

I. OPENING SESSION

1. CALL TO ORDER

A Regular Meeting of the Public Works Commission was called to order by Chair Funabashi at 7:00 p.m. in the City Hall Council Chambers, 415 Diamond Street, Redondo Beach, California.

2. ROLL CALL

Commissioners Present:	Garcia, Glass, Hannon, Minne, Simpson, Chair Funabashi
Commissioners Absent:	Fox
Officials Present:	Gene Kim, City Traffic Engineer Camy Byrd, Minutes Secretary

3. SALUTE TO THE FLAG

Chair Funabashi led the audience and Commissioners in a Pledge of Allegiance to the Flag.

4. BLUE FOLDER ITEMS

Items for 7-1, 8-1, 8-2, 8-3.

II. APPROVAL OF ORDER OF AGENDA

Motion by Commissioner Hannon, seconded by Commissioner Simpson to approve the Order of Agenda as presented. Motion carried unanimously, with Commissioner Fox absent.

III. CONSENT CALENDAR

- 1. APPROVAL OF AFFIDAVIT OF POSTING** for the Public Works Commission meeting of February 24, 2020.
- 2. APPROVAL OF THE FOLLOWING MINUTES** – Public Works Commission Regular meeting of January 27, 2020.

Motion by Commissioner Simpson, seconded by Commissioner Glass, to approve items 1 & 2. Motion carried unanimously, with Commissioner Fox absent.

IV. ORAL COMMUNICATIONS – NONE

V. EXCLUDED CONSENT CALENDAR – NONE

VI. PUBLIC PARTICIPATION ON NON-AGENDA ITEMS – NONE

VII. OLD BUSINESS

1. COMMISSION INPUT RELATED TO DEVELOPMENT OF GOALS AND OBJECTIVES FOR THE CITY'S STRATEGIC PLAN – Receive report and provide input to City Council as appropriate.

City Traffic Engineer Kim said the item was continued from the last meeting where staff presented options and alternatives that outlined portions of the City's goals and Strategic Plan. The recommendation is to receive the report and provide input to staff to present to City Council.

Commissioner Simpson said he had some questions, and Councilmember Horvath called him and answered his questions. He thought it was an excellent start, and that the Beach Cities Health District (BCHD) letter that Commissioner Hannon submitted was appropriate and could be added to the Strategic Plan document.

Chair Funabashi said he thought the Commission preferred Option 3 and referenced a letter from BCHD to the Commission emphasizing the master plan as it related to the bicycle maps, etc. In response to Chair Funabashi regarding the Commission's submissions becoming part of the document going to City Council, City Traffic Engineer Kim answered in the affirmative.

Public Works Director Semaan said they are looking for feedback and direction as a Commission or individually. He said they could choose to receive and file the report and provide the input that was provided by individual Commissioners, however, if the Commission has recommendations as a body, it would stand stronger.

Jacqueline Sun, from Beach Cities Health District provided context to the letter they presented to the Commission regarding the Beach Cities Living Streets Design Manual. Ms. Sun said the City and the Public Works Commission have shared the commitment to street safety and living streets and noted that the City has adopted a living streets policy, a livability plan, and the Bicycle Master Plan. She explained that the three beach cities applied for a planning grant through the Southern California Association of Governments, received the grant, and as part of the deliverables from Stantec was a customized living streets design manual for each city, modeled after the Los Angeles County Model Street Design Manual, put together by the Los Angeles County Department of Public Health and UCLA. She said it is a technical toolbox for cities to be able to implement essential design elements for crosswalks, intersections, pedestrian access, bikeways, traffic calming, looking at the guidelines and requirements from a living streets perspective making sure all users are considered. Ms. Sun said perhaps the Commission might consider including this in the Strategic Plan separately, or in addition to.

Commissioner Minne noted that the goals reference financial stability and resources, however, there is nothing about seeking external funds through grants on the Federal, State or local levels. He thinks one of the strategies listed explicitly should be seeking external funds to allow planning, factual infrastructure, and to supplement the general fund.

Chair Funabashi agrees with highlighting that in the Strategic Plan and as a Commission they highlight the Living Streets Design Manual as part of their consideration.

In response to Commissioner Simpson regarding staff drafting a letter to City Council, City Traffic Engineer Kim said the input was received, and the information will be provided to the City Manager, to provide to City Council.

Motion by Commissioner Hannon, seconded by Commissioner Minne, to receive and file the input from the Commission, documents presented, and the suggestion to search for outside grants. Motion carried unanimously, with Commissioner Fox absent.

VIII. NEW BUSINESS

- 1. BERYL STREET CORRIDOR TRAFFIC CALMING ENHANCEMENTS** – Review the engineering report, receive public input, and provide direction to Staff regarding proceeding with roadway modifications to Beryl Street.

City Traffic Engineer Kim presented the following:

- Background
 - Requests to review traffic safety and traffic calming along the Beryl Street Corridor (Catalina Avenue to Prospect Avenue)
 - Speeding, traffic control concerns, pedestrian and bicycle safety, traffic signal operations
 - School traffic safety recommendations incorporated
 - High-visibility crosswalks, Stop limit lines, Retroreflective post covers, flashing LED Stop signs
- Data Collection
 - Field surveys
 - Accident history surveys
 - Speed survey
- Traffic calming enhances safety for motorists, pedestrians and bicyclists. The main goal of traffic calming is to encourage safer, more responsible driving and reduce traffic speed, collisions, type of collisions, and severity of collisions
- Class II bike lanes include striping and signage to denote a separated bike lane on the roadway to enhance bicyclists safety, and bring about awareness for the driver and the bicyclists
- Sharrows are pavement markings to remind the driver that the bicyclists and the driver share the road
- Bike lanes narrow the travel lane causing drivers to be more cautious because the roadway is tight
- Class III bike lanes do not have lane striping, only pavement markings
- High visibility crosswalks such as zebra, ladder, or continental allow crossing area to pop, reminding drivers that there may be pedestrians crossing
- Curb bulb-outs serve to reduce vehicle speeds and help reduce the pedestrian crossing distance, as the curb extensions extend into the parking lane limit, reducing the pedestrian exposure to the roadway by 14-16 ft
- Radar feedback signs ping vehicle speeds to remind drivers to slow down when they are driving at a high rate of speed
- Traffic circles
 - Mini traffic circles are raised circular islands usually constructed in residential intersections with the intended use to reduce speeds and manage traffic
- Pedestrian actuated flashing crosswalks are used in locations with higher pedestrian counts
- Rectangular Rapid Flashing Beacons
- Illuminated Pedestrian Crossing signs
- In-pavement flashing lights – new alternatives are available, and some cities have used them with positive results

- Eight reported accidents during two-year span (2017-2019), all broadside T-bone, Right-of-Way collisions
- Recommendations

In response to Commissioner Garcia regarding traffic circle concerns, City Traffic Engineer Kim explained that the bike lanes would terminate before the traffic circle, and the vehicle and bicyclist would share the road going through the traffic circle. He said the crosswalks would not cross Beryl, they would be on the minor roadways.

Commissioner Hannon noted that the bike lane ends at Catalina and asked if there will be a Class III bike lane with sharrows that continues down to Harbor. City Traffic Engineer Kim said that is something that could be done.

Commissioner Minne clarified that there is a proposed hybrid beacon at Francisca Avenue and Beryl in the packet, but not on the presentation. City Traffic Engineer Kim said that is one of the alternatives proposed, the recommendation is to find a feasible pedestrian crossing at that location.

In response to Chair Funabashi regarding the direction of the speed counts, City Traffic Engineer Kim said he believes they were facing both directions.

Chair Funabashi suggested flashing signs and signage on the downhill side of PCH as a warning to drivers of their speed.

James Stickler, resident at 620 N. Irena Avenue said it is terrifying to cross Beryl Street at Irena Avenue as a pedestrian, bicyclist, and driver, and he was hoping for the installation of a stop sign at that location. He noted the traffic circle and high visibility crosswalks are parallel to Beryl Street, rather than crossing Beryl Street.

Scott Wright, resident, 600 block of N. Irena Avenue said there are palm trees and parked cars blocking the view of approaching traffic when trying to cross or make a turn onto Beryl Street. He said he requested a stop sign two years ago and is urging the installation of stop signs again.

Angelica Wright, resident, 600 block of N. Irena Avenue, requested a 4-way stop. She also requested a 5-way stop at Irena Avenue and Carnelian Avenue and noted that the visibility is especially bad on Thursdays and Fridays when there is street sweeping.

Mary Ann Stickler, resident on Irena, said she crosses Beryl Street often and is concerned regarding the difficulty of crossing at a traffic circle.

Tim Allen, resident on north side of Maria Avenue, next to Beryl Heights, said he is concerned about keeping the volumes from going into the neighborhoods. He said 25 years ago there was a 4-way stop at Maria Avenue and Beryl Street which was removed because of accidents and injuries at that intersection. He cautioned removing the signal at Maria Avenue without looking at the history of why it was put in. He expressed concern regarding vehicles, pedestrians, and bicyclists traveling through the traffic circles.

Chair Funabashi noted that bulb-outs in conjunction with crosswalks allow extra space to look left and right before pulling out.

Tim Farmer, resident, 400 block of Paulina Avenue asked if there were any pedestrian accidents in the study. City Traffic Engineer Kim reiterated that the accidents are reported accidents, if no police report

was filed, there would be no information on it. He said the accidents were classified as Right-of-Way collisions meaning that the party at fault was at the stop-controlled intersection.

Mr. Farmer said the stop sign technique is more efficient for crossing Beryl, than a traffic circle.

Joanna Farmer, resident on Paulina Avenue prefers a traffic stop sign rather than a traffic circle. She said across the street from VONS there are a lot of apartments and families crossing the streets. She is concerned about families having to navigate a traffic circle along with bicyclists and cars.

Robert Reeves, resident at Beryl Street and Juanita Avenue said he believes traffic circles would be worth considering rather than stop signs at every intersection.

Commissioner Simpson noted that people tend to not stop at stop signs when there is a series of them. He said what he likes about traffic circles is that they demonstrably slow traffic. He noted that some locations for the traffic circles might be in inappropriate locations. He confirmed that the proposed traffic circle on Irena Avenue would be installed, with no crossing of Beryl Street. City Traffic Engineer Kim said under the yield function a crosswalk gives the pedestrian a false sense of safety.

City Traffic Engineer Kim explained that at every traffic location, Beryl Street will remain under a yield function, however, the minor north and south-bound roadways would maintain their stop function.

In response to Commissioner Minne regarding volumes, City Traffic Engineer Kim said they have pedestrian volumes at Beryl Avenue and Francisca Avenue, however, they have not gotten any traffic volumes. Commissioner Minne suggested a temporary trial for a couple of weeks to see how it works, and conduct outreach during the trial.

City Traffic Engineer Kim said they would collect baseline data prior to installation, purchase the parts, move forward with the installation, get volume and speed data, and prior to conclusion of the 6-month evaluation they will send surveys to residents along the corridor to get feedback. He said they would have the data side and the survey side and present it to City Council for their final decision.

Commissioner Hannon said roundabouts are safer because they create more predictable behavior. He explained that at a 4-way stop people are supposed to stop, however, they don't always stop which creates unpredictable behavior. He said roundabouts force drivers into stopping because they have to slow down, which creates predictable behavior to help avoid accidents.

In response to Commissioner Simpson regarding the implementation of the project, City Traffic Engineer Kim said based on a previous City Council decision, the traffic circles don't have to be approved by City Council.

City Traffic Engineer Kim said they have a quick turnaround schedule anticipated for the City Council meeting for the crosswalk location, the radar feedback signs and the bike lanes. He said it is possible that while the traffic circle is being designed, the rest of the elements can be approved and added on as part of the design.

Commissioner Glass said he is concerned that there are not a lot of opportunities to cross Beryl Street. He suggested more evenly spacing the crosswalks. He also suggested putting a crosswalk between Irena Avenue and Guadalupe Avenue, with a flashing light, so people coming out of the traffic circles could see pedestrians trying to cross.

Commissioner Garcia said he has concerns crossing Beryl Street and asked if staff recommendations don't work after 6-months on Paulina Avenue and Irena Avenue, if staff would consider installing all-way stops.

Commissioner Minne said he is in favor of the bike lanes, curb extensions, and radar feedback signs to evaluate the effectiveness of slowing speeds and suggested installing roundabouts only if speeds are still up.

Chair Funabashi suggested emphasizing a crosswalk at Irena Avenue, and adding another stop sign on Beryl Street.

Motion by Commissioner Simpson, seconded by Commissioner Hannon to accept staff's recommendations.

Commissioner Glass said something needs to be done with the crosswalk allocation. He would like staff to look at the placement of the crosswalks across Beryl Street.

Chair Funabashi expressed concern with the potential traffic circles and the bike path because not all bicyclists are experienced.

City Traffic Engineer Kim said a hybrid approach could be considered as part of the recommendations to look at installing bike lanes, the radar feedback signs, and bulb-outs, foregoing the traffic circle installation with a 6-month evaluation to see how the bike lanes work. He said they could conduct a more thorough pedestrian crossing related study to identify the pedestrian crossing locations, and in six months present the findings to the Commission.

Commissioner Minne said he highly recommends a phased approach. He said he would support the roundabouts west of PCH. He said he would make a friendly amendment to accept the roundabouts east of PCH, but not west.

Commissioner Minne added allowing staff to evaluate the possibilities of all-way stops and additional crosswalks throughout Beryl Street.

City Traffic Engineer Kim said a friendly amendment cannot be made because the motion on the floor is to accept all of staff's recommendations and to have a friendly amendment to take portions out can't be done. He said they could take a vote, make a decision on the motion on the floor, and if it falls through, make another motion.

Motion by Commissioner Minne, seconded by Commissioner Glass, to accept staff's recommendations with the exception of the roundabouts east of PCH to allow staff to investigate all-way stops and additional crosswalks throughout Beryl Street.

In response to Commissioner Simpson regarding the timeline, City Traffic Engineer Kim said they would have to design the traffic circle, and wait for the equipment which would take some time.

Commissioner Minne amended his substitute motion to add investigation of all-way stop at Irena Avenue.

Motion by Commissioner Minne, seconded by Commissioner Glass to accept staff's recommendations, with the exception of roundabouts east of PCH and to direct staff to investigate all-way stop at Irena Avenue, and investigate the placement of crosswalks along Beryl Street. Motion carried, with Commissioner Garcia opposed, and Commissioner Fox absent.

2. **DOW AVENUE – JOHNSTON AVENUE NEIGHBORHOOD TRAFFIC SAFETY EVALUATION –**
Review the engineering report, receive public input, and provide direction to Staff regarding proceeding with roadway modifications to the Dow Avenue-Johnston Avenue neighborhood.

City Traffic Engineer Kim presented the following:

- Background
- Modified T-intersection functions the same as a traffic circle, providing horizontal deflection, suited for a T-intersection, using less real estate or equipment, with the same effect
- Raised median center island used to narrow the travel way, which encourages some speed control
- Short term enhancements:
 - Install Class II or Class III bike lane/route pavement markings and signage
 - Install/replace existing crosswalks with high-visibility crosswalks, install new limit lines and yield lines, install new speed limit signs, replace existing speed limit signs with oversized speed limit signs and install speed limit pavement markings
 - Install radar speed feedback signs as part of rotational program
- Long term enhancements:
 - Install traffic circles, modified T-intersection, curb bulb-outs or landscaped center median islands
 - Modify the traffic signal at Manhattan Beach Boulevard and Dow Avenue to provide protected left-turn phasing
 - Address feasibility of Class II bike lane signage and markings along Manhattan Beach Boulevard (Manhattan Beach Boulevard in the subject vicinity is identified as a Class II bike facility per the South Bay Bicycle Master Plan)
 - Address feasibility of Class II bike lane signage and markings along Inglewood Avenue (Inglewood Avenue in the subject vicinity is identified as a Class II bike facility per the South Bay Bicycle Master Plan)
- Speed surveys – along Beland Boulevard, recorded 85th percentile speeds were well above the posted 25 mph speed limit
- 2014-2019 – 32 reported traffic collisions, mostly on Manhattan Beach Boulevard

Staff's recommendations:

- Install Shared Lane Markings immediately after each intersection and spaced at 250 ft intervals between intersections as appropriate along Robinson from Vail to Inglewood; Phelan to Beland and Johnston; Vail Avenue between White Court and Manhattan Beach Boulevard
- High visibility crosswalks, installation of bulb-outs where Phelan meets Robinson, intersection of Perkins and Blaisdell Avenue
- Speed limit signs, speed limit pavement markings, radar-feedback signs on a 3 or 4-month rotational basis
- Install traffic circles, modified T-intersections (received positive resident feedback), consideration of center median island (received positive resident feedback for location)
- Previous request to remove turning restriction at Johnston Avenue and Beland Boulevard – from 7:00-9:00 a.m., staff observed 20 prohibited movements. Staff recommended maintaining it because there is some cut-through traffic as a result of this.
- Manhattan Beach Boulevard/Gibson Place – modification of traffic signal, which would require significant modifications and construction costs

In response to Commissioner Simpson regarding the bulb-outs becoming permanent if they work, City Traffic Engineer Kim said after their evaluation, one recommendation may be to maintain them as is because installation of a permanent bulb-out is far more exorbitant in cost. He said that is something for City Council to consider.

(Commissioner Simpson left the dais at 9:23 p.m., returned at 9:25 p.m.)

John Nemeth, resident at 160th and Vargas, said the concern is not speed on Gibson Place, it is the left turn off Manhattan Beach Boulevard, where the highest number of accidents occurred according to the accident history slide. He noted that a lot of illegal U-turns occur at Gibson Place/Manhattan Beach Boulevard and he thinks the traffic light further up on Manhattan Beach Boulevard will not address the problem. He spoke about a cement planter at Inglewood Avenue and Fraser that prevents traffic from turning into Fraser off Inglewood, and he thinks that would work at Gibson Place and Manhattan Beach Boulevard. He said that would prevent people from getting in and out of the area, so it would require further public input and comments.

Alisa Beeley, resident on Johnston Avenue said there is a lot of traffic eastbound on Manhattan Beach Boulevard in the afternoon and has noticed a lot of cut through traffic. She said they have been trying to get some attention on their street for years and she would be happy with street markings, crosswalks, or signs. She also said she agrees with the bike path crosswalk going into the park.

Commissioner Minne suggested speed humps on Johnston, Gibson, or Dow.

City Traffic Engineer Kim said residents don't want speed cushions. He explained that roadways like Dow and Johnston have rolled curbs so if a speed cushion were installed, drivers would hug one side, making them ineffective. He said vehicles parked on Dow are halfway on the sidewalk, which creates a more open lane for vehicles to travel on, whereas, if they parked appropriately, the travel lane would force drivers to slow down. He said in his discussions with the residents, speed cushions were not heavily pursued or requested.

Commissioner Glass suggested the possibility that residents might not mind the inability to turn from Manhattan Beach Boulevard onto Gibson Place, using the modification at Anita as an example.

Commissioner Simpson suggested a modified T-installation at Thomas and Sebald to slow traffic. City Traffic Engineer Kim confirmed that on Johnston there would be one for vehicles entering from Manhattan Beach Boulevard, and midway through the segment there would be a second one to force them to slow down.

Motion by Commissioner Garcia, seconded by Commissioner Minne, to accept staff's recommendation with reconstructed intersections, more traffic calming, with protected left-turn phasing at Manhattan Beach Boulevard and Dow Avenue. Motion carried unanimously, with Commissioner Fox absent.

3. TORRANCE BOULEVARD AND BROADWAY TRAFFIC CONTROL ENHANCEMENTS – Review the engineering report, receive public input, and provide direction to Staff regarding proceeding with traffic control modifications at Torrance Boulevard and Broadway.

City Traffic Engineer Kim presented the following:

- Background and traffic control enhancements that were installed in 2016
- November 19, 2019, City Council made a referral to staff to reassess the existing traffic controls

- Right-turn Only Restrictions for Broadway recommended, re-routing traffic
- Bulb-Out Installation on Torrance Boulevard to narrow cross distance for pedestrians, oversized signs to emphasize speed limit, and permanent radar speed feedback sign
- All-Way Stop Control Installation would help mitigate reported collision types, potentially causing issues on the length of Torrance
- Construct a Roundabout – for a multi-lane roundabout, additional right-of-way would be needed
- Traffic Signal Installation – 300 ft west of PCH, which could provide concerns with traffic flow along the corridor
- Traffic analysis was not provided, staff plans to provide staff analysis to City Council at the March meeting

Commissioner Hannon said re-routing is a good solution and asked if the potential bulb-out could be replaced with a Class II bike lane, which would reduce exposure trying to cross. He said he has concerns with an all-way stop because he thinks traffic would back up to PCH or Catalina quickly. He also said it would be difficult to synchronize the lights because they would be so close to PCH and Catalina.

Commissioner Garcia said he likes the way it is currently and is in favor of the alternatives, except for the bulb-out.

Commissioner Glass said if the residents don't mind, the first block south of Torrance and the first block north of Torrance will become one-way streets. He said he would like a traffic circle, however, there is not enough room there.

Commissioner Minne said a traffic signal would fix the problems because the backup could be coordinated with the two other signals, however it is expensive. He said this is a perfect example of a grant opportunity for the highway safety improvement program. He suggested going with Option 1, but go for the grant for the signal, curb extension, bike lane, modifications, and median island.

City Traffic Engineer Kim clarified they are trying to address the broadside concerns from vehicles making a left or going through on Broadway.

Chair Funabashi noted the volume of traffic east/west is much higher than on Broadway, and the right turn only would solve that. He asked if the light could be green most of the time unless Broadway triggered it.

City Traffic Engineer Kim replied that it would be a semi-actuated intersection which would allow the vehicle to go, and allow the pedestrian to cross.

City Traffic Engineer Kim explained the alternatives, suggestions and discussions the Commission has had and would be re-presented to City Council.

In response to Commissioner Hannon regarding the ability to consider installing a Class II facility, Public Works Director Semaan said there is a disconnect on just the east leg of Torrance Boulevard at PCH because of the lane configurations. He said they don't want to have short segments of Class II's, then disconnects going through major intersections, though it may be explored.

Motion by Commissioner Hannon, seconded by Commissioner Glass to go with Option 1 and ask staff to look at using a bike lane to give pedestrians more room before moving out into traffic, or investigate using a bulb-out. Motion carried, with Commissioner Garcia opposed, and Commissioner Fox absent.

IX. MEMBERS ITEMS AND REFERRALS TO STAFF

In response to Commissioner Glass regarding faded signs, particularly signs with red on them, Public Works Director Semaan said the sign shop constantly replaces signs, and noted that south facing signs have the most degradation.

In response to Commissioner Garcia regarding the lanes offset on PCH at Francisca Avenue, City Traffic Engineer Kim said lane line extensions have been installed, however, they can look at it.

Commissioner Hannon asked staff to look at traffic volumes because the current data is from 2006-2008. He said traffic counts would be beneficial.

Commissioner Hannon said roundabouts save lives, reduce collisions, and are better than 4-way stops. He would like to have a full demonstration of one with plants and statues, something that neighborhoods want that are conducive and consistent with their neighborhoods.

Chair Funabashi said Grant to 190th looks great. He asked if they could get traffic counts from Caltrans on PCH traveling through the City, and Artesia Boulevard from the County as it passes through the City.

City Traffic Engineer Kim said for PCH, they would get annual average, mid-block volumes for an average 24-hour period. He said it would have annual average daily traffic to get an average 24 ADT type volume. He said the County would not have data on Artesia, the City would get that data.

In response to Chair Funabashi regarding doing counts if the City wanted to pay for it, City Traffic Engineer Kim said it would depend. He said for PCH turning movement volumes, depending on the equipment used, and type of data requested, they would have to get a Caltrans encroachment permit.

X. ADJOURNMENT AT 10:45 P.M.

Motion by Commissioner Hannon, seconded by Commissioner Simpson, to adjourn at 10:45 p.m., to a Regular meeting on Monday, March 23, 2020, at 7:00 p.m., in the Redondo Beach City Council Chambers, 415 Diamond Street, Redondo Beach, California. Motion carried unanimously, with Commissioner Fox absent.

Respectfully submitted,

Ted Semaan
Public Works Director



Administrative Report

Date: February 24, 2020

To: Public Works Commission

From: Department of Public Works

**Subject: TORRANCE BOULEVARD AND BROADWAY
TRAFFIC CONTROL ENHANCEMENTS**

RECOMMENDATION:

1. Review the engineering report, receive public input and provide direction to Staff regarding proceeding with traffic control modifications at Torrance Boulevard and Broadway.

SUMMARY:

In December 2015, City Council approved the Public Works Commission's recommendation to install several traffic control enhancements at the intersection of Torrance Boulevard and Broadway. These enhancements, which included pedestrian actuated flashing beacons for the crossings on Torrance Boulevard, were installed in early 2016. The agenda report and its attachments from the City Council meeting on December 1, 2015 are included in Attachment 1.

Since the installation of the enhancements, there has been one crash involving a pedestrian crossing Torrance Boulevard, which occurred in August 2016, shortly after installation. There have been a number of vehicle vs. vehicle crashes between 2016 and 2019, primarily involving motorists violating the stop signs on Broadway. Of the 14 reported stop sign violation crashes, 10 involved northbound vehicles and four (4) involved southbound vehicles.

On November 19 2019, City Council made a referral to staff to reassess the existing traffic controls at the intersection of Torrance Boulevard and Broadway and reconsider alternate traffic controls.

BACKGROUND:

Torrance Boulevard and Broadway form a four-legged intersection. Broadway is stop controlled while Torrance Boulevard is uncontrolled, with pedestrian actuated flashing beacons for the east and west legs. The intersection has painted high visibility crosswalks on all approaches and posted stop controls and "STOP" markings on both approaches of Broadway. Broadway has a north-south alignment with one lane in each direction and angled head in parking available in both the north/southbound directions while Torrance Boulevard has an east-west alignment with two lanes in each direction and on-street parking available. The speed limit for South Broadway is 25 mph while Torrance Boulevard is 30 mph. Fronting development at the subject intersection includes multi-unit residential and retail land use. There are Metro bus stops located at the southwest and southeast corners.

Although Broadway is relatively flat, the west leg of Torrance Boulevard has an upward grade approaching Broadway from Catalina Avenue. The intersection of Broadway and Torrance Boulevard is located between the intersections of Catalina Avenue and Torrance Boulevard, and Pacific Coast Highway and Torrance Boulevard. These adjacent intersections traffic signal-controlled operations.

City Council approved the Public Works Commission's recommendation to install the pedestrian actuated flashing beacons and a number of other traffic control enhancements at the intersection at their December 1, 2015 meeting. These enhancements included the following:

- Install high-visibility ladder crosswalk on all approaches.
- Repaint 'STOP' pavement markings and install limit line on South Broadway approaches,
- Trim/remove foliage within the landscaped median in west leg of Torrance Boulevard,
- Replace 'stop' and 'cross traffic does not stop' signs on South Broadway with updated retroreflective 'stop' and 'cross traffic does not stop' signs,
- Install yield pavement markings and signage on Torrance Boulevard 30 feet in advance of crosswalks in both directions,
- Repaint red curb on northwest corner of Torrance Boulevard.
- Install pedestrian actuated crossing flashers for the crosswalks on Torrance Boulevard.

These actions were based on an evaluation intended to increase vehicular, bicycle and pedestrian safety at the intersection. The recommendations at this location were intended to provide enhanced visibility for vehicles, pedestrians and crosswalks, and increase driver awareness for the potential for encountering pedestrians. These enhancements were installed in early 2016. The agenda report and its attachments from the City Council meeting on December 1, 2015 are included in Attachment 1.

On November 19, 2019, City Council made a referral to staff to reassess the existing traffic controls at the intersection of Torrance Boulevard and Broadway and reconsider alternate traffic controls. Staff conducted an evaluation which included field observations, obtaining traffic volume counts and a review of the reported crash history between 2016-2019. This evaluation forms the basis for potential traffic control enhancements that are presented in this report.

ANALYSIS:

Field observations were conducted on December 11, 2019 between 9:00 a.m. and 11:00 a.m. to identify pedestrian crossing patterns at the intersection as well as general motorist behaviors. Key observations included the following:

- Motorists on Torrance Boulevard occasionally stopped at the crosswalks even when there were no pedestrians crossing. This was noticed for both eastbound and westbound vehicles.

- Several northbound motorists on Broadway attempting to cross Torrance Boulevard or turn left were observed failing to yield right-of-way to vehicles on Torrance Boulevard. These motorists complied with the stop sign, but then continued into the intersection to complete their movement and forced motorists on Torrance Boulevard to yield.
- A significant number of westbound left-turns were actually U-turns. These motorists appeared to exit the commercial driveway on the northwest corner of PCH and Torrance Boulevard. The U-turn maneuver primarily allowed these motorists to travel northbound on PCH.
- Most pedestrians crossing Torrance Boulevard activated the flashing beacons; however, some were observed crossing without activating the beacons or crossing outside of the crosswalk.
- Motorists on both the north and south approaches of Broadway who were attempting to cross or turn left onto Torrance Boulevard unnecessarily delayed right-turning vehicles when they occupied the entire northbound or southbound lanes.

A review of the available SWITRS reported collision history between 2016 and 2019 revealed the following information:

- 18 total collisions (10 injury)
- 14 stop sign violation collisions
 - 8 Northbound vs. Westbound
 - 2 Northbound vs. Eastbound
 - 4 Southbound vs. Eastbound
- 2 pedestrian collisions (both in 2016)
- 2 bicycle collisions (both involved turning vehicles on Torrance Boulevard vs bicycles crossing Broadway)
- 2019 – 4 collisions
- 2018 – 5 collisions
- 2017 – 2 collisions
- 2016 – 7 collisions

A collision diagram is shown in Attachment 2.

Traffic counts were ordered for the intersection, including a.m. and p.m. peak period turning movement, bicycle and pedestrian volume counts on January 28 and 29, 2020. The traffic counts were taken for the peak periods of 7-9 AM and 4-6 PM. On Broadway, the highest approach traffic volumes recorded were 75 southbound and 221 northbound vehicles in the AM peak hour, and 166 southbound and 106 northbound vehicles for the PM peak hour. On Torrance Boulevard, during the same peak hours, the highest AM peak hour volumes recorded were 408 westbound and 286 eastbound vehicles, and for the PM peak hour, 540 westbound and 429 eastbound vehicles. Highest pedestrian volumes crossing Torrance Boulevard were 36 and 68 pedestrians in the AM and PM peak hours, respectively. Bicycle

activity was generally lower than either vehicle or pedestrian volumes during the data collection period.

POTENTIAL TRAFFIC CONTROL ALTERNATIVES:

Several alternatives to address traffic safety at the intersection of Torrance Boulevard and Broadway were evaluated and are discussed below. In addition to these alternatives, the Commission may wish to consider taking no additional actions or any other appropriate actions.

Right-Turn Only Restrictions for Broadway

The vast majority of the reported collisions are broadside (14 out of 18), and 12 of these could be eliminated if motorists were prohibited from travelling through or turning left at the intersection. Two additional collisions involved northbound vs. eastbound vehicles, and these would also likely be eliminated. To accomplish this, northbound and southbound motorists on Broadway would be restricted to right-turn only at Torrance Boulevard. This alternative would maintain reasonable access routes for motorists travelling on Broadway, due to the existing grid pattern of traffic signals and all-way stop controls on surrounding intersections. The available movements, restrictions and nearby traffic controls are illustrated in Attachment 3.

This alternative would retain the existing pedestrian actuated flashing beacons and other pedestrian related traffic controls.

Bulb-Out Installation on Torrance Boulevard

Broadside collisions are frequently a result of restricted visibility. Installing bulb-outs into the parking lanes on Torrance Boulevard would allow motorists on Broadway to move closer into the intersection (while still protected from approaching traffic) and thus increasing visibility. As an additional enhancement, this would reduce the pedestrian and bicycle crossing distance on Torrance Boulevard, reducing their exposure to vehicular conflict. As components of this alternative, the following actions should be included:

- The north and south approaches of Broadway should be restriped to provide separate right-turn and thru/left-turn lanes. This would eliminate delays to right-turning vehicles caused by through and left-turning vehicles waiting for gaps in Torrance Boulevard traffic;
- The existing "Cross Traffic Does Not Stop" signs on Broadway should be replaced with oversized signs to emphasize the warning;
- Oversized 30 mph speed limit signs and "30" pavement marking should be utilized on Torrance Boulevard between PCH and Catalina Avenue; and,
- A permanent radar speed feedback sign should be placed for westbound traffic on Torrance Boulevard, west of PCH.

This alternative, shown in Attachment 4, would not result in any changes to existing traffic patterns. However, it would still require motorists to use appropriate caution when entering the intersection and yield right-of-way to motorists on Torrance Boulevard. In addition, the transit stop location on the southwest corner should be relocated or shortened to allow bus access around the bulb-out.

All-Way Stop Control Installation

The installation of all-way stop control at the intersection would be expected to mitigate all of the reported collisions, if motorists comply with the stop signs. It would also be expected to enhance pedestrian safety by requiring all traffic on Torrance Boulevard to stop. Although the traffic count data is not available to perform a full all-way stop control warrant analysis, the reported collision data satisfies the collision warrant and is sufficient to justify installation. As components of this alternative, the following actions should be included:

- The existing pedestrian actuated flashing beacons, crossing warning signs and advance yield lines on Torrance Boulevard would be removed;
- The north and south approaches of Broadway should be restriped to provide separate right-turn and thru/left-turn lanes. This would increase the capacity of the intersection by eliminating delays to right-turning vehicles; and,
- The existing “Cross Traffic Does Not Stop” signs on Broadway would be removed.

This alternative, shown in Attachment 5, would not result in any changes to existing traffic patterns. However, it would require every vehicle to stop at the intersection, where previously, Torrance Boulevard traffic was only required to stop when there was pedestrian crossing activity. Due to the significant volume on Torrance Boulevard, it would feasibly back up westbound traffic to (and possibly beyond) PCH during heavy volume periods.

Traffic Signal Installation

The installation of a traffic signal at the intersection would be expected to mitigate the broadside collisions. It would also enhance pedestrian safety by requiring all traffic on Torrance Boulevard to stop when a pedestrian crossing is requested. Although the traffic count data is not available to perform a full traffic signal warrant analysis, the reported collision data satisfies the collision warrant and is sufficient to justify installation.

As components of this alternative, the following actions should be included:

- The existing pedestrian actuated flashing beacons, crossing warning signs and advance yield lines on Torrance Boulevard would be removed;
- The north and south approaches of Broadway should be restriped to provide separate right-turn and thru/left-turn lanes. This would increase the capacity of the intersection by eliminating delays to right-turning vehicles; and,
- The existing “Cross Traffic Does Not Stop” signs on Broadway would be removed.

This alternative, which is not shown, would not result in any changes to existing traffic patterns. However, it would create a new signalized intersection approximately 300 feet from the existing signals at PCH and at Catalina Avenue. This close spacing can degrade traffic flow in this area to the point of potentially creating gridlock conditions unless the signals are coordinated. Since the signal at PCH and Torrance Boulevard is under the jurisdiction of Caltrans, there may be logistical issues with creating a coordinated system on Torrance Boulevard.

Construct a Roundabout

A roundabout at this location would mitigate the broadside collisions and reduce the severity of future collisions by reducing the speed of vehicles travelling through the intersection. A roundabout would need to have two approach lanes in each direction on Torrance Boulevard to prevent traffic congestion and collision potential from reducing two lanes into one as traffic approaches the intersection. This alternative was not determined to be feasible due to the right-of-way requirements. As indicated in Attachment 6, a significant amount of right-of-way would be needed from all corners, up to 20 feet. In addition, the close proximity to PCH may result in opposition from Caltrans as it could affect traffic flowing through the intersection of PCH and Torrance Boulevard.

COORDINATION:

Staff coordinated with Councilmembers Nehrenheim and Loewenstein. Notification for the Public Works Commission meeting were sent to residents and commercial/community properties within one block of the intersection and they were invited to provide comments in advance of the meeting or attend the meeting to provide public input.

BUDGET AND COSTS:

Detailed costs for the alternatives would be developed once approved as designs can vary significantly. A planning level breakdown of costs for the alternatives are shown below. Funding for the items is available through various budgets, depending on the alternative.

- Right-turn only restriction on Broadway - \$2,000
- Bulb-out on Torrance Boulevard Pedestrian - \$50,000
- All-Way Stop Control - \$5,000
- Traffic Signal - \$275,000

Prepared by:

Gene Kim, City Traffic Engineer

Submitted by:

Ted Semaan, Public Works Director

Attachment 1 – December 1, 2015 City Council Administrative Report

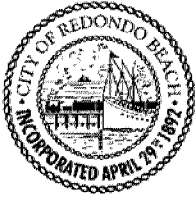
Attachment 2 – 2016-2019 Collision Summary

Attachment 3 – Right-Turn Only Restriction

Attachment 4 – Bulb-Out Construction

Attachment 5 – All-Way Stop Control

Attachment 6 – Roundabout



Administrative Report

Council Action Date: December 1, 2015

To: MAYOR AND CITY COUNCIL

From: TED SEMAAN, PUBLIC WORKS DIRECTOR

**Subject: INTERSECTION IMPROVEMENT RECOMMENDATIONS
SOUTH BROADWAY AT TORRANCE BOULEVARD**

RECOMMENDATION

Approve the following changes to modify the existing traffic controls at the intersection of South Broadway and Torrance Boulevard.

1. Install high-visibility ladder crosswalk on all approaches.
2. Repaint 'STOP' pavement markings and install limit lines on South Broadway approaches.
3. Trim/remove foliage within the landscaped median in west leg of Torrance Boulevard.
4. Replace 'stop' and 'cross traffic does not stop' signs on South Broadway with updated retroreflective 'stop' and 'cross traffic does not stop' signs.
5. Install yield pavement markings and signage on Torrance Boulevard 30 feet in advance of the crosswalks in both directions.
6. Repaint red curb on northwest corner of Torrance Boulevard.
7. Install pedestrian actuated crossing flashers for the crosswalks on Torrance Boulevard.

EXECUTIVE SUMMARY

Several supplemental capital improvement and maintenance work items were approved as part of the City Council's final FY 2015-16 budget adoption motion. One item was an analysis of potential traffic intersection improvements at Torrance Boulevard and South Broadway.

Staff evaluated the intersection of South Broadway and Torrance Boulevard with respect to increasing vehicular, bicycle and pedestrian safety. The recommended improvements at this location would provide enhanced visibility for vehicles, pedestrians and crosswalks, and would increase driver awareness regarding the potential for encountering pedestrians.

On October 22, 2015, the Public Works Commission was presented with Staff's recommendations, received public input, and discussed this issue. The Commission

then concurred with Staff's recommendation and forwarded them to the City Council for approval.

BACKGROUND

South Broadway and Torrance Boulevard form a four-legged intersection. South Broadway is stop controlled while Torrance Boulevard is uncontrolled. The intersection has painted crosswalks on all approaches and posted stop controls and "STOP" markings on both approaches of South Broadway. South Broadway has a north-south alignment with one lane in each direction and angled head in parking available in both the north/southbound directions while Torrance Boulevard has an east-west alignment with two lanes in each direction and on-street parking available. The speed limit for South Broadway is 25 mph while Torrance Boulevard is 30 mph. Fronting development at the subject intersection includes multi-unit residential and retail land use. There are Metro bus stops located at the southwest and southeast corners. Although South Broadway is relatively flat, the west leg of Torrance Boulevard has an upward grade approaching South Broadway from Catalina Avenue. The intersection of South Broadway and Torrance Boulevard is located between the intersections of Catalina Avenue and Torrance Boulevard, and Pacific Coast Highway and Torrance Boulevard. These adjacent intersections have traffic signal controlled operations.

A 5 year review (years 2010-2014) of the available accident history at this location revealed 19 reported intersection-type accidents at South Broadway and Torrance Boulevard. Intersection-type accidents are accidents occurring while making maneuvers to/from or through an intersection. These include broadside and left-turning accidents. The majority of accidents occurred due to right-of-way violations as vehicles traveled northbound or southbound on South Broadway crossing Torrance Boulevard. Other accident types include improper maneuvers/lane changes or drivers driving under the influence.

Some of the following recommendations pertain to enhancements at all approaches to the intersection while others focus specifically on the uncontrolled roadway of Torrance Boulevard.

Recommendation 1: Install high-visibility ladder crosswalk on all approaches.

Currently, the crosswalks located at the intersection are standard crosswalks with two pairs of solid white stripes. The installation of high-visibility striping at the crosswalks would provide additional visibility to the drivers. Installation of high-visibility crosswalks have increasingly been considered the standard for crosswalks as they have been shown to increase pedestrian safety.

Recommendation 2: Repaint 'STOP' pavement markings and install limit lines on South Broadway approaches.

At the South Broadway approaches, the 'STOP' markings are faded and there are no existing limit lines. Restriping the "STOP" pavement markings and installing limit lines would reinforce the stop locations of vehicles and reduce the risk of pedestrians being blocked from the view of oncoming drivers.

Recommendation 3: Trim/remove foliage within the landscaped median in west leg of Torrance Boulevard.

The accident history shows a number of vehicular accidents occurring between vehicles traveling southbound on South Broadway with vehicles traveling eastbound on Torrance Boulevard. Field observations show that the eastbound Torrance Boulevard approach has an upward grade from Catalina Ave to South Broadway and the sight line for vehicles waiting on the southbound approach of South Broadway have an obstructed sight line for these eastbound vehicles.

Staff recommends trimming or removing the foliage present within the landscaped median of the eastbound approach leg on Torrance Boulevard as the removal of foliage would provide southbound South Broadway drivers with the sight line to safely and appropriately determine an oncoming vehicle's location and speed prior to making a traffic maneuver.

Recommendation 4: Replace 'stop' and 'cross traffic does not stop' signs on South Broadway with new signs.

The existing signs on South Broadway are faded and damaged, reducing their effectiveness. In order to comply with the latest edition of the California Manual on Uniform Traffic Control Devices (CA MUTCD), staff recommends that the signs along South Broadway be replaced. With updated signs at this location, the 'stop' regulatory and 'cross traffic does not stop' warning sign would become retroreflective and provide improved visibility for drivers as they approach the intersection.

Currently, the existing signs, from top to bottom are sequenced as 'stop', parking restriction sign and 'cross traffic does not stop'. The new signs should be relocated on the sign post to show, from top to bottom, 'stop', 'cross traffic does not stop' and the parking restriction sign. This sequence would reinforce motorist awareness of the condition to stop and be aware that the traffic on Torrance Boulevard does not stop.

Recommendation 5: Install yield pavement markings and signage on Torrance Boulevard prior to crosswalks.

The current CA MUTCD standard requires the addition of yield pavement markings and pedestrian crossing signage for an uncontrolled multi-lane roadway such as Torrance Boulevard. Installation of advance yield pavement markings would provide awareness to the drivers of the need to yield for pedestrians and encourage drivers to stop farther back from the crosswalk, providing better visibility for motorists to see crossing pedestrians. This layout would prevent the vehicle that is closer to the curb from providing a visual

screen to where a vehicle closer to the median is unaware of the crossing pedestrian. Installation of additional pedestrian crossing signage and arrows would also provide awareness to the drivers that they are approaching a pedestrian crosswalk.

Recommendation 6: Repaint red curb located on westbound approach of Torrance Boulevard.

Staff recommends repainting the red curb near the intersection to prevent vehicles from parking along the curb near the intersection. By repainting the red curb and reinforcing the setback area, vehicles traveling southbound on South Broadway and looking west will have improved sight line visibility for oncoming vehicles.

Recommendation 7: Install actuated pedestrian crossing flashers within crosswalk.

This installation would occur in conjunction with the signs that will be installed per Recommendation 5 as additional actuated flashing beacons would be attached to the proposed pedestrian crossing sign posts. Actuated pedestrian crossing flashers would provide real-time awareness to drivers of the pedestrian crossing signs and may increase driver yielding compliance rate at the intersection. The actuated pedestrian crossing flashers would be installed on the pedestrian crossing sign posts at both crosswalks on Torrance Boulevard to provide safety for the heavy pedestrian movements serving the church, residential and commercial land uses near the intersection.

A conceptual layout of Staff's recommendations is attached in Attachment 1.

At the Public Works Commission meeting, several residents were present to voice their opinions on these changes. Their key points included the opinion that the recommendations do not adequately resolve the speeding concerns along Torrance Boulevard and that the residents have requested installation of a traffic signal at the intersection. Staff does not agree with this observation for the following reasons:

- **Speeding concerns along Torrance Boulevard** – Staff's recommendations include installing high-visibility crosswalks, advance yield markings and pedestrians crossing signage. Currently, the crosswalks at the intersection are faded, making them hard to see, and no signs are present to inform drivers of the pedestrian crossing. Staff's recommendations would encourage heightened pedestrian awareness for drivers and thus have a speed reducing effect and increase safety at the intersection. Further, Staff has worked with the Redondo Beach Police Department to implement enforcement along this segment of Torrance Boulevard.
- **Installation of a Traffic Signal** – As mentioned previously, the adjacent intersections of Catalina Avenue and Torrance Boulevard, and Pacific Coast Highway and Torrance Boulevard are signalized intersections. Due to the close proximity of the adjacent signalized intersections, Staff believes a traffic

signal at the intersection of South Broadway and Torrance Boulevard may cause excessive vehicle delays and would degrade traffic safety along the roadway segment of Torrance Boulevard between Catalina Avenue and Pacific Coast Highway.

Staff also communicated to the Public Works Commission that recommendations presented at the Commission meeting were intended to provide an incremental approach as these enhancements can be readily implemented at a relatively low cost. Staff intends to continue to monitor the intersection and assess the need for additional enhancements based on the recommendations and future input of its users. The recommended improvements can all be installed by the end of February 2016.

COORDINATION

These recommendations were developed in conjunction with input from residents and the Redondo Beach Police Department. The residents within a 300' radius of the intersection were sent notices of the October 22, 2015 Public Works Commission meeting to encourage public input.

FISCAL IMPACT

The breakdown of costs for installing recommendations is provided as follows:

- Removal of foliage/vegetation – include in Public Works Operations Budget
- Additional signs only - \$100 each
- Additional signs (incl. post) - \$250 each
- High visibility crosswalk, limit line, "STOP" pavement marking (thermoplastic) – \$2,500 per intersection
- Actuated pedestrian flashing beacon – \$3,000 each; \$24,000 total

\$40,000 was included in to FY 2015-16 operating budget to implement these improvements.

Submitted by:
Ted Semaan, Public Works Director

Approved for forwarding by:
Joe Hoefgen, City Manager

Attachments:

- Attachment 1 – Intersection Modification Conceptual Sketch

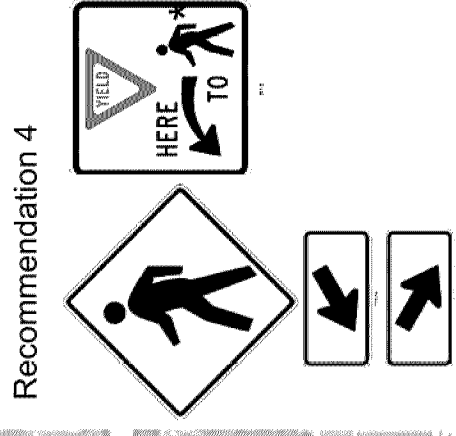
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Recommendations

1. Install high-visibility continental crosswalk.
2. Repaint 'STOP' pavement markings and install limit line.
3. Trim/remove foliage.
4. Replace 'stop' and 'cross traffic does not stop' signs (see Legend).
5. Install yield pavement markings and pedestrian yield signs (see Legend).
6. Restripe red curb.
7. Install Rectangular Rapid Flashing Beacon (RRFB) to sign posts (see Legend).

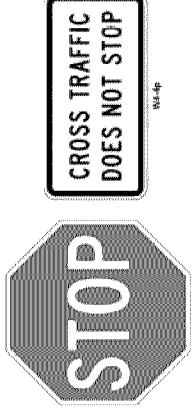
S Broadway

Torrance Blvd

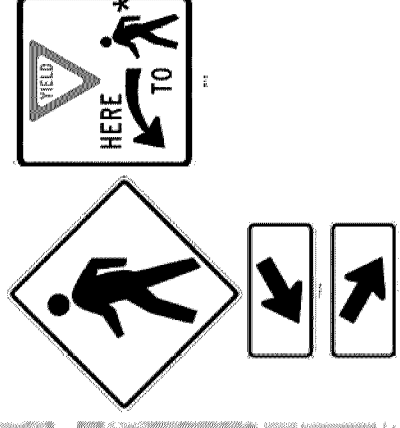


Legend:

Recommendation 3



Recommendation 4



Recommendation 6



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BLUE FOLDER ITEM

Blue folder items are additional back up material to administrative reports and/or public comments received after the printing and distribution of the agenda packet for receive and file.

CITY COUNCIL MEETING December 1, 2015

N.2 DISCUSSION AND POSSIBLE ACTION REGARDING INTERSECTION IMPROVEMENT RECOMMENDATIONS AT THE INTERSECTION OF SOUTH BROADWAY AND TORRANCE BOULEVARD.

RECOMMENDATION:

- a. Approve the following changes to modify the existing traffic controls at the intersection of South Broadway and Torrance Boulevard.
 1. Install high-visibility ladder crosswalk on all approaches.
 2. Repaint 'STOP' pavement markings and install limit lines on South Broadway approaches.
 3. Trim/remove foliage within the landscaped median in west leg of Torrance Boulevard.
 4. Replace 'stop' and 'cross traffic does not stop' signs on South Broadway with updated retroreflective 'stop' and 'cross traffic does not stop' signs.
 5. Install yield pavement markings and signage on Torrance Boulevard 30 feet in advance of the crosswalks in both directions.
 6. Repaint red curb on northwest corner of Torrance Boulevard.
 7. Install pedestrian actuated crossing flashers for the crosswalks on Torrance Boulevard.

CONTACT:

TED SEMANN, PUBLIC WORKS DIRECTOR

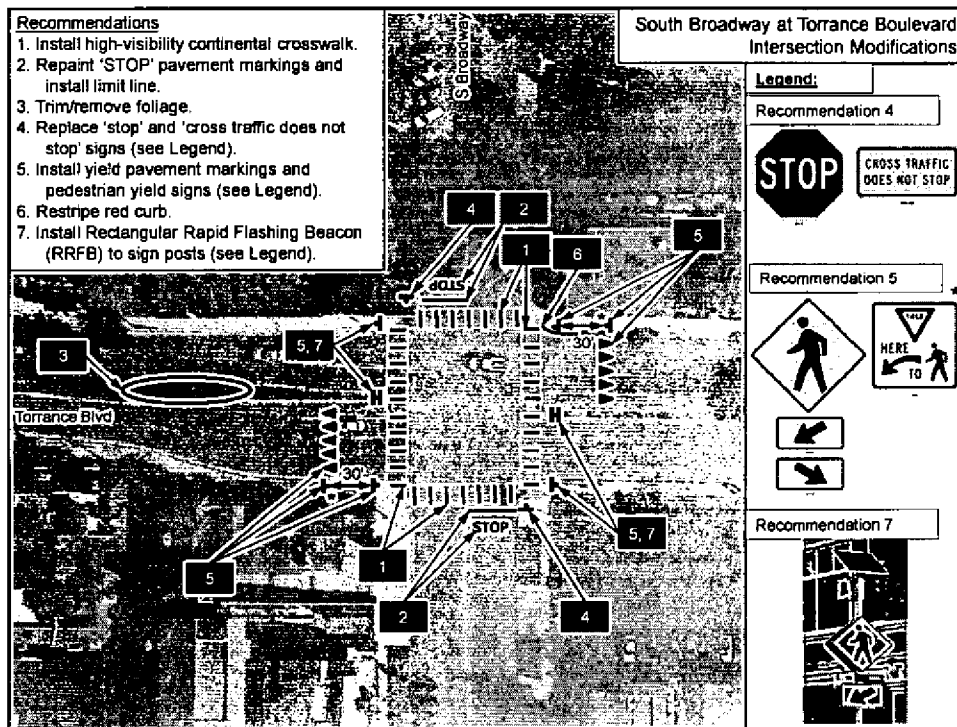
**ATTACHED IS A POWERPOINT PRESENTATION REGARDING
ITEM N.2.**

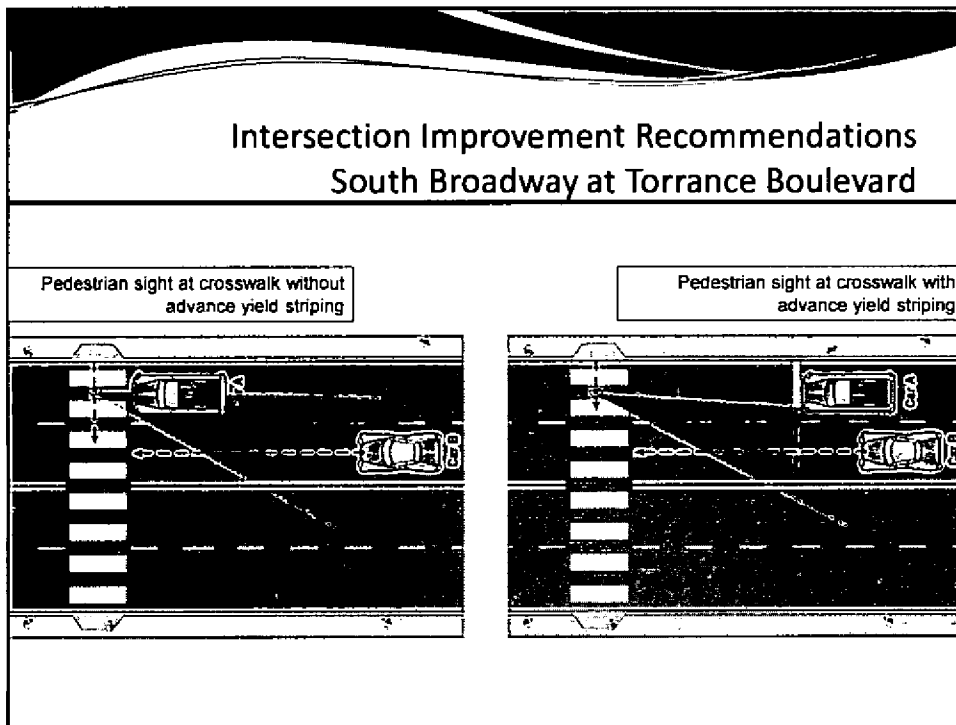
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Intersection Improvement Recommendations

South Broadway at Torrance Boulevard





Intersection Improvement Recommendations South Broadway at Torrance Boulevard

Recommendation

Approve the following changes to modify the existing traffic controls at the intersection of South Broadway and Torrance Boulevard.

- Install high-visibility ladder crosswalk on all approaches.
- Repaint 'STOP' pavement markings and install limit line on South Broadway approaches,
- Trim/remove foliage within the landscaped median in west leg of Torrance Boulevard,
- Replace 'stop' and 'cross traffic does not stop' signs on South Broadway with updated retroreflective 'stop' and 'cross traffic does not stop' signs,
- Install yield pavement markings and signage on Torrance Boulevard 30 ft in advance of crosswalks in both directions,
- Repaint red curb on northwest corner of Torrance Boulevard.
- Install pedestrian actuated crossing flashers for the crosswalks on Torrance Boulevard.

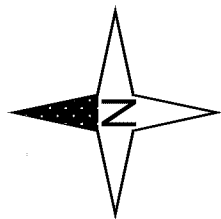
Intersection Improvement Recommendations South Broadway at Torrance Boulevard



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Attachment 2

Collision Summary – 2016-19



Collision Severity

○ Property Damage Only

⊗ Injury

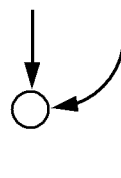
Involved Party

..... Pedestrian

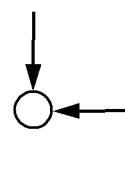
--- Bicycle

→ Motor Vehicle

Type of Collision



Turning



Right Angle

Broadway

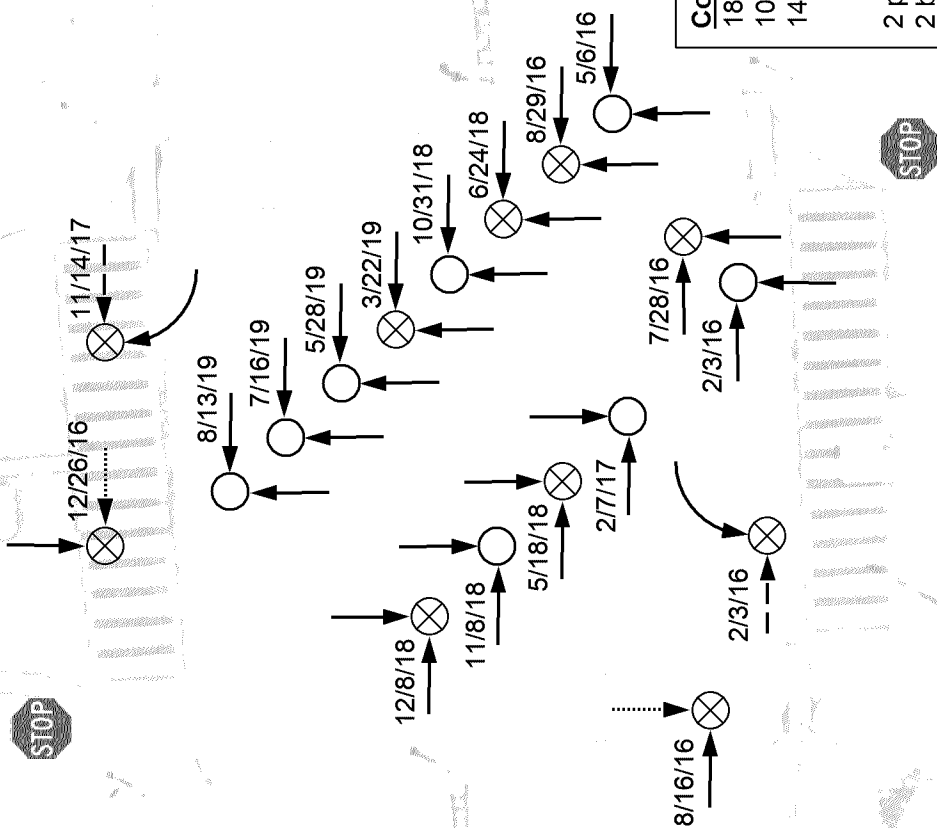
Torrance Blvd

Collision Summary

18 total collisions
10 injury collisions
14 stop sign violation collisions

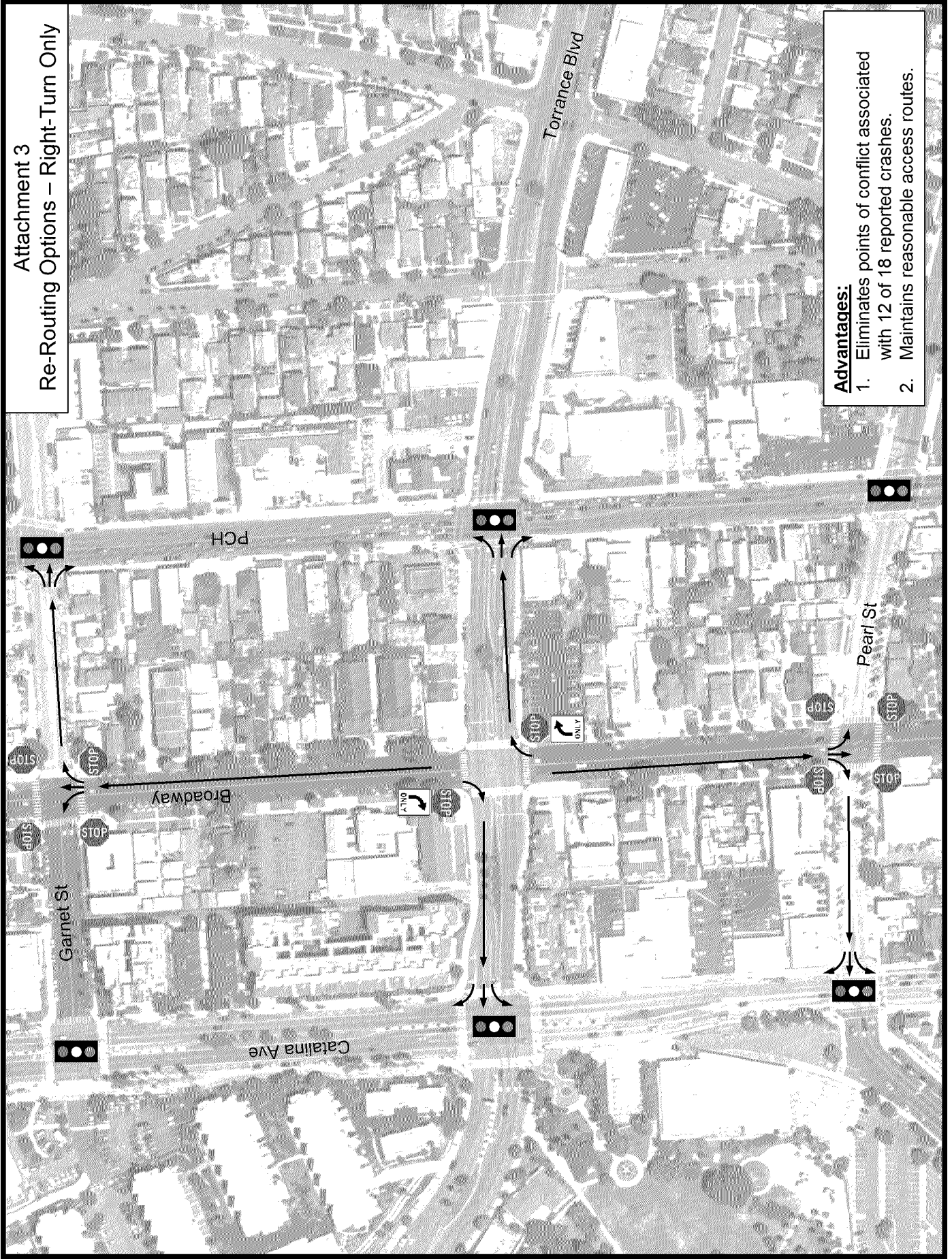
- 10 Northbound
- 4 Southbound

2 pedestrian collisions (both in 2016)
2 bicycle collisions (both turning)
2019 – 4 collisions
2018 – 5 collisions
2017 – 2 collisions
2016 – 7 collisions



Attachment 3

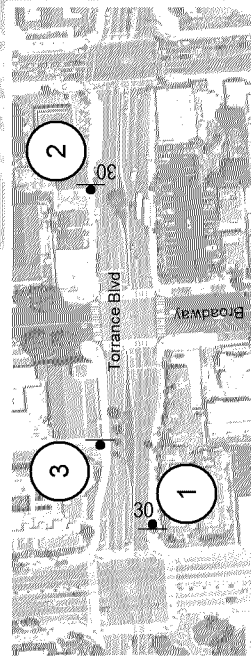
Re-Routing Options – Right-Turn Only



Advantages:

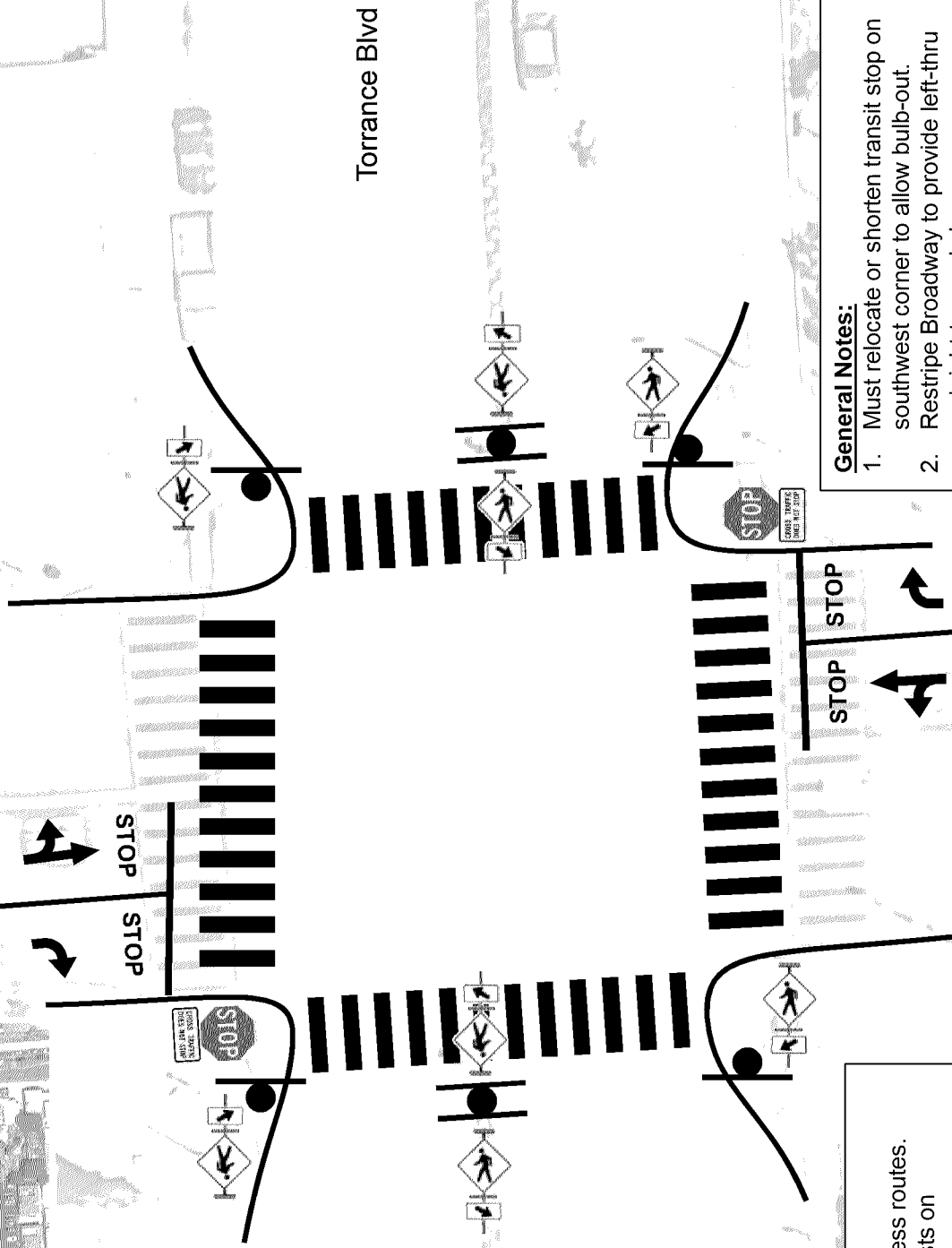
1. Eliminates points of conflict associated with 12 of 18 reported crashes.
2. Maintains reasonable access routes.

Attachment 4 Bulb-Out Installation



Construction Notes:

1. Install oversized 30 mph speed limit sign and "30" pavement markings in both eastbound lanes.
2. Replace existing 30 mph speed limit sign with oversized sign and install "30" pavement markings in both westbound lanes. Place permanent radar speed feedback sign for westbound traffic.
3. Retain existing 30 mph speed limit sign.



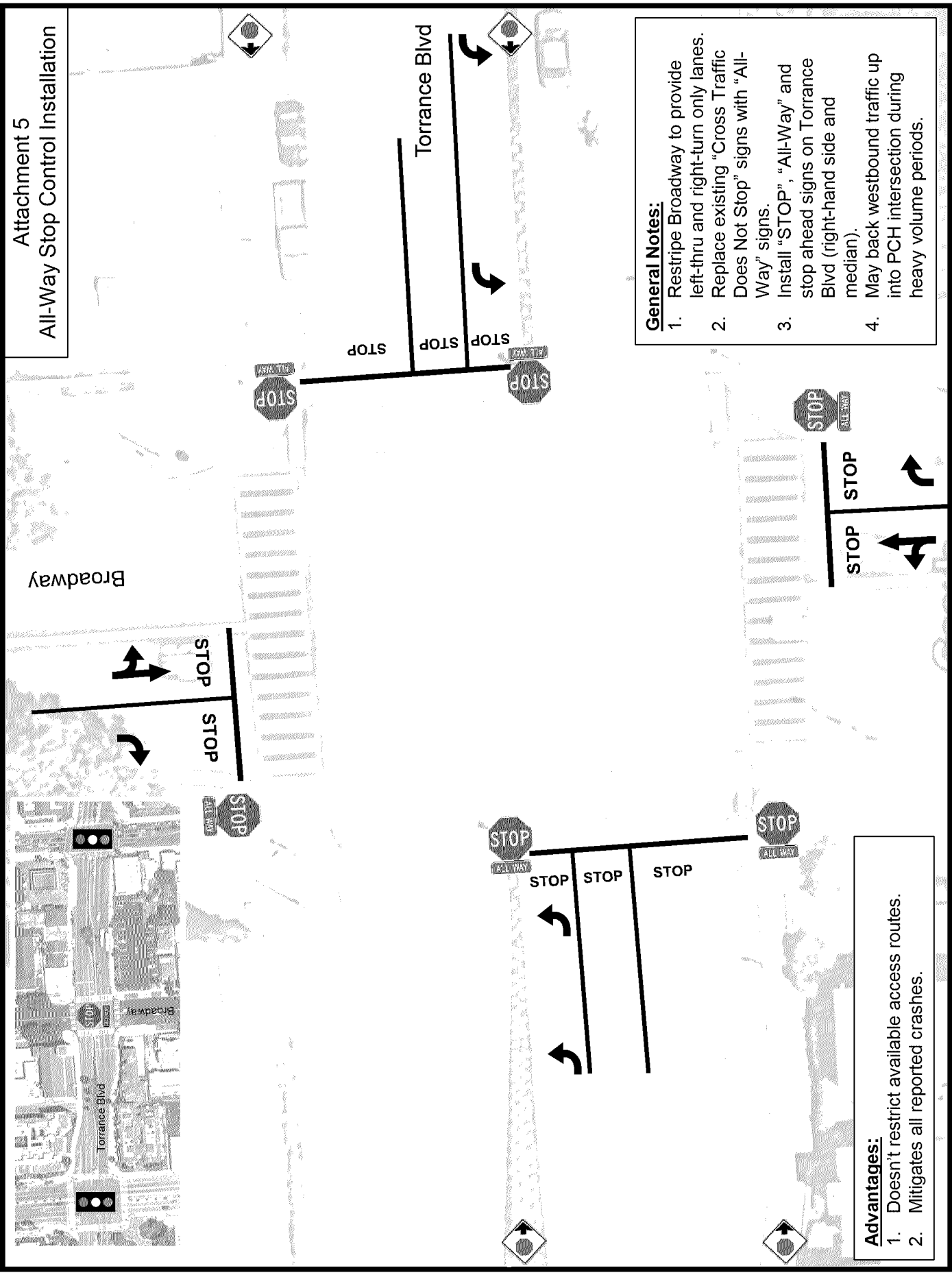
General Notes:

1. Must relocate or shorten transit stop on southwest corner to allow bulb-out.
2. Restripe Broadway to provide left-thru and right-turn only lanes.
3. Replace existing "Cross Traffic Does Not Stop" signs with oversized signs.

Advantages:

1. Doesn't restrict available access routes.
2. Increases visibility for motorists on Broadway.
3. Reduces Torrance Blvd crossing distances for vehicles, pedestrians and bikes.

Attachment 5 All-Way Stop Control Installation

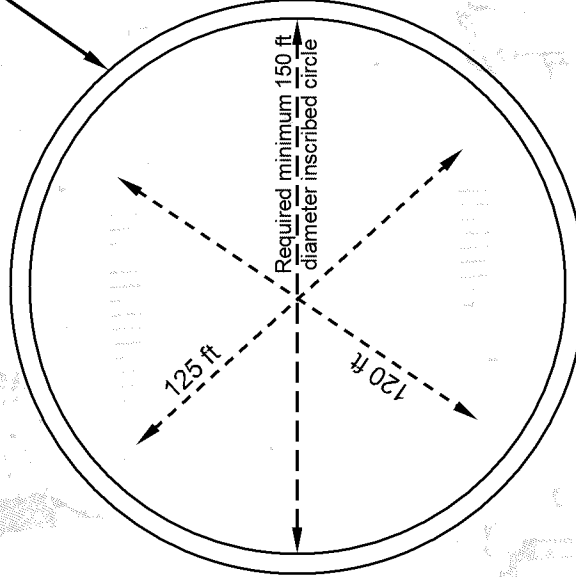


Attachment 6 Roundabout Dimensions

Broadway

Torrance Blvd

Required minimum 160 ft diameter circle to include 5 ft sidewalk access



Required Intersection Modifications:

1. Must acquire right-of-way on all corners.
2. Existing structures and facilities must be removed and/or altered.
3. 150 ft inscribed circle is the minimum for a multi-lane roundabout – design and operational analysis may require a larger circle.
4. The median on Torrance Blvd must be modified and/or removed.
5. Possible Caltrans opposition due to close proximity of PCH (300 ft easterly).

Table 1: Roundabout - Entry Lengths

Design Element	Mini Roundabout	Single Lane Roundabout	Multi-Lane Roundabout
Desirable maximum entry design speed	15 to 20 mph (25 to 30 km/h)	20 to 25 mph (30 to 40 km/h)	25 to 30 mph (40 to 50 km/h)
Maximum radius of turning lane for approach	1	1	2
Typical inscribed circle diameter	45 to 90 ft (13 to 27 m)	90 to 180 ft (27 to 55 m)	150 to 300 ft (46 to 91 m)
Central island treatment	Full Roundabout	Round (may have traversable apertures)	Round (may have traversable apertures)
Typical daily service volumes of which roundabout below which may be expected to operate without requiring a detailed capacity analysis (veh/600*)	Up to approximately 15,000 veh/day	Up to approximately 25,000 veh/day	Up to approximately 45,000 veh/day for two-lane roundabout

*Operational analysis needed to verify right and left lane applications

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