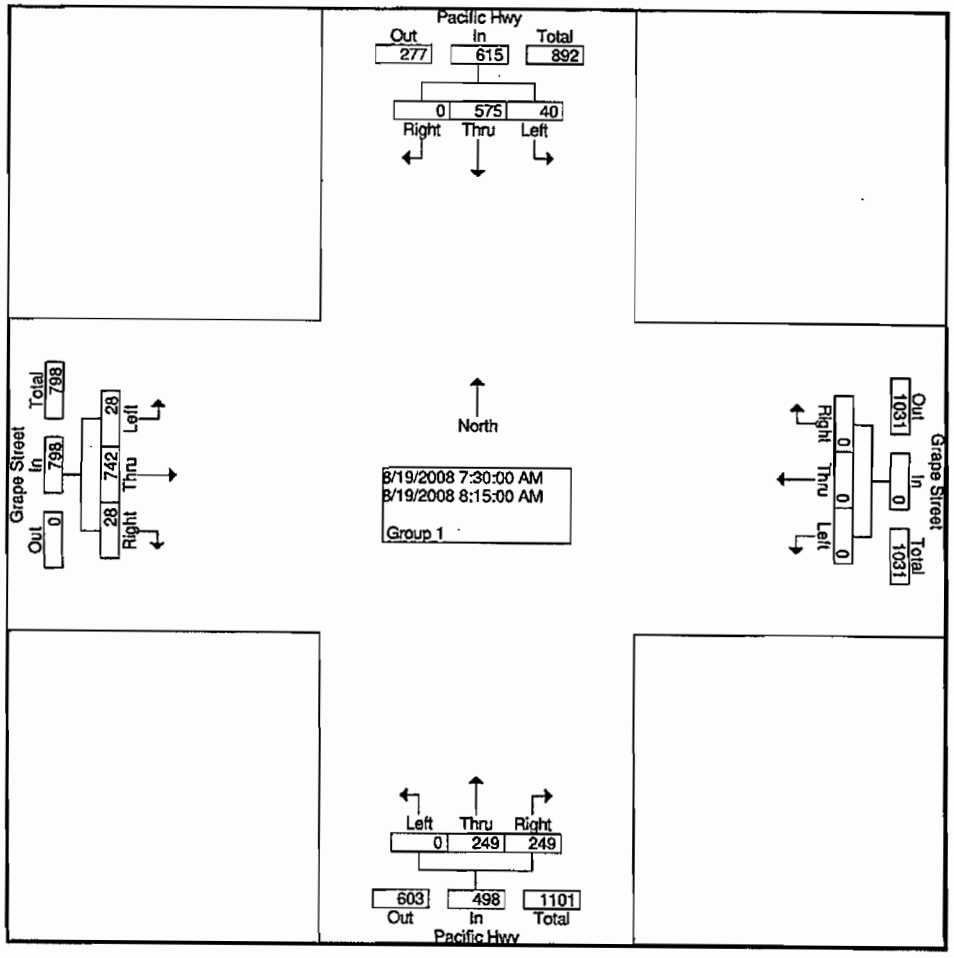
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Tymick
Board No.: D1-1429
Loc: Grape St & Pacific Hwy

File Name : 08174090
Site Code : 00174090
Start Date : 8/19/2008
Page No : 2



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(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: B. Tymick
Board No.: D1-1429
Loc: Grape St & Pacific Hwy

File Name : 08174091
Site Code : 00174091
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Pacific Hwy Southbound					Westbound					Pacific Hwy Northbound					Grape Street Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
15:59	36	86	0	1	122	0	0	0	2	0	0	113	139	6	252	9	377	8	4	394	13	768	781
16:14	32	98	0	0	130	0	0	0	3	0	0	138	123	14	261	11	386	13	2	410	19	801	820
16:29	32	110	0	4	142	0	0	0	5	0	0	143	117	10	260	12	362	6	7	380	26	782	808
16:44	32	93	0	3	125	0	0	0	2	0	0	116	88	14	204	14	337	14	5	365	24	694	718
16:59	26	98	0	1	124	0	0	0	1	0	0	142	131	17	273	23	398	10	2	431	21	828	849
17:14	42	93	0	0	135	0	0	0	3	0	0	127	92	3	219	9	315	5	2	329	8	683	691
17:29	34	67	0	0	101	0	0	0	3	0	0	141	92	20	233	8	295	27	1	330	24	664	688
17:44	26	72	0	2	98	0	0	0	4	0	0	91	55	8	146	14	291	8	8	313	22	557	579
Grand Total	260	717	0	11	977	0	0	0	23	0	0	1011	837	92	1848	100	2761	91	31	2952	157	5777	5934
Apprch %	26.6	73.4	0.0			0.0	0.0	0.0			0.0	54.7	45.3			3.4	93.5	3.1					
Total %	4.5	12.4	0.0		16.9	0.0	0.0	0.0		0.0	0.0	17.5	14.5		32.0	1.7	47.8	1.6		51.1	2.6	97.4	

	Pacific Hwy Southbound				Westbound				Pacific Hwy Northbound				Grape Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 15:59 to 17:44 - Peak 1 of 1																	
Intersection	16:14																
Volume	122	399	0	521	0	0	0	0	0	539	459	998	60	1483	43	1586	3105
Percent	23.4	76.6	0.0		0.0	0.0	0.0		0.0	54.0	46.0		3.8	93.5	2.7		
16:59 Volume	26	98	0	124	0	0	0	0	0	142	131	273	23	398	10	431	828
Peak Factor																	0.938
High Int.	16:29				3:44:00 PM				16:59				16:59				
Volume	32	110	0	142	0	0	0	0	0	142	131	273	23	398	10	431	
Peak Factor				0.917								0.914				0.920	

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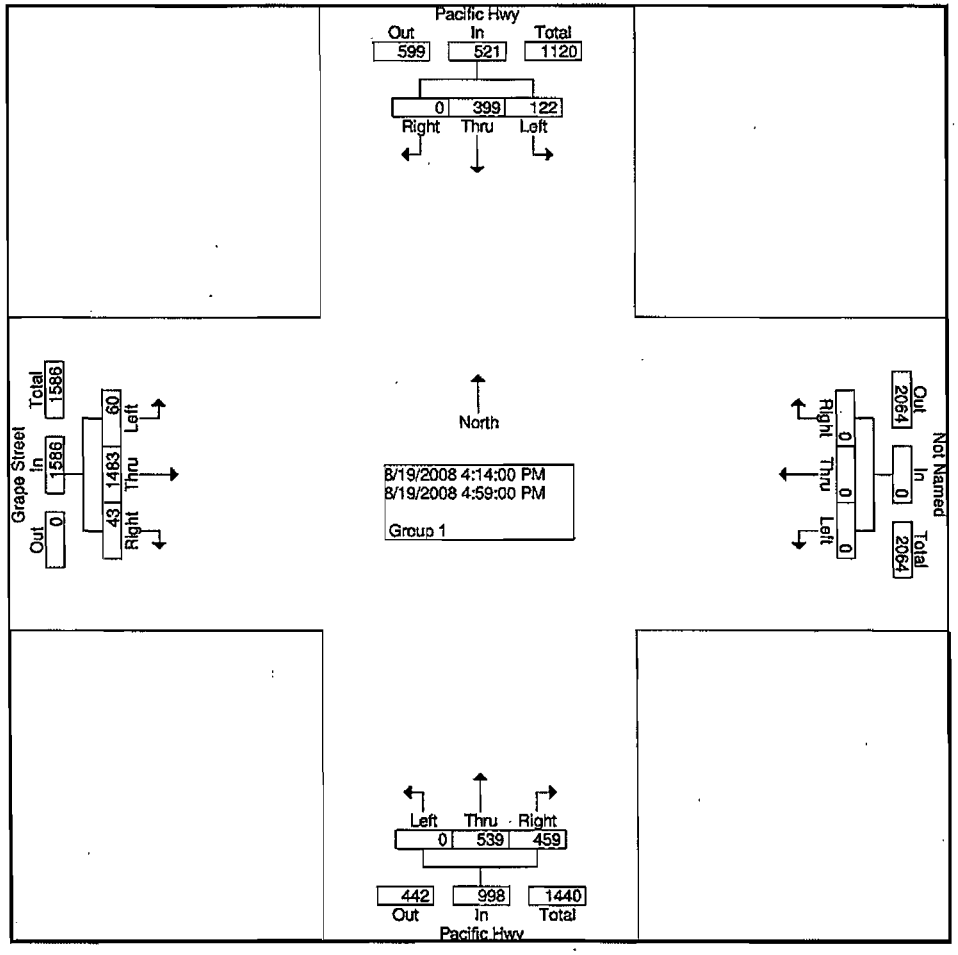
Weather: Clear & Dry
Counted By: B. Tymick
Board No.: D1-1429
Loc: Grape St & Pacific Hwy

File Name : 08174091
Site Code : 00174091
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: M. Parish
Board No.: D1-1306
Loc: Harbor Island Dr & Sheraton Drwy

File Name : 08174100
Site Code : 00174100
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Island Drive Southbound					Driveway Westbound					Harbor Island Drive Northbound					Sheraton Driveway Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	5	50	19	4	74	1	0	7	8	8	7	33	2	0	42	12	2	4	4	18	16	142	158
07:15	8	64	19	4	91	0	0	9	6	9	3	44	1	1	48	10	1	7	1	18	12	166	178
07:30	2	55	25	2	82	0	0	4	2	4	0	41	3	1	44	16	0	2	6	18	11	148	159
07:45	5	76	24	0	105	2	1	4	3	7	1	43	2	0	46	7	0	5	6	12	9	170	179
Total	20	245	87	10	352	3	1	24	19	28	11	161	8	2	180	45	3	18	17	66	48	626	674
08:00	8	81	28	3	117	0	0	10	4	10	2	38	2	0	42	11	0	2	3	13	10	182	192
08:15	4	59	11	0	74	2	0	3	1	5	2	36	0	0	38	8	1	2	4	11	5	128	133
08:30	5	45	6	4	56	0	0	4	6	4	0	25	0	0	25	2	0	1	0	3	10	88	98
08:45	7	63	11	0	81	2	0	11	2	13	1	43	1	0	45	1	0	5	3	6	5	145	150
Total	24	248	56	7	328	4	0	28	13	32	5	142	3	0	150	22	1	10	10	33	30	543	573
Grand Total	44	493	143	17	680	7	1	52	32	60	16	303	11	2	330	67	4	28	27	99	78	1169	1247
Apprch %	6.5	72.5	21.0			11.7	1.7	86.7			4.8	91.8	3.3			67.7	4.0	28.3					
Total %	3.8	42.2	12.2		58.2	0.6	0.1	4.4		5.1	1.4	25.9	0.9		28.2	5.7	0.3	2.4		8.5	6.3	93.7	

	Harbor Island Drive Southbound				Driveway Westbound				Harbor Island Drive Northbound				Sheraton Driveway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	07:15																
Volume	23	276	96	395	2	1	27	30	6	166	8	180	44	1	16	61	666
Percent	5.8	69.9	24.3		6.7	3.3	90.0		3.3	92.2	4.4		72.1	1.6	26.2		
08:00 Volume	8	81	28	117	0	0	10	10	2	38	2	42	11	0	2	13	182
Peak Factor																	0.915
High Int.	08:00				08:00				07:15				07:15				
Volume	8	81	28	117	0	0	10	10	3	44	1	48	10	1	7	18	
Peak Factor				0.844				0.750				0.938				0.847	

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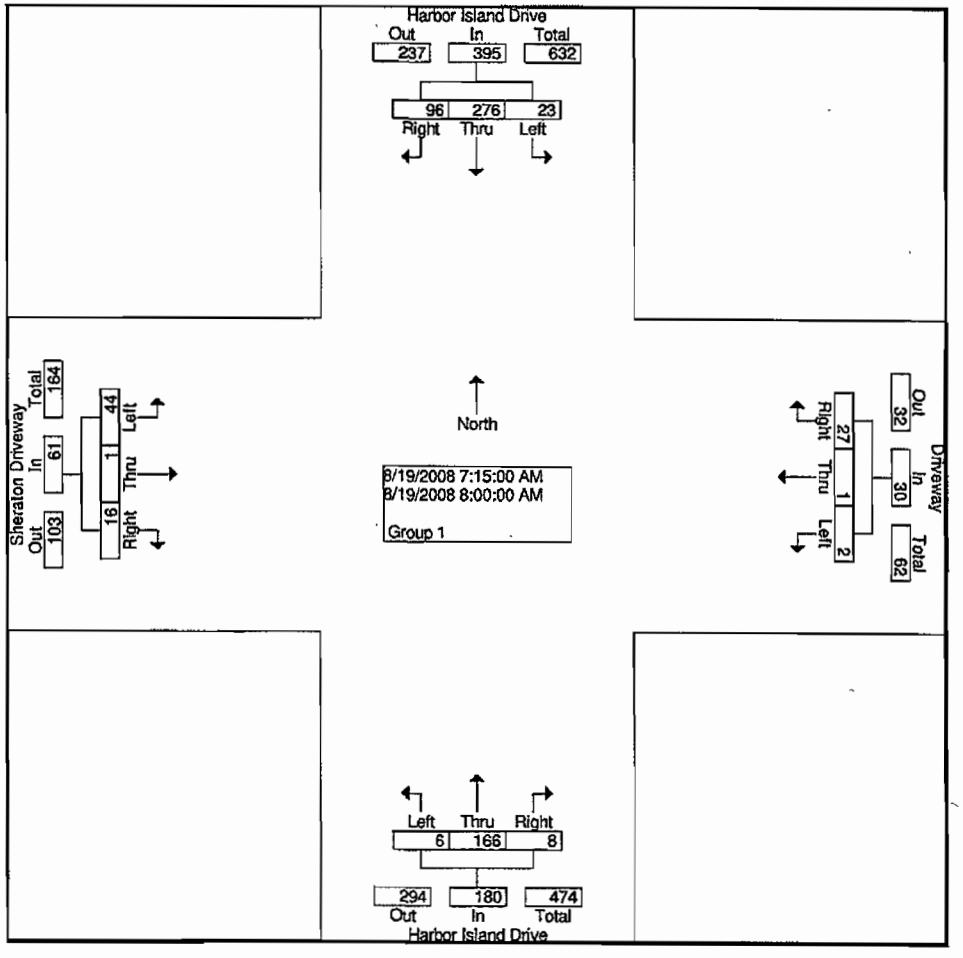
Weather: Clear & Dry
Counted By: M. Parish
Board No.: D1-1306
Loc: Harbor Island Dr & Sheraton Drwy

File Name : 08174100
Site Code : 00174100
Start Date : 8/19/2008
Page No : 2



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(619) 390-8495 Fax (866) 768-1818

Weather: Clear & Dry
Counted By: M. Parish
Board No.: D1-1306
Loc: Harbor Island Dr & Sheraton Drwy

File Name : 08174101
Site Code : 00174101
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Island Drive Southbound					Driveway Westbound					Harbor Island Drive Northbound					Sheriton Driveway Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	5	90	21	2	116	1	0	7	5	8	3	102	5	0	110	24	0	5	3	29	10	263	273
16:15	6	90	13	4	109	4	2	9	3	15	4	95	4	0	103	25	0	6	6	31	13	258	271
16:30	7	95	21	2	123	2	2	11	4	15	2	101	3	1	106	35	0	10	6	45	13	289	302
16:45	5	98	19	0	122	2	0	9	0	11	2	96	3	0	101	14	0	6	2	20	2	254	256
Total	23	373	74	8	470	9	4	36	12	49	11	394	15	1	420	98	0	27	17	125	38	1064	1102
17:00	5	111	16	2	132	2	0	12	3	14	5	81	1	0	87	17	0	3	7	20	12	253	265
17:15	2	68	10	2	80	0	0	6	1	6	5	81	5	2	91	22	0	4	5	26	10	203	213
17:30	2	94	19	2	115	1	1	10	5	12	3	75	2	1	80	24	0	4	3	28	11	235	246
17:45	4	79	23	5	106	0	0	6	8	6	2	76	6	1	84	24	0	7	5	31	19	227	246
Total	13	352	68	11	433	3	1	34	17	38	15	313	14	4	342	87	0	18	20	105	52	918	970
Grand Total	36	725	142	19	903	12	5	70	29	87	26	707	29	5	762	185	0	45	37	230	90	1982	2072
Apprch %	4.0	80.3	15.7			13.8	5.7	80.5			3.4	92.8	3.8			80.4	0.0	19.6					
Total %	1.8	36.6	7.2		45.6	0.6	0.3	3.5		4.4	1.3	35.7	1.5		38.4	9.3	0.0	2.3		11.6	4.3	95.7	

	Harbor Island Drive Southbound				Driveway Westbound				Harbor Island Drive Northbound				Sheriton Driveway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:00																
Volume	23	373	74	470	9	4	36	49	11	394	15	420	98	0	27	125	1064
Percent	4.9	79.4	15.7		18.4	8.2	73.5		2.6	93.8	3.6		78.4	0.0	21.6		
16:30 Volume	7	95	21	123	2	2	11	15	2	101	3	106	35	0	10	45	289
Peak Factor																	0.920
High Int.	16:30				16:15				16:00				16:30				
Volume	7	95	21	123	4	2	9	15	3	102	5	110	35	0	10	45	
Peak Factor				0.955				0.817				0.955				0.694	

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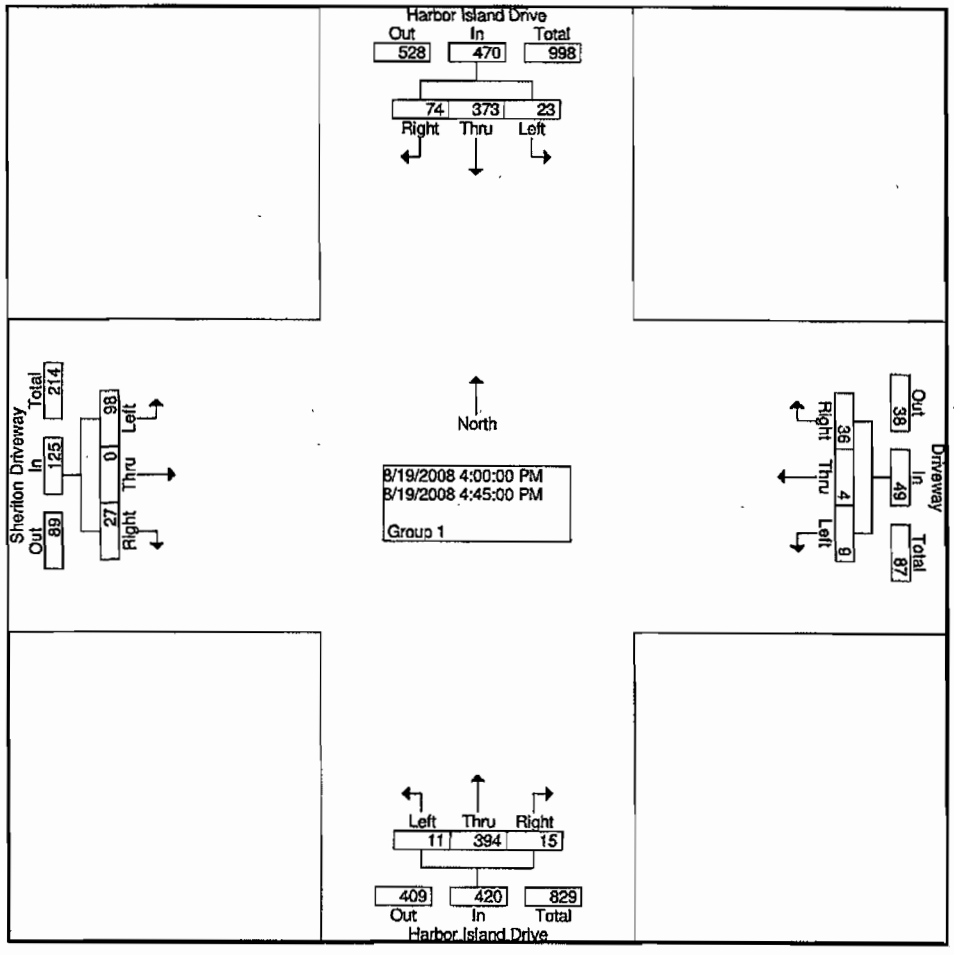
Weather: Clear & Dry
Counted By: M. Parish
Board No.: D1-1306
Loc: Harbor Island Dr & Sheraton Drwy

File Name : 08174101
Site Code : 00174101
Start Date : 8/19/2008
Page No : 2



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Weather: Clear & Dry
Counted By: C. Hust
Board No.: D1-1428
Loc: Harbor Island Dr & Harbor Island Dr

File Name : 08174110
Site Code : 00174110
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Island Drive Southbound					Harbor Island Drive Westbound					Northbound					Harbor Island Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	21	0	33	0	54	0	0	14	0	14	0	0	0	0	0	25	3	0	2	28	2	96	98
07:15	24	0	39	0	63	0	1	12	0	13	0	0	0	0	0	35	4	0	0	39	0	115	115
07:30	16	0	45	0	61	0	0	6	0	6	0	0	0	0	0	40	0	0	1	40	1	107	108
07:45	22	0	55	0	77	0	0	13	0	13	0	0	0	0	0	38	0	0	0	38	0	128	128
Total	83	0	172	0	255	0	1	45	0	46	0	0	0	0	0	138	7	0	3	145	3	446	449
08:00	36	0	36	0	72	0	1	15	0	16	0	0	0	0	0	26	1	0	0	27	0	115	115
08:15	21	0	45	0	66	0	2	21	0	23	0	0	0	0	0	30	2	0	0	32	0	121	121
08:30	21	0	39	0	60	0	2	14	0	16	0	0	0	0	0	33	3	0	0	36	0	112	112
08:45	33	0	40	0	73	0	2	19	0	21	0	0	0	0	0	35	4	0	0	39	0	133	133
Total	111	0	160	0	271	0	7	69	0	76	0	0	0	0	0	124	10	0	0	134	0	481	481
Grand Total	194	0	332	0	526	0	8	114	0	122	0	0	0	0	0	262	17	0	3	279	3	927	930
Apprch %	36.9	0.0	63.1			0.0	6.6	93.4			0.0	0.0	0.0			93.9	6.1	0.0					
Total %	20.9	0.0	35.8		56.7	0.0	0.9	12.3		13.2	0.0	0.0	0.0		0.0	28.3	1.8	0.0		30.1	0.3	99.7	

	Harbor Island Drive Southbound				Harbor Island Drive Westbound				Northbound				Harbor Island Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 to 08:45 - Peak 1 of 1																	
Intersection	08:00																
Volume	111	0	160	271	0	7	69	76	0	0	0	0	124	10	0	134	481
Percent	41.0	0.0	59.0		0.0	9.2	90.8		0.0	0.0	0.0		92.5	7.5	0.0		
08:45 Volume	33	0	40	73	0	2	19	21	0	0	0	0	35	4	0	39	133
Peak Factor																	0.904
High Int.	08:45				08:15				6:45:00 AM				08:45				
Volume	33	0	40	73	0	2	21	23	0	0	0	0	35	4	0	39	
Peak Factor				0.928				0.826								0.859	

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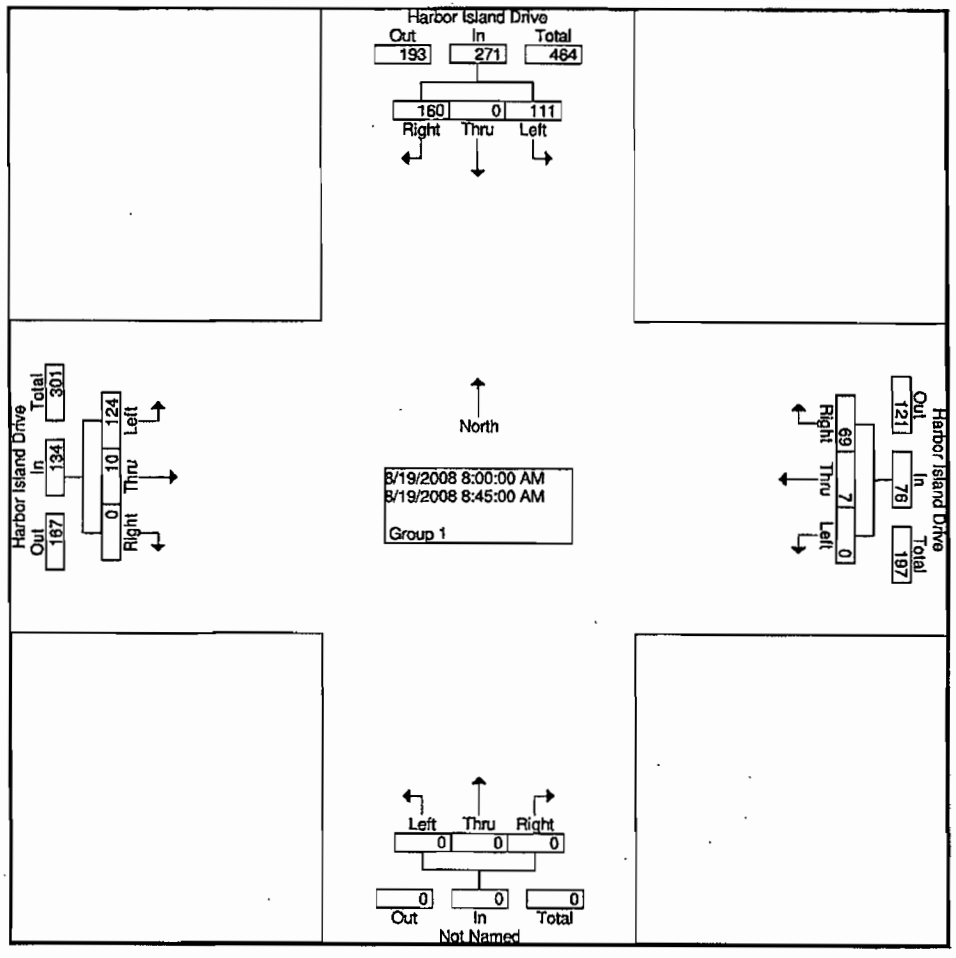
Weather: Clear & Dry
Counted By: C. Hust
Board No.: D1-1428
Loc: Harbor Island Dr & Harbor Island Dr

File Name : 08174110
Site Code : 00174110
Start Date : 8/19/2008
Page No : 2



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Weather : Clear & Dry
Counted By: C. Hust
Board No.: D1-1428
Loc: Harbor Island Dr & Harbor Island Dr

File Name : 08174111
Site Code : 00174111
Start Date : 8/19/2008
Page No : 1

Groups Printed- Group 1

	Harbor Island Drive Southbound					Harbor Island Drive Westbound					Northbound					Harbor Island Drive Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	39	0	51	1	90	0	5	40	0	45	0	0	0	0	0	61	6	0	0	67	1	202	203
16:15	39	0	73	0	112	0	7	25	0	32	0	0	0	0	0	64	9	0	0	73	0	217	217
16:30	30	0	63	0	93	0	4	35	0	39	0	0	0	0	0	82	11	0	0	93	0	225	225
16:45	51	0	66	1	117	0	6	31	0	37	0	0	0	0	0	65	4	0	0	69	1	223	224
Total	159	0	253	2	412	0	22	131	0	153	0	0	0	0	0	272	30	0	0	302	2	867	869
17:00	64	0	46	0	110	0	6	51	0	57	0	0	0	0	0	45	9	0	0	54	0	221	221
17:15	35	0	55	0	90	0	2	49	0	51	0	0	0	0	0	45	6	0	0	51	0	192	192
17:30	47	0	43	0	90	0	6	26	0	32	0	0	0	0	0	49	4	0	0	53	0	175	175
17:45	31	0	50	0	81	0	2	32	0	34	0	0	0	0	0	57	6	0	0	63	0	178	178
Total	177	0	194	0	371	0	16	158	0	174	0	0	0	0	0	196	25	0	0	221	0	766	766
Grand Total	336	0	447	2	783	0	38	289	0	327	0	0	0	0	0	468	55	0	0	523	2	1633	1635
Apprch %	42.9	0.0	57.1			0.0	11.6	88.4			0.0	0.0	0.0			89.5	10.5	0.0					
Total %	20.6	0.0	27.4		47.9	0.0	2.3	17.7		20.0	0.0	0.0	0.0		0.0	28.7	3.4	0.0		32.0	0.1	99.9	

	Harbor Island Drive Southbound				Harbor Island Drive Westbound				Northbound				Harbor Island Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 16:00 to 17:45 - Peak 1 of 1																	
Intersection	16:15																
Volume	184	0	248	432	0	23	142	165	0	0	0	0	256	33	0	289	886
Percent	42.6	0.0	57.4		0.0	13.9	86.1		0.0	0.0	0.0		88.6	11.4	0.0		
16:30 Volume	30	0	63	93	0	4	35	39	0	0	0	0	82	11	0	93	225
Peak Factor																	0.984
High Int.	16:45				17:00				3:45:00 PM				16:30				
Volume	51	0	66	117	0	6	51	57	0	0	0	0	82	11	0	93	
Peak Factor				0.923				0.724								0.777	

57791 112

TDSSW, Inc.
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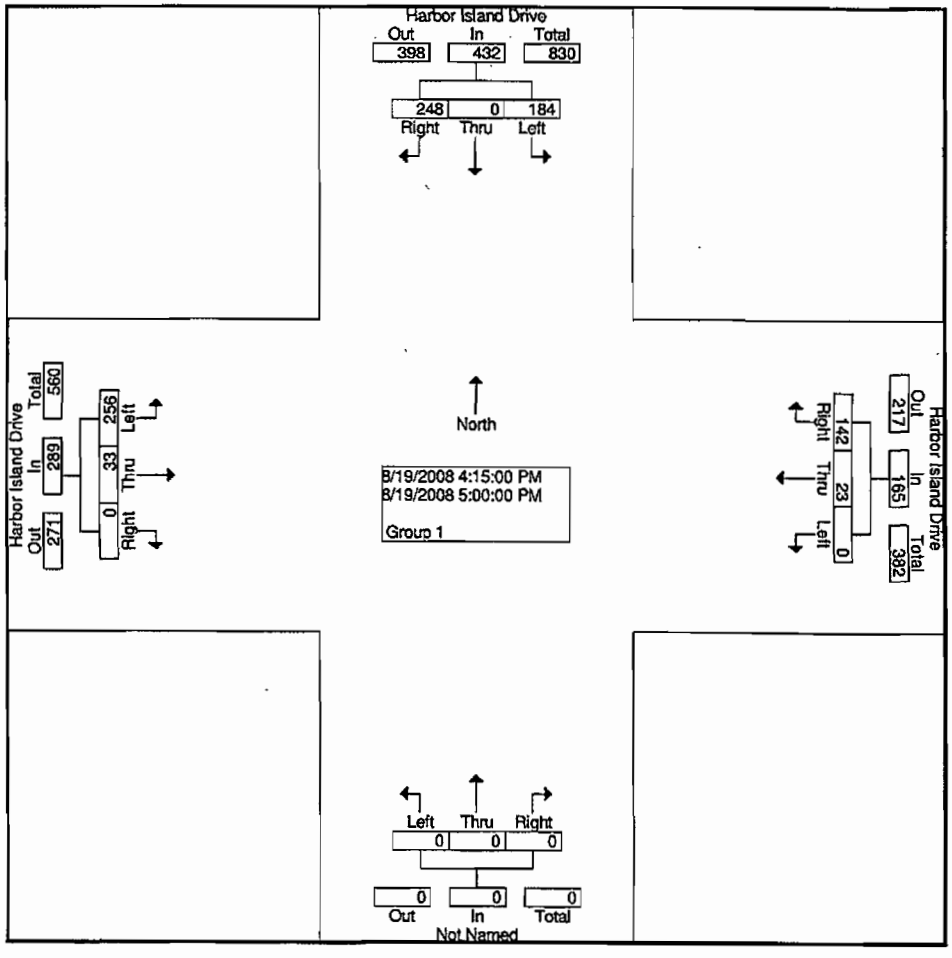
Weather : Clear & Dry
Counted By: C. Hust
Board No.: D1-1428
Loc: Harbor Island Dr & Harbor Island Dr

File Name : 08174111
Site Code : 00174111
Start Date : 8/19/2008
Page No : 2



APPENDIX B

INTERSECTION LEVEL OF SERVICE CRITERIA AND CALCULATION SHEETS

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level of Service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE	CONTROLLED DELAY PER VEHICLE (SEC)		
A		≤	10.0
B	10.1	to	20.0
C	20.1	to	35.0
D	35.1	to	55.0
E	55.1	to	80.0
F		>	80.0

Level of Service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This 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.

Level of Service B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in the level. The number of vehicles stopping is significant at this level, although many still pass through the intersections without stopping.

Level of Service D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. 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.

Level of Service E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered 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.

Level of Service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e. when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4951	1483	1723	4951	1483	1637	1483		3343	1533	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4951	1483	1723	4951	1483	1637	1483		3343	1533	
Volume (vph)	115	669	3	16	1063	3	9	2	8	119	8	83
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	743	3	18	1181	3	10	2	9	132	9	92
RTOR Reduction (vph)	0	0	1	0	0	2	0	8	0	0	78	0
Lane Group Flow (vph)	128	743	2	18	1181	1	10	3	0	132	23	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	8.6	34.9	34.9	0.9	27.2	27.2	8.3	8.3		9.6	9.6	
Effective Green, g (s)	10.6	36.9	36.9	2.9	29.2	29.2	10.3	10.3		11.6	11.6	
Actuated g/C Ratio	0.14	0.50	0.50	0.04	0.40	0.40	0.14	0.14		0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	2479	743	68	1962	588	229	207		526	241	
v/s Ratio Prot	c0.07	0.15		0.01	c0.24		c0.01	0.00		c0.04	0.02	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.52	0.30	0.00	0.26	0.60	0.00	0.04	0.02		0.25	0.10	
Uniform Delay, d1	29.2	10.8	9.2	34.4	17.6	13.4	27.4	27.3		27.2	26.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.1	0.0	2.1	0.5	0.0	0.1	0.0		0.3	0.2	
Delay (s)	31.0	10.9	9.2	36.4	18.2	13.4	27.5	27.4		27.5	26.7	
Level of Service	C	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		13.8			18.4			27.4			27.2	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

52791
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6233		3343	1814	1519	1568	2841	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6233		3343	1814	1519	1568	2841	
Volume (vph)	31	615	91	296	1440	8	69	25	156	45	19	88
Peak-hour factor, PHF	0.60	0.80	0.80	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	52	769	114	493	1800	10	86	31	195	56	24	110
RTOR Reduction (vph)	0	0	97	0	1	0	0	0	0	0	93	0
Lane Group Flow (vph)	52	769	17	493	1809	0	86	31	195	56	41	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.0	18.9	8.9	15.2	28.1		8.9	8.9	72.2	9.2	9.2	
Effective Green, g (s)	8.0	20.9	10.9	17.2	30.1		10.9	10.9	72.2	11.2	11.2	
Actuated g/C Ratio	0.11	0.29	0.15	0.24	0.42		0.15	0.15	1.00	0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	1433	233	796	2599		505	274	1519	243	441	
v/s Ratio Prot	0.03	0.16	0.01	c0.15	c0.29		c0.03	0.02		c0.04	0.01	
v/s Ratio Perm									0.13			
v/c Ratio	0.27	0.54	0.07	0.62	0.70		0.17	0.11	0.13	0.23	0.09	
Uniform Delay, d1	29.4	21.6	26.3	24.6	17.3		26.7	26.5	0.0	26.7	26.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.4	0.1	1.4	0.8		0.2	0.2	0.2	0.5	0.1	
Delay (s)	30.2	22.0	26.5	26.0	18.1		26.9	26.7	0.2	27.2	26.2	
Level of Service	C	C	C	C	B		C	C	A	C	C	
Approach Delay (s)		23.0			19.8			10.2			26.5	
Approach LOS		C			B			B			C	

Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	72.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

S7791

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1501	3343	4948			1740	1501	1723	1562	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1501	3343	4948			1740	1501	1723	1562	
Volume (vph)	54	1784	76	156	2531	8	59	11	131	1	1	4
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	60	1982	84	173	2812	9	66	12	146	1	1	4
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	127	0	4	0
Lane Group Flow (vph)	60	1982	46	173	2821	0	0	78	19	1	1	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.1	51.3	51.3	8.6	56.8			10.5	10.5	8.0	8.0	
Effective Green, g (s)	5.1	53.3	53.3	10.6	58.8			12.5	12.5	10.0	10.0	
Actuated g/C Ratio	0.05	0.54	0.54	0.11	0.60			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	89	3379	813	360	2957			221	191	175	159	
v/s Ratio Prot	c0.03	0.32		0.05	c0.57			c0.04		0.00	c0.00	
v/s Ratio Perm			0.03						0.01			
v/c Ratio	0.67	0.59	0.06	0.48	0.95			0.35	0.10	0.01	0.01	
Uniform Delay, d1	45.8	15.1	10.7	41.3	18.5			39.3	38.0	39.7	39.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.3	0.3	0.0	1.0	8.3			1.0	0.2	0.0	0.0	
Delay (s)	64.1	15.4	10.7	42.3	26.8			40.2	38.2	39.7	39.8	
Level of Service	E	B	B	D	C			D	D	D	D	
Approach Delay (s)		16.6			27.7			38.9			39.8	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	98.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	819	1326	1588	32	43	8
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	910	1473	1764	36	48	9
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	910	1473	1764	36	48	9
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	20.5	66.3	40.8	84.9	8.6	84.9
Effective Green, g (s)	22.5	68.3	42.8	84.9	10.6	84.9
Actuated g/C Ratio	0.27	0.80	0.50	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	886	3983	2496	1519	417	1382
v/s Ratio Prot	c0.27	0.30	c0.36		c0.01	
v/s Ratio Perm				0.02		0.01
v/c Ratio	1.03	0.37	0.71	0.02	0.12	0.01
Uniform Delay, d1	31.2	2.3	16.2	0.0	33.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.3	0.1	0.9	0.0	0.1	0.0
Delay (s)	68.5	2.4	17.1	0.0	33.1	0.0
Level of Service	E	A	B	A	C	A
Approach Delay (s)		27.6	16.8		27.9	
Approach LOS		C	B		C	

Intersection Summary

HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1723	2655	4859			3806
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1723	2655	4859			3806
Volume (vph)	86	1232	314	0	0	1360
Peak-hour factor, PHF	0.65	0.65	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	1895	349	0	0	1511
RTOR Reduction (vph)	0	139	0	0	0	1145
Lane Group Flow (vph)	132	1756	349	0	0	366
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	40.1	40.1	13.4			13.4
Effective Green, g (s)	42.1	42.1	15.4			15.4
Actuated g/C Ratio	0.66	0.66	0.24			0.24
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1142	1760	1178			923
v/s Ratio Prot	0.08		0.07			
v/s Ratio Perm		c0.66				c0.10
v/c Ratio	0.12	1.00	0.30			0.40
Uniform Delay, d1	3.9	10.7	19.6			20.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.0	20.8	0.1			0.3
Delay (s)	4.0	31.5	19.8			20.4
Level of Service	A	C	B			C
Approach Delay (s)	29.7		19.8		20.4	
Approach LOS	C		B		C	

Intersection Summary

HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	6.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

52791
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			4951	1518	3343	3446
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			4951	1518	3343	3446
Volume (vph)	0	0	314	86	833	592
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	349	96	926	658
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	349	96	926	658
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			9.0	9.0	4.2	23.2
Effective Green, g (s)			11.0	11.0	6.2	23.2
Actuated g/C Ratio			0.47	0.47	0.27	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2347	720	893	3446
v/s Ratio Prot			0.07		c0.28	c0.19
v/s Ratio Perm				0.06		
v/c Ratio			0.15	0.13	1.04	0.19
Uniform Delay, d1			3.5	3.4	8.5	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1	40.1	0.0
Delay (s)			3.5	3.5	48.6	0.0
Level of Service			A	A	D	A
Approach Delay (s)	0.0		3.5			28.4
Approach LOS	A		A			C

Intersection Summary

HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	23.2	Sum of lost time (s)	3.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.96		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4932		1723	3401		1723	4701		1723	4311	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4932		1723	3401		1723	4701		1723	4311	
Volume (vph)	249	578	13	37	561	47	47	170	72	101	163	539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	262	608	14	39	591	49	49	179	76	106	172	567
RTOR Reduction (vph)	0	3	0	0	9	0	0	58	0	0	236	0
Lane Group Flow (vph)	262	619	0	39	631	0	49	197	0	106	503	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.3	23.1		2.0	18.8		2.1	12.5		3.0	13.4	
Effective Green, g (s)	8.3	25.1		4.0	20.8		4.1	14.5		5.0	15.4	
Actuated g/C Ratio	0.14	0.41		0.07	0.34		0.07	0.24		0.08	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	236	2043		114	1167		117	1125		142	1096	
v/s Ratio Prot	c0.15	0.13		0.02	c0.19		0.03	0.04		c0.06	c0.12	
v/s Ratio Perm												
v/c Ratio	1.11	0.30		0.34	0.54		0.42	0.18		0.75	0.87dr	
Uniform Delay, d1	26.2	11.9		27.0	16.1		27.1	18.3		27.2	19.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	91.3	0.1		1.8	0.5		2.4	0.1		19.1	0.3	
Delay (s)	117.5	12.0		28.8	16.6		29.5	18.4		46.2	19.4	
Level of Service	F	B		C	B		C	B		D	B	
Approach Delay (s)		43.2			17.3			20.2			22.8	
Approach LOS		D			B			C			C	

Intersection Summary

HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4858		1723	4951			4821	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4858		1723	4951			4821	
Volume (vph)	0	0	0	418	1466	77	80	171	0	0	161	30
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	464	1629	86	89	190	0	0	179	33
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	0	0	0	2174	0	89	190	0	0	186	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					25.0		4.2	18.2			9.0	
Effective Green, g (s)					27.0		6.2	20.2			11.0	
Actuated g/C Ratio					0.51		0.12	0.38			0.21	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2466		201	1880			997	
v/s Ratio Prot							c0.05	0.04			c0.04	
v/s Ratio Perm					0.45							
v/c Ratio					46.40dl		0.44	0.10			0.19	
Uniform Delay, d1					11.7		21.9	10.6			17.4	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					4.1		1.6	0.0			0.1	
Delay (s)					15.8		23.4	10.7			17.5	
Level of Service					B		C	B			B	
Approach Delay (s)		0.0			15.8			14.7			17.5	
Approach LOS		A			B			B			B	

Intersection Summary

HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.92		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		4941	1513					4537		1723	4951	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		4941	1513					4537		1723	4951	
Volume (vph)	28	742	28	0	0	0	0	249	249	40	575	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	31	824	31	0	0	0	0	277	277	44	639	0
RTOR Reduction (vph)	0	0	18	0	0	0	0	162	0	0	0	0
Lane Group Flow (vph)	0	855	13	0	0	0	0	392	0	44	639	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		17.8	17.8					11.7		2.4	19.1	
Effective Green, g (s)		19.8	19.8					13.7		4.4	21.1	
Actuated g/C Ratio		0.42	0.42					0.29		0.09	0.45	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2086	639					1325		162	2227	
v/s Ratio Prot								0.09		0.03	c0.13	
v/s Ratio Perm		0.17	0.01									
v/c Ratio		0.41	0.02					0.30		0.27	0.29	
Uniform Delay, d1		9.5	7.9					12.9		19.8	8.1	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		0.1	0.0					0.1		0.9	0.1	
Delay (s)		9.6	7.9					13.0		20.7	8.2	
Level of Service		A	A					B		C	A	
Approach Delay (s)		9.5			0.0			13.0			9.0	
Approach LOS		A			A			B			A	

Intersection Summary

HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	6.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			0.90	0.85	1.00	0.99		1.00	0.96	
Flt Protected		0.96			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1672			1511	1431	1723	3420		1723	3280	
Flt Permitted		0.81			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1411			1470	1431	1723	3420		1723	3280	
Volume (vph)	44	1	16	2	1	27	6	179	8	23	276	96
Peak-hour factor, PHF	0.65	0.85	0.85	0.65	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	68	1	19	3	1	32	7	211	9	27	325	113
RTOR Reduction (vph)	0	9	0	0	5	17	0	3	0	0	31	0
Lane Group Flow (vph)	0	79	0	0	6	8	7	217	0	27	407	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		22.6			22.6	22.6	1.4	34.4		3.3	36.3	
Effective Green, g (s)		24.6			24.6	24.6	3.4	36.4		5.3	38.3	
Actuated g/C Ratio		0.33			0.33	0.33	0.05	0.48		0.07	0.51	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		461			480	467	78	1653		121	1668	
v/s Ratio Prot							0.00	0.06		c0.02	c0.12	
v/s Ratio Perm		c0.06			0.00	0.01						
v/c Ratio		0.17			0.01	0.02	0.09	0.13		0.22	0.24	
Uniform Delay, d1		18.1			17.1	17.2	34.5	10.7		33.1	10.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	0.5	0.0		0.9	0.1	
Delay (s)		18.3			17.2	17.2	35.0	10.8		34.0	10.5	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		18.3			17.2			11.5			11.8	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	6.0
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1652	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1652	1814	1519	3343	1503
Volume (vph)	124	10	7	69	120	174
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	138	11	8	77	133	193
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	73	76	8	77	133	193
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	9.2	9.2	3.1	59.8	32.5	59.8
Effective Green, g (s)	11.2	11.2	5.1	59.8	34.5	59.8
Actuated g/C Ratio	0.19	0.19	0.09	1.00	0.58	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	307	309	155	1519	1929	1503
v/s Ratio Prot	0.04	c0.05	0.00		0.04	
v/s Ratio Perm				0.05		c0.13
v/c Ratio	0.24	0.25	0.05	0.05	0.07	0.13
Uniform Delay, d1	20.7	20.7	25.1	0.0	5.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.1	0.1	0.0	0.2
Delay (s)	21.1	21.1	25.3	0.1	5.6	0.2
Level of Service	C	C	C	A	A	A
Approach Delay (s)		21.1	2.4		2.4	
Approach LOS		C	A		A	

Intersection Summary

HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	3.0
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1523	1770	5085	1523	1681	1558		3433	1560	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1523	1770	5085	1523	1681	1558		3433	1560	
Volume (vph)	88	988	9	25	1166	1	10	8	19	111	4	82
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	98	1098	10	28	1296	1	11	9	21	123	4	91
RTOR Reduction (vph)	0	0	5	0	0	1	0	18	0	0	77	0
Lane Group Flow (vph)	98	1098	5	28	1296	0	11	12	0	123	18	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	7.5	33.8	33.8	2.2	28.5	28.5	8.4	8.4		9.5	9.5	
Effective Green, g (s)	9.5	35.8	35.8	4.2	30.5	30.5	10.4	10.4		11.5	11.5	
Actuated g/C Ratio	0.13	0.48	0.48	0.06	0.41	0.41	0.14	0.14		0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	2463	738	101	2099	629	237	219		534	243	
v/s Ratio Prot	c0.06	0.22		0.02	c0.25		0.01	c0.01		c0.04	0.01	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.43	0.45	0.01	0.28	0.62	0.00	0.05	0.05		0.23	0.07	
Uniform Delay, d1	29.7	12.5	9.9	33.4	17.1	12.7	27.5	27.5		27.3	26.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.1	0.0	1.5	0.5	0.0	0.1	0.1		0.2	0.1	
Delay (s)	31.0	12.7	9.9	34.9	17.6	12.7	27.5	27.6		27.5	26.8	
Level of Service	C	B	A	C	B	B	C	C		C	C	
Approach Delay (s)		14.1			18.0			27.6			27.2	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	73.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6191		3343	1814	1519	1568	2822	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6191		3343	1814	1519	1568	2822	
Volume (vph)	50	906	162	317	1099	47	127	30	352	45	20	115
Peak-hour factor, PHF	0.60	0.85	0.85	0.60	0.85	0.85	0.60	0.85	0.85	0.60	0.85	0.85
Adj. Flow (vph)	83	1066	191	528	1293	55	212	35	414	75	24	135
RTOR Reduction (vph)	0	0	160	0	3	0	0	0	0	0	115	0
Lane Group Flow (vph)	83	1066	31	528	1345	0	212	35	414	75	44	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	7.8	21.9	11.1	17.9	32.0		11.1	11.1	80.9	10.0	10.0	
Effective Green, g (s)	9.8	23.9	13.1	19.9	34.0		13.1	13.1	80.9	12.0	12.0	
Actuated g/C Ratio	0.12	0.30	0.16	0.25	0.42		0.16	0.16	1.00	0.15	0.15	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	209	1463	250	822	2602		541	294	1519	233	419	
v/s Ratio Prot	0.05	c0.22	0.02	c0.16	0.22		c0.06	0.02		0.05	0.02	
v/s Ratio Perm									c0.27			
v/c Ratio	0.40	0.73	0.12	0.64	0.52		0.39	0.12	0.27	0.32	0.11	
Uniform Delay, d1	32.8	25.6	29.0	27.3	17.4		30.3	29.0	0.0	30.8	29.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	1.8	0.2	1.7	0.2		0.5	0.2	0.4	0.8	0.1	
Delay (s)	34.1	27.4	29.2	29.0	17.5		30.8	29.2	0.4	31.6	29.9	
Level of Service	C	C	C	C	B		C	C	A	C	C	
Approach Delay (s)		28.1			20.8			11.7			30.5	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1502	3343	4949			1723	1502	1723	1527	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1502	3343	4949			1723	1502	1723	1527	
Volume (vph)	22	2335	65	166	2047	6	62	0	175	4	1	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	2594	72	184	2274	7	69	0	194	4	1	11
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	169	0	10	0
Lane Group Flow (vph)	24	2594	49	184	2281	0	0	69	25	4	2	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	1.4	45.4	45.4	10.2	54.2			9.9	9.9	8.0	8.0	
Effective Green, g (s)	3.4	47.4	47.4	12.2	56.2			11.9	11.9	10.0	10.0	
Actuated g/C Ratio	0.04	0.51	0.51	0.13	0.60			0.13	0.13	0.11	0.11	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	63	3163	761	436	2975			219	191	184	163	
v/s Ratio Prot	0.01	c0.42		c0.06	c0.46			c0.04		c0.00	0.00	
v/s Ratio Perm			0.03						0.02			
v/c Ratio	0.38	0.82	0.06	0.42	0.77			0.32	0.13	0.02	0.01	
Uniform Delay, d1	44.0	19.5	11.8	37.4	13.8			37.1	36.2	37.4	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.8	1.8	0.0	0.7	1.2			0.8	0.3	0.0	0.0	
Delay (s)	47.8	21.3	11.8	38.1	15.0			37.9	36.5	37.4	37.4	
Level of Service	D	C	B	D	B			D	D	D	D	
Approach Delay (s)		21.2			16.7			36.9			37.4	
Approach LOS		C			B			D			D	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	93.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	945	1643	1213	120	69	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1050	1826	1348	133	77	6
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1050	1826	1348	133	77	6
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	13.5	44.1	25.6	62.7	8.6	62.7
Effective Green, g (s)	15.5	46.1	27.6	62.7	10.6	62.7
Actuated g/C Ratio	0.25	0.74	0.44	1.00	0.17	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	849	3739	2238	1560	580	1419
v/s Ratio Prot	c0.31	0.36	c0.27		c0.02	
v/s Ratio Perm				0.09		0.00
v/c Ratio	1.24	0.49	0.60	0.09	0.13	0.00
Uniform Delay, d1	23.6	3.4	13.4	0.0	22.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	116.7	0.1	0.5	0.1	0.1	0.0
Delay (s)	140.3	3.5	13.8	0.1	22.2	0.0
Level of Service	F	A	B	A	C	A
Approach Delay (s)		53.4	12.6		20.6	
Approach LOS		D	B		C	

Intersection Summary

HCM Average Control Delay	39.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1770	2727	4990			3908
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1770	2727	4990			3908
Volume (vph)	120	871	524	0	0	1732
Peak-hour factor, PHF	0.60	0.60	0.85	0.85	0.85	0.85
Adj. Flow (vph)	200	1452	616	0	0	2038
RTOR Reduction (vph)	0	230	0	0	0	689
Lane Group Flow (vph)	200	1222	616	0	0	1349
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	25.3	25.3	29.3			29.3
Effective Green, g (s)	27.3	27.3	31.3			31.3
Actuated g/C Ratio	0.42	0.42	0.48			0.48
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	748	1152	2418			1894
v/s Ratio Prot	0.11		0.12			
v/s Ratio Perm		c0.45				c0.35
v/c Ratio	0.27	1.06	0.25			0.71
Uniform Delay, d1	12.1	18.6	9.8			13.1
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	44.3	0.1			1.3
Delay (s)	12.3	62.9	9.8			14.4
Level of Service	B	E	A			B
Approach Delay (s)	56.8		9.8		14.4	
Approach LOS	E		A		B	

Intersection Summary

HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1557	3433	3539
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1557	3433	3539
Volume (vph)	0	0	554	266	926	881
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	652	313	1089	1036
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	652	313	1089	1036
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			13.4	13.4	7.2	30.6
Effective Green, g (s)			15.4	15.4	9.2	30.6
Actuated g/C Ratio			0.50	0.50	0.30	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2559	784	1032	3539
v/s Ratio Prot			0.13		c0.32	0.29
v/s Ratio Perm				c0.20		
v/c Ratio			0.25	0.40	1.06	0.29
Uniform Delay, d1			4.3	4.7	10.7	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.3	43.8	0.0
Delay (s)			4.4	5.1	54.5	0.0
Level of Service			A	A	D	A
Approach Delay (s)	0.0		4.6			27.9
Approach LOS	A		A			C

Intersection Summary

HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	30.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5049		1770	3473		1770	4849		1770	4601	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5049		1770	3473		1770	4849		1770	4601	
Volume (vph)	266	781	34	50	566	70	67	376	141	101	280	361
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	296	868	38	56	629	78	74	418	157	112	311	401
RTOR Reduction (vph)	0	6	0	0	13	0	0	106	0	0	175	0
Lane Group Flow (vph)	296	900	0	56	694	0	74	469	0	112	537	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.3	21.8		2.1	18.6		2.1	13.1		3.0	14.0	
Effective Green, g (s)	7.3	23.8		4.1	20.6		4.1	15.1		5.0	16.0	
Actuated g/C Ratio	0.12	0.40		0.07	0.34		0.07	0.25		0.08	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	215	2003		121	1192		121	1220		148	1227	
v/s Ratio Prot	c0.17	0.18		0.03	c0.20		0.04	0.10		c0.06	c0.12	
v/s Ratio Perm												
v/c Ratio	1.38	0.45		0.46	0.58		0.61	0.38		0.76	0.44	
Uniform Delay, d1	26.4	13.3		26.9	16.2		27.2	18.6		26.9	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	196.0	0.2		2.8	0.7		8.8	0.2		19.6	0.3	
Delay (s)	222.3	13.4		29.7	16.9		36.0	18.8		46.5	18.5	
Level of Service	F	B		C	B		D	B		D	B	
Approach Delay (s)		64.9			17.8			20.8			22.3	
Approach LOS		E			B			C			C	

Intersection Summary

HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.99	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4994		1770	5085			5021	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4994		1770	5085			5021	
Volume (vph)	0	0	0	126	971	82	108	454	0	0	337	27
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	140	1079	91	120	504	0	0	374	30
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	1300	0	120	504	0	0	389	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					22.5		5.8	21.8			11.0	
Effective Green, g (s)					24.5		7.8	23.8			13.0	
Actuated g/C Ratio					0.45		0.14	0.44			0.24	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2253		254	2229			1202	
v/s Ratio Prot							c0.07	0.10			c0.08	
v/s Ratio Perm					0.26							
v/c Ratio					7.37dl		0.47	0.23			0.32	
Uniform Delay, d1					11.1		21.4	9.5			17.0	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					0.4		1.4	0.1			0.2	
Delay (s)					11.4		22.7	9.6			17.2	
Level of Service					B		C	A			B	
Approach Delay (s)		0.0			11.4			12.1			17.2	
Approach LOS		A			B			B			B	

Intersection Summary

HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		5073	1549					4687		1770	5085	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		5073	1549					4687		1770	5085	
Volume (vph)	60	1438	43	0	0	0	0	539	459	122	399	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	1598	48	0	0	0	0	599	510	136	443	0
RTOR Reduction (vph)	0	0	28	0	0	0	0	66	0	0	0	0
Lane Group Flow (vph)	0	1665	20	0	0	0	0	1043	0	136	443	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		25.6	25.6					18.4		7.3	30.7	
Effective Green, g (s)		27.6	27.6					20.4		9.3	32.7	
Actuated g/C Ratio		0.42	0.42					0.31		0.14	0.49	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2112	645					1442		248	2508	
v/s Ratio Prot								c0.22		c0.08	0.09	
v/s Ratio Perm		0.33	0.01									
v/c Ratio		0.79	0.03					0.91dr		0.55	0.18	
Uniform Delay, d1		16.8	11.4					20.4		26.5	9.3	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		2.0	0.0					1.8		2.5	0.0	
Delay (s)		18.8	11.5					22.3		29.0	9.4	
Level of Service		B	B					C		C	A	
Approach Delay (s)		18.6			0.0			22.3			14.0	
Approach LOS		B			A			C			B	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1719			1699	1471	1770	3513		1770	3436	
Flt Permitted		0.79			0.87	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1416			1535	1471	1770	3513		1770	3436	
Volume (vph)	98	0	27	9	4	36	11	375	15	23	396	74
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	109	0	30	10	4	40	12	417	17	26	440	82
RTOR Reduction (vph)	0	9	0	0	0	24	0	3	0	0	16	0
Lane Group Flow (vph)	0	130	0	0	14	16	12	431	0	26	506	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		24.3			24.3	24.3	1.4	24.9		2.9	26.4	
Effective Green, g (s)		26.3			26.3	26.3	3.4	26.9		4.9	28.4	
Actuated g/C Ratio		0.39			0.39	0.39	0.05	0.40		0.07	0.42	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		555			602	577	90	1408		129	1454	
v/s Ratio Prot							0.01	0.12		c0.01	c0.15	
v/s Ratio Perm		c0.09			0.01	0.01						
v/c Ratio		0.24			0.02	0.03	0.13	0.31		0.20	0.35	
Uniform Delay, d1		13.7			12.5	12.5	30.4	13.7		29.3	13.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	0.7	0.1		0.8	0.1	
Delay (s)		13.9			12.5	12.6	31.1	13.9		30.0	13.2	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.9			12.6			14.3			14.0	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	6.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1681	1704	1863	1560	3433	1544
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1681	1704	1863	1560	3433	1544
Volume (vph)	256	33	23	145	184	248
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	284	37	26	161	204	276
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	156	165	26	161	204	276
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	12.8	12.8	2.9	53.6	22.9	53.6
Effective Green, g (s)	14.8	14.8	4.9	53.6	24.9	53.6
Actuated g/C Ratio	0.28	0.28	0.09	1.00	0.46	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	464	471	170	1560	1595	1544
v/s Ratio Prot	0.09	c0.10	0.01		0.06	
v/s Ratio Perm				0.10		c0.18
v/c Ratio	0.34	0.35	0.15	0.10	0.13	0.18
Uniform Delay, d1	15.5	15.5	22.4	0.0	8.2	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.5	0.4	0.1	0.0	0.3
Delay (s)	15.9	16.0	22.9	0.1	8.2	0.3
Level of Service	B	B	C	A	A	A
Approach Delay (s)		16.0	3.3		3.6	
Approach LOS		B	A		A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	3.0
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4951	1482	1723	4951	1482	1637	1533		3343	1536	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4951	1482	1723	4951	1482	1637	1533		3343	1536	
Volume (vph)	120	720	5	20	1140	5	10	5	10	130	10	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	800	6	22	1267	6	11	6	11	144	11	100
RTOR Reduction (vph)	0	0	3	0	0	4	0	9	0	0	84	0
Lane Group Flow (vph)	133	800	3	22	1267	2	11	8	0	144	27	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	8.9	35.1	35.1	2.2	28.4	28.4	8.4	8.4		9.9	9.9	
Effective Green, g (s)	10.9	37.1	37.1	4.2	30.4	30.4	10.4	10.4		11.9	11.9	
Actuated g/C Ratio	0.14	0.49	0.49	0.06	0.40	0.40	0.14	0.14		0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	2430	727	96	1991	596	225	211		526	242	
v/s Ratio Prot	c0.08	0.16		0.01	c0.26		c0.01	0.00		c0.04	0.02	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.54	0.33	0.00	0.23	0.64	0.00	0.05	0.04		0.27	0.11	
Uniform Delay, d1	30.0	11.7	9.8	34.2	18.2	13.5	28.3	28.3		28.0	27.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.1	0.0	1.2	0.7	0.0	0.1	0.1		0.3	0.2	
Delay (s)	32.2	11.8	9.8	35.4	18.8	13.5	28.4	28.3		28.3	27.5	
Level of Service	C	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		14.7			19.1			28.4			28.0	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1630	4684	1458	3162	5895		3162	1716	1437	1483	2687	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1630	4684	1458	3162	5895		3162	1716	1437	1483	2687	
Volume (vph)	35	660	100	310	1550	10	70	30	160	50	20	90
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	58	1100	167	517	2583	17	88	38	200	62	25	112
RTOR Reduction (vph)	0	0	144	0	1	0	0	0	0	0	95	0
Lane Group Flow (vph)	58	1100	23	517	2599	0	88	38	200	62	42	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.5	22.8	9.0	17.3	33.6		9.0	9.0	78.8	9.7	9.7	
Effective Green, g (s)	8.5	24.8	11.0	19.3	35.6		11.0	11.0	78.8	11.7	11.7	
Actuated g/C Ratio	0.11	0.31	0.14	0.24	0.45		0.14	0.14	1.00	0.15	0.15	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	1474	204	774	2663		441	240	1437	220	399	
v/s Ratio Prot	0.04	0.23	0.02	c0.16	c0.44		c0.03	0.02		c0.04	0.02	
v/s Ratio Perm									0.14			
v/c Ratio	0.33	0.75	0.11	0.67	0.98		0.20	0.16	0.14	0.28	0.10	
Uniform Delay, d1	32.5	24.2	29.6	26.9	21.2		30.0	29.8	0.0	29.8	29.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	2.1	0.3	2.2	12.3		0.2	0.3	0.2	0.7	0.1	
Delay (s)	33.6	26.3	29.9	29.1	33.5		30.2	30.1	0.2	30.5	29.1	
Level of Service	C	C	C	C	C		C	C	A	C	C	
Approach Delay (s)		27.1			32.7			11.8			29.6	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1501	3343	4948			1744	1501	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1501	3343	4948			1744	1501	1723	1655	
Volume (vph)	60	1920	80	170	2730	10	60	15	140	5	5	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	2087	87	185	2967	11	65	16	152	5	5	5
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	133	0	4	0
Lane Group Flow (vph)	65	2087	48	185	2978	0	0	81	19	5	6	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.1	51.2	51.2	8.7	56.8			10.6	10.6	8.1	8.1	
Effective Green, g (s)	5.1	53.2	53.2	10.7	58.8			12.6	12.6	10.1	10.1	
Actuated g/C Ratio	0.05	0.54	0.54	0.11	0.60			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	89	3366	810	363	2951			223	192	176	170	
v/s Ratio Prot	c0.04	0.33		0.06	c0.60			c0.05		0.00	c0.00	
v/s Ratio Perm			0.03						0.01			
v/c Ratio	0.73	0.62	0.06	0.51	1.01			0.36	0.10	0.03	0.03	
Uniform Delay, d1	46.1	15.7	10.8	41.5	19.9			39.3	38.0	39.8	39.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.2	0.4	0.0	1.1	18.8			1.0	0.2	0.1	0.1	
Delay (s)	72.3	16.1	10.8	42.6	38.7			40.3	38.2	39.9	39.9	
Level of Service	E	B	B	D	D			D	D	D	D	
Approach Delay (s)		17.5			38.9			39.0			39.9	
Approach LOS		B			D			D			D	

Intersection Summary

HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	880	1430	1710	35	50	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	978	1589	1900	39	56	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	978	1589	1900	39	56	11
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	23.3	73.5	45.2	92.4	8.9	92.4
Effective Green, g (s)	25.3	75.5	47.2	92.4	10.9	92.4
Actuated g/C Ratio	0.27	0.82	0.51	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	915	4045	2529	1519	394	1382
v/s Ratio Prot	c0.29	0.32	c0.38		c0.02	
v/s Ratio Perm				0.03		0.01
v/c Ratio	1.07	0.39	0.75	0.03	0.14	0.01
Uniform Delay, d1	33.6	2.3	17.9	0.0	36.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	49.9	0.1	1.3	0.0	0.2	0.0
Delay (s)	83.5	2.3	19.2	0.0	36.7	0.0
Level of Service	F	A	B	A	D	A
Approach Delay (s)		33.3	18.9		30.7	
Approach LOS		C	B		C	

Intersection Summary

HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	92.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

57791

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Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.97
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1723	2661	4859			3819
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1723	2661	4859			3819
Volume (vph)	90	1300	340	0	0	1460
Peak-hour factor, PHF	0.70	0.70	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	1857	378	0	0	1622
RTOR Reduction (vph)	0	357	0	0	0	1037
Lane Group Flow (vph)	129	1500	378	0	0	585
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	24.4	24.4	16.3			16.3
Effective Green, g (s)	26.4	26.4	18.3			18.3
Actuated g/C Ratio	0.52	0.52	0.36			0.36
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	897	1386	1754			1378
v/s Ratio Prot	0.07		0.08			
v/s Ratio Perm		c0.56				c0.15
v/c Ratio	0.14	1.08	0.22			0.42
Uniform Delay, d1	6.3	12.2	11.2			12.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.1	49.7	0.1			0.2
Delay (s)	6.4	61.9	11.3			12.4
Level of Service	A	E	B			B
Approach Delay (s)	58.3		11.3		12.4	
Approach LOS	E		B		B	

Intersection Summary

HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	50.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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142

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			4951	1518	3343	3446
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			4951	1518	3343	3446
Volume (vph)	0	0	340	90	900	640
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	370	98	978	696
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	370	98	978	696
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			9.1	9.1	4.2	23.3
Effective Green, g (s)			11.1	11.1	6.2	23.3
Actuated g/C Ratio			0.48	0.48	0.27	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2359	723	890	3446
v/s Ratio Prot			0.07		c0.29	c0.20
v/s Ratio Perm				0.06		
v/c Ratio			0.16	0.14	1.10	0.20
Uniform Delay, d1			3.5	3.4	8.5	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1	60.9	0.0
Delay (s)			3.5	3.5	69.5	0.0
Level of Service			A	A	E	A
Approach Delay (s)	0.0		3.5			40.6
Approach LOS	A		A			D

Intersection Summary

HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	23.3	Sum of lost time (s)	3.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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143

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.96		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4932		1723	3402		1723	4711		1723	4314	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4932		1723	3402		1723	4711		1723	4314	
Volume (vph)	280	640	15	40	620	50	50	200	80	110	190	610
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	674	16	42	653	53	53	211	84	116	200	642
RTOR Reduction (vph)	0	3	0	0	8	0	0	63	0	0	221	0
Lane Group Flow (vph)	295	687	0	42	698	0	53	232	0	116	621	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.3	24.0		2.0	19.7		2.1	13.8		3.0	14.7	
Effective Green, g (s)	8.3	26.0		4.0	21.7		4.1	15.8		5.0	16.7	
Actuated g/C Ratio	0.13	0.41		0.06	0.35		0.07	0.25		0.08	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	2042		110	1176		112	1185		137	1147	
v/s Ratio Prot	c0.17	0.14		0.02	c0.21		0.03	0.05		c0.07	c0.14	
v/s Ratio Perm												
v/c Ratio	1.29	0.34		0.38	0.59		0.47	0.20		0.85	0.98dr	
Uniform Delay, d1	27.2	12.5		28.2	16.9		28.3	18.5		28.5	19.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	160.8	0.1		2.2	0.8		3.1	0.1		35.6	0.5	
Delay (s)	188.1	12.6		30.4	17.7		31.4	18.6		64.1	20.3	
Level of Service	F	B		C	B		C	B		E	C	
Approach Delay (s)		65.2			18.4			20.5			25.6	
Approach LOS		E			B			C			C	

Intersection Summary

HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4854		1723	4951			4814	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4854		1723	4951			4814	
Volume (vph)	0	0	0	460	1510	80	90	200	0	0	180	35
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	511	1678	89	100	222	0	0	200	39
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	31	0
Lane Group Flow (vph)	0	0	0	0	2273	0	100	222	0	0	208	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					27.7		5.9	20.3			9.4	
Effective Green, g (s)					29.7		7.9	22.3			11.4	
Actuated g/C Ratio					0.51		0.14	0.38			0.20	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2486		235	1904			946	
v/s Ratio Prot							c0.06	0.04			c0.04	
v/s Ratio Perm					0.47							
v/c Ratio					51.10dl		0.43	0.12			0.22	
Uniform Delay, d1					13.0		23.0	11.5			19.6	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					5.8		1.2	0.0			0.1	
Delay (s)					18.7		24.2	11.5			19.7	
Level of Service					B		C	B			B	
Approach Delay (s)		0.0			18.7			15.5			19.7	
Approach LOS		A			B			B			B	

Intersection Summary

HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		4941	1512					4543		1723	4951	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		4941	1512					4543		1723	4951	
Volume (vph)	30	810	30	0	0	0	0	290	280	45	660	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	900	33	0	0	0	0	322	311	50	733	0
RTOR Reduction (vph)	0	0	19	0	0	0	0	151	0	0	0	0
Lane Group Flow (vph)	0	933	14	0	0	0	0	482	0	50	733	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		19.7	19.7					12.6		4.0	21.6	
Effective Green, g (s)		21.7	21.7					14.6		6.0	23.6	
Actuated g/C Ratio		0.42	0.42					0.28		0.12	0.46	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2090	640					1293		202	2278	
v/s Ratio Prot								0.11		0.03	c0.15	
v/s Ratio Perm		0.19	0.01									
v/c Ratio		0.45	0.02					0.37		0.25	0.32	
Uniform Delay, d1		10.5	8.6					14.7		20.6	8.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0					0.2		0.6	0.1	
Delay (s)		10.7	8.6					14.9		21.2	8.9	
Level of Service		B	A					B		C	A	
Approach Delay (s)		10.6			0.0			14.9			9.7	
Approach LOS		B			A			B			A	

Intersection Summary

HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	6.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

52791

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1676			1667	1431	1723	3411		1723	3277	
Flt Permitted		0.82			0.90	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1423			1551	1431	1723	3411		1723	3277	
Volume (vph)	50	5	20	5	5	30	10	180	10	25	280	100
Peak-hour factor, PHF	0.65	0.85	0.85	0.65	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	77	6	24	8	6	35	12	212	12	29	329	118
RTOR Reduction (vph)	0	9	0	0	0	22	0	5	0	0	37	0
Lane Group Flow (vph)	0	98	0	0	14	13	12	219	0	29	410	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		25.5			25.5	25.5	1.5	29.0		3.2	30.7	
Effective Green, g (s)		27.5			27.5	27.5	3.5	31.0		5.2	32.7	
Actuated g/C Ratio		0.38			0.38	0.38	0.05	0.43		0.07	0.45	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		538			587	541	83	1454		123	1474	
v/s Ratio Prot							0.01	0.06		c0.02	c0.13	
v/s Ratio Perm		c0.07			0.01	0.01						
v/c Ratio		0.18			0.02	0.02	0.14	0.15		0.24	0.28	
Uniform Delay, d1		15.1			14.2	14.2	33.2	12.8		31.9	12.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	0.8	0.0		1.0	0.1	
Delay (s)		15.3			14.2	14.2	34.0	12.8		32.9	12.7	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		15.3			14.2			13.9			13.9	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

147

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1657	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1657	1814	1519	3343	1503
Volume (vph)	130	15	10	70	125	180
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	144	17	11	78	139	200
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	78	83	11	78	139	200
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	9.3	9.3	3.1	59.1	31.7	59.1
Effective Green, g (s)	11.3	11.3	5.1	59.1	33.7	59.1
Actuated g/C Ratio	0.19	0.19	0.09	1.00	0.57	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	313	317	157	1519	1906	1503
v/s Ratio Prot	0.05	c0.05	0.01		0.04	
v/s Ratio Perm				0.05		c0.13
v/c Ratio	0.25	0.26	0.07	0.05	0.07	0.13
Uniform Delay, d1	20.3	20.3	24.8	0.0	5.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.2	0.1	0.0	0.2
Delay (s)	20.7	20.8	25.0	0.1	5.7	0.2
Level of Service	C	C	C	A	A	A
Approach Delay (s)		20.8	3.1		2.5	
Approach LOS		C	A		A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	3.0
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57291

148

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1522	1770	5085	1522	1681	1568		3433	1564	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1522	1770	5085	1522	1681	1568		3433	1564	
Volume (vph)	90	1060	10	30	1260	5	15	10	20	120	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1178	11	33	1400	6	17	11	22	133	6	100
RTOR Reduction (vph)	0	0	5	0	0	3	0	19	0	0	85	0
Lane Group Flow (vph)	100	1178	6	33	1400	3	17	14	0	133	21	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	7.6	36.5	36.5	2.2	31.1	31.1	8.5	8.5		9.7	9.7	
Effective Green, g (s)	9.6	38.5	38.5	4.2	33.1	33.1	10.5	10.5		11.7	11.7	
Actuated g/C Ratio	0.12	0.50	0.50	0.05	0.43	0.43	0.14	0.14		0.15	0.15	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	2546	762	97	2189	655	230	214		522	238	
v/s Ratio Prot	c0.06	0.23		0.02	c0.28		c0.01	0.01		c0.04	0.01	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.45	0.46	0.01	0.34	0.64	0.00	0.07	0.07		0.25	0.09	
Uniform Delay, d1	31.2	12.5	9.6	35.0	17.2	12.5	29.0	28.9		28.8	28.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.1	0.0	2.1	0.6	0.0	0.1	0.1		0.3	0.2	
Delay (s)	32.7	12.6	9.6	37.1	17.8	12.5	29.1	29.1		29.0	28.2	
Level of Service	C	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		14.1			18.3			29.1			28.6	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	76.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57791

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6191		3343	1814	1519	1568	2829	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6191		3343	1814	1519	1568	2829	
Volume (vph)	55	980	170	330	1180	50	130	35	370	50	25	120
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.85	0.85	0.60	0.85	0.85
Adj. Flow (vph)	92	1633	283	550	1967	83	217	41	435	83	29	141
RTOR Reduction (vph)	0	0	171	0	4	0	0	0	0	0	121	0
Lane Group Flow (vph)	92	1633	112	550	2046	0	217	41	435	83	49	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	8.4	28.4	12.8	19.1	39.1		12.8	12.8	90.9	10.6	10.6	
Effective Green, g (s)	10.4	30.4	14.8	21.1	41.1		14.8	14.8	90.9	12.6	12.6	
Actuated g/C Ratio	0.11	0.33	0.16	0.23	0.45		0.16	0.16	1.00	0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	197	1656	251	776	2799		544	295	1519	217	392	
v/s Ratio Prot	0.05	c0.33	c0.07	c0.16	0.33		0.06	0.02		c0.05	0.02	
v/s Ratio Perm									0.29			
v/c Ratio	0.47	0.99	0.45	0.71	0.73		0.40	0.14	0.29	0.38	0.12	
Uniform Delay, d1	37.7	30.0	34.4	32.1	20.4		34.1	32.6	0.0	35.6	34.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	18.7	1.3	3.0	1.0		0.5	0.2	0.5	1.1	0.1	
Delay (s)	39.4	48.7	35.6	35.1	21.4		34.5	32.8	0.5	36.7	34.5	
Level of Service	D	D	D	D	C		C	C	A	D	C	
Approach Delay (s)		46.5			24.3			13.1			35.2	
Approach LOS		D			C			B			D	

Intersection Summary

HCM Average Control Delay	31.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

57791

150

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1723	6239	1503	3343	4947			1733	1503		1503	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (perm)	1723	6239	1503	3343	4947			1733	1503		1503	
Volume (vph)	25	2510	70	180	2200	10	70	5	190	0	0	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	2789	78	200	2444	11	78	6	211	0	0	11
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	182	0	10	0
Lane Group Flow (vph)	28	2789	54	200	2455	0	0	84	29	0	1	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.0	40.0	40.0	10.4	47.4			10.2	10.2		7.8	
Effective Green, g (s)	5.0	42.0	42.0	12.4	49.4			12.2	12.2		9.8	
Actuated g/C Ratio	0.06	0.48	0.48	0.14	0.56			0.14	0.14		0.11	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	97	2964	714	469	2765			239	207		167	
v/s Ratio Prot	0.02	c0.45		c0.06	c0.50			c0.05			c0.00	
v/s Ratio Perm			0.04						0.02			
v/c Ratio	0.29	0.94	0.08	0.43	0.89			0.35	0.14		0.01	
Uniform Delay, d1	40.0	22.0	12.6	34.7	17.1			34.5	33.5		35.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	1.6	6.9	0.0	0.6	3.9			0.9	0.3		0.0	
Delay (s)	41.6	29.0	12.7	35.4	20.9			35.4	33.8		35.0	
Level of Service	D	C	B	D	C			D	C		C	
Approach Delay (s)		28.6			22.0			34.3			35.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

S7791

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	1020	1770	1310	130	70	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1133	1967	1456	144	78	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1133	1967	1456	144	78	11
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	15.5	49.7	29.2	68.4	8.7	68.4
Effective Green, g (s)	17.5	51.7	31.2	68.4	10.7	68.4
Actuated g/C Ratio	0.26	0.76	0.46	1.00	0.16	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	878	3843	2319	1560	537	1419
v/s Ratio Prot	c0.33	0.39	c0.29		c0.02	
v/s Ratio Perm				0.09		0.01
v/c Ratio	1.29	0.51	0.63	0.09	0.15	0.01
Uniform Delay, d1	25.5	3.3	14.2	0.0	24.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	139.2	0.1	0.5	0.1	0.1	0.0
Delay (s)	164.7	3.4	14.7	0.1	25.0	0.0
Level of Service	F	A	B	A	C	A
Approach Delay (s)		62.4	13.4		21.9	
Approach LOS		E	B		C	

Intersection Summary

HCM Average Control Delay	45.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	68.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

57791

152

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1770	2725	4990			3905
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1770	2725	4990			3905
Volume (vph)	130	910	560	0	0	1870
Peak-hour factor, PHF	0.60	0.60	0.85	0.85	0.85	0.85
Adj. Flow (vph)	217	1517	659	0	0	2200
RTOR Reduction (vph)	0	185	0	0	0	689
Lane Group Flow (vph)	217	1332	659	0	0	1511
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	27.1	27.1	30.8			30.8
Effective Green, g (s)	29.1	29.1	32.8			32.8
Actuated g/C Ratio	0.43	0.43	0.48			0.48
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	759	1168	2410			1886
v/s Ratio Prot	0.12		0.13			
v/s Ratio Perm		c0.49				c0.39
v/c Ratio	0.29	1.14	0.27			0.80
Uniform Delay, d1	12.6	19.4	10.5			14.8
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	74.0	0.1			2.5
Delay (s)	12.8	93.4	10.5			17.3
Level of Service	B	F	B			B
Approach Delay (s)	83.3		10.5		17.3	
Approach LOS	F		B		B	

Intersection Summary

HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	6.0
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1557	3433	3539
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1557	3433	3539
Volume (vph)	0	0	600	290	1000	950
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	706	341	1176	1118
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	706	341	1176	1118
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			14.5	14.5	7.3	31.8
Effective Green, g (s)			16.5	16.5	9.3	31.8
Actuated g/C Ratio			0.52	0.52	0.29	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2638	808	1004	3539
v/s Ratio Prot			0.14		c0.34	0.32
v/s Ratio Perm				c0.22		
v/c Ratio			0.27	0.42	1.17	0.32
Uniform Delay, d1			4.3	4.7	11.2	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.4	87.8	0.1
Delay (s)			4.3	5.1	99.1	0.1
Level of Service			A	A	F	A
Approach Delay (s)	0.0		4.6			50.8
Approach LOS	A		A			D

Intersection Summary

HCM Average Control Delay	36.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5046		1770	3469		1770	4847		1770	4597	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5046		1770	3469		1770	4847		1770	4597	
Volume (vph)	300	860	40	60	620	80	80	430	160	110	320	410
Peak-hour factor, PHF	0.90	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90
Adj. Flow (vph)	333	935	44	67	674	89	89	467	178	122	348	456
RTOR Reduction (vph)	0	6	0	0	14	0	0	109	0	0	186	0
Lane Group Flow (vph)	333	973	0	67	749	0	89	536	0	122	618	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.3	21.9		2.7	19.3		2.9	13.0		3.7	13.8	
Effective Green, g (s)	7.3	23.9		4.7	21.3		4.9	15.0		5.7	15.8	
Actuated g/C Ratio	0.12	0.39		0.08	0.35		0.08	0.24		0.09	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	1967		136	1205		141	1186		165	1185	
v/s Ratio Prot	c0.19	c0.19		0.04	c0.22		0.05	0.11		c0.07	c0.13	
v/s Ratio Perm												
v/c Ratio	1.58	0.49		0.49	0.62		0.63	0.45		0.74	0.52	
Uniform Delay, d1	27.0	14.1		27.2	16.6		27.3	19.7		27.1	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	281.7	0.2		2.8	1.0		8.9	0.3		15.9	0.4	
Delay (s)	308.7	14.3		29.9	17.7		36.2	19.9		42.9	19.9	
Level of Service	F	B		C	B		D	B		D	B	
Approach Delay (s)		89.0			18.6			21.9			23.0	
Approach LOS		F			B			C			C	

Intersection Summary

HCM Average Control Delay	44.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

5791

155

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.99	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4989		1770	5085			5024	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4989		1770	5085			5024	
Volume (vph)	0	0	0	140	1000	90	120	520	0	0	390	30
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	156	1111	100	133	578	0	0	433	33
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1356	0	133	578	0	0	452	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					22.7		5.8	22.3			11.5	
Effective Green, g (s)					24.7		7.8	24.3			13.5	
Actuated g/C Ratio					0.45		0.14	0.44			0.25	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2241		251	2247			1233	
v/s Ratio Prot							c0.08	0.11			c0.09	
v/s Ratio Perm					0.27							
v/c Ratio					7.80dl		0.53	0.26			0.37	
Uniform Delay, d1					11.5		21.9	9.7			17.2	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					0.5		2.0	0.1			0.2	
Delay (s)					11.9		23.9	9.7			17.4	
Level of Service					B		C	A			B	
Approach Delay (s)		0.0			11.9			12.4			17.4	
Approach LOS		A			B			B			B	

Intersection Summary

HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

156

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		5072	1549					4694		1770	5085	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		5072	1549					4694		1770	5085	
Volume (vph)	70	1570	50	0	0	0	0	620	510	140	460	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	1744	56	0	0	0	0	689	567	156	511	0
RTOR Reduction (vph)	0	0	33	0	0	0	0	55	0	0	0	0
Lane Group Flow (vph)	0	1822	23	0	0	0	0	1201	0	156	511	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		25.4	25.4					19.2		7.5	31.7	
Effective Green, g (s)		27.4	27.4					21.2		9.5	33.7	
Actuated g/C Ratio		0.41	0.41					0.32		0.14	0.50	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2071	633					1483		251	2554	
v/s Ratio Prot								c0.26		c0.09	0.10	
v/s Ratio Perm		0.36	0.01									
v/c Ratio		0.88	0.04					1.01dr		0.62	0.20	
Uniform Delay, d1		18.3	11.9					21.1		27.1	9.2	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		4.6	0.0					3.4		4.7	0.0	
Delay (s)		23.0	11.9					24.5		31.8	9.3	
Level of Service		C	B					C		C	A	
Approach Delay (s)		22.6			0.0			24.5			14.6	
Approach LOS		C			A			C			B	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

157

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1722			1706	1472	1770	3507		1770	3432	
Flt Permitted		0.80			0.88	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1429			1542	1472	1770	3507		1770	3432	
Volume (vph)	100	5	30	10	5	40	15	390	20	25	410	80
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	111	6	33	11	6	44	17	433	22	28	456	89
RTOR Reduction (vph)	0	8	0	0	0	26	0	4	0	0	17	0
Lane Group Flow (vph)	0	142	0	0	17	18	17	451	0	28	528	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		24.1			24.1	24.1	1.3	23.4		2.8	24.9	
Effective Green, g (s)		26.1			26.1	26.1	3.3	25.4		4.8	26.9	
Actuated g/C Ratio		0.40			0.40	0.40	0.05	0.39		0.07	0.41	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		571			616	588	89	1364		130	1414	
v/s Ratio Prot							0.01	0.13		c0.02	c0.15	
v/s Ratio Perm		c0.10			0.01	0.01						
v/c Ratio		0.25			0.03	0.03	0.19	0.33		0.22	0.37	
Uniform Delay, d1		13.1			11.9	11.9	29.7	14.0		28.5	13.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	1.0	0.1		0.8	0.2	
Delay (s)		13.3			11.9	11.9	30.8	14.1		29.3	13.5	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.3			11.9			14.7			14.3	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	6.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57791

158

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1681	1704	1863	1560	3433	1544
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1681	1704	1863	1560	3433	1544
Volume (vph)	260	35	25	150	190	250
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	289	39	28	167	211	278
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	160	168	28	167	211	278
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	12.7	12.7	4.9	55.9	23.3	55.9
Effective Green, g (s)	14.7	14.7	6.9	55.9	25.3	55.9
Actuated g/C Ratio	0.26	0.26	0.12	1.00	0.45	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	442	448	230	1560	1554	1544
v/s Ratio Prot	0.10	c0.10	0.02		0.06	
v/s Ratio Perm				0.11		c0.18
v/c Ratio	0.36	0.38	0.12	0.11	0.14	0.18
Uniform Delay, d1	16.8	16.8	21.8	0.0	8.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.5	0.2	0.1	0.0	0.3
Delay (s)	17.3	17.4	22.0	0.1	9.0	0.3
Level of Service	B	B	C	A	A	A
Approach Delay (s)		17.3	3.3		4.0	
Approach LOS		B	A		A	

Intersection Summary

HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	3.0
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4951	1482	1723	4951	1482	1637	1533		3343	1536	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4951	1482	1723	4951	1482	1637	1533		3343	1536	
Volume (vph)	120	727	5	20	1151	5	10	5	10	132	10	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	808	6	22	1279	6	11	6	11	147	11	100
RTOR Reduction (vph)	0	0	3	0	0	4	0	9	0	0	84	0
Lane Group Flow (vph)	133	808	3	22	1279	2	11	8	0	147	27	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	8.9	35.2	35.2	2.2	28.5	28.5	8.4	8.4		9.9	9.9	
Effective Green, g (s)	10.9	37.2	37.2	4.2	30.5	30.5	10.4	10.4		11.9	11.9	
Actuated g/C Ratio	0.14	0.49	0.49	0.06	0.40	0.40	0.14	0.14		0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	2433	728	96	1995	597	225	211		526	241	
v/s Ratio Prot	c0.08	0.16		0.01	c0.26		c0.01	0.00		c0.04	0.02	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.54	0.33	0.00	0.23	0.64	0.00	0.05	0.04		0.28	0.11	
Uniform Delay, d1	30.1	11.7	9.8	34.2	18.2	13.5	28.4	28.3		28.1	27.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.1	0.0	1.2	0.7	0.0	0.1	0.1		0.3	0.2	
Delay (s)	32.3	11.8	9.8	35.4	18.9	13.5	28.4	28.4		28.4	27.6	
Level of Service	C	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		14.6			19.2			28.4			28.0	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57291

160.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1630	4684	1458	3162	5895		3162	1716	1437	1483	2737	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1630	4684	1458	3162	5895		3162	1716	1437	1483	2737	
Volume (vph)	35	660	109	338	1550	10	88	40	203	50	30	90
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.80	0.80	0.60	0.80	0.80
Adj. Flow (vph)	58	1100	182	563	2583	17	147	50	254	83	38	112
RTOR Reduction (vph)	0	0	155	0	1	0	0	0	0	0	95	0
Lane Group Flow (vph)	58	1100	27	563	2599	0	147	50	254	74	64	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.8	22.6	10.2	19.4	35.2		10.2	10.2	82.4	10.2	10.2	
Effective Green, g (s)	8.8	24.6	12.2	21.4	37.2		12.2	12.2	82.4	12.2	12.2	
Actuated g/C Ratio	0.11	0.30	0.15	0.26	0.45		0.15	0.15	1.00	0.15	0.15	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	174	1398	216	821	2661		468	254	1437	220	405	
v/s Ratio Prot	0.04	0.23	0.02	c0.18	c0.44		c0.05	0.03		c0.05	0.02	
v/s Ratio Perm									0.18			
v/c Ratio	0.33	0.79	0.12	0.69	0.98		0.31	0.20	0.18	0.34	0.16	
Uniform Delay, d1	34.1	26.5	30.5	27.5	22.2		31.4	30.8	0.0	31.5	30.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	3.0	0.3	2.4	12.4		0.4	0.4	0.3	0.9	0.2	
Delay (s)	35.2	29.5	30.7	29.9	34.6		31.7	31.2	0.3	32.4	30.8	
Level of Service	D	C	C	C	C		C	C	A	C	C	
Approach Delay (s)		29.9			33.7			14.0			31.3	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	82.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

161

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1501	3343	4948			1744	1501	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1501	3343	4948			1744	1501	1723	1655	
Volume (vph)	60	1963	80	170	2758	10	60	15	140	5	5	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	2134	87	185	2998	11	65	16	152	5	5	5
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	133	0	4	0
Lane Group Flow (vph)	65	2134	49	185	3009	0	0	81	19	5	6	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.1	51.2	51.2	8.7	56.8			10.6	10.6	8.1	8.1	
Effective Green, g (s)	5.1	53.2	53.2	10.7	58.8			12.6	12.6	10.1	10.1	
Actuated g/C Ratio	0.05	0.54	0.54	0.11	0.60			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	89	3366	810	363	2951			223	192	176	170	
v/s Ratio Prot	c0.04	0.34		0.06	c0.61			c0.05		0.00	c0.00	
v/s Ratio Perm			0.03						0.01			
v/c Ratio	0.73	0.63	0.06	0.51	1.02			0.36	0.10	0.03	0.03	
Uniform Delay, d1	46.1	15.9	10.8	41.5	19.9			39.3	38.0	39.8	39.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.2	0.4	0.0	1.1	21.7			1.0	0.2	0.1	0.1	
Delay (s)	72.3	16.3	10.8	42.6	41.6			40.3	38.2	39.9	39.9	
Level of Service	E	B	B	D	D			D	D	D	D	
Approach Delay (s)		17.7			41.6			39.0			39.9	
Approach LOS		B			D			D			D	

Intersection Summary

HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	894	1459	1729	35	50	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	993	1621	1921	39	56	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	993	1621	1921	39	56	11
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	23.3	74.2	45.9	93.1	8.9	93.1
Effective Green, g (s)	25.3	76.2	47.9	93.1	10.9	93.1
Actuated g/C Ratio	0.27	0.82	0.51	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	908	4052	2547	1519	391	1382
v/s Ratio Prot	c0.30	0.33	c0.39		c0.02	
v/s Ratio Perm				0.03		0.01
v/c Ratio	1.09	0.40	0.75	0.03	0.14	0.01
Uniform Delay, d1	33.9	2.3	17.9	0.0	36.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	58.7	0.1	1.3	0.0	0.2	0.0
Delay (s)	92.6	2.3	19.2	0.0	37.1	0.0
Level of Service	F	A	B	A	D	A
Approach Delay (s)		36.6	18.9		31.0	
Approach LOS		D	B		C	

Intersection Summary

HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

5791

163

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.97
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1723	2660	4859			3817
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1723	2660	4859			3817
Volume (vph)	90	1317	342	0	0	1489
Peak-hour factor, PHF	0.70	0.70	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	1881	380	0	0	1654
RTOR Reduction (vph)	0	323	0	0	0	1080
Lane Group Flow (vph)	129	1558	380	0	0	574
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	26.4	26.4	16.3			16.3
Effective Green, g (s)	28.4	28.4	18.3			18.3
Actuated g/C Ratio	0.54	0.54	0.35			0.35
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	929	1433	1687			1325
v/s Ratio Prot	0.07		0.08			
v/s Ratio Perm		c0.59				c0.15
v/c Ratio	0.14	1.09	0.23			0.43
Uniform Delay, d1	6.1	12.2	12.2			13.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.1	51.3	0.1			0.2
Delay (s)	6.1	63.5	12.2			13.4
Level of Service	A	E	B			B
Approach Delay (s)	59.8		12.2		13.4	
Approach LOS	E		B		B	

Intersection Summary

HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	52.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			4951	1518	3343	3446
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			4951	1518	3343	3446
Volume (vph)	0	0	342	90	925	644
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.94	0.92
Adj. Flow (vph)	0	0	372	98	984	700
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	372	98	984	700
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			9.1	9.1	4.2	23.3
Effective Green, g (s)			11.1	11.1	6.2	23.3
Actuated g/C Ratio			0.48	0.48	0.27	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2359	723	890	3446
v/s Ratio Prot			0.08		c0.29	c0.20
v/s Ratio Perm				0.06		
v/c Ratio			0.16	0.14	1.11	0.20
Uniform Delay, d1			3.5	3.4	8.5	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1	63.4	0.0
Delay (s)			3.5	3.5	71.9	0.0
Level of Service			A	A	E	A
Approach Delay (s)	0.0		3.5			42.1
Approach LOS	A		A			D

Intersection Summary

HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	23.3	Sum of lost time (s)	3.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

165

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.96		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4932		1723	3402		1723	4711		1723	4313	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4932		1723	3402		1723	4711		1723	4313	
Volume (vph)	287	647	15	40	625	50	50	200	80	110	190	614
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	302	681	16	42	658	53	53	211	84	116	200	646
RTOR Reduction (vph)	0	3	0	0	8	0	0	62	0	0	199	0
Lane Group Flow (vph)	302	694	0	42	703	0	53	233	0	116	647	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.3	22.6		2.6	18.9		2.1	14.1		3.0	15.0	
Effective Green, g (s)	8.3	24.6		4.6	20.9		4.1	16.1		5.0	17.0	
Actuated g/C Ratio	0.13	0.39		0.07	0.34		0.07	0.26		0.08	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	230	1947		127	1141		113	1217		138	1177	
v/s Ratio Prot	c0.18	0.14		0.02	c0.21		0.03	0.05		c0.07	c0.15	
v/s Ratio Perm												
v/c Ratio	1.31	0.36		0.33	0.62		0.47	0.19		0.84	1.01dr	
Uniform Delay, d1	27.0	13.3		27.4	17.3		28.1	18.0		28.3	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	168.3	0.1		1.5	1.0		3.1	0.1		34.5	0.6	
Delay (s)	195.3	13.4		28.9	18.3		31.1	18.1		62.8	19.9	
Level of Service	F	B		C	B		C	B		E	B	
Approach Delay (s)		68.4			18.9			20.1			25.1	
Approach LOS		E			B			C			C	

Intersection Summary

HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4855		1723	4951			4814	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4855		1723	4951			4814	
Volume (vph)	0	0	0	460	1522	80	95	200	0	0	180	35
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	511	1691	89	106	222	0	0	200	39
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	31	0
Lane Group Flow (vph)	0	0	0	0	2286	0	106	222	0	0	208	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					27.7		5.9	20.3			9.4	
Effective Green, g (s)					29.7		7.9	22.3			11.4	
Actuated g/C Ratio					0.51		0.14	0.38			0.20	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2486		235	1904			946	
v/s Ratio Prot							c0.06	0.04			c0.04	
v/s Ratio Perm					0.47							
v/c Ratio					51.10dl		0.45	0.12			0.22	
Uniform Delay, d1					13.0		23.1	11.5			19.6	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					6.1		1.4	0.0			0.1	
Delay (s)					19.1		24.4	11.5			19.7	
Level of Service					B		C	B			B	
Approach Delay (s)		0.0			19.1			15.7			19.7	
Approach LOS		A			B			B			B	

Intersection Summary

HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		4942	1511					4546		1723	4951	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		4942	1511					4546		1723	4951	
Volume (vph)	30	828	37	0	0	0	0	295	280	45	660	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	920	41	0	0	0	0	328	311	50	733	0
RTOR Reduction (vph)	0	0	23	0	0	0	0	150	0	0	0	0
Lane Group Flow (vph)	0	953	18	0	0	0	0	489	0	50	733	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		20.3	20.3					12.6		4.0	21.6	
Effective Green, g (s)		22.3	22.3					14.6		6.0	23.6	
Actuated g/C Ratio		0.43	0.43					0.28		0.12	0.45	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2123	649					1279		199	2251	
v/s Ratio Prot								c0.11		0.03	c0.15	
v/s Ratio Perm		0.19	0.01									
v/c Ratio		0.45	0.03					0.38		0.25	0.33	
Uniform Delay, d1		10.5	8.5					15.0		20.9	9.1	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0					0.2		0.7	0.1	
Delay (s)		10.6	8.6					15.2		21.6	9.1	
Level of Service		B	A					B		C	A	
Approach Delay (s)		10.5			0.0			15.2			9.9	
Approach LOS		B			A			B			A	

Intersection Summary

HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

57791

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1676			1667	1431	1723	3421		1723	3295	
Flt Permitted		0.82			0.90	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1423			1551	1431	1723	3421		1723	3295	
Volume (vph)	50	5	20	5	5	30	10	251	10	25	327	100
Peak-hour factor, PHF	0.65	0.85	0.85	0.65	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	77	6	24	8	6	35	12	295	12	29	385	118
RTOR Reduction (vph)	0	9	0	0	0	22	0	3	0	0	30	0
Lane Group Flow (vph)	0	98	0	0	14	13	12	304	0	29	473	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		26.0			26.0	26.0	1.5	29.5		3.2	31.2	
Effective Green, g (s)		28.0			28.0	28.0	3.5	31.5		5.2	33.2	
Actuated g/C Ratio		0.38			0.38	0.38	0.05	0.43		0.07	0.45	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		541			589	544	82	1462		122	1484	
v/s Ratio Prot							0.01	0.09		c0.02	c0.14	
v/s Ratio Perm		c0.07			0.01	0.01						
v/c Ratio		0.18			0.02	0.02	0.15	0.21		0.24	0.32	
Uniform Delay, d1		15.2			14.3	14.3	33.7	13.3		32.4	13.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	0.8	0.1		1.0	0.1	
Delay (s)		15.4			14.3	14.3	34.5	13.3		33.4	13.1	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		15.4			14.3			14.1			14.2	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1657	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1657	1814	1519	3343	1503
Volume (vph)	130	15	10	141	172	180
Peak-hour factor, PHF	0.56	0.56	0.56	0.95	0.56	0.95
Adj. Flow (vph)	232	27	18	148	307	189
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	126	133	18	148	307	189
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	12.0	12.0	2.9	55.0	25.1	55.0
Effective Green, g (s)	14.0	14.0	4.9	55.0	27.1	55.0
Actuated g/C Ratio	0.25	0.25	0.09	1.00	0.49	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	417	422	162	1519	1647	1503
v/s Ratio Prot	0.08	c0.08	0.01		c0.09	
v/s Ratio Perm				0.10		c0.13
v/c Ratio	0.30	0.32	0.11	0.10	0.19	0.13
Uniform Delay, d1	16.6	16.6	23.0	0.0	7.8	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.3	0.1	0.1	0.2
Delay (s)	17.0	17.0	23.4	0.1	7.8	0.2
Level of Service	B	B	C	A	A	A
Approach Delay (s)		17.0	2.6		4.9	
Approach LOS		B	A		A	

Intersection Summary

HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57791

170.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1522	1770	5085	1522	1681	1568		3433	1564	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1522	1770	5085	1522	1681	1568		3433	1564	
Volume (vph)	90	1072	10	30	1268	5	15	10	20	124	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1191	11	33	1409	6	17	11	22	138	6	100
RTOR Reduction (vph)	0	0	5	0	0	3	0	19	0	0	85	0
Lane Group Flow (vph)	100	1191	6	33	1409	3	17	14	0	138	21	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	7.7	36.7	36.7	2.2	31.2	31.2	8.5	8.5		9.8	9.8	
Effective Green, g (s)	9.7	38.7	38.7	4.2	33.2	33.2	10.5	10.5		11.8	11.8	
Actuated g/C Ratio	0.13	0.50	0.50	0.05	0.43	0.43	0.14	0.14		0.15	0.15	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	222	2549	763	96	2187	655	229	213		525	239	
v/s Ratio Prot	c0.06	0.23		0.02	c0.28		c0.01	0.01		c0.04	0.01	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.45	0.47	0.01	0.34	0.64	0.00	0.07	0.07		0.26	0.09	
Uniform Delay, d1	31.3	12.5	9.6	35.2	17.3	12.6	29.1	29.1		28.9	28.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.1	0.0	2.1	0.7	0.0	0.1	0.1		0.3	0.2	
Delay (s)	32.7	12.7	9.6	37.3	18.0	12.6	29.2	29.2		29.1	28.2	
Level of Service	C	B	A	D	B	B	C	C		C	C	
Approach Delay (s)		14.2			18.4			29.2			28.7	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6191		3343	1814	1519	1568	2875	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6191		3343	1814	1519	1568	2875	
Volume (vph)	55	980	186	377	1180	50	143	43	402	50	41	120
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.85	0.85	0.60	0.85	0.85
Adj. Flow (vph)	92	1633	310	628	1967	83	238	51	473	83	48	141
RTOR Reduction (vph)	0	0	185	0	4	0	0	0	0	0	122	0
Lane Group Flow (vph)	92	1633	125	628	2046	0	238	51	473	83	67	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	8.4	27.8	13.9	21.1	40.5		13.9	13.9	93.6	10.8	10.8	
Effective Green, g (s)	10.4	29.8	15.9	23.1	42.5		15.9	15.9	93.6	12.8	12.8	
Actuated g/C Ratio	0.11	0.32	0.17	0.25	0.45		0.17	0.17	1.00	0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	1576	262	825	2811		568	308	1519	214	393	
v/s Ratio Prot	0.05	c0.33	c0.08	c0.19	0.33		0.07	0.03		c0.05	0.02	
v/s Ratio Perm									0.31			
v/c Ratio	0.48	1.04	0.48	0.76	0.73		0.42	0.17	0.31	0.39	0.17	
Uniform Delay, d1	39.1	31.9	35.1	32.7	20.8		34.7	33.2	0.0	36.8	35.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	32.6	1.4	4.2	1.0		0.5	0.3	0.5	1.2	0.2	
Delay (s)	41.0	64.5	36.5	36.9	21.8		35.2	33.4	0.5	38.0	35.9	
Level of Service	D	E	D	D	C		D	C	A	D	D	
Approach Delay (s)		59.2			25.3			13.6			36.6	
Approach LOS		E			C			B			D	

Intersection Summary

HCM Average Control Delay	36.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	93.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

57791

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00			1.00	0.98		0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1723	6239	1503	3343	4947			1733	1503		1503	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (perm)	1723	6239	1503	3343	4947			1733	1503		1503	
Volume (vph)	25	2542	70	180	2247	10	70	5	190	0	0	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	2824	78	200	2497	11	78	6	211	0	0	11
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	182	0	10	0
Lane Group Flow (vph)	28	2824	54	200	2508	0	0	84	29	0	1	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.0	40.0	40.0	10.4	47.4			10.2	10.2		7.8	
Effective Green, g (s)	5.0	42.0	42.0	12.4	49.4			12.2	12.2		9.8	
Actuated g/C Ratio	0.06	0.48	0.48	0.14	0.56			0.14	0.14		0.11	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	97	2964	714	469	2765			239	207		167	
v/s Ratio Prot	0.02	0.45		c0.06	c0.51			c0.05			c0.00	
v/s Ratio Perm			0.04						0.02			
v/c Ratio	0.29	0.95	0.08	0.43	0.91			0.35	0.14		0.01	
Uniform Delay, d1	40.0	22.2	12.6	34.7	17.4			34.5	33.5		35.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	1.6	8.1	0.0	0.6	4.8			0.9	0.3		0.0	
Delay (s)	41.6	30.4	12.7	35.4	22.2			35.4	33.8		35.0	
Level of Service	D	C	B	D	C			D	C		C	
Approach Delay (s)		30.0			23.2			34.3			35.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

5791

1735

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	1031	1791	1341	130	70	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1146	1990	1490	144	78	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1146	1990	1490	144	78	11
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	15.5	50.5	30.0	69.2	8.7	69.2
Effective Green, g (s)	17.5	52.5	32.0	69.2	10.7	69.2
Actuated g/C Ratio	0.25	0.76	0.46	1.00	0.15	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	868	3858	2351	1560	531	1419
v/s Ratio Prot	c0.33	0.39	c0.29		c0.02	
v/s Ratio Perm				0.09		0.01
v/c Ratio	1.32	0.52	0.63	0.09	0.15	0.01
Uniform Delay, d1	25.9	3.3	14.1	0.0	25.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	152.2	0.1	0.6	0.1	0.1	0.0
Delay (s)	178.1	3.4	14.7	0.1	25.4	0.0
Level of Service	F	A	B	A	C	A
Approach Delay (s)		67.2	13.4		22.3	
Approach LOS		E	B		C	

Intersection Summary

HCM Average Control Delay	48.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1770	2725	4990			3904
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1770	2725	4990			3904
Volume (vph)	130	937	564	0	0	1891
Peak-hour factor, PHF	0.60	0.60	0.85	0.85	0.85	0.85
Adj. Flow (vph)	217	1562	664	0	0	2225
RTOR Reduction (vph)	0	156	0	0	0	756
Lane Group Flow (vph)	217	1406	664	0	0	1469
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	29.0	29.0	29.6			29.6
Effective Green, g (s)	31.0	31.0	31.6			31.6
Actuated g/C Ratio	0.45	0.45	0.46			0.46
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	800	1231	2299			1798
v/s Ratio Prot	0.12		0.13			
v/s Ratio Perm		c0.52				c0.38
v/c Ratio	0.27	1.14	0.29			0.82
Uniform Delay, d1	11.7	18.8	11.5			16.0
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	74.2	0.1			3.0
Delay (s)	11.9	93.0	11.6			19.0
Level of Service	B	F	B			B
Approach Delay (s)	83.1		11.6		19.0	
Approach LOS	F		B		B	

Intersection Summary

HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5791

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1557	3433	3539
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1557	3433	3539
Volume (vph)	0	0	604	290	1018	953
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.86	0.85
Adj. Flow (vph)	0	0	711	341	1184	1121
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	711	341	1184	1121
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			14.7	14.7	7.3	32.0
Effective Green, g (s)			16.7	16.7	9.3	32.0
Actuated g/C Ratio			0.52	0.52	0.29	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2654	813	998	3539
v/s Ratio Prot			0.14		c0.34	0.32
v/s Ratio Perm				c0.22		
v/c Ratio			0.27	0.42	1.19	0.32
Uniform Delay, d1			4.3	4.7	11.4	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.4	94.1	0.1
Delay (s)			4.3	5.0	105.5	0.1
Level of Service			A	A	F	A
Approach Delay (s)	0.0		4.5			54.2
Approach LOS	A		A			D

Intersection Summary

HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	32.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

57791

176

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5046		1770	3470		1770	4846		1770	4593	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5046		1770	3470		1770	4846		1770	4593	
Volume (vph)	305	866	40	60	628	80	80	430	160	110	320	418
Peak-hour factor, PHF	0.90	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90
Adj. Flow (vph)	339	941	44	67	683	89	89	467	178	122	348	464
RTOR Reduction (vph)	0	6	0	0	14	0	0	109	0	0	185	0
Lane Group Flow (vph)	339	979	0	67	758	0	89	536	0	122	627	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.3	22.1		2.7	19.5		2.9	13.1		3.7	13.9	
Effective Green, g (s)	7.3	24.1		4.7	21.5		4.9	15.1		5.7	15.9	
Actuated g/C Ratio	0.12	0.39		0.08	0.35		0.08	0.25		0.09	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	210	1974		135	1211		141	1188		164	1186	
v/s Ratio Prot	c0.19	c0.19		0.04	c0.22		0.05	0.11		c0.07	c0.14	
v/s Ratio Perm												
v/c Ratio	1.61	0.50		0.50	0.63		0.63	0.45		0.74	0.53	
Uniform Delay, d1	27.2	14.2		27.3	16.7		27.5	19.7		27.2	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	297.4	0.2		2.9	1.0		8.9	0.3		16.6	0.4	
Delay (s)	324.5	14.4		30.2	17.7		36.4	20.0		43.8	20.1	
Level of Service	F	B		C	B		D	C		D	C	
Approach Delay (s)		93.8			18.7			22.0			23.2	
Approach LOS		F			B			C			C	

Intersection Summary

HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

57791

177

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.99	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4990		1770	5085			5024	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4990		1770	5085			5024	
Volume (vph)	0	0	0	140	1019	90	128	520	0	0	390	30
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	156	1132	100	142	578	0	0	433	33
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1377	0	142	578	0	0	452	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					22.7		5.8	22.3			11.5	
Effective Green, g (s)					24.7		7.8	24.3			13.5	
Actuated g/C Ratio					0.45		0.14	0.44			0.25	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2241		251	2247			1233	
v/s Ratio Prot							c0.08	0.11			c0.09	
v/s Ratio Perm					0.28							
v/c Ratio					7.80dl		0.57	0.26			0.37	
Uniform Delay, d1					11.5		22.0	9.7			17.2	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					0.5		2.9	0.1			0.2	
Delay (s)					12.0		24.9	9.7			17.4	
Level of Service					B		C	A			B	
Approach Delay (s)		0.0			12.0			12.7			17.4	
Approach LOS		A			B			B			B	

Intersection Summary

HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		5072	1549					4697		1770	5085	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		5072	1549					4697		1770	5085	
Volume (vph)	70	1583	55	0	0	0	0	628	510	140	460	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	1759	61	0	0	0	0	698	567	156	511	0
RTOR Reduction (vph)	0	0	36	0	0	0	0	55	0	0	0	0
Lane Group Flow (vph)	0	1837	25	0	0	0	0	1210	0	156	511	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		25.4	25.4					19.2		7.5	31.7	
Effective Green, g (s)		27.4	27.4					21.2		9.5	33.7	
Actuated g/C Ratio		0.41	0.41					0.32		0.14	0.50	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2071	633					1484		251	2554	
v/s Ratio Prot								c0.26		c0.09	0.10	
v/s Ratio Perm		0.36	0.02									
v/c Ratio		0.89	0.04					1.01dr		0.62	0.20	
Uniform Delay, d1		18.4	11.9					21.1		27.1	9.2	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		5.0	0.0					3.6		4.7	0.0	
Delay (s)		23.4	12.0					24.7		31.8	9.3	
Level of Service		C	B					C		C	A	
Approach Delay (s)		23.1			0.0			24.7			14.6	
Approach LOS		C			A			C			B	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1722			1706	1471	1770	3511		1770	3447	
Flt Permitted		0.80			0.87	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1426			1539	1471	1770	3511		1770	3447	
Volume (vph)	100	5	30	10	5	40	15	443	20	25	489	80
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	111	6	33	11	6	44	17	492	22	28	543	89
RTOR Reduction (vph)	0	9	0	0	0	27	0	4	0	0	14	0
Lane Group Flow (vph)	0	141	0	0	17	17	17	510	0	28	618	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		24.0			24.0	24.0	1.3	25.5		2.8	27.0	
Effective Green, g (s)		26.0			26.0	26.0	3.3	27.5		4.8	29.0	
Actuated g/C Ratio		0.39			0.39	0.39	0.05	0.41		0.07	0.43	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		551			595	568	87	1435		126	1485	
v/s Ratio Prot							0.01	0.15		c0.02	c0.18	
v/s Ratio Perm		c0.10			0.01	0.01						
v/c Ratio		0.26			0.03	0.03	0.20	0.36		0.22	0.42	
Uniform Delay, d1		14.1			12.8	12.8	30.7	13.8		29.5	13.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	1.1	0.2		0.9	0.2	
Delay (s)		14.3			12.8	12.8	31.8	13.9		30.4	13.5	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		14.3			12.8			14.5			14.2	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	6.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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1801

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1681	1704	1863	1560	3433	1544
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1681	1704	1863	1560	3433	1544
Volume (vph)	260	35	25	203	269	250
Peak-hour factor, PHF	0.60	0.60	0.60	0.95	0.60	0.95
Adj. Flow (vph)	433	58	42	214	448	263
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	239	252	42	214	448	263
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	12.3	12.3	3.5	45.3	14.5	45.3
Effective Green, g (s)	14.3	14.3	5.5	45.3	16.5	45.3
Actuated g/C Ratio	0.32	0.32	0.12	1.00	0.36	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	531	538	226	1560	1250	1544
v/s Ratio Prot	0.14	c0.15	0.02		c0.13	
v/s Ratio Perm				0.14		c0.17
v/c Ratio	0.45	0.47	0.19	0.14	0.36	0.17
Uniform Delay, d1	12.4	12.4	17.9	0.0	10.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.4	0.2	0.2	0.2
Delay (s)	13.0	13.1	18.3	0.2	10.7	0.2
Level of Service	B	B	B	A	B	A
Approach Delay (s)		13.0	3.2		6.8	
Approach LOS		B	A		A	

Intersection Summary

HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	6.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4951	1472	1723	4951	1472	1637	1545		3343	1523	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4951	1472	1723	4951	1472	1637	1545		3343	1523	
Volume (vph)	350	1220	10	25	1940	10	15	10	15	300	20	250
Peak-hour factor, PHF	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	385	1326	11	27	2109	11	16	11	16	326	22	272
RTOR Reduction (vph)	0	0	5	0	0	4	0	14	0	0	226	0
Lane Group Flow (vph)	385	1326	6	27	2109	7	16	13	0	326	68	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.1	55.6	55.6	2.9	42.4	42.4	8.6	8.6		15.1	15.1	
Effective Green, g (s)	18.1	57.6	57.6	4.9	44.4	44.4	10.6	10.6		17.1	17.1	
Actuated g/C Ratio	0.18	0.56	0.56	0.05	0.43	0.43	0.10	0.10		0.17	0.17	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	2790	830	83	2151	639	170	160		559	255	
v/s Ratio Prot	c0.22	0.27		0.02	c0.43		c0.01	0.01		c0.10	0.04	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	1.26	0.48	0.01	0.33	0.98	0.01	0.09	0.08		0.58	0.26	
Uniform Delay, d1	42.0	13.3	9.8	47.1	28.5	16.4	41.5	41.4		39.3	37.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	141.7	0.1	0.0	2.3	15.0	0.0	0.2	0.2		1.6	0.6	
Delay (s)	183.7	13.4	9.8	49.3	43.5	16.4	41.7	41.6		40.8	37.6	
Level of Service	F	B	A	D	D	B	D	D		D	D	
Approach Delay (s)		51.5			43.4			41.6			39.3	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	102.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2854	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2854	
Volume (vph)	40	820	120	400	1910	15	90	40	210	60	30	120
Peak-hour factor, PHF	0.60	0.80	0.80	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	67	1025	150	667	2388	19	112	50	262	75	38	150
RTOR Reduction (vph)	0	0	127	0	1	0	0	0	0	0	126	0
Lane Group Flow (vph)	67	1025	23	667	2406	0	112	50	262	75	62	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.3	24.1	9.1	8.4	26.2		9.1	9.1	71.2	9.6	9.6	
Effective Green, g (s)	8.3	26.1	11.1	10.4	28.2		11.1	11.1	71.2	11.6	11.6	
Actuated g/C Ratio	0.12	0.37	0.16	0.15	0.40		0.16	0.16	1.00	0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	201	1815	240	488	2468		521	283	1519	255	465	
v/s Ratio Prot	0.04	0.21	0.02	c0.20	c0.39		0.03	0.03		c0.05	0.02	
v/s Ratio Perm									c0.17			
v/c Ratio	0.33	0.56	0.10	1.37	0.98		0.21	0.18	0.17	0.29	0.13	
Uniform Delay, d1	28.9	18.0	25.8	30.4	21.2		26.2	26.1	0.0	26.2	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.4	0.2	177.8	12.7		0.2	0.3	0.2	0.6	0.1	
Delay (s)	29.9	18.4	25.9	208.2	33.9		26.5	26.4	0.2	26.8	25.6	
Level of Service	C	B	C	F	C		C	C	A	C	C	
Approach Delay (s)		19.9			71.7			10.3			26.0	
Approach LOS		B			E			B			C	

Intersection Summary

HCM Average Control Delay	51.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Volume (vph)	70	3090	100	240	4390	15	80	20	200	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	3253	105	253	4621	16	84	21	211	11	11	11
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	183	0	10	0
Lane Group Flow (vph)	74	3253	75	253	4637	0	0	105	28	11	12	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.9	55.5	55.5	6.1	57.7			11.7	11.7	8.4	8.4	
Effective Green, g (s)	5.9	57.5	57.5	8.1	59.7			13.7	13.7	10.4	10.4	
Actuated g/C Ratio	0.06	0.57	0.57	0.08	0.59			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	100	3527	848	266	2905			235	202	176	169	
v/s Ratio Prot	0.04	0.52		c0.08	c0.94			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.02			
v/c Ratio	0.74	0.92	0.09	0.95	1.60			0.45	0.14	0.06	0.07	
Uniform Delay, d1	47.1	20.1	10.1	46.6	21.0			40.5	38.8	41.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.1	4.7	0.0	41.8	269.9			1.4	0.3	0.1	0.2	
Delay (s)	72.3	24.7	10.2	88.4	290.9			41.9	39.1	41.4	41.5	
Level of Service	E	C	B	F	F			D	D	D	D	
Approach Delay (s)		25.3			280.4			40.0			41.4	
Approach LOS		C			F			D			D	

Intersection Summary

HCM Average Control Delay	169.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	1200	2170	2600	40	60	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1333	2411	2889	44	67	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1333	2411	2889	44	67	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	20.1	79.2	54.1	98.5	9.3	98.5
Effective Green, g (s)	22.1	81.2	56.1	98.5	11.3	98.5
Actuated g/C Ratio	0.22	0.82	0.57	1.00	0.11	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	750	4081	2820	1519	384	1382
v/s Ratio Prot	c0.40	0.49	c0.58		c0.02	
v/s Ratio Perm				0.03		0.02
v/c Ratio	1.78	0.59	1.02	0.03	0.17	0.02
Uniform Delay, d1	38.2	3.0	21.2	0.0	39.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	355.2	0.2	23.5	0.0	0.2	0.0
Delay (s)	393.4	3.2	44.7	0.0	39.6	0.0
Level of Service	F	A	D	A	D	A
Approach Delay (s)		142.1	44.1		29.8	
Approach LOS		F	D		C	

Intersection Summary

HCM Average Control Delay	98.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1723	2654	4859			3804
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1723	2654	4859			3804
Volume (vph)	100	1550	370	0	0	1600
Peak-hour factor, PHF	0.65	0.65	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	2385	411	0	0	1778
RTOR Reduction (vph)	0	115	0	0	0	1288
Lane Group Flow (vph)	154	2270	411	0	0	490
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	40.1	40.1	16.3			16.3
Effective Green, g (s)	42.1	42.1	18.3			18.3
Actuated g/C Ratio	0.63	0.63	0.28			0.28
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1092	1683	1339			1048
v/s Ratio Prot	0.09		0.08			
v/s Ratio Perm		c0.86				c0.13
v/c Ratio	0.14	1.35	0.31			0.47
Uniform Delay, d1	4.9	12.2	19.0			20.0
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.1	160.9	0.1			0.3
Delay (s)	4.9	173.1	19.2			20.3
Level of Service	A	F	B			C
Approach Delay (s)	162.9		19.2		20.3	
Approach LOS	F		B		C	

Intersection Summary

HCM Average Control Delay	96.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			4951	1517	3343	3446
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			4951	1517	3343	3446
Volume (vph)	0	0	460	140	1010	870
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	511	156	1122	967
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	511	156	1122	967
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			10.1	10.1	5.2	25.3
Effective Green, g (s)			12.1	12.1	7.2	25.3
Actuated g/C Ratio			0.48	0.48	0.28	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2368	726	951	3446
v/s Ratio Prot			0.10		c0.34	c0.28
v/s Ratio Perm				0.10		
v/c Ratio			0.22	0.21	1.18	0.28
Uniform Delay, d1			3.8	3.8	9.0	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1	91.9	0.0
Delay (s)			3.9	4.0	100.9	0.0
Level of Service			A	A	F	A
Approach Delay (s)	0.0		3.9			54.2
Approach LOS	A		A			D

Intersection Summary

HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	25.3	Sum of lost time (s)	3.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4926		1723	3381		1723	4758		1723	4289	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4926		1723	3381		1723	4758		1723	4289	
Volume (vph)	700	1040	30	70	1010	120	110	500	140	250	480	1510
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	737	1095	32	74	1063	126	116	526	147	263	505	1589
RTOR Reduction (vph)	0	3	0	0	7	0	0	42	0	0	319	0
Lane Group Flow (vph)	737	1124	0	74	1182	0	116	631	0	263	1775	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	30.0	54.6		6.4	31.0		5.0	23.0		17.0	35.0	
Effective Green, g (s)	32.0	56.6		8.4	33.0		7.0	25.0		19.0	37.0	
Actuated g/C Ratio	0.26	0.47		0.07	0.27		0.06	0.21		0.16	0.31	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	456	2304		120	922		100	983		271	1312	
v/s Ratio Prot	c0.43	0.23		0.04	c0.35		c0.07	0.13		0.15	c0.41	
v/s Ratio Perm												
v/c Ratio	1.62	0.49		0.62	1.28		1.16	0.64		0.97	2.04dr	
Uniform Delay, d1	44.5	22.2		54.7	44.0		57.0	43.9		50.7	42.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	287.3	0.2		9.1	135.1		139.4	1.4		46.3	163.8	
Delay (s)	331.8	22.4		63.8	179.1		196.4	45.3		97.0	205.8	
Level of Service	F	C		E	F		F	D		F	F	
Approach Delay (s)		144.7			172.3			67.6			193.7	
Approach LOS		F			F			E			F	

Intersection Summary

HCM Average Control Delay	159.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	121.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	137.5%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4838		1723	4951			4837	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4838		1723	4951			4837	
Volume (vph)	0	0	0	580	1760	140	110	340	0	0	320	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	644	1956	156	122	378	0	0	356	56
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	36	0
Lane Group Flow (vph)	0	0	0	0	2748	0	122	378	0	0	376	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					24.7		6.0	21.7			10.7	
Effective Green, g (s)					26.7		8.0	23.7			12.7	
Actuated g/C Ratio					0.47		0.14	0.42			0.23	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2290		244	2080			1089	
v/s Ratio Prot							c0.07	0.08			c0.08	
v/s Ratio Perm					0.57							
v/c Ratio					42.93dl		0.50	0.18			0.34	
Uniform Delay, d1					14.8		22.4	10.3			18.4	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					94.5		1.6	0.0			0.2	
Delay (s)					109.4		24.0	10.3			18.5	
Level of Service					F		C	B			B	
Approach Delay (s)		0.0			109.4			13.6			18.5	
Approach LOS		A			F			B			B	

Intersection Summary

HCM Average Control Delay	86.1	HCM Level of Service	F
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.92		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		4942	1508					4515		1723	4951	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		4942	1508					4515		1723	4951	
Volume (vph)	40	1250	50	0	0	0	0	510	550	70	1170	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	1389	56	0	0	0	0	567	611	78	1300	0
RTOR Reduction (vph)	0	0	22	0	0	0	0	102	0	0	0	0
Lane Group Flow (vph)	0	1433	34	0	0	0	0	1076	0	78	1300	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		24.7	24.7					19.1		6.6	30.7	
Effective Green, g (s)		26.7	26.7					21.1		8.6	32.7	
Actuated g/C Ratio		0.41	0.41					0.32		0.13	0.50	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2018	616					1457		227	2476	
v/s Ratio Prot								c0.24		0.05	c0.26	
v/s Ratio Perm		0.29	0.02									
v/c Ratio		0.71	0.05					1.01dr		0.34	0.53	
Uniform Delay, d1		16.1	11.7					19.7		25.8	11.1	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		1.2	0.0					2.0		0.9	0.2	
Delay (s)		17.3	11.7					21.7		26.7	11.3	
Level of Service		B	B					C		C	B	
Approach Delay (s)		17.1			0.0			21.7			12.2	
Approach LOS		B			A			C			B	

Intersection Summary

HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1682			1669	1432	1723	3404		1723	3280	
Flt Permitted		0.81			0.88	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1414			1513	1432	1723	3404		1723	3280	
Volume (vph)	60	10	25	10	10	35	15	220	15	30	340	120
Peak-hour factor, PHF	0.65	0.85	0.85	0.65	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	92	12	29	15	12	41	18	259	18	35	400	141
RTOR Reduction (vph)	0	8	0	0	0	25	0	5	0	0	38	0
Lane Group Flow (vph)	0	125	0	0	27	16	18	272	0	35	503	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		25.2			25.2	25.2	1.4	24.9		3.0	26.5	
Effective Green, g (s)		27.2			27.2	27.2	3.4	26.9		5.0	28.5	
Actuated g/C Ratio		0.40			0.40	0.40	0.05	0.40		0.07	0.42	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		565			604	572	86	1345		127	1373	
v/s Ratio Prot							0.01	0.08		c0.02	c0.15	
v/s Ratio Perm		c0.09			0.02	0.01						
v/c Ratio		0.22			0.04	0.03	0.21	0.20		0.28	0.37	
Uniform Delay, d1		13.5			12.5	12.4	31.1	13.5		29.8	13.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	1.2	0.1		1.2	0.2	
Delay (s)		13.7			12.5	12.4	32.3	13.6		31.0	13.8	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.7			12.5			14.8			14.8	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	6.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1659	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1659	1814	1519	3343	1503
Volume (vph)	150	20	15	75	130	200
Peak-hour factor, PHF	0.60	0.60	0.60	0.95	0.60	0.95
Adj. Flow (vph)	250	33	25	79	217	211
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	138	145	25	79	217	211
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	12.4	12.4	2.9	54.2	23.9	54.2
Effective Green, g (s)	14.4	14.4	4.9	54.2	25.9	54.2
Actuated g/C Ratio	0.27	0.27	0.09	1.00	0.48	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	435	441	164	1519	1597	1503
v/s Ratio Prot	0.08	c0.09	0.01		0.06	
v/s Ratio Perm				0.05		c0.14
v/c Ratio	0.32	0.33	0.15	0.05	0.14	0.14
Uniform Delay, d1	16.0	16.0	22.7	0.0	7.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.4	0.1	0.0	0.2
Delay (s)	16.4	16.5	23.2	0.1	7.9	0.2
Level of Service	B	B	C	A	A	A
Approach Delay (s)		16.4	5.6		4.1	
Approach LOS		B	A		A	

Intersection Summary

HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	54.2	Sum of lost time (s)	3.0
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1514	1770	5085	1514	1681	1585		3433	1554	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1514	1770	5085	1514	1681	1585		3433	1554	
Volume (vph)	270	1800	20	40	2130	10	20	20	30	280	10	250
Peak-hour factor, PHF	0.90	0.92	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	300	1957	22	44	2315	11	22	22	33	311	11	278
RTOR Reduction (vph)	0	0	8	0	0	4	0	29	0	0	231	0
Lane Group Flow (vph)	300	1957	14	44	2315	7	22	26	0	311	58	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.1	51.3	51.3	2.3	44.5	44.5	8.8	8.8		14.4	14.4	
Effective Green, g (s)	11.1	53.3	53.3	4.3	46.5	46.5	10.8	10.8		16.4	16.4	
Actuated g/C Ratio	0.11	0.55	0.55	0.04	0.48	0.48	0.11	0.11		0.17	0.17	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	2800	834	79	2443	727	188	177		582	263	
v/s Ratio Prot	c0.17	0.38		0.02	c0.46		0.01	c0.02		c0.09	0.04	
v/s Ratio Perm			0.01			0.00						
v/c Ratio	1.48	0.70	0.02	0.56	0.95	0.01	0.12	0.15		0.53	0.22	
Uniform Delay, d1	42.8	15.9	9.9	45.3	24.0	13.1	38.7	38.8		36.7	34.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	239.6	0.8	0.0	8.3	8.8	0.0	0.3	0.4		0.9	0.4	
Delay (s)	282.5	16.7	9.9	53.6	32.8	13.1	39.0	39.2		37.7	35.1	
Level of Service	F	B	A	D	C	B	D	D		D	D	
Approach Delay (s)		51.6			33.1			39.1			36.4	
Approach LOS		D			C			D			D	

Intersection Summary

HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2821	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2821	
Volume (vph)	70	1200	220	430	1460	70	170	40	480	60	30	160
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Adj. Flow (vph)	117	2000	367	717	2433	117	283	67	800	100	50	267
RTOR Reduction (vph)	0	0	169	0	4	0	0	0	0	0	228	0
Lane Group Flow (vph)	117	2000	198	717	2546	0	283	67	800	100	89	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	9.9	25.4	16.5	20.3	35.8		16.5	16.5	93.8	11.6	11.6	
Effective Green, g (s)	11.9	27.4	18.5	22.3	37.8		18.5	18.5	93.8	13.6	13.6	
Actuated g/C Ratio	0.13	0.29	0.20	0.24	0.40		0.20	0.20	1.00	0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	219	1446	304	795	2492		659	358	1519	227	409	
v/s Ratio Prot	0.07	c0.40	c0.13	c0.21	0.41		0.08	0.04		0.06	0.03	
v/s Ratio Perm									c0.53			
v/c Ratio	0.53	1.38	0.65	0.90	1.02		0.43	0.19	0.53	0.44	0.22	
Uniform Delay, d1	38.4	33.2	34.7	34.7	28.0		33.0	31.4	0.0	36.6	35.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	176.8	4.9	13.4	23.7		0.5	0.3	1.3	1.4	0.3	
Delay (s)	40.9	210.0	39.6	48.1	51.7		33.5	31.6	1.3	38.0	35.7	
Level of Service	D	F	D	D	D		C	C	A	D	D	
Approach Delay (s)		176.8			50.9			11.0			36.2	
Approach LOS		F			D			B			D	

Intersection Summary

HCM Average Control Delay	86.6	HCM Level of Service	F
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	93.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Volume (vph)	30	4050	80	260	3550	15	80	10	270	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	4500	89	289	3944	17	89	11	300	11	11	22
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	252	0	20	0
Lane Group Flow (vph)	33	4500	71	289	3961	0	0	100	48	11	13	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	2.3	53.6	53.6	9.1	60.4			11.5	11.5	8.5	8.5	
Effective Green, g (s)	4.3	55.6	55.6	11.1	62.4			13.5	13.5	10.5	10.5	
Actuated g/C Ratio	0.04	0.54	0.54	0.11	0.61			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	72	3378	812	361	3006			228	197	176	164	
v/s Ratio Prot	0.02	0.72		c0.09	c0.80			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.03			
v/c Ratio	0.46	1.33	0.09	0.80	1.32			0.44	0.24	0.06	0.08	
Uniform Delay, d1	48.1	23.5	11.3	44.7	20.2			41.1	40.0	41.7	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	151.6	0.0	12.0	145.3			1.3	0.6	0.1	0.2	
Delay (s)	52.6	175.1	11.4	56.7	165.5			42.5	40.7	41.8	41.9	
Level of Service	D	F	B	E	F			D	D	D	D	
Approach Delay (s)		171.1			158.1			41.1			41.9	
Approach LOS		F			F			D			D	

Intersection Summary

HCM Average Control Delay	159.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	1390	2690	1990	140	80	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1544	2989	2211	156	89	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1544	2989	2211	156	89	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	19.3	78.8	54.5	98.4	9.6	98.4
Effective Green, g (s)	21.3	80.8	56.5	98.4	11.6	98.4
Actuated g/C Ratio	0.22	0.82	0.57	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	743	4175	2920	1560	405	1419
v/s Ratio Prot	c0.45	0.59	c0.43		c0.03	
v/s Ratio Perm				0.10		0.02
v/c Ratio	2.08	0.72	0.76	0.10	0.22	0.02
Uniform Delay, d1	38.6	3.8	15.8	0.0	39.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	489.8	0.6	1.2	0.1	0.3	0.0
Delay (s)	528.3	4.4	16.9	0.1	39.6	0.0
Level of Service	F	A	B	A	D	A
Approach Delay (s)		182.9	15.8		31.7	
Approach LOS		F	B		C	

Intersection Summary

HCM Average Control Delay	124.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	98.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1770	2725	4990			3903
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1770	2725	4990			3903
Volume (vph)	140	1100	620	0	0	2040
Peak-hour factor, PHF	0.60	0.60	0.85	0.85	0.85	0.85
Adj. Flow (vph)	233	1833	729	0	0	2400
RTOR Reduction (vph)	0	183	0	0	0	563
Lane Group Flow (vph)	233	1650	729	0	0	1837
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	25.0	25.0	35.0			35.0
Effective Green, g (s)	27.0	27.0	37.0			37.0
Actuated g/C Ratio	0.39	0.39	0.53			0.53
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	683	1051	2638			2063
v/s Ratio Prot	0.13		0.15			
v/s Ratio Perm		c0.61				c0.47
v/c Ratio	0.34	1.57	0.28			0.89
Uniform Delay, d1	15.2	21.5	9.1			14.7
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.3	261.1	0.1			5.3
Delay (s)	15.5	282.6	9.2			20.0
Level of Service	B	F	A			B
Approach Delay (s)	252.5		9.2		20.0	
Approach LOS	F		A		B	

Intersection Summary

HCM Average Control Delay	110.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1553	3433	3539
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1553	3433	3539
Volume (vph)	0	0	810	440	1120	1290
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	953	518	1318	1518
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	953	518	1318	1518
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			25.0	25.0	12.6	47.6
Effective Green, g (s)			27.0	27.0	14.6	47.6
Actuated g/C Ratio			0.57	0.57	0.31	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2884	881	1053	3539
v/s Ratio Prot			0.19		c0.38	0.43
v/s Ratio Perm				c0.33		
v/c Ratio			0.33	0.59	1.25	0.43
Uniform Delay, d1			5.5	6.7	16.5	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	1.0	121.2	0.1
Delay (s)			5.6	7.7	137.7	0.1
Level of Service			A	A	F	A
Approach Delay (s)	0.0		6.3			64.0
Approach LOS	A		A			E

Intersection Summary

HCM Average Control Delay	44.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5036		1770	3444		1770	4902		1770	4591	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5036		1770	3444		1770	4902		1770	4591	
Volume (vph)	750	1410	80	100	1020	180	150	1110	280	250	830	1010
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	833	1567	89	111	1133	200	167	1233	311	278	922	1122
RTOR Reduction (vph)	0	5	0	0	12	0	0	37	0	0	183	0
Lane Group Flow (vph)	833	1651	0	111	1321	0	167	1507	0	278	1861	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	29.0	48.5		11.5	31.0		6.0	30.0		10.0	34.0	
Effective Green, g (s)	31.0	50.5		13.5	33.0		8.0	32.0		12.0	36.0	
Actuated g/C Ratio	0.26	0.42		0.11	0.28		0.07	0.27		0.10	0.30	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	457	2119		199	947		118	1307		177	1377	
v/s Ratio Prot	c0.47	0.33		0.06	c0.38		0.09	0.31		c0.16	c0.41	
v/s Ratio Perm												
v/c Ratio	1.82	0.78		0.56	1.40		1.42	1.15		1.57	1.74dr	
Uniform Delay, d1	44.5	29.9		50.4	43.5		56.0	44.0		54.0	42.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	378.8	1.9		3.4	184.4		229.2	78.1		282.2	163.1	
Delay (s)	423.3	31.8		53.8	227.9		285.2	122.1		336.2	205.1	
Level of Service	F	C		D	F		F	F		F	F	
Approach Delay (s)		162.8			214.5			138.0			220.8	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	183.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	136.6%	ICU Level of Service	H
Analysis Period (min)	15		

dr *Defacto Right Lane. Recode with 1 though lane as a right lane.*
c Critical Lane Group

5779

199

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.98		1.00	1.00			0.99	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4962		1770	5085			5026	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4962		1770	5085			5026	
Volume (vph)	0	0	0	180	1160	150	150	910	0	0	680	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Adj. Flow (vph)	0	0	0	257	1657	214	214	1300	0	0	971	71
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	2110	0	214	1300	0	0	1029	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					21.1		8.0	32.7			19.7	
Effective Green, g (s)					23.1		10.0	34.7			21.7	
Actuated g/C Ratio					0.36		0.16	0.54			0.34	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					1797		277	2766			1709	
v/s Ratio Prot							c0.12	0.26			c0.20	
v/s Ratio Perm					0.43							
v/c Ratio					8.86dl		0.77	0.47			0.60	
Uniform Delay, d1					20.3		25.8	8.9			17.5	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					84.5		12.5	0.1			0.6	
Delay (s)					104.9		38.4	9.0			18.1	
Level of Service					F		D	A			B	
Approach Delay (s)		0.0			104.9			13.2			18.1	
Approach LOS		A			F			B			B	

Intersection Summary

HCM Average Control Delay	55.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

200

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		5074	1548					4668		1770	5085	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		5074	1548					4668		1770	5085	
Volume (vph)	90	2420	80	0	0	0	0	1100	1020	220	810	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	2689	89	0	0	0	0	1222	1133	244	900	0
RTOR Reduction (vph)	0	0	49	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	2789	40	0	0	0	0	2354	0	244	900	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		25.0	25.0					26.0		4.0	35.0	
Effective Green, g (s)		27.0	27.0					28.0		6.0	37.0	
Actuated g/C Ratio		0.39	0.39					0.40		0.09	0.53	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		1957	597					1867		152	2688	
v/s Ratio Prot								c0.50		c0.14	0.18	
v/s Ratio Perm		0.55	0.03									
v/c Ratio		1.43	0.07					1.80dr		1.61	0.33	
Uniform Delay, d1		21.5	13.6					21.0		32.0	9.5	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		194.3	0.0					121.8		300.8	0.1	
Delay (s)		215.8	13.6					142.8		332.8	9.5	
Level of Service		F	B					F		F	A	
Approach Delay (s)		209.6			0.0			142.8			78.5	
Approach LOS		F			A			F			E	

Intersection Summary

HCM Average Control Delay	161.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57291

201

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1726			1710	1472	1770	3505		1770	3438	
Flt Permitted		0.79			0.86	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1410			1507	1472	1770	3505		1770	3438	
Volume (vph)	120	10	35	15	10	50	20	460	25	30	490	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	11	39	17	11	56	22	511	28	33	544	100
RTOR Reduction (vph)	0	8	0	0	0	33	0	4	0	0	16	0
Lane Group Flow (vph)	0	175	0	0	28	23	22	535	0	33	628	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		23.7			23.7	23.7	1.2	22.6		2.6	24.0	
Effective Green, g (s)		25.7			25.7	25.7	3.2	24.6		4.6	26.0	
Actuated g/C Ratio		0.40			0.40	0.40	0.05	0.38		0.07	0.41	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		567			606	592	89	1349		127	1399	
v/s Ratio Prot							0.01	0.15		c0.02	c0.18	
v/s Ratio Perm		c0.12			0.02	0.02						
v/c Ratio		0.31			0.05	0.04	0.25	0.40		0.26	0.45	
Uniform Delay, d1		13.0			11.6	11.6	29.2	14.3		28.0	13.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.0	0.0	1.5	0.2		1.1	0.2	
Delay (s)		13.3			11.7	11.6	30.6	14.5		29.1	14.0	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.3			11.6			15.1			14.7	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	6.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57791

202

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1659	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1659	1814	1519	3343	1503
Volume (vph)	300	40	30	155	195	290
Peak-hour factor, PHF	0.45	0.45	0.45	0.92	0.45	0.92
Adj. Flow (vph)	667	89	67	168	433	315
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	368	388	67	168	433	315
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	21.4	21.4	5.8	54.4	12.2	54.4
Effective Green, g (s)	23.4	23.4	7.8	54.4	14.2	54.4
Actuated g/C Ratio	0.43	0.43	0.14	1.00	0.26	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	704	714	260	1519	873	1503
v/s Ratio Prot	0.22	c0.23	0.04		c0.13	
v/s Ratio Perm				0.11		c0.21
v/c Ratio	0.52	0.54	0.26	0.11	0.50	0.21
Uniform Delay, d1	11.4	11.5	20.7	0.0	17.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.8	0.5	0.1	0.4	0.3
Delay (s)	12.1	12.4	21.3	0.1	17.5	0.3
Level of Service	B	B	C	A	B	A
Approach Delay (s)		12.2	6.2		10.3	
Approach LOS		B	A		B	

Intersection Summary

HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

57791

203

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4951	1472	1723	4951	1472	1637	1545		3343	1523	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4951	1472	1723	4951	1472	1637	1545		3343	1523	
Volume (vph)	350	1227	10	25	1951	10	15	10	15	302	20	250
Peak-hour factor, PHF	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	385	1334	11	27	2121	11	16	11	16	328	22	272
RTOR Reduction (vph)	0	0	5	0	0	4	0	14	0	0	226	0
Lane Group Flow (vph)	385	1334	6	27	2121	7	16	13	0	328	68	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.1	55.6	55.6	2.9	42.4	42.4	8.6	8.6		15.1	15.1	
Effective Green, g (s)	18.1	57.6	57.6	4.9	44.4	44.4	10.6	10.6		17.1	17.1	
Actuated g/C Ratio	0.18	0.56	0.56	0.05	0.43	0.43	0.10	0.10		0.17	0.17	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	2790	830	83	2151	639	170	160		559	255	
v/s Ratio Prot	c0.22	0.27		0.02	c0.43		c0.01	0.01		c0.10	0.04	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	1.26	0.48	0.01	0.33	0.99	0.01	0.09	0.08		0.59	0.26	
Uniform Delay, d1	42.0	13.3	9.8	47.1	28.6	16.4	41.5	41.4		39.3	37.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	141.7	0.1	0.0	2.3	16.1	0.0	0.2	0.2		1.6	0.6	
Delay (s)	183.7	13.5	9.8	49.3	44.7	16.4	41.7	41.6		40.9	37.6	
Level of Service	F	B	A	D	D	B	D	D		D	D	
Approach Delay (s)		51.3			44.6			41.6			39.3	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	102.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

204

57791

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2880	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2880	
Volume (vph)	40	820	129	428	1910	15	108	50	253	60	40	120
Peak-hour factor, PHF	0.60	0.80	0.80	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	67	1025	161	713	2388	19	135	62	316	75	50	150
RTOR Reduction (vph)	0	0	136	0	1	0	0	0	0	0	126	0
Lane Group Flow (vph)	67	1025	25	713	2406	0	135	62	316	75	74	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.2	25.2	9.4	8.4	27.4		9.4	9.4	72.7	9.7	9.7	
Effective Green, g (s)	8.2	27.2	11.4	10.4	29.4		11.4	11.4	72.7	11.7	11.7	
Actuated g/C Ratio	0.11	0.37	0.16	0.14	0.40		0.16	0.16	1.00	0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	1852	242	478	2519		524	284	1519	252	463	
v/s Ratio Prot	0.04	0.21	0.02	c0.21	c0.39		0.04	0.03		c0.05	0.03	
v/s Ratio Perm									c0.21			
v/c Ratio	0.35	0.55	0.10	1.49	0.96		0.26	0.22	0.21	0.30	0.16	
Uniform Delay, d1	29.8	18.0	26.3	31.2	21.0		26.9	26.8	0.0	26.9	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.4	0.2	232.1	9.5		0.3	0.4	0.3	0.7	0.2	
Delay (s)	30.8	18.3	26.5	263.3	30.5		27.2	27.1	0.3	27.5	26.4	
Level of Service	C	B	C	F	C		C	C	A	C	C	
Approach Delay (s)		20.0			83.7			10.6			26.7	
Approach LOS		C			F			B			C	

Intersection Summary

HCM Average Control Delay	58.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

57791

205

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Volume (vph)	70	3133	100	240	4418	15	80	20	200	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	3298	105	253	4651	16	84	21	211	11	11	11
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	183	0	10	0
Lane Group Flow (vph)	74	3298	75	253	4667	0	0	105	28	11	12	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.9	55.5	55.5	6.1	57.7			11.7	11.7	8.4	8.4	
Effective Green, g (s)	5.9	57.5	57.5	8.1	59.7			13.7	13.7	10.4	10.4	
Actuated g/C Ratio	0.06	0.57	0.57	0.08	0.59			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	100	3527	848	266	2905			235	202	176	169	
v/s Ratio Prot	0.04	0.53		c0.08	c0.94			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.02			
v/c Ratio	0.74	0.94	0.09	0.95	1.61			0.45	0.14	0.06	0.07	
Uniform Delay, d1	47.1	20.4	10.1	46.6	21.0			40.5	38.8	41.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.1	5.5	0.0	41.8	274.5			1.4	0.3	0.1	0.2	
Delay (s)	72.3	25.9	10.2	88.4	295.5			41.9	39.1	41.4	41.5	
Level of Service	E	C	B	F	F			D	D	D	D	
Approach Delay (s)		26.4			284.9			40.0			41.4	
Approach LOS		C			F			D			D	

Intersection Summary

HCM Average Control Delay	172.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

57791

206

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	1214	2199	2619	40	60	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1349	2443	2910	44	67	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1349	2443	2910	44	67	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	21.1	83.2	57.1	102.5	9.3	102.5
Effective Green, g (s)	23.1	85.2	59.1	102.5	11.3	102.5
Actuated g/C Ratio	0.23	0.83	0.58	1.00	0.11	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	753	4115	2855	1519	369	1382
v/s Ratio Prot	c0.40	0.49	c0.59		c0.02	
v/s Ratio Perm				0.03		0.02
v/c Ratio	1.79	0.59	1.02	0.03	0.18	0.02
Uniform Delay, d1	39.7	2.9	21.7	0.0	41.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	361.5	0.2	21.9	0.0	0.2	0.0
Delay (s)	401.2	3.1	43.6	0.0	41.6	0.0
Level of Service	F	A	D	A	D	A
Approach Delay (s)		144.7	42.9		31.4	
Approach LOS		F	D		C	

Intersection Summary

HCM Average Control Delay	99.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	102.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

5791

207

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1723	2655	4859			3805
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1723	2655	4859			3805
Volume (vph)	100	1567	372	0	0	1629
Peak-hour factor, PHF	0.65	0.65	0.94	0.94	0.94	0.94
Adj. Flow (vph)	154	2411	396	0	0	1733
RTOR Reduction (vph)	0	133	0	0	0	1262
Lane Group Flow (vph)	154	2278	396	0	0	471
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	39.1	39.1	15.6			15.6
Effective Green, g (s)	41.1	41.1	17.6			17.6
Actuated g/C Ratio	0.64	0.64	0.27			0.27
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	1095	1687	1322			1035
v/s Ratio Prot	0.09		0.08			
v/s Ratio Perm		c0.86				c0.12
v/c Ratio	0.14	1.35	0.30			0.46
Uniform Delay, d1	4.7	11.8	18.7			19.6
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.1	161.7	0.1			0.3
Delay (s)	4.8	173.5	18.8			19.9
Level of Service	A	F	B			B
Approach Delay (s)	163.4		18.8		19.9	
Approach LOS	F		B		B	

Intersection Summary

HCM Average Control Delay	98.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

57791

208

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			4951	1517	3343	3446
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			4951	1517	3343	3446
Volume (vph)	0	0	462	140	1035	874
Peak-hour factor, PHF	0.90	0.90	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	508	154	1137	960
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	508	154	1137	960
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			10.1	10.1	5.2	25.3
Effective Green, g (s)			12.1	12.1	7.2	25.3
Actuated g/C Ratio			0.48	0.48	0.28	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2368	726	951	3446
v/s Ratio Prot			0.10		c0.34	c0.28
v/s Ratio Perm				0.10		
v/c Ratio			0.21	0.21	1.20	0.28
Uniform Delay, d1			3.8	3.8	9.0	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1	98.4	0.0
Delay (s)			3.9	4.0	107.4	0.0
Level of Service			A	A	F	A
Approach Delay (s)	0.0		3.9			58.3
Approach LOS	A		A			E

Intersection Summary

HCM Average Control Delay	45.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	25.3	Sum of lost time (s)	3.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

57791

209

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1723	4926		1723	3381		1723	4758		1723	4288	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1723	4926		1723	3381		1723	4758		1723	4288	
Volume (vph)	707	1047	30	70	1015	120	110	500	140	250	480	1514
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	744	1102	32	74	1068	126	116	526	147	263	505	1594
RTOR Reduction (vph)	0	3	0	0	7	0	0	42	0	0	319	0
Lane Group Flow (vph)	744	1131	0	74	1187	0	116	631	0	263	1780	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	30.0	54.6		6.4	31.0		5.0	22.0		18.0	35.0	
Effective Green, g (s)	32.0	56.6		8.4	33.0		7.0	24.0		20.0	37.0	
Actuated g/C Ratio	0.26	0.47		0.07	0.27		0.06	0.20		0.17	0.31	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	456	2304		120	922		100	944		285	1311	
v/s Ratio Prot	c0.43	0.23		0.04	c0.35		c0.07	0.13		0.15	c0.42	
v/s Ratio Perm												
v/c Ratio	1.63	0.49		0.62	1.29		1.16	0.67		0.92	2.05dr	
Uniform Delay, d1	44.5	22.2		54.7	44.0		57.0	44.8		49.7	42.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	294.1	0.2		9.1	137.4		139.4	1.8		33.5	165.9	
Delay (s)	338.6	22.4		63.8	181.4		196.4	46.6		83.3	207.9	
Level of Service	F	C		E	F		F	D		F	F	
Approach Delay (s)		147.7			174.6			68.7			194.0	
Approach LOS		F			F			E			F	

Intersection Summary

HCM Average Control Delay	160.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	121.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	138.1%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791

210

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4838		1723	4951			4837	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4838		1723	4951			4837	
Volume (vph)	0	0	0	580	1772	140	115	340	0	0	320	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	644	1969	156	128	378	0	0	356	56
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	36	0
Lane Group Flow (vph)	0	0	0	0	2761	0	128	378	0	0	376	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					24.7		6.0	21.7			10.7	
Effective Green, g (s)					26.7		8.0	23.7			12.7	
Actuated g/C Ratio					0.47		0.14	0.42			0.23	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					2290		244	2080			1089	
v/s Ratio Prot							c0.07	0.08			c0.08	
v/s Ratio Perm					0.57							
v/c Ratio					42.93dl		0.52	0.18			0.34	
Uniform Delay, d1					14.8		22.4	10.3			18.4	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					97.0		2.0	0.0			0.2	
Delay (s)					111.8		24.5	10.3			18.5	
Level of Service					F		C	B			B	
Approach Delay (s)		0.0			111.8			13.9			18.5	
Approach LOS		A			F			B			B	

Intersection Summary

HCM Average Control Delay	88.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

57791
112

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.92		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		4943	1508					4517		1723	4951	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		4943	1508					4517		1723	4951	
Volume (vph)	40	1268	57	0	0	0	0	515	550	70	1170	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	1409	63	0	0	0	0	572	611	78	1300	0
RTOR Reduction (vph)	0	0	22	0	0	0	0	102	0	0	0	0
Lane Group Flow (vph)	0	1453	41	0	0	0	0	1081	0	78	1300	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		24.8	24.8					19.2		6.6	30.8	
Effective Green, g (s)		26.8	26.8					21.2		8.6	32.8	
Actuated g/C Ratio		0.41	0.41					0.32		0.13	0.50	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		2019	616					1460		226	2476	
v/s Ratio Prot								c0.24		0.05	c0.26	
v/s Ratio Perm		0.29	0.03									
v/c Ratio		0.72	0.07					1.01dr		0.35	0.53	
Uniform Delay, d1		16.3	11.8					19.8		25.9	11.1	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		1.3	0.0					2.1		0.9	0.2	
Delay (s)		17.5	11.8					21.8		26.9	11.3	
Level of Service		B	B					C		C	B	
Approach Delay (s)		17.3			0.0			21.8			12.2	
Approach LOS		B			A			C			B	

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1681			1669	1432	1723	3414		1723	3295	
Flt Permitted		0.81			0.88	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1411			1511	1432	1723	3414		1723	3295	
Volume (vph)	60	10	25	10	10	35	15	291	15	30	387	120
Peak-hour factor, PHF	0.65	0.85	0.85	0.65	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	92	12	29	15	12	41	18	342	18	35	455	141
RTOR Reduction (vph)	0	9	0	0	0	25	0	4	0	0	31	0
Lane Group Flow (vph)	0	124	0	0	27	16	18	356	0	35	565	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		25.4			25.4	25.4	1.4	26.7		3.0	28.3	
Effective Green, g (s)		27.4			27.4	27.4	3.4	28.7		5.0	30.3	
Actuated g/C Ratio		0.39			0.39	0.39	0.05	0.41		0.07	0.43	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		552			591	560	84	1398		123	1424	
v/s Ratio Prot							0.01	0.10		c0.02	c0.17	
v/s Ratio Perm		c0.09			0.02	0.01						
v/c Ratio		0.23			0.05	0.03	0.21	0.25		0.28	0.40	
Uniform Delay, d1		14.3			13.2	13.2	32.1	13.6		30.9	13.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0	0.0	1.3	0.1		1.3	0.2	
Delay (s)		14.5			13.3	13.2	33.3	13.7		32.1	13.8	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		14.5			13.2			14.7			14.8	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	6.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1659	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1659	1814	1519	3343	1503
Volume (vph)	150	20	15	146	177	200
Peak-hour factor, PHF	0.55	0.55	0.55	0.95	0.55	0.95
Adj. Flow (vph)	273	36	27	154	322	211
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	150	159	27	154	322	211
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	12.5	12.5	4.9	57.2	24.8	57.2
Effective Green, g (s)	14.5	14.5	6.9	57.2	26.8	57.2
Actuated g/C Ratio	0.25	0.25	0.12	1.00	0.47	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	415	421	219	1519	1566	1503
v/s Ratio Prot	0.09	c0.10	0.01		c0.10	
v/s Ratio Perm				0.10		c0.14
v/c Ratio	0.36	0.38	0.12	0.10	0.21	0.14
Uniform Delay, d1	17.5	17.6	22.5	0.0	8.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.6	0.3	0.1	0.1	0.2
Delay (s)	18.1	18.2	22.7	0.1	9.0	0.2
Level of Service	B	B	C	A	A	A
Approach Delay (s)		18.1	3.5		5.5	
Approach LOS		B	A		A	

Intersection Summary

HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	6.0
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1514	1770	5085	1514	1681	1585		3433	1554	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1514	1770	5085	1514	1681	1585		3433	1554	
Volume (vph)	270	1812	20	40	2138	10	20	20	30	284	10	250
Peak-hour factor, PHF	0.90	0.92	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	300	1970	22	44	2324	11	22	22	33	316	11	278
RTOR Reduction (vph)	0	0	8	0	0	4	0	29	0	0	231	0
Lane Group Flow (vph)	300	1970	14	44	2324	7	22	26	0	316	58	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.1	51.3	51.3	2.3	44.5	44.5	8.8	8.8		14.5	14.5	
Effective Green, g (s)	11.1	53.3	53.3	4.3	46.5	46.5	10.8	10.8		16.5	16.5	
Actuated g/C Ratio	0.11	0.55	0.55	0.04	0.48	0.48	0.11	0.11		0.17	0.17	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	2797	833	79	2440	727	187	177		585	265	
v/s Ratio Prot	c0.17	0.39		0.02	c0.46		0.01	c0.02		c0.09	0.04	
v/s Ratio Perm			0.01			0.00						
v/c Ratio	1.48	0.70	0.02	0.56	0.95	0.01	0.12	0.15		0.54	0.22	
Uniform Delay, d1	42.9	16.0	9.9	45.4	24.1	13.2	38.8	38.9		36.7	34.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	239.6	0.8	0.0	8.3	9.4	0.0	0.3	0.4		1.0	0.4	
Delay (s)	282.5	16.8	9.9	53.6	33.6	13.2	39.0	39.3		37.8	35.1	
Level of Service	F	B	A	D	C	B	D	D		D	D	
Approach Delay (s)		51.5			33.9			39.2			36.5	
Approach LOS		D			C			D			D	

Intersection Summary

HCM Average Control Delay	41.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	96.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2858	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2858	
Volume (vph)	70	1200	236	477	1460	70	183	48	512	60	46	160
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Adj. Flow (vph)	117	2000	393	795	2433	117	305	80	853	100	77	267
RTOR Reduction (vph)	0	0	180	0	4	0	0	0	0	0	228	0
Lane Group Flow (vph)	117	2000	213	795	2546	0	305	80	853	100	116	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	10.0	25.5	17.5	20.3	35.8		17.5	17.5	95.0	11.7	11.7	
Effective Green, g (s)	12.0	27.5	19.5	22.3	37.8		19.5	19.5	95.0	13.7	13.7	
Actuated g/C Ratio	0.13	0.29	0.21	0.23	0.40		0.21	0.21	1.00	0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	218	1433	317	785	2461		686	372	1519	226	412	
v/s Ratio Prot	0.07	c0.40	c0.14	c0.24	0.41		0.09	0.04		0.06	0.04	
v/s Ratio Perm									c0.56			
v/c Ratio	0.54	1.40	0.67	1.01	1.03		0.44	0.22	0.56	0.44	0.28	
Uniform Delay, d1	38.9	33.8	34.8	36.4	28.6		33.0	31.4	0.0	37.2	36.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	182.4	5.5	35.3	27.8		0.5	0.3	1.5	1.4	0.4	
Delay (s)	41.4	216.1	40.4	71.7	56.4		33.5	31.7	1.5	38.5	36.6	
Level of Service	D	F	D	E	E		C	C	A	D	D	
Approach Delay (s)		180.5			60.0			11.3			37.1	
Approach LOS		F			E			B			D	

Intersection Summary

HCM Average Control Delay	90.8	HCM Level of Service	F
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Volume (vph)	30	4082	80	260	3597	15	80	10	270	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	4536	89	289	3997	17	89	11	300	11	11	22
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	252	0	20	0
Lane Group Flow (vph)	33	4536	71	289	4014	0	0	100	48	11	13	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	2.3	53.6	53.6	9.1	60.4			11.5	11.5	8.5	8.5	
Effective Green, g (s)	4.3	55.6	55.6	11.1	62.4			13.5	13.5	10.5	10.5	
Actuated g/C Ratio	0.04	0.54	0.54	0.11	0.61			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	72	3378	812	361	3006			228	197	176	164	
v/s Ratio Prot	0.02	0.73		c0.09	c0.81			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.03			
v/c Ratio	0.46	1.34	0.09	0.80	1.34			0.44	0.24	0.06	0.08	
Uniform Delay, d1	48.1	23.5	11.3	44.7	20.2			41.1	40.0	41.7	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	156.3	0.0	12.0	153.2			1.3	0.6	0.1	0.2	
Delay (s)	52.6	179.9	11.4	56.7	173.3			42.5	40.7	41.8	41.9	
Level of Service	D	F	B	E	F			D	D	D	D	
Approach Delay (s)		175.8			165.5			41.1			41.9	
Approach LOS		F			F			D			D	

Intersection Summary

HCM Average Control Delay	164.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	1401	2711	2021	140	80	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1557	3012	2246	156	89	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1557	3012	2246	156	89	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	19.2	79.1	54.9	98.7	9.6	98.7
Effective Green, g (s)	21.2	81.1	56.9	98.7	11.6	98.7
Actuated g/C Ratio	0.21	0.82	0.58	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	737	4178	2931	1560	403	1419
v/s Ratio Prot	c0.45	0.59	c0.44		c0.03	
v/s Ratio Perm				0.10		0.02
v/c Ratio	2.11	0.72	0.77	0.10	0.22	0.02
Uniform Delay, d1	38.8	3.8	15.9	0.0	39.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	505.3	0.6	1.2	0.1	0.3	0.0
Delay (s)	544.0	4.5	17.1	0.1	39.7	0.0
Level of Service	F	A	B	A	D	A
Approach Delay (s)		188.3	16.0		31.9	
Approach LOS		F	B		C	

Intersection Summary

HCM Average Control Delay	127.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	0.88	0.94			0.64
Frpb, ped/bikes	1.00	0.98	1.00			0.96
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			0.85
Flt Protected	0.95	1.00	0.95			1.00
Satd. Flow (prot)	1770	2725	4990			3903
Flt Permitted	0.95	1.00	0.95			1.00
Satd. Flow (perm)	1770	2725	4990			3903
Volume (vph)	140	1127	624	0	0	2061
Peak-hour factor, PHF	0.60	0.60	0.85	0.85	0.85	0.85
Adj. Flow (vph)	233	1878	734	0	0	2425
RTOR Reduction (vph)	0	167	0	0	0	598
Lane Group Flow (vph)	233	1711	734	0	0	1827
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		Perm				
Protected Phases	8		2			
Permitted Phases		8				6
Actuated Green, G (s)	26.0	26.0	34.0			34.0
Effective Green, g (s)	28.0	28.0	36.0			36.0
Actuated g/C Ratio	0.40	0.40	0.51			0.51
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	708	1090	2566			2007
v/s Ratio Prot	0.13		0.15			
v/s Ratio Perm		c0.63				c0.47
v/c Ratio	0.33	1.57	0.29			0.91
Uniform Delay, d1	14.5	21.0	9.7			15.5
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.3	260.9	0.1			6.7
Delay (s)	14.8	281.9	9.7			22.2
Level of Service	B	F	A			C
Approach Delay (s)	252.4		9.7		22.2	
Approach LOS	F		A		C	

Intersection Summary

HCM Average Control Delay	112.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.0	3.0	3.0	3.0
Lane Util. Factor			0.91	1.00	0.97	0.95
Frpb, ped/bikes			1.00	0.98	1.00	1.00
Flpb, ped/bikes			1.00	1.00	1.00	1.00
Frt			1.00	0.85	1.00	1.00
Flt Protected			1.00	1.00	0.95	1.00
Satd. Flow (prot)			5085	1553	3433	3539
Flt Permitted			1.00	1.00	0.95	1.00
Satd. Flow (perm)			5085	1553	3433	3539
Volume (vph)	0	0	814	440	1138	1293
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	0	958	518	1339	1521
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	958	518	1339	1521
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type				Perm	Prot	
Protected Phases			2		1	6
Permitted Phases				2		
Actuated Green, G (s)			25.0	25.0	12.6	47.6
Effective Green, g (s)			27.0	27.0	14.6	47.6
Actuated g/C Ratio			0.57	0.57	0.31	1.00
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			2884	881	1053	3539
v/s Ratio Prot			0.19		c0.39	0.43
v/s Ratio Perm				c0.33		
v/c Ratio			0.33	0.59	1.27	0.43
Uniform Delay, d1			5.5	6.7	16.5	0.0
Progression Factor			1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	1.0	129.8	0.1
Delay (s)			5.6	7.7	146.3	0.1
Level of Service			A	A	F	A
Approach Delay (s)	0.0		6.3			68.5
Approach LOS	A		A			E

Intersection Summary

HCM Average Control Delay	47.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

52791
220

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5036		1770	3445		1770	4902		1770	4589	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5036		1770	3445		1770	4902		1770	4589	
Volume (vph)	755	1416	80	100	1028	180	150	1110	280	250	830	1018
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	839	1573	89	111	1142	200	167	1233	311	278	922	1131
RTOR Reduction (vph)	0	5	0	0	12	0	0	37	0	0	184	0
Lane Group Flow (vph)	839	1657	0	111	1330	0	167	1507	0	278	1869	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	28.0	48.5		11.5	32.0		6.0	30.0		10.0	34.0	
Effective Green, g (s)	30.0	50.5		13.5	34.0		8.0	32.0		12.0	36.0	
Actuated g/C Ratio	0.25	0.42		0.11	0.28		0.07	0.27		0.10	0.30	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	443	2119		199	976		118	1307		177	1377	
v/s Ratio Prot	c0.47	0.33		0.06	c0.39		0.09	0.31		c0.16	c0.41	
v/s Ratio Perm												
v/c Ratio	1.89	0.78		0.56	1.36		1.42	1.15		1.57	1.75dr	
Uniform Delay, d1	45.0	30.0		50.4	43.0		56.0	44.0		54.0	42.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	410.7	1.9		3.4	169.8		229.2	78.1		282.2	165.6	
Delay (s)	455.7	31.9		53.8	212.8		285.2	122.1		336.2	207.6	
Level of Service	F	C		D	F		F	F		F	F	
Approach Delay (s)		174.1			200.6			138.0			222.9	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	185.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	137.3%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0		3.0	3.0			3.0	
Lane Util. Factor					0.91		1.00	0.91			0.91	
Frpb, ped/bikes					1.00		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.99		1.00	1.00			0.99	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					4964		1770	5085			5026	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					4964		1770	5085			5026	
Volume (vph)	0	0	0	180	1179	150	158	910	0	0	680	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Adj. Flow (vph)	0	0	0	257	1684	214	226	1300	0	0	971	71
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	2137	0	226	1300	0	0	1034	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot					
Protected Phases				3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)					20.1		6.0	30.0			19.0	
Effective Green, g (s)					22.1		8.0	32.0			21.0	
Actuated g/C Ratio					0.37		0.13	0.53			0.35	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					1825		236	2707			1756	
v/s Ratio Prot							c0.13	0.26			c0.21	
v/s Ratio Perm					0.43							
v/c Ratio					9.18dl		0.96	0.48			0.59	
Uniform Delay, d1					19.0		25.9	8.8			16.0	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					83.2		46.3	0.1			0.5	
Delay (s)					102.2		72.2	9.0			16.5	
Level of Service					F		E	A			B	
Approach Delay (s)		0.0			102.2			18.3			16.5	
Approach LOS		A			F			B			B	

Intersection Summary

HCM Average Control Delay	56.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.8%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0					3.0		3.0	3.0	
Lane Util. Factor		0.91	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		5074	1548					4669		1770	5085	
Flt Permitted		1.00	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		5074	1548					4669		1770	5085	
Volume (vph)	90	2433	85	0	0	0	0	1108	1020	220	810	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.88	0.90
Adj. Flow (vph)	100	2703	94	0	0	0	0	1231	1133	244	920	0
RTOR Reduction (vph)	0	0	52	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	2803	42	0	0	0	0	2363	0	244	920	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm							Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)		25.0	25.0					26.0		4.0	35.0	
Effective Green, g (s)		27.0	27.0					28.0		6.0	37.0	
Actuated g/C Ratio		0.39	0.39					0.40		0.09	0.53	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		1957	597					1868		152	2688	
v/s Ratio Prot								c0.51		c0.14	0.18	
v/s Ratio Perm		0.55	0.03									
v/c Ratio		1.43	0.07					1.80dr		1.61	0.34	
Uniform Delay, d1		21.5	13.6					21.0		32.0	9.5	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		197.5	0.1					123.6		300.8	0.1	
Delay (s)		219.0	13.6					144.6		332.8	9.6	
Level of Service		F	B					F		F	A	
Approach Delay (s)		212.4			0.0			144.6			77.3	
Approach LOS		F			A			F			E	

Intersection Summary

HCM Average Control Delay	163.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.8%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1726			1710	1472	1770	3508		1770	3450	
Flt Permitted		0.79			0.85	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1409			1506	1472	1770	3508		1770	3450	
Volume (vph)	120	10	35	15	10	50	20	513	25	30	569	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	11	39	17	11	56	22	570	28	33	632	100
RTOR Reduction (vph)	0	8	0	0	0	34	0	4	0	0	14	0
Lane Group Flow (vph)	0	175	0	0	28	22	22	594	0	33	718	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		23.6			23.6	23.6	2.6	23.7		2.6	23.7	
Effective Green, g (s)		25.6			25.6	25.6	4.6	25.7		4.6	25.7	
Actuated g/C Ratio		0.39			0.39	0.39	0.07	0.40		0.07	0.40	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		556			594	581	125	1389		125	1366	
v/s Ratio Prot							0.01	0.17		c0.02	c0.21	
v/s Ratio Perm		c0.12			0.02	0.02						
v/c Ratio		0.31			0.05	0.04	0.18	0.43		0.26	0.53	
Uniform Delay, d1		13.6			12.1	12.1	28.4	14.3		28.5	15.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.0	0.0	0.7	0.2		1.1	0.4	
Delay (s)		13.9			12.2	12.1	29.0	14.5		29.7	15.3	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.9			12.1			15.0			15.9	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1637	1659	1814	1519	3343	1503
Flt Permitted	0.95	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1637	1659	1814	1519	3343	1503
Volume (vph)	300	40	30	208	274	290
Peak-hour factor, PHF	0.45	0.45	0.45	0.92	0.45	0.92
Adj. Flow (vph)	667	89	67	226	609	315
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	368	388	67	226	609	315
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Split			Free		Free
Protected Phases	4	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	21.6	21.6	5.8	58.2	15.8	58.2
Effective Green, g (s)	23.6	23.6	7.8	58.2	17.8	58.2
Actuated g/C Ratio	0.41	0.41	0.13	1.00	0.31	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	664	673	243	1519	1022	1503
v/s Ratio Prot	0.22	c0.23	0.04		c0.18	
v/s Ratio Perm				0.15		c0.21
v/c Ratio	0.55	0.58	0.28	0.15	0.60	0.21
Uniform Delay, d1	13.3	13.4	22.7	0.0	17.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.2	0.6	0.2	0.9	0.3
Delay (s)	14.3	14.6	23.3	0.2	18.1	0.3
Level of Service	B	B	C	A	B	A
Approach Delay (s)		14.5	5.5		12.0	
Approach LOS		B	A		B	

Intersection Summary

HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	6.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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APPENDIX C

CITY OF SAN DIEGO ROADWAY CLASSIFICATION TABLES (*STANDARD AND MODIFIED VERSIONS*)

TABLE 2 (MODIFIED)
ROADWAY CLASSIFICATIONS, LEVELS OF SERVICE (LOS) AND AVERAGE DAILY TRAFFIC (ADT)

			LEVEL OF SERVICE				
STREET CLASSIFICATION	LANES	CROSS SECTIONS	A	B	C	D	E
Freeway	8 lanes		60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes		45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes		30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	102/122	30,000	42,000	60,000	70,000	80,000
Prime Arterial	11 lanes		32,000	44,750	63,750	74,500	85,000
Prime Arterial	10 lanes		30,000	42,000	60,000	70,000	80,000
Prime Arterial	9 lanes		28,750	40,250	57,500	66,250	75,000
Prime Arterial	8 lanes		27,500	38,500	55,000	62,500	70,000
Prime Arterial	7 lanes		26,250	36,750	52,500	58,750	65,000
Prime Arterial	6 lanes	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Prime Arterial Major Arterial	4 lanes 5 lanes		17,500	24,500	35,000	40,000	45,000
Major Arterial	4 lanes	78/98	15,000	21,000	30,000	35,000	40,000
Collector	5 lanes		12,500	17,500	25,000	30,000	35,000
Collector (continuous left-turn lane)	4 lanes	72/92	10,000	14,000	20,000	25,000	30,000
Collector (no Center lane)	4 lanes	64/84	5,000	7,000	10,000	13,000	15,000
	3 lanes						
(continuous left-turn lane)	2 lanes	50/70					
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-collector (single-family)	2 lanes	36/56	—	—	2,200	—	—

Notes:

1. XXX/XXX = Curb to curb width (feet)/right of way (feet) based on the City of San Diego Street Design Manual.
2. XX,XXX = Approximate recommended ADT based on City of San Diego Street Design Manual
3. *The volumes and the average daily level of service listed above are only intended as a general planning guideline.*
4. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.
5. ***Shaded areas indicate LLG-derived ADT capacities.***

S:\Roadway Capacity\City of San Diego_modified version.doc

Drive, Laurel Street, Grape Street, and Hawthorn Street. Modification of the City of San Diego standards was required because the existing standards do not account for the peak-hour spreading, which occurs on these roadways since they primarily serve the airport.

For instance, San Diego standards indicate LOS F operations on North Harbor Drive. These very poor operations were not witnessed during field observations. Rather, field observations indicated LOS C for current conditions of North Harbor Drive between Harbor Island and Laurel Street during nonholiday periods. This observation does not discount the City of San Diego standards, but rather indicates that the standards were developed for normal citywide characteristics. Portions of North Harbor, Laurel, Grape, and Hawthorn do not fall under normal citywide characteristics because they primarily contain airport traffic with nontraditional morning (a.m.) and afternoon (p.m.) peaks. Therefore, traffic is distributed more uniformly throughout the day. The portions of North Harbor, Laurel, Grape, and Hawthorn, as shown in Figure 5-30, with high amounts of airport traffic will have higher capacities.

The City of San Diego roadway capacity standards were therefore modified to more realistically reflect field-observed capacities. The capacities were determined by taking the ratio of p.m. peak percentage over the citywide accepted percentage. This ratio was determined for North Harbor, Laurel, Grape and Hawthorn based on their individual p.m. peak percentages. For example, North Harbor Drive has only 6.4 percent of its average daily traffic (ADT) occurring during the p.m. peak as opposed to the normal 10 percent. By taking the normal p.m. peak of 10 percent and dividing it by the North Harbor Drive peak of 6.4 percent, a factor of 1.56 results. This factor is multiplied by the existing San Diego capacity standards to obtain an increased or modified capacity. These ratios and modified capacities are shown in Table 5-20.

TABLE 5-20
Modified City of San Diego Roadway Capacity Standards

Roadway	LOS A	LOS B	LOS C	LOS D	LOS E
8 Lane Prime (N. Harbor 10/6.4 = 1.56)	67,000	83,000	106,000	114,000	122,000
7 Lane Prime (N. Harbor 10/6.4 = 1.56)	53,000	69,000	92,000	100,000	108,000
6 Lane Prime (N. Harbor 10/6.4 = 1.56)	39,000	55,000	78,000	86,000	94,000
4 Lane Collector (Laurel 10/6.7 = 1.49)	15,000	21,000	30,000	37,000	45,000
4 Lane Major (Laurel 10/6.7 = 1.49)	22,000	31,000	45,000	52,000	60,000
4 Lane Major 1-Way (Grape/Hawthorn 10/6.6 = 1.52)	22,000	31,000	45,000	52,000	60,000
3 Lane Major 1-Way (Grape/Hawthorn 10/6.6 = 1.52)	15,000	21,000	30,000	34,000	38,000

Source: LLG, 2001

The existing ADT model volumes for the key roadway segments are shown in Table 5-21. Also, as shown in Table 5-21, all of the key segments were calculated to operate at LOS A through D under existing conditions.

5 Lane Major (Laurel 10/6.7 = 1.49) 26,000 36,500 52,200 59,600 67,000

APPENDIX D

CUMULATIVE PROJECTS GROWTH FACTOR CALCULATION SHEETS

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Near-Term Cumulative Projects Calculation Sheet
SUNROAD Harbor Island Project—ADT Comparison
September 30, 2008

Segment	Existing 2005–2006	Year 2030	% difference	
Harbor Drive				
West of Terminal 2	27,730	64,280	79%	
Terminal 2 to Harbor Island Dr	29,750	39,540	28%	
Harbor Island Dr to Rental Car Road	81,000	112,020	32%	
Rental Car Road to Laurel Street	82,790	161,620	65%	
Laurel St to Hawthorn St	54,260	71,910	28%	
Hawthorn St to Grape St	37,830	38,970	3%	
South of Grape St	17,690	33,530	62%	
		Average:	***42%***	
Year 2008 - Year 2030:		22 years	42%	*1.9% /year*
Cumulative (Year 2008-2012):		4 years	**7.7%**	
Pacific Highway				
North of Laurel St	18,150	63,660	111%	
Laurel St to Hawthorn St	9,760	23,600	83%	
Hawthorn St to Grape St	18,460	29,330	45%	
South of Grape St	16,940	41,950	85%	
		Average:	***81%***	
Year 2008 - Year 2030:		22 years	81%	*3.7% /year*
Cumulative (Year 2008-2012):		4 years	**14.8%**	
Laurel St				
N. Harbor Dr. to Pacific Highway	36,390	76,210	71%	
Pacific Highway to Kettner Blvd.	27,620	41,550	40%	
		Average:	***56%***	
Year 2008 - Year 2030:		22 years	56%	*2.5% /year*
Cumulative (Year 2008-2012):		4 years	**10.1%**	
Hawthorn St.				
N. Harbor Dr. to Pacific Highway	25,770	30,840	18%	
Pacific Highway to Kettner Blvd.	23,480	28,120	18%	
		Average:	***18%***	
Year 2008 - Year 2030:		22 years	18%	*0.8% /year*
Cumulative (Year 2008-2012):		4 years	**3.3%**	
Grape St.				
N. Harbor Dr. to Pacific Highway	23,130	32,340	33%	
Pacific Highway to Kettner Blvd.	20,330	40,020	65%	
		Average:	***49%***	
Year 2008 - Year 2030:		22 years	49%	*2.2% /year*
Cumulative (Year 2008-2012):		4 years	**9.0%**	

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Segment	Existing 2005–2006	Year 2030	% difference	
Harbor Island Drive (connection)				
Harbor Dr to Harbor Island Dr	16,330	19,230	16%	
		Average:	***16%***	
Year 2008 - Year 2030:		22 years	16%	*0.7% /year*
Cumulative (Year 2008-2012):		4 years	**3.0%**	
Harbor Island Drive				
West of Harbor Island Dr (connector)	8,610	11,000	24%	
East of Harbor Island Dr (connector)	6,940	7,230	4%	
		Average:	***14%***	
Year 2008 - Year 2030:		22 years	14%	*0.6% /year*
Cumulative (Year 2008-2012):		4 years	**2.6%**	

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APPENDIX E

PARKING STUDY FOR THE HARBOR ISLAND PROJECT

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LINSCOTT LAW & GREENSPAN engineers

PARKING STUDY

HARBOR ISLAND

San Diego, California
January 16, 2009

Prepared for:

SUNROAD Enterprises
4445 Eastgate Mall, Suite 400
San Diego, California 92121

LLG Ref. 3-04-1437-3

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PARKING STUDY

HARBOR ISLAND

San Diego, California
January 16, 2009

1.0 INTRODUCTION

A parking assessment was undertaken for the *Harbor Island* project to determine the existing site-generated parking demand and the future parking supply required for the proposed project.

The existing site is located on Harbor Island in the City of San Diego and contains a 600-slip marina with a clubhouse. The project area map is shown in ***Figure 1–1***. Two parking lots serve the site.

The proposed project plans to build a limited service hotel of approximately 210 rooms. The project will be located at the east end of the Sunroad leasehold and will replace an existing locker building and some parking associated with the marina. The project will be approximately 95,000 square feet consisting of hotel rooms, limited meeting space (approximately 5,000 square feet), and common areas. No changes are proposed for the 600-slip marina and clubhouse. Direct parking access to the marina and the proposed hotel will be provided. The development is slated to occur in one phase and is assessed for both weekday and weekend scenarios.

2.0 DATA COLLECTION

Linscott, Law & Greenspan, Engineers (LLG) conducted parking occupancy surveys at the existing site on Tuesday, August 30, 2005, Saturday, August 27, 2005 and Sunday, August 28, 2005. The counts were conducted in summer to account for increased summer activity. Data was collected from two lots that serve the site between the hours of 7:00AM to 7:00PM to best capture peak marina activity during the weekday and weekend.

Although the counts were conducted in Summer 2005, there have been no land use intensity changes since that time. As such, the counts continue to provide a sound basis from which to determine the proposed project parking requirement.

For the purposes of this report the lots will be referred to as Lots A and B as shown in ***Figure 1–2***. Lots A and B are gate controlled and serve the marina and clubhouse. ***Table 2–1*** summarizes the data collection.

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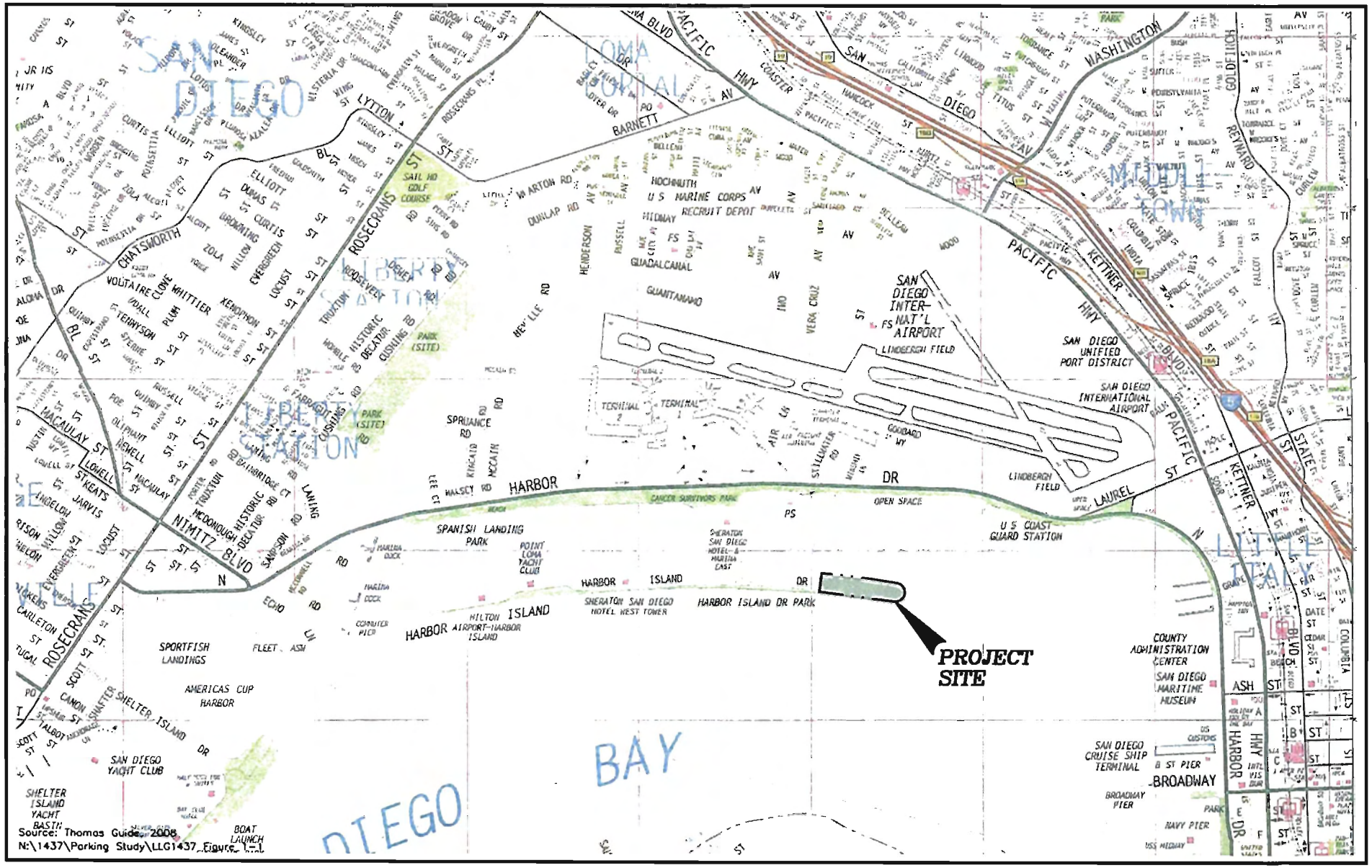

Source: Thomas Guide, 2008
N:\1437\Parking Study\LLG1437_Figure 1-1

LINSCOTT LAW & GREENSPAN engineers

Figure 1-1

Project Area Map

Harbor Island Parking Study

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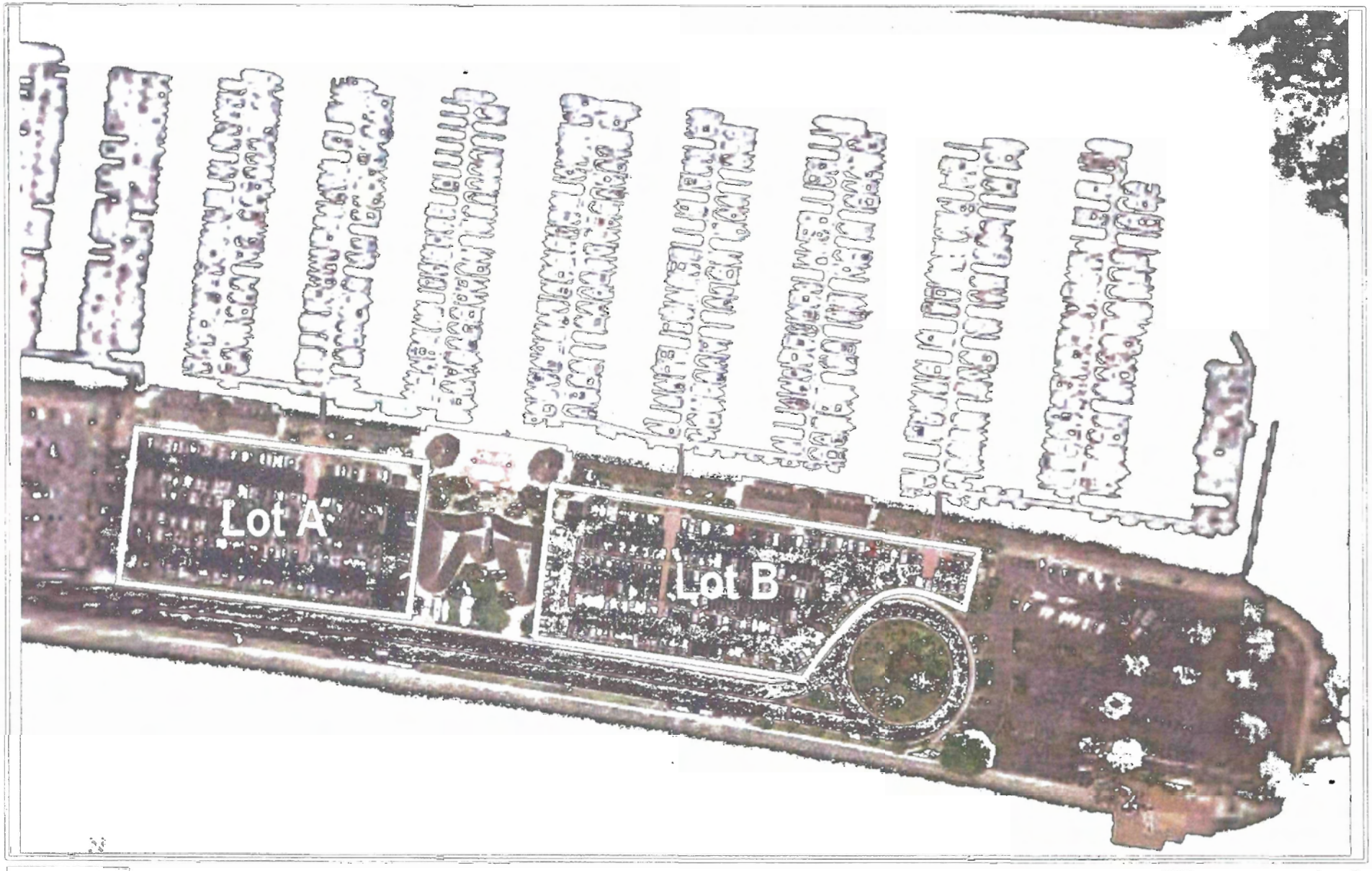

LINSCOTT
LAW &
GREENSPAN
engineers

Figure 1-2

Existing Parking Configuration

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Harbor Island Parking Study

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TABLE 2–1
PARKING OCCUPANCY SURVEY—SUNROAD RESORT MARINA

Time	Marina Parking					
	Parking Lot A (Supply 277)		Parking Lot B (Supply 291)		Total Supply (568)	
	Demand	Surplus/ Deficiency	Demand	Surplus/ Deficiency	Demand	Surplus/ Deficiency
Saturday, August 27, 2005 (Weekend)						
7:00 AM	92	185	73	218	165	403
8:00 AM	94	183	69	222	163	405
9:00 AM	87	190	84	207	171	397
10:00 AM	105	172	83	208	188	380
11:00 AM	113	164	99	192	212	356
12:00 PM	126	151	111	180	237	331
1:00 PM	104	173	104	187	208	360
2:00 PM	111	166	108	183	219	349
3:00 PM	131	146	122	169	253	315
4:00 PM	137	140	129	162	266	302
5:00 PM	125	152	124	167	249	319
6:00 PM	109	168	93	198	202	366
7:00 PM	108	169	99	192	207	361
Sunday, August 28, 2005 (Weekend)						
7:00 AM	106	171	91	200	197	371
8:00 AM	102	175	96	195	198	370
9:00 AM	97	180	89	202	186	382
10:00 AM	92	185	86	205	178	390
11:00 AM	109	168	95	196	204	364
12:00 PM	110	167	94	197	204	364
1:00 PM	122	155	96	195	218	350
2:00 PM	139	138	91	200	230	338
3:00 PM	130	147	93	198	223	345
4:00 PM	117	160	94	197	211	357
5:00 PM	110	167	93	198	203	365
6:00 PM	99	178	92	199	191	377
7:00 PM	97	180	91	200	188	380

TABLE 2–1 *(continued)*
PARKING OCCUPANCY SURVEY—SUNROAD RESORT MARINA

Time	Marina Parking					
	Parking Lot A (Supply 277)		Parking Lot B (Supply 291)		Total Supply (568)	
	Demand	Surplus/ Deficiency	Demand	Surplus/ Deficiency	Demand	Surplus/ Deficiency
Tuesday, August 30, 2005 (Weekday)						
7:00 AM	61	216	57	234	118	450
8:00 AM	55	222	60	231	115	453
9:00 AM	72	205	77	214	149	419
10:00 AM	68	209	77	214	145	423
11:00 AM	87	190	82	209	169	399
12:00 PM	98	179	75	216	173	395
1:00 PM	86	191	65	226	151	417
2:00 PM	76	201	77	214	153	415
3:00 PM	71	206	91	200	162	406
4:00 PM	73	204	79	212	152	416
5:00 PM	59	218	71	220	130	438
6:00 PM	132	145	70	221	202	366
7:00 PM	190	87	65	226	255	313

General Notes:

1. Peak parking demand for the marina is shaded.

3.0 EXISTING MARINA PARKING ASSESSMENT

The marina currently provides 600 slips with a total parking supply (*Lot A + Lot B*) of 568 spaces. The results, presented in *Table 2–1*, indicate the peak marina parking demand occurred on Saturday at 4:00PM with the maximum number of occupied parking spaces observed at 266. This represents an approximately 47% parking occupancy or a reserve capacity of 302 spaces. At the time of this data collection, only 87% of the slips or 522 slips were occupied. Therefore, the parking demand equates to a parking rate of approximately 0.51 spaces per slip (266 spaces ÷ 522 occupied slips), or inversely stated, 1 space per 1.96 slips.

LLG researched other sources for relevant parking data to further validate the data collected. Count data for Harbor Island from the *San Diego Unified Port District Tidelands Parking Guidelines* report was obtained. Excerpts of the data are attached in ***Appendix E–1***. Parking occupancy counts were conducted at four marinas on Harbor Island for this study. The exact dates of the counts were Friday, July 19, 1996 and Saturday, July 20, 1996. These dates were selected based on patterns of peak visitation to San Diego while avoiding the influence of any major event. Despite the data being almost twelve years old, the data provides some insight into parking demands on Harbor Island. The

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aggregate peak parking demand equates to a parking rate of 0.41 spaces per slip (or 1 space per 2.4 slips). This represents a slightly lower rate than the observed rate (0.41 versus 0.51 spaces per slip).

The suggested parking requirement for the existing Sunroad Resort Marina, per peak observed demand, is 0.51 spaces per slip. This is about one-half of the published Port's rate of 1.0 space per slip, per the *Tidelands Parking Guidelines*.

4.0 HARBOR ISLAND PROJECT—REQUIRED PARKING SUPPLY

A parking assessment was also undertaken for the proposed *Harbor Island* project to determine if the parking provided will meet the site-generated demand. The analysis was performed in two parts. First, a required parking supply was calculated based on the project description with no shared parking considered. Then, a shared parking analysis was performed to account for the different peak parking demands of the marina and hotel land uses of the proposed project.

The *Harbor Island* project is slated to occur in one phase, proposing the development of a limited service hotel of approximately 210 rooms. No changes are proposed to the 600-slip marina and clubhouse.

4.1 Required Parking Supply Without Shared Parking

The parking requirements for the project were obtained from the following sources:

- San Diego Unified Port District Tidelands Parking Guidelines dated January 2001, Harbor Island Parking Rates
- The marina "observed" rate derived in Section 3.0 of this report

One adjustment factor (*Dedicated Airport Shuttle*) from the *San Diego Unified Port District Tidelands Parking Guidelines* dated January 2001 was also applied as appropriate. ***Appendix E–1*** contains excerpts from these parking guidelines. ***Table 4–1*** summarizes the required parking supply without shared parking.

The following is a description of the land uses within the proposed project and their respective parking rate calculations:

Hotel Parking Requirement—Per the *San Diego Unified Port District Tidelands Parking Guidelines*, a parking rate of 0.6 spaces per room is to be provided for a hotel development on Harbor Island. No deviation from the guidelines is proposed. Therefore, the ***gross*** parking requirement is 126 spaces. Since the hotel plans on providing a dedicated airport shuttle, a 5% reduction was applied, resulting in a ***net*** parking requirement of 120 spaces.

Marina Parking Requirement—The project proposes no changes to the existing marina, which will continue to contain a total of 600 slips. Using the "observed" rate of 0.51 spaces per slip, the marina requires a ***gross*** requirement of 306 spaces. No adjustment factors were applied to the marina parking demand; therefore, the ***net*** parking requirement of 306 spaces is the same with 306 spaces.

Total Parking Requirement without Shared Parking—Applying the parking demands for the land uses mentioned above, ***Table 4–1 calculates a total project gross parking requirement of 432 spaces and, with the "dedicated airport shuttle" adjustment factor applied, a total project net parking requirement of 426 spaces.***

TABLE 4–1
REQUIRED PARKING SUPPLY WITHOUT SHARED PARKING

Land Use	Size	Parking Rate	Gross Parking Requirement	Adjustment Factor Applied[c] *Dedicated Airport Shuttle (0%–5%)*		Net Parking Requirement
				%	#	
Hotel	210 rooms	0.6 / room [a]	126	-5%	-6	120
Marina (Existing)	600 slips	0.51 / slip [b]	306	—	—	306
		Total:	**432**	—	**-6**	**426**

Footnotes:
a. Parking rate from the *San Diego Unified Port District Tidelands Parking Guidelines* dated January 2001—"Harbor Island" parking rates used.
b. "Site-specific" rate used in calculations (See Section 3.0 for details).
c. Adjustment factor from the *San Diego Unified Port District Tidelands Parking Guidelines* dated January 2001.

4.2 Required Parking Supply With Shared Parking

Shared parking between the hotel and marina land uses of the proposed project is expected. In particular, the marina component and the hotel component of the project would have opposite peak parking needs. The peak parking demand for the marina typically occurs during the day while the hotel typically occurs at night. In performing the shared parking analysis, LLG considered both weekday and weekend scenarios.

"Percentages of Peak Parking Demand" were obtained from two sources: the *City of San Diego Traffic Impact Study Manual July 1998, Parking Requirements* and *site-specific data*. Below is a brief description of the percentage assumptions that were used for each component of the project. ***Appendix E–2*** contains the Weekday and Weekend "Percentage of Peak Parking Demand" tables.

For the ***Hotel*** component of the project, the *City of San Diego's percentage of peak parking demand* was used. No alterations were made to the percentages.

For the ***Marina***, *site-specific data* was used to determine percentages for peak parking demand. The data collected in August 2005 for Lots A and B was used to derive percentages for peak parking demand. ***Appendix E–3*** contains the calculation sheet. Since the data only covered the hours of 7:00AM to 7:00PM, LLG assumed percentages for the hours of 6:00AM and 8:00PM–12:00AM.

The above percentages for peak parking demand were applied to the ***net*** required parking demand numbers that were calculated in *Table 4–1*. ***Table 4–2*** summarizes the results of the shared parking analysis for the project on a weekday and weekend basis.

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TABLE 4–2
HARBOR ISLAND PROJECT—HOURLY PARKING DEMAND WITH SHARED PARKING

	WEEKDAY			WEEKEND		
	Hotel 210 rooms	Marina 600 slips	Total	Hotel 210 rooms	Marina 600 slips	Total
Required Spaces without Shared Parking:	**120**	**306**	**426**	**120**	**306**	**426**
6:00 AM	120	46	166	108	46	154
7:00 AM	114	141	255	96	233	329
8:00 AM	102	138	240	90	233	323
9:00 AM	102	177	279	84	230	314
10:00 AM	96	174	270	72	236	308
11:00 AM	90	202	292	66	266	332
12:00 PM	84	208	292	60	282	342
1:00 PM	84	181	265	60	272	332
2:00 PM	84	184	268	60	288	348
3:00 PM	72	193	265	60	306	366
4:00 PM	78	181	259	60	306	366
5:00 PM	72	156	228	72	291	363
6:00 PM	78	242	320	78	251	329
7:00 PM	90	306	396	84	254	338
8:00 PM	102	230	332	84	230	314
9:00 PM	108	153	261	90	153	243
10:00 PM	108	92	200	102	92	194
11:00 PM	120	46	166	114	46	160
12:00 AM	120	46	166	120	46	166
Required Parking Supply with Shared Parking:			**396**			**366**

General Notes:

1. Peak parking demand is shaded.

Total Parking Requirement with Shared Parking—As shown in *Table 4–2*, the peak parking demand on a *Weekday* occurs at 7:00PM with 396 spaces required for the development. On a *Weekend* basis, the peak parking demand occurs at 3:00PM and 4:00PM with 366 spaces required for the development. Therefore, ***a net shared parking requirement of 396 spaces is needed.***

5.0 CONCLUSIONS

A parking assessment was undertaken for the existing marina located on Harbor Island Drive in the City of San Diego. The marina currently has 600 slips with an 87% occupancy rate. Based on data that was obtained during the summer months to account for increased activity, the parking demand equated to a parking rate of approximately 0.51 spaces per slip, or inversely stated, 1 parking space per 1.96 slips. ***The suggested parking requirement for the existing Sunroad Resort Marina, per peak observed demand, is 0.51 spaces per slip.***

A parking assessment was also undertaken for the proposed *Harbor Island* project. The project proposes to build a limited service hotel of approximately 210 rooms. The project will be located at the east end of the Sunroad leasehold and will replace an existing locker building and some parking.

In order to determine the parking requirement for the *Harbor Island* project, both a "without" and "with" shared parking analysis between the marina and hotel land uses of the proposed project was performed.

As shown in *Table 4–1*, ***without shared parking, a total net parking requirement is 426 spaces.***

Using the net parking requirements that were calculated in *Table 4–1,* a shared parking analysis was performed. The analysis was done for both weekday and weekend scenarios. ***With shared parking, a net shared parking requirement of 396 spaces is needed.***

The proposed 457 spaces of surface parking is expected to adequately serve the proposed project.

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APPENDIX E–1

EXCERPTS FROM SAN DIEGO UNIFIED PORT DISTRICT TIDELANDS PARKING GUIDELINES

TIDELANDS PARKING GUIDELINES
SAN DIEGO UNIFIED PORT DISTRICT

INTRODUCTION/SUMMARY

Purpose and Intent of the Parking Guidelines

The San Diego Unified Port District (District) retained Katz, Okitsu & Associates (KOA) and Wilbur Smith Associates (WSA) to develop a set of parking guidelines for use throughout the District. The internal guidelines are intended to address the generalized parking requirements for potential project uses in the following districts:

- Harbor Island;
- Shelter Island;
- North Embarcadero;
- Coronado; and
- South Bay (Combined National City, Chula Vista, Imperial Beach)

The South Embarcadero and Seaport Village Guidelines were previously evaluated separately by Wilbur Smith Associates, [1] and portions of these documents are included in the appendices to this document.

The parking guidelines are based on parking surveys conducted in the tidelands districts to determine the parking characteristics of specific uses. The guidelines also reflect the knowledge obtained from other recognized national sources of research data on parking requirements. The individual tidelands districts vary significantly in their transportation and land use characteristics. For this reason, it was clear from the onset of the development of the guidelines, that the guidelines must be sensitive to the unique features of each of the districts. In addition, the guidelines must be able to address the full range of potential uses that would likely be considered in each of the districts. These include hotels, marinas, marine sales and service, restaurants, retail, conference centers, and office uses. The guidelines also were intended to assist in addressing the parking requirements of special uses and to provide for parking for public bay access.

The Parking Guidelines as depicted in these ten pages were approved by the Board of Port Commissioners with the support of the Port Tenants Association on December 12, 2000. Any development project and/or use of District tidelands shall be subject to these parking Guidelines as modified, if required, by the California Coastal Commission.

January 5, 2001

[1] *Tidelands Parking Study - Embarcadero Area, Wilbur Smith Associates, September 20, 1995; Seaport Village parking ratios shown in attached table.*

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Table 1
Suggested Base Unadjusted Parking Demand Rates by District [1]

Land Use	Unit	Harbor Island	Shelter Island	North Embarcadero[2] [7]	South Embarcadero	Coronado	South Bay[3]
Restaurant	Seat[4]	0.25	0.25	0.14	0.13	0.25	0.25
Restaurant	ksf [5]	9.3	9.3	9.3	-	9.3	9.3
Marine Sales/Service	ksf	3.9	3.9	3.9	-	3.9	3.9
Marina	slip	1.0	1.0	0.4	0.33	1.0	1.0
Retail	ksf	4.7	4.7	4.7	2.8	4.7	4.7
Office	ksf	2.8	2.8	2.8	-	2.8	2.8
Hotel Uses							
Hotel	room	0.6	1.1	0.7	0.5	1.0	1.1
Hotel Restaurant	Seat[4]	0.12	0.14	0.14	0.13	0.11	(6)
Hotel Restaurant	ksf [5]	8.0	9.3	8.5	-	7.3	(6)
Hotel Conference	ksf	1.2	1.7	1.4	1.55	1.6	(6)
Hotel Dock Slip	berth	0.4	0.4	0.4	0.33	0.3	(6)
Hotel Retail	ksf	2.50	3.0	2.7	2.8	2.2	(6)

Notes:

[1] The parking rates provided in these guidelines may not agree with those of the local jurisdictions adjacent to each of the Tidelands districts. This is because the Tidelands parking rates reflect the specific characteristics of waterfront-oriented uses and developments, whereas a local city's parking requirements are meant to be applied on a broad city-wide basis.

[2] The parking rates provided in these guidelines differ somewhat from those in the North Embarcadero Alliance Visionary Plan. The parking rates in the Visionary Plan were intended as a planning tool to guide the long range development plans of the area, where as the parking rates in these guidelines are intended for immediate application to specific development projects in the North Embarcadero.

[3] South Bay includes National City, Chula Vista and Imperial Beach.

[4] The area-to-seat ratio for restaurants is assumed to be approximately 15 s.f. per seat.

[5] The square footage of restaurants represents the "gross" area of the building footprint, which includes everything such as a kitchen.

[6] A composite parking demand rate for all uses in a hotel is used for this district which is reflected in the per room rate above.

[7] For the South Embarcadero and Seaport Village consult the following documents (excerpts attached): Tidelands Parking Study Embarcadero Area, Wilbur Smith Associates, September 20, 1995; Seaport Village parking ratios shown in attached table.

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Table 2
SUGGESTED DEMAND ADJUSTMENT FACTORS BY DISTRICT

Type of Adjustment Adjustment Range	Impact on Parking Requirements	Harbor Island	Shelter Island	Embarcadero*	Coronado	South Bay (1)
Proximity to Transit	Reduction	0-3%	0-3%	0-12%	0-3%	0-3%
Access to Airport (2)	Reduction	0-5%	0-3%	0-5%	0-3%	0-2%
Shared Parking Potential (9)	Reduction	0-20%	0-8%	0-20%	0-8%	0-3%
Proximity to Public Waterfront Amenities for Public Access (3)	Increase	0-5%	0-5%	0-25%	0-5%	0-3%
Displacement of Existing Parking (4)	Increase	Must be determined on a project-specific basis.				
Existing Parking Shortfall/Surplus (5)	Increase	Must be determined on a project-specific basis.				
Employee Trip Reduction Programs (6)	Incentive/ Reduction	Must be determined on a project-specific basis. Should not exceed 25% including the proximity to transit reduction determined above.				
Dedicated Airport Shuttle Service (7)	Incentive/ Reduction	Hotel uses only. Must be determined on a project specific basis. Should not exceed the proximity to airport reduction determined above.				
Dedicated Water Transportation Service (8)	Incentive/ Reduction	Hotels/Restaurant/Retail uses only. Must be determined on a project specific basis. Should not exceed 10%.				

Notes:

(1) South Bay includes National City, Chula Vista, and Imperial Beach.

(2) This factor does not apply to Marine Sales/Service and Marina/Hotel Marina uses.

(3) Waterfront park and open space amenities attract visitors and recreational users. These users will also patronize the adjacent hotel, restaurant and retail uses resulting in a benefit to the development due to the amenities. This adjustment is designed to ensure that sufficient parking is provided to accommodate public access to these uses. Because of the site specific nature of this adjustment it can only be determined by a review of each individual project based upon a study of existing public access parking.

(4) This factor applies to new developments that displace parking that serves adjacent uses.

(5) This factor applies to new developments that are in an area where a parking shortfall exists. An increase in parking may be necessary to help address the existing problem. In some cases a surplus of area parking may allow a development to reduce its parking requirement.

(6) This factor applies to new developments that provide trip reduction measures such as carpool parking, motorcycle parking, secure bicycle parking, off-site employee parking, transit passes or other incentives to reduce employee use of single occupant vehicles. A monitoring program will be required for this provision to take effect.

(7) This factor applies to new hotel developments that provide a dedicated, regularly scheduled airport shuttle service.

(8) This factor applies to hotel, restaurant, or retail uses that are adjacent to or provide a dedicated water taxi or ferry service that operates in a manner which would offer an alternative to using an automobile to reach the site.

(9) This factor applies to any development or the area surrounding the development which includes a variety of uses which complement each other in terms of parking. The project or area should be evaluated using the ULI shared use parking methodology, which will determine the extent of the parking reduction that is appropriate.

**North and South Embarcadero*

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APPENDIX E–2

PERCENTAGE OF PEAK PARKING DEMAND TABLES

LINSCOTT
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PERCENTAGE OF PEAK PARKING DEMAND (WEEKDAY)

PROJECT #: 3-04-1437-3

PROJECT NAME: Harbor Island Project

LAND USE	Hotel	Marina
SOURCE	City of SD (Visitor Accomodations)	LLG[1] (Observed)
HOUR OF DAY	Weekday	Weekday
6:00 AM	100%	15%
7:00 AM	95%	46%
8:00 AM	85%	45%
9:00 AM	85%	58%
10:00 AM	80%	57%
11:00 AM	75%	66%
12:00 PM	70%	68%
1:00 PM	70%	59%
2:00 PM	70%	60%
3:00 PM	60%	63%
4:00 PM	65%	59%
5:00 PM	60%	51%
6:00 PM	65%	79%
7:00 PM	75%	100%
8:00 PM	85%	75%
9:00 PM	90%	50%
10:00 PM	90%	30%
11:00 PM	100%	15%
12:00 AM	100%	15%

Notes:
LLG—Linscott, Law & Greenspan, Engineers
City of SD—City of San Diego Traffic Impact Study Manual July 1998, Parking Requirements

1. LLG made adjustments to some percentages to better reflect the site.

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12/9/2008
shared parking tables_Sep 2008_210 rm hotel n marina

LINSCOTT
LAW &
GREENSPAN
engineers

PERCENTAGE OF PEAK PARKING DEMAND (WEEKEND)

PROJECT #: **3-04-1437-3**

PROJECT NAME: **Harbor Island Project**

LAND USE	Hotel	Marina
SOURCE	City of SD (Visitor Accomodations)	LLG[1] (Observed)
HOUR OF DAY	Weekend	Weekend
6:00 AM	90%	15%
7:00 AM	80%	76%
8:00 AM	75%	76%
9:00 AM	70%	75%
10:00 AM	60%	77%
11:00 AM	55%	87%
12:00 PM	50%	92%
1:00 PM	50%	89%
2:00 PM	50%	94%
3:00 PM	50%	100%
4:00 PM	50%	100%
5:00 PM	60%	95%
6:00 PM	65%	82%
7:00 PM	70%	83%
8:00 PM	70%	75%
9:00 PM	75%	50%
10:00 PM	85%	30%
11:00 PM	95%	15%
12:00 AM	100%	15%

Notes:
LLG—Linscott, Law & Greenspan, Engineers
City of SD—City of San Diego Traffic Impact Study Manual July 1998, Parking Requirements

1. LLG made adjustments to some percentages to better reflect the site.

APPENDIX E–3

PERCENTAGE OF PEAK PARKING DEMAND CALCULATIONS FOR THE EXISTING MARINA

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% of Peak Parking Demand Calculations

Existing Marina (Lots A & B)

START TIME	% of Peak Parking Demand *factored up 100%* Weekday (Tuesday)	% of Occupancy Tuesday	% of Peak Parking Demand *factored up 100%* Weekend (Sat/Sun avg)	% of Occupancy (Sat/Sun avg)	Working Columns Sat	Sun	Avg.
7:00 AM	**46%**	21%	**76%**	32%	29%	35%	32%
8:00 AM	**45%**	20%	**76%**	32%	29%	35%	32%
9:00 AM	**58%**	26%	**75%**	31%	30%	33%	31%
10:00 AM	**57%**	26%	**77%**	32%	33%	31%	32%
11:00 AM	**66%**	30%	**87%**	37%	37%	36%	37%
12:00 PM	**68%**	30%	**92%**	39%	42%	36%	39%
1:00 PM	**59%**	27%	**89%**	38%	37%	38%	38%
2:00 PM	**60%**	27%	**94%**	40%	39%	40%	40%
3:00 PM	**63%**	29%	**100%**	42%	45%	39%	42%
4:00 PM	**59%**	27%	**100%**	42%	47%	37%	42%
5:00 PM	**51%**	23%	**95%**	40%	44%	36%	40%
6:00 PM	**79%**	36%	**82%**	35%	36%	34%	35%
7:00 PM	**100%**	45%	**83%**	35%	36%	33%	35%

Notes:

1. % derived based on parking data shown in Table 2-1 of the Parking Study.
2. Bold percentages used for Shared Parking Analysis.

APPENDIX F

MITIGATION CALCULATION SHEETS

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.91	0.91	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6091		3343	6231		1568	3204	1542	1568	2873	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.78	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6091		3343	6231		1568	2579	1542	1568	2873	
Volume (vph)	40	820	129	428	1910	15	108	50	253	60	40	120
Peak-hour factor, PHF	0.60	0.80	0.80	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	67	1025	161	713	2388	19	135	62	316	75	50	150
RTOR Reduction (vph)	0	21	0	0	1	0	0	0	129	0	110	0
Lane Group Flow (vph)	67	1165	0	713	2406	0	68	129	187	75	90	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot		pt+ov	Prot		
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases												
Actuated Green, G (s)	8.5	27.0		25.3	43.8		10.2	20.0	40.1	10.5	20.6	
Effective Green, g (s)	10.5	29.0		27.3	45.8		12.2	24.0	42.1	12.5	24.6	
Actuated g/C Ratio	0.11	0.31		0.29	0.49		0.13	0.26	0.45	0.13	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	195	1908		986	3082		207	751	701	212	763	
v/s Ratio Prot	0.04	0.19		c0.21	c0.39		0.04	0.02	c0.12	c0.05	0.02	
v/s Ratio Perm								0.02			0.02	
v/c Ratio	0.34	0.61		0.72	0.78		0.33	0.17	0.27	0.35	0.12	
Uniform Delay, d1	37.9	27.0		29.3	19.3		36.5	26.6	15.7	36.4	25.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.6		2.7	1.3		0.9	0.1	0.2	1.0	0.1	
Delay (s)	38.9	27.6		31.9	20.6		37.4	26.7	15.9	37.4	25.8	
Level of Service	D	C		C	C		D	C	B	D	C	
Approach Delay (s)		28.2			23.2			21.5			29.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.86			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	6235			1744	1500	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	6235			1744	1500	1723	1655	
Volume (vph)	70	3133	100	240	4418	15	80	20	200	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	3298	105	253	4651	16	84	21	211	11	11	11
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	182	0	10	0
Lane Group Flow (vph)	74	3298	75	253	4667	0	0	105	29	11	12	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	4.0	55.5	55.5	5.0	56.5			11.7	11.7	8.4	8.4	
Effective Green, g (s)	6.0	57.5	57.5	7.0	58.5			13.7	13.7	10.4	10.4	
Actuated g/C Ratio	0.06	0.57	0.57	0.07	0.58			0.14	0.14	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	103	3566	857	233	3626			238	204	178	171	
v/s Ratio Prot	0.04	0.53		c0.08	c0.75			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.02			
v/c Ratio	0.72	0.92	0.09	1.09	1.29			0.44	0.14	0.06	0.07	
Uniform Delay, d1	46.5	19.6	9.7	46.8	21.0			39.9	38.3	40.7	40.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.2	4.7	0.0	83.7	131.3			1.3	0.3	0.1	0.2	
Delay (s)	67.6	24.3	9.8	130.5	152.4			41.2	38.6	40.8	40.9	
Level of Service	E	C	A	F	F			D	D	D	D	
Approach Delay (s)		24.8			151.3			39.5			40.9	
Approach LOS		C			F			D			D	

Intersection Summary

HCM Average Control Delay	96.5	HCM Level of Service	F
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.94	0.91	0.91	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	0.99	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.97	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	4859	4951	4951	1519	1678	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	4859	4951	4951	1519	1678	
Volume (vph)	1214	2199	2619	40	60	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1349	2443	2910	44	67	22
RTOR Reduction (vph)	0	0	0	0	11	0
Lane Group Flow (vph)	1349	2443	2910	44	78	0
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		
Protected Phases	7	4	8		6	
Permitted Phases				Free		
Actuated Green, G (s)	26.0	89.2	58.2	110.4	11.2	
Effective Green, g (s)	28.0	91.2	60.2	110.4	13.2	
Actuated g/C Ratio	0.25	0.83	0.55	1.00	0.12	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1232	4090	2700	1519	201	
v/s Ratio Prot	c0.28	0.49	c0.59		c0.05	
v/s Ratio Perm				0.03		
v/c Ratio	1.09	0.60	1.08	0.03	0.39	
Uniform Delay, d1	41.2	3.3	25.1	0.0	44.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	55.7	0.2	42.6	0.0	1.3	
Delay (s)	96.9	3.5	67.7	0.0	46.1	
Level of Service	F	A	E	A	D	
Approach Delay (s)		36.7	66.7		46.1	
Approach LOS		D	E		D	

Intersection Summary

HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86		0.97	0.86		0.91	0.91	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6058		3343	6189		1568	3184	1526	1568	2855	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.65	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6058		3343	6189		1568	2147	1526	1568	2855	
Volume (vph)	70	1200	236	477	1460	70	183	48	512	60	46	160
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Adj. Flow (vph)	117	2000	393	795	2433	117	305	80	853	100	77	267
RTOR Reduction (vph)	0	27	0	0	5	0	0	0	103	0	107	0
Lane Group Flow (vph)	117	2366	0	795	2545	0	153	232	750	100	237	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot		pm+ov	Prot		
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			
Actuated Green, G (s)	7.0	37.3		22.1	52.4		14.6	26.3	33.8	12.1	21.3	
Effective Green, g (s)	9.0	39.3		24.1	54.4		16.6	30.3	37.8	14.1	25.3	
Actuated g/C Ratio	0.09	0.38		0.23	0.53		0.16	0.29	0.37	0.14	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	150	2307		781	3262		252	797	603	214	700	
v/s Ratio Prot	0.07	c0.39		0.24	0.41		c0.10	c0.05	c0.29	0.06	0.05	
v/s Ratio Perm								0.04	0.20		0.04	
v/c Ratio	0.78	1.03		1.02	0.78		0.61	0.29	1.24	0.47	0.34	
Uniform Delay, d1	46.1	32.0		39.6	19.6		40.3	28.2	32.7	41.1	32.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	22.6	25.6		36.8	1.3		4.1	0.2	123.1	1.6	0.3	
Delay (s)	68.7	57.5		76.3	20.9		44.4	28.4	155.8	42.7	32.3	
Level of Service	E	E		E	C		D	C	F	D	C	
Approach Delay (s)		58.0			34.0			118.1			34.7	
Approach LOS		E			C			F			C	

Intersection Summary

HCM Average Control Delay	55.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.86			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	6234			1736	1500	1723	1603	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	6234			1736	1500	1723	1603	
Volume (vph)	30	4082	80	260	3597	15	80	10	270	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	4536	89	289	3997	17	89	11	300	11	11	22
RTOR Reduction (vph)	0	0	17	0	0	0	0	0	247	0	20	0
Lane Group Flow (vph)	33	4536	72	289	4014	0	0	100	53	11	13	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	2.3	57.7	57.7	4.0	59.4			11.5	11.5	8.4	8.4	
Effective Green, g (s)	4.3	59.7	59.7	6.0	61.4			13.5	13.5	10.4	10.4	
Actuated g/C Ratio	0.04	0.59	0.59	0.06	0.60			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	73	3666	881	197	3767			231	199	176	164	
v/s Ratio Prot	0.02	c0.73		c0.09	0.64			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.04			
v/c Ratio	0.45	1.24	0.08	1.47	1.07			0.43	0.27	0.06	0.08	
Uniform Delay, d1	47.5	20.9	9.1	47.8	20.1			40.5	39.6	41.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	109.3	0.0	235.7	35.8			1.3	0.7	0.1	0.2	
Delay (s)	51.9	130.2	9.1	283.5	55.9			41.8	40.3	41.3	41.5	
Level of Service	D	F	A	F	E			D	D	D	D	
Approach Delay (s)		127.4			71.2			40.7			41.5	
Approach LOS		F			E			D			D	

Intersection Summary

HCM Average Control Delay	97.6	HCM Level of Service	F
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	101.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.94	0.91	0.91	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	0.99	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.97	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	4990	5085	5085	1560	1733	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	4990	5085	5085	1560	1733	
Volume (vph)	1401	2711	2021	140	80	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1557	3012	2246	156	89	22
RTOR Reduction (vph)	0	0	0	0	8	0
Lane Group Flow (vph)	1557	3012	2246	156	103	0
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		
Protected Phases	7	4	8		6	
Permitted Phases				Free		
Actuated Green, G (s)	24.2	86.4	57.2	108.5	12.1	
Effective Green, g (s)	26.2	88.4	59.2	108.5	14.1	
Actuated g/C Ratio	0.24	0.81	0.55	1.00	0.13	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1205	4143	2774	1560	225	
v/s Ratio Prot	c0.31	0.59	c0.44		c0.06	
v/s Ratio Perm				0.10		
v/c Ratio	1.29	0.73	0.81	0.10	0.46	
Uniform Delay, d1	41.2	4.6	20.1	0.0	43.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	137.8	0.7	1.8	0.1	1.5	
Delay (s)	178.9	5.2	21.9	0.1	45.1	
Level of Service	F	A	C	A	D	
Approach Delay (s)		64.4	20.5		45.1	
Approach LOS		E	C		D	

Intersection Summary

HCM Average Control Delay	49.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	108.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

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APPENDIX G

HARBOR ISLAND REVISED PROJECT REVIEW LETTER REPORT DATED OCTOBER 27, 2009

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October 27, 2009

Mr. Tom Story
SUNROAD Enterprises
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

LLG Reference: 3-04-1437-3

Subject: **Harbor Island Traffic Impact Study and Parking Study Review**
City of San Diego

Dear Tom:

Linscott, Law & Greenspan, Engineers (LLG) produced a Traffic Impact Study and Parking Study dated January 16, 2009 for the *Harbor Island* project. The project site is located along the eastern strip of Harbor Island Drive on Harbor Island and currently contains a 600-slip marina. The analyses in these reports were based on a project description that included the construction of a *210-room limited service hotel* while maintaining the existing 600-slip marina. The analyses resulted in a parking requirement of 396 spaces and three long-term intersection impacts.

It is our understanding that SUNROAD Enterprises has revised the project description to now include the construction of a *175-room limited service hotel* while maintaining the existing 600-slip marina. This equates to a reduction of 35 rooms (13%) in the hotel land use. Based on this revised project description, LLG has reviewed the Traffic Impact Study and Parking Study dated January 16, 2009 to determine if any changes in parking requirement or impacts is warranted. Also, contained within this *letter report* is a Construction Traffic Impact analysis for the revised project.

TRAFFIC IMPACT STUDY REVIEW

The reduction in the hotel land use for the revised project would result in a reduction in total trips generated by the project. The trip generation in the Traffic Impact Study dated January 16, 2009 calculated the total net project trips at approximately 1,470 ADT with 47 inbound / 71 outbound trips during the AM peak hour and 79 inbound / 53 outbound trips during the PM peak hour. The revised project would generate approximately 1,225 ADT with 39 inbound / 59 outbound trips during the AM peak hour and 66 inbound / 44 outbound trips during the PM peak hour.

The traffic volumes for the revised project are shown in *Figure 1*.

Philip M. Linscott, PE (1924-2000)
Jack M. Greenspan, PE (Ret.)
William A. Law, PE (Ret.)
Paul W. Wilkinson, PE
John P. Keating, PE
David S. Shender, PE
John A. Boarman, PE
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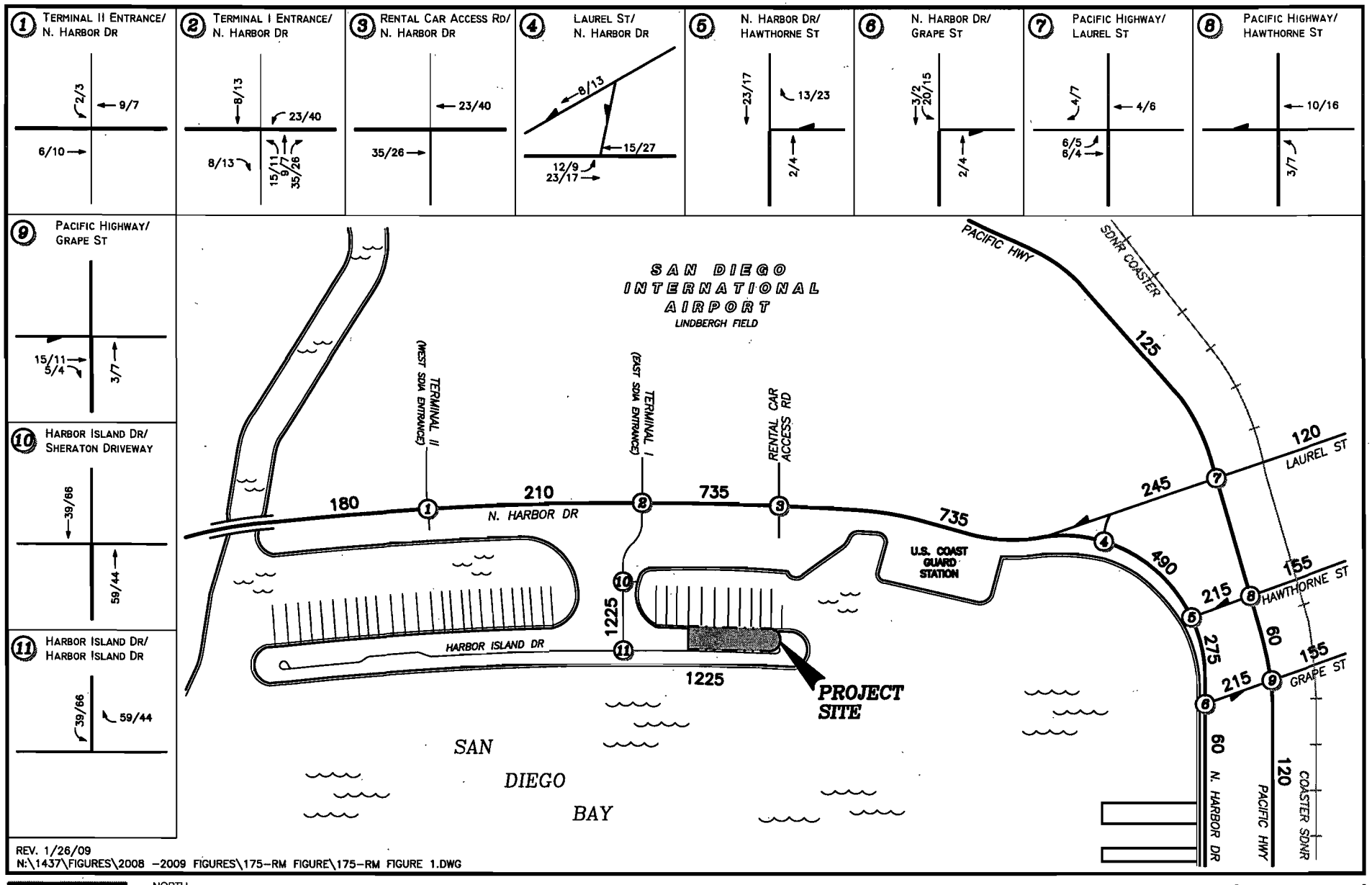

REV. 1/26/09
N:\1437\FIGURES\2008 -2009 FIGURES\175-RM FIGURE\175-RM FIGURE 1.DWG

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NORTH

NOT TO SCALE

Figure 1

Project Traffic Volumes

"175 Room Hotel with 600 Slip Marina"

AM/PM Peak Hours & ADT

HARBOR ISLAND

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Impact and Mitigation Review

Eleven intersections and several street segments were analyzed under both Near-Term and Long-Term conditions in the Traffic Impact Study dated January 16, 2009. In the Near-Term, the original project was calculated to have no significant impacts. In the Long-Term (Year 2030), the original project was calculated to have significant cumulative impacts at the following three intersections:

- N. Harbor Dr./Harbor Island Dr./Terminal 1
- N. Harbor Dr./Rental Car Access Road
- N. Harbor Dr./Laurel Street

Mitigation measures were recommended (Section 13.0 of the Traffic Study) that would reduce the project impacts listed above to a level of 'not significant'.

Based on the revised project, LLG performed a sensitivity analysis, adding the revised project trips to the Year 2030 traffic volumes from the original traffic study and recalculating the Year 2030 intersection operations at the three impacted intersections. The calculation sheets are included in ***Attachment A***.

As shown in ***Table 1***, the revised project is still calculated to have cumulative impacts at the three intersections. The calculations show a decrease in delay at these intersections as compared to the original project; however, the reduction in project trips is not substantial enough as compared to the original project trips in order to remove an impact.

TABLE 1
LONG-TERM (YEAR 2030) INTERSECTION OPERATIONS
(175-ROOM HOTEL WITH 600-SLIP MARINA PROJECT)

Intersection	Peak Hour	Year 2030[a]		Year 2030 + Revised Project			Sig?[e]
		Delay[b]	LOS[c]	Delay	LOS	Δ[d]	
N. Harbor Dr./Harbor Island Dr./Terminal 1 (East Airport Entrance)	AM	51.2	D	56.9	E	**5.7**	**Yes**
	PM	86.6	F	89.1	F	**2.5**	**Yes**
N. Harbor Drive / Rental Car Access Road	AM	169.8	F	171.8	F	2.0	No
	PM	159.0	F	163.7	F	**4.7**	**Yes**
N. Harbor Drive / Laurel Street	AM	98.1	F	98.9	F	0.8	No
	PM	124.1	F	127.0	F	**2.9**	**Yes**

Footnotes:
a. Year 2030 traffic volumes obtained from original Traffic Study dated January 16, 2009.
b. Average delay expressed in seconds per vehicle.
c. Level of Service.
d. Δ denotes an increase in delay due to project.
e. Sig? denotes "Significant Impact"

SIGNALIZED DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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The mitigation measures that were recommended in Section 13.0 of the original Traffic Study would still reduce the project impacts listed above to a level of 'not significant'.

Based on the revised project, no change in impacts or mitigation measures as compared to the original Traffic Impact Study is recommended.

Revised Fair Share Calculations

As discussed in the original Traffic Impact Study, cumulative impacts are long-term by definition and require a financial contribution as mitigation, *proportional* to the project percentage of traffic growth over existing conditions. ***Table 2*** shows the revised preliminary fair-share calculations for the intersections where the *Harbor Island* project has cumulative impacts based on the trips generated by the revised project (175-room hotel with 600-slip marina). The calculations below are based on the traffic volumes for the revised project shown in *Figure 1* and traffic volumes from the original Traffic Study (*Figures 3–2 and 10–2).*

Based on the revised project, a change in fair share contribution by the project as compared to the original Traffic Study is recommended with specific percentages provided in Table 2.

TABLE 2
FAIR SHARE CALCULATIONS
(175-ROOM HOTEL WITH 600-SLIP MARINA PROJECT)

Facility	Formula[a] (Peak Hour Volumes)	Project Percentage
Intersections[b]		
N. Harbor Drive/Harbor Island Drive/Terminal 1	208 / 8,495 – 6,153	8.9%
N. Harbor Drive/Rental Car Access Road	124 / 16,770 – 9,709	1.8%
N. Harbor Drive/Laurel Street	124 / 15,525 – 7,811	1.8%

Footnotes:
a. Project Trips / (Future Traffic with Project – Existing Traffic without Project)
b. Based on Combined AM & PM Peak Hour Volumes

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PARKING STUDY REVIEW

Following the same methodology used in the Parking Study dated January 16, 2009, ***Tables 3 and 4*** calculate the required parking supply for a 175-room hotel with 600 slip marina without and with shared parking, respectively.

As shown in *Table 3*, without shared parking a net parking requirement for the revised project is 406 spaces.

TABLE 3
REQUIRED PARKING SUPPLY WITHOUT SHARED PARKING
(175-ROOM HOTEL WITH 600-SLIP MARINA)

Land Use	Size	Parking Rate	Gross Parking Requirement	Adjustment Factor Applied [c] *Dedicated Airport Shuttle (0%–5%)* %	#	Net Parking Requirement
Hotel	175 rooms	0.6 / room [a]	105	*-5%*	*-5*	100
Marina (Existing)	600 slips	0.51 / slip [b]	306	—	—	306
		Total:	**411**	—	**-5**	**406**

Footnotes:

a. Parking rate from the *San Diego Unified Port District Tidelands Parking Guidelines* dated January 2001—"Harbor Island" parking rates used.

b. "Site-specific" rate used in calculations (See Section 3.0 of Parking Study dated January 16, 2009 for details).

c. Adjustment factor from the *San Diego Unified Port District Tidelands Parking Guidelines* dated January 2001.

Since shared parking between the two land uses of the proposed project is expected, a shared parking analysis was performed, using the net parking requirements from *Table 3*. The analysis was done for both weekday and weekend scenarios. As was the case with the original project, the calculations shown in *Table 4* determine a peak parking demand occurring on a *Weekday* at 7:00PM with a net shared parking requirement of 381 spaces needed for the revised project.

Based on these calculations, the required parking supply for the 175-room limited service hotel and 600 slip marina project is 381 spaces.

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TABLE 4
HOURLY PARKING DEMAND WITH SHARED PARKING
(175-ROOM HOTEL WITH 600-SLIP MARINA)

	WEEKDAY			WEEKEND		
	Hotel 175 rooms	**Marina** 600 slips	Total	**Hotel** 175 rooms	**Marina** 600 slips	Total
Required Spaces without Shared Parking:	**100**	**306**	**406**	**100**	**306**	**406**
6:00 AM	100	46	146	90	46	136
7:00 AM	95	141	236	80	233	313
8:00 AM	85	138	223	75	233	308
9:00 AM	85	177	262	70	230	300
10:00 AM	80	174	254	60	236	296
11:00 AM	75	202	277	55	266	321
12:00 PM	70	208	278	50	282	332
1:00 PM	70	181	251	50	272	322
2:00 PM	70	184	254	50	288	338
3:00 PM	60	193	253	50	306	**356**
4:00 PM	65	181	246	50	306	**356**
5:00 PM	60	156	216	60	291	351
6:00 PM	65	242	307	65	251	316
7:00 PM	75	306	**381**	70	254	324
8:00 PM	85	230	315	70	230	300
9:00 PM	90	153	243	75	153	228
10:00 PM	90	92	182	85	92	177
11:00 PM	100	46	146	95	46	141
12:00 AM	100	46	146	100	46	146
Required Parking Supply with Shared Parking:			**381**			**356**

CONSTRUCTION TRAFFIC IMPACTS

Construction of the project may contribute to traffic delays that are temporary in nature. Construction traffic relates to the traffic generated from construction vehicles. Construction vehicles consist primarily of heavy trucks and worker vehicles. Delay incurred from this activity is of concern since it occurs for a longer period of time and may involve a high number of vehicles. There are several different types of construction activity, including grading, concrete pours, and building structures. Each construction activity has its own intensity and duration. A simple ADT calculation for each construction activity is outlined below based on information provided by SUNROAD Enterprises. A passenger car equivalence (PCE) was applied to large construction trucks.

Grading—1 month

– 1 heavy trucks/day x 2 trips/heavy truck x 2 PCE	=	4 ADT
– 5 workers vehicles/day x 2 trips/worker vehicle	=	10 ADT
Total	=	***14 ADT***

Concrete pours—1 month

– 3 heavy trucks/day x 2 trips/heavy truck x 3 PCE	=	18 ADT
– 15 workers vehicles/day x 2 trips/worker vehicle	=	30 ADT
Total	=	***48 ADT***

Building Structures—8 months at maximum activity

– 25 workers vehicles/day x 2 trips/worker vehicle	=	50 ADT
Total	=	***50 ADT***

The above shows that the maximum construction traffic of 50 ADT is considerably lower than the daily project trips of 1,225 ADT and would be temporary in nature (i.e., 8 months). Therefore, the construction traffic is not expected to cause any significant direct traffic impacts.

LLG also reviewed the possibility of concurrent construction activity due to other cumulative projects in the project vicinity. Based on this review, it was determined that the *2701 North Harbor Drive Demolition* project is anticipated to overlap with the *Harbor Island* project and potentially contribute to a cumulative construction traffic impact. Due to the close proximity of these projects, construction traffic is expected to utilize the same roadways.

The *2701 North Harbor Drive Demolition* project is estimated to generate approximately 206 ADT of construction traffic (see ***Attachment B*** for detailed information). The *Harbor Island* project is estimated to generate 50 ADT of construction traffic during its most traffic intensive phase, as shown in the above calculations. Therefore, the total cumulative construction traffic is 256 ADT (206 + 50).

The cumulative construction traffic (256 ADT) is considerably less than the traffic generated by the land development of the *Harbor Island* project (1,225 ADT) and will be temporary in nature. Since no Near-Term significant impacts were identified with the *Harbor Island* project, the cumulative construction would not trigger any impacts as well.

Finally, construction traffic control plans must be prepared to identify the routes for heavy construction vehicles and the hours of construction activity. This will reduce the potential impacts and avoid the commuter peak hours. The traffic control plans will detail the work zones and lane closures/transitions. They will be prepared to the

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requirements of the City of San Diego Regional Standard Drawings & Caltran's standards to the satisfaction of the City Engineer prior to the commencement of work.

CONCLUSIONS

As demonstrated in this *Letter Report*, the revised Harbor Island project (175-room limited service hotel with 600-slip marina) is calculated to generate less project trips than the original project analyzed in the Traffic Impact Study dated January 16, 2009. However, the reduction in project trips is not substantial enough to warrant any reduction in impacts, and as such the project will still have significant cumulative impacts at the same three intersections that were impacted in the original study. No change in impacts or mitigation measures as compared to the original study is recommended.

A change in fair share contribution based on the revised project is warranted with the new percentages provided in *Table 2*. A reduction in the required parking supply is also warranted with a 381-space demand calculated for the revised project.

Sincerely,
Linscott, Law & Greenspan, Engineers

Lisa Carr
Transportation Planner II

cc: John P. Keating, P.E.
File

Attachment A

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2876	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2876	
Volume (vph)	40	820	128	423	1910	15	105	49	245	60	38	120
Peak-hour factor, PHF	0.60	0.80	0.80	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	67	1025	160	705	2388	19	131	61	306	75	48	150
RTOR Reduction (vph)	0	0	135	0	1	0	0	0	0	0	126	0
Lane Group Flow (vph)	67	1025	25	705	2406	0	131	61	306	75	72	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.3	25.3	9.4	8.4	27.4		9.4	9.4	72.8	9.7	9.7	
Effective Green, g (s)	8.3	27.3	11.4	10.4	29.4		11.4	11.4	72.8	11.7	11.7	
Actuated g/C Ratio	0.11	0.38	0.16	0.14	0.40		0.16	0.16	1.00	0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	196	1857	241	478	2516		523	284	1519	252	462	
v/s Ratio Prot	0.04	0.21	0.02	c0.21	c0.39		0.04	0.03		c0.05	0.03	
v/s Ratio Perm									c0.20			
v/c Ratio	0.34	0.55	0.10	1.47	0.96		0.25	0.21	0.20	0.30	0.16	
Uniform Delay, d1	29.7	17.9	26.3	31.2	21.1		26.9	26.8	0.0	26.9	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.4	0.2	224.8	9.7		0.3	0.4	0.3	0.7	0.2	
Delay (s)	30.8	18.3	26.5	256.0	30.8		27.2	27.2	0.3	27.6	26.5	
Level of Service	C	B	C	F	C		C	C	A	C	C	
Approach Delay (s)		20.0			81.8			10.7			26.8	
Approach LOS		C			F			B			C	

Intersection Summary

HCM Average Control Delay	56.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2852	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2852	
Volume (vph)	70	1200	233	470	1460	70	181	47	506	60	43	160
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Adj. Flow (vph)	117	2000	388	783	2433	117	302	78	843	100	72	267
RTOR Reduction (vph)	0	0	178	0	4	0	0	0	0	0	229	0
Lane Group Flow (vph)	117	2000	210	783	2546	0	302	78	843	100	110	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	9.9	25.4	17.1	20.3	35.8		17.1	17.1	94.4	11.6	11.6	
Effective Green, g (s)	11.9	27.4	19.1	22.3	37.8		19.1	19.1	94.4	13.6	13.6	
Actuated g/C Ratio	0.13	0.29	0.20	0.24	0.40		0.20	0.20	1.00	0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	217	1437	312	790	2476		676	367	1519	226	411	
v/s Ratio Prot	0.07	c0.40	c0.14	c0.23	0.41		0.09	0.04		0.06	0.04	
v/s Ratio Perm									c0.56			
v/c Ratio	0.54	1.39	0.67	0.99	1.03		0.45	0.21	0.55	0.44	0.27	
Uniform Delay, d1	38.7	33.5	34.8	36.0	28.3		33.0	31.4	0.0	36.9	36.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.6	180.6	5.6	29.7	25.7		0.5	0.3	1.5	1.4	0.4	
Delay (s)	41.2	214.1	40.4	65.6	54.0		33.5	31.7	1.5	38.3	36.3	
Level of Service	D	F	D	E	D		C	C	A	D	D	
Approach Delay (s)		179.2			56.8			11.3			36.8	
Approach LOS		F			E			B			D	

Intersection Summary

HCM Average Control Delay	89.1	HCM Level of Service	F
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	94.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Volume (vph)	70	3125	100	240	4413	15	80	20	200	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	3289	105	253	4645	16	84	21	211	11	11	11
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	183	0	10	0
Lane Group Flow (vph)	74	3289	75	253	4661	0	0	105	28	11	12	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.9	55.5	55.5	6.1	57.7			11.7	11.7	8.4	8.4	
Effective Green, g (s)	5.9	57.5	57.5	8.1	59.7			13.7	13.7	10.4	10.4	
Actuated g/C Ratio	0.06	0.57	0.57	0.08	0.59			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	100	3527	848	266	2905			235	202	176	169	
v/s Ratio Prot	0.04	0.53		c0.08	c0.94			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.02			
v/c Ratio	0.74	0.93	0.09	0.95	1.60			0.45	0.14	0.06	0.07	
Uniform Delay, d1	47.1	20.3	10.1	46.6	21.0			40.5	38.8	41.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.1	5.3	0.0	41.8	273.6			1.4	0.3	0.1	0.2	
Delay (s)	72.3	25.6	10.2	88.4	294.6			41.9	39.1	41.4	41.5	
Level of Service	E	C	B	F	F			D	D	D	D	
Approach Delay (s)		26.2			284.0			40.0			41.4	
Approach LOS		C			F			D			D	

Intersection Summary

HCM Average Control Delay	171.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Volume (vph)	30	4076	80	260	3590	15	80	10	270	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	4529	89	289	3989	17	89	11	300	11	11	22
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	252	0	20	0
Lane Group Flow (vph)	33	4529	71	289	4006	0	0	100	48	11	13	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	2.3	53.6	53.6	9.1	60.4			11.5	11.5	8.5	8.5	
Effective Green, g (s)	4.3	55.6	55.6	11.1	62.4			13.5	13.5	10.5	10.5	
Actuated g/C Ratio	0.04	0.54	0.54	0.11	0.61			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	72	3378	812	361	3006			228	197	176	164	
v/s Ratio Prot	0.02	0.73		c0.09	c0.81			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.03			
v/c Ratio	0.46	1.34	0.09	0.80	1.33			0.44	0.24	0.06	0.08	
Uniform Delay, d1	48.1	23.5	11.3	44.7	20.2			41.1	40.0	41.7	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	155.4	0.0	12.0	152.0			1.3	0.6	0.1	0.2	
Delay (s)	52.6	178.9	11.4	56.7	172.2			42.5	40.7	41.8	41.9	
Level of Service	D	F	B	E	F			D	D	D	D	
Approach Delay (s)		174.8			164.4			41.1			41.9	
Approach LOS		F			F			D			D	

Intersection Summary

HCM Average Control Delay	163.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	1212	2193	2615	40	60	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1347	2437	2906	44	67	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1347	2437	2906	44	67	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	21.1	83.2	57.1	102.5	9.3	102.5
Effective Green, g (s)	23.1	85.2	59.1	102.5	11.3	102.5
Actuated g/C Ratio	0.23	0.83	0.58	1.00	0.11	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	753	4115	2855	1519	369	1382
v/s Ratio Prot	c0.40	0.49	c0.59		c0.02	
v/s Ratio Perm				0.03		0.02
v/c Ratio	1.79	0.59	1.02	0.03	0.18	0.02
Uniform Delay, d1	39.7	2.9	21.7	0.0	41.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	360.3	0.2	21.5	0.0	0.2	0.0
Delay (s)	400.0	3.1	43.2	0.0	41.6	0.0
Level of Service	F	A	D	A	D	A
Approach Delay (s)		144.4	42.5		31.4	
Approach LOS		F	D		C	

Intersection Summary

HCM Average Control Delay	98.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	102.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	104.5%	ICU Level of Service	G
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	1399	2707	2017	140	80	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1554	3008	2241	156	89	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1554	3008	2241	156	89	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	19.3	79.6	55.3	99.2	9.6	99.2
Effective Green, g (s)	21.3	81.6	57.3	99.2	11.6	99.2
Actuated g/C Ratio	0.21	0.82	0.58	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	737	4183	2937	1560	401	1419
v/s Ratio Prot	c0.45	0.59	c0.44		c0.03	
v/s Ratio Perm				0.10		0.02
v/c Ratio	2.11	0.72	0.76	0.10	0.22	0.02
Uniform Delay, d1	39.0	3.8	15.8	0.0	39.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	503.4	0.6	1.2	0.1	0.3	0.0
Delay (s)	542.4	4.4	17.0	0.1	40.0	0.0
Level of Service	F	A	B	A	D	A
Approach Delay (s)		187.7	15.9		32.1	
Approach LOS		F	B		C	

Intersection Summary

HCM Average Control Delay	127.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Attachment B

REPORT

2701 NORTH HARBOR DRIVE DEMOLITION PROJECT TRAFFIC IMPACT STUDY

Prepared for

San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 95814

URS Project No. 27687023

April 2009

URS

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may be conservative based upon recently observed declines in traffic. This analysis method was selected to analyze conservative higher estimated traffic volumes.

2.1.2 Trip Generation

Trip generation as used in this analysis represents the two-way trips that will be generated by the Proposed Project and is estimated based on information provided in terms of the amount of cubic yards (cy) of waste materials that will be removed from the Project site. The number of employees who will be working at the site on a daily basis is also taken into account. Truck trips have been converted to passenger car equivalents (PCEs) using a factor of three (one truck = three passenger cars). Trip generation for the Proposed Project was estimated for the following timeframes: daily (weekday) and weekday morning peak commuting hour. Table 1, Trip Generation – Truck Trips, shows the calculations of number of trucks per day for the Proposed Project. Table 2 summarizes Proposed Project-related trip generation.

Peak hour trip generation assumed that the Proposed Project will be completed in 24 months, and analyzes the peak months of Proposed Project activities considering the number of employees accessing the site in addition to number of trucks. This is assumed to occur in the last part of the fist year of Proposed Project schedule.

Table 1
Trip Generation – Truck Trips

Haul Type	Number of Loads
Debris Removal	10,100
Deliveries	200
Soils Import	400
Total Loads	10,700
Total Truck Trips[a]	21,400
Truck Trips/Month[b]	892
Truck Trips/Day[c]	42

a. Total number of loads for the duration of the Project multiplied by two (inbound and outbound).
b. Total truck trips per month based on 24-month Project duration.
c. Trips per day based on 22 working days per month.

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Table 2
Summary of Project Trip Generation

Trip Type	Number of Truck Loads or Persons Per Day[a]	Trip Generation			
		Daily Trips (Two-way)	AM Peak Hour[b]		
			Inbound	Outbound	Total
Debris Removal Trucks	19	38	1	1	2
Other Trucks	2	4	1	1	2
Total Trucks Per Day[c]	21	42	2	2	4
Total Truck PCE[d]		***126***	***6***	***6***	***12***
Employees[e]	40	80	40	0	40
Total PCEs		**206**	**46**	**6**	**52**

a. Trucks have been rounded to the nearest whole number.

b. The AM peak hour is one hour between 7:00 a.m. and 9:00 a.m. The daily construction time period is projected to be 7:00 a.m. to 3:30 p.m. (Late evening work hours may occur, however were not analyzed, as they are off-peak in relation to the adjacent roadway traffic.)

c. 13% of truck trips occur in the peak hour.

d. PCE factor of 3.0 passenger cars per truck.

e. 100% of employees arrive in the peak hour.

2.1.3 Trip Distribution

Trip distribution percentages for Proposed Project-related traffic have been developed based on site ingress and egress at the intersection of North Harbor Drive and Project site primary access driveway. Likely travel routes of haul trucks to the various landfills have been considered.

Truck traffic is expected to use the interstate system to access the Project site via the surrounding roadway network. The majority of truck traffic will carry debris from the Project site to landfills in the vicinity of the Proposed Project. Local landfills that may be used include Miramar Landfill near SR-52 and Convoy Road, Otay Landfill in Chula Vista, east of I-805, and Sycamore Landfill located north of SR-52 and west of I-15. Specific routes to the landfills would be determined using the shortest time interstate route, and by the traffic conditions at the time of haul activities. Truck traffic is estimated to average no more than 2-3 trucks per hour during the AM peak hour for peak operations. This is about 1 truck every 20 minutes. This will not noticeably impact peak hour LOS calculations. Employees exiting the site will access on-ramps outside of the PM peak hour and do not trigger thresholds for analysis.

The Proposed Project includes hauling hazardous materials/waste from the site to appropriate landfill facilities. Unless posted otherwise, roads can accommodate hazardous waste traffic provided they are handled in a safe manner and in accordance to existing regulations. As discussed in Section 4.6, Hazards and Hazardous Materials, of the Proposed Project EIR, the transportation of hazardous waste must be done by a transporter registered with the DTSC. Unless specifically exempted, hazardous waste transporters must comply with the California Highway Patrol Regulations; the California State Fire

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APPENDIX H

SIGNIFICANCE AVOIDANCE PROJECT ALTERNATIVE LETTER REPORT DATED APRIL 28, 2009

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April 28, 2009

Mr. Tom Story
SUNROAD Enterprises
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San Diego, CA 92121

LLG Reference: 3-04-1437-3

Subject: **Harbor Island Traffic Impact Study—Significance Avoidance Project Alternative**
City of San Diego

Dear Tom:

Linscott, Law & Greenspan, Engineers (LLG) produced a Traffic Impact Study and Parking Study dated January 16, 2009 for the *Harbor Island* project. The project site is located along the eastern strip of Harbor Island Drive on Harbor Island and currently contains a 600-slip marina. The analyses in these reports were based on a project description that included the construction of a *210-room limited service hotel* while maintaining the existing 600-slip marina. The analyses resulted in a parking requirement of 396 spaces and three long-term intersection impacts.

At the request of the client, LLG has reviewed the significant impacts in the Traffic Impact Study dated January 16, 2009 and performed a sensitivity analysis to determine a project alternative that would avoid significant impacts. This letter report discusses the results of the sensitivity analysis and presents a "Significance Avoidance Project Alternative".

SIGNIFICANCE AVOIDANCE SENSITIVITY ANALYSIS

Eleven intersections and several street segments were analyzed under both Near-Term and Long-Term conditions in the Traffic Impact Study dated January 16, 2009. In the Near-Term, the original project was calculated to have no significant impacts. In the Long-Term (Year 2030), the original project was calculated to have significant cumulative impacts at the following three intersections:

- N. Harbor Dr./Harbor Island Dr./Terminal 1
- N. Harbor Dr./Rental Car Access Road
- N. Harbor Dr./Laurel Street

In order to eliminate these impacts, a reduction in total trips generated by the hotel land use portion of the project is required. The trip generation in the original Traffic Impact Study dated January 16, 2009 calculated the total net project trips at approximately

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1,470 ADT with 47 inbound / 71 outbound trips during the AM peak hour and 79 inbound / 53 outbound trips during the PM peak hour. Since the time of the original study, the project description has been revised to consider a *175-room limited service hotel* while maintaining the existing 600-slip marina. LLG prepared a sensitivity analysis, based on the *175-room limited service hotel* project, which was calculated to have significant impacts at the same three intersections as the original *210-room limited service hotel.* The results of the *175-room limited service hotel* sensitivity analysis are contained in *Appendix G* in the original Traffic Study.

In determining a "Significance Avoidance Project Alternative," LLG conducted a sensitivity analysis, starting from the *175-room limited service hotel* project volumes and essentially performing a trial-and-error method by decreasing project-induced trips at these intersections until no impacts were registered under "Year 2030 + Project" conditions. It was determined that a hotel with up to 69 rooms could be built before the intersections were impacted. Thus the "Significance Avoidance Project Alternative" consists of a *69-room limited service hotel with 600-slip marina.*

This "Significance Avoidance Project Alternative" is calculated to generate approximately 483 ADT with 15 inbound / 23 outbound trips during the AM peak hour and 26 inbound / 17 outbound trips during the PM peak hour. ***Table 1*** provides a comparison between the intersection results from *Appendix G* of the Traffic Impact Study dated January 16, 2009 (*175-room hotel with 600-slip marina*) and the "Significance Avoidance Project Alternative" (*69-room hotel with 600-slip marina*). The calculations show a decrease in delay at these intersections, resulting in ***no significant cumulative impacts***. The calculation sheets are included in ***Attachment A***.

TABLE 1
LONG-TERM (YEAR 2030) INTERSECTION OPERATIONS

Intersection	Peak Hour	Year 2030[a]		Year 2030 + Project (*175-room hotel with 600 slip marina*)				Year 2030 + Significance Avoidance Project Alternative (*69-room hotel with 600 slip marina*)			
		Delay[b]	LOS[c]	Delay	LOS	Δ[d]	Sig?[e]	Delay	LOS	Δ[d]	Sig?[e]
N. Harbor Dr./Harbor Island Dr./ Terminal 1 (East Airport Entrance)	AM	51.2	D	56.9	E	**5.7**	**Yes**	53.5	D	2.3	No
	PM	86.6	F	89.1	F	**2.5**	**Yes**	87.2	F	0.6	No
N. Harbor Drive / Rental Car Access Rd.	AM	169.8	F	171.8	F	2.0	No	170.6	F	0.8	No
	PM	159.0	F	163.7	F	**4.7**	**Yes**	160.8	F	1.8	No
N. Harbor Drive / Laurel Street	AM	98.1	F	98.9	F	0.8	No	98.2	F	0.1	No
	PM	124.1	F	127.0	F	**2.9**	**Yes**	126.0	F	1.9	No

Footnotes:
a. Year 2030 traffic volumes obtained from original Traffic Study dated January 16, 2009.
b. Average delay expressed in seconds per vehicle.
c. Level of Service.
d. Δ denotes an increase in delay due to project.
e. Sig? denotes "Significant Impact"

SIGNALIZED
DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

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CONCLUSIONS

As demonstrated in this *Letter Report*, the "Significance Avoidance Project Alternative", consisting of a 69-room limited service hotel with 600-slip marina, is calculated to generate less project trips than the original project analyzed in the Traffic Impact Study dated January 16, 2009. This reduction in project trips is substantial enough to warrant a reduction in impacts, and as such ***the "Significance Avoidance Project Alternative" will have no significant cumulative impacts at the three intersections that were impacted in the original study.***

Sincerely,
Linscott, Law & Greenspan, Engineers

Lisa Carr
Transportation Planner II

cc: John P. Keating, P.E.
File

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ATTACHMENT A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2860	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6230		3343	1814	1519	1568	2860	
Volume (vph)	40	820	123	409	1910	15	99	43	224	60	33	120
Peak-hour factor, PHF	0.60	0.80	0.80	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	67	1025	154	682	2388	19	124	54	280	75	41	150
RTOR Reduction (vph)	0	0	130	0	1	0	0	0	0	0	126	0
Lane Group Flow (vph)	67	1025	24	682	2406	0	124	54	280	75	65	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	6.3	25.3	9.3	8.4	27.4		9.3	9.3	72.7	9.7	9.7	
Effective Green, g (s)	8.3	27.3	11.3	10.4	29.4		11.3	11.3	72.7	11.7	11.7	
Actuated g/C Ratio	0.11	0.38	0.16	0.14	0.40		0.16	0.16	1.00	0.16	0.16	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	197	1859	240	478	2519		520	282	1519	252	460	
v/s Ratio Prot	0.04	0.21	0.02	c0.20	c0.39		c0.04	0.03		c0.05	0.02	
v/s Ratio Perm									c0.18			
v/c Ratio	0.34	0.55	0.10	1.43	0.96		0.24	0.19	0.18	0.30	0.14	
Uniform Delay, d1	29.7	17.9	26.3	31.2	21.0		26.9	26.7	0.0	26.9	26.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.4	0.2	203.9	9.5		0.2	0.3	0.3	0.7	0.1	
Delay (s)	30.7	18.2	26.5	235.1	30.5		27.2	27.1	0.3	27.5	26.3	
Level of Service	C	B	C	F	C		C	C	A	C	C	
Approach Delay (s)		19.9			75.7			10.7			26.7	
Approach LOS		B			E			B			C	

Intersection Summary

HCM Average Control Delay	53.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86		0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2833	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1723	4951	1542	3343	6184		3343	1814	1519	1568	2833	
Volume (vph)	70	1200	225	446	1460	70	174	43	490	60	35	160
Peak-hour factor, PHF	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Adj. Flow (vph)	117	2000	375	743	2433	117	290	72	817	100	58	267
RTOR Reduction (vph)	0	0	173	0	4	0	0	0	0	0	228	0
Lane Group Flow (vph)	117	2000	202	743	2546	0	290	72	817	100	97	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Over	Prot			Split		Free	Split		
Protected Phases	7	4	2	3	8		2	2		6	6	
Permitted Phases									Free			
Actuated Green, G (s)	9.9	25.4	16.7	20.3	35.8		16.7	16.7	94.0	11.6	11.6	
Effective Green, g (s)	11.9	27.4	18.7	22.3	37.8		18.7	18.7	94.0	13.6	13.6	
Actuated g/C Ratio	0.13	0.29	0.20	0.24	0.40		0.20	0.20	1.00	0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	218	1443	307	793	2487		665	361	1519	227	410	
v/s Ratio Prot	0.07	c0.40	c0.13	c0.22	0.41		0.09	0.04		0.06	0.03	
v/s Ratio Perm									c0.54			
v/c Ratio	0.54	1.39	0.66	0.94	1.02		0.44	0.20	0.54	0.44	0.24	
Uniform Delay, d1	38.5	33.3	34.7	35.2	28.1		33.0	31.4	0.0	36.7	35.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	178.1	5.0	18.2	24.3		0.5	0.3	1.4	1.4	0.3	
Delay (s)	41.0	211.4	39.7	53.4	52.4		33.5	31.7	1.4	38.1	35.9	
Level of Service	D	F	D	D	D		C	C	A	D	D	
Approach Delay (s)		177.5			52.7			11.1			36.4	
Approach LOS		F			D			B			D	

Intersection Summary

HCM Average Control Delay	87.2	HCM Level of Service	F
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4948			1744	1500	1723	1655	
Volume (vph)	70	3104	100	240	4399	15	80	20	200	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	3267	105	253	4631	16	84	21	211	11	11	11
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	183	0	10	0
Lane Group Flow (vph)	74	3267	75	253	4647	0	0	105	28	11	12	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	3.9	55.5	55.5	6.1	57.7			11.7	11.7	8.4	8.4	
Effective Green, g (s)	5.9	57.5	57.5	8.1	59.7			13.7	13.7	10.4	10.4	
Actuated g/C Ratio	0.06	0.57	0.57	0.08	0.59			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	100	3527	848	266	2905			235	202	176	169	
v/s Ratio Prot	0.04	0.52		c0.08	c0.94			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.02			
v/c Ratio	0.74	0.93	0.09	0.95	1.60			0.45	0.14	0.06	0.07	
Uniform Delay, d1	47.1	20.2	10.1	46.6	21.0			40.5	38.8	41.2	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.1	4.9	0.0	41.8	271.4			1.4	0.3	0.1	0.2	
Delay (s)	72.3	25.0	10.2	88.4	292.4			41.9	39.1	41.4	41.5	
Level of Service	E	C	B	F	F			D	D	D	D	
Approach Delay (s)		25.6			281.9			40.0			41.4	
Approach LOS		C			F			D			D	

Intersection Summary

HCM Average Control Delay	170.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.2%	ICU Level of Service	H
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.86	1.00	0.97	0.91			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1723	6239	1500	3343	4947			1736	1500	1723	1603	
Volume (vph)	30	4060	80	260	3566	15	80	10	270	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	4511	89	289	3962	17	89	11	300	11	11	22
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	252	0	20	0
Lane Group Flow (vph)	33	4511	71	289	3979	0	0	100	48	11	13	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			
Actuated Green, G (s)	2.3	53.6	53.6	9.1	60.4			11.5	11.5	8.5	8.5	
Effective Green, g (s)	4.3	55.6	55.6	11.1	62.4			13.5	13.5	10.5	10.5	
Actuated g/C Ratio	0.04	0.54	0.54	0.11	0.61			0.13	0.13	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	72	3378	812	361	3006			228	197	176	164	
v/s Ratio Prot	0.02	0.72		c0.09	c0.80			c0.06		0.01	c0.01	
v/s Ratio Perm			0.05						0.03			
v/c Ratio	0.46	1.34	0.09	0.80	1.32			0.44	0.24	0.06	0.08	
Uniform Delay, d1	48.1	23.5	11.3	44.7	20.2			41.1	40.0	41.7	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	153.0	0.0	12.0	148.0			1.3	0.6	0.1	0.2	
Delay (s)	52.6	176.6	11.4	56.7	168.2			42.5	40.7	41.8	41.9	
Level of Service	D	F	B	E	F			D	D	D	D	
Approach Delay (s)		172.5			160.6			41.1			41.9	
Approach LOS		F			F			D			D	

Intersection Summary

HCM Average Control Delay	160.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3343	4951	4951	1519	3343	1382
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3343	4951	4951	1519	3343	1382
Volume (vph)	1205	2179	2606	40	60	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1339	2421	2896	44	67	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1339	2421	2896	44	67	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	20.1	78.2	53.1	97.4	9.2	97.4
Effective Green, g (s)	22.1	80.2	55.1	97.4	11.2	97.4
Actuated g/C Ratio	0.23	0.82	0.57	1.00	0.11	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	759	4077	2801	1519	384	1382
v/s Ratio Prot	c0.40	0.49	c0.58		c0.02	
v/s Ratio Perm				0.03		0.02
v/c Ratio	1.76	0.59	1.03	0.03	0.17	0.02
Uniform Delay, d1	37.6	3.0	21.2	0.0	38.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	349.3	0.2	26.5	0.0	0.2	0.0
Delay (s)	386.9	3.2	47.7	0.0	39.1	0.0
Level of Service	F	A	D	A	D	A
Approach Delay (s)		139.9	47.0		29.5	
Approach LOS		F	D		C	

Intersection Summary

HCM Average Control Delay	98.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	1560	3433	1419
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	1560	3433	1419
Volume (vph)	1393	2697	2001	140	80	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1548	2997	2223	156	89	22
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1548	2997	2223	156	89	22
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Free		Free
Protected Phases	7	4	8		6	
Permitted Phases				Free		Free
Actuated Green, G (s)	19.3	79.5	55.2	99.1	9.6	99.1
Effective Green, g (s)	21.3	81.5	57.2	99.1	11.6	99.1
Actuated g/C Ratio	0.21	0.82	0.58	1.00	0.12	1.00
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	738	4182	2935	1560	402	1419
v/s Ratio Prot	c0.45	0.59	c0.44		c0.03	
v/s Ratio Perm				0.10		0.02
v/c Ratio	2.10	0.72	0.76	0.10	0.22	0.02
Uniform Delay, d1	38.9	3.8	15.7	0.0	39.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	498.5	0.6	1.2	0.1	0.3	0.0
Delay (s)	537.4	4.4	16.9	0.1	39.9	0.0
Level of Service	F	A	B	A	D	A
Approach Delay (s)		185.9	15.8		32.0	
Approach LOS		F	B		C	

Intersection Summary

HCM Average Control Delay	126.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

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Appendix F

Air Quality Technical Report

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Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment Air Quality Technical Report

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December 2009

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ICF Jones & Stokes. 2009. Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment, Air Quality Technical Report. December. (ICF J&S 00977.08.) San Diego, CA. Prepared for: San Diego Unified Port District.

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Acronyms

$\mu g/m^3$	micrograms per cubic meters
AB	Assembly Bill
APCD	air pollution control district
AQIA	Air Quality Impact Analysis
BACMs	best available control measures
BAU	business as usual
CAA	federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	corporate average fuel economy
CalEPA	California Environmental Protection Agency
CAP	Clean Air Program
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CCAA	California Clean Air Act
CCAs	community choice aggregators
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	methane
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
CPUC	California Public Utilities Commission
DIY	do-it-yourself
DPM	diesel particulate matter
EPA	U.S. Environmental Protection Agency
ESPs	energy service providers
GHG	greenhouse gas
GVWR	gross vehicle weight rating
GWP	global warming potential
HC	hydrocarbons
HDV	Heavy Duty Vehicle
HFCs	hydrofluorocarbons

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IOUs	investor-owned utilities
ITPR	independent transit planning review
kWh	kilowatt-hours
LCFS	Low Carbon Fuel Standard
LEDs	light emitting diodes
LOS	level of service
MEI	maximum exposed individual
MMT	million metric tons
mpg	miles per gallon
MPO	Metropolitan Planning Organization
MSW	municipal solid waste
MVAC	motor vehicle air conditioning
MWh	megawatt-hours
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NO_X	oxides of nitrogen
O_3	ozone
OAL	Office of Administrative Law
Pb	Lead
PFC	perfluorocompound
PM2.5	fine particulate matter
PMP	Port Master Plan
ppm	parts per million
RAQS	Regional Air Quality Strategy Plan
ROG	reactive organic gas
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SLTs	screening level thresholds
SSAB	Salton Sea Air Basin
TACs	toxic air contaminants
TRUs	Transport Refrigeration Units
VMT	vehicle miles traveled

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Executive Summary

Findings

This air quality technical report provides an analysis of potential air quality impacts related to the proposed Sunroad East Harbor Island Hotel and Port Master Plan Amendment Project. The site is located on East Harbor Island along San Diego Bay.

All analyses have been conducted to comply with the Port of San Diego, California Air Resources Board (CARB), and San Diego Air Pollution Control District (SDAPCD) requirements for air quality assessments to satisfy California Environmental Quality Act (CEQA) requirements. The analyses findings are as follows.

- The proposed project would be consistent with air quality policies set forth by the SDAPCD and the San Diego County Association of Governments (SANDAG) as presented in the region's most recent applicable Regional Air Quality Strategy Plan (RAQS) and State Implementation Plan (SIP).
- Proposed Project emissions during construction would not exceed SDAPCD mass emission thresholds.
- Proposed Project emissions during long-term operations would not exceed SDAPCD mass emission thresholds.
- The proposed project's carbon monoxide (CO) emissions from vehicular traffic at intersections during long-term project operations would not create any new or exacerbate any existing CO standards.
- The proposed project construction and operation would not pose a significant health risk to nearby sensitive receptor locations.
- The proposed project odor emissions would not result in a significant impact.
- The proposed project would not contribute to a significant cumulative impact.
- The proposed project would not conflict with or obstruct the goals of AB32.

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Introduction

Purpose

ICF Jones & Stokes was retained by the Port District to evaluate the potential air quality and climate change impacts that may occur due to the construction and long-term operation of the proposed Sunroad East Harbor Island Hotel and Port Master Plan Amendment Project.

Project Site Location

The proposed development project is in the southern portion of San Diego County, at the northern end of San Diego Bay. The site is on the east side of Harbor Island. East Harbor Island currently includes filled tidelands, which are developed with a marina, restaurants, sidewalks, roadways, a paved parking lot, a promenade, and landscape improvements.

Development Description

The Proposed Project involves the partial redevelopment of one leasehold, which is currently leased by Sunroad Marina Partners, LP, located at 955 Harbor Island Drive. This leasehold is currently developed with a marina, support buildings, and surface parking. The proposed redevelopment would only affect the land side of this leasehold. The traffic circle located at the east end of Harbor Island Drive as well as a portion of Harbor Island Drive are also included in the proposed redevelopment.

The Project description as proposed in this Draft EIR includes the following physical changes to the Project site:

- demolition of one existing locker building and parking lot east of the existing marina building;
- construction of a limited service 4-story hotel with a total floor area of approximately 117,000 square feet, consisting of a maximum of 175 rooms, limited meeting space (approximately 8,000 square feet), and common areas;
- reduction of the traffic circle and realignment of the road and leasehold lines;
- reconfiguration of existing paved areas as necessary to accommodate ingress and egress to the hotel and surface parking;

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- enhanced public access along Harbor Island East Basin; and
- realignment of existing sewer, water, and utility lines.

The Project also proposes an amendment to the Port Master Plan (PMP) to address the changes in land use resulting from reconfiguring East Harbor Island Drive and the traffic circle at its eastern terminus, and providing for the existing allowed 500 hotel rooms (currently allowed only on the parcel used by SDIA for employee parking) to be spread across multiple hotels (together totaling no more than 500 rooms) on East Harbor Island.

Project Design Features

Energy conservation and sustainability features would be incorporated into the design and construction of the Proposed Project. These features will provide energy and water efficiency equivalent to 15% in excess of standards required by California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 6 of the California Code of Regulations). Such features will be incorporated as conditions of approval of the Project and include the following:

Construction

- Reuse or recycle at least 75% of construction materials (including soil, asphalt, concrete, metal, and lumber).
- 10% of building materials and products that will be used are locally or regionally (or within 500 miles) extracted and manufactured, when available.
- Use alternative fuel types for 50% of construction equipment (e.g., biodiesel).
- Implement Green Building Initiatives, including low VOC emitting finishes, adhesives, and sealants.

Building Sustainability

- Install efficient HVAC system with refrigerant with an Ozone Depletion Potential of zero.
- Install Energy Star, "cool" or light-colored roofing for at least 75% of the roof area, cool pavements, and shade trees.
- Use dual pane low-E windows with a minimum of 0.30 solar heat gain coefficient.
- Install R-value optimized wall and roof installation.
- Use better-than-code energy efficient lighting throughout building and site.
- Utilize filtered and controlled natural ventilation to reduce heating and air conditioning demand by 10%.

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- Incorporate engineering design system measures - variable speed chillers, fans, and pumps; boiler and chiller controls; heat recovery; smart auto thermostats; and CO_2 sensors for meeting room.
- Use Energy Star appliances for all eligible equipment and fixtures.
- Use solar heating, automatic covers, and efficient pumps and motors for pools and spas.
- Install light emitting diodes (LEDs) for 50% of the all outdoor lighting (except in parking lots, which would use T-5 lighting or equivalent).
- Limit hours of outdoor lighting for 100% of the site lighting by using photocell controls.
- Utilize natural daylight for 75% of the regularly occupied spaces.

Water Conservation and Efficiency

- Install or reuse drought-tolerant landscaping trees and incorporate vines on selected walls to reduce potable water demand for irrigation by at least 50%.
- Use of low flow plumbing features on all fixtures and appliances to reduce potable water use by at least 20%.
- Install water-efficient irrigation systems and devices, including drip irrigation, soil moisture-based irrigation controls, and/or drought tolerant landscaping to reduce potable water use for irrigation by at least 50%.
- Install only low-flow (0.125 gallons per flush) or waterless urinals.
- Install only low-flow toilets (1.28 gallons per flush), faucets (1.0 gallons per minute), and showers (2.0 gallons per minute).
- Install sensor activated lavatory faucets (0.5 gallons per minute) in public restrooms.
- Install moisture sensors that suspend irrigation during unfavorable weather conditions (rain, wind).
- Educate patrons about water conservation using interior and exterior signage.

Solid Waste

- Provide interior and exterior storage areas for recyclables and green waste and provide adequate recycling containers on site.
- Provide education and publicity about recycling and reducing waste, using signage and a case study.

Transportation

- Limit idling time for commercial vehicles, including deliveries and construction vehicles to 20 minutes.
- Install bicycle parking facilities.
- The applicant will provide a shuttle service between the hotel and the airport.

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Air Quality Assessment

This air quality analysis includes a discussion of applicable significance criteria and analysis methodologies outlined in San Diego County's "Guidelines for Determining Significance—Air Quality" document. Based on this guidance document, this assessment evaluates the short-term construction-period and long-term operational period impacts to localized and regional air quality that would result with development of the proposed project.

In addition, the proposed project was evaluated to determine consistency with the state goal of reducing greenhouse gas (GHG) emissions in California to 1990 levels by 2020, as set forth by the timetable established in Assembly Bill 32, California Global Warming Solutions Act of 2006 (AB 32).

Based on these above-referenced guidance documents, this report evaluates the short-term construction-period and long-term operational period impacts to air quality that would result with development of the proposed project.

Regulatory Setting

The air quality in the United States is governed by the federal Clean Air Act (CAA). In addition to being subject to requirements of the CAA, air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). At the federal level, the CAA is administered by the United States Environmental Protection Agency (EPA). In California, the CCAA is administered by the California Air Resources Board (CARB) at the state level and by the San Diego County Air Pollution Control District (SDAPCD) at regional and local levels.

Authority for Current Air Quality Planning

A number of plans and policies have been adopted by various agencies that address air quality concerns. Those plans and policies that are relevant to the proposed project are discussed below.

Federal Clean Air Act

The CAA was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The

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CAA also mandates that the state submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met. The Port of San Diego is within the San Diego Air Basin (SDAB) and, as such, is in an area designated a nonattainment area for certain pollutants that are regulated under the CAA.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that would most substantially affect the development of the proposed project include Title I (Nonattainment Provisions) and Title II (Mobile-Source Provisions).

Title I provisions were established with the goal of attaining the NAAQS for criteria pollutants. Table 1 shows the NAAQS currently in effect for each criteria pollutant. The NAAQS were amended in July 1997 to include an 8-hour standard for ozone (O_3) and adopt a NAAQS for fine particulate matter (PM2.5). The SDAB fails to meet national standards for O_3 and therefore is considered a federal nonattainment area for that pollutant. Table 2 lists each criteria pollutant and their related federal attainment status.

Federal Climate Change Policy

In 2006, 12 U.S. states and cities (including California), in conjunction with several environmental organizations, sued to force the EPA to regulate GHGs as a pollutant pursuant to the CAA. The court ruled that the plaintiffs had standing to sue, that GHGs fit within the CAA's definition of a pollutant, and that the EPA's reasons for not regulating GHGs were insufficiently grounded in the CAA. The court held that the EPA must determine whether or not greenhouse gas emissions have the potential to endanger public health or welfare, consistent with the language in the CAA (Massachusetts vs. Environmental Protection Agency et al. [U.S. Supreme Court No. 05–1120. argued November 29, 2006—decided April 2, 2007). On April 17, 2009, the EPA declared that GHG emissions do in fact pose a risk to public health, and signed a proposal declaring its findings and the evidence to support the findings. This proposal recently underwent public review, which terminated on June 23, 2009.

Despite the Supreme Court ruling and the EPA proposal, there are no promulgated federal regulations to date limiting GHG emissions that are applicable to the project.

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Table 1. Federal and State Ambient Air Quality Standards

Pollutant	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
		CA	U.S.	CA	U.S.	CA	U.S.
Ozone (O_3)	1 hour	0.09	NA	180	NA	If exceeded	If exceeded on more than 3 days in 3 years
	8 hours	0.07	0.075	137	147	NA	If exceeds 4th highest 8-hour concentration in a year, averaged over 3 years
Respirable Particulate Matter (PM10)	Annual mean	NA	NA	20	NA	If exceeded	If exceeded
	24 hours	NA	NA	50	150	If exceeded	If average 1% over 3 years is exceeded
Fine Particulate Matter (PM2.5)	Annual mean	NA	NA	12	15	If exceeded	If exceeded
	24 hours	NA	NA	NA	35	NA	If average 2% over 3 years is exceeded
Carbon Monoxide (CO)	8 hours	9.0	9	10	10,000	If exceeded	If exceeded on more than 1 day/year
	1 hour	20	35	23	40,000	If exceeded	If exceeded on more than 1 day/year
	8 hour (Lake Tahoe)	6	NA	7	NA	NA	NA
Nitrogen Dioxide (NO_2)	Annual average	0.030	0.053	57	100	NA	If exceeded
	1 hour	0.18	NA	339	NA	If exceeded	If exceeded
Sulfur Dioxide (SO_2)	Annual average	NA	0.03	NA	80	NA	If exceeded
	24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day/ year
	3 hour	NA	0.5	NA	1300	NA	If exceeded no more than 1 day/year
	1 hour	0.25	NA	655	NA	NA	NA
Lead (Pb)	30 days	NA	NA	1.5	NA	If equaled or exceeded	NA
	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than 1 day/year
	Rolling 3-month average	NA	NA	NA	0.15	NA	If exceeded
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more (0.07 – 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent.				If exceeded	NA
Sulfate particles (SO_4)	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Hydrogen sulfide (H_2S)	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride (C_2H_3Cl)	24 hours	0.010	NA	26	NA	If equaled or exceeded	NA

Notes:
All standards are based on measurements at 25°C and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
NA = not applicable.
Source: CARB 2008a.

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Table 2. Federal and State Attainment Status for San Diego Air Basin

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	Attainment *	Nonattainment
O_3 (8-hour)	Nonattainment	Nonattainment
CO	Attainment	Attainment
PM10	Unclassifiable **	Nonattainment
PM2.5	Attainment	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(No federal standard)	Attainment
Hydrogen Sulfide	(No federal standard)	Unclassified
Visibility	(No federal standard)	Unclassified

*The federal 1-hour standard of 12 pphm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in the State Implementation Plans.

**At the time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable.

Source: SDAPCD 2008

California Clean Air Act

In California, the CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for meeting the state requirements of the Federal CAA, administering the CCAA, and establishing the California Ambient Air Quality Standards (CAAQS). The CCAA, as amended in 1992, requires all air districts in the state to endeavor to achieve and maintain the CAAQS. The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective in March 1996. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county levels.

The California Clean Air Act was signed into law on September 30, 1988, and became effective on January 1, 1989. The Act requires that local air districts implement regulations to reduce emissions from mobile sources through the adoption and enforcement of transportation control measures. The California

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Clean Air Act required the SDAB to achieve a five percent annual reduction in ozone precursor emissions from 1987 until the standards are attained. If this reduction cannot be achieved, all feasible control measures must be implemented. Furthermore, the California Clean Air Act required local air districts to implement a Best Available Control Technology rule and to require emission offsets for nonattainment pollutants.

The California Clean Air Act of 1988, as amended in 1992 (CCAA), outlines a program to attain the CAAQS by the earliest practical date. Because the CAAQS are more stringent than the NAAQS, attainment of the CAAQS will require more emissions reductions than what would be required to show attainment of the NAAQS. Consequently, the main focus of attainment planning in California has shifted from the federal to state requirements. Similar to the federal system, the state requirements and compliance dates are based on the severity of the ambient air quality standard violation within a region.

California's Toxic Air Contaminants Regulations

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588).

The Tanner Act sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB designates a substance as a TAC. To date, CARB has identified 21 TACs, and has also adopted EPA's list of HAPs as TACs. Since August 1998, Diesel Particulate Matter (DPM) was added to the CARB list of TACs (CARB 1998).

The Hot Spots Act requires that existing facilities that emit toxic substances above specified levels: (1) prepare a toxic emission inventory; (2) prepare a risk assessment if emissions are significant (i.e. 10 tons per year or on District's HRA list); (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

In September 2000, the CARB approved the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel Risk Reduction Plan) (CARB 2000). The Diesel Risk Reduction Plan outlines a comprehensive and ambitious program that includes the development of numerous new control measures over the next several years aimed at substantially reducing emissions from new and existing on-road vehicles (e.g., heavy-duty trucks and buses), off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats), portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators).

The CARB has adopted several regulations that will reduce diesel emissions from in-use vehicles and engines throughout California (CARB 2009a). In some cases, the particulate matter reduction strategies also reduce smog-forming emissions such as NO_X.

As an ongoing process, the CARB reviews air contaminants and identifies those that are classified as TACs. The CARB also continues to establish new programs and regulations for the control of TACs, including diesel particulate matter, as appropriate.

California Climate Change Regulations

Assembly Bill 1493— Greenhouse Gas Emission Standards for Automobiles

California Assembly Bill 1493 (AB 1493) in 2002 required CARB to develop and adopt the nation's first GHG emission standards for automobiles. The legislature declared in AB 1493 that global warming was a matter of increasing concern for public health and environment in the state. It cited several risks that California faces from climate change, including reduction in the state's water supply, increased air pollution creation by higher temperatures, harm to agriculture, and increase in wildfires, damage to the coastline, and economic losses caused by higher food, water energy, and insurance prices. Further the legislature stated that technological solutions to reduce GHG emissions would stimulate California economy and provide jobs.

The State of California in 2004 submitted a request for a waiver from federal clean air regulations (as the State is authorized to do under the CAA) to allow the state to require reduced tailpipe emissions of CO_2. In late 2007, the EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the state brought suit against EPA related to this denial. On June 30, 2009, the EPA granted the waiver request to enforce GHG emission standards for model year 2009 and later.

A recent CARB study (CARB 2008b) showed that in calendar year 2016, AB 1493 (also referred to as the Pavley standard or the Pavley rules) would reduce California's GHG annual emissions by 16.4 million metric tons (MMT) of carbon dioxide equivalents (CO_2e). This is almost 50% more than the 11.1 MMT reduction produced by currently proposed federal fleet average standards for model years 2011–2015.

Further, by 2020, California is committed to implement revised, more stringent GHG emission limits (the Pavley Phase 2 rules see discussion of scoping plan below). California's requirements would reduce California GHG emissions by 31.7 $MMTCO_2e$ in calendar year 2020, 45% more than the 21.9 MMTs reductions under the proposed federal rules in that year. Since the California rules are significantly more effective at reducing GHGs than the federal corporate average fuel economy (CAFE) program, they also result in better fuel efficiency—roughly 43 miles per gallon (mpg) in 2020 for the California vehicle fleet as compared to the new CAFE standard of 35 mpg.

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SB 1078/SB 107—Renewable Portfolio Standard

Established in 2002 under Senate Bill 1078 (SB 1078) and accelerated in 2006 under Senate Bill 107 (SB 107), California's Renewable Portfolio Standard (RPS) obligates investor-owned utilities (IOUs), energy service providers (ESPs), and community choice aggregators (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are jointly responsible for implementing the program.

Executive Order S-3-05—Greenhouse Gas Emission Reduction Targets

In 2005, Governor Schwarzenegger issued California Executive Order S-3-05 establishing the following GHG emission reduction targets for California:

- reduce GHG emissions to 2000 levels by 2010;
- reduce GHG emissions to 1990 levels by 2020; and
- reduce GHG emissions to 80% below 1990 levels by 2050.

Executive Orders are binding only on state agencies. Accordingly, S-3-05 will guide state agencies' efforts to control and regulate GHG emissions, but have no direct binding effect on local efforts.

Global Warming Solutions Act of 2006 (AB 32)

California Assembly Bill 32 (AB 32), the "Global Warming Solutions Act of 2006," codifies the state's GHG emissions target by directing CARB to reduce the state's global warming emissions to 1990 levels by 2020. CARB regulations are required to begin phasing in by 2012. AB 32 was signed and passed into law by Governor Arnold Schwarzenegger on September 27, 2006. Since that time, CARB, CEC, the CPUC, and the Building Standards Commission have all been at work on regulations that will help meet the goals of AB 32 and S-3-05.

Key AB 32 milestones are as follows:

- June 30, 2007—Identification of "discrete early action GHG emissions reduction measures. This has been completed and is discussed below
- January 1, 2008—Identification of the 1990 baseline GHG emissions level and approval of a statewide limit equivalent to that level. Adoption of reporting and verification requirements concerning GHG emissions. This has been completed. In December of 2007, CARB approved the 2020 emission limit of 427 $MMTCO_2e$ of GHGs.
- January 1, 2009—Adoption of a scoping plan for achieving GHG emission reductions. A scoping plan was approved by the CARB Board in December 2008 and is summarized below.

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- January 1, 2010—Adoption and enforcement of regulations to implement the "discrete" actions.
- January 1 2011—Adoption of GHG emission limits and reduction measures by regulation.
- January 1, 2012—GHG emission limits and reduction measures adopted in 2011 become enforceable.

CARB adopted the following early actions on June 21, 2007:

- Group 1—Three new GHG-only regulations are proposed to meet the narrow legal definition of "discrete early action greenhouse gas reduction measures" in Section 38560.5 of the Health and Safety Code. These include the Governor's Low Carbon Fuel Standard, reduction of refrigerant losses from motor vehicle air conditioning maintenance, and increased methane capture from landfills. These actions are estimated to reduce GHG emissions between 13 and 26 MMT of CO_2e annually by 2020 relative to projected levels. If approved for listing by the Governing Board, these measures will be brought to hearing in the next 12 to 18 months and take legal effect by January 1, 2010.
- Group 2—CARB is initiating work on another 23 GHG emission reduction measures in the 2007–2009 time period, with rulemaking to occur as soon as possible where applicable. These GHG measures relate to the following sectors: agriculture, commercial, education, energy efficiency, fire suppression, forestry, oil and gas, and transportation.
- Group 3—CARB staff has identified 10 conventional air pollution control measures that are scheduled for rulemaking in the 2007–2009 period. These control measures are aimed at criteria and toxic air pollutants, but will have concurrent climate co-benefits through reductions in CO_2 or non-Kyoto pollutants (i.e., diesel particulate matter [DPM], other light-absorbing compounds, and/or ozone precursors) that contribute to global warming.

In October 2007, CARB expanded the early actions to include the following measures:

- Group 1, Discrete Early Actions—Sulfur hexafluoride (SF_6) emissions reductions from non-electricity sector; reduction of emissions from consumer products; Smartway Truck Efficiency (requires existing trucks and trailers to be retrofitted with devices that reduce aerodynamic drag); tire inflation (requires tune-up and oil change technicians to ensure proper tire inflation as part of overall service); reduction of perfluorocompound (PFC) emissions from semiconductor industry; and Green ports (allows docked ships to shut off their auxiliary engines by plugging into shoreside electrical outlets or other technologies).
- Group 2, Other Early Actions—Refrigerant tracking, reporting and recovery program; energy efficiency of California cement facilities; blended cements; anti-idling enforcement; and research regarding nitrogen land application efficiency.

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Since October 2007, CARB has taken the following actions concerning Early Action Measures:

- Low Carbon Fuel Standard – CARB approved for adoption regulations establishing a low-carbon fuel standard on April 23, 2009. The intent of the standard is to reduce the carbon intensity of transportation fuels by an average of ten percent by 2020. CARB intends to finalize rule-making for regulations to take effect by January 1, 2010.
- Landfill Methane Capture – On June 25, 2009, CARB approved for adoption regulations for control of methane emissions from municipal solid waste (MSW) landfills. The regulations will require the installation and proper operation of gas collection and control systems at active, inactive, and closed MSW landfills having 450,000 tons of greater of waste-in-place and that received waste after January 1, 1977. The regulations contain performance standards for the gas collection and control system, and specify monitoring requirements to ensure that that the system is being maintained and operated in a manner to minimize methane emissions. The regulations include a leak standard for gas collection and control system components, a monitoring requirement for wellheads, methane destruction efficiency requirements for most control devices, surface methane emission standards, and reporting requirements. CARB is presently considering several modifications and clarifications to the regulations. CARB intends to finalize rule-making for regulations to take effect by January 1, 2010.
- Small Containers of Automotive Refrigerant – On January 22, 2009, CARB approved for adoption regulations associated with do-it-yourself (DIY) recharging of motor vehicle air conditioning (MVAC) systems. This regulation is intended to help reduce GHG emissions attributable to small containers of automotive refrigerant largely by establishing certification requirements that require containers to be equipped with self-sealing valves, and by establishing a small container deposit and return and refrigerant recovery program. Other components of the regulation include improved container labels and consumer educational materials to promote consumer education of proper MVAC charging practices and of the environmental consequences of releasing refrigerant to the environment. On September 1, 2009, the Office of Administrative Law (OAL) approved the majority of the regulations, but disapproved the portion of the regulatory filing for adjustment of the refrigerant container deposit. CARB intends to finalize rule-making for regulations to take effect by January 1, 2010.
- Semiconductor Perfluorocarbons Emissions– On February 26, 2009, CARB approved for adoption regulations related to semiconductor operations. The regulation applies to an owner or operator of a semiconductor or related devices operation that uses fluorinated gases or fluorinated heat transfer fluids. The regulation includes emission standards, and reporting and recordkeeping requirements. Final rule-making has not yet been completed.
- Sulfur Hexafluoride Reduction – On February 26, 2009, CARB approved for adoption regulations related to the reduction of SF_6 from non-semiconductor and non-utility applications. This regulation would achieve GHG emission reductions from SF_6 applications through a phase-out of use over the next

several years in the non-semiconductor and non-utility sectors. Several modifications to the adopted regulation are currently under consideration.

- High Global Warming Potential Gases in Certain Consumer Products – On September 24, 2009 CARB approved for adoption regulations concerning toxic compounds, aromatics, and high GWP gases in certain consumer products. The amendments are designed to reduce volatile organic compound (VOC) emissions but would also prohibit compounds with high GWP in multi-purpose solvent, paint thinner, and double-phase aerosol air fresheners, which are the three categories of consumer products proposed for regulation. Final rule-making has not yet been completed.
- Heavy-Duty Vehicle GHG Emission Reduction Regulation – On December 11, 2008, CARB approved for adoption regulations concerning long-haul Heavy Duty Vehicle (HDV) fuel efficiency. A more efficient HDV uses less fuel, and as a result, emits less GHG emissions. A HDV consists of a heavy-duty tractor (tractor) and a trailer. The regulation requires new and existing long-haul on-road tractors (of a certain size), which operate on California highways, to be equipped with SmartWay approved aerodynamic technologies and low-rolling resistance tires. The regulation contains a phased implementation and includes several exemptions (such as for emergency vehicles). Final adoption of the regulation is expected in November 2009.
- Tire Pressure – On March 26, 2009, CARB approved for adoption regulations to reduce GHG emissions from vehicles operating with under inflated tires. The regulation requires all Automotive Service Providers perform a tire inflation service (check and inflate) on all passenger vehicles that are brought into a facility for service or repair. Final rule-making has not yet been completed.
- Shore Power – On December 6, 2007, CARB approved for adoption regulations to reduce emissions from diesel auxiliary engines on ocean-going vessels while at berth in California. The regulation requires operators of vessels meeting specified criteria to turn off their auxiliary engines for most of their stay in port. CARB anticipates that such vessels would then receive their electrical power from the shore, or use an alternative, but equally effective, means of emission reductions. Although the measure is intended to reduce NO_X and particulate matter emissions, the measure will produce a co-benefit of also reducing CO_2 emissions. The regulation took effect on January 2, 2009.

AB 32 Scoping Plan

In December 2008, CARB finalized its Scoping Plan which outlines an approach to meet AB 32's goal. The plan identified measures to reduce GHG emissions to 1990 levels which is approximately 30 percent from business-as-usual emission levels projected for 2020, or about 10 percent from today's (2008) levels. On a per-capita basis, that means reducing annual emissions of 14 tons of carbon dioxide for person in California down to about 10 tons per person by 2020. Table 3 presents a summary of the recommended reduction strategies.

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AB 32 does not directly amend CEQA requirements, and there are no acceptable SDAPCD, CARB, and EPA thresholds for significance relative to global warming. As a result, there is no consistent means of determining whether a project will make a significant contribution to greenhouse gases. Also, there are a number of limitations and uncertainties commonly associated with the greenhouse gas emission inventory due to the limited availability of CO_2 emission factor data for motor vehicles, area sources, stationary sources, and other sources. These factors are no more pronounced then when conducting a CO_2 analysis for commercial developments, where such facilities that are traditionally not subject to such analysis and for which "real world" information is just beginning to emerge.

Senate Bill 1368

On August 31, 2006, the California Senate passed SB 1368 (signed into law on September 29, 2006), which requires the PUC to develop and adopt a "greenhouse gasses emission performance standard" by February 1, 2007, for the private electric facilities under its regulation. PUC adopted an interim standard on January 25, 2007. These standards apply to all long-term financial commitments entered into by electric utilities (California SB 2006). CEC was required to adopt a consistent standard by June 20, 2007. However, this date was missed; CEC will address the concerns of the Office of Administrative Law (OAL) and resubmit the rulemaking as soon as possible. The rulemaking then must be approved by OAL before it can take effect.

In consultation with CARB and CPUC, the CEC is currently establishing a GHGs emission performance standard for local, public-owned electric utilities (pursuant to Senate Bill No. 1368). This standard will limit the rate of GHGs emissions to a level that is no higher than the rate of emissions of GHGs for combined-cycle natural gas baseload generation.

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Table 3. Summary of AB 32 Scoping Plan

Recommended Reduction Strategies	**Reductions Counted Towards 2020 Target ($MMTCO_2e$)**
ESTIMATED REDUCTIONS RESULTING FROM THE COMBINATION OF CAP-AND-TRADE PROGRAM AND COMPLEMENTARY MEASURES	**146.7**
California Light-Duty Vehicle GHG Standards · Implement Pavley standards · Develop Pavley II light-duty vehicle standards	31.7
Energy Efficiency · Building /appliance efficiency, new programs, etc. ·Increase CHP generation by 30,000 GWh · Solar Water Heating (AB 1470 goal)	26.3
Renewables Portfolio Standard (33% by 2020)	21.3
Low Carbon Fuel Standard	15
Regional Transportation-Related GHG Targets[1]	5
Vehicle Efficiency Measures	4.5
Goods Movement · Ship Electrification at Ports · System-Wide Efficiency Improvements	3.7
Million Solar Roofs	2.1
Medium/ Heavy Duty Vehicles · Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency) · Medium-and Heavy-Duty Vehicle Hybridization	1.4
High Speed Rail	1.0
Industrial Measures (for sources covered under cap-and-trade program) ·Refinery Measures ·Energy Efficiency & Co-Benefits Audits	0.3
Additional Reductions Necessary to Achieve the Cap	34.4
ESTIMATED REDUCTIONS FROM UNCAPPED SOURCES/SECTORS	**27.3**
High Global Warming Potential Gas Measures	20.2
Sustainable Forests	5.0
Industrial Measures (for sources not covered under cap and trade program) · Oil and Gas Extraction and Transmission	1.1
Recycling and Waste (landfill methane capture)	1.0
TOTAL REDUCTIONS COUNTED TOWARD 2020 TARGET	**174**
Other Recommended Measures	**Estimated 2020 Reductions ($MMTCO_2e$)**
State Government Operations	1-2
Local Government Operations	TBD
Green Buildings	26
Recycling and Waste (other measures)	9
Water Sector Measures	4.8
Methane Capture at Large Dairies	1.0

[1] This number represents an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target. CARB will establish regional targets for each Metropolitan Planning Organization (MPO) region following the input of the Regional Targets Advisory Committee and a public consultation process with MPO's and other stakeholders per SB 375.
Source: CARB 2008c.

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Senate Bill 97 Chapter 185, Statutes of 2007

SB 97 requires that OPR to prepare guidelines to submit to the California Resources Agency regarding feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by CEQA. The Resources Agency is required to certify and adopt these revisions to the State CEQA Guidelines by January 1, 2010. The Guidelines will apply retroactively to any incomplete environmental impact report, negative declaration, mitigated negative declaration, or other related document.

Executive Order S-01-07

Executive Order S-01-07 was enacted by Governor Schwarzenegger on January 18, 2007. Essentially, the order mandates the following: 1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established in California.

Senate Bill 375

On September 30, 2008, Governor Schwarzenegger signed into law SB 375 (Steinberg). SB 375 focuses on housing and transportation planning decisions to reduce fossil fuel consumption and conserve farmlands and habitat. This legislation is important to achieving AB 32 goals because greenhouse gas emissions associated with land use, which includes transportation, are the single largest sector of emissions in California. Further, SB 375 provides a path for better planning by providing incentives to locate housing developments closer to where people work and go to school, allowing them to reduce vehicle miles traveled (VMT) every year. The following bullet points summarize some of the main provisions of the bill:

- Require the regional governing bodies in each of the state's major metropolitan areas to adopt, as part of their regional transportation plan, a "sustainable community strategy" that will meet the region's target for reducing GHG emissions. These strategies would get people out of their cars by promoting smart growth principles such as: development near public transit; projects that include a mix of residential and commercial use; and projects that include affordable housing to help reduce new housing developments in outlying areas with cheaper land and reduce VMT.
- Create incentives for implementing the sustainable community strategies by allocating federal transportation funds only to projects that are consistent with the emissions reductions.
- Provide various forms of CEQA relief by allowing projects that are shown to conform to the preferred sustainable community strategy through the local general plans (and therefore contribute to GHG reduction) to have a more streamlined environmental review process. Specifically, SB 375 will change CEQA in two ways:

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- If a development is consistent with the sustainable community's strategy and incorporates any mitigation measures required by a prior EIR, then the environmental review does not have to consider: a) growth-inducing impacts, or b) project-specific or cumulative impacts from cars on global warming or the regional transportation network.
- A narrowly-defined group of "transit priority projects" will be exempt from CEQA review (SCAQMD 2008).

Title 24, Part 6, California Code of Regulations (2005)

Energy Conservation Standards for new residential and nonresidential buildings were adopted by California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. This program has been partially responsible for keeping California's per capita energy use approximately flat over the past 30 years.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (24 CCR). Part 11 establishes voluntary standards that will become mandatory in the 2010 edition of the code, including planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

San Diego Air Pollution Control District

The local air pollution control district (APCD) has the primary responsibility for the development and implementation of rules and regulations designed to attain the NAAQS and CAAQS, as well as the permitting of new or modified sources, development of air quality management plans, and adoption and enforcement of air pollution regulations. The San Diego Air Pollution Control District (SDAPCD) is the local agency responsible for the administration and enforcement of air quality regulations in San Diego County.

Regional Air Quality Strategy (RAQS) and State Implementation Plan (SIP)

All areas designated as nonattainment under the CCAA are required to prepare plans showing how the area would meet the state and federal air quality standards by its attainment dates. The San Diego RAQS is the region's plan for improving air quality in the region, while the SIP addresses the federal requirements. It addresses the CAA and CCAA requirements and demonstrates attainment with ambient air quality standards.

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The SDAPCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The RAQS was initially adopted in 1991, and is updated on a triennial basis. The RAQS was updated in 1995, 1998, 2001, 2004, and most recently in 2009. The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for 1-hour O_3. The RAQS does not address the state air quality standards for PM10 or PM2.5. The SDAPCD has also developed the air basin's input to the SIP, which is required under the Federal Clean Air Act for areas that are out of attainment of air quality standards. The SIP includes the SDAPCD's plans and control measures for attaining the O_3 NAAQS. The SIP is also updated on a triennial basis. For the 8-hour O_3standard, the SDAPCD submitted their 8-hour Ozone Attainment Plan 2007 in May of 2007; calling for more reductions in VOC and NO_X emissions.

The current status of the RAQS and SIPs that apply to San Diego County are identified in Table 4.

Table 4. Summary of RAQS/SIP for San Diego County

Pollutant	Document Title	Status	Comments
Ozone	2007 Ozone SIP (8-hour federal)	Dated May 2007: prepared by CARB, SDAPCD, SANDAG, and others for the entire southern California area	Calls for reductions in VOCs and NO_X with attainment achieved in 2012
	2002 Ozone (1-hour Federal) Redesignation Request and Maintenance Plan	Dated December 2002: the current "approved" SIP for this pollutant	Calls for reductions in VOCs and NO_X with attainments achieved in 2006
	2009 RAQS (1- and 8-hour state)	Dated April 2009; update to 2004 strategy	Includes an expeditious schedule for adopting feasible emission control measures to reduce ozone precursor emissions
CO	1995/96 Maintenance Plan	Approved in 1998 for the period 1998 to 2008	The 2008 to 2018 plan was submitted to EPA in 2006
PM10	2005 Measures to Reduce PM10	Dated December 2005: current plan for PM10	Calls for reduction in PM10 and PM2.5
PM2.5	N/A	Under development by SDAPCD	--
Source: SDAPCD 2009a			

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The proposed project may be subject to the following SDAPCD rules (as well as others):

Rule 50—Visible Emissions: establishes limits to the opacity of emissions within the SDAPCD. The proposed facility is subject to Rule 50 (d) (1) and (6) and should not exceed the visible emission limitation.

Rule 51—Nuisance: prohibits emissions which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or which endanger the comfort, repose, health, or safety of any such persons or the public; or which cause injury or damage to business or property.

Rule 52—Particulate Matter: establishes limits to the discharge of any particulate matter from non-stationary sources.

Rule 54—Dust and Fumes: establishes limits to the amount of dust or fume discharge into the atmosphere in any one hour.

Rule 55— Fugitive Dust Control: sets restrictions on visible fugitive dust from construction and demolition projects.

Rule 67—Architectural Coatings: establishes limits to the VOC content applied within the SDAPCD (SDAPCD 2009b).

Local Greenhouse Gas and Climate Change Regulations

There are no current state mandates for local governments concerning GHG emissions. As discussed above, the California Air Resources Board has released a *Local Government Operations Protocol* that provides guidance on the preparation of GHG inventories for municipal operations (CARB 2008d). The protocol does not contain recommendations for GHG reductions by local governments.

Port of San Diego Clean Air Program

In 2006, the Port began a voluntarily Clean Air Program (CAP) to address air quality and greenhouse gas emissions from local port-related activities. This CAP seeks to voluntarily reduce criteria pollutants and greenhouse gas emissions from current and future Port operations through the identification and evaluation of feasible and effective control measures for each category of Port emissions. The Port has developed various control measures geared towards reducing emissions from the greatest contributors of air pollution. The Port has identified control measures to achieve a reduction of pollutants from the largest sources, including shore power (to enable ships to turn off their vessels and plug into electric power while docked), truck replacement/retrofits, replacement/retrofits of cargo handling equipment, and vessel speed reductions. The CAP will continue to be refined and be adapted to future changes in Port operations (Port District 2009).

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Regional Transportation Planning

SANDAG has adopted the 2030 Regional Transportation Plan (RTP), *Pathways for the Future*. The RTP emphasizes the coordination of land use and transportation planning, stating "transportation infrastructure and services must be coordinated with land use planning if we are to avoid increased traffic congestion, reduced mobility, and a deteriorating quality of life." SANDAG developed a Smart Growth Concept Map where smart growth areas exist or could exist within the county. SANDAG also established an independent transit planning review (ITPR) to provide expert guidance and assistance to coordinate smart growth and transit initiatives.

Description of Relevant Air Pollutants

Ozone

Ozone (O_3), a colorless toxic gas, is the chief component of urban smog. O_3 enters the bloodstream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O_3 also damages vegetation by inhibiting its growth. Although O_3 is not directly emitted, it forms in the atmosphere through a chemical reaction between reactive organic gas (ROG) and NO_X under sunlight. O_3 is present in relatively high concentrations within the SDAB, and the damaging effects of photochemical smog generally are related to the concentration of O_3. Meteorology and terrain play major roles in O_3 formation. Ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Ozone is considered a regional pollutant; high levels often occur downwind of the emission source because of the length of time between when the ROG form and when they react with light to change to ozone.

Inhalable Particulate Matter

Particulates can damage human health and impede plant growth. Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled. Particulates also reduce visibility and corrode materials. PM10 is generated by both rural and urban sources, including agricultural burning, discing of agricultural fields, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere. The federal and state ambient air quality standard for particulate matter applies to two classes of particulates: particulate matter 2.5 microns or less in diameter (PM2.5), also known as fine particulate matter, and particulate matter 10 microns or less in diameter (PM10)

Carbon Monoxide

Carbon Monoxide (CO), a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete

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combustion of fossil fuels. In urban areas, motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains emit CO. Automobile exhaust releases most of the CO in urban areas. CO is a nonreactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor-vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. Since motor vehicles are the dominant source of CO emissions; CO hotspots are normally located near roads and freeways with high traffic volume. The highest CO concentrations measured in the SDAB typically are recorded during the winter.

Nitrogen Dioxide

Nitrogen Dioxide (NO_2), a brownish gas, irritates the lungs. It can cause breathing difficulties at high concentrations. Like O_3, NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_X) and are major contributors to ozone formation. NO_2 also contributes to the formation of PM10 (see the discussion of PM10 below). At atmospheric concentration, NO_2 is only potentially irritating. In high concentrations, the result is a brownish-red cast to the atmosphere and reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (2 and 3 years old) also has been observed at concentrations below 0.3 parts per million (ppm).

Sulfur Dioxide

SO_2 is a product of high-sulfur fuel combustion. Main sources of SO_2 are coal and oil used in power stations, in industries, and for domestic heating. Industrial chemical manufacturing is another source of SO_2. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 also can cause plant leaves to turn yellow and can erode iron and steel. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary-source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 concentrations have been reduced to levels well below the state and national standards, but further reductions in emissions are needed to attain compliance with standards for sulfates and PM10, of which SO_2 is a contributor.

Lead

Lead (Pb) is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used several decades ago to increase the octane rating in automotive fuel. Since gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels and the use of leaded fuel

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has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Short-term exposure to high levels of lead can cause vomiting, diarrhea, convulsions, coma, or even death. However, even small amounts of lead can be harmful, especially to infants, young children, and pregnant women. Symptoms of long-term exposure to lower lead levels may be less noticeable but are still serious. Anemia is common, and damage to the nervous system may cause impaired mental function. Other symptoms are appetite loss, abdominal pain, constipation, fatigue, sleeplessness, irritability, and headache. Continued excessive exposure, as in an industrial setting, can affect the kidneys.

Lead exposure is most serious for young children because they absorb lead more easily than adults and are more susceptible to its harmful effects. Even low-level exposure may harm the intellectual development, behavior, size, and hearing of infants. During pregnancy, especially in the last trimester, lead can cross the placenta and affect the fetus. Female workers exposed to high levels of lead have more miscarriages and stillbirths.

Toxic Air Contaminants

Although Ambient Air Quality Standards (AAQS) exist for criteria pollutants, no ambient standards exist for toxic air contaminants (TACs). Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the CARB has consistently found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor, called a Hazard Index, is used to evaluate risk. In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (AB 1807) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

In August 1998, CARB identified particulate emissions from diesel-fueled engines as TACs. In September 2000, CARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce diesel PM10 emissions and the associated health risk by 75% in 2010 and by 85% by 2020. The plan identifies 14 measures that CARB will implement over the next several years. Since CARB measures are enacted before any phase of construction, the proposed project would be required to comply with applicable diesel control measures (CARB 1998).

Greenhouse Gases

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). GHGs are both naturally occurring and artificial. Examples of GHGs that are produced both by natural processes and industry include CO_2, methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons [HFCs], and PFCs) and sulfur hexafluoride (SF_6).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without these natural GHGs, the earth's surface would be about 61°F cooler. However, emissions from fossil fuel combustion for activities such as electricity production and vehicular transportation have elevated the concentration of GHGs in the atmosphere above natural levels. According to the Intergovernmental Panel on Climate Change, the atmospheric concentration of CO_2 in 2005 was 379 ppm compared to the pre-industrial levels of 280 ppm. In addition, the Fourth U.S. Climate Action Report concluded, in assessing current trends, that CO_2 emissions increased by 20% from 1990 to 2004, while methane and nitrous oxide emissions decreased by 10% and 2%, respectively.

There appears to be a close relationship between the increased concentration of GHGs in the atmosphere and global temperatures. Scientific evidence indicates a trend of increasing global temperatures near the earth's surface over the past century due to increased human-induced levels of GHGs.

GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase and/or change in global temperatures, which in turn has numerous indirect effects on the environment and humans. For example, some observed changes include shrinking glaciers, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, and earlier flowering of trees. Other, longer-term, environmental impacts of global warming may include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack (for example, estimates include a 30 to 90% reduction in snow pack in the Sierra Nevada mountain range). Current data suggest that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods.

Greenhouse gas is any gas that absorbs infrared radiation in the atmosphere. Major greenhouse gases include water vapor, CO_2, CH_4, N_2O, HCFCs, O_3, PFCs, and HFCs. Greenhouse gases are not considered "pollutants" under the federal Clean Air Act by EPA. However, on April 24, 2009, the EPA issued an endangerment finding for CO_2, which is the first step in regulating CO_2 under the federal Clean Air Act. In addition, they are not considered pollutants under the California Clean Air Act and are not subject to ambient air quality standards unless the greenhouse gas pollutants fall into one of the EPA-regulated pollutant categories (i.e., ozone, PFC, and HFC). Greenhouse gases are regulated by

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CARB under legislative direction and the governor's executive orders, as discussed above.

Emissions of each gas are generally reported separately and in units CO_2e. The CO_2e units reflect normalization based on the ability of each gas to trap heat in the atmosphere, along with consideration of the pollutant's atmospheric lifetime, allowing each of the GHGs to be compared on a common basis. Non-CO_2 gases are converted to CO_2e units based on global warming potential (GWP) factors developed by the IPCC to represent the heat-trapping ability of each GHG relative to that of CO_2. For example, the GWP of methane is 21 because one metric ton of CH_4 has 21 times more ability to trap heat in the atmosphere than one metric ton of CO_2. A list of GWPs for the six GHGs is presented in Table 5 and described below.

Table 5. Global Warming Potential Factors for Greenhouse Gases

Species	Chemical formula or Abbreviation	GWP_{100}
Carbon dioxide	CO_2	1
Methane	CH_4	21
Nitrogen dioxide	N_2O	310
Sulfur hexafluoride	SF_6	23,900
Hydrofluorocarbons	HFCs	12 to 11,700
Perfluorocarbons	PFCs	6,500 to 9,200

Source: CCAR (2009), which uses the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report published in 1995, unless no value was assigned in the document, in which case the GWP values are from the IPCC Third Assessment Report published in 2001. GWP values are based on 100 year atmospheric lifetimes and are consistent with international practices.

Carbon Dioxide (CO_2)

CO_2 is the greenhouse gas whose concentration is most directly affected by human activities. CO_2 also serves as a reference in comparing all other greenhouse gases (see carbon dioxide equivalents). The major source of CO_2 emissions is fossil fuel combustion. CO_2 emissions are also a product of forest clearing, biomass burning, and non-energy production processes such as cement production.

Increasing concentrations of CO_2 in the atmosphere are largely due to emissions from the burning of fossil fuels, gas flaring, cement production, and land-use changes. Three quarters of anthropogenic CO_2 emissions are the result of fossil fuel burning (and to a very small extent, cement production), and approximately one quarter of emissions are the result of land-use change (Intergovernmental Panel on Climate Change 2007a).

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Anthropogenic emissions of CO_2 have increased concentrations in the atmosphere most notably since the Industrial Revolution; the concentration of CO_2 has increased from about 280 to 379 ppm over the last 250 years (IPCC 2007b). IPCC estimates that the present atmospheric concentration of CO_2 has not been exceeded in the last 650,000 years and is likely to be the highest ambient concentration in the last 20 million years (IPCC 2007a)

Methane (CH_4)

CH_4 is a hydrocarbon that is a greenhouse gas with a global warming potential recently estimated at 21. CH_4 is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and oil, coal production, and incomplete fossil fuel combustion.

Anthropogenic emissions of CH_4 are the result of growing rice, raising cattle, combusting natural gas, and mining coal (National Oceanic and Atmospheric Administration 2005). Atmospheric CH_4 has increased from a preindustrial concentration of 715 to 1,775 parts per billion in 2005 (Intergovernmental Panel on Climate Change 2007b). Though it is unclear why, atmospheric concentrations of CH_4 have not risen as quickly as anticipated (National Oceanic and Atmospheric Administration 2005).

Nitrous Dioxide (N_2O)

N_2O is a powerful greenhouse gas with a global warming potential of 310. Major sources of N_2O include soil cultivation practices, especially the use of commercial and organic fertilizers; fossil fuel combustion; nitric acid production; and biomass burning (Association of Environmental Professionals 2007).

N_2O concentrations in the atmosphere have increased from preindustrial levels of 270 ppb to 319 ppb in 2005 (Intergovernmental Panel on Climate Change 2007b).

Sulfur Hexafluoride (SF_6)

SF_6, another human-made chemical, is used as an electrical insulating fluid for power distribution equipment, in the magnesium industry, and in semiconductor manufacturing and also as a trace chemical for study of oceanic and atmospheric processes (Association of Environmental Professionals 2007). SF_6 is the most powerful of all GHGs listed in IPCC studies, with a GWP of 23,900.

Hydrofluorocarbons (HFCs)

These chemicals (along with perfluorocarbons) were introduced as alternatives to ozone-depleting substances that served many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and used in manufacturing. They do not significantly deplete the stratospheric ozone

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layer, but they are powerful greenhouse gases with global warming potentials ranging from 140 (HFC-152a) to 12,100 (HFC-23).

Concentrations of HFCs have risen from zero to current levels. Because these chemicals are human-made, they do not exist naturally in ambient conditions

Perfluorocarbons (PFCs)

This is a group of human-made chemicals composed of carbon and fluorine: CF_4 and C_2F_6. These chemicals, specifically CF_4 and C_2F_6 (along with hydrofluorocarbons), were introduced as alternatives to ozone-depleting substances. In addition, they are emitted as by-products of industrial processes and used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they are powerful greenhouse gases. CF_4 has a global warming potential of 6,300 and C_2F_6 has a global warming potential of 12,500.

Existing Conditions

Regional Setting

The Proposed Project is located within the SDAB, which covers all of San Diego County. The SDAB is bordered by the Pacific Ocean to the west, the South Coast Air Basin (SCAB) to the north, the Salton Sea Air Basin (SSAB) to the east, and the U.S.–Mexico border to the south. The climate in southern California, including the SDAB, is controlled largely by the strength and position of the subtropical high-pressure cell over the Pacific Ocean. Areas within 15 miles of the coast, which includes the Project site, experience moderate temperatures and comfortable humidity. Precipitation is mostly limited to a few storms during the winter season. Winds in the vicinity of the Project usually are driven by the dominant land/sea breeze circulation system. During the day, regional wind patterns are dominated by onshore sea breezes. At night, wind generally slows and reverses direction, traveling toward the sea.

The atmospheric conditions of the SDAB contribute to the region's air quality problems. Because of its climate, the SDAB experiences frequent temperature inversions. Typically, temperature decreases with height. However, under inversion conditions, temperature increases as altitude increases. Temperature inversions prevent the air close to the ground from mixing with the air higher up. As a result, air pollutants are trapped near the ground. During the summer, air quality problems are created by the interaction between the ocean surface and the lower layer of the atmosphere, creating a moist marine layer. An upper layer of warm air mass forms over the cool marine layer, preventing air pollutants from dispersing upward. Additionally, hydrocarbons (HC) and nitrogen oxides (NO_X) react under strong sunlight, creating smog. Light and daytime winds, primarily from the northwest, further aggravate this condition by driving the air pollutants inland, toward the foothills. During the fall and winter, air quality problems are created because of CO and NO_X emissions. High NO_X levels usually occur during fall or winter, on days with summer-like conditions.

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High air pollution levels in coastal communities of San Diego often occur when polluted air from the SCAB, particularly from Los Angeles, travels southwest over the ocean at night and is then brought on shore into San Diego by the sea breeze during the day. Smog transported from the SCAB is a key factor on more than 50% of the days San Diego exceeds clean air standards. Ozone and its precursor emissions (HC and NO_X) are transported to San Diego during relatively mild Santa Ana weather conditions. However, during strong Santa Ana weather conditions, pollutants are pushed far out to sea and miss San Diego. When smog is blown in from the SCAB at ground level, the highest O_3 concentrations are measured at coastal and near-coastal monitoring stations. When the transported smog is elevated, coastal sites may be passed over, and the transported ozone is measured further inland and on the mountain slopes.

Local Area Conditions

Local Climate

Wind-monitoring data recorded at the San Diego/Lindbergh Field Station indicate that the predominant wind direction in the Project vicinity is from the west-northwest. Average wind speed is approximately 6.1 miles per hour (2.7 meters per second).

The annual average temperature in the vicinity of the Project is approximately 63°F. The Project site experiences an average winter temperature of approximately 57°F and an average summer temperature of approximately 69°F. Total annual precipitation in the vicinity of the Project averages approximately 10.17 inches. Precipitation occurs mostly during the winter and relatively infrequently during the summer.

Existing Pollutant Levels at Nearby Monitoring Stations

The SDAPCD maintains and operates a network of ambient air monitoring stations throughout the County. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The ambient monitoring station closest to the project is the San Diego – Union Street Monitoring Station (CARB 80130). Only CO is monitored at this station. The closest monitoring site that monitors the remaining criteria pollutants is the San Diego – Beardsley Street Monitoring Station (CARB 80142). The Beardsley monitoring station measures CO, SO_2, O_3, PM10, PM2.5, and NO_2 concentrations.

Concentrations of pollutants from the two stations over the last three years are presented in Table 6. Concentrations of 1-hour O_3 did not exceed NAAQS or CAAQS for any of the years from 2006-2008, but 8-hour O_3 CAAQS were exceeded all three years. The NAAQS were not exceeded for any of the years for PM10, but CAAQS were exceeded multiple times each year. The 24-hour PM2.5 exceeded NAAQS in each of the years between 2006 and 2008. However

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the standards do not violate the NAAQS because the 24 hour PM2.5 monitored data are averaged out over a 3-year period. The 24 hour PM2.5 standard is attained because at least 98% of the daily monitoring data is below the daily and annual attainment NAAQS. Both the 8-hour and 1-hour CO concentrations were not exceeded over any of the years.

The CCAA requires the CARB to designate areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment.

If a pollutant concentration is lower than the state or federal standard, the area is classified as being in *attainment* for that pollutant. If a pollutant violates the standard, the area is considered a *nonattainment* area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated *unclassified*. As mentioned earlier, San Diego County is classified as a nonattainment area for the state 1-hour ozone standard, the federal and state 8-hour ozone standards, and the state PM10 and PM2.5 standards. The county is in attainment for state and federal CO, NO_2, SO_2, and lead standards, as well as the state sulfates standard.

Table 6. Ambient Background Concentrations from Nearby Monitoring Stations

San Diego – Beardsley Street			
Pollutant Standards	**2006**	**2007**	**2008**
Ozone			
Maximum 1-hour concentration (ppm)	0.082	0.087	0.087
Maximum 8-hour concentration (ppm)	0.071	0.073	0.073
No. Days Standard Exceeded			
NAAQS (1-hour) > 0.12 ppm	0	0	0
CAAQS (1-hour) > 0.09 ppm	0	0	0
NAAQS (8-hour) > 0.075 ppm	0	0	0
CAAQS (8-hour) > 0.07 ppm	1	1	1
Particulate Matter (PM10)			
Federal Maximum 24-hour concentration ($\mu g/m^3$)	71	110	58
State Maximum 24-hour concentration ($\mu g/m^3$)	74	111	59
Annual average concentration ($\mu g/m^3$)	34.4	31.3	29.3
No. Days Standard Exceeded			
NAAQS (24-hour) > 150 $\mu g/m^3$	0	0	0
CAAQS (24-hour) > 50 $\mu g/m^3$	11	4	4
CAAQS (annual) > 20 $\mu g/m^3$ exceeded?	Yes	Yes	Yes
Particulate Matter (PM2.5)			

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San Diego – Beardsley Street			
Pollutant Standards	**2006**	**2007**	**2008**
Maximum 24-hour concentration (μg/m^3)	63.3	71.4	42.0
Annual average concentration (μg/m^3)	13.1	12.7	13.7
No. Days Standard Exceeded			
NAAQS (24-hour) > 35 μg/m^3	2	8	3
NAAQS (annual) > 15 μg/m^3 exceeded?	No	No	No
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	3.27	3.01	2.60
Maximum 1-hour concentration (ppm)	5.3	4.4	3.1
No. Days Standard Exceeded			
NAAQS (8-hour) ≥ 9.0 ppm	0	0	0
NAAQS (1-hour) ≥ 35 ppm	0	0	0
CAAQS (8-hour) ≥ 9.0 ppm	0	0	0
CAAQS (1-hour) ≥ 20 ppm	0	0	0

ppm parts per million
μg/m^3 micrograms per cubic meter
mg/m^3 milligrams per cubic meter
> greater than
≥ equal to or greater than
Source: CARB 2009b. http://www.arb.ca.gov/adam/welcome.html (Top 4 Summary, all pollutants except 1-hour CO)
USEPA 2009a. www.epa.gov/air/data/monvals.html (Monitor Values Report – Criteria Air Pollutants, 1-hour CO)

Regional TAC Background Levels

Ambient levels of selected TACs are measured by the CARB at several locations in southern California. The closest TAC monitoring stations to the project site are Chula Vista and El Cajon, located approximately 10 miles and 15 miles southeast and east of the proposed project site, respectively. Both of these stations may potentially contain higher, as well as different, TAC concentrations than those near the proposed project because of the distance from the project site and the myriad of land uses in those areas. Because DPM is not collected at the two monitoring stations, background concentrations for this TAC were obtained from the 2009 California Almanac of Emissions and Air Quality (CARB 2009c). The annual average concentration for DPM in the SDAB is 1.4 micrograms per cubic meters (μg/m^3) with an estimated cancer risk of 420 chances in one million.

For perspective, one out of three Americans will eventually develop cancer, and 1 out of four will die from cancer. Therefore, the national average background cancer incidence is equivalent to 333,000 chances in one million.

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Sensitive Land Uses

The impact of air emissions on sensitive members of the population is a special concern. Sensitive land uses are defined as locations where particularly pollutant-sensitive members of the population may reside or where the presence of air pollutant emissions could adversely affect use of the land. Sensitive members of the population include those that may be more negatively impacted by poor air quality than other members of the population, such as children, the elderly, or the infirmed. The CARB has identified the following people as the most likely to be affected by air pollution: children younger than 14, the elderly older than 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder-care facilities, elementary schools, and parks. The Project site is located adjacent to a marina and restaurants. No residences, hospitals, daycare facilities, elder-care facilities, schools, or parks are located in the immediate vicinity of the Project site. The nearest sensitive receptors to the Project site are Spanish Landing Park, located approximately 0.5 mile northwest of the Project site; the park located on the south side of West Harbor Island, approximately 1 mile west of the Project site; and residences along Laurel Street, Hawthorne Street, and Grape Street, approximately 1 mile east of the Project site.

Background Greenhouse Gas Emissions

In the 2007 IPCC Synthesis Report, global anthropogenic GHG emissions were estimated to be 49,000 million metric tons of CO_2e in 2004, which is 24% greater than 1990 emissions levels. CO_2 contributed to 76.7% of total emissions; CH_4 accounted for 14.3%; N_2O contributed 7.9% of total emissions and fluorinated gases (HFCs, PFCs, and SF_6) contributed to the remaining 1.1% of global emissions in 2004. Energy supply was the sector responsible for the greatest amount of GHG emissions (25.9%), followed by industry (19.4%), forestry (17.4%), agriculture (13.5%), and transport (13.1%) (Intergovernmental Panel on Climate Change 2007b).

The U.S. Environmental Protection Agency (EPA) estimates that total U.S. GHG emissions for 2007 amounted to 7,150.1 million metric tons of CO_2e, which is 17% greater than 1990 levels. U.S. GHG emissions were responsible for 14.4% of global GHG emissions in 2004 (Intergovernmental Panel on Climate Change 2007b; Environmental Protection Agency 2009b). The largest contributors to U.S. GHG emissions in 2007 were electricity generation (34.2%), transportation (27.9%), and the industrial sector (19.4%) (Environmental Protection Agency 2009b).

In December 2006, the CEC published the *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.* This report indicates that California is the second largest emitter of greenhouse gasses in the United States next to Texas. This is largely a result of the number of people living in a large state, as opposed to a small state such as Rhode Island. California generates about half as

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many CO_2 emissions as Texas. Worldwide, California is the 12th to 16th largest emitter of CO_2 (CEC 2006), and is responsible for approximately 2% of the world's CO_2 emissions (CEC 2006). When considering fossil fuel emissions at the individual person level, California is second lowest in the nation in per capita CO_2 emissions, with only the District of Columbia lower. Between 1990 and 2000, California's population grew by 4.1 million people, and during the 1990 to 2003 period, California's gross state product grew by 83% (in dollars, not adjusted for inflation). However, California's greenhouse gas emissions grew by only 12% between 1990 and 2003. The report concludes that California's ability to slow the rate of growth of greenhouse gas emissions is largely due to the success of its energy efficiency, renewable energy programs, and commitment to clean air and clean energy. In fact, the state's programs and commitments lowered its greenhouse gas emissions rate of growth by more than half of what it would have been otherwise.

Transportation is responsible for 41% of the state's GHG emissions, followed by the industrial sector (21%), electricity generation (22%), agriculture and forestry (8%), and other sources (8%) (CEC 2006). Emissions of CO_2 and N_2O are byproducts of fossil fuel combustion and other sources. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills, among other sources. Sinks of CO_2 include uptake by vegetation and dissolution into the ocean. California GHG emissions in 2004 totaled approximately 492.1 MMT CO_2e.

The Energy Policy Initiatives Center at University of San Diego School of Law has developed a GHG emission inventory for San Diego County. In 2006, San Diego County emitted 34 MMT CO_2e, an increase of 5 MMT CO_2e (18%) over 1990 level emissions (Anders et al. 2008).

The IPCC predicts substantial increases in temperatures globally of between 1.1 to 6.4° Celsius (depending on scenario) by the year 2100 (Intergovernmental Panel on Climate Change 2007a).

The following is a partial list of ways climate change could impact the natural environment in California:

- Rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta due to ocean expansion;
- Extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths, infectious diseases, and risk of respiratory problems caused by deteriorating air quality;
- Reduced snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and

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- Changes in distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California's climate and ecosystems are occurring at a time when California's population is expected to increase from 34 million to 59 million by the year 2040 (CEC 2006).

As such, the number of people potentially affected by climate change as well as the amount of anthropogenic GHG emissions expected under a "business as usual" scenario is expected to increase. Similar changes as those noted above for California would also occur in other parts of the world with regional variations in resources affected and vulnerability to adverse effects. GHG emissions in California are attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors as well as natural processes (CEC 2006).

As a consequence of worldwide GHG emissions altering the global climate, the proposed project area may be subject to increased vulnerability to the following impacts including:

- reduced water supply to the project area;
- increased risk of heat-related human deaths;
- increased spread of infectious diseases; and
- increased risk of respiratory problems associated with deteriorating air quality in the project area

Significance Thresholds

The following significance criteria are based on Appendix G of the State CEQA Guidelines and provide the basis for determining significance of impacts associated with air quality resulting from the Proposed Project.

Impacts are considered significant if the Project would result in any of the following:

- conflict with or obstruct implementation of the applicable air quality management plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- emissions that exceed 250 pounds per day of NO_X, or 75 pounds per day of VOCs;
- emissions of CO that when totaled with the ambient concentrations exceed a 1-hour concentration of 20 ppm or an 8-hour average of 9 ppm;
- emissions of PM2.5 that exceed 55 pounds per day;

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- emissions of PM10 that exceed 100 pounds per day and increase the ambient PM10 concentration by 5 $\mu g/m^3$;
- a cumulatively considerable net increase of PM10 or exceed quantitative thresholds for O_3 precursors, NO_X and VOCs;
- a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment status under an applicable federal or state ambient air quality standard (including the release of emissions that exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

Supplemental Criteria for Project Emissions

The Port of San Diego has not adopted specific emission thresholds by which to evaluate the significance of air quality impacts of projects within its jurisdiction. However, the County of San Diego has adopted the significance thresholds set forth by the SDAPCD and the SCAQMD. These thresholds provide a conservative means of evaluating the potential for a significant impact. The following Guidelines for Determining Significance will be used for determining the cumulatively considerable net increases during the construction phase:

- A project that has a significant direct impact on air quality with regard to emissions of PM10, PM2.5, and NO_X and/or VOCs, would also have a significant cumulatively considerable net increase.
- In the event direct impacts from a proposed project are less than significant, a construction project may still have a cumulatively considerable impact on air quality if the emissions from the proposed project, in combination with the emissions from other proposed construction projects or reasonably foreseeable future projects within a 1/4-mile radius, would be in excess of thresholds.

The following Guidelines for Determining Significance will be used for determining the cumulatively considerable net increases during the operational phase:

- A project that does not conform to the RAQS and/or has a significant direct impact on air quality with regard to operational emissions of PM10, PM2.5, NO, and/or VOCs, would also have a significant cumulatively considerable net increase.
- Projects that cause road intersections or roadway segments to operate at or below a level of service (LOS) E and create a CO "hotspot" create a cumulatively considerable net increase of CO.
- Expose sensitive receptors (including, but not limited to, schools, hospitals, resident care facilities, or day-care centers) to substantial pollutant concentrations.

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Thresholds for Criteria Pollutant Impacts

In lieu of any set quantitative air quality significance thresholds, the SDAPCD's Regulation II, Rule 20.2, Table 20-2-1, "Air Quality Impact Analysis (AQIA) Trigger Levels" are used as a screening criterion for potential significance of air quality impacts. The SDAPCD emission thresholds are shown in Table 7. Therefore, an increase above the SDAPCD's emission thresholds would be expected to have an adverse impact on air quality because any emission increase would contribute to the air quality problems in the SDAB. In addition, if a proposed project's emissions exceed the 100 pounds per day of PM10, relying on the definition of "significant impact" in SDAPCD Rule 20.1, the project would create a significant impact if the actual ambient 24-hour concentration is increased by 5.0 $\mu g/m^3$ in a Class II area (1.0 $\mu g/m^3$ in a Class I area).

Any project would be considered to have a potential significance air quality impact if the emission levels from the proposed project were to exceed any of the criteria presented in Table 7.

Table 7. SDAPCD Screening Level Thresholds

Air Contaminant	Emission Rate		
	(lb/hr)	(lb/day)	(tons/yr)
Particulate Matter less than 10 microns (PM10)	---	100	15
Particulate Matter less than 2.5 microns (PM2.5) [1]	---	55	10
Oxides of Nitrogen (NO_X)	25	250	40
Oxides of Sulfur (SO_X)	25	250	40
Carbon Monoxide (CO)	100	550	100
Lead and Lead Compounds (Pb)	---	3.2	0.6
Volatile Organic Compounds (VOC)[2]	---	75	13.7

[1] EPA's "Proposed Rule to Implement the Fine Particle National Ambient Air Quality Standards," published September 8, 2005. Also used by the SCAQMD.

[2] City of San Diego CEQA Significance Determination Threshold for VOC threshold based on South Coast Air Quality Management District (SCAQMD) levels and the Monterey Bay APCD which has similar federal and state attainment status as San Diego.

Source: SDAPCD Regulation II, Rule 20.2.

Local Micro-scale Concentration Standards

The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a

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State or federal standard, project emissions are considered significant if they increase one hour CO concentrations by 1.0 ppm or more or eight hour CO concentrations by 0.45 ppm or more. The following are applicable local emission concentration standards for CO:

- California State one-hour CO standard of 20.0 ppm
- California State eight-hour CO standard of 9.0 ppm

As in most urban areas, high short-term concentrations of CO, known as "hotspots," can be a problem in San Diego County. Hotspots typically occur in areas of high motor vehicle use, such as in parking lots, at congested intersections, and along highways. Since CO buildup typically occurs at locations where traffic is congested, CO concentrations are often correlated with LOS at intersections. LOS expresses the congestion level for an intersection and is designated by a letter from A to F, with LOS A representing the best operating conditions and LOS F the worst. Significant concentrations of CO sometimes occur (depending on temperature, wind speed, and other variables) at intersections where LOS is rated at D or worse.

Significance of CO emissions from vehicles was evaluated based on the following criteria: a significant impact would occur if (1) project-generated traffic degrades the LOS at intersections to level D or worse, (2) sensitive receptors are nearby, and/or (3) CO hotspot modeling indicates thresholds would be exceeded. The first criterion is based on whether the traffic associated with the proposed project would change the LOS of an intersection, and thereby have the potential to generate CO hotspots. If the LOS remained unaffected, it would be assumed that vehicle emissions would not contribute to CO hotspots.

Supplemental Criteria for Sensitive Receptors

The following criteria were used to determine whether the project would expose sensitive receptors to substantial pollutant concentrations:

- The project would place sensitive receptors near CO "hotspots" or creates CO "hotspots" near sensitive receptors.
- The project would result in exposure to TACs resulting in a maximum incremental cancer risk greater than 1 in 1 million without application of Toxics-Best Available Control Technology, or a health hazard index greater than 1, and thus be deemed as having a potentially significant impact.
- Create objectionable odors affecting a substantial number of people. The project is not an agricultural, commercial, or an industrial activity, and consequently is not subject to SDAPCD standards.

Supplemental Criteria for GHG Emissions

No federal or state agency provides specific emission thresholds by which to evaluate the significance of impacts from GHG emissions. The Legislature

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recently enacted SB 97, which requires the OPR to adopt CEQA Guidelines concerning the effects and mitigation of GHG emissions (Public Resources Code Section 21083.05). Although the final guidelines will not be adopted or implemented until January 1, 2010, OPR has circulated draft guidelines for public review and comment that authorize the use of either quantitative or qualitative thresholds of significance for GHG emissions. In the absence of formally adopted standards, the Port District employs the following significance thresholds, which are adapted from the thresholds recommended in Appendix G of the CEQA Guidelines for determining the significance of other impacts on air quality. GHG emissions would be significant if:

- the proposed project would conflict with or obstruct the goals or strategies of the California Global Warming Solutions Act of 2006 (AB 32) or related Executive Orders; or
- the proposed project would result in substantially increased exposure to the potential adverse effects of global warming identified in the California Global Warming Solutions Act of 2006.

Methodology

RAQS/SIP Consistency Impact Assessment

Because the CARB mobile source emission projections and SANDAG growth projections are based on population and vehicle trends and land use plans developed by the cities and the County of San Diego as part of the development of General Plans, and by the Port as part of the Port Master Plan, projects that propose development that is consistent with the growth anticipated by the general plans/master plan would be consistent with the RAQS and SIP. In the event that a project would propose development which is less dense than anticipated within the general plan or master plan, the project would likewise be consistent with the RAQS and SIP. If a project proposes development that is greater than that anticipated in the general plan or master plan and SANDAG's growth projections, the project might be in conflict with the RAQS and SIP, and might have a potentially significant impact on air quality.

Construction

The SDAPCD does not provide quantitative thresholds for determining the significance of construction or mobile source-related impacts. However, the SDAPCD does specify air quality impact analysis (AQIA) trigger levels for new or modified stationary sources (APCD Rules 20.2 and 20.3). If these incremental levels for stationary sources are exceeded, an AQIA must be performed for the proposed new or modified source. Although these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes these levels may be used to evaluate the increased emissions that would be discharged to the SDAB from proposed land development projects.

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Rule 20.2 outlines the screening level thresholds (SLT's), which are based on the AQIA trigger levels. These SLT's states that any project "which results in an emissions increase equal to or greater than any of these levels, must:

> ...demonstrate through an AQIA... that the project will not (A) cause a violation of a State or national ambient air quality standard anywhere that does not already exceed such standard, nor (B) cause additional violations of a national ambient air quality standard anywhere the standard is already being exceeded, nor (C) cause additional violations of a State ambient air quality standard anywhere the standard is already being exceeded, nor (D) prevent or interfere with the attainment or maintenance of any State or national ambient air quality standard.

For projects whose stationary source emissions are below these criteria, no AQIA is typically required, and project-level emissions are presumed to be less than significant.

For CEQA purposes, these SLTs can be used to demonstrate that a project's total emissions (e.g., stationary and fugitive emissions, as well as emissions from mobile sources) would not result in a significant impact to air quality. When project emissions have the potential to approach or exceed the SLTs, additional air quality modeling may need to be prepared to demonstrate that ground-level concentrations resulting from project emissions (with background levels) would be below federal and state ambient air quality standards listed in Table 1.

APCD Rules 20.2 and 20.3 do not have AQIA thresholds for emissions of VOCs and PM2.5. The use of the screening level for VOCs specified by the SCAQMD, which generally has stricter emissions thresholds than the SDAPCD, is recommended for evaluating projects within San Diego County.

In the event that project emissions exceed these SLTs, specific modeling would be required for NO_2, SO_2, CO, and lead to demonstrate that the project's ground-level concentrations, including appropriate background levels, do not exceed the NAAQS and CAAQS. For ozone precursors, PM10 and PM2.5, exceedance of the SLTs results in a significant impact. The reason for this is that the SDAB is currently not in attainment for PM10 and PM2.5, and ground-level ozone. Therefore, unless a project includes design considerations or mitigation measures that would reduce the daily emissions to below the applicable screening levels, the impact for these pollutants (ozone precursors, PM10 and PM2.5) would be significant, as discussed below.

<u>Ozone Precursors</u>

- Would the project result in emissions that exceed 250 pounds per day of NO_X, or 75 pounds per day of VOCs?

<u>Carbon Monoxide</u>

- Would the project result in emissions that exceed 550 pounds per day of CO?

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Particulate Matter

- Would the project result in emissions of PM2.5 that exceed 55 pounds per day?
- Would the project result in emissions of PM10 that exceed 100 pounds per day and increase the ambient PM10 concentration by 5 .0μg/m3 or greater at any sensitive receptor locations (or maximum exposed individual (MEI), a term commonly used by CARB for sensitive receptors)?

The ambient air quality standards reflect actual concentrations for each criteria pollutant. However, it is not economically feasible for individual land use projects to model actual concentrations for ozone based on emissions of its precursors due to the complex regional nature of ozone formation in the atmosphere. Therefore, exceedance of the SLTs for NO_X and VOCs would result in a significant impact unless mitigation is incorporated that would reduce the emissions of these pollutants below the level of the screening thresholds.

In June 2002, CARB adopted new, stricter standards for particulate matter that would affect both the coarse and fine particulate fraction. CARB delayed action on the proposed 24-hour PM2.5 standard in light of the findings related to statistical issues in several key short-term exposure health effects studies. The USEPA, however, has finalized its NAAQS for PM2.5, published on October 17, 2006, which quantifies significant emissions as 10 tons per year, which is the equivalent of 55 pounds per day. As previously stated, the PM10 SLT of 100 pounds per day comes from SDAPCD Rule 20.2. If a proposed project's emissions exceed the 100 pounds per day of PM10, relying on the definition of "significant impact" in SDAPCD Rule 20.1, the project would create a significant impact if the actual ambient 24-hour concentration is increased by 5.0 $\mu g/m^3$ in a Class II area (1.0 $\mu g/m^3$ in a Class I area).

Mass daily combustion emissions, fugitive PM10 and PM2.5, and off-gassing emissions were compiled using URBEMIS 2007, which is an emissions estimation/evaluation model developed the CARB. The URBEMIS 2007 model separates the construction process into various phases depending on the specifics of the project. For this analysis, construction was separated in six phases. The first phase includes the demolition of the locker building and existing parking lot. Emissions would result from demolition dust, debris haul truck trips, equipment exhaust, and worker commute exhaust. The second phase of construction is site preparation (e.g., grubbing and grading) with emissions resulting from fugitive dust, soil haul truck trips, equipment exhaust, and worker commute exhaust. The third and fourth phases are asphalt paving for both the hotel site and East Harbor Island Drive roadway realignment. Emissions would result from equipment exhaust, ROG emissions from asphalt paving, and worker commute exhaust. The fifth phase is hotel construction which includes emissions from building equipment and worker commute. The sixth and final stage is the architectural coating phase with emissions resulting from ROG emissions from architectural coating and worker commute. Dust estimates assume that the project will comply with SDAPCD Rule 55 regarding the suppression of fugitive dust from construction and demolition sites.

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A detailed inventory of construction equipment that would be used for the proposed project was provided, but the analysis presented herein is more conservative in nature. This analysis is based on anticipated construction equipment calculated by URBEMIS2007 that would be used during construction activities. The types and number of construction equipment for each phase of construction is presented in Table 8 below.

Table 8. URBEMIS Construction Inputs

Assumption		Unit			
Demolition		123,200 square feet to be demolished			
Fugitive Dust		2.69 acres to be disturbed (25% disturbed daily); 10,000 cy of cut to export			
Paving		1.3 acres for hotel site; 0.98 acres for East Harbor Island road realignment			
		Number	***Horsepower***	***Load Factor***	***Hours per day***
Demolition					
	Concrete/Industrial Saw	1	10	0.73	8
	Rubber Tired Dozer	1	357	0.59	1
	Tractor/Loader/Backhoe	2	108	0.55	6
Grading					
	Grader	1	174	0.61	6
	Rubber Tired Dozer	1	357	0.59	6
	Tractor/Loader/Backhoe	2	108	0.55	7
	Water Truck	1	189	0.50	6
Paving for hotel					
	Cement and Mortar Mixer	4	10	0.56	6
	Paver	1	100	0.62	7
	Paving Equipment	1	104	0.53	8
	Roller	1	95	0.56	7
	Tractor/Loader/Backhoe	2	108	0.55	7
Paving for roadway realignment					
	Concrete/Industrial Saw	1	10	0.73	8
	Excavator	1	168	0.57	8
	Grader	1	174	0.61	6
	Paver	1	100	0.62	7
	Roller	1	95	0.56	7
	Tractor/Loader/Backhoe	2	108	0.55	7
	Rubber Tired Dozer	1	357	0.59	6
	Signal Board	2	15	0.78	8
Building Construction					
	Crane	1	399	0.43	4
	Forklift	2	145	0.30	6
	Tractor/Loader/Backhoe	2	108	0.55	8
Architectural Coating		No equipment			

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Operations

Criteria Pollutants

The URBEMIS 2007 software was also used to compile the mass daily emissions estimates from mobile and area sources that would occur during long-term project operations. Mobile-source emissions were compiled using URBEMIS 2007 default assumptions for vehicle fleet, trip lengths, and trip characteristics operating during the proposed project opening year (2012). Daily trip rates were obtained from the traffic engineer (LLG 2009). Area-source emissions were compiled using URBEMIS 2007 default assumptions.

URBEMIS model outputs are provided in Appendix 1 of this report.

CO Modeling

Roadway and Traffic Conditions

Traffic volumes and operating conditions used in the modeling runs were obtained from the traffic analysis prepared by the project traffic engineers, Linscott, Law, and Greenspan (LLG 2009). CO modeling was conducted using AM and PM peak-hour traffic volumes for both the near-term year 2012 and long-term year 2030.

Vehicle Emission Rates

Vehicle emission rates were determined using the CARB Board's EMFAC2007 (version 2.3) emission rate program (CARB 2006). The free flow vehicle traveling speed for the analyses was selected to be 1 mph for links at the intersections. A slow speed of 1 mph was selected because it is the highest CO value as compared to all other speeds, including idling, estimated by the EMFAC2007 model.

Receptor Locations

CO concentrations were estimated at eight receptor locations near the intersections. Receptors were chosen based on the CO protocol developed for Caltrans by the Institute of Transportation Studies at the University of California, Davis (Garza et al. 1997), and were located 3 and 7 meters from the edge of the intersection in all directions to represent a worst-case scenario. Receptor heights were set at 5.9 feet.

Meteorological Conditions

Meteorological inputs to the CALINE4 model were determined using methodology recommended in the CO protocol (Garza et al. 1997). The meteorological conditions used in the modeling represent a calm winter period. The worst-case wind angles option was used to determine a worst-case

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concentration for each receptor. The meteorological inputs include: 0.5 meters per second wind speed, ground-level temperature inversion (atmospheric stability class G), wind direction standard deviation equal to five degrees, and a mixing height of 1,000 meters.

Background Concentrations and 8-Hour Values

A background concentration of 10.8 ppm was added to the modeled 1-hour values to account for sources of CO not included in the modeling. Eight-hour modeled values were calculated from the 1-hour values using a persistence factor of 0.7. Background concentration of 5.18 ppm was added to the modeled 8-hour values. 1-hour background concentration data were taken from the monitoring data provided by the CARB (CARB 2009b) and 8-hour background concentration data were taken from the EPA (EPA 2009a). Actual 1-hour and 8-hour background concentrations would likely be lower than those used in the CO modeling analysis because the maximum value for the previous three years was applied as background concentrations, and background levels of CO are anticipated to lower as older, more polluting vehicles are replaced with cleaner, less polluting vehicles.

Toxic Air Contaminants Impacts (Construction and Operations)

Potential TAC impacts are evaluated by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling) if necessary. The screening-level analysis consists of reviewing the proposed project's description and site plan to identify any new or modified TAC emissions sources. If it is determined that the proposed project would introduce a new source, or modify an existing TAC emissions source, then downwind sensitive-receptor locations are identified, and site-specific dispersion modeling is conducted to determine proposed project impacts.

Climate Change/Greenhouse Gas Emissions (Construction and Operations)

Proposed project-related impacts relative to GHG emissions during construction and operations are provided below. As described below, the relative amounts of construction and operational GHG emissions associated with this project are negligible. The proposed project's amount of emissions, without considering other cumulative global emissions, would be insufficient to cause substantial climate change directly. Thus, project emissions, in isolation, are considered less than significant. However, climate change is a global cumulative impact, and the proper context for analysis of this issue is not a project's emissions in isolation, but rather as a contribution to cumulative GHG emissions.

Project-related GHG emissions were estimated using the following methodology and presented in metric tons per year. Construction-related CO_2 emissions were calculated using the URBEMIS 2007 model. For operations, GHG emissions are

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presented for mobile, area, and stationary sources. For mobile sources, CO_2 emissions were calculated using URBEMIS, while CH_4 and N_2O emissions were compiled using the calculation formulas provided in the *California Climate Action Registry, General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, version 3.1* (CCAR 2009). Area source GHG emissions were calculated using URBEMIS. Stationary source emissions were calculated based on electricity and natural gas consumption rates from the SCAQMD's CEQA Air Quality Handbook (SCAQMD 1993) and emission factors from the *General Reporting Protocol* (CCAR 2009).

Impact Analysis

Consistency with the San Diego Regional Air Quality Strategy (RAQS) and State Implementation Plan (SIP)

The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for ozone. In addition, the SDAPCD relies on the SIP, which includes SDAPCD's plans and control measures for attaining the ozone NAAQS. These plans accommodate emissions from all sources, including even natural sources, through implementation of control measures, where feasible, on stationary sources to attain the standards (mobile sources are regulated by USEPA and CARB, and the emissions and reduction strategies related to mobile sources are considered in the RAQS and the SIP). At present, no particulate matter attainment plan is required by the statutes and no such plans have been developed for the SDAB.

The RAQS rely on information from CARB and SANDAG, including projected growth in the county, mobile, area, and all other source emissions in order to project future emissions and determine from that the strategies necessary for the reduction of stationary source emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population and vehicle trends and land use plans developed by the cities and by the County. As such, projects that propose development that is consistent with the growth anticipated by the PMP would be consistent with the RAQS and SIP. In the event that a project would propose development which is less dense than anticipated within the PMP, the project would likewise be consistent with the RAQS and SIP. If a project proposes development that is greater than that anticipated in the PMP and SANDAG's growth projections, the project would be in conflict with the RAQS and SIP, and might have a potentially significant impact on air quality. This situation would warrant further analysis to determine if the Proposed Project and the surrounding projects exceed the growth projections used in the RAQS and SIP for the specific subregional area.

The current land use designation for the project site is Commercial Recreation in the Lindbergh Field/Harbor Island Precise Plan. Commercial Recreation developments are intended to serve tourism with a balance of commercial and public amenities. Commercial development includes hotels, restaurants, shopping, marinas, and sport fishing. The current approximately 550-slip marina

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generates approximately 2,400 ADT. Implementation of the Proposed Project would not involve changes to the marina but would generate an additional 1,225 ADT.

The Lindbergh Field/Harbor Island Precise Plan identifies East Harbor Island for development of a 500-room complex that would include a restaurant, cocktail lounge, meeting and office space, recreational facilities, and ancillary uses. The Project is consistent with the Precise Plan in its proposal to develop a 175-room hotel, which would result in fewer vehicle trips than identified for East Harbor Island in the Precise Plan. Considering the Proposed Project would not involve a change to the type of land use or number of vehicle trips anticipated by the Precise Plan it would be consistent with the goals of the RAQS and SIP, which are documents based on existing approved land use plans. Therefore, impacts would be less than significant.

Ambient Air Quality Standards

Construction Impacts

Construction of the proposed project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the project site. In addition, fugitive dust emissions would result from demolition and construction activities. Mobile-source emissions, primarily NO_X, would result from the use of construction equipment. During the finishing phase, paving operations and the application of architectural coatings (i.e., paints) and other building materials would release ROGs from off-gassing.

Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust, the prevailing weather conditions. The assessment of construction air quality impacts considers each of these potential sources. Fugitive PM10 and PM2.5 emissions estimates take into account compliance with Rule 55 requirements for fugitive dust suppression, which require that no visible dust be present beyond the site boundaries. Site grading would require 10,000 cubic feet of fill material to be transported off site, and fugitive dust emissions associated with the site grading was estimated by assuming that a maximum of 25% of the total acreage would be disturbed on a single day for each project alternative and each phase. A copy of Rule 55 and the URBEMIS 2007 output sheets that detail the equipment mix and duration for each construction stage are provided in Appendix 1 of this report.

It was assumed that construction activities would include demolishing an existing structure, removing an existing parking lot, site grading, trenching, building construction, and asphalt paving, over an approximately 18-month period. It was assumed that roadway realignment would occur simultaneously with hotel construction over a 90-day period. It is assumed that demolition, roadway improvements, utility improvements, hotel grading, paving, and a portion of hotel construction would be conducted in 2011. Only hotel construction and architectural coatings would occur during 2012. It was assumed that there would

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be some overlap in terms of construction phasing (i.e. hotel construction occurring simultaneously with roadway realignment). This allows for a conservative estimate of construction emissions, as construction emissions represent a worst-case scenario.

Table 9. Construction Emission Estimates (pounds per day)

		Maximum Daily Emissions (pounds)						
2011	Duration	ROG	NO_X	CO	SO_2	PM10	PM2.5	CO_2
Building Construction	**12 months**							
Demolition	2 weeks	1.46	12.07	7.4	0.01	5.95	1.77	1550
Grading / Excavation	10 weeks	3.49	31.5	16.01	0.01	20.04	5.26	3583
Paving for hotel	3 months	2.71	15.79	11.23	0.00	1.37	1.25	1560
Hotel Construction	8 months	1.11	8.51	4.68	0.00	0.54	0.50	893
maximum		*7.27*	*53.14*	*38.52*	*0.01*	*20.04*	*5.26*	*6129*
2012								
Building Construction	**6 months**							
Hotel Construction	3 months	1.11	8.51	4.68	0.00	0.54	0.50	893
Architectural Coatings	3 months	26.01	0.00	0.28	0.00	0.00	0.00	38
maximum		*26.02*	*8.89*	*10.15*	*0.01*	*0.57*	*0.50*	*1744*
SDAPCD Significant Thresholds (lbs/day)		75	250	550	250	100	55	--
Significant?		No	No	No	No	No	No	--

As shown in Table 9, all criteria pollutant emissions would be below their respective thresholds. As a result, the construction activities would be considered a less than significant impact on air quality. Nevertheless, SDAPCD requires project construction to implement strategies for controlling fugitive dust emissions.

The total amount of construction, the duration of construction, and the intensity of construction activity could have a substantial effect upon the amount of construction emissions, the concentrations, and the resulting impacts occurring at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions are anticipated to be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner burning construction equipment fleet mix, and/or (2) a less intensive build out schedule (i.e., fewer daily emissions occurring over a longer time interval).

Toxic Air Contaminants

The greatest potential for TAC emissions would be related to diesel particulate emissions associated with heavy equipment operations during site grading

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activities. The SDAPCD does not consider diesel-related cancer risks from construction equipment to be an issue due to the short-term nature of construction activities. Construction activities associated with the proposed project would be sporadic, transitory, and short term in nature (approximately 18 months). The assessment of cancer risk is typically based on a 70-year exposure period. Because exposure to diesel exhaust would be well below the 70-year exposure period, construction of the proposed project is not anticipated to result in an elevated cancer risk to exposed persons due to the short-term nature of construction. As such, project-related toxic emission impacts during construction would not be significant.

The SDAPCD Rule will become effective December 24, 2009. Rule 55 requires dust control for construction and demolition projects. While Rule 55 does not require specific dust control methods, a list of best available control measures (BACMs) is identified in SCAQMD's Fugitive Dust Rule 403 that could be implemented as part of construction activities. While impacts are considered less than significant, the Project Applicant regardless is required to employ dust suppression to reduce the amount of fugitive dust generated from construction of the proposed project. It is assumed that the Project construction plan is projected to include standard dust control measures to reduce generation of fugitive dust during construction. The text of Rule 55 and the BACMs from SCAQMD's Fugitive Dust Rule 403 are included in Appendices 5 and 6 of this report, respectively.

Operational Impacts

Criteria Pollutants

The operational impacts resulting from the proposed project would be mainly associated with vehicular traffic. Operational emissions were estimated using the URBEMIS2007 model, based on the land use development for the proposed project for opening year 2012. Emissions associated with landscaping and natural gas energy use were also included in the area source emission estimates.

The proposed project would produce long term emissions from vehicle trips generated by the new hotel. The trip generation rates for the Proposed Project were based on the trip rate presented in the traffic report (LLG 2009). To estimate area and vehicular emissions associated with proposed project operations, the URBEMIS2007 model was used. Operational emissions were modeled for maximum daily emissions for opening year 2012. The URBEMIS2007 model outputs are presented in Appendix 1 of this report. Emissions associated with landscaping and energy use were also included in the area source emission estimates. Table 10 presents the total operational emissions anticipated from the project opening year 2012.

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Table 10. Estimate of Operational Emissions for Project Build-out phase (pounds per day)

	Maximum Daily Emissions (pounds)						
	ROG	NO_X	CO	SO_X	PM10	PM2.5	CO_2
Summer							
Area Sources	0.72	1.38	2.69	0	0.01	0.01	1,635
Vehicular Sources	6.83	7.57	67.51	0.08	12.85	2.5	7,692
Total Emissions	*7.55*	*8.95*	*70.2*	*0.08*	*12.86*	*2.51*	*9,327.3*
Winter							
Area Sources	0.6	1.36	1.14	0	0	0	1,632
Vehicular Sources	7.22	9.09	66.12	0.07	12.85	2.5	6,966
Total Emissions	*7.82*	*10.45*	*67.26*	*0.07*	*12.85*	*2.5*	*8,598*
Significance Criteria	75	250	550	250	100	55	--
Significant?	No	No	No	No	No	No	N/A

As shown in Table 10, emissions of ROG, NO_X, CO, SO_X, PM10, and PM2.5 are below the significance thresholds for the proposed project operations. This air quality impact is considered less than significant. No mitigation measure is required.

Traffic-Related CO Concentrations (CO Hot Spot Analysis)

Project-generated vehicle trips would increase traffic volumes at roadway intersections in the project site vicinity once the project becomes operational. During periods of near-calm winds, heavily congested intersections can produce elevated levels of CO that could potentially impact nearby sensitive receptors. Therefore, a CO hot spot analysis was conducted to determine whether the Proposed Project would contribute to a violation of the ambient air quality standards for CO at any local intersections.

The Transportation Project-Level Carbon Monoxide Protocol (Garza et al. 1997) was followed to determine whether a CO hot spot is likely to form due to project-generated traffic. In accordance with the Protocol, CO hot spots are typically evaluated when (a) the level of service (LOS) of an intersection decreases to a LOS E or worse; (b) signalization and/or channelization is added to an intersection; and (c) sensitive receptors such as residences, commercial developments, schools, hospitals, etc. are located in the vicinity of the affected intersection. In general, CO hot spots would be anticipated near affected intersections because operation of vehicles in the vicinity of congested intersections involves vehicle stopping and idling for extended periods.

None of the intersections within the vicinity of the project would decrease to LOS E or F under near-term (2012) direct project conditions (LLG 2009). Therefore this impact is considered less than significant.

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However, three intersections within the vicinity of the project would decrease to LOS E or F under cumulative long-term (2030) project conditions. These three intersections are:

- North Harbor Drive and Laurel Street,
- North Harbor Drive and Rental Car Access Road, and
- North Harbor Drive and Terminal 1 (Harbor Island Drive).

For these intersections a CO hot spot analysis was conducted to determine whether the Proposed Project would contribute to a violation of the ambient air quality standards for CO at any local intersections.

The analysis presents a modeled estimate of baseline 2030 CO concentrations and the project's contribution to these concentrations, as received at the three intersections near the Project site that would accommodate Project traffic and represent the worst-case intersections with the longest peak hour delay. Estimates are given for the one-hour and the eight-hour CO concentrations, considering peak-hour traffic levels reported by LLG, and compares CO levels to California standards (20 ppm for the 1-hour average and 9.0 ppm for the 8-hour average). Table 11 shows the 2030 estimates of the one- and eight-hour concentrations and compares the estimates to the relevant state standard.

Table 11. 2030 Cumulative Carbon Monoxide Concentrations

Intersection	Peak Period[1]	Maximum 1-Hour 2030 w/o Project[2] Concentration (20 ppm)[3]	Maximum 1-Hour 2030 w/ Project[2] Concentration (20 ppm)[3]	Significant 1-Hour Impact?	Maximum 8-Hour 2030 w/o Project[4] Concentration (9 ppm)[3]	Maximum 8-Hour 2030 w/ Project[4] Concentration (9 ppm)[3]	Significant 8-Hour Impact?
Laurel St & N. Harbor Dr	AM	11.4	11.4	No	5.6	5.6	No
	PM	11.2	11.2	No	5.46	5.46	No
Rental Car Access & N Harbor Dr	AM	11.8	11.8	No	5.88	5.88	No
	PM	11.5	11.5	No	5.67	5.67	No
Terminal 1/ Harbor Island & N Harbor Dr	AM	11.1	11.1	No	5.39	5.39	No
	PM	11.4	11.4	No	5.6	5.6	No

Notes:

ppm = parts per million

[1] Peak hour traffic volumes are based on the Traffic Impact Analysis prepared for the Project by LLG 2009.

[2] Highest 3 years SDAPCD 1-hour ambient background concentration (10.8 ppm) + 2030 without Project traffic CO 1-hour contribution.

[3] The state standard for the 1-hour average CO concentration is 20 ppm, and the 8-hour average concentration is 9.0 ppm.

[4] Highest 3years SDAPCD 8-hour ambient background concentration (5.18 ppm) + 2030 without Project traffic CO 8-hour contribution.

Source: EMFAC2007 emission factors and CALINE4 dispersion model output sheets are provided in the Appendix to the report.

As shown in Table 11, estimated cumulative conditions with and without the Project contributions to CO levels from vehicle traffic are below the state

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standards. Therefore, there is no significant cumulative impact, and the project's contribution is not cumulatively considerable.

Expose Sensitive Receptors

The closest sensitive receptors are the Spanish Landing Park located approximately 0.5 mile northwest of the Project site; the park located on the south side of West Harbor Island approximately 1 mile west of the Project site; and residences along Laurel Street, Hawthorne Street, and Grape Street, approximately 1 mile to the east of the Project site.

Construction

Construction activities are sporadic, transitory, and short-term in nature, and once construction activities have ceased, so too have emissions from construction activities. It is estimated that construction activities for the Project would occur over approximately 18 months; however, most of the diesel emissions would occur during site grading and road construction, which would take approximately 3 months. Because the duration of exposure to diesel exhaust during the temporary construction activity would be much shorter than the assumed 70-year exposure period used to estimate lifetime cancer risks, construction of the Proposed Project is not anticipated to result in an elevated health risk to exposed persons due to the short-term nature of construction-related diesel exposure. In addition, air pollution exposure is greatly reduced with distance. Therefore, the distance from the Project site to these sensitive receptor locations is assumed to be enough to greatly reduce pollution concentrations. The Project may create a nuisance for nearby visitors during hours of construction, but this impact is considered minimal. Consequently, the human health impact of diesel risks associated with construction activities is considered to be less than significant.

Operations

Emissions from Project-related vehicles are relatively low and well below the SDAPCD's daily thresholds for all criteria pollutants. There are three carcinogenic TACs that constitute the majority of the known health risk from motor vehicle traffic, that is, DPM from trucks, and benzene and 1,3-butadiene from passenger vehicles. These TACs are a subset of the criteria ROG and PM2.5 emissions. However, as stated in Table 10 ROG and PM2.5 emissions from Project-related vehicles are below the SDAPCD's daily thresholds. The CARB and SDAPCD recommend that health risk assessments be conducted for substantial sources of diesel particulates (e.g., truck stops and warehouse distribution facilities) and have provided guidance for analyzing mobile source diesel emissions. In addition, typical sources of acutely and chronically hazardous TACs include industrial manufacturing processes, automotive repair facilities, and dry cleaning facilities. Considering the Proposed Project would not involve such uses, the Project does not warrant a health risk assessment. Potential Project-generated air toxic impacts on surrounding land uses would therefore be less than significant.

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In addition, as indicated in the CO hotspot analysis above, the Project-related contribution to CO concentrations at local intersections would be less than significant. Therefore, sensitive receptors would not be subject to significant health risks from exposure to emissions associated with Project operations.

Objectionable Odors

While offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and air districts. Any project with the potential to frequently expose the public to objectionable odors would be deemed as one having a significant impact. Odor impacts on residential areas and other sensitive receptors, such as hospitals, daycare centers, schools, etc., warrant the closest scrutiny; but consideration should also be given to other land uses where people may congregate, such as recreational facilities, work sites, and commercial areas.

Construction

The Project would generate temporary, localized odors during construction phases, similar to any other construction project. However, odor impacts would be temporary and limited to the area adjacent to the construction site. Therefore, impacts would be less than significant.

Operation

Operation of the Proposed Project would create motor vehicle trips that would generate tailpipe emissions. However, odor impacts would be limited to the circulation routes and parking areas. Such brief exhaust odors are an adverse, but not significant, air quality impact. Therefore, odor impacts would be less than significant.

Cumulative Impacts

Climate Change/Greenhouse Gas Emissions

CEQA and the State CEQA Guidelines require the disclosure of the significant cumulative environmental effects, whether the project will make a cumulatively considerable contribution to any such effects, and, if so, mitigation measures intended to reduce the project's contribution (Section 15130 of the State CEQA Guidelines). A cumulative effect is one that results from past, present, and probable future projects. A project that has a less-than-significant direct effect on the environment may nonetheless make a considerable contribution to a cumulative effect. The decision in *Communities for a Better Environment, et al v. California Resources Agency* (2002) 103 Cal.App.4th 98 put the approach to evaluating a project's contribution to a cumulative impact succinctly: "In the end, the greater the existing environmental problems are, the lower the threshold

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should be for treating a project's contribution to cumulative impacts as significant."

AB 32 states, in part, that "Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." Because global warming is the result of GHG emissions, and GHGs are emitted by innumerable sources worldwide, global climate change is clearly a significant cumulative impact. However, the global increase in GHG emissions that has occurred and will occur in the future are the result of the actions and choices of individuals, businesses, local governments, states, and nations. Thus, the analysis below should be understood as an analysis of cumulative contributions to a significant global impact, as the impact to climate change.

The Governor's Office of Planning and Research (OPR) is developing, and the California Resources Agency (Resources Agency) will certify and adopt amendments to the CEQA Guidelines on or before January 1, 2010, pursuant to Senate Bill 97. These new CEQA Guidelines will provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents.

The OPR CEQA guidance regarding GHGs, as discussed above, is currently in draft form. In April 2009, OPR submitted its proposed amendments to the state CEQA guidelines for greenhouse gas emissions to the Secretary of Natural Resources as required. In July 2009, the Natural Resource Agency began the official rulemaking process for certifying and adopting amendments to the CEQA Guidelines. The public comment period will close on November 10, 2009 and adoption of the amendments is expected in early 2010. Significant changes to the draft CEQA Guidelines as they are referenced here is not anticipated.

In the interim, OPR has released a technical advisory, entitled *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review* (OPR 2008). OPR offers informal guidance regarding the steps lead agencies should take to address climate change in their CEQA documents. This guidance was developed in cooperation with the Resources Agency, the California Environmental Protection Agency (Cal/EPA), and the CARB. The technical advisory provides the following guidance regarding significance determination:

> When assessing a project's GHG emissions, lead agencies must describe the existing environmental conditions or setting, without the project, which normally constitutes the baseline physical conditions for determining whether a project's impacts are significant.
>
> As with any environmental impact, lead agencies must determine what constitutes a significant impact. In the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a "significant impact," individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice.
>
> The potential effects of a project may be individually limited but cumulatively considerable. Lead agencies should not dismiss a proposed project's direct and/or indirect climate change impacts without careful consideration, supported

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> by substantial evidence. Documentation of available information and analysis should be provided for any project that may significantly contribute new GHG emissions, either individually or cumulatively, directly or indirectly (e.g., transportation impacts).
>
> Although climate change is ultimately a cumulative impact, not every individual project that emits GHGs must necessarily be found to contribute to a significant cumulative impact on the environment. CEQA authorizes reliance on previously approved plans and mitigation programs that have adequately analyzed and mitigated GHG emissions to a less than significant level as a means to avoid or substantially reduce the cumulative impact of a project.

CEQA currently has no thresholds for GHG emissions. As described by the OPR technical advisory, in absence of regulatory guidance or standards, lead agencies must undertake a project-by-project analysis, consistent with available guidance and current CEQA practice.

In January 2009, OPR developed a preliminary draft regulatory guidance with respect to the analysis and mitigation of the potential effects of greenhouse gas emission. OPR held two workshops to present the amendments and obtain comments from the public. OPR is currently in the process of submitting its proposal to the California Resources Agency (OPR 2009).

Scientific studies (as best represented by the IPCC's periodic reports) demonstrate that climate change is already occurring due to past GHG emissions. Forecasting of future growth and related GHG emissions under business as usual (BAU) conditions indicates large increases in those GHG emissions accompanied by an increasing severity of changes in global climate. Thus, the best scientific evidence concludes that global emissions must be reduced below current levels.

On a state level, AB 32 identified that an acceptable level of GHG emissions in California in 2020 is 427 million metric tons of CO_2e, which is the same as 1990 GHG emissions level, is about 12% less than current (480 million metric tons CO_2e in 2004) GHG emissions, and is about 28% less than 2020 BAU conditions (596 million metric tons CO_2e).

On the countywide level, an acceptable level of GHG emissions in San Diego County in 2020 is 29 million metric tons of CO_2e, which is the same as 1990 GHG emissions level, is about 18% less than current (34 million metric tons CO_2e in 2006) GHG emissions, and is about 33% less than 2020 BAU conditions (43 million metric tons CO_2e) (Anders et al. 2008). Thus, on a countywide level, if San Diego County can achieve these reductions, San Diego County as a whole will not contribute considerably to global GHG emissions. San Diego County's emissions in 2020 will still make a cumulative contribution to global GHG emissions, but relative to current baseline emissions will be substantively reduced.

In order to achieve these GHG reductions, there will have to be widespread reductions of GHG emissions across the California economy, including in the Port of San Diego. Some of those reductions will need to come from the existing economy in the form of changes in vehicle emissions and mileage, changes in the

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sources of electricity, and increases in energy efficiency by existing facilities as well as other measures. The remainder of the necessary GHG reductions will need to come from requiring new facility development to have lower carbon intensity than BAU conditions. The Port can substantially influence the GHG emissions from new hotel development.

In terms of determining whether GHG emissions within the Port will be cumulatively considerable, one has to evaluate whether the Port is doing its part to ensure that San Diego County and California, as a whole, meets the AB 32 target.

Given the overwhelming scope of global climate change, it is not anticipated that a single development project would have an individually discernable effect on global climate change (i.e., that any increase in global temperature or sea level could be attributed to the emissions resulting from a single project). Rather, it is more appropriate to conclude the substantial Proposed Project GHG emissions will combine with emissions across California, the U.S., and the globe to cumulatively contribute to global climate change. This amounts to a significant cumulative air quality impact. The Project's GHG emissions would be cumulatively considerable if:

- the proposed project would conflict with or obstruct the goals or strategies of the California Global Warming Solutions Act of 2006 (AB 32) or related Executive Orders; or
- the proposed project would result in substantially increased exposure to the potential adverse effects of global warming identified in the California Global Warming Solutions Act of 2006.

The proposed project's impact on GHG emissions during construction and operations is presented below. As described below, the relative amounts of construction and operational GHG emissions associated with this project are negligible. The proposed project's amount of emissions, without considering other cumulative global emissions, would be insufficient to cause substantial climate change directly. Thus, project emissions, in isolation, are considered less than significant. However, climate change is a global cumulative impact, and the proper context for analysis of this issue is not a project's emissions in isolation, but rather as a contribution to cumulative GHG emissions.

Emissions of GHGs are anticipated to occur with the proposed project, largely due to vehicle trips and energy consumption. Vehicle trips do represent a source of GHG emissions. As discussed previously, increased emissions of GHGs would contribute to global warming and the adverse global environmental effects thereof. Increased GHG emissions could also potentially conflict with the requirement of AB32 to reduce statewide GHG emissions to 1990 levels by 2020. Vehicular GHG emissions result from CO_2, CH_4, and N_2O that is released during the combustion of gasoline or diesel fuel in the vehicles. GHG emissions from stationary and area sources result mainly from the burning of natural gas.

Emission reduction measures targeting sources of GHG emissions called for in AB32 will likely be adopted in the near future, although no measures have yet

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been adopted, and it is unknown at this time if these measures will apply to the proposed project. In addition, the California Air Resources Board has not yet developed the "de minimis" criteria establishing the level of GHG emissions that would not be subject to the emission reduction measures.

Given the overwhelming scope of global climate change, it is not anticipated that a single development project would have an individually discernable effect on global climate change, i.e., that any increase in global temperature or sea level could be attributed to the emissions resulting from a single project. Rather, it is more appropriate to conclude the proposed project greenhouse gas emissions will combine with emissions across California, the U.S., and the globe to cumulatively contribute to global climate change.

Transportation is the largest contributor of GHG's in California, contributing 38 percent of the state's GHG emissions. Electricity and commercial/residential energy use contribute 23 and nine percent of the state's GHG emissions, respectively. Within San Diego County, mobile sources, including motor vehicles, boats, and construction equipment, account for more than three-quarters of total emissions, Industry and consumer end uses each emit nine percent. Electricity production within San Diego County is a mix of mainly natural gas fired power plants, along with nuclear and renewable energy.

Reducing the GHG emissions from the transportation sector will require increases in fuel efficiency and emission standards for light, medium, and heavy duty vehicles, the use of low-carbon fuels, and implementation of high speed rails and other mass transit options, among others. Also, implementing land use measures that reduce motor vehicle trips and mileage will help reduce GHG emissions. Reducing GHG emissions from residential and commercial use will require efforts such as increased energy efficiency, increases in conservation, and increased use of renewables, such as the Million Solar Roofs campaign, among others.

Construction

Proposed project construction would result in a total of approximately 422 metric tons of CO_2 during construction the 18 month construction period. This amount represents approximately 0.00009% of the annual statewide GHG emissions and approximately 0.0012% of annual San Diego County-wide GHG emissions.

Existing CARB regulations (Title 13 of the California Code of Regulations, Sections 2480 and 2485), which limit idling of diesel-fueled commercial motor vehicles, would help to limit GHG emissions associated with project-related construction vehicles. In addition, CARB's proposed Early Action Measures (pursuant to the California Global Warming Solutions Act of 2006) include other emission reduction measures for diesel trucks and diesel off-road equipment. CARB will review and adopt Early Action Measures by January 1, 2010, and equipment used for construction of the project after 2010 could be subject to these requirements. Once such measures go into effect, construction contractors would be subject to these requirements. Nevertheless, project-specific measures to further reduce GHG emissions during construction are prescribed below.

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Operations

Both the existing conditions (BAU) and the Proposed Project would result in GHG emissions due to motor vehicle trips as well as natural gas and electricity consumption. Existing land uses consume an estimated 1,000 kilowatt-hours (kWh) of electricity per month and 30–60 therms per day, and also attract 150 customers/visitors (an estimated 300 vehicle trips) per day.

Table 12 presents the GHG emissions associated with the Project's onsite operations for both the BAU and Proposed Project. GHG emissions of CO_2, CH_4, N_2O, and CO_2e are presented for the year 2012: the expected Project opening year. As shown in Table 12, existing conditions generate an estimated 1,083 metric tons of CO_2e per year. The majority of these emissions (89%) are from motor vehicle trips to the existing facilities, while stationary (6%) and area sources (5%) comprise the remainder. Existing land uses consume an estimated 12 megawatt-hours (MWh) of electricity and 10,958 therms of natural gas annually. The Proposed Project would generate approximately 3,549 metric tons of CO_2e per year. The majority of project-related GHG emissions would be from mobile sources (66%). The Proposed Project would consume approximately 1,308 MWh of electricity and 131,490 therms of natural gas per year, resulting in approximately 1,131 metric tons of CO_2e per year from stationary sources. The remaining 9% of GHG emissions would be from area sources.

Table 12. Estimate of On-Site Operational Greenhouse Gas Emissions

	Pounds per day				Metric Tons per year			
	CO_2	CH_4	N_2O	CO_2e[1]	CO_2	CH_4	N_2O	CO_2e[1]
Existing Conditions (BAU)								
Mobile Source[2]	5,598	0.56	0.67	5,817	927	0.09	0.11	963
Area Source[3]	350	--	--	350	58	--	--	58
Stationary Source	375	0.03	0.0009	376	62	0.01	< 0.01	62
Total	6,323	0.60	0.67	6,544	1,047	0.10	0.11	1,083
Proposed Project (175-room Hotel)								
Mobile Source[2]	12,023	2.30	2.74	12,920	1,991	0.38	0.45	2,139
Area Source[3]	1,683	--	--	1,683	279	--	--	279
Stationary Source	6,808	0.51	0.04	6,831	1,127	0.08	0.01	1,131
Total	20,515	2.80	2.77	21,434	3,396	0.46	0.46	3,549

[1] Global Warming Potential is 21 for CH_4 and 310 for N_2O; General Reporting Protocol, California Climate Action Registry (CCAR 2009). Calculation: $CO_2e = (CO_2 \times 1) + (CH_4 \times 21) + (N_2O \times 310)$

[2] Mobile Source CO_2 emissions are for summer

[3] Area Source CO_2 emissions are for winter

Emissions calculation worksheets are provided in the Appendix of this report.

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The Proposed Project would result in a net increase of 2,465 metric tons of CO_2e per year from operational emissions (mobile, area, stationary sources) over BAU conditions. Because quantitative GHG guidelines, including thresholds, have not been developed by the SDAPCD, these emissions are provided for informational purposes only. According to a recent white paper by the Association of Environmental Professionals, "an individual project does not generate enough GHG emissions to significantly influence global climate change. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHG emissions" (AEP 2007). Therefore, there are no direct or non-cumulative GHG impacts from a climate change perspective (CAPCOA 2008).

Implementation of the Proposed Project would increase short-term GHG emissions as a result of Project construction and increase long-term GHG emission as a result of Project operations. However, because the Project would be consistent with the strategies published by the CAT, CAPCOA, and OPR Technical Advisory, the Proposed Project would not conflict with or obstruct the goals or strategies of AB 32 or related Executive Order nor would it substantially increase exposure to the potential adverse effects of global warming. Therefore, the cumulative contribution of the Project is less than significant.

In the absence of formally adopted quantitative emission thresholds, consistency with adopted programs and policies can be used to examine the significance of a project's impact. The California Climate Action Team (CAT, established by Executive Order S-3-05), has recommended strategies to reduce GHG emissions to meet the goals of AB 32. In addition, the California Air Pollution Control Officers Association (CAPCOA) report, "CEQA & Climate Change," includes numerous GHG-reducing measures (CAPCOA 2008). In June 2008, the California Office of Planning and Research (OPR) released a technical advisory, "CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review," which provides a recommended approach for conducting climate change analysis and includes examples of general GHG reduction measures that have been employed by public agencies. The OPR technical advisory also states that lead agencies must determine what constitutes a significant impact. The Proposed Project includes numerous GHG-reducing measures, including exceeding Title 24 standards by 15%, that are consistent with the strategies proposed by CAT, CAPCOA, and OPR that result in reduced GHG emissions with project construction and operation, as listed in Table 13.

While the OPR draft CEQA guidelines referenced above are used for reference, it is worth mentioning that the final OPR CEQA guidelines are expected to be released in early 2010. It is expected that the adopted guidelines will be similar to the draft guidelines referenced above.

In addition, the project GHG estimate does not include a number of emissions sources that are included in the state inventory. The state inventory captures emissions relevant to the project such as extraction/manufacturing of

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construction materials (sand, gravel, cement, timber), transport of fossil fuels for vehicle consumption, transport of goods made outside the Port, and transport and landfill emissions associated with waste disposal. Thus, the comparison above is not a full "apples to apples" comparison, but is still indicative of the overall GHG efficiency of the project compared to BAU development. Because global warming is the result of GHG emissions, and GHGs are emitted by innumerable sources worldwide, global climate change is clearly a significant cumulative issue. GHG emissions from the project could contribute to cumulative GHG emissions in California and to the potential adverse environmental impacts of climate change.

The Port of San Diego has initiated programs to limit air pollution and greenhouse gas emissions, including the Port's Clean Air Program and Sustainability Partnership with SDG&E. The Port's efforts will help to reduce GHG emissions below current levels.

Project Design Features

In the absence of formally adopted quantitative emission thresholds, a lead agency may choose to use consistency with adopted programs and policies to examine the significance of a project's impact. The CAT, established by Executive Order S-3-05, has recommended strategies to reduce GHG emissions to meet the goals of AB 32. In addition, the CAPCOA report, "CEQA & Climate Change," includes numerous GHG-reducing measures. In June 2008, OPR released a technical advisory, "CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review," which provides a recommended approach for conducting climate change analysis and includes examples of general GHG reduction measures that have been employed by public agencies. The Proposed Project includes numerous GHG-reducing measures, including exceeding Title 24, Part 6 standards by 15%, that are consistent with the strategies proposed by CAT, CAPCOA, and OPR that result in reduced GHG emissions with project construction and operation, as listed below in Table 13. The design features described in Table 13 would be incorporated as conditions of approval of the Proposed Project.

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Table 13. Proposed Project Design Features and GHG Reductions

Strategy and Design Feature	Reduction	Source
Construction		
Reuse or recycle at least 75% of construction materials (including soil, asphalt, concrete, metal, and lumber)	Tons of CO_2e saved per ton of recycled material: Steel (1.79 CO_2e ton saved) Wood (2.46) Asphalt (0.03) Concrete (0.02)	EPA 2008
Use 10% of building materials and products that are locally or regionally (or within 500 miles) extracted and manufactured, when available	Low GHG reduction[1]	CAPCOA 2008
Use alternative fuel types for 50% of construction equipment (e.g., biodiesel)	Biodiesel tailpipe emissions are 10% lower than petroleum but lifecycle emissions are 78% lower	EPA 2009a
Implement Green Building Initiatives, including low VOC emitting finishes, adhesives, and sealants	Low GHG reduction[1]	CAPCOA 2008
Building Sustainability		
Install efficient HVAC system with refrigerant with an Ozone Depletion Potential of zero	1.25% reduction	SMAQMD 2007
Install Energy Star, "cool," or light-colored roofing for at least 75% of the roof area, cool pavements, and shade trees	0.5–1% reduction for roofing for Energy Star—Cool Roofs stay 50–60°F cooler	SMAQMD 2007
Use dual pane low-E windows with a minimum of 0.30 solar heat gain coefficient	Energy Star–compliant light bulbs consume up to 450 lbs less CO_2 over lifetime than conventional bulbs	EPA 2009d
Install R-value optimized wall and roof installation	Too generic to specify reduction	N/A
Use better-than-code energy efficient lighting throughout building and site	Reducing indoor lighting energy consumption could reduce approximately 45% of electricity consumption	CEC 2006
Utilize filtered and controlled natural ventilation to reduce heating and air conditioning demand by 10%	Cooling and ventilation comprise almost 40% of electricity use in hotels	CEC 2006
Incorporate engineering design system measures—variable speed chillers, fans, and pumps; boiler and chiller controls; heat recovery; smart auto thermostats; and CO_2 sensors for meeting room	Too generic to specify reduction	N/A
Use only Energy Star appliances for all eligible equipment and fixtures	Energy Star appliances and fixtures use 10–15% and 75% less energy, respectively.	EPA 2009d
Use solar heating, automatic covers, and efficient pumps and motors for pools and spas	20–70% reduction in hot water energy needs	CAPCOA 2008

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Strategy and Design Feature	Reduction	Source
Install light emitting diodes (LEDs) for 50% of all outdoor lighting (except in parking lots, which would use T-5 lighting or equivalent)	Low GHG reduction[1]	CAPCOA 2008
Limit hours of outdoor lighting for 100% of the site lighting by using photocell controls	Low GHG reduction[1]	CAPCOA 2008
Utilize natural daylight for 75% of the regularly occupied spaces	Low GHG reduction[1]	CAPCOA 2008
Water Conservation and Efficiency		
Install or reuse drought-tolerant landscaping trees and incorporate vines on selected walls to reduce potable water demand for irrigation by at least 50%	Low GHG reduction[1]	CAPCOA 2008
Use low-flow plumbing features on all fixtures and appliances to reduce potable water use by at least 20%	20% reduction in water use will reduce daily water use by approximately 7,000 gallons per day and lower GHG emissions associated with water distribution and treatment	EPA 2009e
Install water-efficient irrigation systems and devices, including drip irrigation, soil moisture-based irrigation controls, and/or drought-tolerant landscaping to reduce potable water use for irrigation by at least 50%	Low GHG reduction[1]	CAPCOA 2008
Install only low-flow (0.125 gallons per flush) or waterless urinals	Will provide 87.5 to 100% water savings versus federal standards for urinals (1 gallon per flush)	EPA 2009e
Install only low-flow toilets (1.28 gallons per flush), faucets (1.0 gallons per minute), and showers (2.0 gallons per minute)	Low GHG reduction[1]	CAPCOA 2008
Install sensor-activated lavatory faucets (0.5 gallons per minute) in public restrooms	Low GHG reduction[1]	CAPCOA 2008
Install moisture sensors that suspend irrigation during unfavorable weather conditions (rain, wind)	Too generic to specify reduction	N/A
Educate patrons about water conservation using interior and exterior signage	Too generic to specify reduction	N/A
Solid Waste		
Provide interior and exterior storage areas for recyclables and green waste, and provide adequate recycling containers on site	Too generic to specify reduction	N/A
Provide education and publicity about recycling and reducing waste, using signage, and a presenting a case study	Too generic to specify reduction	N/A
Transportation		
Limit idling time for commercial vehicles, including deliveries and construction vehicles to 5	Reducing idling time to 5 minutes will reduce GHG emissions 75%	EMFAC2007

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Strategy and Design Feature	Reduction	Source
minutes	and save 145 lbs of CO_2 per delivery	
Install bicycle parking facilities	1–5% reduction	CAPCOA 2008
Provide a shuttle service between the hotel and the airport	Low GHG reduction[1]	CAPCOA 2008

[1] The scoring system in CAPCOA 2008 system entails ratings of high, moderate, and low that refer to the level of the measure to provide a substantive, reasonably certain (e.g., documented emission reductions with proven technologies), and long-term reduction of GHG emissions. Design Features designated as having a low GHG reduction potential are still assumed to have a net-benefit, albeit small, GHG reduction potential.

N/A = Not Applicable

Source: Sunroad 2009; CAPCOA 2008; EMFAC2007; EPA 2009c; SMAQMD 2007.

Implementation of the Proposed Project would increase short-term GHG emissions as a result of Project construction and increase long-term GHG emission as a result of Project operations. However, because the Project would be consistent with the strategies published by the CAT, CAPCOA, and OPR Technical Advisory, the Proposed Project would not conflict with or obstruct the goals or strategies of AB 32 or related Executive Order nor would it substantially increase exposure to the potential adverse effects of global warming. Therefore, the cumulative contribution of the Project is less than significant.

Criteria Pollutants

The SDAB is currently non-attainment for NAAQS ozone as well as for CAAQS ozone, PM10, and PM2.5. Therefore, the emissions of concern within the SDAB are ozone precursors (ROG and NO_X), PM10, and PM2.5.

The nearest cumulative project is the Reuben E. Lee Restaurant Replacement, located at the east end of Harbor Island, approximately 500 feet east of the Project site. While construction could overlap with construction of the Proposed Project, it is expected that site disturbance activities for the Reuben E. Lee Restaurant Replacement will be minimal and likely not require a significant number of truck trips. Therefore, the cumulative emissions would not be expected to exceed SDAPCD thresholds and the cumulative contribution would be less than significant. In addition, although dispersion and settling properties of PM2.5 are different than for PM10, it can be reasonably assumed that the distance between nearby cumulative projects and the Proposed Project would not result in a cumulative impact for PM2.5.

Other cumulative projects within proximity of the Proposed Project, including the 2701 North Harbor Demolition Project and the San Diego International Airport Master Plan projects, could occur simultaneously with the Proposed Project. However, every project, with the exception of the Reuben E. Lee Restaurant Replacement, identified in the cumulative project list (see Table 5-1 of the draft EIR) is over 2,500 feet away from the Proposed Project site. Based on screening methodology provided by the SCAQMD, projects at such a

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distance, in combination with the Proposed Project, would likely not contribute to a significant cumulative PM10 impact (SCAQMD 2006). Therefore, there is no significant impact for PM10 and PM2.5, and impacts are not cumulatively considerable.

In addition to particulates, construction and operation of the Proposed Project would result in ROG and NO_X emissions; however, these emissions would be below the significance thresholds. According to the County of San Diego significance threshold described above, a project which conforms to the applicable General Plan and does not have emissions exceeding the significance thresholds will not create a cumulatively considerable net increase with respect to ozone since these emissions were accounted for in the RAQS. As discussed above, the Proposed Project was deemed consistent with the RAQS and would not result in a direct impact to air quality. Therefore, there is no significant cumulative impact for ozone, and the project's contribution is not cumulatively considerable.

References

Anders, S., D. De Haan, N. Silva-Send, S. Tanaka, and L. Tyner. 2008. San Diego County Greenhouse Gas Inventory: An Inventory of Regional Emissions and Strategies to Achieve AB32 Targets. September 2008. Available: <http://www.sandiego.edu/epic/ghginventory>. Accessed: September 2008.

Association of Environmental Professionals (AEP). 2007. Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents. Final, Approved June 29, 2007. Available: < http://www.califaep.org/userdocuments/File/AEP_Global_Climate_Change_June_29_Final.pdf>. Accessed: July 2008.

Benson, Paul. 1989. CALINE4 – A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways. November.

California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA and Climate Change. Available: <http://www.capcoa.org/>. January.

California Air Resources Board (CARB). 1998. Scientific Review Panel Findings on the report: "Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant" as adopted at the Panel's April 22, 1998 meeting. Available: <http://www.arb.ca.gov/toxics/dieseltac/combined.pdf>.

———. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. October. Sacramento, CA.

———. 2006. EMFAC2007 model: Version 2.3. Available: <http://www.arb.ca.gov/msei/onroad/latest_version.htm>. November.

———. 2007. URBEMIS2007 model. Available: <http://www.aqmd.gov/CEQA/urbemis.html>.

———. 2008a. Ambient Air Quality Standards. Available: <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. November.

———. 2008b. Comparison of Greenhouse Gas Reductions for the United States and Canada Under ARB GHG Regulations and Proposed Federal 2011-2015 Model Year Fuel Economy Standards. Available: <http://www.arb.ca.gov/cc/ccms/ccms.htm>. May.

57791

359

———. 2008c. Climate Change Proposed Scoping Plan. Available: <http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm >. October.

———. 2008d. *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.0.* Developed in partnership by California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, The Climate Registry, September 2008. Available: <http://www.arb.ca.gov/cc/protocols/localgov/pubs/final_lgo_protocol_2008-09-25.pdf>. Accessed: October 2008.

———. 2009a. Summary of ARB Regulations on Diesel Activities. Available: <http://www.arb.ca.gov/diesel/mobile.htm>. Accessed: February 2009.

———. 2009b. Top 4 Measurements and Days Above the Standard. Available: <http:// http://www.arb.ca.gov/adam/welcome.html>. Accessed: February 2009.

———. 2009c. The California Almanac of Emissions and Air Quality, 2009 Edition. Available: <http://http://www.arb.ca.gov/Aqd/almanac/ almanac.htm>. March.

California Climate Action Registry (CCAR). 2009. General Reporting Protocol, Version 3.1. Reporting Entity-Wide Greenhouse Gas Emissions. January.

California Energy Commission (CEC). 2006. *Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004.* (CEC-600-2006-013-SF.) December. Available: <http://www.energy.ca.gov/2006publicastions/ CEC-600-2006-013/CEC-600-2006-013-SF.PDF>.

EMFAC. 2007. Version 2.3 for Windows. Software program for calculating air emissions from motor vehicles. California Air Resources Board. 2006. Sacramento, CA.

Garza, V. J., P. Graney, and D. Sperling. 1997. Transportation Project-Level Carbon Monoxide Protocol. Davis, CA. December.

Intergovernmental Panel on Climate Change. 2007a. *Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis (Working Group 1 Fourth Assessment Report.)* February. Available: http://www.ipcc.ch/ SPM2feb07.pdf. Accessed: January 4, 2008.

———. 2007b. In: *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning (eds.)].

57781
360

Linscott, Law and Greenspan (LLG). 2009. Traffic impact study & parking study: Harbor Island. Project no. 3-04-1437-3. San Diego, CA. January 16.

National Oceanic and Atmospheric Administration. 2005. *Greenhouse Gases: Frequently Asked Questions.* Available: http://lwf.ncdc.noaa.gov/oa/climate/gases.html. Accessed: September, 2009.

Office of Planning and Research (OPR). 2009. Proposes CEQA Guideline Amendments for Greenhouse Gas Emissions. Available: <http://www.opr.ca.gov/index.php?a=ceqa/index.html>. Accessed: June 2009.

———. 2008. CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review – Technical Advisory. Available: <http://opr.ca.gov/index.php?a=ceqa/index.html>. Accessed: January 2009.

Sacramento Metropolitan Air Quality Management District. 2007. Recommended Guidance for Land Use Emission Reductions. Version 2.4. August.

San Diego Air Pollution Control District (SDAPCD). 2008. Fact Sheet: Attainment Status. Available: <http://www.sdapcd.org/info/facts/attain.pdf>. Accessed: January 2009.

———. 2009a. Air Quality Planning. Available:<http://www.sdapcd.org/planning/plan.html>. Accessed: January 2009.

———. 2009b. Rules & Regulations. Available: http://www.sdapcd.org/rules/rules/randr.html. Accessed: September 2009.

San Diego Unified Port District (Port District). 2009. Clean Air. Available: <http://www.portofsandiego.org/environment/clean-air.html>. Accessed: September 2009.

South Coast Air Quality Management District (SCAQMD). 1993. CEQA Air Quality Handbook.

———. 2006. SCAQMD Final Methodology to Calculate Particulate Matter (PM) 2.5 and PM205 Significance Thresholds. Available : <http://www.aqmd.gov/CEQA/handbook/PM2_5/PM2_5.html>. October.

Sunroad. 2009. Email regarding GHG reduction measures. July 22.

United States Environmental Protection Agency (EPA). 2009a. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007. Available: <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>. Accessed: September 2009.

57791

361

———. 2009b. Monitor Values Report. Available: www.epa.gov/air/data/monvals.html. Accessed: February 2009.

———. 2009c. Construction & Demolition Materials. Available:< http://www.epa.gov/epawaste/conserve/rrr/imr/cdm/>. Accessed September 2009.

———. 2009d. Energy Star. Available: <http://www.energystar.gov/>. Accessed: September 2009.

———. 2009e. Region 9 Water Program. Available: <http://www.epa.gov/region09/water/>. Accessed: September 2009.

Western Regional Climate Center (WRCC). 2009. Monthly Climate Summary for San Diego – Lindbergh Field. Available: <www.wrcc.dri.edu>. Accessed: February 2009.

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Appendix 1

URBEMIS 2007 Modeling Output Sheets

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

ile Name: G:\Sacramento\LGT-Air&Noise\Air\Sunroad Harbor Island EIR 00977.08 (SDAPCD) (Hotel)\Urbemis\sunroad.urb924

'roject Name: Sunroad Hotel

'roject Location: South Coast AQMD

)n-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

)ff-Road Vehicle Emissions Based on: OFFROAD2007

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'age: 2

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ummary Report:

ONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
)11 TOTALS (lbs/day unmitigated)	7.27	53.14	38.52	0.01	18.55	3.19	20.04	3.88	2.93	5.26	6,129.22
)12 TOTALS (lbs/day unmitigated)	26.02	8.89	10.15	0.01	0.04	0.53	0.57	0.01	0.49	0.50	1,743.98

REA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	0.72	1.38	2.69	0.00	0.01	0.01	1,634.81

PERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	6.83	7.57	67.51	0.08	12.85	2.50	7,692.49

UM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	7.55	8.95	70.20	0.08	12.86	2.51	9,327.30

onstruction Unmitigated Detail Report:

ONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

ime Slice 1/3/2011-1/14/2011 ctive Days: 10	1.46	12.07	7.40	0.01	5.20	0.74	5.95	1.09	0.68	1.77	1,549.91
Demolition 01/03/2011-01/14/2011	1.46	12.07	7.40	0.01	5.20	0.74	5.95	1.09	0.68	1.77	1,549.91
Fugitive Dust	0.00	0.00	0.00	0.00	5.17	0.00	5.17	1.08	0.00	1.08	0.00
Demo Off Road Diesel	1.05	7.22	4.58	0.00	0.00	0.55	0.55	0.00	0.50	0.50	700.30
Demo On Road Diesel	0.38	4.80	1.84	0.01	0.02	0.19	0.22	0.01	0.18	0.19	725.24
Demo Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.37
ime Slice 1/17/2011-3/4/2011 ctive Days: 35	3.49	31.50	16.01	**0.01**	**18.55**	1.50	**20.04**	**3.88**	1.38	**5.26**	3,582.66
Mass Grading 01/17/2011-03/04/2011	3.49	31.50	16.01	0.01	18.55	1.50	20.04	3.88	1.38	5.26	3,582.66
Mass Grading Dust	0.00	0.00	0.00	0.00	18.50	0.00	18.50	3.86	0.00	3.86	0.00
Mass Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,247.32
Mass Grading On Road Diesel	0.63	8.01	3.08	0.01	0.04	0.32	0.36	0.01	0.30	0.31	1,210.97
Mass Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.37
ime Slice 3/7/2011-3/18/2011 ctive Days: 10	2.71	15.79	11.23	0.00	0.01	1.35	1.37	0.01	1.24	1.25	1,599.89
Asphalt 03/07/2011-04/08/2011	2.71	15.79	11.23	0.00	0.01	1.35	1.37	0.01	1.24	1.25	1,599.89
Paving Off-Gas	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.48	15.15	9.07	0.00	0.00	1.33	1.33	0.00	1.22	1.22	1,272.04
Paving On Road Diesel	0.04	0.52	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	79.12
Paving Worker Trips	0.06	0.11	1.95	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.74

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ime Slice 3/21/2011-4/8/2011 ctive Days: 15	4.06	25.43	21.91	0.01	0.05	1.95	2.00	0.02	1.79	1.81	3,343.98
Asphalt 03/07/2011-04/08/2011	2.71	15.79	11.23	0.00	0.01	1.35	1.37	0.01	1.24	1.25	1,599.89
Paving Off-Gas	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.48	15.15	9.07	0.00	0.00	1.33	1.33	0.00	1.22	1.22	1,272.04
Paving On Road Diesel	0.04	0.52	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	79.12
Paving Worker Trips	0.06	0.11	1.95	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.74
Building 03/21/2011-03/23/2012	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.07	0.82	0.70	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.16	0.31	5.31	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.56
ime Slice 4/11/2011-7/8/2011 ctive Days: 65	7.27	**53.14**	**38.52**	0.01	0.05	**3.19**	3.24	0.02	**2.93**	2.95	**6,129.22**
Asphalt 04/09/2011-07/09/2011	5.92	43.50	27.84	0.00	0.02	2.60	2.61	0.01	2.39	2.39	4,385.13
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	5.79	43.21	25.34	0.00	0.00	2.58	2.58	0.00	2.37	2.37	4,051.62
Paving On Road Diesel	0.01	0.15	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.59
Paving Worker Trips	0.08	0.14	2.44	0.00	0.01	0.01	0.02	0.01	0.01	0.01	310.92
Building 03/21/2011-03/23/2012	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.07	0.82	0.70	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.16	0.31	5.31	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.56

ime Slice 7/11/2011-12/30/2011 ctive Days: 125	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building 03/21/2011-03/23/2012	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.07	0.82	0.70	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.16	0.31	5.31	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.56
ime Slice 1/2/2012-3/23/2012 ctive Days: 60	1.25	8.89	10.15	0.01	0.04	0.53	0.57	0.01	0.49	0.50	1,743.98
Building 03/21/2011-03/23/2012	1.25	8.89	10.15	0.01	0.04	0.53	0.57	0.01	0.49	0.50	1,743.98
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.07	0.74	0.65	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.15	0.28	4.94	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.44
ime Slice 3/26/2012-6/29/2012 ctive Days: 70	26.02	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.75
Coating 03/26/2012-06/29/2012	26.02	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.75
Architectural Coating	26.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.75

Phase Assumptions

hase: Demolition 1/3/2011 - 1/14/2011 - Demolition of locker facility and parking lot

uilding Volume Total (cubic feet): 123200

uilding Volume Daily (cubic feet): 12320

n Road Truck Travel (VMT): 171.11

ff-Road Equipment:

Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

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hase: Mass Grading 1/17/2011 - 3/4/2011 - Grubbing and grading

otal Acres Disturbed: 2.69

laximum Daily Acreage Disturbed: 0.67

ugitive Dust Level of Detail: Low

nsite Cut/Fill: 100 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

n Road Truck Travel (VMT): 285.71

ff-Road Equipment:

Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

hase: Paving 3/7/2011 - 4/8/2011 - Paving for Hotel Site

cres to be Paved: 1.3

ff-Road Equipment:

Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

hase: Paving 4/9/2011 - 7/9/2011 - Paving East Harbor Island Drive road realignment

cres to be Paved: 0.98

ff-Road Equipment:

Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day
Signal Boards (15 hp) operating at a 0.78 load factor for 8 hours per day
Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

hase: Building Construction 3/21/2011 - 3/23/2012 - Hotel Construction
ff-Road Equipment:
Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

hase: Architectural Coating 3/26/2012 - 6/29/2012 - Architectural Coating for Hotel
ule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
ule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
ule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
ule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
ule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
ule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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rea Source Unmitigated Detail Report:

REA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
atural Gas	0.10	1.36	1.14	0.00	0.00	0.00	1,632.00
earth - No Summer Emissions							
andscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
onsumer Products	0.00						
rchitectural Coatings	0.50						
OTALS (lbs/day, unmitigated)	0.72	1.38	2.69	0.00	0.01	0.01	1,634.81

Area Source Changes to Defaults

perational Unmitigated Detail Report:

PERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
otel	6.83	7.57	67.51	0.08	12.85	2.50	7,692.49
OTALS (lbs/day, unmitigated)	6.83	7.57	67.51	0.08	12.85	2.50	7,692.49

perational Settings:

ıcludes correction for passby trips

oes not include double counting adjustment for internal trips

nalysis Year: 2012 Temperature (F): 80 Season: Summer

mfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

and Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
otel		7.00	rooms	170.00	1,190.00	7,436.02
					1,190.00	7,436.02

Vehicle Fleet Mix

ehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
ght Auto	51.5	0.6	99.2	0.2
ght Truck < 3750 lbs	7.3	1.4	95.9	2.7
ght Truck 3751-5750 lbs	23.0	0.4	99.6	0.0
led Truck 5751-8500 lbs	10.7	0.9	99.1	0.0
te-Heavy Truck 8501-10,000 lbs	1.6	0.0	81.2	18.8
te-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
led-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
eavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
ther Bus	0.1	0.0	0.0	100.0
rban Bus	0.1	0.0	0.0	100.0
lotorcycle	2.8	60.7	39.3	0.0
chool Bus	0.1	0.0	0.0	100.0
lotor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
rban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
ural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
rip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
, of Trips - Residential	32.9	18.0	49.1			
, of Trips - Commercial (by land use)						
otel				5.0	2.5	92.5

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Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

ile Name: G:\Sacramento\LGT-Air&Noise\Air\Sunroad Harbor Island EIR 00977.08 (SDAPCD) (Hotel)\Urbemis\sunroad.urb924

'roject Name: Sunroad Hotel

'roject Location: South Coast AQMD

)n-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

)ff-Road Vehicle Emissions Based on: OFFROAD2007

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ummary Report:

ONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
)11 TOTALS (lbs/day unmitigated)	7.27	53.14	38.52	0.01	18.55	3.19	20.04	3.88	2.93	5.26	6,129.22
)12 TOTALS (lbs/day unmitigated)	26.02	8.89	10.15	0.01	0.04	0.53	0.57	0.01	0.49	0.50	1,743.98

REA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	0.60	1.36	1.14	0.00	0.00	0.00	1,632.00

·PERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	7.22	9.09	66.12	0.07	12.85	2.50	6,966.00

UM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	7.82	10.45	67.26	0.07	12.85	2.50	8,598.00

onstruction Unmitigated Detail Report:

ONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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ime Slice 1/3/2011-1/14/2011 ctive Days: 10	1.46	12.07	7.40	0.01	5.20	0.74	5.95	1.09	0.68	1.77	1,549.91
Demolition 01/03/2011-01/14/2011	1.46	12.07	7.40	0.01	5.20	0.74	5.95	1.09	0.68	1.77	1,549.91
Fugitive Dust	0.00	0.00	0.00	0.00	5.17	0.00	5.17	1.08	0.00	1.08	0.00
Demo Off Road Diesel	1.05	7.22	4.58	0.00	0.00	0.55	0.55	0.00	0.50	0.50	700.30
Demo On Road Diesel	0.38	4.80	1.84	0.01	0.02	0.19	0.22	0.01	0.18	0.19	725.24
Demo Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.37
ime Slice 1/17/2011-3/4/2011 ctive Days: 35	3.49	31.50	16.01	**0.01**	**18.55**	1.50	**20.04**	**3.88**	1.38	**5.26**	3,582.66
Mass Grading 01/17/2011-03/04/2011	3.49	31.50	16.01	0.01	18.55	1.50	20.04	3.88	1.38	5.26	3,582.66
Mass Grading Dust	0.00	0.00	0.00	0.00	18.50	0.00	18.50	3.86	0.00	3.86	0.00
Mass Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,247.32
Mass Grading On Road Diesel	0.63	8.01	3.08	0.01	0.04	0.32	0.36	0.01	0.30	0.31	1,210.97
Mass Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.37
ime Slice 3/7/2011-3/18/2011 ctive Days: 10	2.71	15.79	11.23	0.00	0.01	1.35	1.37	0.01	1.24	1.25	1,599.89
Asphalt 03/07/2011-04/08/2011	2.71	15.79	11.23	0.00	0.01	1.35	1.37	0.01	1.24	1.25	1,599.89
Paving Off-Gas	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.48	15.15	9.07	0.00	0.00	1.33	1.33	0.00	1.22	1.22	1,272.04
Paving On Road Diesel	0.04	0.52	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	79.12
Paving Worker Trips	0.06	0.11	1.95	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.74

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ime Slice 3/21/2011-4/8/2011 ctive Days: 15	4.06	25.43	21.91	0.01	0.05	1.95	2.00	0.02	1.79	1.81	3,343.98
Asphalt 03/07/2011-04/08/2011	2.71	15.79	11.23	0.00	0.01	1.35	1.37	0.01	1.24	1.25	1,599.89
Paving Off-Gas	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.48	15.15	9.07	0.00	0.00	1.33	1.33	0.00	1.22	1.22	1,272.04
Paving On Road Diesel	0.04	0.52	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	79.12
Paving Worker Trips	0.06	0.11	1.95	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.74
Building 03/21/2011-03/23/2012	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.07	0.82	0.70	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.16	0.31	5.31	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.56
ime Slice 4/11/2011-7/8/2011 ctive Days: 65	7.27	**53.14**	**38.52**	0.01	0.05	**3.19**	3.24	0.02	**2.93**	2.95	**6,129.22**
Asphalt 04/09/2011-07/09/2011	5.92	43.50	27.84	0.00	0.02	2.60	2.61	0.01	2.39	2.39	4,385.13
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	5.79	43.21	25.34	0.00	0.00	2.58	2.58	0.00	2.37	2.37	4,051.62
Paving On Road Diesel	0.01	0.15	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.59
Paving Worker Trips	0.08	0.14	2.44	0.00	0.01	0.01	0.02	0.01	0.01	0.01	310.92
Building 03/21/2011-03/23/2012	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.07	0.82	0.70	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.16	0.31	5.31	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.56

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ime Slice 7/11/2011-12/30/2011 ctive Days: 125	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building 03/21/2011-03/23/2012	1.35	9.64	10.68	0.01	0.04	0.60	0.63	0.01	0.55	0.56	1,744.09
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.07	0.82	0.70	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.16	0.31	5.31	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.56
ime Slice 1/2/2012-3/23/2012 ctive Days: 60	1.25	8.89	10.15	0.01	0.04	0.53	0.57	0.01	0.49	0.50	1,743.98
Building 03/21/2011-03/23/2012	1.25	8.89	10.15	0.01	0.04	0.53	0.57	0.01	0.49	0.50	1,743.98
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.07	0.74	0.65	0.00	0.01	0.03	0.04	0.00	0.03	0.03	174.15
Building Worker Trips	0.15	0.28	4.94	0.01	0.03	0.02	0.05	0.01	0.02	0.03	676.44
ime Slice 3/26/2012-6/29/2012 ctive Days: 70	26.02	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.75
Coating 03/26/2012-06/29/2012	26.02	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.75
Architectural Coating	26.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.75

Phase Assumptions

hase: Demolition 1/3/2011 - 1/14/2011 - Demolition of locker facility and parking lot

uilding Volume Total (cubic feet): 123200

uilding Volume Daily (cubic feet): 12320

n Road Truck Travel (VMT): 171.11

ff-Road Equipment:

Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

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hase: Mass Grading 1/17/2011 - 3/4/2011 - Grubbing and grading

otal Acres Disturbed: 2.69

laximum Daily Acreage Disturbed: 0.67

ugitive Dust Level of Detail: Low

nsite Cut/Fill: 100 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

n Road Truck Travel (VMT): 285.71

ff-Road Equipment:

Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

hase: Paving 3/7/2011 - 4/8/2011 - Paving for Hotel Site

cres to be Paved: 1.3

ff-Road Equipment:

Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

hase: Paving 4/9/2011 - 7/9/2011 - Paving East Harbor Island Drive road realignment

cres to be Paved: 0.98

ff-Road Equipment:

Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

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Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

Signal Boards (15 hp) operating at a 0.78 load factor for 8 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

hase: Building Construction 3/21/2011 - 3/23/2012 - Hotel Construction

ff-Road Equipment:

Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

hase: Architectural Coating 3/26/2012 - 6/29/2012 - Architectural Coating for Hotel

ule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

ule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

ule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

ule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

ule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

ule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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rea Source Unmitigated Detail Report:

REA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
atural Gas	0.10	1.36	1.14	0.00	0.00	0.00	1,632.00
earth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
andscaping - No Winter Emissions							
onsumer Products	0.00						
rchitectural Coatings	0.50						
OTALS (lbs/day, unmitigated)	0.60	1.36	1.14	0.00	0.00	0.00	1,632.00

Area Source Changes to Defaults

perational Unmitigated Detail Report:

PERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
otel	7.22	9.09	66.12	0.07	12.85	2.50	6,966.00
OTALS (lbs/day, unmitigated)	7.22	9.09	66.12	0.07	12.85	2.50	6,966.00

perational Settings:

ıcludes correction for passby trips

oes not include double counting adjustment for internal trips

nalysis Year: 2012 Temperature (F): 60 Season: Winter

mfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

and Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
otel		7.00	rooms	170.00	1,190.00	7,436.02
					1,190.00	7,436.02

Vehicle Fleet Mix

ehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
ght Auto	51.5	0.6	99.2	0.2
ght Truck < 3750 lbs	7.3	1.4	95.9	2.7
ght Truck 3751-5750 lbs	23.0	0.4	99.6	0.0
led Truck 5751-8500 lbs	10.7	0.9	99.1	0.0
te-Heavy Truck 8501-10,000 lbs	1.6	0.0	81.2	18.8
te-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
led-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
eavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
ther Bus	0.1	0.0	0.0	100.0
rban Bus	0.1	0.0	0.0	100.0
lotorcycle	2.8	60.7	39.3	0.0
chool Bus	0.1	0.0	0.0	100.0
lotor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
rban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
ural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
rip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
, of Trips - Residential	32.9	18.0	49.1			
, of Trips - Commercial (by land use)						
otel				5.0	2.5	92.5

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

ile Name: G:\Sacramento\LGT-Air&Noise\Air\Sunroad Harbor Island EIR 00977.08 (SDAPCD) (Hotel)\Urbemis\sunroad.urb924

'roject Name: Sunroad Hotel

'roject Location: South Coast AQMD

)n-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

)ff-Road Vehicle Emissions Based on: OFFROAD2007

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'age: 2

1/4/2009 11:27:55 AM

ummary Report:

ONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
)11 TOTALS (tons/year unmitigated)	0.43	3.21	2.46	0.00	0.36	0.19	0.55	0.07	0.18	0.25	411.73
)12 TOTALS (tons/year unmitigated)	0.95	0.27	0.31	0.00	0.00	0.02	0.02	0.00	0.01	0.02	53.64

REA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (tons/year, unmitigated)	0.13	0.25	0.49	0.00	0.00	0.00	298.35

PERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (tons/year, unmitigated)	1.27	1.47	12.24	0.01	2.34	0.46	1,359.68

UM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (tons/year, unmitigated)	1.40	1.72	12.73	0.01	2.34	0.46	1,658.03

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

ile Name: G:\Sacramento\LGT-Air&Noise\Air\Sunroad Harbor Island EIR 00977.08 (SDAPCD) (Hotel)\Urbemis\Sunroad existing.urb924

'roject Name: Sunroad - existing

'roject Location: South Coast AQMD

)n-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

)ff-Road Vehicle Emissions Based on: OFFROAD2007

ummary Report:

REA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	0.44	0.33	3.33	0.00	0.01	0.01	350.14

PERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	3.86	5.30	47.08	0.06	9.42	1.82	5,597.70

UM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	4.30	5.63	50.41	0.06	9.43	1.83	5,947.84

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rea Source Unmitigated Detail Report:

REA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
atural Gas	0.02	0.29	0.24	0.00	0.00	0.00	344.52
earth - No Summer Emissions							
andscape	0.25	0.04	3.09	0.00	0.01	0.01	5.62
onsumer Products	0.00						
rchitectural Coatings	0.17						
OTALS (lbs/day, unmitigated)	0.44	0.33	3.33	0.00	0.01	0.01	350.14

Area Source Changes to Defaults

perational Unmitigated Detail Report:

PERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
ity park	1.93	2.65	23.54	0.03	4.71	0.91	2,798.85
acquet club	1.93	2.65	23.54	0.03	4.71	0.91	2,798.85
OTALS (lbs/day, unmitigated)	3.86	5.30	47.08	0.06	9.42	1.82	5,597.70

perational Settings:

oes not include correction for passby trips

oes not include double counting adjustment for internal trips

nalysis Year: 2012 Temperature (F): 80 Season: Summer

1/4/2009 11:29:48 AM

mfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

and Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
ity park		10.10	acres	29.70	299.97	2,724.48
acquet club		10.10	1000 sq ft	29.70	299.97	2,724.48
					599.94	5,448.96

Vehicle Fleet Mix

ehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
ght Auto	51.5	0.6	99.2	0.2
ght Truck < 3750 lbs	7.3	1.4	95.9	2.7
ght Truck 3751-5750 lbs	23.0	0.4	99.6	0.0
led Truck 5751-8500 lbs	10.7	0.9	99.1	0.0
te-Heavy Truck 8501-10,000 lbs	1.6	0.0	81.2	18.8
te-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
led-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
eavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
ther Bus	0.1	0.0	0.0	100.0
rban Bus	0.1	0.0	0.0	100.0
lotorcycle	2.8	60.7	39.3	0.0
chool Bus	0.1	0.0	0.0	100.0
lotor Home	0.9	0.0	88.9	11.1

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
rban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
ural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
rip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
of Trips - Residential	32.9	18.0	49.1			
of Trips - Commercial (by land use)						
ity park				5.0	2.5	92.5
acquet club				5.0	2.5	92.5

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Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

ile Name: G:\Sacramento\LGT-Air&Noise\Air\Sunroad Harbor Island EIR 00977.08 (SDAPCD) (Hotel)\Urbemis\Sunroad existing.urb924

'roject Name: Sunroad - existing

'roject Location: South Coast AQMD

)n-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

)ff-Road Vehicle Emissions Based on: OFFROAD2007

ummary Report:

REA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	0.19	0.29	0.24	0.00	0.00	0.00	344.52

'PERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	4.16	6.36	45.18	0.04	9.42	1.82	5,065.34

UM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
OTALS (lbs/day, unmitigated)	4.35	6.65	45.42	0.04	9.42	1.82	5,409.86

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rea Source Unmitigated Detail Report:

REA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
atural Gas	0.02	0.29	0.24	0.00	0.00	0.00	344.52
earth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
andscaping - No Winter Emissions							
onsumer Products	0.00						
rchitectural Coatings	0.17						
OTALS (lbs/day, unmitigated)	0.19	0.29	0.24	0.00	0.00	0.00	344.52

Area Source Changes to Defaults

perational Unmitigated Detail Report:

PERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
ity park	2.08	3.18	22.59	0.02	4.71	0.91	2,532.67
acquet club	2.08	3.18	22.59	0.02	4.71	0.91	2,532.67
OTALS (lbs/day, unmitigated)	4.16	6.36	45.18	0.04	9.42	1.82	5,065.34

perational Settings:

oes not include correction for passby trips

oes not include double counting adjustment for internal trips

nalysis Year: 2012 Temperature (F): 60 Season: Winter

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mfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

and Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
ity park		10.10	acres	29.70	299.97	2,724.48
acquet club		10.10	1000 sq ft	29.70	299.97	2,724.48
					599.94	5,448.96

Vehicle Fleet Mix

ehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
ght Auto	51.5	0.6	99.2	0.2
ght Truck < 3750 lbs	7.3	1.4	95.9	2.7
ght Truck 3751-5750 lbs	23.0	0.4	99.6	0.0
led Truck 5751-8500 lbs	10.7	0.9	99.1	0.0
te-Heavy Truck 8501-10,000 lbs	1.6	0.0	81.2	18.8
te-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
led-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
eavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
ther Bus	0.1	0.0	0.0	100.0
rban Bus	0.1	0.0	0.0	100.0
lotorcycle	2.8	60.7	39.3	0.0
chool Bus	0.1	0.0	0.0	100.0
lotor Home	0.9	0.0	88.9	11.1

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
rban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
ural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
rip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
of Trips - Residential	32.9	18.0	49.1			
of Trips - Commercial (by land use)						
ity park				5.0	2.5	92.5
acquet club				5.0	2.5	92.5

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Appendix 2

Greenhouse Gas Calculation Worksheets

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Sunroad Hotel

Regional Greenhouse Gas Emission Calculations (lbs/day)

	CO_2	CH_4	N_2O	CO_2e	metric tons/yr CO_2	CH_4	N_2O	CO_2e
Existing Condition								
Mobile	5,597.70	0.56	0.67	5,817.38	927	0.09	0.11	963
Area	350.14	-	-	350.14	58	0.00	0.00	58
Stationary	374.98	0.03	0.0009	375.98	62	0.01	0.00	62
Total Existing	**6,322.82**	**0.60**	**0.67**	**6,543.50**	1,047	0.10	0.11	1,083
Project Condition					CO_2	CH_4	N_2O	CO_2e
Mobile	12,023.00	2.30	2.74	12,919.93	1,991	0.38	0.45	2,139
Area	1,683.00	-	-	1,683.00	279	0.00	0.00	279
Stationary	6,808.99	0.51	0.04	6,831.05	1,127	0.08	0.01	1,131
Total Project	**20,514.99**	**2.80**	**2.77**	**21,433.98**	3,396	0.46	0.46	3,549
Net Project Emissions								
Net Mobile	6,425.30	1.74	2.07	7,102.55				
Net Area	1,332.86	-	-	1,332.86				
Net Stationary	6,434.01	0.47	0.04	6,455.07				
Total Net	14,192.17	2.21	2.10	14,890.48				
SDAPCD Significance Threshold	--	--	--	--				
Difference	--	--	--	--				
Significant?	**No**	**No**	**No**	**No**				
% of Existing								

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Electricity Usage

Land Use	Electricity Usage Rate[a] (kw	Total Electricity Usage (KWh\year)	(MWh\day)	Emission Factors (lbs/MWh)[b] CO_2 724.12	CH_4 0.0302	N_2O 0.0081	CO_2e 21/310[c]
Existing				Emissions from Electricity (lbs/day)			
Office		-	-	-	-	-	-
Retail		-	-	-	-	-	-
Hotel/Motel		12,000.00	0.03	23.806685	0.000993	0.000266	23.91
Restaurant		-	-	-	-	-	-
Food Store		-	-	-	-	-	-
Warehouse		-	-	-	-	-	-
College/University		-	-	-	-	-	-
High School		-	-	-	-	-	-
Elementary School		-	-	-	-	-	-
Hospital		-	-	-	-	-	-
Miscellaneous		-	-	-	-	-	-
Residential (DU)		-	-	-	-	-	-
	Tc	12,000.00	0.03	23.81	0.00	0.00	23.91
		12.00 mwh/yr					
Project							
Office		-	-	-	-	-	-
Retail		-	-	-	-	-	-
Hotel/Motel		1,308,000.00	3.58	2,594.93	0.11	0.03	2,606.19
Restaurant		-	-	-	-	-	-
Food Store		-	-	-	-	-	-
Warehouse		-	-	-	-	-	-
College/University		-	-	-	-	-	-
High School		-	-	-	-	-	-
Elementary School		-	-	-	-	-	-
Hospital		-	-	-	-	-	-
Miscellaneous		-	-	-	-	-	-
Residential (DU)		-	-	-	-	-	-
	Tr	1,308,000.00	3.58	2,594.93	0.11	0.03	2,606.19
		1,308.00 mwh/yr					
	Net Emissions From Electricity Usage			2,571.12	0.11	0.03	2,582.28

Natural Gas Usage

Land Use	Natural Gas Usage Rate[d] 00	Total Natural Gas Usage (btu/mo)	btu/day	MMbtu/day	Emission Factors (kg/MMBtu)[e] CO_2 53.06	CH_4 0.005	N_2O 0.0001	CO_2e 21/310[c]
Existing					Emissions from Natural Gas (lbs/day)			
Office		-	-		-	-	-	-
Retail		-	-		-	-	-	-
Hotel/Motel		91,312,500.00	3,002,054.79	3.00	351.17	0.0331	0.0007	352.07
Restaurant		-	-		-	-	-	-
Food Store		-	-		-	-	-	-
Warehouse		-	-		-	-	-	-
College/University		-	-		-	-	-	-
High School		-	-		-	-	-	-
Elementary School		-	-		-	-	-	-
Hospital		-	-		-	-	-	-
Miscellaneous		-	-		-	-	-	-
Residential (Single Family DU)		-	-		-	-	-	-
Residential (Multi-Family DU)		-	-		-	-	-	-
	Tc	91,312,500.00	3,002,054.79		351.17	0.03	0.00	352.07
		therms per yr f	10,957.50					
Project								
Office		-	-		-	-	-	-
Retail		-	-		-	-	-	-
Hotel/Motel		1,095,750,000.00	36,024,657.53	36.02	4,214.06	0.40	0.01	4,224.86
Restaurant		-	-		-	-	-	-
Food Store		-	-		-	-	-	-
Warehouse		-	-		-	-	-	-
College/University		-	-		-	-	-	-
High School		-	-		-	-	-	-
Elementary School		-	-		-	-	-	-
Hospital		-	-		-	-	-	-
Miscellaneous		-	-		-	-	-	-
Residential (Single Family DU)		-	-		-	-	-	-
Residential (Multi-Family DU)		-	-		-	-	-	-
	Tc	1,095,750,000.00	36,024,657.53		4,214.06	0.40	0.01	4,224.86
		therms per yr f	131,490.00					
	Net Emissions From Natural Gas Usage				3,862.89	0.36	0.01	3,872.79

Summary of Stationary Emissions

	CO_2	CH_4	N_2O	CO_2e
Total Existing Emissions (lbs/day)	374.98	0.03	0.00	375.98
Total Project Emissions (lbs/day)	6,808.99	0.51	0.04	6,831.05
Total Net Emissions (lbs/day)	6,434.01	0.47	0.04	6,455.07

[b] Emission Factors from Table C.1 and Table C.2, General Reporting Protocol California Climate Action Registry, January 2009.

[c] Global Warming Potential is 21 for CH_4 and 310 for N_2O, General Reporting Protocol California Climate Action Registry, January 2009.

[e] Emission Factors from Table C 5 and Table C 6, General Reporting Protocol California Climate Action Registry, January 2009.

[f] 1 Therm = 100,000 Btu Energy Information Administration. Available http://tonto.eia.doe.gov/ask/ng_faqs.asp

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Mobile Sources

Vehicle Type	Percent Type 100	VMT by Type 2725	Emission Factors[a] CH_4	N_2O	CH_4	N_2O	CO_2e 21/310[b]
Existing					Emissions from Mobile Sources (lbs/day)		
Light Auto	51.5	1,403.38	0.06	0.08	0.19	0.25	80.63
Light Truck < 3750 lbs	7.3	198.93	0.11	0.14	0.05	0.06	20.05
Light Truck 3751-5750 lbs	23.0	626.75	0.11	0.14	0.15	0.19	63.16
Med Truck 5751-8500 lbs	10.7	291.58	0.12	0.20	0.08	0.13	41.47
Lite-Heavy Truck 8501-10,000 lbs	1.6	43.60	0.12	0.20	0.01	0.02	6.20
Lite-Heavy Truck 10,001-14,000 lbs	0.5	13.63	0.12	0.20	0.00	0.01	1.94
Med-Heavy Truck 14,001-33,000 lbs	0.9	24.53	0.08	0.05	0.00	0.00	0.93
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	13.63	0.08	0.05	0.00	0.00	0.52
Other Bus	0.1	2.73	0.08	0.05	0.00	0.00	0.10
Urban Bus	0.1	2.73	0.08	0.05	0.00	0.00	0.10
Motorcycle	2.8	76.30	0.42	0.01	0.07	0.00	2.01
School Bus	0.1	2.73	0.08	0.05	0.00	0.00	0.10
Motor Home	0.9	24.53	0.11	0.14	0.01	0.01	2.47
Total Existing			**1.57**	**1.36**	**0.56**	**0.67**	**219.68**

Vehicle Type	Percent Type 100	VMT by Type 11126	Emission Factors (g/mile)[a] CH_4	N_2O	CH_4 lbs	N_2O lbs	CO_2e 21/310[b]
Project							
Light Auto	51.5	5,729.89	0.06	0.08	0.76	1.01	329.20
Light Truck < 3750 lbs	7.3	812.20	0.11	0.14	0.20	0.25	81.85
Light Truck 3751-5750 lbs	23.0	2,558.98	0.11	0.14	0.62	0.79	257.88
Med Truck 5751-8500 lbs	10.7	1,190.48	0.12	0.20	0.31	0.52	169.34
Lite-Heavy Truck 8501-10,000 lbs	1.6	178.02	0.12	0.20	0.05	0.08	25.32
Lite-Heavy Truck 10,001-14,000 lbs	0.5	55.63	0.12	0.20	0.01	0.02	7.91
Med-Heavy Truck 14,001-33,000 lbs	0.9	100.13	0.08	0.05	0.02	0.01	3.79
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	55.63	0.08	0.05	0.01	0.01	2.11
Other Bus	0.1	11.13	0.08	0.05	0.00	0.00	0.42
Urban Bus	0.1	11.13	0.08	0.05	0.00	0.00	0.42
Motorcycle	2.8	311.53	0.42	0.01	0.29	0.01	8.19
School Bus	0.1	11.13	0.08	0.05	0.00	0.00	0.42
Motor Home	0.9	100.13	0.11	0.14	0.02	0.03	10.09
Total Project			**1.57**	**1.36**	**2.30**	**2.74**	**896.93**
Net Emissions From Mobile Sources					**1.74**	**2.07**	**677.25**

g/lb conversion factor 0.002204623

[a] Emission factors from Table C.4, General Reporting Protocol, California Climate Action Registry, January 2009.

[b] Global Warming Potential is 21 for CH_4 and 310 for N_2O, General Reporting Protocol, California Climate Action Registry, January 2009.

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Existing

Vehicle Type	Percent Type	VMT	2725
Light Auto	51.5		
Light Truck < 3750 lbs	7.3		
Light Truck 3751-5750 lbs	23		
Med Truck 5751-8500 lbs	10.7		
Lite-Heavy Truck 8501-10,000 lbs	1.6		
Lite-Heavy Truck 10,001-14,000 lbs	0.5		
Med-Heavy Truck 14,001-33,000 lbs	0.9		
Heavy-Heavy Truck 33,001-60,000 lbs	0.5		
Other Bus	0.1		
Urban Bus	0.1		
Motorcycle	2.8		
School Bus	0.1		
Motor Home	0.9		

Proposed

Vehicle Type	Percent Type	VMT	11126
Light Auto	51.5		
Light Truck < 3750 lbs	7.3		
Light Truck 3751-5750 lbs	23		
Med Truck 5751-8500 lbs	10.7		
Lite-Heavy Truck 8501-10,000 lbs	1.6		
Lite-Heavy Truck 10,001-14,000 lbs	0.5		
Med-Heavy Truck 14,001-33,000 lbs	0.9		
Heavy-Heavy Truck 33,001-60,000 lbs	0.5		
Other Bus	0.1		
Urban Bus	0.1		
Motorcycle	2.8		
School Bus	0.1		
Motor Home	0.9		

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Appendix 3

EMFAC2007 Output Sheets

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Title : San Diego Air Basin Avg Annual CYr 2012 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/02/17 13:06:34
Scen Year: 2012 -- All model years in the range 1968 to 2012 selected
Season : Annual
Area : San Diego
****
****

Year: 2012 -- Model Years 1968 to 2012 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
3	4.253	5.434	7.205	20.135	21.702	31.936	5.897
4	4.123	5.262	7.011	20.135	21.702	31.936	5.752
5	4.001	5.101	6.830	20.135	21.702	31.936	5.615
6	3.886	4.947	6.512	18.623	19.796	30.678	5.395
7	3.777	4.802	6.220	17.243	18.099	29.524	5.191
8	3.674	4.665	5.951	15.981	16.587	28.467	5.001
9	3.576	4.535	5.704	14.827	15.237	27.499	4.824
10	3.484	4.412	5.477	13.772	14.029	26.612	4.659
11	3.396	4.296	5.266	12.806	12.947	25.800	4.505
12	3.312	4.186	5.072	11.922	11.977	25.059	4.361
13	3.233	4.081	4.891	11.115	11.105	24.383	4.226
14	3.157	3.981	4.723	10.378	10.320	23.767	4.099
15	3.085	3.886	4.567	9.706	9.613	23.208	3.981
16	3.016	3.795	4.422	9.095	8.976	22.702	3.870
17	2.950	3.709	4.286	8.541	8.400	22.246	3.765
18	2.886	3.626	4.160	8.041	7.879	21.838	3.667
19	2.826	3.547	4.041	7.582	7.408	21.476	3.575
20	2.768	3.472	3.930	7.242	6.981	21.156	3.491

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Title : San Diego Air Basin Avg Annual CYr 2012 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/02/17 13:38:45
Scen Year: 2012 -- All model years in the range 1968 to 2012 selected
Season : Annual
Area : San Diego
****
Year: 2012 -- Model Years 1968 to 2012 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
21	2.713	3.400	3.826	6.927	6.594	20.878	3.411
22	2.659	3.331	3.728	6.636	6.243	20.640	3.336
23	2.608	3.265	3.636	6.366	5.924	20.441	3.265
24	2.559	3.201	3.549	6.115	5.635	20.279	3.197
25	2.512	3.141	3.468	5.883	5.372	20.155	3.133
26	2.467	3.082	3.392	5.667	5.133	20.067	3.072
27	2.423	3.027	3.320	5.468	4.916	20.016	3.015
28	2.381	2.973	3.252	5.282	4.719	20.000	2.961
29	2.341	2.922	3.188	5.110	4.541	20.022	2.909
30	2.302	2.872	3.127	4.951	4.379	20.079	2.860
31	2.265	2.825	3.071	4.804	4.233	20.175	2.814
32	2.230	2.780	3.017	4.668	4.101	20.308	2.771
33	2.195	2.737	2.967	4.543	3.983	20.481	2.730
34	2.162	2.695	2.920	4.427	3.877	20.695	2.691
35	2.130	2.655	2.876	4.322	3.782	20.950	2.655
36	2.100	2.617	2.834	4.226	3.698	21.250	2.621
37	2.071	2.581	2.795	4.138	3.624	21.596	2.589
38	2.043	2.546	2.759	4.059	3.560	21.991	2.560
39	2.016	2.513	2.726	3.989	3.505	22.438	2.533
40	1.991	2.481	2.695	3.926	3.459	22.940	2.508

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Title : San Diego Air Basin Avg Annual CYr 2012 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/02/17 14:37:45
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : San Diego
****
Year: 2030 -- Model Years 1986 to 2030 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
3	1.479	1.736	2.341	6.269	11.790	23.878	2.065
4	1.451	1.701	2.302	6.269	11.790	23.878	2.034
5	1.423	1.667	2.265	6.269	11.790	23.878	2.004
6	1.396	1.634	2.198	5.741	10.749	23.047	1.944
7	1.370	1.602	2.136	5.256	9.823	22.280	1.886
8	1.344	1.571	2.077	4.810	8.998	21.573	1.832
9	1.320	1.540	2.022	4.401	8.261	20.919	1.780
10	1.295	1.511	1.969	4.027	7.603	20.316	1.732
11	1.271	1.482	1.919	3.686	7.013	19.759	1.686
12	1.248	1.454	1.872	3.377	6.484	19.246	1.643
13	1.226	1.427	1.827	3.097	6.009	18.772	1.602
14	1.204	1.401	1.785	2.847	5.582	18.337	1.563
15	1.182	1.375	1.744	2.624	5.198	17.936	1.526
16	1.161	1.350	1.705	2.428	4.851	17.569	1.492
17	1.141	1.326	1.668	2.257	4.538	17.232	1.459
18	1.121	1.302	1.632	2.112	4.255	16.926	1.429
19	1.102	1.279	1.598	1.984	3.999	16.648	1.399
20	1.083	1.256	1.565	1.911	3.767	16.396	1.373

Title : San Diego Air Basin Avg Annual CYr 2012 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/02/17 14:36:22
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : San Diego
****
Year: 2030 -- Model Years 1986 to 2030 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
21	1.064	1.234	1.533	1.844	3.556	16.171	1.348
22	1.046	1.213	1.503	1.782	3.366	15.971	1.324
23	1.029	1.192	1.474	1.725	3.193	15.795	1.301
24	1.011	1.172	1.446	1.673	3.036	15.643	1.278
25	0.995	1.152	1.419	1.626	2.893	15.513	1.257
26	0.978	1.133	1.392	1.582	2.764	15.407	1.236
27	0.962	1.114	1.367	1.542	2.646	15.324	1.217
28	0.946	1.096	1.343	1.505	2.539	15.263	1.198
29	0.931	1.078	1.319	1.472	2.442	15.225	1.180
30	0.916	1.060	1.296	1.441	2.355	15.209	1.162
31	0.902	1.043	1.274	1.413	2.275	15.217	1.146
32	0.887	1.027	1.253	1.388	2.204	15.249	1.130
33	0.874	1.011	1.232	1.366	2.140	15.305	1.115
34	0.860	0.995	1.212	1.346	2.082	15.385	1.100
35	0.847	0.980	1.193	1.328	2.031	15.492	1.086
36	0.834	0.965	1.174	1.313	1.985	15.626	1.073
37	0.821	0.950	1.156	1.299	1.945	15.789	1.061
38	0.809	0.936	1.139	1.288	1.910	15.981	1.049
39	0.797	0.922	1.122	1.278	1.880	16.205	1.038
40	0.785	0.908	1.105	1.270	1.855	16.462	1.027

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Appendix 4

CALINE4 Output Sheets

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: PCH AND LAUREL ST AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	AL	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	11	-450	11	-150	AG	750	1.2	.0	19.5
B. NA	11	-150	11	0	AG	640	1.7	.0	18.0
C. ND	11	0	11	150	AG	1320	1.3	.0	13.5
D. NE	11	150	11	450	AG	1320	1.2	.0	19.5
E. SF	-11	450	-11	150	AG	2240	1.2	.0	19.5
F. SA	-11	150	-11	0	AG	1990	1.7	.0	22.5
G. SD	-11	0	-11	-150	AG	580	1.3	.0	13.5
H. SE	-11	-150	-11	-450	AG	580	1.2	.0	19.5
I. WF	450	7	150	7	AG	1200	1.2	.0	15.0
J. WA	150	7	0	7	AG	1130	1.7	.0	13.5
K. WD	0	7	-150	7	AG	2630	1.9	.0	9.9
L. WE	-150	7	-450	7	AG	2630	1.2	.0	15.0
M. EF	-450	-7	-150	-7	AG	1770	1.2	.0	15.0
N. EA	-150	-7	0	-7	AG	1070	1.7	.0	13.5
O. ED	0	-7	150	-7	AG	1430	1.4	.0	9.9
P. EE	150	-7	450	-7	AG	1430	1.2	.0	15.0
Q. NL	0	0	7	-150	AG	110	1.7	.0	9.9
R. SL	0	0	-7	150	AG	250	1.7	.0	9.9
S. WL	0	0	150	5	AG	70	1.7	.0	9.9
T. EL	0	0	-150	-5	AG	700	2.0	.0	9.9

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: PCH AND LAUREL ST AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	21	14	1.8
2. SE3	21	-14	1.8
3. SW3	-21	-14	1.8
4. NW3	-21	14	1.8
5. NE7	25	18	1.8
6. SE7	25	-18	1.8
7. SW7	-25	-18	1.8
8. NW7	-25	18	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	263.	1.1	.0	.0	.0	.0	.0	.1	.0	.0
2. SE3	277.	.7	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.9	.0	.0	.0	.0	.0	.4	.0	.0
4. NW3	261.	.8	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	261.	.8	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	278.	.6	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	7.	.7	.0	.0	.0	.0	.0	.3	.0	.0
8. NW7	125.	.7	.0	.0	.0	.0	.0	.2	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: PCH AND LAUREL ST AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.1
3. SW3	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: PCH AND LAUREL ST PM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	11	-450	11	-150	AG	1500	1.2	.0	19.5
B. NA	11	-150	11	0	AG	1390	1.7	.0	18.0
C. ND	11	0	11	150	AG	2040	1.4	.0	13.5
D. NE	11	150	11	450	AG	2040	1.2	.0	19.5
E. SF	-11	450	-11	150	AG	2090	1.2	.0	19.5
F. SA	-11	150	-11	0	AG	1840	1.7	.0	22.5
G. SD	-11	0	-11	-150	AG	1010	1.3	.0	13.5
H. SE	-11	-150	-11	-450	AG	1010	1.2	.0	19.5
I. WF	450	7	150	7	AG	1300	1.2	.0	15.0
J. WA	150	7	0	7	AG	1200	1.7	.0	13.5
K. WD	0	7	-150	7	AG	2140	1.9	.0	9.9
L. WE	-150	7	-450	7	AG	2140	1.2	.0	15.0
M. EF	-450	-7	-150	-7	AG	2240	1.2	.0	15.0
N. EA	-150	-7	0	-7	AG	1490	1.8	.0	13.5
O. ED	0	-7	150	-7	AG	1940	1.9	.0	9.9
P. EE	150	-7	450	-7	AG	1940	1.2	.0	15.0
Q. NL	0	0	7	-150	AG	110	1.7	.0	9.9
R. SL	0	0	-7	150	AG	250	1.7	.0	9.9
S. WL	0	0	150	5	AG	100	1.7	.0	9.9
T. EL	0	0	-150	-5	AG	750	2.1	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: PCH AND LAUREL ST PM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	21	14	1.8
2. SE3	21	-14	1.8
3. SW3	-21	-14	1.8
4. NW3	-21	14	1.8
5. NE7	25	18	1.8
6. SE7	25	-18	1.8
7. SW7	-25	-18	1.8
8. NW7	-25	18	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	263.	1.1	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	276.	.9	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	84.	.9	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	119.	.8	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	260.	.8	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	278.	.7	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	7.	.8	.0	.0	.0	.1	.0	.3	.0	.0
8. NW7	125.	.7	.0	.0	.0	.0	.0	.2	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: PCH AND LAUREL ST PM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.0	.1	.4	.0	.0	.0	.0	.0	.0	.0	.0	.1
2. SE3	*	.0	.0	.0	.1	.0	.3	.0	.0	.0	.0	.0	.1
3. SW3	*	.0	.0	.0	.0	.0	.1	.4	.0	.0	.0	.0	.0
4. NW3	*	.0	.0	.3	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	*	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.1
6. SE7	*	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.1
7. SW7	*	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	*	.0	.0	.2	.0	.0	.0	.1	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: PCH AND LAUREL ST AM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	11	-450	11	-150	AG	750	1.2	.0	19.5
B. NA	11	-150	11	0	AG	640	1.7	.0	18.0
C. ND	11	0	11	150	AG	1327	1.3	.0	13.5
D. NE	11	150	11	450	AG	1327	1.2	.0	19.5
E. SF	-11	450	-11	150	AG	2244	1.2	.0	19.5
F. SA	-11	150	-11	0	AG	1994	1.7	.0	22.5
G. SD	-11	0	-11	-150	AG	580	1.3	.0	13.5
H. SE	-11	-150	-11	-450	AG	580	1.2	.0	19.5
I. WF	450	7	150	7	AG	1205	1.2	.0	15.0
J. WA	150	7	0	7	AG	1135	1.7	.0	13.5
K. WD	0	7	-150	7	AG	2639	1.9	.0	9.9
L. WE	-150	7	-450	7	AG	2639	1.2	.0	15.0
M. EF	-450	-7	-150	-7	AG	1784	1.2	.0	15.0
N. EA	-150	-7	0	-7	AG	1077	1.7	.0	13.5
O. ED	0	-7	150	-7	AG	1437	1.4	.0	9.9
P. EE	150	-7	450	-7	AG	1437	1.2	.0	15.0
Q. NL	0	0	7	-150	AG	110	1.7	.0	9.9
R. SL	0	0	-7	150	AG	250	1.7	.0	9.9
S. WL	0	0	150	5	AG	70	1.7	.0	9.9
T. EL	0	0	-150	-5	AG	707	2.0	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: PCH AND LAUREL ST AM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	21	14	1.8
2. SE3	21	-14	1.8
3. SW3	-21	-14	1.8
4. NW3	-21	14	1.8
5. NE7	25	18	1.8
6. SE7	25	-18	1.8
7. SW7	-25	-18	1.8
8. NW7	-25	18	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	263.	1.1	.0	.0	.0	.0	.0	.1	.0	.0
2. SE3	277.	.7	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.9	.0	.0	.0	.0	.0	.4	.0	.0
4. NW3	261.	.8	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	261.	.8	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	278.	.6	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	7.	.7	.0	.0	.0	.0	.0	.3	.0	.0
8. NW7	125.	.7	.0	.0	.0	.0	.0	.2	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: PCH AND LAUREL ST AM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.1
3. SW3	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: PCH AND LAUREL ST PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	11	-450	11	-150	AG	1540	1.2	.0	19.5
B. NA	11	-150	11	0	AG	1390	1.7	.0	18.0
C. ND	11	0	11	150	AG	2045	1.4	.0	13.5
D. NE	11	150	11	450	AG	2045	1.2	.0	19.5
E. SF	-11	450	-11	150	AG	2098	1.2	.0	19.5
F. SA	-11	150	-11	0	AG	1848	1.7	.0	22.5
G. SD	-11	0	-11	-150	AG	1010	1.3	.0	13.5
H. SE	-11	-150	-11	-450	AG	1010	1.2	.0	19.5
I. WF	450	7	150	7	AG	1308	1.2	.0	15.0
J. WA	150	7	0	7	AG	1208	1.7	.0	13.5
K. WD	0	7	-150	7	AG	2196	1.9	.0	9.9
L. WE	-150	7	-450	7	AG	2196	1.2	.0	15.0
M. EF	-450	-7	-150	-7	AG	2251	1.2	.0	15.0
N. EA	-150	-7	0	-7	AG	1496	1.8	.0	13.5
O. ED	0	-7	150	-7	AG	1946	1.9	.0	9.9
P. EE	150	-7	450	-7	AG	1946	1.2	.0	15.0
Q. NL	0	0	7	-150	AG	150	1.7	.0	9.9
R. SL	0	0	-7	150	AG	250	1.7	.0	9.9
S. WL	0	0	150	5	AG	100	1.7	.0	9.9
T. EL	0	0	-150	-5	AG	755	2.1	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: PCH AND LAUREL ST PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	21	14	1.8
2. SE3	21	-14	1.8
3. SW3	-21	-14	1.8
4. NW3	-21	14	1.8
5. NE7	25	18	1.8
6. SE7	25	-18	1.8
7. SW7	-25	-18	1.8
8. NW7	-25	18	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	263.	1.1	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	276.	.9	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	84.	.9	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	119.	.8	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	260.	.8	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	278.	.7	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	7.	.8	.0	.0	.0	.1	.0	.3	.0	.0
8. NW7	125.	.7	.0	.0	.0	.0	.0	.2	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: PCH AND LAUREL ST PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.0	.1	.4	.0	.0	.0	.0	.0	.0	.0	.0	.1
2. SE3	*	.0	.0	.0	.1	.0	.3	.0	.0	.0	.0	.0	.1
3. SW3	*	.0	.0	.0	.0	.0	.1	.4	.0	.0	.0	.0	.0
4. NW3	*	.0	.0	.3	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	*	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.1
6. SE7	*	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.1
7. SW7	*	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	*	.0	.0	.2	.0	.0	.0	.1	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RENTAL CAR ACCES AND N HARBOR DR AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	5	-450	5	-150	AG	300	1.2	.0	15.0
B. NA	5	-150	5	0	AG	220	2.1	.0	9.9
C. ND	2	0	2	150	AG	105	2.1	.0	9.9
D. NE	2	150	2	450	AG	105	1.2	.0	10.5
E. SF	-5	450	-5	150	AG	30	1.2	.0	15.0
F. SA	-5	150	-5	0	AG	20	2.1	.0	9.9
G. SD	-7	0	-7	-150	AG	350	2.1	.0	9.9
H. SE	-7	-150	-7	-450	AG	350	1.2	.0	10.5
I. WF	450	14	150	14	AG	4645	1.2	.0	19.5
J. WA	150	14	0	14	AG	4405	1.8	.0	22.5
K. WD	0	14	-150	14	AG	4480	1.4	.0	13.5
L. WE	-150	14	-450	14	AG	4480	1.2	.0	19.5
M. EF	-450	-11	-150	-11	AG	3260	1.2	.0	24.0
N. EA	-150	-11	0	-11	AG	3190	1.5	.0	27.0
O. ED	0	-11	150	-11	AG	3300	1.3	.0	18.0
P. EE	150	-11	450	-11	AG	3300	1.2	.0	24.0
Q. NL	0	0	2	-150	AG	80	2.1	.0	9.9
R. SL	0	0	-2	150	AG	10	2.1	.0	9.9
S. WL	0	0	150	9	AG	240	1.5	.0	9.9
T. EL	0	0	-150	-5	AG	70	1.5	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RENTAL CAR ACCES AND N HARBOR DR AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	8	23	1.8
2. SE3	12	-23	1.8
3. SW3	-8	-23	1.8
4. NW3	-12	23	1.8
5. NE7	11	27	1.8
6. SE7	16	-27	1.8
7. SW7	-11	-27	1.8
8. NW7	-16	27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	1.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	276.	.8	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	81.	.8	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	99.	.9	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	278.	.7	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	72.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.9	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RENTAL CAR ACCES AND N HARBOR DR AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.2	1.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
2. SE3	*	.0	.0	.0	.1	.1	.4	.0	.0	.0	.0	.0	.0
3. SW3	*	.2	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	*	.1	.8	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
5. NE7	*	.0	.7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
6. SE7	*	.0	.0	.0	.2	.0	.4	.0	.0	.0	.0	.0	.0
7. SW7	*	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	*	.0	.6	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RENTAL CAR ACCESS AND N HARBOR DR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	5	-450	5	-150	AG	360	1.2	.0	15.0
B. NA	5	-150	5	0	AG	280	2.1	.0	9.9
C. ND	2	0	2	150	AG	55	2.1	.0	9.9
D. NE	2	150	2	450	AG	55	1.2	.0	10.5
E. SF	-5	450	-5	150	AG	40	1.2	.0	15.0
F. SA	-5	150	-5	0	AG	30	2.1	.0	9.9
G. SD	-7	0	-7	-150	AG	350	2.1	.0	9.9
H. SE	-7	-150	-7	-450	AG	350	1.2	.0	10.5
I. WF	450	14	150	14	AG	3825	1.2	.0	19.5
J. WA	150	14	0	14	AG	3565	1.6	.0	22.5
K. WD	0	14	-150	14	AG	3650	1.4	.0	13.5
L. WE	-150	14	-450	14	AG	3650	1.2	.0	19.5
M. EF	-450	-11	-150	-11	AG	4160	1.2	.0	24.0
N. EA	-150	-11	0	-11	AG	4130	1.6	.0	27.0
O. ED	0	-11	150	-11	AG	4330	1.4	.0	18.0
P. EE	150	-11	450	-11	AG	4330	1.2	.0	24.0
Q. NL	0	0	2	-150	AG	80	2.1	.0	9.9
R. SL	0	0	-2	150	AG	10	2.1	.0	9.9
S. WL	0	0	150	9	AG	260	1.5	.0	9.9
T. EL	0	0	-150	-5	AG	30	1.5	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RENTAL CAR ACCESS AND N HARBOR DR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	8	23	1.8
2. SE3	12	-23	1.8
3. SW3	-8	-23	1.8
4. NW3	-12	23	1.8
5. NE7	11	27	1.8
6. SE7	16	-27	1.8
7. SW7	-11	-27	1.8
8. NW7	-16	27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	96.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.9	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	81.	.9	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.9	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	99.	.8	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	278.	.8	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	72.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	98.	.8	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RENTAL CAR ACCESS AND N HARBOR DR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.1	.7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
2. SE3	*	.0	.0	.0	.1	.2	.6	.0	.0	.0	.0	.0	.0
3. SW3	*	.2	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0
4. NW3	*	.1	.6	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
5. NE7	*	.0	.5	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
6. SE7	*	.0	.0	.0	.1	.0	.5	.0	.0	.0	.0	.0	.0
7. SW7	*	.0	.2	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
8. NW7	*	.0	.5	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RENTAL CAR ACCESS AND N HARBOR DR AM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	5	-450	5	-150	AG	300	1.2	.0	15.0
B. NA	5	-150	5	0	AG	220	2.1	.0	9.9
C. ND	2	0	2	150	AG	105	2.1	.0	9.9
D. NE	2	150	2	450	AG	105	1.2	.0	10.5
E. SF	-5	450	-5	150	AG	30	1.2	.0	15.0
F. SA	-5	150	-5	0	AG	20	2.1	.0	9.9
G. SD	-7	0	-7	-150	AG	350	2.1	.0	9.9
H. SE	-7	-150	-7	-450	AG	350	1.2	.0	10.5
I. WF	450	14	150	14	AG	4673	1.2	.0	19.5
J. WA	150	14	0	14	AG	4433	1.8	.0	22.5
K. WD	0	14	-150	14	AG	4508	1.4	.0	13.5
L. WE	-150	14	-450	14	AG	4508	1.2	.0	19.5
M. EF	-450	-11	-150	-11	AG	3303	1.2	.0	24.0
N. EA	-150	-11	0	-11	AG	3233	1.5	.0	27.0
O. ED	0	-11	150	-11	AG	3343	1.3	.0	18.0
P. EE	150	-11	450	-11	AG	3343	1.2	.0	24.0
Q. NL	0	0	2	-150	AG	80	2.1	.0	9.9
R. SL	0	0	-2	150	AG	10	2.1	.0	9.9
S. WL	0	0	150	9	AG	240	1.5	.0	9.9
T. EL	0	0	-150	-5	AG	70	1.5	.0	9.9

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RENTAL CAR ACCESS AND N HARBOR DR AM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	8	23	1.8
2. SE3	12	-23	1.8
3. SW3	-8	-23	1.8
4. NW3	-12	23	1.8
5. NE7	11	27	1.8
6. SE7	16	-27	1.8
7. SW7	-11	-27	1.8
8. NW7	-16	27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	1.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	276.	.8	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	81.	.8	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	99.	.9	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	278.	.7	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	72.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.9	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RENTAL CAR ACCESS AND N HARBOR DR AM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.2	1.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
2. SE3	*	.0	.0	.0	.1	.1	.4	.0	.0	.0	.0	.0	.0
3. SW3	*	.2	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	*	.1	.8	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
5. NE7	*	.0	.7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
6. SE7	*	.0	.0	.0	.2	.0	.4	.0	.0	.0	.0	.0	.0
7. SW7	*	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	*	.0	.6	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RENTAL CAR ACCESS AND N HARBOR DR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	5	-450	5	-150	AG	360	1.2	.0	15.0
B. NA	5	-150	5	0	AG	280	2.1	.0	9.9
C. ND	2	0	2	150	AG	55	2.1	.0	9.9
D. NE	2	150	2	450	AG	55	1.2	.0	10.5
E. SF	-5	450	-5	150	AG	40	1.2	.0	15.0
F. SA	-5	150	-5	0	AG	30	2.1	.0	9.9
G. SD	-7	0	-7	-150	AG	350	2.1	.0	9.9
H. SE	-7	-150	-7	-450	AG	350	1.2	.0	10.5
I. WF	450	14	150	14	AG	3872	1.2	.0	19.5
J. WA	150	14	0	14	AG	3612	1.6	.0	22.5
K. WD	0	14	-150	14	AG	3697	1.4	.0	13.5
L. WE	-150	14	-450	14	AG	3697	1.2	.0	19.5
M. EF	-450	-11	-150	-11	AG	4192	1.2	.0	24.0
N. EA	-150	-11	0	-11	AG	4162	1.6	.0	27.0
O. ED	0	-11	150	-11	AG	4362	1.4	.0	18.0
P. EE	150	-11	450	-11	AG	4362	1.2	.0	24.0
Q. NL	0	0	2	-150	AG	80	2.1	.0	9.9
R. SL	0	0	-2	150	AG	10	2.1	.0	9.9
S. WL	0	0	150	9	AG	260	1.5	.0	9.9
T. EL	0	0	-150	-5	AG	30	1.5	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RENTAL CAR ACCESS AND N HARBOR DR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	8	23	1.8
2. SE3	12	-23	1.8
3. SW3	-8	-23	1.8
4. NW3	-12	23	1.8
5. NE7	11	27	1.8
6. SE7	16	-27	1.8
7. SW7	-11	-27	1.8
8. NW7	-16	27	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	96.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.9	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	81.	.9	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.9	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	99.	.8	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	278.	.8	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	72.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	98.	.8	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RENTAL CAR ACCESS AND N HARBOR DR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.1	.7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
2. SE3	.0	.0	.0	.1	.2	.6	.0	.0	.0	.0	.0	.0
3. SW3	.2	.0	.0	.0	.0	.0	.6	.0	.0	.0	.0	.0
4. NW3	.1	.6	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
5. NE7	.0	.5	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
6. SE7	.0	.0	.0	.1	.0	.5	.0	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
8. NW7	.0	.5	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: TERM1/HARBOR ISLAND AND N HARBOR AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	7	-450	7	-150	AG	340	1.2	.0	24.0
B. NA	7	-150	7	0	AG	250	2.1	.0	18.0
C. ND	0	0	0	150	AG	95	1.8	.0	9.9
D. NE	0	150	0	450	AG	95	1.2	.0	10.5
E. SF	-11	450	-11	150	AG	210	1.2	.0	15.0
F. SA	-11	150	-11	0	AG	150	2.1	.0	13.5
G. SD	-11	0	-11	-150	AG	550	2.0	.0	9.9
H. SE	-11	-150	-11	-450	AG	550	1.2	.0	15.0
I. WF	450	7	150	7	AG	2325	1.2	.0	24.0
J. WA	150	7	0	7	AG	1925	1.5	.0	27.0
K. WD	0	7	-150	7	AG	2120	1.2	.0	18.0
L. WE	-150	7	-450	7	AG	2120	1.2	.0	24.0
M. EF	-450	-14	-150	-14	AG	980	1.2	.0	10.5
N. EA	-150	-14	0	-14	AG	940	1.8	.0	9.9
O. ED	0	-14	150	-14	AG	1090	1.4	.0	9.9
P. EE	150	-14	450	-14	AG	1090	1.2	.0	10.5
Q. NL	0	0	0	-150	AG	90	2.1	.0	9.9
R. SL	0	0	-9	150	AG	60	2.1	.0	9.9
S. WL	0	0	150	0	AG	400	1.5	.0	9.9
T. EL	0	0	-150	-14	AG	40	1.5	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: TERM1/HARBOR ISLAND AND N HARBOR AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	5	19	1.8
2. SE3	19	-19	1.8
3. SW3	-19	-19	1.8
4. NW3	-19	19	1.8
5. NE7	9	23	1.8
6. SE7	23	-23	1.8
7. SW7	-23	-23	1.8
8. NW7	-23	23	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.6	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	84.	.7	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	98.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	277.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	82.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: TERM1/HARBOR ISLAND AND N HARBOR AM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.1	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	*	.0	.0	.0	.1	.0	.3	.1	.0	.0	.0	.0	.0
3. SW3	*	.1	.0	.0	.0	.0	.1	.2	.0	.0	.0	.0	.0
4. NW3	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	*	.0	.0	.0	.1	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	*	.1	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: TERM1/HARBOR ISLAND AND N HARBOR PM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	2	-450	2	-150	AG	690	1.2	.0	10.5
B. NA	2	-150	2	0	AG	520	2.1	.0	9.9
C. ND	2	0	2	150	AG	180	1.4	.0	9.9
D. NE	2	150	2	450	AG	180	1.2	.0	10.5
E. SF	-2	450	-2	150	AG	250	1.2	.0	10.5
F. SA	-2	150	-2	0	AG	190	2.0	.0	9.9
G. SD	-2	0	-2	-150	AG	680	2.1	.0	9.9
H. SE	-2	-150	-2	-450	AG	680	1.2	.0	10.5
I. WF	450	2	150	2	AG	1960	1.2	.0	10.5
J. WA	150	2	0	2	AG	1530	1.9	.0	9.9
K. WD	0	2	-150	2	AG	1790	1.4	.0	9.9
L. WE	-150	2	-450	2	AG	1790	1.2	.0	10.5
M. EF	-450	-2	-150	-2	AG	1490	1.2	.0	10.5
N. EA	-150	-2	0	-2	AG	1420	1.9	.0	9.9
O. ED	0	-2	150	-2	AG	1740	1.4	.0	9.9
P. EE	150	-2	450	-2	AG	1740	1.2	.0	10.5
Q. NL	0	0	2	-150	AG	170	2.0	.0	9.9
R. SL	0	0	-2	150	AG	60	2.0	.0	9.9
S. WL	0	0	150	2	AG	430	1.5	.0	9.9
T. EL	0	0	-150	-2	AG	70	1.5	.0	9.9

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: TERM1/HARBOR ISLAND AND N HARBOR PM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	8	8	1.8
2. SE3	8	-8	1.8
3. SW3	-8	-8	1.8
4. NW3	-8	8	1.8
5. NE7	11	11	1.8
6. SE7	11	-11	1.8
7. SW7	-11	-11	1.8
8. NW7	-11	11	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	85.	1.1	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	95.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.6	.0	.1	.0	.0	.0	.0	.1	.0
6. SE7	276.	.7	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	83.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.6	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: TERM1/HARBOR ISLAND AND N HARBOR PM NP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.0	.6	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	*	.0	.0	.2	.0	.0	.5	.0	.0	.0	.0	.0	.0
3. SW3	*	.0	.2	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	*	.0	.5	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	*	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	*	.0	.0	.1	.0	.0	.3	.0	.0	.0	.0	.0	.0
7. SW7	*	.0	.2	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	*	.0	.3	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: TERM1/HARBOR ISLAND DR AND N HARBOR AM W
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	7	-450	7	-150	AG	411	1.2	.0	24.0
B. NA	7	-150	7	0	AG	303	2.1	.0	18.0
C. ND	0	0	0	150	AG	105	1.6	.0	9.9
D. NE	0	150	0	450	AG	105	1.2	.0	10.5
E. SF	-11	450	-11	150	AG	220	1.2	.0	15.0
F. SA	-11	150	-11	0	AG	160	2.1	.0	13.5
G. SD	-11	0	-11	-150	AG	597	1.9	.0	9.9
H. SE	-11	-150	-11	-450	AG	597	1.2	.0	15.0
I. WF	450	7	150	7	AG	2353	1.2	.0	24.0
J. WA	150	7	0	7	AG	1925	1.5	.0	27.0
K. WD	0	7	-150	7	AG	2138	1.2	.0	18.0
L. WE	-150	7	-450	7	AG	2138	1.2	.0	24.0
M. EF	-450	-14	-150	-14	AG	989	1.2	.0	10.5
N. EA	-150	-14	0	-14	AG	949	1.8	.0	9.9
O. ED	0	-14	150	-14	AG	1133	1.4	.0	9.9
P. EE	150	-14	450	-14	AG	1133	1.2	.0	10.5
Q. NL	0	0	0	-150	AG	108	2.1	.0	9.9
R. SL	0	0	-9	150	AG	60	2.1	.0	9.9
S. WL	0	0	150	0	AG	428	1.5	.0	9.9
T. EL	0	0	-150	-14	AG	40	1.5	.0	9.9

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: TERM1/HARBOR ISLAND DR AND N HARBOR AM W
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	5	19	1.8
2. SE3	19	-19	1.8
3. SW3	-19	-19	1.8
4. NW3	-19	19	1.8
5. NE7	9	23	1.8
6. SE7	23	-23	1.8
7. SW7	-23	-23	1.8
8. NW7	-23	23	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.6	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	84.	.7	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	98.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	277.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	82.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: TERM1/HARBOR ISLAND DR AND N HARBOR AM W
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.1	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	*	.0	.0	.0	.1	.0	.3	.1	.0	.0	.0	.0	.0
3. SW3	*	.1	.0	.0	.0	.0	.1	.2	.0	.0	.0	.0	.0
4. NW3	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	*	.0	.0	.0	.1	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	*	.1	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: TERM1/HARBOR ISLAND AND N HARBOR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NF	2	-450	2	-150	AG	743	1.2	.0	10.5
B. NA	2	-150	2	0	AG	560	2.1	.0	9.9
C. ND	2	0	2	150	AG	188	1.4	.0	9.9
D. NE	2	150	2	450	AG	188	1.2	.0	10.5
E. SF	-2	450	-2	150	AG	266	1.2	.0	10.5
F. SA	-2	150	-2	0	AG	206	1.9	.0	9.9
G. SD	-2	0	-2	-150	AG	759	2.1	.0	9.9
H. SE	-2	-150	-2	-450	AG	759	1.2	.0	10.5
I. WF	450	2	150	2	AG	2007	1.2	.0	10.5
J. WA	150	2	0	2	AG	1530	1.9	.0	9.9
K. WD	0	2	-150	2	AG	1803	1.4	.0	9.9
L. WE	-150	2	-450	2	AG	1803	1.2	.0	10.5
M. EF	-450	-2	-150	-2	AG	1506	1.2	.0	10.5
N. EA	-150	-2	0	-2	AG	1436	1.9	.0	9.9
O. ED	0	-2	150	-2	AG	1772	1.4	.0	9.9
P. EE	150	-2	450	-2	AG	1772	1.2	.0	10.5
Q. NL	0	0	2	-150	AG	183	1.9	.0	9.9
R. SL	0	0	-2	150	AG	60	1.9	.0	9.9
S. WL	0	0	150	2	AG	477	1.5	.0	9.9
T. EL	0	0	-150	-2	AG	70	1.5	.0	9.9

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: TERM1/HARBOR ISLAND AND N HARBOR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NE3	8	8	1.8
2. SE3	8	-8	1.8
3. SW3	-8	-8	1.8
4. NW3	-8	8	1.8
5. NE7	11	11	1.8
6. SE7	11	-11	1.8
7. SW7	-11	-11	1.8
8. NW7	-11	11	1.8

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	85.	1.2	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	95.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.6	.0	.1	.0	.0	.0	.0	.1	.0
6. SE7	276.	.7	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	83.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.7	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: TERM1/HARBOR ISLAND AND N HARBOR PM WP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	*	.0	.6	.0	.0	.0	.0	.2	.0	.0	.0	.1	.0
2. SE3	*	.0	.0	.2	.0	.0	.5	.0	.0	.0	.0	.0	.0
3. SW3	*	.0	.2	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	*	.0	.5	.0	.0	.0	.0	.2	.0	.0	.0	.1	.0
5. NE7	*	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	*	.0	.0	.1	.0	.0	.3	.0	.0	.0	.0	.0	.0
7. SW7	*	.0	.2	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	*	.0	.3	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0

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Appendix 5

SDAPCD Rule 55

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RULE 55 FUGITIVE DUST CONTROL

(Adopted June 24, 2009; Effective December 24, 2009)

(a) APPLICABILITY

Except as provided in Section (b), the provisions of this rule shall apply to any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas. Activities subject to this regulation are also subject to the applicable requirements of Rule 50 (Visible Emissions) and Rule 51 (Nuisance).

(b) EXEMPTIONS

The provisions of this rule shall not apply to the following:

(1) Noncommercial construction or demolition activities in support of any structure designed for and used exclusively as a dwelling for not more than four families;

(2) Emergency operations conducted during and in response to life-threatening situations, or in conjunction with any officially declared disaster or state of emergency;

(3) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and/or sewer during periods of unplanned service outages and emergency disruptions;

(4) Any active operation, open storage pile, or inactive disturbed area for which the owner/operator can demonstrate that necessary fugitive dust preventive or mitigating actions are in conflict with the California or federal Endangered Species Acts, or a local, state, or federal water quality requirement;

(5) Explosive blasting operations. However, any other activities capable of generating fugitive dust emissions and performed in conjunction with explosive blasting, such as vehicle transport of materials produced by blasting operations, are not exempt from complying with the provisions of this rule or other applicable rules;

(6) Abrasive blasting operations regulated by Rule 71 (Abrasive Blasting);

(7) Activities subject to an Air Pollution Control District permit to operate;

(8) Permanent unpaved roads.

(c) DEFINITIONS

For the purpose of this rule, the following definitions shall apply:

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(1) **"Active Operation"** means any construction or demolition activity capable of generating fugitive dust. This includes but is not limited to, earth-moving activities, and heavy- and light-duty vehicular movement on disturbed surface areas or on unpaved roads.

(2) **"Bulk Materials"** means any material which can emit fugitive dust when stored, disturbed, or handled, and is un-packaged. Bulk material includes, but is not limited to, sand, gravel, soil, aggregate material, and other organic or inorganic particulate matter.

(3) **"Commercial"** means work conducted for financial compensation by other than a tenant or property owner.

(4) **"Construction or Demolition Activity"** means any on-site activity preparatory to or for the purpose of building, altering, rehabilitating, raising, tearing down, breaking into pieces, or improving property, including, but not limited to, the following activities: grading, excavation, loading, transporting, crushing, cutting, planing, shaping or ground breaking.

(5) **"Dust"** means minute solid particles released into the air by natural forces or by mechanical processes including, but not limited to: crushing, grinding, milling, drilling, demolishing, shoveling, conveying, covering, bagging, and sweeping.

(6) **"Earth-moving Activities"** means activities that include, but are not limited to, grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing bulk materials from open storage piles, or soil mulching.

(7) **"Emergency"** means an immediate threat to human health or property.

(8) **"Erosion"** means the movement and deposition of land surface materials by water or wind primarily as a result of human activities.

(9) **"Inactive Disturbed Area"** means a portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emissions of fugitive dust. This definition excludes those areas that have:

(i) Been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(ii) Been paved or otherwise covered by a permanent structure; or

(iii) Established a vegetative ground cover equivalent to at least 70% percent of the background coverage for nearby undisturbed areas.

(10) **"Open Storage Pile"** means any accumulation of bulk material with five percent or greater silt content which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more

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square feet. Silt content level is assumed to be five percent or greater unless a person can show, by sampling and analysis in accordance with ASTM Method C-136 or other equivalent method approved in writing by the California Air Resources Board, that the silt content is less than five percent.

(11) **"Owner/operator"** means any person who owns, leases, operates, controls, or supervises any activity subject to this rule or any person who owns, leases, operates, controls, or supervises the site at which any activity subject to this rule occurs, or both.

(12) **"Particulate Matter"** means any finely divided material which exists as a solid or liquid at standard conditions, excluding uncombined water.

(13) **"Paved Road"** means an improved street, highway, alley, public way, or easement that is covered by concrete, asphaltic concrete, fresh or recycled asphalt, or rubberized asphalt, excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic.

(14) **"Permanent Unpaved Road"** means any unsealed or dirt roadway that is not covered by concrete, asphaltic concrete, fresh or recycled asphalt, or rubberized asphalt, and which is designed and intended to remain unsealed and uncovered indefinitely. This definition excludes public or private roads undergoing construction or resurfacing.

(15) **"Person"** means any individual, firm, association, organization, partnership, business trust, corporation, company, contractor, supplier, installer, user or owner, or any state or local government agency or public district and any officer or employee thereof, or the federal government and any officers or employees thereof to the extent authorized by federal law, or any other entity whatsoever which is recognized by law as the subject of rights and duties.

(16) **"Property Line"** means the boundaries of an area in which either a person causing the fugitive dust emissions or a person allowing such emissions has the legal control or possession. This may include all or portions of a legal parcel or parcels as defined by the San Diego County Assessor.

(17) **"Track-Out/Carry-Out"** means any bulk materials that adhere to and agglomerate on the exterior surfaces of motor vehicles and/or equipment (including tires), or are inadvertently carried out, and that fall onto a paved road, creating visible roadway dust.

(18) **"Visible Dust Emissions"** means any solid particulate matter that is visually detectable in the air without the aid of instruments other than corrective lenses.

(19) **"Visible Roadway Dust"** means any sand, soil, dirt, or other solid particulate matter which is visible upon paved public road surfaces and which can be removed by a vacuum sweeper, or a wet sweeper under normal operating conditions.

(d) **STANDARDS**

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(1) **Airborne Dust Beyond the Property Line:** No person shall engage in construction or demolition activity subject to this rule in a manner that discharges visible dust emissions into the atmosphere beyond the property line for a period or periods aggregating more than 3 minutes in any 60 minute period.

(2) **Track-Out/Carry-Out:** Visible roadway dust as a result of active operations, spillage from transport trucks, erosion, or track-out/carry-out shall:

(i) be minimized by the use of any of the following or equally effective track-out/carry-out and erosion control measures that apply to the project or operation: track-out grates or gravel beds at each egress point, wheel-washing at each egress during muddy conditions, soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding; and for outbound transport trucks: using secured tarps or cargo covering, watering, or treating of transported material; and

(ii) be removed at the conclusion of each work day when active operations cease, or every 24 hours for continuous operations. If a street sweeper is used to remove any track-out/carry-out, only PM10-efficient street sweepers certified to meet the most current South Coast Air Quality Management District Rule 1186 requirements shall be used. The use of blowers for removal of track-out/carry-out is prohibited under any circumstances.

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Appendix 6

SCAQMD Rule 403
Best Available Control Measures

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TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

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TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

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TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

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TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Unpaved roads/parking lots	19-1 Stabilize soils to meet the applicable performance standards; and 19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
Vacant land	20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Appendix G

Noise Technical Report

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Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment Noise Report

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November 2009

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ICF Jones & Stokes. 2009. Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment, Noise Report. November. (ICF J&S 00977.08.) San Diego, CA. Prepared for: San Diego Unified Port District.

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Chapter 1

Summary of Findings

ICF Jones & Stokes has conducted a noise impact analysis for the proposed Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment (Project). Key findings are listed below.

Project-related construction noise levels would not exceed the City of San Diego construction noise threshold of 75 dBA at noise-sensitive land uses. The nearest noise-sensitive land uses are located more than 400 feet from the Project site. Less-than-significant impacts are anticipated.

At the representative receptor locations under the Existing Plus Cumulative and Year 2030 Project scenarios where the City standard is exceeded, the Proposed Project would incrementally increase noise levels by 0 to 1 dB when compared to Existing Plus Cumulative and Year 2030 No Project conditions. The incremental increase of 1 dB would not be perceptible by the general public and would not exceed the City of San Diego noise increase threshold. Less-than-significant impacts are anticipated.

Buildings of modern construction typically achieve exterior/interior noise reduction levels of 15 to 20 dBA with windows and doors closed. Because the proposed guest rooms associated with the Project would experience exterior traffic noise levels of less than 65 dBA CNEL under Project conditions, the Proposed Project would comply with the City's interior noise level requirement of 45 dBA CNEL.

Although the Project site is not within the Airport Environs Overlay Zone and is not located within the airport 60 dBA (CNEL) noise contour, aircraft noise is clearly audible within the Project site. To ensure that interior noise levels at the Proposed Project are minimized, mitigation measures are recommended. With implementation of mitigation measures, less-than-significant impacts are anticipated.

The cumulative noise analysis used the Year 2030 traffic conditions to determine the traffic noise that would result from increased cumulative trips. Existing and anticipated noise levels were modeled at various locations along the roadways affected by Project traffic, including hotels, residences, and recreational areas. These areas are subject to the City's transient residential, residential, or recreational noise standards, respective of the land use—all of which are 65 dBA. The estimated 2030 noise levels at the modeling locations without Project

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construction were compared to the estimated Year 2030 levels with the addition of Project traffic noise. A significant cumulative impact would occur where Year 2030 conditions would cause noise at a modeling location to exceed the City's 65-dBA threshold. The Proposed Project's contribution would be cumulatively considerable where the Proposed Project causes an increase of 3 dBA or greater at those areas exceeding 65 dBA. Two modeling locations subject to the City's 65-dBA residential threshold are anticipated to exceed the cumulative threshold under Year 2030 conditions. At these locations, the Proposed Project's contribution is estimated to be 0 dBA, when rounded to whole decibels. Because the Proposed Project would not increase noise at these locations by 3 or more dBA, the Proposed Project's contribution to these significant cumulative impacts is not cumulatively considerable. Therefore, no mitigation is necessary.

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Chapter 2

Introduction

2.1 Purpose of Study

The purpose of this study is to evaluate the potential noise impacts of the Proposed Project. Potential noise impacts have been analyzed for the construction and operation phases of the Proposed Project, and mitigation measures are recommended where necessary.

2.2 Project Description

The Proposed Project is in the southern portion of San Diego County (Figure 1) at the northern end of San Diego Bay. The site is on the east side of Harbor Island (Figure 2), which is within the jurisdiction of the San Diego Unified Port District (Port District). The Port District regulates development within its jurisdiction in accordance with the Port Master Plan (PMP).

The Proposed Project (Figure 3) would consist of a four-story hotel structure with a total floor area of approximately 117,000 square feet, consisting of a maximum of 175 rooms, and including 8,000 square feet of fitness and limited meeting space and surface parking. In addition, the Project would extend the promenade around the site's northern edge.

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Chapter 3

Noise Impacts

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

3.1 Noise Characteristics and Effects

3.1.1 Characteristics of Sound

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies within the entire spectrum; thus, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting," written as dBA.

The following provides brief definitions of important terms and the types of metrics used to characterize the time-varying nature of sound:

- **Sound.** A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

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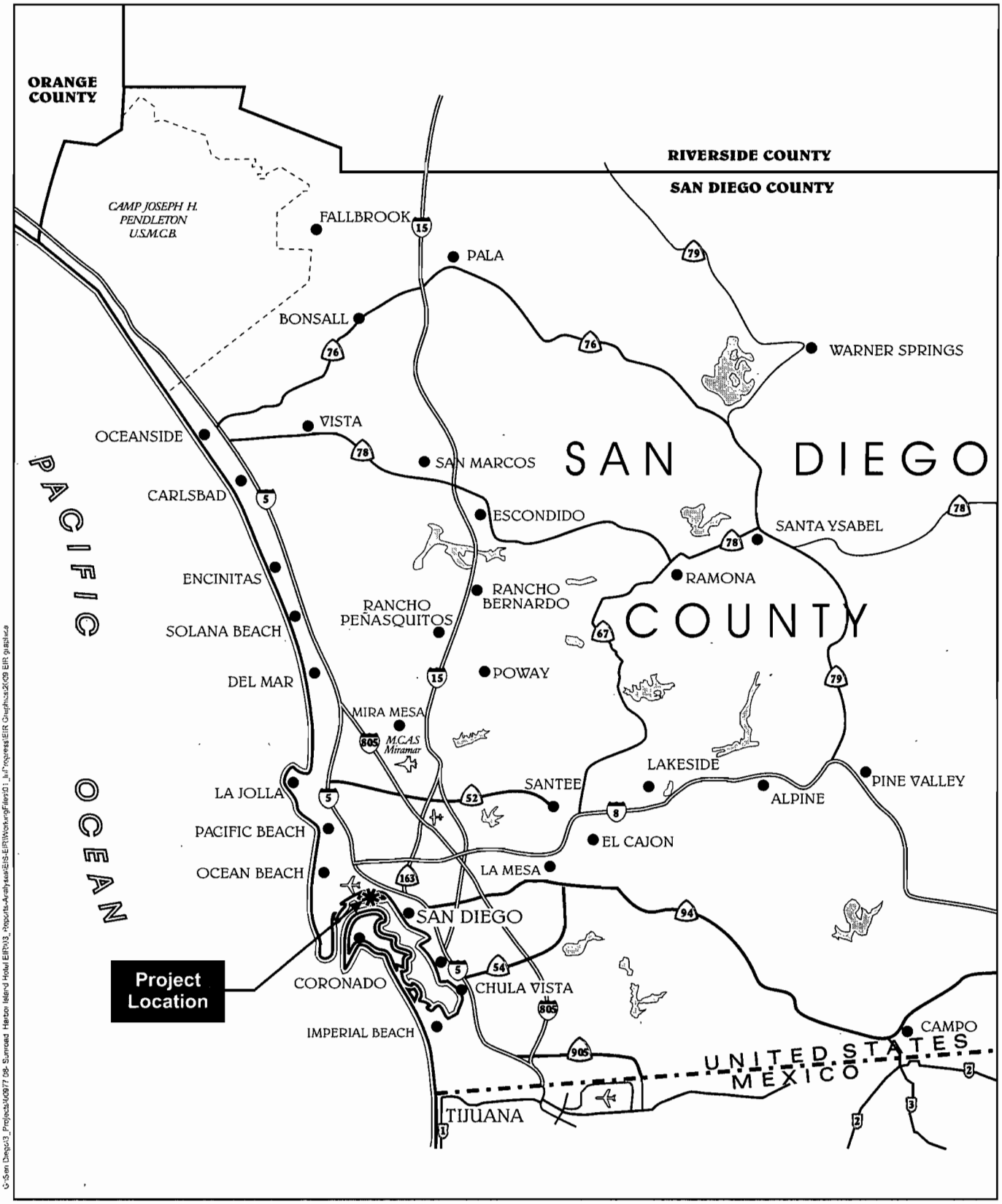

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Regional Location Map
Figure 1

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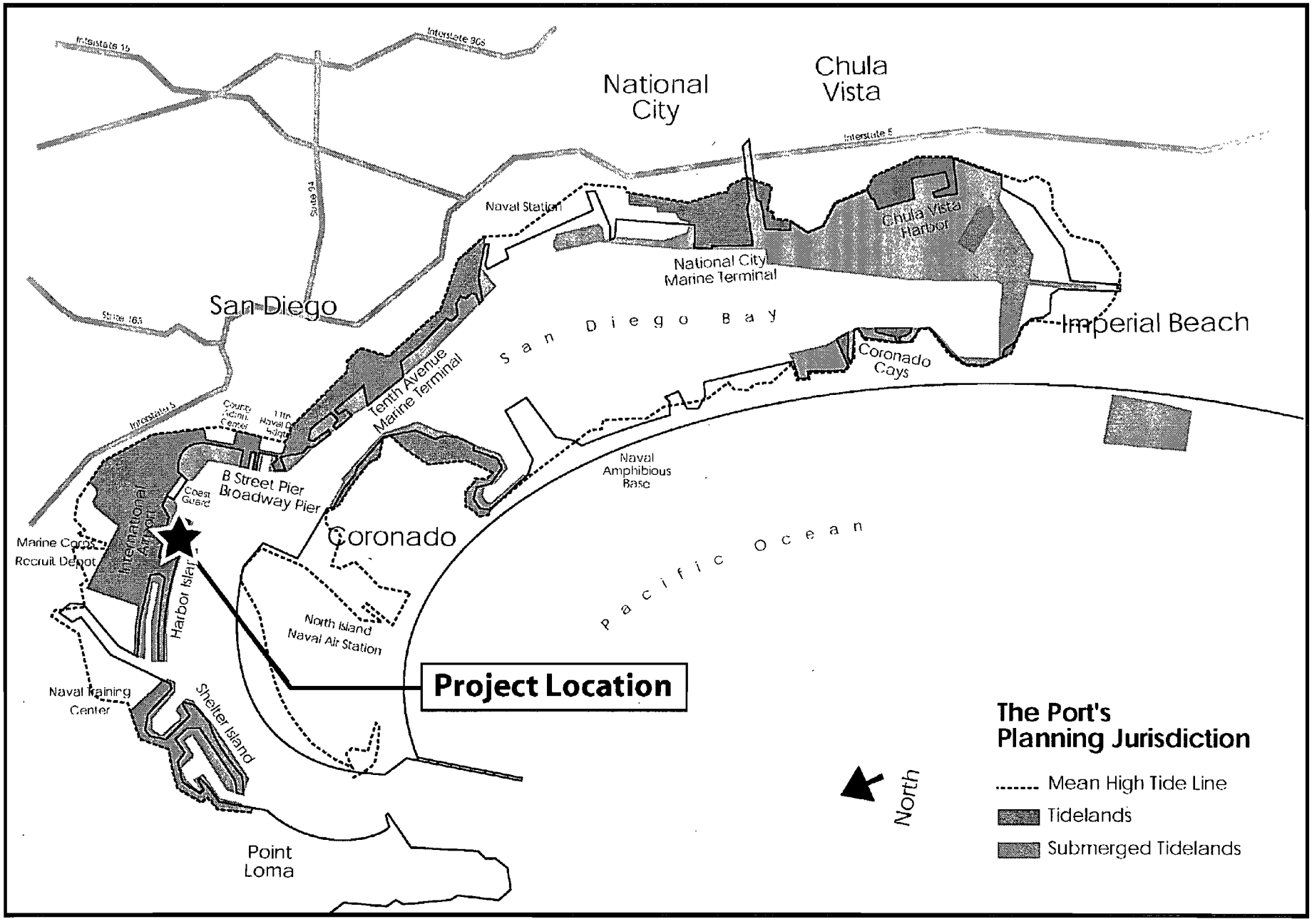

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Vicinity Map
Figure 2

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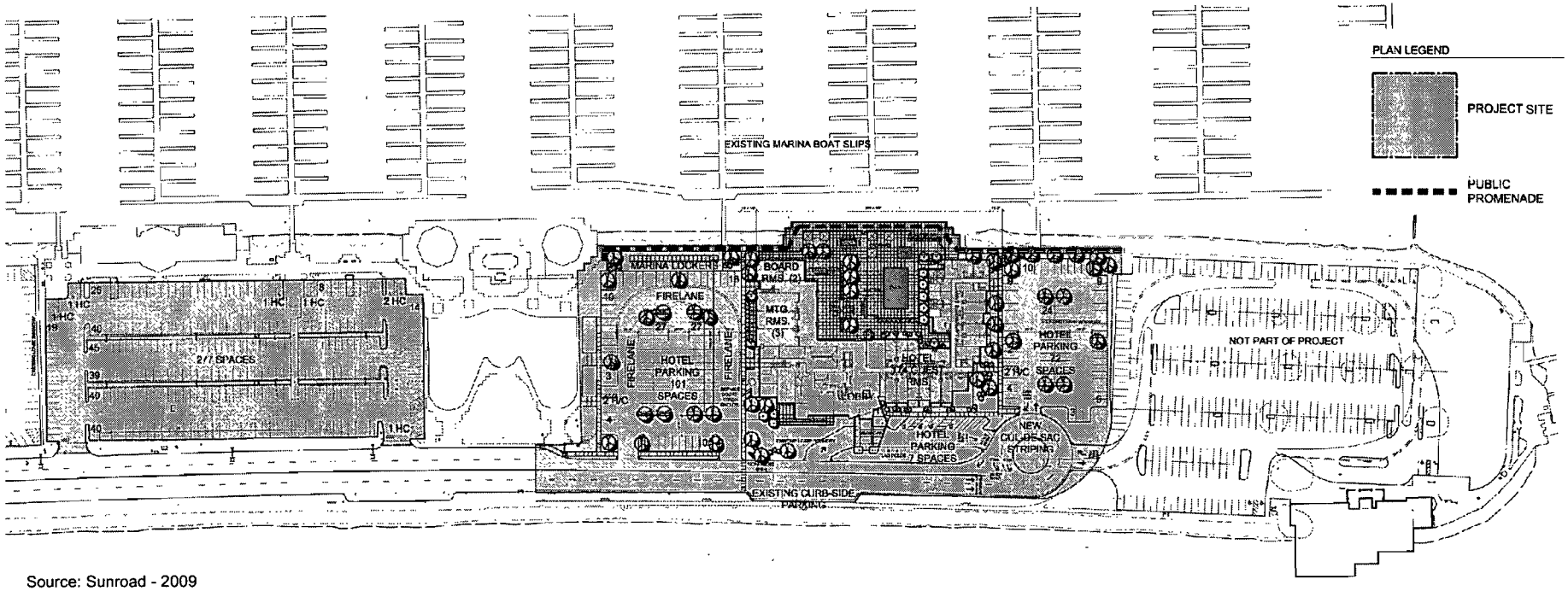

Source: Sunroad - 2009

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Feet

Proposed Site Plan
Figure 3

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- **Decibel (dB).** A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micropascals.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Maximum Sound Level (L_{max}).** The maximum sound level measured during the measurement period of interest.
- **Minimum Sound Level (L_{min}).** The minimum sound level measured during the measurement period of interest.
- **Equivalent Sound Level (L_{eq}).** The equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy.
- **Percentile-Exceeded Sound Level (L_n).** The sound level exceeded "n" percent of a specific time period. For example, L_{10} is the sound level exceeded 10% of the time.
- **Day-Night Level (L_{dn}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment. In general, human sound perception in a community environment is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound level. Table 1 lists typical sound levels measured in the environment and the subjective human response to the various intensities of noise.

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 dB for each doubling of 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.

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Table 1. Typical Sound Levels

Noise Level dBA	Extremes	Home Appliances	Speech at 3 Feet	Motor Vehicles at 50 Feet	General Type of Community Environment
120	Jet aircraft at 500 ft				
110					
100		Chain saw			
90		Power lawn mower		Diesel truck (not muffled)	
80		Shop tools	Shout	Diesel truck (muffled)	
70		Blender	Loud voice	Automobile at 70 mph	Major metropolis
60		Dishwasher	Normal voice	Automobile at 40 mph	Urban (daytime)
50		Air conditioner	Normal voice (back to listener)	Automobile at 20 mph	Suburban (daytime)
40		Refrigerator			Rural (daytime)
30					
20					
10					
0	Threshold of hearing				

Source: Harris Miller Miller & Hanson, Inc. 2003.

Generally, when travelling, noise is most audible by direct line-of-sight. 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 under highly optimal conditions (ideal geometry and a tall noise barrier). A barrier performance level of approximately 5 to 10 decibels of noise reduction is more typical. However, if a barrier is not high or long enough to break the line-of-sight (the unobstructed visual path) from the noise source to the receiver, its effectiveness is greatly reduced.

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3.2 Existing Environmental Setting

3.2.1 Existing Noise Environment

The existing noise environment of the Project site and its vicinity is characterized by ambient noise levels generated by vehicular traffic and aircraft. Vehicular traffic is the most consistent noise source in the vicinity of the Project site. Aircraft noise from the nearby San Diego International Airport (SDIA) to the north and Naval Air Station (NAS) North Island to the south is also a primary contributor to the ambient noise environment, albeit on a somewhat less continuous basis.

3.2.2 Sensitive Receptors

Land uses that are considered sensitive to noise impacts are referred to as *sensitive receptors*. Noise-sensitive receptors consist of, but are not limited to, schools, residences, libraries, hospitals, other care facilities, and parks.

Land uses that are considered sensitive to noise impacts are referred to as "sensitive receptors." Noise-sensitive land uses typically include schools, residences, libraries, hospitals, other care facilities, and parks. The Project site is located adjacent to a marina and restaurants. No schools, residences, libraries, hospitals, care facilities, or parks are located in the immediate vicinity of the Project site. The nearest sensitive receptors to the Project site are the Spanish Landing Park, located approximately 0.5 mile northwest of the Project site, the park located on the south side of West Harbor Island, approximately 1 mile west of the Project site, and residences along Laurel Street, Hawthorne Street, and Grape Street, approximately 1 mile to the east of the Project site.

Short-term attended sound level measurements were conducted with a Larson Davis Type 812 Sound Level Meter (SLM). This instrument is categorized as a Type 1 (Precision Grade) device. Noise was measured at seven representative locations in and around the Project site, as shown in Figure 4. Noise measurements were taken at various locations in and adjacent to the marina (ST-1, ST-2, and ST-3), at the Sheraton hotel west of the Project site (ST-4), at the two restaurants located east of the Project site (ST-5 and ST-6), and at Harbor Island Drive Park, along the bayside promenade overlooking the harbor (ST-7). During the field measurements, physical observations of the predominant noise sources were noted. The field noise measurement data sheets are included in Appendix A. Site photographs were also taken, and are included in Appendix B.

The sound-measuring instruments used for the survey were set to the slow time response mode and the dBA scale for all of the noise measurements. To ensure accuracy, the laboratory calibration of the instruments was field checked before and after each measurement period. The accuracy of the acoustical calibrator is maintained through a program established through the manufacturer and

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traceable to the National Institute of Standards and Technology. The sound measurement instruments meet the requirements of the American National Standard S 1.4-1983 and the International Electrotechnical Commission Publications 804 and 651. In all cases, the microphone height was 5 feet above the ground, and the microphone was equipped with a windscreen.

The results of the attended short-term sound level measurements are summarized in Table 2. As shown in Table 2, measured noise levels during daytime hours in the vicinity of the Project site varied from 54 dBA L_{eq} (at ST-3) to 65 dBA L_{eq} (at ST-7).

Table 2. Short-Term Sound Level Measurement Results

		Measurement Period				Measurement Results (dBA)					
Site ID	**Measurement Location**	**Date**	**Start Time**	**Duration (mm:ss)**	**Noise Sources**	**L_{eq}**	**L_{max}**	**L_{min}**	**L_{90}**	**L_{50}**	**L_{10}**
ST-1	In front of the gangplank leading to marina slips	08/31/06	09:30	17:00	Aircraft from SDIA and NAS North Island, residents walking by, birds	59.5	73.8	48.9	50.4	52.8	64.1
ST-2	Westernmost slip on marina, next to boats	08/31/06	10:08	16:00	Aircraft from SDIA, birds, residents walking by	54.6	65.9	48.4	49.6	51.8	58.6
ST-3	Easternmost slip on marina, next to boats	08/31/06	10:46	16:00	Aircraft from SDIA, birds, residents walking by	54.1	68.3	46.9	48.9	51.3	56.1
ST-4	Room 1051 of Sheraton, east side of building facing Project site	08/31/06	11:59	15:00	Aircraft from SDIA, traffic	64.2	82.1	55.3	58.8	61.8	66.3
ST-5	East of Project site, next to Reuben E Lee	08/31/06	14:00	15:00	Traffic, aircraft from SDIA, birds, ambient	58.3	71.4	49.2	51.8	55.6	61.5
ST-6	East of Project, next to Island Prime Restaurant	08/31/06	14:23	15:00	Traffic, aircraft from SDIA, birds, ambient	60.0	71.7	56.0	56.8	57.6	62.3
ST-7	Southwest of Project site, along Harbor Island Drive Park bayside promenade	08/31/06	15:08	15:00	Traffic (bus traffic), aircraft from SDIA, helicopters from NAS North Island, ambient	64.8	78.0	52.3	54.3	60.9	68.3

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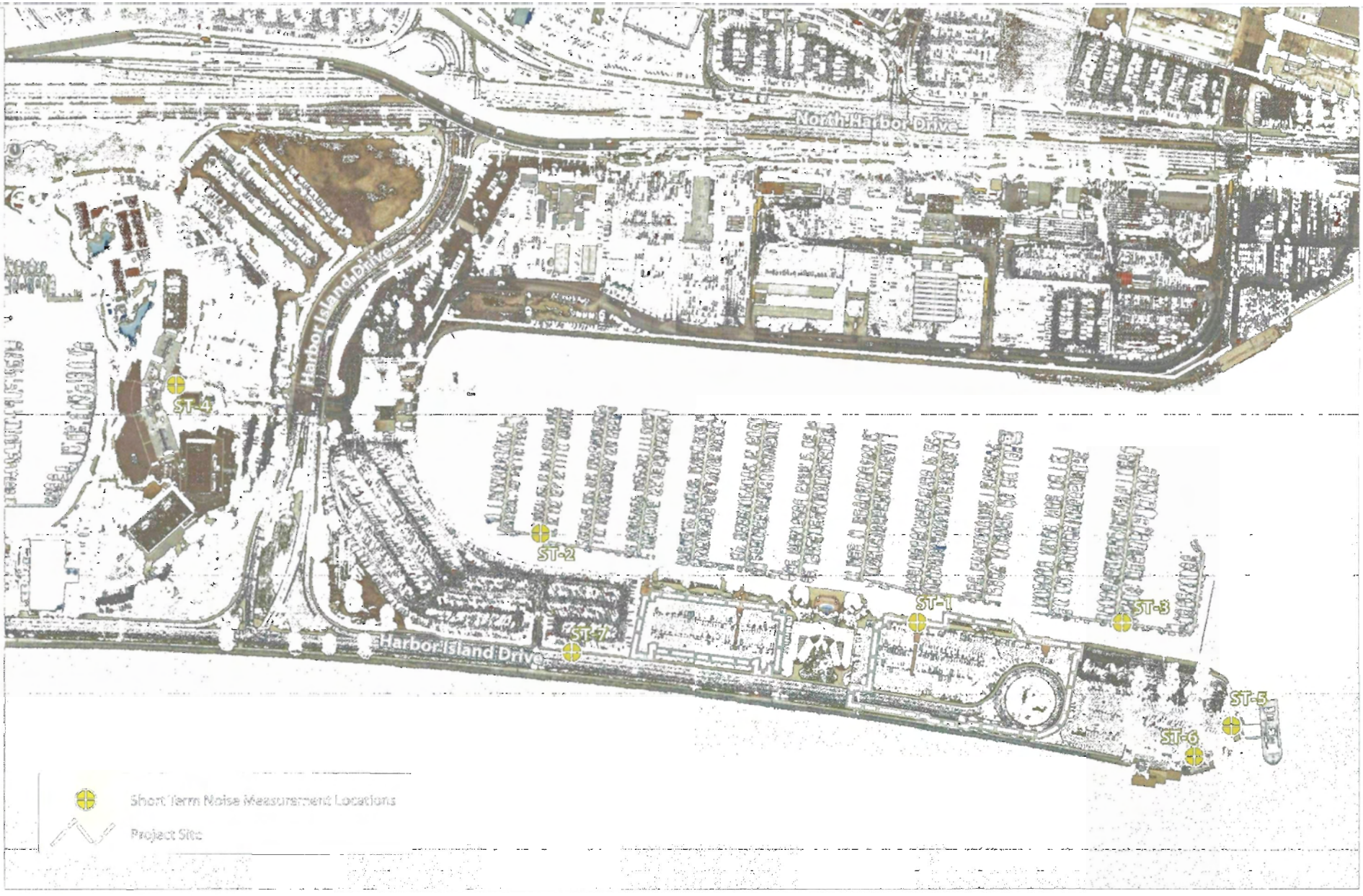

Not to Scale

Project Sits and Noise Measurement Locations
Figure 4

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3.3 Significance Criteria

The following significance criteria are based on Appendix G of the State CEQA Guidelines and are the basis for determining the significance of impacts associated with noise resulting from development of the Proposed Project.

Impacts are considered significant if the Project would:

- expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- expose persons to or generate excessive groundborne vibration or groundborne noise levels;
- result in a substantial permanent increase in ambient noise levels in the project vicinity above existing without the project;
- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- expose people residing or working in the project area within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, to excessive noise levels; or
- expose people residing or working in the project area within the vicinity of a private airstrip to excessive noise levels.

Because the Port District does not maintain significance criteria for noise impacts, the following City of San Diego criteria (2007) were used to further define and determine Project impacts.

The Project would result in a significant impact if:

- construction activities would cause noise levels at a sensitive receptor to exceed 75 dBA L_{eq}, averaged between the construction hours of 7 a.m. and 7 p.m.;
- operation activities would cause noise levels to exceed the exterior noise threshold of 65 dBA (CNEL), which applies to the residential and recreational uses found in the Project vicinity;
- the Project incrementally increases noise levels by 3 dB or more if ambient noise levels already exceed 65 dBA, (CNEL); or
- internal noise levels exceed 45 dBA (CNEL) in the proposed hotel.

Because neither the Port District nor the City maintains significance thresholds for ground-borne vibration, this analysis used thresholds maintained by the California Department of Transportation (Caltrans) and the Federal Transit Administration (FTA), measured in peak particle velocity (PPV). Caltrans has identified a PPV of between 0.0059 and 0.019 inch per second as the threshold of

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human perception, 0.079 inch per second as being "readily perceptible" to people, and 0.197 inch per second as the threshold at which there is a risk of architectural damage to normal dwellings. The FTA maintains a 0.12 inch-per-second threshold for potential damage to "extremely fragile historic buildings," which, although none occur on the Project site, remains a useful reference in the absence of more applicable standards.

3.4 Analysis of Project Impacts

3.4.1 Construction Phase Impacts

Construction of the Proposed Project would result in temporary increases in ambient noise levels in the vicinity of the Project site on an intermittent basis. Construction would take approximately 18 months. Noise levels would fluctuate depending on 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 require the use of numerous noise-generating equipment, such as jack hammers, pneumatic impact equipment, saws, front-end loaders, concrete trucks and pumpers, cranes, and other heavy equipment. Helical Earth Anchor Technology (HEAT anchors) or stone columns will be used in lieu of pile driving techniques to install any necessary foundation piles; therefore construction noise and vibration will be limited to the levels discussed herein for conventional construction methods. Typical noise levels from various types of equipment that may be used during construction are listed in Table 3. The table shows noise levels at various distances from the construction noise source.

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Table 3. Maximum Noise Levels of Common Construction Machines

	Noise Level (dBA)[a]			
Noise Source	**50 Feet**	**100 Feet**	**200 Feet**	**400 Feet**
Jackhammer	82	76	70	64
Steamroller	83	77	71	55
Street Paver	80	74	68	62
Backhoe	83	77	71	55
Street Compressor	67	61	55	49
Front-end Loader	79	73	67	61
Street Cleaner	70	64	58	52
Idling Haul Truck	72	66	60	54
Cement Mixer	72	66	60	54

[a] Assumes a 6 dB 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 10 and 30 feet from the noise source.

Source: Cowan 1994.

Whereas Table 3 shows the noise level of individual equipment types, the noise levels shown in Table 4 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 U.S. Environmental Protection Agency (EPA) 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 4 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.

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Table 4. Outdoor Construction Noise Levels

	Noise Level (dBA)			
Construction Phase	**50 Feet**	**100 Feet**	**200 Feet**	**400 Feet**
Ground Clearing	84	78	72	66
Grading/Excavation	89	83	77	71
Foundations	78	72	66	60
Structural	85	79	73	67
Finishing	89	83	77	71

Source: EPA 1971.

Construction noise would be audible to visitors in the vicinity of the Project site, including marina guests in the slips north of the Project site and promenade users south of the Project site. The marina would be within 100 feet of potential construction areas, which, as shown in Table 4, would receive noise exceeding the adopted 75-dBA threshold during most of the construction activities. However, this noise increase is temporary and limited only to typical work (and thus, construction) hours. Furthermore, the marina adjacent to the Project site is not considered to be a noise-sensitive land use.

As discussed above, the nearest sensitive receptors to the Project site are the Spanish Landing Park, located approximately 0.5 mile northwest of the Project site; the park located on the south side of West Harbor Island, approximately 1 mile west of the Project site; and residences along Laurel Street, Hawthorne Street, and Grape Street, approximately 1 mile to the east of the Project site. As shown on Table 4, construction noise would be well below the noise threshold of 75 dBA at a distance of 400 feet; accordingly, construction noise would not exceed the threshold for the closest sensitive receptors, which would all be further than 400 feet from the construction site. Therefore, noise from construction activities is considered to be a less-than-significant impact.

Vibration

Ground-borne vibration during heavy construction activities can be an annoyance to people and, in some circumstances, can cause damage to buildings. Generally, high levels of construction-related vibration are associated with impact-type pile driving and blasting (techniques not planned for this Project). Vibration would be generated during normal construction activity from conventional heavy construction equipment, but the magnitude of the vibration would dissipate fairly rapidly, and would not be perceptible at a distance of 50 feet or less. Because the nearest sensitive land uses are located more than 50 feet from construction activities, this impact would be less than significant.

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Methodologies detailed in Chapter 12 of the FTA manual *Transit Noise and Vibration Impact Assessment* were used for this analysis to predict vibration levels from conventional construction equipment in terms of PPV in inches per second (IPS). At a distance of 50 feet from the nearest potential grading and construction activities, vibration levels from conventional construction equipment are predicted to be approximately 0.03 IPS. This level is below FTA criteria levels for potential damage to structures, even using the most stringent "extremely fragile historic buildings" category. The damage criterion for such structures is 0.12 IPS, and below the threshold of perception (0.1 IPS).

3.4.2 Operational Phase Impacts

Vehicular Noise

The predominant noise source for the Proposed Project, as with most urbanized areas, is vehicular traffic. According to the Project traffic report prepared by Linscott, Law & Greenspan Engineers (LLG), the Proposed Project would generate a net total of approximately 1,225 daily vehicle trips (LLG 2009).

The expected traffic noise levels at existing offsite and existing/proposed onsite noise-sensitive receptors were predicted using the Federal Highway Administration's (FHWA's) Traffic Noise Model (TNM®). TNM is the FHWA's computer program for highway traffic noise prediction and analysis. The most current version of TNM (Version 2.5) was used for this Project. The parameters used to estimate vehicular traffic noise were the typical distance between roadway centerline and receiver; typical AM/PM peak-hour traffic volumes and posted speed limits; percentages of automobiles, medium trucks, and heavy trucks; roadway grade; and site conditions (terrain or structural shielding and ground propagation characteristics) (FHWA 2004). The input and output files from the TNM model files are included in Appendix C.

Noise from motor vehicle traffic associated with the Proposed Project was analyzed using data from the Project's traffic study (LLG 2009). AM/PM peak-hour volumes for the Existing, Near-Term (Year 20123) Existing Plus Cumulative, and Future Year 2030 With and Without Project scenarios were used to predict the changes in traffic noise at selected roadway segments.

The segments modeled in this noise analysis (selected based upon Project traffic flow and the presence in these areas of noise-sensitive land uses) were:

- Harbor Island Drive East
- Harbor Island Drive West
- Harbor Island Drive North
- Laurel Street east of Pacific Highway
- Hawthorne Street east of Pacific Highway

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- Grape Street east of Pacific Highway

The predicted traffic noise levels at representative receptors (shown in Figure 5) are presented in Tables 5 and 6. Year 2030 With and Without Project traffic noise (summarized in Table 6) is discussed further in Section 3.7, "Cumulative Impacts." The existing traffic noise levels ranged from approximately 42 dBA CNEL at M-4 (the marina to the northwest of the Project site) to approximately 66 dBA CNEL at M-5 (residences in the vicinity of Laurel Street, east of the Project site).

Near-Term (Year 2012) Existing Plus Cumulative and Near-Term (Year 2012) Existing Plus Cumulative Plus Project noise levels also were predicted using TNM and are presented in Table 5. As the table shows, increases in near-term future traffic volumes (in the absence of the Project) are expected to increase noise levels 0 to 1 dB (when rounded to whole numbers) compared to existing levels. With the addition of the Proposed Project, near-term future noise levels would increase local noise levels in the vicinity of the Project site by up to approximately 1 dB, and would not cause an exceedance of relevant noise standards.

As indicated in Table 5, ambient noise levels under No Project conditions in the Near-Term (Year 2012) Existing Plus Cumulative and Year 2030 scenario exceeds 65 dBA (CNEL) at several locations. According to the City of San Diego noise thresholds, if noise levels exceed 65 dBA (CNEL), then a significant impact would occur if the Proposed Project incrementally increases noise levels by 3 dB or more. As shown in Table 5, in the representative receptor locations under the Near-Term (Year 2012) Existing Plus Cumulative Plus Project scenario where the City standard is exceeded (M-5 and M-7), the Proposed Project would incrementally increase noise levels by 0 dB (rounded to the whole number) when compared to Near-Term (Year 2012) Existing Plus Cumulative condition. Because the Project-related noise increase is less than 3 dBA, City noise thresholds would not be exceeded and impacts would be less than significant.

Buildings of modern construction typically achieve exterior/interior noise reduction levels 15 to 20 dBA minimum with windows and doors closed. Because the proposed guest rooms associated with the Project (as represented by modeled receptor M-8) would experience exterior traffic noise levels of less than 65 dBA CNEL under Project conditions, the habitable rooms of the Proposed Project would comply with the City's interior noise level requirement of 45 dBA CNEL.

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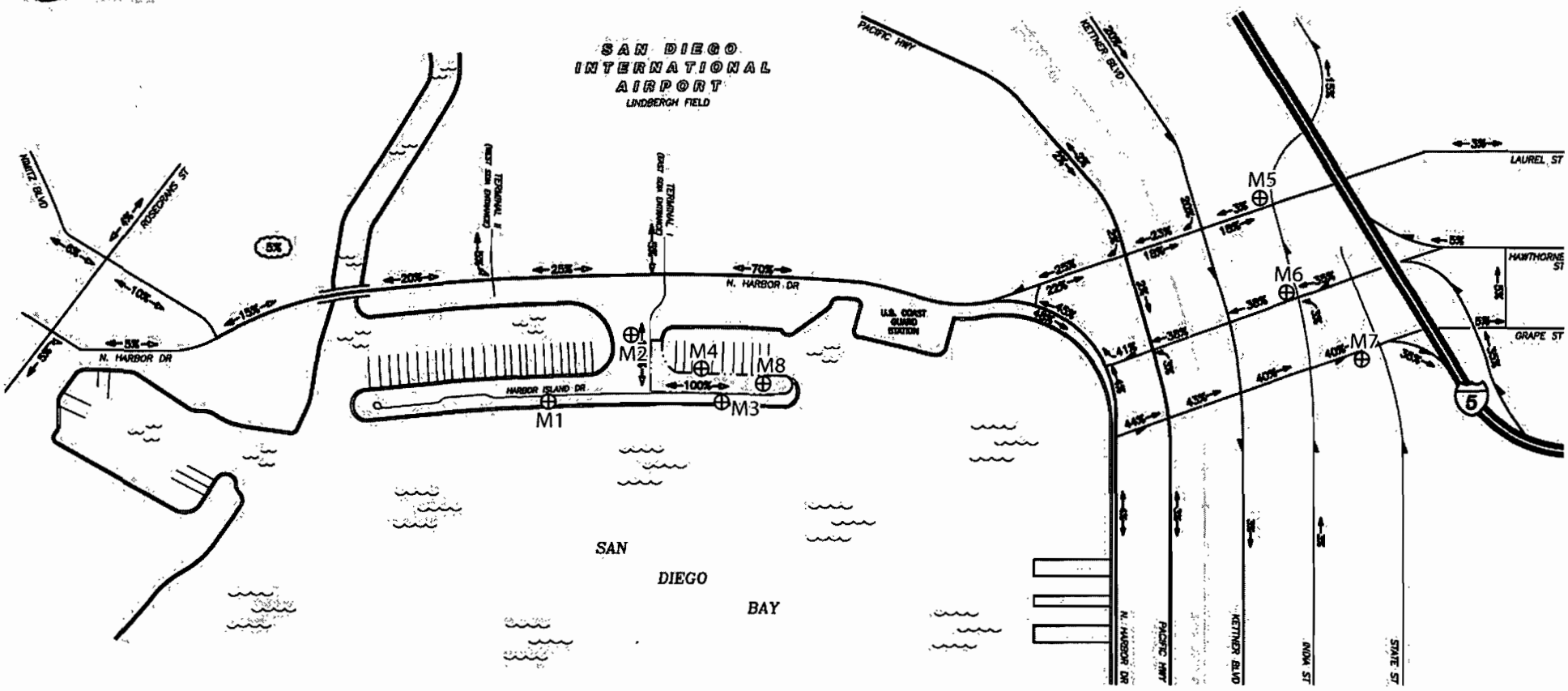

Source: LLG, 2009; ICF Jones & Stokes, 2009

Not to Scale

Traffic Noise Model Receptors
Figure 5

ICF Jones & Stokes
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Table 5. Traffic Noise Modeling Results—Existing and Near-Term (Year 2012) Existing Plus Cumulative Conditions (dBA CNEL/L_{dn})

Receptor	Land Use Type / Noise Standard	Existing	Near-Term (Year 2012) Existing Plus Cumulative	Near-Term (Year 2012) Existing Plus Cumulative Plus Project	Project-Related Noise Increase	Relevant Noise Standard Exceeded?	Ambient "No Project" Conditions over Relevant Standard and Project-Related Increase 3 dBA or more?
M-1: Harbor Island Drive Promenade, West Harbor Island	Recreation / 65	62	62	62	0	No	No
M-2: Hotel adjacent to Harbor Island Drive	Transient Residential / 65	50	50	50	0	No	No
M-3: Harbor Island Drive Promenade, East Harbor Island	Recreation / 65	60	61	62	1	No	No
M-4: Boat / Marina area, East Harbor Island	Recreation / 65	42	42	43	1	No	No
M-5: Residences in the vicinity of Laurel Street	Residential / 65	66	67	67	0	**Yes**	No
M-6: Residences in the vicinity of Hawthorne Street	Residential / 65	62	62	62	0	No	No
M-7: Residences in the vicinity of Grape Street	Residential / 65	64	65	65	0	No	No
M-8: Proposed Project Site	Transient Residential / 65	57	58	58	0	No	No

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Table 6. Traffic Noise Modeling Results—Existing and Year 2030 Conditions (dBA CNEL/L_{dn})

Receptor	Land Use Type / Noise Standard	Existing	Year 2030 Without Project	Year 2030 With Project	Project-Related Noise Increase	Relevant Noise Standard Exceeded?	Ambient "No Project" Conditions over Relevant Standard and Project-Related Increase 3 dBA or more?
M-1: Harbor Island Drive Promenade, West Harbor Island	Recreation / 65	62	62	62	0	No	No
M-2: Hotel adjacent to Harbor Island Drive	Transient Residential / 65	50	51	51	0	No	No
M-3: Harbor Island Drive Promenade, East Harbor Island	Recreation / 65	60	62	62	0	No	No
M-4: Boat / Marina area, East Harbor Island	Recreation / 65	42	44	44	0	No	No
M-5: Residences in the vicinity of Laurel Street	Residential / 65	66	69	69	0	**Yes**	No
M-6: Residences in the vicinity of Hawthorne Street	Residential / 65	62	63	63	0	No	No
M-7: Residences in the vicinity of Grape Street	Residential / 65	64	67	67	0	**Yes**	No
M-8: Proposed Project Site	Transient Residential / 65	57	58	59	1	No	No

Aircraft Noise

The Project site is located approximately 0.5 mile south of Lindbergh Field. The Project site is not located within the Airport Environs Overlay Zone (AEOZ) and is also not located within the airport 60 dBA CNEL noise contour.[1] Generally, land uses that are located within the AEOZ and the 60 dBA CNEL noise contour are considered noise impacted because these land uses are within the flight path of aircraft approaching the airport for landing. Although the Project site is not within the AEOZ or the airport noise contour, aircraft noise is clearly audible within the Project site, periodically experiencing high levels of *single event* noise from takeoffs and landings. During field noise measurements, maximum noise levels from aircraft ranged from 66 dBA to 82 dBA L_{max}. To ensure that interior noise levels at the proposed hotel are minimized, mitigation measures are recommended.

3.5 Mitigation Measures

MM NOI-1: Noise Insulation Features

The proposed hotel shall include noise insulation features such that an interior noise level of 45 dBA (CNEL) is achieved. An acoustical consultant shall be retained by the Project Applicant prior to commencement of construction to review Proposed Project construction-level plans to ensure that the hotel plans incorporate measures that will achieve the 45 dBA (CNEL) standard. Noise insulation features that could be installed include, but are not limited to, the following:

1. Acoustically rated dual pane windows and sliding glass door assemblies
2. Heavy-weight drapes and thick carpets for sound absorption
3. The following minimal performance requirements as specified by the Project's franchiser (Hyatt Place Franchising, LLC) as they pertain to interior/exterior sound transmission loss:
   - Exterior wall assemblies and walls between guestrooms shall have a minimum sound transmission class (STC) rating of 52
   - Walls between guestrooms and stairwells shall have a minimum STC rating of 60
   - All floor/ceiling assemblies shall have a minimum STC rating of 60
   - Guest room entry doors shall receive full-frame sound insulation stripping

[1] San Diego Municipal code, Chapter 13, Article 3, Division 3. San Diego County Regional Airport Authority, *San Diego County Airport Land Use Compatibility Plan, Volume 2: Background Data*, March 2005.

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3.6 Significance of Impacts after Mitigation

Implementation of mitigation measure MM NOI-1 would reduce significant noise impacts to below a level of significance.

3.7 Cumulative Impacts

To account for the extensive development occurring within the vicinity of the Project site, the Project traffic consultant, Linscott, Law & Greenspan Engineers, derived Existing Plus Cumulative and Year 2030 traffic growth factors based on the San Diego Association of Governments' (SANDAG's) Year 2030 traffic volume projections. The growth factors were applied to existing traffic volumes to estimate cumulative project volumes for these scenarios. Thus, the future traffic results with and without the Proposed Project already account for the cumulative impacts from other projects. Because noise impacts are generated directly from the traffic analysis results, the future with Project and future without Project noise impacts described in this report already reflect cumulative impacts.

The cumulative noise analysis used the Year 2030 traffic conditions, as estimated by LLG in the traffic report, to determine the traffic noise that would result from increased cumulative trips. Existing and anticipated noise levels were modeled at various locations along the roadways affected by Project traffic, including hotels, residences, and recreational areas. These areas are subject to the City's transient residential, residential, or recreational noise standards, respective of the land use—all of which are 65 dBA. Table 6 compares the estimated Year 2030 noise levels at the modeling locations without Project construction to the estimated Year 2030 levels with the addition of Project traffic noise. The Project-related increase is also shown. A significant cumulative impact would occur where Year 2030 conditions would cause noise at a modeling location to exceed the City's 65-dBA threshold. The Proposed Project's contribution would be cumulatively considerable where the Proposed Project causes an increase of 3 dBA or greater at those areas exceeding 65 dBA.

Table 6 identifies that two modeling locations subject to the City's 65-dBA residential threshold (M-5 and M-7) are anticipated to exceed the cumulative threshold under Year 2030 conditions. At these locations, the Proposed Project's contribution is estimated to be 0 dBA, when rounded to whole decibels. Because the Proposed Project would not increase noise at these locations by 3 or more dBA, the Proposed Project's contribution to these significant cumulative impacts is not cumulatively considerable. Therefore, no mitigation is necessary.

As shown in Table 6, the Proposed Project would not cause any of the other modeling locations to exceed the 65-dBA threshold or cause an increase of 3 dBA or greater at those areas exceeding 65 dBA. Thus, the Proposed Project's contribution to cumulative noise at the Project site is not significant, and no mitigation is necessary.

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Chapter 4

References

Beranek, L. L. (ed). 1971. *Noise and Vibration Control*. McGraw-Hill, Inc. New York, NY.

Cowan, J. P. 1994. *Handbook of Environmental Acoustics*. Wiley.

Harris, C. M. (ed). 1979. *Handbook of Noise Control*. Second Edition. McGraw-Hill, Inc. New York, NY.

Linscott, Law & Greenspan, Engineers (LLG). 2006. *Traffic Impact and Parking Analysis: Sunroad Harbor Island*. July 21. San Diego, CA.

———. 2009. *Traffic Impact & Parking Study, Harbor Island, San Diego, California*. January 16.

San Diego, City of. 2000. Chapter 5, Article 9.5: Noise Abatement and Control. *San Diego Municipal Code*. June. San Diego, CA.

———. 2005. Noise Element. *The City of San Diego General Plan*. Draft, July. City of San Diego Planning Department. San Diego, CA.

San Diego, City of, Development Services Department, Land Development Review Division. 2007. *Significance Determination Thresholds: California Environmental Quality Act (CEQA)*. February 2007.

U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA). 2004. FHWA Traffic Noise Model, Version 2.5. Office of Environment and Planning. Washington, DC.

U.S. Department of Transportation (USDOT), Federal Transit Administration (FTA), Office of Planning and Environment. 2006. *Transit Noise and Vibration Impact Assessment*. May. FTA-VA-90-1003-06. (Prepared under contract by Harris, Miller, Miller and Hanson). Burlington, MA.

U.S. Environmental Protection Agency (EPA). 1971. *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances*. Prepared under contract by Bolt, Beranek & Newman. Boston, MA.

APPENDIX A. FIELD DATA SHEETS

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FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

SITE IDENTIFICATION: ST-1 Decks H-5 OBSERVER(S): Peter Hardie
START DATE / TIME: 9:30 8/31/06 END DATE / TIME:
ADDRESS:

METEROLOGICAL CONDITIONS:
TEMP: 70 °F HUMIDITY: 71.2 %R.H. WIND: ~~CALM~~ LIGHT MODERATE VARIABLE
WINDSPEED: 3.7 MPH DIR: (N) NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 105.8 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST-1	9:30	9:47	59.5	73.9	46.9	50.4	52.8	64.1			

COMMENTS:

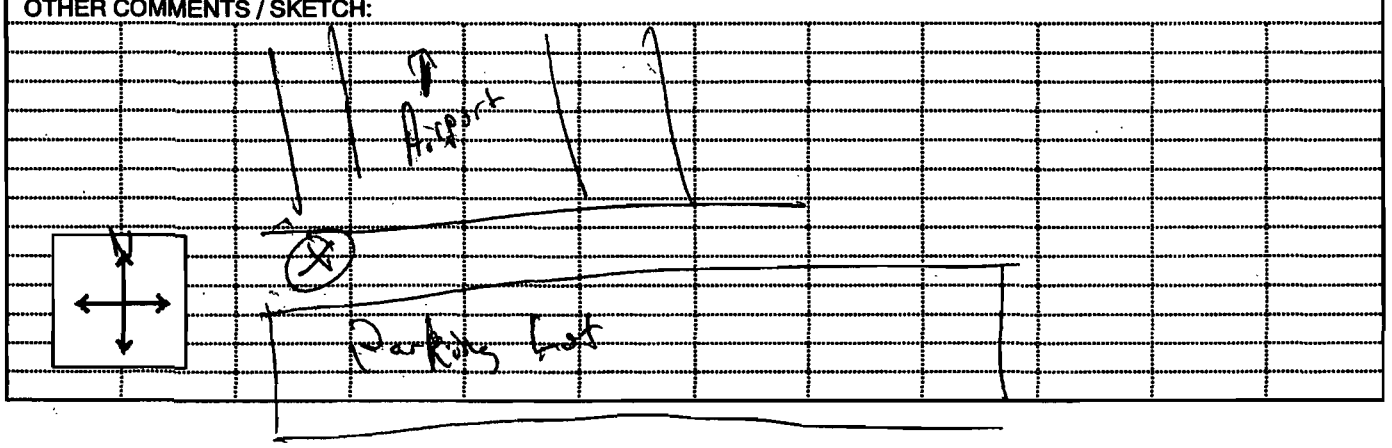
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC ~~AIRCRAFT~~ RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

	SPEED				#2 COUNT		SPEED	
	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / ~~BIRDS~~ / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES ~~/ OTHER:~~
~~People~~ Residents playing the Nois meter, Noise from the Naval base possibly jet engines

DESCRIPTION / SKETCH:
TERRAIN: ~~HARD~~ SOFT MIXED FLAT OTHER:
PHOTOS: 9 10 11 12 N & SW
OTHER COMMENTS / SKETCH:



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FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

ST-2

SITE IDENTIFICATION: Slip A on Deck OBSERVER(S): Peter Hardie
START DATE / TIME: 10:08 8-31-06 END DATE / TIME:
ADDRESS:

METEROLOGICAL CONDITIONS:
TEMP: 74.2 °F HUMIDITY: 71 %R.H. WIND: ~~CALM~~ LIGHT MODERATE VARIABLE
WINDSPEED: 13 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: ~~SUNNY~~ CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER: 1-5

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 820 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST-2	10:08	10:24	54.6	65.9	48.4	47.6	51.8	58.6			

COMMENTS:

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC ~~AIRCRAFT~~ RAIL INDUSTRIAL ~~AMBIENT~~ OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

	SPEED NB / EB	SPEED SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: E & W
OTHER COMMENTS / SKETCH:

Boats on Slip A

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FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

SITE IDENTIFICATION: Dock Slip East Side (ST-3) OBSERVER(S): Peter Hardie
START DATE / TIME: 10:30, 8/30/06 END DATE / TIME:
ADDRESS:

METEROLOGICAL CONDITIONS:
TEMP: 77 °F HUMIDITY: 67 %R.H. WIND: ~~CALM~~ LIGHT MODERATE VARIABLE
WINDSPEED: 2 MPH DIR: ~~N~~ NE E SE S SW W NW STEADY GUSTY
SKY: ~~SUNNY~~ CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 105.6 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST3	10:46	11:02	54.1	68.3	46.5	48.9	51.3	56.1			

COMMENTS:

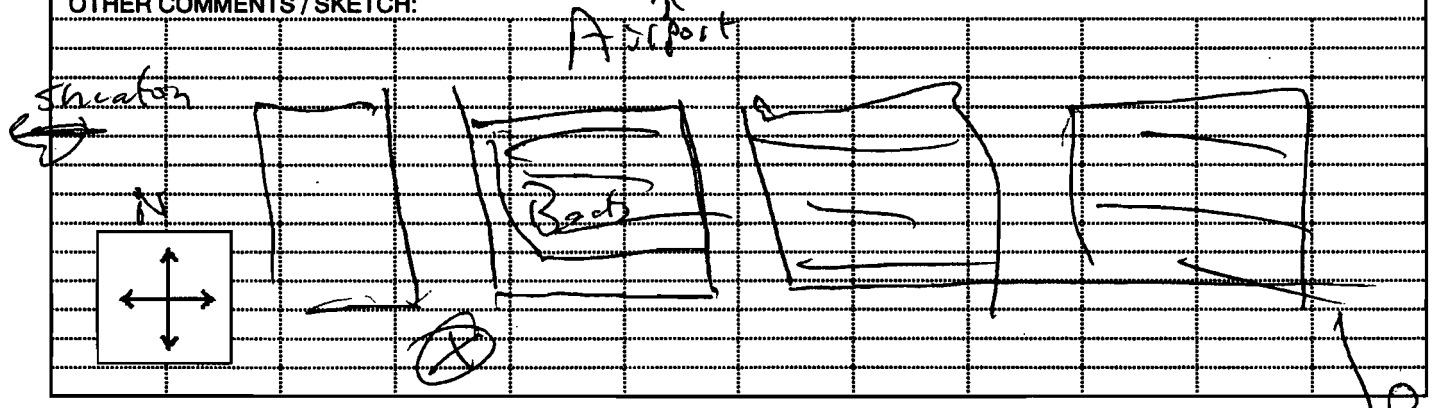
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC ~~AIRCRAFT~~ RAIL INDUSTRIAL ~~AMBIENT~~ OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	SPEED NB / EB	SPEED SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / ~~BIRDS~~ / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT ~~MIXED~~ FLAT OTHER:
PHOTOS: 1,2,3,4 N E S W
OTHER COMMENTS / SKETCH:



Pos. end 486

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FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

SITE IDENTIFICATION: ST-4 OBSERVER(S): Peter Hardie
START DATE / TIME: 11:59 8/31 END DATE / TIME:
ADDRESS: 1051 Scripps Ranch Blvd

METEROLOGICAL CONDITIONS:
TEMP: 85 °F HUMIDITY: %R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 0 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 106.6 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
~~1155~~ 54	1159	1214	64.2	82.1	55.3	58.8	61.8	66.3		

COMMENTS:

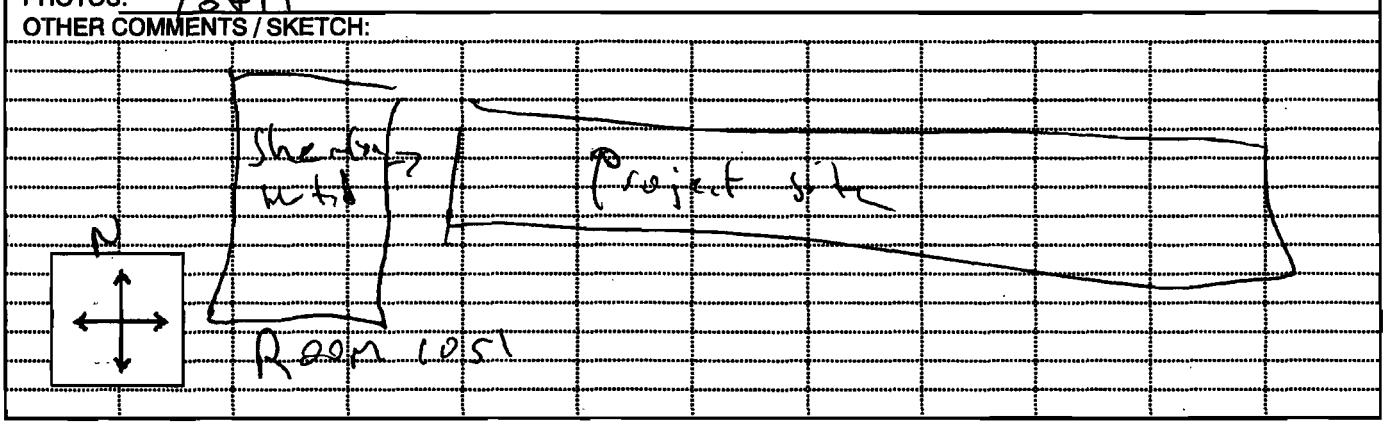
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

	SPEED NB / EB	SPEED SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 13 + 14
OTHER COMMENTS / SKETCH:



5791

487

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

SITE IDENTIFICATION: ST-5 Rueben E Lee
OBSERVER(S): Peter Hardie
START DATE / TIME: 2:00 8-31
END DATE / TIME:
ADDRESS:

METEROLOGICAL CONDITIONS:
TEMP: 80 °F HUMIDITY: 60.7 %R.H. WIND: CALM ~~LIGHT~~ MODERATE VARIABLE
WINDSPEED: 4 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: ~~SUNNY~~ CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER: 3-6

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 105.2 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST-5	2:00	2:16	58.3	71.4	43.2	51.8	55.6	61.5			

COMMENTS:

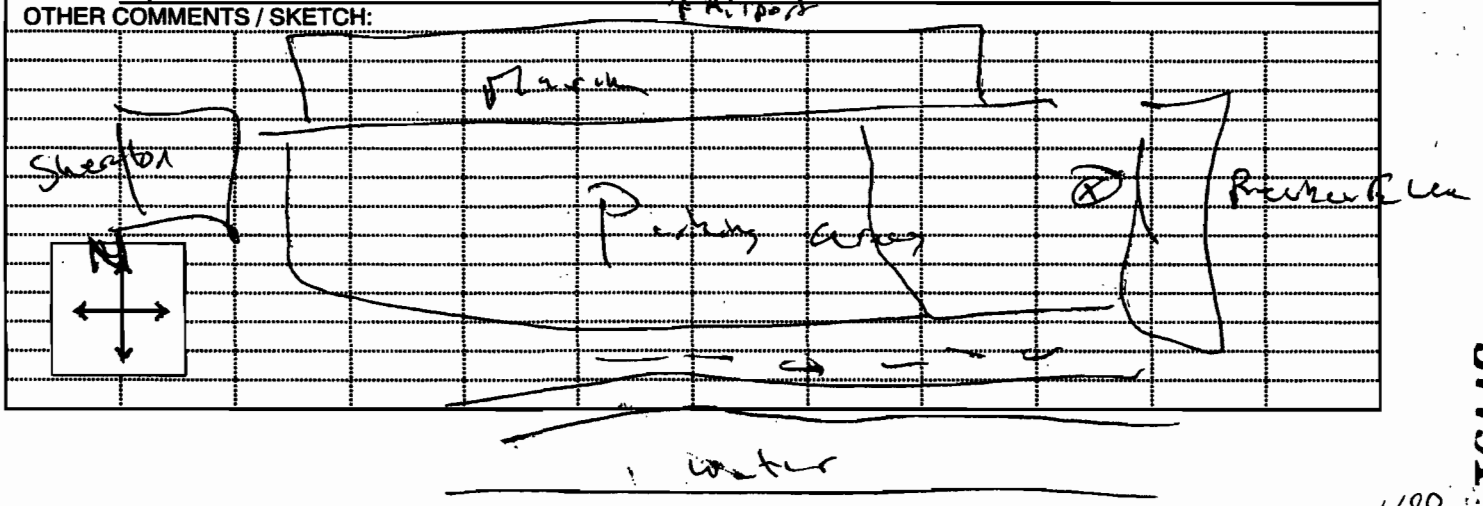
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ~~TRAFFIC~~ ~~AIRCRAFT~~ RAIL INDUSTRIAL ~~AMBIENT~~ OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

			SPEED		#2 COUNT		SPEED	
	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: ~~HARD~~ SOFT MIXED FLAT OTHER:
PHOTOS: 15 16 17 18 N R S W
OTHER COMMENTS / SKETCH:



57791

488

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

SITE IDENTIFICATION: ST-6 Island Prime Restaurant
OBSERVER(S): Peter Hardie
START DATE / TIME: 2 28 8-31
END DATE / TIME:
ADDRESS:

METEROLOGICAL CONDITIONS:
TEMP: 81 °F HUMIDITY: 59 %R.H. WIND: CALM ~~LIGHT~~ MODERATE VARIABLE
WINDSPEED: 4 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER: 3-5

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 105.5 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
ST-6	223	239	60.0	71.7	56.0	56.8	57.1	62.3		

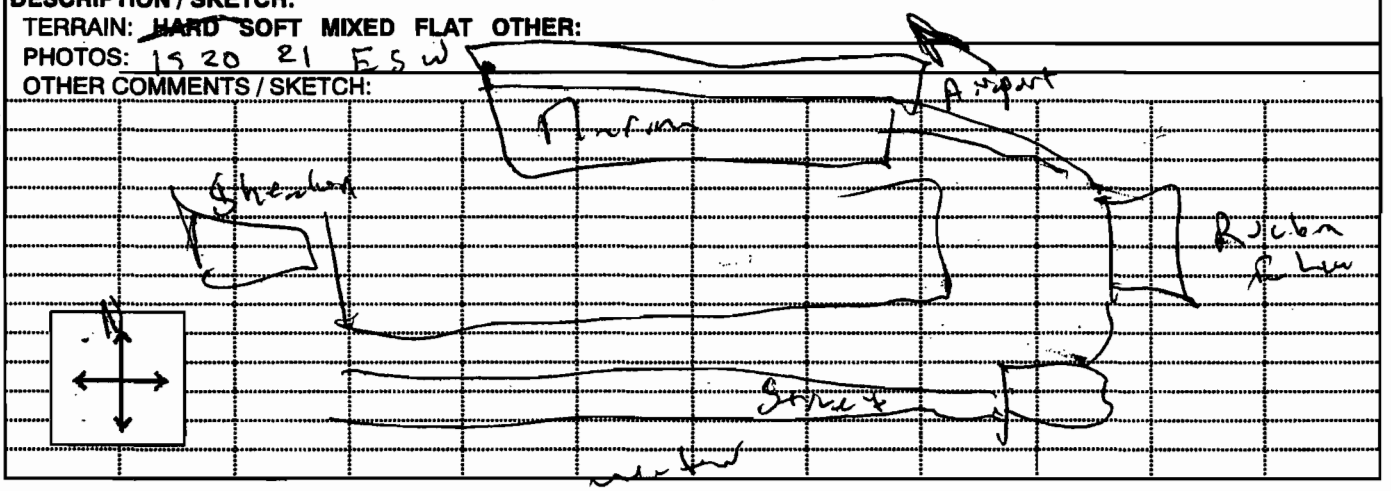
COMMENTS:

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC ~~AIRCRAFT~~ RAIL INDUSTRIAL ~~AMBIENT~~ OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:						
MED. TRUCKS:						
HVY TRUCKS:						
BUSES:						
MOTORCYCLES:						

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER
OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:
Infront of a restaurant. People talking in the background

DESCRIPTION / SKETCH:
TERRAIN: ~~HARD~~ SOFT MIXED FLAT OTHER:
PHOTOS: 15 20 21 E S W
OTHER COMMENTS / SKETCH:



5779

489

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: San Diego: Sunroad Hotel/Resorts PROJ. #

SITE IDENTIFICATION: ST 7 OBSERVER(S): Peter Hardie
START DATE / TIME: 7/23 8-31 END DATE / TIME:
ADDRESS:

METEROLOGICAL CONDITIONS:
TEMP: 82 °F HUMIDITY: 62 %R.H. WIND: ~~CALM~~ LIGHT MODERATE VARIABLE
WINDSPEED: 3 MPH DIR: N NE ~~E~~ SE S SW W NW STEADY GUSTY
SKY: ~~SUNNY~~ CLEAR OVRCST PRTLY CLOUDY ~~FOG~~ RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #:
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 105.6 dBA SPL POST-TEST dBA SPL WINDSCREEN ✓

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST7	253	308	64.8	98.0	52.3	54.3	60.9	68.3			

COMMENTS:

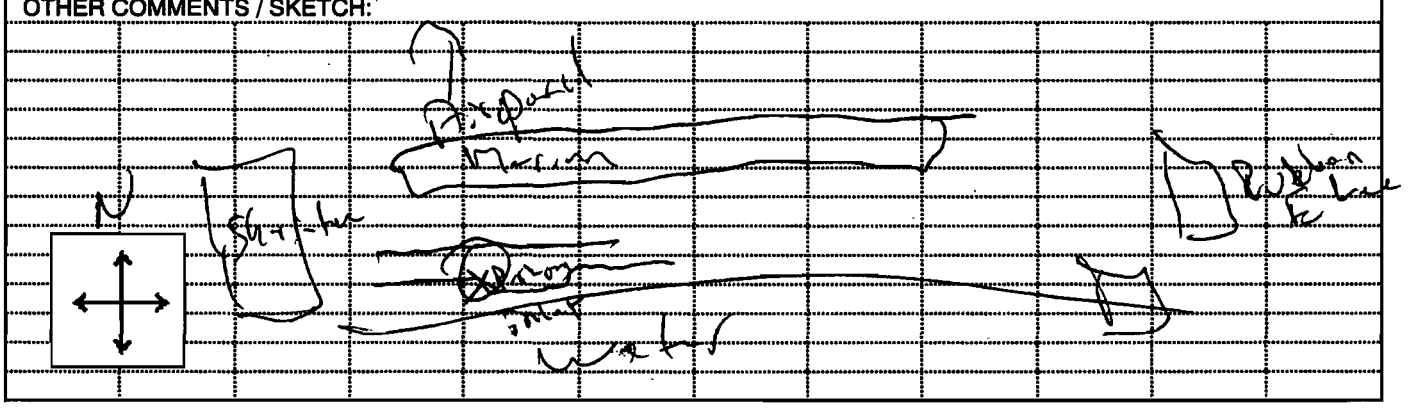
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ~~TRAFFIC~~ ~~AIRCRAFT~~ RAIL INDUSTRIAL ~~AMBIENT~~ OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

			SPEED		#2 COUNT		SPEED	
	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:
Bus traffic

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT ~~MIXED~~ FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



57791

490

APPENDIX B. SITE PHOTOGRAPHS

57791

St-1 looking west

ST-2 looking east

57791

ST-3 looking east

ST-4 looking east

57791

ST-5 looking east

ST-6 looking east

ST-7 looking west

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APPENDIX C. TNM INPUT AND OUTPUT

527791

<Organization?>
<Analysis By?>

5 November 2009
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Rev'd Existing

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Harbor Island Dr W. of HID access - WB	24.0	point2	2	1,000.0	100.0	100.00				Average	
		point1	1	100.0	100.0	100.00					
Harbor Island Dr W. of HID access - EB	24.0	point3	3	100.0	80.0	100.00				Average	
		point4	4	1,000.0	80.0	100.00					
Harbor Island Dr E. of HID access - WB	24.0	point5	5	2,000.0	100.0	100.00				Average	
		point6	6	1,001.0	100.0	100.00					
Harbor Island Dr E. of HID access - EB	24.0	point7	7	1,001.0	80.0	100.00				Average	
		point8	8	2,000.0	80.0	100.00					
Harbor Island Dr. Access Rd - NB	24.0	point9	9	1,000.0	101.0	100.00				Average	
		point10	10	1,000.0	1,000.0	100.00					
Harbor Island Dr. Access Rd - SB	24.0	point11	11	980.0	101.0	100.00				Average	
		point12	12	980.0	1,000.0	100.00					
Laurel St. E. of India - WB	24.0	point13	13	3,000.0	2,000.0	100.00				Average	
		point14	14	2,000.0	2,000.0	100.00					
Laurel St. E. of India - EB	24.0	point15	15	2,000.0	1,980.0	100.00				Average	
		point16	16	3,000.0	1,980.0	100.00					
Hawthorne St. E. of India - WB	24.0	point17	17	3,000.0	3,000.0	100.00				Average	
		point18	18	2,000.0	3,000.0	100.00					
Grape St. E. of India - EB	24.0	point19	19	2,000.0	4,000.0	100.00				Average	
		point20	20	3,000.0	4,000.0	100.00					

497

57791

<Organization?> 5 November 2009
<Analysis By?> TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Rev'd Existing

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Harbor Island Dr W. of HID access - WB	point2	2	264	35	5	35	2	35	0	0	0	0
	point1	1										
Harbor Island Dr W. of HID access - EB	point3	3	282	35	5	35	2	35	0	0	0	0
	point4	4										
Harbor Island Dr E. of HID access - WB	point5	5	164	35	3	35	1	35	0	0	0	0
	point6	6										
Harbor Island Dr E. of HID access - EB	point7	7	211	35	4	35	2	35	0	0	0	0
	point8	8										
Harbor Island Dr. Access Rd - NB	point9	9	496	35	9	35	4	35	0	0	0	0
	point10	10										
Harbor Island Dr. Access Rd - SB	point11	11	480	35	9	35	4	35	0	0	0	0
	point12	12										
Laurel St. E. of India - WB	point13	13	668	35	13	35	5	35	0	0	0	0
	point14	14										
Laurel St. E. of India - EB	point15	15	997	35	19	35	8	35	0	0	0	0
	point16	16										
Hawthorne St. E. of India - WB	point17	17	1149	35	22	35	9	35	0	0	0	0
	point18	18										
Grape St. E. of India - EB	point19	19	1967	35	37	35	15	35	0	0	0	0
	point20	20										

<Organization?>
<Analysis By?>

5 November 2009
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Rev'd Existing

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	2	1	693.6	36.9	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	3	1	729.3	763.1	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	4	1	1,504.6	40.8	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	5	1	1,686.9	612.7	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	6	1	2,572.2	2,042.3	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	7	1	2,577.8	3,085.0	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver7	8	1	2,530.2	4,090.5	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver8	10	1	1,132.5	240.5	100.00	4.92	0.00	66	10.0	8.0	Y

499
57791

RESULTS: SOUND LEVELS <Project Name?>

<Organization?>
<Analysis By?>

5 November 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Rev'd Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	2	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
Receiver2	3	1	0.0	49.5	66	49.5	10	----	49.5	0.0	8	-8.0
Receiver3	4	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
Receiver4	5	1	0.0	42.3	66	42.3	10	----	42.3	0.0	8	-8.0
Receiver5	6	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
Receiver6	7	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Receiver7	8	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
Receiver8	10	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICF Jones & Stokes
M Greene

5 November 2009
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Harbor Island Dr W. of HID access - WB	24.0	point2	2	1,000.0	100.0	100.00				Average	
		point1	1	100.0	100.0	100.00					
Harbor Island Dr W. of HID access - EB	24.0	point3	3	100.0	80.0	100.00				Average	
		point4	4	1,000.0	80.0	100.00					
Harbor Island Dr E. of HID access - WB	24.0	point5	5	2,000.0	100.0	100.00				Average	
		point6	6	1,001.0	100.0	100.00					
Harbor Island Dr E. of HID access - EB	24.0	point7	7	1,001.0	80.0	100.00				Average	
		point8	8	2,000.0	80.0	100.00					
Harbor Island Dr. Access Rd - NB	24.0	point9	9	1,000.0	101.0	100.00				Average	
		point10	10	1,000.0	1,000.0	100.00					
Harbor Island Dr. Access Rd - SB	24.0	point11	11	980.0	101.0	100.00				Average	
		point12	12	980.0	1,000.0	100.00					
Laurel St. E. of India - WB	24.0	point13	13	3,000.0	2,000.0	100.00				Average	
		point14	14	2,000.0	2,000.0	100.00					
Laurel St. E. of India - EB	24.0	point15	15	2,000.0	1,980.0	100.00				Average	
		point16	16	3,000.0	1,980.0	100.00					
Hawthorne St. E. of India - WB	24.0	point17	17	3,000.0	3,000.0	100.00				Average	
		point18	18	2,000.0	3,000.0	100.00					
Grape St. E. of India - EB	24.0	point19	19	2,000.0	4,000.0	100.00				Average	
		point20	20	3,000.0	4,000.0	100.00					

5-01
57751

ICF Jones & Stokes
M Greene

5 November 2009
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv

Roadway Name	Points Name	No.	Segment Autos V veh/hr	Autos S mph	MTrucks V veh/hr	MTrucks S mph	HTrucks V veh/hr	HTrucks S mph	Buses V veh/hr	Buses S mph	Motorcycles V veh/hr	Motorcycles S mph
Harbor Island Dr W. of HID access - WB	point2	2	268	35	5	35	2	35	0	0	0	0
	point1	1										
Harbor Island Dr W. of HID access - EB	point3	3	287	35	5	35	2	35	0	0	0	0
	point4	4										
Harbor Island Dr E. of HID access - WB	point5	5	170	35	3	35	1	35	0	0	0	0
	point6	6										
Harbor Island Dr E. of HID access - EB	point7	7	219	35	4	35	2	35	0	0	0	0
	point8	8										
Harbor Island Dr. Access Rd - NB	point9	9	516	35	10	35	4	35	0	0	0	0
	point10	10										
Harbor Island Dr. Access Rd - SB	point11	11	502	35	9	35	4	35	0	0	0	0
	point12	12										
Laurel St. E. of India - WB	point13	13	740	35	14	35	6	35	0	0	0	0
	point14	14										
Laurel St. E. of India - EB	point15	15	1101	35	21	35	8	35	0	0	0	0
	point16	16										
Hawthorne St. E. of India - WB	point17	17	1198	35	23	35	9	35	0	0	0	0
	point18	18										
Grape St. E. of India - EB	point19	19	2163	35	41	35	16	35	0	0	0	0
	point20	20										

ICF Jones & Stokes
M Greene

5 November 2009
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	2	1	693.6	36.9	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	3	1	729.3	763.1	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	4	1	1,504.6	40.8	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	5	1	1,686.9	612.7	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	6	1	2,572.2	2,042.3	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	7	1	2,577.8	3,085.0	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver7	8	1	2,530.2	4,090.5	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver8	10	1	1,132.5	240.5	100.00	4.92	0.00	66	10.0	8.0	Y

5.03

57751

ICF Jones & Stokes
M Greene

5 November 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	2	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
Receiver2	3	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
Receiver3	4	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
Receiver4	5	1	0.0	42.4	66	42.4	10	----	42.4	0.0	8	-8.0
Receiver5	6	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
Receiver6	7	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
Receiver7	8	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
Receiver8	10	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICF Jones & Stokes
M Greene

5 November 2009
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv+Prj

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Harbor Island Dr W. of HID access - WB	24.0	point2	2	1,000.0	100.0	100.00				Average	
		point1	1	100.0	100.0	100.00					
Harbor Island Dr W. of HID access - EB	24.0	point3	3	100.0	80.0	100.00				Average	
		point4	4	1,000.0	80.0	100.00					
Harbor Island Dr E. of HID access - WB	24.0	point5	5	2,000.0	100.0	100.00				Average	
		point6	6	1,001.0	100.0	100.00					
Harbor Island Dr E. of HID access - EB	24.0	point7	7	1,001.0	80.0	100.00				Average	
		point8	8	2,000.0	80.0	100.00					
Harbor Island Dr. Access Rd - NB	24.0	point9	9	1,000.0	101.0	100.00				Average	
		point10	10	1,000.0	1,000.0	100.00					
Harbor Island Dr. Access Rd - SB	24.0	point11	11	980.0	101.0	100.00				Average	
		point12	12	980.0	1,000.0	100.00					
Laurel St. E. of India - WB	24.0	point13	13	3,000.0	2,000.0	100.00				Average	
		point14	14	2,000.0	2,000.0	100.00					
Laurel St. E. of India - EB	24.0	point15	15	2,000.0	1,980.0	100.00				Average	
		point16	16	3,000.0	1,980.0	100.00					
Hawthorne St. E. of India - WB	24.0	point17	17	3,000.0	3,000.0	100.00				Average	
		point18	18	2,000.0	3,000.0	100.00					
Grape St. E. of India - EB	24.0	point19	19	2,000.0	4,000.0	100.00				Average	
		point20	20	3,000.0	4,000.0	100.00					

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TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv+Prj

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Harbor Island Dr W. of HID access - WB	point2	2	268	35	5	35	2	35	0	0	0	0
	point1	1										
Harbor Island Dr W. of HID access - EB	point3	3	287	35	5	35	2	35	0	0	0	0
	point4	4										
Harbor Island Dr E. of HID access - WB	point5	5	222	35	4	35	2	35	0	0	0	0
	point6	6										
Harbor Island Dr E. of HID access - EB	point7	7	296	35	6	35	2	35	0	0	0	0
	point8	8										
Harbor Island Dr. Access Rd - NB	point9	9	568	35	11	35	4	35	0	0	0	0
	point10	10										
Harbor Island Dr. Access Rd - SB	point11	11	579	35	11	35	4	35	0	0	0	0
	point12	12										
Laurel St. E. of India - WB	point13	13	748	35	14	35	6	35	0	0	0	0
	point14	14										
Laurel St. E. of India - EB	point15	15	1107	35	21	35	8	35	0	0	0	0
	point16	16										
Hawthorne St. E. of India - WB	point17	17	1217	35	23	35	9	35	0	0	0	0
	point18	18										
Grape St. E. of India - EB	point19	19	2175	35	41	35	17	35	0	0	0	0
	point20	20										

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TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv+Prj

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	2	1	693.6	36.9	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	3	1	729.3	763.1	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	4	1	1,504.6	40.8	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	5	1	1,686.9	612.7	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	6	1	2,572.2	2,042.3	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	7	1	2,577.8	3,085.0	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver7	8	1	2,530.2	4,090.5	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver8	10	1	1,132.5	240.5	100.00	4.92	0.00	66	10.0	8.0	Y

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TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Ex + Cumv+Prj
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	2	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
Receiver2	3	1	0.0	50.1	66	50.1	10	----	50.1	0.0	8	-8.0
Receiver3	4	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
Receiver4	5	1	0.0	43.1	66	43.1	10	----	43.1	0.0	8	-8.0
Receiver5	6	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
Receiver6	7	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
Receiver7	8	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
Receiver8	10	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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5 November 2009
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w/o Prj

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Harbor Island Dr W. of HID access - WB	24.0	point2	2	1,000.0	100.0	100.00				Average	
		point1	1	100.0	100.0	100.00					
Harbor Island Dr W. of HID access - EB	24.0	point3	3	100.0	80.0	100.00				Average	
		point4	4	1,000.0	80.0	100.00					
Harbor Island Dr E. of HID access - WB	24.0	point5	5	2,000.0	100.0	100.00				Average	
		point6	6	1,001.0	100.0	100.00					
Harbor Island Dr E. of HID access - EB	24.0	point7	7	1,001.0	80.0	100.00				Average	
		point8	8	2,000.0	80.0	100.00					
Harbor Island Dr. Access Rd - NB	24.0	point9	9	1,000.0	101.0	100.00				Average	
		point10	10	1,000.0	1,000.0	100.00					
Harbor Island Dr. Access Rd - SB	24.0	point11	11	980.0	101.0	100.00				Average	
		point12	12	980.0	1,000.0	100.00					
Laurel St. E. of India - WB	24.0	point13	13	3,000.0	2,000.0	100.00				Average	
		point14	14	2,000.0	2,000.0	100.00					
Laurel St. E. of India - EB	24.0	point15	15	2,000.0	1,980.0	100.00				Average	
		point16	16	3,000.0	1,980.0	100.00					
Hawthorne St. E. of India - WB	24.0	point17	17	3,000.0	3,000.0	100.00				Average	
		point18	18	2,000.0	3,000.0	100.00					
Grape St. E. of India - EB	24.0	point19	19	2,000.0	4,000.0	100.00				Average	
		point20	20	3,000.0	4,000.0	100.00					

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TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w/o Prj

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Harbor Island Dr W. of HID access - WB	point2	2	312	35	6	35	2	35	0	0	0	0
	point1	1										
Harbor Island Dr W. of HID access - EB	point3	3	331	35	6	35	3	35	0	0	0	0
	point4	4										
Harbor Island Dr E. of HID access - WB	point5	5	229	35	4	35	2	35	0	0	0	0
	point6	6										
Harbor Island Dr E. of HID access - EB	point7	7	296	35	6	35	2	35	0	0	0	0
	point8	8										
Harbor Island Dr. Access Rd - NB	point9	9	614	35	12	35	5	35	0	0	0	0
	point10	10										
Harbor Island Dr. Access Rd - SB	point11	11	594	35	11	35	5	35	0	0	0	0
	point12	12										
Laurel St. E. of India - WB	point13	13	1266	35	24	35	10	35	0	0	0	0
	point14	14										
Laurel St. E. of India - EB	point15	15	1890	35	36	35	14	35	0	0	0	0
	point16	16										
Hawthorne St. E. of India - WB	point17	17	1452	35	27	35	11	35	0	0	0	0
	point18	18										
Grape St. E. of India - EB	point19	19	3566	35	67	35	27	35	0	0	0	0
	point20	20										

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5 November 2009
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w/o Prj

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	2	1	693.6	36.9	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	3	1	729.3	763.1	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	4	1	1,504.6	40.8	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	5	1	1,686.9	612.7	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	6	1	2,572.2	2,042.3	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	7	1	2,577.8	3,085.0	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver7	8	1	2,530.2	4,090.5	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver8	10	1	1,132.5	240.5	100.00	4.92	0.00	66	10.0	8.0	Y

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5 November 2009
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w/o Prj
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	2	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
Receiver2	3	1	0.0	50.5	66	50.5	10	----	50.5	0.0	8	-8.0
Receiver3	4	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Receiver4	5	1	0.0	43.6	66	43.6	10	----	43.6	0.0	8	-8.0
Receiver5	6	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Receiver6	7	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Receiver7	8	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
Receiver8	10	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w Prj

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Harbor Island Dr W. of HID access - WB	24.0	point2	2	1,000.0	100.0	100.00				Average	
		point1	1	100.0	100.0	100.00					
Harbor Island Dr W. of HID access - EB	24.0	point3	3	100.0	80.0	100.00				Average	
		point4	4	1,000.0	80.0	100.00					
Harbor Island Dr E. of HID access - WB	24.0	point5	5	2,000.0	100.0	100.00				Average	
		point6	6	1,001.0	100.0	100.00					
Harbor Island Dr E. of HID access - EB	24.0	point7	7	1,001.0	80.0	100.00				Average	
		point8	8	2,000.0	80.0	100.00					
Harbor Island Dr. Access Rd - NB	24.0	point9	9	1,000.0	101.0	100.00				Average	
		point10	10	1,000.0	1,000.0	100.00					
Harbor Island Dr. Access Rd - SB	24.0	point11	11	980.0	101.0	100.00				Average	
		point12	12	980.0	1,000.0	100.00					
Laurel St. E. of India - WB	24.0	point13	13	3,000.0	2,000.0	100.00				Average	
		point14	14	2,000.0	2,000.0	100.00					
Laurel St. E. of India - EB	24.0	point15	15	2,000.0	1,980.0	100.00				Average	
		point16	16	3,000.0	1,980.0	100.00					
Hawthorne St. E. of India - WB	24.0	point17	17	3,000.0	3,000.0	100.00				Average	
		point18	18	2,000.0	3,000.0	100.00					
Grape St. E. of India - EB	24.0	point19	19	2,000.0	4,000.0	100.00				Average	
		point20	20	3,000.0	4,000.0	100.00					

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INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w Prj

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Harbor Island Dr W. of HID access - WB	point2	2	312	35	6	35	2	35	0	0	0	0
	point1	1										
Harbor Island Dr W. of HID access - EB	point3	3	331	35	6	35	3	35	0	0	0	0
	point4	4										
Harbor Island Dr E. of HID access - WB	point5	5	232	35	4	35	2	35	0	0	0	0
	point6	6										
Harbor Island Dr E. of HID access - EB	point7	7	306	35	6	35	2	35	0	0	0	0
	point8	8										
Harbor Island Dr. Access Rd - NB	point9	9	665	35	13	35	5	35	0	0	0	0
	point10	10										
Harbor Island Dr. Access Rd - SB	point11	11	671	35	13	35	5	35	0	0	0	0
	point12	12										
Laurel St. E. of India - WB	point13	13	1274	35	24	35	10	35	0	0	0	0
	point14	14										
Laurel St. E. of India - EB	point15	15	1896	35	36	35	14	35	0	0	0	0
	point16	16										
Hawthorne St. E. of India - WB	point17	17	1470	35	28	35	11	35	0	0	0	0
	point18	18										
Grape St. E. of India - EB	point19	19	3578	35	68	35	27	35	0	0	0	0
	point20	20										

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5 November 2009
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w Prj

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	2	1	693.6	36.9	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver2	3	1	729.3	763.1	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver3	4	1	1,504.6	40.8	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver4	5	1	1,686.9	612.7	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver5	6	1	2,572.2	2,042.3	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver6	7	1	2,577.8	3,085.0	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver7	8	1	2,530.2	4,090.5	100.00	4.92	0.00	66	10.0	8.0	Y
Receiver8	10	1	1,132.5	240.5	100.00	4.92	0.00	66	10.0	8.0	Y

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RESULTS: SOUND LEVELS <Project Name?>

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TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Sunroad Harbor Island - Yr 2030 w Prj
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	2	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
Receiver2	3	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
Receiver3	4	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Receiver4	5	1	0.0	43.8	66	43.8	10	----	43.8	0.0	8	-8.0
Receiver5	6	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Receiver6	7	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
Receiver7	8	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
Receiver8	10	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix H-1

Geotechnical Investigation/ Geologic Fault Investigation

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The March 3, 2006, Geocon Geotechnical Investigation and Geologic Fault Investigation and June 21, 2006, Ninyo & Moore Preliminary Geotechnical Evaluation and Third-Party Review were used as the basis for the geotechnical evaluation included in the EIR for the current Harbor Island Hotel Project (4-story, 175 room hotel located east of the existing Sunroad Resort Marina building). ICF Jones & Stokes did not conduct any updates to information contained in the reports for purposes of completing the EIR.

The previous geotechnical reports evaluated a 10-story hotel structure encompassing all of East Harbor Island. The current project is a 4-story hotel, with a maximum of 175 rooms. The Port District and ICF Jones & Stokes determined that the Geocon and Ninyo & Moore reports are still appropriate and adequate assessments of the current Project site because the Project site evaluated in the EIR is located within the limits of the area evaluated in the 2006 reports.

9775 Businesspark Avenue, Suite 200 — San Diego, CA 92131 — 858.578.8964 — 858.578.0573 fax — icfi.com — jonesandstokes.com

GEOTECHNICAL INVESTIGATION AND GEOLOGIC FAULT INVESTIGATION

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS

PREPARED FOR

SUNROAD ENTERPRISES
SAN DIEGO, CALIFORNIA

MARCH 3, 2006
PROJECT NO. 07569-22-01

57791

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GEOCON
INCORPORATED

GEOTECHNICAL CONSULTANTS

Project No. 07569-22-01
March 3, 2006

Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, California 92121

Attention: Mr. Uri Feldman

Subject: EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA
GEOTECHNICAL INVESTIGATION AND
GEOLOGIC FAULT INVESTIGATION

Gentlemen:

In accordance with your authorization, we herein submit the results of our geotechnical investigation and geologic fault investigation for the subject site. The accompanying report presents the findings and conclusions from our study.

If you have any questions regarding this investigation, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of a geotechnical and geologic fault investigation for the proposed hotel buildings on the eastern half of Harbor Island in the Lindbergh Field area of San Diego, California (see *Vicinity Map*, Figure 1). Geocon Incorporated has previously performed an investigation for the western portion of the eastern half of the island. The purpose of this geotechnical and geologic fault investigation was to perform a site-specific subsurface investigation for the remainder of the site and provide geotechnical engineering recommendations for the design and construction of the hotel buildings for the entire site. Portions of the site are within a State Fault Study Zone and required a detailed fault evaluation. This report also presents the fault evaluation.

The scope of the investigation consisted of a review of investigation reports for adjacent properties, a site reconnaissance, a subsurface exploration consisting of seismic reflection surveys, soil borings, cone penetration tests (CPTs), laboratory analysis on samples collected from the borings, and the preparation of this report.

Logs of the exploratory borings and CPTs and other details of the field investigation are presented in Appendix A. Laboratory tests were performed on selected soil samples obtained from the borings to determine their pertinent physical properties for engineering analyses. A discussion pertaining to the laboratory testing and results is presented in Appendix B. The geophysical survey consisted of seismic reflection lines oriented roughly east-west, and was performed by Kerry Hennon, California registered geophysicist, of Terraphysics. The results and conclusions of his study are presented in Appendix C. Logs of borings, CPTs, and laboratory test results from the previous investigation are presented in Appendix D.

The conclusions presented herein are based on our analysis of data obtained from the borings, CPTs, previous borings, laboratory test results, and our experience with similar soil and geologic conditions.

2. SITE DESCRIPTION

The project site consists of an approximately 350-foot by 3,000-foot parcel of land (approximately 24 acres) (see *Site Plan/Geologic Map*, Figure 2). The property is currently used as a resort marina and at-grade parking lots. The area is relatively flat and bordered on the north, south, and east by San Diego Bay. The existing complex consists of several single-story structures including a main commercial building, two locker room buildings, and a restaurant. The resort facilities also include a spa/fitness center with swimming pool, patio, and restrooms. All shorelines are protected by rock revetment with heavy riprap. Along the north shoreline, a berm and an underwater seawall are present

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along the toe of the riprap slope. A concrete water-breaker wall extends from the east end of the island towards the marina and boat channel.

A review of published geologic maps indicates that the site is underlain by hydraulic fill over Holocene to Pleistocene-age Bay Deposits which overlie the Pleistocene Bay Point Formation. The fills were placed during dredging operations for the adjacent bay in 1961.

The eastern portion of the site is located within a State of California Alquist-Priolo Earthquake Fault Zone. We under-stand that this fault zone was put in place based on recent geophysical surveys performed in San Diego Bay during investigations for the Coronado Bay Bridge. Based on State requirements, projects within this special study zone require a geologic fault investigation to determine whether surface rupture has occurred from displacements along "active" faults that may traverse the property.

The existing site topography surveys and as-built plans of the buildings, seawall and rock revetment are not available to Geocon Incorporated at the time of preparing this report. However, the site is generally flat, and surface elevations are estimated between approximately 13 to 16 feet above mean sea level (MSL) based on the City of San Diego topographic survey dated 1978.

3. SITE HISTORY

A 1919 Map of the San Diego Quadrangle, showing the marine terraces and marine soundings, indicates that the project area was inundated by San Diego Bay at that time. Review of pertinent literature by Carol Forrest (1982) and D.R. Forest, *et al.* (1961) indicate that dredging in San Diego Bay for the then-proposed Harbor Island began in 1961. Our review of orthotopo maps show that the marina was constructed sometime after 1978.

4. PROJECT DESCRIPTION

Project plans regarding the proposed construction are currently being developed. Based on the current available plans, we understand that the proposed improvements will be developed in phases. The early phases of the project would include one hotel tower up to approximately 10 stories, a multi-story parking garage, and several bay villas buildings up to approximately 3 levels.

Future plans for development of the central and western portions of the site include additional hotel facilities, improvement, or replacement of yacht facilities, retail facilities, and an additional parking structure.

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5. SOIL AND GEOLOGIC CONDITIONS

Our field investigations indicate that the site is underlain by undocumented hydraulic fill (Qhf), Bay Deposits (Qbd), and Bay Point Formation (Qbp). The geologic units are described in detail below and a Geologic Cross Section is presented on Figure 4.

5.1 Hydraulic Fill (Qhf)

Hydraulic fill was derived from local dredging operations and was placed with little to no densification or compactive effort below water level, and unknown effort above water level. The fill consists predominantly of loose to dense fine sand with varying amounts of shells. Maximum thickness of the undocumented hydraulic fill is approximately 20 to 22 feet. The relative compaction of the undocumented hydraulic fill was not determined. These soils are highly susceptible to liquefaction where located below the water table. Mitigation of liquefaction of these soils will likely consist of ground improvements, or, alternately, settlement-sensitive structures will be supported on deep foundations extending through the hydraulic fill. Densification and/or deep foundation systems will be necessary for support of the proposed structures.

5.2 Quaternary Bay Deposits (Qbd)

The Pleistocene- to Holocene-age Bay Deposits underlie the fill in all the borings. The Bay Deposits consist of loose to medium dense fine sand. Numerous shells and shell-hash zones were observed in the Bay Deposits. This unit ranges in thickness from approximately 11 feet in the central portion of the project limits to approximately 43 feet in the easternmost portion. The loose and saturated portions of Bay Deposits are highly susceptible to liquefaction.

5.3 Quaternary Bay Point Formation (Qbp)

The Pleistocene-age Bay Point Formation was encountered in all borings at approximate depths of 33 to 64 feet. Bay Point Formation was encountered at shallower depths in the middle and western parts of the project limits. The Bay Point Formation, as observed from the borings, consists of dense to very dense silty sand and fine sand.

6. GROUNDWATER

Groundwater was encountered in all of the borings at depths of approximately 9 to 14 feet below the ground surface. Groundwater could have a significant influence on construction operations depending on finished floor elevation, utility invert elevation, and excavation depths. Bottom stabilization and/or dewatering will likely be necessary for excavations below approximately elevation 5 feet MSL. In

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addition, proper surface drainage of irrigation and rainwater will be critical to the future performance of the project.

7. GEOLOGIC HAZARDS

7.1 Landslides

No landslides were encountered during the site investigation, and none are known to exist on the property or at a location that would impact the proposed development.

7.2 Faulting

Review of the *City of San Diego Seismic Safety Study, Geologic Hazards and Faults*, 1995 edition, indicates that a fault passes beneath the easternmost tip of Harbor Island. Furthermore, the Point Loma Quadrangle Earthquake Fault Zones Map of the State of California (2003) indicates that a strand of the Rose Canyon Fault (Spanish Bight Fault) extends through the subject property. As such, a fault evaluation was required for the property to assess the presence or absence of faults on the site. The fault study is discussed in Section 7.3 of this report.

Table 7.2 below presents a list of significant active faults, their distance from the site, and a summary of potential ground shaking effects. The information presented on Table 7.2 is derived from an analysis using *EQFAULT*, a computer program that performs deterministic analyses based upon distances from the site to known earthquake faults that have been digitized into an earthquake catalog. Attenuation relationships by Sadigh (1997) were used to estimate the maximum peak site accelerations.

TABLE 7.2
DETERMINISTIC SITE PARAMETERS FOR SELECTED ACTIVE FAULTS

Fault Name	Distance from Site (miles)	Maximum Magnitude Event	
		Magnitude	Peak Site Acceleration (g)
Rose Canyon Fault Zone	0	7.2	0.59
Coronado Bank	12	7.6	0.27
Newport-Inglewood (Offshore)	33	7.1	0.08
Elsinore (Julian)	42	7.1	0.06
Elsinore (Temecula)	46	6.8	0.04
Earthquake Valley	47	6.5	0.03
Elsinore (Coyote Mountain)	51	6.8	0.04
Palos Verdes	58	7.3	0.05

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It is our opinion that the site could be subjected to moderate to severe ground shaking in the event of an earthquake along any of the faults listed on Table 7.2 or other faults in the southern California/ northern Baja California region. However, we do not consider the site to possess any greater seismic risk than that of the surrounding developments. While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. We recommend that seismic design of the structures be performed in accordance with California Building Code (CBC) guidelines that are currently adopted by the City of San Diego.

7.3 On-Site Faulting Evaluation

Geophysical seismic reflection was utilized at this site to evaluate faulting due to the presence of approximately 20 feet of hydraulic fill and a shallow groundwater table. The seismic lines are shown on Figure 3 and the interpretation of the data is presented in Appendix D. The seismic lines were situated to intercept any north to northwest-trending faults that were recognized in the geophysical study of Coronado Bay (1999), namely the Spanish-Bight Fault. Four seismic lines, with a nearly east-west orientation, varying in length from 300 feet to 478 feet and reflecting depths to 160 feet were performed.

Using borehole data, reflective markers were identified in the seismic profile for correlation. Breaks in the reflective markers appear in all seismic lines. The breaks or structural features that recurred in more than one seismic line were interpreted to be faults. Faults A, B, and C fall into this category. Structural features that had no continuity between seismic lines, such as features F1 through F5, are speculated to be differential settlement features. The recurrence of structural features A, B, and C in seismic lines 1, 2, and 4 indicate that these features are most likely faults. Seismic Reflection Line 2 shows faulting extending more than halfway up into the Bay Deposits along Faults A, B, and C to a depth of about 32 feet below the ground surface. To constrain the age of faulting, samples with abundant marine shells (B2-6 and B2-7 from a depth of 30 and 36 feet, respectively) were analyzed by paleontology staff at the San Diego Natural History Museum. The ages of both samples are indicative of a mid-Holocene age. Therefore, Faults A, B, and C are considered active faults. It is likely that these faults are strands of the Spanish-Bight Fault and one can speculate that they converge at depth. A structural setback of 25 feet is recommended for Faults A, B, and C as depicted on Figure 3.

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7.4 Probabilistic Seismic Hazard Analysis

The computer program *FRISKSP* (Blake, 1995, updated 1998) was used to perform a site-specific probabilistic seismic hazard analysis. The program is a modified version of *FRISK* (McGuire, 1978) that models earthquake sources as lines to evaluate site-specific probabilities of exceedance of given horizontal accelerations for each line source. Geologic parameters not included in the deterministic analysis are included in this analysis. The program operates under the assumption that the occurrence rate of earthquakes on each mappable Quaternary fault is proportional to the fault's slip rate. The program accounts for fault rupture length as a function of earthquake magnitude and site acceleration estimates are made using the earthquake magnitude and closest distance from the site to the rupture zone. Uncertainty in each of following are accounted for: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from all identified earthquake sources, the program calculates the total average annual expected number of occurrences of a site acceleration greater than a specified value. Attenuation relationships suggested by Sadigh, *et al.*, (1997) were utilized in the analysis. The results of the analysis indicate that for a weighted magnitude of 7.5 and a 10 percent probability of exceedance in 50 years, a mean site acceleration of 0.24 g may be generated. This value corresponds to a return period of approximately 475 years. For a weighted magnitude of 7.5 and a 10 percent probability of exceedance in 100 years (949-year return period), a mean site acceleration of 0.37 g may be generated. An unweighted mean site acceleration of 0.31 g and 0.46 g was calculated for a 10 percent probability of exceedance in 50 and 100 years, respectively.

7.5 Seismicity – Spectral Analysis

Several site-specific response spectra are presented on Figure 5, including the response spectrum generated by the CBC code modified for softening due to liquefaction, two deterministic response spectra for mean and mean plus one standard deviation, and two probabilistic design response spectra for a return period of 475 and 949 years. The use of deterministic or probabilistic spectra should only be used where liquefaction is remediated using ground improvement techniques. The appropriate spectrum for structural design should be selected by the project structural engineer.

7.6 Soil Liquefaction and Lateral Spread Potential

Soil liquefaction occurs within relatively loose, cohesionless sand located below the water table that is subjected to ground accelerations from earthquakes. Liquefaction potential was evaluated using the methodology of NCEER (2001). Peak ground accelerations were based on a probabilistic acceleration for a 475-year-return-period magnitude weighted to a 7.5 magnitude earthquake. Based on the analysis, there is a high potential for liquefaction of the loose, granular portions of the hydraulic fill and Bay Deposits below groundwater level. The zone of liquefiable soils beneath the site gradually

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increases eastward; from approximately groundwater level to a depth of 35 feet near the west end of the site to a depth of approximately 60 feet deep near the east end of the island. Manifestation of liquefaction at the ground surface is expected to be of 8 to 13 inches of ground settlement.

Current understanding within the geotechnical engineering profession is that lateral spreading can be expected in liquefiable sites adjacent to slopes such as river channels or large bodies of water. The observed horizontal ground displacement typically decreases with increased distances from the open face. The potential of lateral spreading is estimated based on the deformation analysis using Newmark's approach. Based on the acceleration corresponding to a 475-year return period, earthquake-induced horizontal ground displacement on the order of ½ foot are possible 10 feet from the crest of the shoreline for this site. Based on a deterministic peak site acceleration of 0.59 g, earthquake-induced horizontal ground displacements on the order of 7, 3, and 2 feet are possible at 10, 25, and 50 feet, respectively, from the crest of the shoreline.

Recommendations regarding the mitigation for soil liquefaction and lateral spreading potential are provided in subsequent sections of this report.

7.7 Tsunamis and Seiches

The site is located in San Diego Bay at elevations of approximately 13 to 16 feet MSL. Harbor Island is protected from direct ocean waves; however, the Multi-Jurisdictional Hazard Mitigation Plan of San Diego County (2004) shows that the island is within the zone of tsunami maximum projected run-up. Four historic tsunamis have been recorded in San Diego with wave heights ranging from 1.5 to 4.6 feet. Even though it is possible that the site could be affected by waves generated by tsunamis or seiches, the height and runout length of those waves would have to be very large. Therefore, the potential for a very large tsunami or seiche to affect the site is high.

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8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 Geologic hazards at the site include fault features beneath the eastern portion of the site, liquefaction, and the potential for inundation due to tsunamis or seiches. In our opinion, these geologic hazards would not preclude the development of the property as presently planned, provided the recommendations of this report are followed.

8.1.2 For proposed hotel buildings and parking structures, a minimum setback of 25 feet from the above-referenced faults at the eastern portion of the site is recommended as depicted on Figure 3. The recommended minimum setback zones should be incorporated in project planning and design.

8.1.3 The site is underlain by hydraulic fill, Bay Deposits and Bay Point Formation. Significant amounts of hydraulic fill and Bay Deposits below the groundwater table are susceptible to liquefaction. Lateral spreading is also possible along the shoreline. Therefore, on-site soils are not considered suitable, without mitigation, for support of the planned buildings.

8.1.4 For planned improvements that cannot accommodate expected settlement, ground improvements and/or deep foundations will be required. Ground improvements by installation of stone columns, compaction grouting, or deep soil mixing is recommended. The depth of ground improvements may vary depending upon the stratigraphic conditions and types of structures.

8.1.5 The planned buildings can be supported by shallow or mat foundations in improved ground, or by deep foundation systems capable of transmitting foundation loads through the hydraulic fill and Bay Deposits into Bay Point Formation. The choice of foundation systems is discussed herein.

8.1.6 Groundwater is expected at a depth of about 10 feet below the existing ground surface. Groundwater could have a significant influence on construction. De-watering will likely be required for excavations below an elevation of about 5 feet MSL.

8.2 Soil and Excavation Characteristics

8.2.1 Based on numerous laboratory tests of the hydraulic fill materials, the majority of the on-site material is anticipated to possess a very low to low expansion potential as defined by California Building Code (CBC) Table 18-I-B.

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8.2.2 We expect that the existing hydraulic fill can be excavated with light to moderate effort with conventional heavy-duty grading equipment.

8.2.3 A near-surface sample was subjected to laboratory pH, resistivity, and water-soluble sulfate content tests. The results are summarized in Appendix B and indicate a very corrosive environment with respect to buried metals. The soluble-sulfate test results indicate that concrete structures exposed to soils at the location tested have a "negligible" water-soluble sulfate exposure as defined in CBC Table 19-A-4. Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, if improvements that could be susceptible to corrosion are planned, it is recommended that further evaluation by a corrosion engineer be performed.

8.3 Seismic Design Criteria

8.3.1 The following table summarizes site design criteria obtained from the CBC. The values listed in Table 8.3 are for the Rose Canyon Fault, which is identified as a Type B fault and is more dominant than the nearest Type A fault due to its proximity to the site. Because soil liquefaction will not be mitigated if deep foundations are utilized, Soil Profile Type S_F was used. If ground improvements are utilized, liquefaction will be mitigated and a Soil Profile Type S_D can be used.

TABLE 8.3
SITE DESIGN CRITERIA

Parameter	Ground Improvements	Deep Foundations	CBC Reference
Seismic Zone Factor	0.40	0.40	Table 16-I
Soil Profile	S_D	S_F	Table 16-J
Seismic Coefficient, C_a	0.57	0.57	Table 16-Q
Seismic Coefficient, C_v	1.02	1.87	Table 16-R
Near-Source Factor, Na	1.3	1.3	Table 16-S
Near-Source Factor, N_v	1.6	1.6	Table 16-T
Seismic Source	B	B	Table 16-U

8.4 Mitigation of Liquefaction and Lateral Spreading

8.4.1 Mitigation of liquefiable soils and lateral spreading will be necessary for settlement-sensitive structures. We do not recommend deep dynamic compaction be used for densification due to the type of proposed improvements and the proximity to the resort

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marina facilities. The ground improvement method of stone columns, which consists of densifying existing soils with a vibrating probe and vibro-replacement with crushed rock, is recommended for structures supported by shallow and/or mat foundations. Where stone columns would result in damage to existing structures, ground improvement using cement deep soil mixing or compaction grouting should be considered. High load structures including multi-story hotel buildings should be supported by deep foundation systems extending below the potential liquefiable soils and embedded into competent Bay Point Formation.

8.4.2 The pattern and depth of ground improvements may vary depending upon the purposes of mitigation, stratigraphic conditions and the types of structures supported. In general, mitigation for lateral spreading is to densify on-site soils and/or increase the residual shear strength of soil mass in the event of a major earthquake. Therefore, we recommended the ground improvements for lateral spreading be extended at least 5 feet below the mud line of the adjacent bay along the existing shoreline. Mitigation for liquefaction settlement should extend to a depth of approximately 35 to 40 feet near the west end of the site and vary to a depth of approximately 60 feet near the east end of the island. Depths can be estimated from the cross section on Figure 4.

8.4.3 If ground densification methods such as stone columns are used, the upper 3 feet of soil, measured from the existing ground surface, should be removed and compacted. For purposes of this report, we have assumed stone column spacing will be approximately 9 feet and stone column diameter to be about 30 inches; however, final spacing and diameter should be selected by the contractor to obtain the necessary densification as outlined below. Following stone column construction, a minimum CPT tip resistance of 140 tons per square foot (tsf) in clean sands and 120 tsf in silty sands or 80 tsf for clean silts or a minimum Standard Penetration Test (SPT) blowcount of 22 blows/foot in clean sands and 20 blows/foot in silty sands should be obtained within the improved zones. To prevent the potential impact on the existing seawall, stone columns should be installed proceeding from the north boundary and to the south.

8.4.4 Mitigation using cement deep soil mixing, if selected, should be designed and constructed to meet the criteria of ground improvements. A testing program consists of coring and unconfined compression strength testing should be implemented during construction. Densification by compaction grouting should result in densification adequate to provide densification as tested in Section 8.4.3.

8.4.5 For all structures, the minimum depth of mitigation should be 35 feet. The mitigation should extend 15 feet laterally outside the edge of planned building structures. Mitigation

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within non-structure areas will be limited to that improvement obtained by nearby remediation within structure areas.

8.5 Mitigation of Consolidation Settlement

8.5.1 Following densification of the existing soils, additional fill material will have to be placed on the site to re-establish existing grades of between approximately 13 to 16 feet MSL. We anticipate an approximately 10 percent decrease in volume of the upper 30 feet of soil which corresponds to 3 feet of fill. The placement of the fill may result in consolidation of the underlying Bay Deposits. Based on a worst-case scenario of 3 feet of Bay Deposits settling under a load of 3 feet of new fill, approximately 1½ inches of consolidation settlement was calculated. It will take a total of about 30 days for complete consolidation of the Bay Deposits. If construction can be started with approximately ½ inch of long-term settlement remaining, approximately 20 days will be needed for consolidation.

8.5.2 Settlement monuments should be placed at approximately five locations at the site chosen by the geotechnical engineer and surveyed on a weekly basis following placement of the fill. When survey data indicate that only ½ inch of long-term settlement remains, construction of proposed structures can begin.

8.6 Grading

8.6.1 All grading should be performed in accordance with the attached *Recommended Grading Specifications* (Appendix E). Where the recommendations of this section conflict with Appendix E, the recommendations of this section take precedence. All earthwork should be observed and all fills tested for proper compaction by Geocon Incorporated.

8.6.2 Prior to commencing grading, a pre-construction conference should be held at the site with the owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling requirements can be discussed at that time.

8.6.3 Site preparation should begin with the removal of all deleterious material and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site.

8.6.4 In the areas subjected to densification by stone columns, the upper 3 feet of soil will be disturbed. Therefore, the upper 3 feet of soil within these areas should be removed, moisture conditioned and recompacted.

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8.6.5 In new parking areas, along retaining wall footings, and beneath mat foundations, the upper two feet of existing fill soil should be removed and recompacted. Hardscape areas should be scarified to a depth of 12 inches, moisture conditioned to slightly above optimum moisture content and compacted to 90 percent of the maximum dry density as determined by ASTM D 1557-02.

8.6.6 In areas to receive new fill and/or areas where removal have been performed, the ground surface should be scarified to a depth of at least 12 inches, moisture conditioned, and compacted to at least 90 percent of the maximum dry density at near optimum moisture content, as determined by ASTM D 1557-02.

8.6.7 Excavated soil free of deleterious debris can be placed as fill and compacted in layers to the design finish grade elevations. All fill and backfill soil should be placed in horizontal loose layers approximately 8 inches thick, moisture conditioned to a moisture content at or slightly above optimum, and compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557-02. The upper 12 inches of fill beneath pavement should be moisture conditioned and compacted to at least 95 percent relative compaction.

8.6.8 Any import soils should have an Expansion Index of less than 50 and a maximum particle dimension of 3 inches. Geocon Incorporated should be notified of the import source and should perform laboratory testing prior to delivery of the material to the site to determine its suitability as fill material.

8.7 Slope Stability

8.7.1 We anticipate that no slopes greater than 5 feet in height will be constructed for the project. Permanent fill slopes should be no steeper than 2:1, if used. Slopes composed of granular soils are susceptible to surface erosion. All slopes should be planted, drained and properly maintained to reduce erosion. Consideration should be given to the use of jute mesh or other surface treatment to minimize transport by runoff until adequate vegetation can take root.

8.7.2 Existing slopes along the shoreline are protected by rock revetment with heavy riprap and are performing adequately.

8.8 Shallow Foundations

8.8.1 Following ground improvements such as stone columns, deep soil mixing, or compaction grouting, the proposed approximately one-, two-, and three-story buildings can be

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supported on shallow footings. Foundations for the structures should consist of continuous strip footings and/or isolated spread footings. Continuous footings should be at least 12 inches wide and extend at least 24 inches below lowest adjacent pad grade. Isolated spread footings should have a minimum width of 24 inches and should extend at least 24 inches below lowest adjacent pad grade. A footing dimension detail depicting the depth to lowest adjacent grade is presented on Figure 6. Steel reinforcement for continuous footings should consist of at least four No. 5 steel reinforcing bars placed horizontally in the footings; two near the top and two near the bottom. Steel reinforcement for the spread footings should be designed by the project structural engineer.

8.8.2 The minimum reinforcement recommended above is based on soil characteristics only (Expansion Index of 50 or less) and is not intended to replace reinforcement required for structural considerations.

8.8.3 The recommended allowable bearing capacity for 24-inch-deep by 12-inch-wide foundations bearing in compacted fill following densification by stone columns is 3,000 pounds per square foot (psf). These allowable soil-bearing pressures may be increased by an additional 400 psf for each additional foot of depth and 200 psf for each additional foot of width, to a maximum allowable bearing capacity of 4,000 psf.

8.8.4 We estimate total settlement of footings imposing the above bearing pressures to be on the order of ½ inch.

8.8.5 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel and concrete to verify that the exposed soil conditions are consistent with those anticipated. If unanticipated soil conditions are encountered, foundation modifications may be required.

8.8.6 Footings should be located sufficiently distant from the property line so that excavation and construction do not influence neighboring property. Footings located within 7 feet of the top of slopes are not recommended. However, footings that must be located within this zone should be extended in depth such that the outer bottom edge of the footing is at least 7 feet horizontally inside the face of the slope.

8.8.7 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel and concrete to observe that the exposed soil conditions are consistent with those anticipated and that they have been extended to the appropriate bearing strata. If unanticipated soil conditions are encountered, foundation modifications may be required.

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8.9 Deep Foundations

8.9.1 If site improvements to mitigate liquefaction and lateral spreading, such as stone columns, are not performed or if building loads require footings that are too large, deep foundations are recommended. Because groundwater was encountered at about 11 feet in the boring, drilled piers would require water- or slurry-displacement methods of construction. Therefore, driven pre-cast concrete piles (PCCP) or auger cast piles will likely be the most economical. Recommendations for the other types of piles such as driven steel H piles can be provided if required. For ease of evaluation, we have provided recommendations for PCCP driven piles. Slight modifications will be required if auger cast piles are used.

8.9.2 Piles will develop support by both friction and by end bearing in the Bay Point Formation at depth. Capacities are commonly limited to 70 tons for 12-inch square piles, 100 tons for 14-inch square piles, and 150 tons for 18-inch square piles due to structural and drivability concerns. Geocon will provide the tip elevations and lateral capacities based on the design service loads and the specific subsurface conditions below the structures. If different loadings or pile types are used, Geocon Incorporated should be contacted. Allowable uplift capacities can be taken as one half the allowable compressive capacities. The ultimate uplift capacity is equal to the allowable compressive capacity. The uplift capacity may also be limited by structural considerations and should be checked by the structural engineer. In general, pile lengths can be estimated for the loadings above at a penetration of 10 to 20 feet into Bay Point Formation. The elevation of the top of the Bay Point Formation is depicted on Figure 4. Downdrag loads due to liquefaction will also be incorporated into the design.

8.9.3 If pile spacing is at least four times the maximum dimension of the pile, no reduction in axial capacity for group effects is considered necessary.

8.9.4 Pile settlement is expected to be on the order of ¼-inch for PCCP piles. Settlement should be essentially complete shortly after completion of the structure.

8.9.5 Pre-drilling should not be used. The geotechnical engineer (a representative of Geocon Incorporated) should observe pile driving and evaluate each pile on a case-by-case basis or a load test should be performed. It is recommended that a pile hammer that develops a minimum energy of 30,000 foot-pounds per blow be used. Each pile should be evaluated during driving to determine if adequate capacity has been attained. For practical purposes, the final set should equal or exceed that required for recommended allowable capacity based on dynamic equation or wave equation formulas.

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8.9.6 On-site soils are very corrosive with respect to steel and "negligible" corrosive with respect to concrete. The groundwater is expected to be saltwater. The structural engineer should take this data into account when selecting cement quantities and types for piles. Adequate concrete cover over reinforcing steel should be provided in accordance with good construction practices and design standards.

8.10 Mat Foundations

8.10.1 As an alternative to deep foundation, the heavy structures such as the parking structure (but not high-rise structures) may be supported on a mat or raft foundation system following grading as described in previous sections of this report. A raft or mat foundation consists of a thick, rigid concrete mat that allows the entire footprint of the structure to carry the structural loads. In addition, this type of foundation can tolerate greater differential settlements associated with liquefaction than conventional foundations. Liquefaction settlements of 8 to 13 inches are possible across the site. Depending on the location of the proposed structure, deformation associated with lateral spread should also be evaluated.

8.10.2 We expect structural loads to impose a uniform bearing pressure of less than 300 pounds per square feet (psf). However, isolated column areas within the mat foundation could have bearing pressures exceeding 300 psf. The anticipated total and differential static settlements of mat imposing the above bearing pressures are estimated to be on the order of ¾ inch and ½ inch, respectively.

8.10.3 The allowable bearing capacity can be taken as 2,500 psf following remedial grading beneath the building area. The modulus of subgrade reaction for design of the mat can be taken as 100 pounds per cubic inch (pci). This modulus should be modified using the conventional equation for mat dimensions.

8.10.4 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel and concrete to verify that the exposed soil conditions are consistent with those anticipated. If unanticipated soil conditions are encountered, foundation modifications may be required.

8.11 Concrete Slabs-on-Grade

8.11.1 If liquefaction is not mitigated using soil improvement techniques such as stone columns, the ground floor of buildings should have a structurally supported slab. If liquefaction is mitigated, slabs-on-grade can be used. Concrete slabs-on-grade for all the buildings should have a minimum thickness of 5 inches and be reinforced with No. 3 steel reinforcing bars at

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18 inches on center in both horizontal directions. The slabs should be underlain by 4 inches of clean sand. Where moisture-sensitive floor coverings are planned, the slabs should be underlain by a visqueen moisture barrier placed at the midpoint of the sand blanket. Where heavy concentrated floor loads and/or heavy forklift loads are anticipated, Geocon Incorporated should be contacted for specific recommendations.

8.11.2 The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting equipment and storage loads.

8.11.3 All exterior concrete flatwork not subject to vehicular traffic should be at least 4 inches thick and constructed in accordance with the following recommendations. Slab panels in excess of 8 feet square should be reinforced with 6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh to reduce the potential for cracking. In addition, all concrete flatwork should be provided with crack-control joints to reduce and/or control shrinkage cracking. Crack-control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack-control spacing. Subgrade soils for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soils should be properly compacted and the moisture content of surficial soils should be verified prior to placing concrete.

8.11.4 The recommendations presented herein are intended to reduce the potential for cracking of slabs and foundations as a result of differential movement. However, even with the incorporation of the recommendations presented herein, foundations and slabs-on-grade will still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints, and proper concrete placement and curing. Crack-control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

8.12 Retaining Walls and Lateral Loads

8.12.1 The following recommendations for retaining walls are provided based on our experience with similar site and soil conditions. Modifications may be required depending on actual

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site conditions. All retaining walls should be founded on properly compacted fill extending at least 2 feet below the bottom of footings.

8.12.2 Retaining walls that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall in feet) at the top of the wall and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 32 pounds per cubic foot (pcf). Where the backfill will be inclined at no steeper than 2:1 (horizontal:vertical), an active soil pressure of 50 pcf is recommended. These soil pressures assume that the backfill materials within an area bounded by the wall and a 1:1 plane extending upward from the base of the wall possess an Expansion Index of less than 50. For those pads where backfill materials do not conform to the above criteria, Geocon Incorporated should be consulted for additional recommendations.

8.12.3 Where walls are restrained from movement at the top, an additional uniform pressure of 7H psf should be added to the above active soil pressure.

8.12.4 All retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed if required by the project architect. The use of drainage openings through the base of the wall (weep holes, etc.) is not recommended where the seepage could be a nuisance or otherwise adversely impact the property adjacent to the base of the wall. A typical wall drain detail is provided as Figure 6. The above recommendations assume a properly compacted granular (Expansion Index less than 50) backfill material with no hydrostatic forces or imposed surcharge load. If conditions different than those described are anticipated, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

8.12.5 In general, wall foundations having a minimum depth and width of one foot and founded on a minimum of two feet of properly compacted fill may be designed for an allowable soil bearing pressure of 2,500 psf. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Geocon Incorporated should be consulted where such a condition is anticipated.

8.12.6 For resistance to lateral loads, an allowable passive earth pressure equivalent to a fluid density of 300 pcf is recommended for footings or shear keys poured neat against properly compacted granular fill soils. The allowable passive pressure assumes a horizontal surface extending away from the base of the wall at least 5 feet or three times the height of the surface generating the passive pressure, whichever is greater. The upper 12 inches of material not protected by floor slabs or pavement should not be included in the design for lateral resistance. An allowable friction coefficient of 0.4 may be used for resistance to

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sliding between soil and concrete. This friction coefficient may be combined with the allowable passive earth pressure when determining resistance to lateral loads.

8.12.7 The recommendations presented above are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 10 feet. In the event that walls higher than 10 feet or other types of walls are planned, Geocon Incorporated should be consulted for additional recommendations.

8.13 Preliminary Pavements Recommendations

8.13.1 R-Value tests performed on near-surface soils indicate that soil has an R-Value of at least 50. The R-Value of materials present at grade after completion of grading may vary significantly from these preliminary test results. The final pavement sections should be based on the R-Value of the subgrade soils encountered at final subgrade elevation.

TABLE 8.13
FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking stalls for automobiles and light-duty vehicles	4.5	50	3	4
Driveways for automobiles and light-duty vehicles	5.5	50	3	4
Driveways for heavy truck and buses	7.0	50	3½	5½
Fire lane if City Fire Requires TI=9.5	9.5	50	5½	8

8.13.2 Subgrade soil should be compacted to a minimum of 95 percent relative compaction to a depth of 12 inches beneath pavement sections.

8.13.3 Class 2 base should conform to Section 26-1.028 of the *Standard Specifications for The State of California Department of Transportation (Caltrans)* with a ¾-inch maximum size aggregate and should be compacted to a minimum of 95 percent of the maximum dry density at near optimum moisture content. The asphalt concrete should conform to Section 203-6 of the *Standard Specifications for Public Works Construction (Greenbook).*

8.13.4 Where trash bin enclosures are planned within asphalt paved areas, the pavement sections should consist of 7 inches of Portland cement concrete reinforced with No. 3 bars spaced at

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18 inches in each direction. The concrete should extend into the roadway sufficiently so that all wheels of the trash truck are on the concrete when loading.

8.13.5 The performance of asphalt concrete pavements is highly dependent upon providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement will likely result in pavement distress and subgrade failure. If planter islands are proposed, the perimeter curb should extend at least 6 inches into the subgrade. In addition, the surface drainage within the planter should be such that ponding will not occur.

8.14 Drainage and Maintenance

8.14.1 Establishing proper drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Positive measures should be taken to properly finish grade the building pads after structures and other improvements are in place, so that drainage water from the building pads and adjacent properties is directed away from foundations and tops of slopes to controlled drainage devices. Under no circumstances should water be allowed to pond adjacent to footings. Experience has shown that even with these provisions, a shallow groundwater or subsurface condition can and may develop in areas where no such condition existed prior to site development. This is particularly true where a substantial increase in surface water infiltration results from an increase in landscape irrigation.

8.15 Grading and Foundation Plan Review

8.15.1 It is recommended that Geocon Incorporated review proposed grading and/or foundation plans prior to finalizing. The need for additional analysis or comments can be determined at that time.

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LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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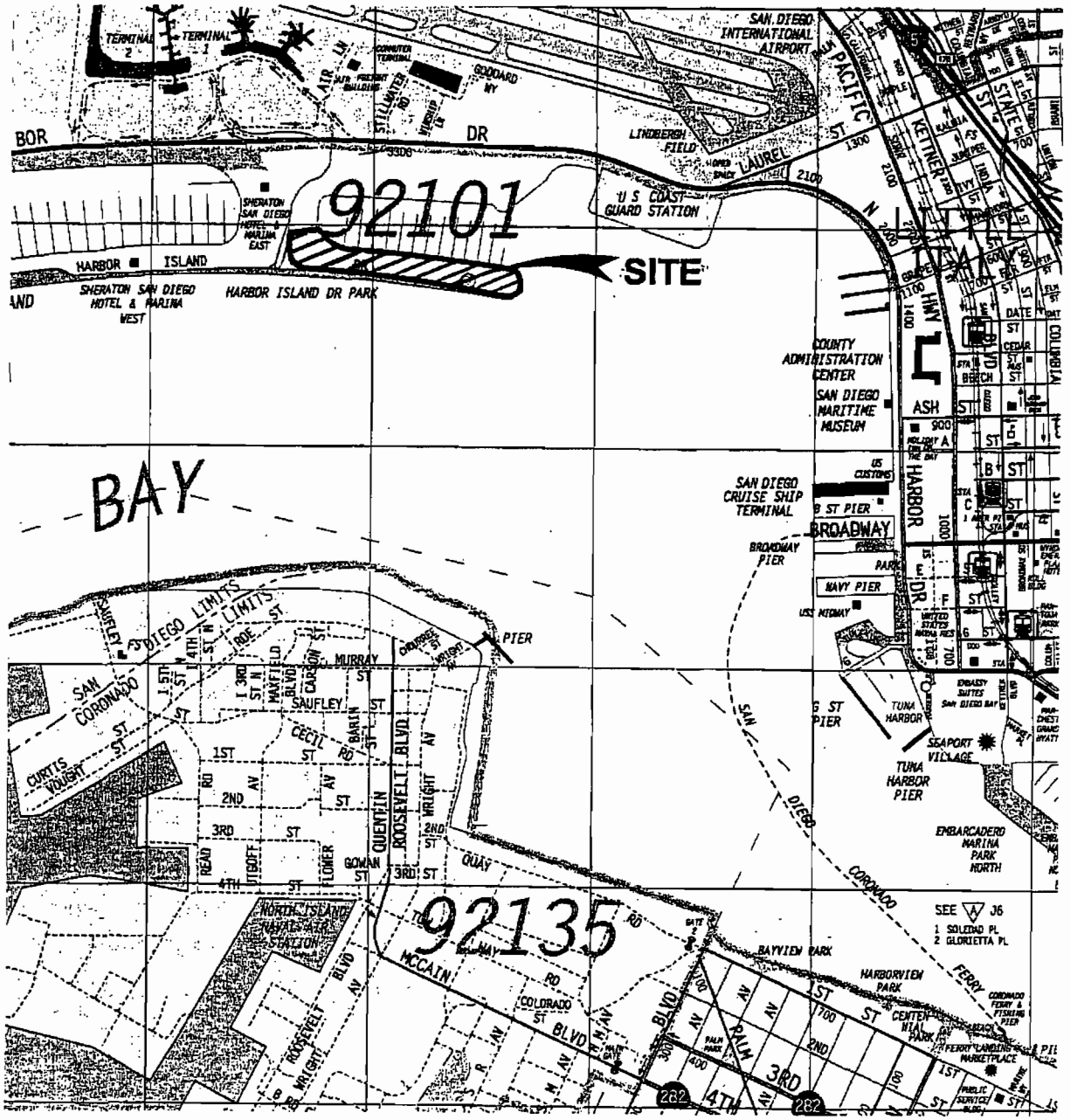

SOURCE: 2006 THOMAS BROTHERS MAP
SAN DIEGO COUNTY, CALIFORNIA

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FK / RA		DSK/GTYPD

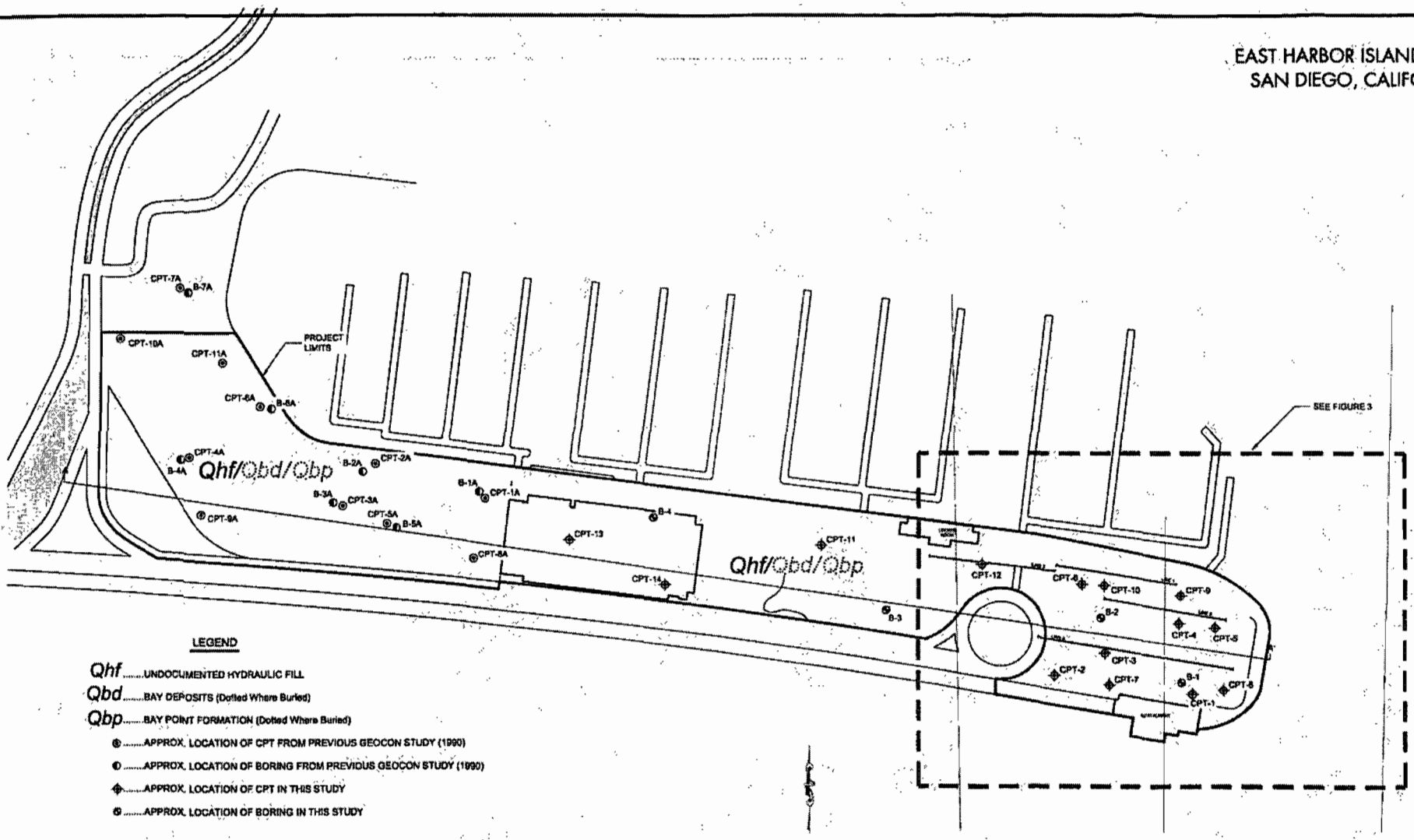
VICINITY MAP

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

DATE 03-03-2006	PROJECT NO. 07569 - 22 - 01	FIG. 1

Vicinity Map

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA



LEGEND

Qhf.....UNDOCUMENTED HYDRAULIC FILL
Qbd.....BAY DEPOSITS (Dotted Where Buried)
Qbp.....BAY POINT FORMATION (Dotted Where Buried)
.....APPROX. LOCATION OF CPT FROM PREVIOUS GEOCON STUDY (1990)
.....APPROX. LOCATION OF BORING FROM PREVIOUS GEOCON STUDY (1990)
.....APPROX. LOCATION OF CPT IN THIS STUDY
.....APPROX. LOCATION OF BORING IN THIS STUDY
.....APPROX. LOCATION OF SEISMIC LINE
A A' .....APPROX. LOCATION OF GEOLOGIC CROSS SECTION

SCALE: 1" = 240'

SITE PLAN / GEOLOGIC MAP

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FIGURE 2
DATE 03 - 03 - 2006

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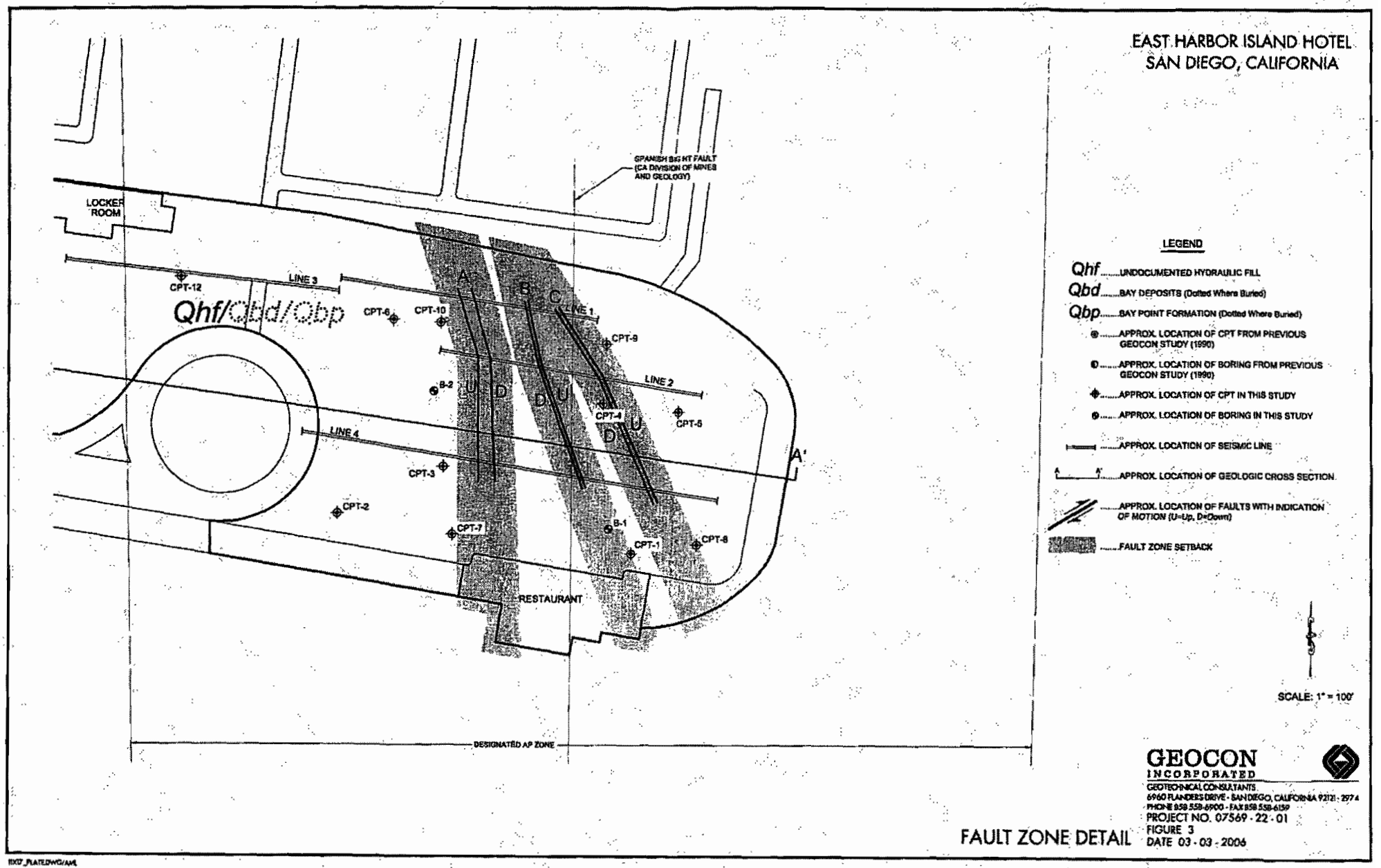
EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA
SPANISH BIGHT FAULT (CA DIVISION OF MINES AND GEOLOGY)
LOCKER ROOM
LINE 3
LINE 1
LINE 2
LINE 4
CPT-12
CPT-6
CPT-10
CPT-9
B-2
CPT-4
CPT-5
CPT-3
CPT-2
CPT-7
B-1
CPT-1
CPT-8
A
A'
B
C
U
D
Qhf/Qbd/Qbp
RESTAURANT
DESIGNATED AP ZONE
LEGEND
Qhf.....UNDOCUMENTED HYDRAULIC FILL
Qbd.....BAY DEPOSITS (Dotted Where Buried)
Qbp.....BAY POINT FORMATION (Dotted Where Buried)
.....APPROX. LOCATION OF CPT FROM PREVIOUS GEOCON STUDY (1990)
.....APPROX. LOCATION OF BORING FROM PREVIOUS GEOCON STUDY (1990)
.....APPROX. LOCATION OF CPT IN THIS STUDY
.....APPROX. LOCATION OF BORING IN THIS STUDY
.....APPROX. LOCATION OF SEISMIC LINE
.....APPROX. LOCATION OF GEOLOGIC CROSS SECTION
.....APPROX. LOCATION OF FAULTS WITH INDICATION OF MOTION (U=Up, D=Down)
.....FAULT ZONE SETBACK
SCALE: 1" = 100'
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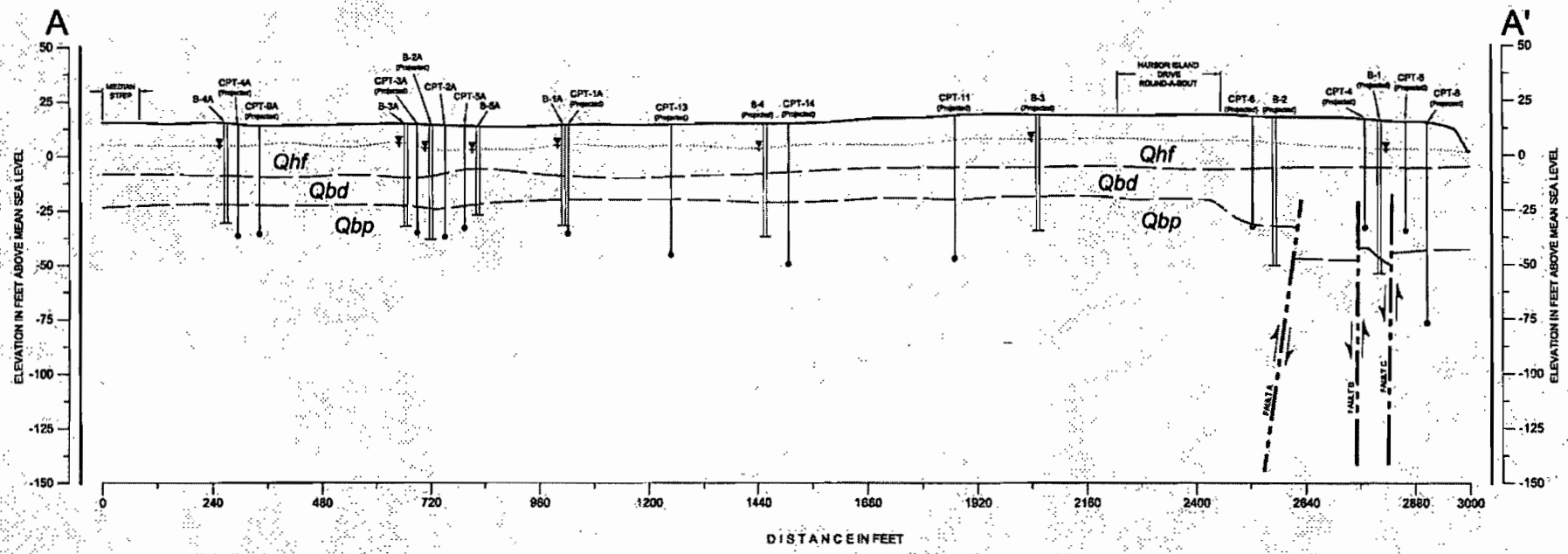
FIGURE 3
DATE 03 - 03 - 2006
FAULT ZONE DETAIL

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION A-A'

SCALE
VERTICAL: 1" = 50'
HORIZONTAL: 1" = 240'

LEGEND

Qhf ..... HYDRAULIC FILL
Qbd ..... BAY DEPOSITS
Qbp ..... BAY POINT FORMATION
..... APPROX. LOCATION OF GEOLOGIC CONTACT
..... APPROX. DEPTH OF WATER TABLE
..... FAULT INDICATING RELATIVE MOTION

NOTE:
SURFACE ELEVATION ESTIMATED BASED ON THE CITY OF SAN DIEGO TOPOGRAPHIC SURVEY DATED 1978

GEOLOGIC CROSS SECTION

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FIGURE 4
DATE 03-03-2006

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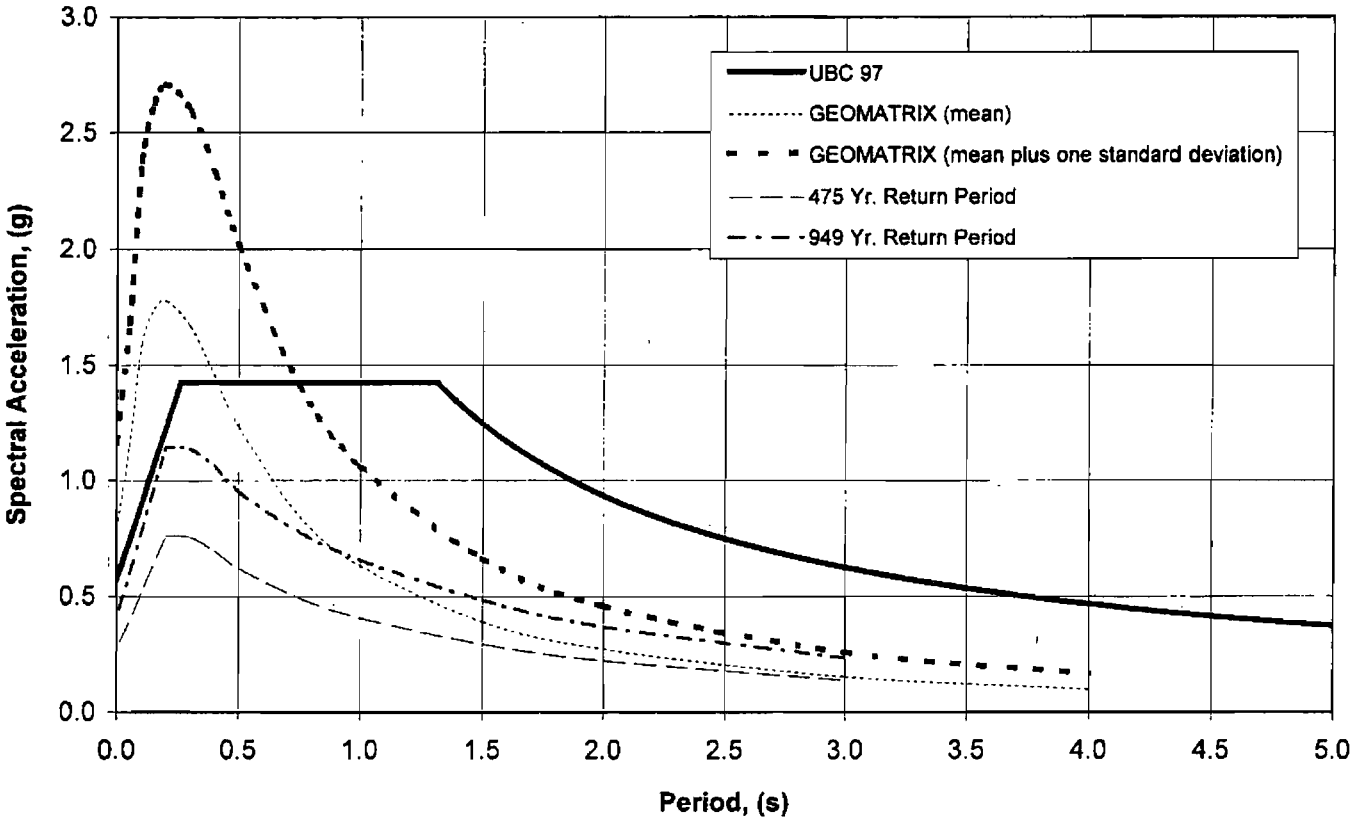

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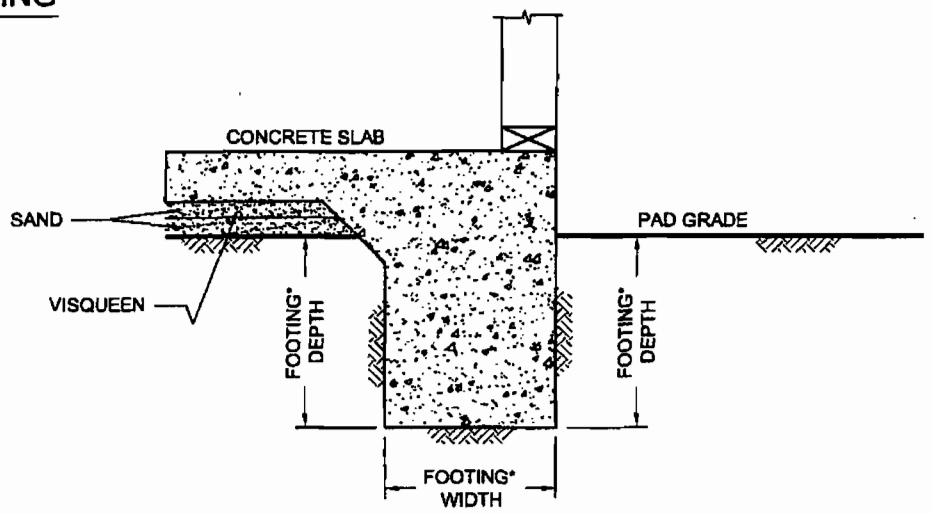
SW/SW

RESPONSE SPECTRA

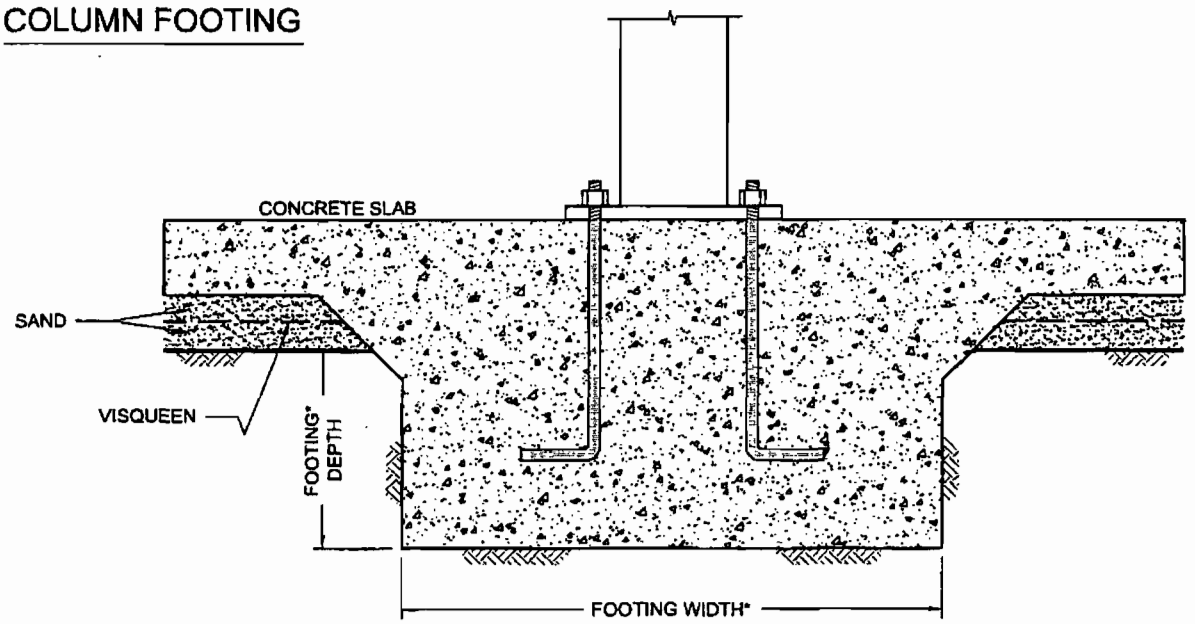
EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

DATE 03-03-2006	PROJECT NO. 07569-22-01	FIG. 5

WALL FOOTING



COLUMN FOOTING



*....SEE REPORT FOR FOUNDATION WITDH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

FK/RA		DSK/GTYPD	DATE 03-03-2006	PROJECT NO. 07569 - 22 - 01	FIG. 6

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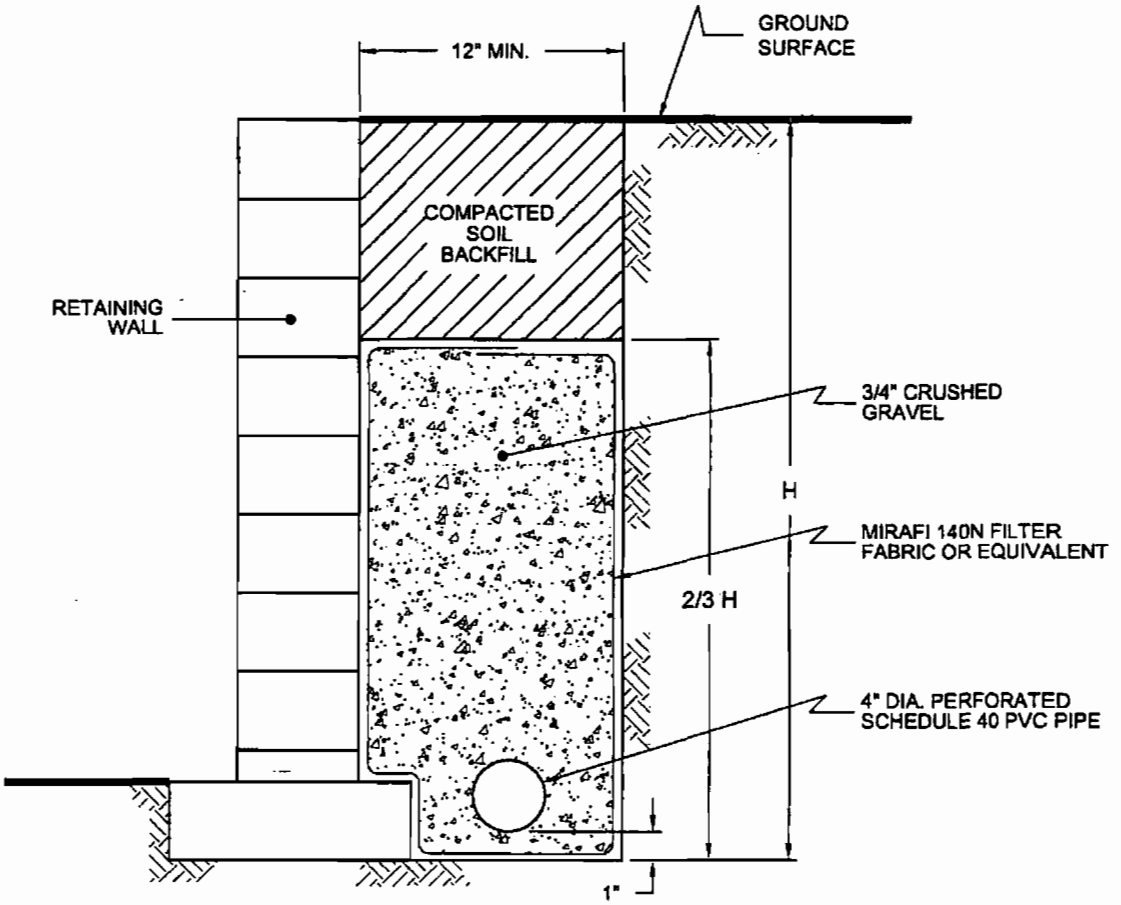

NO SCALE

RETAINING WALL DRAINAGE DETAIL

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EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

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X:_DETAIL\RETWALL3.rc

APPENDIX A

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APPENDIX A

FIELD INVESTIGATION – CURRENT STUDY

FOR

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

PROJECT NO. 07569-22-01

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APPENDIX A

CURRENT FIELD INVESTIGATION

The current field investigation was performed on September 6, 2005 and February 21, 2006 and consisted of drilling four small-diameter borings and performing 14 Cone Penetration Tests (CPTs) at the approximate locations shown on Figure 2. The small-diameter borings were drilled using a CME 55 for Borings B-1 and B-2 and a Mayhew 1000 mud rotary wash drill rig for Borings B-3 and B-4. Boring depths ranged from approximately 50 feet to 70 feet. Relatively undisturbed samples were obtained with the drill rig by driving a 3-inch O.D. split-tube sampler 12 inches into the undisturbed soil mass with blows from a 140-pound hammer falling 30 inches. The split-tube sampler was equipped with 2-inch-high by 2⅜-inch-diameter brass sampler rings to facilitate sample removal and testing. Standard penetration tests (SPT) were performed by driving a 1-inch O.D. split-spoon sampler 18 inches in accordance with ASTM D 1586. The number of blows to drive the sampler the last 12 of 18 inches is reported. Disturbed bulk samples were obtained from drill cuttings and SPT testing. CPTs were advanced using a 30-ton, hydraulic push rig, to a maximum depth of 90 feet in some locations.

The soil conditions encountered in the borings were visually examined, classified, and logged in general conformance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D 2488). The logs of the exploratory borings are presented on Figures A-1 through A-4. The logs depict the various soil types encountered and indicate the depths at which samples were obtained. CPT data is presented on Figures A-5 through A-18.

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PROJECT NO. 07569-22-01

BORING B 1

ELEV. (MSL.) ~13 DATE COMPLETED 09-06-2005

EQUIPMENT CME 55 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1				3 inches of **ASPHALT**			
					5 inches of **BASE**			
				SP	**HYDRAULIC FILL** Loose to medium dense, moist, fine to medium, yellowish brown, SAND with muscovite; shells are present		99.6	14.3
2								
4								
6								
8					-Color change			
				SP	Very dense, moist, light yellowish brown, fine to medium SAND with shells			
10	B1-2					38		
12								
14			▼					
	B1-3				-Saturated, dark brown, with muscovite and broken pieces of shells	40		
16								
18	B1-4				-Gray, with small pieces of shells	34		
20								
				SP	**BAY DEPOSITS** Very loose, saturated, medium gray, fine to medium SAND with muscovite and biotite			
	B1-5					1		
22								
	B1-6				-Very little recovery	2		
24								
26								
28	B1-7					5		
					-Coherent shell pieces			

Figure A-1,
Log of Boring B 1, Page 1 of 3

07569-22-01.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▩ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 07569-22-01

BORING B 1

ELEV. (MSL.) -13 DATE COMPLETED 09-06-2005

EQUIPMENT CME 55 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B1-8			SP		12		
					-Medium dense, with plenty coherent/discernible shell fragments			
32								
34	B1-9				-Fine to coarse with shell fragments	22		
36	B1-10			SM	Loose to medium dense, saturated, dark gray, Silty, fine SAND; poorly graded with shell fragments	21		
38	B1-11					8		
40								
42	B1-12				-Clay in the shoe	2		
				CL	Medium stiff, gray, fine Sandy CLAY with few small snail shell fragments			
44	B1-13					9		
46								
48	B1-14					11		
					-Very stiff, dark gray, (no discernible shell fragments)			
50								
52	B1-15				-Homogenous CLAY; no obvious shell, rusty smell	14		
54	B1-16					9		
					-Stiff, organic (?) smell			
56								
58	B1-17					10		
					-Very stiff			

Figure A-1,
Log of Boring B 1, Page 2 of 3

07569-22-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

57291

554

PROJECT NO. 07569-22-01

BORING B 1

ELEV. (MSL.) ~13 DATE COMPLETED 09-06-2005

EQUIPMENT CME 55 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60								
62	B1-18			SC	Interbedded dense, saturated, brown, Clayey SAND and Sandy CLAY -Stiff, greenish (pieces of gypsum found)	18		
64	B1-19			SM	**BAY POINT FORMATION** Dense, saturated, medium reddish brown, Silty SAND	30		
66								
68								
70					BORING TERMINATED AT 70 FEET (Refusal) Groundwater depth was measured to be approximately 14½' Boring was backfilled with 4.0 ft³ of bentonite chips and 20.4 ft³ of bentonite grout			

57791

Figure A-1,
Log of Boring B 1, Page 3 of 3

07569-22-01.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 07569-22-01

BORING B 2

ELEV. (MSL.) ~13 DATE COMPLETED 09-07-2005

EQUIPMENT CME 55 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B2-1				3 inches of **ASPHALT** 5 inches of **BASE**			
2				SP	**HYDRAULIC FILL** Loose to medium dense, slightly moist, light brown, medium SAND with large shell fragments			
4								
6								
8								
10	B2-2				-Color change -Soft, dark gray, CLAY layer - Very dense, wet, medium to coarse light brown sand with abundant shell fragments	18	99.1	16.9
12					-Medium dense, fine to coarse			
14								
16	B2-3				-Very dense, saturated, medium to coarse light gray	>50	98.4	24.4
18								
20	B2-4				-Medium dense, no shells	17	94.4	31.1
22				SP	**BAY DEPOSITS** Loose, saturated, dark gray, fine to coarse SAND, no shells			
24	B2-5					5		
26								
28								

Figure A-2,
Log of Boring B 2, Page 1 of 3

07569-22-01.GPJ

SAMPLE SYMBOLS
... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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57791

556

PROJECT NO. 07569-22-01

BORING B 2

ELEV. (MSL.) ~13 DATE COMPLETED 09-07-2005

EQUIPMENT CME 55 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B2-6			SP	-Medium dense, fine to medium with shell fragments heavily concentrated in last 6 inches of sample	22	98.1	26.4
32								
34								
36	B2-7				-Loose, fine to coarse with abundant shell fragments	12		
38								
40								
42	B2-8			CL	Soft, saturated, dark gray, CLAY with small shell fragments	2		
44								
46								
48	B2-9				-Very stiff, gray, Sandy CLAY	11		
50				SM	**BAY POINT FORMATION** Dense, saturated, greenish gray to reddish brown, Silty, medium SAND			
52	B2-10			SP	Dense, saturated, yellowish tan brown, fine to medium SAND	24		
54								
56								
58	B2-11				-Dense to very dense, brown	>50	97.1	24.7

57791

Figure A-2,
Log of Boring B 2, Page 2 of 3

07569-22-01.GPJ

SAMPLE SYMBOLS
... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. 07569-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 2 ELEV. (MSL.) ~13 DATE COMPLETED 09-07-2005 EQUIPMENT CME 55 BY: F. KHATIB	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
60				SM	Dense, saturated, brown, Silty fine SAND			
62								
64								
66	B2-12					24	103.4	22.7
					BORING TERMINATED AT 66.5 FEET Groundwater not measured Boring was backfilled with 4.0 ft³ of bentonite chips and 20.4 ft³ of bentonite grout			

57791

Figure A-2,
Log of Boring B 2, Page 3 of 3

07569-22-01.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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558

PROJECT NO. 07569-22-01

BORING B 3

ELEV. (MSL.) ~13 DATE COMPLETED 02-21-2006

EQUIPMENT MAYHUE 1000 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3 inches of **ASPHALT**			
				SP	6 inches of **BASE**			
2					**HYDRAULIC FILL** Loose, moist to wet, tan, fine SAND with silt; muscovite is abundant			
4								
6	B3-1					11		
8								
10	B3-2			CL	Stiff, wet, dark gray, fine Sandy CLAY with shell fragments	48		
			▼	SP	Medium dense, moist to saturated, gray, fine SAND with abundance of muscovite and biotite			
12								
14								
16	B3-3				-Trace of silt; some angular gravel present	9		
18								
20	B3-4					14		
22								
24				SP	**BAY DEPOSITS** Loose, saturated, dark gray, fine SAND with silt; contains whole shells			
26	B3-5					7		
28								

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Figure A-3,
Log of Boring B 3, Page 1 of 2

07569-22-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 07569-22-01

BORING B 3

ELEV. (MSL.) ~13 DATE COMPLETED 02-21-2006

EQUIPMENT MAYHUE 1000 BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B3-6			SP	-Medium dense, upper 6" contains whole shells	51		
32								
34								
	B3-7					3		
36				SM	**BAY POINT FORMATION** Medium dense, saturated, brown to orange brown, Silty, fine SAND with muscovite and biotite, some gravel present in upper portion of sampler			
38								
40	B3-8					47	115.5	17.2
42								
44				SP	Medium dense, saturated. brown, fine to medium SAND with trace silt, abundant shell fragments present			
	B3-9					29		
46								
48								
50	B3-10					75/11"		
52								
54				SM	Dense, saturated, grayish brown, Silty, fine SAND			
	B3-11					33		
56								
					BORING TERMINATED AT 56.5 FEET Groundwater encountered at approximately 11.5 feet Boring was backfilled with 7.4 ft³ of bentonite grout			

57791

Figure A-3,
Log of Boring B 3, Page 2 of 2

07569-22-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE. THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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560

PROJECT NO. 07569-22-01

BORING B 4

ELEV. (MSL.) ~10 DATE COMPLETED 02-21-2006

EQUIPMENT MUD ROTARY BY: F. KHATIB

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3 inches of **ASPHALT**			
				SP	6 inches of **BASE**			
2					**HYDRAULIC FILL** Loose, moist to wet, light gray, fine SAND with trace silt; abundant muscovite and biotite; abundance of shells; some angular gravel present			
4								
6	B4-1					12		
8								
10	B4-2		▼		-Dense layer at 10 feet	43		
12								
14								
16	B4-3				-Saturated, gray, ; abundant mica; some shells	6		
18								
20	B4-4				-Loose to medium dense, angular gravel present in upper part of sample	22		
22								
24				SP	**BAY DEPOSITS** Loose, saturated, dark gray, micaceous, fine SAND with trace silt; organic odor; some shell fragments present			
26	B4-5					7		
28								

Figure A-4,
Log of Boring B 4, Page 1 of 2

07569-22-01.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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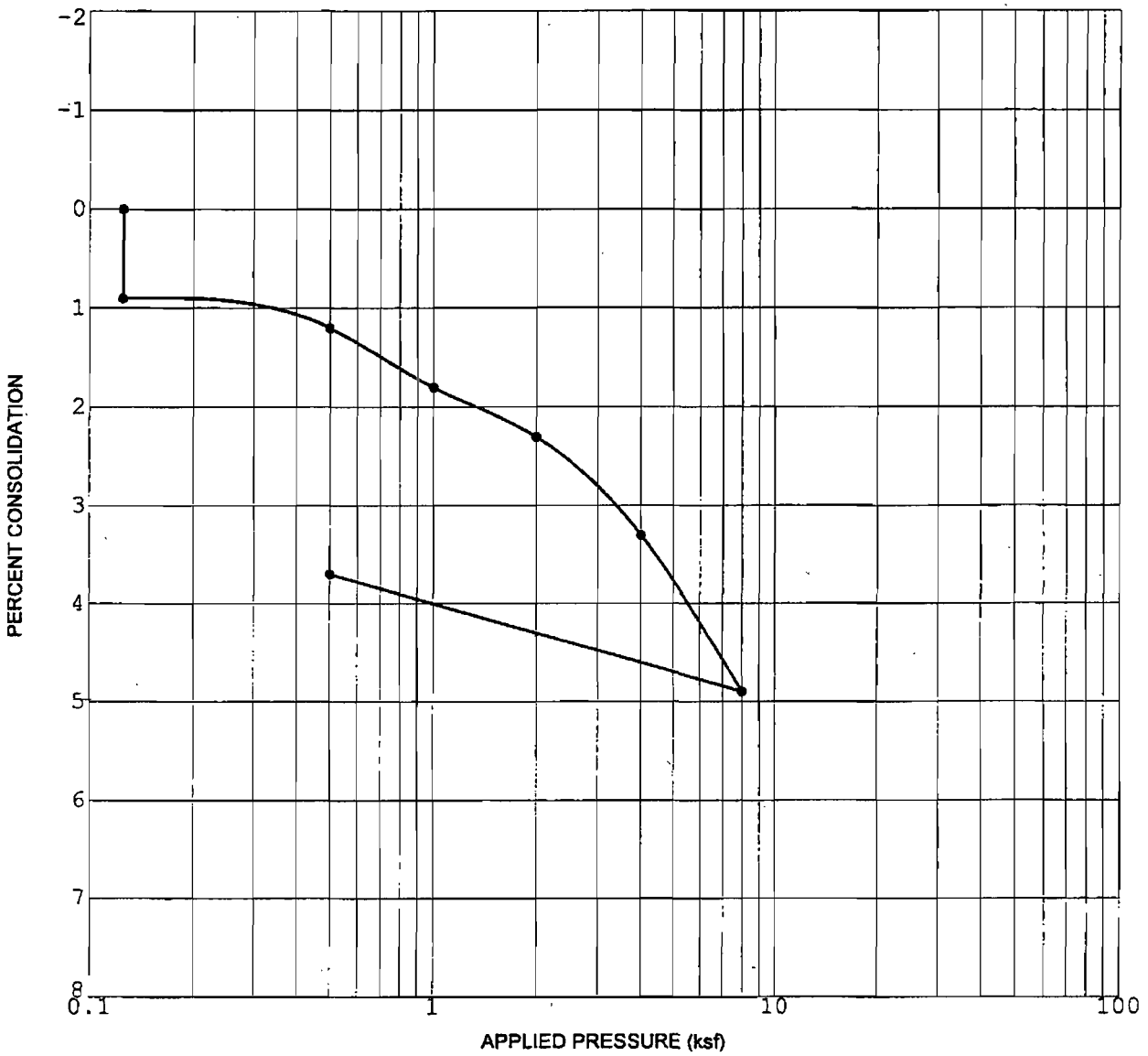
561

PROJECT NO. 07569-22-01

SAMPLE NO. B2-2



Initial Dry Density (pcf)	99.1
Initial Water Content (%)	16.9

Initial Saturation (%)	88.3
Sample Saturated at (ksf)	.125

CONSOLIDATION CURVE

EAST HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

07569-22-01.GPJ

Figure B-1

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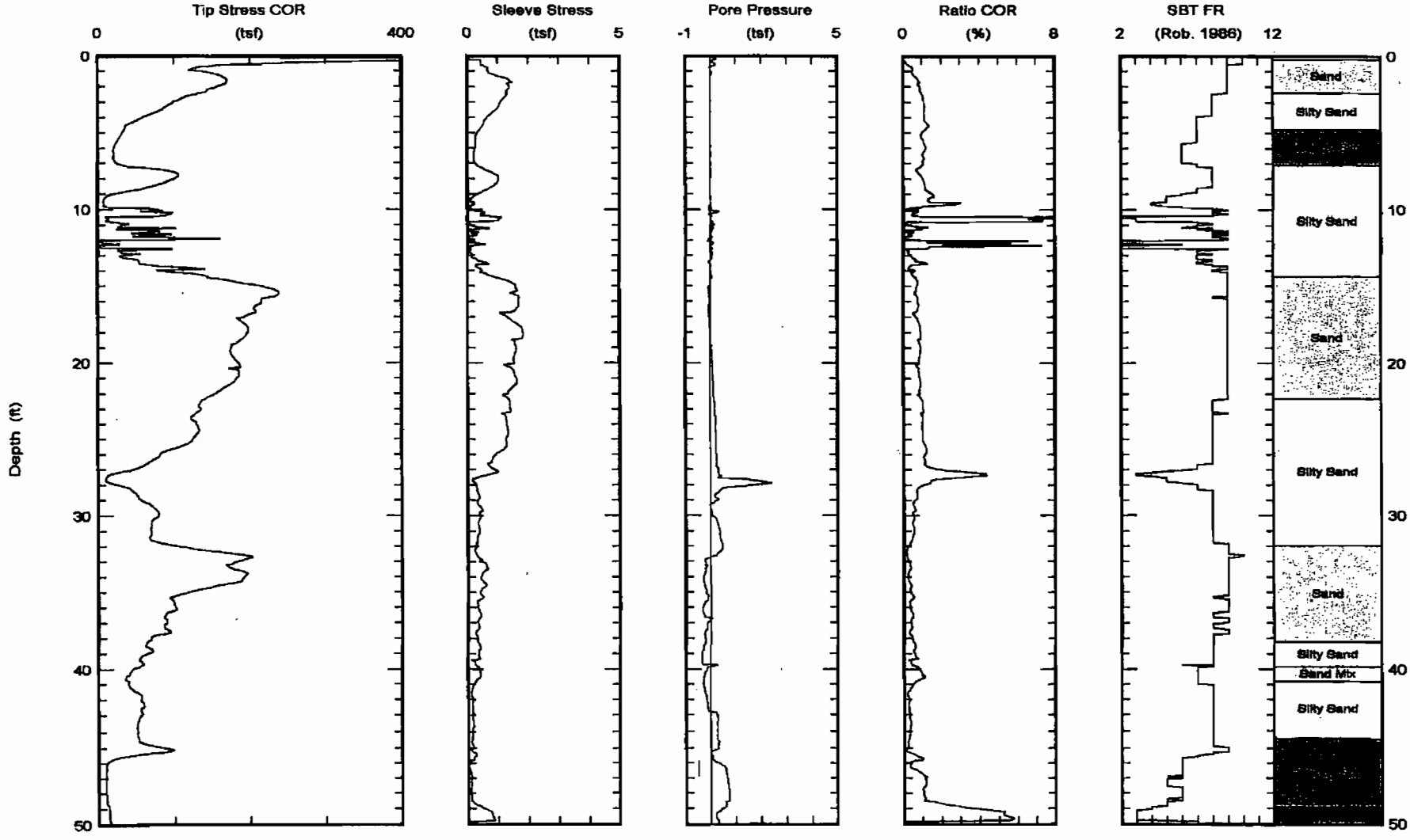
562

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 06/Sep/2005
Test ID: CPT-1
Project: SanDiego

Client: Geocon Consultants
Job Site: East Harbor Island



Maximum depth: 50.10 (ft)
Page 1 of 2

Test ID: CPT-1
File: Z06S0601C.ECP

FIGURE A

563

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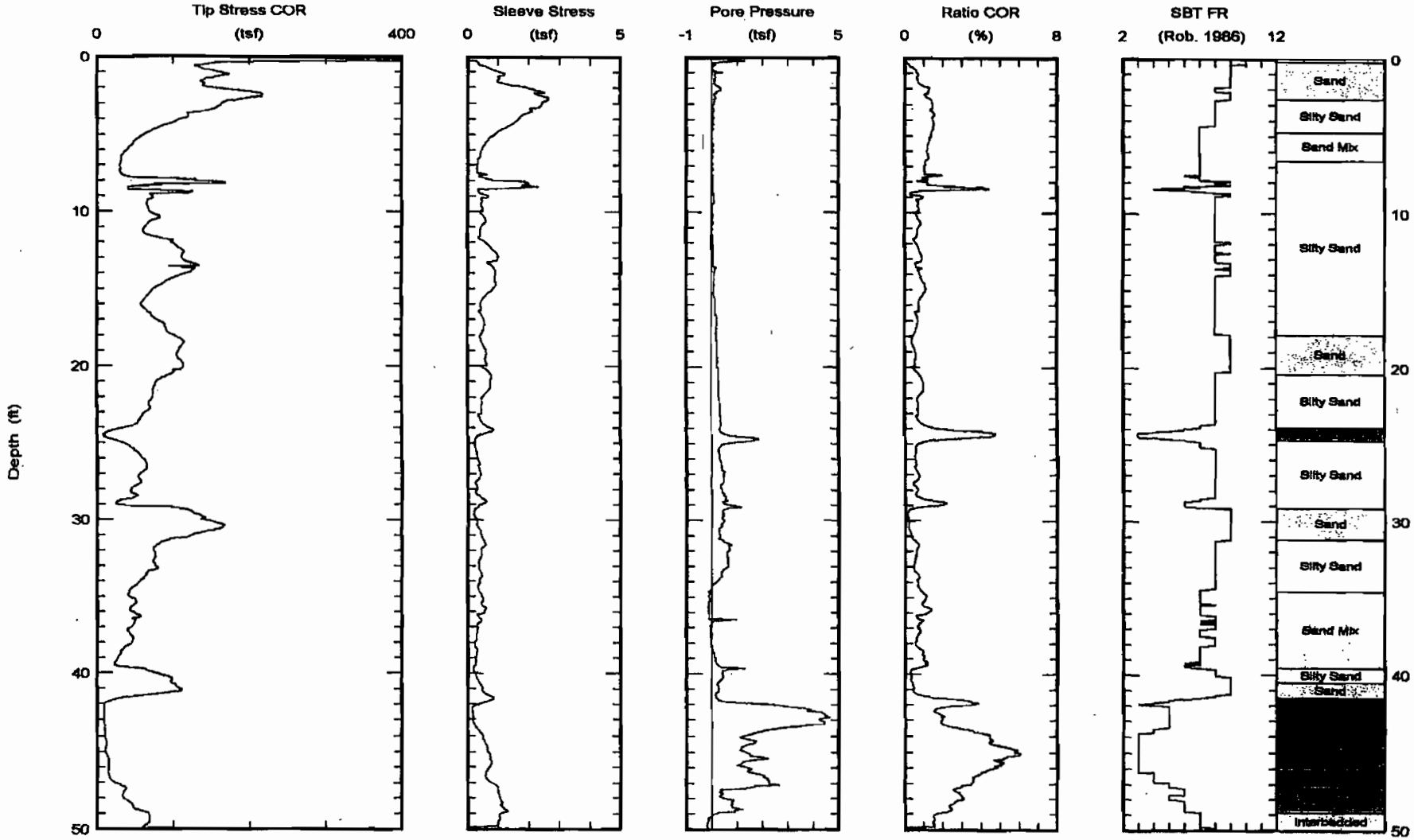
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 06/Sep/2005
Test ID: CPT-2
Project: SanDiego

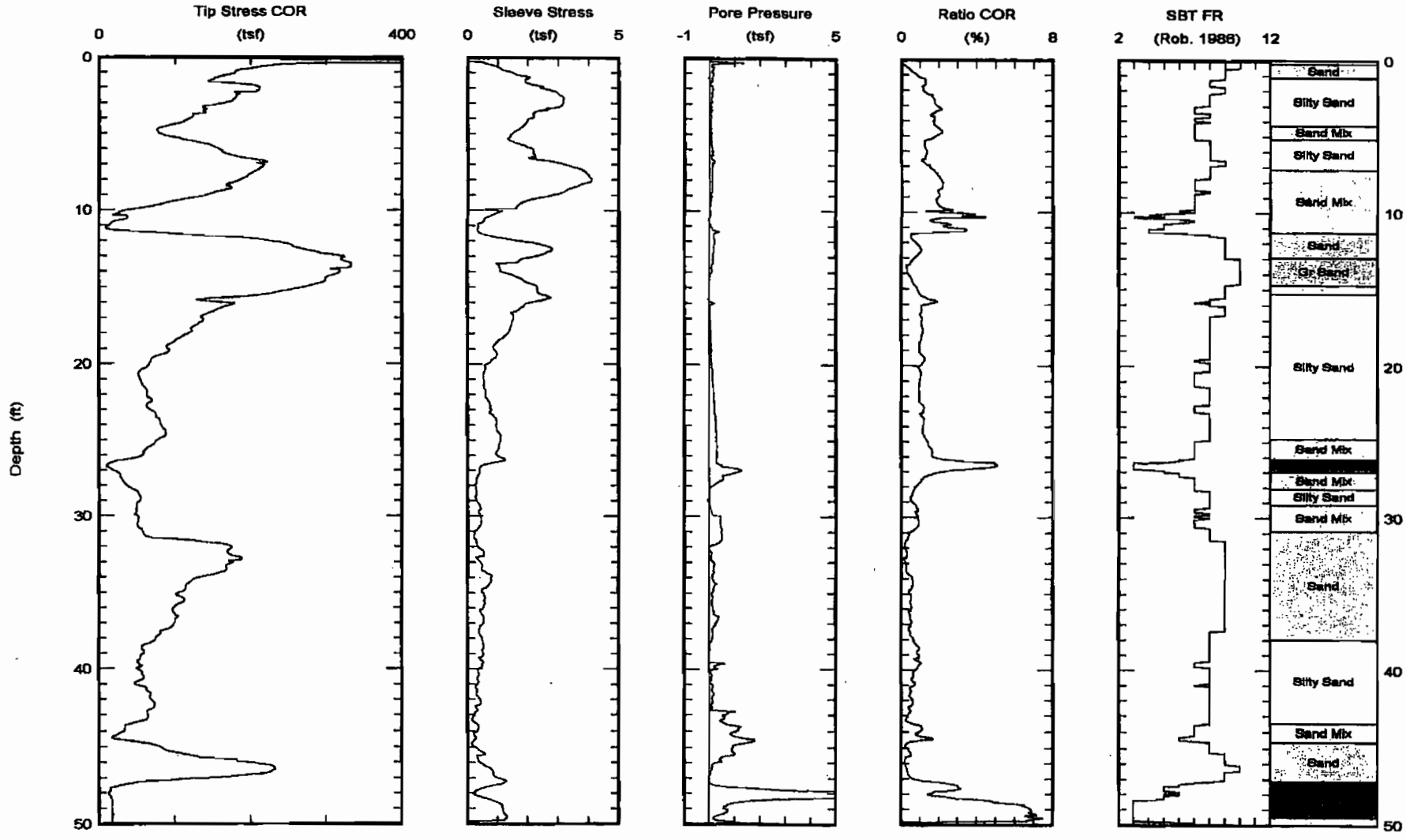
Client: Geocon Consultants
Job Site: East Harbor Island



Maximum depth: 50.20 (ft)
Page 1 of 2

Test ID: CPT-2
File: z06S0502C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 06/Sep/2005 Test ID: CPT-3 Project: SanDiego
	Client: Geocon Consultants Job Site: East Harbor Island	



Maximum depth: 50.19 (ft)

Page 1 of 2

Test ID: CPT-3
File: Z06S0603C.ECP

FIGURE A-7

565

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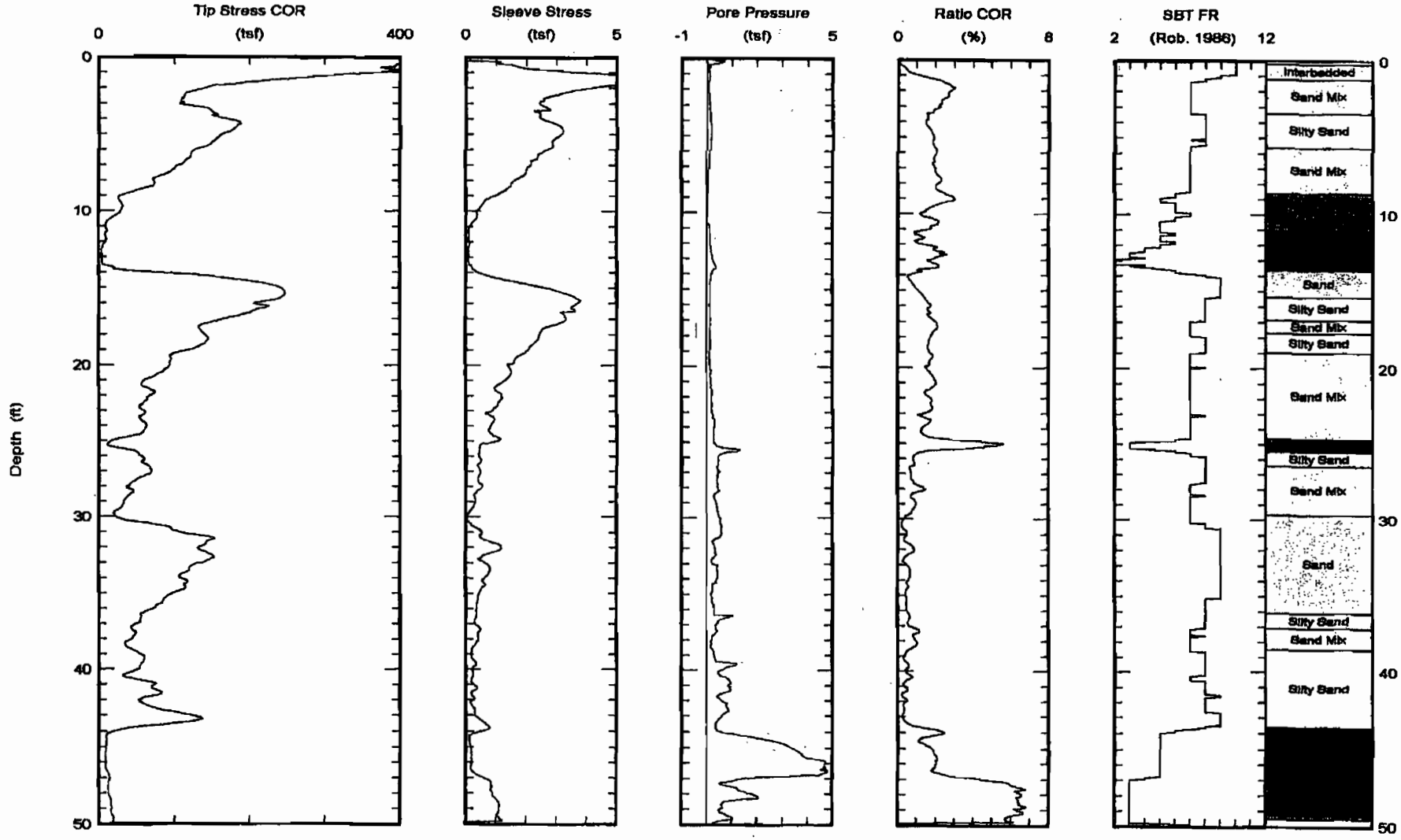
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 06/Sep/2005
Test ID: CPT-4
Project: SanDiego

Client: Geocon Consultants
Job Site: East Harbor Island

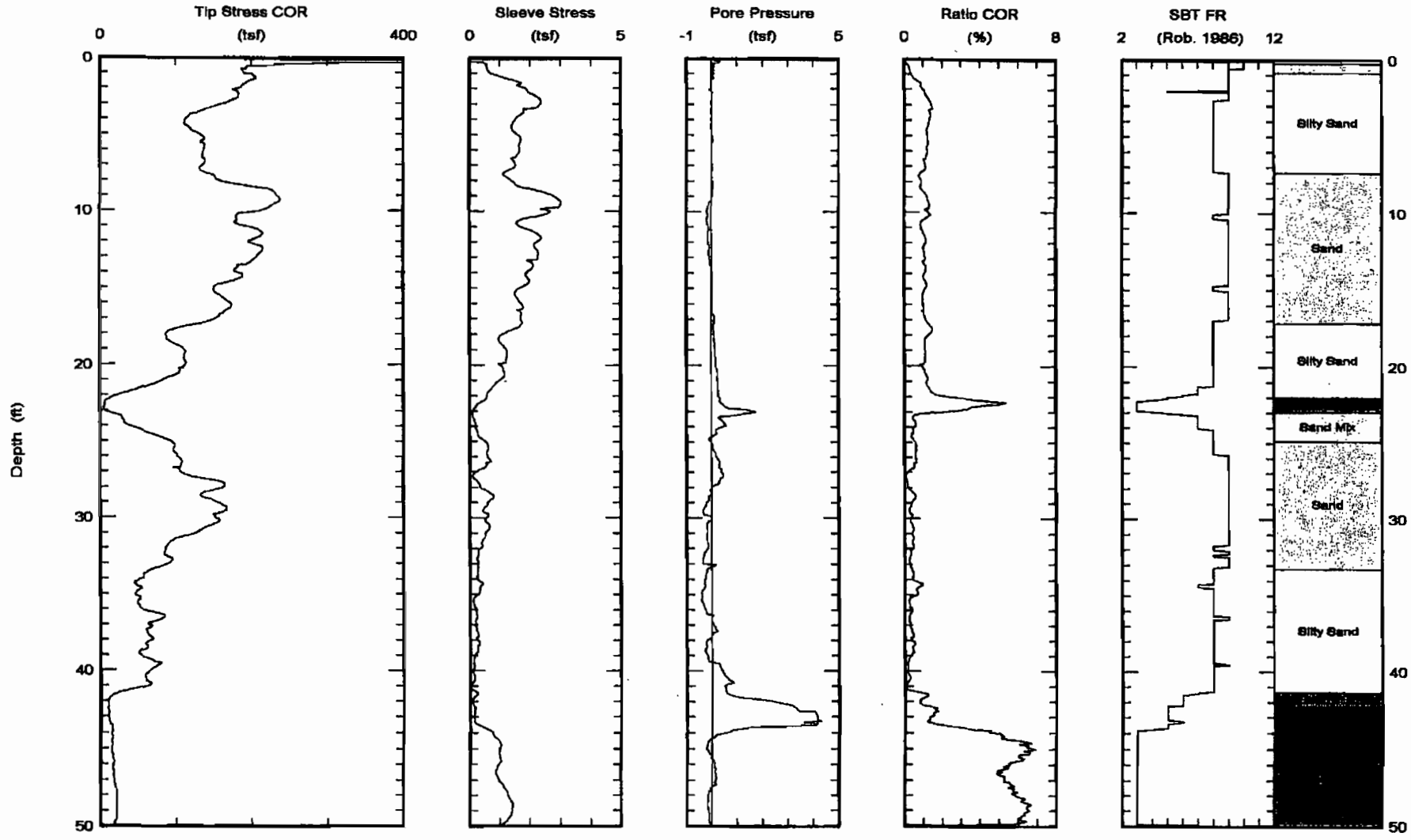


Maximum depth: 50.20 (ft)
Page 1 of 2

Test ID: CPT-4
File: 20050504C.ECP

FIGURE A-8

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 06/Sep/2005 Test ID: CPT-5 Project: SanDiego
	Client: Geocon Consultants Job Site: East Harbor Island	



Maximum depth: 50.24 (ft)

Page 1 of 2

Test ID: CPT-5

File: 20SS0505C.ECP

FIGURE A-9

567

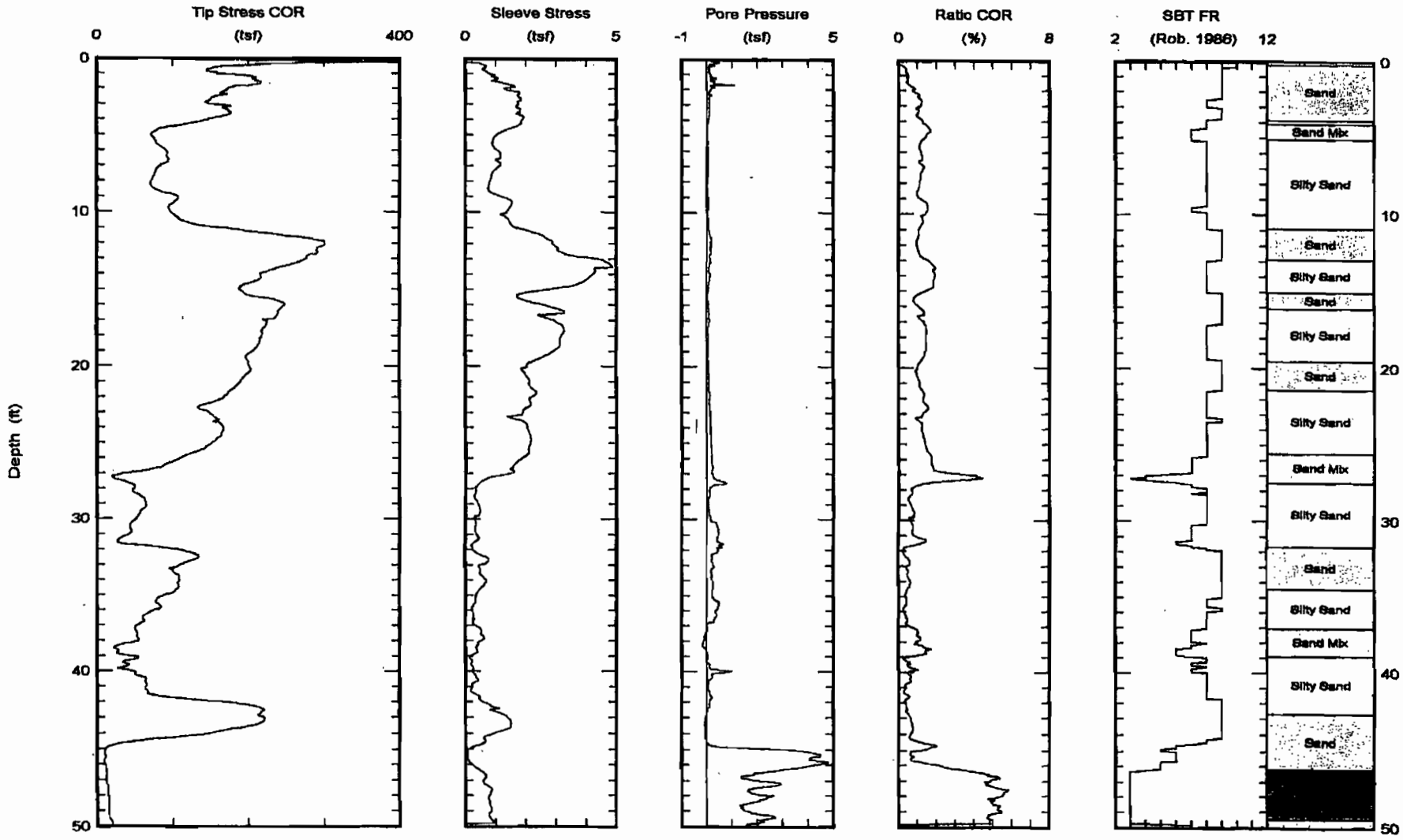
5791

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 06/Sep/2005
Test ID: CPT-6
Project: SanDiego

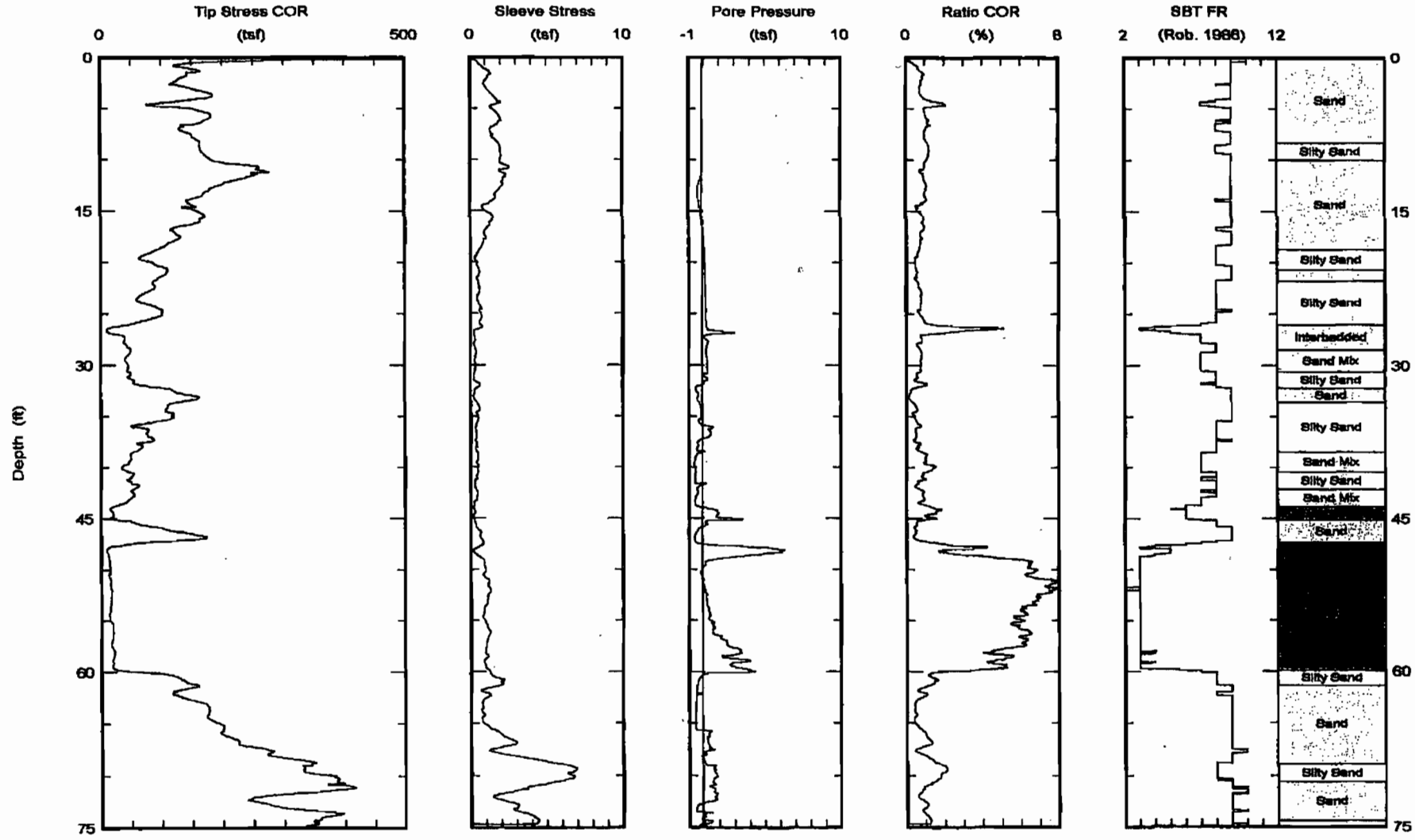
Client: Geocon Consultants
Job Site: East Harbor Island



Maximum depth: 50.18 (ft)
Page 1 of 2

Test ID: CPT-6
File: Z0650606C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 21/Feb/2006 Test ID: CPT-7 Project: SanDiego
	Client: Geocon Consultants Inc Job Site: East Harbor Island Hotel	



Maximum depth: 75.09 (ft)

Page 1 of 2

Test ID: CPT-7
File: Z21F0601C.ECP

FIGURE A-11

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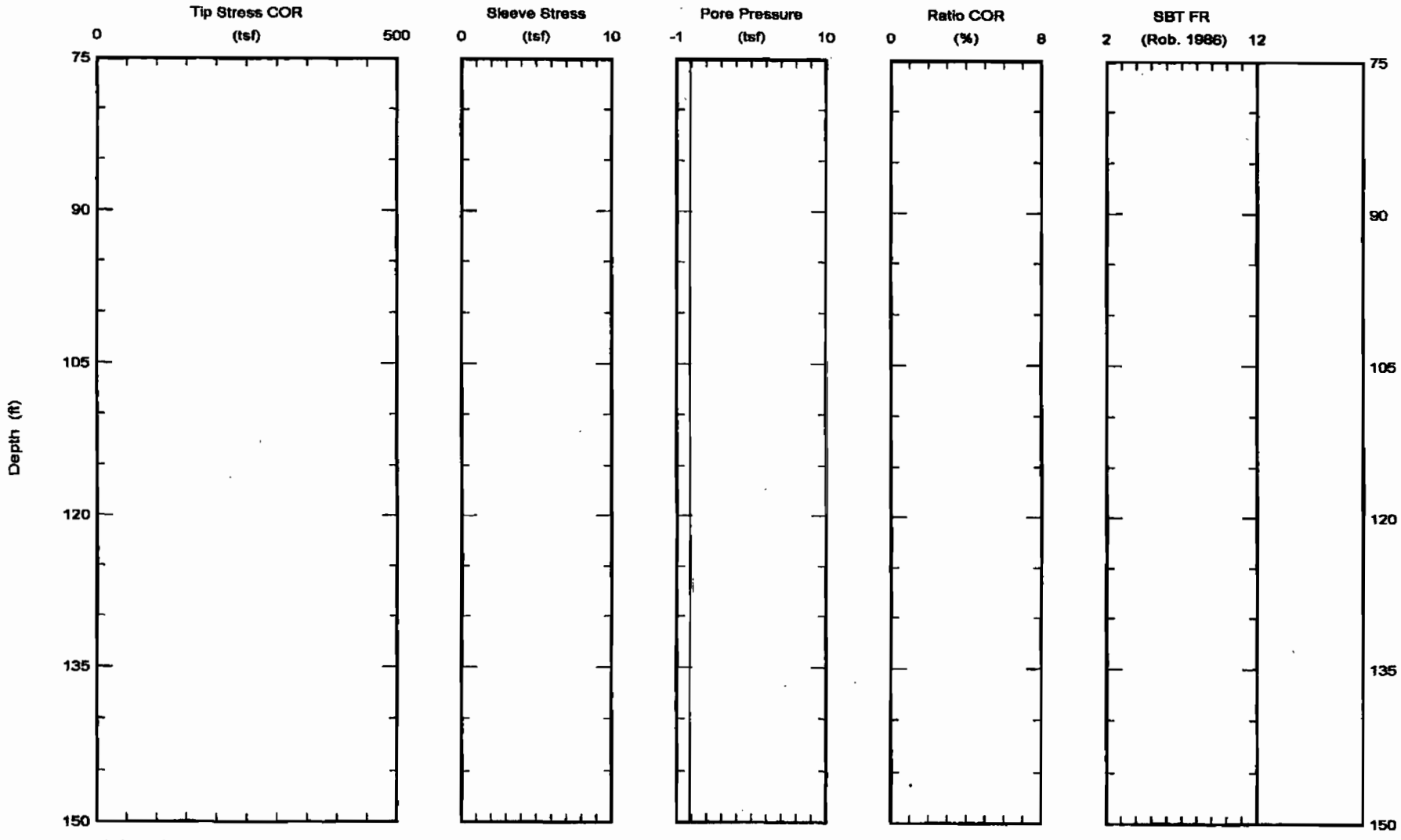
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-7
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 75.09 (ft)

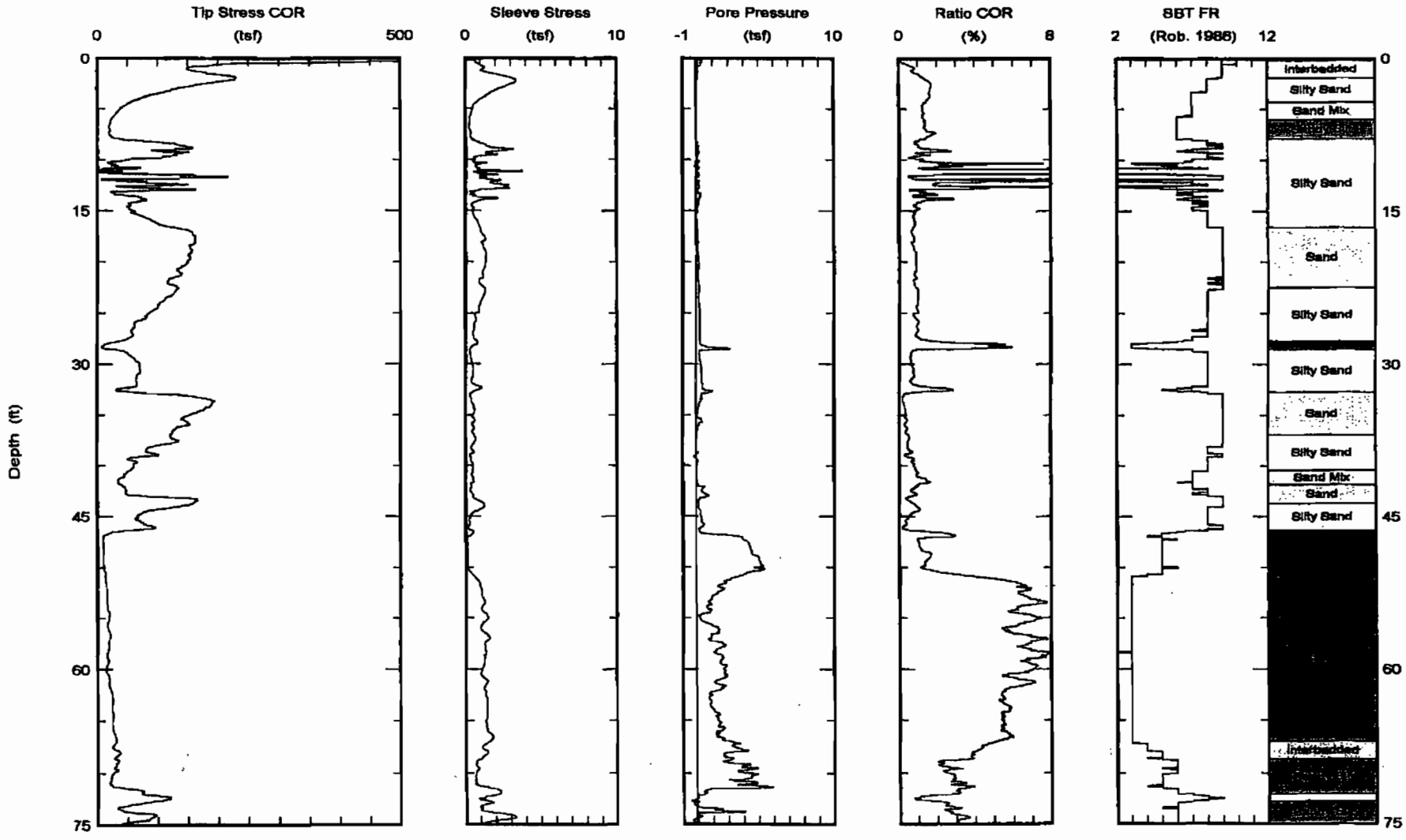
Test ID: CPT-7
File: Z21F0601C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-8
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 90.14 (ft)
Page 1 of 2

Test ID: CPT-8
File: Z21F0602C.ECP

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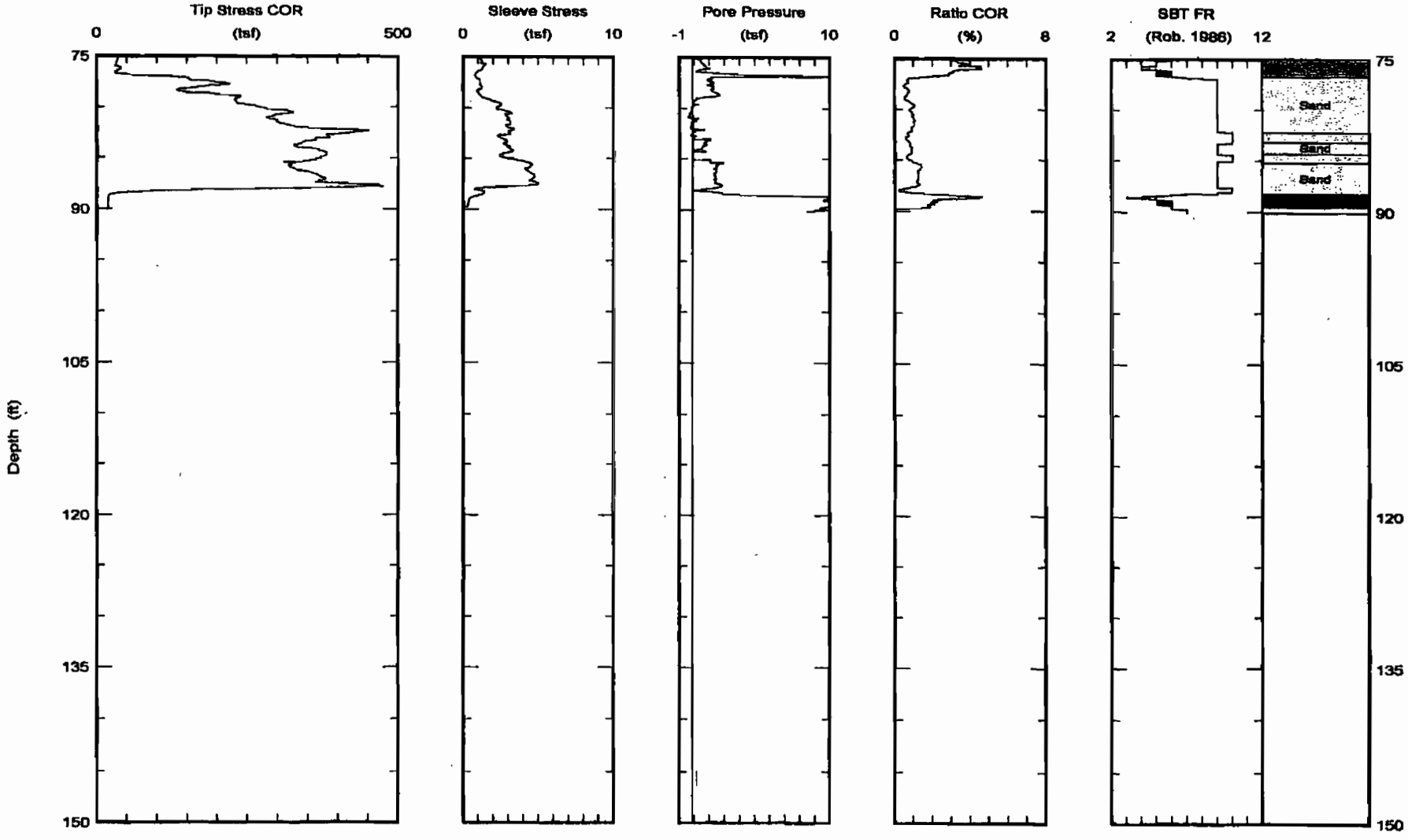
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-8
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 90.14 (ft)
Page 2 of 2

Test ID: CPT-8
File: Z21F0602C.ECP

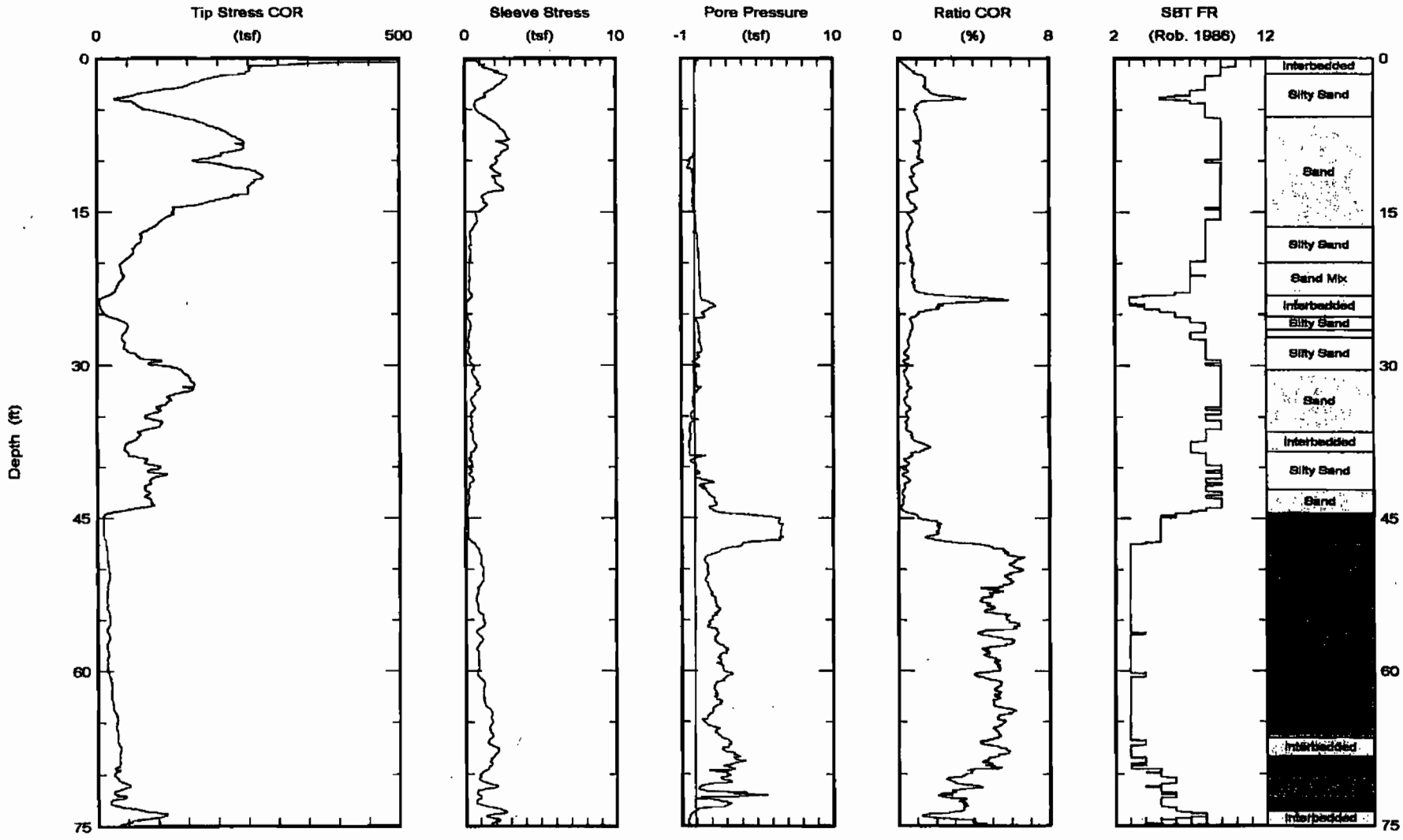
FIGURE A 4

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-9
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 90.12 (ft)
Page 1 of 2

Test ID: CPT-9
File: 221F0609C.ECP

573-

FIGURE A-4

57791

574

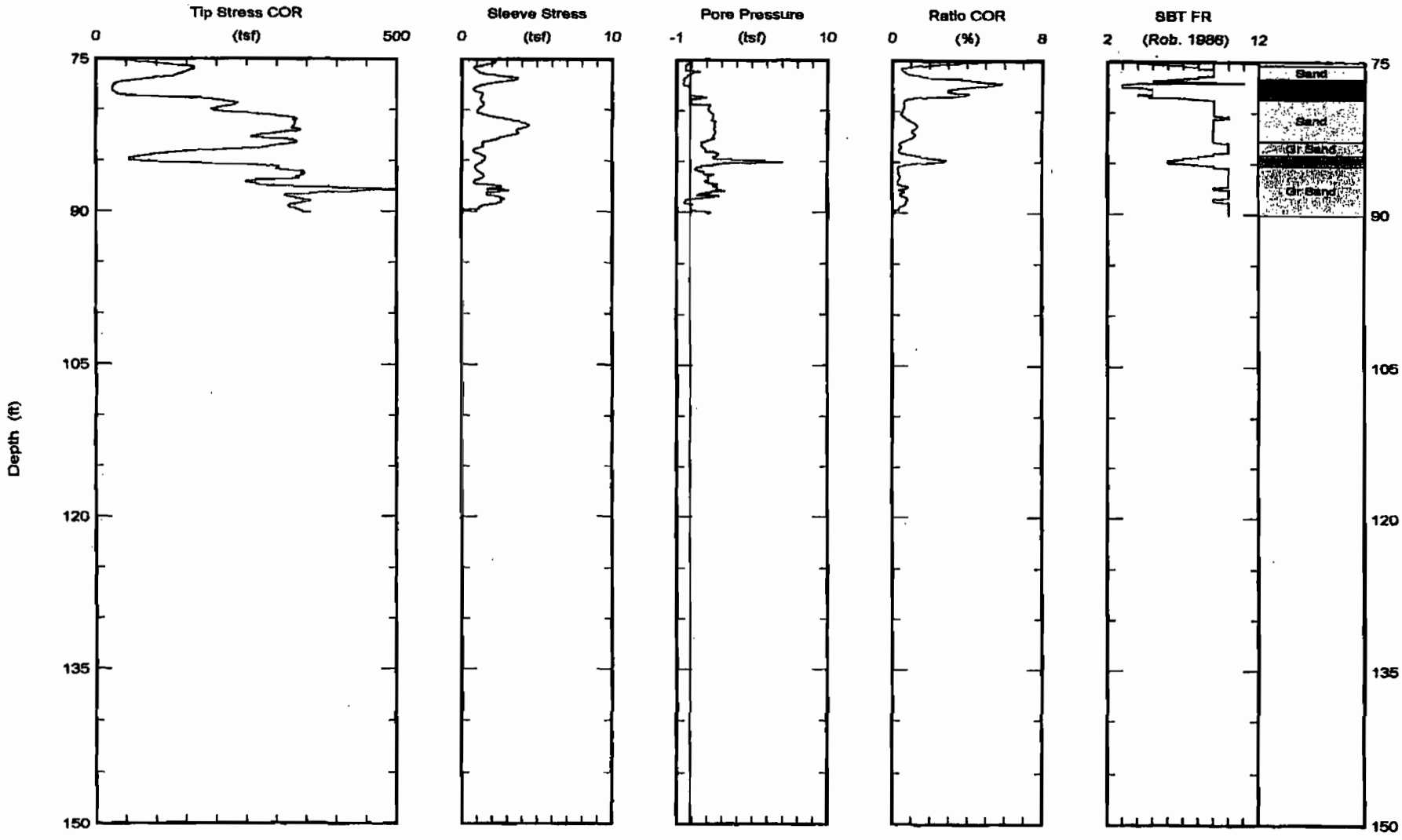
52791

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-9
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel

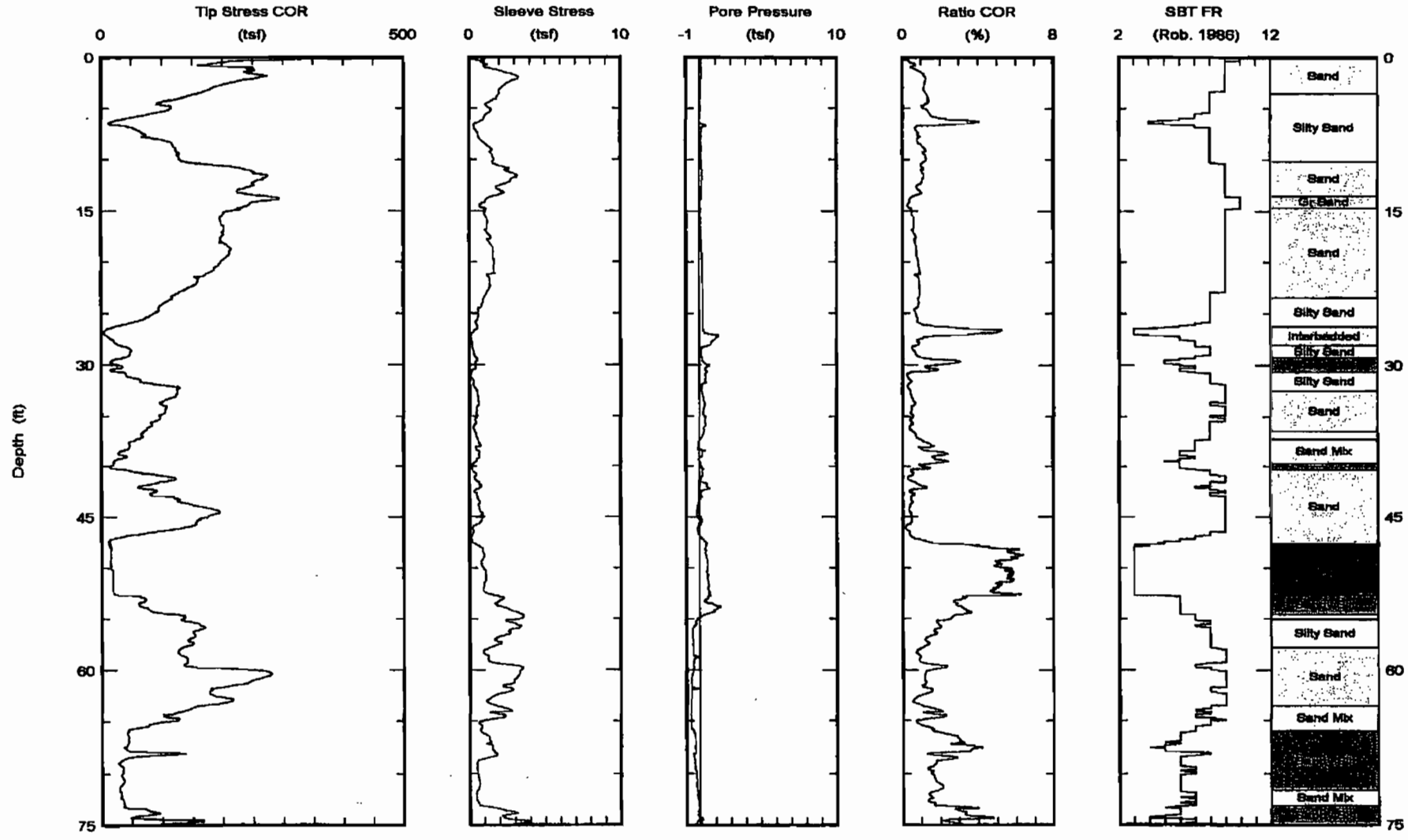


Maximum depth: 90.12 (ft)
Page 2 of 2

Test ID: CPT-9
File: Z21F0603C.ECP

FIGURE A-1

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 21/Feb/2006 Test ID: CPT-10 Project: SanDiego
	Client: Geocon Consultants Inc Job Site: East Harbor Island Hotel	



Maximum depth: 90.13 (ft)

Page 1 of 2

Test ID: CPT-10
File: Z21F0604C.ECP

575

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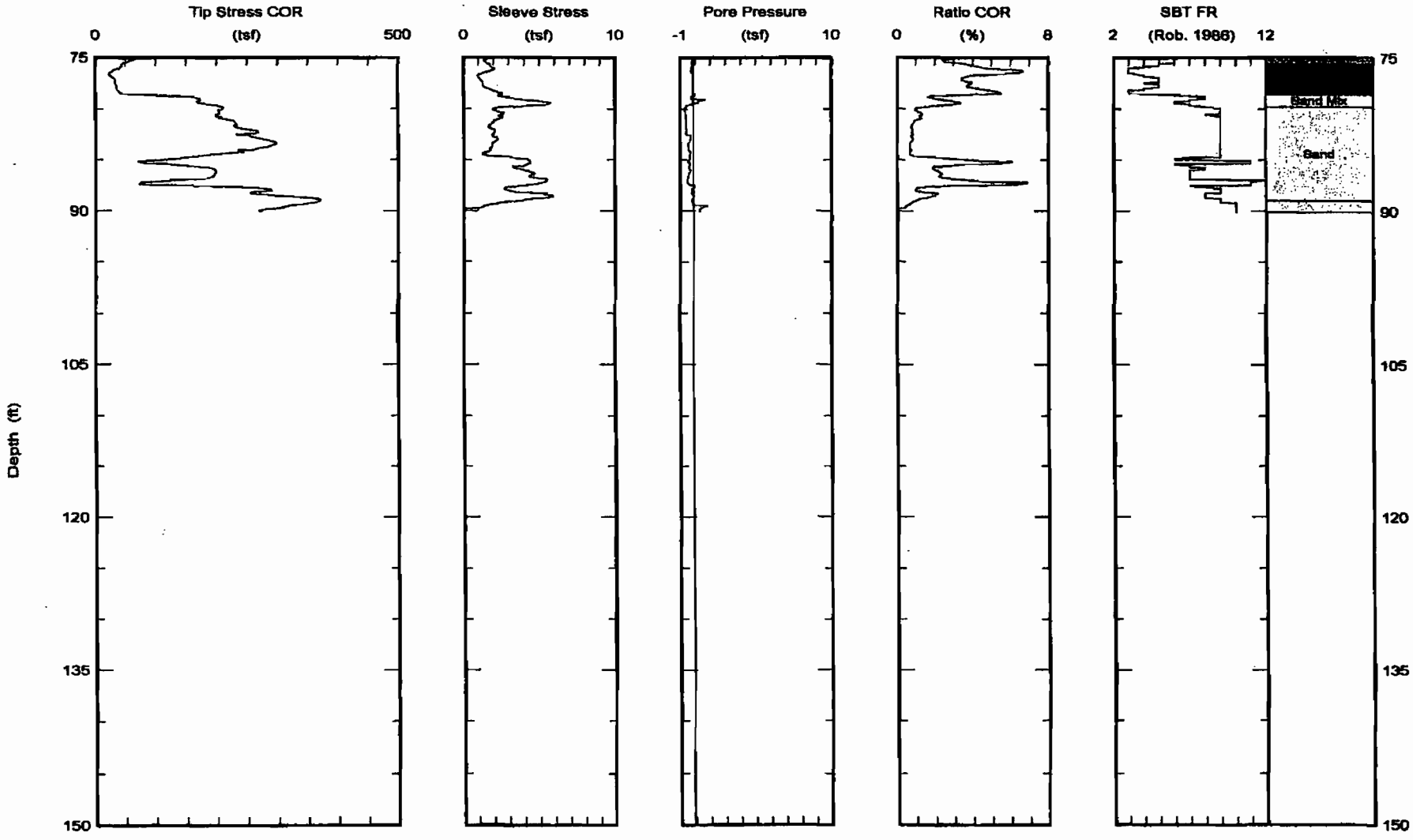
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-10
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 90.13 (ft)
Page 2 of 2

Test ID: CPT-10
File: 221F0604C.ECP

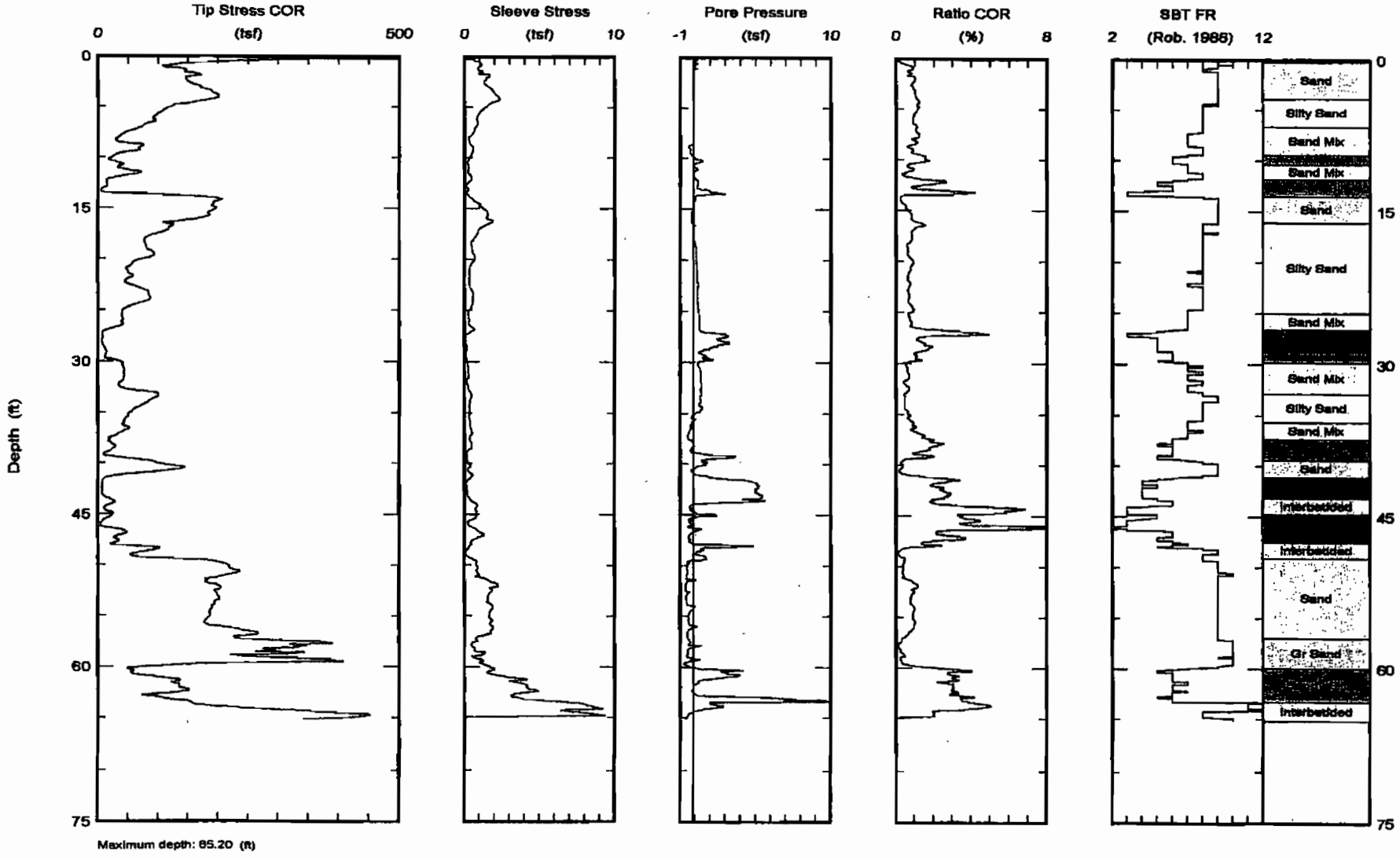
FIGURE A-1

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-11
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 65.20 (ft)

Test ID: CPT-11
File: Z21P0605C.ECP

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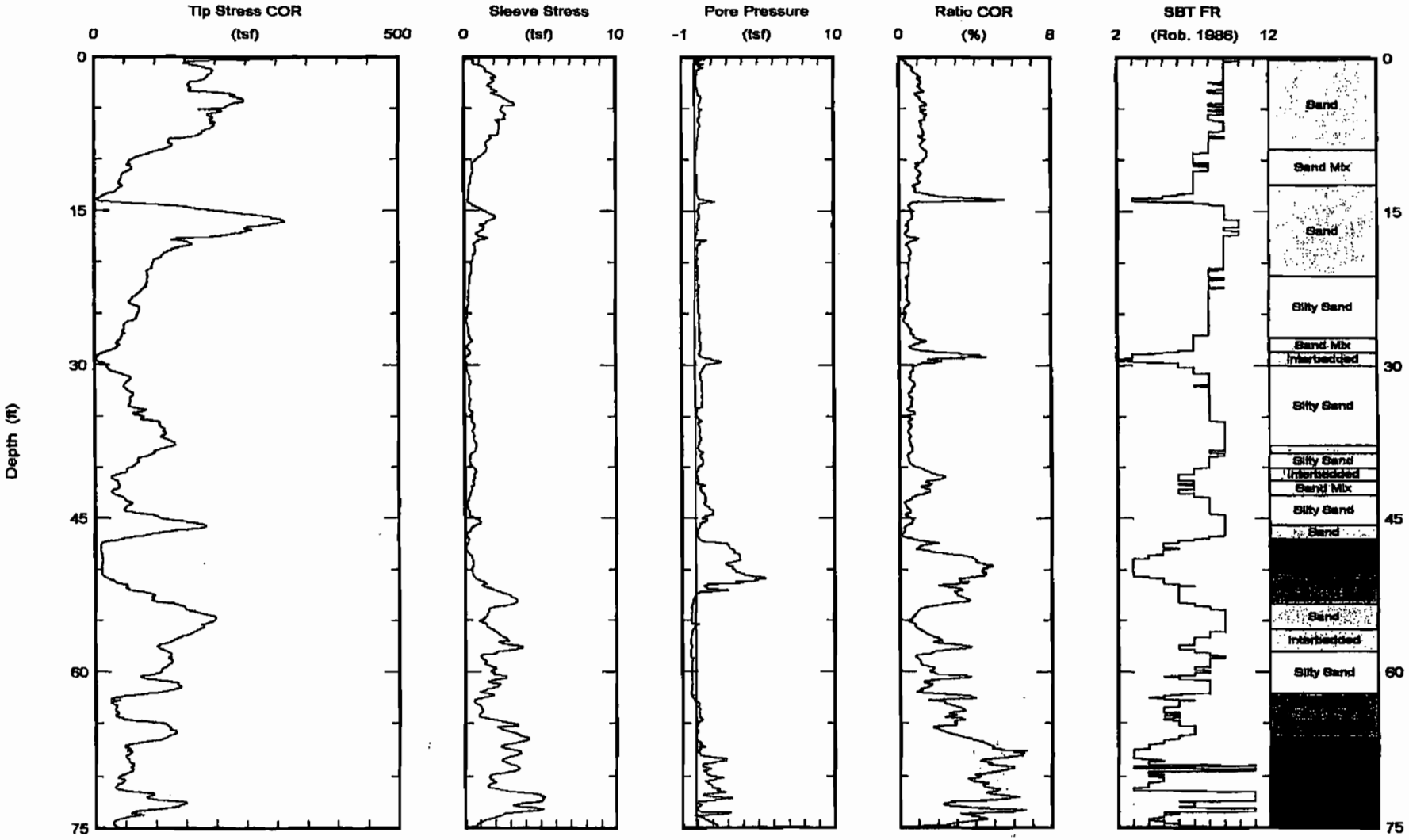
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 21/Feb/2006 Test ID: CPT-12 Project: SanDiego
	Client: Geocon Consultants Inc Job Site: East Harbor Island Hotel	



Maximum depth: 75.19 (ft)

Page 1 of 2

Test ID: CPT-12
File: Z21F0606C.ECP

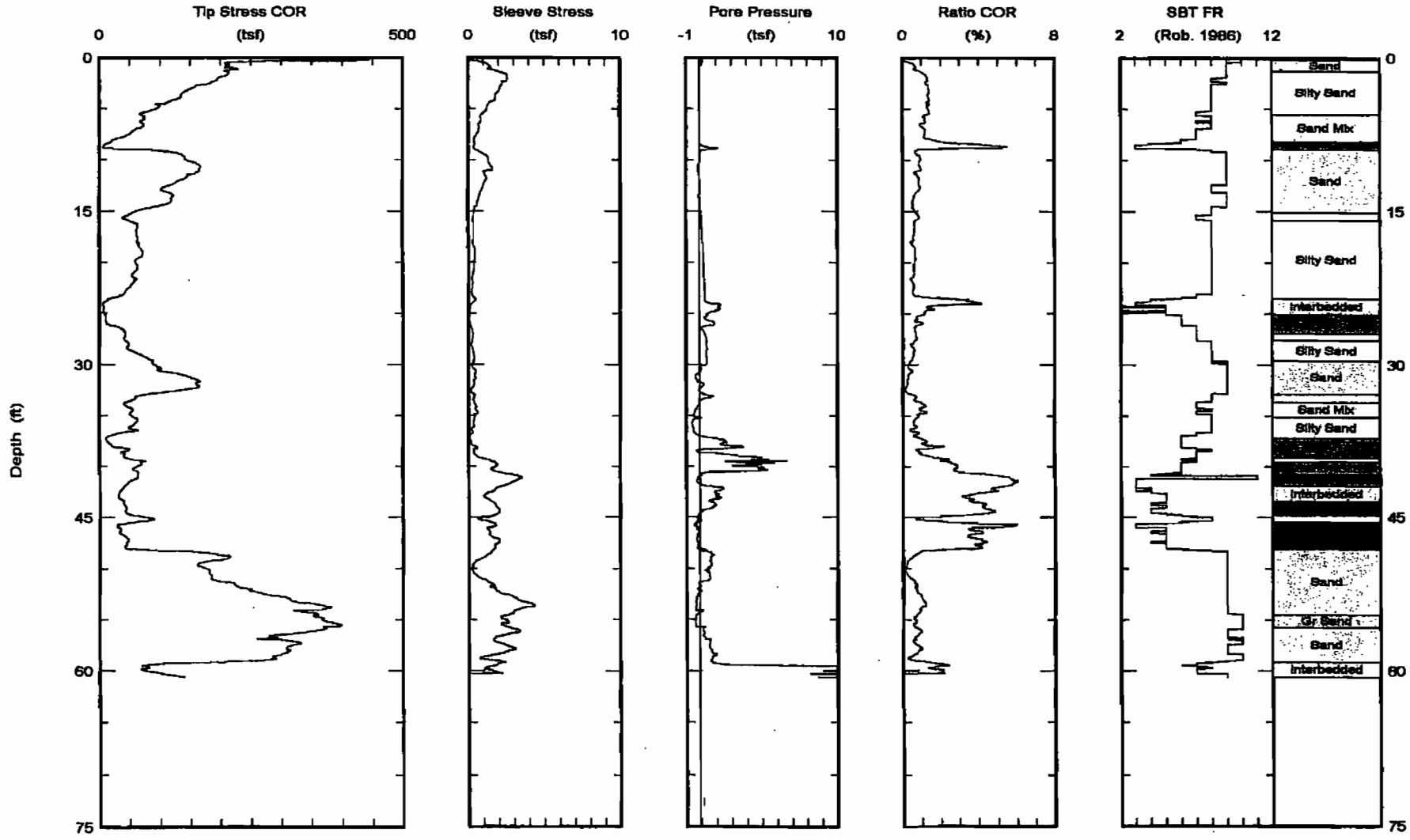
FIGURE A-1

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-13
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 60.61 (ft)

Test ID: CPT-13
File: Z21F0607C.ECP

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FIGURE A-1

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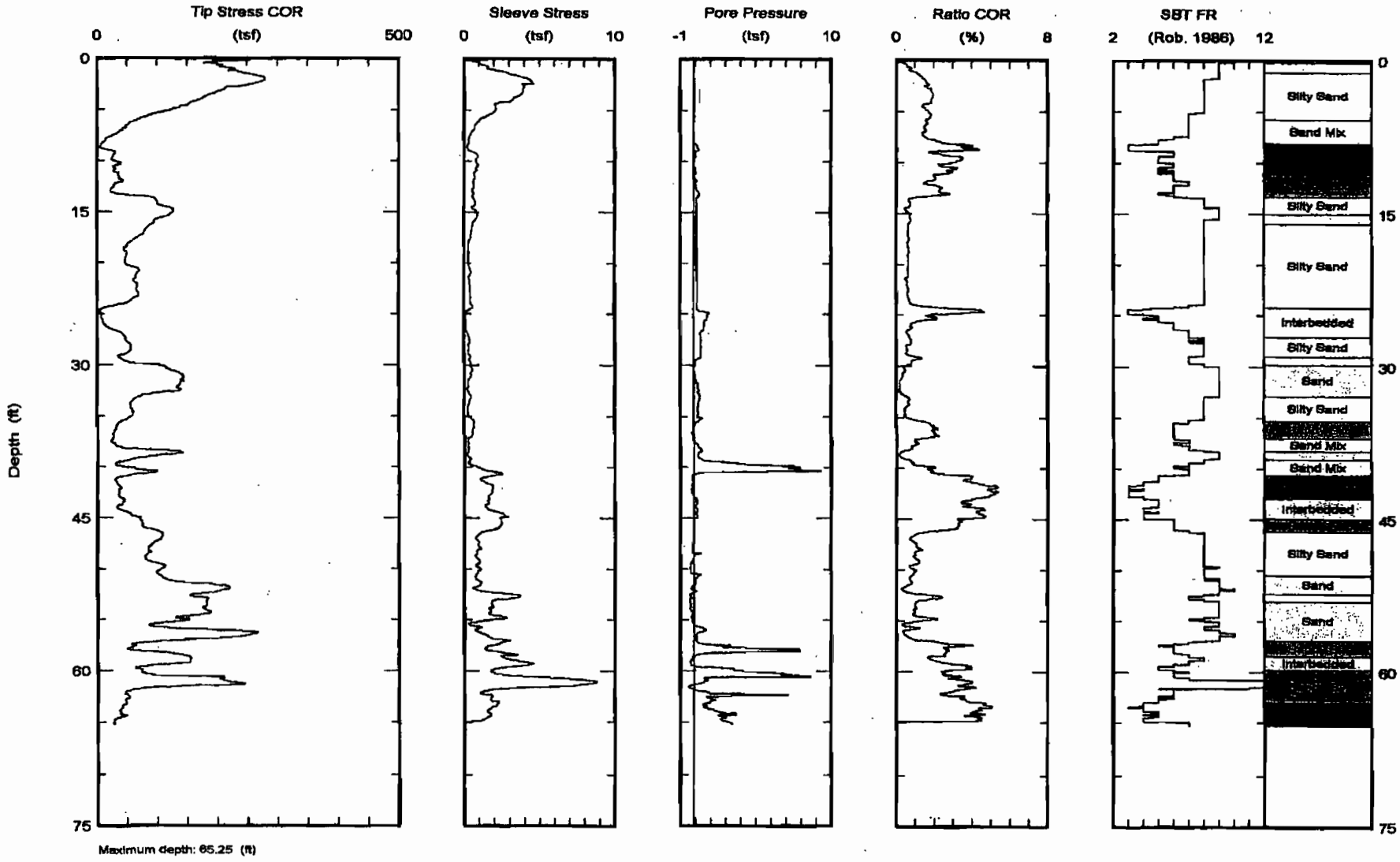
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 21/Feb/2006
Test ID: CPT-14
Project: SanDiego

Client: Geocon Consultants Inc
Job Site: East Harbor Island Hotel



Maximum depth: 65.25 (ft)

Test ID: CPT-14
File: Z21F0608C.ECP

FIGURE A-

APPENDIX B

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APPENDIX B

LABORATORY TESTING- CURRENT STUDY

FOR

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

PROJECT NO. 07569-22-01

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APPENDIX B

LABORATORY TESTING – CURRENT STUDY

Laboratory tests were performed in general accordance with the test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected samples were tested for maximum dry density and optimum moisture content, expansion index, soluble-sulfate content, pH, resistivity, direct shear strength, resistance value, plasticity, unconfined compressive strength, and consolidation. The test results are presented on Tables B-I through B-VIII and on Figure B-1.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-02

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-1	Yellowish brown, fine SAND, SP	111.1	14.1

TABLE B-II
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829-03

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B1-1	11.5	23.0	105.5	0

TABLE B-III
SUMMARY OF LABORATORY SOLUBLE-SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate Content (percent)
B2-1	0.038

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TABLE B-IV
SUMMARY OF LABORATORY PH AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	pH	Resistivity (Ohm cm)
B2-1	7.2	744

TABLE B-V
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080-03

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B1-1*	99.5	14.3	0	40
B2-2	97.8	15.6	0	42
B2-11	97.1	24.7	50	42
B3-8	115.5	17.2	445	37
B4-8	115.5	17.8	591	33

* Remolded to 90 percent relative compaction at approximately optimum moisture content.

TABLE B-VI
SUMMARY OF LABORATORY R-VALUE TEST RESULTS
ASTM D2844-01

Sample No.	R-Value
B2-1	61

TABLE B-VII
SUMMARY OF LABORATORY PLASTICITY INDEX TEST RESULTS
ASTM D 4318-00

Sample No.	Liquid Limit	Plasticity Limit	Plasticity Index	USCS Classification
B2-8	63	29	39	OL

TABLE B-VIII
SUMMARY OF LABORATORY UNCONFINED COMPRESSION TEST RESULTS
ASTM D 2166-00

Sample No.	Unconfined Compressive Strength (psf)	Undrained shear strength (psf)
B2-9	4378	2189

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APPENDIX C

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APPENDIX C

SEISMIC REFLECTION SURVEY REPORT

FOR

EAST HARBOR ISLAND
SAN DIEGO, CALIFORNIA

PROJECT NO. 07567-22-01

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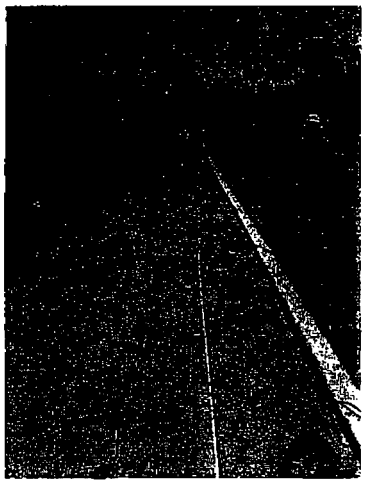
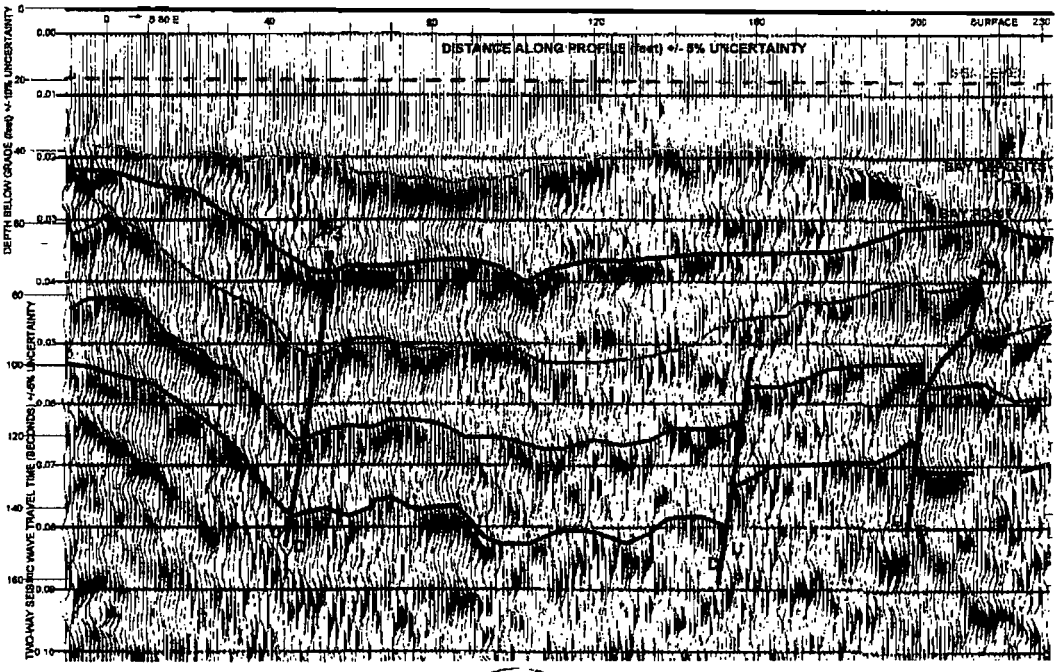
FINAL REPORT
SEISMIC REFLECTION SURVEY TO DETECT THE SPANISH BIGHT FAULT ZONE
(TRIP #2 – WESTWARD EXTENSION FROM ORIGINAL SURVEY AREA)
PROPOSED EAST HARBOR ISLAND HOTEL SITE
SAN DIEGO BAY, CALIFORNIA





Prepared For:
Mr. Joe Vettel
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Prepared By:
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Highland, CA 92346

GEOCON Consultants, Inc. Project No.: 07569-22-01
TERRA PHYSICS Project No.: 05-53
February 8, 2006

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GEOPHYSICAL SURVEY LIMITATIONS

Geophysical exploration is not an exact science, only an additional tool used to locate subsurface material boundaries and measure their physical properties. *TERRA PHYSICS* is not a guarantor of the services provided, but agrees to perform services in a professional and non-negligent manner and according to information and data available to us. Users of this report should recognize the extreme difficulty in locating undocumented, subsurface material boundaries due to factors such as changing stratigraphy and hydrology and the proximity of near-surface sources of vibrational and electrical noise.

Data and results presented in this report were compiled from existing geological data and the current surveys. Geophysical interpretation of subsurface conditions from the surface measurements is not unique. These results represent reasonable descriptions of the geological conditions and are presented for information only. The results should be verified by direct investigation methods. Complex subsurface geology may prevent reliable extrapolation of these results away from their original measurement locations.

TERRA PHYSICS reserves the right to review this report's results when additional information concerning this investigation is available in the future.

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1.0 INTRODUCTION

This report describes the continuation of the seismic reflection survey conducted by *TERRA PHYSICS* at the proposed future hotel site on the eastern end of Harbor Island (Figure 1) in San Diego, California. The survey added two reflection lines west of the original seismic survey.

Figure 1 – Harbor Island Location Map

1.1 Survey Design

A marine reflection survey conducted by the California Division of Mines (1997) shows the west splay of the Spanish Bight fault zone (Figure 2) passes through the proposed hotel site on the eastern end of the island. The north striking, normal fault displaces soil layers down to the east. The initial geotechnical investigation was designed to locate the Spanish Bight zone with several borings/CPTs and two reflection lines (*TERRA PHYSICS* report dated October 5, 2005). The reflection survey objectives were to delineate subsurface soil layering to depths of about 60 feet and identify structural features (possible faults) interrupting those layers.

This report describes the Trip #2 survey where two reflection lines were added that extended from the original two lines westward to the property line. The lines were oriented roughly east (S 80 E) so they would cross the fault nearly perpendicular and produce the clearest subsurface image with a minimum of geometric distortion. Lateral resolution was increased by placing the geophones extremely close together (2 feet) and recording data with source points at every geophone using the same equipment and procedures as the initial survey. Field work was conducted to minimize interruptions to the nearby restaurant. No safety problems occurred.

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Line 3 was about 330 feet long and located 0.5 feet south of the sidewalk in the grass area north of the Marina parking lot. The line west end (0 foot distance) was 0.5 feet east of the main walkway eastern light pedestal (near pay phone) and the east end (303.5 feet distance) was in an asphalt parking lot about 11 feet south of Line 1 west end (0 foot distance). Directly connecting the geophones to soil instead of asphalt reduces the probability that seismic waves traveling in the asphalt will mask small amplitude waves reflected from deep soil layers.

Line 4 was about 498 feet long and located 2 feet south of the southern row of street lights and about 118 feet south of Line 2. The line west end (0 foot distance) was located on the eastern curb of the Harbor Island Drive roundabout and the east end (770 feet distance) was on the west sidewalk curb to the Rueben E Lee dock. Small diameter holes were drilled in the asphalt so the geophones could be connected. As the survey progressed, 1 inch diameter holes were drilled through the asphalt at the source points and the waves were generated by striking a metal rod inserted into the holes. This process minimized the amplitude of the asphalt traveling waves so they would not masked waves reflected from deep soil layers.

Table 1 describes the locations of the four reflection lines.

TABLE 1
REFLECTION LINE LOCATIONS

LINE NO.	LATITUDE (degrees)	LONGITUDE (degrees)	ELEVATION (feet)	ORIENTATION (degrees)
1 – West End (0 ft distance)	32.7250936	117.18926390	19.8	S 80 E
East End (300 ft distance)	32.7249433	117.18831150	13.6	---
2 – West End (0 ft distance)	32.7248539	117.18887788	17.9	S 80 E
East End (300 ft distance)	32.7247000	117.18793300	16.5	---
3 – West End (0 ft distance)	32.7251806	117.19024860	23.0	S 78 E
East End (310 ft distance)	32.7250481	117.18925800	21.5	---
4 – West End (0 ft distance)	32.7246012	117.18946180	21.0	S 80 E
East End (478 ft distance)	32.7243725	117.18793480	20.5	---

NOTE: Coordinates in NAD83 (WGS84) and elevations in NAVD 88 datum.

1.2 Schedule

The following list describes the major survey steps.

- 10/15/05 Project scope finalized and proposal submitted.
- 12/21/05 Joe Vittel scheduled the data collection to start on December 27.
- 12/27/05 Mobilized crew and equipment to the site. Lines were constructed between the endpoints marked by Fatan and GPS coordinates recorded. Geophone holes were drilled along most of Line 4.
- 12/28/05 Recorded Line 4 data from 0 to 288 feet.
- 12/29/05 Drilled remaining geophone holes on both lines. Too much wind (background Vibration noise) to record data. Filled geophone holes already used.
- 12/30/05 Completed recording data on both lines and filled all geophone holes.
- 01/03/06 Preliminary velocity model constructed, geophone elevations calculated, and reflection processing started.
- 01/26/06 Processing completed and geological interpretation started.
- 02/08/06 Final results emailed to GEOCON Consultants, Inc.

2.0 RESULTS

The proposed hotel site (Figure 1) on the eastern end of Harbor Island has been identified as an AP zone based in part on the results of a California Division of Mines (1997) marine seismic study. They show the western splay of the Spanish Bight Fault Zone passing through the site. Their Profile M (about 2300 feet south of the site) shows the fault passes through 28 reflections in the upper 0.2 seconds of the data section. The fault's seismic response is subtle and irregular, only affecting about 46% of the reflectors it passes through. There are no near-constant amplitude, near-vertical offsets of multiple overlying soil layers as would be expected for a normal fault.

TERRA PHYSICS completed two reflection lines during the initial survey (report dated October 5, 2005) and two additional lines during this survey to locate this fault zone. The survey objectives were to delineate subsurface soil layering to depths of about 60 feet and identify structural features (possible faults) interrupting these layers. Figure 2 shows the four parallel, roughly east oriented, reflection lines and Table 1 lists their GPS coordinates. All data collection and processing for Trip #2 were identical to those described for the initial survey. The processed data sections (location and depth uncertainties are ±5% and ±10%, respectively) for all four lines appear in Appendix A. Independent interpretation of geological features can be made from these sections.

The sections with *TERRA PHYSICS*'s interpretation of soil layering down to about 120 feet are shown in Figures 3, 4, 5, and 6. The eastward down sloping ground surface (**BLACK**) is shown near the section top. Sea level (LIGHT BLUE) is marked as a dotted line. The shallowest two reflectors roughly correspond in depth with the top of the Bay Deposits (**PINK**) and Bay Point Formation (**BLUE**) as identified by GEOCON Consultants, Inc. Borings B-1 and B-2. Deeper layers are marked with GREEN and ORANGE and **PURPLE** lines. An intermediate layer ( ) was delineated only on Line 1.

Features interrupting these layers were highlighted on the sections (red lines). Normal faults should form near vertical offsets in adjacent overlying layers at a near-vertical angle. Offsets should be in the same direction on each overlying layer and the offset magnitude may increase with depth. A regional fault should be detected by all the reflection lines crossing it. Structural Features A, B, and C in Table 2 and Figure 2 (red lines) satisfy these criteria and may represent boundaries between blocks undergoing differential settlement within the Spanish Bright Fault zone. This ABC zone trends NNW and is 140-200 feet wide. CPT and borings positioned between these three features will directly investigate the most probable location of normal faulting within the proposed hotel site. Features 1-5 interrupt layering only one line each and may not represent faulting.

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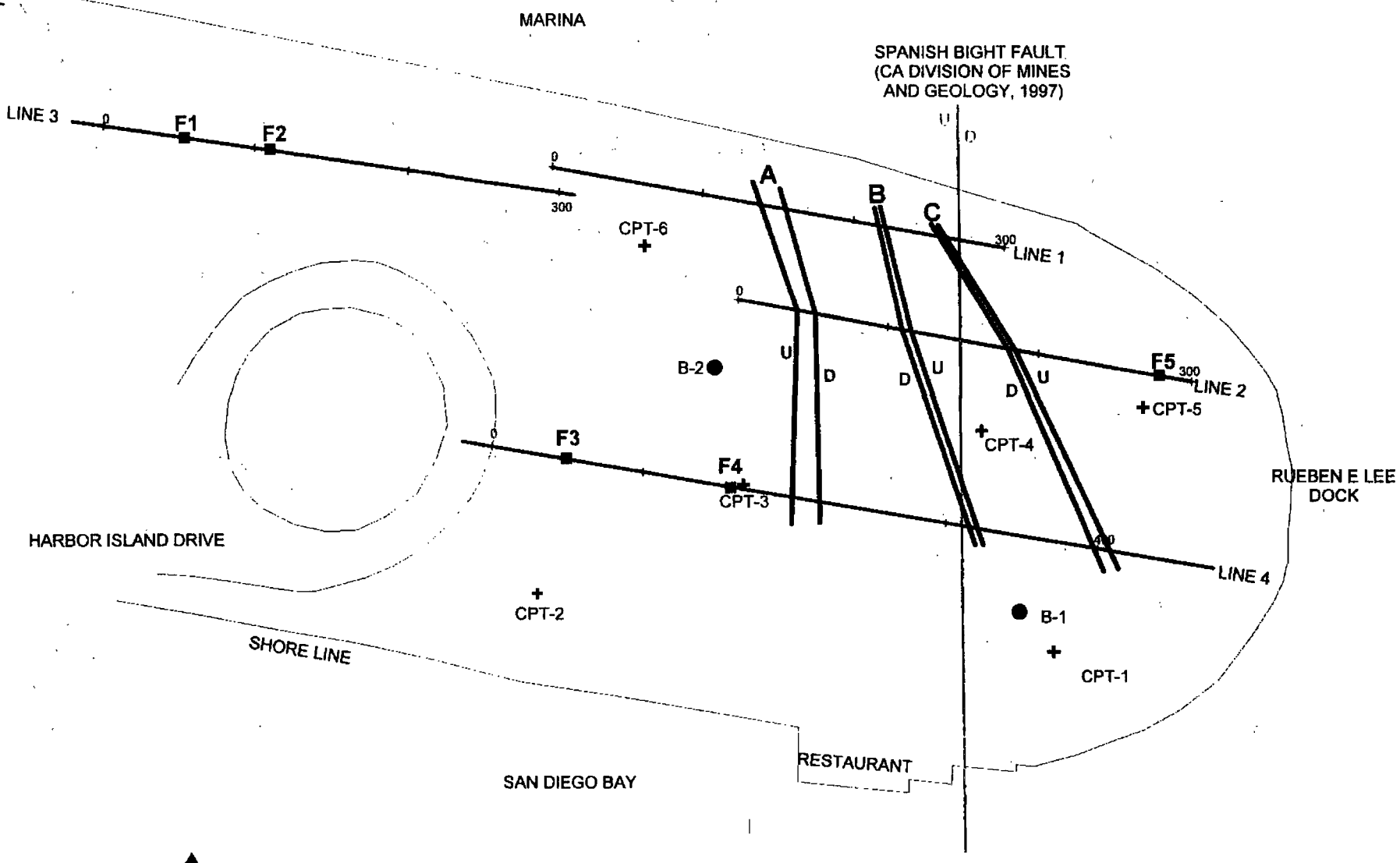
TABLE 2
DESCRIPTION OF STRUCTURAL FEATURES INTERPRETED FROM THE REFLECTION DATA

FEATURE	DESCRIPTION	BLUE LAYER OFFSET (feet)	GREEN LAYER OFFSET (feet)	ORANGE LAYER OFFSET (feet)	PURPLE LAYER OFFSET (feet)
A	All offsets are up about 4-12 feet to the west (same as the Spanish Bight zone). The features dips about 7-14° west, is about 12-20 feet wide, and is offset about 90-115 feet from the Spanish Bight zone.	Line1 4 Line2 5 Line4 0	8 5 12	5 4 6	7 ?? 7
B	All offsets are up about 3-17 feet to the east (opposite the Spanish Bight zone). The feature dips about 0-5° east, is about 10 feet wide, and offset about 0-50 feet from the Spanish Bight zone. The area between A and B may be a localized graben.	Line 1 0 Line 2 17 Line 4 0	3 8 8	3 3 7	4 ?? 12
C	All offsets are up about 5-19 feet to the east (opposite the Spanish Bight zone). The feature dips about 0-8° west, is about 12 feet wide, and is offset about 0-85 feet from the Spanish Bight zone.	Line 1 0 Line 2 19 Line 4 0	0 14 ??	0 10 ??	5 8 11
F1	All offsets are up about 5-7 feet to the west (same as the Spanish Bight zone). If the feature's strike is NNW (general trend of Features A, B, and C), then it would miss Line 4.	5	6	7	5
F2	All offsets are up about 4-10 feet to the east (opposite the Spanish Bight zone). If the feature's strike is NNW, then it would miss Line 4.	5	??	10	4
F3	Slope change (up to the west) in all layers.	—	—	—	—
F4	All offsets are up about 9-10 feet to the east (opposite the Spanish Bight zone). If the feature's strike is NNW, then it would intersect Lines 1 and 3 near their ends where less than optimum data quality may have prevented detection.	0	0	9	10
F5	All offsets are up about 6-8 feet to the west (same as the Spanish Bight zone). If the feature's strike is NNW, then it would miss Lines 1 and 4.	6	7	6	8



NOTE: BASE FROM GEOCON, INC (9/30/05)

FIGURE 2
REFLECTION SURVEY SITE MAP
SHOWING POSSIBLE FAULTS INTERPRET
SOLELY FROM THE REFLECTION DATA

EAST HARBOR ISLAND HOTEL SITE

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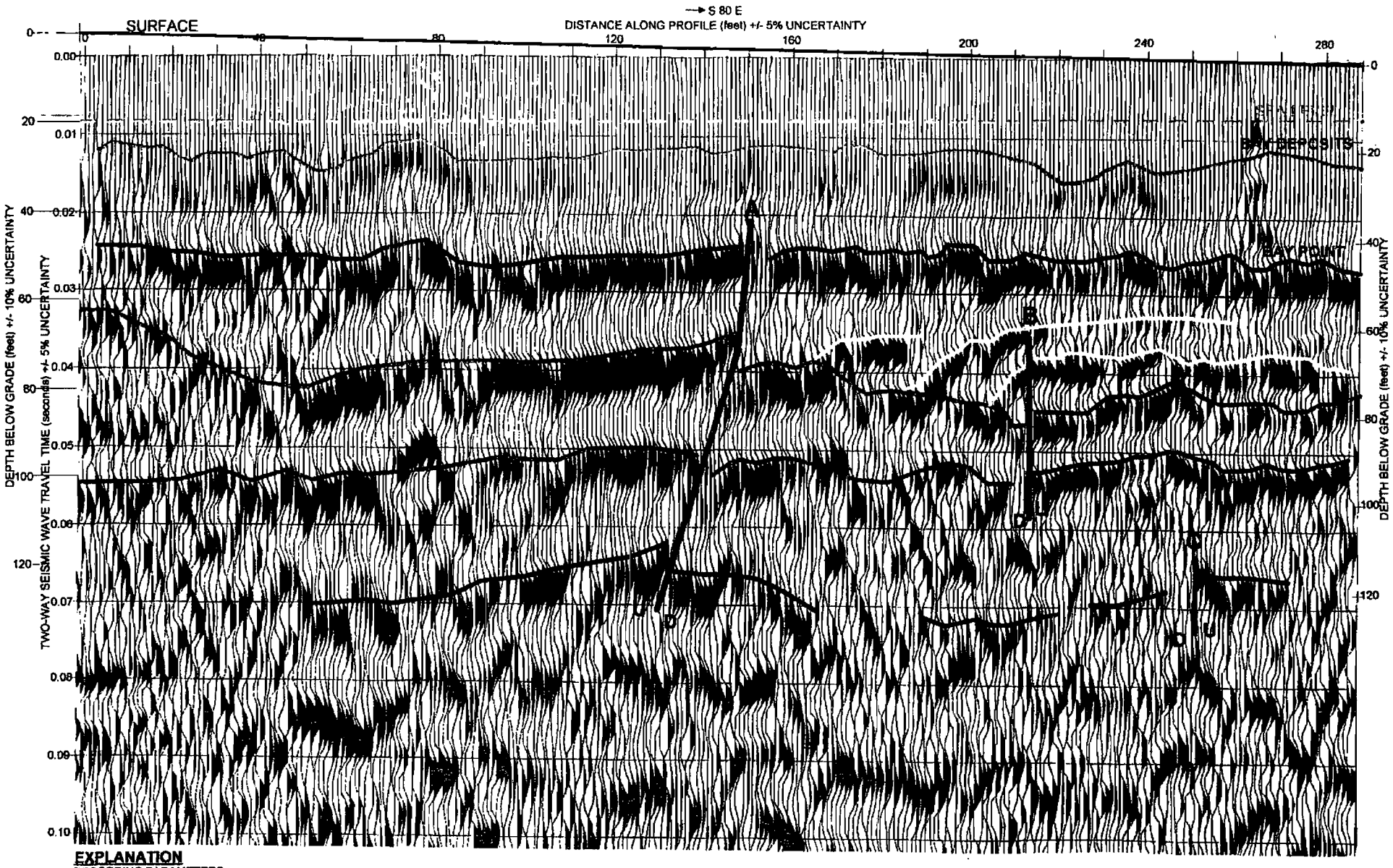


EXPLANATION

RECORDING PARAMETERS:
- SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
- DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
- SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
- HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
- DATA RECORDED WITH NO INPUT FILTERING.

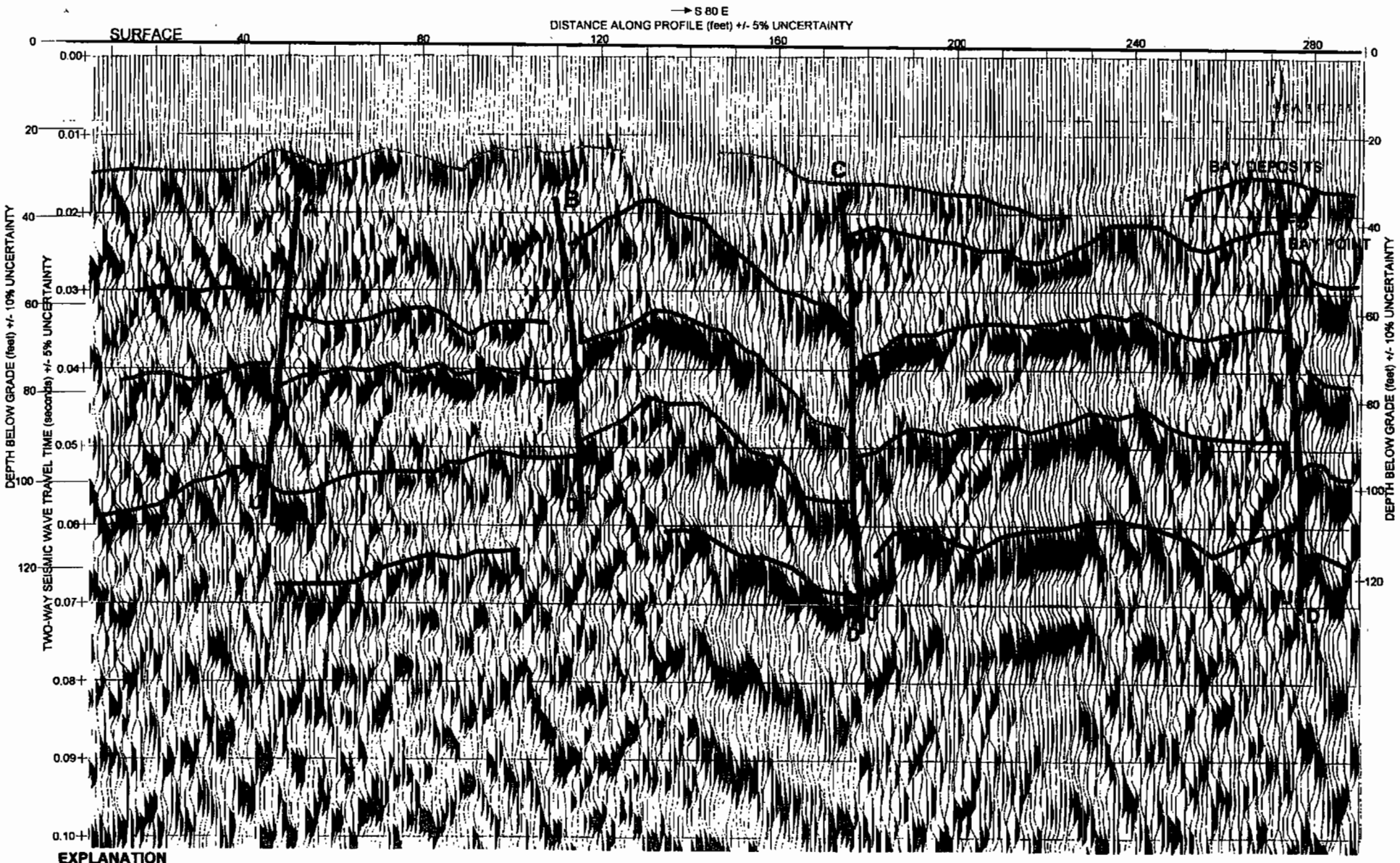
PROCESSING PARAMETERS:
- DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
- HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - ALMOST NO VERTICAL EXAGGERATION

INTERPRETED RESULTS:
- REFLECTIONS CAUSED BY SEISMIC VELOCITY/MATERIAL DENSITY CHANGES INTERPRETED AS STRATIGRAPHIC CHANGES.
- POSSIBLE FAULTS INTERUPTING THE INTERPRETED REFLECTIONS.

FIGURE 3
REVISED REFLECTION LINE 1
GEOLOGICAL FEATURES INTERPRETED
FROM THE PROCESSED REFLECTION SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS



EXPLANATION

RECORDING PARAMETERS:
- SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
- DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
- SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
- HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
- DATA RECORDED WITH NO INPUT FILTERING.

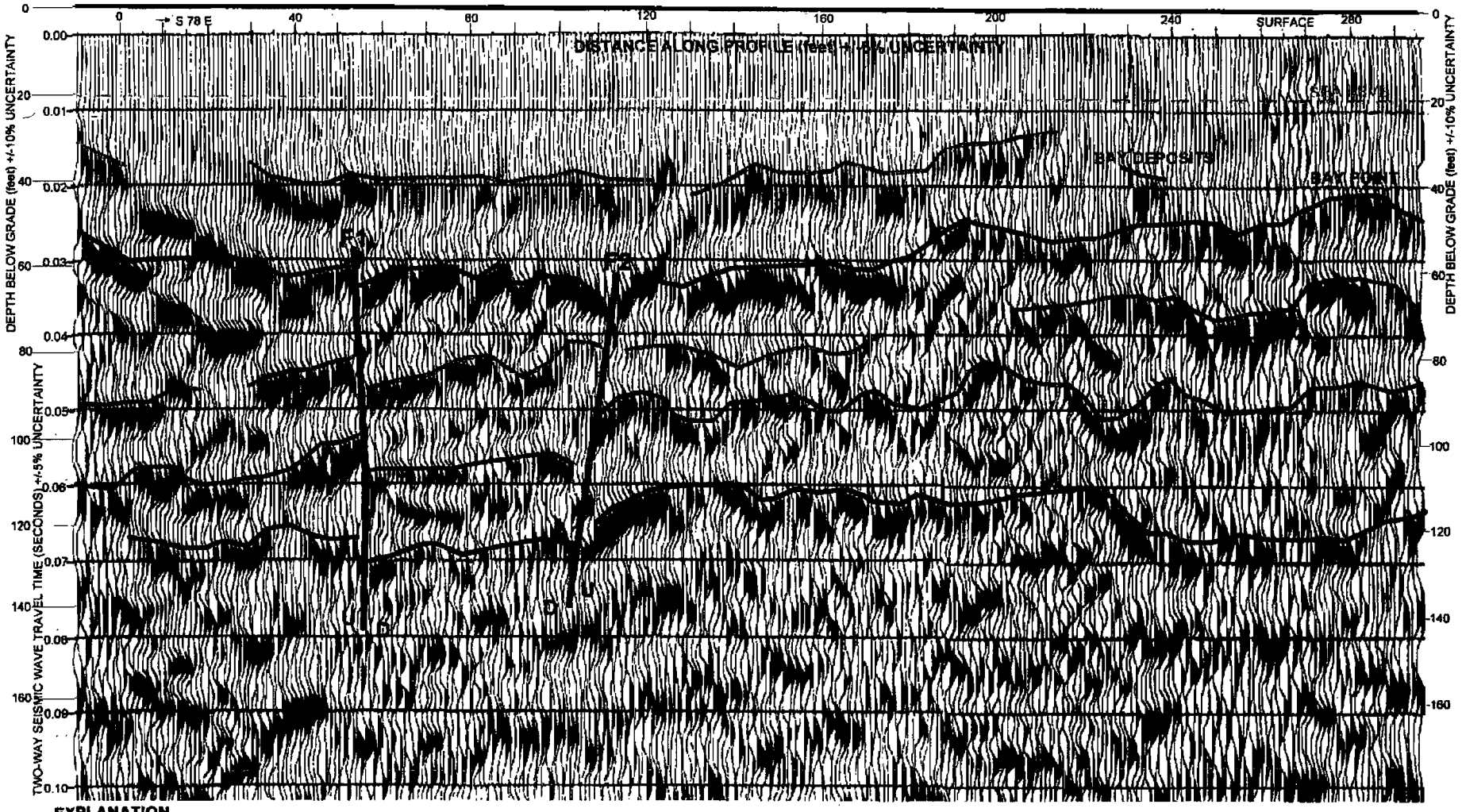
PROCESSING PARAMETERS:
- DETAILS SHOWN IN APPENDIX A TABLES SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
- HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - ALMOST NO VERTICAL EXAGGERATION.

INTERPRETED RESULTS.
- REFLECTIONS CAUSED BY SEISMIC VELOCITY/MATERIAL DENSITY CHANGES INTERPRETED AS STRATIGRAPHIC CHANGES.
- POSSIBLE FAULTS INTERUPTING THE INTERPRETED REFLECTIONS.

FIGURE 4
REVISED REFLECTION LINE 2
GEOLOGICAL FEATURES INTERPRETED
FROM THE PROCESSED REFLECTION SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS



EXPLANATION

RECORDING PARAMETERS:
SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING

PROCESSING PARAMETERS:
DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 33 feet - ALMOST NO VERTICAL EXAGGERATION.

INTERPRETED RESULTS:
REFLECTIONS CAUSED BY SEISMIC VELOCITY/MATERIAL DENSITY CHANGES INTERPRETED AS STRATIGRAPHIC CHANGES.
POSSIBLE FAULTS INTERUPTING THE INTERPRETED REFLECTIONS.

FIGURE 5
REVISED REFLECTION LINE 3
GEOLOGICAL FEATURES INTERPRETED
FROM THE PROCESSED REFLECTION SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS

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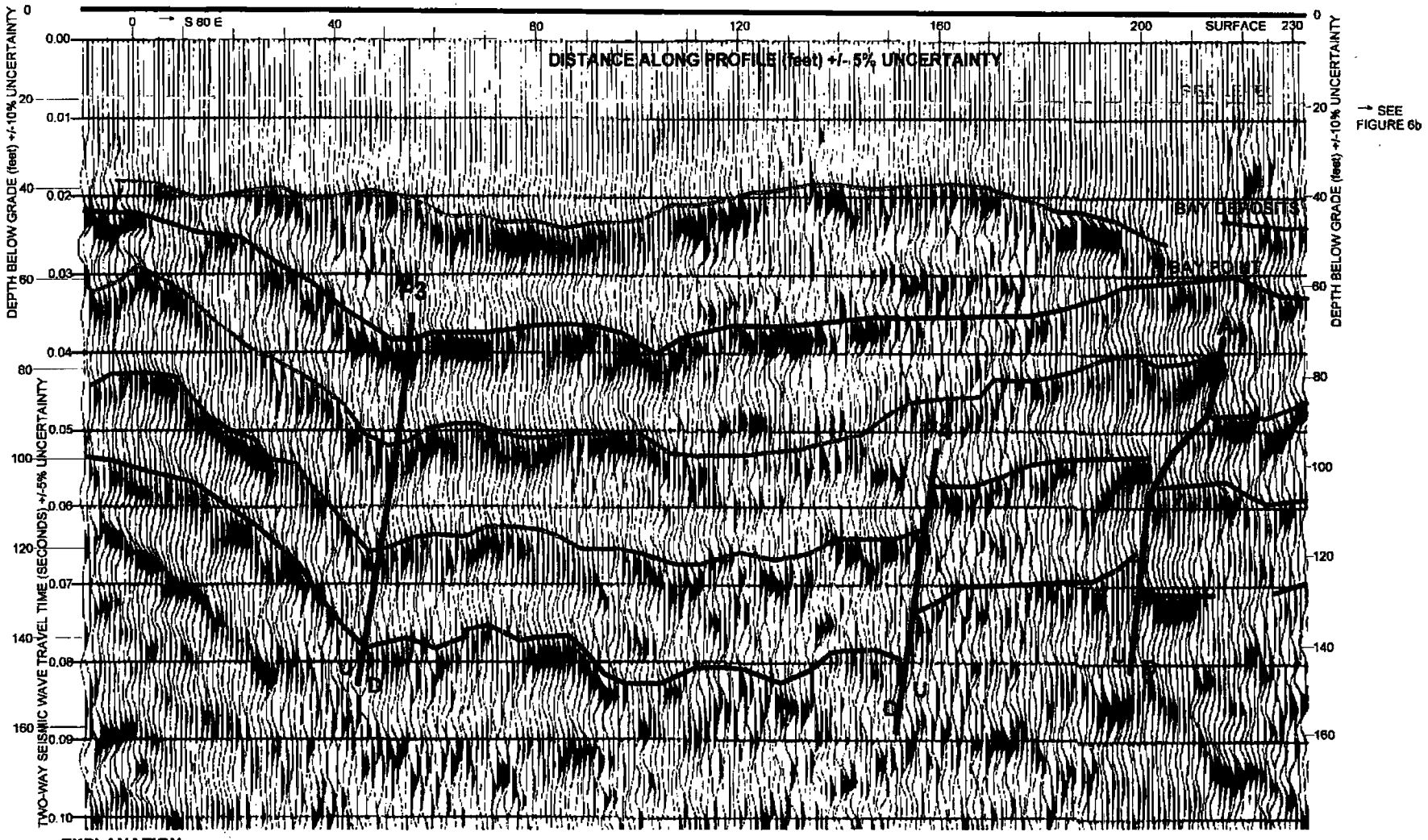


EXPLANATION

RECORDING PARAMETERS:
SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

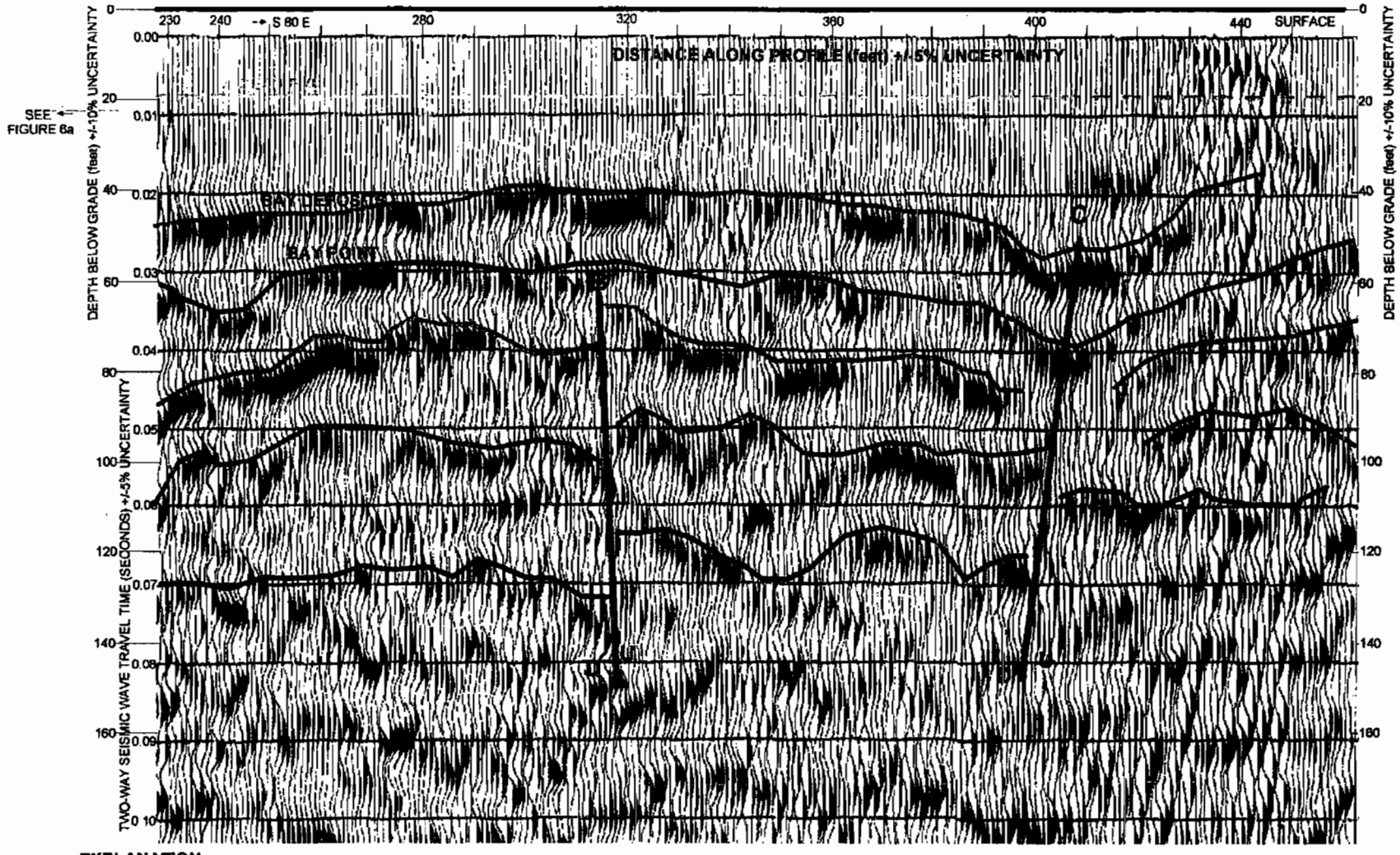
PROCESSING PARAMETERS:
DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - ALMOST NO VERTICAL EXAGGERATION.

INTERPRETED RESULTS:
REFLECTIONS CAUSED BY SEISMIC VELOCITY/MATERIAL DENSITY CHANGES INTERPRETED AS STRATIGRAPHIC CHANGES.
POSSIBLE FAULTS INTERUPTING THE INTERPRETED REFLECTIONS

FIGURE 6a
REVISED REFLECTION LINE 4 (WEST)
GEOLOGICAL FEATURES INTERPRETED
FROM THE PROCESSED REFLECTION SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS



EXPLANATION

RECORDING PARAMETERS:
SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-8 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

PROCESSING PARAMETERS:
DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - ALMOST NO VERTICAL EXAGGERATION

INTERPRETED RESULTS:
REFLECTIONS CAUSED BY SEISMIC VELOCITY/MATERIAL DENSITY CHANGES INTERPRETED AS STRATIGRAPHIC CHANGES.
POSSIBLE FAULTS INTERUPTING THE INTERPRETED REFLECTIONS.

FIGURE 6b
REVISED REFLECTION LINE 4 (EAST)
GEOLOGICAL FEATURES INTERPRETED
FROM THE PROCESSED REFLECTION SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS

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599

FINAL REPORT – TRIP 2
SEISMIC REFLECTION SURVEY TO DETECT THE SPANISH BIGHT FAULT ZONE
(TRIP #2 – WESTWARD EXTENSION FROM ORIGINAL SURVEY AREA)
PROPOSED EAST HARBOR ISLAND HOTEL SITE
SAN DIEGO BAY, CALIFORNIA

APPENDIX A
PROCESSED REFLECTION SECTIONS
WITHOUT INTERPRETED GEOLOGIC FEATURES

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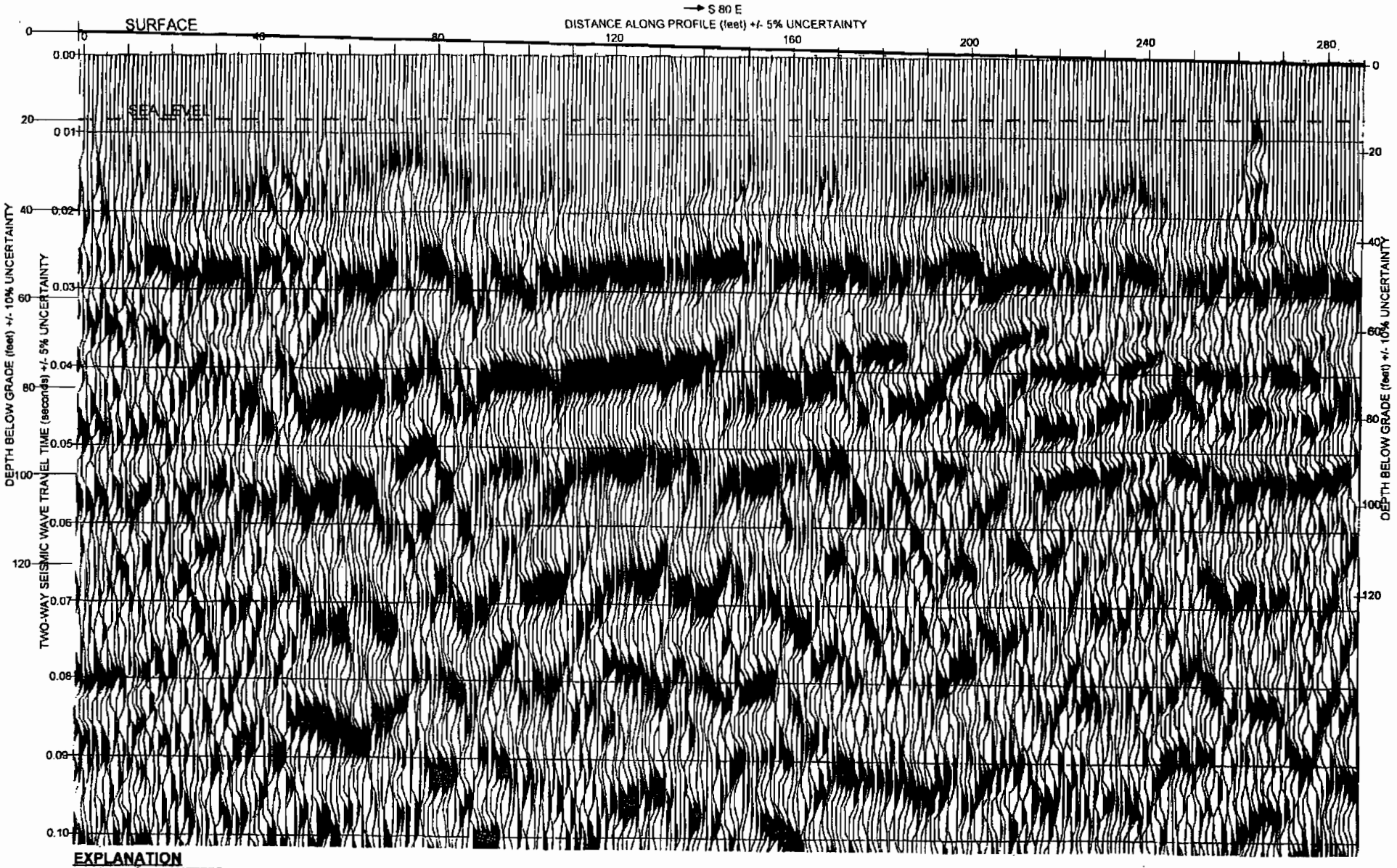

EXPLANATION

RECORDING PARAMETERS:

SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

PROCESSING PARAMETERS:

DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - NO VERTICAL EXAGGERATION

FIGURE A1
REFLECTION LINE 1
PROCESSED DATA SECTION

AST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS

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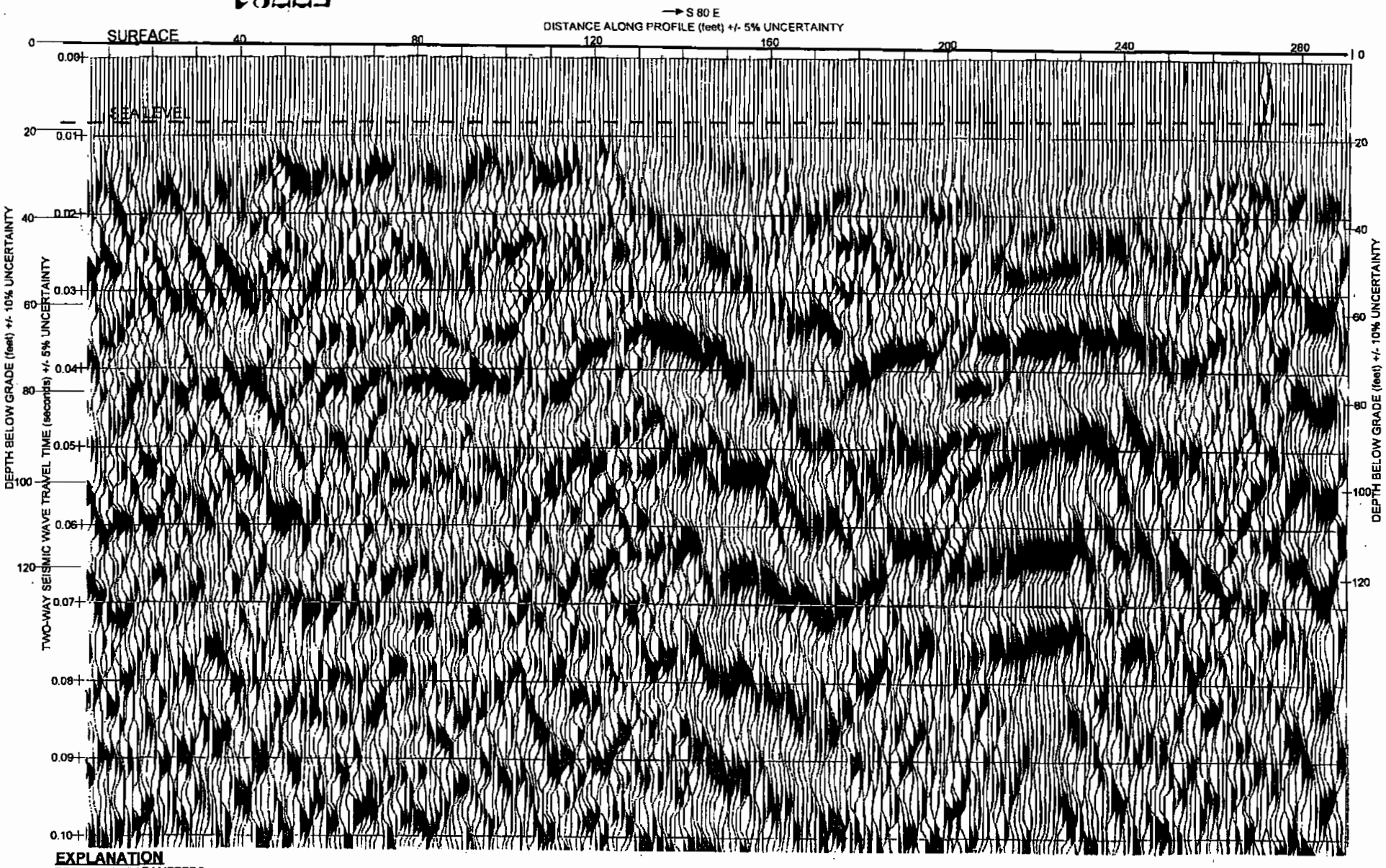


EXPLANATION

RECORDING PARAMETERS:

SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

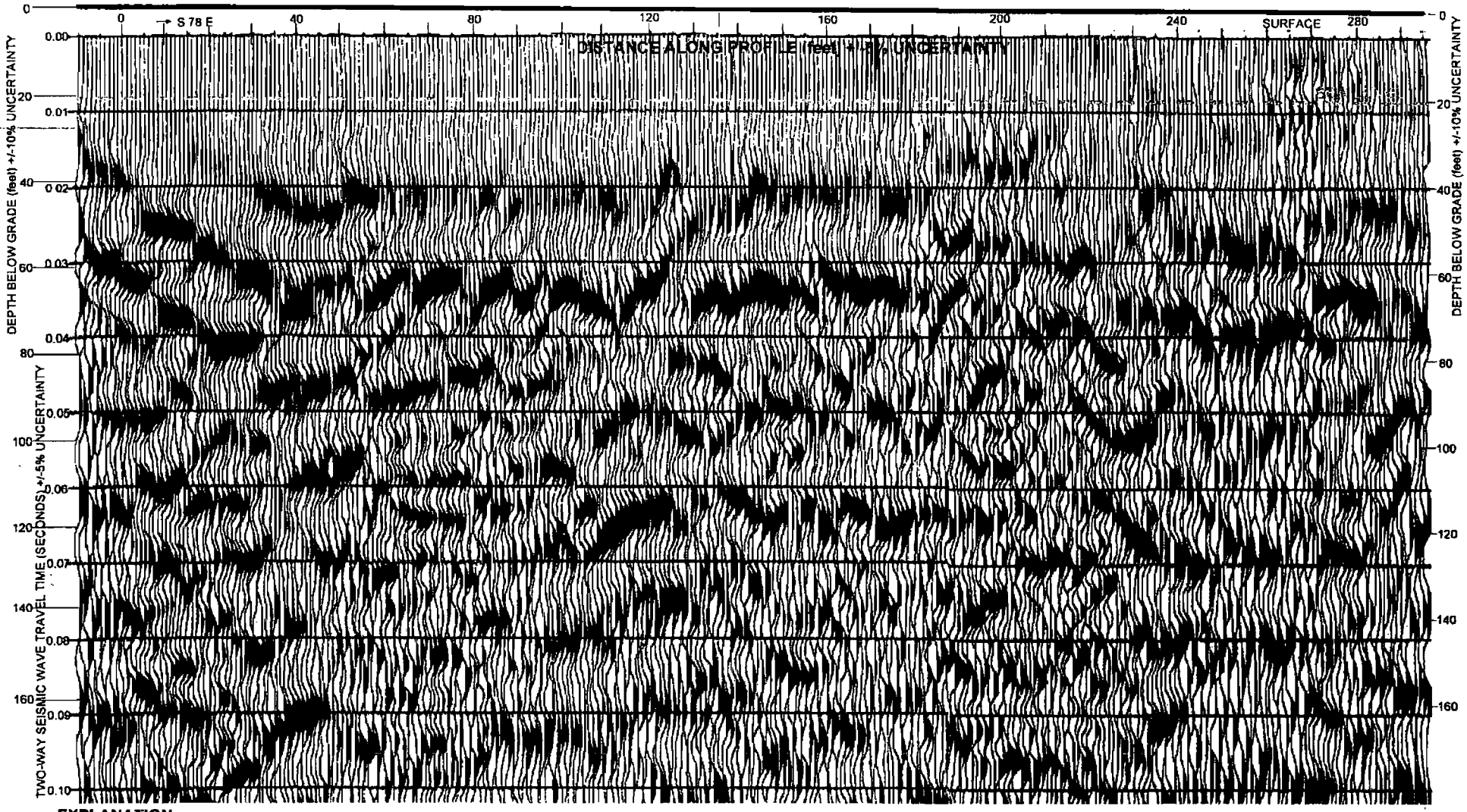
PROCESSING PARAMETERS:

DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - NO VERTICAL EXAGGERATION

FIGURE A2
REFLECTION LINE 2
PROCESSED DATA SECTION

AST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS



EXPLANATION

RECORDING PARAMETERS:

SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

PROCESSING PARAMETERS:

DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 33 feet - ALMOST NO VERTICAL EXAGGERATION

FIGURE A3
REVISED REFLECTION LINE 3
PROCESSED DATA SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS

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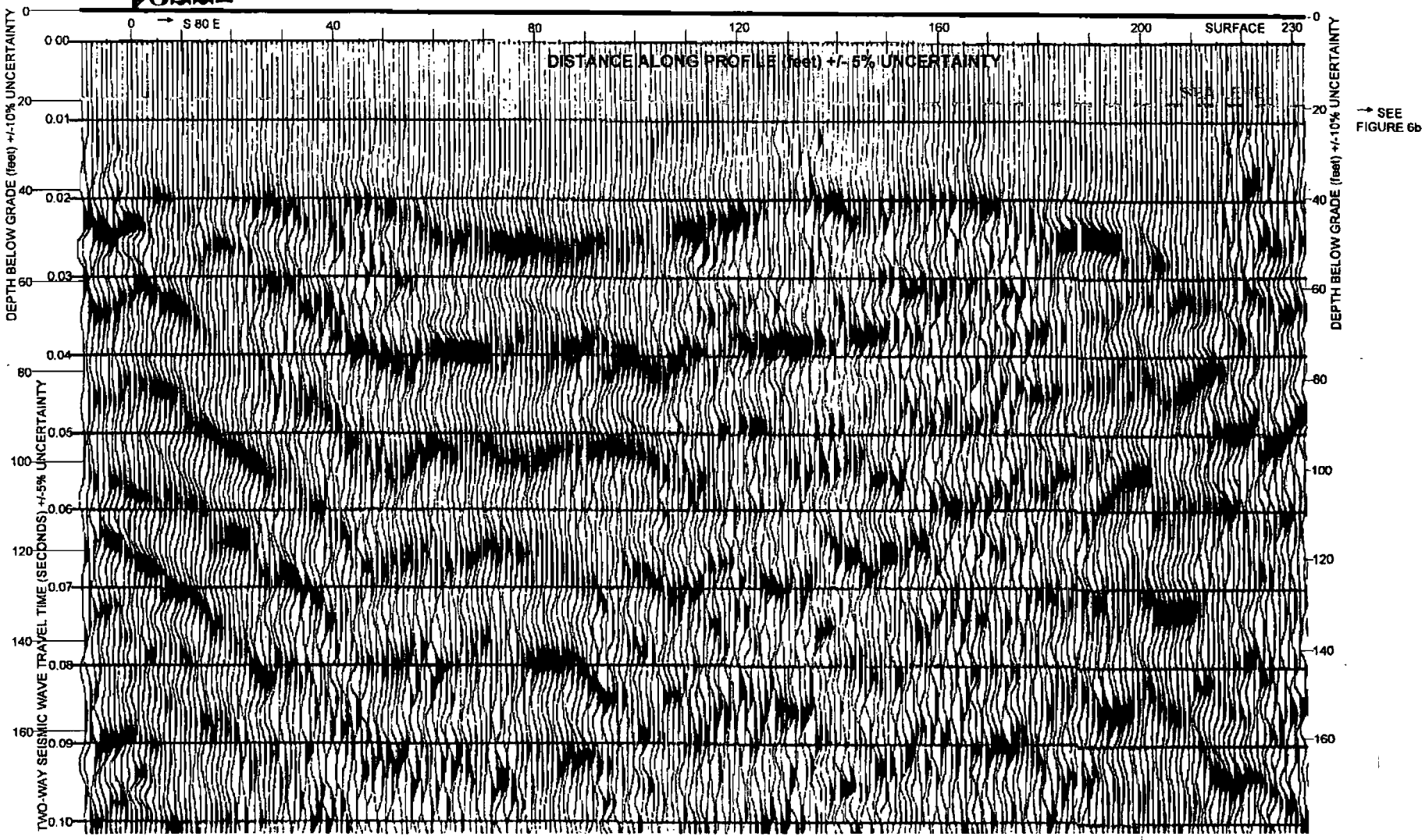


EXPLANATION

RECORDING PARAMETERS:

SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

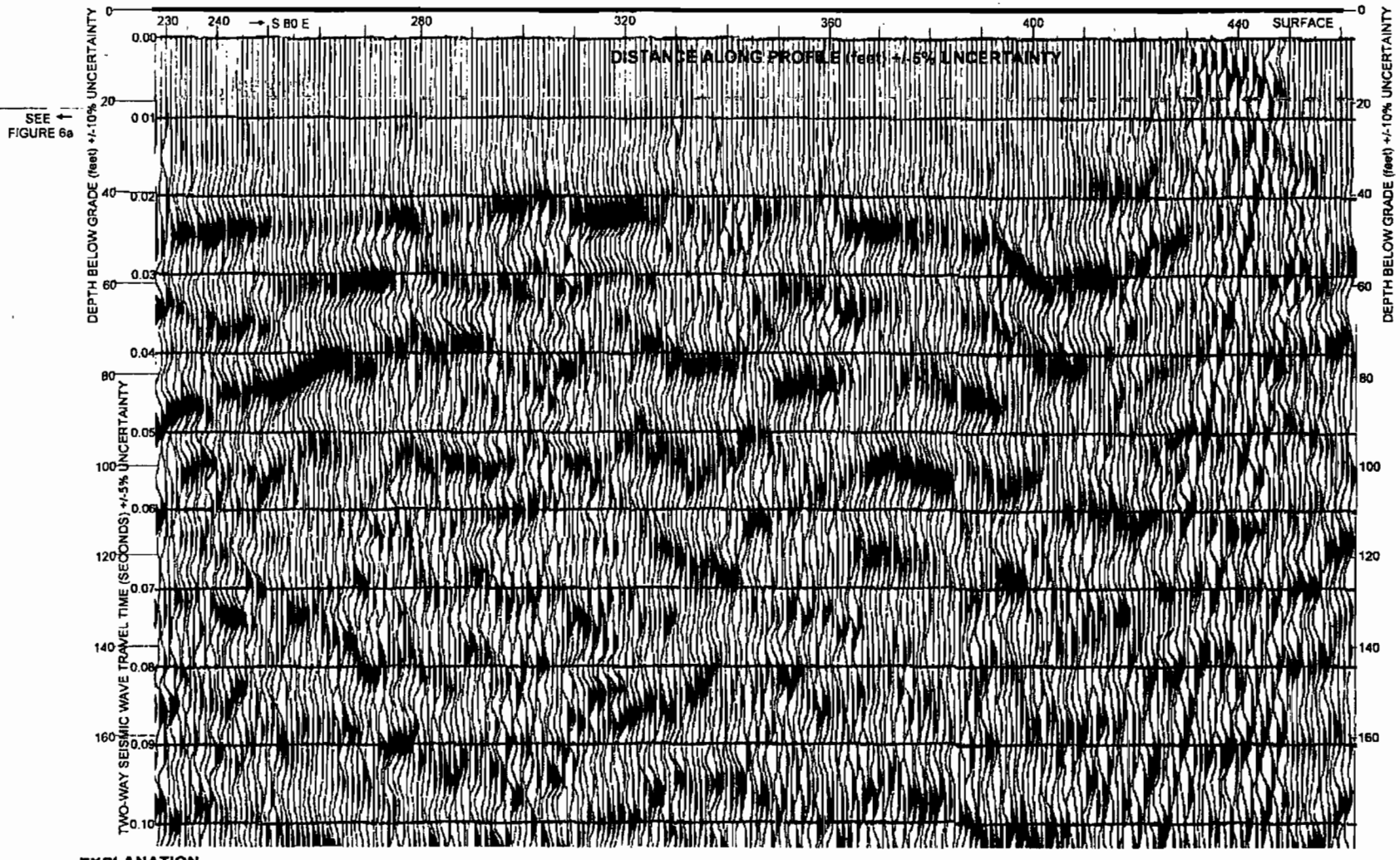
PROCESSING PARAMETERS.

DETAILS SHOWN IN APPENDIX A TABLES SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - ALMOST NO VERTICAL EXAGGERATION.

FIGURE A4
REFLECTION LINE 4 (WEST)
PROCESSED DATA SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS



EXPLANATION

RECORDING PARAMETERS:

SEISMIC WAVES GENERATED FREQUENCIES AS HIGH AS 100 Hz BY STRIKING A 3 pound HAMMER ON A 1 X 1 inch ROD.
DATA QUALITY WAS IMPROVED BY STACKING 4-6 INDIVIDUAL HAMMER HITS FOR EACH DATA RECORD.
SEISMIC WAVES SENSED BY 24 GEOPHONES (SINGLE, 40 Hz, UNDAMPED) SPACED 2 feet APART.
HAMMER TO NEAR GEOPHONE OFFSET WAS 20 feet.
DATA RECORDED WITH NO INPUT FILTERING.

PROCESSING PARAMETERS:

DETAILS SHOWN IN APPENDIX A TABLES. SURFACE DATUM = 15 feet AND AVERAGE VELOCITY = 3500 feet/second.
HORIZONTAL SCALE AND VERTICAL DEPTH SCALE IS 1 INCH = 30 feet - ALMOST NO VERTICAL EXAGGERATION

FIGURE A5
REFLECTION LINE 4 (EAST)
PROCESSED DATA SECTION

EAST HARBOR ISLAND HOTEL SITE

TERRA PHYSICS

APPENDIX D

57791

APPENDIX D

FIELD INVESTIGATION/LABORATORY TESTING – PREVIOUS STUDY

FOR

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

PROJECT NO. 07569-22-01

57791

FILE NO. D-4503-501

BORING B 1A

ELEVATION 14 DATE COMPLETED 1/31/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**FILL SOIL** Moderately dense, moist, tan to brown, fine to coarse Clayey SAND with shell fragments			
2								
4								
6	B1-1				Moderately dense, very moist, fine SAND	24	97.9	6.3
8								
10	B1-2		▼		Moderately dense, saturated, tan, fine to coarse SAND with shell fragments	32	108.4	15.0
12								
14								
16	B1-3				Loose, saturated, tan, fine to medium SAND with some layers of shell fragments	9		
18								
20	B1-4					18		
22								
24					**BAY DEPOSITS** Loose, saturated, black, fine Silty SAND with some clay (strong organic odor)			
26	B1-5					5	90.3	32.5
28								

Figure A-1 Log of Test Boring B 1, page 1 of 2 STRH

SAMPLE SYMBOLS
□ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

608

FILE NO. D-4503-501

BORING B 1A

ELEVATION 14 DATE COMPLETED 1/31/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B1-6				Moderately dense, saturated, grey, fine to medium Silty SAND with shell fragments	25	99.0	26.7
32								
34					**BAY POINT FORMATION** Moderately dense to dense, saturated, grey to brown, fine to medium Silty SAND			
36	B1-7					35	124.6	14.4
38								
40	B1-8				Moderately dense to dense, saturated, brown, fine to medium Silty SAND	32	112.6	19.0
42								
44								
46	B1-9					47		
					BORING TERMINATED AT 46.5 FEET			

57791

Figure A-2 Log of Test Boring B 1, page 2 of 2

STRH

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 2A

ELEVATION 14 DATE COMPLETED 1/31/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0, 2, 4, 6	B2-1				**FILL SOIL** Moderately dense, moist, tan, fine to medium Silty SAND	16	98.4	5.2
8, 10, 12	B2-2		▼		Moderately dense, very moist, tan, fine to coarse SAND with many shell fragments. Becomes saturated at 10 feet	23		
14, 16, 18	B2-3				Moderately dense, saturated, grey, fine to medium SAND with some shell fragments	18	95.3	25.9
20, 22, 24	B2-4				Moderately dense, saturated, dark grey fine Silty SAND	20	104.6	24.1
26, 28	B2-5				**BAY DEPOSITS** Loose, saturated, black, fine to medium Silty SAND; strong organic odor	8		
					Moderately dense, saturated, dark grey to black fine Silty SAND with trace of clay with shell fragments			

Figure A-3 Log of Test Boring B 2, page 1 of 2

STRH

SAMPLE SYMBOLS: □ ... SAMPLING UNSUCCESSFUL; ◧ ... STANDARD PENETRATION TEST; ■ ... DRIVE SAMPLE (UNDISTURBED); ⊠ ... DISTURBED OR BAG SAMPLE; ▨ ... CHUNK SAMPLE; ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

5279A

610

FILE NO. D-4503-501

BORING B 2A

ELEVATION 14 DATE COMPLETED 1/31/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B2-6				**BAY DEPOSITS** (continued) Silty SAND	35	97.7	28.0
32								
34								
36	B2-7				Dense, saturated, dark grey with some tan portions, fine Silty SAND with shell fragments	37		
38					**BAY POINT FORMATION** Dense, saturated, dark grey fine Silty SAND with trace of clay			
40	B2-8					35	102.5	24.8
42								
44								
46	B2-9				Very dense, saturated, tan fine Silty SAND	50/9"	97.8	27.5
48								
50	B2-10				Very dense, moist, brown, fine Silty SAND	48	101.8	24.9
					BORING TERMINATED AT 51 FEET			

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Figure A-4 Log of Test Boring B 2, page 2 of 2

STRH

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 3A

ELEVATION 13 DATE COMPLETED 1/31/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0, 2, 4, 6	B3-1				**FILL** Moderately dense, damp, light tan, fine to medium SAND with trace of clay with shell fragments	25	101.0	6.3
8, 10, 12	B3-2		▼		Moderately dense, saturated, tan and grey fine to coarse SAND with trace clay with shell fragments	30	110.8	19.5
14, 16	B3-3				Moderately dense, saturated, tan fine to medium SAND with trace silt	16	109.6	21.3
18, 20, 22	B3-4				Moderately dense, saturated, grey fine Silty SAND with shell fragments	17	96.1	28.0
24, 26, 28	B3-5				**BAY DEPOSITS** Loose, saturated, black fine Silty SAND with trace clay; strong organic odor	10	88.9	35.9

Figure A-5 Log of Test Boring B 3, page 1 of 2

STRH

SAMPLE SYMBOLS: □ ... SAMPLING UNSUCCESSFUL; ◧ ... STANDARD PENETRATION TEST; ■ ... DRIVE SAMPLE (UNDISTURBED); ▩ ... DISTURBED OR BAG SAMPLE; ▨ ... CHUNK SAMPLE; ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 3A

ELEVATION 13 DATE COMPLETED 1/31/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B3-6				Moderately dense, saturated, dark grey fine Clayey SAND with some silt, some shell fragments	42		
32								
34					Dense, saturated, dark grey fine Silty SAND with some shells			
	B3-7					40		26.3
36								
38					BAY POINT FORMATION Dense, saturated, tan, fine Silty SAND			
40								
42								
44								
	B3-8					45	98.9	28.2
46					BORING TERMINATED AT 46 FEET			

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Figure A-6 Log of Test Boring B 3, page 2 of 2

STRH

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 4A

ELEVATION 14 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0, 2, 4, 6, 8	B4-1				**FILL SOIL** Moderately dense, moist, tan, fine to medium SAND with some silt and many shell fragments	27	98.8	7.7
10, 12, 14, 16, 18	B4-2		▼		Moderately dense, very moist to saturated, tan, fine to coarse SAND with a trace of silt and many shell fragments. Becomes saturated at 10.5 feet	25		
20, 22, 24	B4-3				Moderately dense, saturated, tan to light grey, fine to medium Silty SAND with a few shell fragments	23	93.1	31.5
26, 28	B4-4				**BAY DEPOSITS** Loose, saturated, dark grey to black, fine Silty SAND with a little clay	8		

Figure A-7 Log of Test Boring B 4, page 1 of 2 STRH

SAMPLE SYMBOLS: ☐ ... SAMPLING UNSUCCESSFUL; ◧ ... STANDARD PENETRATION TEST; ■ ... DRIVE SAMPLE (UNDISTURBED); ⊠ ... DISTURBED OR BAG SAMPLE; ▨ ... CHUNK SAMPLE; ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 4A

ELEVATION 14 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B4-5				Moderately dense, saturated, grey, fine Silty SAND	45	99.7	27.5
32					Moderately dense, saturated, dark grey to black, fine Silty SAND with a little clay and a few shell fragments			
34								
	B4-6					40	103.4	23.3
36								
38					BAY POINT FORMATION Dense, saturated, tan to brown, fine to medium SAND with a little silt			
40	B4-7					52		
42								
44								
	B4-8					70/10"	99.1	25.9
46					BORING TERMINATED AT 46 FEET			

57791

Figure A-8 Log of Test Boring B 4, page 2 of 2

STRH

SAMPLE SYMBOLS
□ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 5A

ELEVATION 12 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**FILL SOIL** Moderately dense, moist, brown, fine to coarse Silty SAND with a trace of clay and many shell fragments			
2								
4								
6								
8								
10	B5-1		▼		Becomes saturated at 10 feet	32	106.3	22.1
12								
14					Moderately dense, saturated, tan, fine to medium Silty SAND with many shell fragments			
16								
18								
20	B5-2				**BAY DEPOSITS** Loose, saturated, grey to black Clayey SILT with a little fine sand	3		
22								
24					Moderately dense, saturated, black, fine Silty SAND with a trace of clay and some shell fragments			
26	B5-3					10		
28								

Figure A-9 Log of Test Boring B 5, page 1 of 2

STRH

SAMPLE SYMBOLS
□ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▩ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

616

FILE NO. D-4503-501

BORING B 5A

ELEVATION 12 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B5-4				**BAY DEPOSITS** (continued) Silty SAND	40	100.8	26.4
32								
34					**BAY POINT FORMATION** Moderately dense, saturated, brown, fine to medium SAND with a little silt			
	B5-5					35	114.7	17.8
36								
38								
40	B5-6					50/10"	95.3	27.4
					BORING TERMINATED AT 41 FEET			

57791

Figure A-10 Log of Test Boring B 5, page 2 of 2

STRH

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 6A

ELEVATION 15 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0, 2, 4, 6	B6-1				**FILL SOIL** Moderately dense, moist, tan, fine SAND with some silt	23	95.5	7.5
8, 10, 12, 14	B6-2		▼		Moderately dense, very moist to saturated, tan to brown, fine to medium SAND with a little silt and some shell fragments	33		
16, 18, 20, 22	B6-3, B6-4				Loose to moderately dense, saturated, tan, fine to medium SAND with a trace of silt and many shell fragments	11, 16	101.5	22.4
24, 26	B6-5				**BAY DEPOSITS** Loose, saturated, dark grey to black, Clayey SILT with a little fine sand (strong organic odor)	6	87.9	33.9
28					Moderately dense, saturated, black, fine Silty SAND with a little clay			

Figure A-11 Log of Test Boring B 6, page 1 of 2

STRH

SAMPLE SYMBOLS: ☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED) ⊠ ... DISTURBED OR BAG SAMPLE ▨ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

618

FILE NO. D-4503-501

BORING B 6A

ELEVATION 15 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B6-6				**BAY DEPOSITS** (continued) Silty SAND	41		
32								
34								
36					Moderately dense, saturated, grey, fine to coarse Silty SAND with many shell fragments and a trace of clay			
38								
40	B6-7					34	111.6	18.5
42								
44					**BAY POINT FORMATION** Dense, saturated, brown, fine to medium SAND with trace of silt			
46								
48								
50	B6-8					70	99.6	25.0
					BORING TERMINATED AT 51 FEET			

57791

Figure A-12 Log of Test Boring B 6, page 2 of 2

STRH

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 7A

ELEVATION 14 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**FILL SOIL** Moderately dense, moist, tan to brown, fine to coarse SAND with a little silt and some shell fragments			
2								
4								
6								
8								
10	B7-1		▼		Becomes saturated at 10 feet	38	106.0	21.5
12								
14								
16	B7-2				Moderately dense, saturated, light grey, fine to coarse SAND with many shell fragments	15		
18								
20	B7-3				**BAY DEPOSITS** Moderately dense, saturated, grey to black, fine Silty SAND with a trace of clay and many shell fragments	12		
22								
24								
26								
28								

Figure A-13 Log of Test Boring B 7, page 1 of 2

STRH

SAMPLE SYMBOLS
□ ... SAMPLING UNSUCCESSFUL
▥ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▩ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

FILE NO. D-4503-501

BORING B 7A

ELEVATION 14 DATE COMPLETED 2/1/90

EQUIPMENT MAYHEW 1000 DRILLRIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B7-4				**BAY DEPOSITS** (continued) Silty SAND	38	98.1	27.9
32								
34								
36								
38					**BAY POINT FORMATION** Moderately dense, saturated, brown, fine to medium SAND with a little silt			
40	B7-5					45	104.3	23.7
42								
44								
46								
48								
50	B7-6					35	116.2	18.3
					BORING TERMINATED AT 51 FEET			

57791

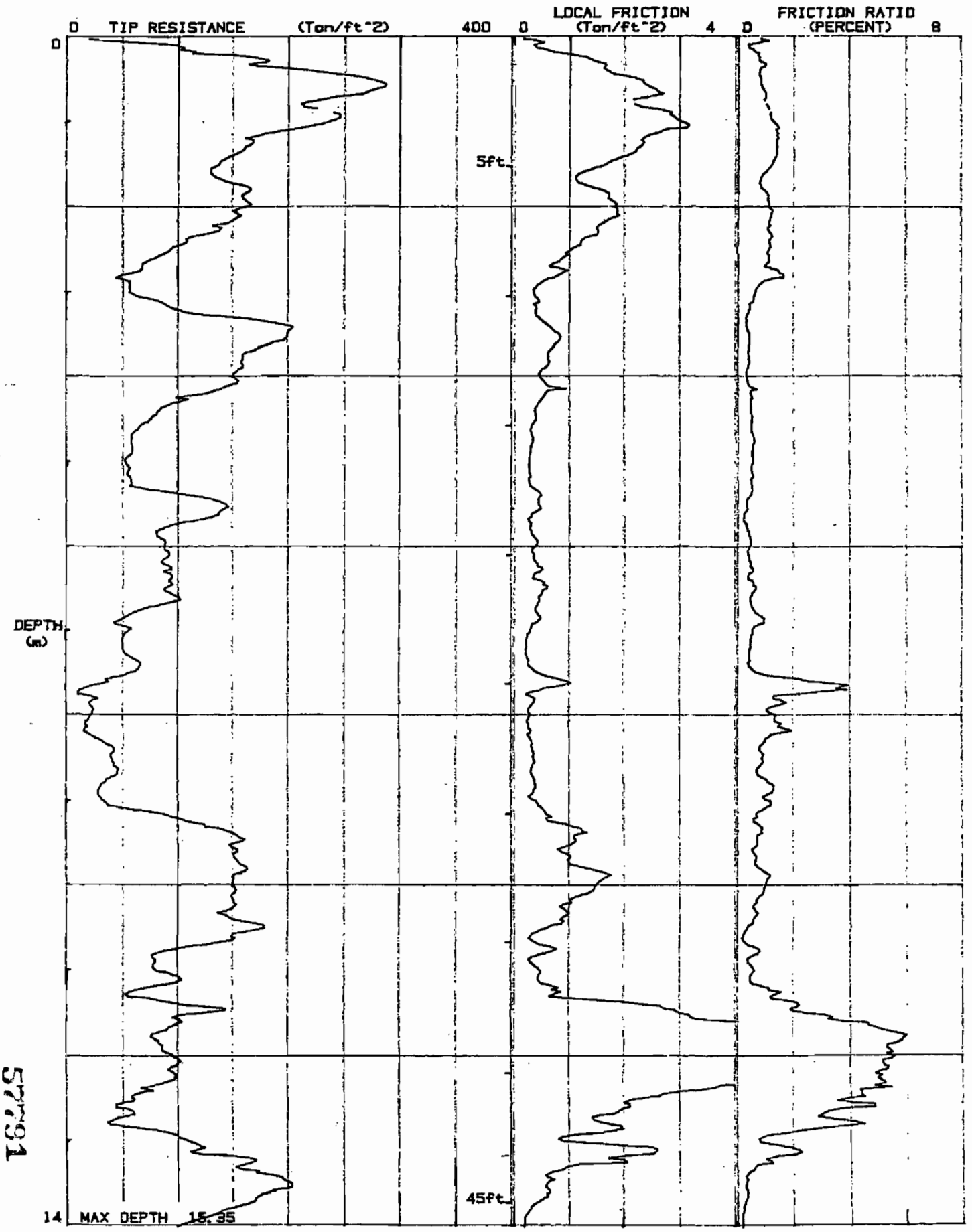
Figure A-14 Log of Test Boring B 7, page 2 of 2

STRH

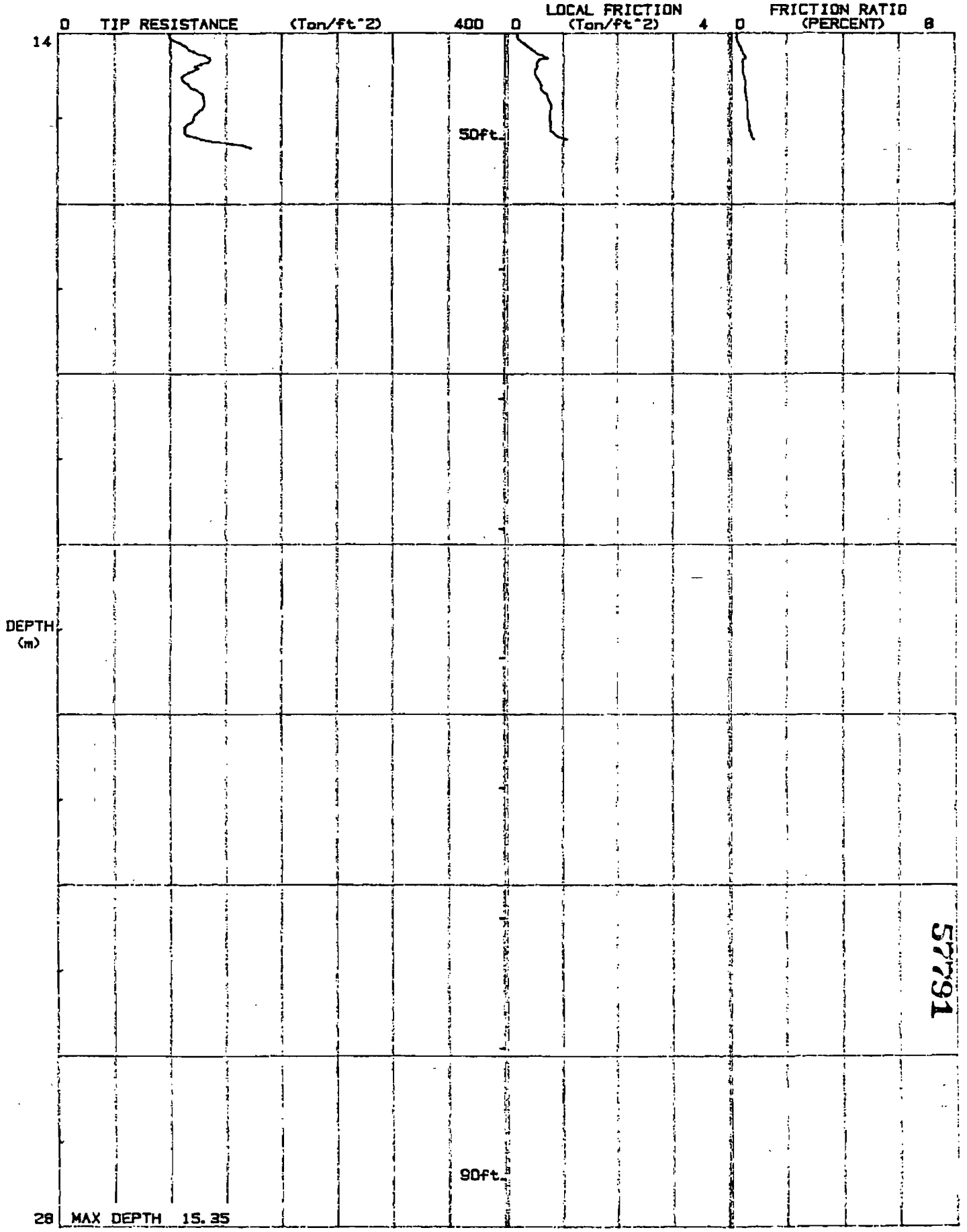
SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

JOB # : 4503-501
DATE : 02/05/90/9:48
LOCATION : CPT-01A
FILE : FIL035

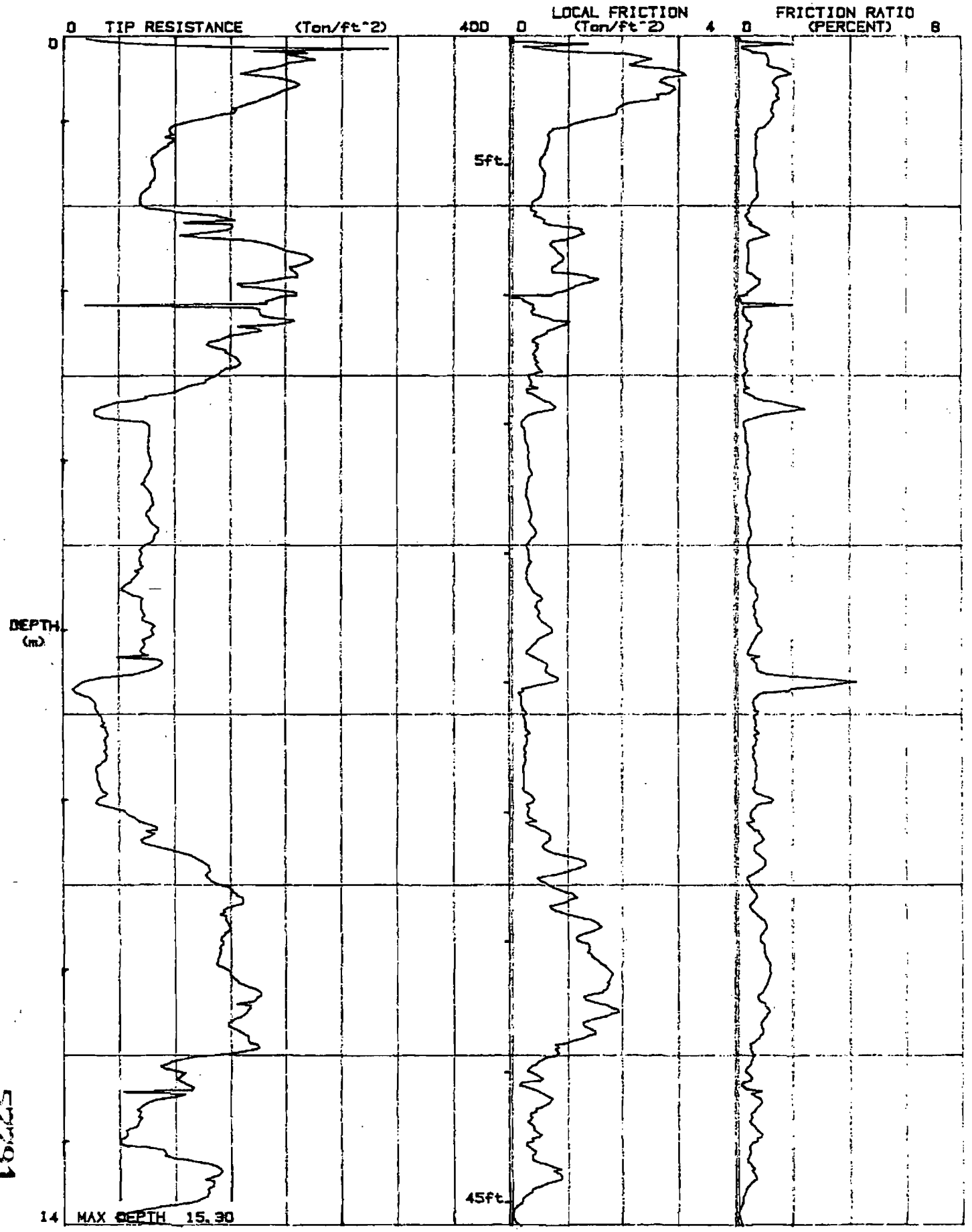


JOB # : 4503-501
DATE : 02/05/90/9:48
LOCATION : CPT-01A
FILE : FIL035



57791

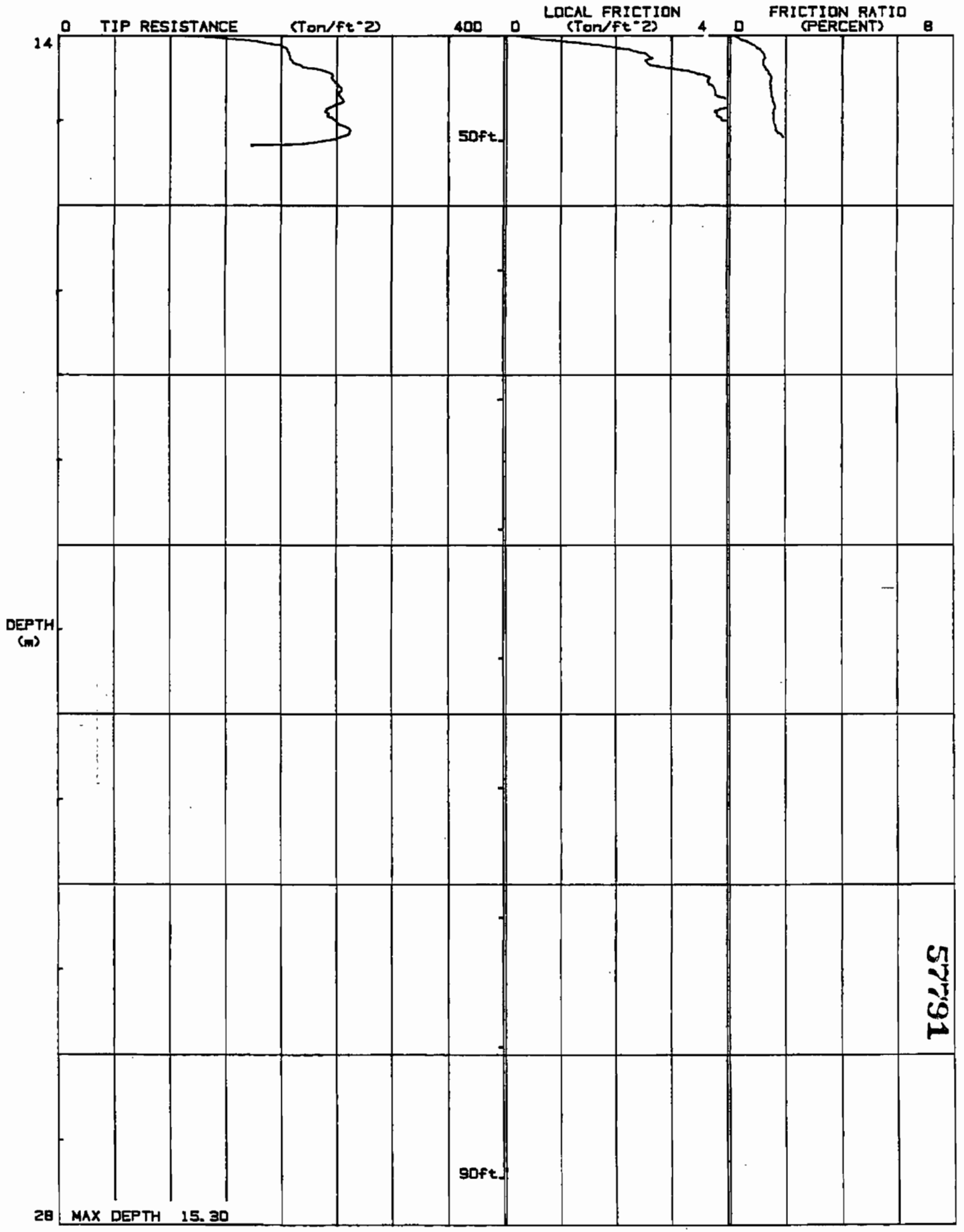
JOB # : 4503-501
DATE : 02/05/90/10:47
LOCATION : CPT-02A
FILE : FIL036



5791

624

JOB # : 4503-501
DATE : 02/05/90/10:47
LOCATION : CPT-02A
FILE : FIL036



57791

625.

JOB # : 4503-501
DATE : 02/05/90/13:41
LOCATION : CPT-03-A
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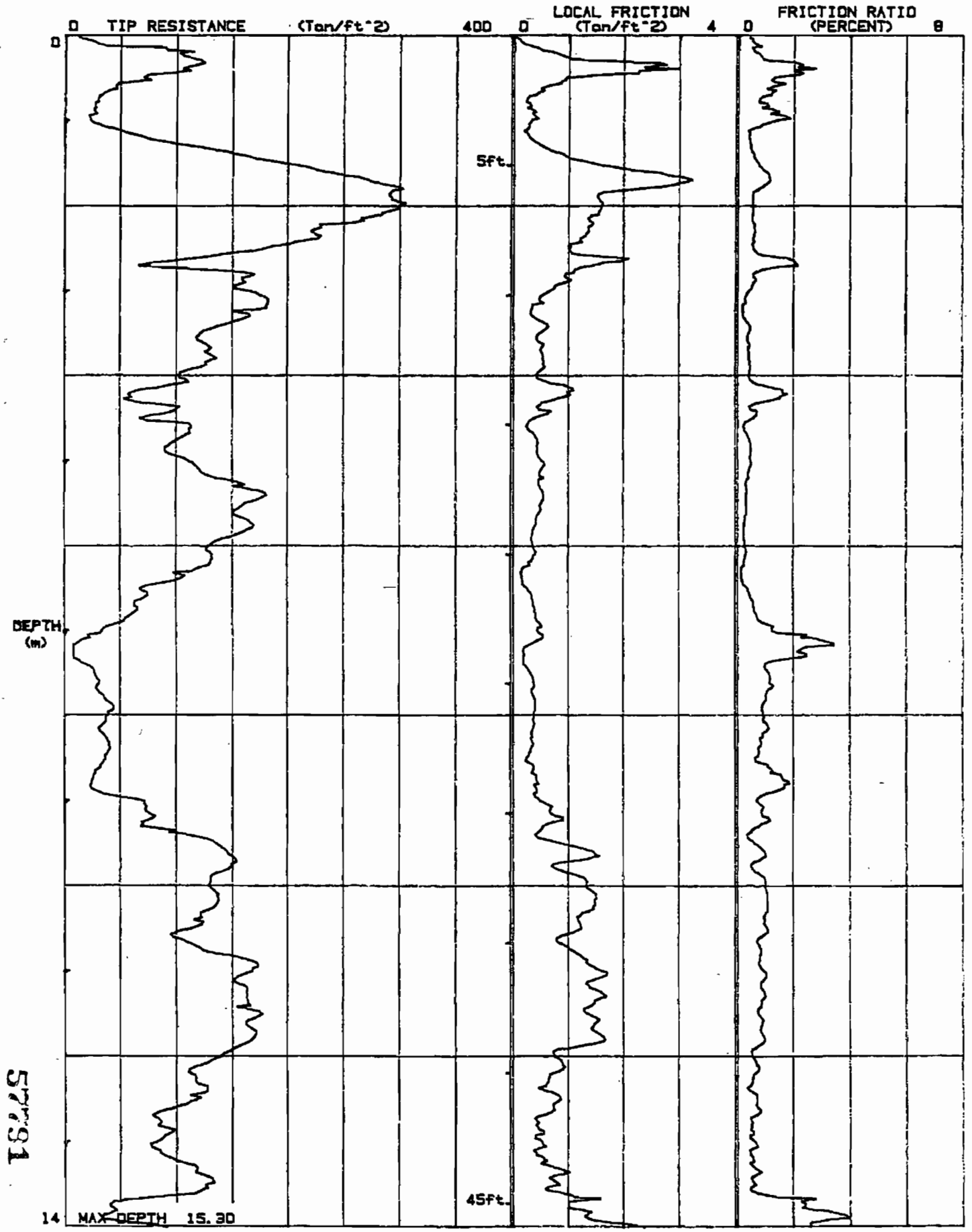

5791

626

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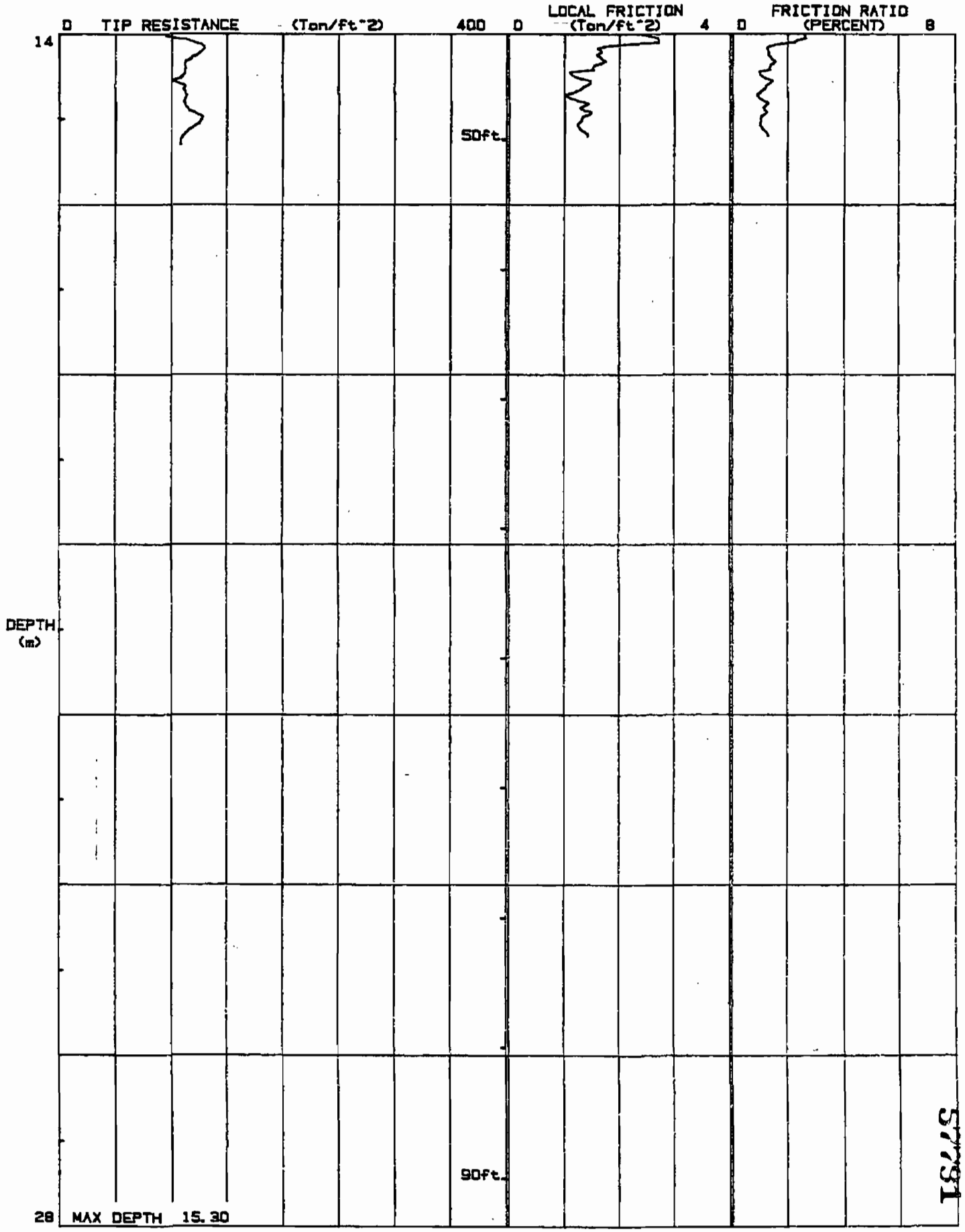
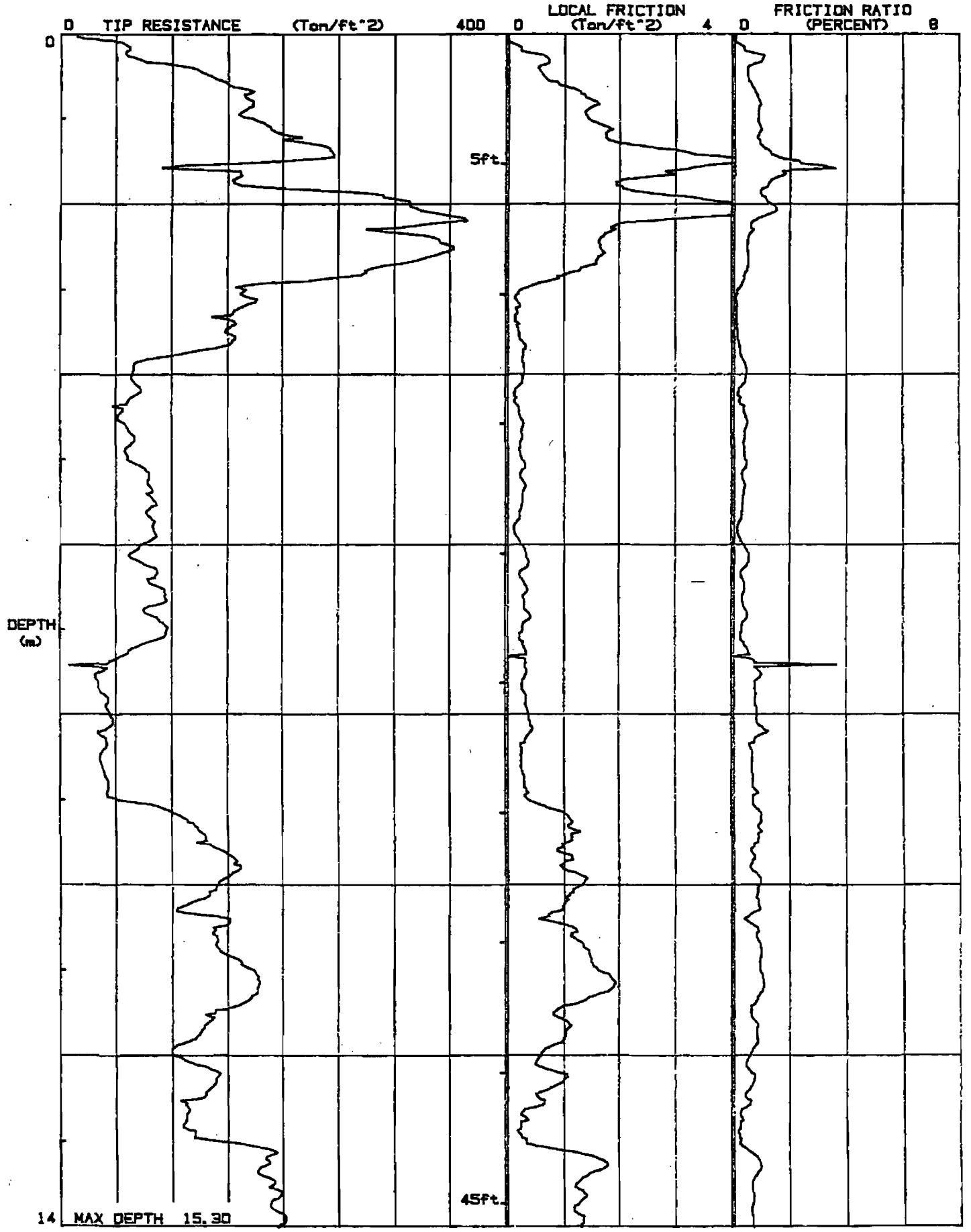


S/7S1

627

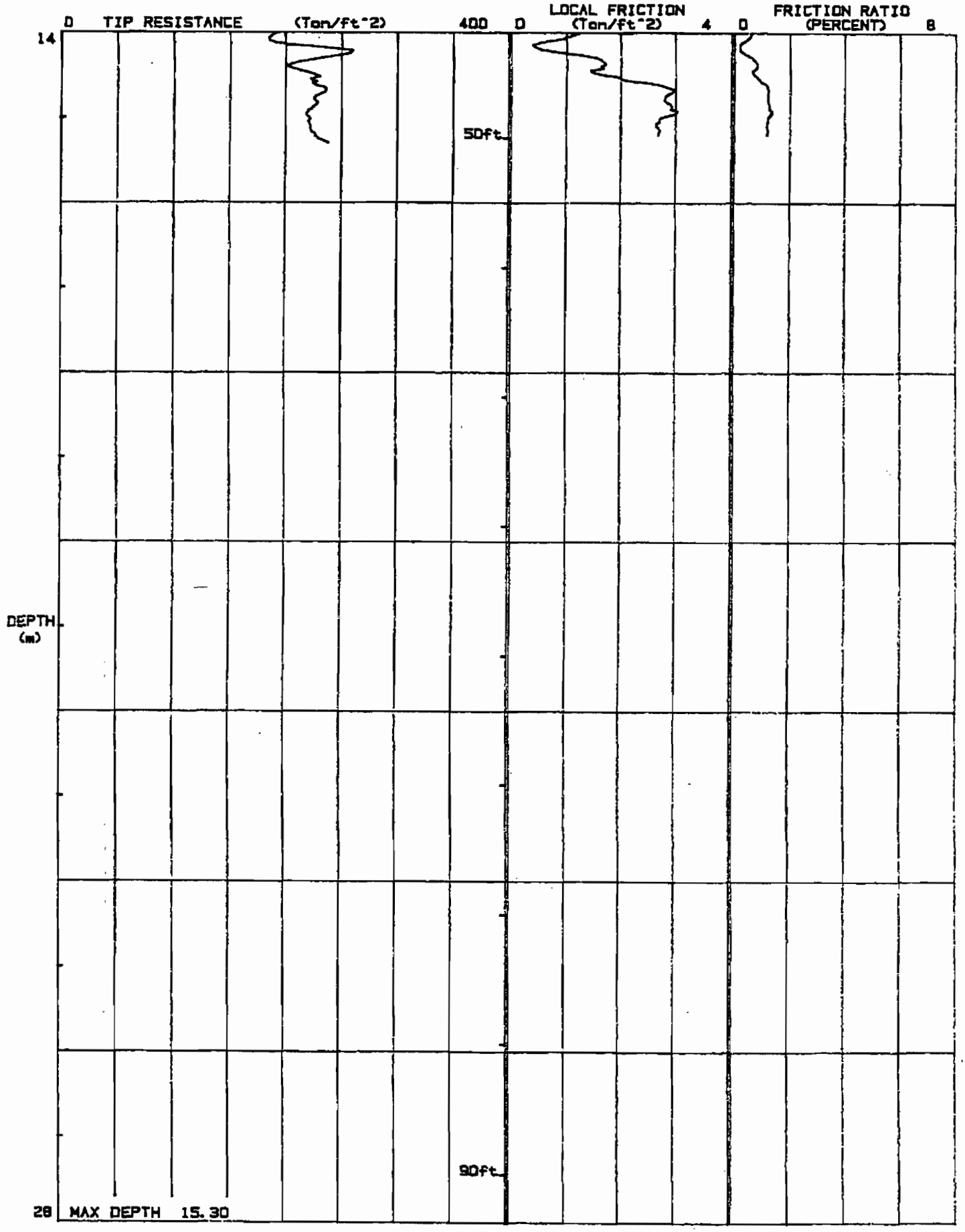
JOB # : 4503-501
DATE : 02/05/90/14:26
LOCATION : CPT-04A
FILE : FIL040



5/7/91

628

JOB # : 4503-501
DATE : 02/05/90/14:28
LOCATION : CPT-04A
FILE : FIL040



57791

629

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LOCATION : CPT-05A
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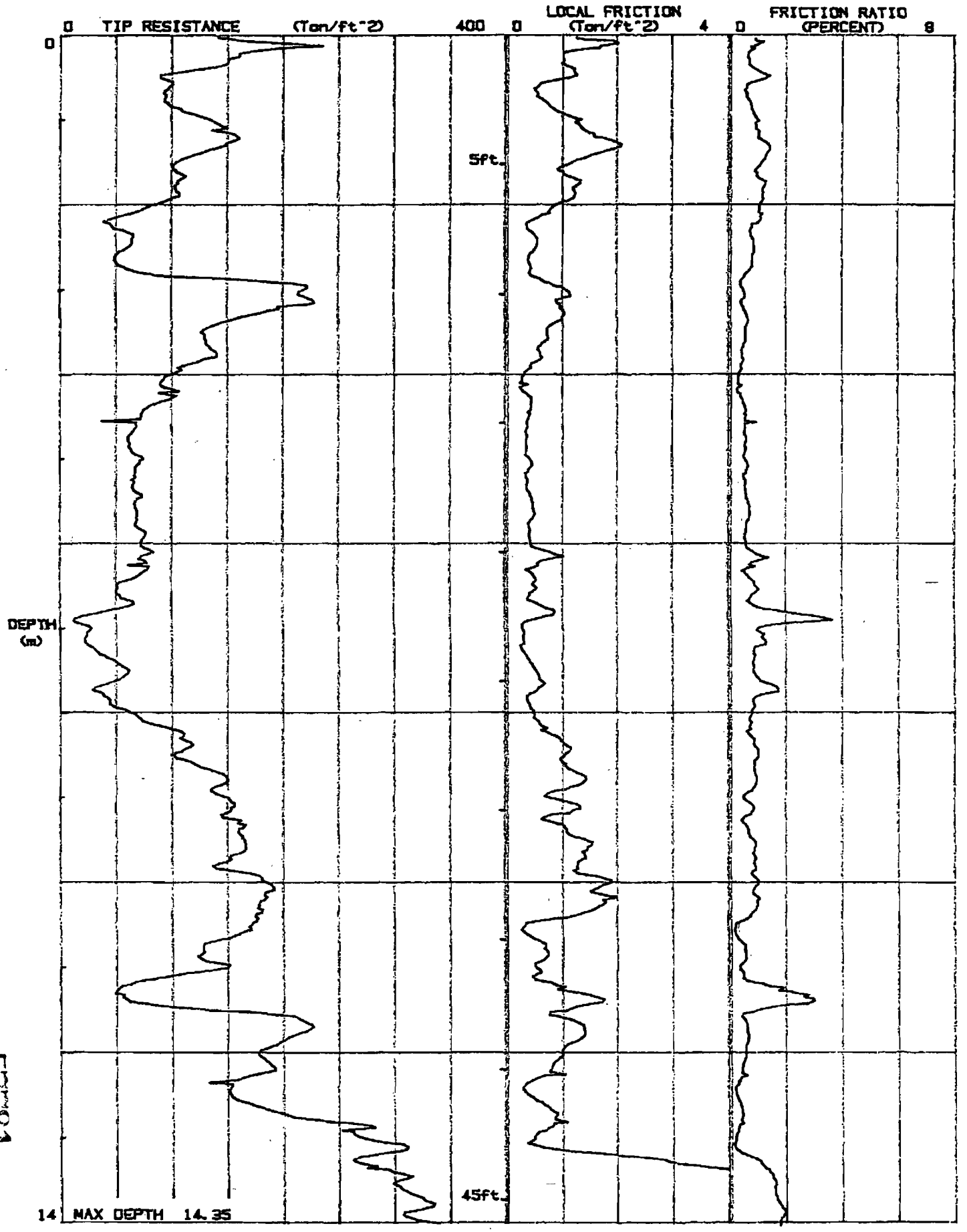

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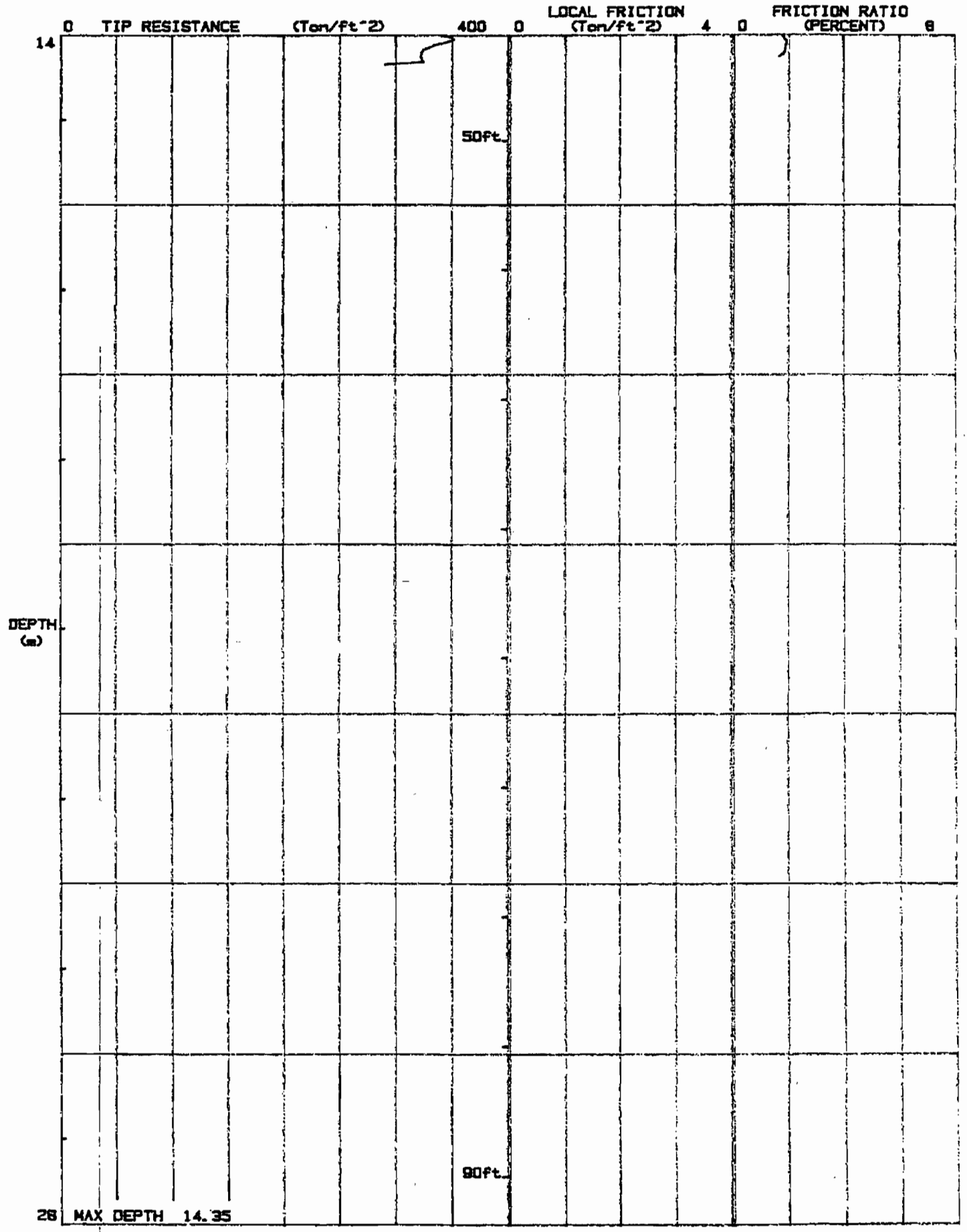
FILE : FIL042



5779

631.

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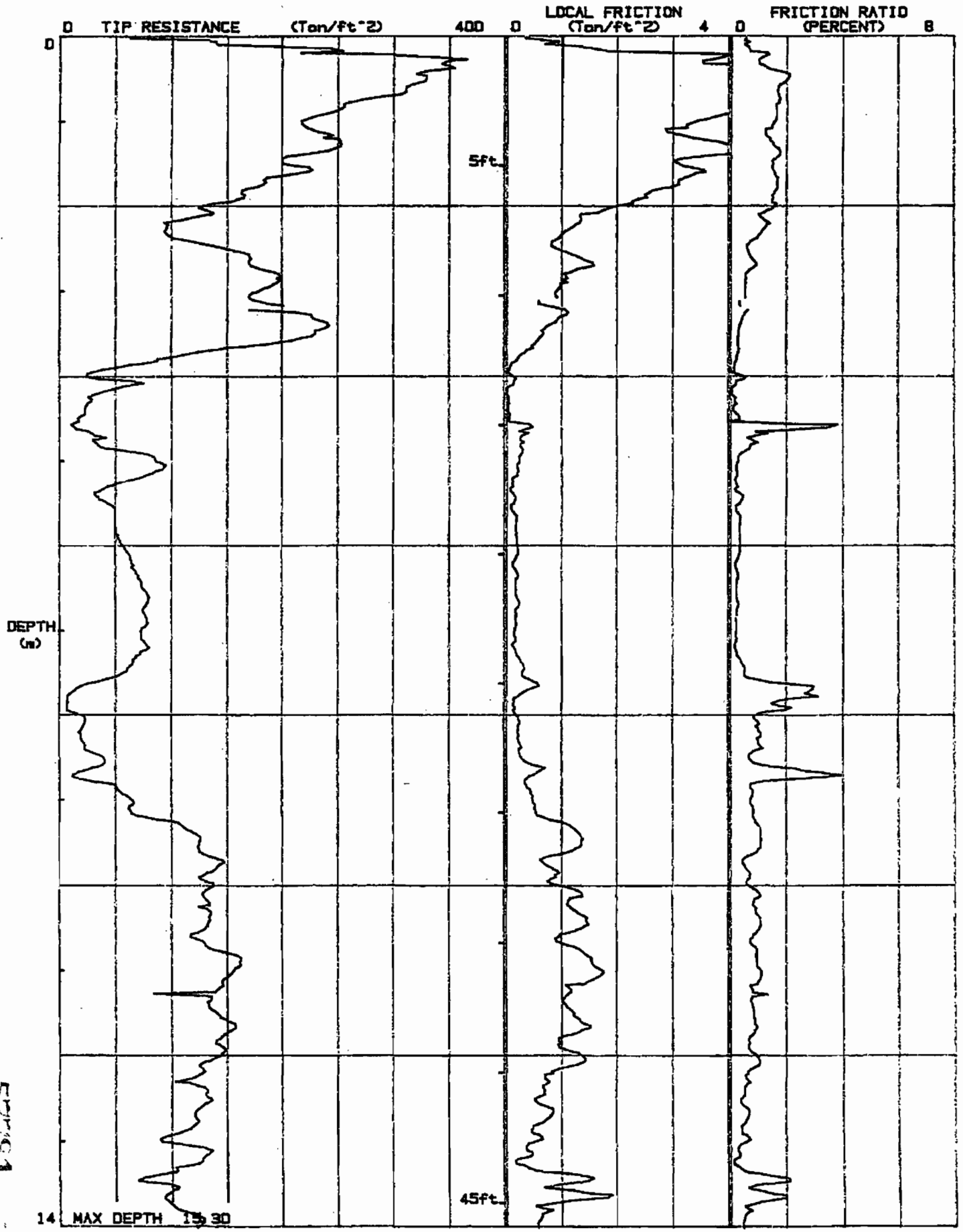
FILE : FIL041



57751

632

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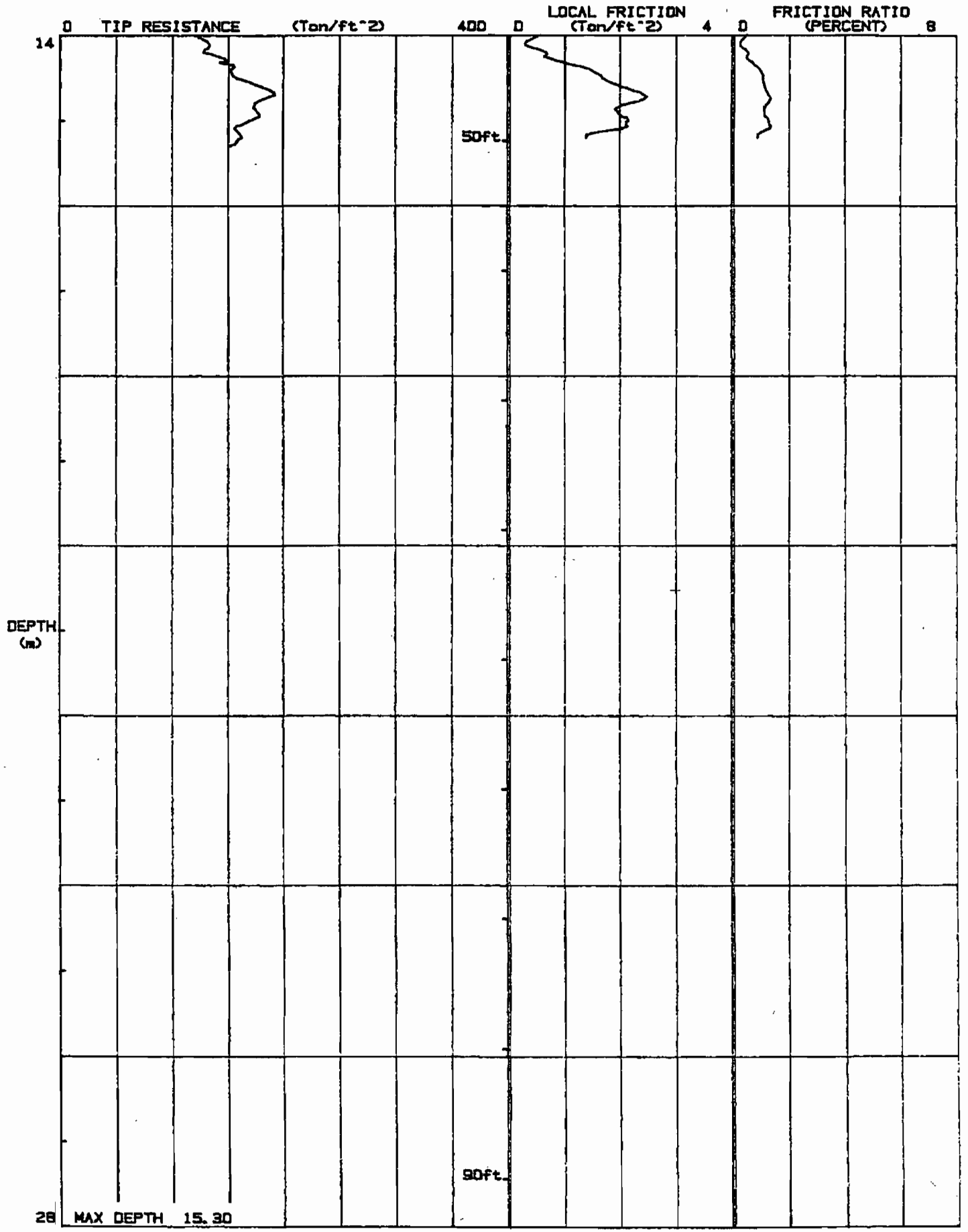
LOCATION : CPT-06A
FILE : FIL041



57731

633

JOB # : 4503-501
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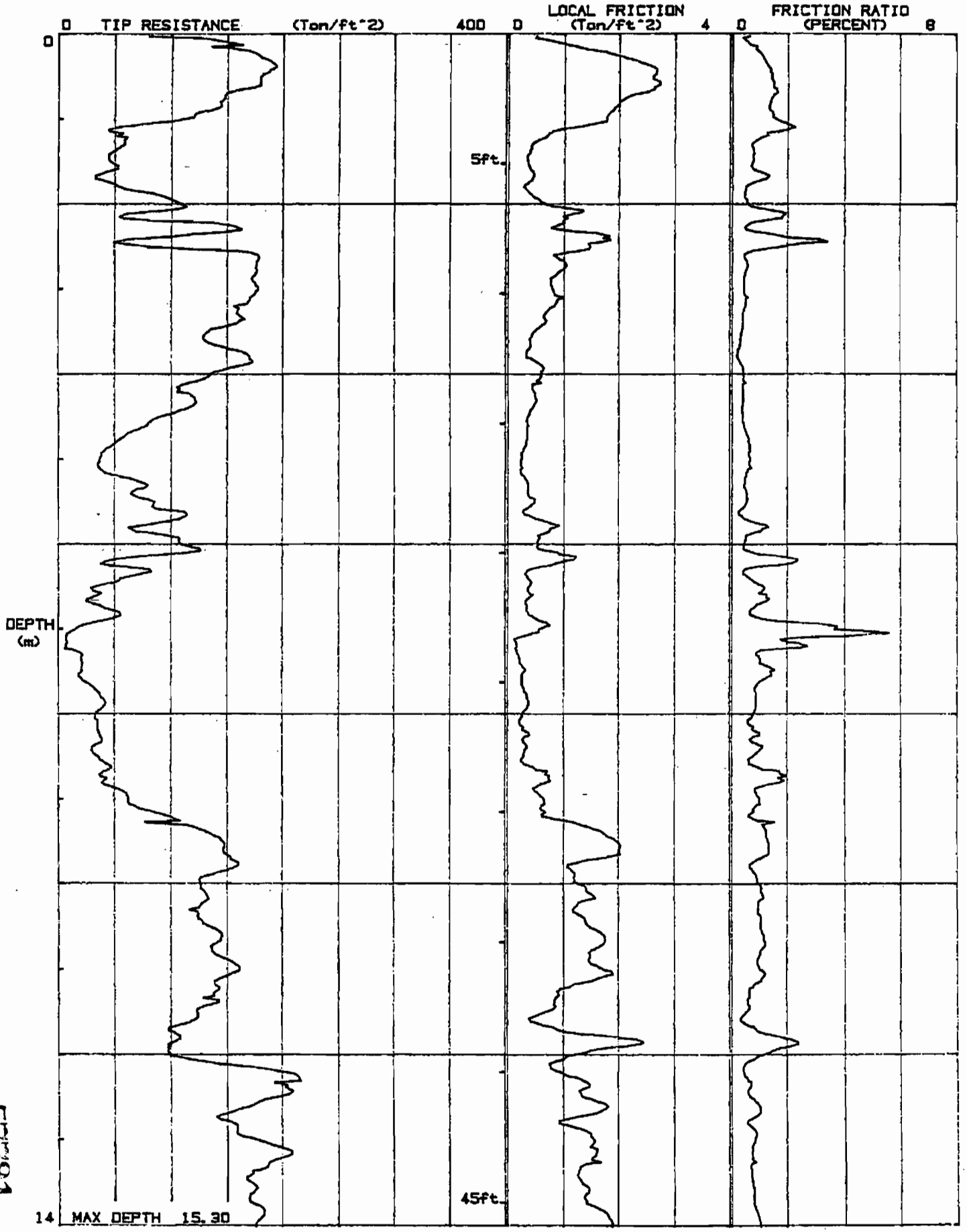
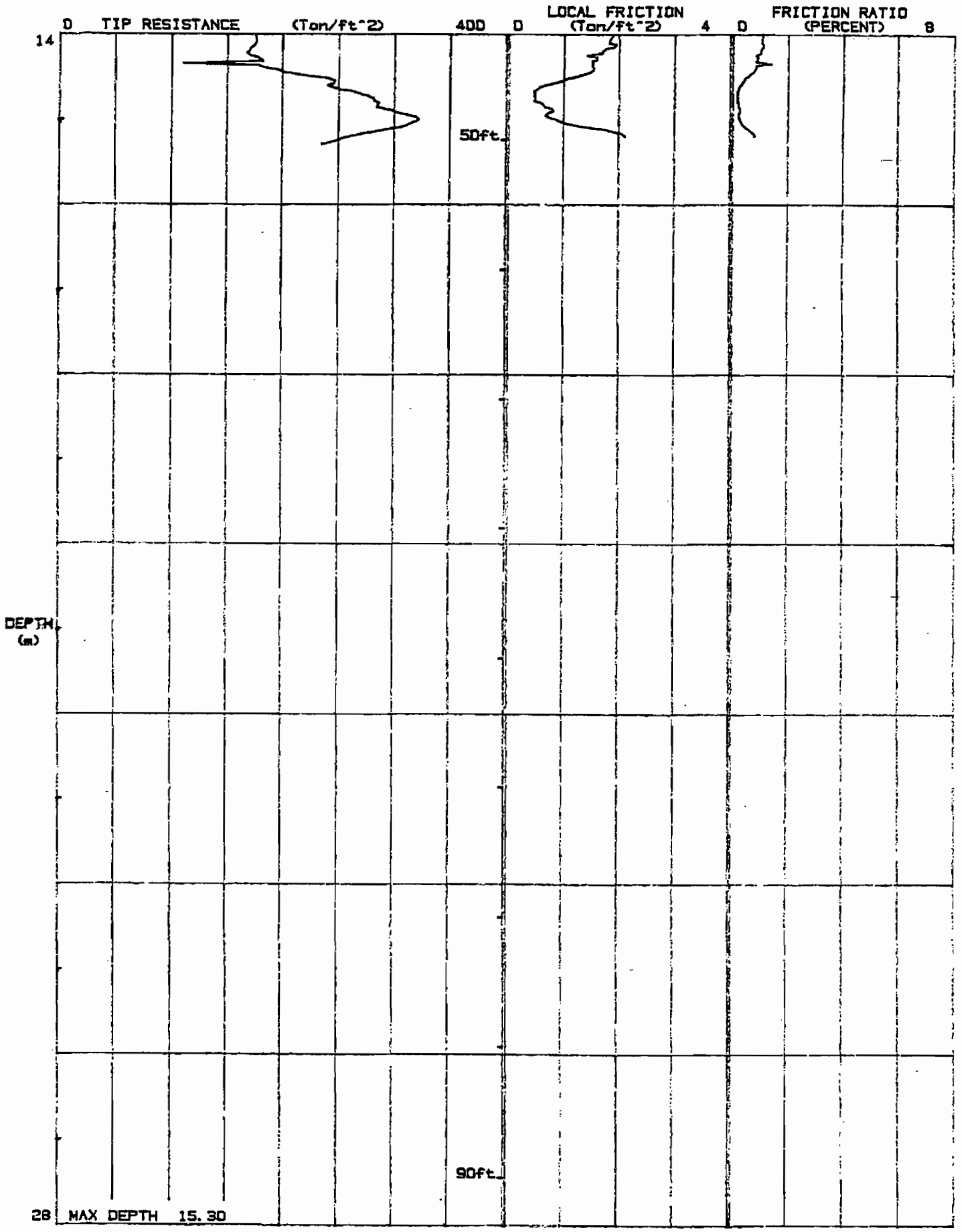
FILE : FIL046



5/91

634

JOB # : 4503-501
DATE : 02/06/90/11:39
LOCATION : CPT-07A
FILE : FIL046



57791

635

JOB # : 4503-501
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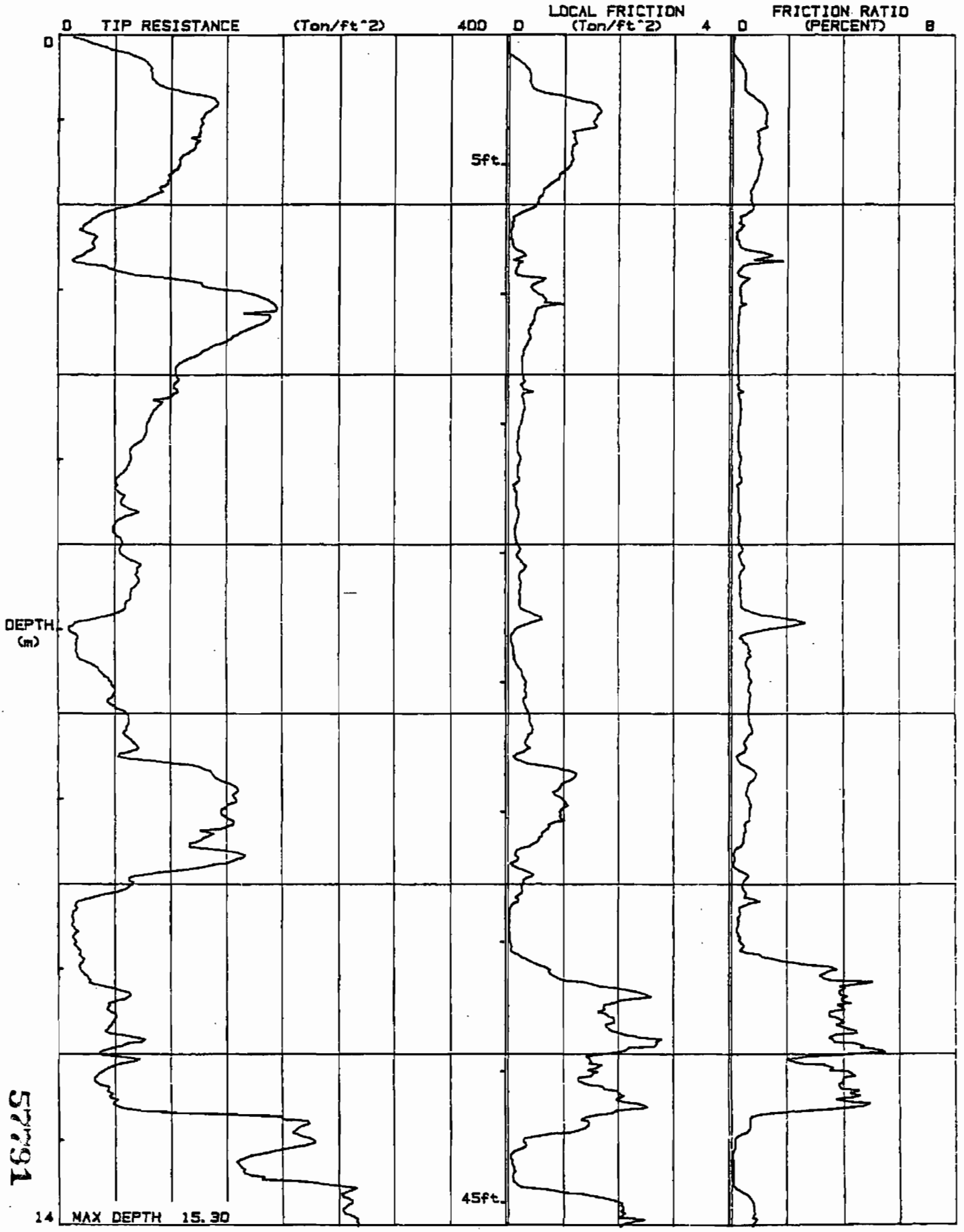
FILE : FIL037



52791

636

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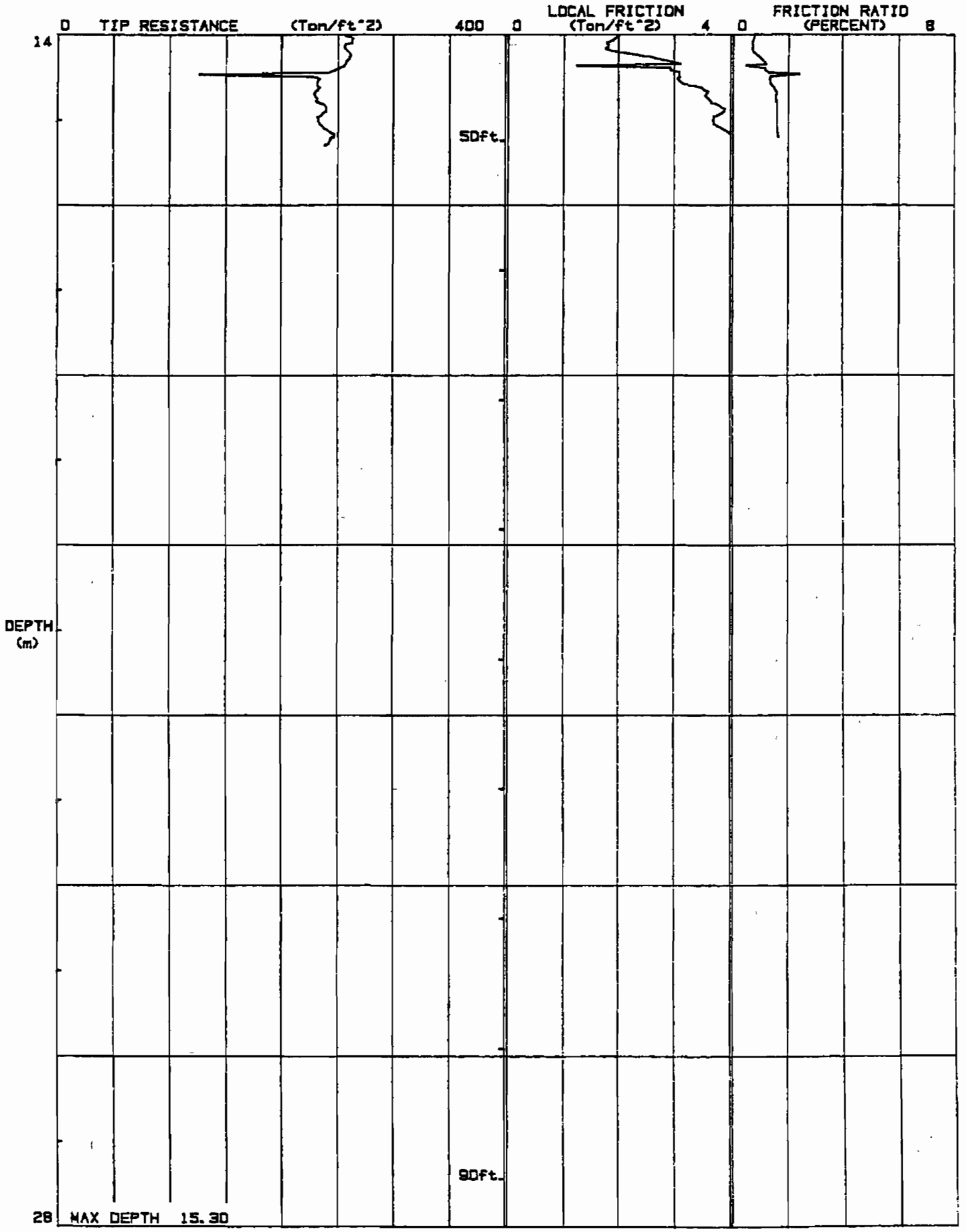

57791

637

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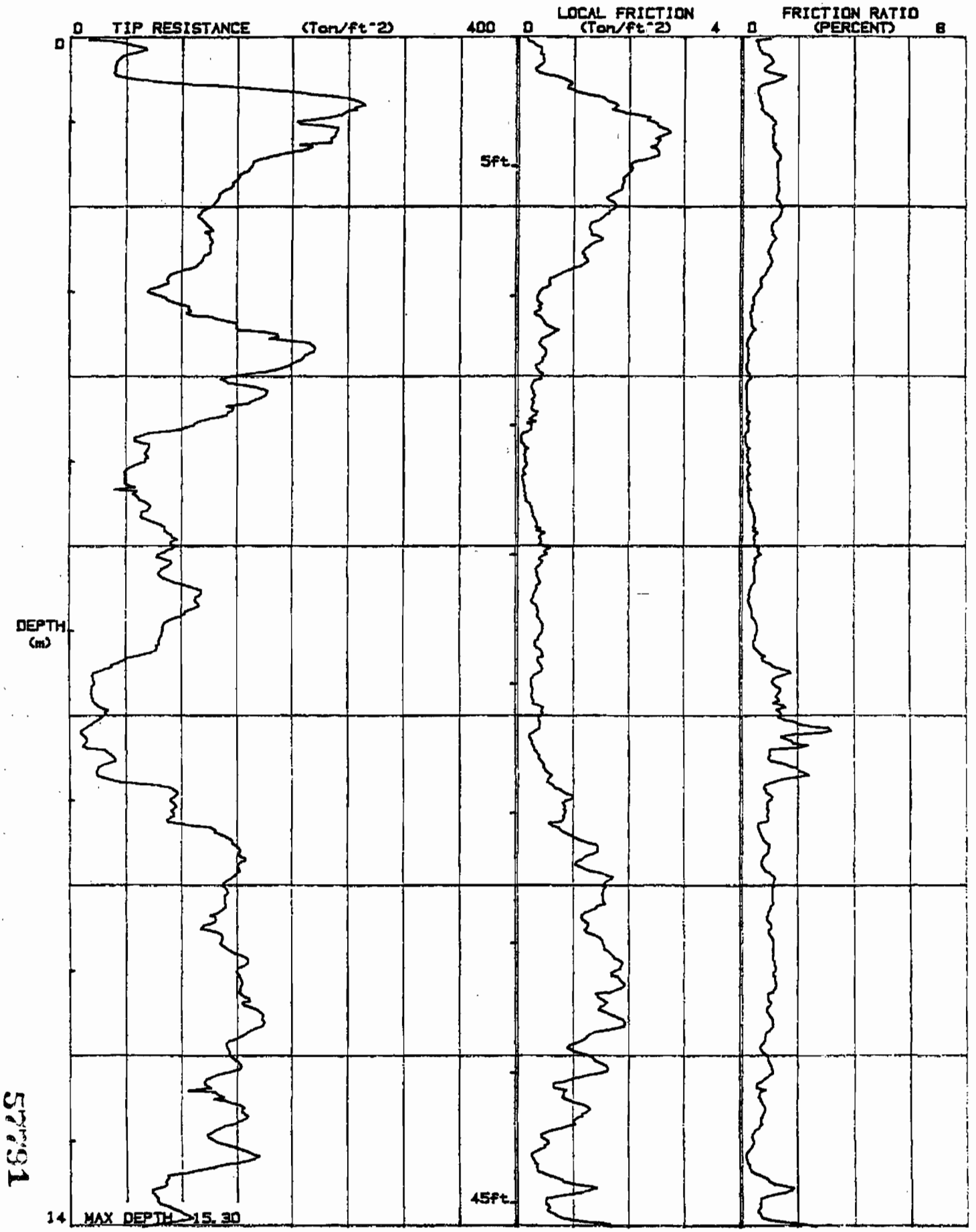
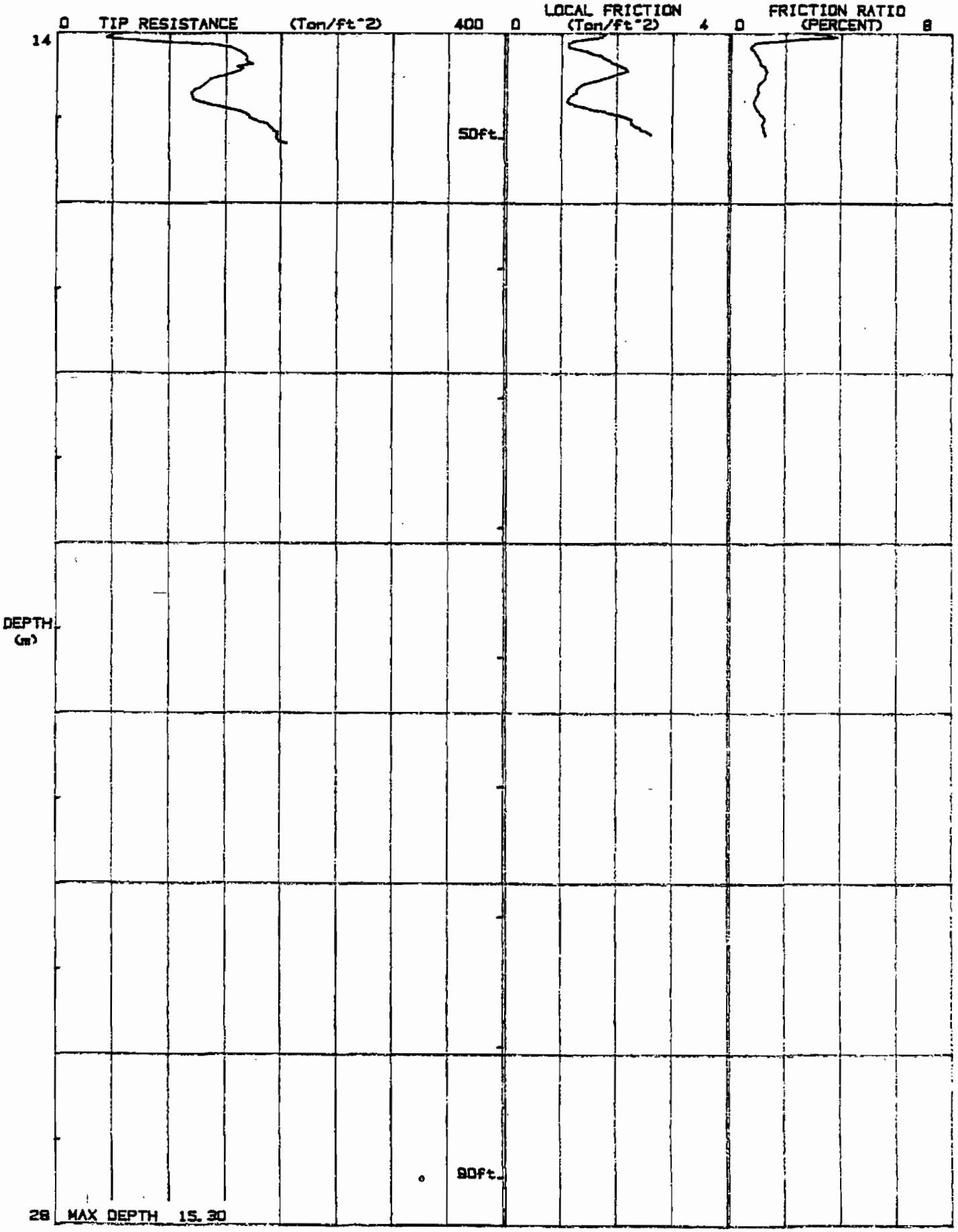
FILE : FIL043



5/7/91

638

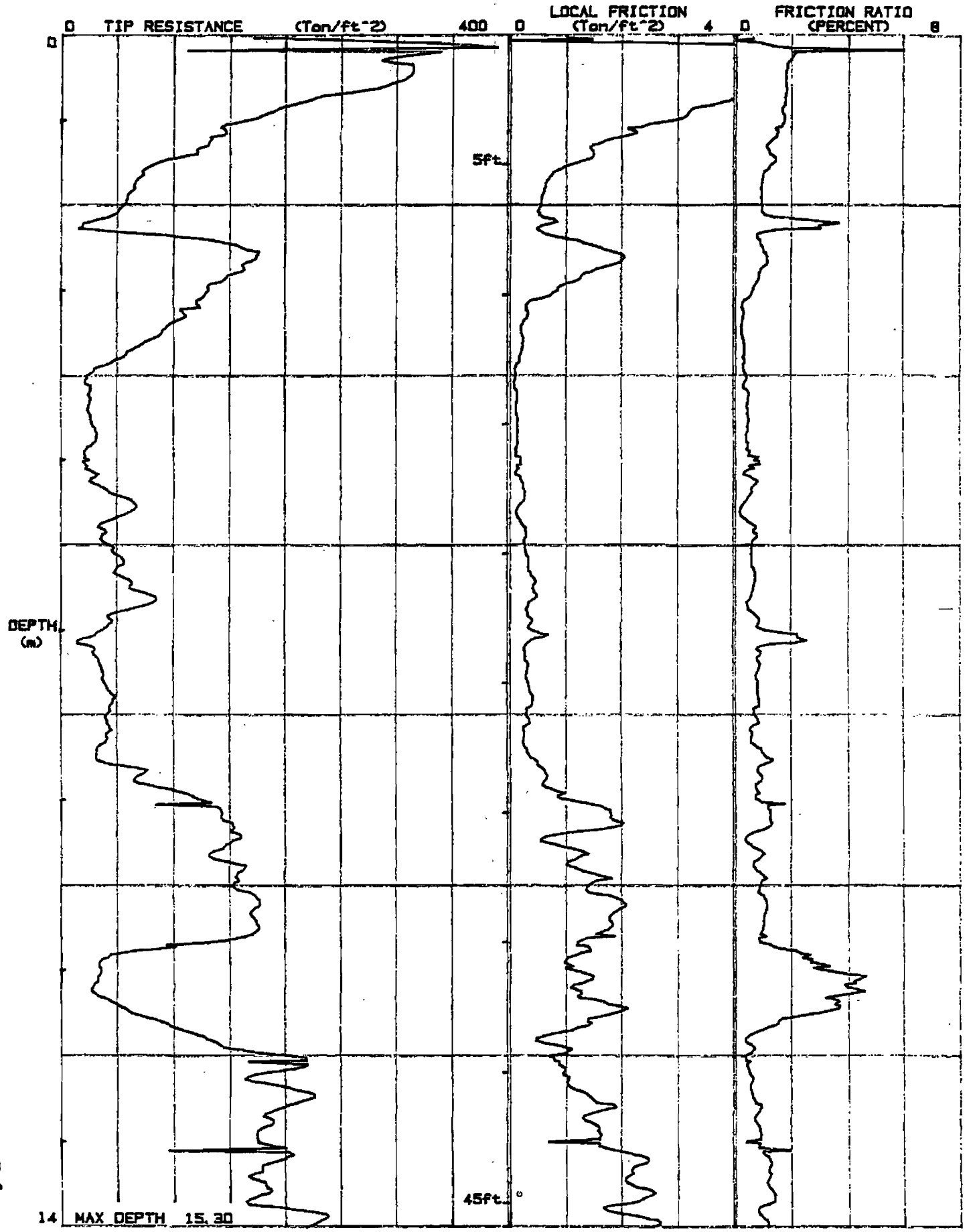
JOB # : 4503-501
DATE : 02/08/90/7:55
LOCATION : CPT-09A
FILE : FIL043



57791

639.

JOB # : 4503-501
DATE : 02/06/90/8:54
LOCATION : CPT-10A
FILE : FIL044



5791

640

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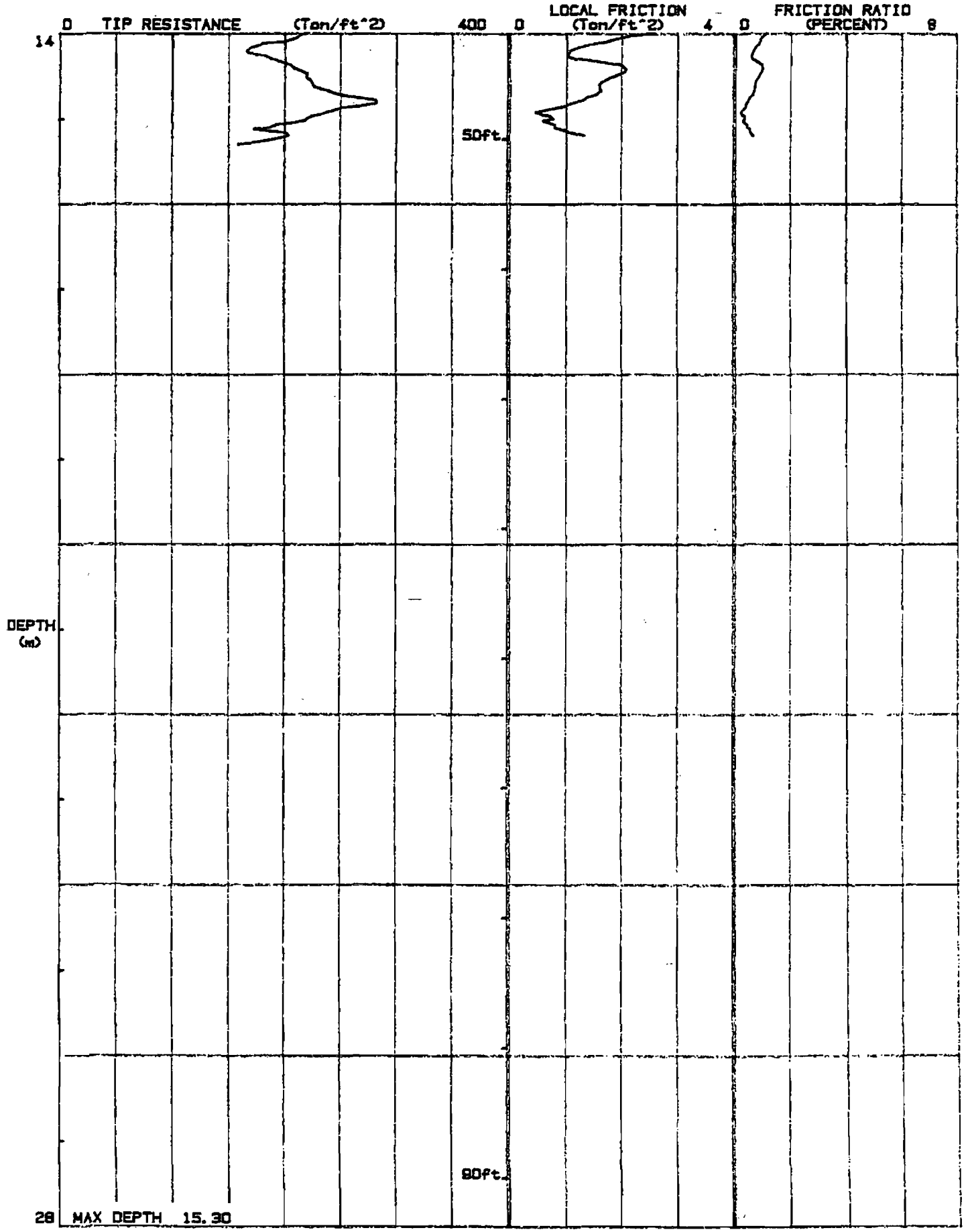
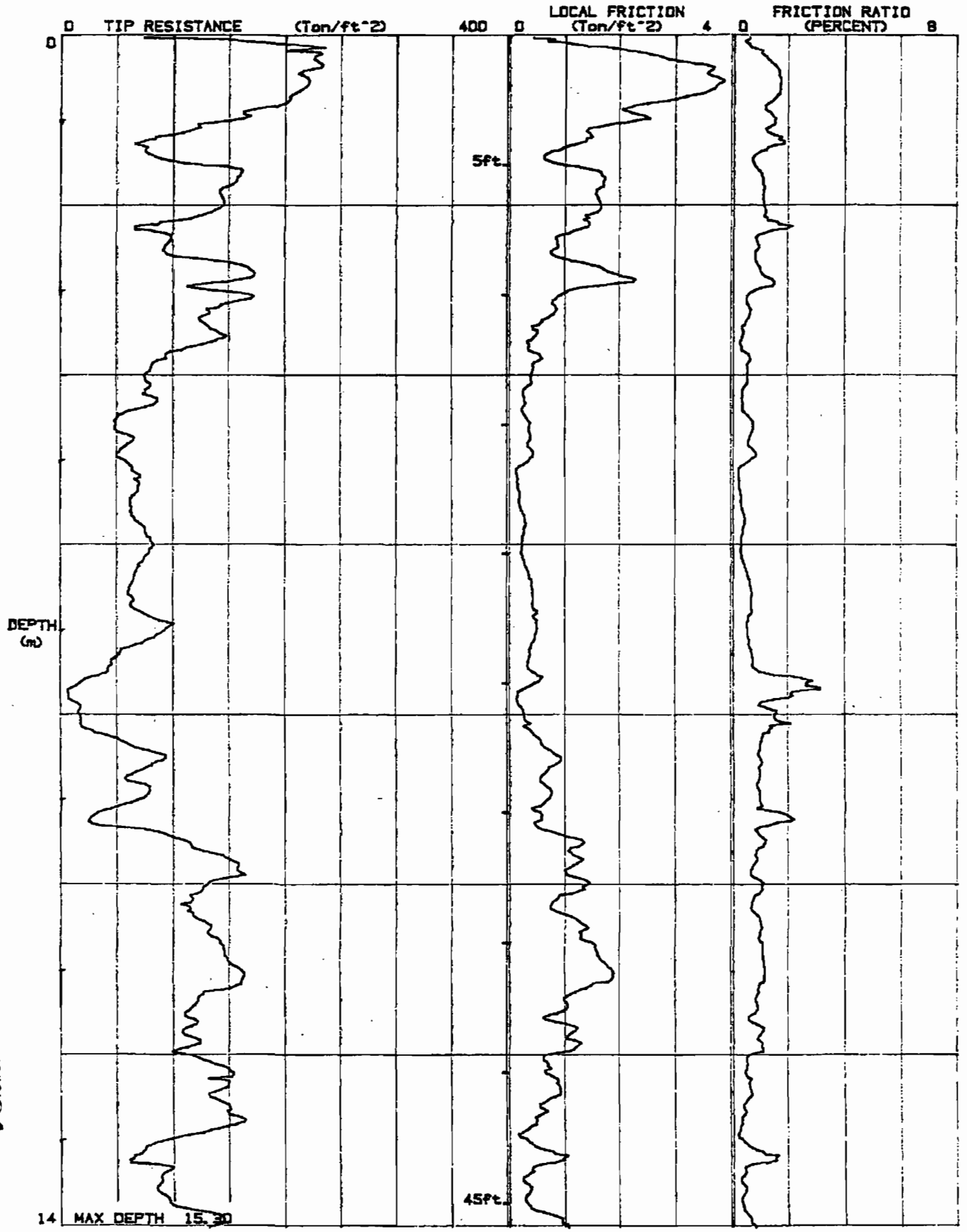
DATE : 02/08/90/8:54
LOCATION : CPT-10A
FILE : FIL044



5779

641.

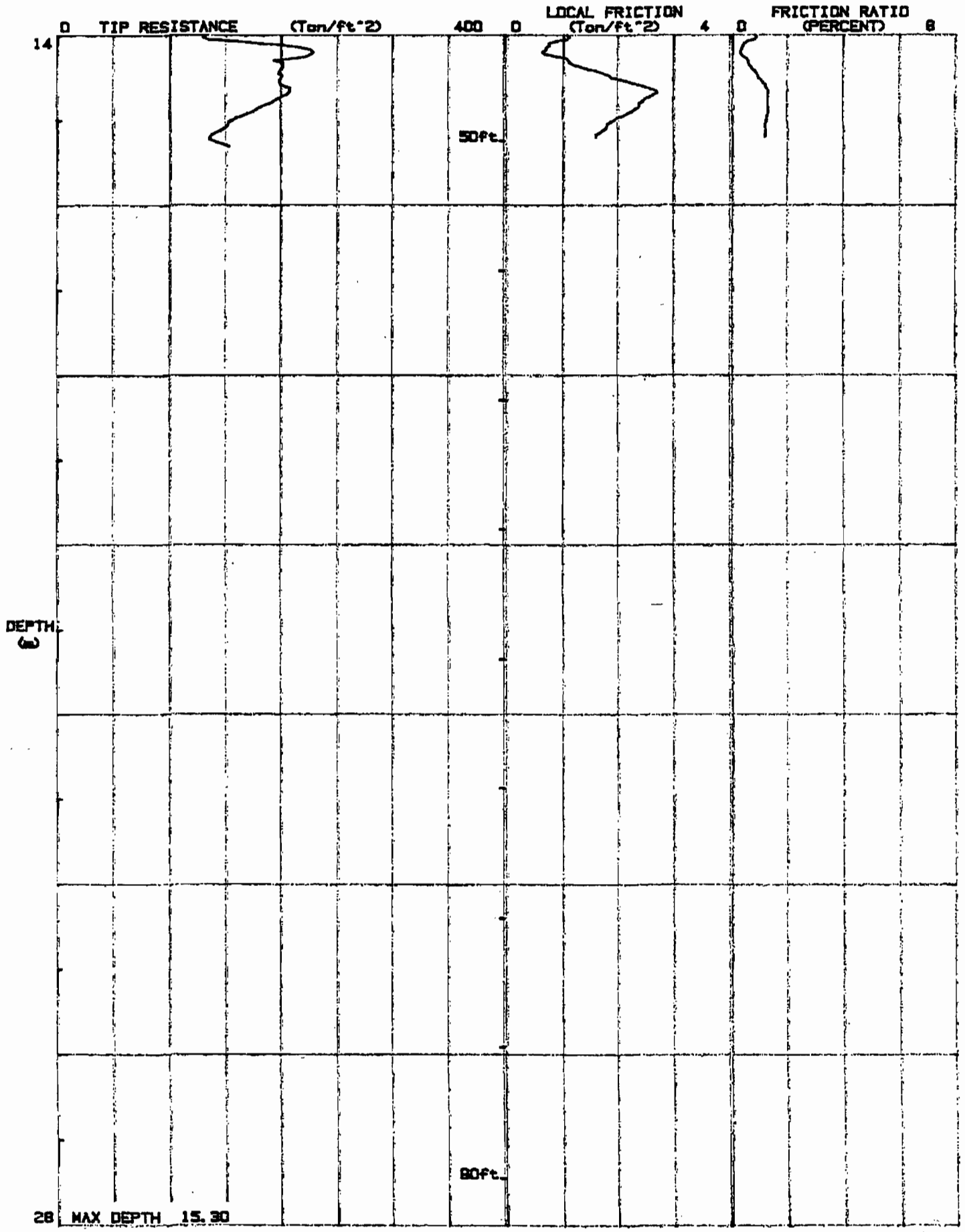
JOB # : 4503-501
DATE : 02/06/90/8:55
LOCATION : CPT-11A
FILE : FIL045



5/91

642

JOB # : 4503-501
DATE : 02/08/80/8:55
LOCATION : CPT-11A
FILE : FIL045

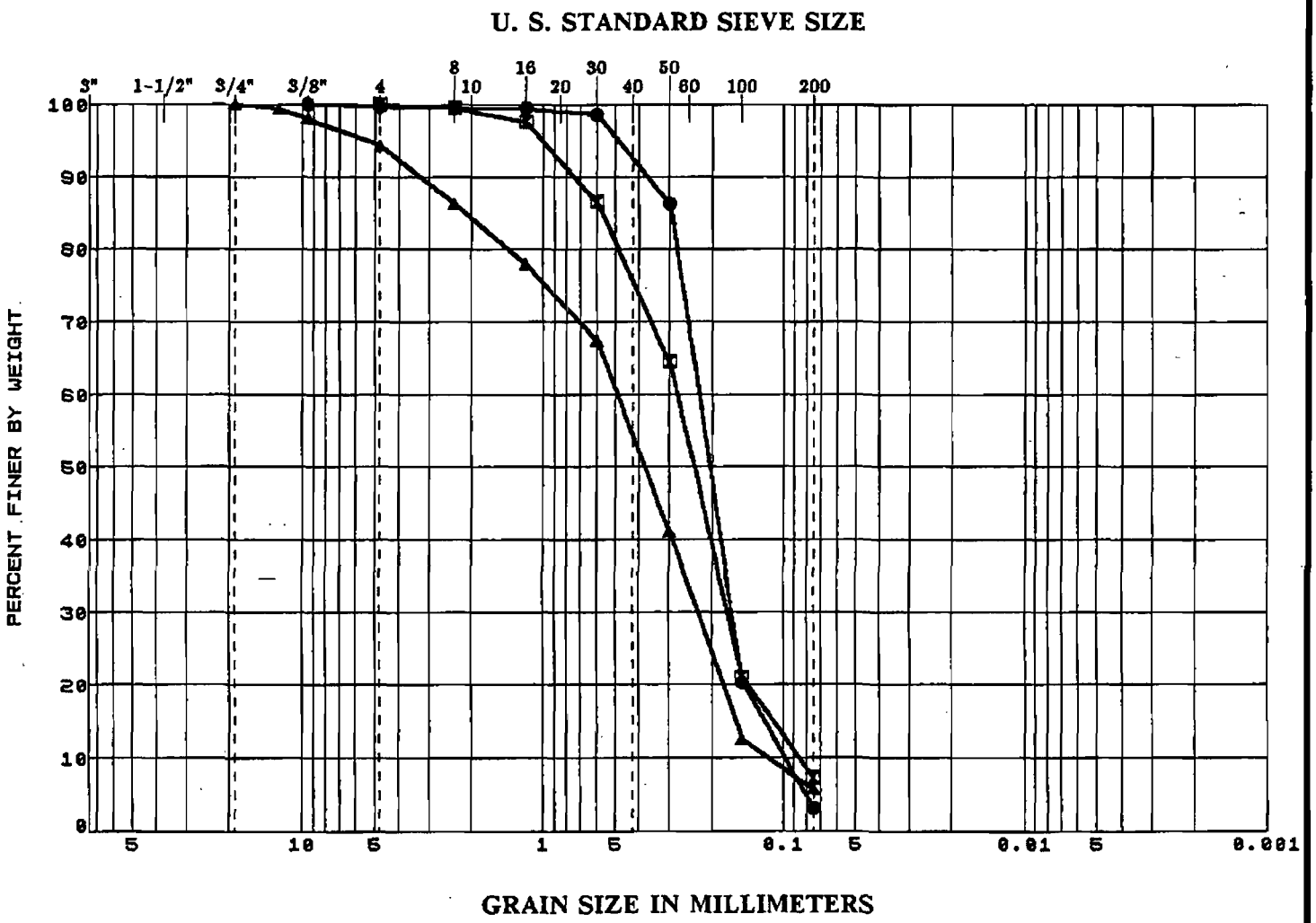


57791

643

File No. 04503-05-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	Depth (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B1A-3	15	(SP) F-M SAND w/ trace silt				
⊠	B1A-9	45	(SP) F-M SAND w/ trace silt				
▲	B2A-2	10	(SW) F-C SAND w/ trace silt				

GRADATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

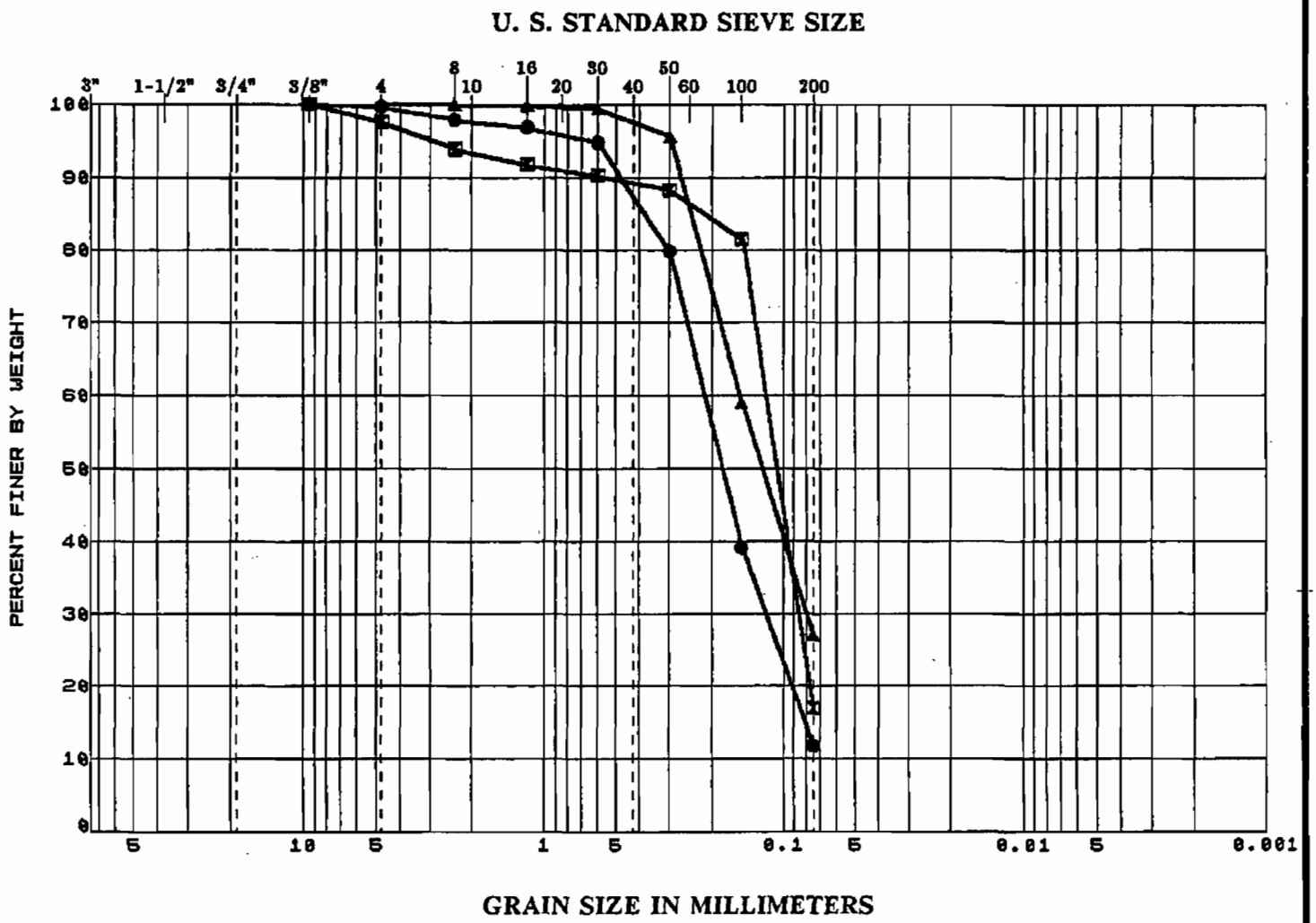
5/751

644 STRH

Figure B-1

File No. 04503-05-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	Depth (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B2A-5	25	(SP) F-M SAND w/ little silt				
⊠	B3A-6	30	(SM) Silty F-M SAND				
▲	B4A-4	25	(SM) Silty F-M SAND				

GRADATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

STRH

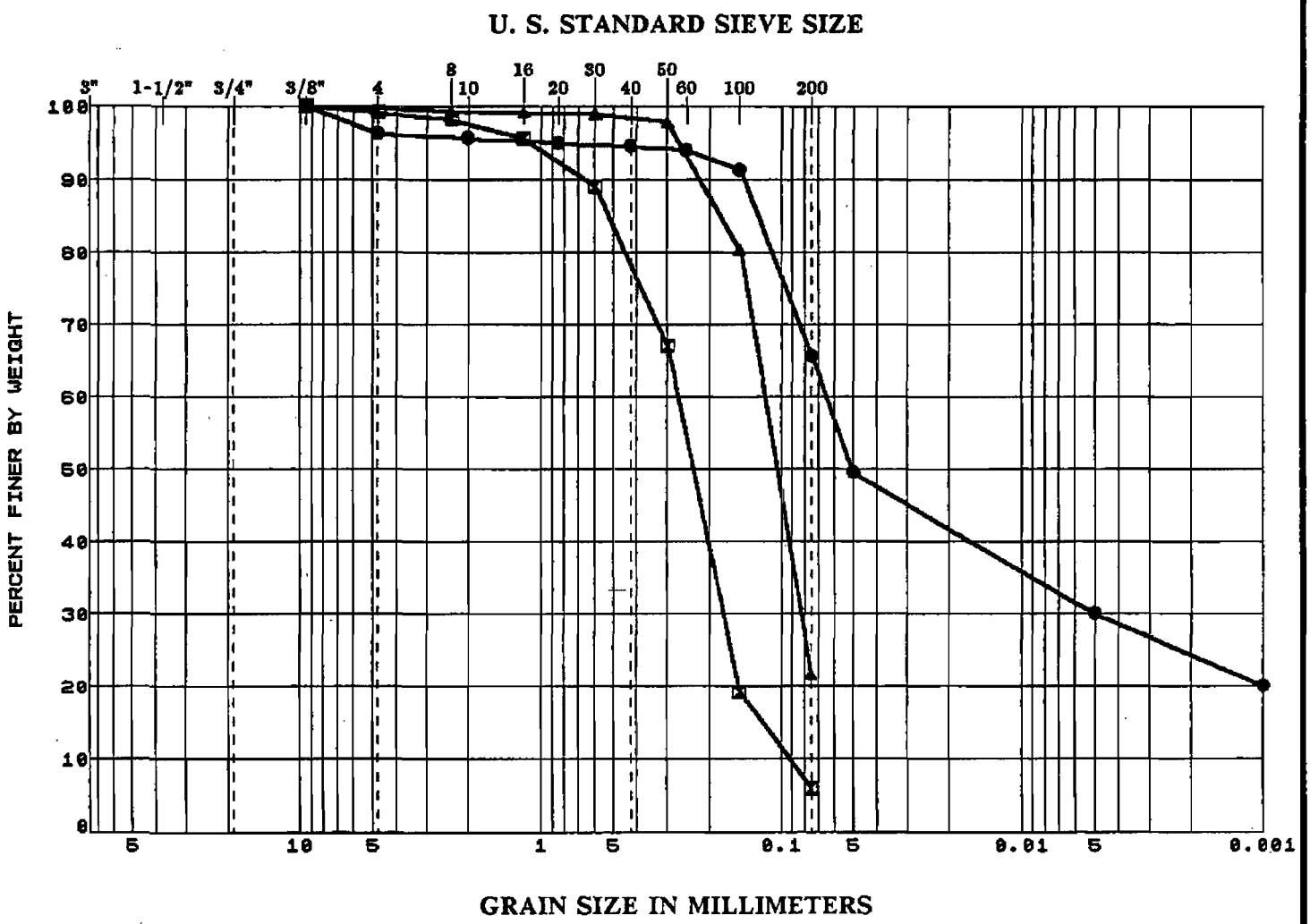
Figure B-2

645

57791

File No. 04503-05-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	Depth (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B5A-2	20	(ML) Fine Sandy SILT, little clay				
⊠	B7A-2	15	(SP) F-M SAND, little silt				
▲	B7A-3	20	(SP) F-M SAND, little silt				

GRADATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

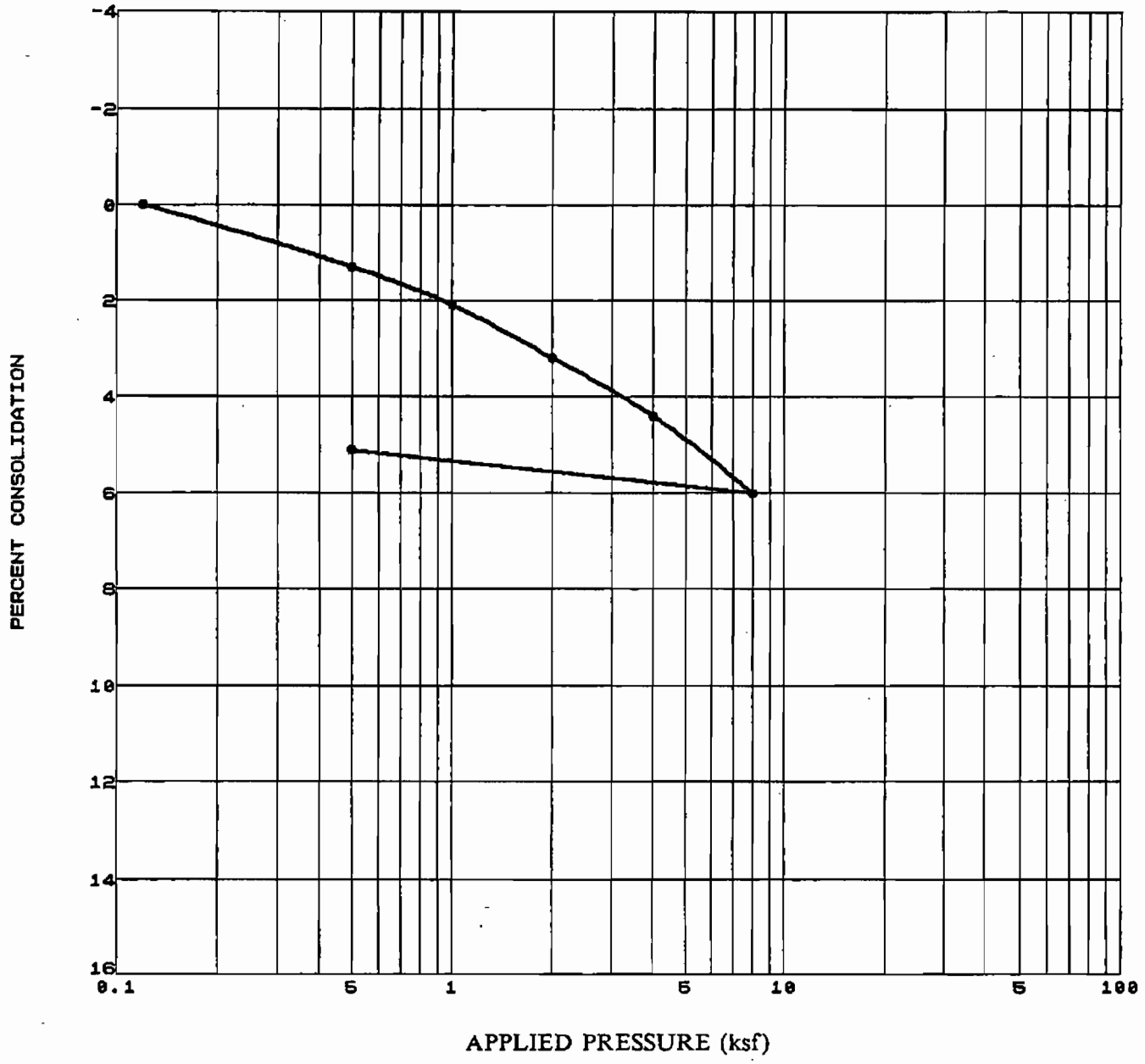
STRH

Figure B-3

646

File No. 04503-05-01

SAMPLE NO. B1A-5



Initial Dry Density (pcf)	90.3
Initial Water Content (%)	32.5

Initial Saturation (%)	95.8
Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

STRH

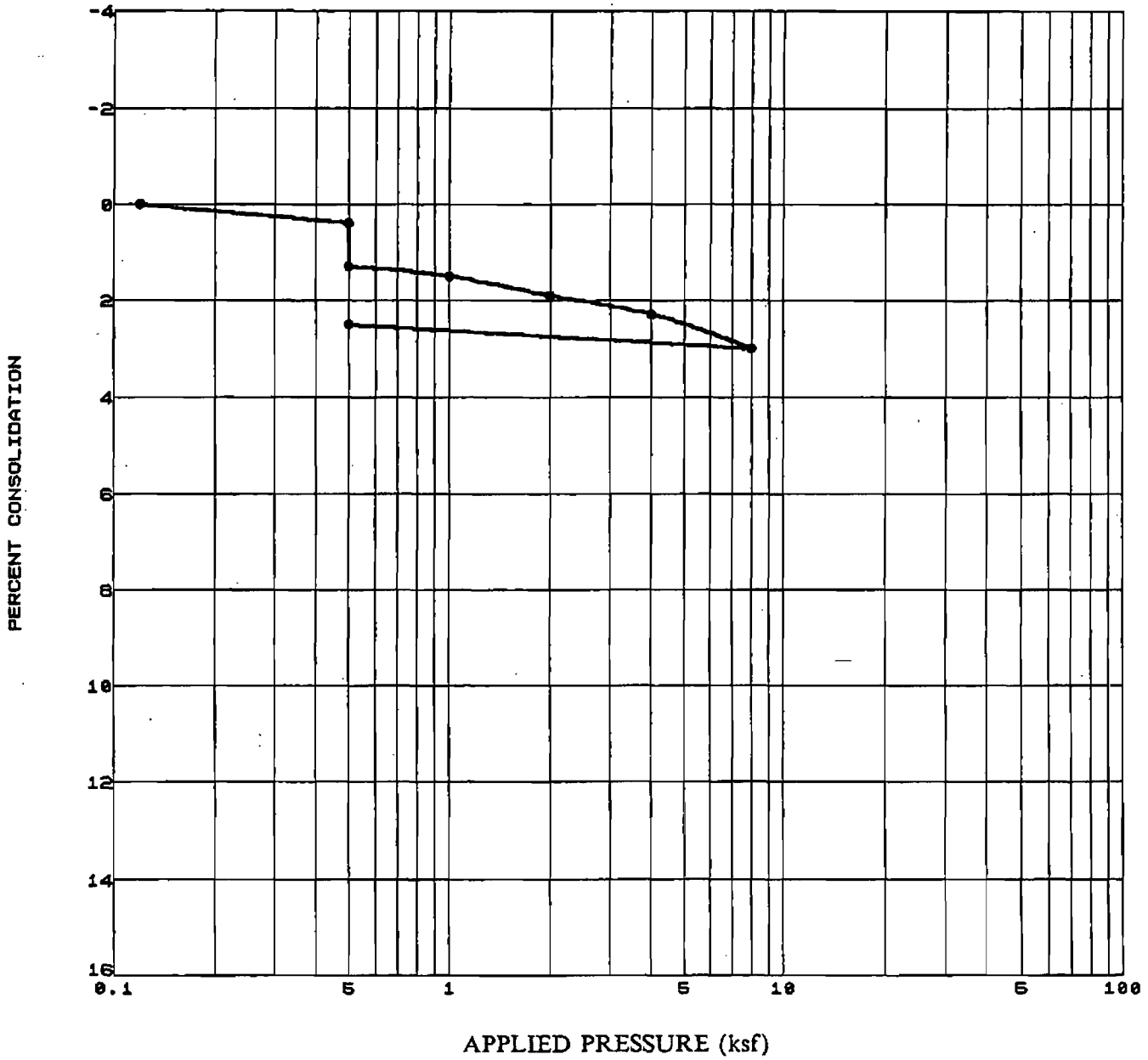
Figure B-4

647

57791

File No. 04503-05-01

SAMPLE NO. B2A-3



Initial Dry Density (pcf)	95.3
Initial Water Content (%)	25.9

Initial Saturation (%)	99.7
Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

STRH

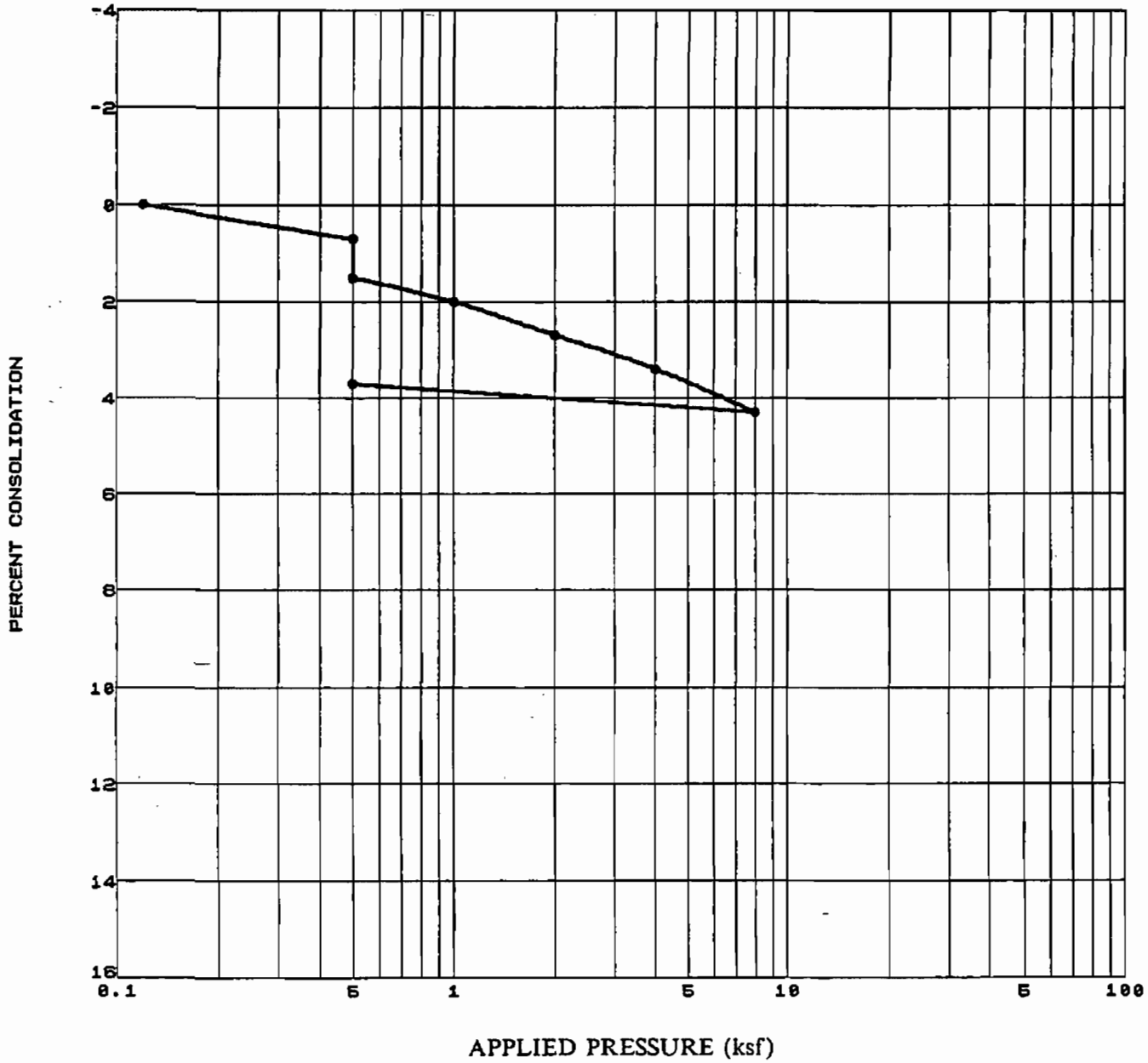
Figure B-5

648

52791

File No. 04503-05-01

SAMPLE NO. B4A-1



Initial Dry Density (pcf)	98.8
Initial Water Content (%)	7.7

Initial Saturation (%)	33.1
Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

STRH

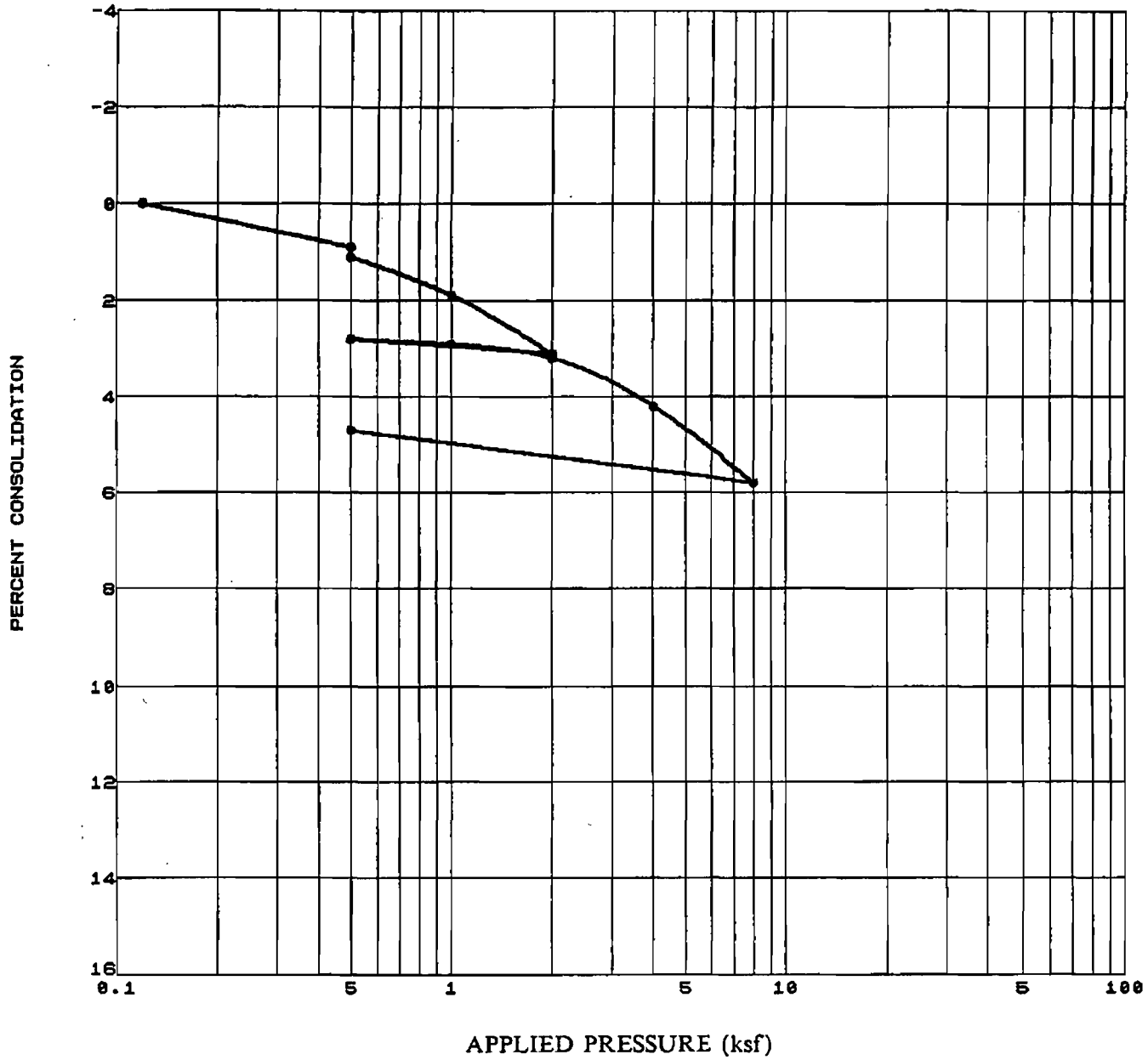
Figure B-6

649

57791

File No. 04503-05-01

SAMPLE NO. B6A-5



Initial Dry Density (pcf)	87.9
Initial Water Content (%)	33.9

Initial Saturation (%)	01.2
Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

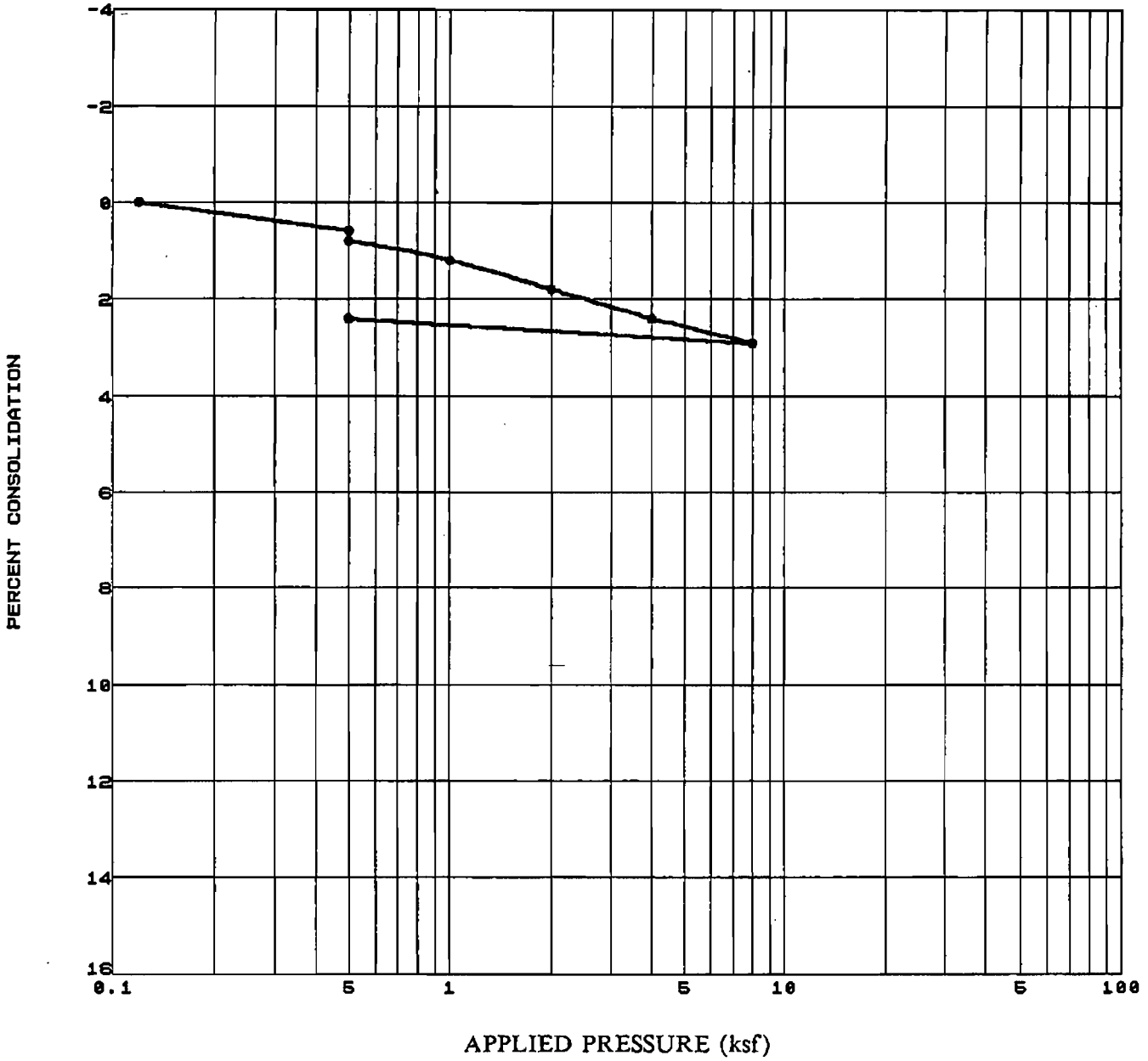
STRH

Figure B-7

650

File No. 04503-05-01

SAMPLE NO. B6A-8



Initial Dry Density (pcf)	99.6
Initial Water Content (%)	25.0

Initial Saturation (%)	96.6
Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

STRH

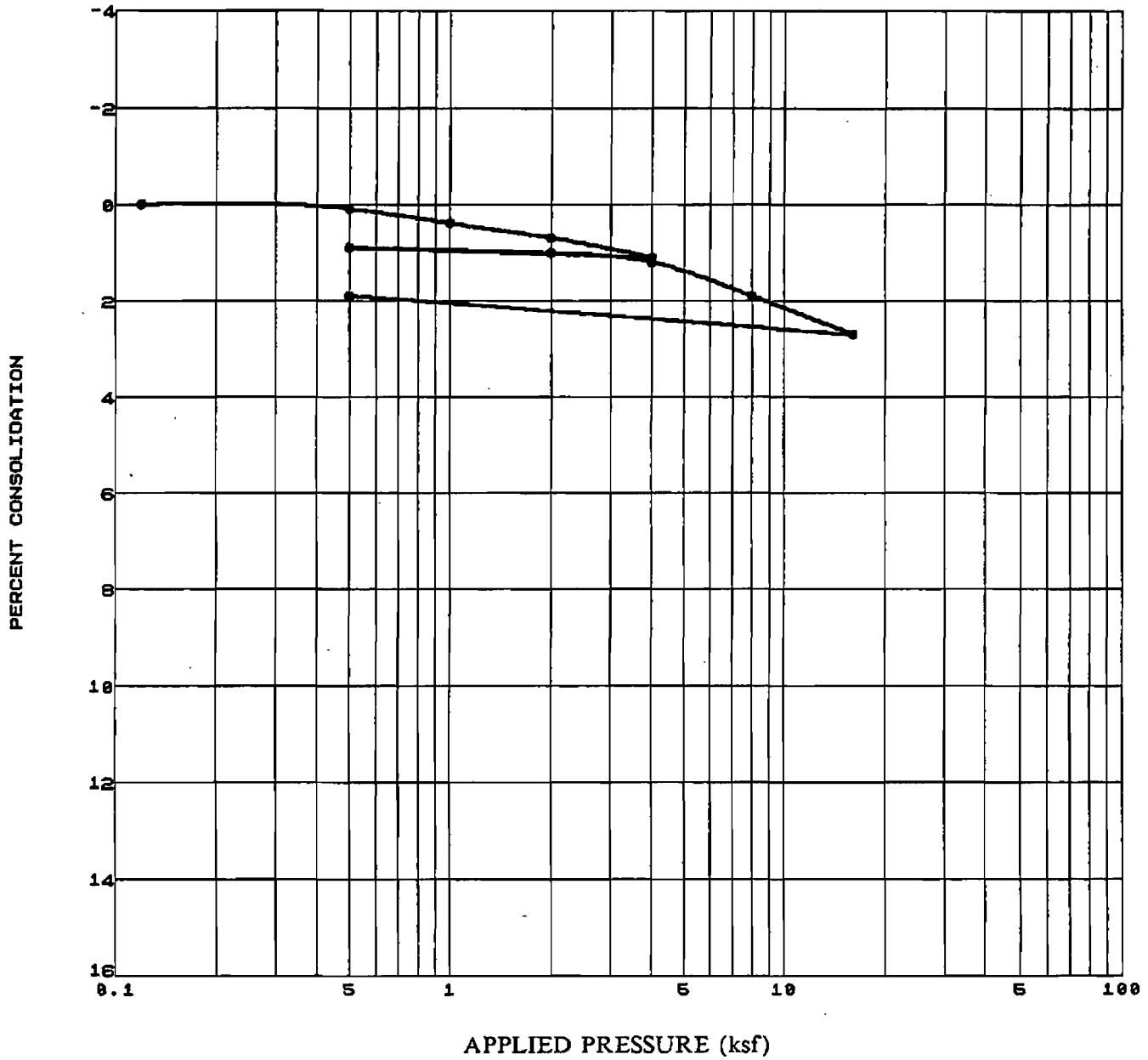
Figure B-8

651

57791

File No. 04503-05-01

SAMPLE NO. B7A-5



Initial Dry Density (pcf)	104.3
Initial Water Content (%)	23.7

Initial Saturation (%)	98.8
Sample Saturated at (ksf)	0.5

CONSOLIDATION CURVE

HARBOR ISLAND HOTEL

SAN DIEGO, CALIFORNIA

STRH

Figure B-9

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APPENDIX D

FIELD INVESTIGATION/LABORATORY TESTING – PREVIOUS STUDY

TABLE D-I
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080-03

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B1A-2	108.4	15.0	100	32
B2A-6	97.7	28.0	100	33
B3A-3	109.6	21.3	100	36
B3A-5	88.9	35.9	300	20
B5A-6	95.3	27.4	150	36
B6A-7	111.6	18.5	50	36

TABLE D-II
SUMMARY OF LABORATORY R-VALUE TEST RESULTS
ASTM D2844-01

Sample No.	R-Value
R-1	61

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APPENDIX

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APPENDIX E

RECOMMENDED GRADING SPECIFICATIONS

FOR

EAST HARBOR ISLAND HOTEL
SAN DIEGO, CALIFORNIA

PROJECT NO. 07569-22-01

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RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1. These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon Incorporated. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2. Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. It will be necessary that the Consultant provide adequate testing and observation services so that he may determine that, in his opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep him apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3. It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, and so forth, result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that construction be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1. **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2. **Contractor** shall refer to the Contractor performing the site grading work.

2.3. **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

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2.4. **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5. **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6. **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7. **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1. Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1. **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than 3/4 inch in size.

3.1.2. **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3. **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than 3/4 inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

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3.2. Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3. Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4. The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized, provided it is acceptable to the governing agency, Owner and Consultant.

3.5. Representative samples of soil materials to be used for fill shall be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6. During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

4.1. Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1-1/2 inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

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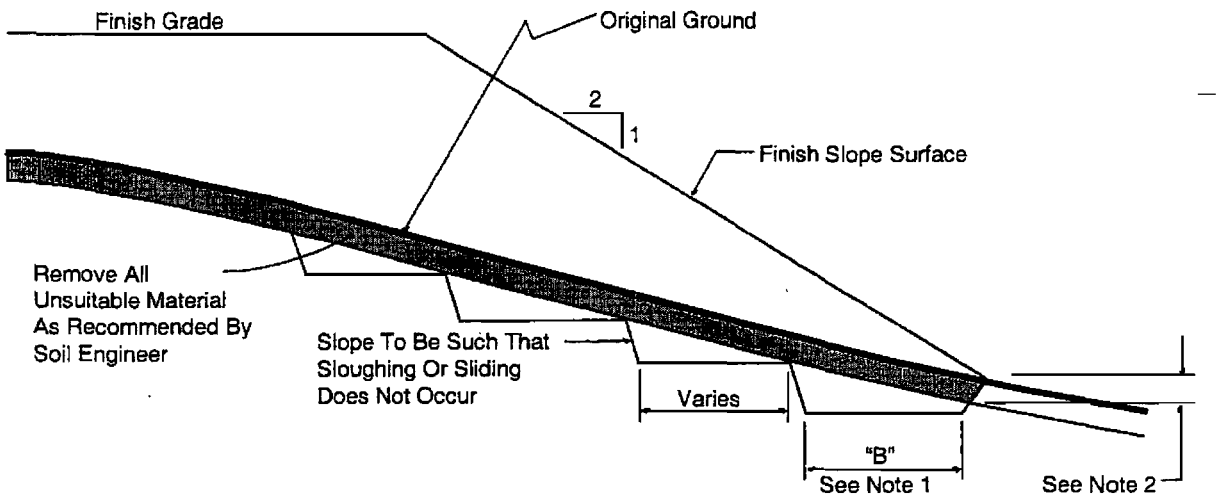
4.2. Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments which are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3. After clearing and grubbing of organic matter or other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction shall be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4. Where the slope ratio of the original ground is steeper than 6:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet wide, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the bottom key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

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4.5. After areas to receive fill have been cleared, plowed or scarified, the surface should be disced or bladed by the Contractor until it is uniform and free from large clods. The area should then be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6.0 of these specifications.

5. COMPACTION EQUIPMENT

5.1. Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2. Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1. *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1. *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2. In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D1557-00.

6.1.3. When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4. When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

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6.1.5. After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D1557-00. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6. Soils having an Expansion Index of greater than 50 may be used in fills if placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7. Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8. As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2. *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1. Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2. Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3. For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4. For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5. Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6. All rock placement, fill placement and flooding of approved granular soil in the windrows must be continuously observed by the Consultant or his representative.

6.3. *Rock* fills, as defined in Section 3.1.3., shall be placed by the Contractor in accordance with the following recommendations:

6.3.1. The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent, maximum slope of 5 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2. *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be

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utilized. The number of passes to be made will be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3. Plate bearing tests, in accordance with ASTM D1196-93, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the number of passes of the compaction equipment to be performed. If performed, a minimum of three plate bearing tests shall be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4. A representative of the Consultant shall be present during *rock* fill operations to verify that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading. In general, at least one test should be performed for each approximately 5,000 to 10,000 cubic yards of *rock* fill placed.

6.3.5. Test pits shall be excavated by the Contractor so that the Consultant can state that, in his opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

6.3.6. To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

6.3.7. All *rock* fill placement shall be continuously observed during placement by representatives of the Consultant.

7. OBSERVATION AND TESTING

7.1. The Consultant shall be the Owners representative to observe and perform tests during clearing, grubbing, and filling and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill shall be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test shall be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

7.2. The Consultant shall perform random field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion as to whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

7.3. During placement of *rock* fill, the Consultant shall verify that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant shall request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. If performed, plate bearing tests will be performed randomly on the surface of the most-recently placed lift. Plate bearing tests will be performed to provide a basis for expressing an opinion as to whether the *rock* fill is adequately seated. The maximum deflection in the *rock* fill determined in Section 6.3.3 shall be less than the maximum deflection of the properly compacted *soil* fill. When any of the above criteria indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

7.4. A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

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7.5. The Consultant shall observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.

7.6. Testing procedures shall conform to the following Standards as appropriate:

7.6.1. Soil and Soil-Rock Fills:

7.6.1.1. Field Density Test, ASTM D1556-00, *Density of Soil In-Place By the Sand-Cone Method.*

7.6.1.2. Field Density Test, Nuclear Method, ASTM D2922-96, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

7.6.1.3. Laboratory Compaction Test, ASTM D1557-00, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

7.6.1.4. Expansion Index Test. ASTM D4829-95, *Expansion Index Test.*

7.6.2. Rock Fills

7.6.2.1. Field Plate Bearing Test, ASTM D1196-93 (Reapproved 1997) *Standard Method for Nonreparative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

8.1. During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

8.2. After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

9. CERTIFICATIONS AND FINAL REPORTS

9.1. Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

9.2. The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

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LIST OF REFERENCES

1. ALTA survey, Sunroad Marina ALTA, Harbor Island Drive, San Diego, CA, prepared by Snipes-Dye Associates, dated April 6, 2001 (sheets 1 through 5).

2. City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Engineering and Development Services Department, 1995 edition.

3. California Department of Conservation, Division of Mines and Geology, Analysis of Late Quaternary Faulting in San Diego Bay and Hazards to the Coronado Bridge, 1999, DMG Open File Report 97-10A.

4. California Division of Mines and Geology, 7.5 minute Quadrangle Series, Point Loma Quadrangle, 1967, photorevised 1975.

5. California Geological Survey, State of California Earthquake Fault Zones, Point Loma Quadrangle, 7.5 Minute Series, 2003.

6. City of San Diego, Topographic Survey, No. 202-1707, 206-1713, dated 11-6-1978.

7. Division of Mines and Geology, 1998, *Recommended Procedures for Implementation of DMG SP117 Guidelines for Evaluating and Mitigating Seismic Hazards in California, Liquefaction Hazards.*

8. Geology of San Diego Metropolitan Area, California, California Division of Mines and Geology, Bulletin 200, Reprint (2001).

9. Forest, Carol Liana, (1982) The Liquefaction Potential of Harbor Island, Master's Thesis at San Diego State University, p98.

10. Forest, D. R., F. Asce, J. B. Stetson, and M. Asce, (1961) Navy's New Carrier Berthing Facilities at San Diego, Journal of the Waterways and Harbors Division, p. 69-82.

11. Kennedy, M. D. and E. E. Welday, *Character and Recency of Faulting, San Diego Metropolitan Area, San Diego, California,* California Division of Mines and Geology, Special Report 123, 1975.

12. Multi-Jurisdictional Hazard Mitigation Plan, San Diego County, California, 2004, Prepared by URS (Project No. 27653042.00500).

13. NCEER, *Liquefaction Resistance of Soils,* Summary report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, October 2001.

14. United States Department of Agriculture, *1953 Stereoscopic Aerial Photographs, Flight AXN-4M,* Photo Nos. 95 and 96.

LIST OF REFERENCES (Continued)

15. United States Geological Survey, Map of San Diego Quadrangle, California, Showing Marine Terraces and Marine Soundings, 15 Minute Quadrangle, 1919.

16. Unpublished reports, aerial photographs, and maps on file with Geocon Incorporated.

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Appendix H-2

Third Party Review of Geotechnical Investigation

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ICF Jones & Stokes
an ICF International Company

The March 3, 2006, Geocon Geotechnical Investigation and Geologic Fault Investigation and June 21, 2006, Ninyo & Moore Preliminary Geotechnical Evaluation and Third-Party Review were used as the basis for the geotechnical evaluation included in the EIR for the current Harbor Island Hotel Project (4-story, 175 room hotel located east of the existing Sunroad Resort Marina building). ICF Jones & Stokes did not conduct any updates to information contained in the reports for purposes of completing the EIR.

The previous geotechnical reports evaluated a 10-story hotel structure encompassing all of East Harbor Island. The current project is a 4-story hotel, with a maximum of 175 rooms. The Port District and ICF Jones & Stokes determined that the Geocon and Ninyo & Moore reports are still appropriate and adequate assessments of the current Project site because the Project site evaluated in the EIR is located within the limits of the area evaluated in the 2006 reports.

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Ninyo & Moore

Geotechnical and Environmental Sciences Consultants

PRELIMINARY GEOTECHNICAL EVALUATION AND THIRD-PARTY REVIEW PROPOSED EAST HARBOR ISLAND DEVELOPMENT PROJECT SAN DIEGO, CALIFORNIA

PREPARED FOR:

Mooney/Jones and Stokes
9903 Businesspark Avenue, Suite B
San Diego, California 92131

PREPARED BY:

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
5710 Ruffin Road
San Diego, California 92123

June 21, 2006
Project No. 105871001

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Ninyo & Moore
Geotechnical and Environmental Sciences Consultants

June 21, 2006
Project No. 105871001

Ms. Jaimie Coppola
Mooney/Jones & Stokes
9903 Businesspark Avenue, Suite B
San Diego, California 92131

Subject: Preliminary Geotechnical Evaluation
and Third-Party Review
Proposed East Harbor Island Development Project
San Diego, California

Dear Ms. Coppola:

Transmitted herein are the results of Ninyo & Moore's Preliminary Geotechnical Evaluation study and third-party review for the Proposed East Harbor Island Development Project. This study was conducted in accordance with your request and included review and analysis of available geologic and geotechnical background data, and a geologic reconnaissance of the project site area.

We appreciate the opportunity to be of service. Should you have any questions or comments regarding this report, please contact the undersigned at your convenience.

Respectfully submitted,
NINYO & MOORE

REGISTERED GEOLOGIST
RONALD D. HALLUM
Exp. 11.30.07
No. 1484
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Ronald D. Hallum, C.E.G.
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Chief Engineering Geologist

RUB/RDH/RI/gg

Distribution: (4) Addressee

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Figure

Figure 1 – Site Location Map

1. INTRODUCTION

In accordance with your request, Ninyo & Moore has performed a Preliminary Geotechnical Evaluation study and a third-party review of a geotechnical and geologic fault investigation report for the project site. This report presents our preliminary findings and conclusions pertaining to the Proposed Harbor Island Development Project. The purpose of this study was to evaluate geologic and geotechnical conditions using available geologic and geotechnical data and to provide a Preliminary Geotechnical Evaluation report, which we understand will be utilized as part of an Environmental Impact Report (EIR) study. Subsurface exploration and laboratory testing of materials were not included in the scope of this preliminary evaluation.

2. SCOPE OF SERVICES

Ninyo & Moore's scope of services has included review of background materials and geologic reconnaissance of the site area. Specifically, we have performed the following tasks:

- Collection and review of pertinent, available geotechnical literature including topographic/bathymetric maps, geologic maps, in-house geotechnical reports, geologic hazards maps, fault hazard maps, historical stereoscopic aerial photographs, and site development plans. Documents reviewed for our site study are listed in the Selected References section of this report.
- Peer review of a geotechnical investigation and geologic fault investigation report prepared by Geocon Incorporated (Geocon, 2006).
- Geologic reconnaissance of the project study area by a California-certified engineering geologist from our firm.
- Compilation and analysis of the data obtained.
- Preparation of this report presenting our findings, and conclusions regarding the adequacy of the proponent's geotechnical report for inclusion in the Geology, Seismic and Coastal Processes section of the Environmental Impact Report. This review discusses the geologic setting, anticipated earth units, soil conditions, faulting and seismicity, seismic parameters, liquefaction, potential geologic hazards, groundwater, and unique geological or physical features.

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3. SITE DESCRIPTION

The project site is located on the east side of Harbor Island in the city of San Diego (Figure 1). The project area extends east from the north bound Harbor Island Drive, to the east end of Harbor Island. The site currently consists of a restaurant, retail space, and parking areas. Grassy areas as well as palm and eucalyptus trees are located throughout the project site. Topographically, the site consists of relatively level land. Elevations across the property range from a high of roughly 15 feet above mean sea level (MSL) near the eastern end of the project area to roughly 12 feet above MSL near the western end of the project. Surface drainage is generally to the north.

4. PROJECT DESCRIPTION

Based on our review of preliminary plans and our understanding of the project, the project will include a hotel tower up to 10 stories, a multistory parking garage, restaurant, meeting, recreational, retail, and open space development of the site.

5. GEOLOGY

The following sections present our findings relative to regional geology, site geology, groundwater, and faulting and seismicity.

5.1. Regional Geologic Setting

The project study area is situated in the western portion of the Peninsular Ranges geomorphic province of southern California. This geomorphic province encompasses an area that extends 125 miles, from the Transverse Ranges and the Los Angeles Basin, south to the Mexican border, and beyond another 795 miles to the tip of Baja California (Norris and Webb, 1990; Harden, 1998). The geomorphic province varies in width from 30 to 100 miles, most of which is characterized by northwest trending mountain ranges separated by subparallel fault zones. In general, the Peninsular Ranges are underlain by Jurassic-age metavolcanic and metasedimentary rocks and by Cretaceous-age igneous rocks of the southern California batholith. The westernmost portion of the province in San Diego County,

including the project area, generally consists of uplifted and incised Upper Cretaceous-, Tertiary-, and Quaternary-age sedimentary rocks.

The Peninsular Ranges are traversed by several major active faults. The Whittier-Elsinore, San Jacinto, and the San Andreas faults are major active fault systems located northeast of the site and the Agua Blanca-Coronado Bank and San Clemente faults are active faults located to the west-southwest. The nearby Rose Canyon fault zone, located east of the site, has also been recognized as active by the State of California. A strand of the Rose Canyon fault zone (Spanish Bight Fault), as mapped in the geotechnical investigation and geologic fault investigation report, passes through the east end of the subject property. Major tectonic activity associated with these and other faults within this regional tectonic framework is right-lateral strike-slip movement. These faults, as well as other faults in the region, have the potential for generating strong ground motions at the project site. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report.

5.2. Site Geology

Based on our literature review of published geologic maps and geologic reports, the geotechnical investigation and geologic fault investigation report (Geocon, 2006), and our site reconnaissance, the project vicinity is underlain by fill materials, and bay deposits, overlying the Bay Point Formation, A brief description of these units, as described in the cited literature is presented below.

5.2.1. Hydraulic Fill

Based on our review of the Geocon report, approximately 18 to 22 feet of hydraulic fill soil underlie portions of the developed areas of the project vicinity. The hydraulic fill was derived from local dredging operations and was placed with little to no densification or compactive effort below water level, and unknown level of compaction above water level. The fill consists of loose to dense fine sand with varying amounts of shells. These soils are considered susceptible to liquefaction where located below the water table.

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5.2.2. Quaternary Bay Deposits

The Pleistocene- to Holocene-age Bay Deposits underlie the fill soils. The bay deposits consist of loose to medium dense fine sand. Numerous shells and shell-hash zones occur in the Bay Deposits. As reported, the unit ranges in thickness from approximately 11 feet in the western portion of the site, to approximately 43 feet in the eastern part. The loose and saturated portions of the bay deposits are considered susceptible to liquefaction.

5.2.3. Quaternary Bay Point Formation

Materials of the Pleistocene-age Bay Point Formation were encountered beneath the bay deposits. The Bay Point Formation, as described in the geotechnical investigation and geologic fault investigation report, consists of dense to very dense silty sand and fine sand.

5.2.4. Groundwater

Seeps and springs were not observed during our site visit. Based on our review of the geotechnical investigation and geologic fault investigation report, shallow groundwater was encountered at depths of approximately 9 to 14 feet below the ground surface.

5.3. Faulting and Seismicity

The project area is considered to be seismically active, as is much of southern California. Based on our review of the Geocon, 2006 report, the eastern portion of the site is underlain by the three splays of the Spanish Bight Fault, a strand of the Rose Canyon Fault zone. According to the fault investigation report, the three faults offset sediments of Holocene-age (i.e., within the last 11,000 years) and are thus considered to be active.

Several portions of the Rose Canyon fault zone in the Mount Soledad, Rose Canyon, downtown San Diego, and San Diego Bay areas have been designated by the State of California (California Geological Survey [CGS], 1991 and 2003b) as being Earthquake Fault (Alquist-Priolo) Zones. The Rose Canyon fault zone is the onshore portion of a more extensive fault zone that includes the Offshore Zone of Deformation and the Newport-Inglewood fault to

the north, and several possible extensions southward, both onshore and offshore (Treiman, 1993). The Rose Canyon fault zone also consists of predominantly right-lateral strike-slip faults that extend south-southeast through the San Diego metropolitan area. Various fault strands display strike-slip, normal, oblique, or reverse components of displacement. The fault zone extends offshore at La Jolla and continues north-northwest subparallel to the coastline. South of downtown, the fault zone splits into several splays that underlie San Diego Bay, Coronado, and the ocean floor south of Coronado (Treiman, 1993; Kennedy and Clarke, 1999). The eastern portion of the subject site is located with an Earthquake Fault (Alquist-Priolo) zone.

In general, hazards associated with seismic activity include ground surface rupture, strong ground motion, liquefaction, seismically induced settlement, and tsunamis. These potential hazards are discussed in the following sections.

5.3.1. Ground Surface Rupture and Strong Ground Motion

Based on our review of the Geocon (2006) geotechnical investigation and geologic fault investigation report, three splays of the active Spanish Bight fault are located on the eastern portion of the site. The potential for ground rupture due to faulting at the site is considered high. Lurching or cracking of the ground surface as a result of local or nearby seismic events is also possible.

A significant seismic event that could affect the proposed project would be a moment magnitude (M_W) 7.2 earthquake within the Rose Canyon fault zone (CGS, 2003a). According to the 2001 California Building Code (CBC) and the CGS (1998), the Rose Canyon fault is classified as a "B" seismic source type. The site is within a CBC Near-Source Zone for active faults and is within CBC Seismic Zone 4.

Based on review of the project geotechnical investigation and geologic fault investigation report, unweighted mean site accelerations of 0.31g and 0.46g were calculated for probability of exceedance in 50 and 100 years respectively.

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5.3.2. Liquefaction, Seismically Induced Settlement, and Lateral Spread

Liquefaction of cohesionless soils and resultant induced settlement can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils and non-plastic silts that are saturated by a relatively shallow groundwater table are most susceptible to liquefaction.

The site is underlain by hydraulic fill soils and bay deposits and shallow groundwater. Based on these conditions and review of the Geocon (2006) report, the potential for liquefaction, seismically induced settlement, and lateral spread to occur on the site is considered high. Recommendations for mitigation of potential liquefaction are included in the geotechnical investigation report.

5.3.3. Tsunamis

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. A seiche is an oscillating wave within an enclosed or semi-enclosed body of water caused by an earthquake or other subsurface disturbance. Based on the location of the site, the potential for damage due to tsunami or seiche is considered to be low to moderate. However the Geocon (2006) report indicates the potential for a very large tsunami or seiche to affect the site is considered to be high.

5.3.4. CBC Seismic Design Parameters

The seismic design parameters for the site as defined in the 2001 edition of the CBC were presented in the project geotechnical investigation and geologic fault investigation report (Geocon, 2006).

5.4. Landsliding

Based on our review of published geologic maps, stereoscopic aerial photographs, the geotechnical investigation report, as well as our site reconnaissance, landslides or indi-

cations of deep-seated slope instability have not been mapped nor were observed underlying the project site.

5.5. Geologic Hazards Map

According to Sheet 18 of the City of San Diego Seismic Safety Study (City of San Diego, 1995), the project site is located in Geologic Hazard Categories 31. This is described as having a high potential for liquefaction. The Seismic Safety Study does not indicate known or suspected landslides as existing on or adjacent to the site.

5.6. Expansive Soils

Expansive soils are soils that undergo volumetric change with change in water content. The soil will swell with increase in moisture content and will shrink with decrease in moisture content. Soils with high shrink-swell potential usually contain high percentages of certain clay minerals and can cause extensive damage to structures and improvements.

The geotechnical investigation and geologic fault investigation report (Geocon, 2006) indicated that hydraulic fill materials on the site range from very low to low expansion potential as defined by UBC Standard No. 18-2 (California Building Standards Commission, 2001).

5.7. Flood Hazards

According to a Federal Emergency Management Agency (FEMA) flood insurance rate maps (FEMA, 1997), the outer edges of Harbor Island are mapped as being within 100-year and 500-year floodplains. However, the majority of the site including the areas being considered for development is mapped as outside the 100-year and 500-year flood zones. Based on review of topographic maps, the site is not located downstream of a dam or within a dam inundation area. Based on this review and our site reconnaissance, the potential for flooding of the developable areas of the project area is considered low.

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5.8. Mineral Resources

Our evaluation has indicated that no significant economic mineral resources have been discovered within the limits of the project study area. Therefore the potential for loss of mineral deposits due to further development of the study area is considered low.

6. THIRD-PARTY REVIEW OF GEOTECHNICAL AND FAULT INVESTIGATION REPORT

Based on our review, the geotechnical investigation and geologic fault investigation report (Geocon, 2006) generally addresses the significant geotechnical impacts for the proposed project. The main potential impacts reported are:

- On-site faults
- Seismic shaking
- Liquefaction
- Inundation by tsunami or seiches

Locations of three active strands of the Spanish Bight fault are identified in the subject report. The report recommends a structural setback of 25 feet from the three identified faults. It is our understanding that, based on State of California guidelines, the typical structural setback from active fault strands is 50 feet. Recommended fault setbacks will depend on the quality of data and complexity of the faulting encountered.

The potential impacts from seismic shaking would be addressed through design in accordance with the recommendations of the CBC. The potential impacts from liquefaction would be addressed by following the recommendations for grading and deep foundations included in the report.

The potential impact from inundation due to tsunami or seiche is harder to quantify. The report indicates ". . .the island is within the zone of tsunami maximum projected run-up. Four historic tsunamis have been recorded in San Diego with wave heights ranging from 1.5 to 4.6 feet. Even though it is possible that the site could be affected by waves generated by tsunamis or seiches,

the height and runout length of those waves would have to be very large. Therefore the potential for a very large tsunami or seiche to affect the site is high." Based on the location of the site within San Diego Bay, we do not consider the potential for direct impact or inundation from a tsunami to be a design consideration. However, the potential for a seiche (an oscillating wave within an enclosed or semi-enclosed body of water caused by an earthquake or other subsurface disturbance) within San Diego Bay is harder to estimate based on the short historic record of southern California. Based on the available historic record and the location and alignment of San Diego Bay to potential seismic sources, we would estimate the potential for inundation at the site due to seiches to be low to moderate. The risk would be comparable to other low-lying sites located along San Diego Bay.

7. CONCLUSIONS

Based on the results of our Preliminary Geotechnical Evaluation, it is our opinion that development within the proposed East Harbor Island Development Project is feasible from a geotechnical perspective. The following sections discuss site specific geologic and geotechnical issues and constraints and potential mitigation measures.

7.1. Geologic and Geotechnical Issues and Constraints

- The reviewed geotechnical investigation and geologic fault investigation report for the site (Geocon, 2006) generally addresses the significant geotechnical impacts for the proposed project.
- Based on our review of the geotechnical investigation and geologic fault investigation report, active fault strands of the Rose Canyon fault zone have been mapped on the eastern portion of the site. The fault investigation report recommends a structural setback of 25 feet from the three identified faults.
- The subject site is located within a State of California Earthquake Fault Zone (Alquist-Priolo Special Studies Zone).
- The potential for strong ground motions to occur at the site is significant. San Diego County is located within Seismic Zone 4 according to the 2001 edition of the CBC. Ac-

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cordingly, the potential for relatively strong seismic accelerations will need to be considered in the design of proposed improvements.

- The site has a moderate to high potential for liquefaction and seismically induced settlement. The project geotechnical investigation and geologic fault investigation report includes recommendations for grading, soil improvement, and deep foundations to mitigate the potential for liquefaction and seismically induced settlement.
- Landslides have not been mapped or observed on or adjacent to the project site. Parcels proposed for development should be individually evaluated for slope stability.
- In general, the soils in the area should be excavatable with standard heavy-duty excavation equipment.
- The geotechnical investigation and geologic fault investigation report indicates up to 22 feet of hydraulic fill are present across the site, which is underlain by bay deposits. The report includes recommendations for grading, soil improvement, and deep foundations to mitigate potential settlement of the on-site soils.
- In general, soil materials generated from excavations should be suitable for reuse as backfill, assuming they are free of organic, oversize, or other deleterious materials.

8. LIMITATIONS

The field evaluation and geotechnical analyses presented in this report have been conducted in accordance with current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No warranty, implied or expressed, is made regarding the conclusions, recommendations, and professional opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered. Our preliminary conclusions and recommendations are based on an analysis of the observed conditions and the referenced background information.

The purpose of this study was to evaluate geologic and geotechnical conditions within the project site and to provide a geotechnical reconnaissance report to assist in the preparation of environmental impact documents for the project.

9. SELECTED REFERENCES

Anderson, J.G., Rockwell, T.K., and Agnew, D.C., 1989, Past and Possible Future Earthquakes of Significance to the San Diego Region: Earthquake Spectra, Volume 5, No. 2.

California Building Standards Commission, 2001, *California Building Code*, Title 24, Part 2, Volumes 1 and 2.

California Geological Survey (CGS), 1998, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada: International Conference of Building Officials.

California Geological Survey (CGS), 2001, State of California, Special Studies Zones, La Jolla Quadrangle: effective November 1, 2001, scale 1:24,000.

California Geological Survey (CGS), 2003a, Probabilistic Seismic Hazard Assessment Maps (PSHA), World Wide Web, http://www.consrv.ca.gov/cgs/rghm/psha/index.htm.

California Geological Survey (CGS), 2003b, State of California, Earthquake Fault Zones, Point Loma Quadrangle: effective May 1, scale 1:24,000.

City of San Diego, 1978, Topographic Survey (Orthotopographic), Sheet 202-1707, Scale 1" = 200'.

City of San Diego, 1995, Seismic Safety Study, Sheet 16.

Geocon Incorporated, 2006, Geotechnical Investigation and Geologic Fault Investigation, East Harbor Island Hotel, San Diego, California, dated March 3.

Harden, D.R., 1998, *California Geology*: Prentice Hall, Inc.

Jennings, C.W., 1994, Fault Activity Map of California and Adjacent Areas: California Geological Survey, California Geologic Data Map No. 6, scale 1:750,000.

Kennedy, M.P., and Tan, S.S., 2005, Geologic Map of the San Diego 30' x 60' Quadrangle, California, Department of Conservation, scale 1:100,000.

Kennedy, M.P. and Clarke, S.H., 1999, Analysis of Late Quaternary Faulting in San Diego Bay and Hazards to the Coronado Bridge: California Geological Survey, Open File Report 97-10A.

Kohler, S.L. and Miller, R.V., 1982, Mineral Land Classification: Aggregate Minerals in the Western San Diego County Production-Consumption Region: California Geological Survey, Special Report 153.

Norris, R.M. and Webb, R.W., 1990, *Geology of California*: John Wiley & Sons, Inc.

Rockwell, T.K., Lindvall, S.C. Haraden, C.C., Hirabayashi, C.K., and Baker, E., 1991, Minimum Holocene Slip Rate for the Rose Canyon Fault in San Diego, California *in* Abbott, P.L.

57791
684

and Elliott, W.J., eds., Environment Perils, San Diego Region: San Diego Association of Geologists.

Treiman, J.A., 1993, Rose Canyon Fault Zone, Southern California: California Geological Survey.

United States Geological Survey (USGS), 1994, Point Loma Quadrangle, 7.5-Minute Series Topographic Map, San Diego County, California: scale 1:24,000.

Wesnousky, S.G., 1986, Earthquakes, Faults, and Seismic Hazards in California: Journal of Geophysical Research, Vol. 91, No. B12.

AERIAL PHOTOGRAPHS

Source	Date	Flight	Numbers	Scale
United States Department of Agriculture	April 14, 1953	AXN-3M	214 and 215	1:20,000

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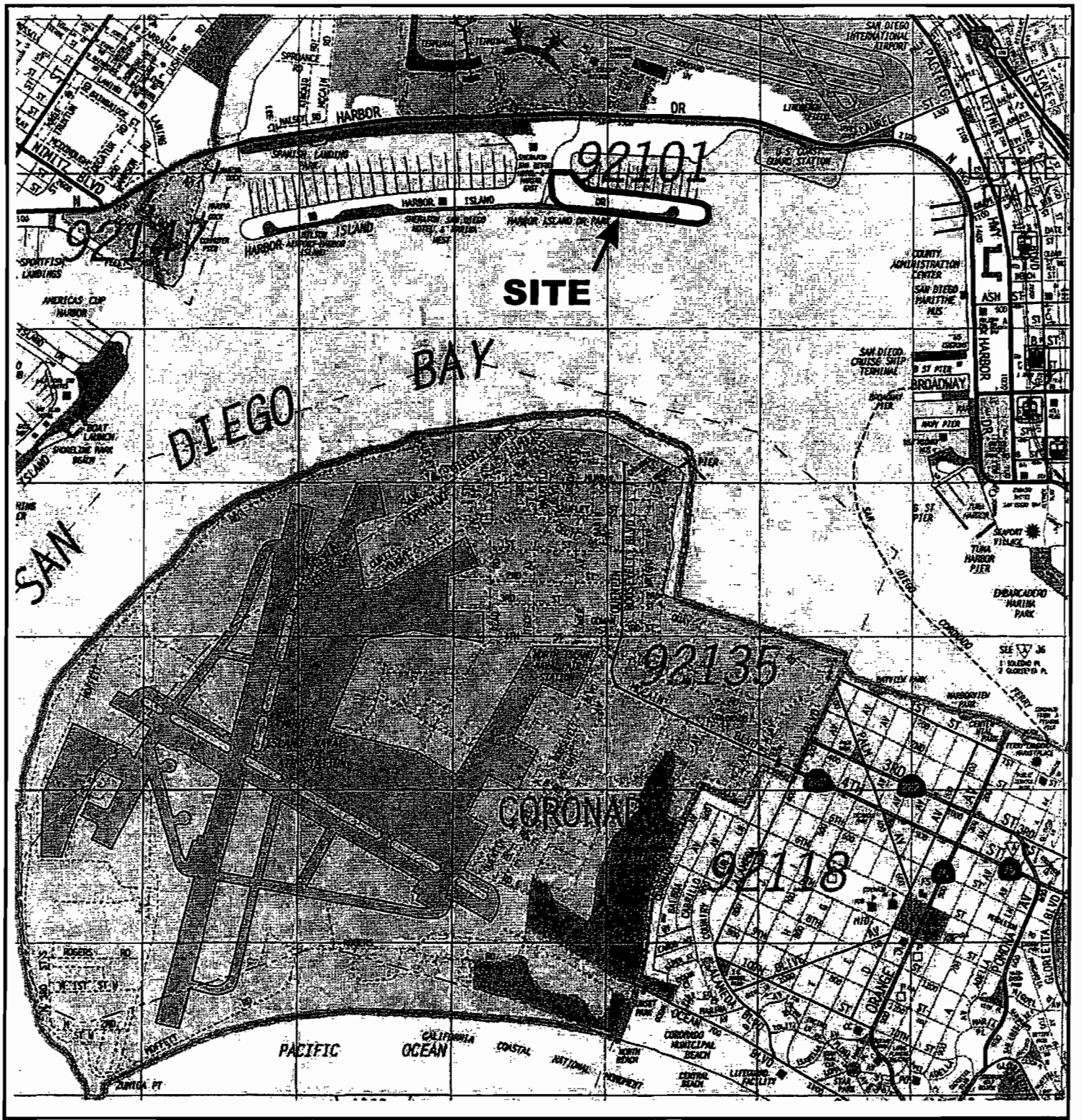

REFERENCE: 2005 THOMAS GUIDE FOR SAN DIEGO COUNTY, STREET GUIDE AND DIRECTORY.

0 2400 4800

APPROXIMATE SCALE IN FEET

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NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	SITE LOCATION MAP	FIGURE
PROJECT NO. 105871001 / DATE 6/06	PROPOSED EAST HARBOR ISLAND DEVELOPMENT PROJECT SAN DIEGO, CALIFORNIA	1

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Appendix I-1

Water Study

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WATER STUDY

FOR

HARBOR ISLAND HOTEL
P.T.S. 179641

CITY OF SAN DIEGO, CALIFORNIA

MARCH 23, 2009
Revised: September 15, 2009

Prepared for:
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REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

9/15/09

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Registration Expires 9-30-2009

PREPARED BY: NAB
CHECKED BY: CJE

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APPENDICES

APPENDIX A.	EXHIBIT 1: CITY OF SAN DIEGO WATER FIELD BOOK AND PRESSURE ZONE, TILE NO. AY119
	EXHIBIT 2: HYDRAULIC CONTROL MAP & SCHEMATIC WATER PLAN
APPENDIX B.	WATER MAP
APPENDIX C.	WATERCAD NODE MAP
APPENDIX D.	ESTIMATE OF WATER DEMAND
APPENDIX E.	HYDRAULIC CALCULATIONS
APPENDIX F.	REFERENCES

- *SDUPD TENANT PROJECT NO. 007-012-2199, CITY DWG. NO. 29977-D*
- *CITY OF SAN DIEGO PEAK HOUR DEMAND FACTOR CHART*
- *CITY OF SAN DIEGO MAXIMUM DAY DEMAND FACTOR CHART*
- *CITY OF SAN DIEGO PEAKING FACTOR ZONES*

I. INTRODUCTION

The purpose of this water study is to evaluate the hydraulics of the proposed onsite potable water associated with the proposed Harbor Island Hotel. The intent is to provide a planning level of detail needed to preliminarily assess water demands and overall function of the proposed system.

The proposed project includes the construction of a 4-story hotel. The existing marina and off site restaurants will remain. The existing public water was constructed in 1967 and was aligned under the roadway (Harbor Island Drive). The road alignment was subsequently changed and the water line is no longer located under the roadway. The proposed hotel will be sited over the existing public water main. The public water main is proposed to be realigned to allow construction of the hotel and correspond with the realignment of Harbor Island Drive.

II. PROJECT DESCRIPTION

This water study has been prepared in support of the design of the public water facilities associated with the construction of this project. The public water system is owned and maintained by the City of San Diego. See Exhibit '1', City of San Diego Field Book & Pressure Zone for project location.

Existing Condition

Currently the project site is developed and includes a marina and associated parking areas. Contiguous to and east of the project site is another leasehold currently developed with two existing restaurants. The project site is served by existing 10-inch A.C.P., which is reduced to an existing 8-inch line just west of the proposed hotel site, and continues easterly to serve the existing restaurants. There are currently 3 fire hydrants off of the existing main serving the hotel site and marina leasehold, and another 4 hydrants off the main serving the restaurants within the easternmost leasehold. See Exhibit 2: Hydraulic control map & schematic water main.

Proposed Project

The proposed project includes the construction of a 4-story hotel. The existing marina and off site restaurants will also remain. The existing 8" A.C. dead-end public water will be removed or abandoned and replaced with a 12" PVC system relocated within the realigned Harbor Island Drive. An extension of the planned looped system into the easternmost leasehold will be required to meet City of San Diego redundancy standards for the easterly leasehold. The proposed public water extension will begin near the Harbor Island Drive cul-de-sac and will continue into the restaurant leasehold. Two new commercial fire hydrants, one fire service and one domestic service will be built to serve the proposed hotel. A 24-foot paved easement within the existing parking lot will contain the proposed 12-inch water loop to the easterly leasehold.

III. METHODOLOGY

The City of San Diego's Water Department's Facility Design Guidelines for Capital Improvement Projects was used for system layout and performance standards. City of San Diego standards require that water mains serving more than 30 equivalent dwelling units (EDU) or 2 fire hydrants must be looped. The existing system does not meet this standard. A looped system has been designed per S.D.U.P.D. tenant project No. 007-012-2199 and City of San Diego drawing No. 29977-D. See attached reference documents in Appendix 'F'. This looped water

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main construction project is currently on hold. If the proposed hotel project proceeds prior to the water main loop construction, the Harbor Island Hotel shall be responsible for the looped water main improvements to the site subject to reimbursement by the Port District.

Per the guide, each water main must be capable of supplying a minimum static pressure of at least 65 pounds per square inch (psi). Operating pressures under the peak hour demand and the maximum day peak hour demand plus fire flow shall not fall more than 25 psi below the respective static pressure, and residual water main pressure must not fall below 40 psi. During fire conditions, an operating pressure of at least 20 psi must be maintained in the main near the fire, while a drop in pressure of no more than 25 psi below static pressure is desirable in the remainder of the water system. When analyzing a system with one source of supply out of service (single reservoir), pressures may fall more than 25 psi below static, but not below 40 psi. This report analyzes the looped system (double reservoir), as well as the single reservoir system to model the performance of the system if a main break were to occur.

As indicated on Exhibits '1' & '2', the project is located within the City of San Diego's "University Heights" zone hydraulic gradient: 390' (HGL). The site's elevations range from 14' to 17' above mean sea level with the proposed hotel finish floor elevation of 18.5'. With the existing site grades & proposed finished floor of the hotel, resulting static pressures will be approximately 160 psi. While this value exceeds desirable maximum pressures, the existing developed properties and conditions elsewhere on the island combined with the mid-rise nature of the proposed hotel building would support mitigation of the excess pressure through increased pressure classification for pipe and fittings, as opposed to creation of an additional pressure zone by installation of pressure reducing valves. In accordance with city policy, all individual services shall be equipped with pressure regulators since the static pressure exceeds 80 psi.

The connection points to the City of San Diego's planned 12" looped water system were modeled as infinite reservoirs with a static HGL consistent with the City of San Diego's Water Department Water Map, see Appendix E. This study also assumes that the proposed hotel, will possess a fire sprinkler system and utilize construction materials/techniques that would require a maximum fire flow of 4,000 GPM. Water demands were calculated using either, the land use (Appendix C) or fixture units where plumbing plans were available. Peak flows were calculated using the peaking factor zone map (Appendix E).

Onsite water mains and laterals used in this study will be PVC pipe, and vary from 2-inches or 4-inches for the domestic service, to 12-inches for the public water main. Onsite laterals and meter size requirements shall be established at the final engineering phase based upon plumbing and mechanical design requirements to provide the necessary peak flows. Mains were analyzed against minimum pressure and fire flow requirements during the maximum day demand plus the fire flow demand. The computer modeling software "WaterCAD", developed by Haestad Methods was used to determine the pressures and flows throughout the system. This software utilizes the Hazen-Williams equation for determining head-losses and flows. Equivalent pipe lengths were used in place of pipe bends. A Hazen-Williams 'C' value of 150 was used for all proposed pipes.

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IV. DESIGN DOCUMENTATION

Flow tests were not available at the time this report was written. However, the site lies within HGL zone 390 based on the City of San Diego Water Map (see Appendix E). The base HGL zone was used to determine an available static pressure of 165 psi (see Appendix D for the calculation).

V. ANALYSIS

The WaterCAD program output verified that the proposed system meets the requirements for pressure and flow (4,160 GPM) as stated in City's Facility Design Guidelines for Capital Improvement Projects. Appendices 'C&D' show the results for the maximum day demand & fire flow analysis. As shown in the tables, none of the nodes experienced significant loss in pressure. The minimum pressures for the systems are 82.6 psi for the single reservoir (main break) and 113.2 psi for the double reservoir (looped) system. Both figures are well above the 40 psi minimum as required by city standards.

Pressure regulators will be required for all services exceeding 80 psi. A more detailed analysis of these and other water system appurtenances should be performed to satisfy final engineering requirements.

VI. CONCLUSION

This water study has been prepared to quantify the water demand associated with the proposed Harbor Island Hotel and to evaluate the hydraulics of the proposed onsite water system and existing infrastructure. The analysis demonstrates that the added demand of the hotel, combined with the existing land use demands are adequately served by the existing 10" & 16" supply offsite, together with extension of a new 12" main loop across the project's frontage in the realigned Harbor Island Drive. This extension would reach the east end of the island to serve the existing restaurants.

Current City of San Diego standards require that water mains serving more than 30 equivalent dwelling units (EDU) or 2 fire hydrants must be looped. A looped 12" PVC main in Harbor Island Drive as was proposed with city drawing No. 29977-D per S.D.U.P.D. tenant project No. 007-012-2199. However, that water main construction project has been put on hold. If the proposed hotel project proceeds prior to the water main loop construction, the Harbor Island Hotel will be responsible for the installation of looped water main improvements to the hotel site prior to, or concurrent with occupancy. This looped system is required to meet the city's requirement for redundant supply and to serve the existing property. According to the calculations provided herein, there will be no adverse impacts as a result of the development.

All proposed public water facilities and appurtenances shall be constructed in accordance with the most current City of San Diego Water Facilities Design Guidelines. Public water facilities including meters, services and mains shall comply with current standards for location, operation, maintenance, and access and shall include public easements as necessary. All existing fire hydrants within the property to be connected to the new public water loop shall be replaced with new fire hydrant assemblies.

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EXHIBIT 1

CITY OF SAN DIEGO WATER FIELD BOOK AND PRESSURE ZONE,

TILE NO. AY119

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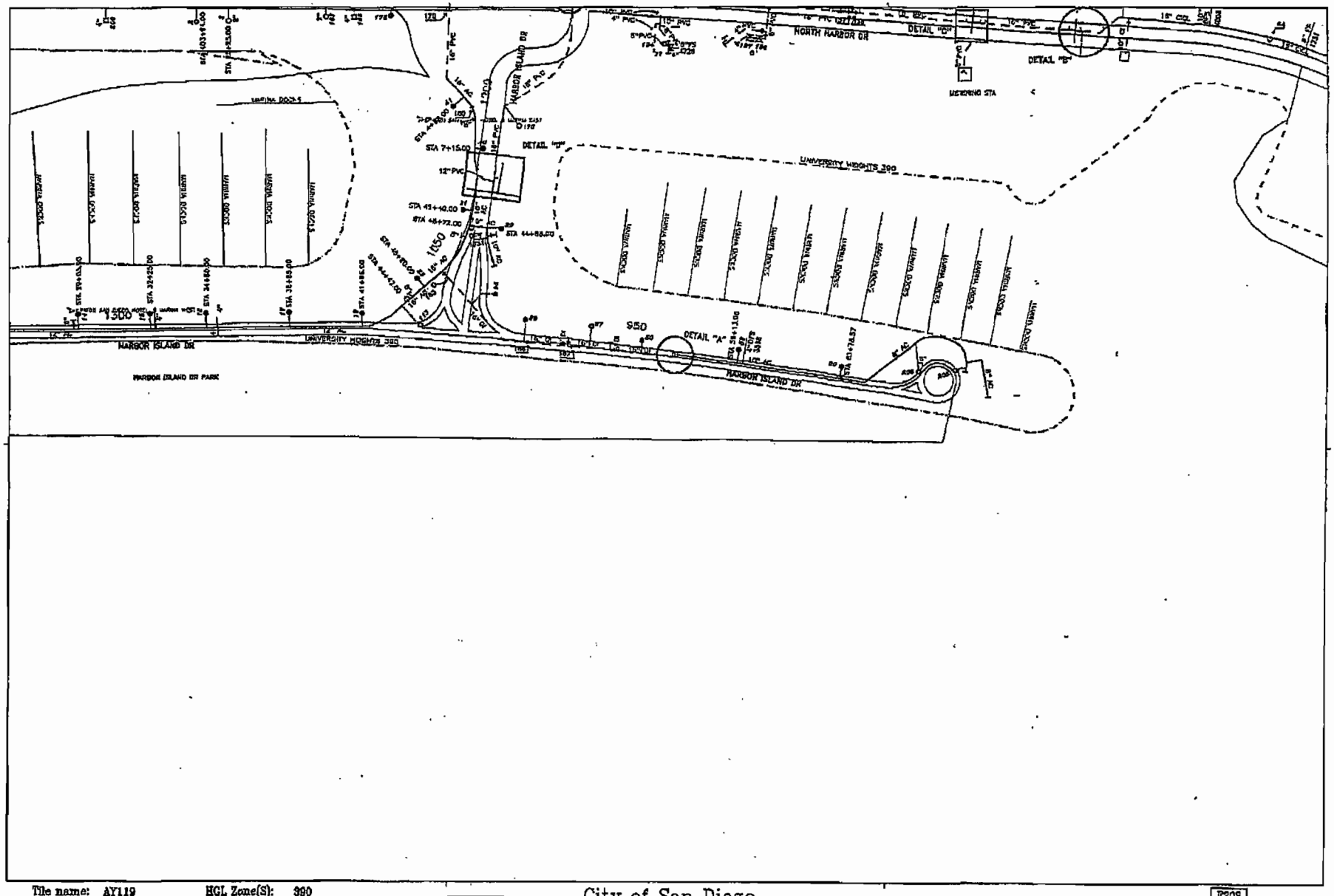

Tile name: AY119
NAD 27: 202-1707
NAD 83: 6268407,1842444

HGL Zone(S): 390
Revised Date:
Date Printed: 04-04-03

City of San Diego
WATER FIELD BOOK

	D20S	
D21S	D21S	F21S
	D22S	

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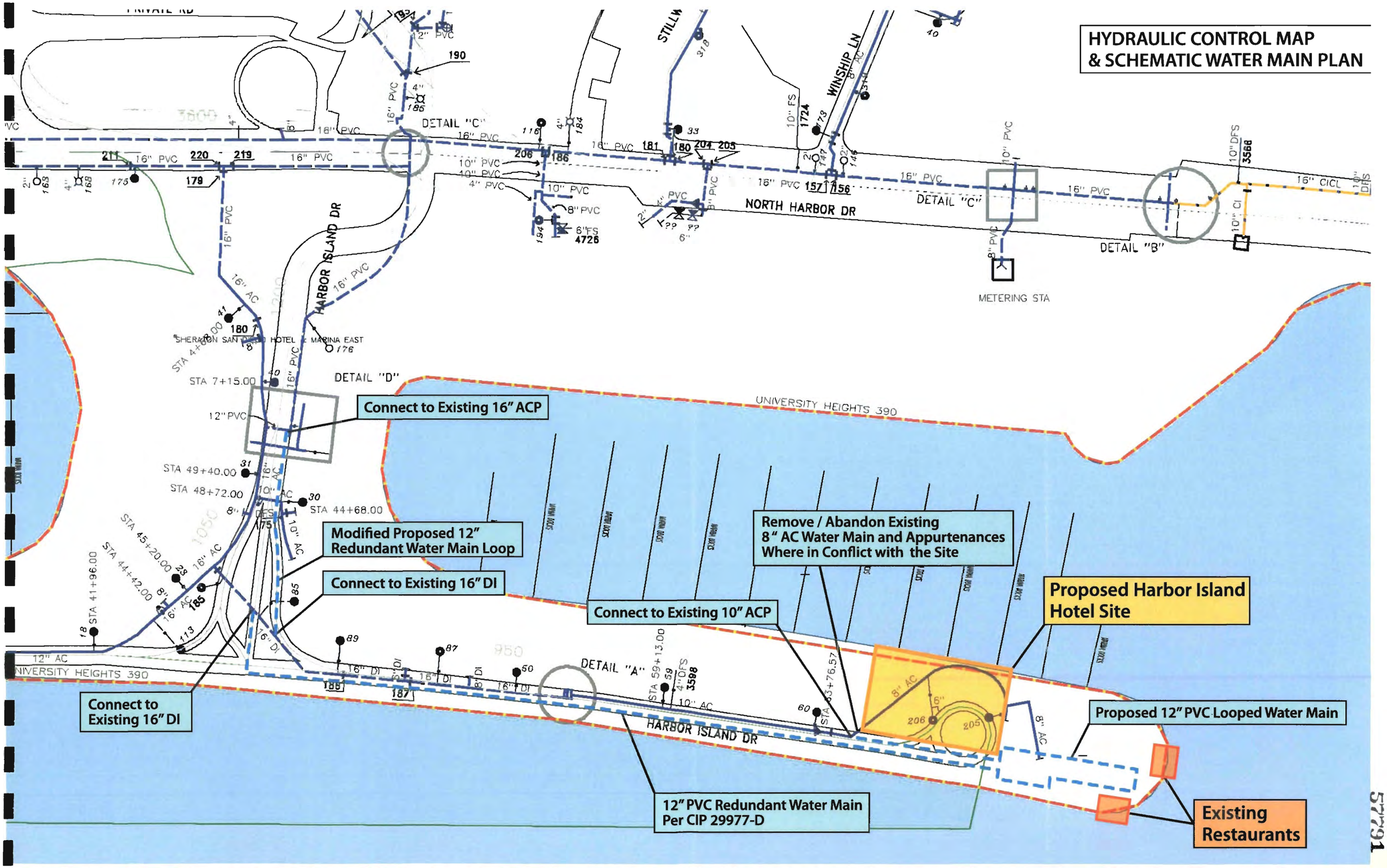
EXHIBIT 2

HYDRAULIC CONTROL MAP & SCHEMATIC WATER PLAN

57791
695

HYDRAULIC CONTROL MAP & SCHEMATIC WATER MAIN PLAN



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696

WATER MAP

27791
697

HARBOR ISLAND HOTEL WATER STUDY MAP

N

0 60' 120' 180'
SCALE: 1"=60'

EXISTING MARINA

PROPOSED HOTEL

EXISTING RESTAURANT

EXISTING RUEBEN E. LEE RESTAURANT

HARBOR ISLAND DRIVE

LEASEHOLD LIMITS

REMOVE/ABANDON EXISTING WATER MAIN

EXISTING 8" A.C. WATER PER DWG. NO. 13365-D REMOVE OR ABANDON

① EXISTING PRIVATE FIRE HYDRANT AND SERVICE LINE

EXISTING 10" A.C. WATER PER DWG. NO. 13365-D

① EXIST. FH

REMOVE/ABANDON EXISTING WATER MAIN

10' PARKWAY

PROP. FIRE SERVICE

PROP. DOMESTIC WATER SERVICE

PROP. FH

10' PARKWAY

PROP. FH

24' PAVED WATER EASEMENT

POST INDICATOR VALVES

RECONNECT EXIST. DOMESTIC WATER SERVICE

POINT OF CONNECTION TO EXISTING 10" AC WATER

RECONNECT TO EXIST FH

RECONNECT TO EXIST WATER SERVICE TO MARINA

NEW RIGHT-OF-WAY AT 10' FROM CURB LINE

12" PVC REDUNDANT WATER LOOP PER C.I.P. PROJECT. DWG. NO. 29977-D TO BE CONSTRUCTED PRIOR TO, OR CONCURRENT WITH PROPOSED PROJECT

PROP. 8" PVC SEWER (PUBLIC)

PROPOSED 12" PVC LOOP EXTENSION

EXIST. DOMESTIC WATER SERVICE

EXIST. FH ①

PROP. 8" PVC SEWER MAIN (PRIVATE)

24' PAVED WATER EASEMENT

① EXIST. FH

LIMITS OF WATER LOOP EXTENSION REQUIRED TO SERVE EXISTING RESTAURANTS

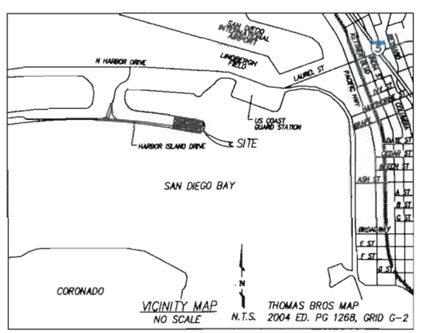
36'

11'

15'

20'

5'



VICINITY MAP
NO SCALE

LEGEND

- EXISTING WATER MAIN
- 12" WATER PER CANCELED C.I.P. PROJECT. DWG. NO. 29977-D.
- PROPOSED 12" LOOP EXTENSION
- WATER LATERAL
- PAVED WATER EASEMENT
- PROPOSED FIRE HYDRANT
- PROPOSED RIGHT OF WAY
- PROPOSED SEWER

① NOTE: ALL EXISTING FIRE HYDRANTS TO BE REPLACED WITH NEW ASSEMBLIES. EXISTING FIRE HYDRANTS TO BE SALVAGED.

Latitude 33
Planning and Engineering
4933 Paramount Dr. 2nd Flr.
San Diego, Ca. 92123
858-751-0633 Fax 858-751-0634

REV. DATE: SEPTEMBER 23, 2009
REV. DATE: SEPTEMBER 21, 2009

J.N. 971.00 JULY 09, 2009

WATERCAD NODE MAP

57791

HARBOR ISLAND NODE MAP

0 60' 120' 180'
SCALE: 1"=60'

LEASEHOLD LIMITS

EXISTING MARINA

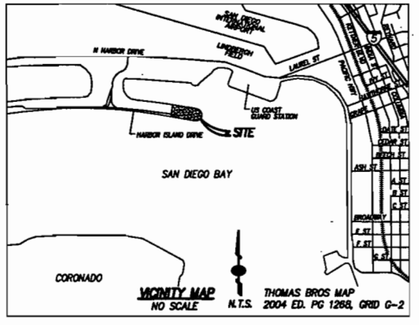
PROPOSED HOTEL

HARBOR ISLAND DRIVE

12" PVC REDUNDANT WATER LOOP PER C.I.P. PROJECT. DWG. NO. 29977-D TO BE CONSTRUCTED PRIOR TO, OR CONCURRENT WITH PROPOSED PROJECT

EXISTING RESTAURANT

EXISTING RUEBEN E. LEE RESTAURANT



VICINITY MAP
NO SCALE
N.T.S.
THOMAS BROS MAP
2004 ED. PG 1288, GRID G-2

LEGEND

- 12" PVC WATER LOOP EXTENSION
- WATER LATERAL
- COMMERCIAL FIRE HYDRANT
- RESERVOIR ID
- NODE ID
- PIPE ID
- HYDRANT ID

Latitude 33
Planning and Engineering
4933 Paramount Dr. 2nd Flr.
San Diego, Ca. 92123
858-751-0633 Fax 858-751-0634

H:\800\859.00\Reports\Water\Water Study Map - PIPE SCHEMATIC.dwg 9/21/2009 10:58:26 AM PDT

ESTIMATE OF WATER DEMAND

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880 HARBOR ISLAND DRIVE
PROPOSED CONDITIONS WATER DEMAND ANALYSIS
3/23/2009

WATER DEMAND, BY LAND USE (CITY OF S.D. DESIGN GUIDELINES, TABLE 2-2):

	USE	NET ACRES	GAL/AC-DAY	AVE. ANNUAL DEMAND		MAX. DAY	PEAK HOUR
Development				GPD	MGD	GPM	GPM
Existing							
Marina	COMM.	3.5	5000	17,500	0.018	29	73
Island Prime Restaurant	COMM.	1.5	5000	7,500	0.008	12	31
TOTAL				25,000	0.025		

WATER DEMAND, PER ARCHITECTURAL PLANS:

	USE	FIXTURE UNITS	EDUS	AVE. ANNUAL DEMAND		MAX. DAY	PEAK HOUR
Development				GPD	MGD	GPM	GPM
Existing							
Rueben E. Lee Restaurant	COMM.	520	26	13,650	0.014	23	57
Proposed							
Hotel	COMM.	2200	110	57,750	0.058	96	240
TOTAL				71,400	0.071		

TOTAL PROPOSED DEMAND: **96,400 GPD 0.096 MGD**

Water Peak Factors

Peak Hour (Figure 2:1 City Water Design Manual Coastal/Downtown)
@ 0.096 MGD, Peak Factor is 6.0 x AAD = 0.576 MGD or Approx. 400 GPM

Maximum Day (City Figure 2-2 City Water Design Manual Coastal/Downtown)
@ 0.096 MGD Maximum/Day = 2.4 x AAD = 0.230 MGD, or Approx. 160 GPM

Required Fire Flows

Per City Design Guide, Commercial Land Use requires 4,000 GPM fire flow with minimum 5 hour duration, and minimum 20 PSI residual water pressure. The system must provide either:
1) Maximum Day + Fire Flow, or
2) Peak Hour Flow
whichever is greater. Therefore, for this project minimum required design is for 4,000 GPM + 160 GPM =**4,160 GPM**

NOTE: POPULATION FACTORS AND EQUIVALENT UNITS:

20 FU'S = 1 EDU
1 EDU = 525 Gal/Day
1 MGD = 694 Gal/Min

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HYDRAULIC CALCULATIONS

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703

HARBOR ISLAND PIPE REPORT
MAX. DAY + FIRE FLOW FOR DOUBLE RESERVOIR

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Check Valve?	Minor Loss	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-3	184	25: J-3	27: J-4	12	PVC	150	FALSE	0	1183.60	3.36	3.00E-03
P-4	143	27: J-4	29: J-5	12	PVC	150	FALSE	0	1183.60	3.36	3.00E-03
P-5	91	29: J-5	31: J-6	12	PVC	150	FALSE	0.22	1183.60	3.36	3.00E-03
P-7	23	33: J-7	35: J-8	12	PVC	150	FALSE	0.2	-2839.40	8.05	2.20E-02
P-10	56	39: J-10	41: J-11	12	PVC	150	FALSE	0.22	-2851.40	8.09	1.80E-02
P-11	281	41: J-11	91: R-3	12	PVC	150	FALSE	0	-2851.40	8.09	1.40E-02
P-15	237	52: J-14	47: H-1	6	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-16	233	27: J-4	48: H-2	6	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-17	122	37: J-9	57: J-15	12	PVC	150	FALSE	0	-2839.40	8.05	1.30E-02
P-19	32	57: J-15	51: H-5	6	PVC	150	FALSE	0.22	0.00	0	0.00E+00
P-20	48	37: J-9	50: H-4	6	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-21	28	33: J-7	62: J-16	3	PVC	150	FALSE	0.22	23.00	1.04	2.00E-03
P-22	15	62: J-16	64: J-17	3	PVC	150	FALSE	0.22	23.00	1.04	2.00E-03
P-23	344	31: J-6	66: J-18	12	PVC	150	FALSE	0.22	1183.60	3.36	3.00E-03
P-24	9	66: J-18	33: J-7	12	PVC	150	FALSE	0.22	-2816.40	7.99	3.80E-02
P-25	132	66: J-18	49: H-3	6	PVC	150	FALSE	0.35	4000.00	45.39	8.26E-01
P-26	37	35: J-8	70: J-19	12	PVC	150	FALSE	0	-2839.40	8.05	1.30E-02
P-28	52	70: J-19	73: J-20	4	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-29	3	70: J-19	75: J-21	12	PVC	150	FALSE	0	-2839.40	8.05	1.30E-02
P-30	3	75: J-21	37: J-9	12	PVC	150	FALSE	0.2	-2839.40	8.05	7.20E-02
P-31	57	75: J-21	78: J-22	4	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-33	83	80: J-23	25: J-3	12	PVC	150	FALSE	0	1183.60	3.36	3.00E-03
P-34	14	80: J-23	83: J-24	4	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-35	23	52: J-14	85: J-25	12	PVC	150	FALSE	0	1279.60	3.63	3.00E-03
P-36	26	85: J-25	80: J-23	12	PVC	150	FALSE	0	1183.60	3.36	3.00E-03
P-37	14	85: J-25	88: J-26	3	PVC	150	FALSE	0.35	96.00	4.36	2.90E-02
P-38	33	57: J-15	93: J-27	12	PVC	150	FALSE	0	-2839.40	8.05	1.30E-02
P-39	20	93: J-27	39: J-10	12	PVC	150	FALSE	0.22	-2851.40	8.09	2.40E-02
P-40	33	93: J-27	96: J-28	6	PVC	150	FALSE	0.22	12.00	0.14	0.00E+00
P-41	38	23: J-2	99: J-30	12	PVC	150	FALSE	0.22	1308.60	3.71	4.00E-03
P-42	143	99: J-30	52: J-14	12	PVC	150	FALSE	0	1279.60	3.63	3.00E-03
P-43	156	99: J-30	102: J-31	6	PVC	150	FALSE	0.35	29.00	0.33	0.00E+00
P-45	670	23: J-2	21: R-1	10	AC	140	FALSE	0	-1308.60	5.35	9.00E-03

HARBOR ISLAND JUNCTION REPORT
MAX. DAY + FIRE FLOW FOR DOUBLE RESERVOIR

Label	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	<None>	<Collection: 0 items>	0	374.1	161.8
J-3	<None>	<Collection: 0 items>	0	373.1	161.4
J-4	<None>	<Collection: 0 items>	0	372.6	161.2
J-5	<None>	<Collection: 0 items>	0	372.2	161.1
J-6	<None>	<Collection: 0 items>	0	372	160.9
J-7	<None>	<Collection: 0 items>	0	371.3	160.7
J-8	<None>	<Collection: 0 items>	0	371.8	160.9
J-9	<None>	<Collection: 0 items>	0	372.6	161.2
J-10	<None>	<Collection: 0 items>	0	375.2	162.3
J-11	<None>	<Collection: 0 items>	0	376.2	162.8
J-14	<None>	<Collection: 0 items>	0	373.5	161.6
J-15	<None>	<Collection: 0 items>	0	374.3	161.9
J-16	<None>	<Collection: 0 items>	0	371.3	160.6
J-17	<None>	<Collection: 2 items>	23	371.3	160.6
J-18	<None>	<Collection: 0 items>	0	371	160.5
J-19	<None>	<Collection: 0 items>	0	372.3	161.1
J-20	<None>	<Collection: 0 items>	0	372.3	161.1
J-21	<None>	<Collection: 0 items>	0	372.4	161.1
J-22	<None>	<Collection: 0 items>	0	372.4	161.1
J-23	<None>	<Collection: 0 items>	0	373.3	161.5
J-24	<None>	<Collection: 0 items>	0	373.3	161.5
J-25	<None>	<Collection: 0 items>	0	373.4	161.6
J-26	<None>	<Collection: 1 item>	96	373	161.4
J-27	<None>	<Collection: 0 items>	0	374.7	162.1
J-28	<None>	<Collection: 1 item>	12	374.7	162.1
J-30	<None>	<Collection: 0 items>	0	373.9	161.8
J-31	<None>	<Collection: 1 item>	29	373.9	161.8

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HARBOR ISLAND HYDRANT REPORT
MAX. DAY + FIRE FLOW FOR DOUBLE RESERVOIR

Label	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	<None>	<Collection: 0 items>	0	373.5	161.6
H-2	<None>	<Collection: 0 items>	0	372.6	161.2
H-3	<None>	<Collection: 1 item>	4,000.00	261.7	113.2
H-4	<None>	<Collection: 0 items>	0	372.6	161.2
H-5	<None>	<Collection: 0 items>	0	374.3	161.9

HARBOR ISLAND RESERVOIR REPORT
MAX. DAY + FIRE FLOW FOR DOUBLE RESERVOIR

Label	Elevation (ft)	Zone	Outflow (gpm)	Hydraulic Grade (ft)
R-1	380	<None>	1,308.60	380
R-2	380	<None>	2,851.40	380

57791

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HARBOR ISLAND PIPE REPORT
MAX. DAY + FIRE FLOW FOR SINGLE RESERVOIR

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Check Valve?	Minor Loss	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-3	184	25: J-3	27: J-4	12	PVC	150	FALSE	0	4035.00	11.45	2.60E-02
P-4	143	27: J-4	29: J-5	12	PVC	150	FALSE	0	4035.00	11.45	2.60E-02
P-5	91	29: J-5	31: J-6	12	PVC	150	FALSE	0.22	4035.00	11.45	3.10E-02
P-7	23	33: J-7	35: J-8	12	PVC	150	FALSE	0.2	12.00	0.03	0.00E+00
P-10	56	39: J-10	41: J-11	12	PVC	150	FALSE	0.22	0.00	0	0.00E+00
P-15	237	52: J-14	47: H-1	6	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-16	233	27: J-4	48: H-2	6	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-17	122	37: J-9	57: J-15	12	PVC	150	FALSE	0	12.00	0.03	0.00E+00
P-19	32	57: J-15	51: H-5	6	PVC	150	FALSE	0.22	0.00	0	0.00E+00
P-20	48	37: J-9	50: H-4	6	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-21	28	33: J-7	62: J-16	3	PVC	150	FALSE	0.22	23.00	1.04	2.00E-03
P-22	15	62: J-16	64: J-17	3	PVC	150	FALSE	0.22	23.00	1.04	2.00E-03
P-23	344	31: J-6	66: J-18	12	PVC	150	FALSE	0.22	4035.00	11.45	2.70E-02
P-24	9	66: J-18	33: J-7	12	PVC	150	FALSE	0.22	35.00	0.1	0.00E+00
P-25	132	66: J-18	49: H-3	6	PVC	150	FALSE	0.35	4000.00	45.39	8.26E-01
P-26	37	35: J-8	70: J-19	12	PVC	150	FALSE	0	12.00	0.03	0.00E+00
P-28	52	70: J-19	73: J-20	4	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-29	3	70: J-19	75: J-21	12	PVC	150	FALSE	0	12.00	0.03	0.00E+00
P-30	3	75: J-21	37: J-9	12	PVC	150	FALSE	0.2	12.00	0.03	0.00E+00
P-31	57	75: J-21	78: J-22	4	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-33	83	80: J-23	25: J-3	12	PVC	150	FALSE	0	4035.00	11.45	2.60E-02
P-34	14	80: J-23	83: J-24	4	PVC	150	FALSE	0.35	0.00	0	0.00E+00
P-35	23	52: J-14	85: J-25	12	PVC	150	FALSE	0	4131.00	11.72	2.70E-02
P-36	26	85: J-25	80: J-23	12	PVC	150	FALSE	0	4035.00	11.45	2.60E-02
P-37	14	85: J-25	88: J-26	3	PVC	150	FALSE	0.35	96.00	4.36	2.90E-02
P-38	33	57: J-15	93: J-27	12	PVC	150	FALSE	0	12.00	0.03	0.00E+00
P-39	20	93: J-27	39: J-10	12	PVC	150	FALSE	0.22	0.00	0	0.00E+00
P-40	33	93: J-27	96: J-28	6	PVC	150	FALSE	0.22	12.00	0.14	0.00E+00
P-41	38	23: J-2	99: J-30	12	PVC	150	FALSE	0.22	4160.00	11.8	4.00E-02
P-42	143	99: J-30	52: J-14	12	PVC	150	FALSE	0	4131.00	11.72	2.70E-02
P-43	156	99: J-30	102: J-31	6	PVC	150	FALSE	0.35	29.00	0.33	0.00E+00
P-45	670	23: J-2	106: R-1	10	AC	140	FALSE	0	-4160.00	16.99	7.50E-02

HARBOR ISLAND JUNCTION REPORT
MAX. DAY + FIRE FLOW FOR SINGLE RESERVOIR

Label	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	<None>	<Collection: 0 items>	0	329.6	142.6
J-3	<None>	<Collection: 0 items>	0	320.8	138.8
J-4	<None>	<Collection: 0 items>	0	316	136.7
J-5	<None>	<Collection: 0 items>	0	312.4	135.1
J-6	<None>	<Collection: 0 items>	0	309.6	133.9
J-7	<None>	<Collection: 0 items>	0	300.2	129.9
J-8	<None>	<Collection: 0 items>	0	300.2	129.9
J-9	<None>	<Collection: 0 items>	0	300.2	129.9
J-10	<None>	<Collection: 0 items>	0	300.2	129.9
J-11	<None>	<Collection: 0 items>	0	300.2	129.9
J-14	<None>	<Collection: 0 items>	0	324.2	140.3
J-15	<None>	<Collection: 0 items>	0	300.2	129.9
J-16	<None>	<Collection: 0 items>	0	300.2	129.9
J-17	<None>	<Collection: 2 items>	23	300.2	129.9
J-18	<None>	<Collection: 0 items>	0	300.2	129.9
J-19	<None>	<Collection: 0 items>	0	300.2	129.9
J-20	<None>	<Collection: 0 items>	0	300.2	129.9
J-21	<None>	<Collection: 0 items>	0	300.2	129.9
J-22	<None>	<Collection: 0 items>	0	300.2	129.9
J-23	<None>	<Collection: 0 items>	0	322.9	139.7
J-24	<None>	<Collection: 0 items>	0	322.9	139.7
J-25	<None>	<Collection: 0 items>	0	323.6	140
J-26	<None>	<Collection: 1 item>	96	323.2	139.8
J-27	<None>	<Collection: 0 items>	0	300.2	129.9
J-28	<None>	<Collection: 1 item>	12	300.2	129.9
J-30	<None>	<Collection: 0 items>	0	328.1	141.9
J-31	<None>	<Collection: 1 item>	29	328	141.9

HARBOR ISLAND HYDRANT REPORT
MAX. DAY + FIRE FLOW FOR SINGLE RESERVOIR

Label	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	<None>	<Collection: 0 items>	0	324.2	140.3
H-2	<None>	<Collection: 0 items>	0	316	136.7
H-3	<None>	<Collection: 1 item>	4,000	191	82.6
H-4	<None>	<Collection: 0 items>	0	300.2	129.9
H-5	<None>	<Collection: 0 items>	0	300.2	129.9

HARBOR ISLAND RESERVOIR REPORT
MAX. DAY + FIRE FLOW FOR SINGLE RESERVOIR

Label	Elevation (ft)	Zone	Outflow (gpm)	Hydraulic Grade (ft)
R-1	380	<NONE>	4,160	380

57791

REFERENCES

57791

710

HARBOR ISLAND WATER IMPROVEMENTS

STANDARD DRAWINGS & SPECIFICATIONS

STANDARD SPECIFICATIONS:

DOC. NO.	FILED	DESCRIPTION
1. 701041	07-1-04	STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (2003 EDITION), INCLUDING THE REGIONAL AND CITY OF SAN DIEGO SUPPLEMENTAL AMENDMENTS.
2. 769843	01-24-00	CALIFORNIA DEPARTMENT OF TRANSPORTATION, 'MANUAL OF TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE WORK ZONES,' (1996 EDITION)
3. 769842	10-22-99	1999 STANDARD SPECIAL PROVISIONS FOR SIGNALS, LIGHTING & ELECTRICAL SYSTEMS OF THE CITY OF SAN DIEGO.

STANDARD DRAWINGS:

DOC. NO.	FILED	DESCRIPTION
1. 701042	07-1-04	CITY OF SAN DIEGO STANDARD DRAWINGS INCLUDING ALL REGIONAL STANDARD DRAWINGS.

UNDERGROUND UTILITIES

AT LEAST THREE (3) WORKING DAYS PRIOR TO EXCAVATION, THE CONTRACTOR SHALL REQUEST MARKOUT OF UNDERGROUND UTILITIES BY CALLING THE BELOW LISTED REGIONAL NOTIFICATION CENTER FOR AN INQUIRY IDENTIFICATION NUMBER:

UNDERGROUND SERVICE ALERT (U.S.A.) 1-800-422-4133

CONTRACTOR'S RESPONSIBILITIES

1. THE CONTRACTOR SHALL DESIGN, CONSTRUCT AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS.
2. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SURVEY MONUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION A LAND SURVEYOR MUST FIELD LOCATE, REFERENCE, AND /OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR TO ANY EARTHWORK. IF DESTROYED, SUCH MONUMENTS SHALL BE REPLACED WITH APPROPRIATE MONUMENTS BY A LAND SURVEYOR. A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED AS REQUIRED BY THE PROFESSIONAL LAND SURVEYOR'S ACT. IF ANY VERTICAL CONTROL IS TO BE DISTRUBED, OR DISTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION MUST BE NOTIFIED, IN WRITING, AT LEAST 3 DAYS PRIOR TO THE CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE COST OF REPLACING ANY VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.
4. CONTRACTOR TO EXCAVATE AROUND WATER METER BOX (CITY PROPERTY SIDE) TO DETERMINE IN ADVANCE, EXACT SIZE OF SERVICE BEFORE TAPPING MAIN.
5. CITY FORCES WHERE CALLED OUT SHALL MAKE PERMANENT CUTS & PLUGS, CONNECTIONS, ETC.
6. EXISTING MAINS SHALL BE KEPT IN SERVICE IN LIEU OF HIGH-LINING, UNLESS OTHERWISE SHOWN ON PLANS.
7. THE LOCATION OF EXISTING BUILDINGS AS SHOWN ON THE PLAN ARE APPROXIMATE.
8. CONTRACTOR SHALL REPLACE IN KIND ANY TRAFFIC SENSORS OR EQUIPMENT DAMAGED DURING CONSTRUCTION.
9. CONTRACTOR SHALL PREVENT DEBRIS FROM GOING TO THE STORM DRAIN DURING CONSTRUCTION.
10. STORM DRAIN INLETS TO REMAIN FUNCTIONAL / OPERATIONAL AT ALL TIMES DURING CONSTRUCTION.
11. UNLESS OTHERWISE NOTED AS PREVIOUSLY POTHOLED (PH), ALL ELEVATIONS SHOWN ON THE PROFILE FOR EXISTING UTILITIES ARE BASED ON A SEARCH OF THE AVAILABLE RECORD INFORMATION ONLY AND ARE SOLELY FOR THE CONTRACTOR'S CONVENIENCE. THE CITY IN NO WAY WARRANTS OR GUARANTEES THAT IT HAS REVIEWED ALL AVAILABLE DATA. IT IS THE CONTRACTOR'S RESPONSIBILITY TO POTHOLE ALL EXISTING UTILITIES (EITHER SHOWN ON THE PLANS OR MARKED IN THE FIELD) IN ACCORDANCE WITH THE SPECIFICATIONS (REFERENCE SPECIFICATIONS SECTION 5-1)
12. EXCEPT FOR THOSE PORTIONS OF THE WORK COVERED BY ANY ATTACHED TRAFFIC PLANS, ALL TRAFFIC CONTROL SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED AS SHOP DRAWINGS IN ACCORDANCE WITH SECTION 7-10.1.1 OF THE SPECIFICATIONS.
13. CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER IMMEDIATELY IF A ONE FOOT VERTICAL SEPARATION (FROM OUTSIDE PIPE WALL TO OUTSIDE PIPE WALL) BETWEEN SEWER AND WATER CANNOT BE MAINTAINED.
14. CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER IMMEDIATELY IF A FOUR FOOT HORIZONTAL SEPARATION (FROM OUTSIDE PIPE WALL TO OUTSIDE PIPE WALL) BETWEEN SEWER AND WATER CANNOT BE MAINTAINED.
15. CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER IMMEDIATELY IF A 6 INCH VERTICAL SEPARATION (FROM OUTSIDE PIPE WALL TO OUTSIDE PIPE WALL) BETWEEN UTILITIES CANNOT BE MAINTAINED.

ABBREVIATIONS

ABAND	ABANDON	CONTR	CONTRACTOR	OVHD	OVER HEAD
ABAND'D	ABANDONED	DB	DIRECT BURIED	PVC	POLYVINYL CHLORIDE
AC	ASBESTOS CEMENT PIPE	EB	ENCASED BURIED	PROP	PROPOSED
		EL, ELEV	ELEVATION	RED	REDUCER
AHD	AHEAD	ELEC	ELECTRIC	RT	RIGHT
ASSY	ASSEMBLY	EX, EXIST	EXISTING	S̲L	SURVEY LINE
BK	BACK	F	FLANGE	SWR	SEWER
BTWN	BETWEEN	GV	GATE VALVE	TEL	TELEPHONE
CATV	CABLE TV	HP	HIGH PRESSURE	UNK	UNKNOWN
CI	CAST IRON PIPE	IE	INVERT ELEVATION	VC	VITRIFIED CLAY PIPE
C̲L	CENTER LINE	LT	LEFT	WM	WATER METER
COND	CONDUIT	MJ	MECHANICAL JOINT	WTR	WATER
CONT	CONTINUED	MTD	MULTIPLE TELEPHONE DUCT		

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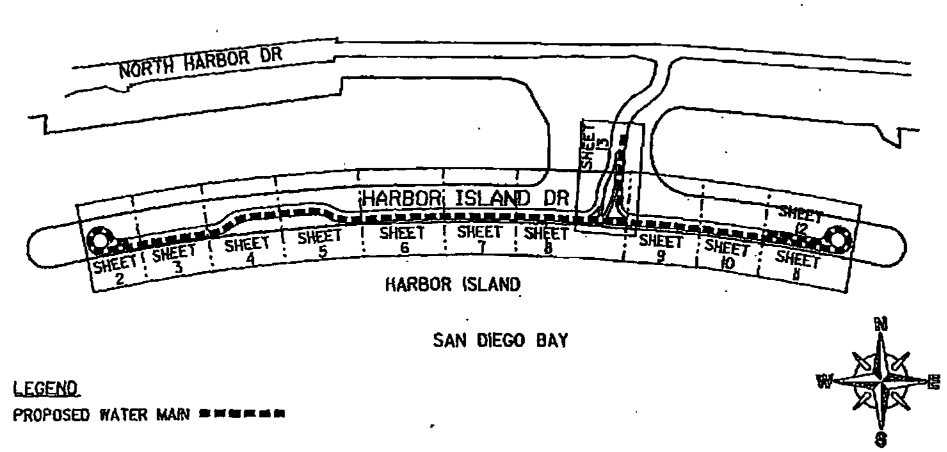
LIMITS OF WORK

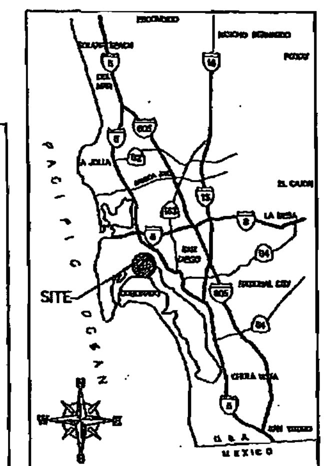
SHEET NO.	STREET	LIMITS	BLOCK NO.	PIPE SIZE (IN)	PIPE TYPE	LENGTH (FT)	FIELD BOOK	THOMAS BROTHERS MAPS	RETIREMENTS LENGTH (FT)	RETIREMENTS SIZE (IN)	RETIREMENTS MATERIAL	RETIREMENTS YEAR	FH 2 PT	FH 3 PT
2	HARBOR ISLAND DRIVE	STA 1+00 TO STA 10+00	—	12	WATER	900.00	E 21S	1288	557.00	8	AC	1967	—	2
3	HARBOR ISLAND DRIVE	STA 10+00 TO STA 17+00	—	12	WATER	700.00	E 21S	1288	—	—	—	—	—	—
4	HARBOR ISLAND DRIVE	STA 17+00 TO STA 25+00	—	12	WATER	800.00	E 21S	1288	—	—	—	—	—	—
5	HARBOR ISLAND DRIVE	STA 25+ 00 TO STA 33+00	—	12	WATER	800.00	E 21S	1288	—	—	—	—	—	—
6	HARBOR ISLAND DRIVE	STA 33+00 TO STA 41+00	—	12	WATER	800.00	E 21S	1288	—	—	—	—	—	—
7	HARBOR ISLAND DRIVE	STA 41+00 TO STA 49+00	—	12	WATER	800.00	E 21S	1288	—	—	—	—	—	—
8	HARBOR ISLAND DRIVE	STA 49+00 TO STA 57+00	—	12	WATER	800.00	E 21S	1288	—	—	—	—	—	—
9	HARBOR ISLAND DRIVE	STA 57+00 TO STA 65+00	—	12	WATER	800.00	E 21S	1288	5.00	10	AC	1967	—	—
10	HARBOR ISLAND DRIVE	STA 65+00 TO STA 71+00	—	12	WATER	600.00	E 21S	1288	—	—	—	—	—	—
11	HARBOR ISLAND DRIVE	STA 71+00 TO STA 78+00	—	12	WATER	700.00	E 21S	1288	—	—	—	—	—	—
12	HARBOR ISLAND DRIVE	STA 78+00 TO STA 86+27.46	—	12	WATER	827.02	E 21S	1288	—	—	—	—	—	—
13	HARBOR ISLAND DRIVE	STA 1+00 TO STA 6+77.90	—	16	WATER	577.90	E 21S	1288	10.00	10	AC	1967	—	2
14		CITY FORCES												
15		STREET RESURFACING												
16		BEST MANAGEMENT PRACTICES												
17		HORIZONTAL ALIGNMENT COORDINATE INDEX REPORT												

BENCHMARK: NEBP HAWTHORNE ST & N HARBOR DR
FIELD NOTES: FARNSWORTH/HACKNEY, 204-1701,11-30-98, W.O. 183351, SHT 7 OF 37
DATUM: MEAN SEA LEVEL
MAJOR STREET: HARBOR ISLAND DRIVE



LIMITS OF WORK TO BE DONE

KEY MAP
NO SCALE



VICINITY MAP
NO SCALE

EXISTING UTILITIES

- EX WATER MAIN & VALVES
- EX WATER METER
- EX FIRE HYDRANT — FH
- EX SEWER MAIN & MANHOLES
- EX DRAINS
- EX PAVEMENT (PROFILE)
- EX GROUND LINE (PROFILE)
- EX TRAFFIC SIGNAL — TS
- EX STREET LIGHT — SL
- GAS MAIN
- ELEC. COND., TEL. COND., CATV — E T C

WORK TO BE DONE

CONSTRUCTION OF HARBOR ISLAND WATER IMPROVEMENTS CONSISTS OF THE REPLACEMENT OF APPROXIMATELY 572 LINEAR FEET OF EXISTING 8-INCH AND 10-INCH AC WATER MAINS AND THE INSTALLATION OF APPROXIMATELY 7,970 LINEAR FEET OF 12-INCH WATER MAINS AND 578 LINEAR FEET OF 16-INCH WATER MAINS, AND ALL OTHER APPURTENANCES IN ACCORDANCE WITH THESE SPECIFICATIONS AND DRAWINGS NUMBERED 29977-01-D THROUGH 29977-17-D.

LEGEND

IMPROVEMENTS	STANDARD DRAWINGS	SYMBOL
WATER MAIN & APPURTENANCES	W-17, W-18, W-19, W-20, W-22, W-25, SDW-100, SDW-106	
VALVES WITH CAPS AND WELLS	SDW-100, W-12A, W-12B, SDW-109, W-18A	
6" FIRE HYDRANT ASSEMBLY & MARKER 2-WAY UNLESS SPECIFIED AS 3-WAY	W-10, W-11, SDW-100 W-19, W-19A, W-25	
WATER SERVICES	W-1, W-2, W-15, W-28, SDW-100, SDW-134, SDW-135, SDW-136, SDW-137	PROPOSED WATER WM P.L. (W)
SURVEY MONUMENT	M-10	△
HORIZONTAL ALIGNMENT COORDINATE POINT NUMBER		(789)

FOR ADDITIONAL SYMBOLS SEE RESURFACING, CURB RAMP, AND TRAFFIC CONTROL SHEETS.

OFFICE COPY

CANCELLED

SAN DIEGO UNIFIED PORT DISTRICT
ARCHITECTURAL & MAPPING SERVICES
TENANT PROJECT NO. 007, 012-2199
REGIONAL PROJECT NO. ______
GENERAL CONTROL NO. ______
APPROVED AS NOTED: ______
THIS IS NOT A BUILDING PERMIT
BRUCE B. HOLLINGSWORTH
EXECUTIVE DIRECTOR
BY ______
DATE ______

CONCEPT

HARBOR ISLAND WATER IMPROVEMENTS

PERMIT:	PERMIT NO.
PERMIT:	PERMIT NO.
PERMIT:	PERMIT NO.
FUNDING: CIP 73-847.3	SPEC. NO.

AS-BUILT INFORMATION

MATERIALS	MANUFACTURER
PIPE CL 150 (WATER)	-
PIPE SDR 35 (SEWER)	-
GATE VALVES	-
FIRE HYDRANTS	-
SEWER MANHOLES	-

FOR CITY ENGINEER
ASSOCIATE ENGINEER
INSPECTOR

PLANS FOR THE CONSTRUCTION OF HARBOR ISLAND WATER IMPROVEMENTS COVER SHEET

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 1 OF 17 SHEETS

WATER W.O. 183351
SEWER W.O.

FOR CITY ENGINEER DATE

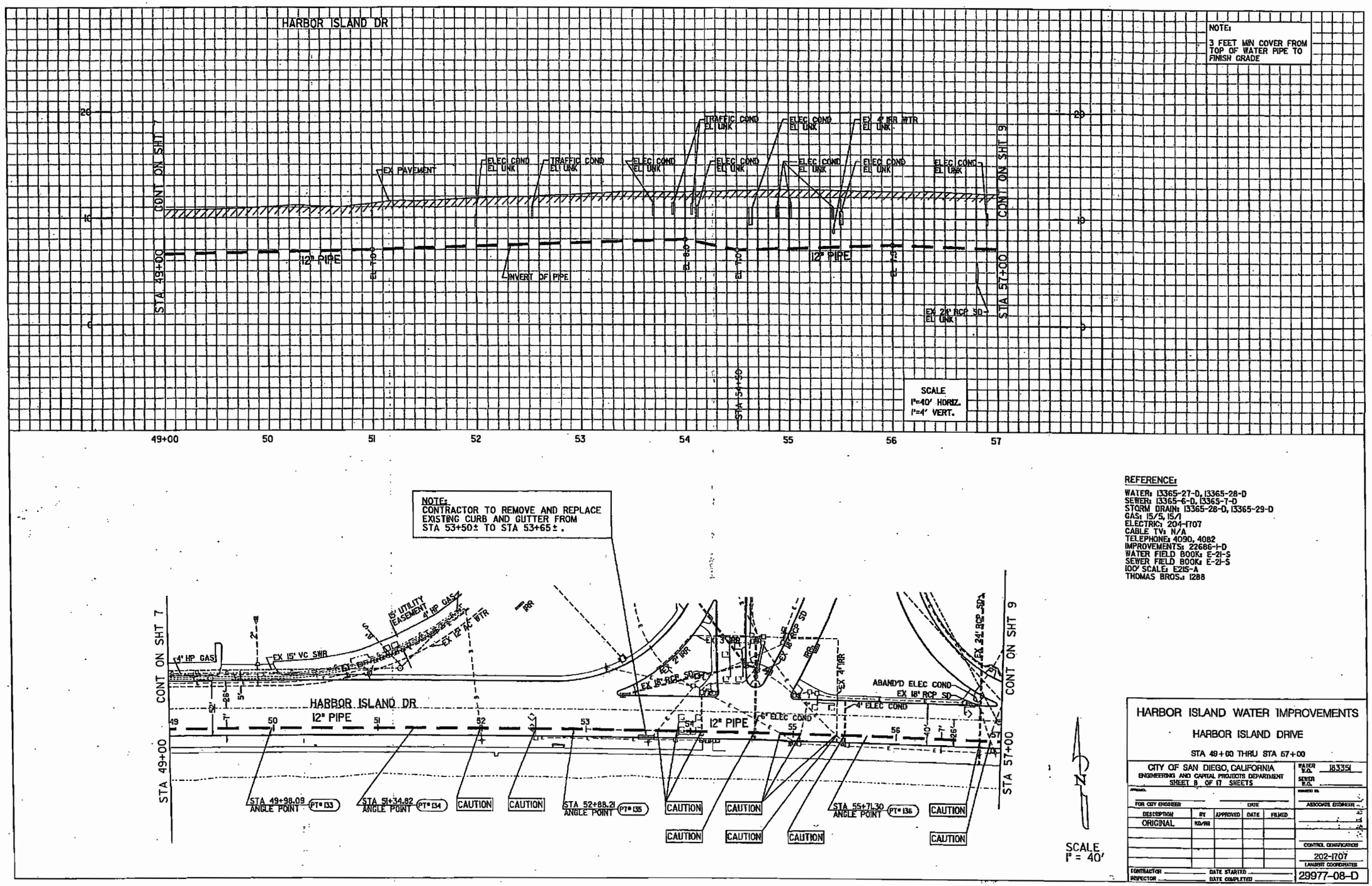
DESCRIPTION	DRAWN BY	DATE	FILMED
ORIGINAL	ND/RH		

ASSOCIATE ENGINEER
PROJECT ENGINEER
CONTROL CERTIFICATION
202-1701
LAMBERT COORDINATES

CONTRACTOR ______ DATE STARTED ______
INSPECTOR ______ DATE COMPLETED ______

29977-01-D

57791



REFERENCE:
WATER: 13365-27-D, 13365-28-D
SEWER: 13365-6-D, 13365-7-D
STORM DRAIN: 13365-28-D, 13365-29-D
GAS: 15/5, 15/1
ELECTRIC: 204-1707
CABLE TV: N/A
TELEPHONE: 4090, 4082
IMPROVEMENTS: 22686-1-D
WATER FIELD BOOK: E-21-S
SEWER FIELD BOOK: E-21-S
100' SCALE: E215-A
THOMAS BROS.: 1288

HARBOR ISLAND WATER IMPROVEMENTS

HARBOR ISLAND DRIVE

STA 49+00 THRU STA 57+00

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 8 OF 17 SHEETS

WATER W.O. 183351
SEWER W.O.

APPROVED: FOR CITY ENGINEER — DATE
ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	KD/RH			

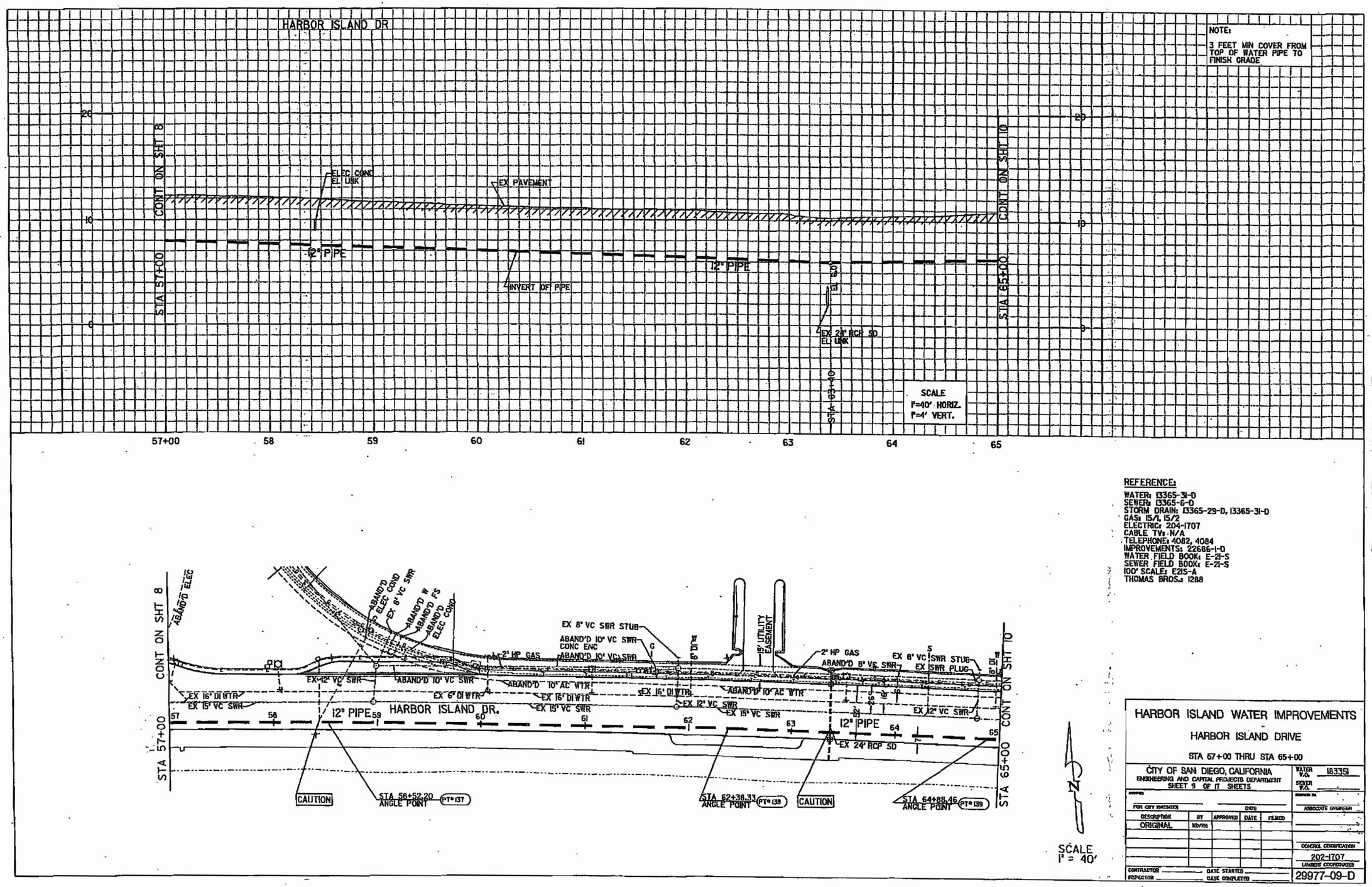
CONTROL CERTIFICATES
202-1707
LAMBERT COORDINATES
29977-08-D

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

HARBOR ISLAND DRIVE

57791

712



REFERENCE:

WATER: 13365-31-D
SEWER: 13365-6-D
STORM DRAIN: 13365-29-D, 13365-31-D
GAS: 15/1, 15/2
ELECTRIC: 204-1707
CABLE TV: N/A
TELEPHONE: 4082, 4084
IMPROVEMENTS: 22686-1-D
WATER FIELD BOOK: E-21-S
SEWER FIELD BOOK: E-21-S
100' SCALE: E215-A
THOMAS BROS.: 1288

HARBOR ISLAND WATER IMPROVEMENTS

HARBOR ISLAND DRIVE

STA 57+00 THRU STA 65+00

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 9 OF 17 SHEETS

WATER W.O. 183351
SEWER W.O.

APPROVED FOR CITY ENGINEER
ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	KDVRN			

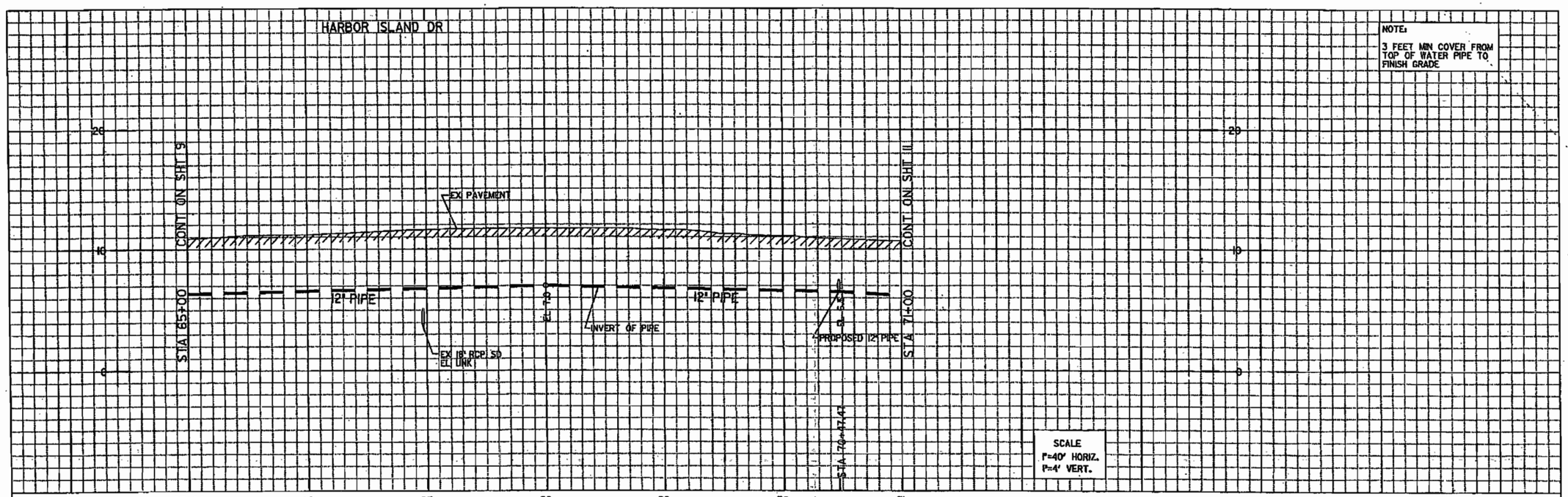
CONTROL CERTIFICATION
202-1707
LAMBERT COORDINATES
29977-09-D

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

HARBOR ISLAND DRIVE

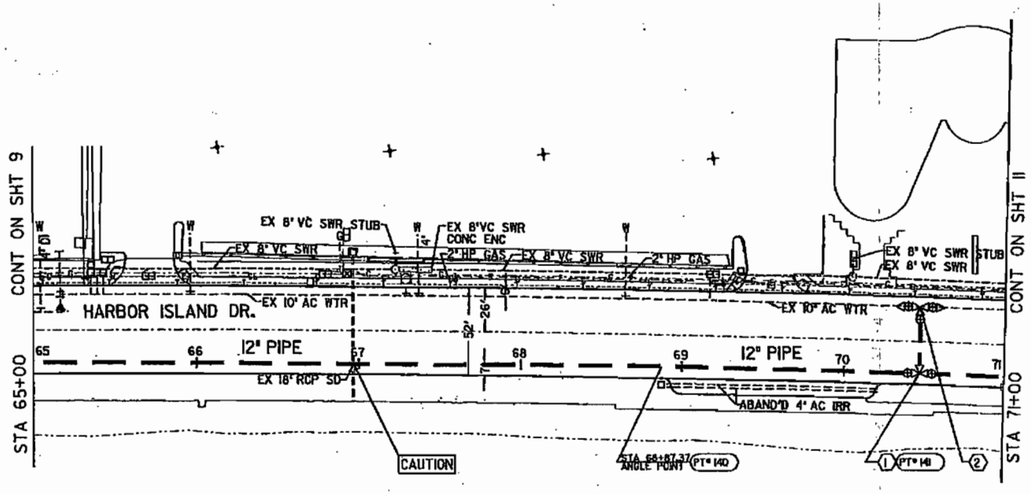
57791

713



NOTE:
3 FEET MIN COVER FROM TOP OF WATER PIPE TO FINISH GRADE

SCALE
1"=40' HORIZ.
1"=4' VERT.



REFERENCE:
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SEWER: 13365-7-D
STORM DRAIN: 13365-31-D
GAS: 15/2
ELECTRIC: 204-1710
CABLE TV: N/A
TELEPHONE: 4084
IMPROVEMENTS: 22686-1-D
WATER FIELD BOOK: E-21-S
SEWER FIELD BOOK: E-21-S
100' SCALE: E21S-B
THOMAS BROS.: 1288

① BY CONTRACTOR
STA 70+47.47
FURNISH & INSTALL:
1 - 12" TEE(F)
2 - 12" VALVES(F, MJ) BK, AHD
40'± 12" PIPE, CLASS 150, LT
PT# 141

② BY CITY FORCES
AHEAD OF CONTRACTOR
STA 70+47.47, 40'± LT
CUT IN:
1 - 12" TEE(F, F, MJ)
3 - 12" VALVES(F) BK, AHD, RT
2 - 12" X 10" REDUCERS(F, MJ) BK, AHD
CONTRACTOR TO FURNISH MATERIALS AND MAKE CONNECTION.

SCALE
1" = 40'

HARBOR ISLAND WATER IMPROVEMENTS

HARBOR ISLAND DRIVE

STA 65+00 THRU STA 71+00

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 10 OF 17 SHEETS

WATER W.O. 183351
SEWER W.O.

FOR CITY ENGINEER — DATE — ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	RD/RR			

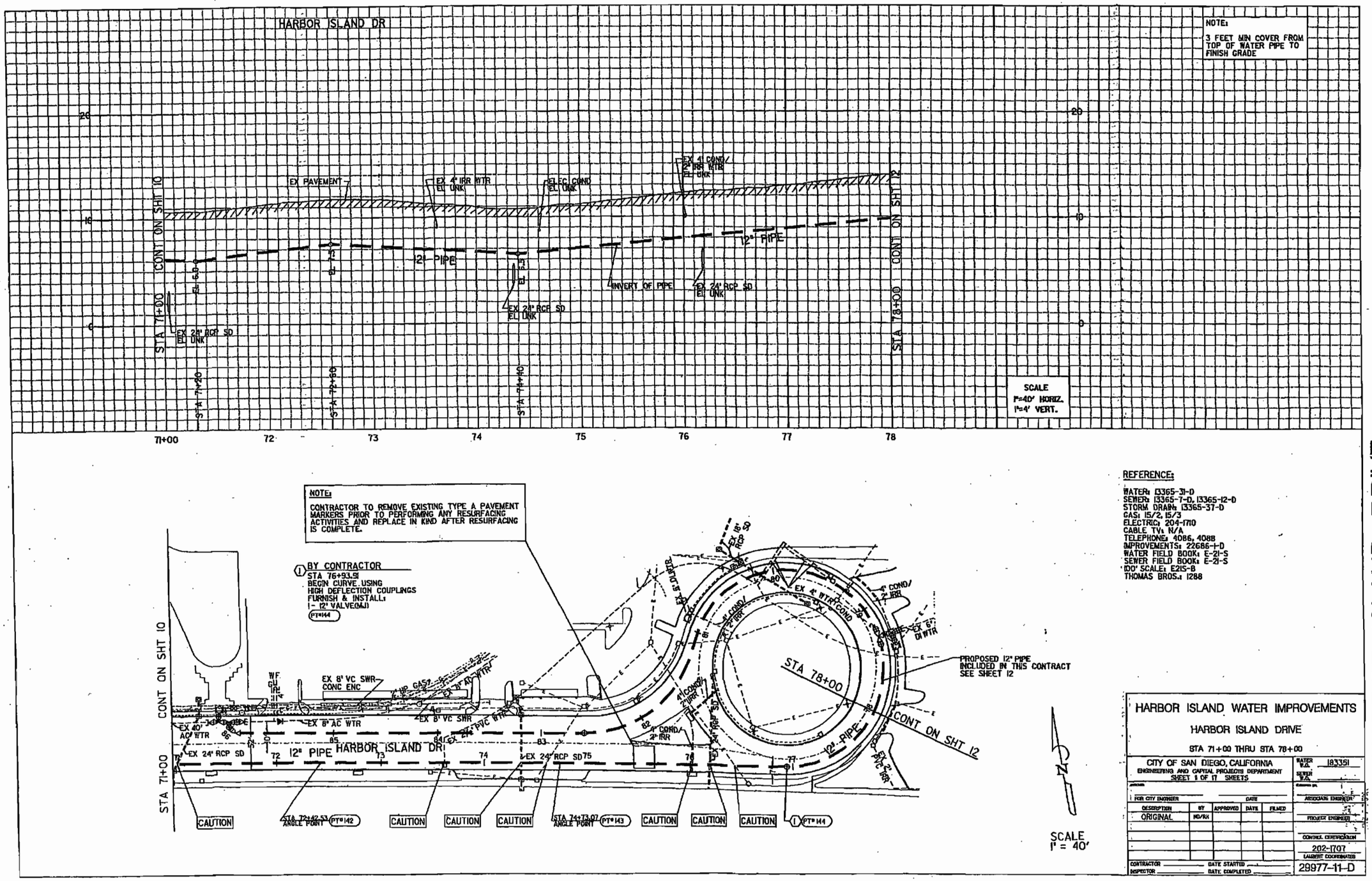
CONTROL CERTIFICATION
202-1701
LAMBERT COORDINATES
29977-10-D

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

HARBOR ISLAND DRIVE

57791

714



REFERENCE:

WATER: 13365-31-D
SEWER: 13365-7-D, 13365-12-D
STORM DRAIN: 13365-37-D
GAS: 15/2, 15/3
ELECTRIC: 204-1710
CABLE TV: N/A
TELEPHONE: 4086, 4088
IMPROVEMENTS: 22686-1-D
WATER FIELD BOOK: E-21-S
SEWER FIELD BOOK: E-21-S
100' SCALE: E21S-B
THOMAS BROS.: 1288

HARBOR ISLAND WATER IMPROVEMENTS

HARBOR ISLAND DRIVE

STA 71+00 THRU STA 78+00

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 1 OF 17 SHEETS

WATER W.O. 183351
SEWER W.O.

FOR CITY ENGINEER _____ DATE _____

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	MO/RH			

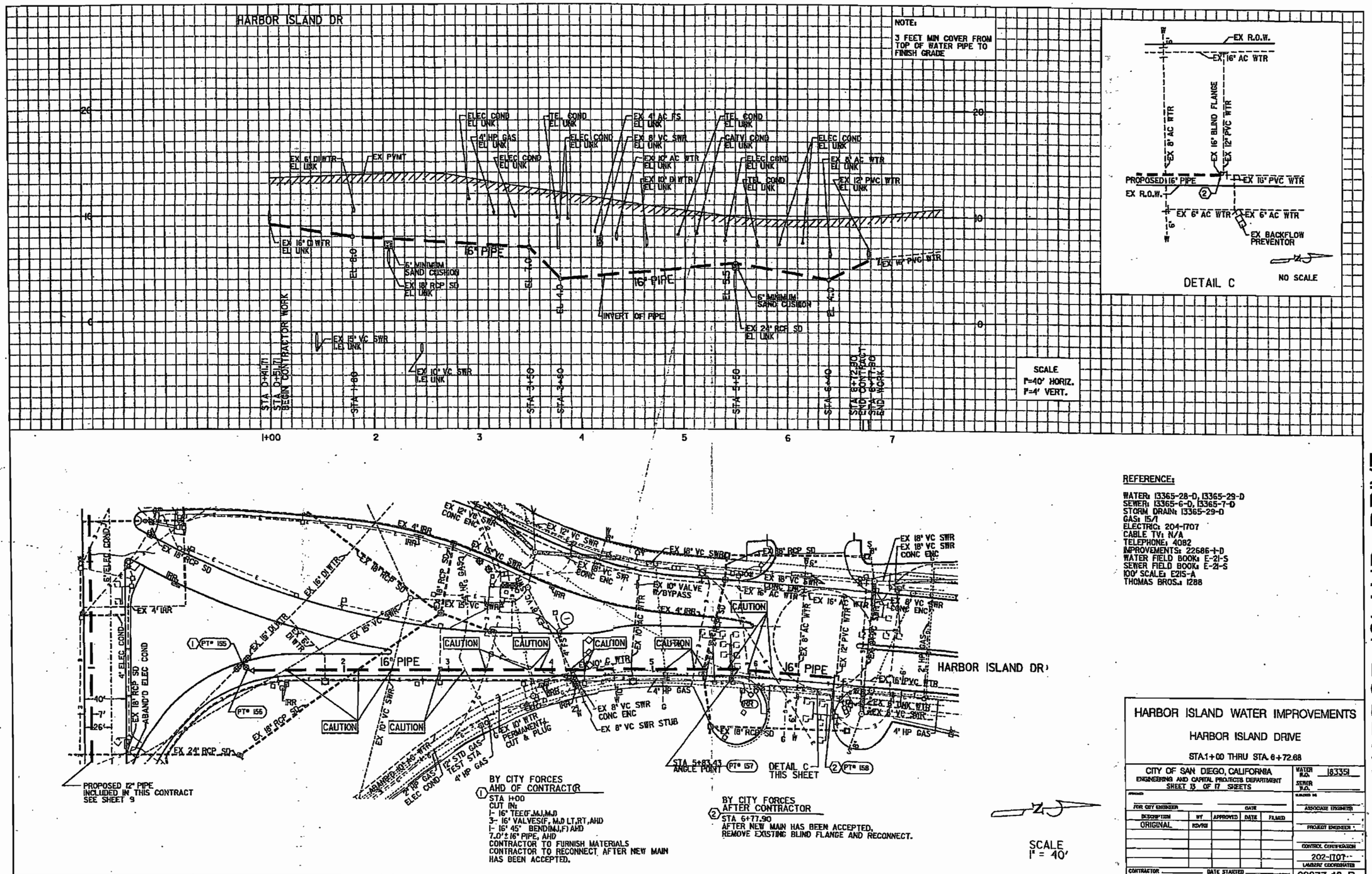
ASSISTANT ENGINEER
PROJECT ENGINEER
CONTROL CERTIFICATION
202-1707
LAUREN COORDINATED
29977-11-D

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

HARBOR ISLAND DRIVE

52751

715



REFERENCE:

WATER: 13365-28-D, 13365-29-D
SEWER: 13365-6-D, 13365-7-D
STORM DRAIN: 13365-29-D
GAS: 15/1
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WATER FIELD BOOK: E-21-S
SEWER FIELD BOOK: E-21-S
100' SCALE: E21S-A
THOMAS BROS.: 1288

HARBOR ISLAND WATER IMPROVEMENTS

HARBOR ISLAND DRIVE

STA.1+00 THRU STA. 6+72.68

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 13 OF 17 SHEETS

WATER W.O. 183351
SEWER W.O.

APPROVED FOR CITY ENGINEER — DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	KD/VGI			

ASSOCIATE ENGINEER
PROJECT ENGINEER
CONTROL CERTIFICATION
202-1707
LAUREN' COORDINATES
29977-13-D

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

HARBOR ISLAND DRIVE

57791

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FIGURE 2-1
PEAK HOUR DEMAND FACTOR

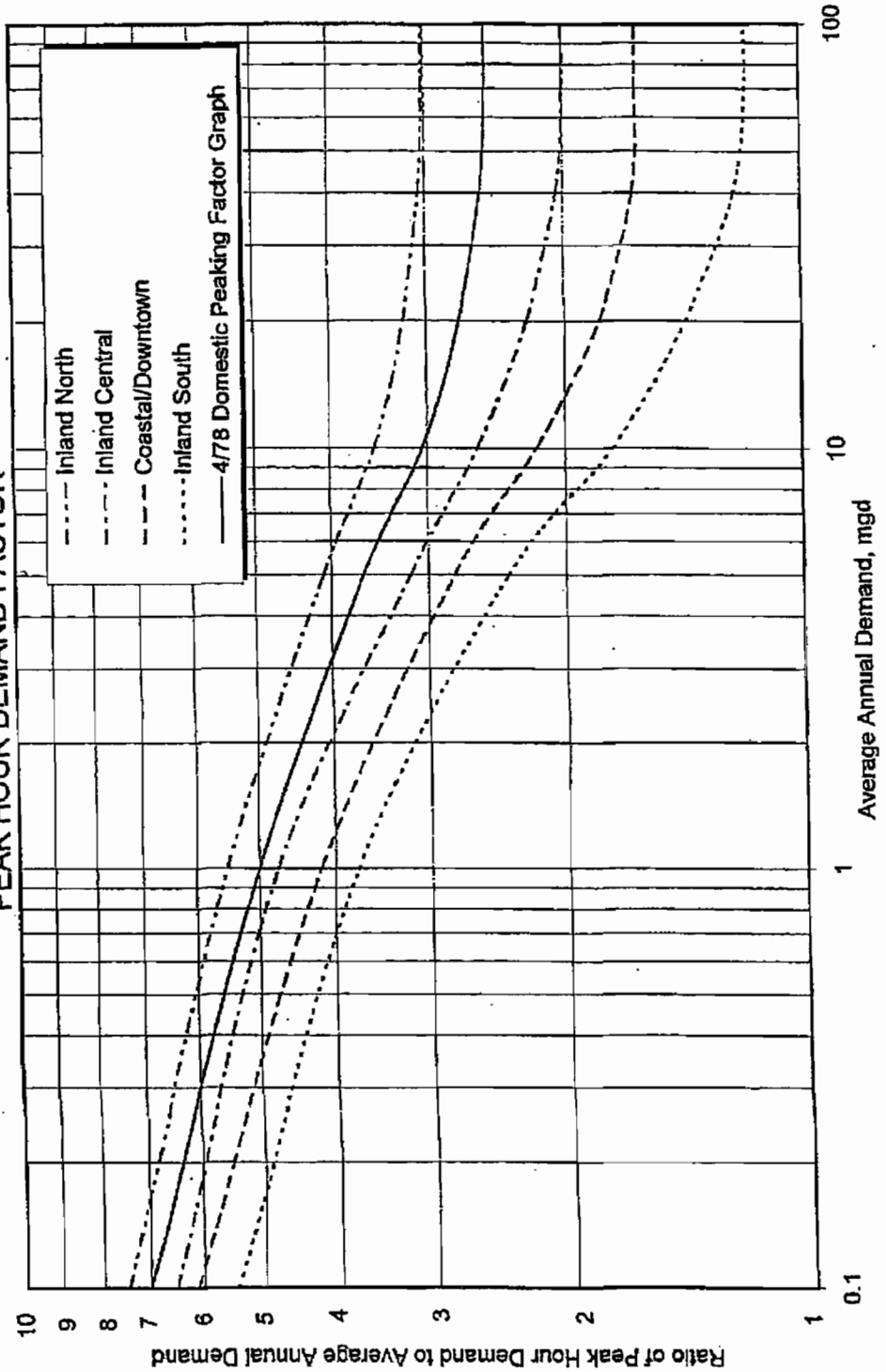

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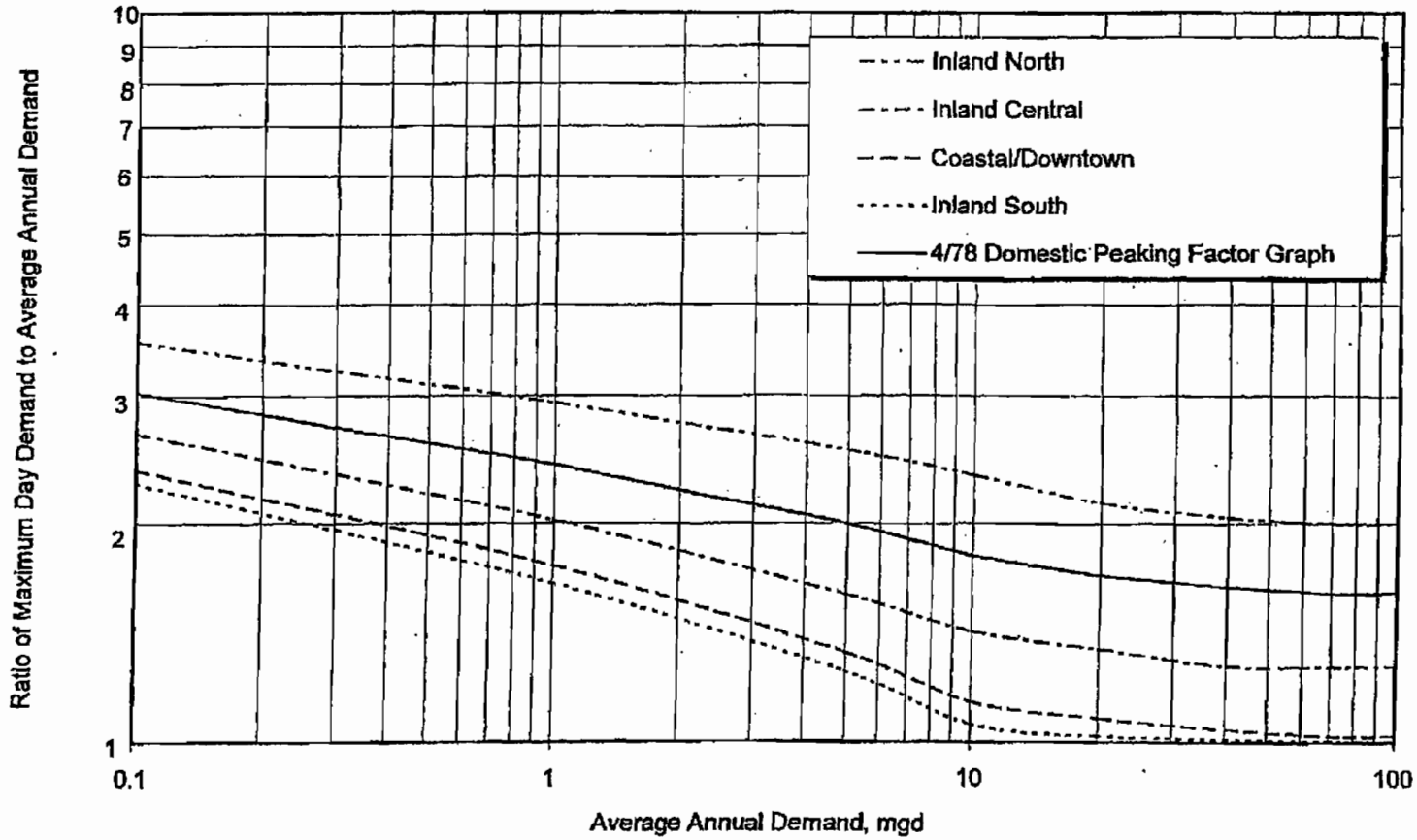
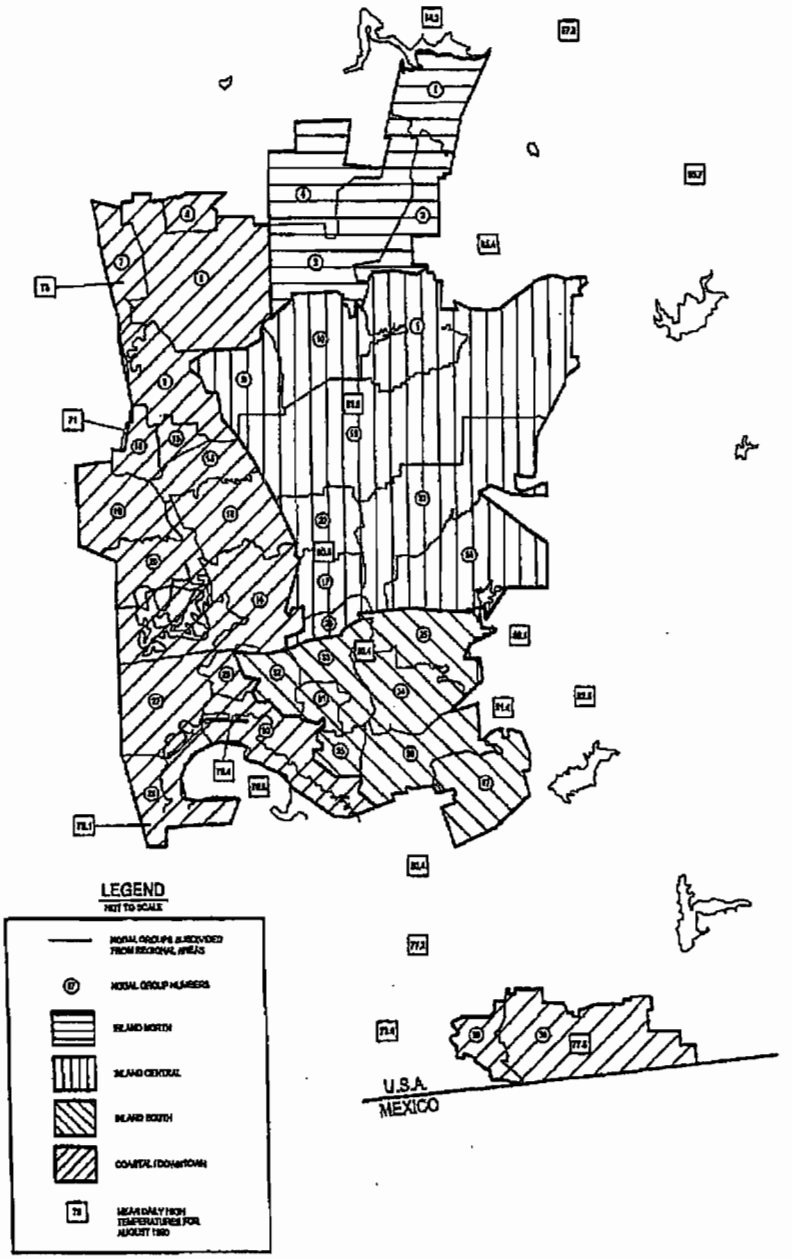
FIGURE 2-2
MAXIMUM DAY DEMAND FACTOR



57791
718

PEAKING FACTOR ZONES
(BOUNDARIES BASED ON LAND USE GROUPINGS)

FIGURE 2-3



July 1999

57791

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Appendix I-2

Sewer Study

57791

SEWER STUDY

FOR

HARBOR ISLAND HOTEL

P.T.S 177921

CITY OF SAN DIEGO, CALIFORNIA

MARCH 26, 2009
Revised: May 11, 2009

Prepared for:
Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

Prepared By:

LATITUDE 33 PLANNING AND ENGINEERING
4933 Paramount Drive, Second Floor
San Diego, CA 92123
Voice (858) 751-0633
Fax (858) 751-0634
(JOB NO. 859.0)

REGISTERED PROFESSIONAL ENGINEER
CLIFFORD JOHN EARDENSOHN II
No. 34584
Exp. ~~09-30-09~~
CIVIL
STATE OF CALIFORNIA

5/11/09

C. John Eardensohn RCE 34584
Registration Expires 9-30-2009

PREPARED BY: NAB
CHECKED BY: NAB

57791

721

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	PROJECT DESCRIPTION	1
III.	METHODOLOGY	1-2
IV.	ANALYSIS	2
V.	CONCLUSION	3

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• ESTIMATE OF SEWER FLOWS	APPENDIX 2
• HOTEL LATERAL SIZING	APPENDIX 3
• HYDRAULIC CALCULATIONS	APPENDIX 4
• PIPE CAPACITY SUMMARY	APPENDIX 5
• REFERENCE DRAWINGS	APPENDIX 6

57791

I. INTRODUCTION

The proposed Harbor Island Hotel project is a development within the San Diego Unified Port District (SDUPD) jurisdiction. The project includes the construction of a 4-story hotel, and associated site improvements.

II. PROJECT DESCRIPTION

This sewer study has been prepared in support of the design of the public sewer facilities associated with the construction of this project. The public sewer system is owned and maintained by the City of San Diego.

The existing public sewer was constructed in 1967 and was aligned under the roadway (Harbor Island Drive). The road alignment was subsequently changed and the sewer is no longer under the road. The proposed hotel will be sited over the existing sewer alignment. The sewer will be realigned to allow construction of the hotel and correspond with the realignment of Harbor Island Drive.

Existing Condition

Currently the project site is developed and includes a marina and associated parking areas. Contiguous to and east of the project site is another lease hold currently developed with two restaurants. The project site is served by an existing 8-inch vitrified clay sewer main constructed per SDUPD drawing #926. There are no records of any existing public sewer easements on the site.

Proposed Project

The proposed project includes the construction of a 4-story hotel. The existing marina and off site restaurants will also remain. The existing onsite public sewer will be removed. A new 8-inch pvc public sewer will be constructed to serve the existing and proposed improvements. The public sewer will begin in front of the existing restaurants and continue westerly through Harbor Island Drive, eventually reconnecting with the existing public sewer. The existing restaurants will connect at the easterly end of the realigned public main. The existing marina and proposed hotel will connect to the public sewer at points within Harbor Island Dr.

III. METHODOLOGY

This sewer study has been prepared in general conformance with the City of San Diego Sewer Design Guide, dated June 11, 2001 (2004 Edition). This study will estimate the sewer flows (on-site and Offsite) for the proposed project. In addition, this sewer study will evaluate the existing 8-inch public sewer main in Harbor Island Dr. to confirm its conformance to City of San Diego standards. The following City of San Diego hydraulic requirements/standards for public sewer mains will be verified:

1. The ratio of depth of flow in the main (dn) to the diameter of main (D) or dn/D < 0.5 for wet weather flows – Section 1.3.3.1 on page 1-6

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2. The minimum cleansing velocity (V) is greater than or equal to 2 feet per second or $V \geq 2$ f.p.s. – Section 1.3.3.3 on page 1-6

IV. ANALYSIS

The analysis consists of estimating the sewer flows (on-site) for the existing condition and the proposed project. In addition, the analysis will include an evaluation of the existing 8-inch public sewer main in Harbor Island Drive for the proposed condition.

Existing Condition Sewer Flow

The existing sewer generation was analyzed to provide a baseline to compare the flows from the proposed improvements. The existing off-site sewer flows were determined by using the Equivalent Population shown in Table 1-1 of the Sewer Design Guide (see calculations in Appendix 2).

Existing Condition Sewer Flow

The existing public system in Harbor Island Drive was evaluated by estimating sewer flows for the existing site and adjacent property based on fixture units. The estimated on-site flows for the project were estimated by using the zoning/land use and the Equivalent Population shown in Table 1-1 of the Sewer Design Guide, page 1-12. The exact points at which the marina connects to the public sewer main are unknown. Based on the lateral locations shown on SDUPD dwg # 926, it was assumed that half of the flow from the marina enters the public system at MH 32 and the remaining flows enter at MH 31. See Appendix 2 for the existing condition sewer flow calculations.

Proposed Project Flow

The existing public system in Harbor Island Drive was evaluated by estimating sewer flows based on a combination of the existing condition as described above plus an estimate of the on-site sewer flow for the proposed project. The proposed condition analysis was based on the proposed number fixture units for this project. This method provides a more representative sewer flow compared to using the figures from the Table 1-1 of the City of San Diego's Sewer Design Guide because the proposed project size and scope are well defined. The proposed hotel project will discharge to the pubic main in Harbor Island Drive at one point via an 8" lateral in reach 2. The sewer flows from the proposed hotel will combine with the flows from the existing restaurants at the west end of the proposed project in the vicinity of MH C. Using a peak factor of 1.5, the proposed wet weather peak flow from the 2 restaurants, the proposed hotel and the existing marina are 75,180 gpd, 99,480 gpd, and 42,561 gpd, respectively.

Evaluation of the Harbor Island Drive Existing Sewer Main

The existing 8-inch public sewer main in Harbor Island Drive was evaluated for the proposed project identified above. The existing public sewer system has segments/reaches that convey different amounts of sewer flow and/or have different pipe gradients/slopes. The evaluation of the existing system is limited to verifying that the City of San Diego's requirement for minimum cleansing velocity (V greater than or equal to 2 f.p.s.) and maximum depth of flow to diameter of pipe (dn/D not to exceed 0.5) is met. Information about the existing sewer pipe was obtained from SDUDP drawings #926 and #1468. Refer to Appendix 6 (copy of as-built plans) for

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identification of the segments/reaches analyzed. The existing system was analyzed from the proposed connection just west of the proposed hotel (MH 33) westerly in Harbor Island Drive up to the existing 15" VCP sewer (MH 4). The hydraulic calculations are summarized in Appendix 1.

V. CONCLUSION

This sewer study has included an estimate of the sewer flows for the proposed project. The estimates of sewer flow within this report include an estimate of offsite flows from existing uses as well as onsite flows from the proposed project. The evaluation of the existing 8" v.c. public sewer adjacent to the project demonstrates that the existing public sewer main will maintain the City of San Diego's minimum cleansing velocity and maximum dn/D requirements in accordance with the City of San Diego Sewer Design Guide, dated June 11, 2001 (2004 Edition) for the proposed project identified herein. The existing public sewer run is constrained by fixed elevations near the restaurants to the east, and the existing system to the west. The existing public system is characterized by minimal pipe slopes, low cleansing velocities and is currently located outside of the public roadway. The proposed pipe is to be realigned within a relocated Public Roadway, and the resulting pipe slope of the new public sewer is increased, contributing to increased velocities and better pipe capacity. The proportion of the realigned sewer easterly of MH B will be outside of the proposed public street dedication and therefore will be a private sewer main. The analysis also identified the necessary lateral size for the hotel connection as an 8" diameter service (see Appendix 3). The proposed 8" line is of sufficient capacity to handle the increased sewer demand (as demonstrated in the supporting calculations), and will support acceptable pipe velocities. Therefore the proposed project does not cause any significant impacts to the existing offsite public 8-inch sewer system.

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Appendix 1

SEWER MAP

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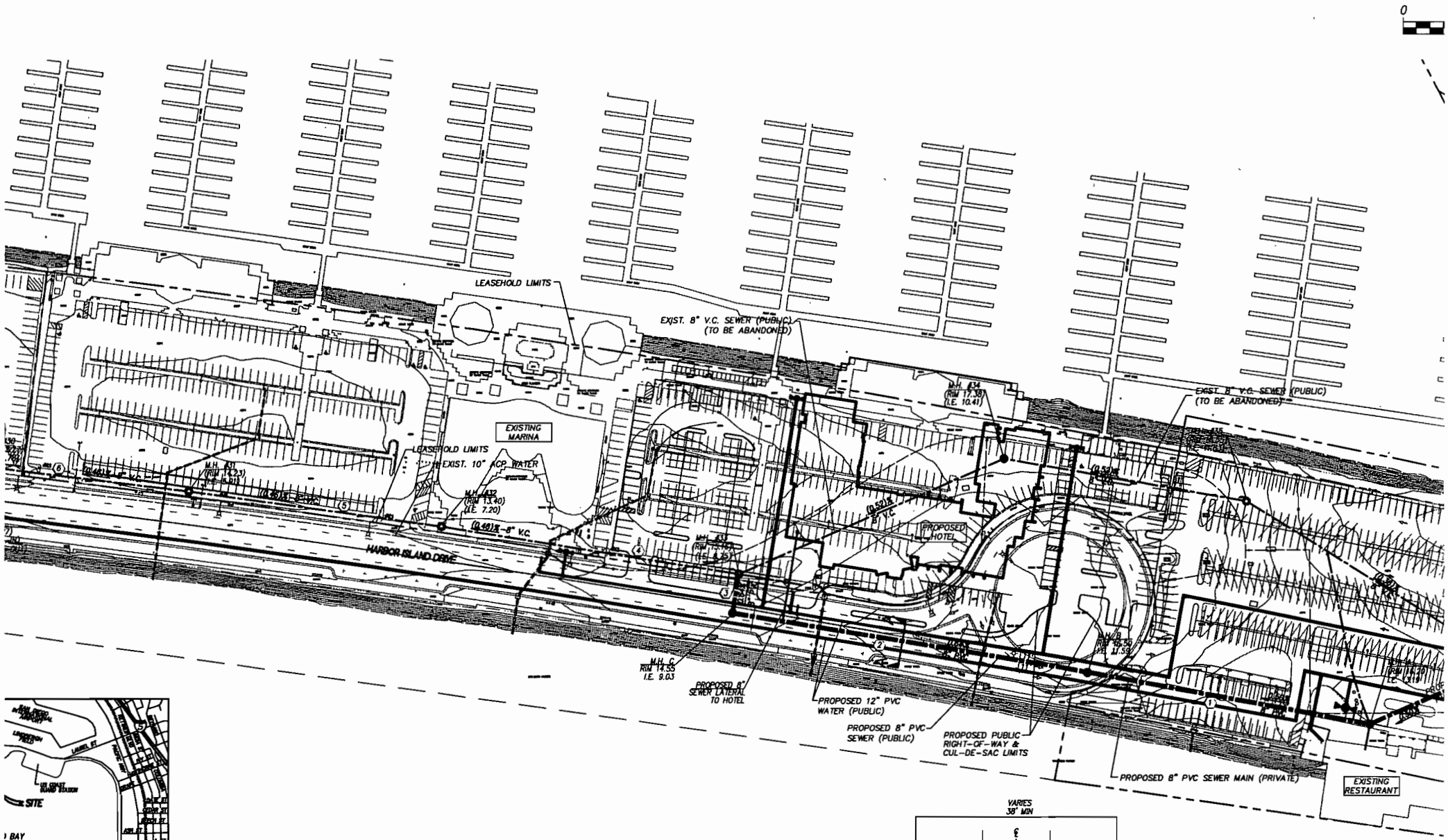
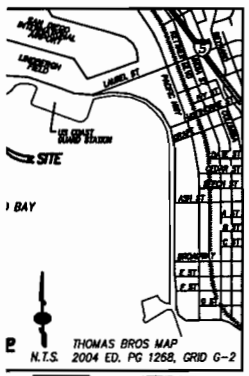
HARBOR ISLAND SEWER STUDY MAP

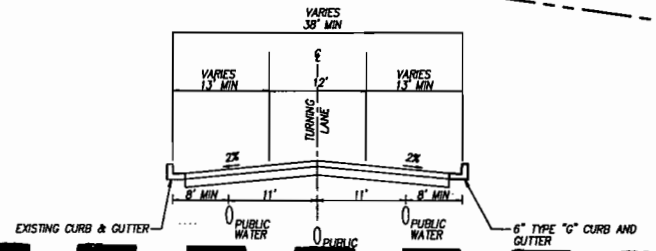




LEGEND

- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- REACH NUMBER
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- [redacted]ASEHOLD

M.H. #32 ..... EXISTING MH ID (IF AVAILABLE)
(RIM 13.40) ..... EXISTING RIM ELEVATION
(I.E. 7.20) ..... EXISTING INVERT
M.H. A ..... PROPOSED MH ID
RIM 15.20 ..... PROPOSED RIM ELEVATION
I.E. 13.43 ..... PROPOSED INVERT



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