



SANTA ANA RIVER PARKWAY ENGINEER'S REPORT AND ALIGNMENT STUDY

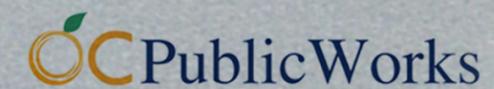
TRAIL AND BIKEWAY FROM GYPSUM CANYON
TO THE ORANGE COUNTY BOUNDARY

Prepared by:



14725 Alton Parkway • Irvine, CA 92618

In association with:



DRAFT

**SANTA ANA RIVER PARKWAY
ENGINEER'S REPORT AND ALIGNMENT STUDY**

AGREEMENT NO. D09-121

APRIL 11, 2011

ORANGE COUNTY PUBLIC WORKS DEPARTMENT

SANTA ANA, CALIFORNIA

Exhibit 4: Engineer's Report and Alignment Study

JESS A. CARBAJAL, DIRECTOR

**ENGINEER'S REPORT AND ALIGNMENT STUDY
FOR
SANTA ANA RIVER PARKWAY
AGREEMENT NO. D09-121**

PREPARED BY:



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APRIL 11, 2011

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CHAPTER ONE | EXECUTIVE SUMMARY



INTRODUCTION

The County of Orange is proposing to extend and realign the Santa Ana River Bikeway and Riding and Hiking Trail to better serve users and to complete its portion of the proposed 100-mile recreational parkway adjacent to the Santa Ana River. The project site is located along the Santa Ana River Parkway between Gypsum Canyon Road and the Orange County Boundary. The Santa Ana River Parkway (Project) will extend the Santa Ana River Bikeway and the separate Santa Ana River Riding and Hiking Trail within this parkway. The Santa Ana River Bikeway is a regional Class I (off-road, paved) bikeway; it accommodates pedestrians and commuter and recreational bicyclists. The Santa Ana River Trail is a regional riding and hiking trail (unpaved); it accommodates walkers, hikers, runners, joggers, mountain bicyclists, and equestrians.

Currently the Orange County portion of the Santa Ana River Class I Bikeway extends 28 miles from the Pacific Ocean to the County Boundary. The bikeway is adjacent to the Santa Ana River for most of this distance. The 26-mile Riding and Hiking Trail also begins near the Pacific Ocean and ends approximately 2 miles downstream of the Orange County Boundary, at Gypsum Canyon Road in the City of Yorba Linda. Access to the Parkway is available from numerous public roadways which span the river, and from regional and local parks and trails.

The project study area, also known as the "Santa Ana River Narrows", is defined by a two mile length of the Santa Ana River floodplain from Gypsum Canyon Road on the west to the Orange County/Riverside County/San Bernardino County Boundary on the east. Its narrow width (850 to 1,950 feet) is defined by SR-91 (Riverside Freeway) on the south, and the BNSF railroad and La Palma Avenue on the north. This area is largely owned by four public entities - three of which are owned/managed by the County of Orange: Orange County Flood Control District (OCFCD), Orange County Parks (OC Parks, formerly Beaches, Harbors and Parks), Green River Golf Club (OCFCD/GRGC); and Chino Hills State Park (CHSP). A narrow strip of private property ownership is noted along the north levee of the river adjacent to the Villa Del Rio neighborhood. (See Exhibit 4-1: Ownership)



PURPOSE

To complete its portion of the Santa Ana River Bikeway and Riding and Hiking Trail, the County desires to extend these routes and to connect with other upstream segments of the trail and bikeway now under development in Riverside and San Bernardino Counties. To accomplish this, the County of Orange requires the preparation of an Engineer's Report and Alignment Study to provide alternatives from which it can select a preferred route(s). The purpose of this study is to prepare the Santa Ana River Parkway Engineer's

Report and Alignment Study which will achieve two primary goals:

1. To close a critical two-mile gap in the Santa Ana River Bikeway and Trail system, and
2. To complete and extend the system to eventually connect with planned improvements in Riverside and San Bernardino Counties.

Further, the study will accomplish its purpose by:

- Preparing trail and bikeway alignment alternatives;
- Preparing a preliminary environmental analysis of the alignments;
- Preparing an opportunities and constraints summary for each alternative;
- Preparing preliminary construction drawings and cost estimates of those alignments;
- Providing for the selection of a Recommended Preferred Trail and Bikeway Alignment; and,
- Ensuring that there is a public outreach program to provide for staff, stakeholder and community input in the selection process.

COMMUNITY WORKSHOPS AND MEETINGS

Participants shared their thoughts about the potential issues and opportunities related to the project and possible trail and bikeway alignments at community workshops on April 8, 2010 at the Yorba Linda Community Center, as well as on April 13, 2010 and August 11, 2010 at the East Anaheim Community Center. A summary report of the input received through the community workshops is provided in **Appendix B**.



The project team met with many interested organizations and agencies during the summer and fall of 2010. A list of the meetings can be found in Chapter 3: Community Outreach and Tools.

GOALS

Based on input from community members and stakeholder organizations, 12 goals were established to guide the development of the alternative alignments to extend the Riding and Hiking Trail and the Class I Bikeway from Gypsum Canyon Road to the County Boundary. These goals include:

1. Provide an enjoyable bikeway, riding and hiking experience.
2. Enhance the Santa Ana River corridor as a passive recreational destination.

3. Encourage linkages to adjacent existing and future bike paths, trails and facilities to reduce driving and encourage outdoor exercise.
4. Minimize impacts to/from river hydraulics.
5. Avoid/minimize impacts to the environment.
6. Interface compatibly with existing uses.
7. Minimize Green River Golf Course intrusion.
8. Minimize Featherly Regional Park/Canyon RV Park intrusion.
9. Minimize intrusion and conform to the Chino Hills State Park (CHSP) General Plan.
10. Provide design coordination and planning interface with other on-going, on-site projects.
11. Establish a maintainable bikeway and trail system.
12. Maximize bikeway and trail user safety.

TRAIL AND BIKEWAY ANALYSIS

A comprehensive assessment of the existing site conditions was prepared to facilitate the development and evaluation of potential alternative trail and bikeway alignments. The analysis included an opportunities and constraints study, preliminary environmental assessment, and a review of ongoing and future projects in the vicinity of the study area. The opportunities and constraints analysis studied the preliminary physical constraints of the alternative route alignments. A composite graphic was prepared for each of the alignments studied utilizing the analysis to gauge conflicts. The composite overlaid five major topics with a total of ten different attributes including:

- Floodplain boundaries (5,000 cfs, 18,000 cfs and 30,000 cfs);
- Wildlife corridors;
- Arundo mitigation parcels;
- Wildlife (California Gnatcatcher, Least Bells Vireo, Southwestern Willow Flycatcher and Santa Ana Sucker); and,
- Sensitive vegetation

ALTERNATIVE ALIGNMENTS

Four alternative alignment concepts were ultimately developed and evaluated to extend the Riding and Hiking Trail and the Class I Bikeway through the study area. These alternatives are cumulative so that each subsequent alternative builds upon and expands what was proposed in the prior alternative, each adding additional bikeway, riding and hiking trails, and other facilities.

Alternative 1: The Parallel Trail

This alternative meets the minimum requirements for the project and includes a paved bikeway and a parallel unpaved trail largely on the south bank of the Santa Ana River. Both routes run parallel with SR-91. The bikeway will use the existing paved surface constructed as part of the SARI Line relocation and Santa Ana River Reach 9-Phase IIB projects. The riding and hiking trail will be constructed parallel to the existing paved

surface with a minimum separation of 3-feet. A new bridge is required for the crossing of the Gypsum Canyon drainage. Alternative 1 also includes an unpaved trail on the north side of the river connected to the south bank trail by a new bridge over the Santa Ana River. For all of the alternatives, it was determined that a new river crossing was necessary to extend the existing riding and hiking trail from its current terminus on the north side of the river at Gypsum Canyon Road through the project area. A third bridge further east spanning the downstream end of the Santa Ana River Reach 9 Phase IIb improvements was also required to move the riding and hiking trail back across the river. This is required due to the lack of space for the riding and hiking trail along the south bank of the Reach 9 Phase IIb improvements. At the Riverside County line, the bikeway and trail continue to parallel the river and could potentially extend upstream along the east side of the river to connect with the future Riverside and San Bernardino County portions of the Santa Ana River Parkway.

Alternative 2: The Split Trail

This alternative is similar to Alternative 1, except that the unpaved trail splits off when it crosses the bridge at the Reach 9 Phase IIb improvements to sweep inland to the north and east around the perimeter of the golf use area of the Green River Golf Club. A staging area is also added on the north river bank with a short paved bikeway adjacent to La Palma Avenue. A potential future railroad over/under crossing is proposed in San Bernardino County near the golf course clubhouse to connect to potential trail alignments in Riverside and San Bernardino Counties.

Alternative 3: The Loop Trail

This alternative is similar to Alternative 2, except that it provides two additional paved bikeway loop routes for more relaxed recreational cycling in addition to the paved bikeway paralleling SR-91 along the south bank of the river. This first loop extends the existing bikeway at Gypsum Canyon Road along the north bank of the river, and connects to the south bank trail via the same bridge proposed for the riding and hiking trail crossing. The bridge would be widened to accommodate both users. The major of this bikeway would use an existing paved maintenance road adjacent to La Palma Avenue and the Villa Del Rio neighborhood. The second loop is located on the east side of the project area and would provide a paved trail around the perimeter of the golf course use area. This alternative also differs from Alternative 2 in that it shows a future railroad tunnel undercrossing for the paved and unpaved facilities.

Alternative 4: The Multi-Loop Trail

This alternative continues to build on Alternative 3 to provide an additional commuter-oriented paved bikeway paralleling a separate more relaxed recreational paved bikeway and a separate unpaved trail along SR-91. These three separate routes begin at Gypsum Canyon Road and continue parallel to each other to just east of the Chino Hills State Park at Coal Canyon. A key element of this alternative is to enhance the bikeway/trail user safety by separating the commuter cyclists from the recreational users.



ENGINEERING AND DESIGN FEATURES

The engineering and design features of the project include a range of items including but not limited to hydraulics, new bridges, staging areas, trailheads, turn outs and vista points, as well as cross roads/intersections, paving treatments, plant materials, fencing, striping and signage.

COMMUNITY OPEN HOUSE

An open house was held on Saturday, November 13, 2010 for the public to learn about and provide input on the alternative alignments that had been developed for the Bikeway and Riding and Hiking Trail. Participants had the opportunity to learn more about the project history and background and speak with project team members. The goal of the open house was to have the public assist in the development of a preferred alternative by rating each alternative alignment. A summary report of the input received through the open house is provided in **Appendix C**.

RECOMMENDED PREFERRED ALTERNATIVE

A Preferred Alternative was recommended based on community and stakeholder input and team analysis of the potential routes, opportunities and constraints, on-going projects, preliminary environmental analysis and project costs. Because each alternative built on the previous alternative, many comments recommended that alternative three or four may be proposed as later phases of the project and could be built over time as more funds become available. The overall consensus of the project team and from community/stakeholder input was that the best alternative was a hybrid of Alternatives 2 and 3, called "Alternative 2 Modified: The Split Trail with Loop."

- **Alternative 2 Modified: The Split Trail with a Loop** (See **Exhibit 7-2**)
The Preferred Alternative is a hybrid which combines elements of Alternatives 2 and 3 into a new Alternative 2 Modified. The modified alternative is a hybrid because it extends the south bank bikeway a short distance over the proposed bridge to meet the existing north bank bikeway which has also been extended by joining a segment of the County service road. This requires a wider bridge (20' vs. 12') over the Santa Ana River. The benefit is that this modification creates a north bank bikeway that joins the south bank bikeway. This creates a new bikeway loop that is one of the loop elements of Alternative 3 that does not exist in Alternative 2.

CONCLUSION

This Engineer's Report and Alignment Study concludes with a preliminary cost estimate for each of the alternatives, as well as the Alternative 2 Modified. The preferred alternative is also developed further in the preliminary construction drawings located at the end of this report.

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CHAPTER TWO | INTRODUCTION



The County of Orange is proposing to extend and realign the Santa Ana River Bikeway and Riding and Hiking Trail to better serve users and to complete its portion of the proposed 100-mile recreational parkway adjacent to the Santa Ana River. The project site is located along the Santa Ana River between Gypsum Canyon Road and the Orange County Boundary. (See **Exhibit 2-1: Regional Vicinity Map**, and **Exhibit 2-2: Local Vicinity Map**.)

The Santa Ana River Parkway (Project) will extend the Santa Ana River Bikeway and the separate Santa Ana River Riding and Hiking Trail within this parkway. The Santa Ana River Bikeway is a regional Class I (off-road, paved) bikeway; it accommodates pedestrians and commuter and recreational bicyclists. The Santa Ana River Trail is a regional riding and hiking trail (unpaved); it accommodates walkers, hikers, runners, joggers, mountain bicyclists, and equestrians.

The County is undertaking this Engineer's Report and Alignment Study to provide alternatives from which it can select a preferred route(s).

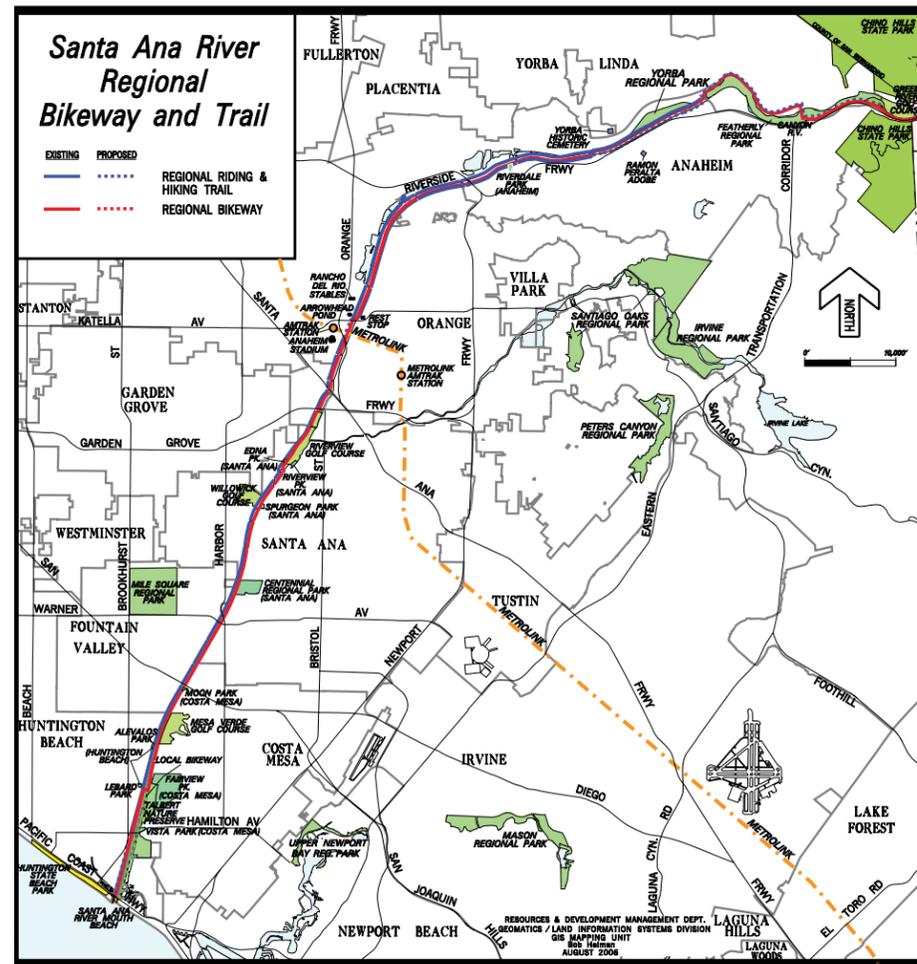


Exhibit 2-1: Regional Vicinity Map

PROJECT BACKGROUND

On October 17, 2006, the Counties of Orange, Riverside and San Bernardino; the Santa Ana Watershed Project Authority (SAWPA); and the Wildlands Conservancy signed a Memorandum of Understanding (MOU) to coordinate Parkway planning along the Santa Ana River. In the MOU, these agencies identified a common desire to create a 100-mile recreational Parkway adjacent to the Santa Ana River. The Parkway would include a Class I Bikeway and a Riding and Hiking Trail. It is estimated that approximately a million trail users already visit the Orange County portion of the Parkway each year.

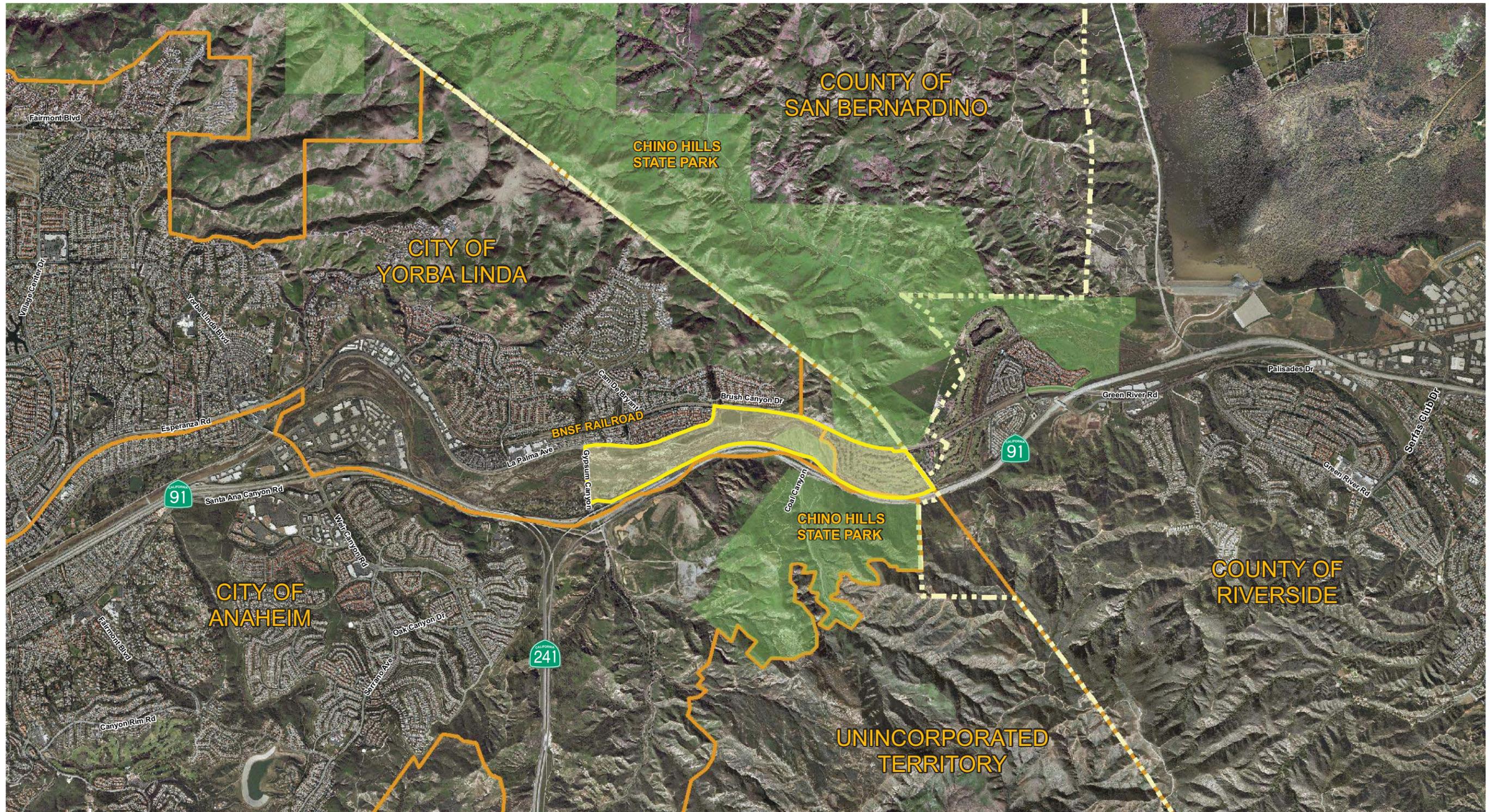
Currently the Orange County portion of the Santa Ana River Class I Bikeway extends 28 miles from the Pacific Ocean to the County Boundary. The bikeway is adjacent to the Santa Ana River for most of this distance. The 26-mile Riding and Hiking Trail also begins near the Pacific Ocean and ends approximately 2 miles downstream of the Orange County Boundary, at Gypsum Canyon Road in the City of Yorba Linda. Access to the Parkway is available from numerous public roadways which span the river, and from regional and local parks and trails.

To complete its portion of the Santa Ana River Bikeway and Riding and Hiking Trail, the County desires to extend these routes and to connect with other upstream segments of the trail and bikeway now under development in Riverside and San Bernardino Counties. To accomplish this, the County of Orange requires the preparation of an Engineer's Report and Alignment Study to provide alternatives from which it can select a preferred route(s). Acceptable alignments can cross or parallel the Santa Ana River, but must remain outside of railroad right-of-way (except where a crossing is proposed). The study also examines locations where the trail and bikeway can connect with other regional and local trails and bikeways, including the Coal Canyon and Gypsum Canyon Regional Riding and Hiking Trails.



STUDY AREA

The project study limits includes the area between Gypsum Canyon Road and the Orange/Riverside/San Bernardino County Boundary, and between State Route (SR) 91 and the BNSF railroad/La Palma Avenue. The study area includes the river banks and elevated earthen benches, a regional railroad corridor, Featherly Regional Park (Canyon RV Park), Chino Hills State Park, and the Green River Golf Club. (See **Exhibit 2-3** for the Study Area boundaries.)

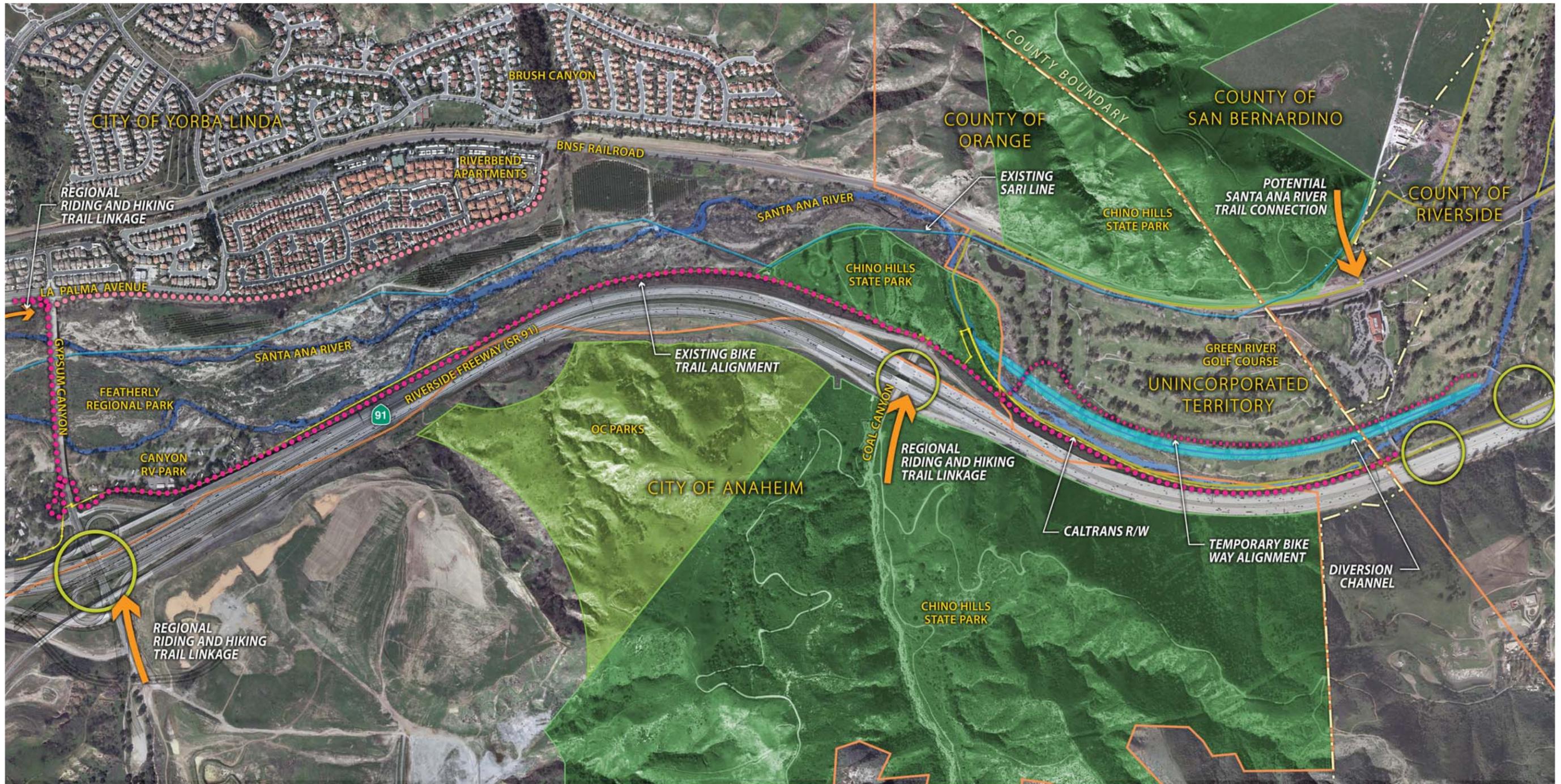


Legend

 Project Boundary



Exhibit 2-2: Local Vicinity Map



- Existing Class I Bike way
- Existing Service Road
- Temporary Bikeway Detour
- ➔ Regional Riding & Hiking Trail
- SR-91 Undercrossing Points
- County Boundaries
- City Boundaries
- Caltrans Right-of-Way
- Orange County Parks
- Chino Hills State Park
- Green River Golf Course
- Existing SARI Line
- Diversion Channel



Exhibit 2-3: Project Area

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CHAPTER THREE | COMMUNITY OUTREACH



INTRODUCTION

As part of the overall approach to project development, regular bi-weekly meetings and staff working sessions were held with OC Public Works. Community outreach and stakeholder input were also important components in the project development and included workshops, stakeholder working group meetings, and a public open house. A community outreach plan was prepared to guide this effort. A copy of the plan and print outs of the outreach materials are included in **Appendix A: Outreach Tools**.

BI-WEEKLY MEETINGS

The project team met regularly with County staff for the duration of the project to monitor progress, discuss issues and project alternatives, obtain feedback, and maintain an open dialog as the project alternatives evolved. Included in these meetings were field trips and information sharing about other on-going projects within the study area.

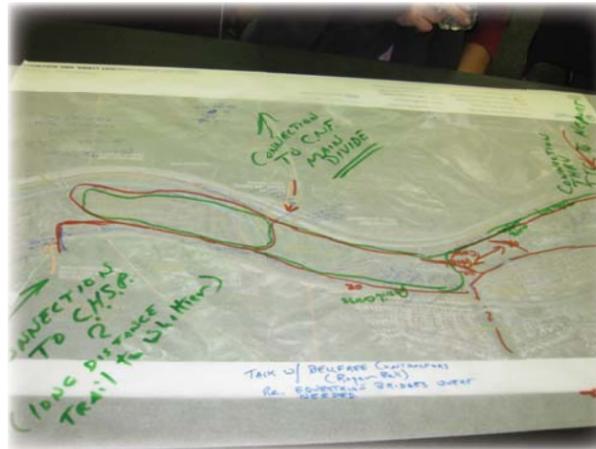
STAFF WORKING SESSIONS

In addition to the general coordination and bi-weekly meetings, four staff working sessions were held with OC Public Works and OC Parks. The meetings were “roll up your sleeves” work sessions for the development of project goals, alternatives, analysis and recommendation of a preferred alternative.

COMMUNITY WORKSHOPS AND MEETINGS

Participants shared their thoughts about the potential issues and opportunities related to the project and possible trail and bikeway alignments at community workshops on April 8, 2010 at the Yorba Linda Community Center, as well as on April 13, 2010 at the East Anaheim Community Center, and August 11, 2010 with the Villa Del Rio HOA Board at a local school in Yorba Linda.

A summary report of the input received through the community workshops is provided in **Appendix B: Community Workshops Summary**.



STAKEHOLDER WORKING GROUP

The Stakeholder Working Group included approximately 20 stakeholders representing federal, state and county agencies, as well as municipalities, selected from a list prepared by County staff (see Acknowledgements). Five meetings were conducted on:

- April 27, 2010 – Issues and Opportunities;
- May 25, 2010 – Preliminary Alternatives;
- June 29, 2010 – Evaluate/ Refine Alternatives;
- August 17, 2010 – Recommend Preferred Alternative; and,
- November 30, 2010 – Open House Debrief and Preferred Alternative

For other key stakeholder groups involved in the process, see the roadshows listed below.

ROADSHOWS

The project team conducted presentations as needed and upon request during 2010. These presentations covered a range of public entities, private groups and interested parties which were identified by OC Public Works staff. The meetings were:

- May 18 – Villa Del Rio Board of Directors;
- May 20 – Meeting with City staff from Anaheim and Yorba Linda, and Chino Hills State Park;
- June 24 – Counties of Orange, Riverside, San Bernardino, and City of Corona;
- July 7 – Yorba Linda Country Riders;
- July 16 – Field Trip with Yorba Linda Country Riders;
- July 19 – Orange County Regional Recreational Trails Advisory Committee (RRTAC);
- August 13 – BNSF Rail Road;
- August 30 – Round Table Meeting with Resource Agencies; and,
- September 8 – Riverside County Meeting, Reach 9 Phase 2A

OPEN HOUSE

Toward the end of the planning process, a public open house was held at the Green River Golf Club on Saturday, November 13, 2010 to present the set of alternatives and the analysis conducted for each. Participants were asked to rate the alternative alignments based on personal preferences. An open house summary is provided in **Appendix C: Open House Summary**.



TOOLS

The following communications tools were used during the course of the project. Copies of which may be found in **Appendix A: Outreach Tools**.

- Website – a website called www.sartrail.com was created for the project;
- Newsletter – one newsletter was published;
- Press releases – press releases were used before the two community workshops and the open house;
- Flyers – flyers were used to publicize the workshops and open house;
- Letters – the County sent letter invitations to all members of the stakeholders group for each meeting and also sent invitations for the August 11th workshop to over 500 residences in the Villa Del Rio and part of the Bryant Ranch neighborhoods;
- E-mail blasts – as reminders, e-mails were sent out before the workshops and open house; and,
- Direct calls – County staff made direct phone calls to interested parties and as follow up to direct inquiries.



ORANGE COUNTY PublicWorks
Our Community. Our Commitment.

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FOR IMMEDIATE RELEASE
November 3, 2010

Media Contact: Debbie Kroner
(714) 834-5373

PUBLIC INVITED TO OPEN HOUSE
Parkway Project Will Plan for Future Extension of the Santa Ana River Trail and Bikeway

The County of Orange is welcoming the public to participate in an open house to view and provide input on the alternative alignments developed for the Santa Ana River Parkway extension from Gypsum Canyon Road to the Orange County boundary.

Visitors can watch a PowerPoint slide show, view the four alternative alignments, discuss trail and bikeway amenities and learn about the project schedule from concept to construction. The self-paced format will allow for individual conversations between visitors and project team members.

This extension project is part of a regional, multi-agency effort to create a 100-mile Parkway along the Santa Ana River. The Santa Ana River Parkway is a landscaped greenway with recreational paths located on each side of the Santa Ana River. It is estimated that over a million trail users already visit the Orange County portion of the Parkway each year.

To close a critical gap between the Orange County portion of the Parkway and the planned Parkway improvements in Riverside and San Bernardino Counties, the County of Orange is currently proposing to extend and realign the Santa Ana River Riding and Hiking Trail and the Santa Ana River Bikeway from Gypsum Canyon Road to the Orange County boundary.

The Santa Ana River Bikeway is a paved regional Class I bikeway; it accommodates pedestrians and non-motorized commuter and recreational bicyclists. The Santa Ana River Trail is an unpaved regional riding and hiking trail; it accommodates walkers, hikers, runners, joggers, mountain bicyclists, and equestrians.

The open house will be held at the following time and location:

Saturday, November 13th
8 am to 11 am
Green River Golf Club
5215 Green River Road
Corona, CA 92880

The open house will be self-paced and the public may arrive at anytime during the open house hours.
(more)

SANTA ANA RIVER PARKWAY (TRAIL AND BIKEWAY) COMMUNITY WORKSHOP

Rescheduled- Thursday, April 8th
Registration: 5:30 p.m.
Workshop: 6:00 to 7:30 p.m.
Yorba Linda Community Center
4501 Cass Loma Avenue
Yorba Linda

The County of Orange is extending and realigning the Santa Ana River Bikeway and Riding and Hiking Trail from Gypsum Canyon Road to the County boundary and wants to hear from you!

You are invited to participate in a Community Workshop and learn about the Santa Ana River Parkway project, identify issues and opportunities, and tell us what's important to you.
The same information will be presented at both workshops.

Tuesday, April 13th
Registration: 5:30 p.m.
Workshop: 6:00 to 7:30 p.m.
East Anaheim Community Center
8201 E. Santa Ana Canyon Road
Anaheim

For more information about the Santa Ana River Parkway Project, please contact Jeff Dickman with OC PublicWorks at 714.834.2774 or via email jeff.dickman@ocgov.com or visit www.sartrail.com.

SANTA ANA RIVER PARKWAY (TRAIL AND BIKEWAY)

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ABOUT THE PROJECT

Project Background and History
On October 17, 2006, the Counties of Orange, Riverside and San Bernardino, the Santa Ana Watershed Project Authority (SAWPA), and the Wildlands Conservancy signed an agreement to coordinate Parkway planning along the Santa Ana River. In the agreement, the agencies involved identified a common desire to create a 100-mile recreational Parkway adjacent to the Santa Ana River. The Parkway would include a Class I (off-road, paved) Bikeway, which serves non-motorized commuter and recreational bicyclists, and a Riding and Hiking Trail. Riding and Hiking Trails are unpaved paths which accommodate walkers, runners, joggers, mountain bicyclists and equestrians. It is estimated that over a million trail users already visit the Orange County portion of the Parkway each year.

Currently the Orange County portion of the Santa Ana River Class I Bikeway extends 28 miles from the Pacific Ocean to the county boundary. The bikeway is adjacent to the Santa Ana River for most of its distance. The Riding and Hiking Trail also begins near the Pacific Ocean and ends approximately 2 miles downstream of the Orange County boundary at Gypsum Canyon Road in the City of Yorba Linda. Access to the river Parkway is available from numerous public roads which span the river, and from regional and local parks and trails.

To complete its portion of the Santa Ana River Bikeway and Riding and Hiking Trail, the County desires to extend these routes, to connect with other upstream lengths of the trail and bikeway near under development in Riverside and San Bernardino Counties. To accomplish this, the County of Orange requires the preparation of an Engineer's Report and Alignment Study to provide alternatives from which it can select a preferred route(s). Acceptable alignments can cross or parallel the Santa Ana River, but must remain outside of riparian right-of-way (except where a crossing is proposed). The study will examine locations where the trail and bikeway can connect with other regional and local trails and bikeways including the Cool Canyon and Gypsum Canyon Regional Riding and Hiking Trails.

Study Area
The project study limits include the area between Gypsum Canyon Road and the Orange/Riverside/San Bernardino County boundary, and between State Route 91 (the Riverside Freeway) and the BNSF railroad/La Palma Ave. The study area includes levees or elevated waterway benches, a regional railroad corridor, the Featherly Regional Park (including the Canyon RV Park), the Oros Hills State Park, and the Green River Golf Club.

CHAPTER FOUR | TRAIL AND BIKEWAY ANALYSIS



INTRODUCTION

A comprehensive assessment of the existing site conditions was prepared to facilitate the development and evaluation of potential alternative trail and bikeway alignments. The analysis included an opportunities and constraints study, preliminary environmental assessment, and a review of ongoing and future projects in the vicinity of the study area. The following sections summarize the results of the project site assessment.

OPPORTUNITIES AND CONSTRAINTS

An opportunities and constraints analysis has been prepared for the project site. It is based on a preliminary examination of existing conditions and the potential impacts the bikeway and hiking and riding trails alternatives may have on them. This preliminary opportunities and constraints analysis coupled with a preliminary environmental analysis (see below) were used to identify and develop potential alternatives, and to later evaluate the alternatives based upon a set of criteria established in conjunction with the County and Stakeholders. Key elements evaluated in the opportunities and constraints study include:

- Property owner rights;
- Santa Ana River Flood Control and other facilities;
- The Orange County arundo removal program;
- Wildlife movement corridors;
- River-related wildlife species;
- Vegetation;
- Public access points; and,
- The Green River Golf Club

The following summaries and exhibits were developed from existing and available data from various sources.

Property Ownership (Exhibit 4-1)

Most property within the study area is publicly owned. There are four major owners within the project study area: Orange County Flood Control District (OCFCD), Orange County Parks (OC Parks- formerly Harbors, Beaches and Parks), Green River Golf Club (owned by OCFCD), and Chino Hills State Parks (CHSP).

Canyon RV Park at Featherly Regional Park is a private leasehold with 140 RV hookups and cabins on a portion of OC Parks land between SR-91 and the south bank of the Santa Ana River. Orange groves on the north bank of the river near Villa del Rio Homeowners' Association (HOA) and Riverbend apartments are on a month-to-month lease to an orange grower.

The north bank of the river includes an OCFCD service road which marks the southern border of the Villa Del Rio neighborhood HOA. The OCFCD service road utilizes an

easement across these private residential lots. Property owners were invited and some have attended the public meetings conducted for the project. Several property owners within the Villa Del Rio neighborhood have expressed support for using the north bank service road for bikeway purposes. A separate parallel hiking and riding trail along the river side of the north bank service road would be located outside of the residential properties on OCFCD land.

Floodplain (Exhibit 4-2)

The Santa Ana River is a major element of the site and flows through the center of the project area. The project area begins at the County line which is approximately two miles downstream of Prado Dam. Prado Dam is a major flood control facility which controls the discharges in the river. There are three critical release rates from the dam that were evaluated for the project, 5,000 cfs, 18,000 cfs and 30,000 cfs. The floodplain limits through the project area for each of these release rates were calculated and mapped as part of the evaluation. The exhibit depicts the extent of flooding for the three release levels: 5,000 cfs, 18,000 cfs and 30,000 cfs. (Source: OCFCD; Related projects are SARI Line Protection/Relocation Project, Lower Santa Ana River Reach 9, Phase 2B and Phase 3 Bank Stabilization Projects, etc.)

OC Arundo Removal Program (Exhibit 4-3)

The Santa Ana River floodplain within the project area is home to Giant Cane, Arundo donax, which is a tall perennial cane that adapts well to floodplain habitats. It is an invasive plant because it damages riparian ecosystems by out-competing native species, such as willows, for water. It is also highly flammable and can change a riparian community from flood-defined to fire-defined. This study area has suffered recent fires allowing for invasive materials to be removed. The exhibit indicates those parcels that are subject to the OC Arundo removal program. Once the Arundo is removed, native plants will be replanted. (Source: County of Orange)

Wildlife Movement Corridors (Exhibit 4-4)

The project area includes an important north-south wildlife movement corridor between Coal Canyon (off-site), which is south of the project to the Chino Hills State Park north of the site. The main wildlife movement corridor is through the SR-91 Freeway/Coal Canyon underpass to the small Chino Hills State Park parcel within the project area. From there, the corridor extends across the river to Brush Canyon and other locations in the larger Chino Hills State Park. This is an important wildlife corridor for numerous species, especially mountain lion and mule deer.

There are also several small culverts under SR-91 that also allow small mammals and rodents to pass into and through the project area. Other important corridors are located to the east of the project area at B Canyon in Riverside County and to the west of the project at Gypsum Canyon Road. (Sources: USFWS and Santa Ana River Canyon Habitat Management Plan, Vol. II, Appendix F , p. 16 – 22, and Vol. III, Appendix V and W)

Wildlife and Special Status Species (Exhibit 4-5)

The known wildlife and special status species in the project area were developed from existing available data. The information noted on this exhibit are derived from files shared by USFWS showing Santa Ana River Woolly Star (mostly south of Gypsum Canyon Road), Least Bell's vireo (2002- 2008), California Coastal Gnatcatcher (1998-2008: off-site at Coal Canyon underpass), and Southwestern willow flycatcher (near Gypsum Canyon Road). Other species noted historically (1997) in the SAR HMP are hawks nests, San Diego Horned Lizard, Santa Ana Sucker, Sticky Yerba Santa, Coulter's Matilja Poppy, and Spreading Yellow Crest.

Other recent surveys along the river bank in between SR-91 and Green River Golf Club identified small rodents – squirrels, gophers and desert cottontails, as well as lizards, snakes and birds in the study area. Bats were observed under the bridge for the main golf course entry drive. Medium to large mammals were also noted – raccoons, skunks, weasels, opossums, coyotes, bobcats and grey fox. (Sources: USFWS, SAR HMP, FSEA Reach 9 Phase II)

Vegetation (Exhibit 4-6)

The vegetation exhibit was prepared by BonTerra Consulting during the spring of 2010. It utilized the Habitat Classification System Natural Resources Geographic Information System (GIS) Project (Prepared for the County of Orange).

Twenty distinct communities were documented within the project area. Generally, riparian communities are located near the banks of the Santa Ana River and areas of periodic flow. Upland communities are located above the riverbanks on elevated terraces and on the Green River Golf Club (GRGC). A list of sensitive species was also utilized as part of this analysis (See **Vegetation Table - Appendix G**).

Public Access Points (Exhibit 4-7)

The project area is a two-mile long corridor between SR-91 and the BNSF Railroad. It begins at Gypsum Canyon Road and ends at the Orange County line. There is presently a two mile gap in the trail system with no formal riding or hiking trail. The bikeway is complete on the south bank; however public access to this linear corridor is limited. Access to the bikeway is currently provided from Gypsum Canyon Road on the west end, and Green River Road on the east side.

There are three existing off-site Bikeway access points to the project area:

1. Gypsum Canyon Road at SR-91;
2. Gypsum Canyon Road at La Palma Road; and,
3. Green River Road at the Orange County line.

There are also two existing Riding and Hiking Trail access points to the project area:

1. Where the trail stops on the north bank of the river at the La Palma Road/Gypsum Canyon Road underpass, and,
2. From the Coal Canyon trail which passes under SR-91 and stops at CHSP.

This project will provide future linkages to connect these bikeways and trails through the river corridor that will allow the public to enjoy its resources.



0 200 400 Feet

Source: County of Orange, ESRI, Eagle Aerial 2009
11/05/10 JN10-106888 SAR_Base24x36_Ownership_mxd JM, LT, KO

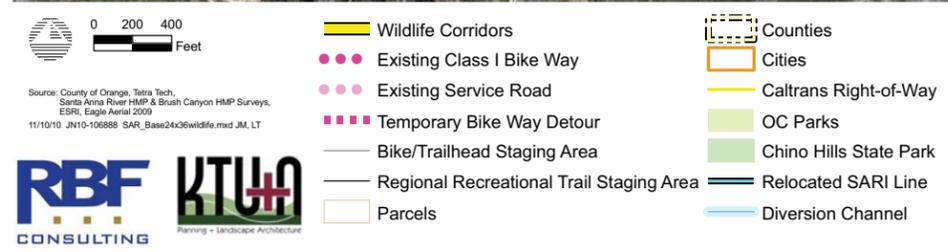
13.71 Ac	Caltrans Relinquishment Parcel (OCFCD)	●●●●● Existing Class I Bike Way	▭ Counties
101.70 Ac	Orange County Parks (OC Parks)	●●●●● Existing Service Road	▭ Cities
116.46 Ac	Orange County Flood Control District (OCFCD)	●●●●● Temporary Bike Way Detour	▭ Chino Hills State Park
114.68 Ac	Orange County Flood Control District (OCFCD) (Unincorporated)	— Bike/Trailhead Staging Area	▭ OC Parks
2.93 Ac	Private Ownership	— Relocated SARI Line	
29.53 Ac	State Parks	— Diversion Channel	
379.00 =	Total Ownership Acres		



Exhibit 4-1: Opportunities and Constraints - Ownership



Exhibit 4-3: OC Arundo Removal Program

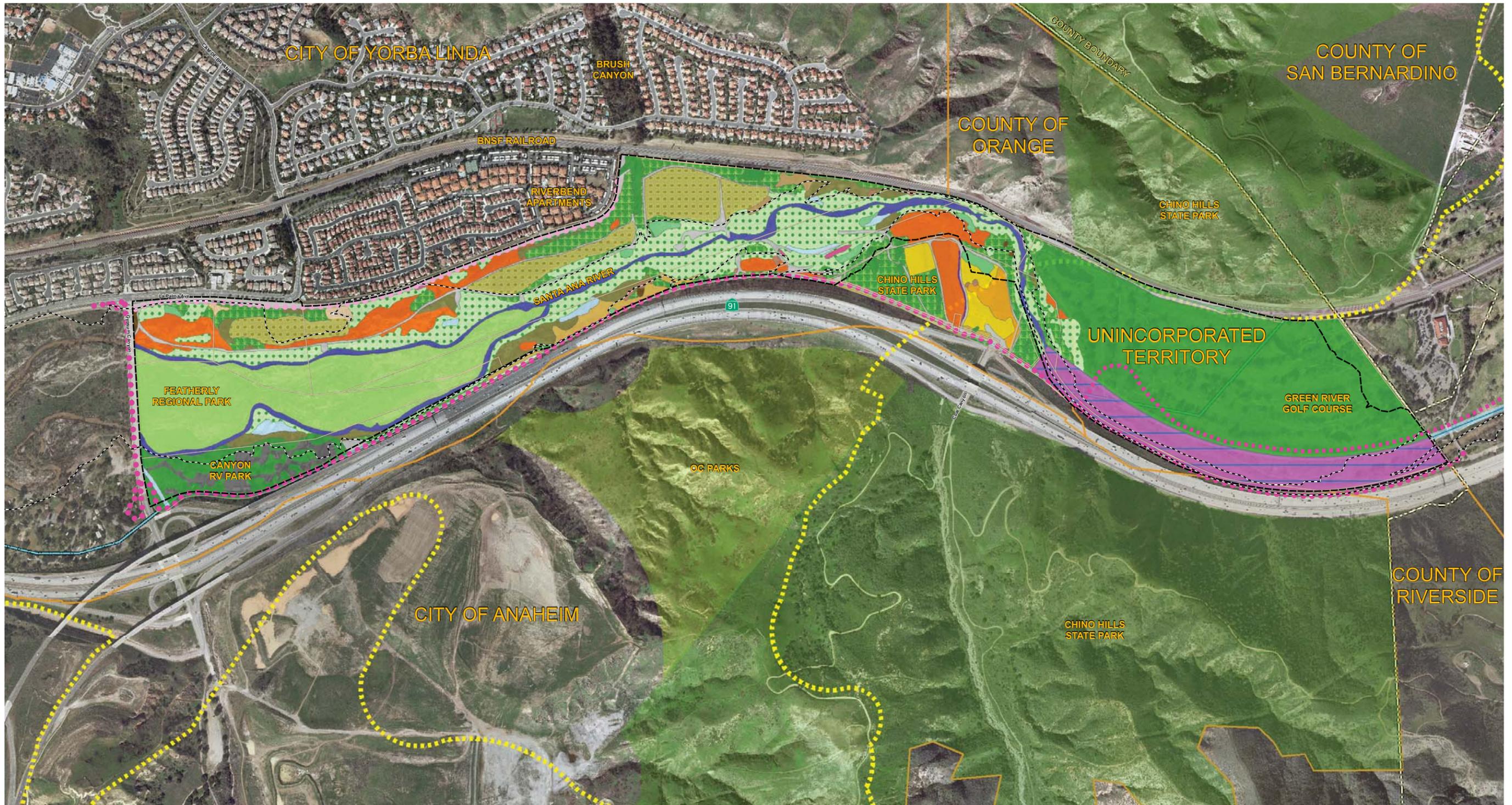


Source: County of Orange, Tetra Tech, Santa Ana River HMP & Brush Canyon HMP Surveys, ESRI, Eagle Aerial 2009
11/10/10 JN10-106888 SAP_Base24x36wildlife.mxd JML.LT



Exhibit 4-4: Wildlife Movement Corridors



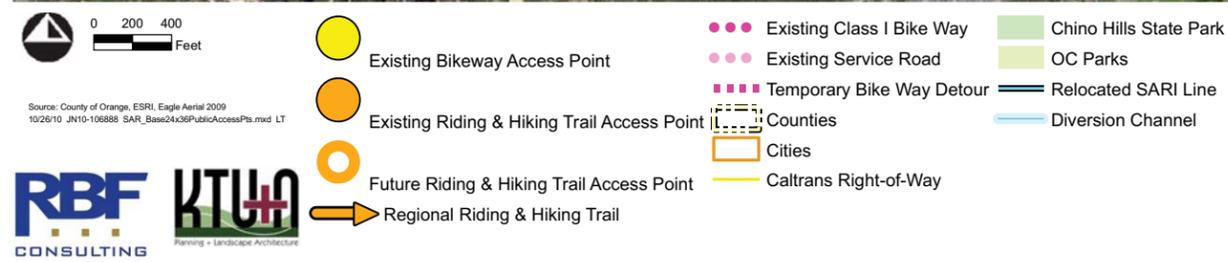


0 200 400 Feet

Source: County of Orange, Bonterra Consulting, ESRI, Eagle Aerial 2009 11/05/10_JN10-106888_SAR_Base24x36_Veg.mxd JM, LT, KO

27.99 Ac	Approximate River Construction Area	4.95 Ac	Mixed Sage Scrub	51.32 Ac	Southern Cottonwood-Willow Riparian Forest	Existing Class I Bike Way	Relocated SARI Line
0.23 Ac	Buckwheat Scrub	3.10 Ac	Mulefat Scrub	48.70 Ac	Southern Cottonwood-Willow Riparian Forest/ Mexican Elderberry Woodland/Floodplain Sage Scrub	Existing Service Road	Diversion Channel
1.11 Ac	California Walnut Woodland	5.95 Ac	Other Developed Areas	8.40 Ac	Southern Sycamore Riparian Woodland	Temporary Bike Way Detour	2008 Freeway Fire Boundary
0.74 Ac	Coast Live Oak Woodland	20.20 Ac	Other Disturbed Areas	10.34 Ac	Southern Willow Scrub	Counties	Waters of the U.S.
0.36 Ac	Coastal Freshwater Marsh	99.59 Ac	Parks and Ornamental Plantings	4.87 Ac	Toyon-Sumac Chaparral	Cities	HMP Boundary
0.69 Ac	Coastal Goldenbush-Grassland	14.71 Ac	Perennial Rivers and Streams	0.01 Ac	Venturan-Diegan Transitional Coastal Sage Scrub	Chino Hills State Park	Parcels
2.96 Ac	Ephemeral Drainages and Washes	31.18 Ac	Ruderal	20.72 Ac	Vineyards and Orchards	OC Parks	
21.97 Ac	Floodplain Sage Scrub	2.62 Ac	Sage Scrub-Grassland Ecotone				
0.84 Ac	Mexican Elderberry Woodland	0.97 Ac	Sagebrush Scrub				

375.51 = Total Vegetation Acres
*Note: 3.49 acres with no Vegetation attribute



Source: County of Orange, ESRI, Eagle Aerial 2009
10/26/10 JN10-106888 SAR_Base2436PublicAccessPs.mxd LT



Exhibit 4-7: Public Access Points

ENVIRONMENTAL ANALYSIS

California Environmental Quality Act

In accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000-21177) and pursuant to Section 15063 of Title 14 of the California Code of Regulations (CCR), the County of Orange, acting in the capacity of Lead Agency, is required to undertake the preparation of an Initial Study to determine if the proposed project would have a significant environmental impact. If, as a result of the Initial Study, the Lead Agency finds that there is evidence that any aspect of the project may cause a significant environmental effect, the Lead Agency shall prepare an Environmental Impact Report (EIR) to analyze project-related and cumulative environmental impacts. Alternatively, if the Lead Agency finds that there is no evidence that the project would cause a significant effect on the environment, either as proposed or as modified to include the mitigation measures identified in the Initial Study, then the Lead Agency shall prepare a Negative Declaration for that project.

Such determination can be made only if “there is no substantial evidence in light of the whole record before the Lead Agency” that such impacts may occur (Section 21080(c), Public Resources Code). The environmental documentation and supporting analysis is subject to a public review period. Following review of any comments received, the County of Orange would consider these comments as a part of the project’s environmental review and include them with the Initial Study documentation for consideration by the County of Orange.

Environmental Factors Potentially Affected

A preliminary environmental assessment was prepared as part of this project in order to discuss and evaluate potential environmental and jurisdictional impacts associated with the project alternatives. Table 4-1 summarizes the potential environmental impacts of the project. Refer to **Appendix E: Preliminary Environmental Analysis** for complete information.

Environmental Topic	Impact Unlikely	Potential Impact	Comments
Aesthetics		X	No significant impacts anticipated; visual impacts associated with a new recreational bridge and presence of construction equipment (temporary).
Agricultural Resources	X		Minor impacts to existing orchard. No prime farmland is situated within the boundaries of the project site.
Air Quality		X	Analysis would be required to calculate “during construction” air emissions.
Biological Resources		X	Potential impacts associated with vegetation removal and wildlife species.
Cultural Resources		X	Potential impacts associated with cultural areas along the River. Potential for “during construction” discovery.
Geology and Soils		X	Potential for liquefaction associated with bridge abutments. Project site is located in an active fault area.
Greenhouse Gasses		X	Analysis would be required to calculate “during construction” air emissions and associated greenhouse gasses.
Hazards and Hazardous Materials		X	During construction activities may utilize hazardous materials such as fuel and other petroleum products near the River. Potential for “during construction” discovery.
Hydrology and Water Quality		X	The proposed project may have impacts to water quality during construction. The project is not anticipated to impact existing hydrology.
Land Use and Planning	X		No change in land use is proposed. The bikeway and trail would continue to provide recreational uses along a river corridor.
Mineral Resources	X		No impacts are anticipated.
Noise		X	Impacts may occur and be associated with during construction activities. Residential uses adjoin the project site on the northern portion of the River.
Population and Housing	X		The proposed project is not growth-inducing. No structures are proposed.



ONGOING AND FUTURE PROJECTS

The project area is undergoing significant change due to the recent raising of the Prado Dam and the need for the Santa Ana River to accommodate increased dam releases up to 30,000 cfs in the event of a flood emergency. The existing SARI line within the Santa Ana River in the project area is being relocated and further protected to safeguard it from such releases and the scour damage it could cause. The increased discharge rates also results in a need for bank stabilization projects and a reconfiguration of the golf course. The on-going projects currently underway are listed below.

Green River Golf Club Routing Studies

The Green River Golf Club (GRGC) is owned and operated by OCFCD. It was originally a 36-hole course which, during SARI line relocation and river bank stabilization projects, has been reconfigured temporarily to an 18-hole course. A separate GRGC Routing Study is underway to analyze the potential future configuration of the golf course. There are as many as nine different routings under consideration.

The County has asked as part of the SAR Bikeway and Trail alternative alignment studies that a "Golf Course Use Area" be noted on the alignment base map. The County has requested that the future bikeway and trail alignments remain on the perimeter of the Golf Course Use Area.

The SAR Parkway Alternative 2 shows a reduced golf course footprint (less than Golf Course Use Area) which represents an executive golf course layout within Orange County with a multi-purpose trail around its perimeter.

Santa Ana River Interceptor Line (SARI) Relocation Project

The SARI Relocation Project will interface with this project from Chino Hills State Park to Featherly Regional Park/Canyon RV Park. The SARI Line project is anticipated to be completed prior to the implementation of the SAR Bikeway and Trail project. This project will include the construction of a new 12-foot wide service road. The location of the new road has been incorporated in the project planning, and will be used, wherever possible, as the future paved SAR Class I Bikeway.

West Bound State Route 91 Right-of-way Relinquishment (Part of SARI Relocation Project)

The SR-91 ROW relinquishment project relinquishes a strip of existing Caltrans right-of-way to OCFCD from Featherly Regional Park/Canyon RV Park to Green River Road. This transfers ownership to the Orange County Flood Control District a corridor, which averages 30-feet wide, where the future SARI line will be located. The bikeway and hiking and riding trail will also be located in this corridor, where possible, on the south side of the river.

Lower Santa Ana River Reach 9 Phase 2B Bank Stabilization Project

The SAR Reach 9, Phase 2B project will stabilize the south river bank with grouted stone

at the big bend in the river adjacent to SR-91 and the GRGC at the County Boundary. As part of this project a 15-foot wide paved maintenance road on top of the bank will be constructed. The maintenance access road will be used as a portion of the Santa Ana River Class I Bikeway to connect from the Chino Hills State Park to the Orange County Boundary at Green River Road. A temporary bike detour through GRGC has been installed during the construction of the project and will likely be removed at the completion of the project.

Perennial Stream Mitigation Project (Part of Reach 9, Phase 2B)

This project is included within the Reach 9 Phase 2B project and will partially mitigate impacts from recent construction at Prado Dam and Reach 9 of the Santa Ana River. The Perennial Stream Mitigation consists of widening the Santa Ana River between Coal Canyon Road and the proposed GRGC entry road/bridge to accommodate a meandering stream design and additional native vegetation.

Lower Santa Ana River Reach 9 Phase 3 Bank Stabilization Project

The SAR Reach 9 Phase 3 project is a ±1,400-foot length of proposed bank stabilization adjacent to SR-91 between the Canyon RV Park and the Coal Canyon Road. The project is located along a stretch of the SAR where the existing access is narrow and part of the SAR meanders towards the SR-91. This area is also used by the existing Class I bikeway and will be the location for the new SARI line. It was determined during the SARI Relocation project that this area could be subject to significant erosion as a result of the increased discharges from Prado Dam. The Army Corps of Engineers is proposing to construct a project that will stabilize the bank with either a grouted stone revetment or a sheet pile wall. This will allow enough room between SR-91 and the river for the paved Santa Ana River Class I bikeway and the Gypsum-Coal Canyon Regional Riding and Hiking Trail to pass.

State Route 91 Corridor Improvement Project (CIP)

The SR-91 CIP project by RCTC and Caltrans District 8 proposes to widen SR-91 by adding several lanes between the County line and I-15. The current concept for the improvements will extend the freeway toward the river just south of the GRGC. The project would require some modifications to the existing Green River Road which is being implemented in advance as part of the SAR Reach 9 Phase 2B project. It also removes an area of shoulder parking that many bicyclists use and proposes to replace it with a parking lot next to the new golf course entry driveway, which will be located nearer to the B Canyon undercrossing. This new parking lot is proposed to be located just east of the County line in Riverside County, but will provide parking and a small staging opportunity for future SAR Parkway users.

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CHAPTER FIVE | EVALUATION CRITERIA

DRAFT EVALUATION CRITERIA		CONCEPT				
GOAL	OBJECTIVES	MEASUREMENT UNIT	1	2	3	4
1. Provide Enjoyable Bikeway, Riding and Hiking Experience	1.1 Accommodate and appeal to a variety of bikeway & trail users by providing a Riding and Hiking trail and a Class I Bikeway	From New River Department Meets Objective 1 Metric: Objective 1.1	5	1	2	2
	1.2 Provide convenient public access points	United Access ID 2 (paved) +1 Metric: Objective 1.2	1	2	2	2
	1.3 Provide Opportunities to Experience Different Ecological Environments	Meets Objective 1.3 Metric: Objective 1.3	1	2	2	2
	1.4 Provide a separate Class I Bikeway for Slower Recreational Bikers where possible	Separate in places +1 Metric: Objective 1.4	0	1	2	2
	1.5 Separate Riding and Hiking Trails from Class I Bikeways where possible	Separation +1 Metric: Objective 1.5	2	2	1	1
Subtotal			5	6	9	9
2. Enhance Santa Ana River Corridor as a Passive Recreational Destination	2.1 Provide Riding and Hiking Trail Loops (paved) to add variety, distance and enjoyment	No Loops +0 Loop Trail Length +1 Metric: Objective 2.1	1	1	1	1
	2.2 Provide Bikeway Loops (paved) to Add Variety, Distance and Enjoyment	Loop Bikeway Length +1 Metric: Objective 2.2	0	0	2	2
	2.3 Provide Turnouts for Interpretive Education and Rest Stops along Trail and Bikeway	No Turnouts +0 Turnout Length +1 Metric: Objective 2.3	1	1	2	2
	2.4 Provide Trailhead and/or Staging areas within or adjacent to project area	Trailhead or Staging +0 Metric: Objective 2.4	1	2	2	2
	2.5 Provide a Riding and Hiking Trail connection from Yorba Linda across the river southward that is an alternative to Gypsum Canyon Bridge	Connection Provided +1 Metric: Objective 2.5	1	1	1	1
3. Encourage Linkages to Adjacent Existing and Future Bike Paths/Trails and Facilities to Reduce Driving and Encourage Outdoor Exercise	3.1 Provide Opportunities for Connections to Existing Trails and Facilities	No Connections +0 Metric: Objective 3.1	1	1	2	2
	3.2 Provide Opportunities for Connections to Future Trails and Facilities	Connections +1 Metric: Objective 3.2	1	1	2	2
	3.3 Take Advantage of Existing Shade Opportunities	Shade Opportunities +1 Metric: Objective 3.3	1	1	2	2
Subtotal			6	7	10	10
4. Minimize Impacts to/from River Hydraulics	4.1 Provide a "High & Dry" Paved Bikeway (above 30,000 cfs) where possible	None +0 Metric: Objective 4.1	1	2	2	2
	4.2 Minimize Flood Plain Intrusions for Soft Surface Trails	None +0 Metric: Objective 4.2	1	1	1	1
	4.3 Minimize Bridges, and associated piers and bank stabilization structures	None +0 Metric: Objective 4.3	2	2	1	1
	4.4 Minimize grading and design trail slopes with consideration of drainage	Min. of all trails 2.5% slope +1 Metric: Objective 4.4	1	1	1	1
	Subtotal			5	6	6

The goals of the project were created collaboratively by working with County staff, stakeholders, and the community. This process began with public input, draft concepts and goal development. The goals were refined and specific objectives to meet the goals were developed in conjunction with the County and stakeholders. The goals and objectives were later used to test and evaluate each of the potential alternatives. An evaluation of each alternative was shared and refined with staff and stakeholders and each alternative was presented to the public for comment at a public open house. A preferred alternative was recommended at the conclusion of this process. This chapter focuses on the goals and objectives by which the alternatives were analyzed and later ranked.

GOALS SUMMARY

Based on input from community members and stakeholder organizations, twelve goals were established to guide the development of the alternative alignments to extend the Santa Ana River Regional Riding and Hiking Trail (unpaved) and the Santa Ana River Regional Class I (paved, off-road) Bikeway from Gypsum Canyon Road to the County Boundary. The goals are:

1. Provide an enjoyable bikeway, riding and hiking experience.
2. Enhance the Santa Ana River corridor as a passive recreational destination.
3. Encourage linkages to adjacent existing and future bike paths, trails and facilities to reduce driving and encourage outdoor exercise.
4. Minimize impacts to/from river hydraulics.
5. Avoid/minimize impacts to the environment.
6. Interface compatibly with existing uses.
7. Minimize Green River Golf Course intrusion.
8. Minimize Featherly Regional Park/Canyon RV Park intrusion.
9. Minimize intrusion and conform to the Chino Hills State Park (CHSP) General Plan.
10. Provide design coordination and planning interface with other on-going on-site projects.
11. Establish a maintainable bikeway and trail system.
12. Maximize bikeway and trail user safety.

GOALS AND OBJECTIVES

The following list describes each of the twelve goals and identifies the specific objectives developed for each goal.

1. **Provide an enjoyable bikeway, riding and hiking experience.**
 - Accommodate and appeal to a variety of bikeway and trail users by providing a Riding and Hiking trail and Class I Bikeway.
 - Provide convenient public access points.
 - Provide opportunities to experience different ecological environments.
 - Provide a separate Class I bikeway for slower recreational bikers where

- possible.
- Separate riding and hiking trails from Class I bikeways wherever possible.

2. Enhance the Santa Ana River Corridor as a passive recreational destination.

- Provide riding and hiking trail loops (unpaved) to add variety, distance and enjoyment.
- Provide bikeway loops (paved) to add variety, distance and enjoyment.
- Provide turnouts for interpretive education and rest stops along trail and bikeway.
- Provide trailhead and/or staging areas within or adjacent to project area.
- Provide riding and hiking trail connection from Yorba Linda across the river southward that is an alternative to Gypsum Canyon Bridge.
- Provide vista/viewing opportunity areas.
- Take advantage of existing shade opportunities.

3. Encourage linkages to adjacent existing and future bike path/trails and facilities to reduce driving and encourage outdoor exercise.

- Provide opportunities for connections to the Santa Ana River Trail and Class I Bikeway in Riverside County.
- Provide opportunities for connections to Yorba Linda trails.
- Provide opportunities for connections to Anaheim riding and hiking trails (future Mountain Park Staging Area and Gypsum Canyon and Weir Canyon Regional Riding and Hiking Trails).
- Provide opportunities for connections to Corona trails and future Green River Road Parking Area.
- Provide connections to Chino Hills State Park and the Coal Canyon Regional Riding and Hiking Trail.

4. Minimize impacts to/from river hydraulics.

- Provide a "high and dry" bikeway (above the 30,000 cfs) where possible.
- Minimize floodplain intrusions for soft surface trails.
- Minimize bridges, and associated piers and bank stabilization structures.
- Minimize grading and design trail slopes with consideration of drainage.

5. Avoid/minimize impacts to the environment.

- Utilize existing roads, service roads, and trails whenever possible.
- Design bikeway/trails to discourage off-trail use and potential subsequent damage to environmental resources.
- Avoid/minimize impacts to potential jurisdictional waters.
- Avoid/minimize impacts to sensitive vegetation.
- Avoid/minimize impacts to major wildlife movement corridors.
- Avoid/minimize impacts to OC Arundo Mitigation sites, other mitigation sites and restoration areas.
- Comply with resource management practices, Santa Ana River Habitat Management Plan, etc.

6. Interface compatibly with existing land uses:

- Green River Golf Club and facilities.
- Chino Hills State Park.
- BNSF Railroad.
- Villa Del Rio and Bryant Ranch- adjacent Yorba Linda neighborhoods.
- Future Mountain Park project- adjacent future Anaheim neighborhood.
- Canyon RV Park (leasehold) and Featherly Regional Park.

7. Minimize Green River Golf Course Intrusion.

- Route future bikeway and trail alignments around the perimeter of Golf Use Areas whenever possible.
- Avoid bikeway alignment between the existing 13th hole slope and the golf course parking lot.
- Separate trail and bikeway users from the Golf Course Clubhouse and associated facilities.
- Separate trail and bikeway users from Golf Course vehicular traffic.
- Separate any future bikeway and trail staging area or trailhead from the Golf Course parking lots.

8. Minimize Featherly Regional Park/Canyon RV Park Intrusion.

- Route the bikeway and trail alignments around Canyon RV Park perimeter whenever possible.
- Provide separation between bikeway/trail users and RV Park users.
- Allow continued bikeway and trail limited access corridors and connections to the off-site future Gypsum Canyon Trail and existing paved bikeway on the bridge at Gypsum Canyon Road and in the vicinity of the Park Ranger Station.
- Protect existing wildlife, natural vegetation and improvements in the Featherly Natural Wilderness Park areas.
- Plan for future bikeway and trail linkages to the RV Park, as needed and agreed to by OC Parks and Canyon RV Park lessee.
- Consider opportunities for the Canyon RV Park lessee to request and operate a bikeway and riding and hiking staging area within the Canyon RV Park, if desired by OC Parks and Lessee at a later date.
- Afford the RV Park lessee the potential to request future concessions to bikeway and trail users if desired by OC Parks and RV Park lessee.

9. Minimize intrusion and conform to Chino Hills State Park General Plan.

- Provide a connection to local and regional trail systems outside the park boundary to the extent feasible and appropriate (CHSP General Plan, p. 71).
- Protect bio-corridors and facilitate the movement of animals and dispersal of plant seed within CHSP (CHSP General Plan, p. 57).
- Expand the visitors' awareness, understanding and appreciation of the park's resources (CHSP General Plan, p. 66).

- Create appropriate pedestrian access points to meet the needs of both the park and local jurisdictions that are contiguous to the park boundary (CHSP General Plan, p. 71).
- Provide access to trails that offer scenic and panoramic views of the park (CHSP General Plan, p. 71).
- Access points should accommodate multiple trail uses (hikers, bicyclists, equestrians) (CHSP General Plan, p. 71).
- Protect and enhance natural resources in the Santa Ana River and adjacent habitat. (CHSP General Plan, p. 76).

10. Provide design coordination and planning interface with other on-going on-site projects, including:

- SARI Protection/ Relocation Project.
- Lower Santa River Channel, Reach 9 Phase 2B: Bank Stabilization Project.
- Lower Santa River Channel, Reach 9 Phase 2B: Perennial Stream Restoration Project.
- State Route 91 Corridor Improvement Project.
- West Bound State Route 91 Right-of-way Relinquishment.
- Green River Golf Course Routing Alternatives and Economic Study.
- Santa Ana River Canyon and Brush Canyon Habitat Management Plan Implementation.

11. Establish a maintainable bikeway and trail system.

- Minimize need for extensive grading.
- Minimize the need for acquisition of land and private property easements.
- Trail will accommodate the maintenance and access requirements of the local jurisdiction.
- Minimize the need for ongoing vegetation clearance
- Minimize the repair of trails and closure due to flooding.
- Minimize use of structural devices (walls, bridges, culverts, etc.).
- Minimize operation and maintenance costs.

12. Maximize bikeway and trail user safety.

- Minimize interaction with motor vehicles.
- Minimize bikeway and trail intersections
- Comply with established design standards.
- Provide safe river and rail road crossings.
- Ensure protection of trail users.
- Provide access for police and fire services.



CHAPTER SIX | ALTERNATIVE ALIGNMENTS



INTRODUCTION

This chapter discusses all the potential alignments considered, the various bikeway and trail types, and the range of alternatives that were developed and evaluated as part of this study. The alternatives were developed in cooperation with County staff, the stakeholders and community.

ALL POTENTIAL ALIGNMENTS

The All Potential Routes exhibit (Exhibit 6-1) records the various existing and potential bikeway and trail alignments that are located within the study area. The exhibit was developed from extensive field investigations of the study area, and evaluations of the baseline data identified in the trail and bikeway analysis (Chapter 4). In addition, the exhibit shows the various existing and potential bridge locations, railroad crossings, planned and proposed staging areas, public access points and flood release levels.

The potential trail routes analysis identified and studied existing/under construction and other possible routes that could potentially be used to develop a recommended project. The potential routes were also discussed with the public and stakeholders during the community outreach and stakeholder working group sessions. The following summarizes some of the key items considered to narrow the many potential routes to a range of potential alternatives.

Existing/Under Construction Routes

Other projects now under construction which will include paved access roadways that will be useable for bikeway purposes include:

- The SARI line relocation project will include a paved service road (12-foot wide) that will parallel SR-91 from Gypsum Canyon Road to the east end of Chino Hills State Park (CHSP), and
- The Reach 9, Phase 2B project include the installation of a paved service road (15-foot wide) that also parallels SR-91 from the east end of CHSP to the County Boundary.

Other Potential Routes

These routes are shown in white and were considered as possible alignments for the bikeway and hiking and riding trails through the project area. These potential routes were discussed with staff, the community and stakeholders during the review process. All routes shown on Alternatives 1 through 4 are represented. Routes that are outside of Orange County were discussed conceptually with Riverside County, San Bernardino County, BNSF Railway Company and other stakeholders. A record of these conceptual alignments and sketches are in the **Appendix J**.

Routes Eliminated from Consideration

Several of the potential route alignments were eliminated due to functional or environmental concerns. These alignments included:

- Routes through the middle of the Golf Course Use Area (not shown) were discussed and largely eliminated before presentation due to potential disruption of play and safety concerns,
- Routes in the middle of the river corridor in the floodplain were avoided and considered dangerous, erodible and too intrusive for sensitive vegetation and wildlife.
- River crossings were also minimized (see Bridges below). A key goal was to have a “high and dry” bike route, thus most routes were placed on the perimeter of the river corridor.
- Yellow colored routes on the “All Potential Routes” exhibit were eliminated at the request of stakeholders to protect and leave open major wildlife corridors, and avoid hazardous areas.

Potential Bridges and Railroad Crossings

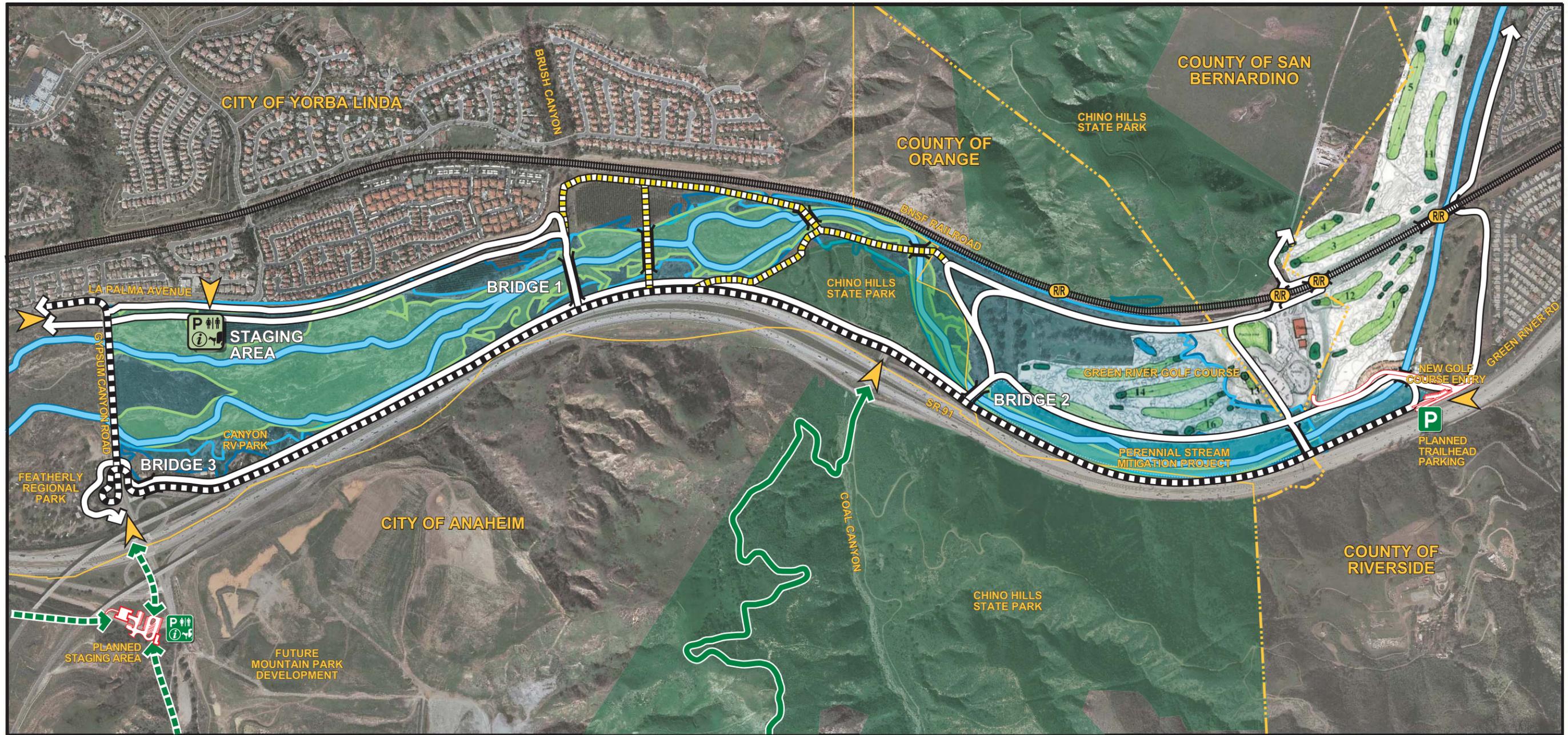
The All Potential Routes exhibit also shows other potential locations that were explored for bridges and railroad crossings. Bridges 1A, 1B, 2, 3 and 4 in Orange County were examined. Bridge 1B (just east and upstream of Bridge 1A) was eliminated due to its length, impacts associated with the trail extensions to the bridge location crossing the Brush Canyon drainage, and other potential intrusions into habitat and wildlife corridors. Other bridges at the existing golf course entry road (4) and at the new golf course entry road are outside of the Orange County Boundary, and were explored for connection options with future Riverside County trails. These crossings require concurrence with Riverside County and may be explored further in the future.

Only one of the five potential railroad crossings studied was in Orange County. This existing railroad undercrossing adjacent to the golf course is at the mouth of a small canyon and is designed for drainage purposes. It was examined to determine if the sediment in the underpass could be removed and the underpass expanded to provide a minimum height clearance of ten feet for a riding and hiking trail. (See **Appendix J**.) Although possible, the undercrossing was too limited because it would not accommodate bicycle/vehicular crossings in conjunction with the drainage function. Other potential railroad crossing locations in San Bernardino and Riverside Counties were evaluated. The optimal crossing at these locations would provide passage for golf carts, cyclists, equestrians, pedestrians and vehicles. Additional information on the study of railroad crossings can be found in Chapter 10: Conclusions.

Potential Staging Areas

The lack of existing staging locations was cited as a major concern at many of the public outreach sessions. To address this deficiency, an evaluation of potential staging areas was included as part of the study. The following staging areas were considered in the study:

- Golf Course Parking Lot. A portion of the Green River Golf Club parking lot was explored for use as a Staging Area on the east end of the study area. This staging area location was eliminated for a number of reasons including; on-going golf course



Potential Trail Routes

- Existing/Under Construction
- Other Potential Alignments
- Routes Removed from Consideration due to Environmental Concerns

- Potential Bridge Locations
- Potential Railroad Crossing Points
- Chino Hills State Park
- Perennial Stream Mitigation Project
- Access Points

Regional Trail Facilities

- Planned or Proposed Parking/Staging Areas
- Existing/Proposed Trails

Flood Release Levels

- 5,000 CFS
- 18,000 CFS
- 30,000 CFS
- River Channel



Exhibit 6-1: All Potential Routes

potential conflicts between the golf club facility users and the bikeway and hiking and riding trail users.

- Featherly Regional Park/ Canyon RV Park. This private leasehold for camping and RV camping will be a staging area for its users and will serve as an informal trailhead. However, the RV Park is not designed to be a public staging area. Use of any portion of the leasehold for staging purposes will require coordination with OC Parks and the lessee.
- Off-site Staging Areas. There are several future off-site staging areas that will allow users to stage and access the study area. They are shown on the alternative alignments exhibits:
 - Mountain Park planned staging area at Gypsum Canyon (Anaheim),
 - Planned trailhead parking adjacent to Green River Road (Riverside County), and
 - Other potential staging areas under consideration in Riverside County but not formalized.

TRAIL TYPES

The trail types studied for inclusion in the project include a Class I Bikeway and a Riding and Hiking Trail. A Class I Bikeway, as defined by the Caltrans Highway Design Manual, “provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized (p. 1000-1). The off-street bikeway will be designed as a paved route to provide additional recreational opportunities and to accommodate commuter demand through the Santa Ana River canyon. Some alignments will explore a separate 8-foot wide paved bikeway for the slower recreational user (see Exhibit 6-2: Typical Sections, blue bike path and section for “Class I Bikeway – Recreational”) and another 12-foot wide paved bikeway for the faster speed commuter (see Exhibit 6-2: Typical Sections, orange bike path and section for “Class I Bikeway-Commuter”). If this separation is not feasible and the recreational bicyclist must share the bike path with the faster commuter bicyclists, then the pavement must have additional width (varies from 12 feet to 15 feet), signage and pavement markers for safe bike travel (see Exhibit 6-2: Typical Sections, red bike path and section for “Class I Bikeway – Shared”).

It is not desirable to mix bicycle traffic with riding and hiking traffic on the same path as they move at different speeds and require different surface materials. Whenever possible, the riding and hiking trail will be designed as a separate 10-foot wide soft surface. Riding and hiking trails include horseback riding, mountain bicycling, hiking, and jogging (see Exhibit 6-2: Typical Sections, yellow trail and section for “Riding and Hiking Trail”). Areas where the two uses come together, such as bridges and staging areas, will require special design solutions.

ALIGNMENT CONCEPTS

Four alternative alignment concepts were ultimately developed and evaluated to extend the Riding and Hiking Trail and the Class I Bikeway through the study area. These alternatives are cumulative so that each subsequent alternative builds upon and expands what was proposed in the prior alternative, each adding additional bikeway, riding and hiking trails, and other facilities. (See Exhibits 6-3 through 6-6 following.)

Alternative 1: The Parallel Trail

This alternative meets the minimum requirements for the project and includes a paved bikeway and a parallel unpaved trail largely on the south bank of the Santa Ana River. Both routes run parallel with SR-91. The bikeway will use the existing paved surface constructed as part of the SARI Line relocation and Santa Ana River Reach 9-Phase 2B projects. A portion of the Gypsum Canyon Riding and Hiking Trail will be constructed parallel to the existing paved surface with a minimum separation of 3-feet. A new bridge is required for the crossing of the Gypsum Canyon drainage. Alternative 1 also includes a length of the Santa Ana River Riding and Hiking Trail on the north side of the river connected to the south bank trail by a new bridge over the Santa Ana River. For all of the alternatives, it was determined that a new river crossing was necessary to extend the existing riding and hiking trail from its current terminus on the north side of the river at Gypsum Canyon Road through the project area. A third bridge further east spanning the downstream end of the Santa Ana River Reach 9 Phase 2B improvements was also required to move the riding and hiking trail back across the river. This is required due to the lack of space for the riding and hiking trail along the south bank of the Reach 9 Phase 2B improvements. At the Riverside County line going eastward, both the Class I bikeway and unpaved trail routes could potentially continue on paralleling the river along the east river bank and then proceed northward to connect with the planned Riverside and San Bernardino County portions of the Santa Ana River Parkway.

Alternative 2: The Split Trail

This alternative is similar to Alternative 1, except that the unpaved trail splits off when it crosses the bridge at the Reach 9 Phase 2B improvements to sweep inland to the north and east around the perimeter of the golf course use area of the Green River Golf Club. A staging area is also added on the north river bank with a short paved bikeway adjacent to La Palma Avenue. A potential future railroad over/under crossing is proposed in San Bernardino County near the golf course clubhouse to connect to potential trail alignments in Riverside and San Bernardino Counties.

Alternative 3: The Loop Trail

This alternative is similar to Alternative 2, except that it provides two additional paved bikeway loop routes for more relaxed recreational cycling in addition to the paved bikeway paralleling SR-91 along the south bank of the river. This first loop extends the existing bikeway at Gypsum Canyon Road along the north bank of the river, and connects to the south bank trail via the same bridge proposed for the riding and hiking trail crossing. The bridge would be widened to accommodate both users. The bikeway

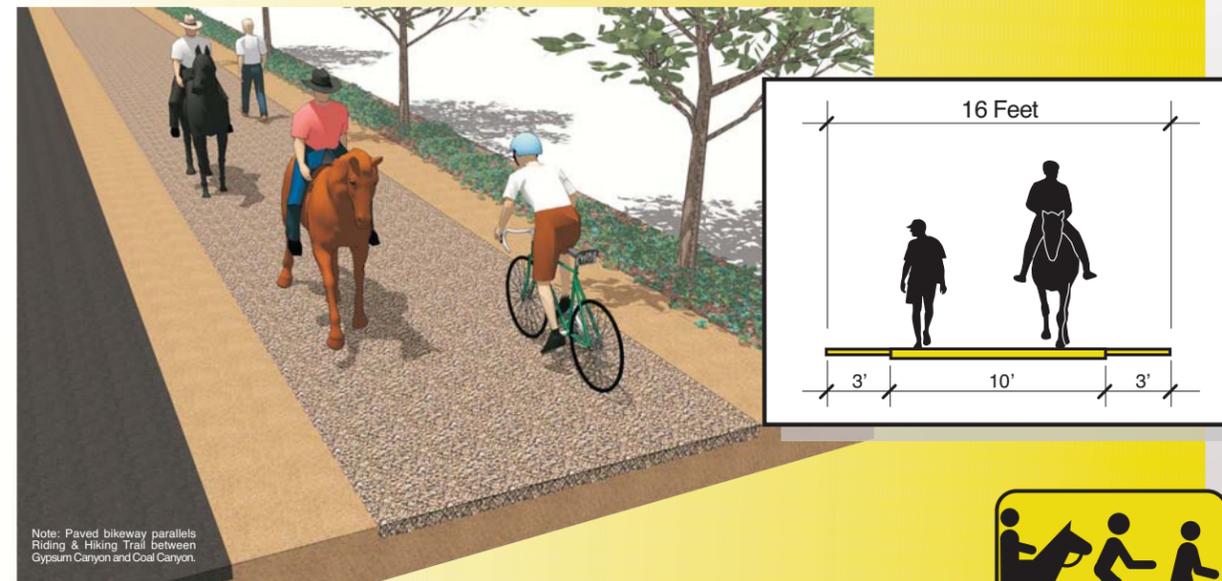
would use an existing paved maintenance road adjacent to La Palma Avenue and the Villa Del Rio neighborhood. The second loop is located on the east side of the project area and would provide a paved trail around the perimeter of the golf course use area. This alternative also differs from Alternative 2 in that it shows a future railroad tunnel undercrossing for the paved and unpaved facilities.

Alternative 4: The Multi-Loop Trail

This alternative continues to build on Alternative 3 to provide an additional commuter-oriented paved bikeway paralleling a separate more relaxed recreational paved bikeway and a separate unpaved trail along SR-91. These three separate routes begin at Gypsum Canyon Road and continue parallel to each other to just east of the Chino Hills State Park at Coal Canyon. A key element of this alternative is to enhance the bikeway/trail user safety by separating the commuter cyclists from the recreational users.

Riding & Hiking Trail

Runners, Joggers, Walkers, Equestrians and Mountain Bicyclists

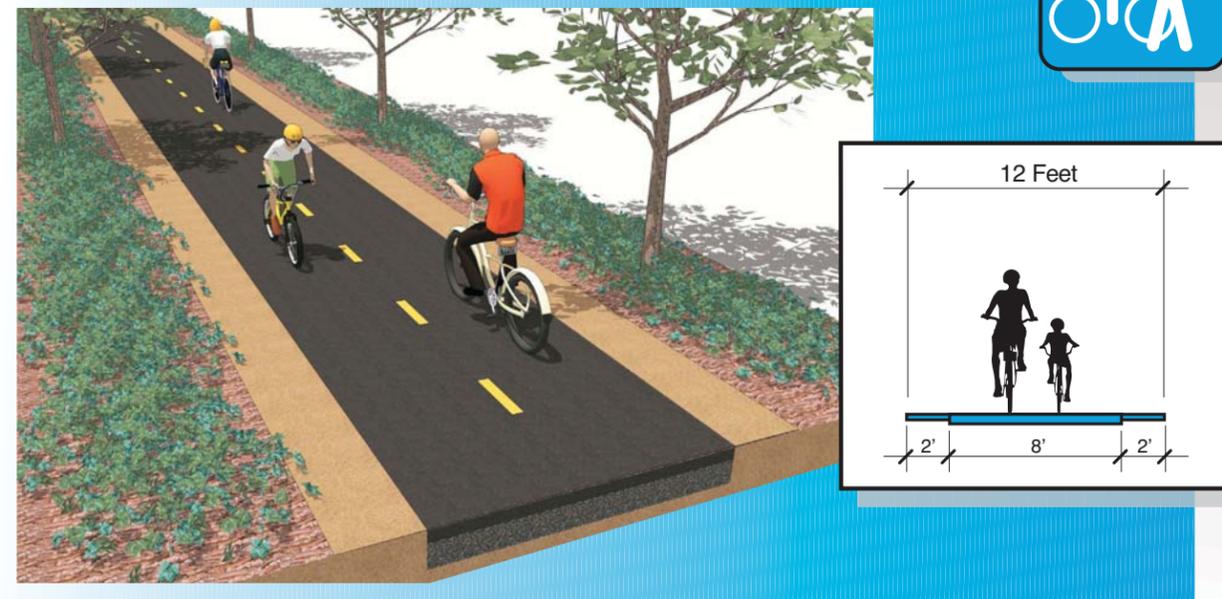


(See all Alternatives)



Class 1 Bikeway (Recreational)

Recreational Cyclists and Other Users

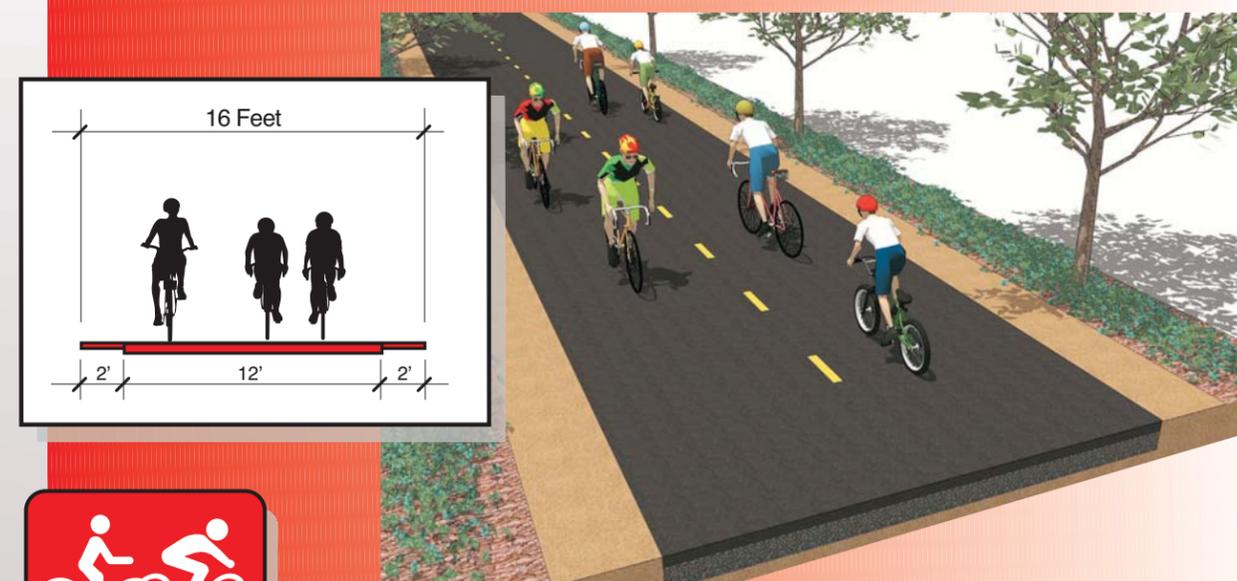


(See Alternatives 2-4)



Class 1 Bikeway (Shared)

Commuter and Recreational Cyclists

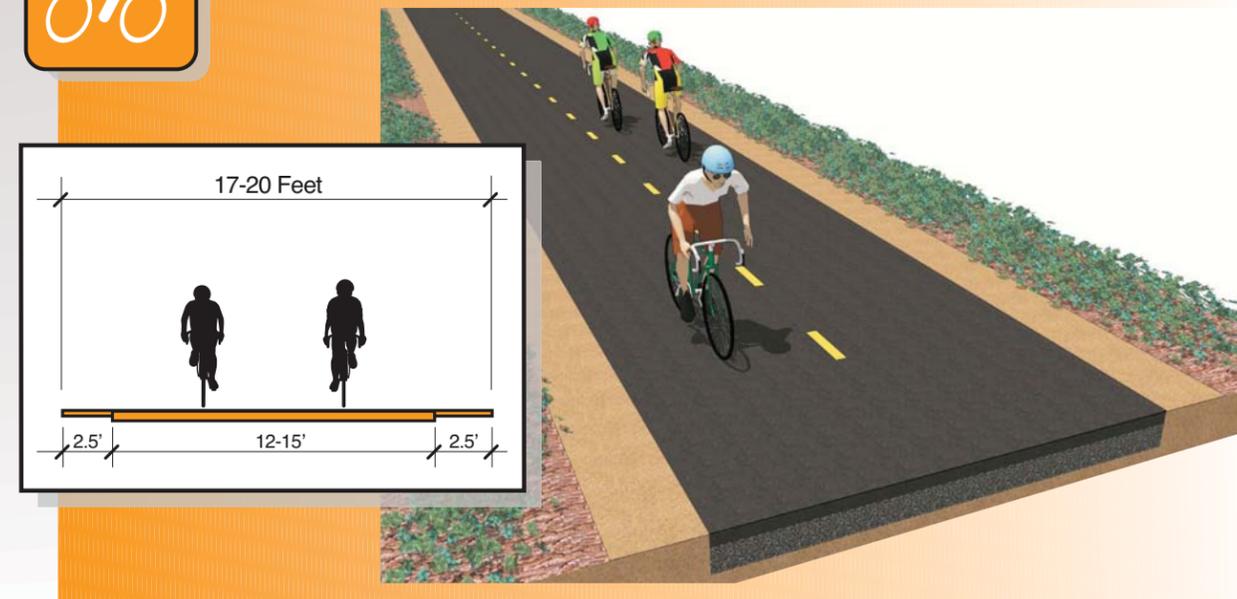


(See Alternatives 2-4)



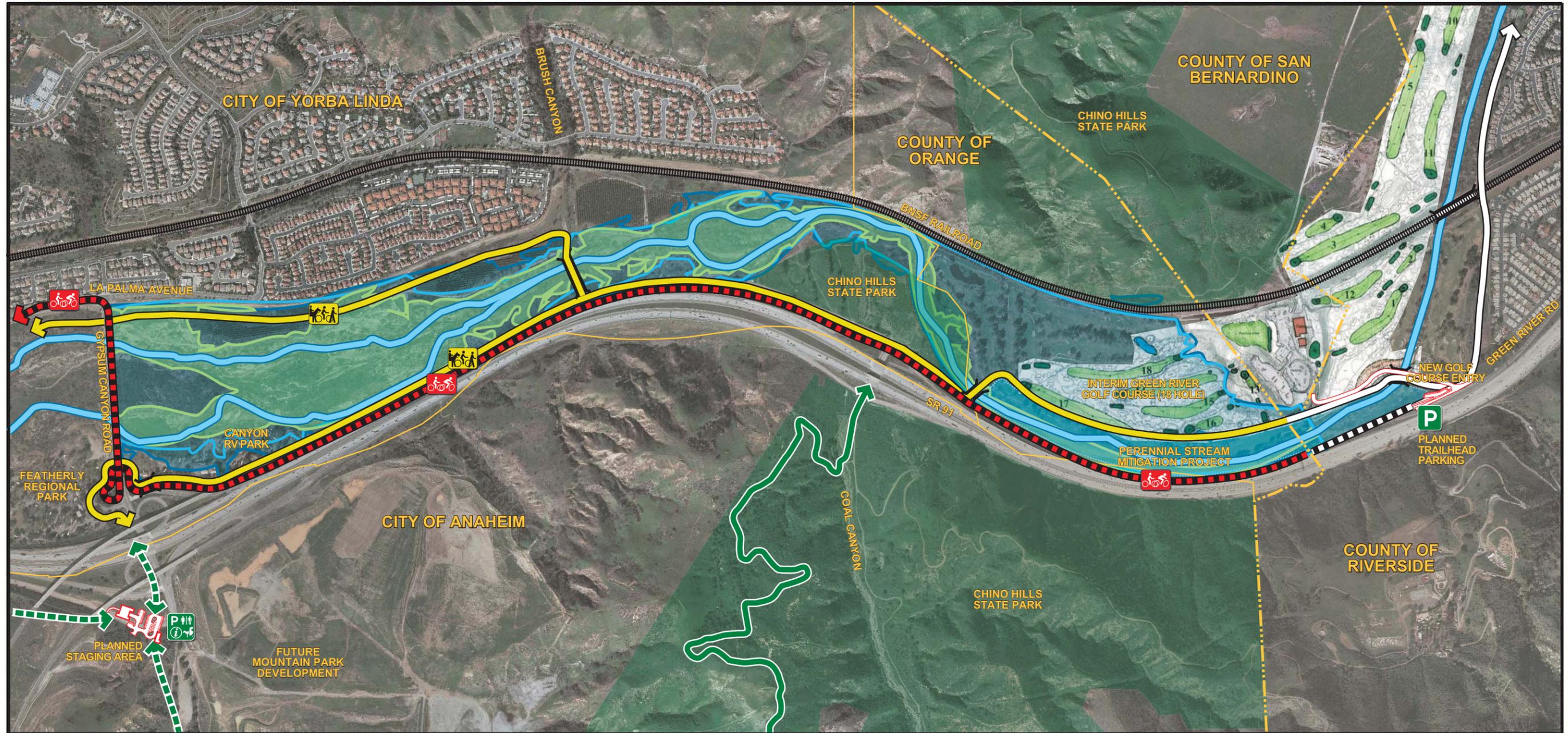
Class 1 Bikeway (Commuter)

Faster Commuter and Fitness Cyclists



(See Alternative 4)





Trail Types

- Class 1 Bikeway - Commuter and Recreational Cyclists (Ex. 12-15' Paved)
- Class 1 Bikeway - Recreational Cyclists and Other Users (8' Paved)
- Riding/Hiking Trail - Equestrian and Other Users (10' Soft Surface)
- Potential Trail Linkages Beyond Project Area (Outside Orange County)

- Chino Hills State Park
- Perennial Stream Mitigation Project
- Bridge

Regional Trail Facilities

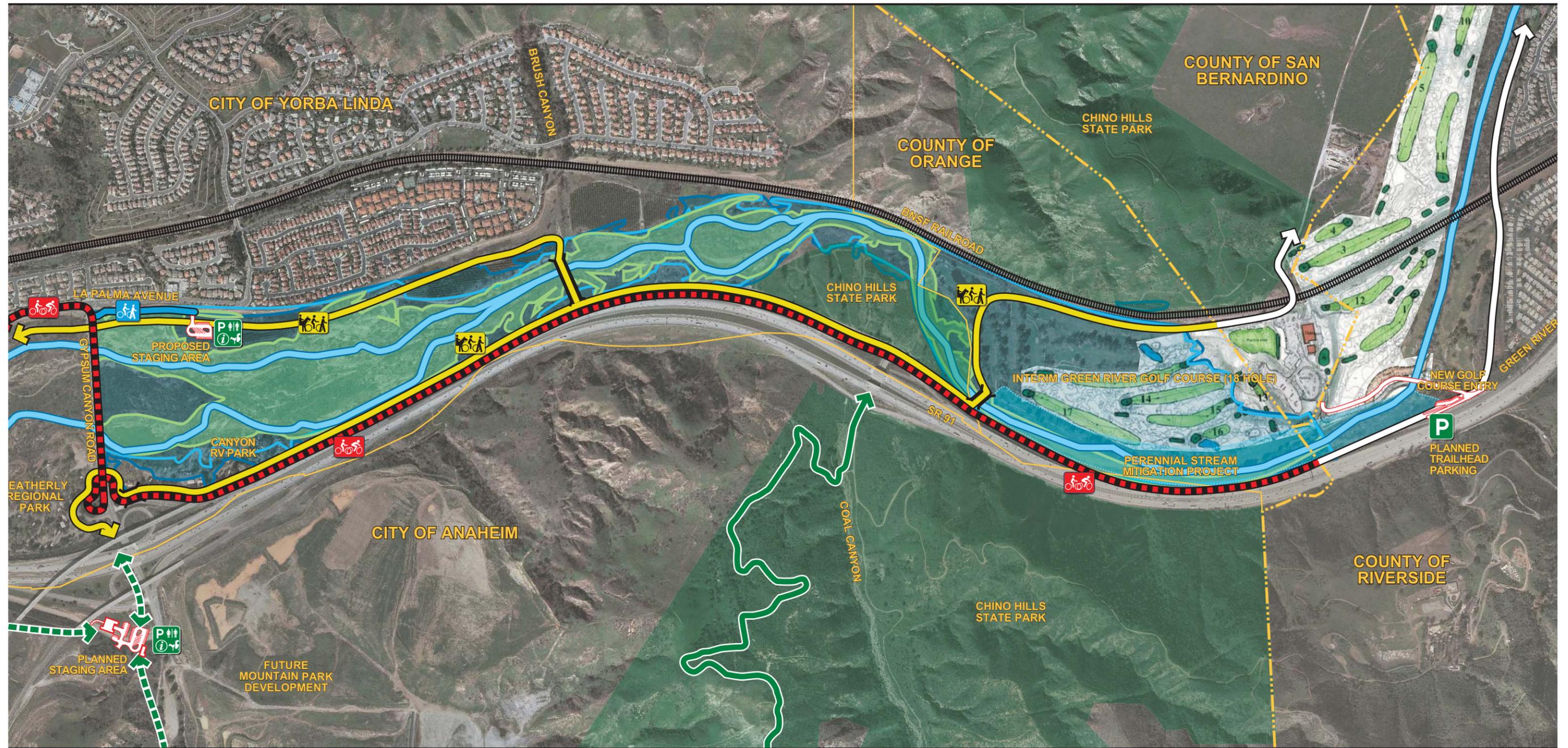
- Planned or Proposed Parking/Staging Areas
- Existing/Proposed Trails

Flood Release Levels

- 5,000 CFS
- 18,000 CFS
- 30,000 CFS
- River Channel



Exhibit 6-3: Alternative 1: The Parallel Trail



Trail Types

-  Class 1 Bikeway - Commuter and Recreational Cyclists (Ex. 12-15' Paved)
-  Class 1 Bikeway - Recreational Cyclists and Other Users (8' Paved)
-  Riding/Hiking Trail - Equestrian and Other Users (10' Soft Surface)
-  Potential Trail Linkages Beyond Project Area (Outside Orange County)

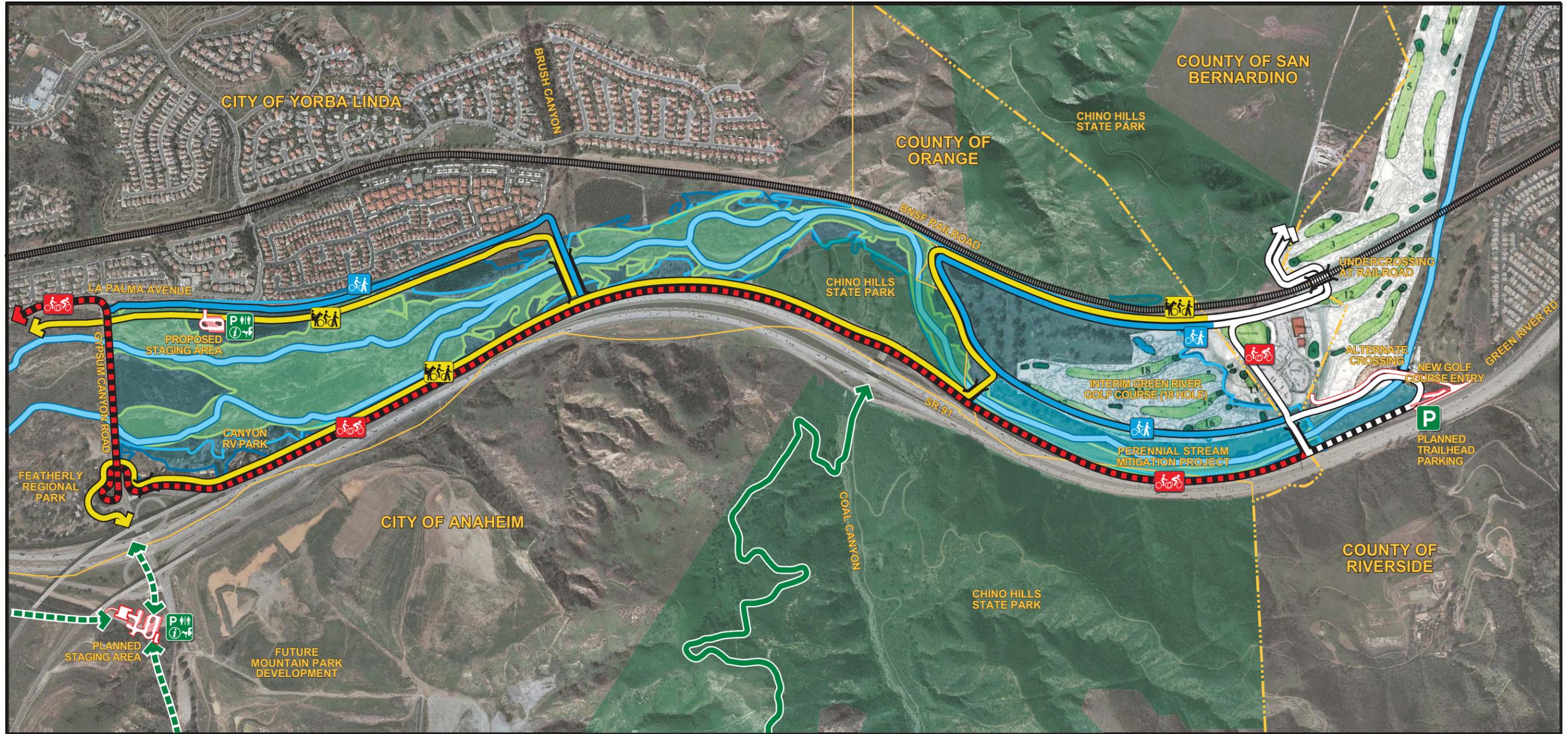
-  Chino Hills State Park
-  Perennial Stream Mitigation Project
-  Bridge

Regional Trail Facilities

-  Planned or Proposed Parking/Staging Areas
-  Existing/Proposed Trails

Flood Release Levels

-  5,000 CFS
-  18,000 CFS
-  30,000 CFS
-  River Channel



Trail Types

-  Class 1 Bikeway - Commuter and Recreational Cyclists (Ex. 12-15' Paved)
-  Class 1 Bikeway - Recreational Cyclists and Other Users (8' Paved)
-  Riding/Hiking Trail - Equestrian and Other Users (10' Soft Surface)
-  Potential Trail Linkages Beyond Project Area (Outside Orange County)

-  Chino Hills State Park
-  Perennial Stream Mitigation Project
-  Bridge

Regional Trail Facilities

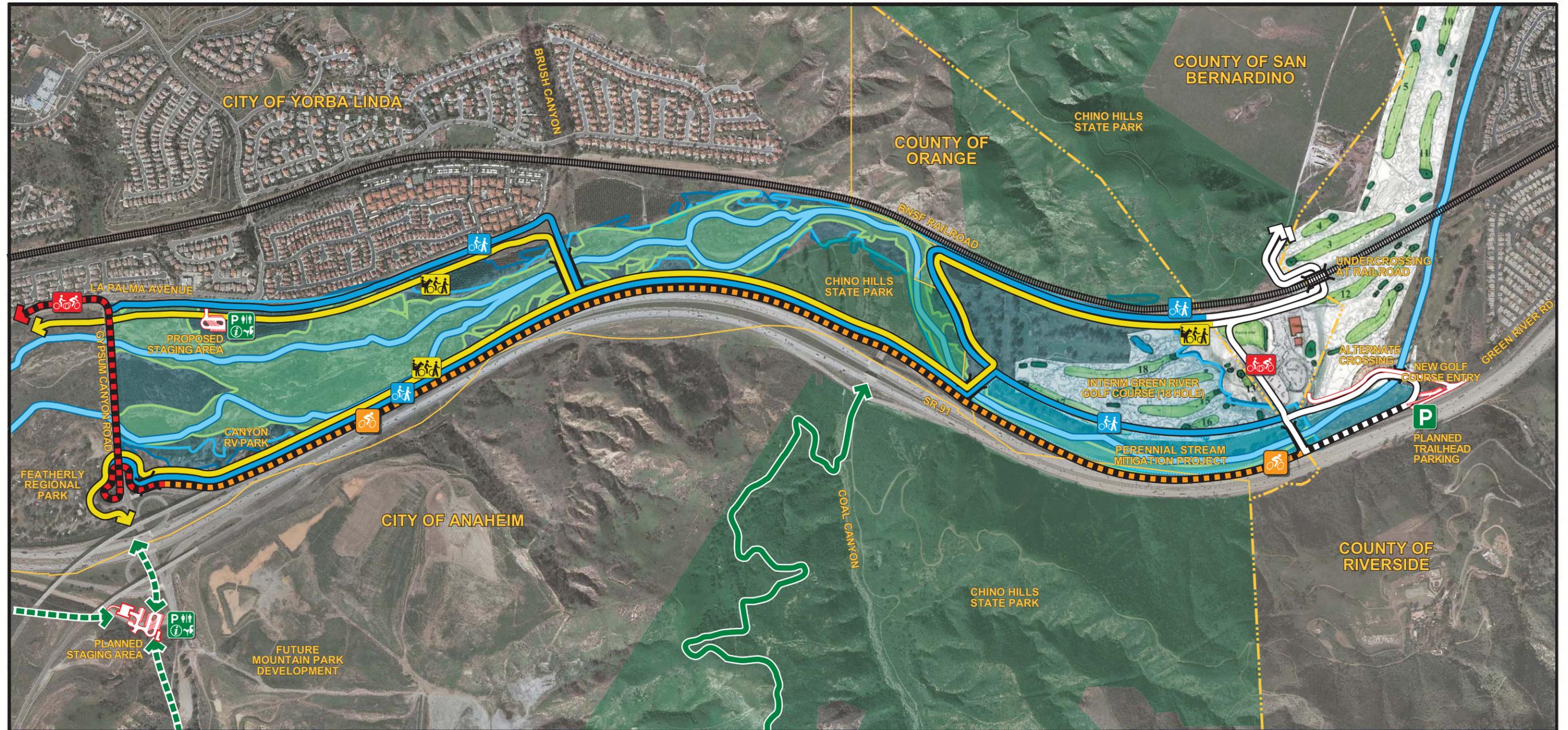
-  Planned or Proposed Parking/Staging Areas
-  Existing/Proposed Trails

Flood Release Levels

-  5,000 CFS
-  18,000 CFS
-  30,000 CFS
-  River Channel



Exhibit 6-5: Alternative 3: The Loop Trail



Trail Types

- Class 1 Bikeway (Commuter and Recreational Cyclists, 12-15' Paved)
- Class 1 Bikeway (Commuter Cyclists, 15' Paved)
- Class 1 Bikeway (Recreational Cyclists and Other Users, 8' Paved)
- Riding/Hiking Trail (Equestrian and Other Users, 10' Soft Surface)
- Potential Trail Linkages Beyond Project Area (Outside Orange County)

- Chino Hills State Park
- Perennial Stream Mitigation Project
- Bridge

Regional Trail Facilities

- Planned or Proposed Parking/Staging Areas
- Existing/Proposed Trails

Flood Release Levels

- 5,000 CFS
- 18,000 CFS
- 30,000 CFS
- River Channel



Exhibit 6-4: Alternative 4: The Multi-Loop Trail

CHAPTER SEVEN | RECOMMENDED PREFERRED ALTERNATIVE



INTRODUCTION

The four developed alternatives were evaluated in a multiple step process to identify a recommendation for a Preferred Alternative. The first step included an evaluation of each alternative in relation to the opportunities and constraints, preliminary environmental assessment and on-going projects which were documented in Chapter 4: Trail and Bikeway Analysis. The second step rated each alternative based on the evaluation criteria identified in Chapter 5: Evaluation Criteria. The goals and objectives developed as part of the evaluation criteria provided a policy framework for the ranking of alternatives. The third step of the recommendation process was provided by the public and stakeholder input through the community workshops, road shows, open house and stakeholder meetings. The public and stakeholders were asked to rate each of the alternatives, and their input was used to develop the final recommendation. The final step included a comparison of the cost estimates for each alternative. The intent was not to use cost as a key factor in the selection of a preferred alternative, but to use it as a differentiator between similarly ranked alternatives.

The preferred alternative is therefore a result of several recommendations which staff and the consultant team considered, along with preliminary costs in Chapter 9. The final result was a recommendation for a hybrid alternative of Alternative 2 and 3, called Alternative 2 Modified.

OPPORTUNITIES AND CONSTRAINTS SUMMARY

The opportunities and constraints analysis studied the preliminary physical constraints of the four alternative route alignments. A composite graphic was prepared for each of the four alignments utilizing the analysis to identify conflicts. The composite graphic overlaid five major topics (see Exhibits 4-2 through 4-6) with a total of ten different attributes including:

- Floodplain (5,000 cfs, 18,000 cfs and 30,000 cfs);
- Wildlife corridors;
- Arundo mitigation parcels;
- Wildlife (California Gnatcatcher, Least Bells Vireo, Southwestern Willow Flycatcher and Santa Ana Sucker); and,
- Sensitive vegetation.

The preliminary physical constraints composite maps for each alternative indicate those alignments/facilities where there are no constraints shown, and where there are multiple overlays of physical constraints. This gives a preliminary indication of those alignment segments that will need further analysis and potential adjustment or realignment as the project undergoes further detailed environmental review in the next phase of the study. The composite exhibits use a color code to identify the number of constraints that the alternative impacts. The color code uses the following system:

- Route segments where there are no constraints (0 attributes) are color coded in pale green,

- Route segments with one constraint are colored pale yellow (1),
- Route segments with several constraints are colored yellow to darker yellow (2-3),
- Routes with four constraints are colored orange (4),
- Routes with five constraints are colored red (5), and
- Routes with the most constraints (6- 8 attributes) are colored in purple hues. (See Composite exhibits for Alt. 1 -4).

The comparison of the four alternatives shows a gradual increase in constraints from Alternative 1 through Alternative 4, due to the alternatives adding more trails and loops. This constraints analysis highlights areas of multiple overlapping constraints. It does not weight any of the attributes – rather it is a gauge of intensity and an early indication that certain segments of the trail may have environmental attributes or sensitivities that may bear further analysis to identify the final trail alignment and minimize impacts.

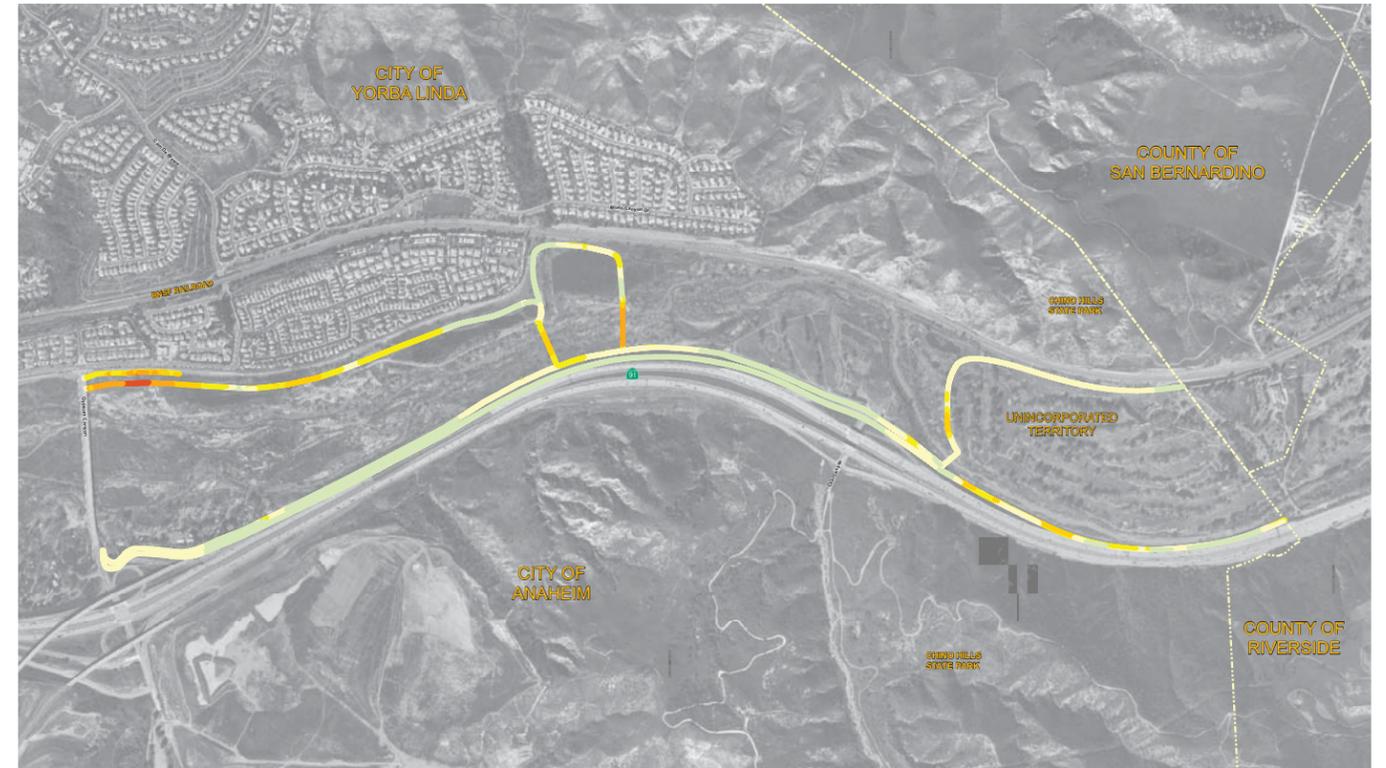
Areas of note are Bridge 1B (shown as orange in all alternatives) which was dropped in favor of the downstream Bridge 1A location which had few impacts. This was reflected in the refinement of the alternatives that were presented to the public. Also, when the north bank riding and hiking trail along La Palma Avenue is placed lower in the floodplain in Alternatives 1, 2 and 4 it becomes red. As a result, in the Preferred Alternative this trail segment has been raised and placed along the toe of the levee next to the bikeway to minimize this conflict. (See Preliminary Construction Drawings).

Subsequent to the completion of the composite analysis, the development of the alternatives have been coordinated with the other on-going projects including the SARI Line relocation project and the Santa Ana River Reach 9-Phase 2A and 2B projects to identify proposed trail and bikeway alignments that are developed and evaluated with the latest versions of those projects. This was done to maximize the use of service road facilities constructed as part of those projects, and to reduce the number of potential conflicts.

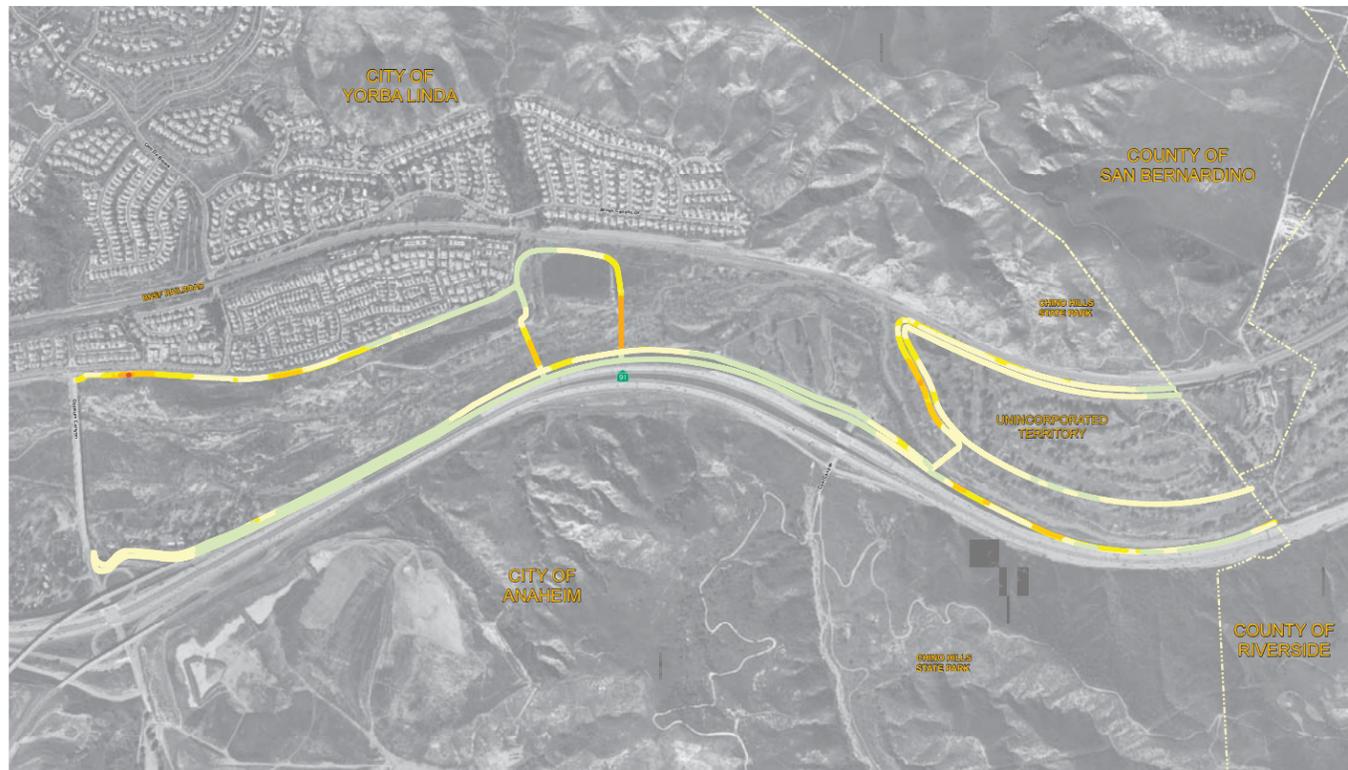
The opportunities and constraints summary was presented to staff and the stakeholders and was included in their recommendation of a preferred alternative. Alternatives 1 and 2 had fewer impacts while Alternatives 3 and 4, having more loops and trail, had more impacts.



Alternative 1



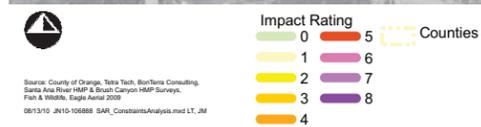
Alternative 2



Alternative 3



Alternative 4



Source: County of Orange, Terra Tech, Bonterra Consulting, Santa Ana River 1987 & South Canyon 1987 Surveys, Fish & Wildlife, Eagle Aerial 2009
06/13/10 10:10:588 SAP_ConstraintsAnalysis.mxd LT_JM



Exhibit 7-1: Composite Contraints Maps

EVALUATION CRITERIA SUMMARY

The goals and objectives became the key evaluation criteria to compare and rank the four alternatives. A matrix was created and a simple point system was devised for each objective. The points were either “no or yes” answers (0 or 1 point) or gradient related evaluations such as “low, medium or high” (0, 1 or 2 points). The intent was to keep the scores general as the research and data were general. The recommended preferred alternative will be further analyzed by an in-depth environmental review process during the next phase of the study. The August 17th Stakeholders Working Group meeting discussed the evaluation criteria. Based on suggestions from the stakeholders, minor revisions to wording and points were then made which changed the totals. The final totals (out of 100 points) for the alternatives were (See **Appendix D: Evaluation Matrix**):

- Alternative 1 = 87 points
- Alternative 2 = 88 points
- Alternative 3 = 87 points
- Alternative 4 = 83 points

A review of the rankings reveals that the total points received for each alternative was relatively similar, and all of the alternatives generally meet the goals and objectives established for the project. A vote by the stakeholders was also held at this meeting to assist in the identification of a preferred alternative. The vote ranked Alternative 2 the highest, with Alternative 3 getting the next highest number of votes. (See Alternative Alignments Chapter for more information.)

COMMUNITY OPEN HOUSE RATINGS

The November 13th Open House was held to present detailed information on each of the four alternatives to the public and asked them to rate the alternatives. Participants were asked to rate each alternative on a scale of one to five. A score of one represented that they disliked the alternative, and score of five representing that they like the alternative. The following is a summary of the ratings of each alternative.

	Dislike		Neutral		Like
	1	2	3	4	5
Alternative 1: The Parallel Trail	*	*****	*****		***
Alternative 2: The Split Trail		**	****	*****	*
Alternative 3: The Loop Trail	*	**	***	****	*****
Alternative 4: The Multi-Loop Trail	*	****	*	***	*****

Each (*) represents one vote.

Based on the Open House rating exercise, the public showed a preference for Alternatives 2, 3 and 4. Alternative 1 was viewed neutrally. The feedback from the open house was that the public liked Alternative 2, but that the loop elements and additional features of Alternatives 3 and 4 were also very appealing. The outcome from the open house was that the public would like to see more of the loop routes incorporated into the project than the stakeholder-recommended Alternative 2.

COST COMPARISON

Recommendations were intentionally developed, at least initially, without regard to costs to allow for a comparison of the alternatives based on their merits. Chapter 9 presents the detailed preliminary cost estimates prepared for each of the alternatives. These estimates were ultimately an additional measure used by staff and the consultant team to weigh the stakeholder Alternative 2 recommendation and the Open House recommendation for something more.

Based on the preliminary costs (Alternative 1- \$8.7M, Alternative 2- \$12.7M, Alternative 3- \$18.4, and Alternative 4- \$19.7M) it was decided that a hybrid of Alternatives 2 and 3 should be pursued to widen the bridge and make a single loop at the west end of the project. The cost for this alternative was \$15.1M. Based on this figure and the design features described herein, Alternative 2 Modified was recommended as the Preferred Alternative.

RECOMMENDED PREFERRED ALTERNATIVE

The Preferred Alternative was recommended following community and stakeholder input and team analysis of the potential routes, opportunities and constraints, on-going projects, preliminary environmental analysis and project costs. Alternatives were built on the previous alternative with each subsequent alternative adding additional features, many comments recommended that alternative three or four be proposed as later phases of the project and could be built over time as more funds become available. The overall consensus of the project team and from community/stakeholder input was that the best alternative was a hybrid of Alternatives 2 and 3, called "Alternative 2 Modified: The Split Trail with Loop."

Alternative 2 Modified: The Split Trail with Loop

The Preferred Alternative is a hybrid which combines elements of Alternatives 2 and 3 into a new Alternative 2 Modified. The modified alternative is a hybrid because it includes the west bikeway loop from Alternative 3. The added loop extends the south bank bikeway a short distance over the proposed Bridge 1A to meet the existing north bank bikeway which has also been extended by joining a segment of the County service road. This requires a wider bridge (20' instead of 12'). The benefit is that this modification creates a north bank bikeway that joins the south bank bikeway. This creates a new bikeway loop that is one of the loop elements of Alternative 3, which does not exist in Alternative 2.

The main elements of this Preferred Alternative are described first for the south bank, and then for the north bank of the river:

South Bank

A parallel Bikeway and Riding and Hiking Trail are located adjacent to SR-91 with the trail meandering on the river side of the bikeway.

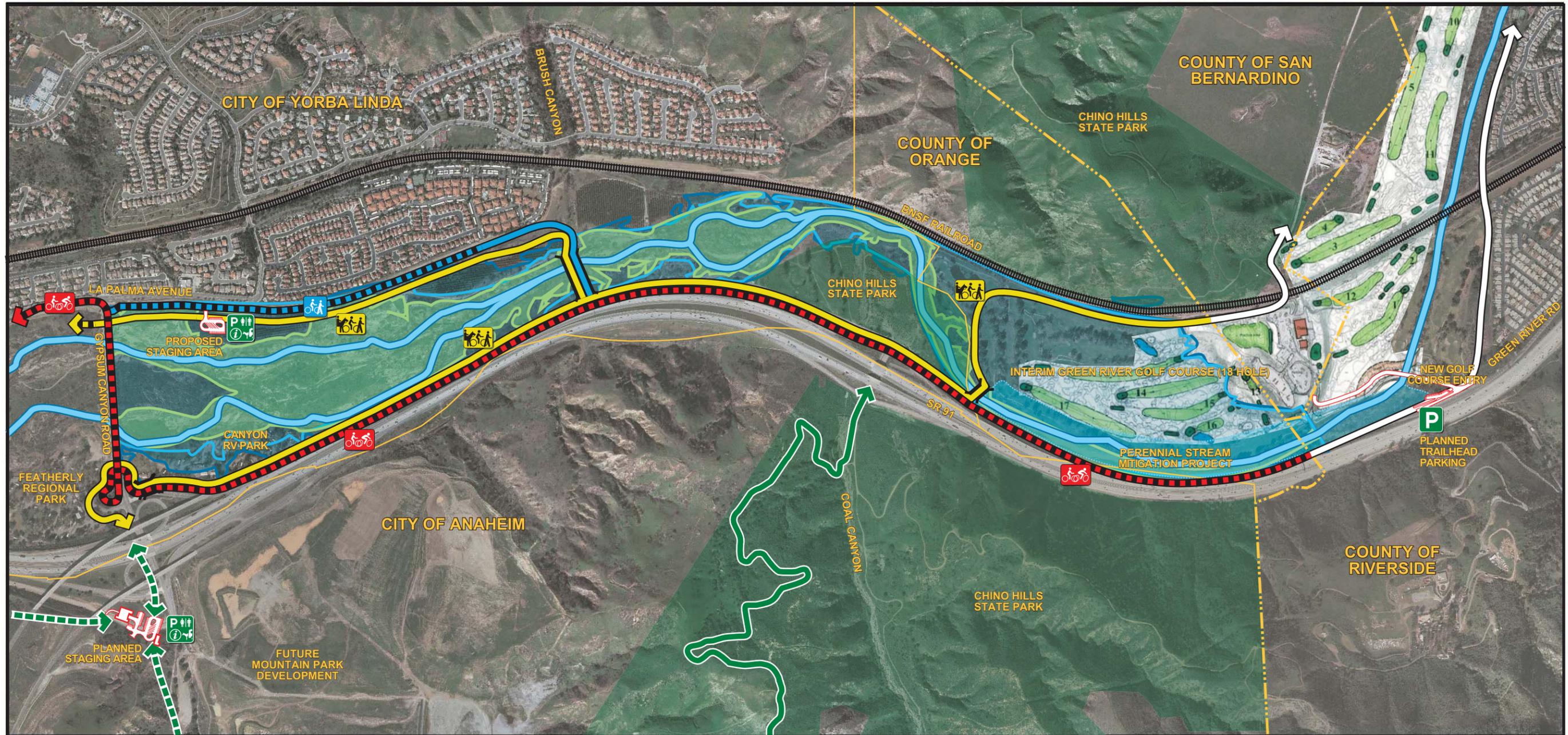
- Class 1 Bikeway (12' wide paved) will utilize the SARI Line service road segment from Featherly Regional Park/Canyon RV Park through Chino Hills State Park (CHSP). At mid-point the trail/bikeway branches off to the north to cross the river. (See North Bank – Bridge.)
- Class 1 Bikeway (15' wide paved) will utilize future service road segment (under construction) from CHSP to the Orange County line
- Riding and Hiking Trail (10' wide unpaved) from Featherly Regional Park/Canyon RV Park through CHSP.
- Bridge #3 (10'-12' wide) will be provided for the Riding and Hiking Trail as it passes by the Featherly Regional Park/Canyon RV Park to span the existing storm control channel.
- Riding and Hiking Trail (10' wide unpaved) from CHSP crosses the river, (see Bridge #2) skirts the perimeter of the golf course and runs adjacent to the BNSF Railroad.

- Bridge #2 (12' wide) crosses the river with the Riding and Hiking Trail.
- Trailheads (2) – one at Featherly Regional Park, another near the Coal Canyon Trail/CHSP.
- Turn Outs (5) – exact location to be determined (See Trail Features exhibit).
- Vista Point (1) – at east end of CHSP at river overlook.

North Bank

A parallel Bikeway and Riding and Hiking Trail located adjacent to La Palma Avenue.

- Class 1 Bikeway (12' wide paved) and adjacent Riding and Hiking Trail (10' wide unpaved) from Gypsum Canyon Road to a Staging Area.
- Staging Area (1) – vehicles enter off La Palma Avenue. Staging Area to be located below the road but above the 30,000 cfs line (See Staging Area Exhibit).
- Class I Bikeway (12' wide paved) on top of levee using existing County service road – from staging area eastward to bridge.
- Riding and Hiking Trail (10' wide unpaved) at toe of levee from Staging Area east to proposed 20' wide bridge.
- Bridge 1A (1) – a 20' wide bridge for both Bikeway and Riding and Hiking Trail.
- Turn Out (2) – one at north end of bridge, the other at bend in trail at golf course/railroad.
- Vista Point (1) – at midpoint of bridge.



Trail Types

-  Class 1 Bikeway - Commuter and Recreational Cyclists (Ex. 12-15' Paved)
-  Class 1 Bikeway - Recreational Cyclists and Other Users (8' Paved)
-  Riding/Hiking Trail - Equestrian and Other Users (10' Soft Surface)
-  Potential Trail Linkages Beyond Project Area (Outside Orange County)

-  Chino Hills State Park
-  Perennial Stream Mitigation Project
-  Bridge

Regional Trail Facilities

-  Planned or Proposed Parking/Staging Areas
-  Existing/Proposed Trails

Flood Release Levels

-  5,000 CFS
-  18,000 CFS
-  30,000 CFS
-  River Channel



Exhibit 7-2: Alternative 2 Modified- Preferred Alternative

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CHAPTER EIGHT | ENGINEERING AND DESIGN FEATURES



INTRODUCTION

The engineering and design features of the project include a range of proposed items including, but not limited to, trail and bikeway configurations, river and bridge hydraulics, bridge type selection, trailheads, staging areas, turn outs and vista points, as well as cross roads/intersections, paving treatments, plant materials, fencing, striping and signage. The engineering and design considerations that were used to develop and analyze these elements are summarized in the following sections.

TRAILS AND BIKEWAYS

The intent of the proposed design is to provide safe and cost effective trails and bikeways throughout the project reach. Design guidelines used for the project are established based on the following standards in order of priority:

1. Caltrans Highway Design Manual – Chapter 1000: “Bikeway Planning and Design”
2. County of Orange Trail Design Manual
3. City of Yorba Linda Equestrian Trail Standard
4. City of Anaheim Hiking and Riding Trail Design Standards

The proposed bikeway alignments follow existing service roads wherever possible, provided the existing roadways meet the current design speeds and stopping sight distances as defined for Class I Bikeways in Chapter 1000, “Bikeway Planning and Design,” of the California Department of Transportation Highway Design Manual, September, 2006. Trail alignments for the other reaches were designed to work with the existing site topography and other physical constraints to minimize the grading requirements and impacts during construction. With safety and practicality in mind, the project design team, in conjunction with the County, established a typical section for the riding and hiking trail and bikeway that adheres to these standards and includes a buffer area between the two paths, as well as minimum shoulder widths. The typical section is shown on **Exhibit 8-1: Typical Cross Section**.

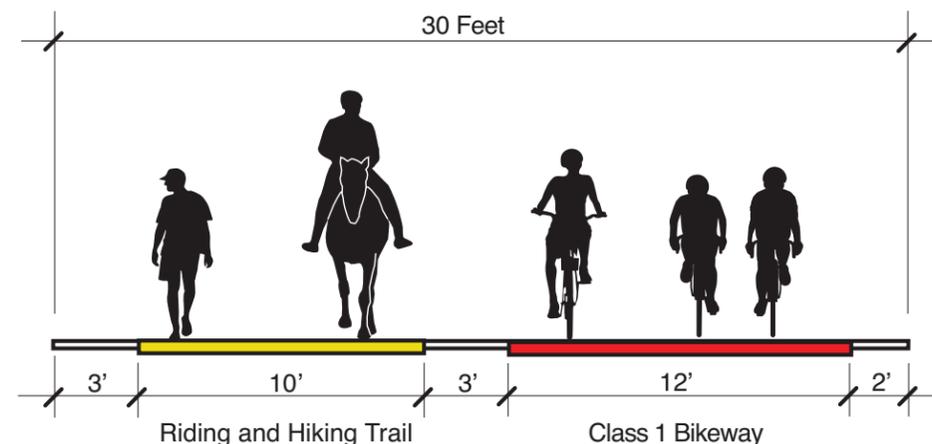


Exhibit 8-1: Typical Cross Section

HYDRAULICS

Floodplain Analysis

An existing Hydraulic Engineering Center River Analysis System (HEC-RAS) model for the Santa Ana River was provided by the County for the study area. The hydraulic model was used to map the floodplain limits and analyze any potential impacts of the project on the existing floodplain. The model was originally developed to map the floodplain and identify any impacts associated with improvements to Prado Dam. With the improvements to Prado Dam outlet works, the USACE now has the ability to release larger discharges during and after major storm events. Floodplain limits and water surface elevations were delineated for a range of release rates from Prado Dam including; 5,000 cfs (5k), 18,000 cfs (18k), and 30,000 cfs (30k). (See Exhibits 7-2, 7-3 and 4-2.)

Bikeway Design

A key goal of the project is to align the bikeway so it remains outside of the 30k floodplain inundation area. The existing Santa Ana River Class I Bikeway is the only non-motorized cycling facility to connect commuter and recreational cyclists from Orange County to Riverside and San Bernardino Counties. To insure cyclists have uninterrupted travel between the counties the bikeway must remain open year-round. Other benefits from achieving this goal include enhancing user safety, minimizing maintenance and replacement of trails after larger storm events.

Riding and Hiking Trail Design

The proposed riding and hiking trails (alternative alignments 1-4) follow existing topography and are planned to remain out of the 30k floodplain wherever possible. The floodplains were mapped and overlaid on the proposed trail alignment and in some areas fill soil will be used to raise the riding and hiking trail outside of the 30k floodplain to minimize impacts from major storm events. The riding and hiking trail encroaches into the existing floodplain at the Green River Golf Club, where it crosses from the south side of the river to the north side. Within the golf course, flows are shallow and slow moving, and risk of damage to the natural surface due to flood flows are generally low. The trail is not proposed to be raised in this location to avoid potential adverse impacts to the flood elevations along the Santa Ana River Reach 9 Phase IIb improvements. The proposed trail design will include a protective fence with an option that allows flood waters and debris to pass with minimum impacts during higher storm events in this area. (See Fencing below.)

GEOTECHNICAL STUDY

A Geotechnical evaluation was performed by Earth Mechanics, Inc. (EMI) to evaluate potential bridge, bikeway and riding and hiking trail locations. The evaluation included a review of available geotechnical information and how it relates to the Santa Ana River Bikeway and Riding and Hiking Trail Project. According to the geotechnical evaluation there are no conditions that impact the project’s ability to accomplish minor grading for the proposed bridge abutments or the proposed trails. Although the geotechnical

evaluation deemed the proposed improvements constructible, EMI identified a few issues that should be considered during the design phase. The key issues are listed below, and are discussed in more detail in the technical memorandum provided in Appendix G.

1. Excavations near the active portion of the SAR (i.e. the active streambed) have the potential of encountering groundwater which make excavations more difficult to accomplish.
2. Placing compacted fill near the streambed may require stabilization of the foundation soils prior to placing the fill.
3. The proposed bridges should be founded on deep foundations (piles) due to the potential for scour.
4. Dewatering is most likely required for constructing the bridge pier foundations.
5. Excavations for large diameter shafts would require the use of drilling mud or temporary casing.

BRIDGES

There are three bridges that are proposed with the project alternatives for crossing the Santa Ana River and the Gypsum Canyon drainage. A number of potential bridge sites were explored as part of the "All Potential Routes" analysis (see Exhibit 6-1: All Potential Routes). Several sites were removed from consideration during the development of design alternatives. Two potential bridge sites were considered within the Chino Hills State Park (CHSP) property, however, this area is subject to bank erosion and significant bank improvements would be required to protect these structures. Hardened bank improvements within the CHSP were not acceptable to the Park staff. The Puente-Chino Hills Wildlife Corridor in this area is also a sensitive habitat that stakeholders would prefer to leave undisturbed. Therefore, the bridge locations in the CHSP were eliminated from consideration. A third potential bridge site (1B) west of the CHSP was also removed from consideration due to environmental and site constraints. The bridge and associated approach trail would impact wildlife movement to the Brush Canyon area and would cross the river in a wide section resulting in an increased construction cost. One potential bridge site located along the SAR Reach 9 Phase IIb improvements adjacent to the County Boundary on the Riverside County side is still considered as a potential crossing location for the Bikeway; however, the site is not a part of this project. The three bridge sites proposed with the project alternatives have been labeled Bridge 1, Bridge 2, and Bridge 3.

All bridges are proposed to be pre-fabricated steel truss sections typically used for bikeway and riding and hiking trail crossings. The length and deck widths vary by location and alternative. The following conceptual bridge criteria applied as part of the bridge type selection process:

- **Bridge Siting:** Locate bridge deck above 30k flow. Bridge abutments shall be located to minimize impacts to existing floodplain limits, and protected against scour.
- **Bridge Deck Width:** 12 feet wide for single trails or 20 feet wide if it serves both

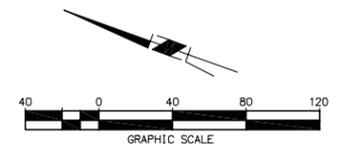
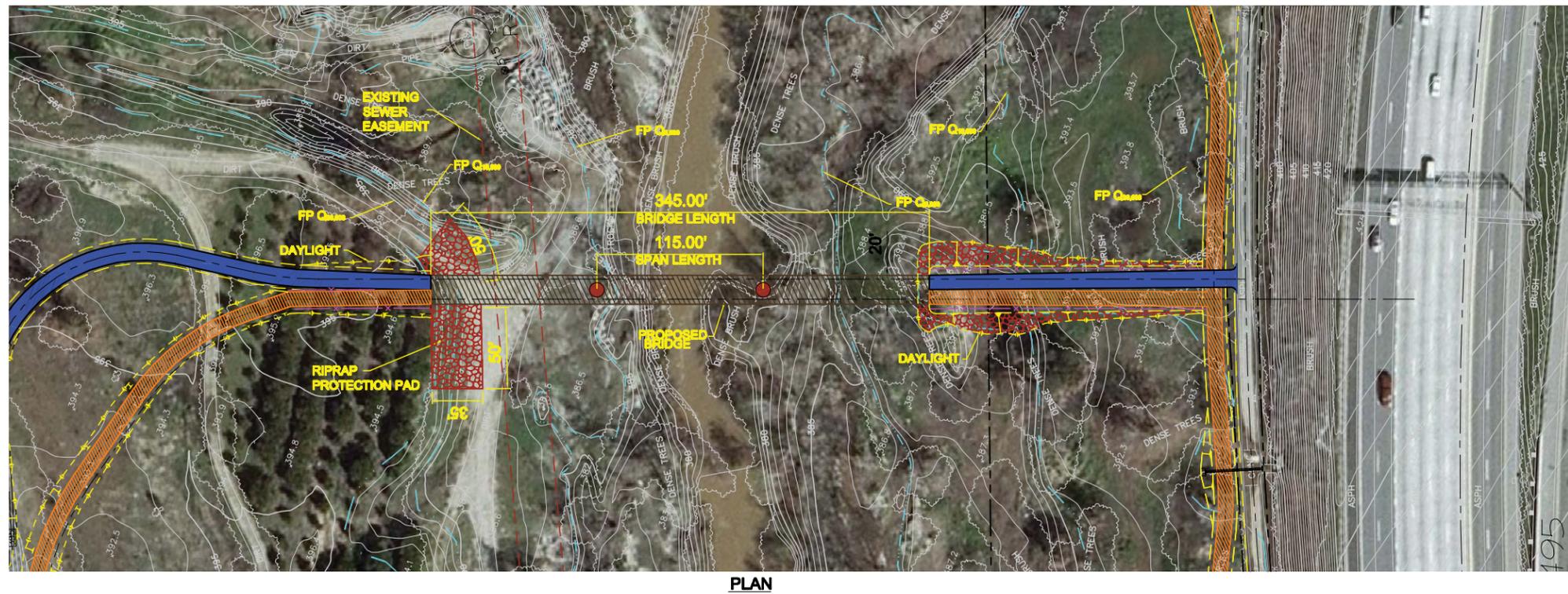
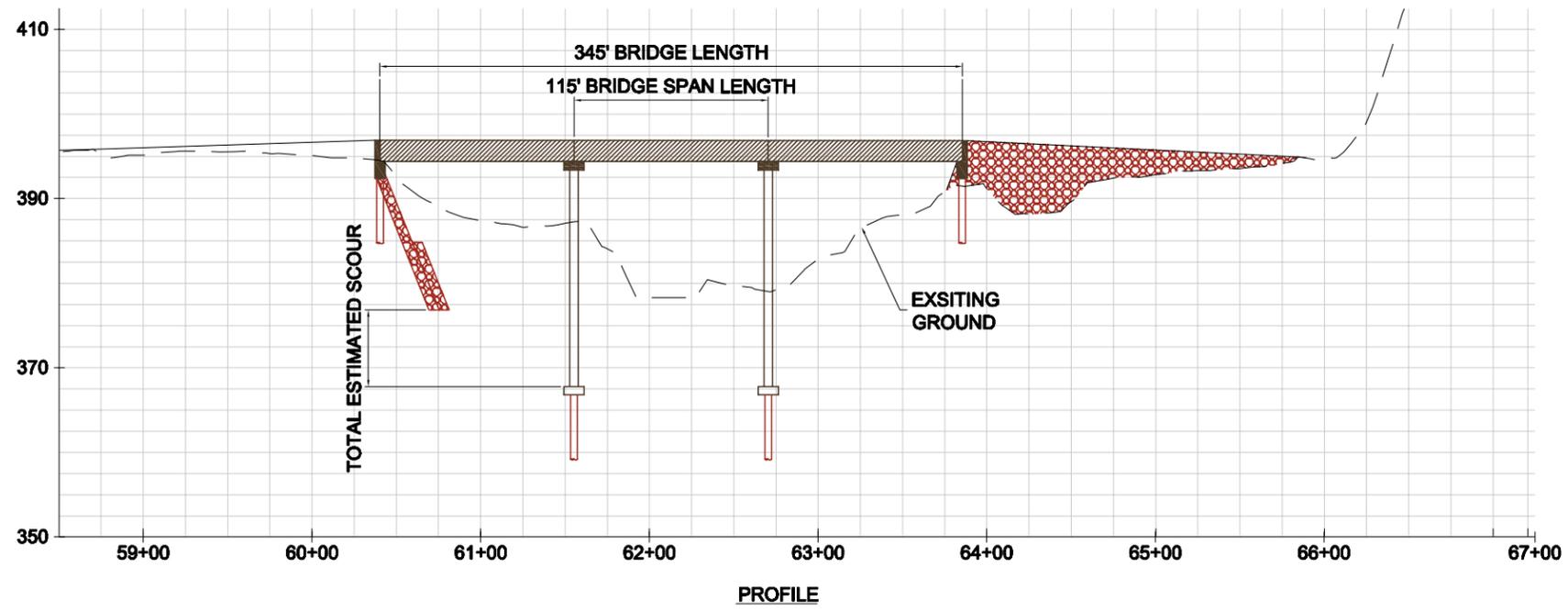
bikeway and riding and hiking trails.

- **Bridge Deck Length:** Range from 100 to 360 feet.
- **Bridge Span:** 100 to 120 feet between piers.
- **Bridge Type:** non-vehicular pre-fabricated steel or wood truss type bridge.

A plan and profile for the three proposed bridge sites are shown on Exhibits 8-2 through 8-4. The following provides a summary description of the key features:

- **Bridge 1:** This bridge over the Santa Ana River is located downstream of the confluence of Brush Canyon. It has a bridge deck span of 345' with 2 piers (3 spans of 115' each). This bridge will be designed for a 20' width to accommodate the bikeway and riding and hiking trails identified in the recommended alternative.
- **Bridge 2:** This bridge is located just upstream of CHSP and spans the Santa Ana River (at the downstream limits of the Reach 9 Phase IIb improvements) to reach the golf course use area. This bridge has a bridge deck length of 360' with 2 piers (3 spans of 120' each). This bridge is proposed to be 12' wide to accommodate the riding and hiking trail only.
- **Bridge 3:** This bridge is located within the Canyon RV Park and will span an existing storm drain channel (Gypsum Canyon drainage). It will be 100' long and 12' wide with no piers. This bridge is proposed to be 12' wide to accommodate the riding and hiking trail only.





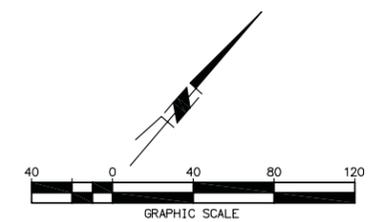
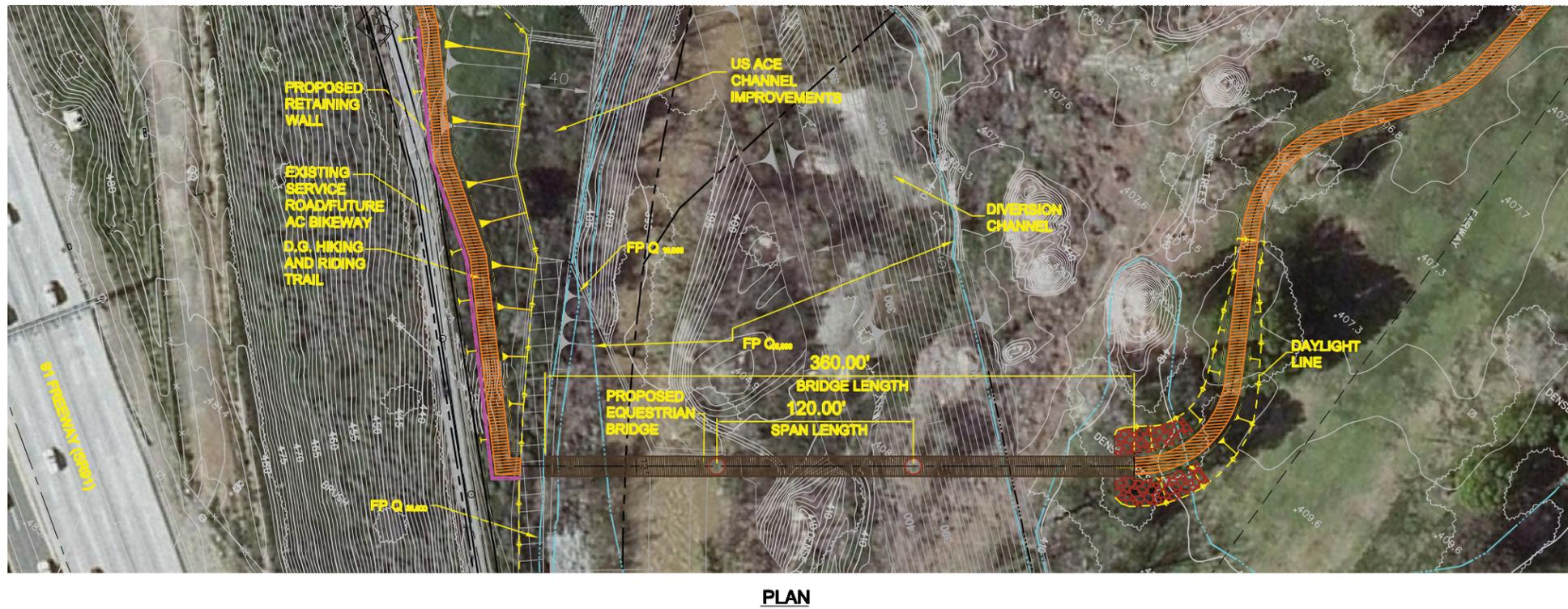
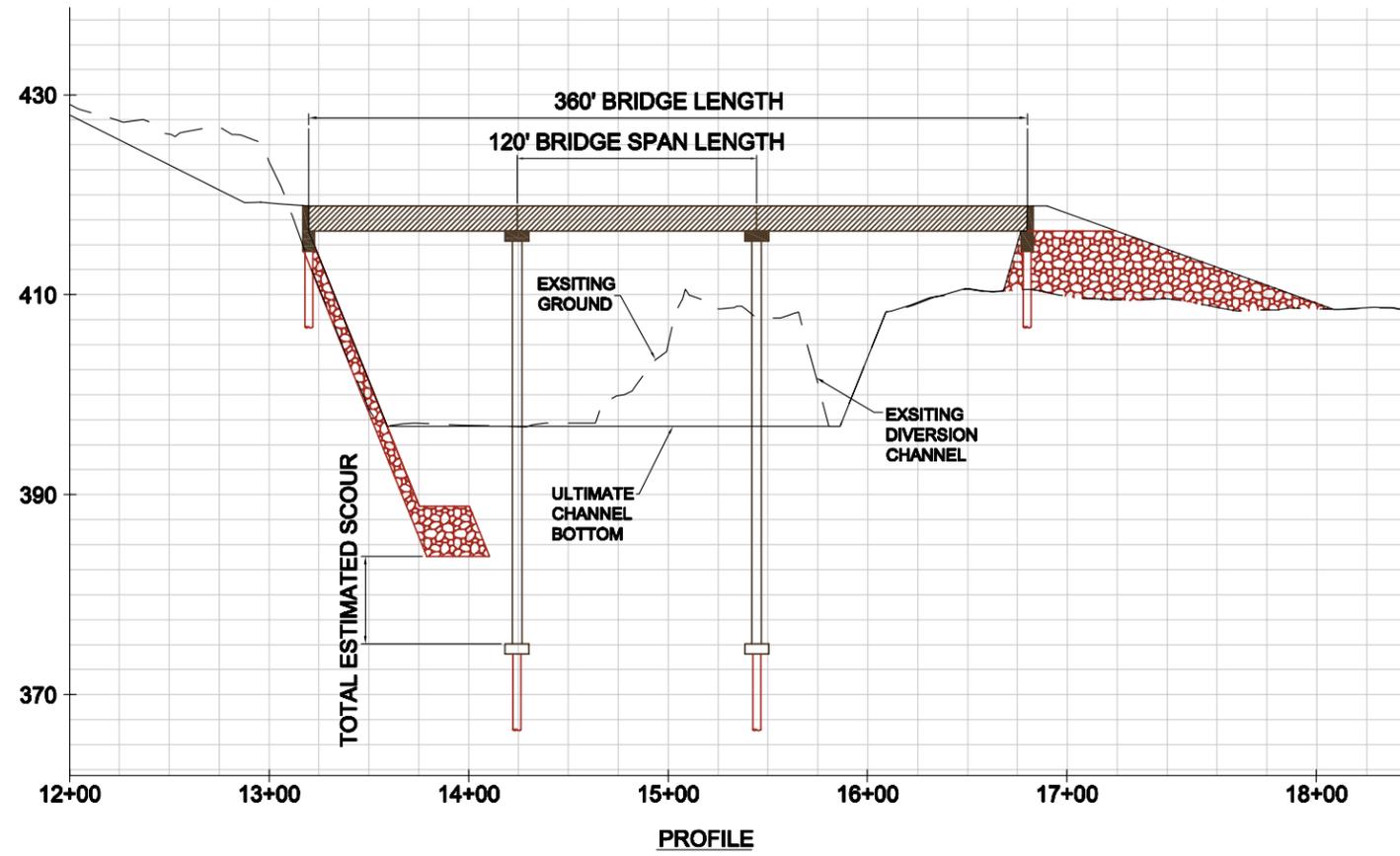
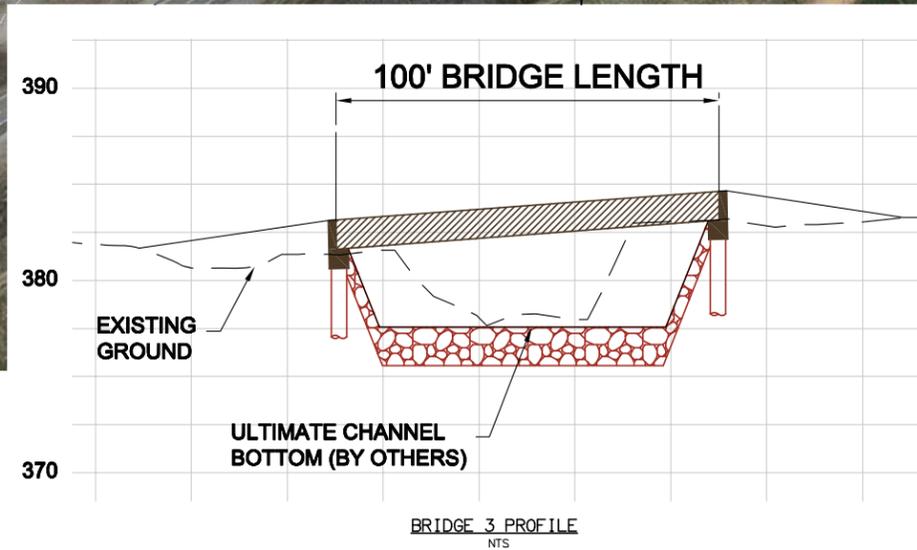
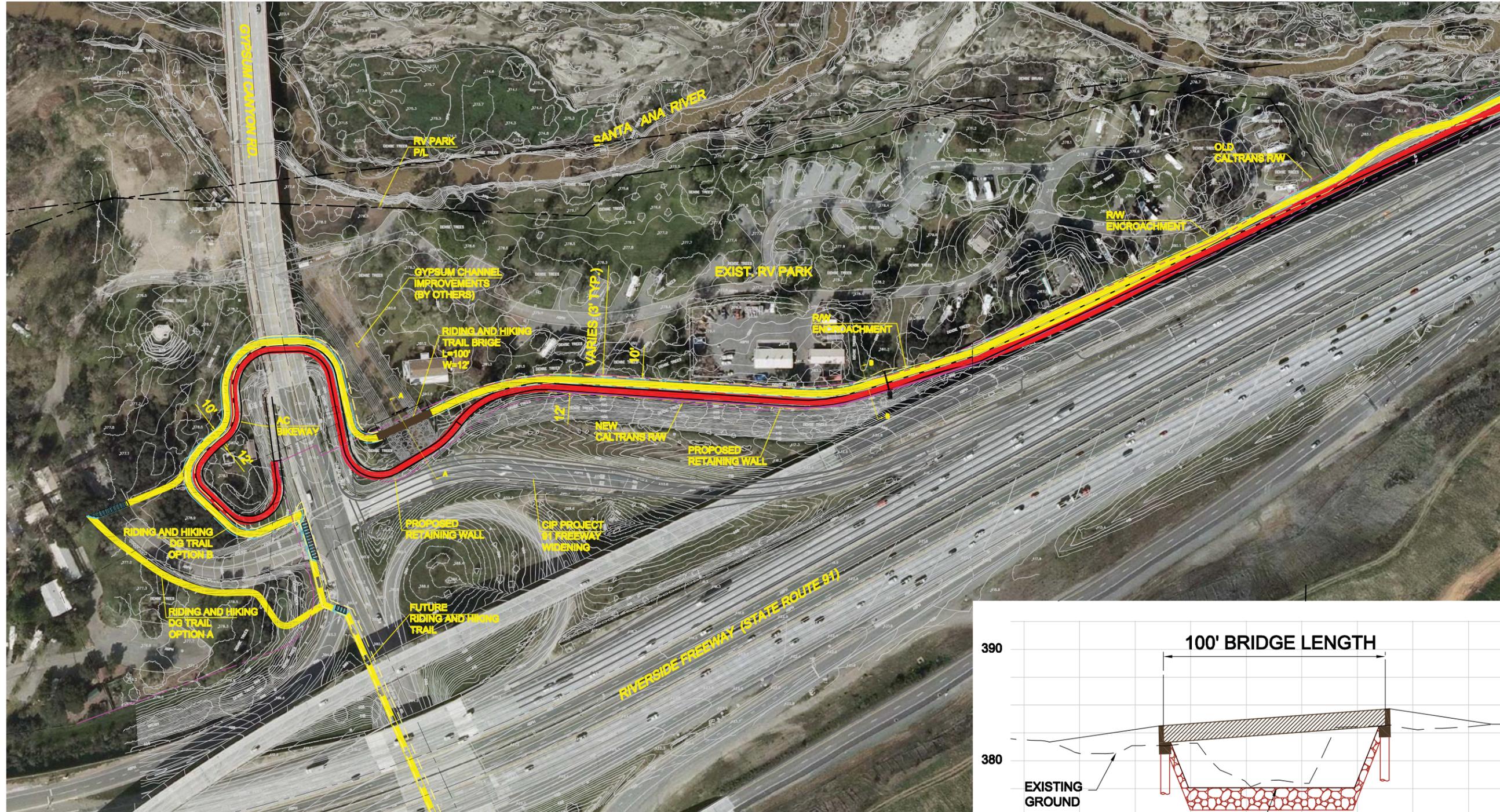


Exhibit 8-3: Bridge 2 - Plan and Profile



- 12' AC PAVED BIKEWAY
- 10' DG RIDING/HIKING TRAIL
- FUTURE RIDING/HIKING TRAIL CONNECTION
- PEDESTRIAN CROSSING

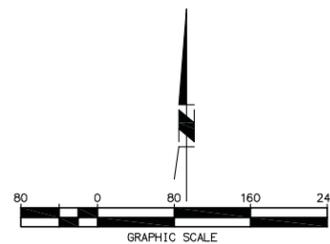


Exhibit 8-4: Bridge 3 - Plan and Profile

Bridge Hydraulics

Criteria used to identify potential bridge locations included field investigations, practicality, environmental impacts, cost effectiveness, and physical constraints. A floodplain analysis was also used to determine the bridge length requirements to span the 5k, 18k and 30k floodplain limits.

Bridge 1 is located in between two orange groves on the north bank of the Santa Ana River approximately 4650 linear feet upstream of Gypsum Canyon Road. Bridge 1 connects the proposed north and south bank bikeways and trails. The hydraulic analysis of Bridge 1 was used to determine local pier scour, and to delineate the floodplain.

The initial bridge deck length was designed to elevate the bridge entirely out of the 30k floodplain with 1' freeboard. However, the review of the floodplain in conjunction with the bridge hydraulic model showed shallow flow areas on the south bank of the bridge span that may not need to be spanned. In determining the final bridge length, a hydraulic model was built from the existing hydraulic model cross-sections that consider a shortened overall bridge deck length and the impacts this would have on the existing floodplain. A shortened bridge span will require fill material for some of the shallow flow areas which will reduce the overall cross-sectional area within the bridge. The bridge location was modeled for both a shortened bridge span (more fill, smaller cross-sectional area) and a full length span of the floodplain. The following table shows the impacts of a shortened bridge length on the floodplain in comparison to a bridge that spans the entire 30k floodplain. A shortened bridge span increases the water surface slightly within a few hundred feet of the bridge. According to the hydraulic model, there is a maximum increase in water surface elevation of 0.29'. An Exhibit of the study area shows there are not impacts on existing structures due to the increase in water surface.

Table 8-1 Bridge 1 - Floodplain Impacts Analysis			
River Station	Reduces Span WSE	Full Span WSE	WSE Delta
141091	399.81	399.78	0.03
141075	399.17	399.12	0.05
140837	397.20	397.05	0.15
140586	396.67	396.48	0.19
140244	396.18	395.94	0.24
139883	395.64	395.35	0.29
139770	394.04	393.94	0.10
139740 BR U	393.48	393.54	-0.06
139740 BR D	393.37	393.48	-0.11
139710	393.22	393.36	-0.14
139364	391.14	391.14	0
138958	389.92	389.92	0

From the table, the water surface actually decreases through a more constricted (reduced span) bridge. The reduced size bridge removes 1 bridge span, an overall deck length reduction of 115', which is approximately \$1.15 million in savings on construction costs.

Bridge 2 is located approximately 190 feet downstream from the existing temporary bikeway bridge at the end of the Reach 9 - Phase 2B channel improvements. The hydraulic analysis of Bridge 2 was used to determine local pier scour. The bridge deck is elevated out of the 30k floodplain with 1' freeboard. The bridge is designed as a Riding and Hiking Bridge to connect the proposed Riding and Hiking Trail from the south side of the river to the north. The intent of this bridge location is to provide the most sensible and cost effective trail connection with surrounding Counties. This bridge will also provide opportunity for users to utilize a future rail road crossing, and provide access to State Park entrances located near the existing Golf Course.

The challenge with Bridge 2 is getting the south side riding and hiking trail down to the same elevation of the bridge deck, while maintaining a bikeway path that matches the existing slopes and grading. The design includes a retaining wall along the south side trail alignment to create the vertical separation needed at Bridge 2.

Scour Analysis

Scour potential was also analyzed and considered in the design process at the proposed bridge locations. Long term degradation and general scour was taken from “The Santa Ana Regional Interceptor SARI Pipeline Relocation Project; Scour Study of Santa Ana River Below Prado Dam,” dated January, 2010. The scour results from this report was added to local pier scour analysis done for each of the bridge locations in order to determine pile cap and rock slope protection depths at the bridges.

STAGING AREAS

A new trail and bikeway parking (staging) area is proposed in the City of Yorba Linda near the La Palma Avenue/Gypsum Canyon Road intersection. The North Bank staging area would be accessed from La Palma Avenue east of Gypsum Canyon Road. It is proposed to provide access to the bikeway and trail system from the north side of the river without having to cross the Gypsum Canyon Road Bridge.

Staging areas are specifically designated locations designed to accommodate the majority of expected users wanting to access a particular trail or trail system. As the primary gateways to a trail, the staging area’s facilities encourage trail users to use these designated access points by providing convenient vehicle parking and unloading of both people and their equipment such as horses, bicycles, etc. Staging areas may also provide facilities for trail user group assembly such as kiosks, shelters, picnic tables or corrals, and often provide informational, wayfinding and educational signage.

Staging areas are typically recommended at the beginning and end of a trail. This staging area is proposed at the beginning of this last two mile segment of the Santa Ana River Trail and Bikeway in Orange County. Access to the riding and hiking trail is especially needed along this segment, and has been requested by users at the community workshops and open house. The staging area will be sited above the 18k floodplain limit with any future restrooms sited above the 30k floodplain limit. To address the short and long-term need for parking the North Bank staging area (described below) may be developed in phases. The following recommended components are grouped by phase. (See Exhibit 8-6.)

First Phase

- Native drought tolerant plants and shade trees,
- Benches,
- Picnic tables,
- Bicycle racks – no long term storage,
- Fencing and hitching rails,
- Small corral,
- Water for horses,
- Water for hikers, bikers and riders,
- Entry road drive and monumentation,
- Interpretive and directional signage,
- Trash receptacles,

- Off-street parking for 20 cars,
- Six pull-thru parking spaces for horse trailers,
- Portable toilets (two) or as needed for special events, and
- Decomposed granite parking lot and entry drive surface.

Later Phases (See Appendix E.)

- Shade structure (optional),
- Restrooms (optional),
- Minimal security lighting (optional),
- Large corral (optional),
- Paved parking lot and entry drive.

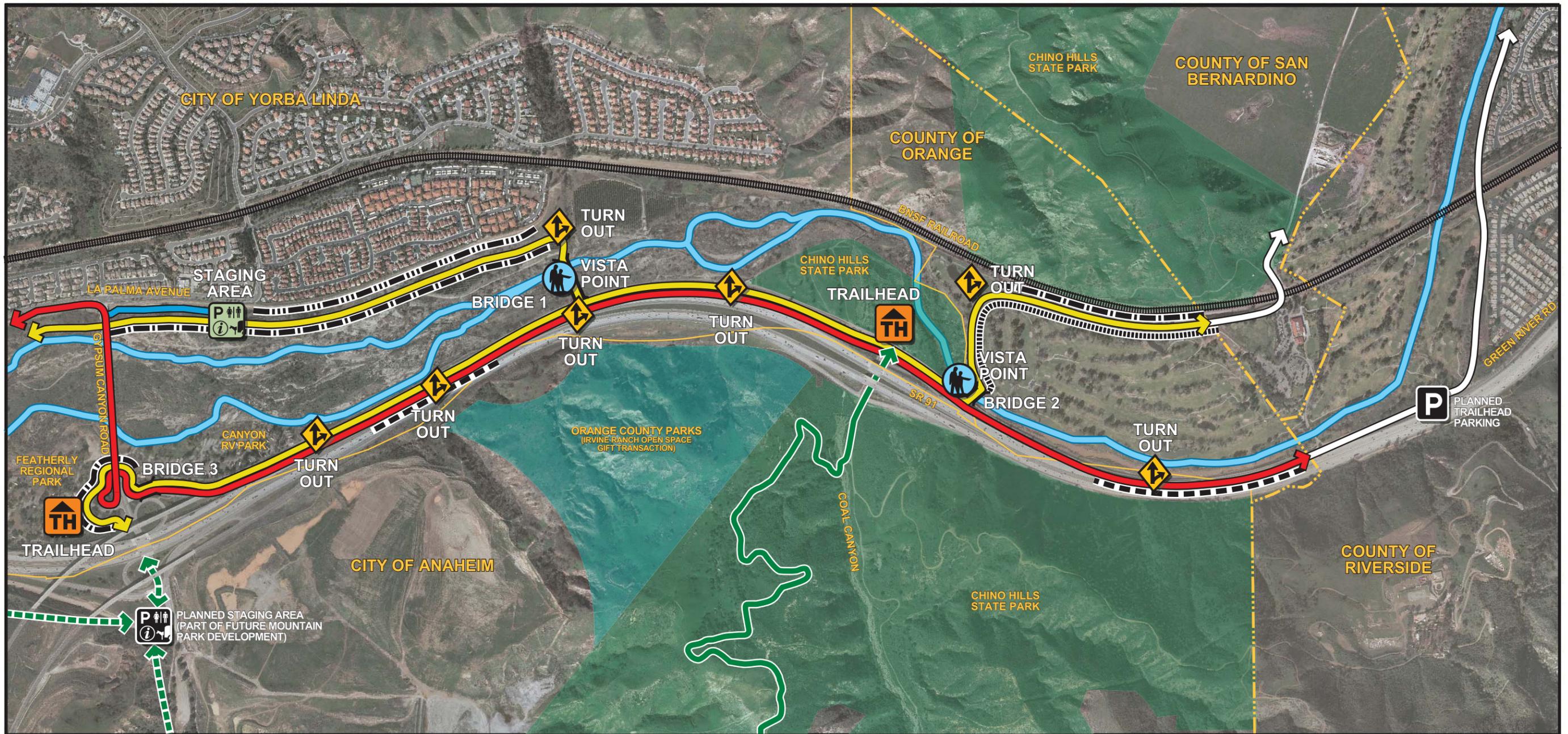
TRAILHEADS

A trailhead is defined as a non-vehicular crossroads that is a rest area and orientation point where two or more trails and/or bikeways meet. It is smaller, accommodates less people and has fewer facilities than a staging area. The alternatives provide for two trailheads which may be located at Coal Canyon/CHSP and Gypsum Canyon Road/Featherly Regional Park.

- **Trailhead for Coal Canyon Trail/SAR Class I Bikeway and Riding and Hiking Trail.** The crossroads for these three systems occurs at CHSP within the OCFCD right-of-way next to the Coal Canyon/SR-91 underpass. This trailhead is located in the middle of the project area on the Santa Ana River Parkway corridor and may only be reached by riding, hiking or bicycling from the SAR Parkway corridor from the east or west, or from the Coal Canyon Trail to the south. The proposed trailhead is an opportunity to coordinate design, needs and interpretive boards between State Parks and OC Parks..
- **Trailhead for Gypsum Canyon Trail and Class II Bikeway/ SAR Class I Bikeway and Trail.** This crossroads occurs within Featherly Regional Park/Canyon RV Park near the main entry gatehouse and adjacent to the entry drive. If desired, an optional drop off may be designed to allow hiker and bicycle unloading. Parking can be considered as part of a future design and review process. The trailhead may be reached from the Gypsum Canyon Trail to the south, from the Gypsum Canyon Bridge Class I Bikeway or Class II Bike Lane from the north, or from Santa Ana River Parkway corridor trails to the east.

The trailheads will be designed as non-vehicular crossroads and will provide users the following limited features:

- Benches (two),
- Picnic tables (two),
- Trash receptacles,
- Bicycle racks (no long term storage),
- Hitching posts,



P **Staging Area** - Parking, picnic tables, bike racks, corral, hitching posts, interpretive and directional signage, shade trees, trash receptacles, views, water (Optional: Restrooms, shade structure, monumentation, minimal security lighting)

TH **Trailhead** - Water, picnic tables, bike racks, hitching posts, interpretive and directional signage, shade trees, trash receptacles (Optional: Shade structure)

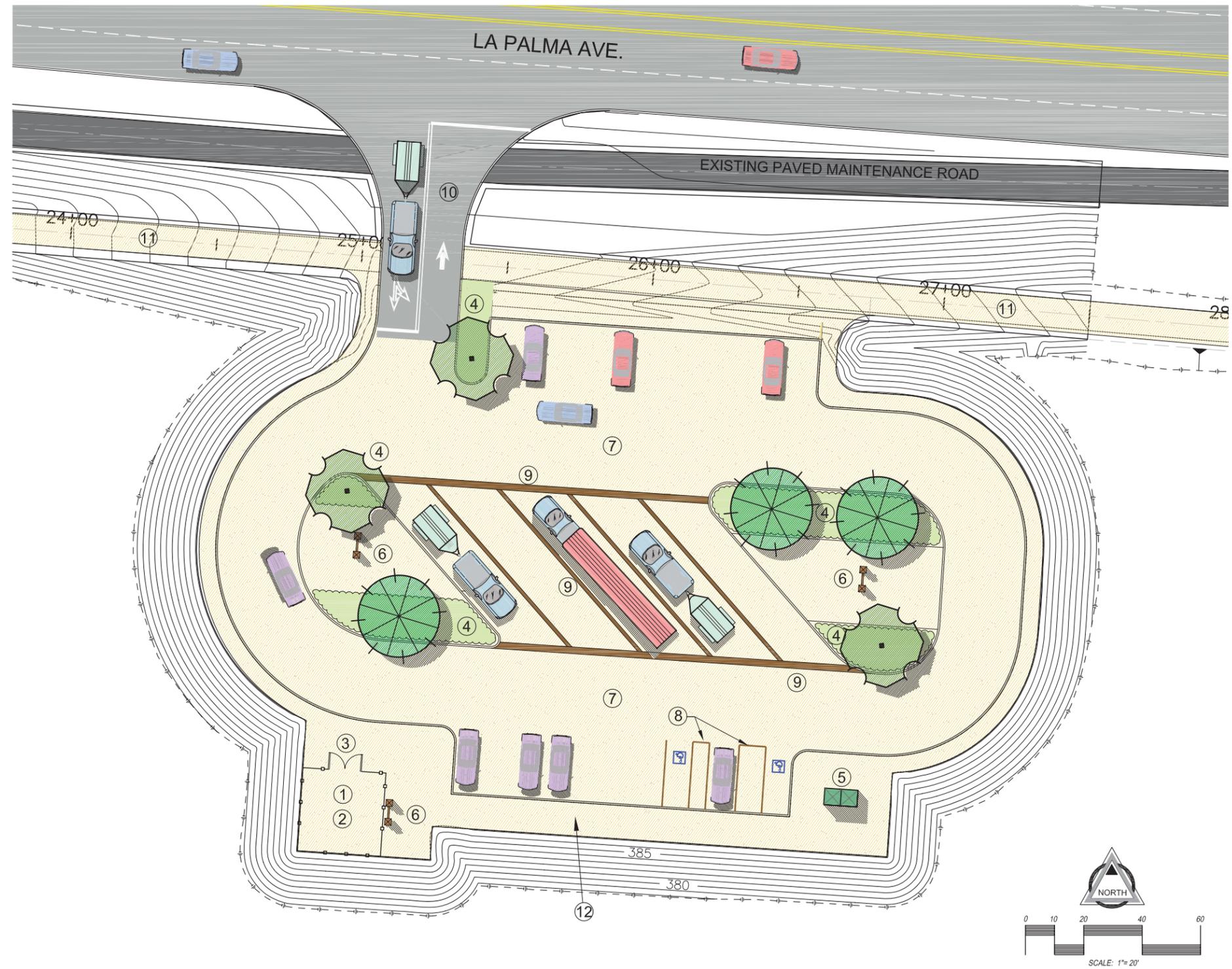
Turn Out - Seating, directional and mileage signage, shade trees, trash receptacles

Vista Point - Seating, view orientation, interpretive, directional and mileage signage, shade trees, trash receptacles

Fencing Types
 Chainlink (6') - Security fencing along bikeway edge
 Wood Rail - Intermittent safety fencing along slopes and rail line
 Landscape/Sound Wall Buffer - Sound/visual barrier along freeway
 Chainlink (12') - Protective curved top fencing along golf course with openings to facilitate wildlife movement



Exhibit 8-5: Trail Features



- HORSE ARENA**
- ① Decomposed Granite
 - ② Horse Corral
 - ③ Wooden Gates

- PLANTINGS**
- ④ Native Drought Tolerant Veg.

- STAGING AREA AMENITIES**
- ⑤ Portable Comfort Station
 - ⑥ Double Hitching Post

- SURFACE TREATMENT**
- ⑦ Decomposed Granite Parking Lot
 - ⑧ Parking Stall Border
 - ⑨ Horse Trailer / Large Vehicle Parking Banding

- ⑩ Staging Area Access Road
- ⑪ 10' Riding / Hiking Trail
- ⑫ Perimeter Access

Exhibit 8-6: Typical Staging Area

- Water for horses,
- Water for hikers, riders and bicyclists,
- Shade trees, and
- Interpretive and directional signs.
- Shade structure (optional)
- Drop-off (optional only at Featherly Regional Park/Canyon RV Part if approved)

No parking will be provided.

TURN OUTS, VISTA POINTS AND REST AREAS

Each alternative will have turn outs, vista points and rest areas. The recommended alternative will include proposed locations for review and discussion. The criteria used for each are described below:

Turn Outs

A turn out is defined as either a widened section of trail to allow faster traffic to pass or a side path that allows users to pull over and rest away from the main trail. A turn out will have:

- Widened Pavement,
- Bench,
- Shade trees and native vegetation,
- Signage- direction or mileage,
- Trash Receptacle,
- Fencing as needed.

The project will have turnouts on the:

- **South River Bank (5 total)** – four of the turn outs are located between Canyon RV Park and CHSP including one at the south bank entry to Bridge 1A, and the fifth is located midway along the big bend of the bikeway between Green River Road and the Orange County Boundary.
- **North River Bank (2 total)** – one at the north bank entry to Bridge 1A and the another across the river next to the golf course and along the bend near the railroad.

Vista Points

A vista point is a type of turn out/rest area used for orientation that is specifically focused on scenic long distance views and overlooks either upstream, downstream or across the river corridor. A vista point will have similar features as the turn out above. If it is located on a bridge deck it will be more limited with only a widened pullout and, if there is room, a bench and signage.

There are several vista point opportunities:

- **East of Chino Hills State Park on OCFCD land (1)** - at the high point looking eastward over the golf course and upstream along the Santa Ana River.
- **Bridge 1 (1 or 2)** – a vista point can be created on the bridge above a mid-point pier on the west side of the bridge looking downstream. If desired, a companion vista point could be built on the other side of the bridge looking eastward and upstream.

SHADE STRUCTURES

An open frame design feature that provides shade from the sun at a staging area, trail head or rest area. As part of this plan, a shade structure will be provided at a staging area, and is optional at a trail head.

RESTROOMS

Limited existing restroom facilities were identified along the project study area. Existing facilities are located only at the Featherly Regional Park/Canyon RV Park and at the Green River Golf Club clubhouse. These restrooms were not designed to accommodate trail users, and were designed only for the intended users of the respective facility. A temporary or portable restroom (or comfort station) is an inexpensive way to quickly address the need without a significant cost investment and may be included in the early years of a staging areas development. Portable toilets may also be brought in for special events, or as needed, and then be removed. A portable rest room is recommended to be included with the proposed north bank staging area. A permanent facility with a water and sewer connection may be provided at a later date as demand for further facilities increase.

CROSSROADS/ INTERSECTIONS

A crossroads/intersection is defined as a convergence of two or more bikeways or trails, and/or roads. Crossroads are often sites where staging areas, trail heads or rest areas are located. The main crossroads within the project area are: (See Exhibit 4-7: Public Access Points)

- Featherly Regional Park/Canyon RV Park entry and Gypsum Canyon Road with the Santa Ana River Bikeway and Riding and Hiking Trails.
- Gypsum Canyon Road/La Palma Avenue with the SAR Bikeway and Riding and Hiking Trail.
- Green River Road/Golf Course Entry Road and the SAR Class I Bikeway.
- Coal Canyon Riding and Hiking Trail and SAR Bikeway and Riding and Hiking trails.

FUTURE CONNECTIONS

Development of the alignments and recommended alternative in this study included outreach and coordination with project Stakeholders including Riverside and San Bernardino Counties. As part of this coordination Orange County also identified



12' High Curved Top Chain Link Fencing



6' High Chain Link Fencing



Acoustiblok All Weather Sound Panels



Barrier Wall/Buffer



Intermittent Wood Railing

potential trail and bikeway alignments and railroad crossing locations in Riverside and San Bernardino Counties within its Green River Golf Club. At the conclusion of the Stakeholder meetings important off-site connections to the Santa Ana River Bikeway and Riding and Hiking Trail in Riverside and San Bernardino Counties (where these routes might connect at the tri-county boundary) still remain to be identified. It is possible that future routing of the trail and bikeway into Riverside and San Bernardino Counties may affect this study's recommendation of a preferred alternative. Once upstream alignments for the trail and bikeway are fixed, Orange County can then proceed to implement its preferred alignment alternative from Coal Canyon to the County boundary, or pursue one of several other alignment alternatives described herein.

Key components of the special studies focused on identifying alignments and features for the following elements: (See **Appendices H & J: Riverside County Studies and Riverside County/ Railroad Crossing Conceptual Studies**)

- Santa Ana River – one or more bridges are required to cross the trails over the river;
- Green River Golf Club – trail alignments and railroad crossing locations should respect future golf course routing to be selected by Orange County; and,
- BNSF Railroad – may require a new overpass or underpass, and/or the widening of an existing underpass.

Potential future trail alignments through the golf club area are shown in Appendix H. At the time of this study, the most likely alternatives include the bikeway to be located on the Santa Ana River bank protection improvements along the south side of the river, and the riding and hiking trail to be located on the north side of the river. The recommended preferred alignment identified these locations as the future connection points. However, until a final determination is made by the other Counties, construction of the bikeway and riding and hiking trails in Orange County is recommended to terminate at the Coal Canyon trailhead in the CHSP.

The future trail extensions will also require one or more crossings of the BNSF railroad tracks. Potential crossing locations were reviewed and an initial coordination meeting was held in the field with BNSF representatives. A discussion of the study is included in Chapter 10.

FENCING

The fencing for the project falls into four categories:

- Chain link (12-foot high);
- Chain link (6-foot high);
- Wood rail; and,
- Landscape/sound wall buffer.

The chain link (12-foot high) fencing along the golf course use area is a protective barrier that will include openings to facilitate wildlife movement.

A portion of the 12-foot high chain link protective fencing will be located within the floodplain. In this area, the design includes a floating fence design that will allow debris to pass during higher storm events. The following figure shows the proposed floating fence design.

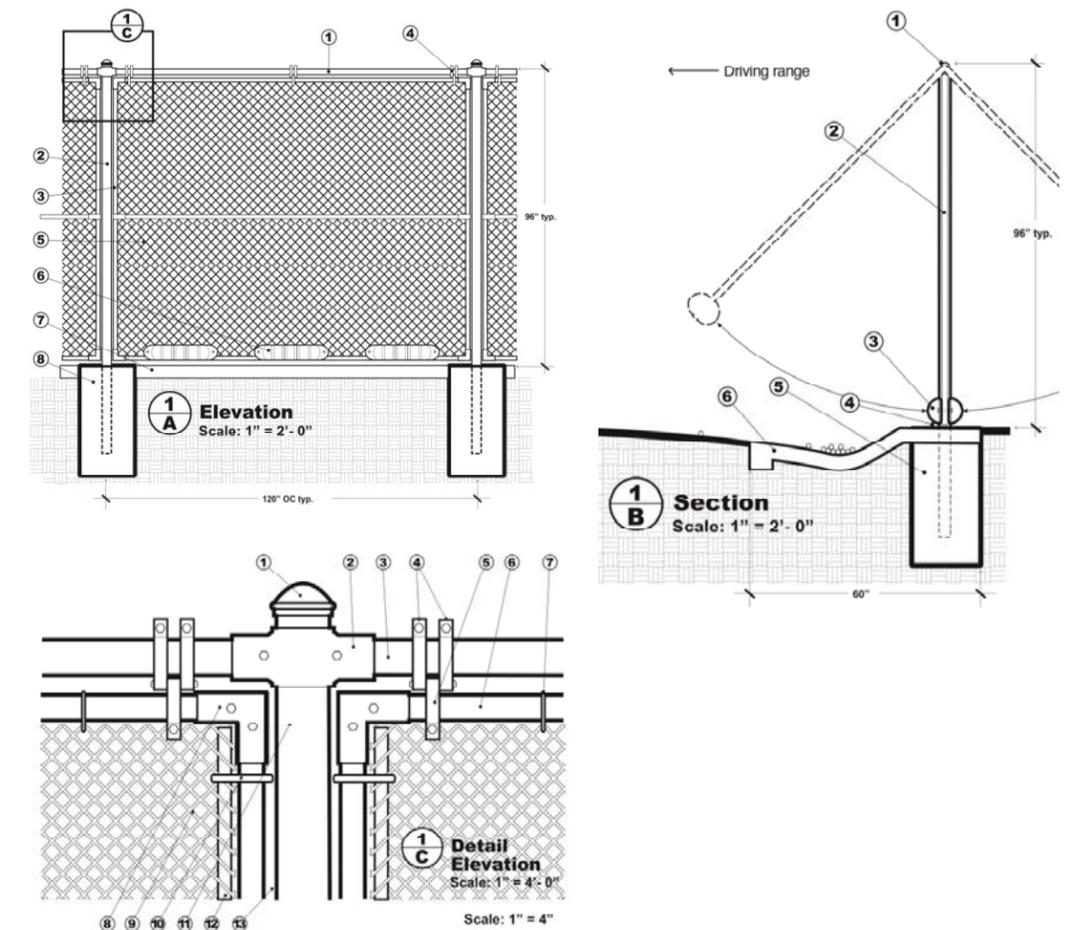


Exhibit 8-7: Floating Gate Design

TRAIL SURFACE MATERIALS

Trail surfacing will typically be locally-sourced, compacted decomposed granite (DG) for the soft surface riding and hiking trail portions of this project. DG is a visually attractive and permeable material that can be relatively easily repaired following seasonal flood events and lends itself well for most typical trail uses.

BIKEWAY PAVING TREATMENTS

The bikeway surface will typically be asphaltic concrete (AC), similar to the existing bikeway paving. Since bicycles are easily deflected by surface irregularities, care will be taken to maintain a smooth surface to facilitate safe cycling. Anywhere the surface must be laid down in multiple operations, longitudinal gaps will be avoided. Striping or other surface markings will be non-skid paint or tape designed for the purpose. A regular sweeping plan will be necessary where the bikeway passes under existing bridges and is low enough to accumulate debris from winter storm flows. These specific locations may be constructed with concrete for durability.

PLANT MATERIALS

Plant material will be confined along the trail and bikeway at staging areas, trail heads, vista points and turn outs. All planting will be regional native species. Trail features are planned to occur at regular intervals along the corridor and native trees are planned as the primary shading method at these locations. Additional native shrub plantings will be incorporated into these locations to help integrate them with surrounding habitats and the overall riparian ecosystem.

SIGNAGE AND INTERPRETIVE BOARDS

Project signage may be directional, destination, distance (mileage), regulatory/advisory and interpretive. Due to the limited number of corridor access points within this project area, directional and other typical signage will occur primarily at staging areas, trailheads and where users intersect the corridor.

Distance markers may occur on a regular interval of at least once per mile and, more likely, every half mile.

Interpretive signage usually coincide with a point of public interest, but will likely be concentrated at the staging areas, trailheads and vista points where users are more likely to spend time off the trail surface resting or admiring the views.

Except for regulatory signs, Parkway signage can be comprehensively designed as a definitive signature element that ties the experience of this segment together with the rest of the Orange County trail system, as well as the rest of the Santa Ana River Parkway.

RIGHT-OF-WAY

South River Bank

The limits of the Caltrans right-of-way relinquishment for the SARI line created an opportunity area for the trail and bikeway (within a 30' average width) along the southern bank of the Santa Ana River. This area is now relinquished and transferred to Orange County Flood Control District. (the fee owner). At two locations the recommended alternative alignment leaves the relinquishment area and encroaches into the adjacent Canyon RV Park (an OC Parks lessee).. A critical area of restriction is along the bikeway between Featherly Regional Park/Canyon RV Park located adjacent to the Gypsum Canyon Road Bridge. Within this reach, the typical section is reduced to a minimal width less than 30 feet and there are two areas of encroachment into the RV Park leasehold.. To address the encroachment of the trail will require an accommodation by the lessee and OC Parks prior to final design. Also, a retaining wall will be required along the slope in order to provide both a bikeway and a riding and hiking trail through this area.

Another area where the trail will encroach is within the CHSP property. In preliminary discussions with State Park representatives, it has been determined that the unpaved riding and hiking trail alignment will be allowed to pass through the CHSP property parallel to the Class I Bikeway. The decomposed granite riding and hiking trail will follow existing dirt maintenance roads within the CHSP property wherever possible. Construction of the trail will provide CHSP visitors with amenities such as a vista point at the eastern edge of the CHSP and a trailhead at the interface with the existing Coal Canyon trail. The trail alignment within the CHSP will require an easement and/or right-of-entry permit from State Parks and will be maintained by Orange County Parks.

North River Bank

Along the north bank of the Santa Ana River Parkway the proposed loop bikeway is proposed to utilize the tread of the existing paved County service road (Alternatives 3, 4, and the preferred alternative). The recommended alternative loop bikeway is proposed to pass through the rear portion of the numerous homeowner lots (part of the Villa Del Rio Association) within an existing recreational easement located along the north river bank levee. This existing recreational easement is outside the homeowners' wall and allows for recreational trail access.



Exhibit 8-8: Sample Materials

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CHAPTER NINE | COST ESTIMATES



Cost estimates were prepared for each of the four alternatives and the recommended preferred alternative. Alternatives 1 through 4 are discussed in Chapter 6: Alternative Alignments. The recommended preferred alternative is discussed in Chapter 7: Recommended Preferred Alternative. The cost estimates include separate categories for trails, bridges and amenities. Refer to **Appendix I: Cost Estimates** for detailed cost estimates by alternative and category.

The ultimate bikeway on the south side of the river is generally proposed to be located on the paved maintenance road constructed as part of the SARI line relocation project. However, a portion of the SARI line maintenance road will need to be removed and replaced during the construction of this project to accommodate the adjacent unpaved riding and hiking trail. The quantities of AC pavement removal and replacement are included in the overall cost estimates for each Alternative. The cost for using the existing paved maintenance access road includes signing and striping only.

Bridge improvements are separated into categories based on the bridge location. Included in the unit costs for the bridge deck are the pre-fabricated truss structure, abutments, and pier walls. Excavation/fill required to construct the bridge, and rock slope protection along the bridge slope abutment areas are included as separate line items under the bridge totals.

The cost estimates for the basic trail amenities include the staging area, trailheads, vista points and turnouts. Two types of staging areas were considered during the development of the recommended project; a Basic Staging Area and a Full Staging Area. The cost estimates only include the construction of the basic staging area. The Basic Staging Area includes the first phase items described in Chapter 8, and as shown on **Exhibit 8-6: Typical Staging Area**.

The major differences between a basic staging area and a full staging area are the structural components. A full staging area would require a comfort station, which also requires a potable water source; whereas the basic staging area includes a portable comfort room. Another difference is the building and parking lot requirements. The difference in construction cost between the Basic Staging Area and the Full Staging Area is estimated to be about \$1.8 million dollars. When all environmental, permitting, engineering, administration and contingencies are considered, the estimated additional cost for the full staging area is approximately \$3 million dollars.

The Total Estimated Project Cost is broken down into the categories of construction costs, and engineering and administration costs. The construction totals are the basic unit costs of the construction items, plus a 15 percent construction contingency and a 10 percent mobilization and bonding cost. The Engineering and Administration Costs include engineering and construction services (15 percent), permitting (5 percent), and contract administration (7.5 percent). These costs are based on a percentage of the construction total. The two totals are combined to become the Total Estimated Project Cost for each alternative. A summary of the total estimated cost for each alternative is

shown in Table 9-1, which reflects the construction of a Basic Staging Area.

The recommended alternative alignment resulted from input from the County, stakeholders as well as input during the public open house. The recommended alternative includes a mix of features from both Alternative 2 and Alternative 3, thus the name "Alternative 2 Modified." A separate cost was prepared for the recommended preferred alternative. The following is a summary of the cost estimates for each alternative.

Table 9-1: Cost Estimates			
Alt. No.	Alt. Name	Description	Cost
2	Parallel Trail	Construction Total	\$6,819,125
		Engineering And Administration	\$1,875,260
		Total Estimated Project Cost	\$8,694,385
2	Split Trail	Construction Total	\$9,945,740
		Engineering And Administration	\$2,735,080
		Total Estimated Project Cost	\$12,680,820
3	Loop Trail	Construction Total	\$14,428,620
		Engineering And Administration	\$3,967,870
		Total Estimated Project Cost	\$18,396,490
4	Multi-Loop Trail	Construction Total	\$15,480,145
		Engineering And Administration	\$4,257,040
		Total Estimated Project Cost	\$19,737,185
2.5	Recommended Alternative	Construction Total	\$11,888,730
		Engineering And Administration	\$3,269,400
		Total Estimated Project Cost	\$15,158,135

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CHAPTER 10 | CONCLUSIONS



The Santa Ana River Parkway Engineer's Report and Alignment Study is the first phase of a three-phase project to design and construct the extension of the regional Class I bikeway and riding/hiking trail from Gypsum Canyon Road to the County Boundary. This study intended to provide the County with a selection of feasible alternatives to complete the bikeway and trail. It has concluded with the recommendation of Alternative 2 Modified as the Preferred Alternative.

The next steps in the County process will include:

- Phase II (2011 - 2013) - Prepare plans, specifications and environmental documentation; and
- Phase III (2014 - 2015) - Construction.

COORDINATION ISSUES TO BE RESOLVED GOING FORWARD

There are many on-going projects which occupy the same area as this bikeway/trail project in the Santa Ana River Parkway. These projects have been described earlier in Chapter 4. Trails and Bikeway Analysis.

On-Going Project Interface

The Santa Ana River Parkway will require on-going coordination through construction with the following projects:

- Green River Golf Club routing studies;
- Santa Ana Regional Interceptor (SARI) Line Protection/Relocation Project;
- Lower Santa Ana River Bank Stabilization - Reach 9, Phase 2B;
- Perennial Stream Mitigation Project;
- Lower Santa Ana River Bank Stabilization - Reach 9, Phase 3;
- SR-91 CIP Improvements; and
- Westbound SR-91 right-of way relinquishment.

This study has interfaced with the teams for all of the on-going projects noted. The preferred alignment has benefited from sharing some of the common project features with these projects at a savings of time and improvement costs. Most notably by:

- Sharing the future SARI line 12-foot wide paved service road as a Class I Bikeway segment adjacent to SR-91;
- Sharing the future 15-foot wide service road as a Class I Bikeway adjacent to SR-91 built as part of the Reach 9, Phase 2B project;
- Utilizing the Caltrans relinquishment area now owned by OCFCD for much of the future south bank bikeway and trail alignment;
- Utilizing the existing OCFCD service road on the north bank adjacent to Villa Del Rio for a Class I Bikeway; and
- Coordinating with the Reach 9, Phase 3 project to provide a wide enough area along

this narrow south bank of the river to build both the Class I Bikeway and Riding and Hiking Trail.

Riverside County Santa Ana River Bikeway and Trail Connections

At this writing it is unclear where Riverside County will be placing its portion of the Class I Bikeway. It may follow the future levee service road (Lower Santa Ana River Bank Stabilization - Reach 9, Phase 2a) being designed adjacent to the River Bend mobile homes. Until a point of connection between the Orange and Riverside/San Bernardino County segments can be identified, it is likely that Orange County will construct the ultimate trail to the Coal Canyon undercrossing (SR-91) in the Chino Hills State Park.

The Riverside County portion of the Riding and Hiking Trail alignment and connection point is also undetermined. It is presumed to arrive from the north on the west side of the river along the existing unpaved SARI service road. The trail will need to cross the BNSF railroad tracks within the Green River Golf Club area. Orange County's anticipated preferred alternative alignment for the riding/hiking will parallel the south side of the existing railroad tracks and stop at the County Boundary near the existing golf course driving range. However, until a point of connection between the Orange and Riverside/San Bernardino County segments can be identified, it is likely that Orange County will construct the ultimate trail to the Coal Canyon undercrossing (SR-91) in the Chino Hills State Park. Within Riverside/San Bernardino Counties there are various scenarios for crossing the BNSF railroad tracks. It is anticipated that all three Counties will need to coordinate and concur on the ultimate crossing type and location. (See BNSF Railroad below.)

BNSF Railroad Crossing Options

The BNSF railroad must be crossed in order to join the future Orange County and San Bernardino/Riverside County segments of the Santa Ana River Bikeway and Trail. There are several crossing points that have been reviewed and discussed with the parties involved, although no decision has been made where to cross. The crossing options preliminarily explored were:

- Existing undercrossing adjacent to the golf course in Orange County. This option would require expansion of the undercrossing.
- Future overcrossing near the driving range in San Bernardino County.
- Future undercrossing near the Clubhouse with a possible tunnel at the Riverside and San Bernardino County Boundary.
- Existing golf cart undercrossing adjacent to the river (west side) with possible widening/tie-back wall in Riverside County.
- Existing railroad bridge crossing of the river (east side) with possible bikeway/trail in Riverside County.

As part of this study, various options were considered for the railroad crossing and a preliminary evaluation is included in Appendix J. Only one potential crossing location was identified in Orange County. It was located at an existing drainage crossing adjacent

to the golf course use area. This small crossing would require extensive modification, would continue to flood during storm events, and would require extensive maintenance. It has not been pursued due these reasons, the significant estimated construction cost, and the uncertainty of the point of connection with the San Bernardino/Riverside County Bikeway and Trail.

BNSF has requested that the present "at-grade" crossing located behind the Golf Course Clubhouse be removed. In turn the railroad will cooperatively work with the Counties to explore and approve an undercrossing or overcrossing solution.

Determining the best solution to cross the BNSF railroad at or near the County Boundary and join the various trail segments is an on-going issue that will require a concerted tri-county and multi-jurisdictional effort going forward into Phase II of this project.

PRELIMINARY CONSTRUCTION DRAWINGS



The preliminary construction drawings were prepared for the recommended preferred alignment and include the proposed Class I bikeways, riding/hiking trails, bridges and staging area within the project limits. Half-sized drawings for the improvements are included with this report.

The ultimate project alignment for the south bank bikeway included coordination with the design of the SARI Line maintenance road. The new maintenance access road to be constructed with the SARI line relocation project was aligned to accommodate the Class I bikeway where possible. A portion of the maintenance access road adjacent to the Canyon RV Park will need to be removed and reconstructed to include both the paved Class I bikeway and the unpaved riding/hiking trail through this restricted area. The new bikeway construction extends from the Gypsum Canyon Road connection to the east end of the Canyon RV Park.

The unpaved riding/hiking trail is proposed to be installed adjacent to the Class I bikeway along the south bank from Gypsum Canyon Road to the east side of the Chino Hills State Park. This reach of trail includes a new bridge structure at the Gypsum Canyon drainage crossing. The existing reinforced concrete box culvert across this drainage at SR-91 does not provide adequate space for both trails. A 100-foot long bridge is proposed to crossing the drainage. East of the Chino Hills State Park (at Coal Canyon), the riding/hiking trail will diverge from the bikeway and cross the Santa Ana River at the downstream end of the Reach 9 Phase 2B project. The riding/hiking trail is required to cross the river at this location due to the lack of space for both trails along the south bank of the river. A specific alignment for the riding/hiking trail around the golf course use area is not provided due to the uncertainty of the ultimate golf course configuration. However, the trail is proposed to wrap around the area and join a future trail extension from San Bernardino/Riverside Counties at the County line.

The proposed north bank trails include both a Class I bikeway and the unpaved riding/hiking trail. Both routes will extend under the Gypsum Canyon Road Bridge to join the existing trails on the west side. A small floodwall is proposed adjacent to the trails to prevent flood waters during an 18,000 cfs release from inundating the trails. The Class I bikeway will use the existing maintenance access road adjacent to La Palma Avenue and the Villa Del Rio neighborhood. At the east end of the neighborhood, the existing access road is dirt, and will be paved as part of this project. The unpaved riding/hiking trail will be located at the toe of the existing slope along La Palma Avenue and the Villa Del Rio neighborhood. Fill soil will be added at the toe-of-slope to elevate the trail above the 18,000 cfs release floodplain limits. At the east side of the Riverbend Apartment complex, the bikeway and trail will turn south and cross the Santa Ana River. The bridge is proposed to be a 3-span pre-fabricated truss structure that will cross the river at a constricted point. Minor fill is proposed in the floodplain limits to reduce the span of the bridge structure.

The preliminary plans include the ultimate bikeway alignments and features, hiking/riding trail alignments, drainage improvements, and the locations of recommended amenities

such as turnouts, vista points and trailheads. Also included with the preliminary design plans are the recommended bridges and bridge improvements. The preliminary plan alignments were used as a basis for the quantity take-offs for the cost estimates.

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ORANGE COUNTY PUBLIC WORKS

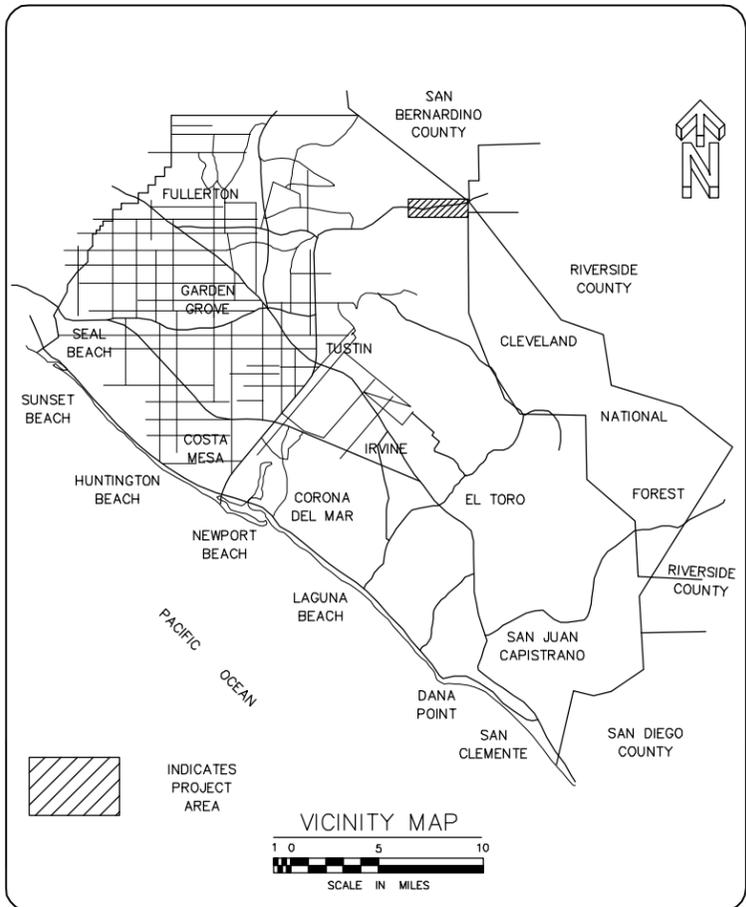
DIRECTOR
JESS A. CARBAJAL

PLANS FOR CONSTRUCTION OF
THAT PORTION OF

LOWER SANTA ANA RIVER REACH 9 PARKWAY TRAIL ALIGNMENT

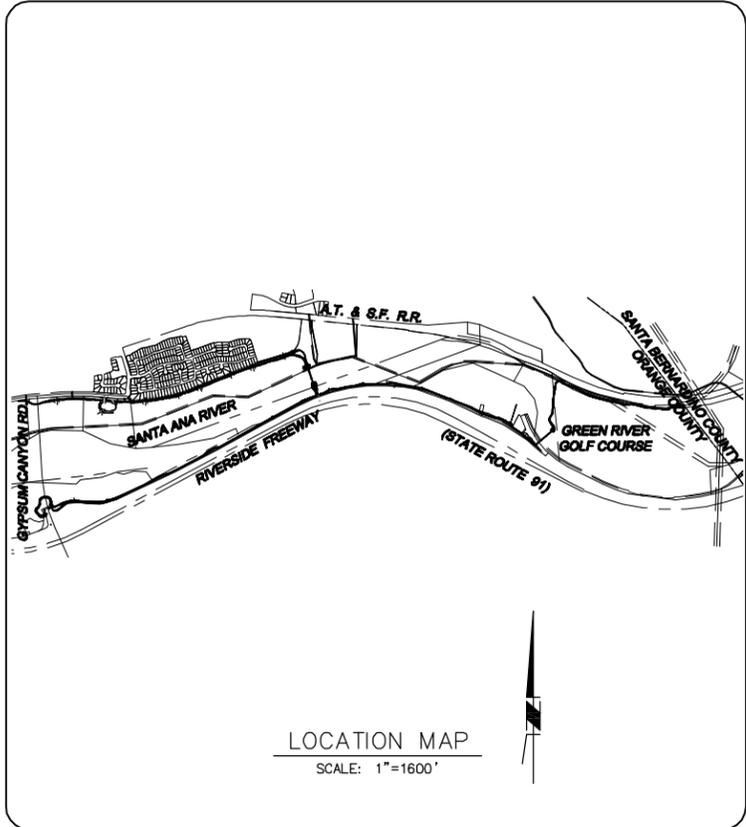
BETWEEN GYMSUM CANYON RD. AND ORANGE COUNTY LINE

SOUTH BANK BIKEWAY FROM STA. 11+14.98 TO STA. 113+36.32
AND NORTH BANK RIDING AND HIKING TRAIL FROM
STA 12+09.36 TO STA 65+77.23 AND NORTH BANK
BIKEWAY FROM STA. 47+01.12 TO STA. 63+70.77
WITHIN COUNTY OF ORANGE
APRIL 2011



INDEX OF SHEETS	
SHEET	DESCRIPTION
1	TITLE SHEET
2	BIKEWAY AND RIDING AND HIKING TRAIL SHEET INDEX
3	BIKEWAY AND RIDING AND HIKING TRAIL SHEET INDEX
4	BIKEWAY AND RIDING AND HIKING TRAIL STA 11+14.98 TO STA 26+00.00
5	BIKEWAY AND RIDING AND HIKING TRAIL STA 26+00.00 TO STA 36+00.00
6	BIKEWAY AND RIDING AND HIKING TRAIL STA 36+00.00 TO STA 48+00.00
7	BIKEWAY AND RIDING AND HIKING TRAIL STA 48+00.00 TO STA 60+00.00
8	BIKEWAY AND RIDING AND HIKING TRAIL STA 60+00.00 TO STA 72+00.00
9	BIKEWAY AND RIDING AND HIKING TRAIL STA 72+00.00 TO STA 83+50.00
10	BIKEWAY AND RIDING AND HIKING TRAIL STA 83+50.00 TO STA 95+50.00
11	BIKEWAY AND RIDING AND HIKING TRAIL STA 95+50.00 TO STA 108+00.00
12	BIKEWAY AND RIDING AND HIKING TRAIL STA 108+00.00 TO STA 118+00.00
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19	BIKEWAY AND RIDING AND HIKING TRAIL STA 43+50.00 TO STA 54+00.00
20	BIKEWAY AND RIDING AND HIKING TRAIL STA 54+00.00 TO BRIDGE 1
21	BIKEWAY AND RIDING AND HIKING TRAIL BRIDGE 1 PLAN & PROFILE
22	BIKEWAY AND RIDING AND HIKING TRAIL BRIDGE 2 PLAN & PROFILE

AGENCY-UTILITY	PHONE NO.
CITY OF YORBA LINDA	(714) 961-7166
SOUTHERN CALIFORNIA GAS COMPANY	(714) 432-6037
SOUTHERN CALIFORNIA EDISON	(714) 458-4447
AT & T TELEPHONE	(714) 666-5698
UNDERGROUND SERVICE ALERT (USA)	(800) 422-4133
COUNTY SANITATION DISTRICTS OF ORANGE COUNTY	(714) 962-2411
COX COMMUNICATIONS	(949) 546-2000
METROPOLITAN WATER DISTRICT (WATER)	(714) 577-5084
VERIZON WIRELESS (TELECOMMUNICATIONS)	(949) 286-8772
LEVEL 3 (COMMUNICATIONS)	(720) 888-6149
XO COMMUNICATIONS (COMM)	(949) 417-7762
ELLER MEDIA (BUST SHELTER)	(310) 755-7225
OCFCD (STORM DRAIN)	(714) 834-5618



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ENGINEER

RBF PLANNING ■ DESIGN ■ CONSTRUCTION

14725 ALTON PARKWAY
IRVINE, CALIFORNIA 92618-2027
949.472.3505 • FAX 949.472.8373 • www.RBF.com

UNDER THE SUPERVISION OF:

LARRY TORTUYA R.C.E. NO. 71502

DATE: _____

GEOTECHNICAL CONSULTANT

EARTH MECHANICS
17660 NEWHOPE STREET
FOUNTAIN VALLEY, CA. 92708

ATT: ANDY KORDOS
PH: (714) 751-3826

ORANGE COUNTY PUBLIC WORKS

THIS PLAN IS SIGNED BY OC PUBLIC WORKS FOR CONCEPT AND ADHERENCE TO COUNTY STANDARDS AND REQUIREMENTS ONLY. OC PUBLIC WORKS IS NOT RESPONSIBLE FOR DESIGN ASSUMPTIONS OR ACCURACY.

APPROVED: _____
DATE: _____

BASIS OF BEARING

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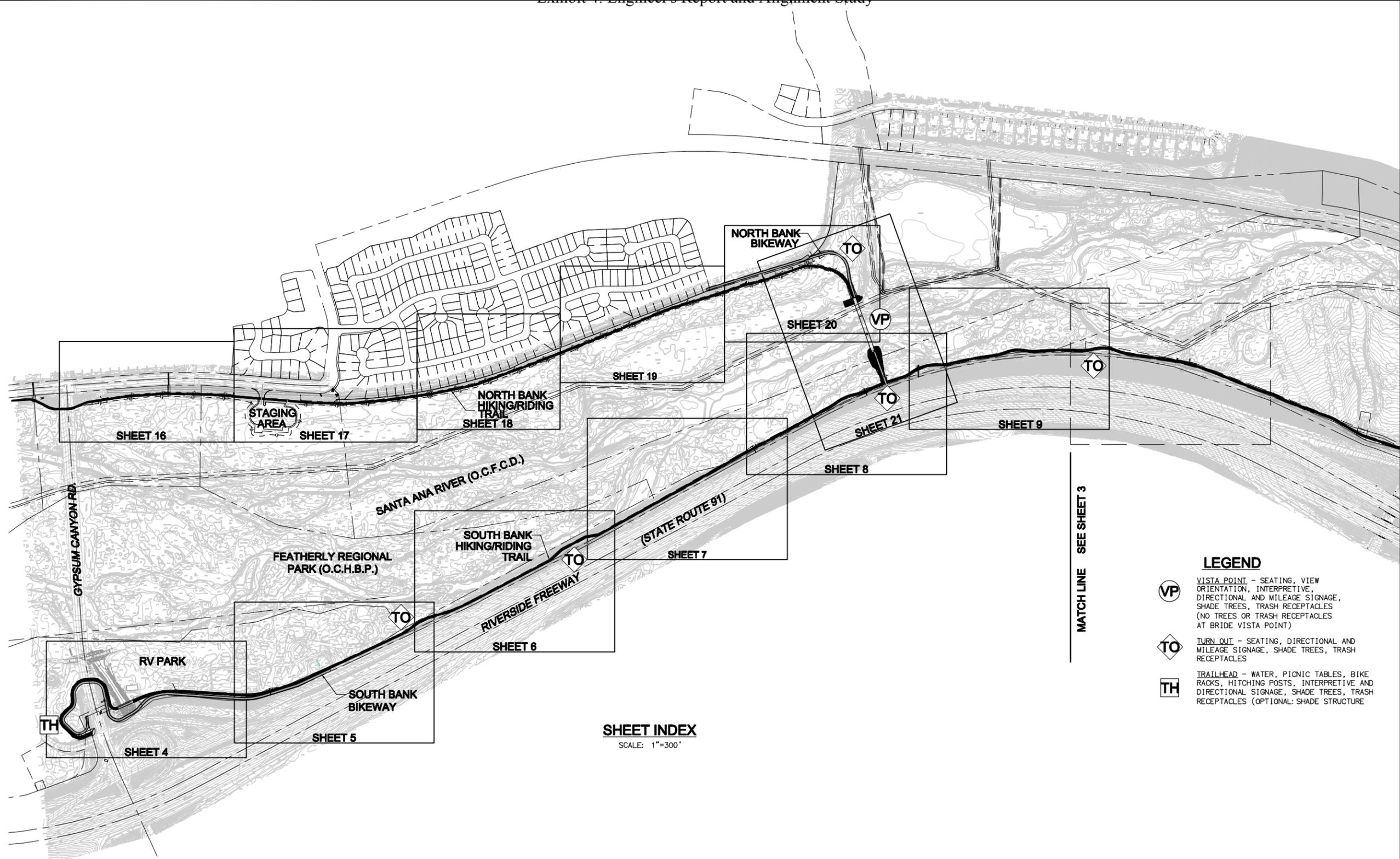
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300 N. FLOWER STREET
SANTA ANA, CA 92703

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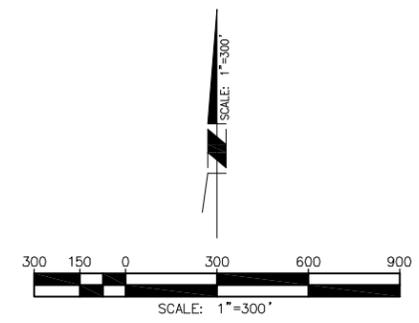
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SHEET 1 OF 22



MATCH LINE SEE SHEET 3

- LEGEND**
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 -  TURN OUT - SEATING, DIRECTIONAL AND MILEAGE SIGNAGE, SHADE TREES, TRASH RECEPTACLES
 -  TRAILHEAD - WATER, PICNIC TABLES, BIKE RACKS, HITCHING POSTS, INTERPRETIVE AND DIRECTIONAL SIGNAGE, SHADE TREES, TRASH RECEPTACLES (OPTIONAL: SHADE STRUCTURE)



SHEET INDEX
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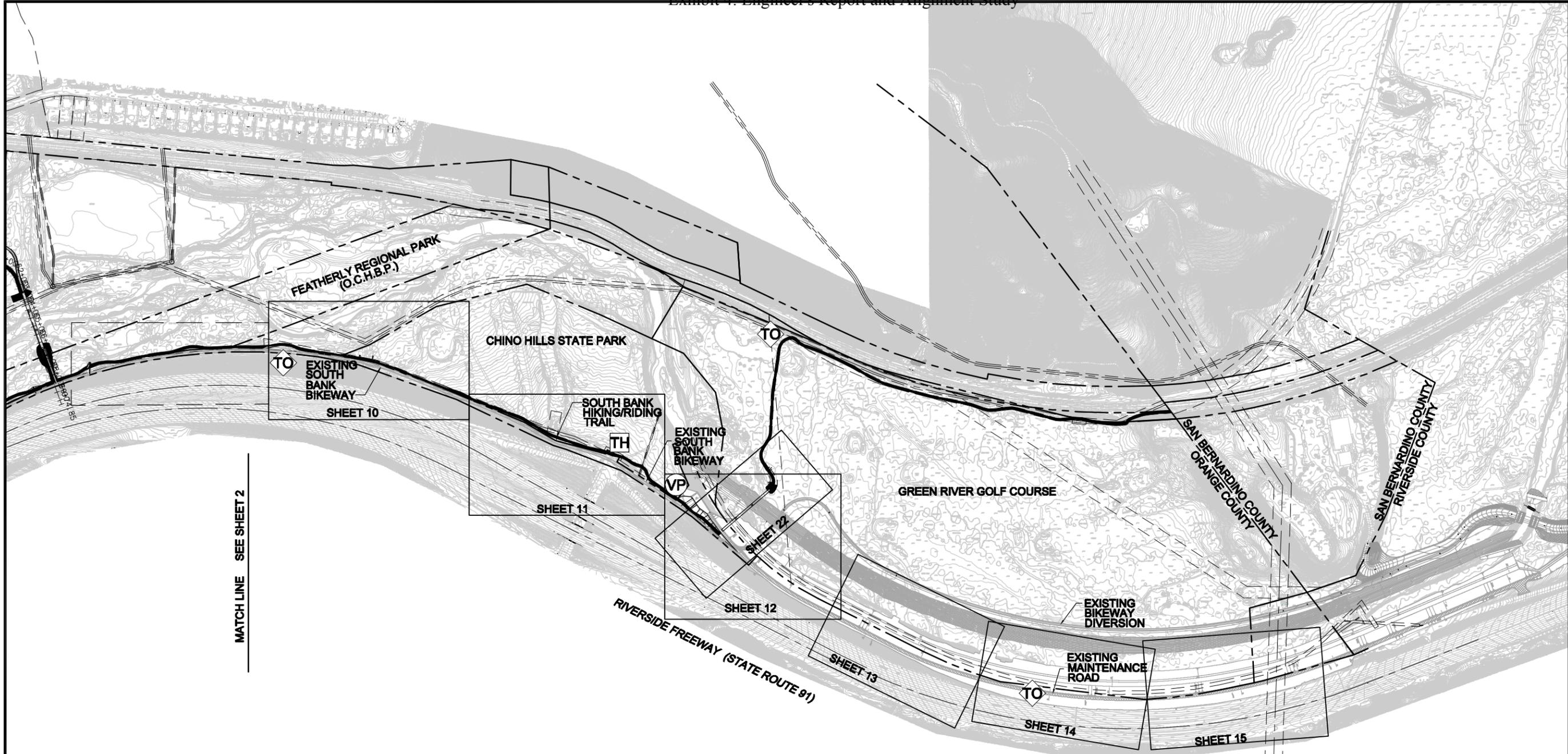


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PREPARED BY: RBF CONSULTING		

COUNTY OF ORANGE
FACILITY NO. XXX
SANTA ANA RIVER PARKWAY
SANTA ANA RIVER
BIKEWAY AND RIDING
AND HIKING TRAIL
SHEET INDEX

Sheet Reference Number
2
OF 22 SHEETS

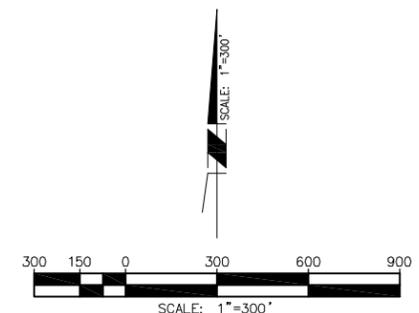


MATCH LINE SEE SHEET 2

SHEET INDEX

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 - TO** - TURN OUT - SEATING, DIRECTIONAL AND MILEAGE SIGNAGE, SHADE TREES, TRASH RECEPTACLES
 - TH** - TRAILHEAD - WATER, PICNIC TABLES, BIKE RACKS, HITCHING POSTS, INTERPRETIVE AND DIRECTIONAL SIGNAGE, SHADE TREES, TRASH RECEPTACLES (OPTIONAL: SHADE STRUCTURE)



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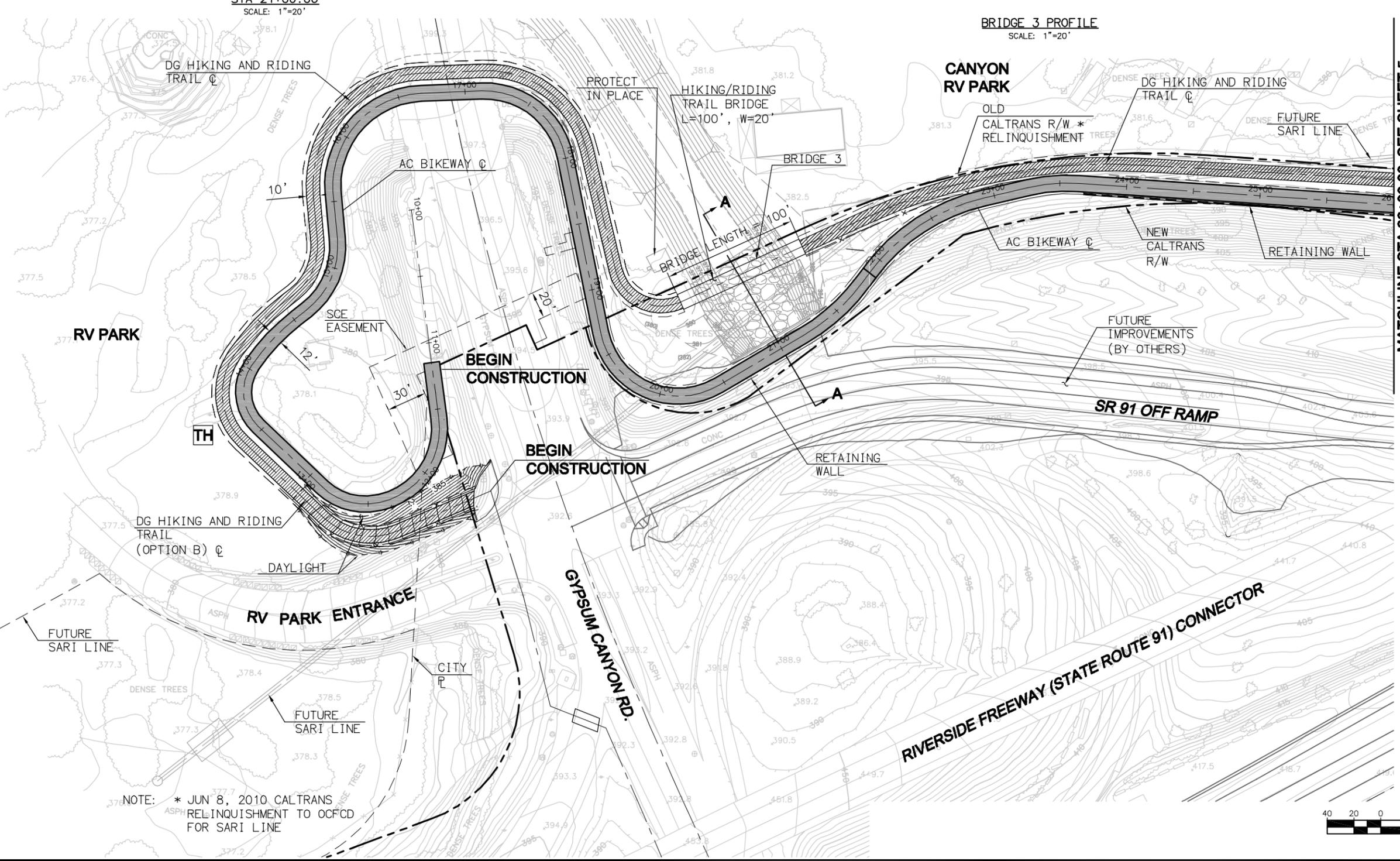
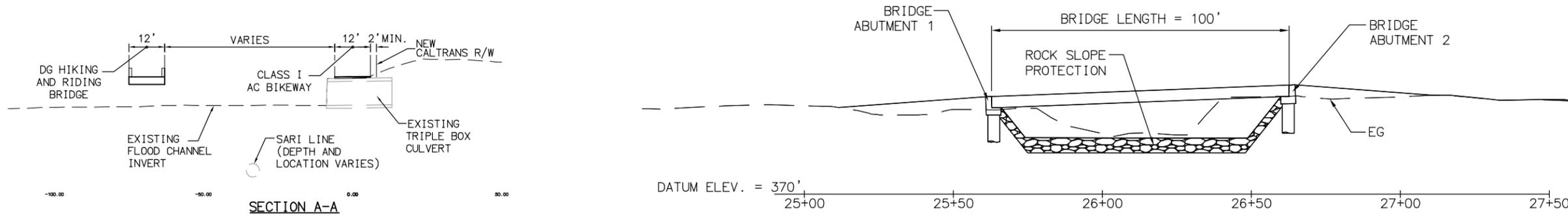
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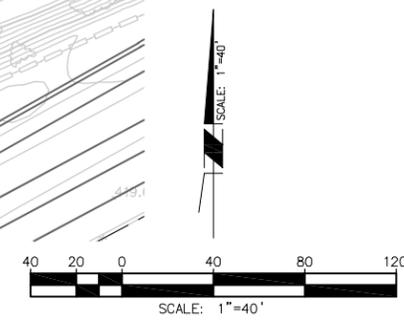
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 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 SHEET INDEX

Sheet Reference Number
3
 OF 22 SHEETS



MATCHLINE STA 26+00.00 SEE SHEET 5

NOTE: * JUN 8, 2010 CALTRANS RELINQUISHMENT TO OCFCD FOR SARI LINE



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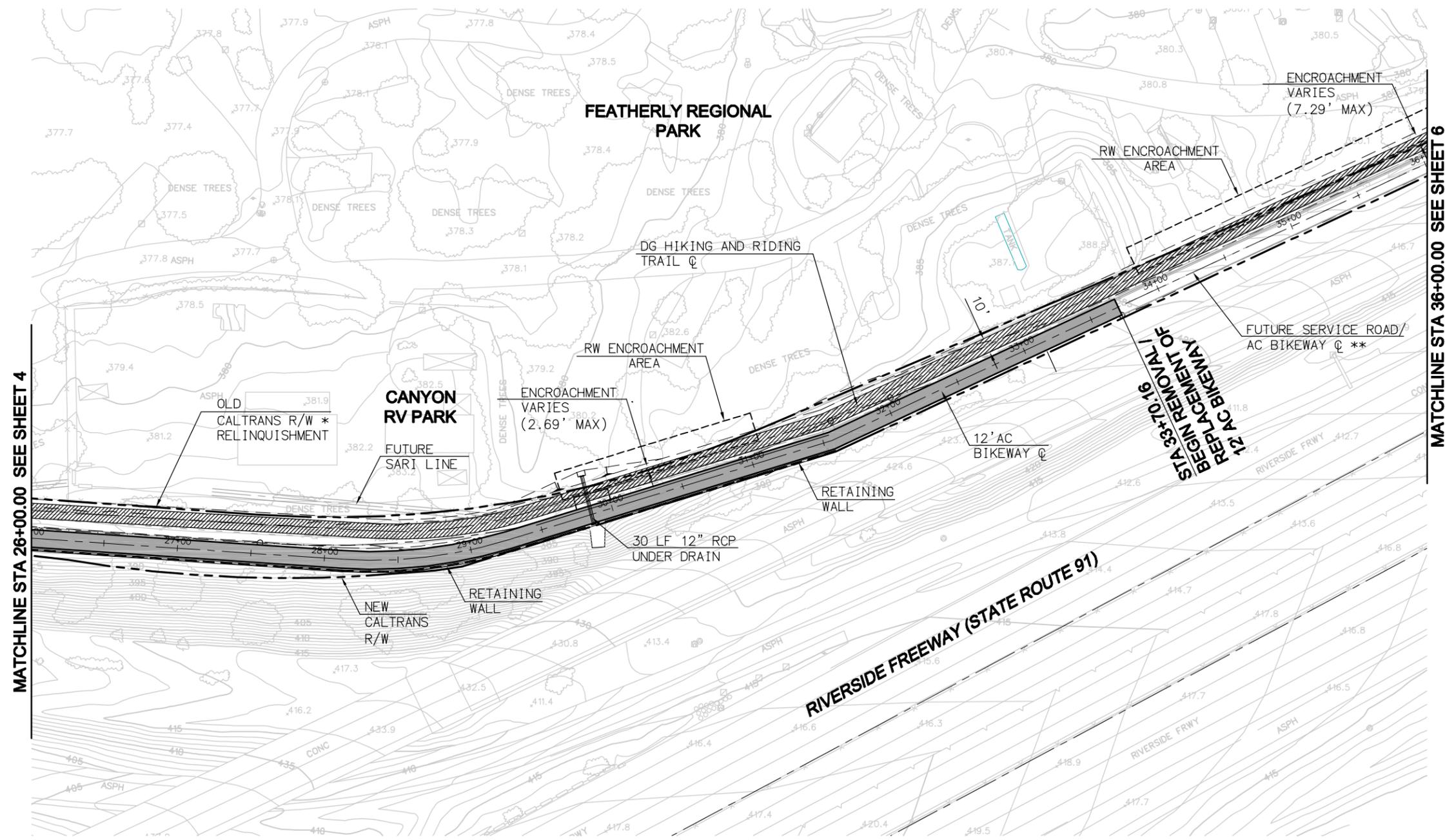
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ORANGE COUNTY PUBLIC WORKS
 PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER BIKEWAY AND RIDING TRAIL AND HIKING TRAIL
 STA 11+14.98 TO STA 26+00

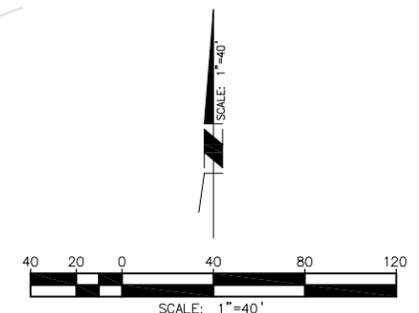
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 OF 22 SHEETS



MATCHLINE STA 26+00.00 SEE SHEET 4

MATCHLINE STA 36+00.00 SEE SHEET 6

NOTES: * JUN 8, 2010 CALTRANS RELINQUISHMENT TO OCFCD FOR SARI LINE
 ** TO BE CONSTRUCTED BY SARI LINE PROJECT. ESTIMATED COMPLETION MAY 2013



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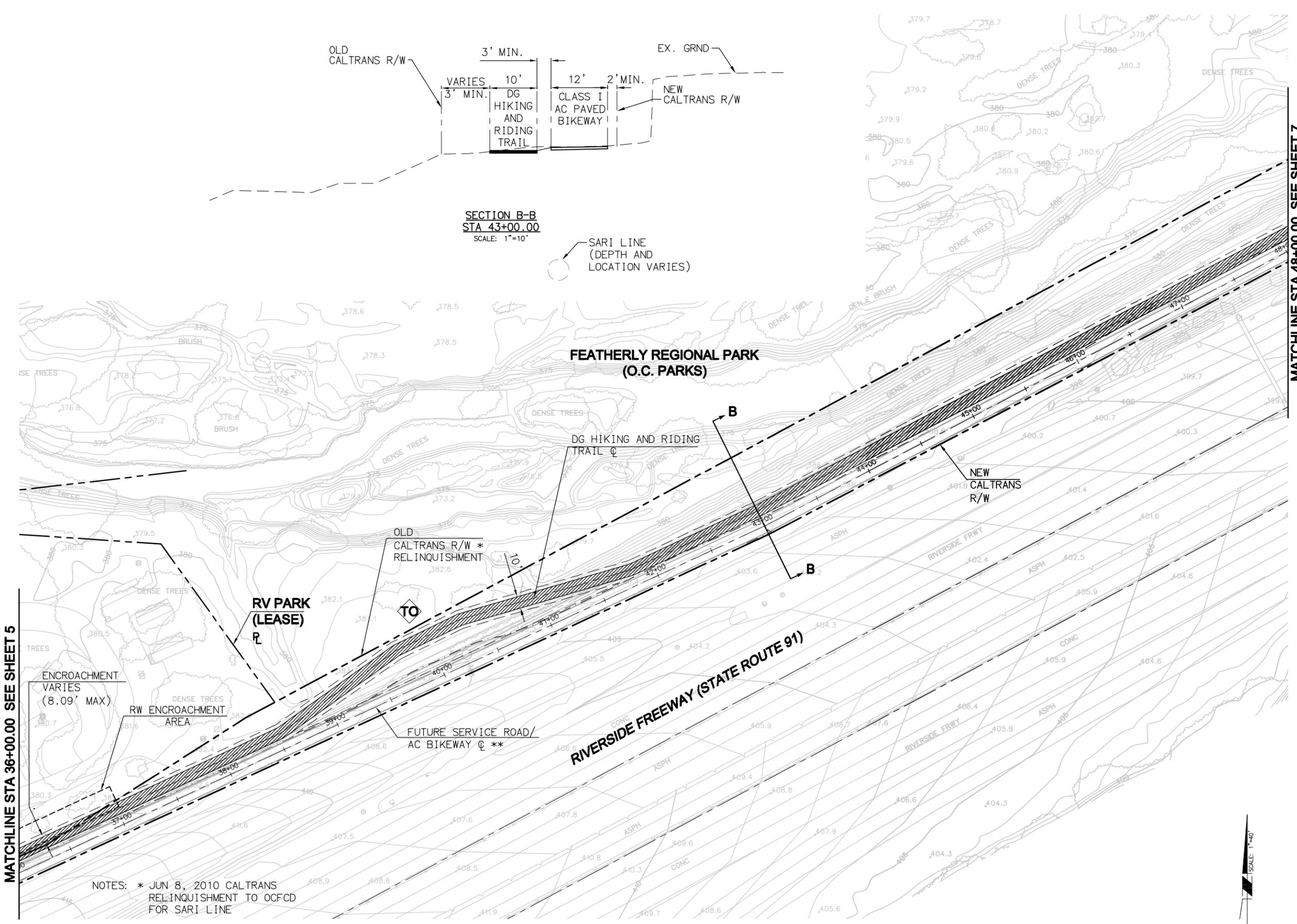
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ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 26+00
 TO STA 36+00

Sheet Reference Number
5
 OF 22 SHEETS



MATCHLINE STA 36+00.00 SEE SHEET 5

MATCHLINE STA 48+00.00 SEE SHEET 7

SECTION B-B
STA 43+00.00
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SARI LINE
 (DEPTH AND
 LOCATION VARIES)

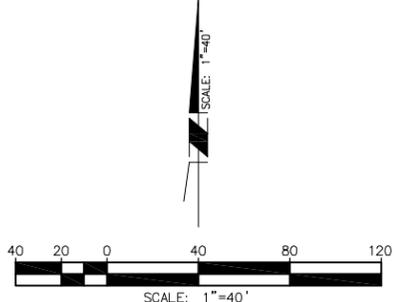
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 (O.C. PARKS)

RIVERSIDE FREEWAY (STATE ROUTE 91)

RV PARK
 (LEASE)

NOTES: * JUN 8, 2010 CALTRANS
 RELINQUISHMENT TO OCFCD
 FOR SARI LINE

** TO BE CONSTRUCTED BY SARI LINE PROJECT.
 ESTIMATED COMPLETION MAY 2013



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

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ORANGE COUNTY PUBLIC WORKS

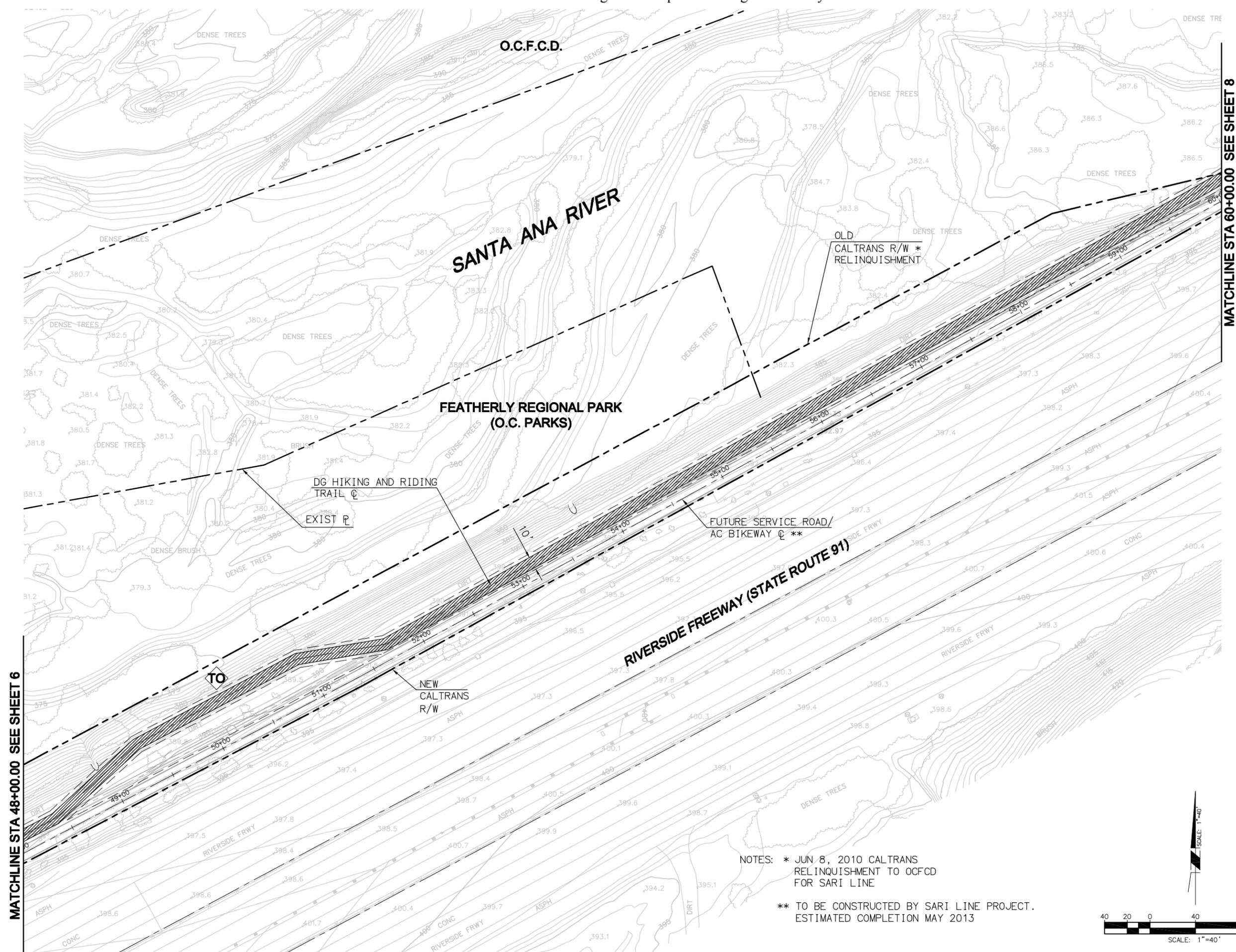
PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 TRAIL AND HIKING TRAIL
 STA 36+00
 TO STA 48+00

Sheet Reference Number

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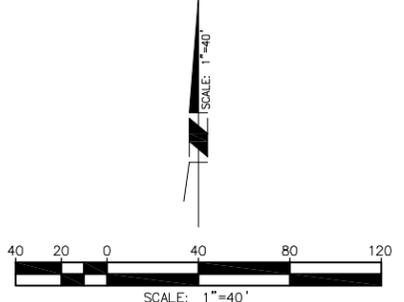
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MATCHLINE STA 60+00.00 SEE SHEET 8

NOTES: * JUN 8, 2010 CALTRANS RELINQUISHMENT TO OCFCD FOR SARI LINE
 ** TO BE CONSTRUCTED BY SARI LINE PROJECT. ESTIMATED COMPLETION MAY 2013



MARK	DESCRIPTION	DATE	APPR.

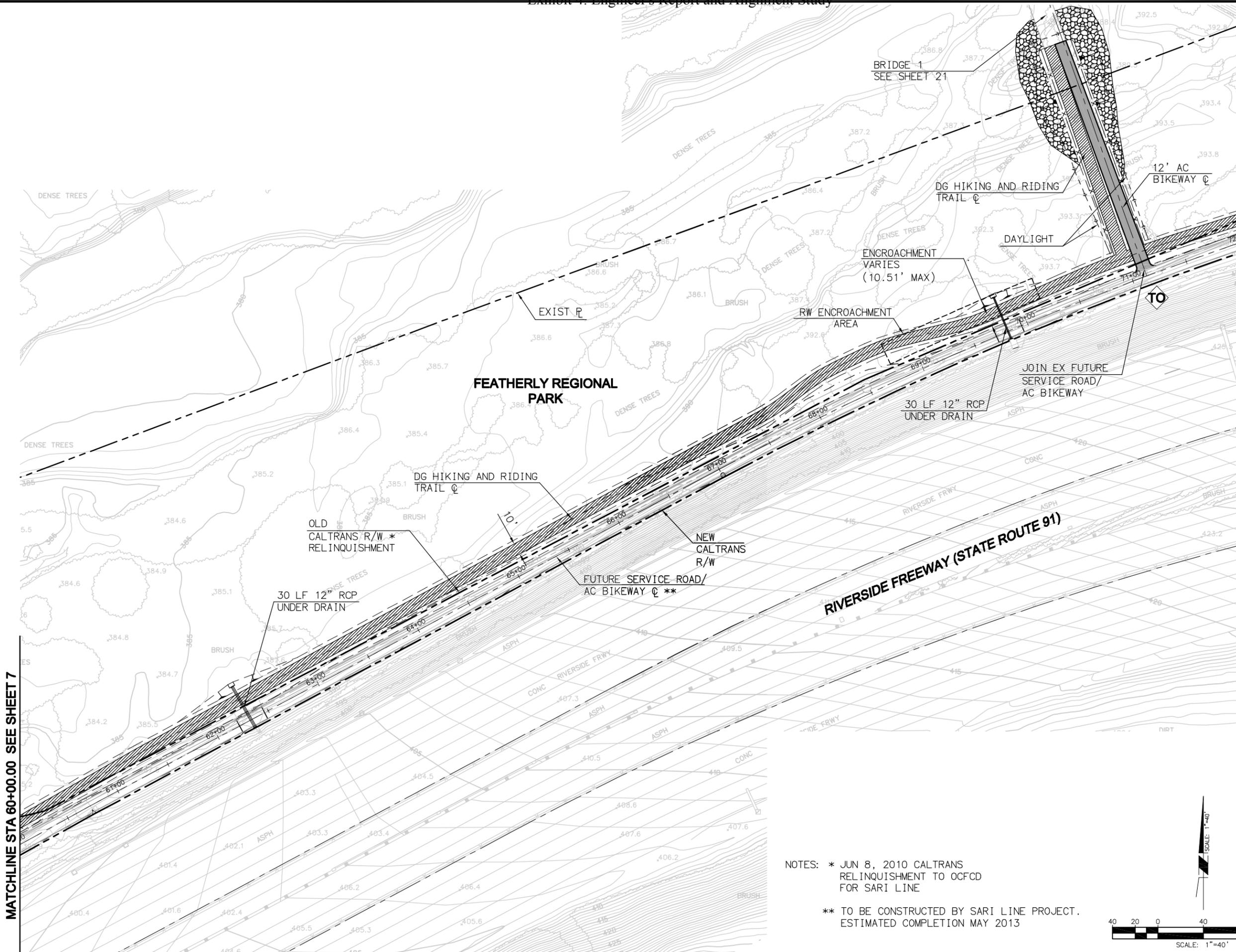
PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	FILE NAME: ***
DRAWING CODE: ***	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 48+00
 TO STA 60+00

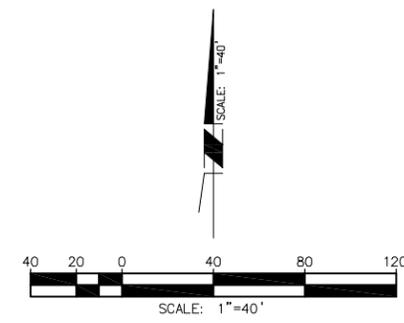
Sheet Reference Number
 7
 OF 22 SHEETS



MATCHLINE STA 60+00.00 SEE SHEET 7

MATCHLINE STA 72+00.00 SEE SHEET 9

NOTES: * JUN 8, 2010 CALTRANS RELINQUISHMENT TO OCFCD FOR SARI LINE
 ** TO BE CONSTRUCTED BY SARI LINE PROJECT. ESTIMATED COMPLETION MAY 2013



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

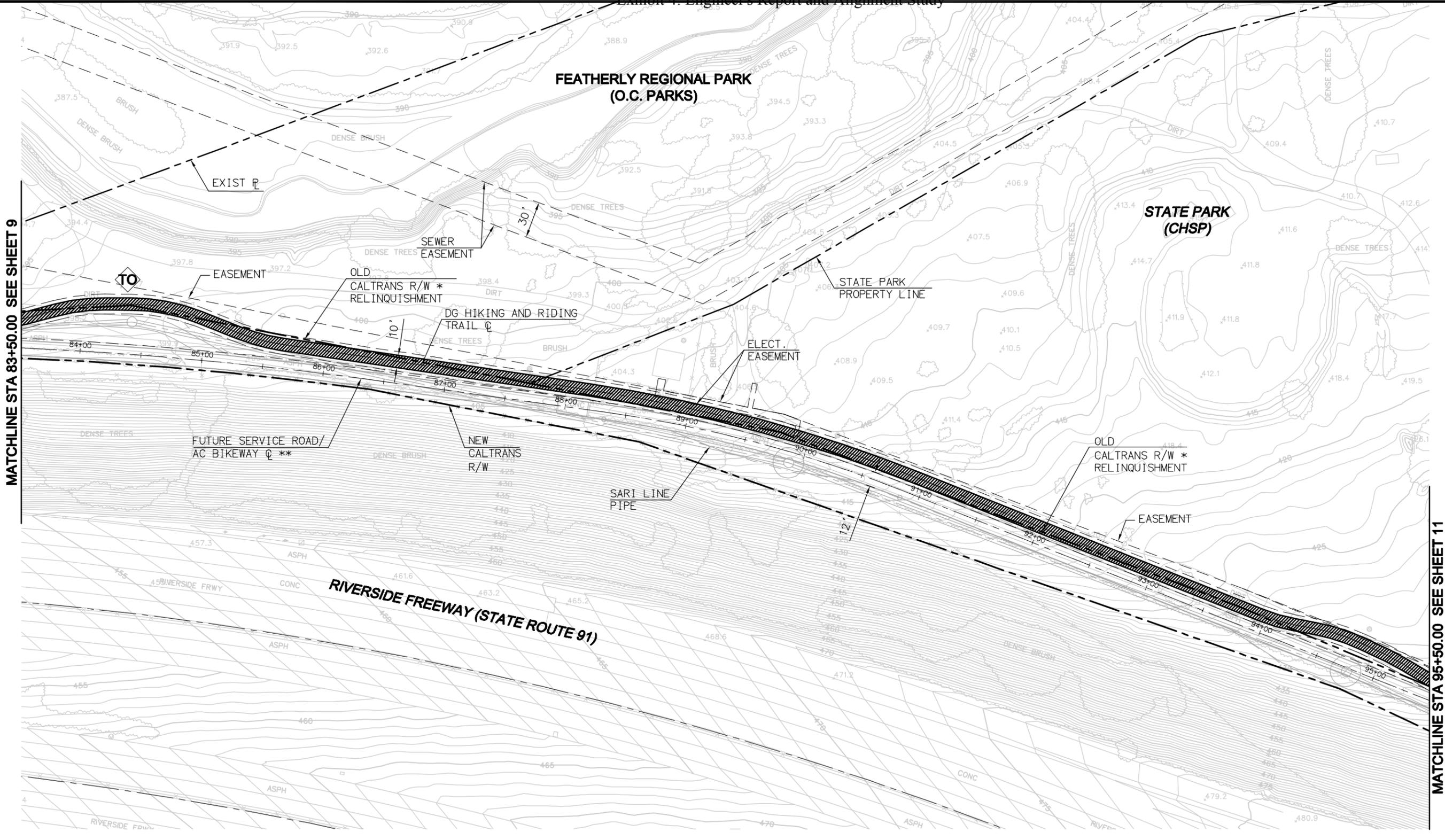
DATE: _____

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	DRAWING CODE: ---
FILE NAME: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	

ORANGE COUNTY PUBLIC WORKS
 PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA. 60+00
 TO STA. 72+00

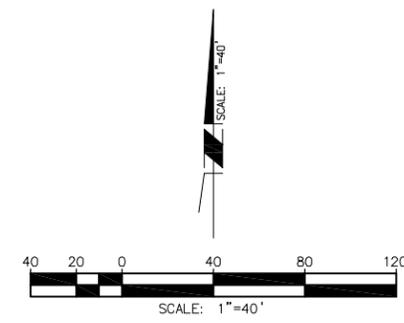
Sheet Reference Number
 8
 OF 22 SHEETS



MATCHLINE STA 83+50.00 SEE SHEET 9

MATCHLINE STA 95+50.00 SEE SHEET 11

NOTES: * JUN 8, 2010 CALTRANS RELINQUISHMENT TO OCFCD FOR SARI LINE
 ** TO BE CONSTRUCTED BY SARI LINE PROJECT. ESTIMATED COMPLETION MAY 2013



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

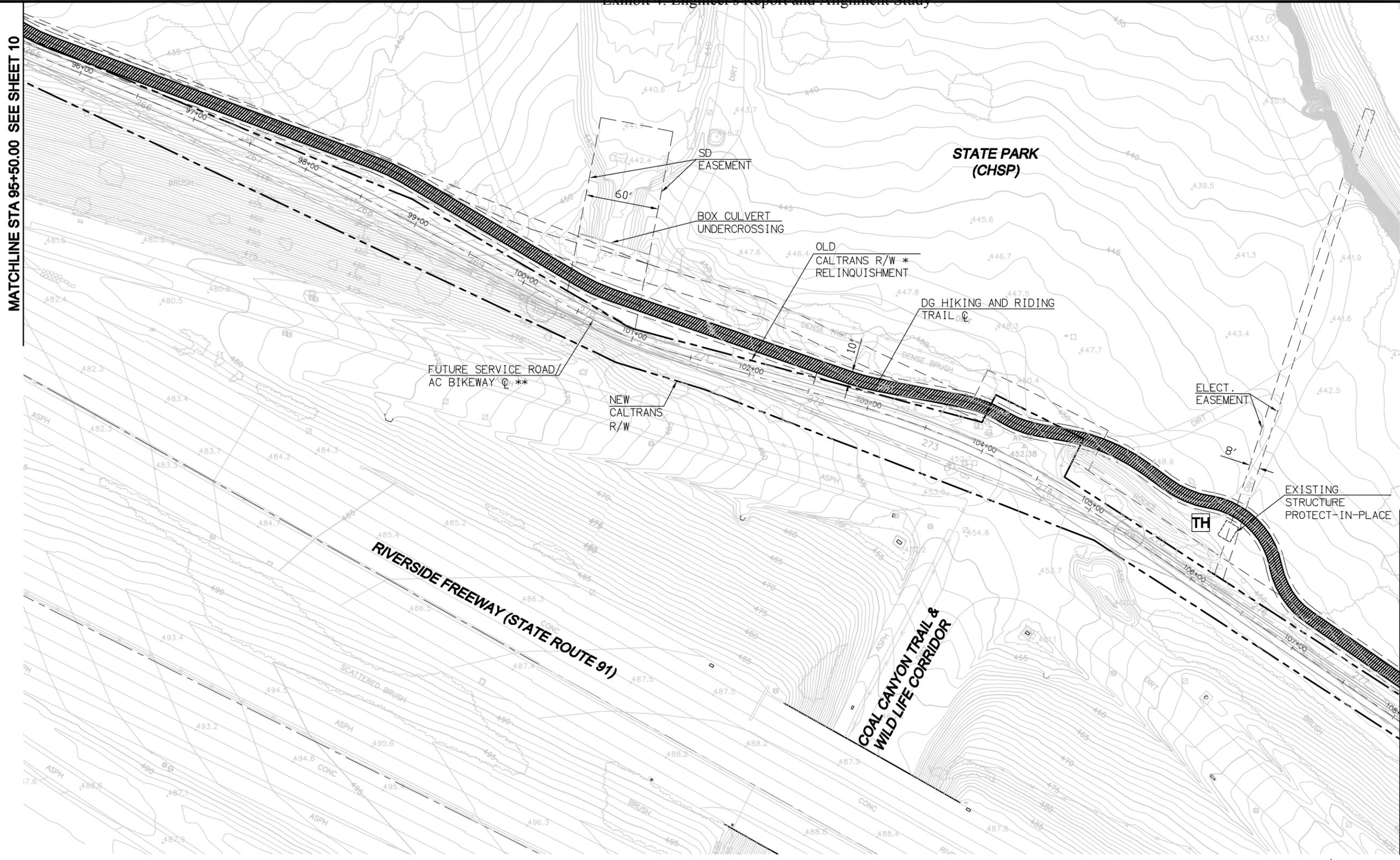
DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	DRAWING CODE: ---
FILE NAME: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	DATE: _____
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 BIKEWAY AND RIDING TRAIL
 AND HIKING TRAIL
 TO STA 83+50.00
 TO STA 95+50.00

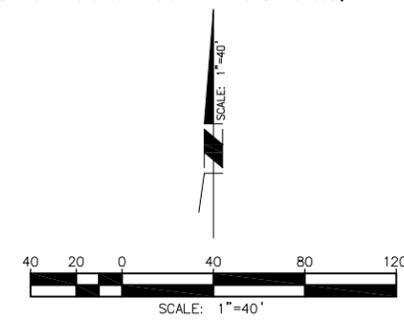
Sheet Reference Number
10
 OF 22 SHEETS

MATCHLINE STA 95+50.00 SEE SHEET 10

MATCHLINE STA 108+00.00 SEE SHEET 12



NOTES: * JUN 8, 2010 CALTRANS RELINQUISHMENT TO OCFCD FOR SARI LINE
 ** TO BE CONSTRUCTED BY SARI LINE PROJECT. ESTIMATED COMPLETION MAY 2013



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

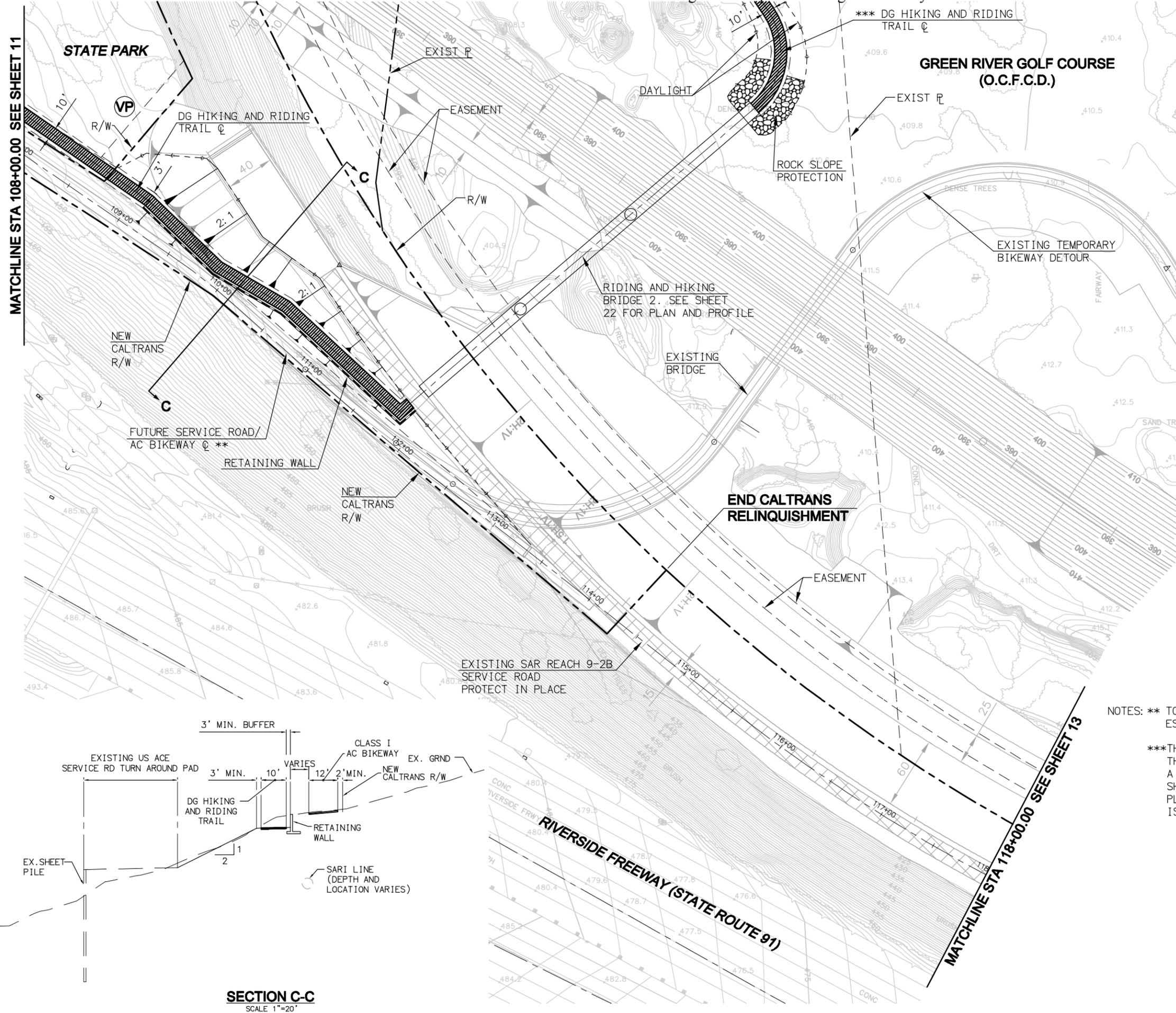
DATE

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	FILE NAME: ***
DRAWING CODE: ***	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	

ORANGE COUNTY PUBLIC WORKS
 PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 95+50.00 TO
 STA 108+00.00

Sheet Reference Number
 11
 OF 22 SHEETS



MATCHLINE STA 108+00.00 SEE SHEET 11

MATCHLINE STA 118+00.00 SEE SHEET 13

STATE PARK

GREEN RIVER GOLF COURSE (O.C.F.C.D.)

RIVERSIDE FREEWAY (STATE ROUTE 91)

DG HIKING AND RIDING TRAIL

RIDING AND HIKING BRIDGE 2. SEE SHEET 22 FOR PLAN AND PROFILE

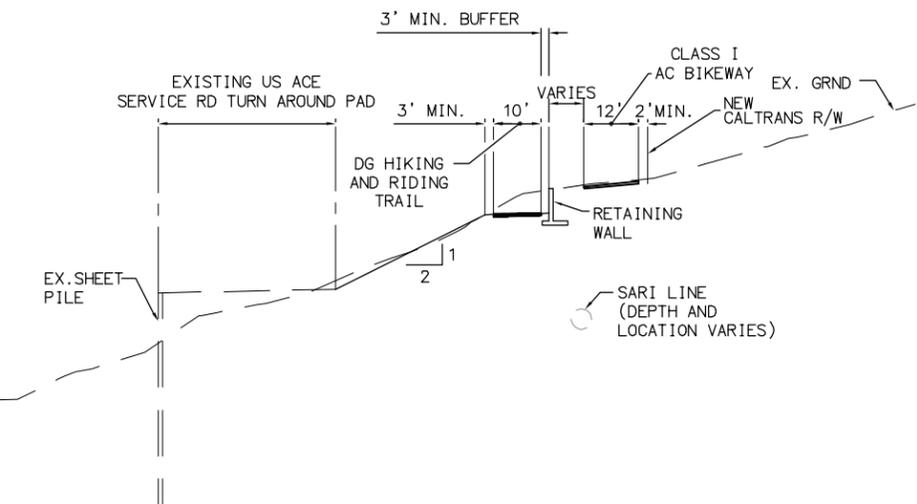
FUTURE SERVICE ROAD/ AC BIKEWAY

END CALTRANS RELINQUISHMENT

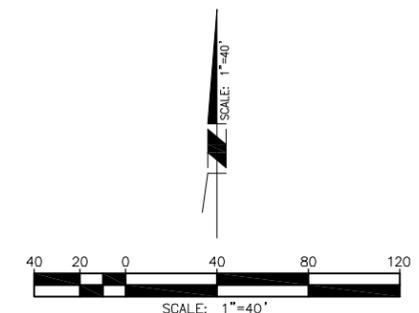
EXISTING SAR REACH 9-2B SERVICE ROAD PROTECT IN PLACE

NOTES: ** TO BE CONSTRUCTED BY SARI LINE PROJECT ESTIMATED COMPLETION MAY 2013

***THE HIKING AND RIDING TRAIL THROUGH THE GOLF COURSE WILL BE BASED ON A A FUTURE GOLF COURSE LAYOUT. THESE SHEETS HAVE BEEN OMITTED FROM THIS PLAN UNTIL GOLF COURSE LAYOUT STUDY IS COMPLETE.



SECTION C-C
SCALE 1"=20'



MARK	DESCRIPTION	DATE	APPR.

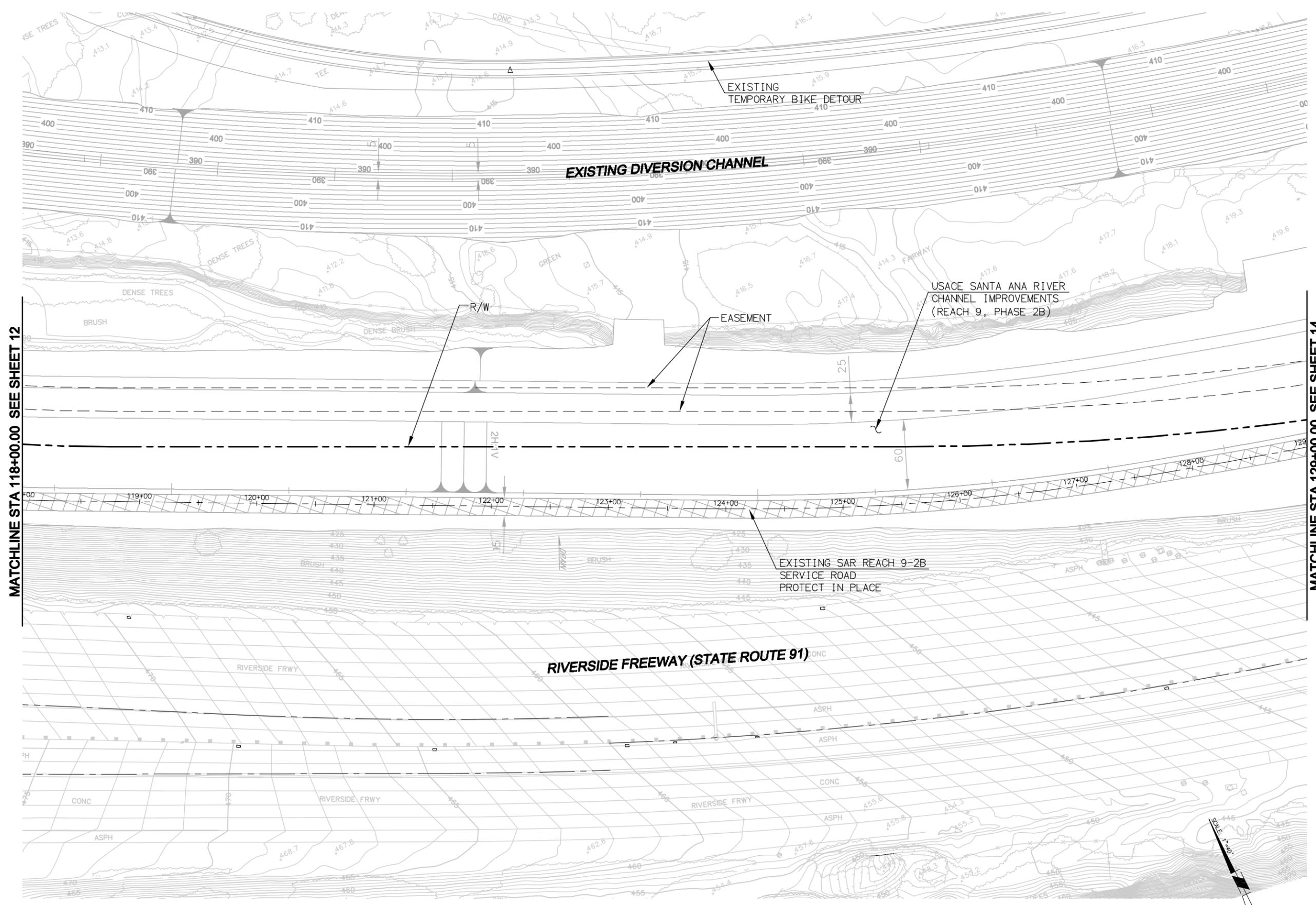
PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE

DESIGNED BY: LQT	CHECKED BY: JAM	SCALE: AS SHOWN
DRAWN BY: EC	DRAWING CODE: ---	FILE NAME: ---
PLOT DATE: DD/MM/YY		
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING	

COUNTY OF ORANGE
FACILITY NO. XXX
SANTA ANA RIVER PARKWAY
SANTA ANA RIVER BIKEWAY AND RIDING AND HIKING TRAIL
STA 108+00.00 TO STA 118+00.00

Sheet Reference Number
12
OF 22 SHEETS



MATCHLINE STA 118+00.00 SEE SHEET 12

MATCHLINE STA 129+00.00 SEE SHEET 14



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

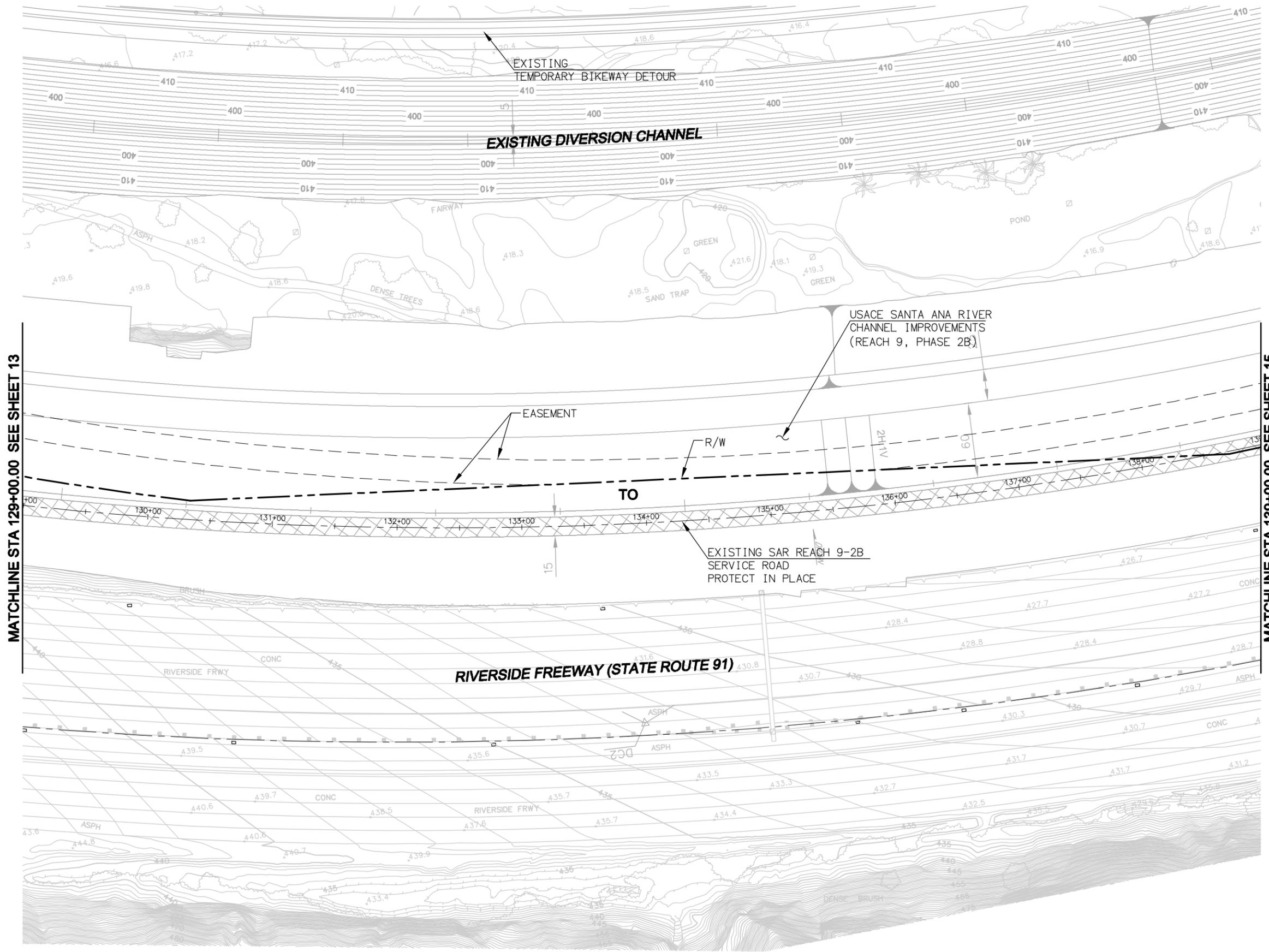
DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	DRAWING CODE: ---
FILE NAME: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	

ORANGE COUNTY PUBLIC WORKS
 PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 118+00.00
 TO STA 129+00.00

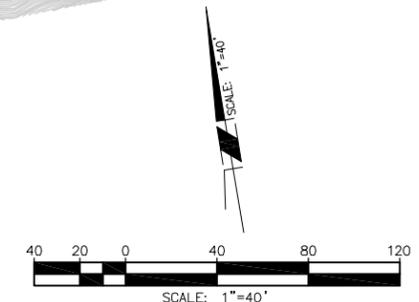
Sheet Reference Number
13
 OF 22 SHEETS





MATCHLINE STA 129+00.00 SEE SHEET 13

MATCHLINE STA 139+00.00 SEE SHEET 15



MARK	DESCRIPTION	DATE	APPR.

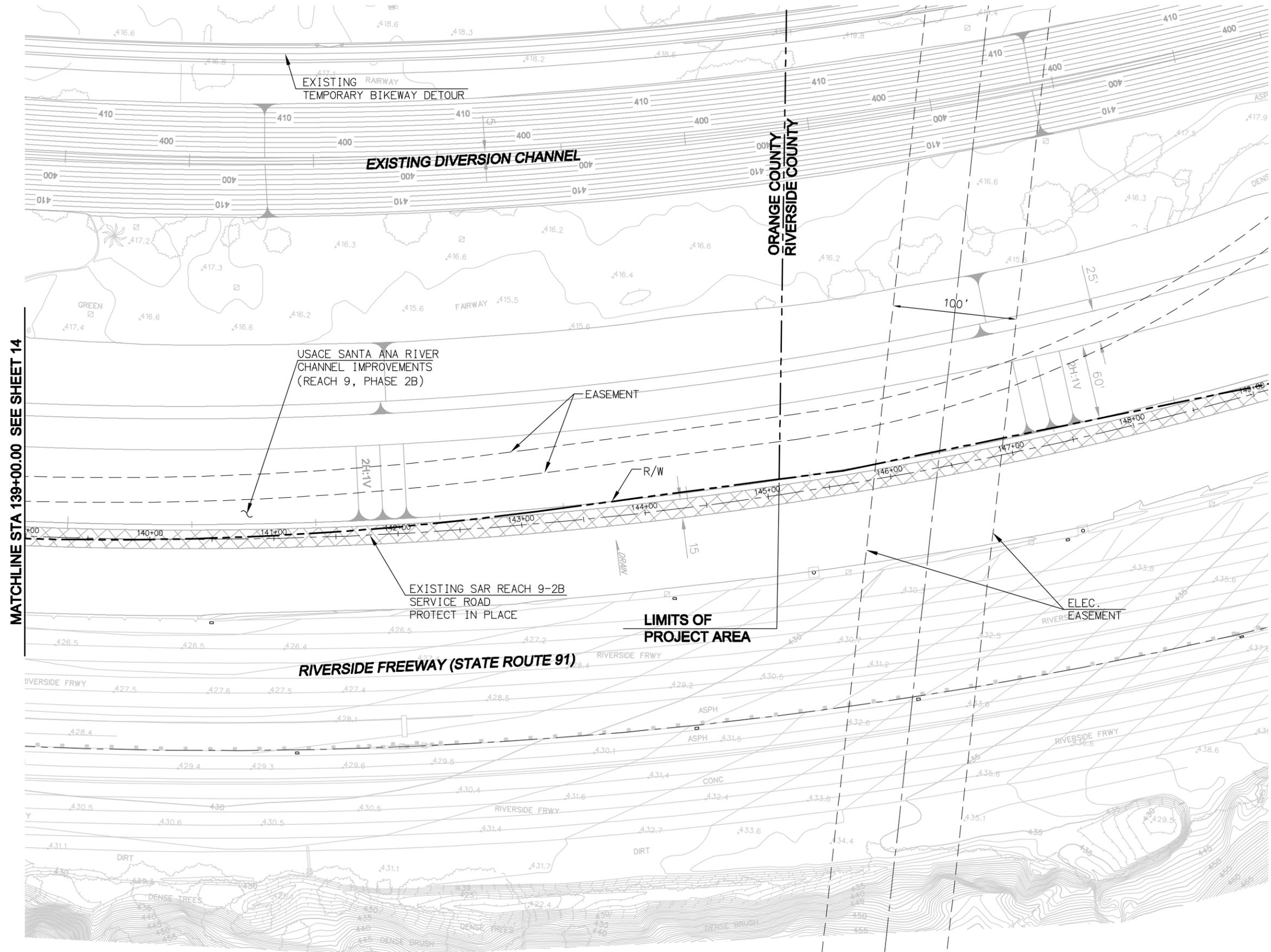
PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	DRAWING CODE: ---
FILE NAME: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 129+00.00
 TO STA 139+00.00

H:\PDATA\10106888\CADD\STRM\WATER\DLV\6888-SD-014.DWG ECC 4/8/11 11:18 am



MATCHLINE STA 139+00.00 SEE SHEET 14



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

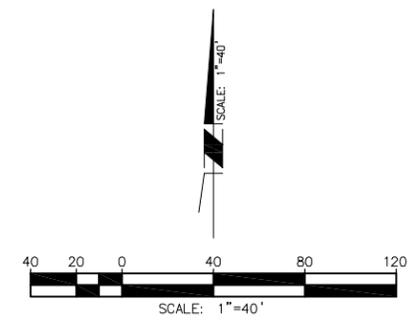
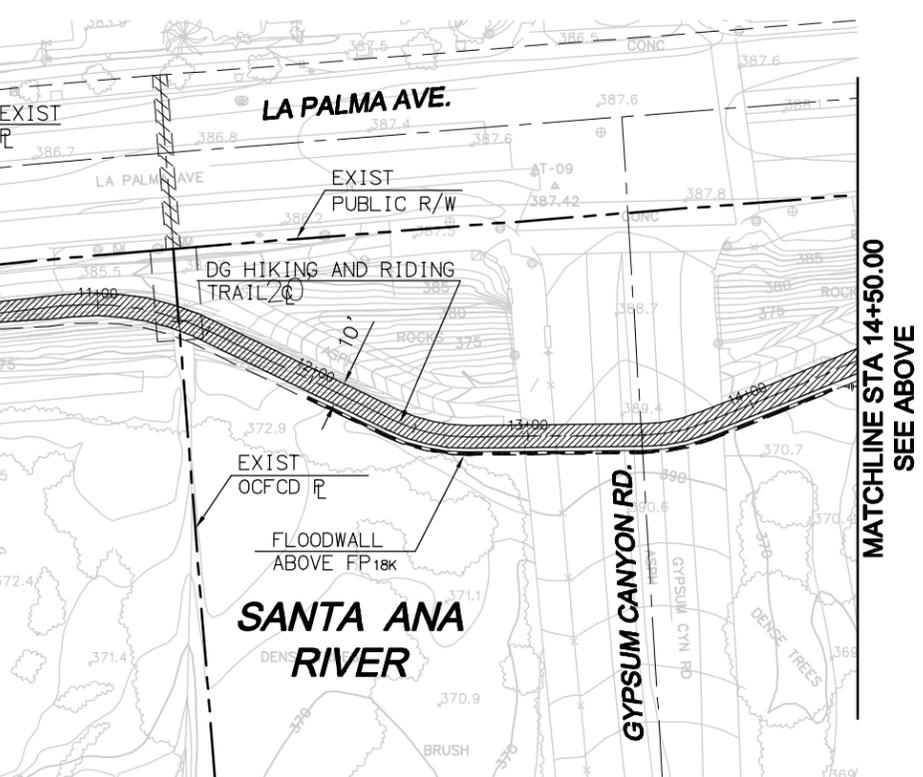
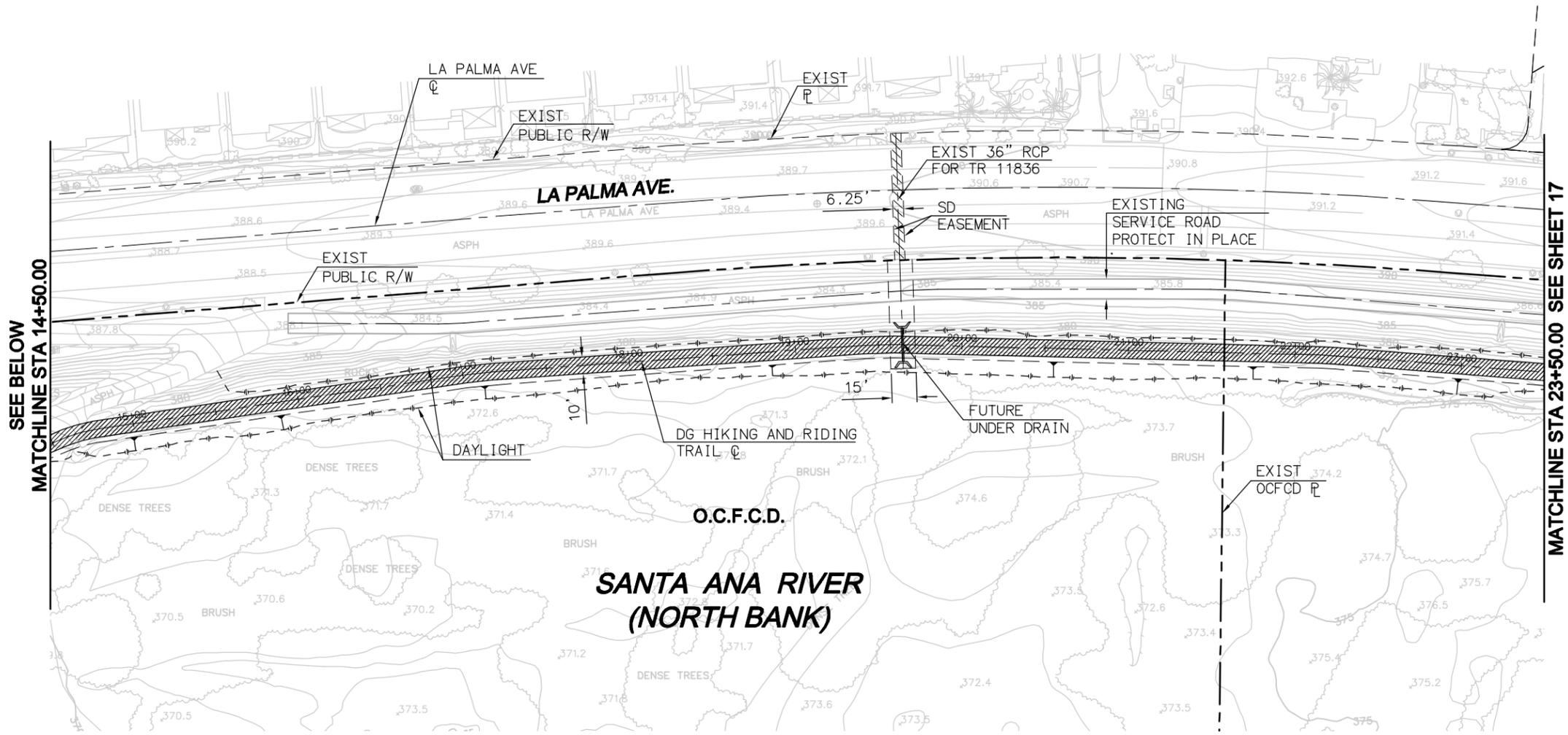
DESIGNED BY: LQT	CHECKED BY: JAM	SCALE: AS SHOWN
DRAWN BY: EC	DRAWING CODE: ---	FILE NAME: ---
PLOT DATE: DD/MM/YY		DATE: DD/MM/YY

ORANGE COUNTY PUBLIC WORKS
 PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 139+00.00
 TO STA 145+08.64

Sheet Reference Number
15
 OF 22 SHEETS





MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	FILE NAME: ***
DRAWING CODE: ***	PLOT DATE: DD/MM/YY
SCALE: AS SHOWN	

ORANGE COUNTY PUBLIC WORKS

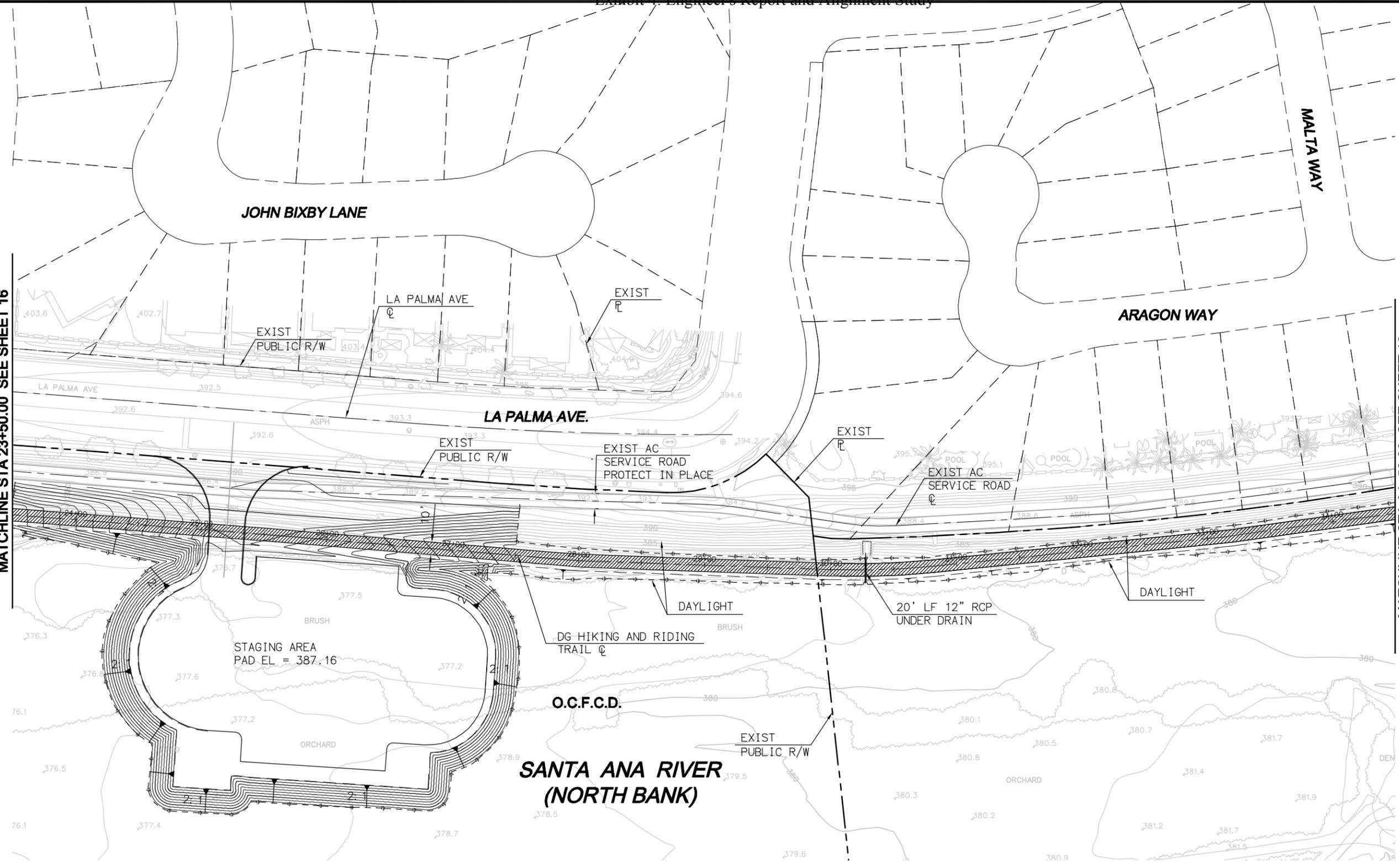
PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKING AND RIDING
 AND HIKING TRAIL
 STA 10+00.00
 TO STA 23+50

Sheet Reference Number
16
 OF 22 SHEETS

MATCHLINE STA 23+50.00 SEE SHEET 16

MATCHLINE STA 34+50.00 SEE SHEET 18



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

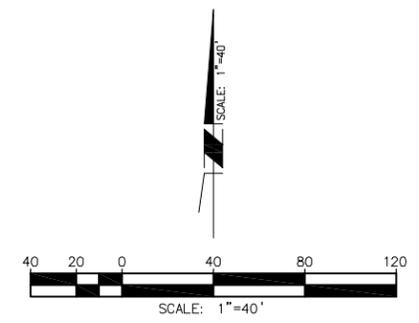
DATE

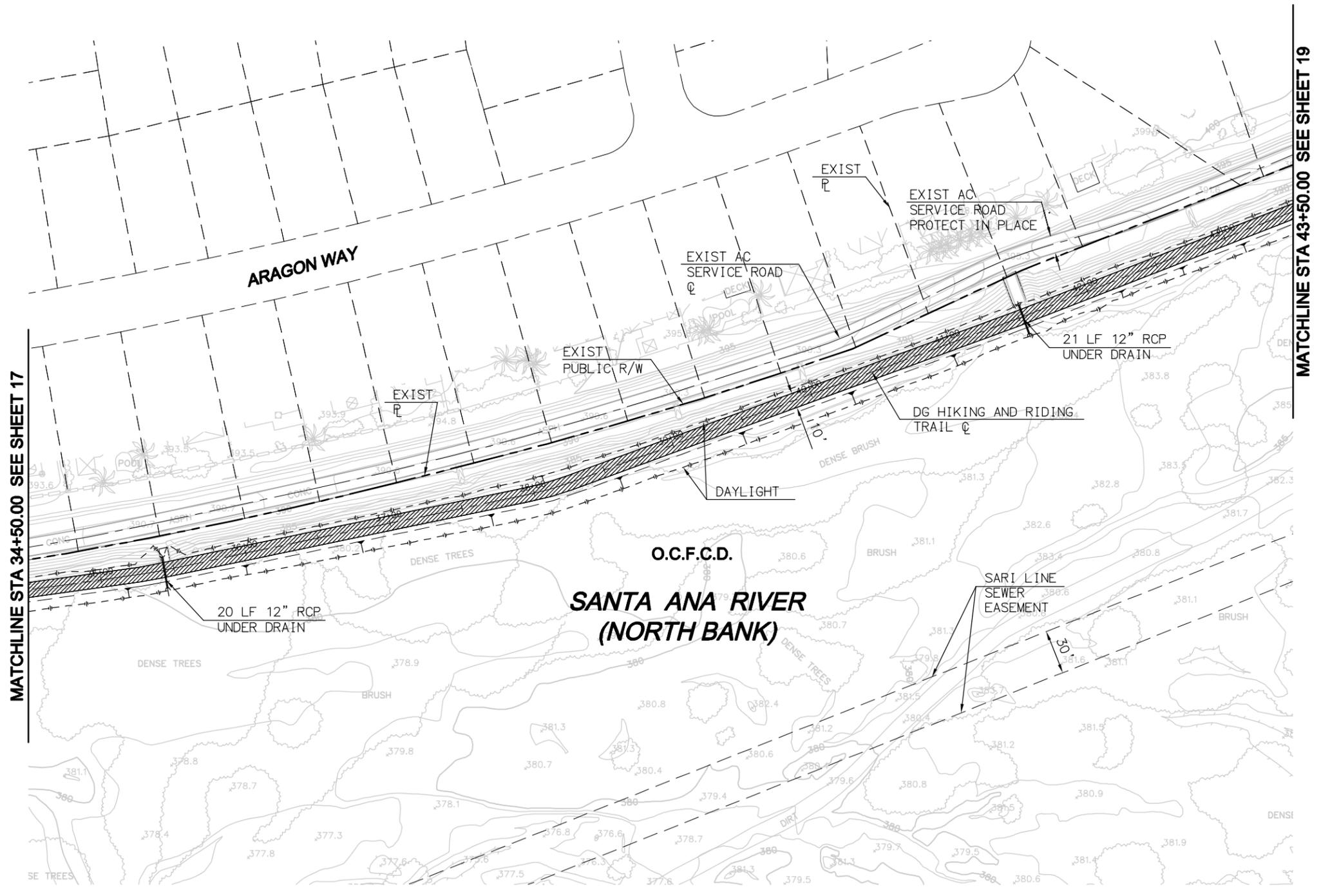
DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	DRAWING CODE: ---
FILE NAME: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	

ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING
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COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA. 23+50
 TO STA. 34+50

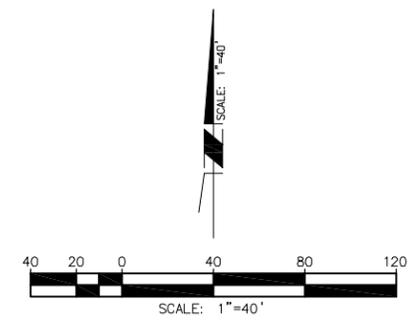
Sheet Reference Number
17
 OF 22 SHEETS





MATCHLINE STA 34+50.00 SEE SHEET 17

MATCHLINE STA 43+50.00 SEE SHEET 19



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

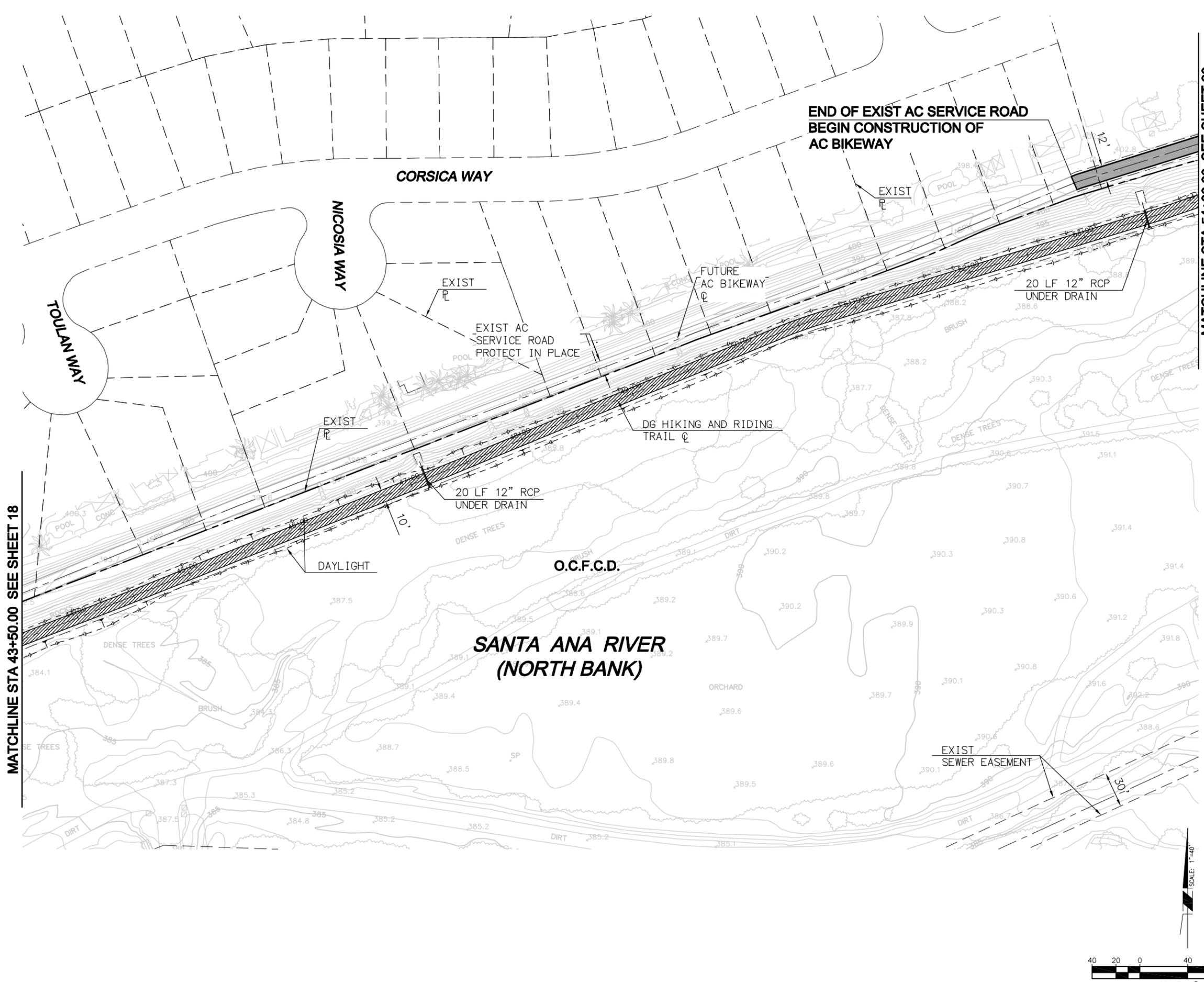
DATE

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	FILE NAME: ***
DRAWING CODE: ***	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 34+50
 TO STA 43+50

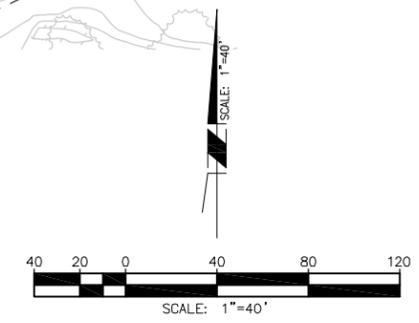
Sheet Reference Number
18
 OF 22 SHEETS

H:\PDATA\101066886\CADD\STREAMWATER\DLV\6888-SD-018.DWG EGC 4/8/11 11:31 am



MATCHLINE STA 43+50.00 SEE SHEET 18

MATCHLINE STA 54+00.00 SEE SHEET 20



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

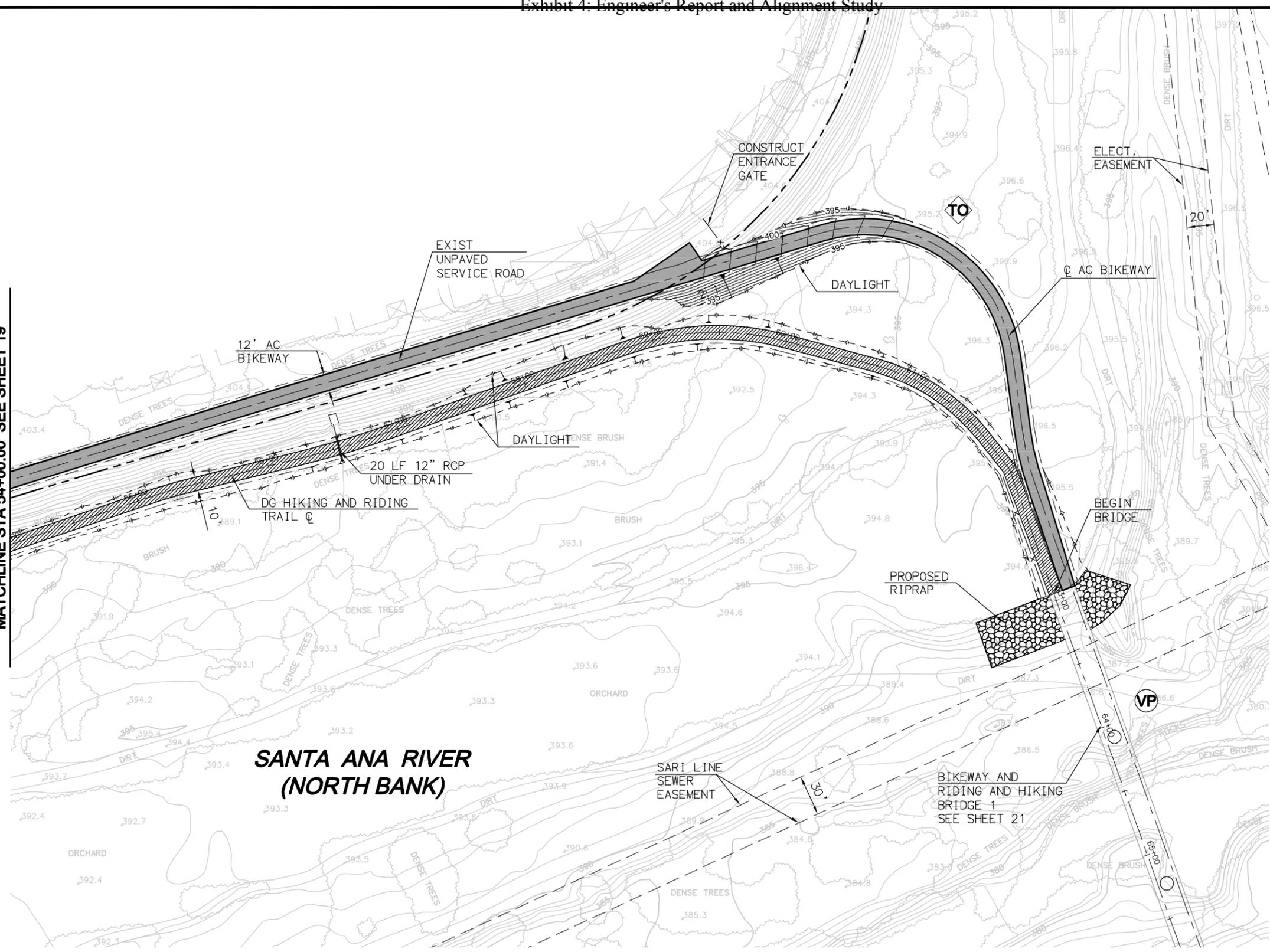
DATE: _____

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	FILE NAME: ***
DRAWING CODE: ***	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 43+50
 TO STA 54+00

Sheet Reference Number
19
 OF 22 SHEETS

MATCHLINE STA 54+00.00 SEE SHEET 19



**SANTA ANA RIVER
(NORTH BANK)**



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE: _____

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	DRAWING CODE: ---
FILE NAME: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	DATE: ---

ORANGE COUNTY PUBLIC WORKS

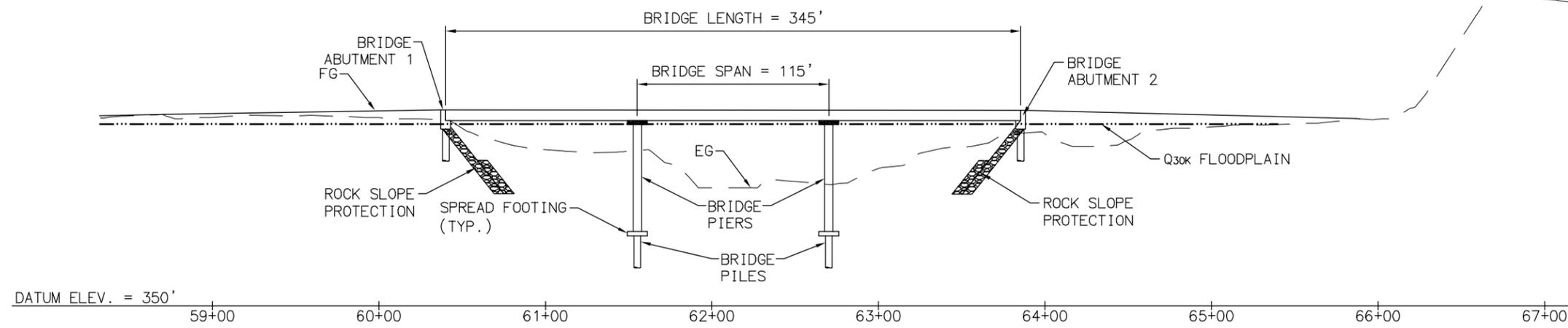
PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 STA 54+00
 TO BRIDGE 1

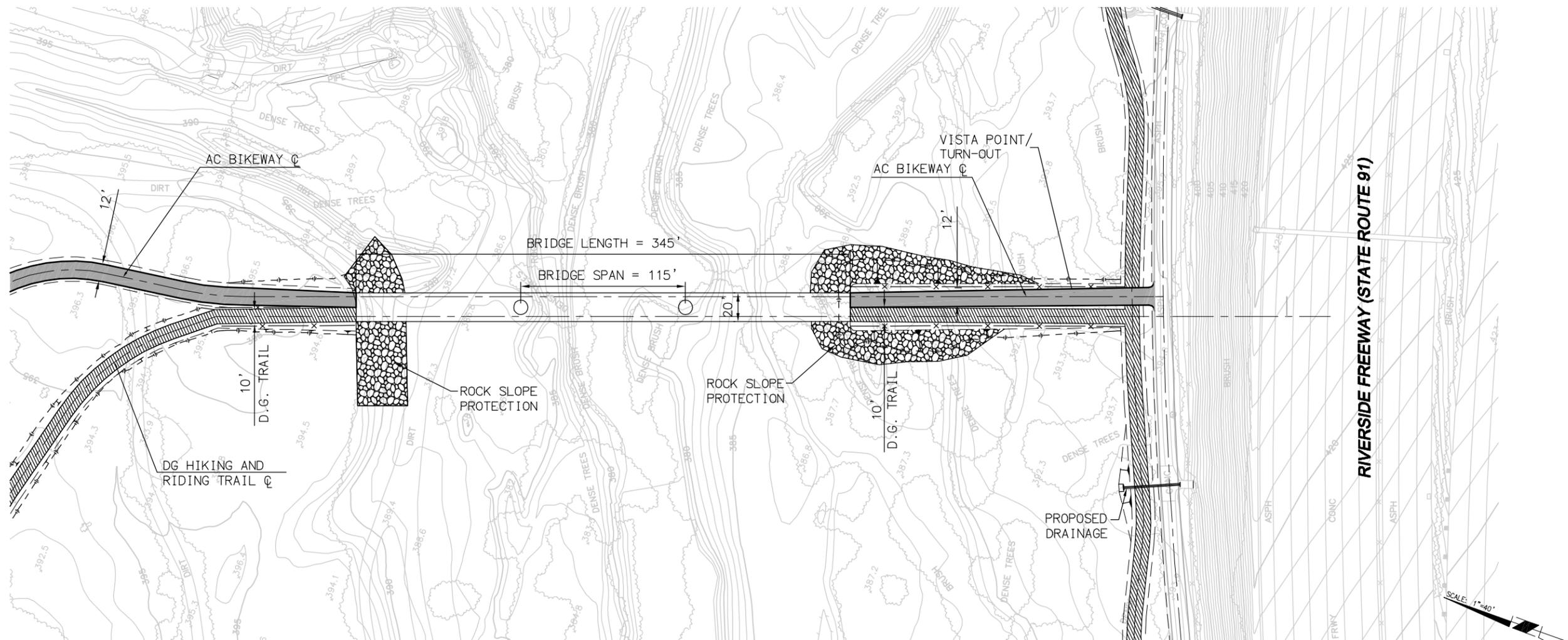
Sheet Reference Number

20

OF 22 SHEETS



BRIDGE 1 PROFILE
SCALE: 1"=40'



BRIDGE 1 PLAN
SCALE: 1"=40'

NOTE:
EXHIBIT SHOWS PREFERRED ALTERNATIVE 2 MODIFIED.
MAY BE CONSTRUCTED IN PHASES.



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

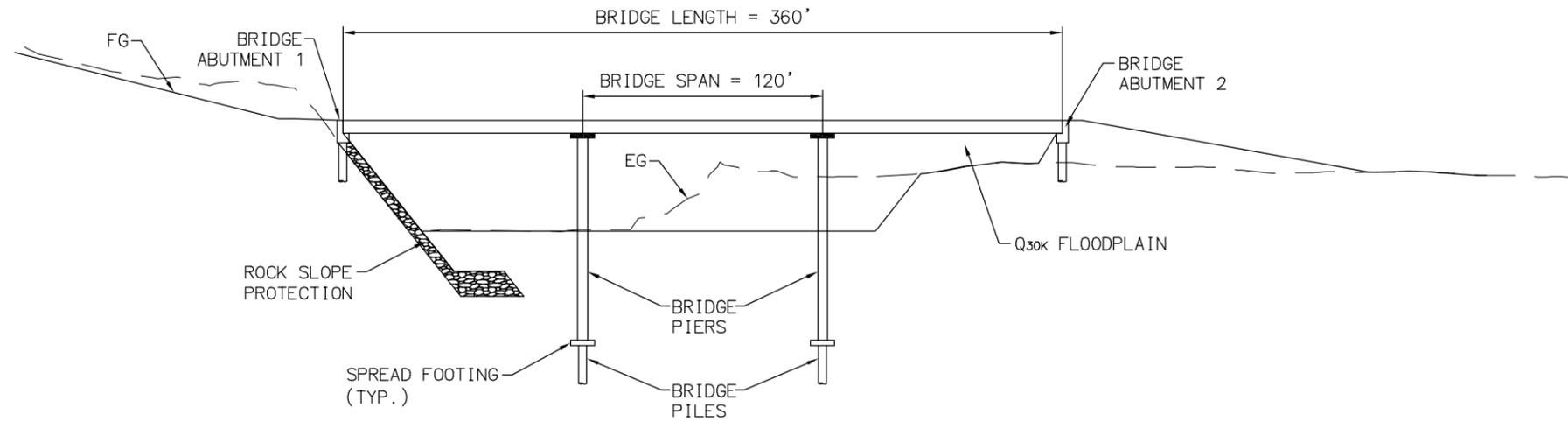
DATE: _____

DESIGNED BY: LQT	CHECKED BY: JAM
DRAWN BY: EC	FILE NAME: ---
DRAWING CODE: ---	SCALE: AS SHOWN
PLOT DATE: DD/MM/YY	DATE: ---

ORANGE COUNTY PUBLIC WORKS

PREPARED BY: RBF CONSULTING

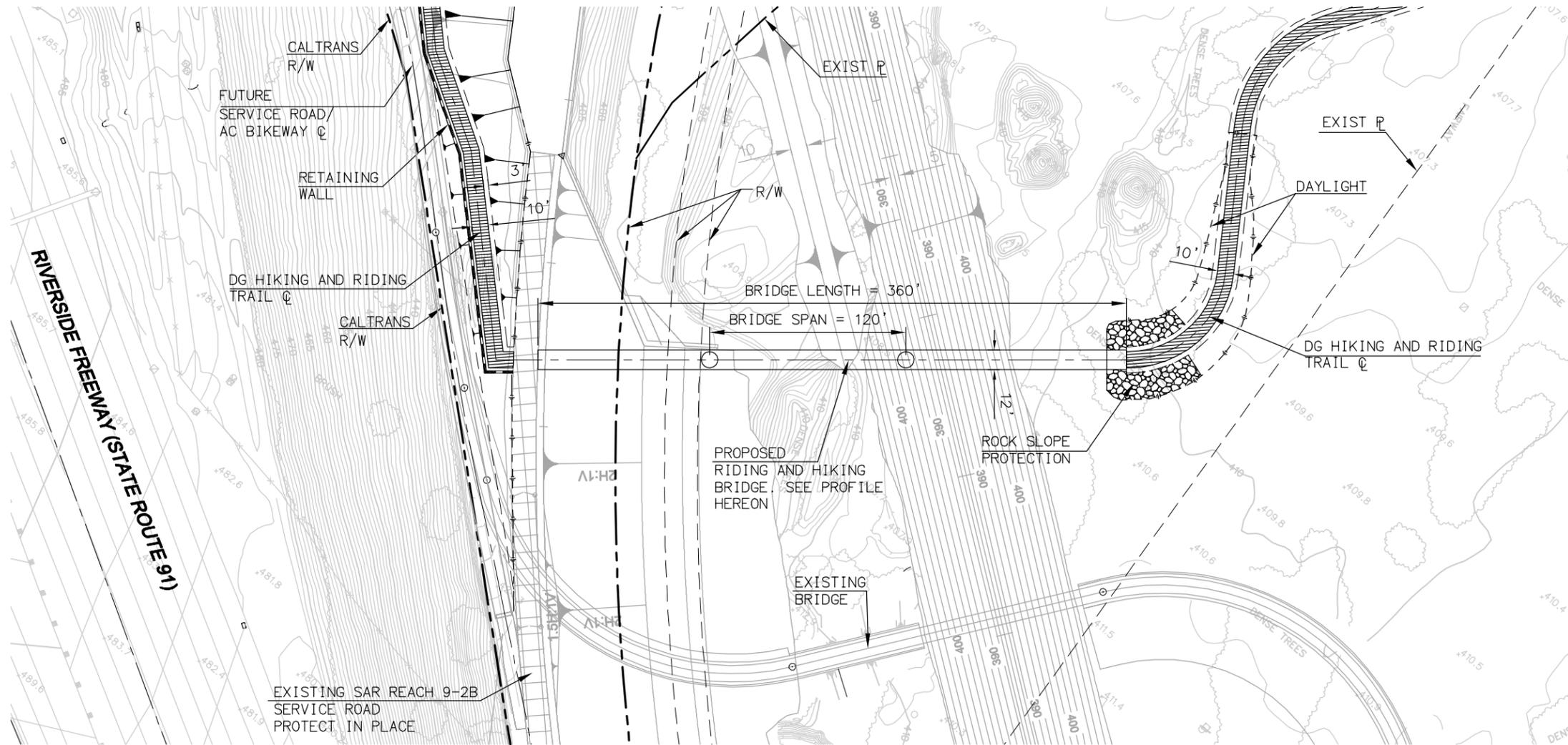
COUNTY OF ORANGE
FACILITY NO. XXX
SANTA ANA RIVER PARKWAY
SANTA ANA RIVER
BIKEWAY AND RIDING
TRAIL AND HIKING TRAIL
BRIDGE 1
PLAN AND PROFILE



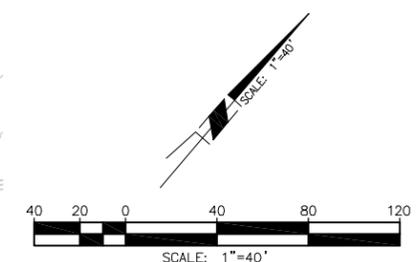
DATUM ELEV. = 350'

116+00 117+00 118+00 119+00 120+00 121+00 122+00 123+00 124+00

BRIDGE 2 PROFILE
SCALE: 1"=40'



BRIDGE 2 PLAN
SCALE: 1"=40'



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

DATE

DESIGNED BY: LQT
 DRAWN BY: EC
 CHECKED BY: JAM
 DRAWING CODE: ---
 FILE NAME: ---
 PLOT DATE: DD/MM/YY
 SCALE: AS SHOWN

ORANGE COUNTY PUBLIC WORKS
 PREPARED BY: RBF CONSULTING

COUNTY OF ORANGE
 FACILITY NO. XXX
 SANTA ANA RIVER PARKWAY
 SANTA ANA RIVER
 BIKEWAY AND RIDING
 AND HIKING TRAIL
 BRIDGE 2
 PLAN AND PROFILE

Sheet Reference Number
22
 OF 22 SHEETS