FINAL REPORT

Imperial Avenue Bikeway
Traffic and Safety Impact Assessment

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EXECUTIVE SUMMARY

This Traffic and Safety Impact Assessment analyzes the impacts of the Imperial Avenue Bikeway Project ("proposed project") to vehicular traffic and to safety for people who walk and bike in the proposed project area. Preparation of this assessment is required before the San Diego Association of Governments (SANDAG), the project's lead agency, can make a determination that the proposed project is exempt from the California Environmental Quality Act (CEQA) under Public Resources Code Section 21080.20.5.

The proposed project will make it easier and safer for people of all ages and abilities to walk and bike within Southeastern San Diego while also connecting them to Downtown. One of the primary benefits of the Imperial Avenue Bikeway is that it will connect to adjacent planned bikeway projects such as the City of San Diego's Downtown Cycletrack Network, the Chollas Creek Bikeway, the 47th Street Bikeway, and the Imperial Avenue Bikeway from 47th Street to Lemon Grove. The proposed project will include design elements and traffic safety measures that enhance the experience for people biking and walking, make streets safer for all users – including those who drive – and benefit people who live, recreate, work, and do business in the neighborhoods served by the proposed project. This is important on the Imperial Avenue Corridor, which is designated as a Vision Zero Corridor in the (2015) Vision Zero San Diego report by Circulate San Diego.[1] A description of the proposed project from west to east is provided below.

The Imperial Avenue Bikeway spans Imperial Avenue, from 17th Street to 47th Street, and also includes improvements on the adjacent J Street, L Street, 20th Street, and 21st Street. For the most part, the western portion of the bikeway from 17th Street to 32nd Street consists of buffered bike lanes – enabled through the removal of the center turn lane and pockets – and is enhanced by intersection treatments such as bend-outs. The typical section of the proposed project includes two travel lanes and two buffered bike lanes. In the eastern portion, much of bikeway includes a physical barrier in addition to the buffer in order to accommodate greater separation for people on bikes from vehicle traffic. The following section provides separate descriptions for each instance where the section changes. Further detail on each segment is provided in Section 1.3 Description of Design Features and Related Physical Improvements.

[1] Vision Zero is a strategy to eliminate all traffic deaths and severe injuries, while increasing safe, healthy, equitable mobility for all. It has been championed across Europe and the United States and was adopted by the City of San Diego City Council in October 2015. According to the (2015) Vision Zero San Diego report by Circulate San Diego, the Vision Zero Corridors consist of eight corridors that represent 30 percent of all collisions with people walking and 15 percent of all collisions with people bicycling. They also expect to contain 61 percent of all the expected population growth in the City of San Diego and 25 percent of all growth in the region. More information on Vision Zero and the corridors can be found in the referenced report.

J STREET FROM 17TH STREET TO 20TH STREET

In this segment, the proposed project will narrow the two travel lanes to provide bike lanes with buffers between the driving lane as well as the parking lane on both sides of the street. Parallel parking will remain adjacent to the curb on both sides of the street.

20TH STREET FROM J STREET TO L STREET

In this segment, the proposed project will maintain the existing lane configuration and add shared lane markings on both sides of the street. Head-in and parallel parking will remain as existing. A yield control will be added to the approaches on K Street.

L STREET FROM 20TH STREET TO 21ST STREET

In this segment, the proposed project will maintain the existing lane configuration and add shared lane markings on both sides of the street. Parallel parking will remain on both sides of the street.

21ST STREET FROM L STREET TO IMPERIAL AVENUE

In this segment, the proposed project will maintain the existing lane configuration and add shared lane markings on both sides of the street. Parallel parking will remain on both sides of the street.

IMPERIAL AVENUE BETWEEN 17TH STREET AND 19TH STREET

In this segment, the proposed project will narrow the travel lanes and repurpose one of the westbound through lanes to provide buffered bike lanes on both sides of the street.

IMPERIAL AVENUE BETWEEN 19TH STREET AND 32ND STREET

In this segment, the proposed project will remove the center turn lane to provide buffered bike lanes on both sides of the street. Parallel parking will remain on both sides of the street. Bend-outs or curb extensions will be installed at 19th, 24th, and 25th Streets, and a raised crosswalk will be installed at 26th Street.

IMPERIAL AVENUE BETWEEN 32ND STREET AND FRANCIS STREET

In this segment, the proposed project will remove one travel lane in each direction to provide buffered bike lanes on both sides of the street. Parallel parking would remain on both sides of the street except for a small portion where parking will be removed from the north side of Imperial Avenue at the west leg of the

intersection at Francis Street. At the intersection of Imperial Avenue and Francis Street, the project will maintain two lanes at the westbound approach which will then merge back into a single westbound lane approximately 60 feet to the west of the intersection. Green paint treatment will be applied at 33rd Street and Francis Street to guide people on bikes and alert drivers. A physical barrier will also be installed for a short segment to the east of 32nd Street.

IMPERIAL AVENUE BETWEEN FRANCIS STREET AND 36TH STREET

In this segment, the proposed project will remove one travel lane in each direction for the short segment between Francis Street and Gillette Street and will provide a two-way protected bikeway on the south and west sides of the road. Shared lane markings will also be added to both sides of the street. And exclusive bicycle phase will be added to the signal at the southern intersection of 36th Street and Imperial Avenue.

IMPERIAL AVENUE BETWEEN 36TH STREET AND 40TH STREET

In this segment, the proposed project repurposes parking lanes to create buffered bike lanes on both sides of the street. Finally, a bend-out will be provided for the eastbound approach to 40th Street, and a curb extension will be installed at the Southeast corner.

IMPERIAL AVENUE BETWEEN 40TH STREET AND 45TH STREET

In this segment, the proposed project will remove one travel lane in each direction to provide buffered bike lanes with physical separation on both sides of the street. Green paint treatment will be applied at 40th Street, Messina Way, Edgefield Way, the Redworks Driveway, Marketplace Avenue, and 45th Street to guide people on bikes and alert drivers. Bend-outs will be installed at the Redworks Driveway, and 45th Street. Finally, bus islands will be installed between Messina Way and Edgefield Way and east of the Redworks Driveway.

IMPERIAL AVENUE BETWEEN 45TH STREET AND 47TH STREET

In this segment, the proposed project will remove parallel parking to provide buffered bike lanes with physical separation on both sides of the street. Green paint treatment will be applied at West Street and the I-805 northbound and southbound ramps to guide people on bikes and alert drivers. Bend-outs will be installed at the I-805 northbound and southbound ramps and 47th Street.

OTHER IMPROVEMENTS

In addition to the improvements described preceding paragraphs, the project proposes several other treatments to facilitate the safe and comfortable movement of people walking, biking, and driving along the corridor. Other physical improvements that may be installed as part of the proposed project could include new painted crossings at intersections or at mid-blocks, advanced signal phases for people walking and biking, new raised medians, curb extensions, accessible curb ramps, sidewalks, modifications to existing curbs, gutters and drainage inlets, colored concrete and/or colored pavement, intersection crossing (or "conflict") markings, shared lane markings, new signage, re-striping of travel lanes, new trees, landscaping or other measures to treat storm water, relocating existing underground utilities, new bikeway lighting at priority locations, and similar minor physical improvements.

WALKING AND BICYCLING SAFETY IMPACTS

The assessment concludes that the proposed project will not have any negative safety impacts for people who walk or bike in the proposed project area as shown in Table 9 of this report. In fact, the proposed project will have potential safety and comfort benefits for people that walk, bike, and drive. The proposed project will decrease the level of traffic stress for people walking and biking along and across roadways in the project area by installing buffered and protected bike lanes, shared lane markings, and other measures to calm motor vehicle traffic.

VEHICULAR TRAFFIC IMPACTS

Vehicle traffic conditions are described using the "level of service" (LOS) methodology, which categorizes traffic conditions for intersections and roadway segments from LOS A to LOS F. Free-flowing traffic conditions are represented by LOS A, whereas LOS F represents the highest level of traffic congestion. Because the project area is located within the City of San Diego, this assessment uses the City of San Diego's adopted criteria for evaluating vehicular traffic conditions at intersections and on roadway segments. LOS A through LOS D traffic conditions meet the City's operational criteria.

The project is expected to be completed by Year 2022 or roughly seven (7) years from the time that traffic volumes in the project corridor were studied. This study compares the time period when volumes were studied to that at project completion: Existing Year 2017 and Future Year 2022. For each analysis scenario, the study looks at traffic conditions "with the project" and "without the project" to assess the proposed project's vehicular traffic impacts on intersections and roadway segments. The roadway segment analysis addresses how the project will affect all-day traffic conditions; the intersection analysis addresses vehicle

traffic conditions during peak traffic periods: 7:00 a.m. to 9:00 a.m. (the morning peak) and 4:00 pm to 6:00 pm (the evening peak).

Intersection Analysis

The assessment concludes that all intersections in the project area will meet City of San Diego criteria for vehicular traffic conditions with implementation of the proposed project, except for the following two intersections:

- (29) I-805 Southbound Ramps and Imperial Avenue during the PM peak hour under Future Year conditions only, which will already operate below the City's standard with or without the project. As such, the proposed project will not result in a vehicle traffic impact at these intersections as defined by the City of San Diego Significance Thresholds for Traffic Impacts.
- (31) 47th Street and Imperial Avenue during the AM peak hour under Existing and Future Year conditions, which will already operate below the City's standard with or without the project. As such, the proposed project will not result in a vehicle traffic impact at these intersections as defined by the City of San Diego Significance Thresholds for Traffic Impacts.

Roadway Segment Operations

The assessment also concludes that all roadway segments in the project area will meet City of San Diego criteria for vehicular traffic conditions with implementation of the proposed project except for the following roadway segments as shown in **Table 12** in this report:

- (2-7) Imperial Avenue between 19th Street and 33rd Street
- (14) Imperial Avenue between Redworks Driveway and 45th Street

For segments #2-6 of Imperial Avenue between 19th Street and 32nd Street, the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, an arterial analysis shows that the segment will operate at LOS D or better during peak traffic periods. Lastly, the project design in this segment is consistent with the (2015) adopted Southeastern San Diego Community Plan in proposing a buffered bikeway and reconfiguration to a 4-lane or 2-lane collector. Having satisfied these three conditions, the traffic conditions along this segment meet the City of San Diego Standards.

For the segment #7 of Imperial Avenue between 32nd Street and 33rd Street, the table shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, the arterial analysis of the segment will operate at LOS D or better during peak traffic periods. Lastly, the segment is only partially consistent with the (2015) adopted Southeastern San Diego Community Plan: in

proposing a buffered bikeway, it is consistent with the plan to provide an enhanced bicycle facility; however, the proposal to reconfigure the roadway from a 4-lane to a 2-lane collector is inconsistent with the 2-lane-with-center-left-turn-lane collector configuration in the Community Plan. Because of the inconsistency with the adopted Community Plan, the traffic conditions along this segment do not meet City of San Diego standards.

Finally, for the segment of Imperial Avenue between Redworks Driveway and 45th Street, the intersection operations analysis shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, the arterial analysis of the segment will operate at LOS D or better during peak traffic. Similar to the segment described above, this segment is also partially consistent with the (2015) adopted Southeastern San Diego Community Plan: in proposing a Class II bikeway, it is consistent with the plan to provide an enhanced bicycle facility; however, the proposal to reconfigure the roadway from a 4-lane major arterial to a 2-lane-with-center-left-turn-lane collector is inconsistent with the 4-lane major arterial configuration in the Community Plan. Because of the inconsistency with the adopted Community Plan, the traffic conditions along this segment do not meet City of San Diego standards.

An additional vehicle lane would be required to be maintained on study roadway segments #7: 32nd Street and 33rd Street and #14: Redworks Driveway to 45th Street in order to achieve the City's standard of LOS D or better. Maintaining an additional vehicle lane along these segments is not feasible due to lack of public right-of-way (i.e. there is not adequate space to maintain a vehicle lane). Despite the segments operating at LOS E, however, travel times through these roadway segments will decrease by 1 to 5 seconds (depending on the direction and AM or PM peak hour) with implementation of the project compared to conditions without the project. This decrease in travel time will occur because traffic signal timing will be optimized at the intersections at 32nd, 33rd, and 45th Streets as part of the project. Therefore, even though it will not be possible to bring the LOS to the City's standard, the project will improve travel times through these segments.

Summary of Changes:

- Safety for people who walk and bike along the project corridor would improve with the proposed project.
- Under Existing conditions, one intersection currently operates below the City of San Diego Standards and would not change with the project.
- Under Future conditions, two intersections would operate below the City of San Diego Standards and would not change with the project.

- Two road segments are inconsistent with the City of San Diego Standards due the project reconfiguring a 4-lane major arterial shown in the Community Plan to a 2-lane collector or a 2-lane-with-center-left-turn-lane collector. While being inconsistent, travel times through these roadway segments will decrease by 1 to 5 seconds (depending on the direction and AM or PM peak hour) with implementation of the project compared to conditions without the project.

1.0 PROJECT DESCRIPTION

This chapter discusses the objectives of the proposed Imperial Avenue Bikeway project, its design features and related physical improvements, and its anticipated safety features and potential safety benefits. The bikeway project is designed to increase safety and comfort for all roadway users by slowing vehicle traffic, providing designated space for people biking that is separate from where people drive, highlighting the presence of people who walk and bike, and enhancing safety at street crossings. The bikeway will link key origins and destinations including businesses, residences, schools, parks, and transit as well as providing a desired connection between Downtown San Diego and the Southeastern San Diego and Encanto communities.

1.1 PROJECT OBJECTIVES

The proposed project is part of the San Diego Association of Governments (SANDAG) Regional Bike Plan Early Action Program (Bike EAP), a 10-year effort to expand the regional bike network and complete the high-priority projects approved in Riding to 2050: The San Diego Regional Bike Plan (Regional Bike Plan) (SANDAG 2010). The Regional Bike Plan and Bike EAP are part of larger goals for the region to increase transportation choices and to make riding a bike a viable, attractive transportation choice.

In addition to closing gaps within the larger bikeway network that is being planned throughout the region, one of the objectives of the proposed project is to create connections between the Southeastern and Downtown areas of San Diego, including access to and through the following neighborhoods:

- Lincoln Park
- Sherman Heights
- Logan Heights
- Mountain View
- Grant Hill
- Stockton
- East Village
- Encanto

There is clear and consistent policy direction on the local, regional, and state levels to enhance safety and connected infrastructure that supports biking and walking as viable choices for everyday trips and to reduce greenhouse gas and other air pollutant emissions, including but not limited to:

- The Southeastern San Diego Community Plan Update
- The Encanto Community Plan Update
- The City of San Diego Bicycle Master Plan
- The City of San Diego Climate Action Plan
- The SANDAG Regional Bike Plan
- San Diego Forward: The Regional Plan
- The SANDAG Climate Action Strategy
- Vision Zero San Diego

Analysis of ninety large American cities confirmed a positive correlation between how many people ride bikes and the supply of bike paths and lanes, even when controlling for other factors such as city size, climate, topography, vehicle ownership, income, and student population (Buehler, 2012). Building facilities for people that walk and bike enhances safety for all roadway users, especially for women, senior citizens, and people who do not have experience riding bikes (FHWA 2015). A major reason existing ridership levels in the region are not higher is because of the high levels of perceived and actual risks associated with riding a bike on the street (SANDAG 2010). Based on case studies nationwide, a large percentage of the population currently "interested in biking, but concerned about safety," is expected to begin to ride and to ride more often, when served by a network of safe bikeways and low stress streets (NITC 2014).

Based on factors such as its compact design, high-density development, mixed land use patterns, population characteristics, facility gaps, incidence of collisions, and public comments related to problem areas, the Imperial Avenue corridor was identified by SANDAG as an area where investments in bikeway infrastructure will yield substantial benefits. As a result, the proposed project is ranked as "high-priority project" in the Regional Bike Plan (SANDAG 2010).

Described in greater detail, the purpose of this particular project is to provide livable, complete streets that serve people of all ages and abilities, and to design innovative facilities with appropriate separation from vehicular traffic, traffic calming elements, and end-of-trip facilities. The Imperial Avenue Bikeway will improve, and complete, overall east-west bicycle travel within the Southeastern San Diego and Encanto neighborhoods of San Diego by creating inviting and convenient bikeways that connect key community destinations, including schools, parks, transit stops, and commercial centers. In addition to enhancing mobility for people riding bikes, some of the improved locations will include enhancements for people who

walk, as well as new opportunities for landscaped areas, resulting in multi-modal benefits to the overall circulation network, including enhanced safety.

The design features of the project include:

- Class II standard and buffered bike lanes
- Class III shared lane markings
- Class IV physically protected bike lanes
- Green bike crossings
- Bend-outs
- Curb extensions
- Raised crossings
- Striped crosswalks

These design features are described in greater detail in section 1.3 and on **Figure 3**.

1.2 PROJECT SAFETY BENEFITS

One of the major goals of the proposed project is to improve safety for all roadway users in the project area for people of all ages and abilities who walk, bicycle, and drive. The proposed project aims to improve safety with approximately 3.3 miles of buffered and protected bike lanes, which provide dedicated space – along the roadway – for people who bike. In addition, the proposed project will include traffic calming features that promote safe driving speeds. The project also will improve conditions at intersections to enhance safety for people who walk, bike, ride transit, and drive. These facilities provide varying degrees of perceived and actual safety desired by people who are interested in biking for transportation, but who are concerned about the safety of riding on streets with higher levels of traffic stress. The following facility types are proposed as part of this project:

Class II Bike Lanes Including Buffered Bike Lanes

Class II bike lanes are facilities located in roadway right-of-way and separated from vehicle lanes with a painted stripe, and in this case a three-foot or larger painted buffer (creating buffered bike lanes). These facilities lower traffic stress by providing designated space for people on bikes on streets with higher levels of motor vehicle traffic where separate bicycle or shared-use paths are not feasible.

Class III Bike Routes

Class III bike routes are facilities located in roadway right-of-way where people on bikes share lane with motor vehicle traffic as highlighted by "sharrows" and signage. Traffic calming devices help maintain low motor-driving speeds, thus benefitting people riding along the street, people crossing the street by walking or riding a bicycle, and vehicle drivers.

Class IV Bikeways

Class IV bike lanes are facilities located adjacent to the roadway and separated from vehicle lanes with a physical barrier, such as flexible posts or inflexible walls. These facilities, along with Class I bike paths, provide the maximum amount of safety and separation from vehicles.

TRAFFIC CALMING AND OTHER PROJECT FEATURES

Several traffic calming measures and traffic control modifications will be implemented as part of the proposed project including curb extensions, bicycle bend-outs, raised crosswalks, and narrowing the road through repurposing driving lanes for bikeways. These measures will encourage safe vehicle speeds, shorten crossing distances and exposure for people walking and biking, and increase visibility of people walking and biking, thereby improving safety for people biking, walking, and driving. These features also will generally promote efficient travel for people riding bikes and driving vehicles.

Encouraging safe driving speeds through traffic calming helps attract a greater number of people to walk and bike. In addition, scientific studies have shown that when people walking or biking are involved in a crash with someone driving a vehicle, there is a significantly lower chance that they will be killed or suffer a serious injury when driving speeds on streets are maintained at less than 25 to 30 mph (Department for Transport 2010). For example, as shown in **Figure 1**, someone who is walking and is hit by a person driving a vehicle traveling at 20 mph has a 90 percent chance of survival, but the likelihood of survival decreases to 60 percent if the driver is traveling at 30 mph, and decreases further to 20 percent if the driver is traveling at 40 mph (SFMTA, 2014). Each of the traffic calming treatments listed above is briefly described in the following paragraphs.

Figure 1 Pedestrian Survival Rate by Vehicle Speed (SFMTA 2014)

Curb Extensions

Curb extensions, also known as bulb-outs, are extensions of the curb line into the roadway. They are common where on-street parking is available on a roadway. Bulb-outs are intended to be used for both pedestrian safety and traffic calming purposes. The extension of the curb provides a shorter length of roadway for people walking to cross along with higher visibility of crosswalks to oncoming drivers. In the event a driver needs to make a turn, the shape of the bulb-out forces drivers to make a wider turn, which encourages safer speeds.

Bend-Outs

Bicycle bend-outs, or simply bend-outs, are a combination of curb extensions and bicycle lanes. This feature directs people biking onto a large curb extension, out of the intersection, so that they are more visible to drivers making right turns. The feature also provides space for vehicles to yield to people walking and/or people riding bikes across the side streets without blocking traffic on the main street. Bend-outs also provide shorter crossing distances for people walking and help to clearly define travel ways for each mode (e.g., through pavement markings, colored material, or other treatment).

Bus Islands

Bus islands allow for buses to make in-lane stops, reducing transit delay. At bus islands, people on bikes will be redirected via a ramp onto the sidewalk located behind the bus stop waiting area. Having this portion of the bike path on the sidewalk alerts people on bikes to the potential for conflicts with people walking, while the sidewalk treatment and island configuration alerts people walking to the potential for conflicts with people on bikes, while simultaneously eliminating the most dangerous conflict between the people on bikes and buses.

Raised Crosswalks

A raised crosswalk is essentially a speed cushion with a flat section along the center across the entire street width that allows people walking to cross the street at curb level (i.e. without having to use a curb ramp or step off a curb). The sloped approaches to the crosswalk in the street serve to slow down people driving, whether or not people walking are present.

Lane Repurposing and Roadway Narrowing

When a lane is repurposed, space is reallocated so the street functions more efficiently. In this project, space will be reallocated to infrastructure for walking and biking. The reallocated space benefits those who live, work, and shop in the corridor instead of the drivers who just drive through the area. Studies across the country have shown that lane repurposing can help to reduce speeding and increase safety (Florida Department of Transportation, 2014).

1.3 DESCRIPTION OF DESIGN FEATURES AND RELATED PHYSICAL IMPROVEMENTS

The Imperial Avenue Bikeway will improve east-west travel for people riding bikes to and through the Southeastern area by creating inviting and convenient bikeways that connect key community destinations, including schools, parks, transit stops, and commercial areas. The Imperial Avenue Bikeway, later referred to simply as "the corridor," spans Imperial Avenue, from 17th Street to 47th Street. **Figure 2** shows the bikeway alignment along with the proposed facility types and project improvements at intersections. Typical cross sections are provided in **Appendix A**. The following description is based on the proposed project's current level of design and will be finalized during the final engineering design phase, before construction.

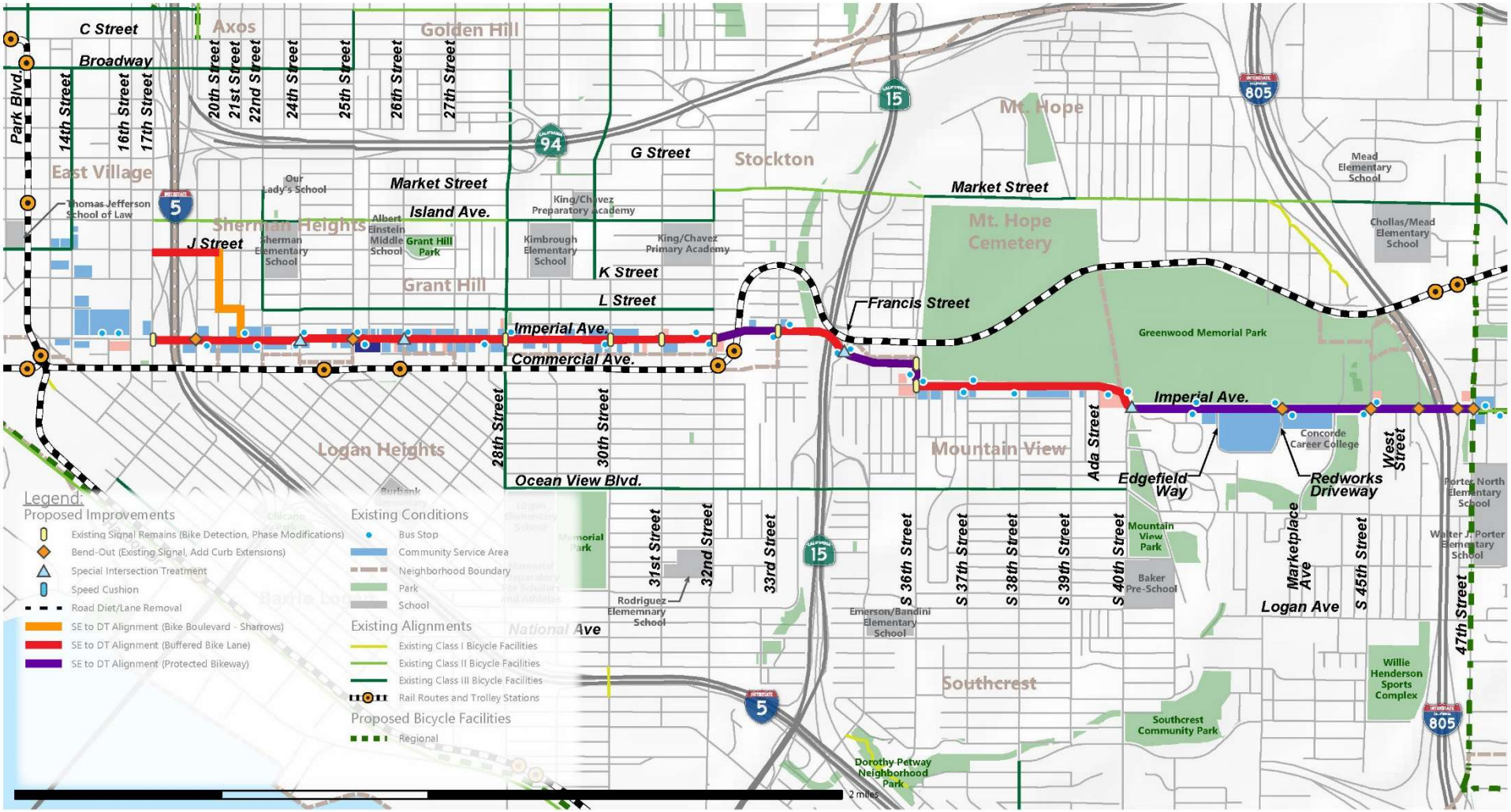


Figure 2

Proposed Project Facility Type and Improvements

J Street from 17th Street to 20th Street

In this segment, the proposed project will narrow the two travel lanes to provide bike lanes with buffers between the driving lane as well as the parking lane on both sides of the street.

20th Street from J Street to L Street

In this segment, the proposed project will maintain the existing lane configuration and add shared lane markings on both sides of the street. Head-in and parallel parking will remain as existing. A yield control will be added to the approaches on K Street.

L Street from 20th Street to 21st Street

In this segment, the proposed project will maintain the existing lane configuration and add shared lane markings on both sides of the street. Parallel parking will remain on both sides of the street.

21st Street from L Street to Imperial Avenue

In this segment, the proposed project will maintain the existing lane configuration and add shared lane markings on both sides of the street. Parallel parking will remain on both sides of the street.

Imperial Avenue between 17th Street and 19th Street

In this segment, the proposed project will narrow the travel lanes and repurpose one of the westbound through lanes to provide buffered bike lanes on both sides of the street.

Imperial Avenue between 19th Street and 32nd Street

In this segment, the proposed project will remove the center turn lane to provide buffered bike lanes on both sides of the street. Parallel parking will remain on both sides of the street. Bend-outs or curb extensions will be installed at 19th, 24th, and 25th Streets, and a raised crosswalk will be installed at 26th Street.

Imperial Avenue between 32nd Street and Francis Street

In this segment, the proposed project will remove one travel lane in each direction to provide buffered bike lanes on both sides of the street. Parallel parking would remain on both sides of the street except for a small portion where parking will be removed from the north side of Imperial Avenue at the west leg of the intersection at Francis Street. At this intersection, the project will maintain two lanes at the westbound approach which will then merge back into a single westbound lane approximately 60 feet to the west of the intersection. Green paint treatment will be applied at 33rd Street and Francis Street to guide people on bikes and alert drivers. A physical barrier will also be installed for a short segment to the east of 32nd Street.

Imperial Avenue between Francis Street and 36th Street

In this segment, the proposed project will remove one travel lane in each direction for the short segment between Francis Street and Gillette Street and will provide a two-way protected bikeway on the south and west sides of the road. Shared lane markings will also be added to both sides of the street. And exclusive bicycle phase will be added to the signal at the southern intersection of 36th Street and Imperial Avenue.

Imperial Avenue between 36th Street and 40th Street

In this segment, the proposed project repurposes parking lanes to create buffered bike lanes on both sides of the street except for the segment between 37th Street and the Mount Hope Cemetery Driveway where the roadway narrows and standard Class-II bike lanes are provided. Finally, a bend-out will be provided for the eastbound approach to 40th Street, and a curb extension will be installed at the Southeast corner.

Imperial Avenue between 40th Street and 45th Street

In this segment, the proposed project will remove one travel lane in each direction to provide buffered bike lanes with physical separation on both sides of the street. Green paint treatment will be applied at 40th Street, Messina Way, Edgefield Way, the Redworks Driveway, Marketplace Avenue, and 45th Street to guide people on bikes and alert drivers. Bend-outs will be installed at the Redworks Driveway, and 45th Street. Finally, bus islands will be installed between Messina Way and Edgefield Way and east of the Redworks Driveway.

Imperial Avenue between 45th Street and 47th Street

In this segment, the proposed project will remove parallel parking to provide buffered bike lanes with physical separation on both sides of the street. Green paint treatment will be applied at West Street and the I-805 northbound and southbound ramps to guide people on bikes and alert drivers. Bend-outs will be installed at the I-805 northbound and southbound ramps and 47th Street.

Other Improvements

In addition to the improvements described preceding paragraphs, the project proposes several other treatments to facilitate the safe and comfortable movement of people walking, biking, and driving along the corridor. Other physical improvements that may be installed as part of the proposed project could include new painted crossings at intersections or at mid-block, advanced signal phases for people walking and biking, new raised medians, curb extensions, accessible curb ramps, sidewalks, modifications to existing curbs, gutters and drainage inlets, colored concrete and/or colored pavement, intersection crossing (or "conflict") markings, shared lane markings, new signage, re-striping of travel lanes, new trees, landscaping

or other measures to treat storm water, relocating existing underground utilities, new bikeway lighting at priority locations, and similar minor physical improvements.

While Level of Traffic Stress helps to explain how the project will improve the walking and bicycling conditions along Imperial Avenue, it does not tell the whole story. The following pages describe the specific issues that make walking and biking uncomfortable, and how the proposed improvements will address these issues and make the street safer and more comfortable for everyone.

Since the corridor is approximately 3.3 miles long, and many of the issues and solutions are repeated throughout the project limits, each exhibit utilizes one street segment to represent typical existing conditions and proposed improvements. The diagram in the bottom right corner of each page shows the specific segment location and the extents that the exhibit generally applies to. As noted, these examples are intended to be representative in order to help paint a better picture of how the project will make walking and biking along Imperial Avenue more comfortable and accessible. While each block in the project area is unique, the conditions described in the typical segments generally cover the range of scenarios that can be found along Imperial Avenue. **Figure 3** shows the existing and proposed project improvements on Imperial Avenue.

FIGURE 3

17TH STREET TO 19TH STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There is no marked space for people walking to cross Imperial Avenue on the west side of this intersection. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

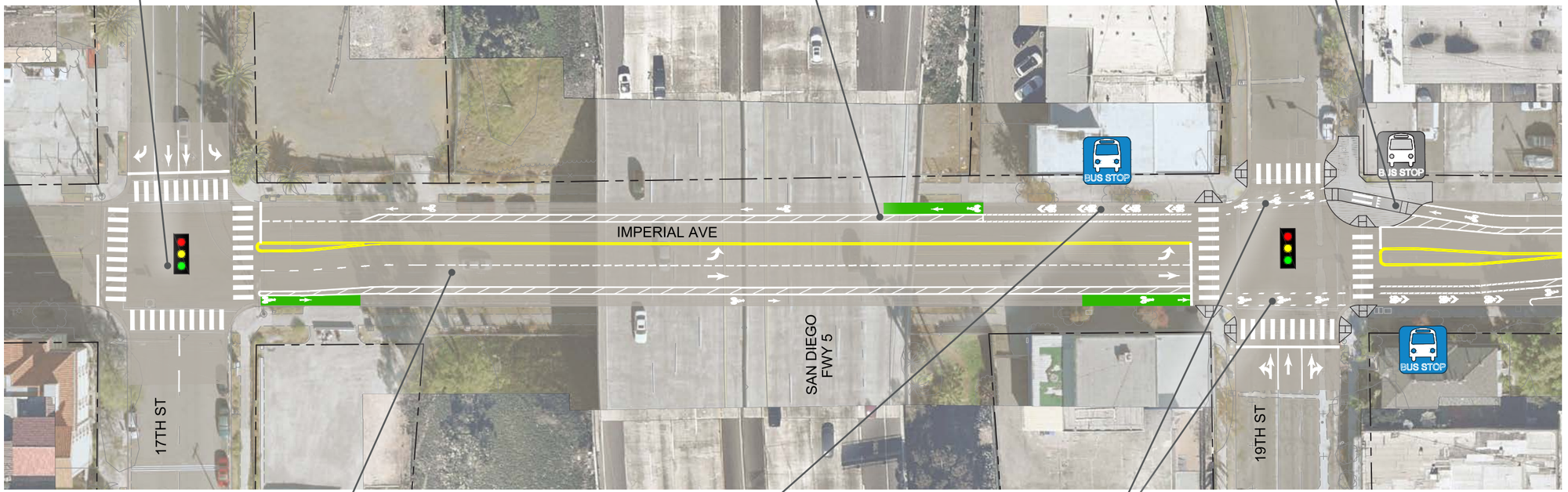
Proposed Improvements: High-visibility crosswalks will be installed on all legs of this intersection.

Existing Conditions: There are currently no marked bike facilities along Imperial Avenue, so people biking must share the lane with people driving. This creates a stressful situation for both people biking and driving, especially due to conflicting movements and roadway needs between people on bikes, and people driving who are attempting to access the freeway.

Proposed Improvements: Stripe bike lanes with a painted buffer between the bike lane and the driving lane on each side of the street. The buffer provides added protection between people biking and people driving and narrows the travel lanes to help further calm traffic.

Existing Conditions: There are high volumes of drivers turning right onto 19th Street at this intersection. Turning cars create conflicts with people walking and biking across 19th Street.

Proposed Improvements: Construct a bend-out at the northeast corner of the intersection. This extends the curb to help shorten the crossing for people walking, places people biking in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down when making a right turn.



Existing Conditions: Community members expressed a strong desire for a safe, comfortable bike connection across Interstate 5 into Downtown. There is still a need to accommodate high volumes of east bound traffic accessing the on-ramp to Interstate 5 at 19th Street.

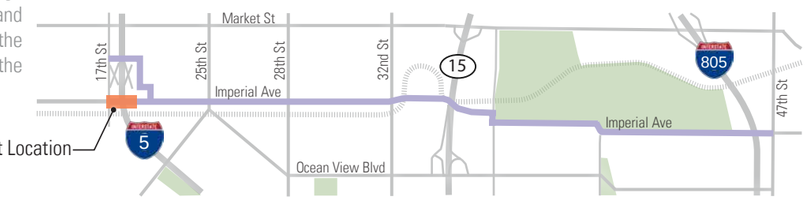
Proposed Improvements: Remove one lane of westbound through traffic in order to stripe bike lanes with a painted buffer. Two lanes will remain in the eastbound direction, helping to facilitate normal traffic flow.

Existing Conditions: The proposed bend out is located in the space where a bus would normally stop.

Proposed Improvements: Move the bus stop to the northwest corner of the intersection. Allow the bus to utilize the bike lane to stop outside of the travel lane and maintain traffic flow. This will improve signal operations compared to maintaining the bus stop on the northeast corner because the bus will be able to stop without blocking the westbound right-turn traffic.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.



IMPERIAL AVENUE BIKEWAY

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FIGURE 3

25TH STREET TO 26TH STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There are high volumes of people driving turning right onto 25th Street from Imperial Avenue. Turning cars create conflicts with people walking and biking across 25th Street.

Proposed Improvements: Construct a bend-out on the northeast and southwest corners of the intersection. This extends the curb to help shorten the crossing for people walking, places people biking in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn.

Existing Conditions: There are currently no marked bike facilities along Imperial Avenue, so people biking must share the lane with people driving. This creates a stressful situation for both people biking and driving, especially due to conflicting movements and roadway needs between people on bikes and people driving.

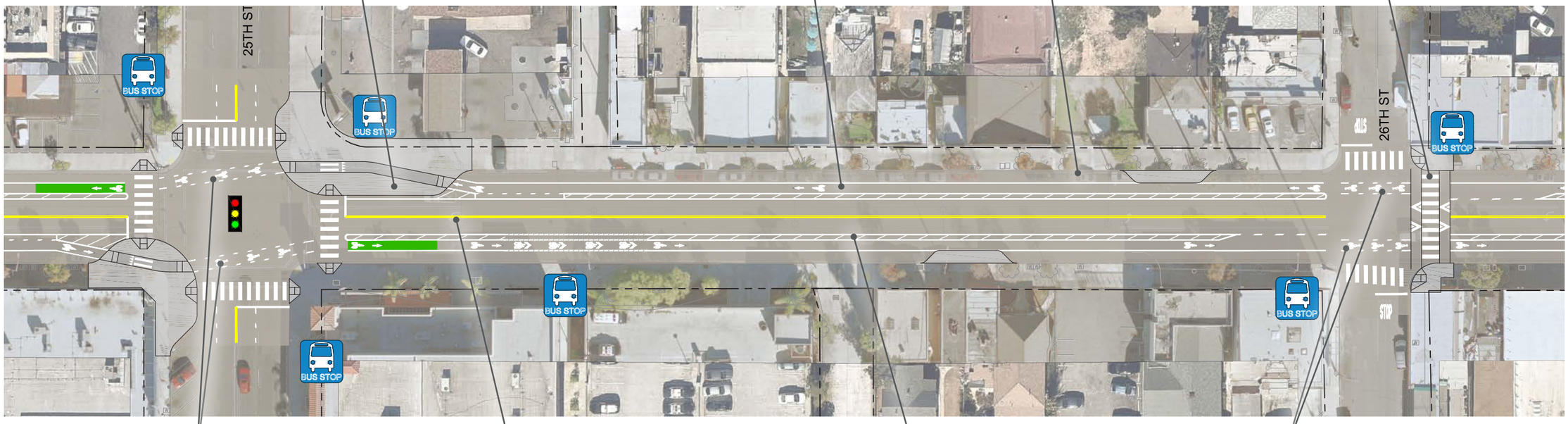
Proposed Improvements: Stripe bike lanes with a painted buffer between the bike lane and the driving lane on each side of the street. The buffer provides added protection between people biking and people driving and narrows the travel lanes to help further calm traffic.

Existing Conditions: Businesses noted a need to retain parking in the business district.

Proposed Improvements: Maintain parking against the curb to retain the maximum number of parking spaces.

Existing Conditions: There are high volumes of people crossing Imperial Avenue along 26th Street on foot in this area to access local destinations. However, there is no marked space for people walking to cross Imperial Avenue and no signal or other form of traffic control to require drivers to yield. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

Proposed Improvements: Construct a raised crossing. Raised crosswalks are crosswalks that are elevated to sidewalk level. Tapers on each side of the crosswalk encourage slow speeds for people driving and alert them to a crossing for people walking, improving the safety and comfort of streets for people walking. Additionally, install a flashing beacon to further signify driver to yield to people crossing on foot. Paint high visibility crosswalks across 26th Street to guide people walking and help alert people driving that people may be walking or biking across the street.



Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: Delivery trucks and other drivers sometimes park in the center turn lane. Additionally, some people driving utilize the turn lane as a passing lane. Both blocking the lane and speeding through it create potential safety issues for people driving, walking, and biking.

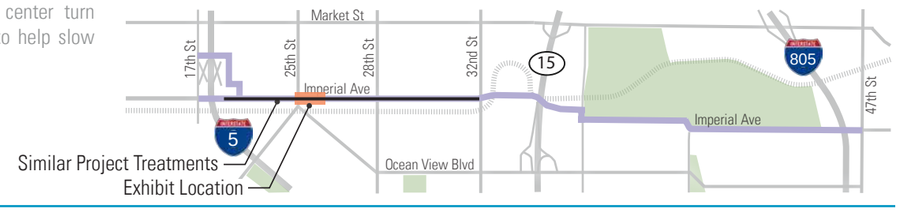
Proposed Improvements: Eliminate the center left turn lane, as called for in the adopted Southeastern San Diego Community Plan. This will allow for the reallocation of the space to create new bike lanes, retain parking, and retain one through lane in each direction, while also calming traffic.

Existing Conditions: Neighbors and business owners noted that people speed along Imperial Avenue, which can cause an unsafe situation for people trying to cross the street or for people biking who share the lanes with drivers.

Proposed Improvements: Narrow the street through removing the center turn lane and striping bike lanes to help slow people down.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.



IMPERIAL AVENUE BIKEWAY

FIGURE 3

32ND STREET TO 33RD STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There is no marked space for people walking to cross Imperial Avenue or 32nd Street, although there are bus stops, a trolley stop, and other destinations near this intersection. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

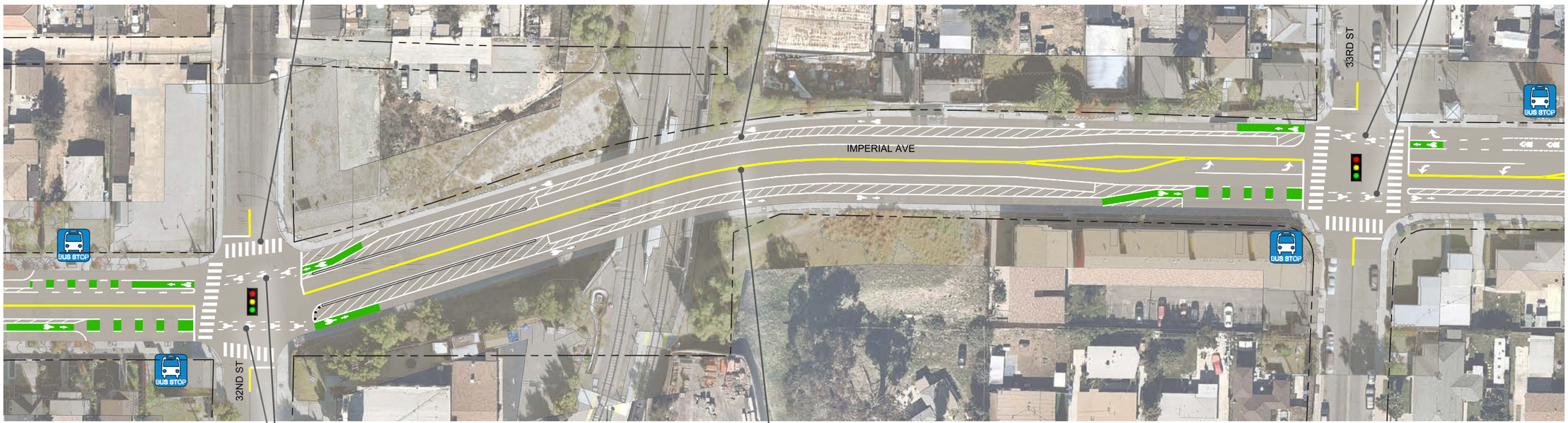
Proposed Improvements: Paint high visibility crosswalks across 32nd Street and Imperial Avenue to guide people walking and help alert people driving that people may be walking or biking across the street.

Existing Conditions: The faded and widely spaced sharrows are not effective at reminding everyone this is a bike priority street and that people on bikes should ride outside of the "door zone." They also create a stressful condition for people biking and people driving due to differences in speed.

Proposed Improvements: Stripe bike lanes with a painted buffer between the bike lane and the driving lane and/or parking lane on each side of the street. The buffer provides added protection between people biking and people driving as well as moves people biking outside of the "door zone." It also helps to narrow the road to help further calm traffic. Construct a physical barrier where feasible to provide further comfort for people riding bikes. Where parking remains, the parking acts as a physical barrier protecting people biking from people driving.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.



Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: Neighbors and business owners noted that people speed along Imperial Avenue, which can cause an unsafe situation for people trying to cross the street or for people biking who share the lanes with drivers. The wide street and relatively low traffic volumes further enable speeding in this area.

Proposed Improvements: Narrow the street re-purposing one lane in each direction from a driving lane to a bike lane to help slow people down. Maintain parking between the bike lane and the driving lane where feasible.

IMPERIAL AVENUE BIKEWAY

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FIGURE 3

FRANCIS STREET TO 36TH STREET

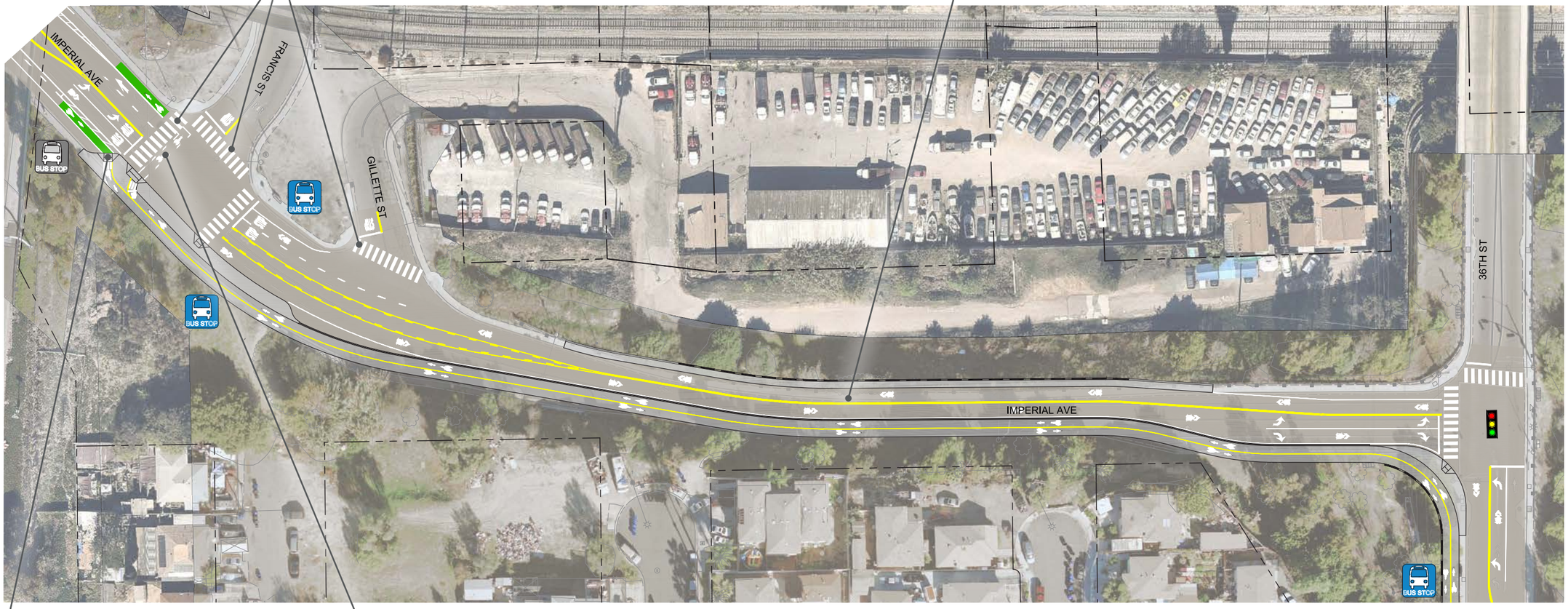
EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There is no marked space for people walking to cross Imperial Avenue, Francis Street, or Gillette Street, although there are bus stops and other destinations near this intersection. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

Proposed Improvements: Install high visibility crosswalks across Imperial Avenue, Francis Street, and Gillette Street to guide people walking and help alert people driving that people may be walking or biking across the street.

Existing Conditions: The faded and widely spaced sharrows are not effective at reminding everyone this is a bike priority street. Additionally, the incline of the hill creates an uncomfortable situation for people riding bikes slowly up the hill who have to share the lane with people driving.

Proposed Improvements: Construct a two-way bikeway on the south side of the street with a physical barrier between the bikeway and the travel lanes to create a safe and comfortable space for people of all abilities to bike. Maintain shared lane markings on the street for people riding bikes who wish to ride faster.



Existing Conditions: The proposed two-way bikeway entrance is located in the space where a bus would normally stop.

Proposed Improvements: Move the bus stop to the southeast corner of the intersection. Create a wide platform for people riding the bus to wait on and to provide plenty of space for getting on or off the bus.

Existing Conditions: The bikeway transitions from a two-way bikeway to one lane in each direction on either side of the street. Guidance is needed for people riding bikes to show them how to make the transition. Additionally, this requires crossing a street, and drivers may not be expecting this.

Proposed Improvements: Stripe a bike lane through the intersection to guide people on bikes regarding how to cross the street and alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

N

0′ 40′ 80′

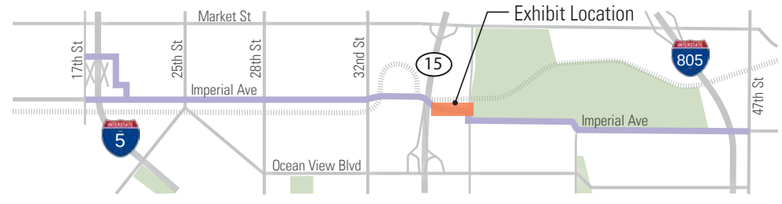


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FIGURE 3

37TH STREET TO 38TH STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: The faded and widely spaced sharrows are not effective at reminding everyone this is a bike priority street and that people on bikes should ride outside of the "door zone." They also create a stressful condition for people biking and people driving due to differences in speed.

Proposed Improvements: Stripe bike lanes to provide a designated space for people riding bikes. Where the street width permits, provide a painted buffer between the bike lane and the driving lane on each side of the street. The buffer provides added protection between people biking and people driving. These improvements will also narrow the travel lanes, helping to calm traffic.

Existing Conditions: Neighbors and business owners noted that people speed along Imperial Avenue, which can cause an unsafe situation for people trying to cross the street or for people biking who share the lanes with drivers.

Proposed Improvements: Narrow the street through removing the parking lane, narrowing the driving lanes, and striping buffered bike lanes to help slow people down. Buses and trucks with wider wheel-bases will be able to utilize the buffer as needed for extra space.

Existing Conditions: There is no marked space for people walking to cross 37th Street. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

Proposed Improvements: Paint high visibility crosswalks across 37th Street to guide people walking and help alert people driving that people may be walking or biking across the street.

Existing Conditions: There is no marked space for people walking to cross 38th Street. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

Proposed Improvements: Paint high visibility crosswalks across 38th Street to guide people walking and help alert people driving that people may be walking or biking across the street.

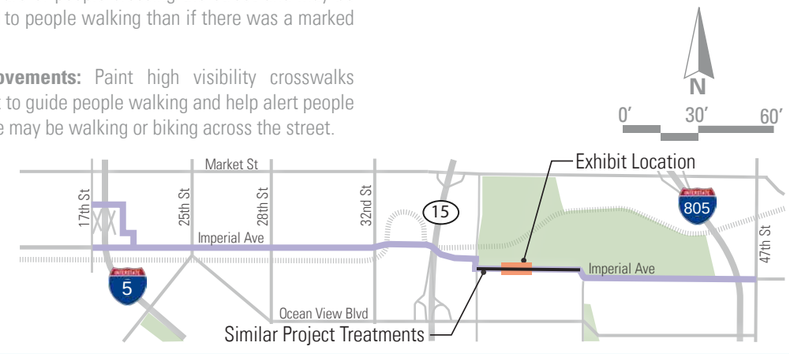

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FIGURE 3

40TH STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There is no marked space for people walking to cross Ada Street. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk. It also poses a skewed intersection, which creates visibility issues between people driving and people walking.

Proposed Improvements: Paint high visibility crosswalks across Ada Street to guide people walking and help alert people driving that people may be walking or biking across the street.

Existing Conditions: Neighbors and business owners noted that people speed along Imperial Avenue, which can cause an unsafe situation for people trying to cross the street or for people biking who share the lanes with drivers. The street is wide here, further enabling people to speed around this turn.

Proposed Improvements: Narrow the street through narrowing the driving lanes and striping bike lanes to help slow people down.

Existing Conditions: There are high volumes of drivers turning right onto 40th Street at this intersection. Turning cars create conflicts with people walking and biking across 40th Street.

Proposed Improvements: Construct a bend-out on the southwest corner of the intersection. This extends the curb to help shorten the crossing for people walking, places the person on a bike in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn.

Existing Conditions: This intersection is very wide and can be confusing for people who are approaching it.

Proposed Improvements: Realign the intersection to create more of a "T" shape and further require drivers to slow down when crossing it.

Existing Conditions: The faded and widely spaced sharrows are not effective at reminding everyone this is a bike priority street. They also create a stressful condition for people biking and people driving due to differences in speed.

Proposed Improvements: Stripe bike lanes with a painted buffer and a physical barrier between the bike lane and the driving lane. The buffer and barrier provide added protection between people biking and people driving. It also helps to narrow the road to help further calm traffic.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: The sweeping curve on this side of the intersection allows drivers to speed around this corner. This poses a safety issue, as people driving may not see people walking across the street or may not be able to stop in time for them.

Proposed Improvements: Extend the curb and create a tighter turning radius to encourage drivers to slow down.

N

0′ 40′ 80′

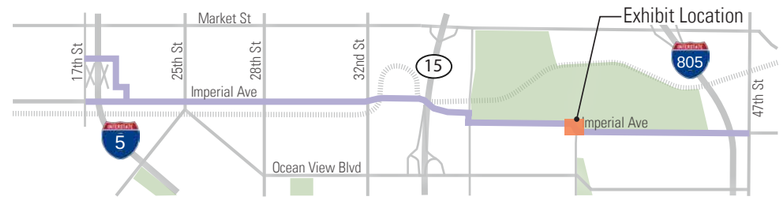

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FIGURE 3

REDWORKS DRIVEWAY TO MARKETPLACE AVENUE

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: The existing bike lanes on Imperial Avenue in this location are inconsistent, and are narrow where they do exist. This creates a stressful situation for both people biking and driving, especially considering relatively high driving speeds and volumes here.

Proposed Improvements: Stripe bike lanes with a painted buffer and a physical barrier between the bike lane and the driving lane. The buffer and barrier provides added protection between people biking and people driving. It also helps to narrow the road to help further calm traffic.

Existing Conditions: The cemetery requires a right turn lane for funeral processions.

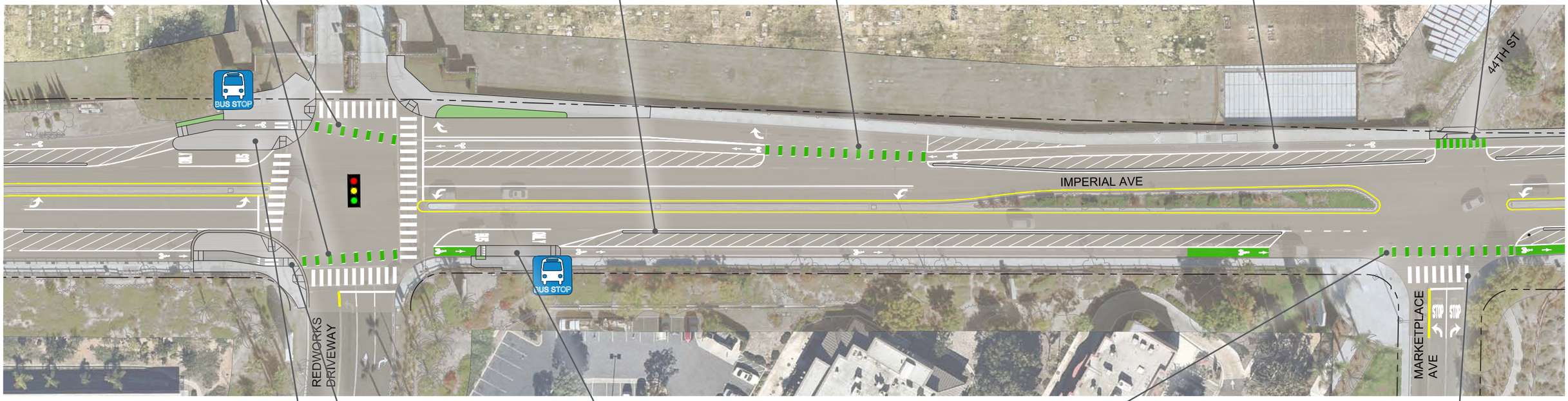
Proposed Improvements: Maintain the right turn lane into the cemetery and stripe green paint where the drivers turning right cross the bike lane to alert people driving and people biking to be aware of the potential conflicts.

Existing Conditions: Neighbors and business owners noted that people speed along Imperial Avenue, which can cause an unsafe situation for people trying to cross the street or for people biking who share the lanes with drivers. The wide street width further enables speeding in this area.

Proposed Improvements: Narrow the street by re-purposing one lane in each direction from a driving lane to a bike lane to help slow people down. Creating a physical barrier between the bikeway and the driving lane helps to further calm traffic and provide a comfortable ride for people biking and people driving.

Existing Conditions: People riding bikes must cross a driveway. Driveways pose potential conflicts between people biking and people pulling out of the driveway.

Proposed Improvements: Paint the area near or in front of the driveway green to alert both people on bikes and people driving of the need to be cautious at the crossing.



Existing Conditions: The bus stop in this location should be separated from traffic due to higher traffic volumes. Additionally, the sweeping curve allows people driving to turn right at higher speeds out of the cemetery.

Proposed Improvements: Build a side boarding island stop on the northwest corner of the intersection. This extends the curb to help shorten the crossing for people walking and encourages drivers to slow down or stop when making a right turn. Create a bus pullout that can utilize the extra space created by the curb extension to create a comfortable area for people riding the bus to wait and to get on and off of the bus. Striping along the bikeway will alert drivers to watch for people who are getting on or off of a bus.

Existing Conditions: There are high volumes of drivers turning right onto the Redworks Driveway at this intersection. Turning cars create conflicts with people walking and biking across the driveway.

Proposed Improvements: Build a bend-out on the southwest corner of the intersection. This extends the curb to help shorten the crossing for people walking, places the person on a bike in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn.

Existing Conditions: The bus stop in this location should be separated from traffic due to higher traffic volumes. However, there is not space to provide both an bike lane an a bus stop.

Proposed Improvements: Create a bus pullout and raise the bike lane to the height of the curb. The bike lane in this location with serve a dual purpose to allow for people to cross it to get on and off of buses. Striping will signify to people on bikes to slow down and be alert for people who are getting on or off of a bus.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: There is no marked space for people walking to cross Marketplace Avenue. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

Proposed Improvements: Paint high visibility crosswalks across Marketplace Avenue to guide people walking and help alert people driving that people may be walking or biking across the street.

N

0′ 30′ 60′

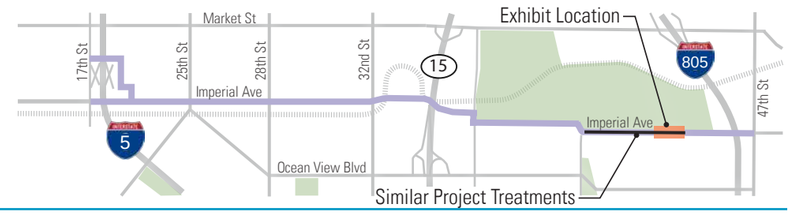


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FIGURE 3

MARKETPLACE AVENUE TO WEST STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: Neighbors and business owners noted that people speed along Imperial Avenue, which can cause an unsafe situation for people trying to cross the street or for people biking who share the lanes with drivers. The wide street width further enables speeding in this area.

Proposed Improvements: Narrow the street by re-purposing one lane in each direction from a driving lane to a bike lane to help slow people down. Creating a physical barrier between the bikeway and the driving lane helps to further calm traffic and provide a comfortable ride for people biking and people driving.

Existing Conditions: The proposed Chollas Creek Bikeway will connect into the Imperial Avenue Bikeway here. People continuing on the Chollas Creek Bikeway will follow the Imperial Avenue Bikeway past I-805 to 47th Street to reconnect with the Chollas Creek path.

Proposed Improvements: Ensure that the bikeway design allows for the Chollas Creek Bikeway to connect in when it is constructed by maintaining the current opening to Chollas Creek.

Existing Conditions: The proposed bend out is located in the space where a bus would normally stop.

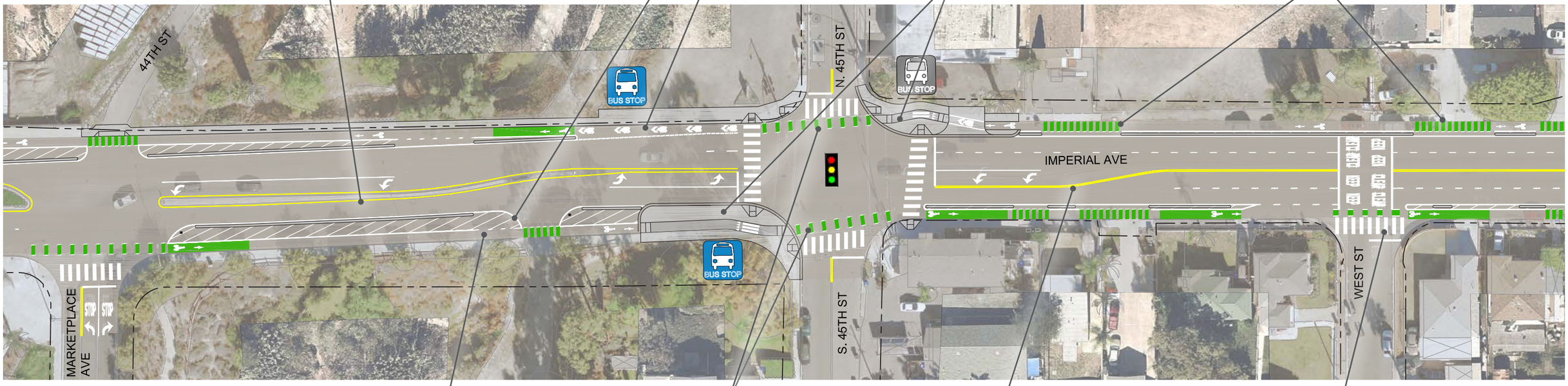
Proposed Improvements: Move the bus stop to the northwest corner of the intersection. Allow the bus to utilize the bike lane to stop outside of the travel lane and maintain traffic flow.

Existing Conditions: There are high volumes of drivers turning right onto 45th Street at this intersection. Turning cars create conflicts with people walking and biking across 45th Street.

Proposed Improvements: Construct a bend-out on the northeast and southwest corners of the intersection. This extends the curb to help shorten the crossing for people walking, places the person on a bike in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn.

Existing Conditions: People riding bikes must cross a driveway. Driveways pose potential conflicts between people biking and people pulling out of the driveway.

Proposed Improvements: Paint the area near or in front of the driveway green to alert both people on bikes and people driving of the need to be cautious at the crossing.



Existing Conditions: There are currently no marked bike facilities along Imperial Avenue, so people biking must share the lane with people driving. This creates a stressful situation for both people biking and driving, especially due to conflicting movements and roadway needs between people biking and people driving, especially considering relatively high driving speeds and volumes here.

Proposed Improvements: Stripe bike lanes with a painted buffer and a physical barrier between the bike lane and the driving lane. The buffer and barrier provides added protection between people biking and people driving. It also helps to narrow the road to help further calm traffic.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

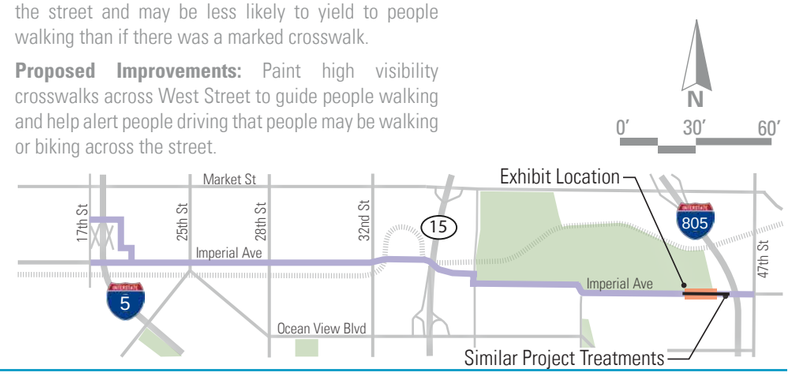
Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: Traffic speeds and volumes are too high between 45th Street and the 805 on-ramp to re-purpose a lane, but it is also a critical link in the Imperial Avenue Bikeway and the Chollas Creek Bikeway. The high speeds and volumes create a stressful condition for people biking and for people driving.

Proposed Improvements: Re-purpose the parking lanes on either side of the street to bike lanes with a physical barrier between the bike lane and the travel lane.

Existing Conditions: There is no marked space for people walking to cross West Street. Because of this, people driving may not be as aware of people crossing the street and may be less likely to yield to people walking than if there was a marked crosswalk.

Proposed Improvements: Paint high visibility crosswalks across West Street to guide people walking and help alert people driving that people may be walking or biking across the street.



IMPERIAL AVENUE BIKEWAY

FIGURE 3

INTERSTATE 805 TO 47TH STREET

EXISTING AND PROPOSED CONDITIONS

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

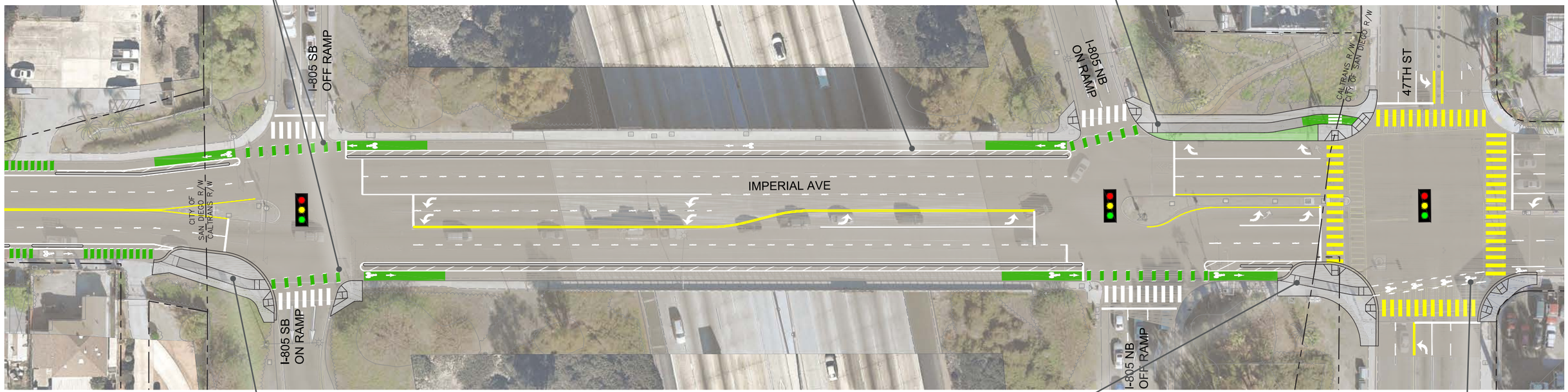
Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.

Existing Conditions: Traffic speeds and volumes are too high between the I-805 on-ramp and 47th Street to re-purpose a lane, but it is also a critical link in the Imperial Avenue Bikeway and the Chollas Creek Bikeway. The high speeds and volumes create a stressful condition for people biking and for people driving.

Proposed Improvements: Narrow the travel lanes to provide space for bike lanes with a physical barrier between the bike lane and the travel lane.

Existing Conditions: There are high volumes of people driving and turning right onto I-805 in this section of Imperial Avenue. The high volumes of people driving make riding a bike on the street uncomfortable. Turning cars create conflicts with people walking and biking across the on-ramp.

Proposed Improvements: Construct a separated bike lane and bend-out on the north side of this segment. This separates people biking from people driving between the intersections, making biking more comfortable and accessible. Additionally, this extends the curb to help shorten the crossing for people walking, places people biking in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn. This also provides a better connection between the Imperial Avenue Bikeway and the future regional bikeway on 47th Street as well as the future Chollas Creek Bikeway.



Existing Conditions: There are high volumes of drivers turning right onto the I-805 on-ramp at this intersection. Turning cars create conflicts with people walking and biking across the on-ramp.

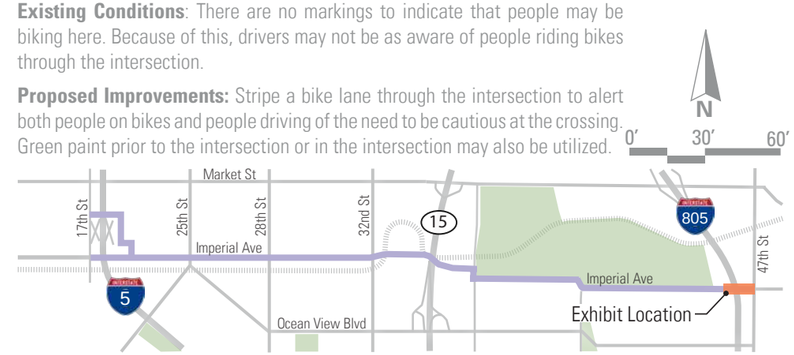
Proposed Improvements: Construct a bend-out on the southwest corner of the intersection. This extends the curb to help shorten the crossing for people walking, places the person on a bike in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn.

Existing Conditions: There are high volumes of drivers turning right onto 47th Street at this intersection. Turning cars create conflicts with people walking and biking across the driveway.

Proposed Improvements: Build a bend-out on the southwest corner of the intersection. This extends the curb to help shorten the crossing for people walking, places the person on a bike in front of drivers who are turning right to provide better visibility, and encourages drivers to slow down or stop when making a right turn.

Existing Conditions: There are no markings to indicate that people may be biking here. Because of this, drivers may not be as aware of people riding bikes through the intersection.

Proposed Improvements: Stripe a bike lane through the intersection to alert both people on bikes and people driving of the need to be cautious at the crossing. Green paint prior to the intersection or in the intersection may also be utilized.



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2.0 TRAFFIC AND SAFETY ASSESSMENT METHODOLOGY

This assessment of safety for people who walk and bike, and of the vehicular traffic conditions is based on the Level of Traffic Stress (LTS) methodology based on the 2012 *Mineta Transportation Institute (MTI) Report 11-19: Low-Stress Bicycling and Network Connectivity*, the *City of San Diego Traffic Impact Study Manual* (1998), and the *City of San Diego Significance Determination Thresholds, Development Services Department* (2011).

2.1 METHODOLOGY FOR ANALYZING SAFETY FOR PEOPLE WHO WALK AND BIKE

The approach was based on the 2012 *Mineta Transportation Institute (MTI) Report 11-19* and uses roadway network data, including posted speed limit, number of travel lanes, and presence and character of bicycle lanes, as a proxy for the comfort level of people who bike. For this analysis, roadway segments and roadway crossings are classified into one of four levels of traffic stress to characterize the actual and perceived safety of roadways for people walking and biking. The lowest level of traffic stress (LTS), LTS 1, is assigned to roads that will be tolerable for most children to ride, as well as to multi-use trails or physically separated bicycle facilities that are restricted for vehicle traffic use. LTS 2 roads are those that could be comfortably ridden by the mainstream adult population. The higher levels of traffic stress, LTS 3 and 4, correspond to types of cyclists who will tolerate higher vehicle traffic volumes and speeds (Geller, 2005). LTS 3 is the level assigned to roads that will be acceptable for current "enthused and confident" cyclists and LTS 4 is assigned to segments that are only acceptable to "strong and fearless" people on bikes. To support use of regional bikeways by people of all ages and abilities, including the Imperial Avenue Bikeway, the bikeway program strives to achieve LTS 1 and LTS 2 wherever possible.

Table 1 and **Table 2** identify the LTS criteria for roadway segments with and without bikeways or bike lanes, respectively. To evaluate the level of traffic stress for people walking or biking along roadway segments in the project area, the analysis takes into account several factors, including the presence or absence of bikeways or bike lanes, the presence or absence of physical separation between a bikeway and the roadway, the presence or absence of a parking lane, the number of travel lanes, the average daily traffic, the speed limit, and how often a bike lane is blocked.

It is important to note that while LTS is a helpful tool in providing a general understanding of conditions for people who walk and bike and in determining project impacts, it does not provide a detailed

understanding of some of the benefits of the project's unique design features and also lacks the nuance to paint a clear picture of what it is like to walk or bike along the project corridor. For example, LTS does not account for unique crossing improvements, pavement conditions, treatments at bus stops, etc. Therefore, it is important to understand the impacts of the changes presented in Section 1.3 of this report in order to develop a holistic understanding of the benefits of this project.

TABLE 1 LEVEL OF TRAFFIC STRESS CRITERIA FOR ROADWAY SEGMENTS WITH BIKEWAYS OR BIKE LANES

Criteria	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Physically Separated Bikeway[1]				
Physical Separation Present	Yes	N/A	N/A	N/A
Bike Lanes Alongside Parking Lanes				
Through Lanes Per Direction	1	N/A	2+	N/A
Bike & Parking Lane Combined Width (feet)	≥ 15	14 to 14.5	≤ 13	N/A
Speed Limit (mph)	≤ 25	30	35	≥ 40
Bike Lane Blockage	Rare	N/A	Frequent	N/A
Average Daily Traffic (ADT)	≤ 5,000	5,001 to 15,000	> 15,000	N/A
Bike Lanes Not Alongside Parking Lanes				
Through Lanes Per Direction	1	2 with median	≥ 2, 2 without median	N/A
Bike Lane Width (feet)	≥ 6	≤ 5.5	N/A	N/A
Average Daily Traffic (ADT)	≤ 5,000	5,001 to 15,000	> 15,000	N/A

Source: 2012 MTI
Note:
1. Physically separated bikeways (Class I or Class IV) automatically receive an LTS score of 1, regardless of other conditions. Since the LTS methodology does not distinguish between physical separation and striped separation, a striped buffer of greater than 2 feet in width is considered physical separation for the LTS analyses.

TABLE 2 LEVEL OF TRAFFIC STRESS CRITERIA FOR ROADWAY SEGMENTS WITHOUT BIKEWAYS OR BIKE LANES

Speed Limit (mph)	2-3 Lanes	4-5 Lanes	≥ 6 Lanes
≤ 25	LTS 1 or 2[1]	LTS 3	LTS 4
30	LTS 2 or 3[1]	LTS 4	LTS 4
≥ 35	LTS 4	LTS 4	LTS 4

Source: 2012 MTI
Notes:
1. The lower LTS values are assigned to residential streets with no centerline striping.

Table 3 and **Table 4** identify the LTS criteria for intersection crossings with and without a median refuge island, respectively. To evaluate the level of traffic stress for people walking or biking across a roadway in the project area, the analysis takes into account the presence or absence of a median refuge island, the number of travel lanes, and the speed limit.

Table 3 and **Table 4** identify the LTS criteria for intersection crossings with and without a median refuge island, respectively. To evaluate the level of traffic stress for people walking or biking across a roadway in the project area, the analysis takes into account the presence or absence of a median refuge island, the number of travel lanes, and the speed limit.

TABLE 3 LEVEL OF TRAFFIC STRESS CRITERIA FOR INTERSECTION CROSSINGS WITHOUT A MEDIAN REFUGE ISLAND

Speed Limit (Street Crossed)	Number of Lanes		
	≤ 3	4-5	≥ 6
≤ 25	LTS 1	LTS 2	LTS 4
30	LTS 1	LTS 2	LTS 4
≥ 35	LTS 2	LTS 3	LTS 4
≥ 40	LTS 3	LTS 4	LTS 4

Source: 2012 MTI

TABLE 4 LEVEL OF TRAFFIC STRESS CRITERIA FOR INTERSECTION CROSSINGS WITH A MEDIAN REFUGE ISLAND

Speed Limit (Street Crossed)	Number of Lanes		
	≤ 3	4-5	≥ 6
≤ 25	LTS 1	LTS 1	LTS 2
30	LTS 1	LTS 2	LTS 3
≥ 35	LTS 2	LTS 3	LTS 4
≥ 40	LTS 3	LTS 4	LTS 4

Source: 2012 MTI
Notes:
Physically separated bikeways automatically receive an LTS score of 1, regardless of other conditions. Since the LTS methodology does not distinguish between physical separation and striped separation, a striped buffer of greater than 2 feet in width is considered equal to physical separation for the LTS analyses.
For signalized intersections, the presence of a pedestrian or bicycle exclusive phase automatically receives an LTS of 1.

COLLISIONS INVOLVING PEOPLE WALKING OR BIKING

Collisions involving people walking or biking were assessed as a part of the analysis of the Existing Conditions Without the Project scenario. Collision data was collected from the Statewide Integrated Traffic Records System (SWITRS) of the State of California, maintained by the California Highway Patrol. Collision data was assessed for the corridors and intersections within the project area from 2012 to 2016, the most recent data available. Collisions being assessed included collisions of people who walk and bike with automobiles or fixed objects, identifying injuries and deaths associated with these collisions.

2.2 VEHICULAR TRAFFIC METHODOLOGY

The vehicular traffic operations study methodology and analysis are consistent with the *City of San Diego Traffic Impact Study Manual, 1998* and *City of San Diego Significance Determination Thresholds, 2011*.

Four study scenarios were analyzed. Intersections were analyzed for the morning peak period (7:00 AM to 9:00 AM) and evening peak period (4:00 PM to 6:00 PM). The intersection analysis is based on the busiest one hour of traffic during each peak period. The roadway segment analysis examines daily roadway capacity over a 24-hour period. The four scenarios assessed are:

- Existing Conditions without the Project ("Existing Without Project")
- Existing Conditions with the Project ("Existing With Project")

- Future (2022) Conditions without the Project ("Future Without Project")
- Future (2022) Conditions with the Project ("Future With Project")

A combination of traffic modeling based on observed traffic counts and SANDAG's Series 13 Regional Growth Forecast (SANDAG 2010) was used to determine the traffic volumes for each study scenario.

The methodologies used to calculate roadway segment and intersection traffic are described in section 2.3, and the process by which intersections and roadway segments were selected for vehicular traffic analysis is described in section 2.4. A field review was also conducted to determine the existing intersection and roadway segment capacities. The field review identified existing intersection geometry, traffic control devices, and traffic signal phasing.

The traffic modeling uses regional forecasts (SANDAG's Series 13 Regional Growth Forecast) of population, housing, land use, and economic growth based on local jurisdiction land use plans and input, along with roadway capacities, to estimate future traffic volumes on roadways in the project area. The project is expected to be completed by Year 2022 or roughly seven (7) years from the time that traffic volumes in the project corridor were studied. As such, the analysis evaluates 2022 traffic volume data to show how the proposed project will affect future traffic conditions once it is built. An average annual growth rate of 0.45% for intersections within the project corridor was determined based on a comparison of Base Year 2012 and future Year 2022 volumes (**Appendix F**).

TRAFFIC MODELING LIMITATIONS

When estimating future traffic volumes with implementation of the proposed project, the methodology does not assume any future trips will change from other travel modes (e.g., driving, transit, carpool) to biking or walking. While research indicates that the proposed project will encourage people to shift from other travel modes to biking or walking, sufficient data is not available to provide a transportation model that could accurately quantify reductions in future vehicle trips associated with implementation of the proposed project. As a result, the analysis of future vehicle traffic volumes does not assume any mode shift as a result of the proposed project implementation. Therefore, this analysis likely overestimates future traffic volumes and future vehicle delay as a result of the proposed project.

2.3 METHODOLOGIES FOR INTERSECTION AND ROADWAY SEGMENT CAPACITY ANALYSIS

The operations of roadway facilities are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. The methodology for signalized and unsignalized intersection analysis is described below.

INTERSECTION AND ROADWAY COUNT METHODOLOGY

Intersection turning movement counts involved the use of video counters to determine the total number of vehicles entering and exiting an intersection by movement (e.g., turning, through) during the weekday morning peak period from 7:00 AM to 9:00 AM and evening peak period from 4:00 PM to 6:00 PM. Segment counts involved laying tubes across roadway segments to count the number of vehicles during a 24-hour cycle. Intersection turning movement and roadway segment volumes were collected in 2015 and 2017. For the volumes obtained prior to 2017, an annual growth factor of 0.45% was applied to increase volumes to Year 2017 levels. **Appendix B** contains the individual intersection and roadway segment traffic counts.

METHODOLOGIES FOR INTERSECTION CAPACITY AND ROADWAY SEGMENT ANALYSIS

The analysis of intersection operations performed for this study is based upon procedures presented in the HCM, published by the Transportation Research Board in 2000 and 2010. Due to the HCM 2010's limitations with unique signal timings (e.g. custom phasing, exclusive pedestrian phases), the HCM 2000 methodology was applied at two intersections. Consistent with City of San Diego guidelines, LOS A through LOS D conditions meet the operational criteria (*Traffic Impact Study Manual, City of San Diego, July 1998*).

The City standard for intersection operations is *not* met if implementation of the proposed project causes one of the following criteria to be met:

1. An intersection operating at LOS D or better under existing or future conditions without the project worsens to LOS E or F with the proposed project, or
2. The delay at an intersection operating at LOS E or F without the proposed project increases by more than 2.0 and 1.0 seconds, respectively, because of the proposed project.

Signalized Intersections

Signalized study intersections were analyzed according to the method described in the 2010 Highway Capacity Manual (HCM). This LOS method analyzes a signalized intersection's operation based on average control delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using the Synchro 9.0 analysis software. The LOS criteria used for the analysis are described in **Table 5**, identifying the thresholds of control delays and the associated LOS. The intersection analysis assumes optimization of signal timings and splits (i.e., the amount of time allocated to each approach) to some intersections in the future conditions.

TABLE 5
SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay (seconds/vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	<10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	>10– 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20 – 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	>35– 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	>55 – 80
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	>80

Source: *Highway Capacity Manual*, Transportation Research Board, 2010

Unsignalized Intersections

Control delay for unsignalized intersections is based upon geometric design of intersections and the interactions of motor vehicles. Two unsignalized intersection types can be assessed by the HCM 2010 methodologies: all-way stop-controlled intersections and minor-street stop-controlled intersections.

All-Way Stop Controlled

The HCM 2010 method for analyzing all-way stop-controlled intersections is based on conflicting traffic for motor vehicles stopped at an intersection. Average control delay is calculated using a weighted average of the delays by volume distributed across all motor vehicles entering the intersection.

Minor-Street or Side-Street Stop Controlled

The HCM 2010 method for analyzing minor-street stop-controlled intersections is based on the concept of gap acceptance and the presence of conflicting traffic for motor vehicles stopped on the minor street approaches. Control delay and level of service for the "worst" approaches are reported, as opposed to average intersection LOS and delay.

The average approach delay for unsignalized intersections is calculated using Synchro 9.0 analysis software and is correlated to a LOS designation as shown in **Table 6**.

TABLE 6
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay (seconds/vehicle)
A	Little or no delay.	≤ 10.0
B	Short traffic delay.	<10.1- 15.0
C	Average traffic delays.	<15.1- 25.0
D	Long traffic delays.	<25.1- 35.0
E	Longer traffic delays.	<35.1- 50.0
F	Longest traffic delays with intersection capacity exceeded.	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2010

Roadway Segment Analysis

The roadway segment capacity analysis identifies the LOS scores for each roadway segment in the project corridor. It does so by comparing the design capacity of each roadway as determined by the City of San Diego planning documents with the existing or future traffic volumes that occur or are expected to occur on that roadway segment. This volume-to-capacity (V/C) analysis then uses City of San Diego criteria (provided in **Appendix C**) to determine the LOS score for each roadway segment based on the comparison of volume to capacity. A two-part analysis is performed to determine whether the proposed project meets City of San Diego criteria for traffic conditions on roadway segments.

Roadway Segment Analysis: Part 1

First, the V/C analysis is performed to determine whether the proposed project will result in:

- Traffic conditions on any roadway segment to worsen from LOS D or better without the proposed project to LOS E or LOS F with the proposed project.
- A V/C ratio increase of more than 0.02 for LOS E roadway segments or 0.01 for LOS F roadway segments.

If a proposed project does not result in one of the above scenarios, then traffic conditions on that roadway meet the City of San Diego standards and no further analysis is required. If, however, a proposed project results in one of the scenarios described in Part 1, then a secondary analysis may be performed.

Roadway Segment Analysis: Part 2

The analysis considers the following three additional factors to determine traffic conditions along the study segment:

- if the intersections at each end of the segment will operate at LOS D or higher with the project (using the intersection criteria described in **Section 2.3**),
- if traffic conditions along the segment will operate at LOS D or better based on an arterial analysis with the project during the AM and PM peak hours, and
- if the proposed street classification is consistent with the adopted Community Plan for the area.

If all three criteria are satisfied, then traffic conditions along the roadway segment meet City of San Diego standards. If any of the three criteria are not satisfied, then traffic conditions along the roadway segment do not meet City of San Diego standards.

2.4 INTERSECTION AND ROADWAY SEGMENT STUDY LOCATIONS

The major operational change within the Imperial Avenue Bikeway is removal of travel lanes in each direction and the center left-turn pockets at intersections. Since signalized intersections typically serve higher traffic volumes than unsignalized intersections and some signalized intersections include separate left-turn phasing, all signalized intersections with proposed left-turn removal along the corridor were analyzed. In addition, a representative sample of unsignalized intersections was also analyzed in this impact assessment since the elimination of separate left-turn lanes could affect delay for movements controlled by stop signs on the cross streets of Imperial Avenue. The process for selecting unsignalized intersections and roadway segments to analyze is described below.

Based on empirical evidence and field review, many of the unsignalized intersections and roadway segments along Imperial Avenue exhibit levels of service that meet the City standard, even during the peak hours. In turn, these unsignalized intersections and roadway segments are comparable in characteristics (e.g. intersection and roadway configuration, adjacent land uses, etc.) to many adjacent unsignalized intersections and segments along the corridor. Because of the observed levels of service that meet the City standard at key locations, and comparable characteristics between them and many adjacent locations, a study of every unsignalized intersection and roadway segment within the project area is not needed. Rather, a sample of unsignalized intersections and roadway segments was chosen where the project most altered the lane configurations. With implementation of the proposed project, unsignalized intersections and roadway segments not included in the analysis will perform equal to or better than those included in the analysis due to traffic volumes that are equal to or lower than those analyzed with similar traffic control devices, capacity, and lane configurations.

The 31 study intersections are as follows:

1. 19th St & J St
2. 17th St & Imperial Ave
3. 19th St & Imperial Ave
4. 20th St & Imperial Ave
5. 21st St & Imperial Ave
6. 22nd St & Imperial Ave
7. 24th St & Imperial Ave
8. 25th St & Imperial Ave
9. 26th St & Imperial Ave
10. 27th St & Imperial Ave
11. Evans St & Imperial Ave
12. Hensley St & Imperial Ave
13. 28th St & Imperial Ave
14. 29th St & Imperial Ave
15. 30th St & Imperial Ave
16. 31st St & Imperial Ave

17. 32nd St & Imperial Ave
18. 33rd St & Imperial Ave
19. Francis St & Imperial Ave
20. 36th St & Imperial Ave (N)
21. 36th St & Imperial Ave (S)
22. 40th St & Imperial Ave
23. Messina Way & Imperial Ave
24. Edgefield Way & Imperial Ave
25. Redworks Driveway & Imperial Ave
26. Marketplace Avenue & Imperial Ave
27. 45th St & Imperial Ave
28. West St & Imperial Ave
29. I-805 SB Ramps & Imperial Ave
30. I-805 NB Ramps & Imperial Ave
31. 47th St & Imperial Ave

The 17 roadway segments studied are as follows:

1. Imperial Avenue between 17th Street & 19th Street
2. Imperial Avenue between 19th Street & 21st Street
3. Imperial Avenue between 21st Street & 25th Street
4. Imperial Avenue between 25th Street & 28th Street
5. Imperial Avenue between 28th Street & 30th Street
6. Imperial Avenue between 30th Street & 32nd Street
7. Imperial Avenue between 32nd Street & 33rd Street
8. Imperial Avenue between 33rd Street & Francis Street
9. Imperial Avenue between Francis Street & 36th Street
10. Imperial Avenue between Southlook Avenue & 37th Street
11. Imperial Avenue between 38th Street & 39th Street
12. Imperial Avenue between 40th Street & Edgefield Way
13. Imperial Avenue between Edgefield Way & the Redworks Driveway
14. Imperial Avenue between the Redworks Driveway & 45th Street
15. Imperial Avenue between 45th Street & West Street
16. Imperial Avenue between West Street & I-805 southbound ramps
17. Imperial Avenue between I-805 southbound ramps & I-805 northbound ramps

Figure 4 shows the location of the intersections and roadway segments analyzed in this traffic and safety impact assessment.

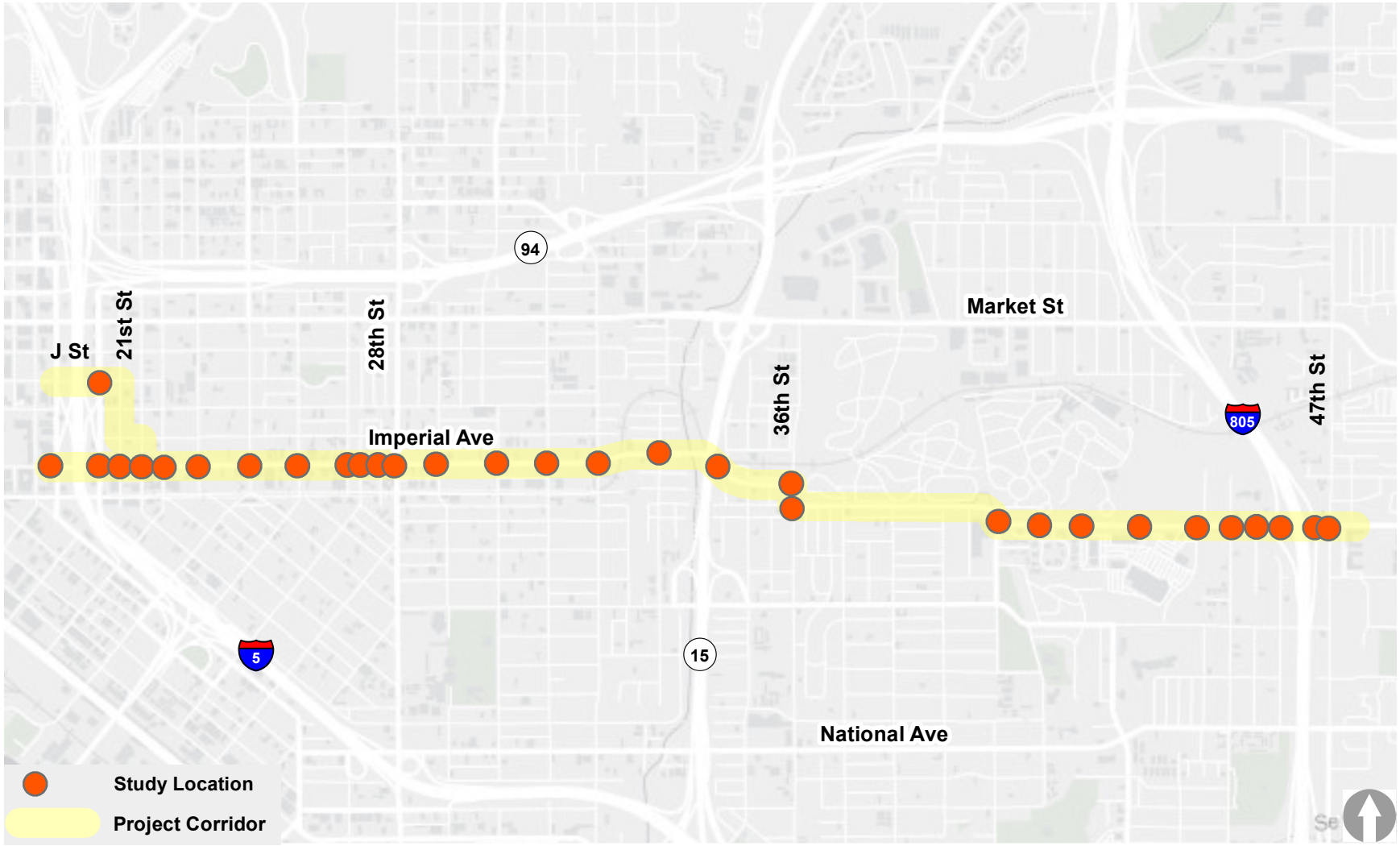

Figure 4

Imperial Avenue Bikeway Study Locations

3.0 EXISTING CONDITIONS WITH AND WITHOUT THE PROJECT

This chapter describes safety conditions for people who walk and bike as well as the vehicle traffic conditions (at roadway segments and intersections) under the Existing Conditions Without the Project and Existing Conditions With the Project scenarios.

3.1 EXISTING CONDITIONS WITHOUT THE PROJECT

This section describes existing conditions for intersections and roadway segments in the project corridor, including existing facilities and collision history for people who walk and bike, and vehicular traffic conditions including volumes, intersection turning movements, roadway classifications, and traffic control devices (e.g., traffic signals, stop signs).

BICYCLE FACILITIES AND COLLISION HISTORY

Imperial Avenue is designated as a Class III bike route between 22nd Street and 32nd Street and a Class II bike lane between Messina Way and 45th Street according to the SANDAG Regional Bike Plan. Existing Class II bike lanes intersect the Imperial Avenue project corridor at 22nd Street, 28th Street, and 32nd Street.

Under existing conditions, the level of stress for the Imperial Avenue project corridor is classified as LTS 4 based on the information in **Table 1**. The roadway is posted with a 30-mph speed limit and includes a two- to four-lane cross-section.

Collisions Involving People on Bikes

Data from the Statewide Integrated Traffic Records System (SWITRS) was obtained to assess the collision history within the corridor. SWITRS is a database that serves to collect and process data gathered from a collision scene. Within the Imperial Avenue project corridor, a total of 12 collisions involving people on bikes occurred during the five-year period from 2012 to 2016, which is the latest year for which complete SWITRS data are available. This total resulted in an average of 2.4 collisions each year, although the highest number of reported collisions in a given year was four, which occurred in 2013. Of the five-year total, one of the collisions resulted in someone dying, two resulted in someone suffering severe injuries, and 9 collisions resulted in someone suffering some other type of injury. The collision that resulted in the death of a person

riding a bike occurred at Imperial Avenue and Messina Way in 2015. **Figure 5** shows the location of bicycle collisions on Imperial Avenue.

WALKING FACILITIES AND COLLISION HISTORY

Sidewalks, Curb Ramps, Crosswalks and Curb Extensions

Existing conditions without the proposed Imperial Avenue project in place were assessed for the presence of connected and continuous well-maintained sidewalks, curb ramps, and street crossings. Existing crosswalks are more frequent at four-way intersections west of State Route 15 on Imperial Avenue, and none are provided across Imperial Avenue between 36th Street and Redworks Driveway. Well-maintained curb ramps are located at all signalized intersections and most unsignalized intersections throughout the Imperial Avenue project corridor. Continuous sidewalks exist throughout the project corridor, with the exception that no sidewalk is provided on the north side of the roadway between 36th Street and Redworks Driveway.

Under existing conditions, the level of stress for the Imperial Avenue project corridor is classified as LTS 4 based on the information in **Table 1**. The roadway is posted with a 30-mph speed limit and includes a two- to four-lane cross-section.

Collisions Involving People Walking

A total of 35 collisions involving people who were walking occurred along the Imperial Avenue project corridor during the five-year period from 2012 to 2016 (the latest dataset available), or an average of 7.0 collisions each year. In the year with the highest total, 2015, 12 collisions were reported. Of the five-year total, three of these collisions resulted in someone dying, five resulted in someone suffering severe injuries, and 27 resulted in someone suffering some other type of injury. The three collisions that resulted in someone who was walking being killed occurred at Imperial Avenue and Interstate 5 in 2013, Imperial Avenue at 33rd Street in 2014, and Imperial Avenue at 32nd Street in 2016. **Figure 6** shows the location of pedestrian collisions along the project corridor.

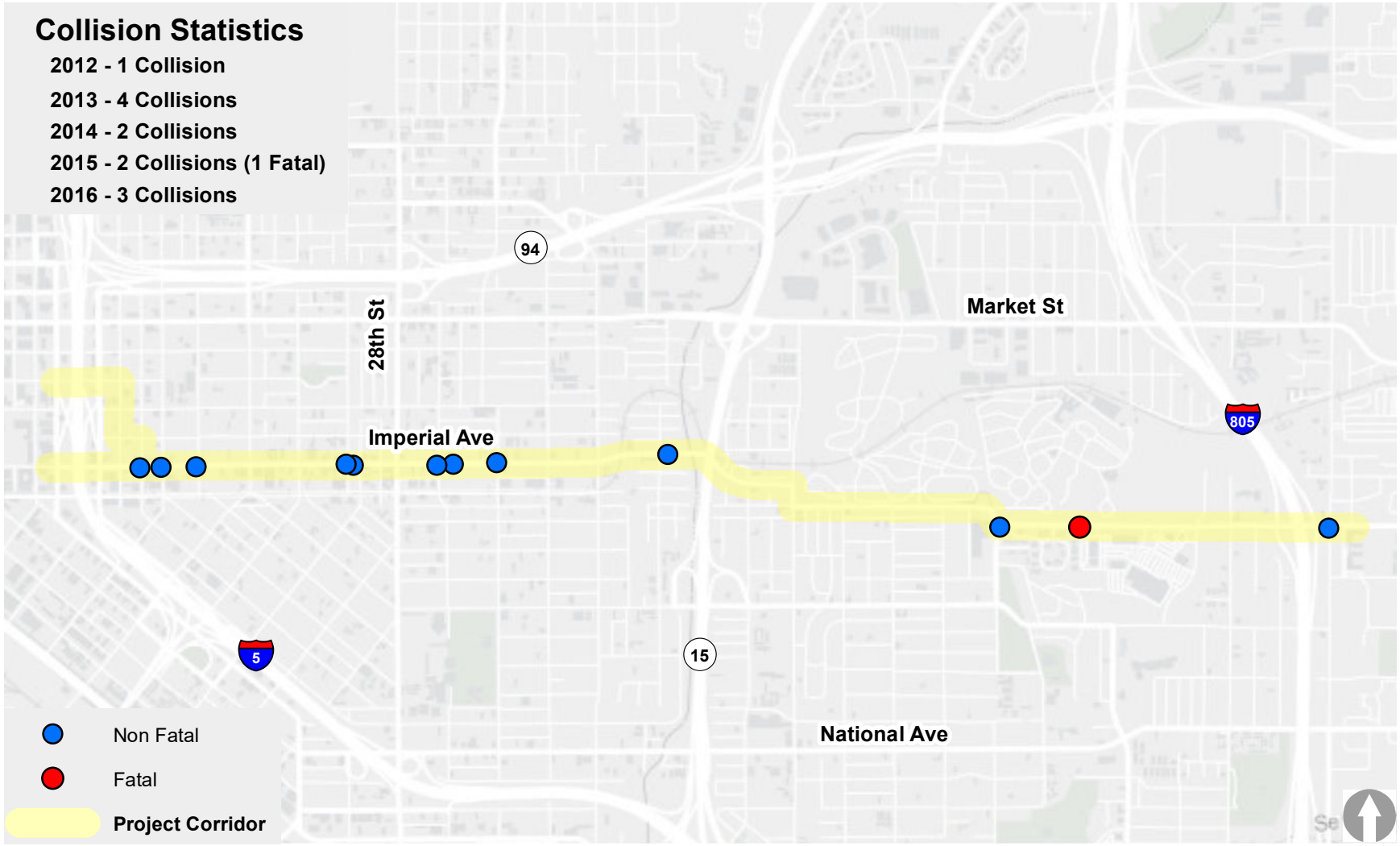

Figure 5

Imperial Avenue Bicycle Collisions (2012 - 2016)

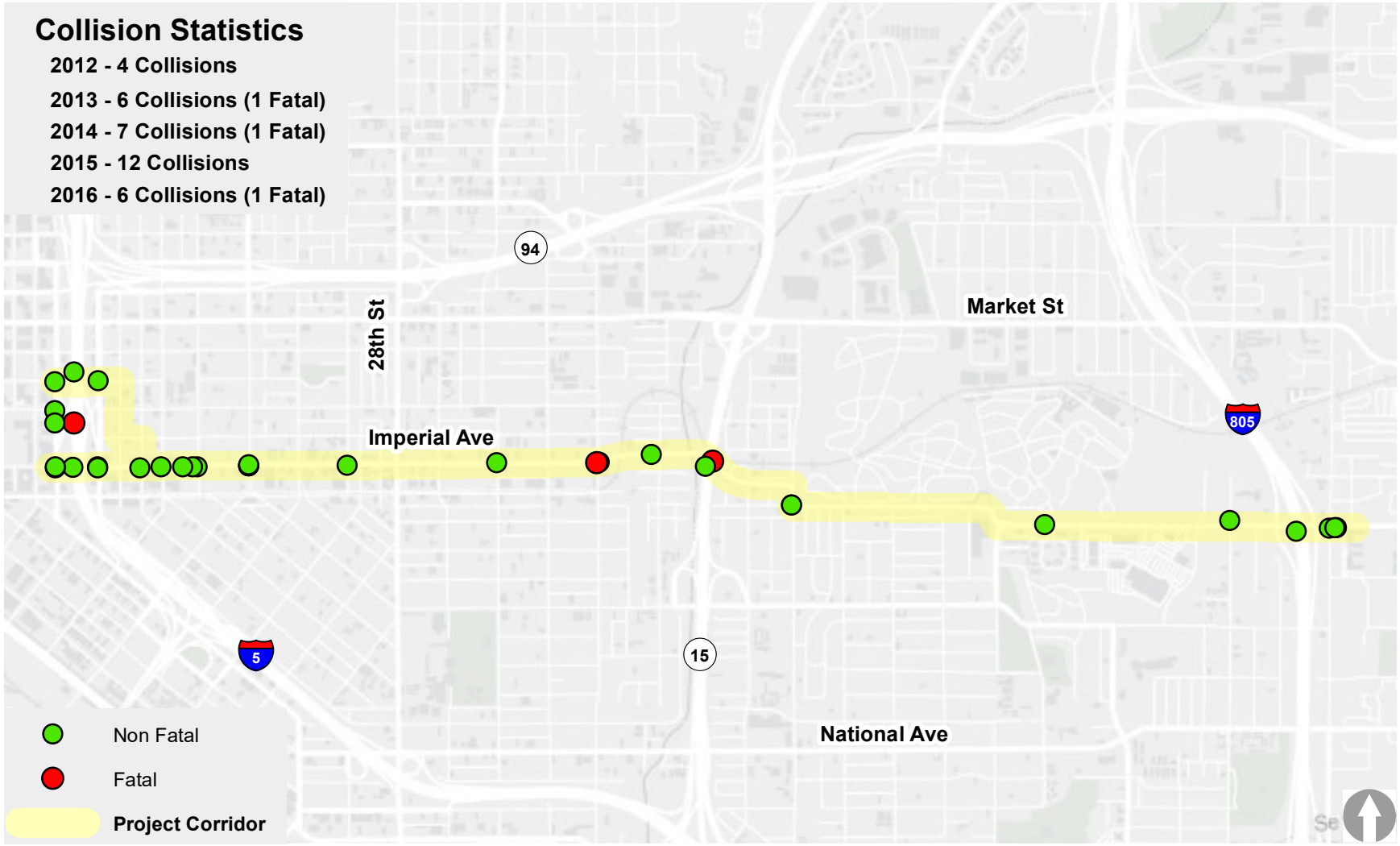

Figure 6

Imperial Avenue Pedestrian Collisions (2012 - 2016)

VEHICULAR TRAFFIC CONDITIONS

This section describes the Existing without Project condition for intersections and roadway segments along the project corridor, including existing vehicle traffic volumes and levels of service, intersection turning movements, roadway classifications, and traffic control devices (e.g., traffic signals, stop signs).

Roadway Network

The study roadways included in the vehicular operations analysis are described briefly below. The description includes the physical characteristics, adjacent land uses, and traffic control devices along these roadways.

Imperial Avenue is an east-west roadway that functions as a two-lane collector with a center left turn lane between 19th Street and 32nd Street, as a four-lane collector between 17th Street and 19th Street, as well as between 32nd Street and Gillette Street, a two-lane collector between Gillette Street and 40th Street, and a 4-lane major arterial between 40th Street and 47th Street. Imperial Avenue extends between Park Boulevard and the Lemon Grove city limit. East of the limit, Imperial Avenue is designated as Lemon Grove Avenue and terminates at North Avenue. Imperial Avenue provides direct east-west access to a number of local destinations including Petco Park, Imperial Marketplace, and Lincoln High School. Imperial Avenue has existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees on both sides, with the exception that no sidewalk is provided on the north side of the roadway between 36th Street and Redworks Driveway. Within the project corridor, Imperial Avenue is designated as a Class III bike route between 22nd Street and 32nd Street and a Class II bike lane between Messina Way and 45th Street. Driveways exist along the roadway and parallel parking is allowed on both sides of Imperial Avenue between 19th Street and Francis Street as well as between 45th Street and 47th Street, and parallel parking is also allowed on the south side of the street between 36th Street and Ada Street. The posted speed limit is 30 mph.

17th Street is a north-south roadway that is two- to three-lane collector and extends between Logan Avenue and B Street, with a break between F Street and E Street. In the vicinity of the project, 17th Street is one-way in the southbound direction and provides access to I-5 southbound and a mix of commercial and residential facilities. 17th Street contains existing curbs, sidewalks, pedestrian-scale lighting, and intermittent landscaped parkway strips and street trees along the west side of the roadway. Parallel parking is allowed on both sides of 17th Street north of K Street and in front of the Neil Good Day Center. In the absence of a posted speed, the limit is 25 mph.

19th Street is a one-way northbound roadway that is a one- to three-lane local street and extends between Kearney Avenue and B Street, with a break between G Street and E Street. Near the project corridor, 19th

Street provides access to I-5 northbound and residential development. 19th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 19th Street. The posted speed limit is 25 mph.

J Street is an east-west roadway that is a two-lane local street and extends discontinuously between 2nd Avenue and Gavin Street. Near the project corridor, J Street provides access to a mix of commercial and residential facilities. J Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of J Street. In the absence of a posted speed, the limit is 25 mph.

20th Street is a north-south roadway that is a two-lane local street and extends between Commercial Street and B Street, with a break between G Street and E Street. Near the project corridor, 20th Street serves primarily single-family residences to the north and mixed use to the south. 20th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. A combination of head-in angle and parallel parking is provided on both sides of 20th Street. In the absence of a posted speed, the limit is 25 mph.

L Street is an east-west roadway that is a two-lane local street and extends discontinuously between 5th Avenue and 36th Street. Near the project corridor, L Street serves primarily single-family residences. L Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of L Street. L Street from 20th Street to 32nd Street is an existing bike route. In the absence of a posted speed, the limit is 25 mph.

21st Street is a north-south roadway that is a two-lane local street and extends between Julian Avenue and B Street, with a break between G Street and F Street. Near the project corridor, 21st Street serves primarily single-family residences to the north and mixed use to the south. 21st Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 21st Street. The posted speed limit is 25 mph.

22nd Street is a north-south roadway that is a two-lane local street and extends between Beardsley Street and A Street. Near the project corridor, 22nd Street serves primarily single-family residences as well as the Sherman Elementary School to the north and mixed use to the south. 22nd Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 22nd Street. 22nd Street is an existing bike route. The posted speed limit is 25 mph.

24th Street is a north-south roadway that is a two-lane local street and extends between Commercial Street and Russ Boulevard, with a break between G Street and F Street. Near the project corridor, 24th Street serves

primarily single-family residences as well as the Sherman Elementary School to the north and mixed use to the south. 24th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 24th Street. In the absence of a posted speed, the limit is 25 mph.

25th Street is a north-south roadway that is a four-lane collector and extends between Commercial Street and Golden Hill Drive. 25th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Near the project corridor, 25th Street serves primarily single-family residences to the north and the 25th Street/Commercial Street trolley stop to the south. Parallel parking is allowed on both sides of 25th Street. The posted speed limit is 25 mph.

26th Street is a north-south roadway that is a two-lane local street and extends between Commercial Street and Pershing Drive, with a break between G Street and F Street. Near the project corridor, 26th Street serves primarily single-family residences as well as Albert Einstein Middle School and Grant Hill Neighborhood Park to the north and mixed use to the south. 26th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 26th Street. The posted speed limit is 25 mph.

27th Street is a north-south roadway that is a two-lane local street and extends between Commercial Street and Russ Boulevard, with a break between G Street and Treat Street. Near the project corridor, 27th Street serves primarily single-family residences as well as Grant Hill Neighborhood Park to the north and mixed use to the south. 27th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 27th Street. The posted speed limit is 25 mph.

Evans Street is a north-south roadway that is a two-lane local street and extends between Commercial Street and L Street. South of Commercial Street, S Evans Street is a northeast-southwest roadway that extends to Main Street, with a break between Kearney Avenue and Logan Avenue. Near the project corridor, Evans Street serves primarily single-family residences to the north and mixed use to the south. Evans Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on the east side of the roadway, and a combination of head-in angle parking and parallel parking is allowed on the west side. In the absence of a posted speed, the limit is 25 mph.

Hensley Street is a north-south roadway that is a two-lane local street and extends between Commercial Street and L Street. Near the project corridor, Hensley Street serves primarily single-family residences to the north and mixed use to the south. Hensley Street contains existing curbs, sidewalks, and intermittent

landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on the west side of the roadway, and a combination of head-in angle parking and parallel parking is allowed on the east side. In the absence of a posted speed, the limit is 25 mph.

28th Street is a north-south roadway that is a two-lane collector and extends between Harbor Drive and Date Street. Near the project corridor, 28th Street serves primarily single-family residences to the north and mixed use to the south. 28th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 28th Street.

29th Street is a north-south roadway that is a two-lane local street and extends discontinuously between Main Street and University Avenue. Near the project corridor, 29th Street serves primarily single-family residences as well as Kimbrough Elementary School to the north and mixed use to the south. 29th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 29th Street. In the absence of a posted speed, the limit is 25 mph.

30th Street is a north-south roadway that is a two-lane collector and extends between Main Street and Adams Avenue, with a break between Boston Avenue and Newton Avenue. Near the project corridor, 30th Street serves primarily single-family residences to the north and mixed use to the south. 30th Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 30th Street. The posted speed limit is 25 mph.

31st Street is a north-south roadway that is a two-lane local street and extends discontinuously between Main Street and University Avenue. Near the project corridor, 31st Street serves primarily single-family residences as well as King Chavez Preschool to the north and mixed use to the south. 31st Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 31st Street. The posted speed limit is 25 mph.

32nd Street is a north-south roadway that is a two-lane collector and extends discontinuously between Surface Navy Boulevard and Collier Avenue. Near the project corridor, 32nd Street serves primarily single-family residences to the north and the 32nd Street/Commercial Street trolley stop to the south. 32nd Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 28th Street. 32nd Street is an existing bike route. The posted speed limit is 25 mph.

33rd Street is a north-south roadway that is a two-lane local street and extends discontinuously between National Avenue and Collier Avenue. Near the project corridor, 33rd Street serves primarily single-family

residences to the north and mixed use to the south. 33rd Street contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of 33rd Street. The posted speed limit is 25 mph.

Francis Street is a north-south roadway that is a two-lane local street and extends between Imperial Avenue and L Street. Near the project corridor, Francis Street serves primarily single-family residences. Francis Street contains existing curbs and sidewalks along the roadway. Parallel parking is allowed on both sides of Francis Street. In the absence of a posted speed, the limit is 25 mph.

36th Street is a north-south roadway that is a two-lane local street north of the corridor and a two-lane collector south of the corridor with left turn pockets at Imperial Avenue. 36th Street extends between Acacia Street and Market Street. At 36th Street, Imperial Avenue jogs approximately 300 feet, such that a vehicle traveling eastbound will turn right to travel south on 36th Street before turning left to continue west on Imperial Avenue. Near the project corridor, 36th Street serves primarily single-family residences to the south and does not have fronting property to the north. 36th Street contains existing curbs and sidewalks along the roadway. Parallel parking is allowed on both sides of 36rd Street south of the project corridor. The posted speed limit is 25 mph north of the project corridor and 30 mph south of the project corridor.

40th Street is a north-south roadway that is a four-lane collector with a left turn pocket at Imperial Avenue. 40th Street extends discontinuously between C Street and Division Street. Near the project corridor, 40th Street serves the Cypress View Mausoleum as well as Mountain View Park to the south. 40th Street contains existing curbs and sidewalks along the roadway. Parallel parking is allowed on both sides of 40rd Street. The posted speed limit is 25 mph.

Messina Way is a north-south roadway that is a two-lane local street and extends between Messina Drive and Imperial Avenue. Messina Way provides access to the Town & Country Village multi-family residential community. Messina Way contains existing curbs and sidewalks along the roadway. Parking is prohibited on both sides of Messina Way. In the absence of a posted speed, the limit is 25 mph.

Edgefield Way is a north-south roadway that is a two-lane driveway into Imperial Marketplace, a commercial shopping center. Edgefield Way contains existing curbs and sidewalks along the roadway. Parking is prohibited on both sides of Edgefield Way.

Redworks Driveway is a north-south roadway that is a two-lane driveway with a left- and right-turn pocket for Imperial Marketplace, a commercial shopping center. Redworks Driveway contains existing curbs along the roadway, but not sidewalks. Parking is prohibited on both sides of Redworks Driveway.

Marketplace Avenue is a north-south roadway that is a two-lane collector with center left turn lanes and extends between Ocean View Boulevard and Imperial Avenue. Marketplace Avenue serves Imperial Marketplace, a commercial shopping center. Marketplace Avenue contains existing curbs along the roadway, with a sidewalk on the west side and a meandering path through landscaping and street trees on the east. Parking is prohibited on both sides of Marketplace Avenue. In the absence of a posted speed, the limit is 25 mph.

45th Street is a north-south roadway that is a two-lane collector and extends between Mayberry Street and Hilltop Drive, with a break between Imperial Avenue and Market Street. Near the project corridor, 45th Street serves single family residences to the south and the Jackie Robinson Family YMCA to the north. 45th Street contains existing curbs and sidewalks along the west side of the roadway. Parallel parking is allowed on the west side of 40rd Street to the south of the project corridor. The posted speed limit is 30 mph.

West Street is a north-south roadway that is a two-lane local street and extends for nearly 900 feet south of Imperial Avenue, ending in a cul-de-sac. West Street serves single-family residences and contains existing curbs along the roadway as well as a sidewalk on the west side of the street. Parallel parking is allowed on both sides of West Street. In the absence of a posted speed, the limit is 25 mph.

47th Street is a north-south roadway that is a four-lane collector with a center left turn lane and transitions to a two-lane collector with a center left turn lane north of the project corridor. 47th Street extends between Scott Drive and Chollas Parkway. Near the project corridor, 47th Street serves two elementary schools to the south and single- and multi-family residences to the north. 47th Street contains existing curbs and sidewalks along the roadway. Parallel parking is allowed on the east side of 47rd Street to the south of the project corridor. The posted speed limit is 30 mph north of the project corridor and 40 mph south of the project corridor.

Intersection Level of Service

Existing Without Project morning and evening peak period LOS for the 31 intersections in the project area are shown in **Table 7**. The intersection analysis worksheets for the Existing without Project condition are provided in **Appendix D**. As shown in **Table 7,** most intersections meet the City's minimum LOS D levels during the AM and PM peak hours. One (1) locations operates below the City standard during the AM peak hour: 47th Street & Imperial Avenue (LOS E). The LOS E operations at this intersection can be attributed to the short amount of green time provided to the northbound left turn movement relative to the demand, which results in delays on the order of minutes for this movement.

TABLE 7
INTERSECTION LEVEL OF SERVICE RESULTS FOR EXISTING WITHOUT PROJECT

Intersection	Traffic Control	Peak Hour	Existing Without Project Conditions	
			Delay (sec/veh)[1]	LOS[2,3]
1. 19th St & J St	AWSC	AM	9.6	A
		PM	16.6	C
2. 17th St & Imperial Ave	Signalized	AM	17.7	B
		PM	11.9	B
3. 19th St & Imperial Ave	Signalized	AM	13.0	B
		PM	9.3	A
4. 20th St & Imperial Ave	SSSC	AM	16.2	C
		PM	19.2	C
5. 21st St & Imperial Ave	SSSC	AM	19.8	C
		PM	22.8	C
6. 22nd St & Imperial Ave	AWSC	AM	13.5	B
		PM	16.2	C
7. 24th St & Imperial Ave	SSSC	AM	16.1	C
		PM	17.9	C
8. 25th St & Imperial Ave	Signalized	AM	10.1	B
		PM	13.0	B
9. 26th St & Imperial Ave	SSSC	AM	23.3	C
		PM	17.8	C
10. 27th St & Imperial Ave	SSSC	AM	14.5	B
		PM	13.4	B
11. Evans St & Imperial Ave	SSSC	AM	17.6	C
		PM	15.5	C
12. Hensley St & Imperial Ave	SSSC	AM	13.9	B
		PM	14.9	B

TABLE 7
INTERSECTION LEVEL OF SERVICE RESULTS FOR EXISTING WITHOUT PROJECT

Intersection	Traffic Control	Peak Hour	Existing Without Project Conditions	
			Delay (sec/veh)[1]	LOS[2,3]
13. 28th St & Imperial Ave	Signalized	AM	10.3	B
		PM	11.0	B
14. 29th St & Imperial Ave	SSSC	AM	18.4	C
		PM	17.1	C
15. 30th St & Imperial Ave	Signalized	AM	6.6	A
		PM	13.9	B
16. 31st St & Imperial Ave	Signalized	AM	5.9	A
		PM	5.2	A
17. 32nd St & Imperial Ave	Signalized	AM	30.5	C
		PM	16.0	B
18. 33rd St & Imperial Ave	Signalized	AM	8.8	A
		PM	7.4	A
19. Francis St & Imperial Ave	AWSC	AM	15.0	B
		PM	10.8	B
20. 36th St & Imperial Ave (N)	Signalized	AM	43.1	D
		PM	38.2	D
21. 36th St & Imperial Ave (S)*	Signalized	AM	35.9	D
		PM	21.9	C
22. 40th St & Imperial Ave	Signalized	AM	13.3	B
		PM	12.4	B
23. Messina Way & Imperial Ave	SSSC	AM	10.5	B
		PM	11.8	B
24. Edgefield Way & Imperial Ave	SSSC	AM	9.2	A
		PM	10.2	B

TABLE 7
INTERSECTION LEVEL OF SERVICE RESULTS FOR EXISTING WITHOUT PROJECT

Intersection	Traffic Control	Peak Hour	Existing Without Project Conditions	
			Delay (sec/veh)[1]	LOS[2,3]
25. Redworks Driveway & Imperial Ave	Signalized	AM	8.1	A
		PM	10.6	B
26. Marketplace Avenue & Imperial Ave	SSSC	AM	14.6	B
		PM	16.1	C
27. 45th St & Imperial Ave	Signalized	AM	9.0	A
		PM	8.9	A
28. West St & Imperial Ave	SSSC	AM	20.7	C
		PM	13.3	B
29. I-805 SB Ramps & Imperial Ave	Signalized	AM	29.2	C
		PM	53.2	D
30. I-805 NB Ramps & Imperial Ave*	Signalized	AM	34.0	C
		PM	32.2	C
31. 47th St & Imperial Ave	Signalized	AM	**76.7**	**E**
		PM	47.7	D

Source: Fehr & Peers, 2018

Notes:

AWSC = All-way stop controlled intersection

SSSC = Side street stop-controlled intersection

[1] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. Worst approach delay reported for stop-controlled intersection

[2] LOS calculations performed using the *Highway Capacity Manual (HCM)* method.

[3] Below-standard seconds of delay per vehicle and LOS highlighted in **bold.**

* Signal phasing prevents the application of the *HCM 2010* method. *HCM 2000* method was applied instead.

Roadway Segment Level of Service for Existing Without Project

Existing Without Project LOS for the roadway segments along the project corridor are shown in **Table 8**. The assessment was based upon existing road geometry and the daily traffic volumes for the segments. As

shown in **Table 8**, all roadway segments along the project corridor operate at an LOS of D or better except for segments (9) Francis Street to 36th Street, (10) Southlook Avenue to 37th Street, and (11) 38th Street to 39th Street.

TABLE 8
ROADWAY SEGMENT LEVEL OF SERVICE FOR EXISTING WITHOUT PROJECT

Study Segments			Existing (2015) Conditions			
ID	**Imperial Avenue To/From**		**Roadway Classification (# of Lanes)[1]**	**ADT**	**V/C[2]**	**LOS[3,4]**
1	17th Street	19th Street	4C	9,100	0.61	C
2	19th Street	21st Street	2C w/CLTL	7,904	0.53	C
3	21st Street	25th Street	2C w/CLTL	8,231	0.55	C
4	25th Street	28th Street	2C w/CLTL	7,890	0.53	C
5	28th Street	30th Street	2C w/CLTL	7,445	0.50	C
6	30th Street	32nd Street	2C w/CLTL	6,847	0.46	B
7	32nd Street	33rd Street	4C	7,804	0.52	C
8	33rd Street	Francis Street	4C	7,136	0.48	C
9	Francis Street	36th Street	2C	7,136	0.89	**E**
10	Southlook Ave	37th Street	2C	10,002*	**1.25**	**F**
11	38th Street	39th Street	2C	9,361	**1.17**	**F**
12	40th Street	Edgefield Way	4M	11,434	0.29	A

TABLE 8
ROADWAY SEGMENT LEVEL OF SERVICE FOR EXISTING WITHOUT PROJECT

Study Segments			Existing (2015) Conditions			
ID	**Imperial Avenue To/From**		**Roadway Classification (# of Lanes)[1]**	**ADT**	**V/C[2]**	**LOS[3,4]**
13	Edgefield Way	Redworks Driveway	4M	12,024	0.30	A
14	Redworks Driveway	45th Street	4M	14,482	0.36	A
15	45th Street	West Street	4M	25,948	0.65	C
16	West Street	I-805 SB Ramps	4M	20,932*	0.52	B
17	I-805 SB Ramps	I-805 NB Ramps	4M	26,414	0.66	C

Source: Fehr & Peers, 2018

Notes:

* Indicated counts were obtained in 2017

1 4C = 4-lane collector

2C = 2-lane collector

2C w/CLTL = 2-lane collector with center left-turn lane
3M = 3-lane major arterial (2 lanes in one direction and 1 in opposing direction); capacity is assumed to be 75% of 4M capacity

4M = 4-lane major arterial

2 Volume-to-capacity ratio. Worst-case is shown on segments with multiple classifications.

3 LOS calculations performed using City of San Diego Traffic Impact Study Manual (1998)

4 Below-standard ADT volumes per segment and LOS highlighted in **bold**.

3.2 EXISTING CONDITIONS WITH THE PROJECT

This section analyzes how existing conditions for people who walk, bike, and drive the project corridor would be affected if the proposed project were implemented.

CONDITIONS FOR PEOPLE WALKING AND BICYCLING

The proposed improvements along the Imperial Avenue Bikeway are designed to enhance safety for people walking and biking within the physical constraints of the roadway. Both people biking and walking will benefit from safer speeds along the bikeways through implementation of traffic calming devices including speed cushions and raised crosswalks. In addition, new pedestrian ramps and curb extensions at selected intersections will increase the visibility of people walking to drivers and enhance ADA accessibility.

LEVEL OF TRAFFIC STRESS ALONG ROADWAY SEGMENTS

The LTS for roadway segments in the project area was assessed based upon the criteria identified in the tables in **Section 2.1**. **Table 9** compares the level of traffic stress results along roadway segments in the project area for Existing Conditions without the Project and Existing Conditions with the Project.

With implementation of the project, the level of traffic stress will improve to or maintain LTS 1 or 2 along the entire bikeway length. Overall, the project achieves LTS 2 ("the traffic stress that most adults will tolerate") or 1 ("suitable for children"), and is therefore consistent with best practices in low-stress network design (MTI 2012).

LEVEL OF TRAFFIC STRESS FOR INTERSECTION CROSSINGS

The LTS for intersection crossings within the project area was assessed based upon the criteria identified in the tables in **Section 2.1**. **Table 10** compares the level of traffic stress results along roadway segments in the project area for Existing Conditions without the Project and Existing Conditions with the Project. With implementation of the project, the level of traffic stress will remain at LTS 2 with the exception of the high LTS 4 at the project terminus at 47th Street due to a lack of facilities east of the intersection, beyond the project corridor. Numerous project features will enhance safety and help to reduce the potential for conflicts between vehicles and people who walk or bike. This includes better visibility of people who walk and bike as well as slower overall travel speeds along the corridor. Overall, the project achieves LTS 2 ("the traffic stress that most adults will tolerate") or 1 ("suitable for children"), and is therefore consistent with best practices in low-stress network design (MTI 2012).

TABLE 9
ROADWAY SEGMENT LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Roadway Segment		Existing Without Project		Existing With Project		
		Traffic Stress	Bicycle Facilities	Traffic Stress	Bicycle Facilities	Potential Safety Benefits
J Street	17th Street to 20th Street	Low (2)	None	Low (1)	Buffered bike lane (both directions)	Painted buffer provides separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity
20th Street	J Street to L Street	Low (1)	None	Low (1)	Sharrows in both directions	Features designed to raise driver awareness of people who bike; reductions in motor vehicle travel speeds and collision severity
L Street	20th Street to 21st Street	Low (1)	Route	Low (1)	Sharrows in both directions	Features designed to raise driver awareness of people who bike; reductions in motor vehicle travel speeds and collision severity
21st Street	L Street to Imperial Avenue	Low (1)	None	Low (1)	Sharrows in both directions	Features designed to raise driver awareness of people who bike; reductions in motor vehicle travel speeds and collision severity
Imperial Avenue	17th Street to 19th Street	High (4)	None	Low (1)	Buffered bike lanes (both directions)	Painted buffer provides separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity
Imperial Avenue	19th Street to Francis Street	High (3)	Route/ None	Low (1)	Buffered or Physically Protected bike lanes (both directions) plus bend-outs	Painted buffer provides separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity
Imperial Avenue	Francis Street to 36th Street	High (3)	Route	Low (1)	Grade-separated two-way protected bikeway	Physical barriers completely separate people on bikes from vehicles, reducing collision severity

TABLE 9
ROADWAY SEGMENT LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Roadway Segment		Existing Without Project		Existing With Project		
		Traffic Stress	Bicycle Facilities	Traffic Stress	Bicycle Facilities	Potential Safety Benefits
Imperial Avenue	36th Street to 40th Street	High (3)	Route	Low (2)	Standard bike lanes (both directions)	Painted stripe provides separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity
Imperial Avenue	40th Street to Messina Way	High (3)	Route	Low (1)	Buffered bike lanes (both directions) plus physical separation and bend-outs	Physical barriers provide maximum separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity
Imperial Avenue	Messina Way to 45th Street	Low (2)	Lane	Low (1)	Buffered bike lanes (both directions) plus physical separation, bus bulb-outs, and bend-outs	Physical barriers provide maximum separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity
Imperial Avenue	45th Street to 47th Street	High (4)	None	Low (1)	Buffered bike lanes (both directions) plus physical separation and bend-outs	Physical barriers provide maximum separation between people biking and people driving; reductions in travel lane widths, motor vehicle travel speeds, and collision severity

Source: Fehr & Peers, 2018

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
Bikeway Street: J Street					
17th Street	Low (1)	Push button signal activation, diagonal ramps, striped crosswalks	Low (1)	Signal, striped bike lane leading to intersection on one side	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
19th Street	Low (1)	Stop signs on all approaches, diagonal ramps, striped crosswalks	Low (1)	Stop signs on all approaches, striped bike lane leading to intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
20th Street	Low (1)	Side street stop only, diagonal ramps	Low (1)	Side street stop, striped bike lane leading to intersection on one side, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
Bikeway Street: L Street					
20th Street	Low (1)	Stop signs on all approaches, diagonal ramps	Low (1)	Stop signs on all approaches, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
21st Street	Low (1)	Side street stop only, diagonal ramps	Low (1)	Side street stop, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
Bikeway Street: Imperial Avenue					
17th Street	Low (2)	Push button signal activation, diagonal ramps, striped crosswalks; crossing not permitted on east leg	Low (2)	Signal, striped bike lane leading to intersection on one side, add east leg crossing	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows; increased convenience for people who walk.

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
19th Street	Low (1)	Push button signal activation, diagonal ramps, striped crosswalks	Low (1)	Signal, direct ramps, striped bike lane leading to intersection on one side, bend-out leading to opposite side, sharrows in intersection	Slower vehicle speeds, increased visibility to drivers and awareness of people walking or biking, slower vehicle turning speeds, reduced exposure to vehicle flows, potential reduced collision severity for all travelers
20th Street 21st Street 27th Street Evans Street Hensley Street 29th Street	Low (1)	Side street stop only, diagonal ramps, some marked crosswalks north and south legs only	Low (1)	Side street stop, striped crosswalks north and south legs only, striped bike lane leading to intersection, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
22nd Street	Low (1)	Stop signs on all approaches, diagonal ramps, striped crosswalks	Low (1)	All way stop, striped bike lane leading to intersection, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
24th Street	Low (1)	Side street stop only, diagonal ramps, striped crosswalk west leg only with ped crossing sign	Low (1)	All way stop, direct ramps, curb extensions, striped crosswalks all legs, striped bike lanes leading to intersection, sharrows in intersection	Slower vehicle speeds approaching intersections, increased visibility to drivers and awareness of people walking or biking, slower vehicle turning speeds, reduced exposure to vehicle flows, potential reduced collision severity for all travelers
25th Street	Low (2)	Push button signal activation, diagonal ramps, striped crosswalks	Low (2)	Signal, direct ramps, bend-outs leading to intersection, sharrows in intersection	Slower vehicle speeds approaching intersections, increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows, potential reduced collision severity for all travelers

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
26th Street	Low (1)	Side street stop only, diagonal ramps; raised crossing across Imperial Avenue with flashing beacons	Low (1)	Side street stop, striped crosswalks north and south legs only, raised crosswalk east leg striped bike lane leading to intersection with flashing beacons, sharrows in intersection	Slower vehicle speeds approaching intersections, increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
28th Street 30th Street 31st Street	Low (1)	Push button signal activation, diagonal ramps, striped crosswalks	Low (1)	Signal, striped bike lanes leading to intersection, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
32nd Street	Low (1)	Push button signal activation, diagonal ramps	Low (1)	Signal, striped crosswalks except east leg, striped bike lanes leading to intersection, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
33rd Street	Low (1)	Push button signal activation, diagonal ramps	Low (1)	Signal, striped crosswalks except north leg, striped bike lanes leading to intersection, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
Francis Street	Low (1)	Stop signs on all approaches, diagonal ramps	Low (1)	All way stop, striped crosswalks, striped bike lane leading to intersection on one side, separated protected bikeway leading to other side, sharrows in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows, potential reduced collision severity for all travelers
40th Street	Low (2)	Push button signal activation, striped crosswalk on south leg, no crossing permitted on east or west legs, one diagonal and one direct ramp	Low (1)	Signal, fewer vehicle lanes to cross, direct ramps, bend-out or separated bike lane leading to intersection, curb extension, shorter crossing distances, dashed green bike lane in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows, reduced right-turn conflicts for people who bike, slower vehicle turning speeds
Messina Way	Low (1)	Side street stop only, diagonal ramps	Low (1)	Side street stop, striped crosswalks south legs only, striped bike lane leading to intersection, dashed green bike lane in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
Edgefield Way	Low (1)	Side street stop only, driveway curb cut outside of sidewalk path	Low (1)	Side street stop, striped crosswalks south leg only, striped bike lane leading to intersection, dashed green bike lane in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows
Redworks Driveway	Low (2)	Push button signal activation, diagonal ramps, striped crosswalks	Low (2)	Signal, some direct ramps, bend-outs leading to intersection, dashed green bike lane in intersection	Slower vehicle speeds approaching intersections, increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows, potential reduced collision severity for all travelers
Marketplace Avenue/44th Street	Low (1)	Side street stop only, diagonal ramps (Marketplace Ave), driveway curb cut inside of sidewalk path (44th St)	Low (1)	Side street stop, striped crosswalks south leg only, sidewalk improvements north leg, striped bike lane leading to intersection, dashed green bike lane in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
45th Street	Low (1)	Push button signal activation, diagonal ramps, striped crosswalks	Low (1)	Signal, direct ramps, bend-outs leading to intersection, dashed green bike lane in intersection	Slower vehicle speeds approaching intersections, increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows, potential reduced collision severity for all travelers
West Street	Low (1)	Side street stop only, direct ramps	Low (1)	Side street stop, striped crosswalks south leg only, striped bike lane leading to intersection, dashed green bike lane in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows

TABLE 10
INTERSECTION CROSSING LEVEL OF TRAFFIC STRESS FOR EXISTING CONDITIONS WITHOUT AND WITH PROJECT

Bikeway Street and Cross Street(s)	Existing Without Project		Existing With Project		
	Traffic Stress	Crossing Treatment	Traffic Stress	Crossing Treatment	Potential Safety Benefits
I-805 SB Ramp I-805 NB Ramp	Low (1)	Push button signal activation, striped crosswalks on north and south legs, some diagonal and some direct ramps; no crossing permitted on east or west legs	Low (1)	Signal, add some direct ramps, bend-out or separated bike lane leading to intersection, shorter crossing distances, dashed green bike lane in intersection	Increased visibility to drivers and awareness of people walking or biking, reduced exposure to vehicle flows, reduced right-turn conflicts for people who bike, slower vehicle turning speeds, potential reduced collision severity for all travelers
47th Street	High (4)	Push button signal activation, diagonal ramps, striped crosswalks	High (4)	Signal, some direct ramps, no bike facility leading to intersection on one side, bend-out leading to opposite side, sharrows in intersection on south leg only	Slower vehicle speeds, increased visibility to drivers and awareness of people walking or biking, slower vehicle turning speeds, reduced exposure to vehicle flows, potential reduced collision severity for all travelers

Source: Fehr & Peers, 2018

VEHICULAR TRAFFIC CONDITIONS

The Existing Conditions with the Project scenario examines how implementation of the proposed project will affect vehicle traffic conditions along roadways segments and at intersections in the project area. The results of the roadway capacity and intersection capacity analyses are provided below.

Proposed Changes to Roadway Segment Capacity

The removal of westbound and eastbound through lanes along the majority of the project corridor will reduce the street capacity. This reconfiguration of Imperial Avenue between 17th Street and 32nd Street is called for by the Southeastern Community Plan from February 2016. However, between 32nd Street and 33rd Street as well as between Redworks Driveway and 45th Street, the reconfiguration is not consistent with the Community Plan. The effect of this roadway change on roadway segment and intersection operations is evaluated in Chapter 3 and Chapter 4 of this report.

Roadway Capacity Analysis

Table 11 shows the results for Part 1 of the roadway segment analysis. As shown in the table, the removal of through lanes with the project causes the LOS on eight segments of Imperial Avenue to decrease from LOS D or better to LOS E or F:

2 between 19th Street and 21st Street
3 between 21st Street and 25th Street
4 between 25th Street and 28th Street
5 between 28th Street and 30th Street
6 between 30th Street and 32nd Street
7 between 32nd Street and 34th Street
14 between Redworks Driveway and 45th Street

As a result, these eight roadway segments were subject to additional evaluation in Part 2 of the roadway segment analysis, to determine if the traffic conditions for these segments will meet the City of San Diego standards.

In addition, two roadway segments are currently operating at LOS F and are not improved by the project:

10) between Southlook Avenue and 37th Street
11) between 38th Street and 39th Street

These do not meet the threshold of a V/C increase of 0.01 that would trigger the additional evaluation. The other roadway segments will meet the City's standard of LOS of D or better with implementation of the proposed project, so no further evaluation of these segments is required. **Table 12** shows the results for Part 2 of the roadway segments analysis. The Synchro 9.0 arterial analysis LOS calculation sheets for the corresponding roadway segments are included in **Appendix E**.

TABLE 11
PART 1: ROADWAY SEGMENT ANALYSIS FOR EXISTING WITHOUT AND WITH PROJECT

Study Segments			Existing Without Project				Existing With Project				
ID	Imperial Avenue To/From		Roadway Classification (# of Lanes)[1]	ADT	V/C[2]	LOS[3,4]	Roadway Classification (# of Lanes)[1]	ADT	V/C[2]	LOS[3,4]	Δ V/C
1	17th Street	19th Street	4C	9,100	0.61	C	3C	9,100	0.81	D	0.20
2	19th Street	21st Street	2C w/CLTL	7,904	0.53	C	2C	7,904	**0.99**	**E**	**0.46**
3	21st Street	25th Street	2C w/CLTL	8,231	0.55	C	2C	8,231	**1.03**	**F**	**0.48**
4	25th Street	28th Street	2C w/CLTL	7,890	0.53	C	2C	7,890	**0.99**	**E**	**0.46**
5	28th Street	30th Street	2C w/CLTL	7,445	0.50	C	2C	7,445	**0.93**	**E**	**0.43**
6	30th Street	32nd Street	2C w/CLTL	6,847	0.46	B	2C	6,847	**0.86**	**E**	**0.40**
7	32nd Street	33rd Street	4C	7,804	0.52	C	2C	7,804	**0.98**	**E**	**0.46**
8	33rd Street	Francis Street	4C	7,136	0.48	C	2C w/CLTL	7,136	0.48	C	0.00
9	Francis Street	36th Street	2C	7,136	**0.89**	**E**	2C w/CLTL	7,136	0.48	C	-0.42

10	Southlook Ave	37th Street	2C	10,002*	**1.25**	**F**	2C	10,002*	**1.25**	**F**	0.00
11	38th Street	39th Street	2C	9,361	**1.17**	**F**	2C	9,361	**1.17**	**F**	0.00
12	40th Street	Edgefield Way	4M	11,434	0.29	A	2C w/CLTL	11,434	0.76	D	0.48
13	Edgefield Way	Redworks Driveway	4M	12,024	0.30	A	2C w/CLTL	12,024	0.80	D	0.50
14	Redworks Driveway	45th Street	4M	14,482	0.36	A	2C w/CLTL	14,482	**0.97**	**E**	**0.60**
15	45th Street	West Street	4M	25,948	0.65	C	3/4M	25,948	0.86	D	0.22
16	West Street	I-805 SB Ramps	4M	20,932*	0.52	B	4M	20,932*	0.52	B	0.00
17	I-805 SB Ramps	I-805 NB Ramps	4M	26,414	0.66	C	4M	26,414	0.66	C	0.00

Source: Fehr & Peers, 2018

Notes:

* Indicated counts were obtained in 2017

1 4C = 4-lane collector
2C = 2-lane collector
2C w/CLTL = 2-lane collector with center left-turn lane
3C = 3-lane collector (2 lanes in one direction and 1 in opposing direction); capacity is assumed to be 75% of 4C capacity
3M = 3-lane major arterial (2 lanes in one direction and 1 in opposing direction); capacity is assumed to be 75% of 4M capacity
4M = 4-lane major arterial

2 Volume-to-capacity ratio. Worst-case is shown on segments with multiple classifications.

3 LOS calculations performed using City of San Diego Traffic Impact Study Manual (1998)

4 Below-standard ADT volumes per segment and LOS highlighted in **bold**.

TABLE 12
PART 2: ROADWAY SEGMENT ANALYSIS FOR EXISTING WITH PROJECT

ID	Study Segments: Imperial Avenue To/From		Peak Hour Intersection LOS	Direction	Peak Hour Speed-Based LOS		Change in Vehicle Travel Time (sec)[1]		Consistent with Community Plan?
					AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	
1	17th St	19th St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	C	D	-0.3	-0.2	Yes
				WB	C	D	-0.1	+2.1	
2-3	19th St	25th St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	C	D	-10.1	-9.1	Yes
				WB	D	C	+10.7	+1.6	
4	25th St	28th St	Meets the City standard in AM and PM for both intersections (LOS D or better).	EB	B	C	+0.2	+0.8	Yes
				WB	C	B	-0.2	+0.6	
5	28th St	30th St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	B	B	+0.1	-0.4	Yes
				WB	B	C	-0.4	+1.6	
6	30th St	32nd St	Meets the City standard in AM and PM for both intersections (LOS D or better).	EB	C	D	-2.4	+10.7	Yes
				WB	C	C	-7.5	-1.1	
7	32nd St	33rd St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	C	D	-0.5	+6.2	No
				WB	D	C	+2.7	-4.8	
14	Redworks Dwy	45th St	Meets the City standard in AM and PM for both intersections (LOS D or better).	EB	C	D	+4.3	+11.8	No
				WB	C	C	+6.0	+0.8	

Source: Appendix E (Synchro 9.0 Arterial Analysis Reports)
1. Existing With Project Travel Time minus Existing Without Project Travel Time

For the segments of Imperial Avenue between 19th Street and 32nd Street, **Table 12** shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, an arterial analysis shows that the segment will operate at LOS D or better during peak traffic periods. Lastly, the project design in this segment is consistent with the (2015) adopted Southeastern San Diego Community Plan in proposing a buffered bikeway and reconfiguration to a 4-lane or 2-lane collector. Having satisfied these three conditions, the traffic conditions along this segment meet the City of San Diego Standards.

For the segment of Imperial Avenue between 32nd Street and 33rd Street, the table shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, the arterial analysis shows that the segment will operate at LOS D or better during peak traffic periods. Lastly, the segment is only partially consistent with the (2015) adopted Southeastern San Diego Community Plan. In proposing a buffered bikeway, it is consistent with the plan to provide an enhanced bicycle facility. However, the proposal to reconfigure the roadway from a 4-lane to a 2-lane collector is inconsistent with the 2-lane-with-center-left-turn-lane collector configuration in the Community Plan. Because of the inconsistency with the adopted Community Plan, the traffic conditions along this segment do not meet the City of San Diego standards.

Finally, for the segment of Imperial Avenue between Redworks Driveway and 45th Street, the table shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, the arterial analysis shows that the segment will operate at LOS D or better during peak traffic periods. Similar to the segment described above, this segment is also partially consistent with the (2015) adopted Southeastern San Diego Community Plan. In proposing a Class-IV bikeway, it is consistent with the plan to provide an enhanced bicycle facility. However, the proposal to reconfigure the roadway from a 4-lane major arterial to a 2-lane-with-center-left-turn-lane collector is inconsistent with the 4-lane major arterial configuration in the Community Plan. Because of the inconsistency with the adopted Community Plan, the traffic conditions along this segment do not meet the City of San Diego standards.

An additional vehicle lane would be required to be maintained on study roadway segments #7: 32nd Street and 33rd Street and #14: Redworks Driveway to 45th Street in order to acheive the City's standard of LOS D or better . Adding an additional vehicle lane along these segments is not feasible due to lack of public right-of-way (i.e. there is not adequate space to maintain a vehicle lane). Despite the segments operating at LOS E, however, travel times through these roadway segments will decrease by 1 to 5 seconds (depending on the direction and AM or PM peak hour) with implementation of the project compared to conditions without the project. This decrease in travel time will occur because traffic signal timing will be optimized at the intersections at 32nd, 33rd, and 45th Streets as part of the project. Therefore, even though it will not be

possible to bring the LOS to the City's standard, the project will improve travel times through these segments.

Proposed Changes to Intersection Capacity

Intersection operations for Existing Conditions assume all of the current lane configurations and traffic control devices in place. For Existing with Project Conditions, the network assumptions were modified as follows:

- Lane configurations were modified to remove one westbound lane at 17th Street and 19th Street.
- Lane configurations were modified to remove the exclusive eastbound and westbound left turn lanes at all intersections between 19th Street and 32nd Street
- Shared through/right-turn movements were also removed from intersections where the installation of curb extensions/bend outs will result in a shared left/through/right lane on the affected approaches. Affected intersections include 19th Street and Imperial Avenue and 25th Street and Imperial Avenue.
- At the intersection of 24th Street and Imperial Avenue, the project proposes to convert the control from a side-street stop to an all-way stop.
- At the intersection of 32nd Street and Imperial Avenue, the project proposes to remove one westbound approach lane resulting in a single shared left/through/right lane at the westbound approach.
- One eastbound through lane is proposed to be removed from the intersection of Francis Street and Imperial Avenue, and the westbound lanes will merge to one lane approximately 60 feet west of the intersection.
- At the north intersection of 36th Street and Imperial Avenue, the eastbound left turn pocket is proposed to be reduced from 200 feet to 140 feet.
- At the south intersection of 36th Street and Imperial Avenue, an exclusive bicycle phase of 11 seconds is provided, reallocated from 5 seconds of the westbound phase, 5 seconds of the northbound phase, and 1 seconds of the southbound left-turn phase (and equivalently 6 seconds of the southbound through phase).
- At the intersection of 40th Street and Imperial Avenue, the outside exclusive left turn lane will be removed from the 40th Street approach resulting in a single exclusive left and single exclusive right turn lane at the intersection. The westbound through movement will also be converted from yield control to a signalized control
- The portion of Imperial Avenue between 40th Street and 45th Street will be reduced from a 4-lane roadway to a 2-lane roadway with left turns on the affected approaches. Affected intersections include:

- Messina Way and Imperial Avenue
- Edgefield Way and Imperial Avenue
- Redworks Driveway and Imperial Avenue
- Marketplace Avenue and Imperial Avenue
- 45th Street and Imperial Avenue (east leg only)

Intersection Analysis

The results of the operations analysis of Existing Without and With Project Conditions are presented in **Table 13**. **Appendix D** includes the corresponding LOS worksheets for all study scenarios.

As shown in **Table 13**, all study intersections are expected to meet the City's standard of LOS D or better under the Existing without Project conditions except for (31) 47th Street and Imperial Avenue during the AM peak hour.

Under Existing with Project conditions, all intersections operate at a level of service LOS D or better and thus meet the City standard except for the intersection of (31) 47th Street and Imperial Avenue.

The intersection of 47th Street and Imperial Avenue does not meet the City of San Diego standard of LOS D or better without the project and the project will not increase vehicle delay at these intersections. As such, the proposed project will not result in a vehicle traffic impact at these intersections as defined by the City of San Diego Significance Thresholds for Traffic Impacts.

TABLE 13
INTERSECTION LEVEL OF SERVICE RESULTS FOR EXISTING WITHOUT AND WITH PROJECT

Intersection	Peak Hour	Traffic Control	Existing Without Project Conditions		Existing With Project Conditions		Delay Change
			Delay (sec/veh)[4]	LOS[5]	Delay (sec/veh)[4]	LOS[5]	
1. 19th St & J St	AM	AWSC	9.6	A	9.6	A	0.0
	PM		16.6	C	16.6	C	0.0
2. 17th St & Imperial Ave	AM	Signalized	17.7	B	15.8	B	-1.9
	PM		11.9	B	11.0	B	-0.9
3. 19th St & Imperial Ave	AM	Signalized	13.0	B	14.9	B	1.9
	PM		9.3	A	9.5	A	0.2
4. 20th St & Imperial Ave	AM	SSSC	16.2	C	16.0	C	-0.2
	PM		19.2	C	19.0	C	-0.2
5. 21st St & Imperial Ave	AM	SSSC	19.8	C	19.1	C	-0.7
	PM		22.8	C	21.2	C	-1.6
6. 22nd St & Imperial Ave	AM	AWSC	13.5	B	14.3	B	0.8
	PM		16.2	C	16.6	C	0.4
7. 24th St & Imperial Ave	AM	SSSC (convert to AWSC)	16.1	C	15.7	C	-0.4
	PM		17.9	C	15.8	C	-2.1
8. 25th St & Imperial Ave	AM	Signalized	10.1	B	10.1	B	0.0
	PM		13.0	B	13.3	B	0.3
9. 26th St & Imperial Ave	AM	SSSC	23.3	C	22.5	C	-0.8
	PM		17.8	C	17.3	C	-0.5
10. 27th St & Imperial Ave	AM	SSSC	14.5	B	14.5	B	0.0
	PM		13.4	B	13.4	B	0.0
11. Evans St & Imperial Ave	AM	SSSC	17.6	C	17.4	C	-0.2
	PM		15.5	C	15.3	C	-0.2
12. Hensley St & Imperial Ave	AM	SSSC	13.9	B	13.9	B	0.0
	PM		14.9	B	14.8	B	-0.1
13. 28th St & Imperial Ave	AM	Signalized	10.3	B	10.1	B	-0.2
	PM		11.0	B	11.0	B	0.0
14. 29th St & Imperial Ave	AM	SSSC	18.4	C	18.0	C	-0.4
	PM		17.1	C	16.8	C	-0.3

TABLE 13
INTERSECTION LEVEL OF SERVICE RESULTS FOR EXISTING WITHOUT AND WITH PROJECT

Intersection	Peak Hour	Traffic Control	Existing Without Project Conditions		Existing With Project Conditions		Delay Change
			Delay (sec/veh)[4]	LOS[5]	Delay (sec/veh)[4]	LOS[5]	
15. 30th St & Imperial Ave	AM	Signalized	6.6	A	11.3	B	4.7
	PM		13.9	B	14.9	B	1.0
16. 31st St & Imperial Ave	AM	Signalized	5.9	A	5.9	A	0.0
	PM		5.2	A	12.3	B	7.1
17. 32nd St & Imperial Ave	AM	Signalized	30.5	C	8.2	A	-22.3
	PM		16.0	B	12.6	B	-3.4
18. 33rd St & Imperial Ave	AM	Signalized	8.8	A	13.8	B	5.0
	PM		7.4	A	7.9	A	0.5
19. Francis St & Imperial Ave	AM	AWSC	15.0	B	15.0	B	0.0
	PM		10.8	B	16.5	C	5.7
20. 36th St & Imperial Ave (N)	AM	Signalized	43.1	D	39.6	D	-3.5
	PM		38.2	D	40.9	D	2.7
21. 36th St & Imperial Ave (S)*	AM	Signalized	35.9	D	42.6	D	6.7
	PM		21.9	C	28.5	C	6.6
22. 40th St & Imperial Ave	AM	Signalized	13.3	B	14.3	B	1.0
	PM		12.4	B	11.2	B	-1.2
23. Messina Way & Imperial Ave	AM	SSSC	10.5	B	12.2	B	1.7
	PM		11.8	B	13.7	B	1.9
24. Edgefield Way & Imperial Ave	AM	SSSC	9.2	A	9.9	A	0.7
	PM		10.2	B	11.9	B	1.7
25. Redworks Driveway & Imperial Ave	AM	Signalized	8.1	A	9.5	A	1.4
	PM		10.6	B	12.8	B	2.2
26. Marketplace Avenue & Imperial Ave	AM	SSSC	14.6	B	20.9	C	6.3
	PM		16.1	C	24.9	C	8.8
27. 45th St & Imperial Ave	AM	Signalized	9.0	A	9.3	A	0.3
	PM		8.9	A	11.5	B	2.6
28. West St & Imperial Ave	AM	SSSC	20.7	C	21.0	C	0.3
	PM		13.3	B	13.3	B	0.0

TABLE 13
INTERSECTION LEVEL OF SERVICE RESULTS FOR EXISTING WITHOUT AND WITH PROJECT

Intersection	Peak Hour	Traffic Control	Existing Without Project Conditions		Existing With Project Conditions		Delay Change
			Delay (sec/veh)[4]	LOS[5]	Delay (sec/veh)[4]	LOS[5]	
29. I-805 SB Ramps & Imperial Ave	AM	Signalized	29.2	C	29.2	C	0.0
	PM		14.6	B	20.9	C	6.3
30. I-805 NB Ramps & Imperial Ave*	AM	Signalized	34.0	C	34.0	C	0.0
	PM		32.2	C	32.2	C	0.0
31. 47th St & Imperial Ave	AM	Signalized	**76.7**	**E**	**76.7**	**E**	**0.0**
	PM		47.7	D	47.7	D	0.0

Source: Fehr & Peers, 2018

Notes:

AWSC = All-way stop controlled intersection

SSSC = Side street stop-controlled intersection

[1] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. Worst approach delay reported for side-street-stop-controlled intersection

[2] LOS calculations performed using the *Highway Capacity Manual 2010 (HCM 2010)* method.

[3] Below-standard seconds of delay per vehicle and LOS highlighted in **bold.**

* Signal phasing prevents the application of the *HCM 2010* method. *HCM 2000* method was applied instead.

4.0 FUTURE CONDITIONS WITH AND WITHOUT THE PROJECT

This chapter describes safety conditions for people who walk and bike as well as the vehicle traffic conditions (at roadway segments and intersections) under the Future Conditions Without the Project and Future Conditions With the Project scenarios.

4.1 FUTURE CONDITIONS WITHOUT THE PROJECT (YEAR 2022)

This section describes existing conditions as of year 2022 for intersections and roadway segments in the project corridor, including existing facilities and collision history for people who walk and bike as well as vehicular traffic conditions including volumes, intersection turning movements, roadway classifications, and traffic control devices (e.g., traffic signals, stop signs).

WALKING AND BICYCLING CONDITIONS

Without the proposed project, this study assumes that safety conditions for people who walk and bike in 2022 will remain substantially the same as the existing conditions described in **Section 3.1**.

VEHICULAR TRAFFIC CONDITIONS

The Future Conditions without the Project scenario examines vehicle traffic conditions along roadway segments and at intersections in the project area in the future. The results of the roadway capacity and intersection capacity analyses are provided below.

Proposed Changes to Roadway Capacity

No roadway capacity changes are anticipated for the year 2022 without the proposed project. As such, the roadway network for the Future Without Project scenario is the same as the roadway network for the Existing Without Project scenario described in **Section 3.1**.

Proposed Changes to Intersection Capacity

No intersection capacity changes are anticipated for the year 2022 without the proposed project. As such, the intersection capacities for the Future Without Project scenario are the same as those analyzed in the Existing Without Project scenario described in **Section 3.1**.

4.2 FUTURE CONDITIONS WITH THE PROJECT (YEAR 2022)

Future With Project conditions represent the conditions of the roadways and intersections within the project area in the year 2022 if the proposed project were implemented.

WALKING AND BICYCLING CONDITIONS

The safety assessment for people who walk and bike is expected to be the same for the Future with Project condition as the Existing with Project condition (see **Chapter 3** for this information). Safety for people who bike and walk is expected to be enhanced and the number and severity of collisions is expected to decline with the project in place. On parallel facilities, collisions could also be reduced in number and severity as people who bike shift to the Imperial Avenue Bikeway instead of traveling on streets with higher vehicle speeds and volumes.

VEHICULAR TRAFFIC CONDITIONS

The Future Conditions with the Project scenario examines how implementation of the proposed project will affect vehicle traffic conditions along roadways segments and at intersections in the project area. The results of the roadway capacity and intersection capacity analyses are provided below.

Proposed Changes to Roadway Capacity

No roadway capacity changes are anticipated for the year 2022 besides the changes proposed by the proposed project. Therefore, the Future with Project scenario analyzes the same roadway capacity changes as the Existing with Project scenario described in **Section 3.1**.

Roadway Capacity Analysis

Table 14 shows the results for Part 1 of the roadway segment analysis. As shown in the table, the removal of through lanes with the project causes the LOS on eight segments of Imperial Avenue to decrease from LOS D or better to LOS E or F:

2) between 19th Street and 21st Street
3) between 21st Street and 25th Street
4) between 25th Street and 28th Street
5) between 28th Street and 30th Street
6) between 30th Street and 32nd Street
7) between 32nd Street and 34th Street
14) between Redworks Driveway and 45th Street

TABLE 14
PART 1: ROADWAY SEGMENT LEVEL OF SERVICE RESULTS FOR FUTURE WITHOUT AND WITH PROJECT

Roadway Segment			Future Without Project				Future With Project				
ID	Imperial Avenue To/From		Roadway Classification (# of Lanes)[1]	ADT	V/C[2]	LOS[3,4]	Roadway Classification (# of Lanes)[1]	ADT	V/C[2]	LOS[3,4]	Δ V/C
1	17th Street	19th Street	4C	9,389	0.63	C	3C	9,389	0.83	D	0.21
2	19th Street	21st Street	2C w/CLTL	8,155	0.54	C	2C	8,155	**1.02**	**F**	**0.48**
3	21st Street	25th Street	2C w/CLTL	8,492	0.57	C	2C	8,492	**1.06**	**F**	**0.50**
4	25th Street	28th Street	2C w/CLTL	8,140	0.54	C	2C	8,140	**1.02**	**F**	**0.47**
5	28th Street	30th Street	2C w/CLTL	7,681	0.51	C	2C	7,681	0.96	**E**	**0.45**
6	30th Street	32nd Street	2C w/CLTL	7,064	0.47	C	2C	7,064	0.88	**E**	**0.41**
7	32nd Street	33rd Street	4C	8,052	0.54	C	2C	8,052	**1.01**	**F**	**0.47**
8	33rd Street	Francis Street	4C	7,362	0.49	C	2C w/CLTL	7,362	0.49	C	0.00
9	Francis Street	36th Street	2C	7,362	0.92	**E**	2C w/CLTL	7,362	0.49	C	-0.43
10	Southlook Ave	37th Street	2C	10,229	**1.28**	**F**	2C	10,229	**1.28**	**F**	0.00
11	38th Street	39th Street	2C	9,658	**1.21**	**F**	2C	9,658	**1.21**	**F**	0.00
12	40th Street	Edgefield Way	4M	11,797	0.29	A	2C w/CLTL	11,797	0.79	D	0.49

TABLE 14
PART 1: ROADWAY SEGMENT LEVEL OF SERVICE RESULTS FOR FUTURE WITHOUT AND WITH PROJECT

Roadway Segment			Future Without Project				Future With Project				
ID	Imperial Avenue To/From		Roadway Classification (# of Lanes)[1]	ADT	V/C[2]	LOS[3,4]	Roadway Classification (# of Lanes)[1]	ADT	V/C[2]	LOS[3,4]	Δ V/C
13	Edgefield Way	Redworks Driveway	4M	12,406	0.31	A	2C w/CLTL	12,406	0.83	D	0.52
14	Redworks Driveway	45th Street	4M	14,942	0.37	A	2C w/CLTL	14,942	1.00	**E**	**0.62**
15	45th Street	West Street	4M	26,772	0.67	C	3/4M	26,772	0.89	D	0.22
16	West Street	I-805 SB Ramps	4M	21,407	0.54	C	4M	21,407	0.54	C	0.00
17	I-805 SB Ramps	I-805 NB Ramps	4M	27,252	0.68	C	4M	27,252	0.68	C	0.00

Source: Fehr & Peers, 2018

Notes:

* Indicated counts were obtained in 2017

1 4C = 4-lane collector
2C = 2-lane collector
2C w/CLTL = 2-lane collector with center left-turn lane
3C = 3-lane collector (2 lanes in one direction and 1 in opposing direction); capacity is assumed to be 75% of 4C capacity
3M = 3-lane major arterial (2 lanes in one direction and 1 in opposing direction); capacity is assumed to be 75% of 4M capacity
4M = 4-lane major arterial

2 Volume-to-capacity ratio. Worst-case is shown on segments with multiple classifications.

3 LOS calculations performed using City of San Diego Traffic Impact Study Manual (1998)

4 Below-standard ADT volumes per segment and LOS highlighted in **bold**.

As a result, these eight roadway segments were subject to additional evaluation in Part 2 of the roadway segment analysis, to determine if the traffic conditions for these segments will meet the City of San Diego standards. The other roadway segments will meet the City's standard of LOS of D or better with implementation of the proposed project, so no further evaluation of these segments is required. **Table 15** shows the results for Part 2 of the roadway segments analysis. The arterial analysis LOS calculation sheets for the corresponding roadway segments are included in **Appendix E**.

For the segments of Imperial Avenue between 19th Street and 32nd Street, **Table 15** shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, an arterial analysis shows that the segment will operate at LOS D or better during peak traffic periods. Lastly, the project design in this segment is consistent with the (2015) adopted Southeastern San Diego Community Plan in proposing a buffered bikeway and reconfiguration to a 4-lane or 2-lane collector. Having satisfied these three conditions, the traffic conditions along this segment meet the City of San Diego Standards.

For the segment of Imperial Avenue between 32nd Street and 33rd Street, the table shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, the arterial analysis of the segment shows that the segment will operate at LOS D or better during peak traffic periods. Lastly, the segment is only partially consistent with the (2015) adopted Southeastern San Diego Community Plan: in proposing a buffered bikeway, it is consistent with the plan to provide an enhanced bicycle facility; however, the proposal to reconfigure the roadway from a 4-lane to a 2-lane collector is inconsistent with the 2-lane-with-center-left-turn-lane collector configuration in the Community Plan. Because of the inconsistency with the adopted Community Plan, the traffic conditions along this segment do not meet the City of San Diego standards.

Finally, for the segment of Imperial Avenue between Redworks Driveway and 45th Street, the table shows that the intersections at either end of this segment will meet the City's standard of LOS D or better. In addition, the arterial analysis of the segment shows that the segment will operate at LOS D or better during peak traffic. Similar to the segment described above, this segment is also partially consistent with the (2016) adopted Southeastern San Diego Community Plan: in proposing a Class II bikeway, it is consistent with the plan to provide an enhanced bicycle facility; however, the proposal to reconfigure the roadway from a 4-lane major arterial to a 2-lane-with-center-left-turn-lane collector is inconsistent with the 4-lane major arterial configuration in the Community Plan. Because of the inconsistency with the adopted Community Plan, the traffic conditions along this segment do not meet the City of San Diego standards.

TABLE 15
PART 2: ROADWAY SEGMENT ANALYSIS FOR FUTURE WITH PROJECT

ID	Study Segments: Imperial Avenue To/From		Peak Hour Intersection LOS	Direction	Peak Hour Speed-Based LOS		Change in Vehicle Travel Time (sec)[1]		Consistent with Community Plan?
					AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	
1	17th St	19th St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	C	D	-0.3	+0.4	Yes
				WB	C	D	+0.2	+2.5	
2-3	19th St	25th St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	C	D	-10.0	-8.9	Yes
				WB	D	C	+11.0	+2.2	
4	25th St	28th St	Meets the City standard in AM and PM for both intersections (LOS D or better).	EB	B	C	+0.7	+1.0	Yes
				WB	C	B	-0.1	+0.6	
5	28th St	30th St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	B	B	+0.1	-0.6	Yes
				WB	B	C	-0.2	+1.8	
6	30th St	32nd St	Meets the City standard in AM and PM for both intersections (LOS D or better).	EB	C	D	-2.6	+6.5	Yes
				WB	C	C	-8.3	-0.5	
7	32nd St	33rd St	Meets the City standard in AM and PM for both intersections (LOS D or better)	EB	C	D	+0.3	+5.5	No
				WB	D	C	+1.3	-6.3	
14	Redworks Dwy	45th St	Meets the City standard in AM and PM for both intersections (LOS D or better).	EB	C	C	+4.7	+16.7	No
				WB	C	C	+5.5	+0.9	

Source: Appendix E (Synchro 9.0 Arterial Analysis Reports)

1. Future With Project Travel Time minus Future Without Project Travel Time

An additional vehicle lane would be required to be maintained on study roadway segments #7: 32nd Street and 33rd Street and #14: Redworks Driveway to 45th Street in order to achieve the City's standard of LOS D or better. Maintaining an additional vehicle lane along these segments is not feasible due to lack of public right-of-way (i.e. there is not adequate space to maintain a vehicle lane). Despite the segment operating at LOS E, however, travel times through these roadway segments will decrease by 1 to 5 seconds (depending on the direction and AM or PM peak hour) with implementation of the project compared to conditions without the project. This decrease in travel time will occur because traffic signal timing will be optimized at the intersections at 32nd, 33rd, and 45th Streets as part of the project. Therefore, even though it will not be possible to bring the LOS to the City's standard, the project will improve travel times through these segments.

Proposed Changes to Intersection Capacity

No intersection capacity changes are anticipated for the year 2022 besides the changes proposed by the project. Therefore, the Future with Project scenario assumes the same intersection capacity changes as the Existing with Project scenario described in **Section 3.1**.

Intersection Analysis

The results of the operations analysis of Future Without and With Project conditions are presented in **Table 16**. **Appendix D** includes the corresponding LOS worksheets for all study scenarios.

As shown in **Table 16**, all study intersections are expected to meet the City's standard of LOS D or better under the Future Without Project conditions except for the following two study intersections: (29) I-805 Southbound Ramps and Imperial Avenue during the PM peak hour and (31) 47th Street and Imperial Avenue during the AM peak hour.

Under Future With Project conditions, all intersections are projected to operate at LOS D or better except for the intersections of (29) I-805 Southbound Ramps and Imperial Avenue during the PM peak hour and (31) 47th Street and Imperial Avenue during the AM peak hour.

The intersections of (29) I-805 Southbound Ramps and Imperial Avenue and (31) 47th Street and Imperial Avenue will both operate below the City's standard of LOS D without the project and the project will not increase vehicle delay at either of these intersections. As such, the proposed project will not result in a vehicle traffic impact at these intersections as defined by the City of San Diego Significance Thresholds for Traffic Impacts.

TABLE 16
INTERSECTION LEVEL OF SERVICE RESULTS FOR FUTURE WITHOUT AND WITH PROJECT

Intersection	Peak Hour	Traffic Control	Future Without Project Conditions		Future With Project Conditions		Delay Change
			Delay (sec/veh)[4]	LOS[5]	Delay (sec/veh)[4]	LOS[5]	
1. 19th St & J St	AM	AWSC	9.9	A	9.9	A	0.0
	PM		18.1	C	18.1	C	0.0
2. 17th St & Imperial Ave	AM	Signalized	17.6	B	15.6	B	-2.0
	PM		11.8	B	11.5	B	-0.3
3. 19th St & Imperial Ave	AM	Signalized	13.3	B	15.4	B	2.1
	PM		9.7	A	9.8	A	0.1
4. 20th St & Imperial Ave	AM	SSSC	19.3	C	19.0	C	-0.3
	PM		23.1	C	22.6	C	-0.5
5. 21st St & Imperial Ave	AM	SSSC	22.7	C	21.5	C	-1.2
	PM		28.9	D	26.2	D	-2.7
6. 22nd St & Imperial Ave	AM	AWSC	14.6	B	16.0	C	1.4
	PM		18.8	C	18.6	C	-0.2
7. 24th St & Imperial Ave	AM	SSSC (convert to AWSC)	19.3	C	17.5	C	-1.8
	PM		22.1	C	19.3	C	-2.8
8. 25th St & Imperial Ave	AM	Signalized	10.5	B	10.6	B	0.1
	PM		12.9	B	13.3	B	0.4
9. 26th St & Imperial Ave	AM	SSSC	30.9	D	29.0	D	-1.9
	PM		21.4	C	20.4	C	-1.0
10. 27th St & Imperial Ave	AM	SSSC	17.8	C	17.6	C	-0.2
	PM		16.8	C	16.6	C	-0.2
11. Evans St & Imperial Ave	AM	SSSC	19.6	C	19.3	C	-0.3
	PM		18.0	C	17.6	C	-0.4
12. Hensley St & Imperial Ave	AM	SSSC	18.5	C	18.3	C	-0.2
	PM		19.0	C	18.8	C	-0.2
13. 28th St & Imperial Ave	AM	Signalized	10.5	B	10.3	B	-0.2
	PM		10.7	B	10.7	B	0.0
14. 29th St & Imperial Ave	AM	SSSC	22.0	C	21.2	C	-0.8
	PM		20.2	C	19.5	C	-0.7

TABLE 16
INTERSECTION LEVEL OF SERVICE RESULTS FOR FUTURE WITHOUT AND WITH PROJECT

Intersection	Peak Hour	Traffic Control	Future Without Project Conditions		Future With Project Conditions		Delay Change
			Delay (sec/veh)[4]	LOS[5]	Delay (sec/veh)[4]	LOS[5]	
15. 30th St & Imperial Ave	AM	Signalized	7.3	A	15.9	B	8.6
	PM		14.2	B	15.8	B	1.6
16. 31st St & Imperial Ave	AM	Signalized	6.2	A	6.2	A	0.0
	PM		5.7	A	10.2	B	4.5
17. 32nd St & Imperial Ave	AM	Signalized	33.8	C	8.6	A	-25.2
	PM		14.4	B	12.0	B	-2.4
18. 33rd St & Imperial Ave	AM	Signalized	10.0	A	16.9	B	6.9
	PM		8.0	A	9.1	A	1.1
19. Francis St & Imperial Ave	AM	AWSC	16.1	C	15.9	C	-0.2
	PM		11.1	B	18.6	C	7.5
20. 36th St & Imperial Ave (N)	AM	Signalized	48.1	D	44.5	D	-3.6
	PM		41.0	D	43.7	D	2.7
21. 36th St & Imperial Ave (S)*	AM	Signalized	40.4	D	51.0	D	10.6
	PM		22.2	C	29.3	C	7.1
22. 40th St & Imperial Ave	AM	Signalized	14.0	B	16.9	B	2.9
	PM		12.7	B	11.8	B	-0.9
23. Messina Way & Imperial Ave	AM	SSSC	11.4	B	14.0	B	2.6
	PM		12.6	B	14.9	B	2.3
24. Edgefield Way & Imperial Ave	AM	SSSC	9.4	A	10.1	B	0.7
	PM		10.3	B	12.1	B	1.8
25. Redworks Driveway & Imperial Ave	AM	Signalized	8.8	A	10.4	B	1.6
	PM		10.9	B	13.5	B	2.6
26. Marketplace Avenue & Imperial Ave	AM	SSSC	17.3	C	27.7	D	10.4
	PM		17.3	C	28.8	D	11.5
27. 45th St & Imperial Ave	AM	Signalized	10.4	B	10.8	B	0.4
	PM		10.0	A	13.4	B	3.4
28. West St & Imperial Ave	AM	SSSC	23.7	C	24.3	C	0.6
	PM		20.7	C	21.0	C	0.3

TABLE 16
INTERSECTION LEVEL OF SERVICE RESULTS FOR FUTURE WITHOUT AND WITH PROJECT

Intersection	Peak Hour	Traffic Control	Future Without Project Conditions		Future With Project Conditions		Delay Change
			Delay (sec/veh)[4]	LOS[5]	Delay (sec/veh)[4]	LOS[5]	
29. I-805 SB Ramps & Imperial Ave	AM	Signalized	29.5	C	29.5	C	0.0
	PM		**56.4**	**E**	**56.4**	**E**	**0.0**
30. I-805 NB Ramps & Imperial Ave*	AM	Signalized	34.2	C	34.2	C	0.0
	PM		31.2	C	31.2	C	0.0
31. 47th St & Imperial Ave	AM	Signalized	**78.5**	**E**	**78.5**	**E**	**0.0**
	PM		49.5	D	49.5	D	0.0

Source: Fehr & Peers, 2018

Notes:

AWSC = All-way stop controlled intersection

SSSC = Side street stop-controlled intersection

[1] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. Worst approach delay reported for side-street-stop-controlled intersection

[2] LOS calculations performed using the *Highway Capacity Manual 2010 (HCM 2010)* method.

[3] Below-standard seconds of delay per vehicle and LOS highlighted in **bold.**

* Signal phasing prevents the application of the *HCM 2010* method. *HCM 2000* method was applied instead.

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