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Title

Traffic Impact Analysis and Traffic Signal Design

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Traffic Impact Analysis & Traffic Signal Design

TranSummit – Transportation Team 5



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Project Description

TranSummit in conjunction with RK Engineering Group has been tasked to conduct a traffic impact study and design the traffic signals for a future mixed-use development in Aliso Viejo, CA. Existing traffic conditions were analyzed to project future traffic impacts. Following the study, possible mitigation measures will be recommended to achieve the best Level of Service.

Design Approach

- Site plan includes: a coffee shop, a quality restaurant, a sit-down restaurant, general office space, assorted retail space, and sufficient parking (determined by Aliso Viejo Municipal Code and ADA Manual)
- Design alternative site plans
- Use ITE Trip Generation Manual to develop project trip generation
- Base trip distributions on surrounding land use
- Model the roadway network in Traffix to determine the Level of Service (LOS) of the study intersections with and without the project traffic volumes

Existing Conditions



Figure 1. Upper Pad (Western Section)



Figure 2. Lower Pad (Eastern Section)

Design Constraints and Parameters

- Site is separated into two sections due to an elevation difference of 35 feet
- Project site area is approximately four acres
- Locate Starbucks on Enterprise for increased visibility
- Restricted to right-in/right-out access due to existing medians
- Minimum acceptable Level of Service is C
- Provide a sufficient parking supply for site land usage

Site Plan

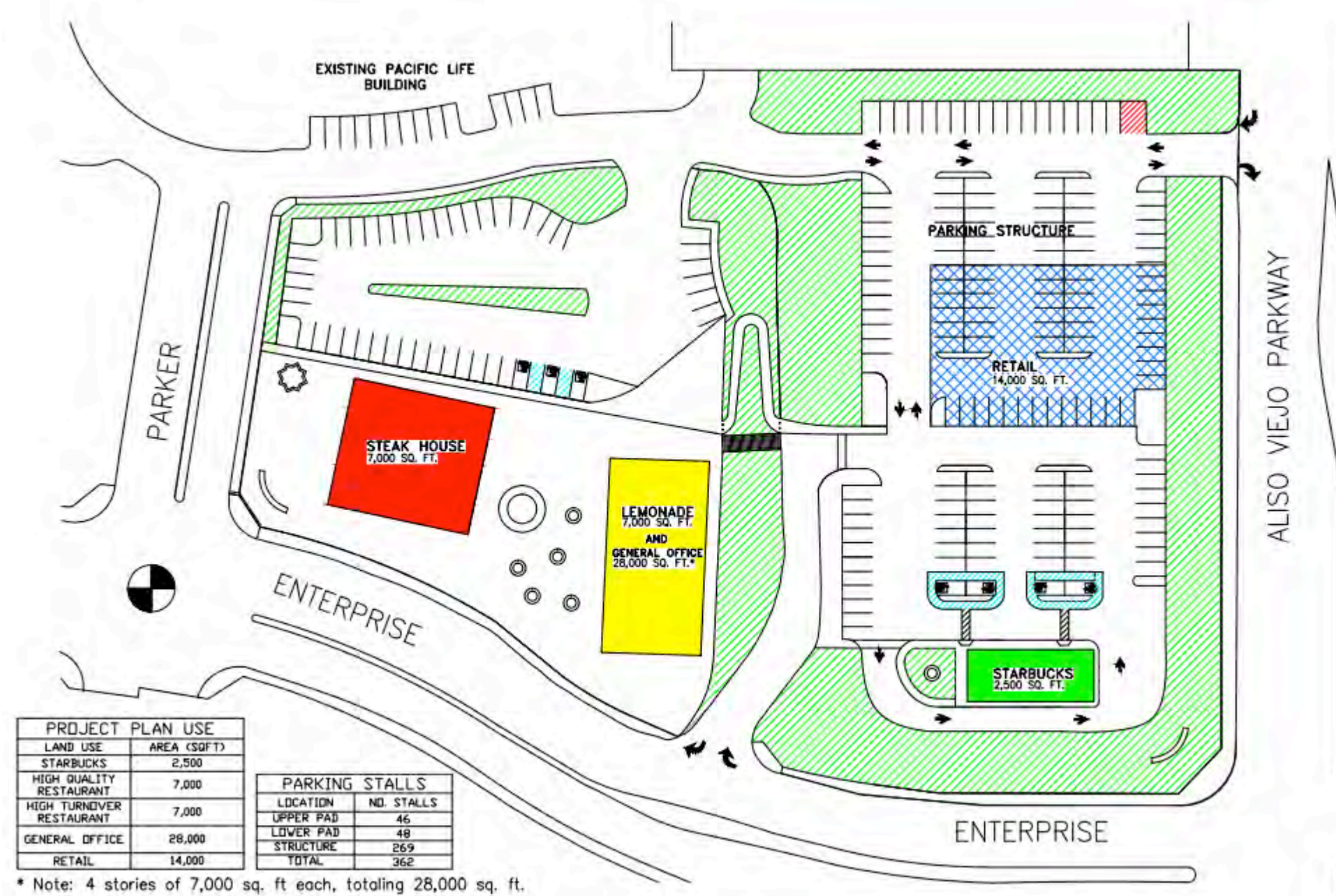


Figure 3. Site Plan

Trip Generation Table

Land Use	ITE Code ¹	Quantity (TSF ²)	Peak Hour						Daily
			AM			PM			
			In	Out	Total	In	Out	Total	
Coffee Shop with Drive-Thru*	937	2.5	65	62	127	27	27	54	1024
General Office Building	710	28.0	39	6	45	7	35	42	309
Quality Restaurant	931	7.0	5	3	8	36	18	54	630
High-Turnover (Sit Down) Restaurant*	932	7.0	34	28	62	34	22	56	891
Shopping Center	820	14.0	9	6	15	25	28	53	478
Total		58.5	152	105	257	129	130	259	3332

¹ Source: Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012

² TSF = Thousand Square Feet

*Applied: 50% reduction to Coffee Shop with Drive-Thru and 20% reduction to High-Turnover (Sit Down) Restaurant

Alternative

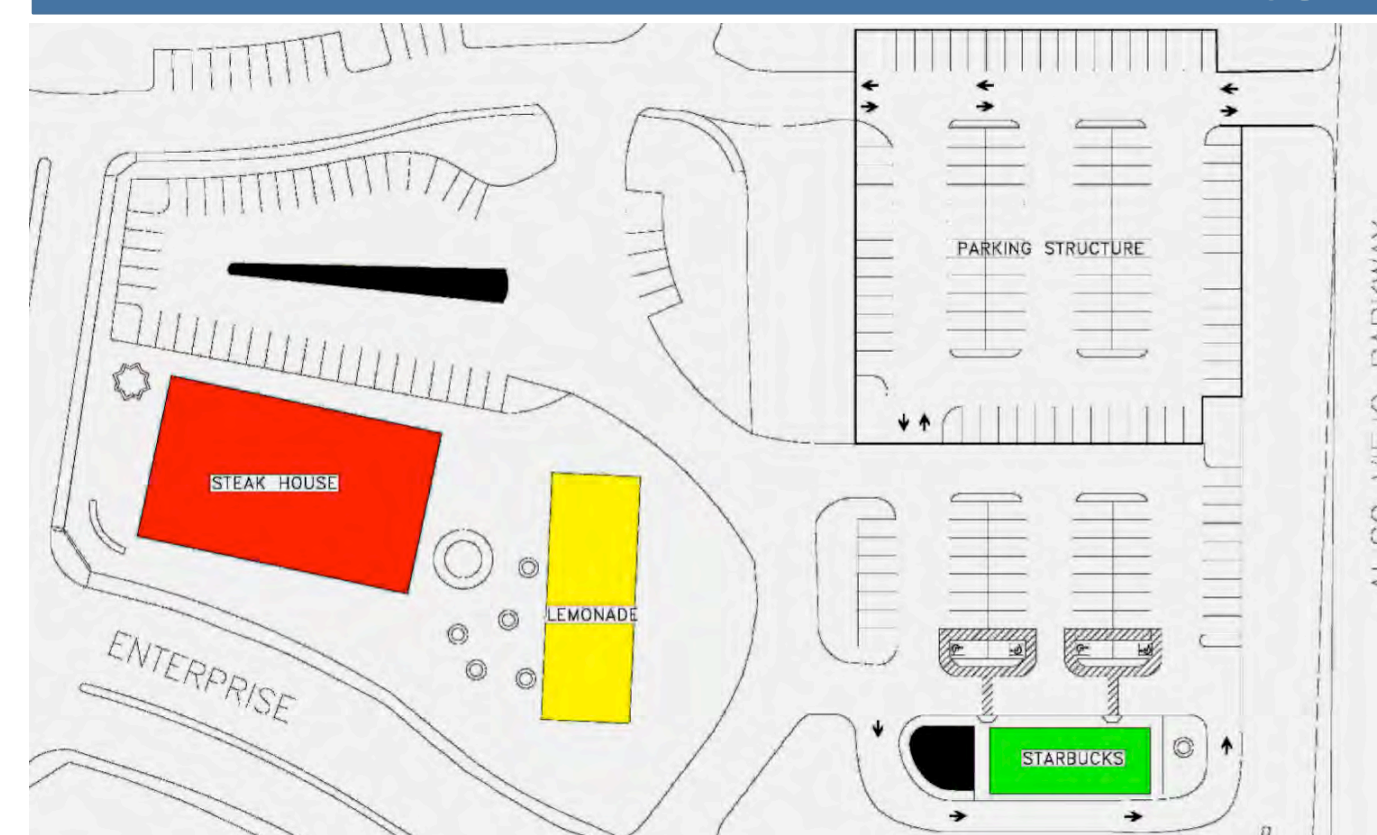


Figure 4. Alternative Site Plan

The alternative does not include office space or a retail establishment. It was disregarded in order to:

- Maximize parking utilization by increasing land usage
- Add land use diversity
- Minimize traffic impact with mixed-use development
- Increase number of revenue-producing businesses

Trip Distribution

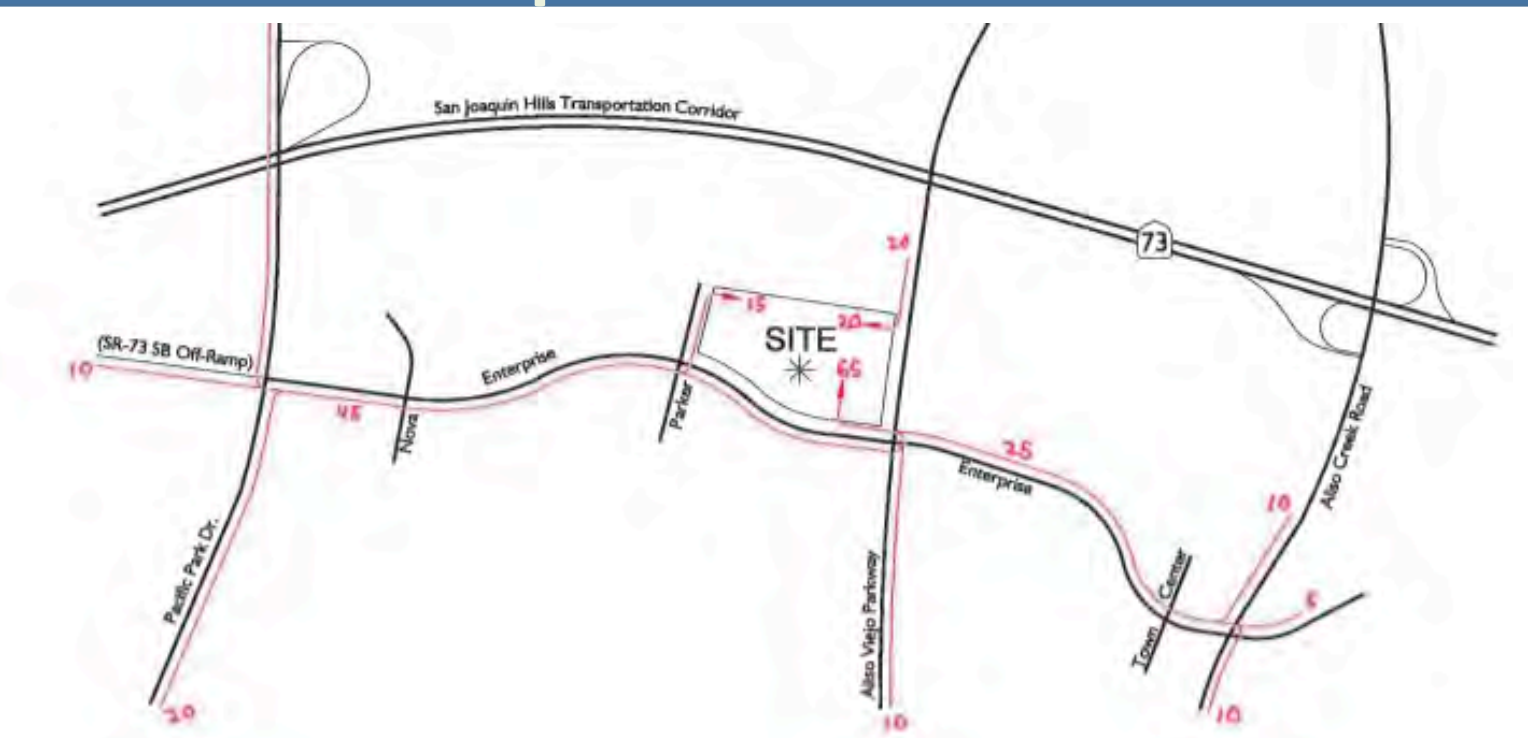


Figure 5. Inbound Trip Distribution

Traffix

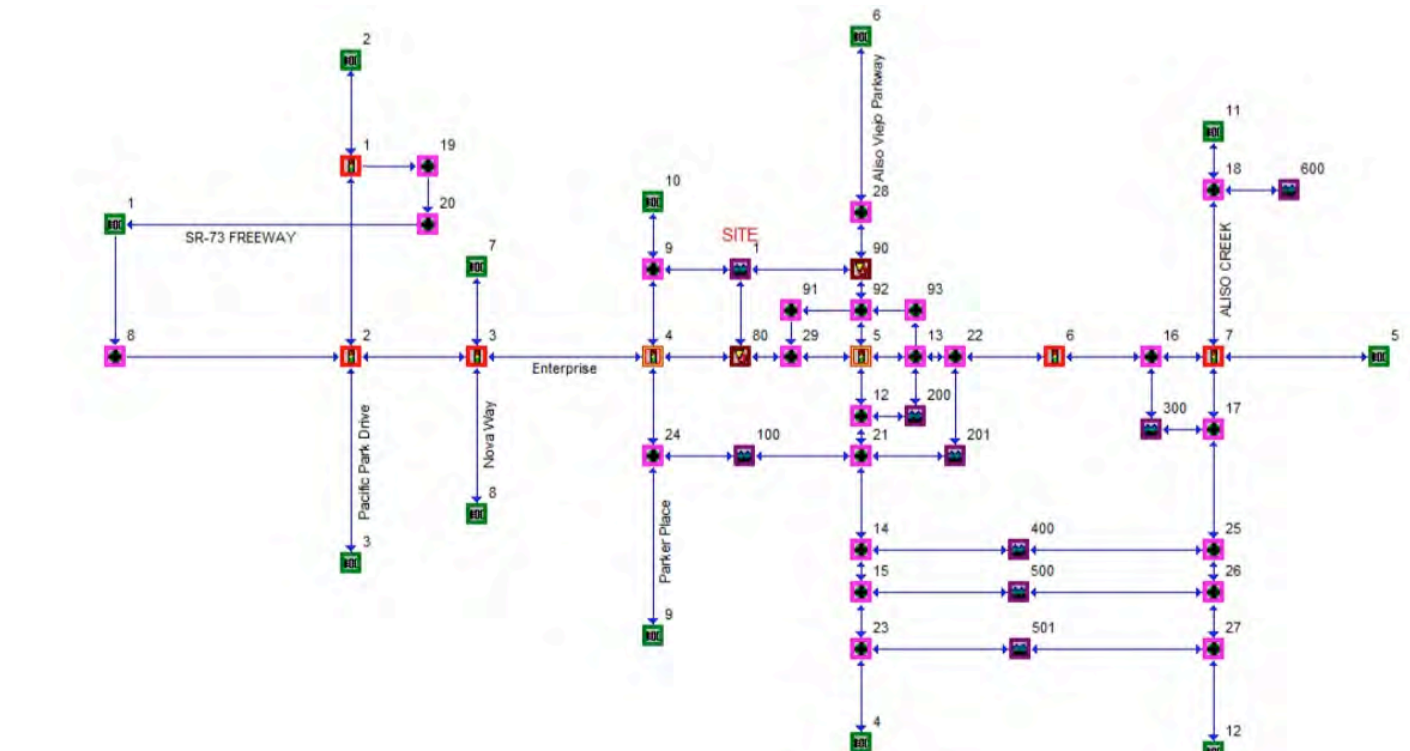


Figure 6. Traffix Network Model

Project Tasks

Completed/In-Progress:

- Site visit/Analysis of existing road geometrics & configurations
- Determination of Trip Generation Rates & Trip Distributions
- Starbucks Parking Study & Queuing Analysis
- Determination of Parking Requirements
- Calculate existing Level of Service at local intersections
- Development and finalization of Site Plan
- Determine future project traffic impacts

Remaining (Estimated completion date - June 2015):

- Determine mitigation measures
- Review on-site circulation and access
- Traffic Signal Design

Group Picture



Figure 7. Left to right: P. Johnson, E. Sy Su, J. Narciso, A. Besa, B. Elenes, S. Kevorkian