City of Santa Barbara
Transportation & Circulation Committee
Staff Report

DATE: November 8, 2012

TO: Transportation and Circulation Committee (TCC)

FROM: Brian D'Amour, Supervising Civil Engineer

SUBJECT: Las Positas Road at Cliff Drive Intersection Improvements Project

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RECOMMENDATION:

That the Transportation and Circulation Committee (TCC) receive a report on the Las Positas Road at Cliff Drive Intersection Improvements Project (Project) and evaluate the proposed alternatives for consistency with the Circulation Element and General Plan.

EXECUTIVE SUMMARY:

The City has initiated this project to construct intersection improvements at the Las Positas/Cliff Drive intersection in order to improve traffic operations. Three build alternatives have been evaluated: 1) maintain the existing all-way stop control and widen the southbound approach to accommodate a second left-turn lane; 2) installation of a traffic signal; and 3) construction of a roundabout. At this time, the only construction funding available for this project is a $750,000 State Transportation Improvement Program (STIP) grant.

BACKGROUND:

In August 1999 a draft Annexation Policy Update (APU) Program Environmental Impact Report was prepared for the City to update the General Plan policies regarding future annexations to the City. The overall purpose of the APU is to plan comprehensively for the future development of unincorporated islands of land located in the western portion of the City, specifically land within the Las Positas Valley and Northside areas above upper State Street. The APU included a traffic assessment of the Las Positas Valley area, which included the Las Positas Road/Cliff Drive intersection. The APU found that the intersection was operating deficiently during the PM peak hour and would continue to experience degrading operations with the future build out of the APU study area. To reduce significant impacts related to traffic at the intersection, the APU study proposed mitigation measure T-1, which states the following:

T-1 The City shall propose to the Santa Barbara County Association of Governments (SBCAG) inclusion of the intersection at Las Positas Road/Cliff Drive in the Regional Transportation Plan for future funding of signalization or other alternative intersection design (such as a roundabout).

In response to mitigation T-1 of the APU, the City of Santa Barbara initiated the preparation of a Project Study Report (PSR) for the Las Positas Road/Cliff Drive intersection in 2001, which was subsequently approved by Caltrans in 2002. At the time the PSR was prepared, the Las Positas Road/Cliff Drive

intersection was within the jurisdictional boundary of the County of Santa Barbara (County) and within the SR 225 right of way, but within the sphere of influence of the City. The County was supportive of the Project and was consulted for input during the PSR process. Since that time, the intersection has been annexed to the City.

During the course of preparing the PSR, discussions developed between the City and Caltrans about the relinquishment of SR 225 to the City. Relinquishment of SR 225 to the City would eliminate the need for the project to be reviewed and approved by Caltrans, as the intersection would no longer be within State right of way.

The PSR evaluated two build alternatives – implementation of a traffic signal and implementation of a roundabout. At the time the PSR was prepared, construction of each of the alternatives was estimated by a consultant at approximately $750,000, and the roundabout was then selected as the preferred alternative. Upon approval of the PSR in 2002, the Santa Barbara County Association of Governments (SBCAG) recommended the project for $750,000 of STIP funding. Since then, that funding has been reprogrammed several times due to the State's ongoing cash flow deficiencies. The funding is currently programmed in Fiscal Year 2015-2016 for the construction phase only.

PROJECT PURPOSE:

The purpose of this Project is to improve traffic operations and reduce congestion at the Las Positas Road/Cliff Drive intersection during the morning (AM) and evening (PM) peak hours. The existing three-way stop controlled intersection experiences recurrent congestion and queuing, particularly during the PM peak hour. The intersection currently operates at level of service (LOS) F during both the AM and PM peak hours. The City of Santa Barbara's intersection level of service standard is LOS C. Traffic operations at this intersection are projected to continue to degrade through the 2035 design year.

CURRENT STATUS:

In January of 2012, City Council approved a contract with Penfield & Smith (P&S) for preliminary design services for the Project. P&S's scope of work included the preparation of preliminary designs and cost estimates for the two build alternatives – traffic signal and roundabout – which will be utilized during the Environmental phase and as the basis for the Final Design phase. At that time, staff had not yet received direction from Council regarding whether or not to continue to pursue the potential relinquishment of SR 225, so staff proceeded under the assumption that SR 225, and thus the Project intersection, would continue to be a State Highway, which would require Caltrans review and approval of the entire Project process.

In May 2012, after several staff reports and presentations to Council regarding the relinquishment of SR 225 to the City, staff was directed by Council to proceed with the relinquishment. As a result, staff modified the Project's scope of work to reflect the revised assumption that SR 225 would become a City street and that Caltrans review and approval would no longer be required for this Project.

P&S, with support from their sub-consultant Kittelson & Associates, who are experts in roundabout design, have completed preliminary designs and cost estimates for both build alternatives – traffic signal and roundabout. Although it was not included in P&S's scope of work, staff has included a third build alternative for discussion purposes, which consists of maintaining the current all-way stop control at the

Project intersection and would widen southbound Las Positas to accommodate two southbound left-turn lanes.

ALTERNATIVES ANALYSIS:

Following is a discussion of the existing conditions at the Project intersection, as well as a discussion of each of the build alternatives. Attachment 1 includes a matrix that compares the operational, environmental, and fiscal impacts of the different alternatives evaluated.

Existing Conditions

The Project intersection currently operates with all-way stop control, with stop signs and a flashing red beacon. The southbound leg of Las Positas Road consists of one left-turn lane and one right turn lane, which are separated by a landscaped 'pork chop' island. The westbound Cliff Drive leg has two through lanes, one right-turn lane, and a bike lane. The eastbound Cliff Drive approach includes one shared left-through lane, one through lane, and a bike lane. Attachment 2 shows the existing intersection configuration.

As previously discussed, the Project intersection currently operates at LOS F during both the AM and PM peak hours. The overall intersection delay during the AM peak hour is 59.3 seconds, while the overall intersection delay during the PM peak hour is 100.2 seconds. The southbound approach consistently experiences the longest delays and queues at the intersection, particularly during the PM peak hour (194.0 seconds of delay). Although the intersection operates deficiently during the peak hours, the intersection generally operates acceptably during the rest of the day. The crash history at this intersection is consistent with statewide average for this type of intersection and there are no known safety concerns at this time. Attachment 3 includes a summary of existing traffic operations, as well as future condition operations using projected 2035 traffic volumes. Without modifications to the existing intersection geometry, traffic operations at the Project intersection are expected to continue to degrade through the 2035 design year. Furthermore, without intersection improvements, there is a potential for increased crash frequency as the intersection delay increases.

All-Way Stop with Two Southbound Left-Turn Lanes

This alternative would maintain the existing all-way stop control at the intersection, but would widen the southbound Las Positas approach in order to accommodate a second southbound left-turn lane (see Attachment 4). Although implementation of this alternative would result in noticeable improvements to both the overall intersection delay and southbound approach delay during the PM peak hour (overall intersection delay reduced from 100.2 seconds to 30.0 seconds; southbound approach delay reduced from 194.0 seconds to 32.5 seconds), the intersection would continue to operate at LOS D, which would still be deficient under existing conditions based on the City's level of service standard of LOS C. Attachment 5 includes a summary of existing and 2035 traffic operations for this alternative.

This alternative would include new sidewalks with protected pedestrian crossings and would result in minimal aesthetic changes at the intersection. The roadway widening associated with this project would result in a net increase of 700 square feet of impervious surface and this alternative would have the potential of only minor impacts on archaeological resources. If the roadway widening of the southbound Las Positas approach cannot be accommodated on the west side of the road, the roadway may be widened on the west side toward Arroyo Burro Creek. Some modifications to an existing culvert that

crosses Las Positas Road north of the intersection may also be required, but all improvements would be made within the City right of way. From a safety perspective, implementation of this alternative could potentially increase the crash frequency due to the addition of a turning lane, which increases the number of conflict points at the intersection.

The total construction cost of this project is estimated at $370,000, with a total project cost estimated at $460,000. Unfortunately, because this alternative would not improve traffic operations above the City's LOS standard, this project would not be eligible for the $750,000 of STIP funds that are available in FY 15/16. This project could, however, be scaled back to not include the roadway widening or sidewalk installation, in which case the cost would be significantly decreased; however, the operational benefit would also be significantly decreased.

Traffic Signal with Two Southbound Left-Turn Lanes
This alternative would include the installation of a new traffic signal at the Project intersection, as well as widening the southbound Las Positas approach to accommodate two southbound left-turn lanes (see Attachment 6). With the existing traffic volumes, implementation of this alternative would improve the level of service of the overall intersection from LOS F to LOS A during the AM peak hour and from LOS F to LOS B during the PM peak hour. This corresponds to an improvement in the overall intersection delay from 100.2 seconds to 12.2 seconds during the PM peak hour. The delay for the southbound approach during the PM peak hour would be significantly reduced from 194.0 seconds to 15.5 seconds. This alternative is expected to continue to provide acceptable traffic operations through the 2035 design year, with the overall intersection operating at LOS B during the PM peak hour in 2035. Attachment 7 includes a summary of existing and 2035 traffic operations for this alternative.

This alternative would include new sidewalks with protected pedestrian crossings and would add urban elements at the intersection; however, the overall aesthetics and footprint of the intersection would not change significantly. The roadway widening associated with this project would result in a net increase of 700 square feet of impervious surface and this alternative would have the potential of only minor impacts on archaeological resources. If the roadway widening of the southbound Las Positas approach cannot be accommodated on the west side of the road, the roadway may be widened on the west side toward Arroyo Burro Creek. Some modifications to an existing culvert that crosses Las Positas Road north of the intersection may also be required, but all improvements would be made within the City right of way. Implementation of a traffic signal at the Project intersection would have a negligible impact on intersection safety as compared to stop-controlled conditions.

The total construction cost of this project is estimated at $625,000 with a total project cost estimated at $780,000. Although the $625,000 total construction cost of this alternative could be covered by the $750,000 in available STIP funding, the STIP funding can only be used for the construction phase. This means that the remaining project costs ($155,000) would require funding by another source that has not been identified at this time.

Roundabout
This alternative would include the construction of a new single-lane roundabout at the Project intersection (see Attachment 8). Similar to the traffic signal alternative, with the existing traffic volumes, implementation of this alternative would improve the overall intersection level of service from LOS F to LOS B during the PM peak hour. This corresponds to an improvement in the overall intersection delay from 100.2 seconds to 10.9 seconds during the PM peak hour. The delay for the southbound approach

during the PM peak hour would be significantly reduced from 194.0 seconds to 12.1 seconds. The roundabout is expected to continue to provide acceptable traffic operations through the 2035 design year, with the overall intersection operating at LOS B during the PM peak hour in 2035. Attachment 9 includes a summary of existing and 2035 traffic operations for this alternative.

This alternative would include new off-street multipurpose pathways, which would provide bicyclists with the option of either travelling through the roundabout or using the off-street paths, depending on rider comfort level. The roundabout would provide uncontrolled pedestrian crossings that would be significantly shorter than the crossings provided by the other alternatives. One of the unique features of the roundabout alternative is the opportunity to include various aesthetic features that could create a 'gateway' to this area of the City. Construction of a roundabout would result in a net decrease of 9,000 square feet of impervious surface and this alternative would have the potential of only minor impacts on archaeological resources. The roundabout alternative may shift the intersection footprint toward Arroyo Burro creek at the northeast corner, but all improvements would be made within the City right of way. Although the Project intersection currently has relatively low accident rates, implementation of a roundabout would reduce the *potential* for severe, high speed, right angle crashes by significantly changing the intersection geometry and reducing speeds.

The total construction cost of this project is estimated at $1,320,000 with a total project cost estimated at $1,650,000. Given the $750,000 in available STIP funding for the construction phase, the remaining project costs ($900,000) would require funding by another source that has not been identified at this time.

BUDGET/FINANCIAL INFORMATION:

As previously discussed, the City received $750,000 in STIP funding for the construction phase of this Project based upon the PSR that was approved in 2002. At that time, both alternatives – traffic signal and roundabout – were estimated at approximately the same cost and the roundabout was selected as the preferred alternative.

At this time, the $750,000 of STIP funding is the only construction funding available for this project. Although the construction cost of installing a traffic signal could be fully covered by the STIP funds, there is still a shortfall for the environmental and final design phases ($155,000). The total project cost for the roundabout alternative is significantly higher than the available funding, with a total shortfall of $900,000.

Staff continuously pursues available grant funding for City projects. Currently, the majority of available grant funding for this type of intersection improvement project is dedicated to locations with proven safety issues. Because the Project intersection does not have a history of safety concerns or elevated crash rates, it would not be eligible for grant funds intended for safety improvement projects. To date, staff has been unable to identify any other potential sources of funding for this Project.

SUMMARY:

Improvements are needed at the Project intersection in order to improve traffic operations during the AM and PM peak hours. At the time the PSR was prepared and approved in 2002, the construction cost estimates for the two alternatives – traffic signal and roundabout – were estimated by the consultant as comparable. The roundabout was subsequently selected as the preferred alternative and the project received $750,000 in STIP funding for the construction phase, which was full

construction funding at that time. Due to the State's ongoing financial issues, the funding has been reprogrammed several times since it was originally programmed. Updated cost estimates reflect a significant funding shortfall for the roundabout alternative, which was previously selected as the preferred alternative. Although the total construction cost for the traffic signal alternative could be covered by funding available, there would be a funding shortfall for the environmental and final design phases. A third alternative of maintaining the existing all-way stop control and widening the southbound approach to accommodate a second left-turn lane is the least expensive alternative; however, because this alternative would not improve traffic operations above the City's minimum standard, it is unlikely that the STIP funding could be used for this alternative.

AS/

ATTACHMENTS:

1. Project Alternative Summary
2. Existing Intersection Configuration
3. Existing Traffic Operations
4. All-Way Stop with Two Southbound Left-Turn Lanes – Preliminary Design
5. All-Way Stop with Two Southbound Left-Turn Lanes – Traffic Operations
6. Traffic Signal with Two Southbound Left-Turn Lanes – Preliminary Design
7. Traffic Signal with Two Southbound Left-Turn Lanes – Traffic Operations
8. Roundabout – Preliminary Design
9. Roundabout – Traffic Operations

Cliff / Las Positas Intersection Improvements
Project Alternative Summary

10/31/2012

PROJECT ALTERNATIVE	OPERATIONAL						ENVIRONMENTAL				FISCAL				
	PM Peak Hour Delay (seconds)				Bike / Ped	Safety	Aesthetics	Arch.	Creek	Net Impervious Area (S.F.)	Total Const. Cost	Total Project Cost	Available Const. Funding	Const. Funding Shortfall	Total Funding Shortfall
	2012		2035												
	Intersection (Avg.)	SB Las Positas	Intersection (Avg.)	SB Las Positas											
No Project	100.2 LOS F	194.0 LOS F	170.7 LOS F	329.0 LOS F	No Change	Potential increased crash frequency as delay increases	No Change	No Impact	No Impact	No Change	$ -	$ -	$ -	$ -	$ -
All Way Stop w/ 2 SB lanes	30.0 LOS D	32.5 LOS D	60.1 LOS F	62.1 LOS D	New Sidewalks Protected Xings	Potential increased crash frequency w/ additional lanes / conflict points	Little Change	Minor Impact Potential	Roadway widening may shift SB approach toward creek (within ROW)	700	$ 370,000	$ 460,000	$ -	$ (460,000)	$ (460,000)
Traffic Signal w/ 2 SB lanes	12.2 LOS B	15.5 LOS B	14.6 LOS B	19.0 LOS B	New Sidewalks Protected Xings	Negligible change from stop-controlled scenarios	Urban Elements Added	Minor Impact Potential	Roadway widening may shift SB approach toward creek (within ROW)	700	$ 625,000	$ 780,000	$ 750,000 *	$ 125,000	$ (155,000)
Roundabout	10.9 LOS B	12.1 LOS B	12.9 LOS B	14.8 LOS B	New Multi-Purpose Path Shorter Uncontrolled Xings	Reduced potential for severe, high speed, right angle crashes	Gateway Opportunities	Minor Impact Potential	Intersection footprint may shift toward creek (within ROW)	-9000	$ 1,320,000	$ 1,650,000	$ 750,000 *	$ (570,000)	$ (900,000)

* $750,000 of STIP funds available in FY 15/16 for construction costs only

ATTACHMENT 1

ATTACHMENT 2	
CLIFF DRIVE AND LAS POSITAS - EXISTING CONDITIONS	
SERVICE REQUEST: N/A	WORK ORDER: N/A
SHEET: 1 OF 1	DATE: 10/31/2012
SCALE: 1"=40'	DRAWN BY: DVB

Las Positas Rd/Cliff Dr Intersection
Scenario 1 - Existing Traffic Control and Geometry

Existing Conditions

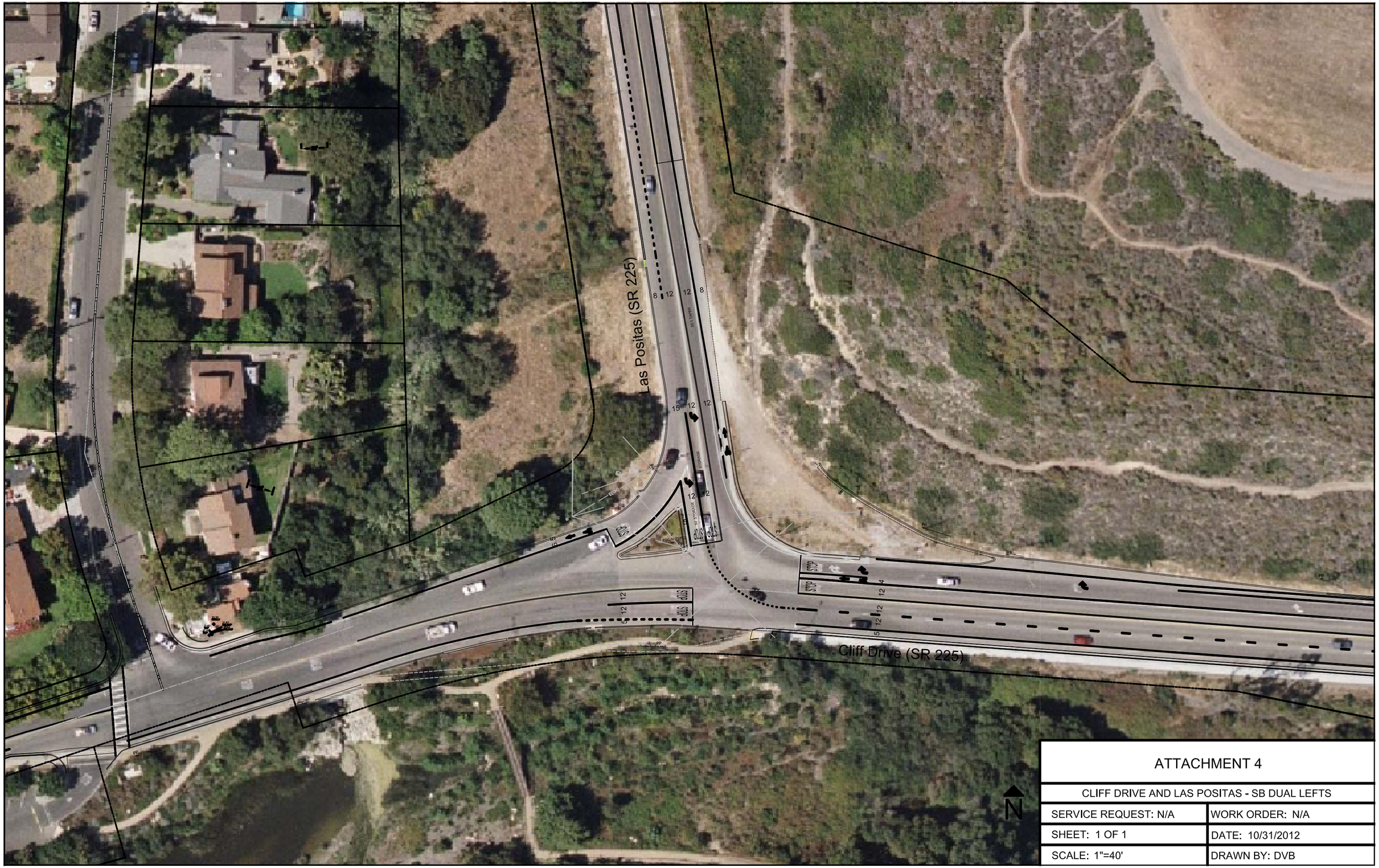
	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	B	N/A	13.1	-	B	N/A	14.9	-
Westbound Cliff Dr	E	N/A	49.8	-	D	N/A	27.8	-
Southbound Las Positas Rd	F	N/A	88.0	-	F	N/A	194.0	-
Total	**F**	**N/A**	**59.3**	**-**	**F**	**N/A**	**100.2**	**-**

Year 2035 Conditions

	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	B	N/A	14.2	-	C	N/A	17.5	-
Westbound Cliff Dr	F	N/A	102.6	-	F	N/A	52.6	-
Southbound Las Positas Rd	F	N/A	169.1	-	F	N/A	329.8	-
Total	**F**	**N/A**	**115.2**	**-**	**F**	**N/A**	**170.7**	**-**

Delay is average delay per vehicle in seconds.
Queues are 95th Percentile queue lengths.

ATTACHMENT 3



ATTACHMENT 4	
CLIFF DRIVE AND LAS POSITAS - SB DUAL LEFTS	
SERVICE REQUEST: N/A	WORK ORDER: N/A
SHEET: 1 OF 1	DATE: 10/31/2012
SCALE: 1"=40'	DRAWN BY: DVB

Las Positas Rd/Cliff Dr Intersection
Scenario 2 - Existing Traffic Control and Southbound Left-Turn Lane/Shared Left-Right Turn Lane

Existing Conditions

	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	B	N/A	13.0	-	C	N/A	16.2	-
Westbound Cliff Dr	E	N/A	49.7	-	D	N/A	34.4	-
Southbound Las Positas Rd	C	N/A	20.5	-	D	N/A	32.5	-
Total	**D**	**N/A**	**32.1**	**-**	**D**	**N/A**	**30.0**	**-**

Year 2035 Conditions

	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	B	N/A	14.5	-	C	N/A	19.8	-
Westbound Cliff Dr	F	N/A	120.4	-	F	N/A	79.4	-
Southbound Las Positas Rd	D	N/A	28.5	-	F	N/A	62.1	-
Total	**F**	**N/A**	**66.5**	**-**	**F**	**N/A**	**60.1**	**-**

Delay is average delay per vehicle in seconds.
Queues are 95th Percentile queue lengths.

ATTACHMENT 5

EQUIPMENT SCHEDULE

LOCATION	STANDARD TYPE	STANDARD SIGNAL MAST ARM	STANDARD LUMINAIRE MAST ARM	LUMINAIRE WATTAGE (HPS)	VEHICLE SIGNAL MOUNTING	PED SIGNAL MOUNTING	PED PUSH BUTTON #	PED PUSH BUTTON ARROW	POLE LOCATION (CALTRANS STD PLAN ES-1G) A	POLE LOCATION (CALTRANS STD PLAN ES-1G) B	SIGN (MAST ARM MOUNTED)	NOTES
(A)	17-2-100*	20'	15'	250	MAS SV-1-T	SP-1-T	–	–	–	–	S.N.S.(LAS POSITAS RD-SR 225⇨) R3-18	4
(B)	1-A-7*	–	–	–	–	TP-2-T	2/4	⇧⇩	–	–	–	
(C)	TYPE A	–	15'	250	–	–	–	–	–	–	–	
(D)	1-A-7*	–	–	–	–	TP-2-T	4/6	⇧⇩	–	–	–	
(E)	15TS*	–	15'	250	SV-2-T	–	–	–	–	–	–	4
(F)	24-4-100*	35'	15'	250	SV-2-T	SP-1-T	6	⇦	–	–	S.N.S.(⇦LAS POSITAS RD-SR 225) R73-3(CA)	4
(G)	1-A-10*	–	–	–	TV-2-T	–	–	–	–	–	–	
(H)	15TS*	–	15'	250	SV-2-T	SP-1-T	2	⇦	–	–	–	4

ALL TRAFFIC SIGNAL EQUIPMENT IS NEW.

* POLES ARE PER CALTRANS STANDARD PLANS, WITH DECORATIVE BASE, LUMINAIRE, BRACKET AND FINIAL PER CITY OF SANTA BARBARA STANDARD DETAIL 3-008.0-06

SIGNAL PHASE DIAGRAM

CONDUCTOR SCHEDULE

		CONDUIT RUN 1	2	3	4	5	6	7	8	9	10
#8 2/7 CONDUCTOR CABLE WIRING											
#10	LUMINAIRES										
#10	GROUND WIRE										
(c)	SERVICE										
#6	SIGNAL POWER										
M-138 CABLE	OPTICOM CABLE										
	SIC										
SWC150	CAMERA CABLE ASSEMBLY										
12-STRAND SMFO CABLE											
CONDUIT SIZE											

ALL CONDUCTORS ARE NEW EXCEPT WHERE NOTED.

GENERAL NOTES

1. EXISTING TRAFFIC SIGNAL TO REMAIN IN OPERATION UNTIL NEW TRAFFIC SIGNAL EQUIPMENT IS INSTALLED IN ORDER TO MINIMIZE TRAFFIC CONTROL DISRUPTION.
2. ALL VEHICULAR INDICATIONS SHALL BE 12" LED TYPE BY GE, CORE OR APPROVED EQUAL. ALL SIGNAL HEADS AND BRONZE FRAMEWORK TERMINAL HOUSINGS AND FITTINGS SHALL BE POWDER COATED MALAGA GREEN. TUNNEL VISORS AND 5-INCH ALUMINUM LOUVERED BACKPLATES SHALL BE POWDER COATED BLACK. ALL PEDESTRIAN SIGNALS SHALL BE INSTALLED WITH BRONZE FRAMEWORK.
3. ALL PEDESTRIAN INDICATIONS BE COUNTDOWN LED TYPE BY GE GELCORE OR APPROVED EQUAL.
4. ALL TRAFFIC SIGNAL WORK SHALL CONFORM TO CALTRANS 2010 STANDARD PLANS AND SPECIFICATIONS.
5. THE FINAL LOCATION OF ALL TRAFFIC SIGNAL EQUIPMENT IS TO BE DETERMINED IN THE FIELD BY THE CITY TRAFFIC ENGINEER OR HIS DESIGNEE.
6. ALL PULL BOXES SHALL BE NO. 6 PER CALTRANS STANDARD PLAN ES-8.
7. INSTALL PULL ROPE AND DUCT SEAL IN ALL NEW EMPTY CONDUITS PER CALTRANS SPECIFICATIONS.

SIGNAL CONSTRUCTION NOTES

1. FURNISH AND INSTALL TYPE III CF SERVICE PEDESTAL EQUIPPED WITH TWO METERS PER S.C.E. REQUIREMENTS. CONSTRUCT PEDESTAL FOUNDATION PER REVISED STD. PLAN ES-3F. INSTALL CONDUIT FROM SERVICE PEDESTAL TO SERVICE POINT PER SPECIFICATIONS. COORDINATE WORK WITH SOUTHERN CALIFORNIA EDISON.
2. FURNISH AND INSTALL NEW 333JP CABINET WITH BATTERY BACKUP SYSTEM AND RACK MOUNT SHELVING IN EMPTY SIDE OF CABINET, POWDER COATED (MALAGA GREEN). CONSTRUCT CONTROLLER CABINET FOUNDATION PER CALTRANS STANDARD PLAN ES-3C. POUR P.C.C. SLAB BETWEEN CONTROLLER AND SERVICE CABINETS. FURNISH AND INSTALL 170ATC-CF-L2C CONTROLLER AND CLARY SP1250PO-R UPS BATTERY BACKUP SYSTEM WITH 6 OPB-1251, 51 Ahr, 172 VOLT BATTERIES, PER PROJECT SPECIFICATIONS.
3. INSTALL 3" CONDUIT FROM SOUTHERN CALIFORNIA EDISON POINT OF SERVICE TO NEW TYPE III CF SERVICE. DEPTH OF CONDUIT SHALL BE 42" MINIMUM.
4. POT HOLE PROPOSED TRAFFIC SIGNAL EQUIPMENT LOCATION PRIOR TO ORDERING EQUIPMENT TO CONFIRM NO UTILITY CONFLICTS.
5. REMOVE AND SALVAGE EXISTING POWER POLE AND ATTACHED OVERHEAD WIRE.
6. REMOVE AND SALVAGE EXISTING STREET FROM EXISTING POWER POLE.
7. REMOVE AND SALVAGE EXISTING OVERHEAD FLASHING BEACON AND CONDUCTORS.

REGISTERED PROFESSIONAL ENGINEER DAVID W. RUNDLE NO. 48540 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER DEREK B. RAPP TR2026 TRAFFIC STATE OF CALIFORNIA

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Phone: (805) 963-9532 Fax: (805) 966-9801

PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION

APPROVED _____ DATE _____ CITY ENGINEER

ORIGINAL SIGNED DATE

DESIGN _____ DRAWN _____ CHECKED _____

CONSTRUCTION DOCUMENTS

NO.	DATE	REVISIONS

INTERSECTION IMPROVEMENT PROJECT
LAS POSITAS ROAD AND CLIFF DRIVE
TRAFFIC SIGNAL INSTALLATION PLAN

2012-XXXX PERM. NO.

XXXX PROJ. NO. SHT. NO.

C-1-XXXX DWG. NO.

SHT. 1 OF 1

ATTACHMENT 6

ATTACHMENT 6

Las Positas Rd/Cliff Dr Intersection
Scenario 3 - Traffic Signal and Southbound Left-Turn Lane/Shared Left-Right Turn Lane

Existing Conditions

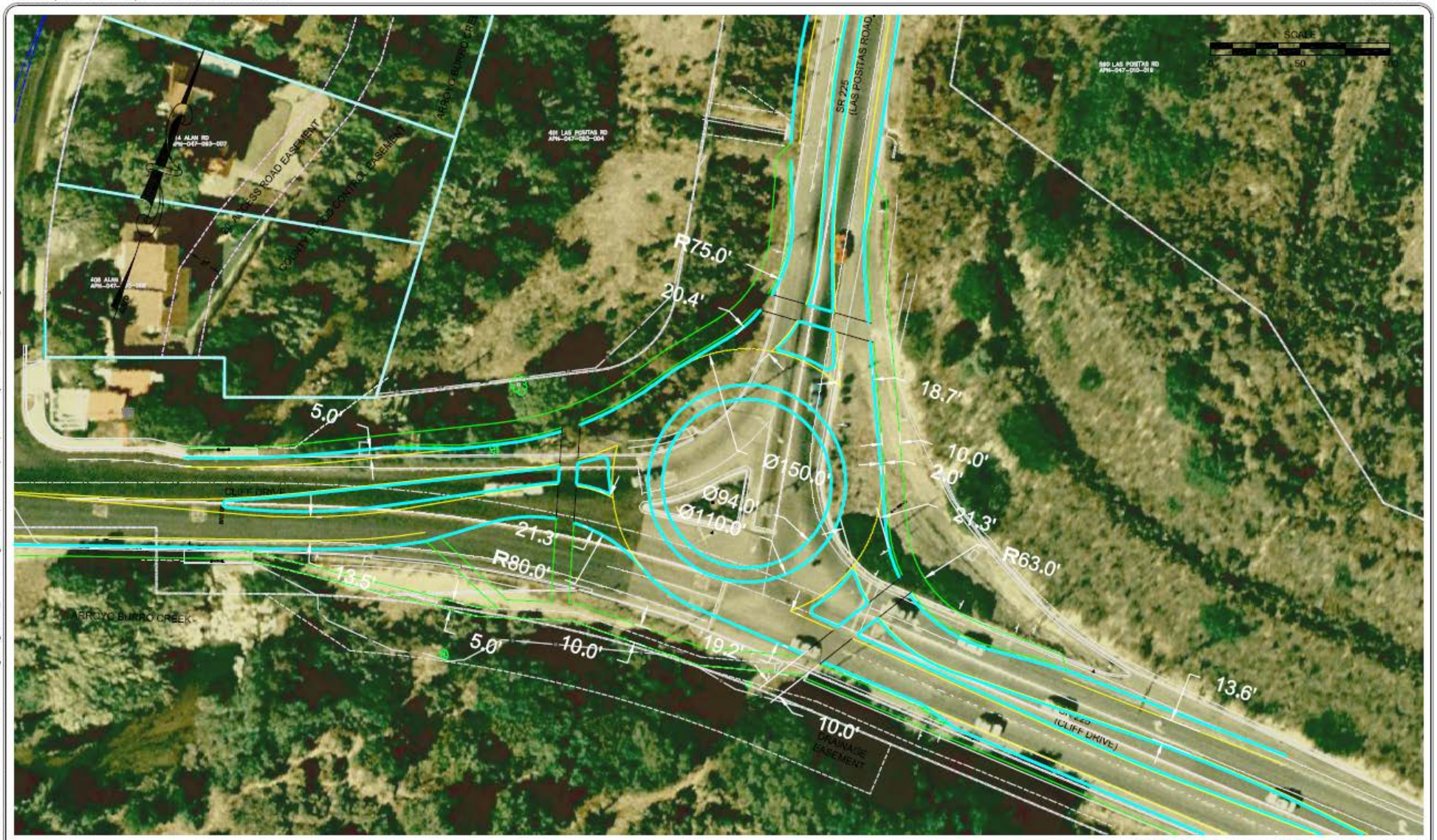
	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	B	0.04	15.9	92	B	0.10	16.0	117
Westbound Cliff Dr	A	0.15	5.0	63	A	0.08	5.8	82
Southbound Las Positas Rd	B	0.18	14.8	158	B	0.22	15.5	214
Total	**A**	**0.47**	**9.8**	**-**	**B**	**0.50**	**12.2**	**-**

Year 2035 Conditions

	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	B	0.09	15.9	105	B	0.12	18.0	136
Westbound Cliff Dr	A	0.17	5.0	73	A	0.1	7.1	98
Southbound Las Positas Rd	B	0.21	14.8	197	B	0.26	19.0	313
Total	**B**	**0.57**	**10.7**	**-**	**B**	**0.58**	**14.6**	**-**

Delay is average delay per vehicle in seconds.
Queues are 95th Percentile queue lengths in feet.

ATTACHMENT 7



PRELIMINARY ROUNDABOUT CONCEPT
SR 225 (LAS POSITAS ROAD) AT CLIFF DRIVE
SANTA BARBARA, CA

FIGURE 2

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

H:\proj\Wat\10360 - Las Positas Roundabout Peer Review\dwgs\dea\proj\10360_PreliminaryConcept.dwg Oct 22, 2012 - 12:40pm - cpandrad Layout Tab: 11X17_PreliminaryDesign

ATTACHMENT 8

Las Positas Rd/Cliff Dr Intersection
Scenario 4 - Single Lane Roundabout

Existing Conditions

	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	-	-	-	-	B	0.46	11.0	75
Westbound Cliff Dr	-	-	-	-	A	0.54	9.2	100
Southbound Las Positas Rd	-	-	-	-	B	0.67	12.1	150
Total	**-**	**-**	**-**	**-**	**B**	**-**	**10.9**	**-**

Year 2035 Conditions

	AM				PM			
Approach	**LOS**	**V/C**	**Delay**	**Queues**	**LOS**	**V/C**	**Delay**	**Queues**
Eastbound Cliff Dr	-	-	-	-	B	0.53	13.1	75
Westbound Cliff Dr	-	-	-	-	B	0.60	10.5	100
Southbound Las Positas Rd	-	-	-	-	B	0.74	14.8	175
Total	**-**	**-**	**-**	**-**	**B**	**-**	**12.9**	**-**

Delay is average delay per vehicle in seconds.
Queues are 95th Percentile queue lengths in feet.