

Shiva-Vishnu Temple

Om Namah Shivaya Om Namo Narayanaya

**Hindu Community and Cultural
Center**

1232 Arrowhead Ave, Livermore, CA 94551

A Non-Profit Organization since 1977

Tax ID# 94-2427126; Inc #D0821589

Tel: 925-449-6255; Fax: 925-455-0404

Web: <http://www.livermoretemple.org>

ATTACHMENT - 3

**Evaluation of Traffic Conditions
(Revised September 2009)**



September 30, 2009

Mahendra Patel, Assistant Civil Engineer
City of Livermore
1052 Livermore Avenue
Livermore, CA 94550

**Re: Comments on Evaluation of Traffic Conditions Report for the
Shiva-Vishnu Temple Expansion**

The following is our response to your comments on our "Evaluation of Traffic Conditions" for the Shiva-Vishnu Temple Expansion. We have numbered the comments in accordance with your letter of September 9, 2009.

- 1.) We did not have any background traffic counts on Springtown Boulevard that were taken on a day where a special event was held at the temple. While we do have a PM weekday count, this is really not relevant because the Temple does not generate any traffic during the weekday commute peak hours. Therefore, the study was limited to the nearby neighborhood streets that are used by Temple visitors.

The "special event" problem that you have described occurs very infrequently (almost exclusively on weekends) and often at different times of the day, and during very different times of the year (holidays). This is a traffic analysis that would involve a permit for special events. The Temple currently has traffic control personnel that direct traffic, and show people where to park during these events.

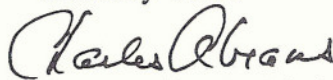
Where a "special event" could possibly be large enough to cause traffic concerns, a plan can be provided that would involve temporary signing, police support, temporary parking, traffic management plans, etc. We do not believe that any of the previous Temple events would have required such a plan.

- 2.) The same issue relates to the intersections on Vasco Road. There are no background counts available for the times that special events were held.
- 3.) There are no standard guides for estimating the trip generation of such a land use. We used our professional judgment to estimate the trip generation based on an extrapolation of the traffic volumes and parking conditions during a typical Saturday service. The estimated trip distribution was based on the driveway turning movement counts and observations on a Saturday.
- 4.) Thank you. These changes can be made in subsequent reports.
- 5.) Thank you. These changes can be made in subsequent reports. The traffic counts were conducted on Saturday, August 8.

- 6.) The queuing analysis and a discussion of the results has been included in the Synchro model data that was transmitted to you.
- 7.) This traffic problem involves a “one-time” event which involves very different factors. If another event such as this is planned, the Temple would be pleased to work with the City on temporary signing, police support, temporary parking, traffic management, etc. The problem you discuss could perhaps be mitigated by having temporary traffic controls and signs, or perhaps by having the Temple spread the special event activities over a longer time period.
- 8.) There is no specific data on the number of cars that are parked on site during a festival. While the parking lots do appear to have about a 400-vehicle capacity for parking, the number of parked cars at any one time is significantly less, since the Temple visitors are staggered throughout the day.

The revised report has been provided to the applicant, and they are submitting it as a part of their application on September 30, 2009. A copy of this report has also been attached to this letter.

Sincerely Yours



Charlie Abrams, Principal
Abrams Associates Traffic Engineering

cc Bob Vinn, Planning Department, City of Livermore

Evaluation Of Traffic Conditions

Abrams Associates
Transportation • Traffic • Engineering • Planning

Shiva-Vishnu Temple Expansion in the City of Livermore

Prepared for:

Hindu Community and Cultural Center, Inc.
1232 Arrowhead Avenue
Livermore, CA 94551

Prepared by:

Abrams Associates
1660 Olympic Boulevard, Suite 210
Walnut Creek, CA 94596

REVISED SEPTEMBER, 2009

HCCC – Shiva Hindu Temple City of Livermore

Evaluation of Traffic Conditions

Summary and Findings

The current operations at the Shiva Hindu Temple generate only 2 vehicles per hour during the weekday AM and PM peak hours. The project could add about 6 new vehicle trips. A check of the capacity calculations reveal that this change in traffic is well below the threshold where a change in the v/c ratio would be noted. About 25 vehicles per hour at a specific approach would be required before there would be any change to the intersection capacity in the AM or PM commute weekdays.

The Saturday services generate 141 vehicles during the highest hour of activity. The proposed project could add an estimated 27 vehicle trips to this traffic. Studies of the delay and queue lengths show very little impact and very minor impact by the additional traffic. No mitigations would be required.

Special events and festivals can generate about twice this amount of activity, or about 280 vehicles an hour. The project itself could add an additional 60 vehicle trips per hour to this traffic. During these conditions, there will be some short 15-minute periods where there is congestion and delay at the project entrance on Arrowhead Avenue, and possibly on Bluebell Drive. For these festivals and special events, it is recommended that the Temple, in cooperation with the City, develop a traffic control plan and parking plan to accommodate any unusual conditions.

Project Description

The project involves the expansion of the Hindu Temple onto the currently vacant parcel to the south. The existing temple property covers 12 acres. The project includes two new buildings plus additional parking, along with the elimination of the current unimproved gravel surface and the addition of 152 new parking spaces. **Figure 1** shows the proposed site plan.

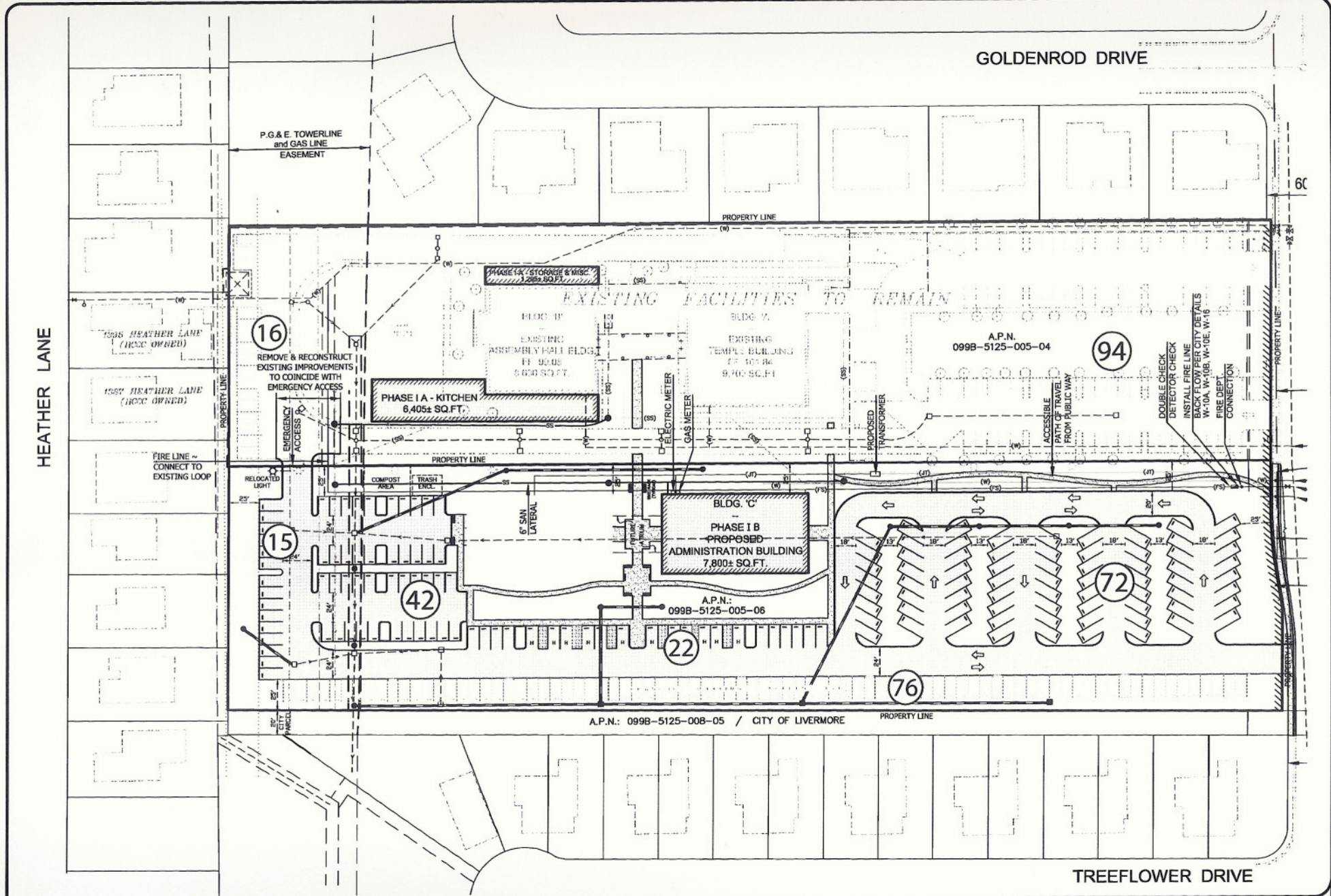


FIGURE 1 | PROJECT SITE PLAN
TRAFFIC IMPACT STUDY
HINDU TEMPLE
 City of Livermore

The proposed project Temple is at 1232 Arrowhead Lane in the City of Livermore. The development of the proposed project will be done in two phases. The first phase involves the expansion of the existing assembly hall project. The second phase comprises two new buildings with a total of 15,600 square feet and a 152 space parking lot. The new project will be constructed alongside (to the south) of the existing temple. The existing property includes a Temple Sanctuary and Assembly Building with a total of 18,500 square feet, and a 106 space parking lot. **Figure 1** shows the proposed site plan. This traffic analysis is based on the entire project, and assumes both phases have been completed.

The Temple has outlined the plan for the use of the facilities, and provided a description of the rationale for the project. This document has been included in the letter of application. Table 1 below provides a list of the activities and services at the Hindu Temple.

Table 1
Hindu Temple –Facilities and Operation

A. Project Description

Description	Existing	Phase II	Total
Total Land	12 acre	12 acre	12 acre
Building A: Temple area in ft ²	9,800	9,800	9,800
Building B: Assembly Hall area in ft ²	8,605	7,736	16,341
Building C: Administration area in ft ²	0	8,000	7,800
Building D: Class rooms, Guest Rooms	0	7,800	7,800
Permanent Parking Spaces	106	152	258

B. Hours of Operation

Days	Hours of Operations
Monday through Thursday	9:00 to 12:00 noon and 6:00 to 8:00 pm
Friday to Sunday and Holidays	9:00 am to 8:00 pm

C. Functions and Number of Attendees

Assembly Hall Ancillary Uses	Existing	After Project
	Functions per month/ ave attendees per function	
Wedding per month	4 / 150	6 / 250
Culture Programs	1 / 100	2 / 150
Religious Discourses	1 / 60	2 / 100
Youth Education	1 / 60	1 / 60
Religious Festivals 8 per year	0.7 / 300	0.7 / 300
Committee Meeting 4 per year	0.3 / 150	0.3 / 150
Health Fair 2 per year	0.2 / 300	0.2 / 300
Health Advisory Clinic per month	2 / 20	2 / 20

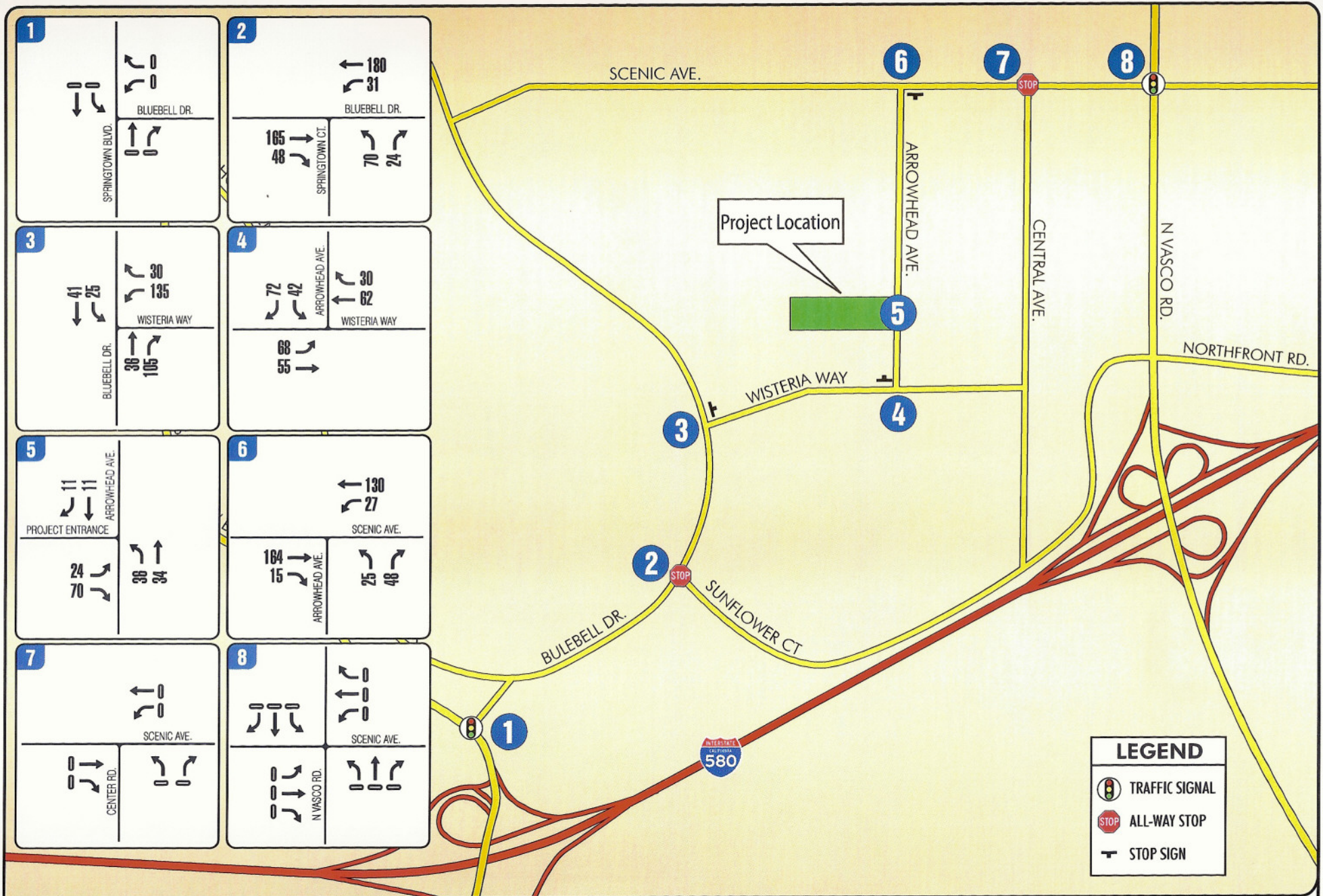


FIGURE 2 | EXISTING TRAFFIC VOLUMES (SATURDAY 10 ~ 11AM)
TRAFFIC IMPACT STUDY
HINDU TEMPLE
 City of Livermore

Existing Traffic Conditions

Current Traffic at Hindu Temple. Traffic counts have been taken on Saturday, August 08, 2009 from 8:30 AM to 12:30 pm. This traffic was higher than most of the Saturday services, since this date also included a wedding. Results of the traffic counts are shown below.

Traffic movements were also estimated for each of the unsignalized, stop-sign controlled intersections that are affected by Temple traffic. These include intersections on Arrowhead, Wisteria, Scenic and Bluebell, which are the principal streets used by visitors to the church. The turning movement counts show that about 70 percent of the traffic arrives at the church to and from the south on Arrowhead, and 30 percent are destined to the north toward Scenic Avenue and Vasco Road. The Temple’s brochure shows the recommended route to be Scenic Avenue and Vasco Road; however the most convenient route is in the direction of Springtown Road, and this is the favored approach.

Figure 2 shows these traffic counts. At the three Temple driveways onto Arrowhead Avenue, the peak hour volume is shown for the hour with the heaviest traffic which is from 10 to 11 AM. The traffic volumes have been combined as if there were one intersection.

Table 2
Intersection Turning Movement Count Data
at the Temple Driveways on Arrowhead Avenue

Traffic Count at Arrowhead Lane and Driveways to Hindu Temple Saturday Morning							
Time	Traffic Movements						Total
	Arrowhead Ave		Driveway Exits		Arrowhead Ave		
	NB Thru	NB Left	EB Right	EB Left	SB Right	SB Thru	
8:00 - 8:30 AM	6	22	8	4	9	7	56
8:30 - 9:00 AM	5	34	7	3	11	12	72
9:00 - 9:30 AM	12	29	12	7	9	18	87
9:30 - 10:00 AM	9	26	10	7	10	16	78
10:00 -10:30 AM	13	18	34	8	7	20	100
10:30 - 11:00 AM	14	18	35	11	4	27	109
11:00 - 11:30 AM	19	11	24	11	3	29	97
11:30 - Noon	21	8	12	7	2	29	79
Peak Hour	27	36	69	19	11	47	
Max Traffic	21	34	35	11	11	29	

The amount of parking on-site at the temple is also consistent with this pattern. At 8:00 AM, there were 35 vehicles parked in the two parking lots. This rose to a total of 114 vehicles parked at 10:30 PM, and decreased thereafter.

The additional trip generation from this project will be those new trips that result from the construction of this project. The Temple has been in existence for many years, and currently generates trips from the activities listed in Table 1. Therefore the net new project trips will only be those that result from the new construction. When considering the trip generation and traffic impacts of a church or temple, there are three levels of activity that need to be considered.

The first is the traffic which occurs during the weekday commute hours. The second occurs as a result of the weekly church events. The third is the traffic generated during special events and festivals that occur about four times each year, and affect about eight days of traffic. Table 3 provides a comparison of the trip generation for the three levels of activity.

Table 3
Trip Generation Estimates for the Hindu Temple

Time Period for the Impact	Existing Traffic Conditions	Project Trip Generation	Existing Plus Project Traffic
AM Peak Hour Weekday Commute	2 trips (8 – 9 AM)	6 trips	8 trips
PM Peak Hour Weekday Commute	2 trips (5 – 6 PM)	8 trips	8 trips
Saturday Morning Services	141 trips (10 – 11 AM)	27 trips	168 trips
Annual Festival (This event occurs four times each year)	282 trips (1 – 2 PM)	60 trips	342 trips

Note: The Saturday data is based on traffic counts conducted on August 8, 2009 at Arrowhead Avenue and the project driveways. The PM peak hour data is based on observations taken between August 4 and August 12, 2009

1.) Traffic During Weekday Commute Peak Hours.

On weekdays the church is generally closed or is limited to office staff and administrative staff. The current operation, based on limited observations, has no traffic during the AM and PM peak hours. For the purpose of this study, it is assumed that there will be 2 vehicle trips during the peak hours. With the addition of the project, which comprises some administrative space and a multi-purpose building, the type of activity will not change. For this study it is assumed that there will be an additional six (6) trips during this hour, resulting in a total of eight (8) trips during the weekday commute peak period. Traffic from the Hindu Temple services will never coincide with the peak weekday commute hours.

Field studies and observations of traffic conditions were carried out during the AM and PM time periods. There were no special traffic problems observed. Left turn delay was very limited. It is clear that none of the stop sign locations would trigger a study of traffic signal warrants. Perhaps the busiest intersection observed was at Bluebell and Sunflower Court, where there are a lot of turning movements onto Sunflower Court. The only traffic or safety problem that was noted in this area in this area was caused by speeding vehicles on Bluebell Avenue.

2.) Traffic Impacts During Weekly Temple Services

During church services on Saturday mornings, the project is estimated to generate about 141 vehicle trips per hour. Table 2 shows the results of a traffic count taken on Saturday, August 7th, from 8:00 AM to 12 Noon. This date represented an above average level of activity since a wedding was occurring in addition to the normal activities. The three driveways have been combined into one traffic count. The peak hour traffic is 141 vehicles (47 in, 94 out) between 10 and 11 AM.

The project itself will not cause a change to the nature of or the number of church services. The project will, however, permit the church to accommodate more visitors at each event. It is estimated that an additional 27 vehicle trips (About a 20% increase) will be generated during the Saturday morning events. This would result in a total of 167 trips per hour generated by church, which are estimated to be split 70% to the south and 30% from the north.

3.) Traffic Impacts During Festivals and Special Events

The Temple will hold “special events” about six to eight times each year. About four of these events are festivals which can have high attendance. These events can occur at different times of the day and are almost exclusively held on weekends and holidays. Traffic volume counts have not been collected during these festivals. However, there are reports that a significant queue can develop in the eastbound direction on Bluebell Drive at Sunflower Court. This queue can extend back almost to Springtown Road. The next event of this type is on Diwali, which is scheduled for October 17th.

Estimated Trip Generation. One method of estimating the traffic generated by a special event would be based on the number of attendees. During these festivals, the total attendance is estimated to about twice that of a typical Saturday service. Since the Saturday service generated about 140 vehicle trips per hour, a festival could generate up to 282 vehicles per hour. The traffic impacts of such an event have been evaluated by assuming that these 282 vehicle trips would be distributed in a similar manner as on Saturday. We have also assumed that the new project could increase the total traffic during the festival by an additional 60 trips per hour. Using this estimate, the intersection capacity conditions were tested at each of the study locations. The results are that traffic can still be handled satisfactorily, and that the maximum queue would be 3 or 4 vehicles at the stop sign on Bluebell Drive.

Recent Experience During Festivals. The Temple currently has traffic control personnel that direct traffic in and out of the driveways on Arrowhead Avenue during festivals. There are also Temple personnel that direct people where to park during these events. Parking is generally confined to the parking areas on the west side of Arrowhead Avenue. There have been one or two occasions where the additional parking area on the east side of Arrowhead Lane has also been used. The maximum number of cars parked at any one time is reported to be between 350 and 400, although there have not been any specific parking counts.

Recommendations. Traffic mitigations are not necessary for one-time events as they would be for recurrent traffic conditions. For future festivals, it is recommended that the Temple work with the City Traffic Department to develop a “Traffic Management Plan” that would be implemented during each event. The plan could involve traffic control personnel provided by the Temple, temporary signing, temporary parking, and police traffic services, if needed. The next event of this type is Diwali, on October 17th. Traffic counts and evaluation of traffic patterns could be made at that time, if the City would like such data.

Results of the Intersection Capacity Calculations

Existing Conditions – The intersection capacity conditions at the present time are all at Level of Service A. A sample of these calculations, for the conditions at the project entrance on Arrowhead Drive (#5) have been attached.

Table 4
Summary of Intersection Capacity Impacts During Temple Activities
Saturday (10 AM to 11 AM)

No	Intersection	Traffic Control	Existing		Existing plus Project		During Festival	
			Delay	95 th % Queues	Delay	95 th % Queues	Delay	95 th % Queues
1	Bluebell at Springtown	Signal	N/A	N/A	N/A	N/A	N/A	N/A
2	Bluebell at Sunflower Court	All-way Stop	7.8	2.0 veh 50 ft	7.9	2.0 veh 50 ft	8.6	2.2 veh 55 ft
3	Bluebell at Wisteria	Stop	5.3	2.7 veh 67.5 ft	5.6	3.0 veh 75.0 ft	8.3	3.7 veh 92.5 ft
4	Wisteria Way at Arrowhead Avenue	Stop	5.1	2.5 veh 62.5 ft	5.1	2.6 veh 65.0 ft	7.9	3.0 veh 75 ft
5	Arrowhead Way at the Project Driveways	Stop	6.0	2.3 veh 57.5 ft	6.0	2.4 veh 60.0 ft	9.2	3.1 veh 77.5ft
6	Scenic Avenue at Arrowhead Avenue	Stop	2.4	2.6 veh 65 ft	2.4	2.6 veh 65 ft	3.9	2.7 veh 67.5 ft
7	Scenic Avenue at Central Avenue	All-way Stop	N/A	N/A	N/A	N/A	N/A	N/A
8	Scenic Avenue at Vasco Road	Sig	N/A	N/A	N/A	N/A	N/A	N/A

Note: The results are shown in terms of the average vehicle delay for the stop-controlled approaches at each intersection. The 95th percentile queue lengths are expressed in terms of the delay in seconds for the most critical approach and the average number of vehicles in the queue.

Existing plus Project – As shown on Table 4, with the addition of the project traffic, the traffic capacity conditions are basically unchanged, and all will continue to operate at acceptable limits. Once again, the calculations result in very acceptable levels of levels of vehicle delay, and there are no intersection approaches where any significant vehicle queue will result.

Festivals – The traffic conditions during festivals can be more congested, especially on Bluebell Drive. Following the completion of this project, it is recommended that the Temple develop a traffic management and parking plan for these events.

Analysis of Site Access and Driveways – The three driveways onto Arrowhead Avenue can be confusing, but this is not considered to be a problem by the Temple visitors. The primary parking lot has two driveways, with one marked for entering traffic and one as the exit. Each driveway, however, is used for both directions. As a part of the future plans, it is recommended that there two driveways, one to each parking lot, and that there be internal circulation between the parking lots. An additional recommendation would be to consider restriping Arrowhead Avenue along the project frontage to three lanes, and the creation of a two-way center left turn lane.

Summary and Findings

The current operations at the church generate only 2 vehicles per hour during the weekday AM and PM peak Hours. The project will add about 6 new vehicle trips. A check of the capacity calculations reveals that this change in traffic is well below the threshold where these changes would be noted. About 25 vehicles per hour at a specific approach would be required to see any change to the intersection capacity in the AM or PM commute weekdays.

The Saturday services generate 141 vehicles per hour. The project will add an estimated 27 vehicle trips to the traffic. Studies of the delay and queue lengths show very little impact and very minor impact by the project volumes. No mitigations would be required.

The festival activities could generate up to 282 vehicles an hour. The project will add an estimated 60 vehicle trips to this traffic. With this level of traffic, there will be some short-time periods where there is congestion and delay at the project entrance on Arrowhead Avenue. The average delay and queues lengths are somewhat longer during these conditions, but are not noticeable at locations beyond a quarter-mile from the project. It is recommended that the Temple, in cooperation with the City, should develop a traffic control plan and parking plan for each of these festivals.

5: Project Entrance & Arrowhead Ave.
 HCM Unsignalized Intersection Capacity Analysis

Existing Plus Festival
 Saturday Mornings

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘			↕	↕	↙
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	72	210	108	34	11	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	78	228	117	37	12	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	302	30	48			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	302	30	48			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	78	92			
cM capacity (veh/h)	638	1045	1559			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	307	154	48			
Volume Left	78	117	0			
Volume Right	228	0	36			
cSH	898	1559	1700			
Volume to Capacity	0.34	0.08	0.03			
Queue Length (ft)	38	6	0			
Control Delay (s)	11.1	5.8	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.1	5.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			8.4			
Intersection Capacity Utilization			38.0%	ICU Level of Service	A	
Analysis Period (min)			15			