



**Feasibility and Options Study  
for Traffic Operation  
Improvements – Final Report**



Prepared for:  
City of Lafayette

Prepared by:  
Stantec



May 15, 2015

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Attachment A Existing Conditions Report (with Appendices)

## Executive Summary

Based on a review of existing conditions and community input, Stantec recommends the following improvements for the Olympic Boulevard and Reliez Station Road corridor in the City of Lafayette:

- A single-lane roundabout with right-turn bypass lanes at Pleasant Hill Road and Olympic Boulevard
- A traffic signal at Olympic Boulevard and Reliez Station Road with additional pedestrian and bicycle safety features
- “Keep Clear” pavement markings at the intersection of Reliez Station Road and Beechwood Drive / Andreasen Drive and a two-way-left-turn-lane (TWLTL) to facilitate side street access / egress, as well as additional detection for vehicles at Beechwood Drive and Andreasen Drive to facilitate future coordination
- A traffic signal at Reliez Station Road and Las Trampas Road / Richelle Court
- Additional corridorwide improvements, including additional speed limit signage, speed feedback signs, better signage for enforcement of the ban against large trucks, and efforts to change the designation of the corridor as a regional connector in publicly available navigation tools (e.g. Google Maps, Bing Maps)

It is expected that these improvements will address traffic congestion along Olympic Boulevard (between Pleasant Hill Road and Reliez Station Road) and Reliez Station Road (between Olympic Boulevard and Glenside Drive) and thereby address some secondary issues such as drivers using the northern section of Reliez Station Road as a bypass route. Furthermore, these changes are expected to improve the safety along Reliez Station Road by addressing sight distance issues and clarifying which road users have the right of way at any given time. The construction costs of these improvements are expected to total approximately \$1,384,000 and are described in more detail in this report.

Stantec would like to thank the residents, staff, and Circulation Commission of the City of Lafayette for their input into this study. Their dedication to improving the operations and safety of this corridor was inspirational and provided the Stantec team with a wealth of information for developing appropriate solutions for the corridor.

Introduction  
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## 1.0 INTRODUCTION

This study evaluates the feasibility of addressing traffic-related congestion and safety issues with cost-effective and innovative improvements along the corridor between Olympic Boulevard at its intersection with Pleasant Hill Road and Reliez Station Road where it intersects Glenside Drive. The corridor and some of the issues identified early in the project are shown in Figure 1.N

Figure 1: Study Corridor and Preliminary Issue Set





## FEASIBILITY AND OPTIONS STUDY FOR TRAFFIC OPERATION IMPROVEMENTS – FINAL REPORT

Introduction  
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As such, the goals of the project are as follows:

- Identify additional areas of concerns for residents
- Clarify parameters and metrics for a traffic study
- Gather and analyze data
- Develop an appropriate traffic improvement plan for the corridor
- Gather residents' feedback on the improvements
- Recommend a corridorwide solution

The study process included an initial resident opinion survey, which was available between May 16 and June 16, 2014. There was an initial community meeting held on June 4, 2014 to discuss corridor issues, then two community walks scheduled in the same month to gather additional observations and concerns from residents. A review of available traffic data, and cross-check against concerns stated by the public were synthesized to determine whether the concern is a confirmed problem versus a perceived problem. This input, combined with ranking of the various stated public concerns gathered in the community meetings and community walks, led to the development of improvement alternatives. These were presented at a second community meeting on January 22, 2015, which was concurrent with a second resident opinion survey. These alternatives, as well as recommendations, were presented to the Circulation Commission on March 16, 2015. A DRAFT Report summarizing these items was submitted to the Circulation Commission for review, and all recommendations were approved. Comments received from the Circulation Commission have been incorporated into this Final Report.

Current Conditions  
May 15, 2015

## 2.0 CURRENT CONDITIONS

A comprehensive review of current and forecasted conditions was conducted for in the corridor. This review consisted of the following elements:

- Intersection level of service (LOS) analysis for existing conditions and forecasted 2040 traffic conditions
- Corner Sight distance analysis at key intersections
- Speed analysis
- Volume analysis
- Vehicle class analysis
- Accident analysis

A key part of the existing conditions review was the collection of input from the community through two community walks through the corridor, an on-line survey, and a community meeting. Specific traffic operations issues were discussed during the community walks, and the first on-line survey gave respondents an opportunity to identify top concerns at each intersection in the corridor. The first community meeting had breakout sessions where four distinct geographical sections in the corridor were discussed.

The summary of findings can be found in the Existing Conditions Memo dated October 1, 2014 (Attachment A). A summary of issues identified for each intersection along the corridor is provided in Table 1. This table shows the degree to which residents and the data analysis regarded specific issues at individual intersections to be problems. Severe issues are shown in red, while secondary issues are shown in yellow, and minor issues are shown in green. Issues that could not be confirmed or which are not applicable to a particular intersection are not highlighted. This table guides the remainder of the study by identifying what the issues are from the perspective of the community for each intersection and whether these issues could be confirmed with data. Stantec has developed solutions for the issues that were considered severe from both the community and through the data analysis. A summary of the key intersection issues is as follows:

- At Pleasant Hill Road and Olympic Boulevard, the key issue is traffic congestion
- At Olympic Boulevard and Reliez Station Road, the key issue is traffic congestion
- At Reliez Station Road and Beechwood Drive / Andreasen Drive, the key issue is safe side street accessibility
- At Reliez Station Road and Las Trampas Road / Richelle Court, the key issue is safe side street accessibility
- There are no severe issues raised by the public at Reliez Station Road and Glenside Drive. Data analysis indicates congestion during the morning peak period.

FEASIBILITY AND OPTIONS STUDY FOR TRAFFIC OPERATION IMPROVEMENTS – FINAL REPORT

Current Conditions  
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Table 1: Summary of Intersection Issues

Intersection	Issue Identified by Residents													
	Excessive Speed / Traffic Violations		Traffic Congestion (Ex. + Future)		Safety at Intersections		Side Street Accessibility		Excessive Truck Traffic		Traffic Routing/ RSR as a Bypass		Pedestrian / Bicycle Safety	
Measures / Analysis Conducted for Verification	Resident Input	Speed Data Assessment	Resident Input	Traffic Volume Data / Intersection LOS Assessment	Resident Input	Collision Data Assessment	Resident Input	Sight Distance Assessment	Resident Input	Classification Count Assessment	Resident Input	Traffic Volume Assessment	Resident Input	Traffic Volume / Speed / Collision Data/ Sight Distance Assessment
<b>Assessment Key: [Red = Severe, Yellow = Moderate, Green = Minor]</b>														
1	Pleasant Hill Rd. / Olympic Blvd.	Inconclusive, as there is no posted speed limit	Resident Input	LOS F under future conditions and long EB queues in AM	Resident Input	Verified: four collisions in five years	Resident Input	Not applicable; all-way stop	Resident Input	The vehicle counts indicate that some larger trucks are violating the "trucks restricted" sign and using the corridor. However, large truck volume appears low and typical at 1% Single Unit truck volumes may be excessive at 12%.	Resident Input	n / a	Impact of bypassing is likely minimal	Verified; auto volumes create potential issue
2	Olympic Blvd. / Reliez Station Rd.			Verified: LOS F in AM		Verified; three collisions in five years		Not applicable; all-way stop				n / a	Verified; more trips observed than homes would generate	Verified; potential issue as entry point to trail and observation that few drivers fully stop
3	Reliez Station Rd. / Beechwood Dr./ Andreason Ln.	85 <sup>th</sup> percentile speed is less than 5 mph over the actual speed limit	Verified: LOS E in the existing AM and LOS F in the future AM	Verified; no collisions in five years	Verified; does not meet Caltrans standards	n / a	Not applicable	Not suitable for cyclists or a pedestrian crosswalk						
4	Reliez Station Rd. / Las Trampas Rd. / Richelle Ln.	Verified; 85 <sup>th</sup> percentile speed is less than 5 mph over the speed limit	Verified: LOS F in AM	Two collisions in five years	Verified; does not meet Caltrans standards	n / a	Not applicable	Verified; auto volumes, and grades make this intersection unsafe for pedestrians; limited visibility						
5	Reliez Station Rd. / Glenside Dr.	Inconclusive	Verified: LOS F in AM	Verified; no collisions in five years	Not applicable; all-way stop	n / a	Not applicable	Verified; auto volumes create potential issue						
Notes:	<p>[A] Resident Input corresponds to 1) how respondents to the on-line survey ranked issues at each intersection and 2) input gathered from the Community Walks and Community Meeting; "Traffic Routing/Reliez Station Road (RSR) as a Bypass" was not offered as an issue choice in the survey but was raised in the community meeting.</p> <p>[B] In addition to intersection issues, the analysis addresses issues between intersections, such as speeding.</p>													



Option Development  
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### 3.0 OPTION DEVELOPMENT

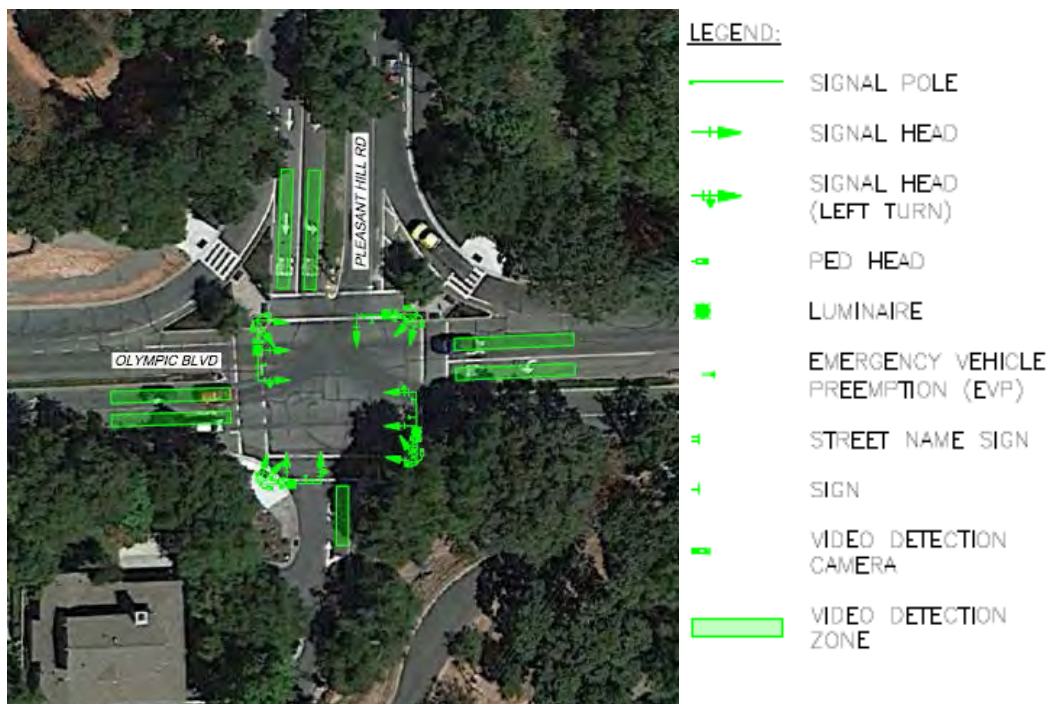
Options for each intersection were developed from ideas that had been brought up over the course of the community outreach or which are innovative solutions for typical traffic operations issues. Options that targeted the high priority “severe” issues raised by the community were analyzed and are described in this chapter on an intersection by intersection basis.

#### 3.1 OLYMPIC BOULEVARD & PLEASANT HILL ROAD

The results from the existing conditions review indicated that the major problem at this intersection is the excessive queueing of eastbound traffic and forecasts of poor LOS continuing into the future. Residents had indicated that traffic congestion is a major issue at this intersection, and this was confirmed by the analysis of current traffic volumes. Auto volumes and speeds were also viewed as creating a secondary priority problem for pedestrian and bicycle safety, and this was confirmed through the analysis of auto volumes and speeds.

As shown in Figure 2, the first alternative developed for the Olympic Boulevard and Pleasant Hill Road intersection was a traffic signal. In this option, the lane configurations would remain as they are today, and there would be a four-phase signal that would direct traffic safely through the intersection. Operations would be optimized through the use of video-detection zones as shown in the figure. The estimated construction cost of this alternative is approximately \$300,000.

Figure 2: Olympic Boulevard & Pleasant Hill Road Alternative #1: Traffic Signal



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A traffic signal would reduce delay and improve operations during the peak periods, create a more familiar movement for pedestrians and bicyclists, and require a short construction duration. The downsides of this alternative are that it has a relatively high operating cost, may not be visually appealing to some users, is less efficient during the non-peak periods, and has a history of opposition by the community.

The second alternative that was developed for addressing the congestion at Olympic Boulevard and Pleasant Hill Road is shown in Figure 3. Alternative #2 features a single-lane roundabout with dedicated right turn lanes for southbound Pleasant Hill Road and westbound Olympic Boulevard. Drivers making these turns are expected to yield to pedestrians and cyclists, but are allowed to make the free right without having to enter the circular intersection or yield to other vehicles. The roundabout would be designed to accommodate larger vehicles, and cyclists could travel through the roundabout with the vehicles if they felt comfortable doing so. A separate “bypass” would be provided for less-experienced bicyclists to traverse the roundabout using the crosswalks. If built, this would be the first roundabout built in the City of Lafayette, and as such, would require a supporting educational campaign to show the public how to properly navigate a roundabout. The estimated cost for the construction of Alternative #2 is approximately \$700,000.

Figure 3: Olympic Boulevard & Pleasant Hill Road Alternative #2: Roundabout



This design offers cyclists several options for traveling through the roundabout. Confident cyclists can enter the regular traffic lanes and travel through the roundabout with automobiles, while

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less confident cyclists can use the sidewalks and the pedestrian crossings. Signage and road markings will communicate the options to cyclists and drivers.

The advantages of this alternative are that it would reduce speed approaching and going through the intersection, reduce delay and improve traffic operation without unnecessary stops during off-peak hours, have low operating costs, and provide an appealing visual aesthetic that may be more compatible with the character of the area. The disadvantages of this option are that the pedestrian (and cautious cyclist) paths of travel are longer, some drivers may be unfamiliar with this type of intersection operation, construction may take longer than Alternative #1, and the construction cost may be higher than Alternative #1.

### 3.2 RELIEZ STATION ROAD & OLYMPIC BOULEVARD

The community identified congestion as a severe issue at this intersection and this was confirmed through traffic analysis, which showed that this intersection operates at LOS F in the AM peak. There were also moderate concerns about excessive truck traffic through this intersection, traffic using the Reliez Station Road north of the intersection as a bypass of the Pleasant Hill Road and Olympic Boulevard intersection, and pedestrian and bicycle safety. Traffic counts upheld the concerns about heavy trucks using the Reliez Station Road /Olympic Boulevard corridor and automobiles using the north end of Reliez Station Road as a bypass due to the congestion at Pleasant Hill Road / Olympic Boulevard. The issues of pedestrian and bicycle safety can be explained by the fact that the entrance to the regional multi-use trail is at this location and that with the wide range of users at this intersection – bicyclists, pedestrians, and autos - there can be uncertainty about which users have the right of way.

Figure 4: Reliez Station Road & Olympic Boulevard Alternative #1-A: Free NB Right and WB Left



LEGEND:

RRFB      RECTANGULAR  
 RAPID FLASH  
 BEACON





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The first solution alternative for this intersection is shown in Figure 4. This alternative would provide some re-striping to allow free westbound left turn and northbound right turn movements and would be stop-controlled for other users. Southbound left turns would not be allowed. Pedestrian movements would be enhanced through the installation of three rectangular rapid flash beacons (RRFBs) that would flash when activated. To address concerns about side street access from Beechwood Drive and Andreasen Drive, the segment of Reliez Station Road between Olympic Boulevard and Beechwood Drive would be reconfigured to convert the left-turn lane to a two-way-left-turn-lane (TWLTL). The estimated cost of construction for this option is approximately \$49,000.

The advantages to this alternative are that it would relieve congestion, improve side street access to/from Beechwood Drive as a result of the two-way turn lane in the median, and have a low construction cost. The issues with this alternative are that it uses non-conventional stop control where only certain movements are controlled which might lead to confusion, it still requires vehicles making a right turn onto Olympic Boulevard to stop for pedestrians where there is history of vehicles-yield-to-pedestrian problems, and because it restricts cars traveling southbound on Reliez Station Road from making a left onto Olympic Boulevard, it could cause inconvenient detours for some residents.

Figure 5: Reliez Station Road & Olympic Boulevard Alternative #1-B: Free NB Right and WB Left with a Raised Median



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The second alternative developed for this intersection is shown in Figure 5. This alternative is a modified version of the first alternative, with the addition of a traffic “island” to formalize the new turning movements. The island results in added restriction on northbound through movements, but provides a refuge island for pedestrians crossing Reliez Station Road. The estimated cost of construction is approximately \$56,000.

This alternative would have the same benefits as the first alternative. In addition, by eliminating the northbound through movement, it can reduce cut-through traffic on Reliez Station Road (through the north loop). The disadvantages to this solution are also same as first alternative with addition of inconvenience for drivers going to or coming from the north end of Reliez Station Road.

**Figure 6: Reliez Station Road & Olympic Boulevard Alternative #1-C: Free NB Right and WB Left with a Raised Median and Relocated Parking Lot**



The third alternative developed for this intersection is shown in Figure 6. This alternative is a modification to Alternative #1-B, providing a means of access to and from the Reliez Station Road north loop. This access is provided by relocating the existing parking lot at this intersection



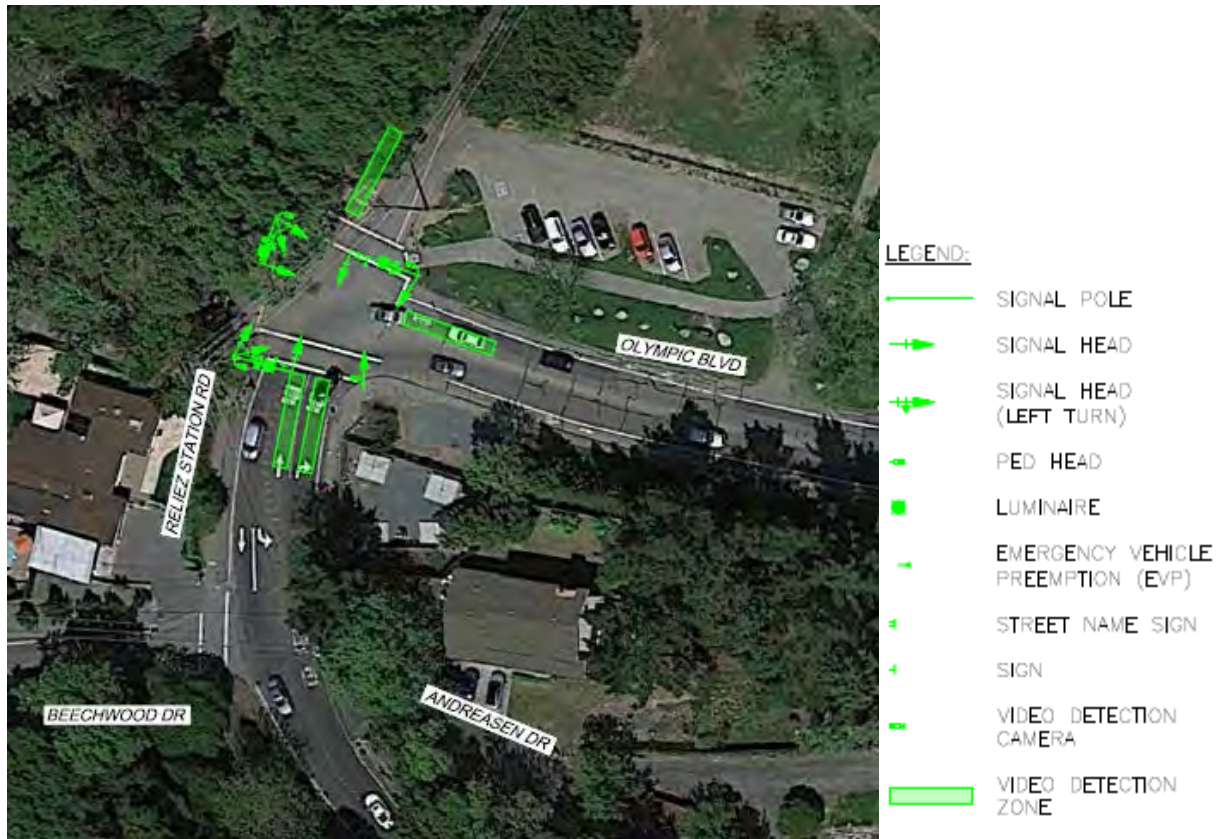
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and moving the location where the north loop meets Olympic Boulevard. The estimated cost of construction of this alternative is approximately \$1,960,000.

This alternative has a clear disadvantage in that the cost to construction is very high and the City does not control the right-of-way needed to achieve the concept.

**Figure 7: Reliez Station Road & Olympic Boulevard Alternative #2: Traffic Signal**



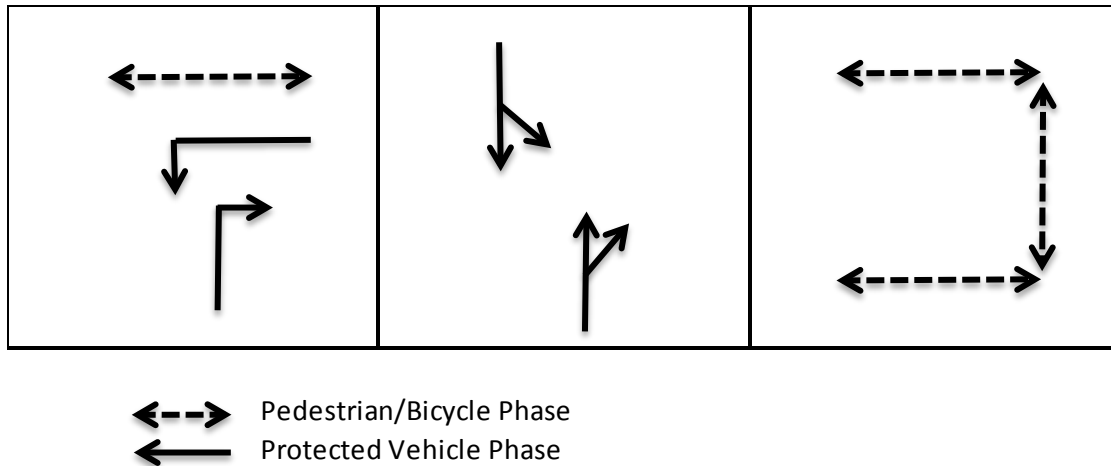
The fourth alternative developed for Reliez Station Road and Olympic Boulevard is shown in Figure 7. This alternative is the installation of a traffic signal. The phase diagram is shown in Figure 8. The first phase shows the protected left turn from Olympic Boulevard onto Reliez Station Road and the protected right turn from Reliez Station Road onto Olympic Boulevard. Pedestrians and cyclists can still cross over to the trail on the north side of the intersection. The second phase shows the protected through movements on Reliez Station Road, and the third phase is the phase that will be triggered by a pedestrian or bicyclist pressing a button.

With a traffic signal, the City can make it operate to achieve the benefits of the other previously described alternatives. In addition, this alternative would considerably increase the pedestrian and bicycle safety at this intersection through the clarification about right of way that traffic signals offer. The estimate cost of construction for this alternative is approximately \$300,000.



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Figure 8: Proposed Phase Diagram for Alternative #2



The presence of a traffic signal at Reliez Station Road and Olympic Boulevard is expected to provide more gaps in the traffic flow to enable drivers to exit from Andreasen Drive or Beechwood Drive on to Reliez Station Road. However, the operation of this signal should be monitored to identify if additional enhancements are needed. Additional enhancement could include adding vehicle detection at the stopping locations on Beechwood Drive and Andreasen Drive and integrating those movements into the signal operations. This would require up to two additional phases, and the details would be considered during the design of the signal system.

In addition, signal timing and sequencing could also be modified to discourage northbound cut-through traffic from using Reliez Station north loop. As documented in the Existing Conditions Report (Attachment A), it was observed that in the morning peak, a larger number of vehicles travel south on Reliez Station Road just north of Olympic Boulevard than would be expected given the number of people who live in this area.

The advantages to this alternative are the same as the other alternatives, with the added benefits of enhancing pedestrian and bicycle safety and mitigating the use of the northern loop of Reliez Station Road for by-pass traffic. It also addresses side street access from Beechwood Drive and Andreasen Drive. The disadvantages to this alternative are the comparatively high construction and operation costs and past negative perception by area residents of traffic lights.

The fifth alternative developed for the intersection at Reliez Station Road and Olympic Boulevard is shown in Figure 9. This alternative is a single-lane roundabout that would address the congestion and pedestrian and bicycle safety at this location. The estimated cost of construction for this alternative is approximately \$980,000.

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This option has a very high construction cost and it requires right-of-way acquisition. It would have impacts on the Regional Trail approach. It offers no benefits to side street access at Beechwood Drive and Andreasen Drive.

Figure 9: Reliez Station Road & Olympic Boulevard Alternative #3: Roundabout



**NOTES:**

1. PROVIDE PROPER SIGNAGE FOR PEDESTRIANS AND BICYCLIST TO USE CROSSWALK TO PASS THROUGH THE ROUNDABOUT.
2. ROUNDABOUT DESIGNED TO ACCOMMODATE FIRE TRUCKS AND OTHER EMERGENCY VEHICLES.
3. CONFORM BIKE LANE WITH BUFFER TO "OLYMPIC CORRIDOR TRAIL CONNECTOR STUDY".

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### **3.3 RELIEZ STATION ROAD & BEECHWOOD DRIVE / ANDREASEN DRIVE**

The major concerns about the intersection at Reliez Station Road and Beechwood Drive / Andreasen Drive included low levels of service in the AM peak and side street accessibility. A secondary concern at this intersection was the high levels of truck traffic. Four alternatives described for the intersection of Reliez Station Road and Olympic Boulevard integrated measure to address the level of service and accessibility issue through the introduction of a two-way-left-turn-lane (TWLTL) that can facilitate turning movements into and out of Beechwood Drive and left turns into Adreason Drive (Alternatives #1-A, #1-B, #1-C and #2).

### **3.4 RELIEZ STATION ROAD & LAS TRAMPAS ROAD / RICHELLE COURT**

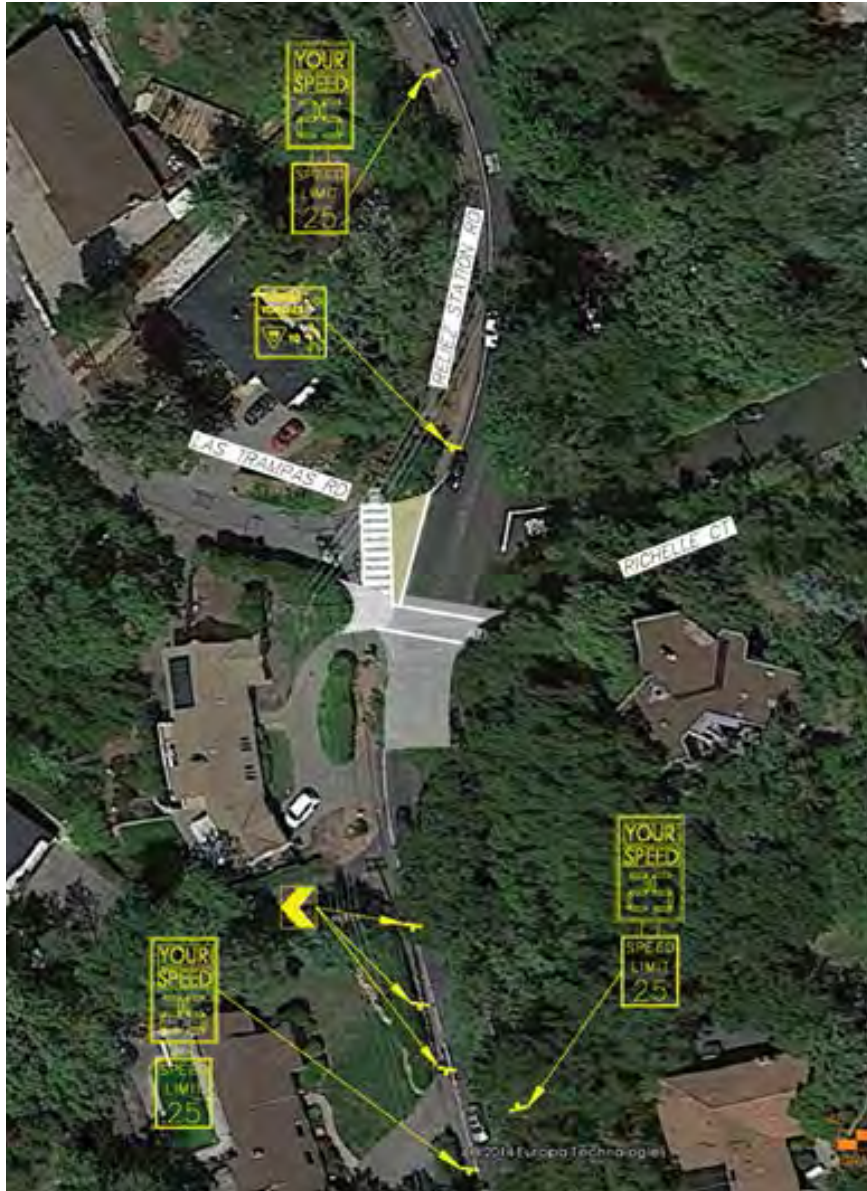
Residents considered side street accessibility to be the main concern at this intersection. This was supported by the technical analysis, as the turning sight distances from Las Trampas Road and Richelle Court do not meet Caltrans standards. Residents also noted concerns about truck volumes, pedestrian and bicycle safety, intersection congestion, and high speeds. The speed analysis suggested that most drivers do not exceed the speed limit by more than 5 mph and that there have not been an above-average number of reported collisions in the corridor in the last five years. However, the traffic analysis suggested that this intersection operates at a LOS F in the AM peak, there are a noticeable number of trucks, and that the corridor poses pedestrian and cyclist safety concerns due to visibility, grades, traffic volumes, and speeds.

The first alternative developed for this intersection is shown in Figure 10. This alternative consists of speed feedback signs for both southbound and northbound traffic along Reliez Station Road, a high visibility crosswalk, and the addition of warning signs. The estimated cost of construction of this alternative is approximately \$42,000.



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Figure 10: Reliez Station Road & Las Trampas Road / Richelle Court Alternative #1:  
Pavement Marking and Signage



The advantages to this alternative are low construction costs, increased driver awareness of speeds, and increased pedestrian visibility. The disadvantage to this alternative is that it does not improve side street movements.

The second alternative developed for the intersection at Reliez Station Road and Las Trampas Road, a traffic signal, is shown in Figure 11. The traffic signal will be actuated by traffic on Las Trampas Road and Richelle Court to provide a safe green phase for users seeking to leave these

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roads. The green will not be activated immediately, in the event a right-turning vehicle is able to quickly enter the flow of traffic on Reliez Station Road, so that the traffic signal does not create unnecessary delay on Reliez Station Road. The estimated cost of construction for this alternative is approximately \$300,000.

**Figure 11: Reliez Station Road & Las Trampas Road / Richelle Court Alternative #2: Traffic Signal**



The advantages to this option are that it improves side street access and safety, improves traffic operations, improves bicycle and pedestrian safety, and has a short construction duration. The disadvantages to this option are the relatively high construction and operation costs, the

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potential need for special measures related to trucks stopping on steep slopes, and the history of opposition to traffic signals by some at this location.

### **3.5 RELIEZ STATION ROAD & GLENSIDE DRIVE**

Some residents raise a concern about traffic congestion and pedestrian and bicycle safety at this intersection. Based on the results described in the Existing Conditions Memo and summarized in Table 1, a few alternatives were proposed including installing a traffic signal and converting the intersection to a single-lane roundabout. However, there is not enough right-of-way at the intersection for a roundabout. In addition, by installing a traffic signal, it would only benefit traffic operations for a short window of time during the a.m. peak period but increase unnecessary delay on Reliez Station Road for the rest of the day, when traffic volumes do not warrant a signal. A bigger concern is the potential secondary impact of a signal inducing people to drive faster if the signal defaults to green on Reliez Station Road.

### **3.6 AREAWIDE IMPROVEMENTS**

The set of areawide improvements shown in Figure 12 was developed for the northern portion of the study corridor. It consists of speed limit signs with speed feedback signs (simulated illustrations of these signs are shown in Figure 13, Figure 14, and Figure 15), truck restriction signs, vegetation removal to improve sight distance, and “Keep Clear” pavement markings at Reliez Station Road and Andreasen Drive. Note that the locations of these improvements shown in the figure are conceptual only. In addition, it is recommended that the City will contact Google Maps, Yahoo Maps, and other routing services to change the roadway designation so that the corridor is not used as a regional connector. The estimated cost of the construction of these improvements is approximately \$84,000.



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Figure 12: Areawide Improvements



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Figure 13: Northbound Reliez Station Road – Proposed Speed Feedback Sign



Figure 14: Northbound Reliez Station Road – Proposed Speed Feedback Sign





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The sign in Figure 15 addresses a gap in the current corridor signage based on a speed survey completed in March 2015 and also provides a speed feedback sign to inform drivers whether they are complying with the speed limit.

**Figure 15: Westbound Olympic Boulevard – Proposed Speed Feedback Sign**



Public Outreach  
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## 4.0 PUBLIC OUTREACH

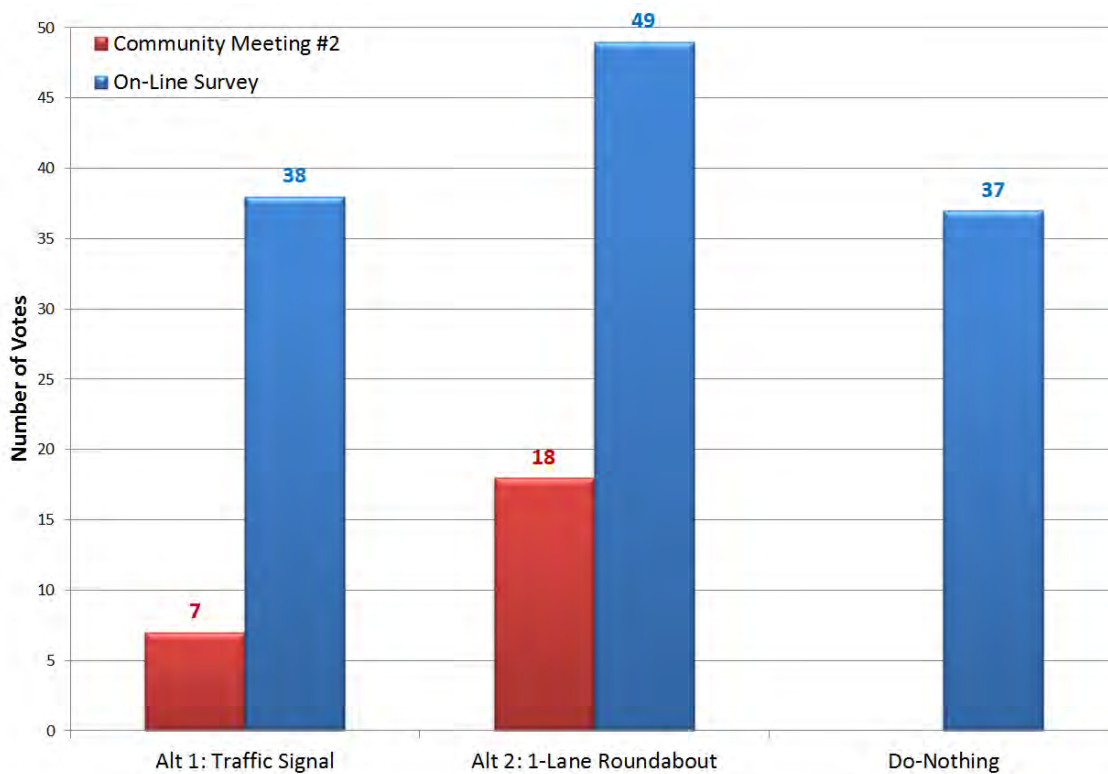
A public meeting was held on January 22, 2015 where a presentation was given to the community to present the different options for the intersections in the corridor. Attendees were asked to vote on their preferences for each of the intersections in the study corridor, and the results are provided in this chapter.

Concurrently, a SurveyMonkey survey was available between January 23, 2015 and February 9, 2015 that presented respondents with the options and asked for their preference for each intersection. The results are also provided in this chapter of the report.

### 4.1 OLYMPIC BOULEVARD & PLEASANT HILL ROAD

The public was presented with two alternative solutions for this intersection. Alternative #1 is a traffic signal and Alternative #2 is a one-lane roundabout. While Alternative #2 is expected to have a higher construction cost, it was expected to have lower operating costs and address peak period congestion without causing delay in the off-peak period.

Figure 16: Voting for Solutions at Pleasant Hill Road and Olympic Boulevard



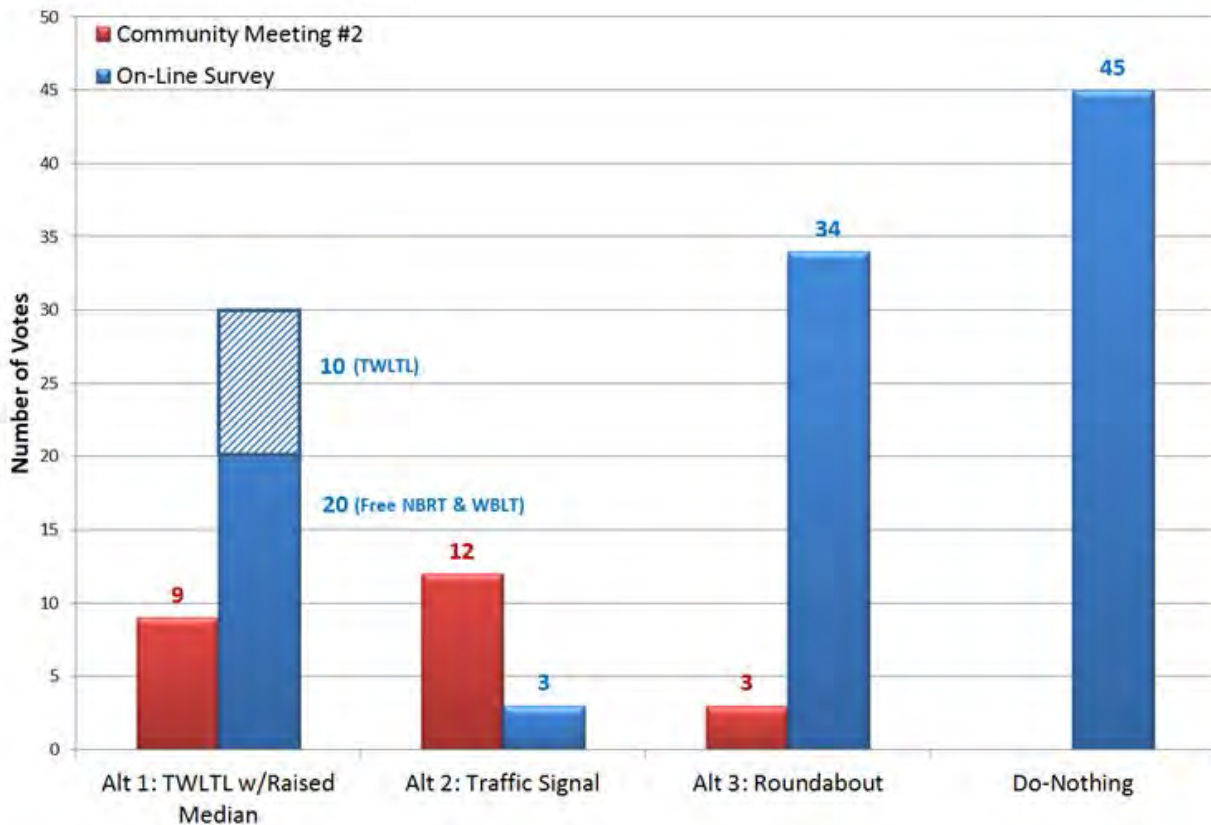
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The votes suggest that Alternative #2 at Olympic Boulevard and Pleasant Hill Road is preferred by the community, both through the on-line survey and the community meeting, as shown in Figure 16.

## 4.2 RELIEZ STATION ROAD & OLYMPIC BOULEVARD

The public was presented with five alternative solutions for this intersection. Alternative #1 was a range of solutions that involved removing the required stop for northbound drivers turning right onto Olympic Boulevard and restricting movements from the northern part of Reliez Station Road to the southern part of Reliez Station Road. Alternative #2 was a traffic signal, and Alternative #3 was a roundabout. These alternatives varied widely in terms of costs and impacts on drivers traveling to and from the northern loop of Reliez Station Road.

Figure 17: Voting for Solutions at Olympic Boulevard and Reliez Station Road



At first glance, the on-line votes suggest that doing nothing at Olympic Boulevard and Reliez Station Road is preferred. However, further analysis of the results shows that the majority of people feel that something needs to be done at this intersection. Among the “Do-Something” options, the most popular is the roundabout. However, this is considered to be too expensive and needs right-of-way not controlled by the City. The second most popular option blocks

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access to the north loop of Reliez Station Road, which received multiple negative comments from residents, and was therefore not considered. The traffic signal is the most preferred option based on the community meeting feedback, as shown in Figure 17, and can integrate the beneficial features of the other options without the secondary impacts. It can also be operated in such a way to mitigate the concerns regarding cut-through traffic onto the north loop of Reliez Station Road, and side street access from Beechwood Drive and Andreasen Drive, which were the primary concerns stated by people who oppose the signal.

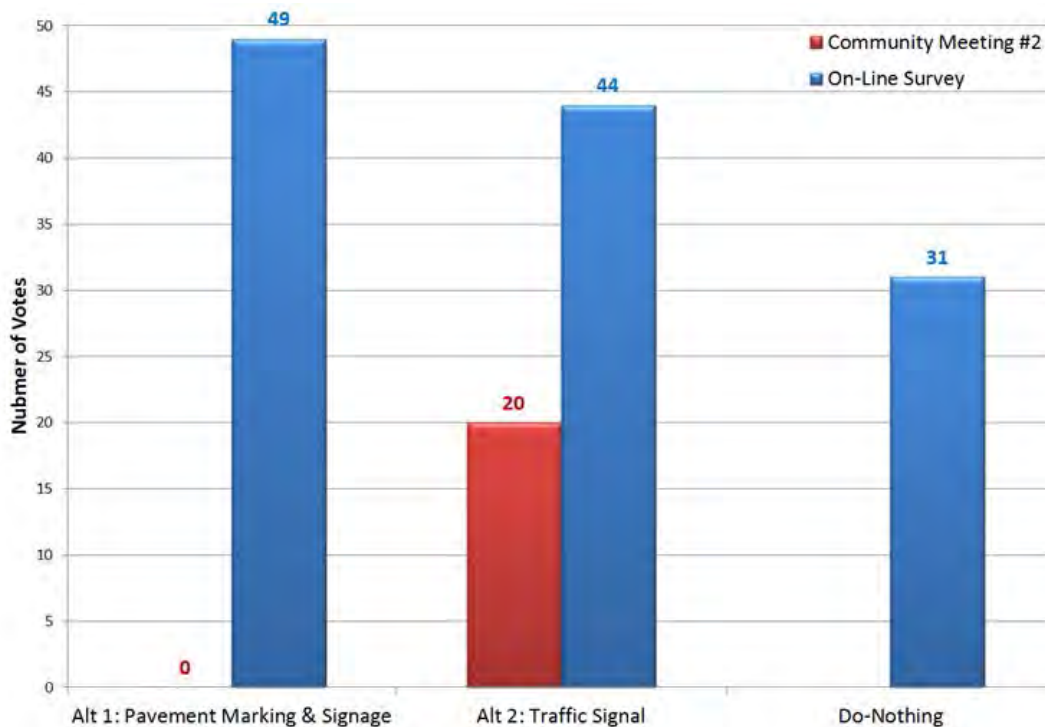
### 4.3 RELIEZ STATION ROAD & BEECHWOOD DRIVE / ANDREASEN DRIVE

The solution options for this intersection are integrated with proposals for Reliez Station Road and Olympic Boulevard, and so the community was not presented with separate alternatives.

### 4.4 RELIEZ STATION ROAD & LAS TRAMPAS ROAD / RICHELLE COURT

The public was presented with two alternative solutions for this intersection. Alternative #1 was a change in pavement markings and signage, while Alternative #2 was a traffic signal. These alternatives varied widely in terms of costs and side street accessibility.

Figure 18: Voting for Solutions at Reliez Station Road and Las Trampas Road / Richelle Court





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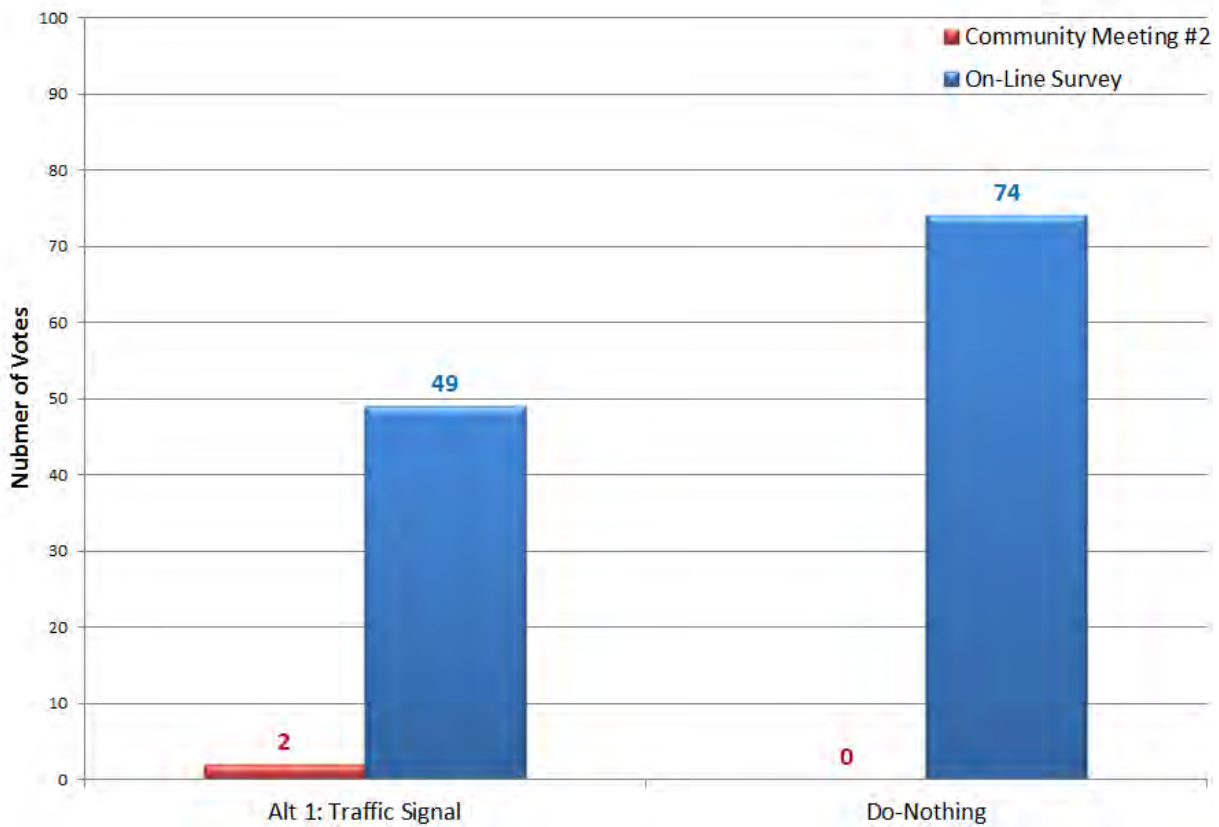
The votes suggest that pavement markings and signage was preferred by the community through the on-line survey, but not by a significant amount compared to those preferring a traffic signal. The traffic signal was overwhelmingly preferred at the community meeting, as shown in Figure 18.

At the community meeting, concern was expressed about including accommodations for trucks even though the areawide improvements might be able to successfully restrict trucks from using the corridor. As a result, these truck accommodation measures were dropped from Alternative #2 until such time as they are proven to be necessary.

#### 4.5 RELIEZ STATION ROAD & GLENSIDE DRIVE

There is less-than-majority support from the community for a change at this intersection, especially at the public workshop, as shown in Figure 19. An analysis of traffic operations and safety indicates that this intersection does not need any improvements except for a short window of time during the a.m. peak period.

Figure 19: Voting for Solutions at Reliez Station Road and Glenside Drive



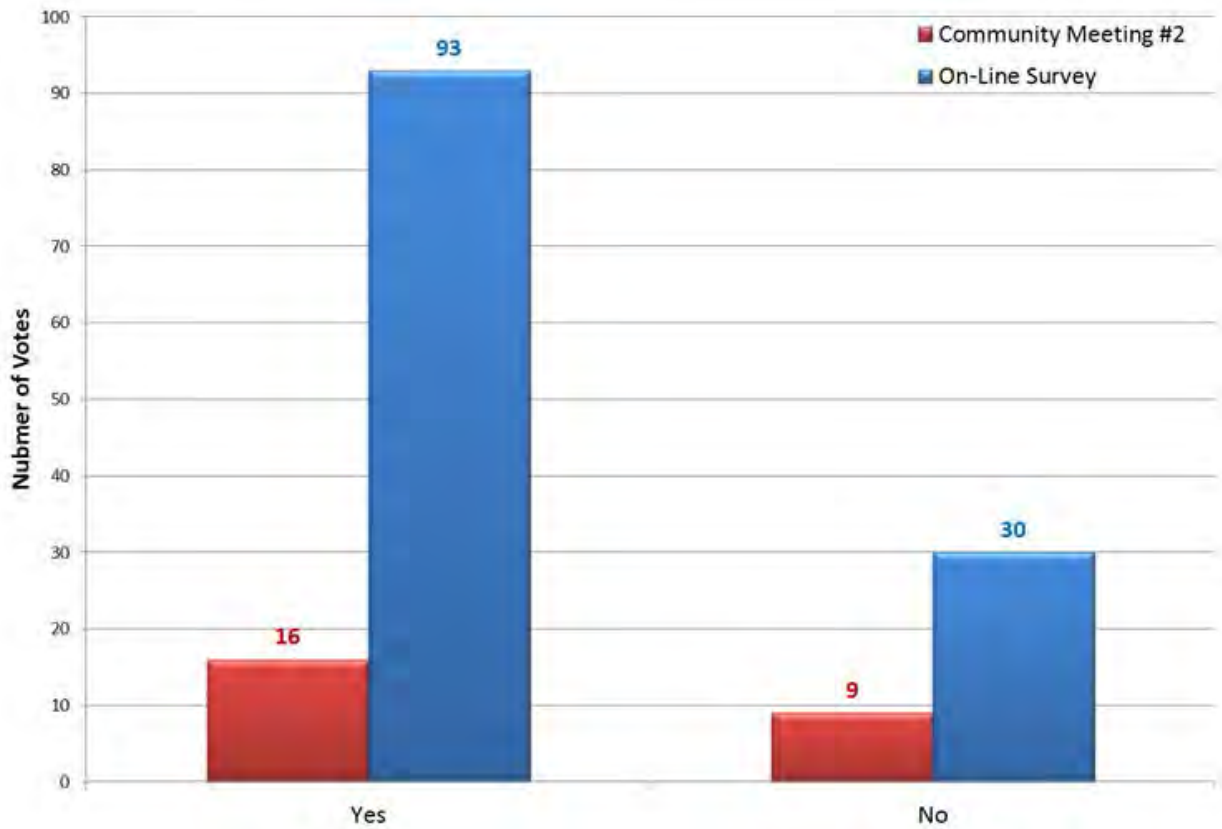
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## 4.6 AREAWIDE IMPROVEMENTS

The public was presented with a solution for areawide improvements.

The votes suggest that the community is in favor of the areawide improvements, as shown in Figure 20.

Figure 20: Voting for Area-Wide Improvements



### 5.0 CONCLUSION AND RECOMMENDATIONS

These recommendations were presented to the Circulation Commission on March 16, 2015.

#### 5.1 OLYMPIC BOULEVARD & PLEASANT HILL ROAD

Traffic volume analysis indicates that a roundabout would improve the traffic flow through this intersection such that it would operate at LOS A under existing conditions and would continue to meet local LOS standards in 2040. Stantec also carried out a simulation of traffic through the roundabout under existing conditions that confirmed that it would function well.

Two main concerns have been expressed with respect to the roundabout option. The first issue is that even though a roundabout is proven to reduce the automobile speed and improve pedestrian and bicyclist safety, many road users are unfamiliar with roundabout operations. Stantec suggests that an education campaign be conducted to inform residents how to properly and safely navigate through a roundabout. The education campaign may consist of articles in local newspapers and postings on the City's website. The second concern is whether trucks will be able to successfully make turns through the roundabout. Turning analysis has suggested that there is sufficient room for truck turns, although a separate corridorwide endeavor is to enforce the restriction of trucks in the corridor to minimize their number.

#### 5.2 RELIEZ STATION ROAD & OLYMPIC BOULEVARD

Stantec carried out a simulation of traffic at the Reliez Station Road and Olympic Boulevard intersection under existing traffic volumes and with a traffic signal. The simulation suggests that the proposed traffic signal design will be effective at managing flow at this intersection, and so this is the recommendation for this location.

Several concerns have been expressed with respect to the traffic signal option. The first is that the free turns that will exist under green light conditions (northbound right from Reliez Station Road to eastbound Olympic Boulevard and westbound left from Olympic Boulevard to southbound Reliez Station Road) will create longer waits for pedestrians and bicyclists crossing Reliez Station Road. The second concern is that automobiles will be delayed in the off-peak periods. To mitigate these concerns, the traffic signal will be designed to serve the automobile movements as a default, but if the traffic signal is actuated by a pedestrian or bicyclists, it will trigger a protected pedestrian and bicycle signal phase to allow these users to cross safely.

### **5.3 RELIEZ STATION ROAD & BEECHWOOD DRIVE / ANDREASEN DRIVE**

The changes recommended for this intersection are tightly linked to the changes recommended at Reliez Station Road and Olympic Boulevard. In particular, the recommended changes include a two-way-left-turn-lane (TWLTL) in the median that will make it easier for drivers to get in and out of the side streets. It is also recommended that “Keep Clear” pavement markings be introduced to support side street access.

To further address side street access concerns, vehicle detections could be installed on Beechwood Drive and Andreasen Drive to control the signal timing, which would provide gaps for traffic exiting Beechwood Drive or Andreasen Drive. If this still cannot provide sufficient gaps in traffic in the northbound direction, the City could consider moving the northbound stop bar to the south side of Andreasen Drive on Reliez Station Road. This would require additional signal heads and detectors. This option can be considered during the design phase of this project. As discussed in the analysis on page 3.7, the signal can also be operated to fully accommodate bicycle and pedestrian crossings at this intersection using an “all-ped” phase.

### **5.4 RELIEZ STATION ROAD & LAS TRAMPAS ROAD / RICHELLE COURT**

Traffic volume analysis indicated that a traffic signal at this location would bring this intersection to LOS A under existing conditions and in the future. Stantec carried out a simulation of traffic at the Reliez Station Road and Las Trampas Road/Richelle Court intersection under existing conditions and with a traffic signal. The simulation suggests that the proposed traffic signal design will be effective at managing traffic flow, and so this is the recommendation for this location.

Two main concerns have been expressed with respect to the traffic signal option. The first is that automobiles will be delayed in the off-peak periods. The second is that trucks will have difficulty making the stops due to the street grade. The truck issue may not materialize given the proposed efforts to enforce the rules about restricting heavy truck use along this corridor. It's recommended that the new signal optimization be monitored to determine if they present difficulty for trucks due to grades. Mitigation measure can be considered if this issue occurs, including creation of an advanced signal for trucks to stop on a section of the road with flatter grades.

In addition, the traffic signal will be designed to respond to pedestrian requests to cross Reliez Station Road. Also, the traffic signal will have a slight delayed response to automobiles detected on the side streets by 5-10 seconds; if a driver is able to join the flow of traffic on Reliez Station Road within 5-10 seconds, then the light will not change phase and cause unnecessary delay to drivers on Reliez Station Road.

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## 5.5 RELIEZ STATION ROAD & GLENSIDE DRIVE

No recommendations are proposed for this intersection, per discussion in the options analysis section.

## 5.6 AREAWIDE IMPROVEMENTS

Areawide improvements are recommended to address issues such as speeding and trucks. These issues are not necessarily restricted to individual intersections.

## 5.7 OVERALL IMPLEMENTATION

Given the above recommendations, the proposed overall corridor improvement program includes the following:

**Table 2: Proposed Corridor Improvement Program**

Item	Estimated Construction Cost
Roundabout at Pleasant Hill Road and Olympic Boulevard	\$700,000
Traffic Signal at Olympic Boulevard and Reliez Station Road	\$300,000
Traffic Signal at Reliez Station Road and Las Trampas Road and Richelle Court	\$300,000
Areawide Improvements	\$84,000
<b>TOTAL</b>	<b>\$1,384,000</b>

Together, these improvements will relieve congestion in the corridor, address pedestrian and bicycle safety, improve safety of side street access, and potentially reduce heavy truck traffic volume.

## 5.8 CIRCULATION COMMISSION MEETING

In advance of developing this final recommendation report, the solution options for the corridor were presented to the Circulation Commission at a public meeting. In addition to supporting the recommendations provided in this report, the Circulation Commission offered the following eventual comments related to the implementation of this plan:

- The plan recognizes the Olympic Corridor Trail Connector Study that is being carried out by Contra Costa County, the City of Lafayette, and the City of Walnut Creek, and consideration for pedestrians and cyclists can be enhanced through the use of bicycle signals and signage along Olympic Boulevard.
- The Commission request that new technologies be explored to assist in enforcement of truck regulations. The new technologies include video enforcement of oversize

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enforcement that is used in other States (e.g. Washington DC)<sup>1</sup>, but at the current time, such means of enforcement are not legal in California.

- There was remaining concern that the traffic signal at Reliez Station Road and Olympic Boulevard and the roundabout at Pleasant Hill Road and Olympic Boulevard would add to the cut-through traffic along the northern segment of Reliez Station Road. However, with the free right/ left being the dominant traffic phase at the proposed traffic signal and improved level of service of the roundabout, there is a strong reason to believe that drivers will have less incentive to use Reliez Station Road as a bypass road, because the time savings advantage of such a bypass would not exist.
- There was remaining concern that residents from the northern segment of Reliez Station Road would have greater difficulty turning left onto Pleasant Hill Road due to the roundabout at Pleasant Hill Road / Olympic Boulevard as compared to the current all-way stop. This turn is 800 feet north of the intersection. This is a relatively long distance that should allow for the dispersion of any platooning that may exist currently under the stop control, so it is expected that the impacts on the flow of traffic at this point will be minimal.
- There was concern that because this corridor is already at capacity, these improvements will have limited impact. However, the improvements were tested against future traffic conditions and were shown to improve operations.
- Commission members stressed the importance of education in making the changes successful.

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<sup>1</sup> <http://mpdc.dc.gov/node/724462>, April 28, 2015