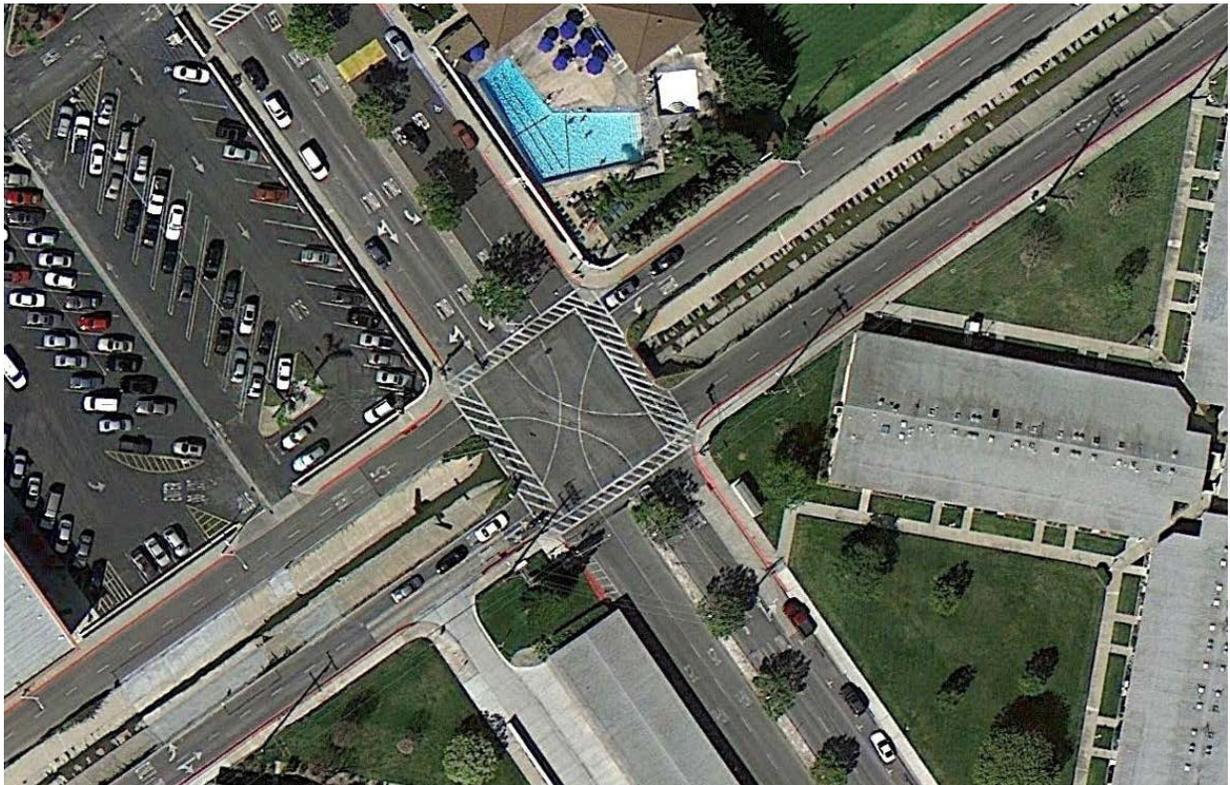


Leisure World Community – Seal Beach Traffic Study

Prepared for:

Golden Rain Foundation

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Prepared by:



AndersonPenna Partners, Inc.
20280 Acacia Street, Suite 100
Newport Beach, CA 92660
T (949) 428-1500 F (949) 258-5053
www.andpen.com

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SECTION 1

INTRODUCTION AND STUDY APPROACH

In June, 2013, the Golden Rain Foundation (GRF) retained AndersonPenna Partners (APP) to perform a Traffic Study of the Leisure World Community (Community) consisting of vehicular traffic, bicycle, scooter, golf cart, and pedestrian usage of the roadways in Seal Beach, California. The following document summarizes our efforts, analyses, results and recommendations. The purpose of this Study is to determine if motor vehicle and pedestrian regulations and standards within the Community conform to those in surrounding municipalities and establish a prioritized list of recommended improvements to improve safety within the Community.

The scope of work entails the following tasks:

1. Meet with GRF staff to discuss the study approach and identify any specific areas of concern in the Community.
2. Complete an inventory of the existing roadway and traffic elements including traffic signal, crosswalks, signage, speed limits, striping and pavement markings.
3. Analyze the existing roadway and traffic elements and compare them with the “standard of care” used in surrounding municipalities.
4. Develop a prioritized list of recommended improvements.
5. Prepare a report summarizing the above, including construction cost estimates.

SECTION 2

REVIEW OF EXISTING CONDITIONS

Several field reviews were conducted at varying times during the day to collect pertinent information related to the existing striping, signage, circulation, signals, and pedestrian movements throughout the Community. The results of this review are summarized below.

Traffic Circulation

Leisure World Seal Beach is a gated residential senior community consisting of approximately 6,600 dwelling units. There are 3 gates to the Community – the Main Gate from Seal Beach Boulevard, the St. Andrews Gate from Seal Beach Boulevard and the North Gate from Beverly Manor Drive. The Community is essentially square shaped.

Golden Rain Road is the Community's main roadway and traverses in a westerly direction from the Main Gate. A 30-foot wide trapezoidal channel bisects the roadway from El Dorado Drive to the Main Gate, with two, one-way westbound lanes on the north side of the channel and two, one-way eastbound lanes on the south side of the channel. West of El Dorado Drive, Golden Rain Road reduces to one lane in each direction with on-street parking on the north side of the channel and no on-street parking on the south side of the channel. The only traffic signal in the Community is at the Golden Rain Road and St. Andrews Drive intersection. There are a number of streets that intersect Golden Rain Road throughout its length.

St. Andrews Drive is the other main road in the Community. It intersects Golden Rain Road near the center of the Community and traverses in a southerly direction from near the North Gate to the St. Andrews Gate. After entering the southerly gate from Seal Beach Boulevard, St. Andrews intersects with Church Place, and is a two lane road in each direction with on-street parking and several driveways on either side of the street until intersecting with Golden Rain Road. North of Golden Rain Road, St. Andrews remains a two lane road in each direction with on-street parking and several intersecting streets and driveways, ending at Northwood Road. The segment of St. Andrews Drive from Golden Rain Road to north of Tam O'Shanter has some difficult circulation issues due to the number of driveways exiting from the parking lots on the west side of the street, the number of crosswalks and the location of the Tam O'Shanter intersection.

The remaining streets consist of one-lane of traffic in each direction, with or without on-street parking. Golf carts and small personal scooters are used throughout the Community, with golf carts primarily using the road and scooters primarily using the adjacent sidewalk.

The traffic circulation at the Main Gate is adequate given the number of vehicles entering and exiting. The traffic circulation at the North Gate is a bit circuitous, but again is adequate and appears to be working well, except for the turning radius from the exit driveway to Beverly Manor Drive. The right turn at this location onto Beverly Manor is very compact. Several circulation issues were noted outside of the St. Andrews Gate, in particular at the driveway leading to the back of the shopping center just east of the Gate.

Although bicycles are not excluded from using any of the streets, there are currently no dedicated bike lanes. The heaviest concentration of pedestrians is in the vicinity of the main parking lot, near the Health Care Center, Amphitheater and Clubhouse 6.

Traffic Signal

Signalized traffic lights are a highly effective control device used by engineers and municipalities to safely manage vehicular right-of-way at high volume intersections. Traffic signals require more planning and are initially more expensive to install and modify than signs and markings. However, when properly maintained, they offer a level of control and convenience to variations in the flow of traffic, such as rush hours, that have long lasting cost benefits, including safely controlling pedestrian crosswalks and vehicles making dedicated left turns.

The intersection of Golden Rain Road and Saint Andrews Drive is controlled by a traffic signal that controls existing traffic lanes in all four directions of travel. Each direction of travel has a dedicated left/U-turn lane adjacent to a straight/right turn lane. There are crosswalks between each of the four corners of the intersection and a 30-foot wide channel that bisects Golden Rain Road. A chain link fence is on top of channel, making it difficult to see opposing traffic movement at the intersection with Saint Andrews Drive. These conditions make it more difficult for motorists to make left and U-turns safely.

Traffic Signage

Traffic signs are primarily used to inform motorists and pedestrians of allowable vehicle activity, including vehicle speed, movement (i.e. turning, merging, stopping, yielding, one way, etc.), parking, and pedestrian behavior. They are also used to warn motorists about irregular and unsafe roadway conditions. Proper placement of standardized traffic signs is an important component of traffic safety. However, the use of numerous, repetitive, and non-standard signage can cause confusion and draw driver's attention away from the roadway and other vehicles.

Traffic signage is fairly consistent throughout the Community. Other than directional signs in the vicinity of the gates, traffic signage primarily consists of "STOP" signs at intersections and roadway-mounted signs at key crosswalks on Saint Andrews Drive. The portion of St. Andrews Drive between Golden Rain Road and the north end of the amphitheater parking lot has a significant amount of signage over a relatively short roadway length, which is further confused by non-standard roadway-mounted pedestrian crossing signage located at the crosswalks between the two lanes of travel on both sides of the street.

Traffic Striping and Pavement Markings

Updating the Community's roadway striping and markings is a highly affordable and effective approach for calming traffic, improving capacity, and directing vehicles away from roadway hazards, pedestrians, and other vehicles. The California Uniform Code on Traffic Control Devices (MUTCD) allows for reasonable variations in the types of stripes and markings used by municipalities for traffic control. However, it is important to apply standardized symbols, markers, and stripes to avoid confusion and promote safety. This study investigates the existing roadway striping and markings and in the next section recommends a strategy to calm the flow of traffic, promote pedestrian safety, and encourage the use of bicycles.

Traffic striping and pavement markings are relatively consistent throughout the Community. However, there are a number of locations where the striping and markings are faded and wearing away or where markings have become exposed that were previously removed by covering with black paint. Speed limits are generally posted on the pavement. Additionally, the amount of red curb at intersections is varied.

Crosswalks

A crosswalk is a critical element of roadway safety that is used to mark the best place for pedestrians to cross traffic. Crosswalks are typically located at stop signs and traffic signals. However, they can also be used at “mid-block” locations (not at intersections), after carefully determining that the speed limit can be controlled, traffic flows can be minimalized, and that pedestrian exposure is great enough to warrant their use. Although crosswalks can be an effective traffic control device when properly applied, they can also provide a “false sense of security” when installed at locations that do not comply with proper planning standards. A roadway with too many crosswalks or unused crosswalks creates a “numbing” affect on drivers, causing them to ignore the crosswalk and reducing the driver’s ability to react to pedestrians.

Crosswalks throughout the Community are located at both intersections and at mid-blocks. Most of the crosswalks are located on the busier roadways and at the 3 entry gates. Mid-block crosswalks are generally located along the busier Trust Streets.

Speed Limits

Speed limits are a highly standardized and regulated form of traffic control. The California Vehicle Code uses a comprehensive approach for determining speed limits that takes into consideration a roadway’s shape and the driver’s ability to react to hazards, pedestrians, bicyclists, and other motorists. Wide open roads are typically assigned higher speed limits, while narrow, winding neighborhoods are assigned lower speeds. Private communities have additional flexibility to further reduce speed limits to further enhance safety and promote traffic calming.

Speed limits for most of the Trust streets throughout the Community are posted and striped at 25 mph, with occasional 15 mph markings along the busier roadways to control vehicles at steep curves and in areas with the potential for increased pedestrian exposure. There are roadways with posted and striped speed limits of 10 mph that are maintained by the individual Mutuels.

SECTION 3

ANALYSIS AND RECOMMENDATIONS

Circulation

During the field investigations, a significant number of vehicles and pedestrians were observed travelling between the St. Andrews Gate and the shopping center located outside of the Gate, just west of Seal Beach Boulevard. This area combines heavy pedestrian movement with motor vehicle activities over a short, 100-foot stretch of roadway, including non-standard crosswalks, parking stalls, a heavily-used driveway, stop signs, bike racks, and ADA ramps. This area can be improved to incorporate ADA compliant pedestrian access while maintaining the existing parking stalls and improving vehicular movement.

As previously discussed, the area immediately outside of the St. Andrews Gate is cluttered as a result of the driveway into the back of the shopping center, the mixing of pedestrians and cars exiting the gate and the compact area. The pedestrian crosswalk is located behind the parking stalls. Additionally, the right angle turns into and from the driveway result in very slow traffic and traffic congestion. Since a significant number of the vehicles that exit from the gate use the driveway, the geometry and pavement markings should be improved.

The segment of St. Andrews Place between Golden Rain and the north end of the amphitheater is crowded with driveways, crosswalks and in-road signage (non-standard stop and yield signs). The frequency of signs is confusing for the motorists and this segment is further complicated due to the high number of pedestrians.

Near the North Gate, the turning radius from the exit driveway to Beverly Manor Drive is restricted and does not appear to allow oversized vehicles to turn right without going over the existing curb.

Recommendation 1 (Outside St. Andrews Gate) \$18,000
Upgrade pavement markers, striping, ADA ramps and driveway to relocate pedestrian access and bike racks away from the roadway and parking stalls. Reconstruct, widen, restripe, and install raised pavement markers to improve traffic circulation in the vicinity of the existing driveway. Relocate the pedestrian path in front of the parking stalls. See Figure 1.

Recommendation 2 (St. Andrews - Golden Rain to North End of Amphitheater) \$25,000
Reconfigure the first driveway north of the amphitheater to allow only “inbound” vehicles and remove the corresponding crosswalk on the north side of the driveway. Relocate the existing “outbound” only driveway on the west side of St. Andrews to line up with Tam O’Shanter, resulting in a four-way stop intersection. The relocated driveway will accommodate left and right “outbound” vehicles only. See Figure 2.

Recommendation 3 (Exit Driveway by North Gate) \$500
Determine if an increased turning radius can be provided for vehicles using the exit driveway and turning right onto Beverly Manor Drive. Provide appropriate warning signage if restrictions cannot be alleviated. See Figure 6.

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Golf Cart and Scooters

Golf cars and scooters are a highly utilized method of transportation for the Community. Therefore, accommodations should be made to provide access for them and safe passage through the Community. California Vehicle Code allows golf carts to travel on roadways posted 30 mph or less. Usage of golf carts on Community roads can be safe if implementation of lower speed limits is adopted. Scooters are typically slower moving vehicles and therefore should be operated on the sidewalk.

Recommendation 4 (Golf Cart and Scooter Education Program) **\$1,300**

Adopt a program and education that discourages scooters from traveling in roadways and golf carts from traveling on sidewalks. Develop flyers and conduct “Town Hall” meetings to educate the Community residents of the safety benefits of consistent and predictable behavior between vehicles and pedestrians.

Traffic Signals

The traffic signal at Golden Rain Road and St. Andrews Drive does not provide a left turn arrow for vehicles in the dedicated left turn lane, nor does it provide adequate hearing and sight impaired facilities. Although this is not uncommon, this type of signaling does not conform to the current standard and tends to cause confusion, especially to motorists who are encountering the intersection for the first time. Based on discussions with GRF staff and field observations, there does not appear to be enough evidence to recommend that this signal be upgraded to accommodate a dedicated left turn. However, GRF staff has indicated that there are hearing and sight impaired residents that live in the Community.

Recommendation 5 (Golden Rain and St Andrews Traffic Signal and Striping) **\$4,200**

Modify the existing traffic signal to accommodate the hearing and sight impaired. Update the traffic signal to re-align the striping with recommended bike route striping and pavement markers (see Recommendation 7 below). It is also recommended that traffic counts be collected for the intersection to properly set the timing for the intersection. See Figure 3.

Traffic Signage

Traffic signs should only be used when it is absolutely necessary to inform motorists of allowable vehicle movement, hazards, and pedestrian behavior. Placement of signs should be limited to the recommendations of local and state law. Signs should be consistent throughout the Community for text, size and placement.

Recommendation 6 (Roadway Signage) **\$7,100**

Remove and salvage redundant signage, update non-standard, damaged, and improperly placed signage (especially at crosswalks), and install missing signage as appropriate. For consistency and liability reasons, remove all non-standard roadway-mounted pedestrian crossing signage located at the crosswalks between travel lanes.

Traffic Striping and Pavement Markings

Golden Rain Road from Del Monte Drive to El Dorado Drive is approximately 18-foot wide in each direction (measured from curb to curb) and is separated by a 30-foot wide trapezoidal channel. There are two 9-foot lanes in each direction and no shoulders on either side. Although there is a curb between the roadway and the top of the channel, it is often less than 2-inches tall and does not provide an adequate barrier to prevent errant vehicles from driving into the channel. At the intersection of Golden Rain Road and St. Andrews Drive, the lane along the

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edge of the channel becomes a dedicated left/U-turn lane, while the lane along the curb becomes a through/right lane.

Line of sight issues are commonplace in residential communities at intersections due to parked cars. The biggest issue relating to the line of sight is for vehicles at an intersection that are making a left turn while the vehicles on the cross-street are not controlled by a “Stop” sign. The vehicle making the left turn is forced to slowly move forward to see around the parked cars. This is particularly difficult for vehicles on the side streets that intersect with St. Andrews Drive.

As vehicles are traveling easterly on North Gate Road approaching Clubhouse 4, there is a small “L”-shaped drive aisle just north of Clubhouse 4 that services five parking stalls. It is a one-way drive aisle without any pavement markings.

Recommendation 7 (Golden Rain Enhanced Striping and Bike Lane) \$25,500
Convert Golden Rain to a one-lane road in each direction from Burning Tree to El Dorado. Install an edge stripe with reflective raised pavement warning markers one foot from the inside curb. Stripe a 3-foot wide cross-hatched buffer between the traffic lane and the bike lane. The bike lane striping will end approximately 100 feet from the St. Andrews intersection to allow for a right turn lane. The inside lane will become a left/through lane. In conjunction with the proposed traffic counts at the St. Andrews/Golden Rain intersection per Recommendation 5, the lane configurations may be revised if too much delay is caused by the left turn movement. Reconstruction of the inside curb is also recommended. See Figure 4.

Recommendation 8 (Red Curb Painting on St. Andrews) \$2,000
Extend red curb painting on St. Andrews to 25’ beyond the end of the curb return to assist left turn movements onto St. Andrews.

Recommendation 9 (Parking Area Just North of Clubhouse 4) \$500
Stripe one-way pavement arrows for entering and travel through the parking area north of Clubhouse 4. Place a “Do Not Enter” sign at the parking lot exit. See Figure 6.

Crosswalks

Crosswalks should generally only be placed at intersections. Mid-block locations are only acceptable when pedestrian exposure is high enough to warrant their use and after carefully determining that the motorists will be able to see pedestrians and have enough time to stop, based on roadway conditions and the posted speed limit.

Recommendation 10 (Eliminate Crosswalks) \$4,000
Eliminate crosswalks at the following locations:

<u>Crosswalk Location</u>	<u>Reason for Removal</u>
South leg crosswalk Del Monte at Interlachen	North leg already has crosswalk
East leg crosswalk Northwood at St. Andrews	Relocate to east of driveway*
Mid-block crosswalk Northwood at Clubhouse 3	Too many crosswalks*
North leg crosswalk St. Andrews at Kenwood	Too many crosswalks*
Mid-block crosswalk St. Andrews at amphitheater	Too many crosswalks
Mid-block crosswalk El Dorado south of Oakmont	Too many crosswalks
Mid-block crosswalk El Dorado north of Canoe Brook	Too many crosswalks

*See Figure 5.

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Bike Lanes

During preliminary field visits, bicyclists were observed traveling in both the roadway and along sidewalks. Well-defined bike lanes on major roadways are an excellent tool for reminding motorists that bicyclist share the same privileges and responsibilities as vehicles.

Recommendation 11 (Bike Lane Striping Plan) \$26,000

Develop and incorporate a Bike Lane Striping Plan that provides clear paths of travel for bicyclists, promotes bike use, and encourages traffic calming. Construction activities include education materials and outreach, signage, pavement striping, and information kiosks at bike racks, public areas, and entrance gates. Our original thought is to have marked bike lanes on Del Monte, Northwood, El Dorado and Golden Rain.

Speed Limits

The existing posted speed limit for Trust streets varies from 15 to 25 mph and are not posted and striped at regular locations or standard intervals. Although the State of California has guidelines and standards for determining the speed limit, the Leisure World Community has the flexibility to enhance those criteria. Although enforcing the posted speed limits can be challenging, implementing reduced speed through signage and striping has proven to work with motorists in other communities very well over time.

Recommendation 12 (Speed Limit Plan) \$4,000

Develop and install a speed limit plan that clearly defines the extent of the Community's roadway speed limits and install respective signage and striping. Specifically, we recommend a speed limit of 15 mph for all streets except Golden Rain.

SECTION 4

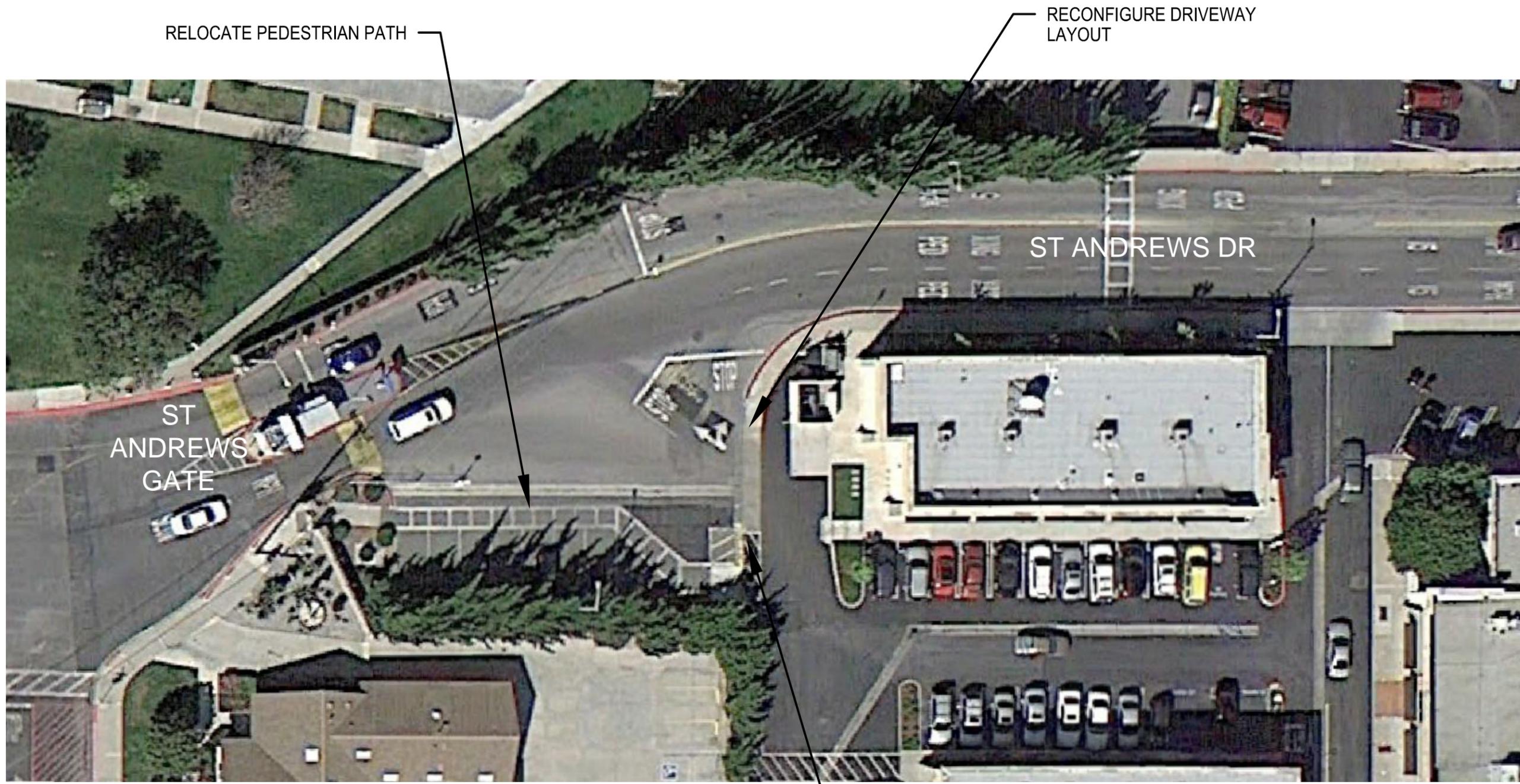
PRIORITIZED IMPROVEMENT COSTS

Following is a summary table of the recommendations and estimated cost of improvements listed by priority. The costs include a 35% construction cost contingency.

Priority No	Description	Estimated Costs		
		Design	Construction	Total
1	Golden Rain enhanced striping and bike lane	\$1,500	\$24,000	\$25,500*
2	Golden Rain/St. Andrews traffic signal and striping	\$700	\$3,500	\$4,200
3	St. Andrews – Golden Rain to north of amphitheater	\$4,000	\$21,000	\$25,000
4	Outside St. Andrews Gate	\$3,000	\$15,000	\$18,000
5	Speed limit plan	-	\$4,000	\$4,000
6	Roadway signage	\$900	\$6,200	\$7,100
7	Eliminate crosswalks	-	\$4,000	\$4,000
8	Exit driveway by North Gate	-	\$500	\$500
9	Red curb painting on St. Andrews	-	\$2,000	\$2,000
10	Parking area just north of Clubhouse 4	-	\$500	\$500
11	Bike lane striping plan	\$2,000	\$24,000	\$26,000
12	Golf cart and scooter education	-	\$1,300	\$1,300
	TOTAL	\$12,100	\$106,000	\$118,100

* Add \$175,000 for reconstruction of inside curbs to provide additional barrier.

FIGURES

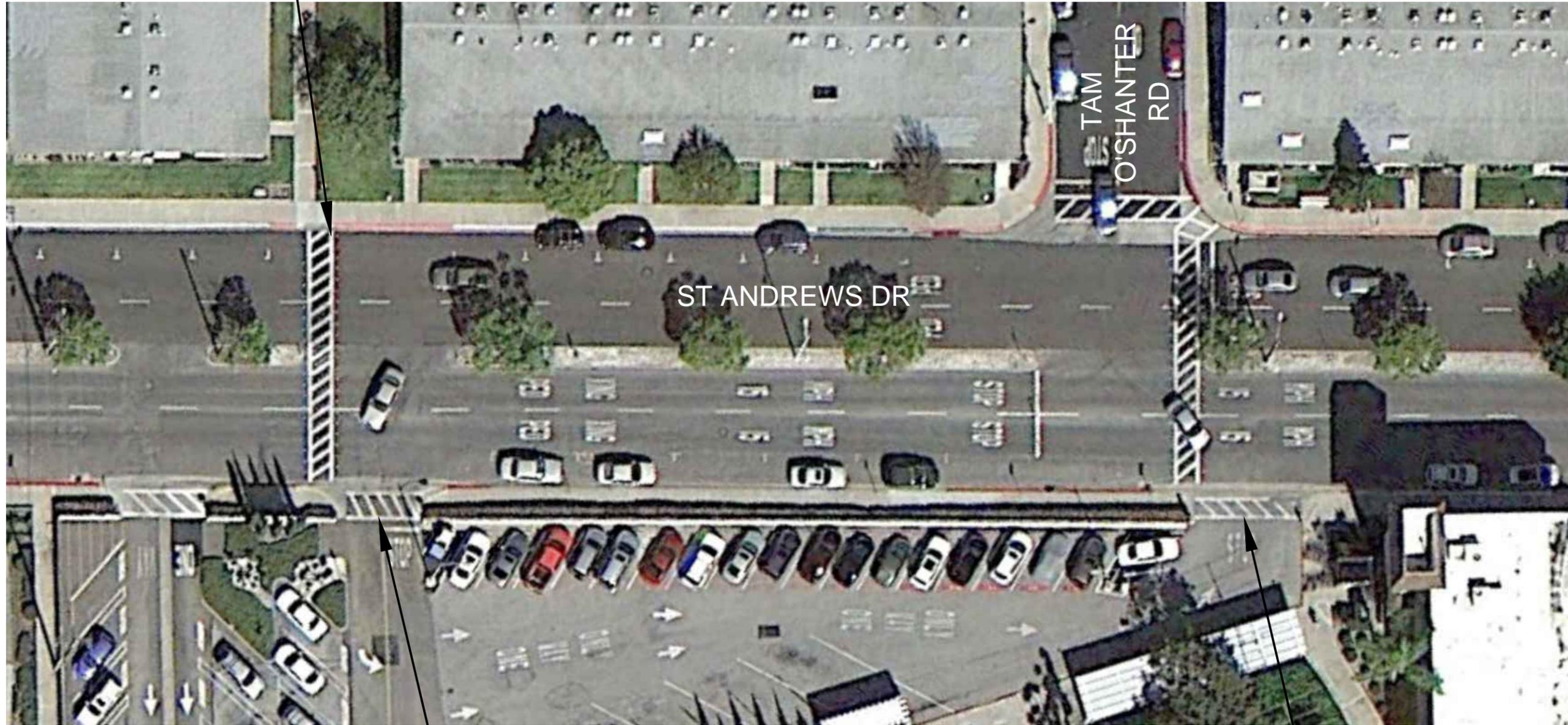


LEISURE WORLD
SEAL BEACH



FIGURE 1
ST ANDREWS GATE

ELIMINATE CROSSWALK

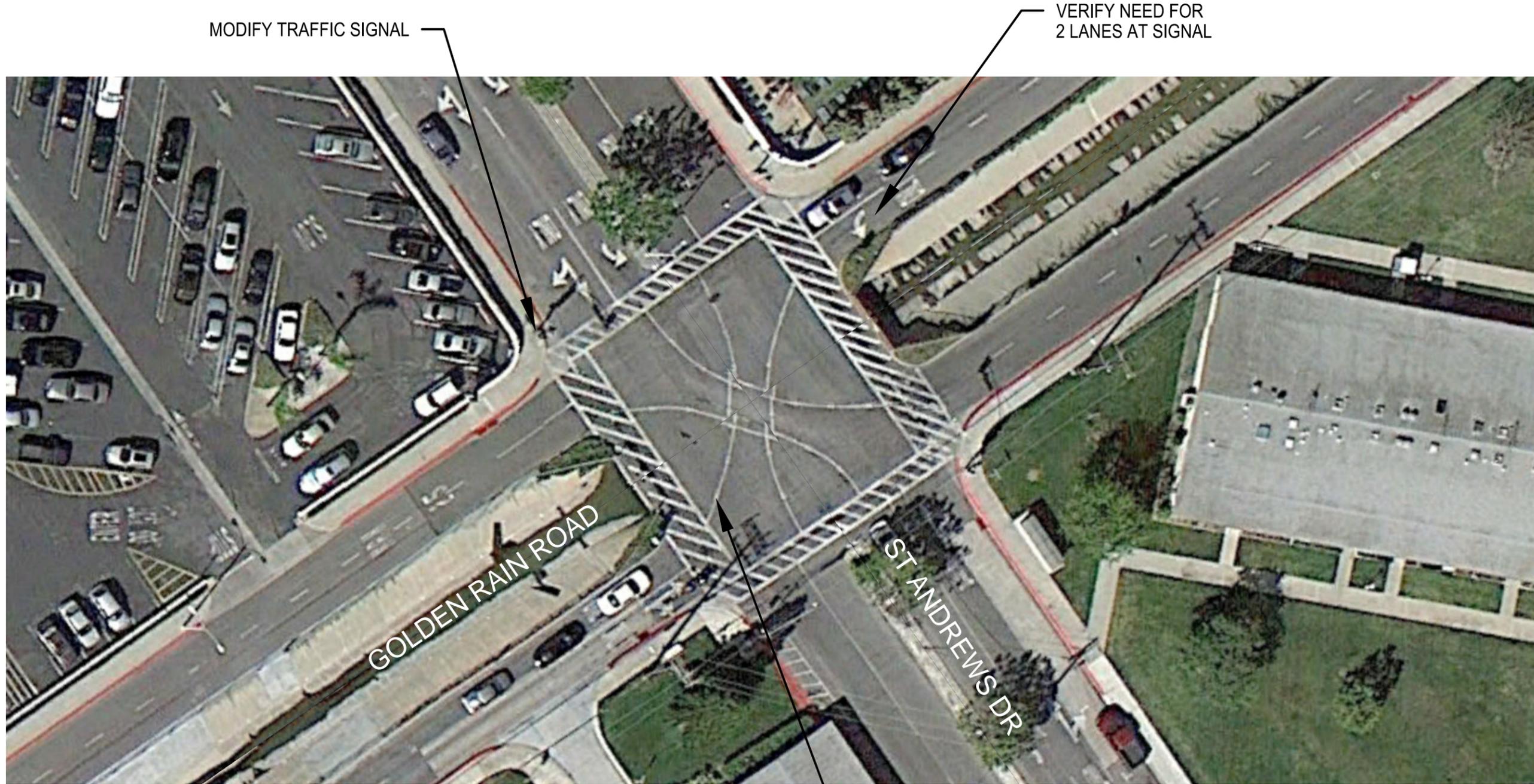


RECONFIGURE DRIVEWAY-
INBOUND TRAFFIC ONLY

RELOCATE DRIVEWAY
TO LINE UP WITH
TAM O'SHANTER RD

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FIGURE 2
ST ANDREWS DR



MODIFY TRAFFIC SIGNAL

VERIFY NEED FOR
2 LANES AT SIGNAL

GOLDEN RAIN ROAD

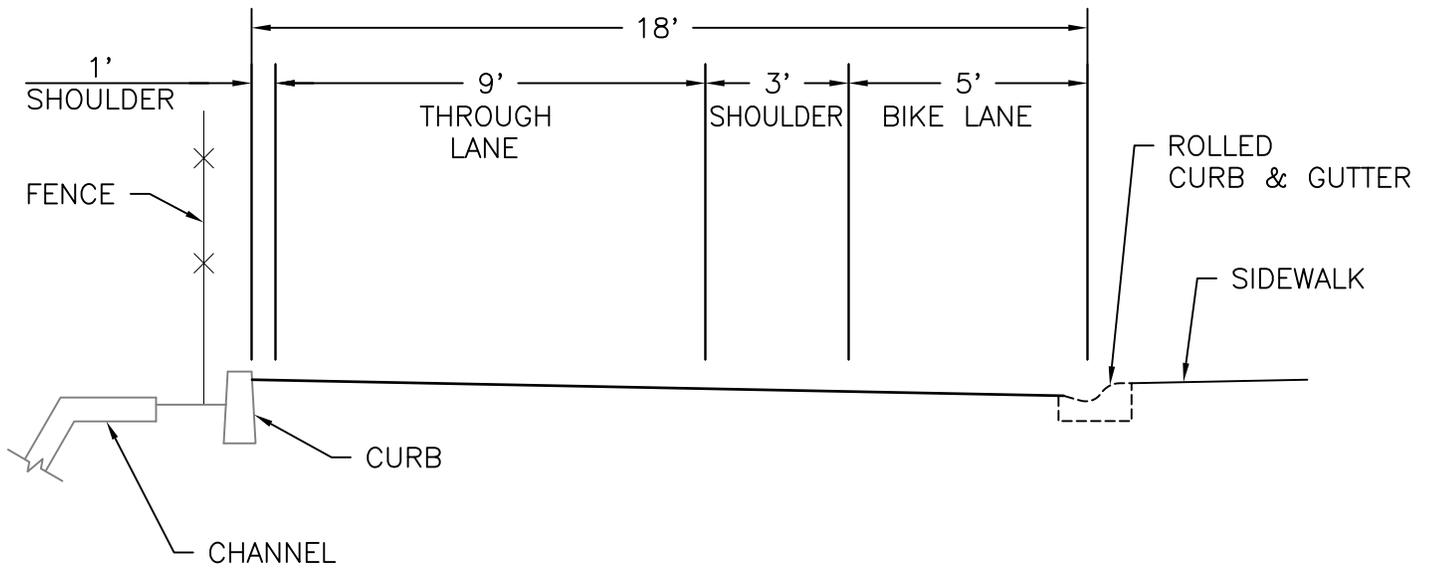
ST ANDREWS DR

RESTRIPE
INTERSECTION

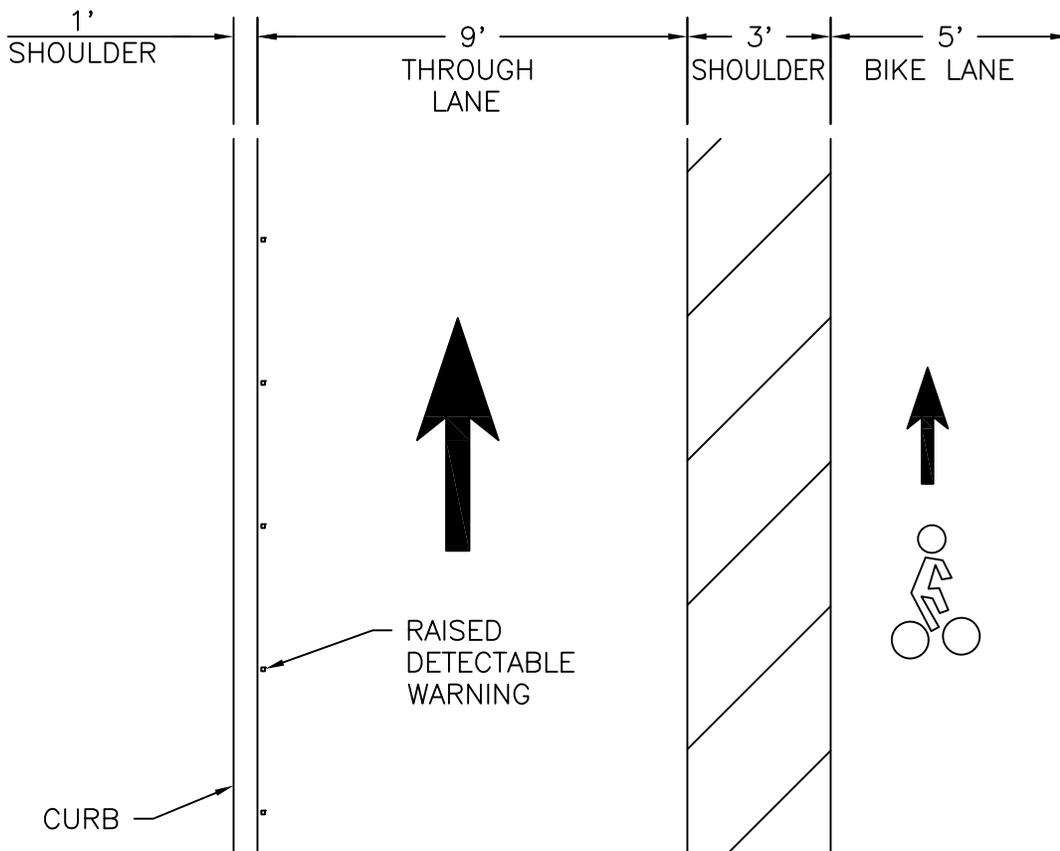
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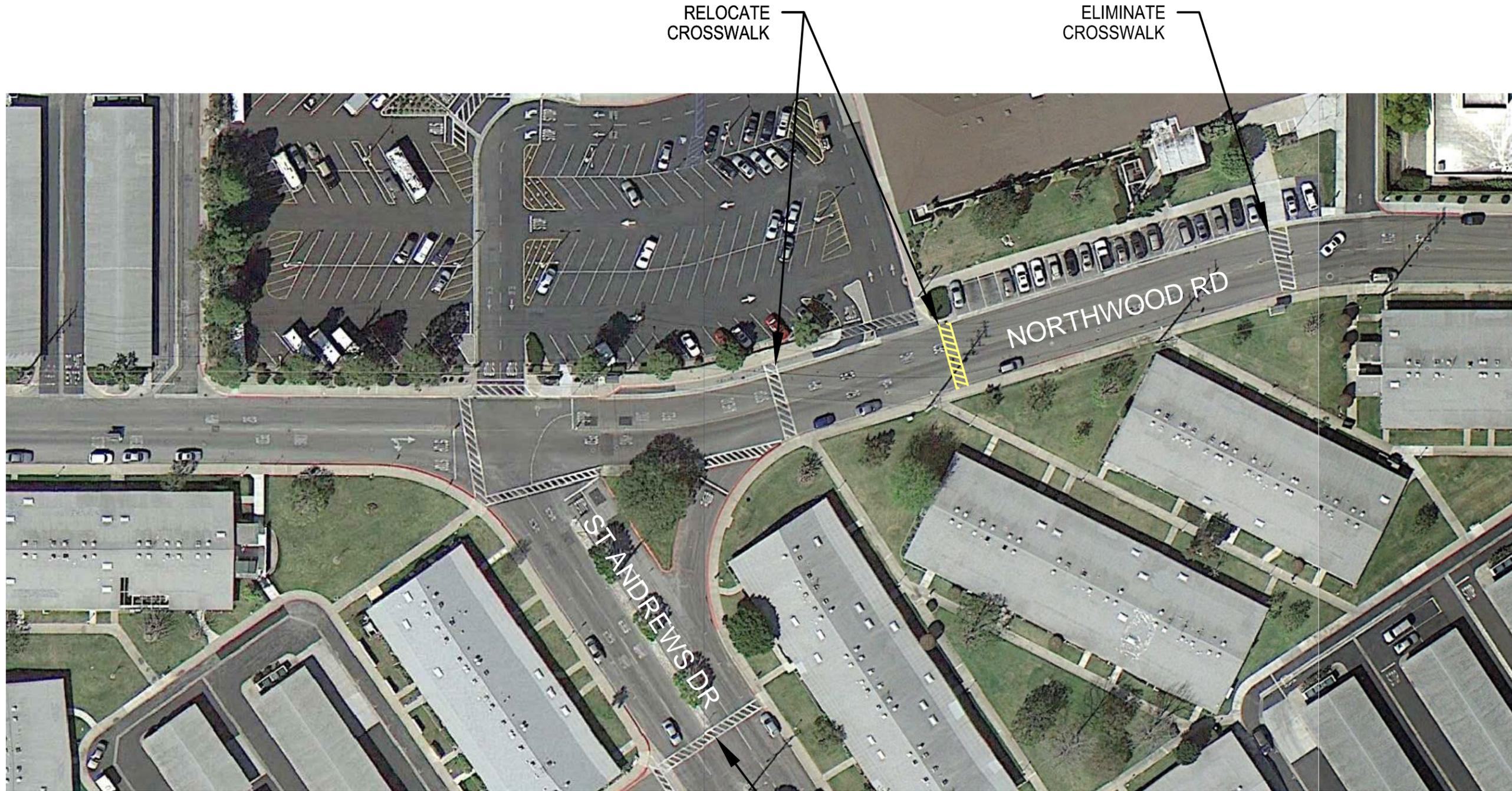
FIGURE 3
GOLDEN RAIN RD & ST ANDREWS DR



SECTION

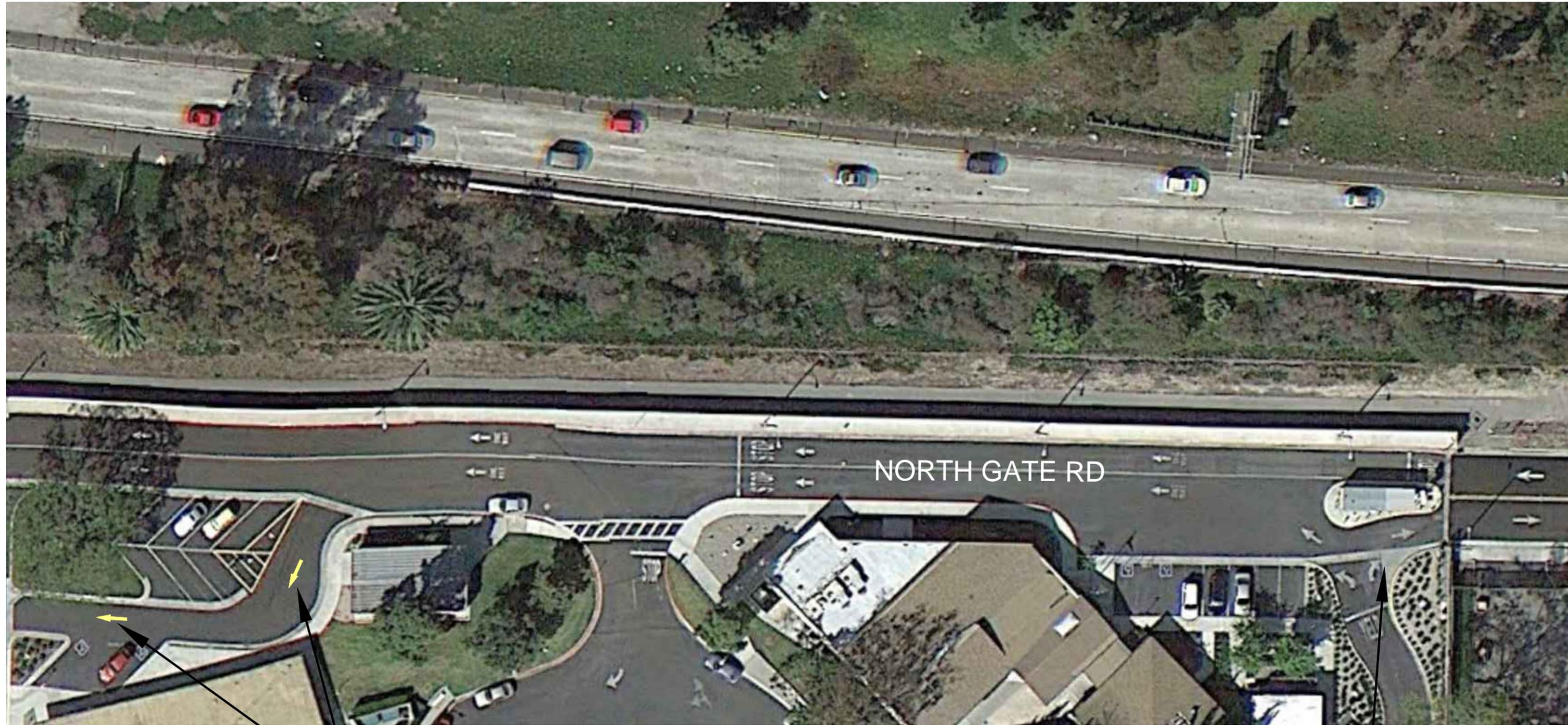


PLAN



LEISURE WORLD
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FIGURE 5
NORTHWOOD RD & ST ANDREWS DR



NORTH GATE RD

ADD ONE-WAY
PAVEMENT ARROWS

DETERMINE
VEHICLE
RESTRICTIONS



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FIGURE 6
NORTH GATE RD