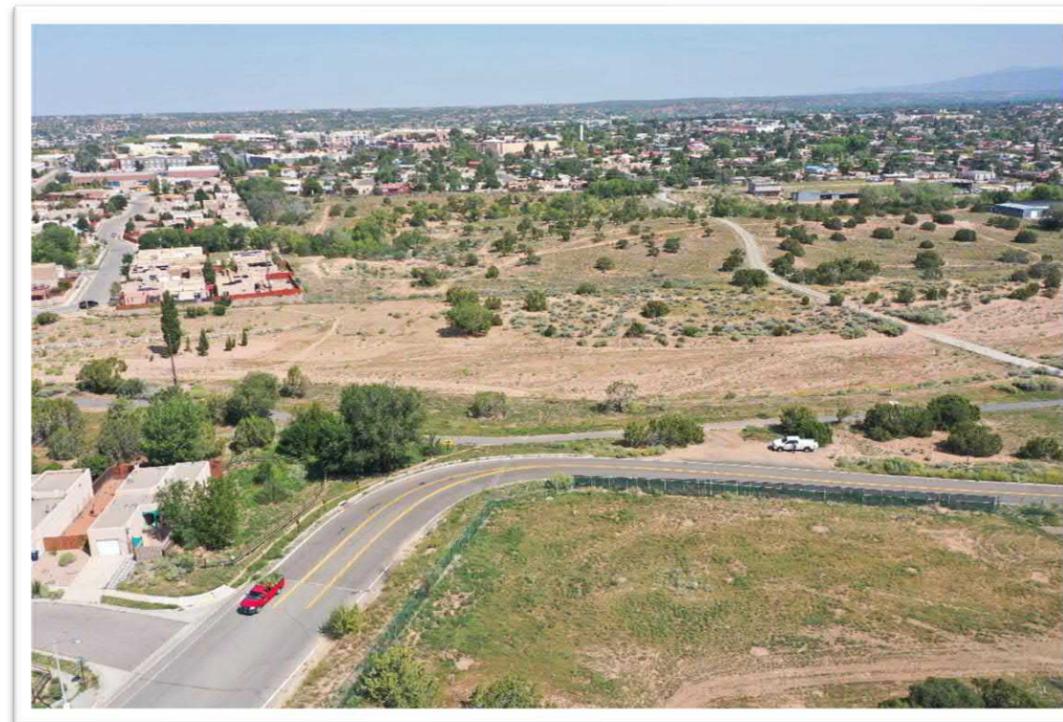

Phase IB Detailed Evaluation of Alternatives

ARROYO DE LOS CHAMISOS CROSSING

Rodeo Road to Cerrillos Road

City of Santa Fe Project: 19-0127



Submitted to:



City of Santa Fe
Public Works Department

Submitted by:



Bohannon  **Huston**

In Association with:

YeDoma Consultants, LLC

May 2022

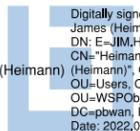


ARROYO DE LOS CHAMISOS CROSSING

Rodeo Road to Cerrillos Road

City of Santa Fe Project: 19-0127

Phase IB Detailed Evaluation of Alternatives

<p>Phase IB Analyses and Report</p>  <p>Digitally signed by Heimann, James (Heimann) DN: E=JIM.HEIMANN@wsp.com, CN=Heimann, James (Heimann), OU=Active, OU=Users, OU=US, OU=WSPOjects, DC=corp, DC=pbwan, DC=net Date: 2022.05.18 09:48:06-06'00'</p>		<p>Traffic Analyses</p>  <p>Digitally signed by Albert Thomas DN: cn=Albert Thomas, o=Bohannon Huston, Inc., ou, email=athomas@bhinc.com, c=US Date: 2022.05.18 15:59:09 -06'00'</p>	
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 Public Works Director

Date

Leroy Pacheco 6/2/22

Leroy Pacheco, P.E.
 City Project Manager

Date



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EXECUTIVE SUMMARY

The City of Santa Fe completed this Phase IB study to identify a preferred alternative for improvements to Richards Avenue including a connection across the Arroyo de los Chamisos, and to assess the impacts and potential fiscal requirements associated with the proposed improvements. The results of this study will provide information to plan and program improvements for the Richards Avenue improvements based on the best information available in 2022. Phased implementation is anticipated. Subsequent phases of project development will occur as funding for individual projects is programmed in the Santa Fe Metropolitan Planning Organization's (SFMPPO) Transportation Improvement Program (TIP) and the Statewide Transportation Improvement Program (STIP).

Purpose and Need

The purpose of the proposed improvements is to enhance the transportation system in the area bounded by Rodeo Road to the south and Cerrillos Road to the north, and between Zafarano Road and Avenida de las Campanas to the east and west, respectively. The purpose is to provide for improved access and transportation system connectivity across a natural physical barrier, the Arroyo de Los Chamisos, between Zafarano Drive and Avenida de las Campanas. The need is based on balancing travel and overall impacts on local roads within this part of the City. Multi-modal connectivity and a permanent roadway for emergency service providers would also benefit this area of Santa Fe.

Alternatives Considered

The preferred alignment from the Phase IA study is a direct connection across the Arroyo de los Chamisos (ADLC) in the Richards Avenue corridor. The three alternatives considered in this Phase IB study include the No Build Alternative and two Build alternatives. The No Build Alternative does not meet the purpose and need for the project. The two Build alternatives both meet the project purpose and need and have many similarities including one travel lane in each direction, intersection improvements, drainage system features, lighting locations, environmental conditions, pedestrian and bicycle multi-modal facilities, the connection across the undeveloped land, and right-of-way needs. **Exhibit ES-1** and **ES-2** are photo visualizations developed to illustrate the potential improvements.

Traffic Calming Measures in the Alternatives

It is recognized that Richards Avenue is and will be a local street that is residential and recreational in character so the design approach needs to include measures to encourage lower travel speeds. Enforcement is the most effective deterrent for speeding, but physical methods that reinforce compliance with posted speed can be effective. In addition to a 25-30 mph posted speed limit, the types of traffic calming measures incorporated into one or both of the Phase IB conceptual alternatives include:

- ◆ Roundabout: A roundabout will be incorporated south of Siringo Road as a *gateway feature* for northbound travel as well as a speed control measure.
- ◆ Bulb-outs: Curb bulb-outs may be used to narrow the traveled way as well as to develop recessed on-street parking.
- ◆ Speed Tables/Raised Crosswalks: Speed tables and/or raised crosswalks exist between Siringo Road and James Street, and may be incorporated at other locations along Richards Avenue.
- ◆ On-Street Parking: Build Alternative 1 provides on-street parking on the west side of Richards Avenue for the single-family homes with frontage and driveways along Richards Avenue.
- ◆ Lane Widths: The proposed travel lane width will be between 10 feet and 11 feet.

Public and Stakeholder Input

All public involvement and agency coordination for the Arroyo de los Chamisos Crossing Phase IB Study was conducted in compliance with the City's Early Neighborhood Notification (ENN) and the NMDOT Location Study Procedures. During the Phase IB Study, one virtual public outreach meeting was conducted, ongoing stakeholder communication was maintained, and updates to the project-specific website page ([Arroyo Chamiso Crossing | City of Santa Fe, New Mexico \(santafenm.gov\)](https://www.santafenm.gov/Arroyo-Chamiso-Crossing)) were completed. All public comments received have been documented and will be considered during the environmental and design phases.

Traffic Analysis Conclusions

The traffic analysis determined the Arroyo de Los Chamisos crossing project is feasible under the 2040 Build scenario. The new connection will reduce traffic on other roadways such as Avenida de Las Campanas, Camino Consuelo, and Camino Carlos Rey. Overall, the proposed Arroyo de Los Chamisos crossing will be beneficial to the area, will enhance mobility, and will improve the overall serviceability to the area.

Right-of-Way (ROW) Conditions

Additional ROW in the form of acquisitions, temporary construction permits (TCP), or construction maintenance easements (CME) will be required to implement the proposed improvements. While there are slivers of property that would be required to implement the proposed improvements, the major ROW acquisition involves the New Mexico Game and Fish (NMGF) property where the new roadway would be located. At a minimum, a roadway corridor for the Arroyo de los Chamisos crossing would be needed across this property. The City is considering the acquisition of the entire NMGF parcel as the NMGF is ready to sell the property.

Within the north segment of Richards Avenue from the NMGF land to James Street, many encroachments into the public ROW exist. Some property owners have placed walls and fence lines which are encroaching onto the Richards Avenue ROW. Further research by the City is needed for each parcel to confirm ownership, their legal descriptions and if there are any agreements between the City of Santa Fe and the private owners to allow for the encroachments. The proposed improvements can be constructed between the existing walls and fences.

Estimated Costs

The planning-level estimated cost of Build Alternative 1 is \$13.7M and the cost for Build Alternative 2 is \$10.6M. The key difference between the alternatives is the estimated cost of major structures and the associated increase in percentage-based items. The costs do not include ROW acquisition, utility costs, nor regular maintenance after the initial installation of the major structures crossing the arroyos. The construction cost of the preferred alternative after refinements are made is expected to be in the \$12M range.

Preferred Alternative

The preferred alternative to advance for further development reflects a combination of both Build alternatives and will be refined based on public/stakeholder input that was received. Key refinements include protected bicycle lanes and additional pedestrian crossings and traffic calming measures. Travel lane widths will be 10.5 feet.

Next Steps

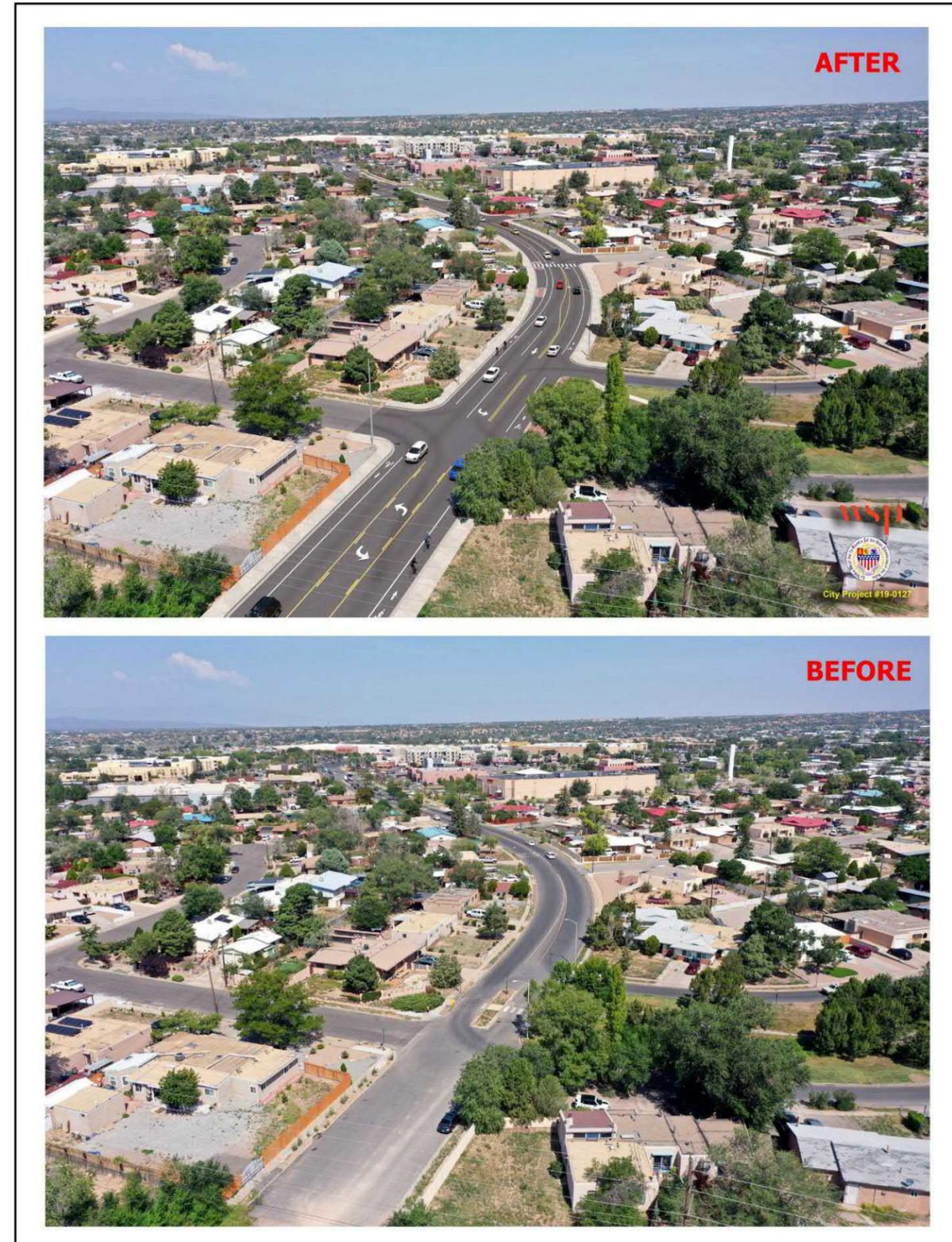
This Phase IB report summarizes the findings of the engineering evaluation of alternatives and public input for the City's consideration. During Phase IC and concurrent with preliminary and final design, an environmental clearance document evaluating the preferred alternative and its impact on the human and natural environment will be prepared. It is anticipated that the appropriate level of effort for environmental clearance and NEPA compliance will be a Categorical Exclusion (CE) document.



Exhibit ES-1, North View Photo Simulation



Exhibit ES-2, Northwest View Photo Simulation





CHAPTER 1 - INTRODUCTION

The City of Santa Fe completed this Phase IB study to identify a preferred alternative for improvements to Richards Avenue including a connection across the Arroyo de los Chamisos and to assess the impacts and potential fiscal requirements associated with the proposed improvements. The limits of the project are depicted in **Exhibit 1-1** and include Richards Avenue from Rodeo Road to Cerrillos Road. The project is located in City Council District 4 and traverses the La Resolana Subdivision, within the Southwest Bellamah Neighborhood Association, and the Vista del Prado Subdivision and Homeowners Association.

The scope of this study includes Phase IA and Phase IB of the NMDOT *Location Study Procedures*. Phase IA of the study was completed on December 4, 2019. This report documents the Phase IB study. Refer to **Exhibit 1-2** for a flow chart of the phases of project development per the NMDOT Location Study Procedures. The results of this study will provide information to plan

and program improvements for the Richards Avenue improvements with reasonable accuracy based on the best information available in 2022. Phased implementation is anticipated. Subsequent phases of project development will occur as funding for individual projects is programmed in the Santa Fe Metropolitan Planning Organization's (SFMP) Transportation Improvement Program (TIP) and the Statewide Transportation Improvement Program (STIP).

The previously completed Phase IA document described the existing conditions, identified operational and safety deficiencies within the corridor, established the purpose and need for the study, developed a range of alternatives to address the purpose and need, conducted a preliminary screening of the alternatives, and recommended a preferred alignment for additional analysis. This Phase IB document describes the detailed analysis of alternatives, recommends a preferred alternative, and presents an implementation/phasing plan to aid the City and SFMPO with planning and programming improvements. Below is a summary of the project purpose and need as well as a description of how the Phase IB report is structured.

Exhibit 1-2, Flow Chart of Project Phases

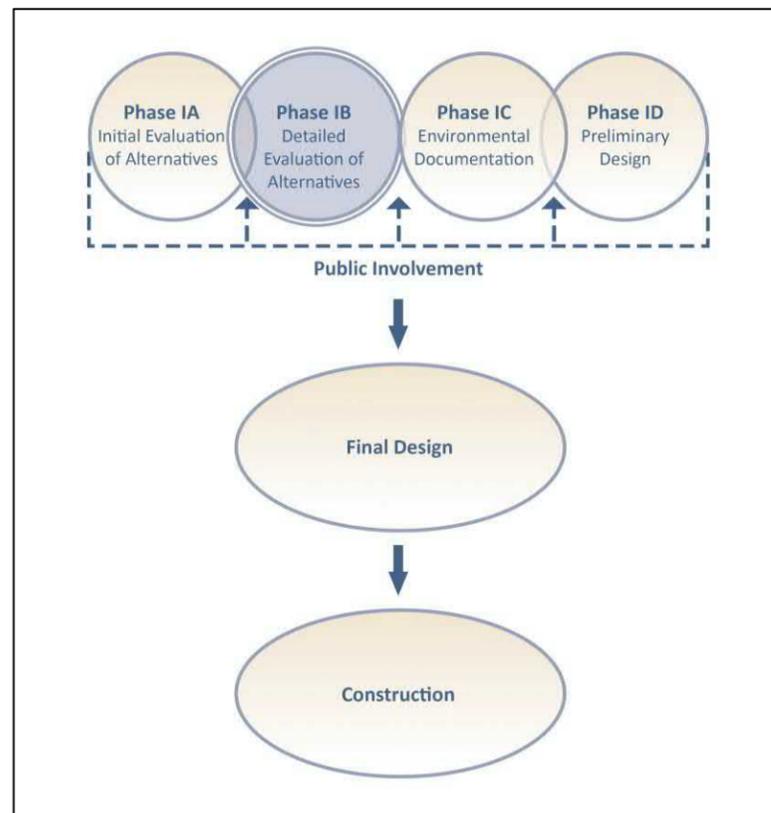
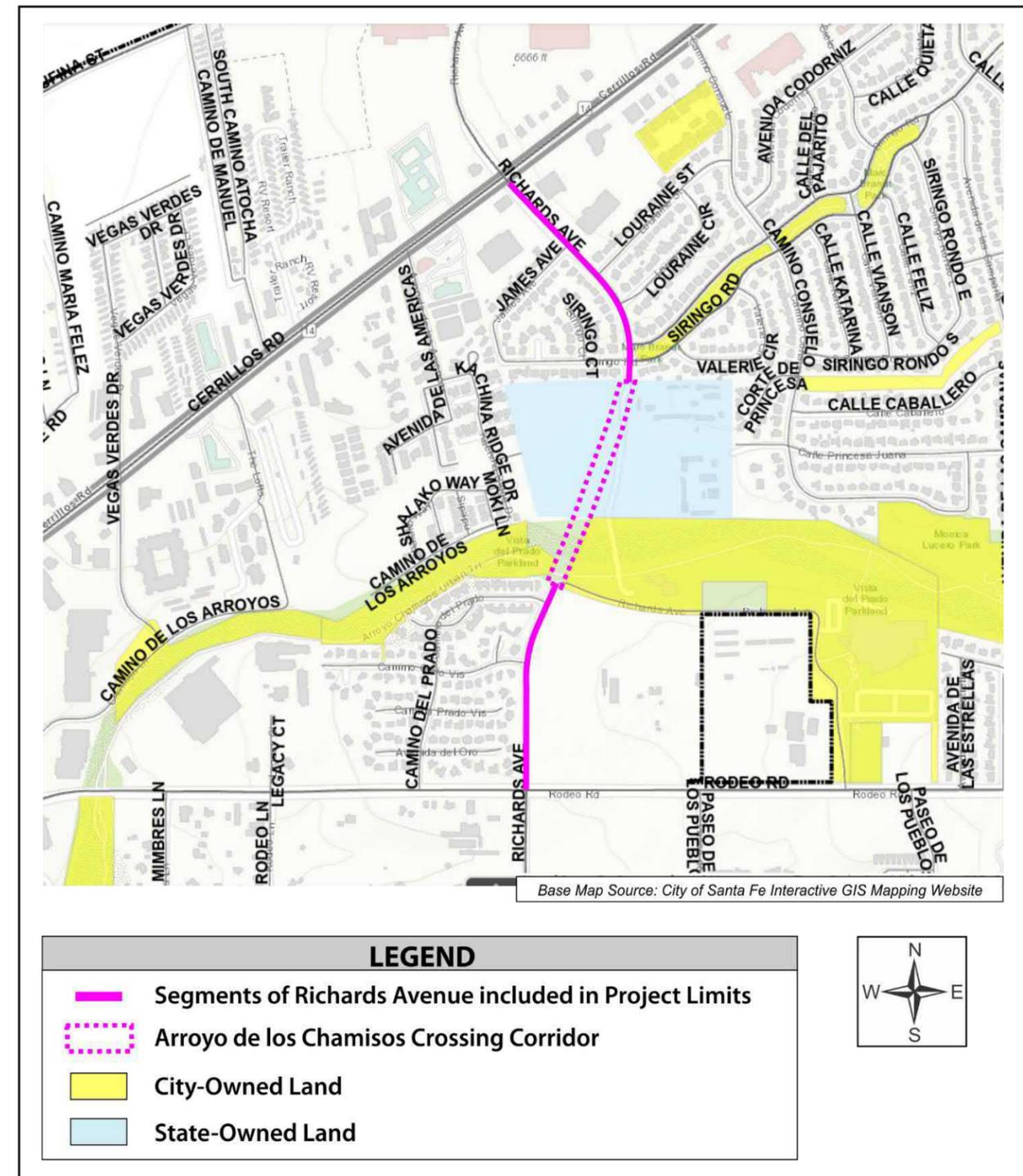


Exhibit 1-1, Map of Project Limits





Purpose and Need

The purpose of the proposed improvements is to enhance the transportation system in the area bounded by Rodeo Road to the south and Cerrillos Road to the north, and between Zafarano Road and Avenida de las Campanas to the east and west, respectively. The purpose is to provide for improved access and transportation system connectivity across a natural physical barrier, the Arroyo de Los Chamisos, between Zafarano Drive and Avenida de las Campanas. The need is based on balancing travel and overall impacts on local roads within this part of the City. Multi-modal connectivity and a permanent roadway for emergency service providers would also benefit this area of Santa Fe.

Roadway System Connectivity

A proper crossing of the Arroyo de los Chamisos (ADLC) has long been a deterrent to north-south travel moving through this area of Santa Fe and the need for additional roadway capacity has increased with the continued growth in Santa Fe. As a result, northbound and southbound traffic needing to cross the ADLC must use neighborhood roads including Avenida de las Campanas and Camino Carlos Rey as well as Zafarano Drive. The ability to directly cross the ADLC in the Richards Avenue alignment would increase multi-modal access for local residents as well as others traveling through the project area, and would result in balancing traffic traveling between Rodeo Road and Cerrillos Road. As Santa Fe continues to grow and traffic demand increases, additional north/south capacity will be needed to distribute the demand on multiple streets to help manage congestion.

The improved roadway is not intended to accommodate commercial vehicle/truck travel. Trucks are currently banned from using Richards Avenue between Siringo Road and James Street and this designation is expected to apply to the connection across the arroyo when it is completed.

Multi-Modal Connectivity

The proposed improvements would provide formal connectivity across the Arroyo de los Chamisos, as well as the Arroyo de los Pinos (ADLP), for pedestrians and bicyclists. On-street bike lanes exist on Richards Avenue from a mile south of Rodeo Road to the Fire Station Road and on Rodeo Road. On the north segment, from Siringo Road to Cerrillos Road, there are no designated bike facilities. The blue line on **Exhibit 1-3** for this segment is for a proposed bike lane. There are existing on-street bike lanes on Richards Avenue north of Cerrillos Road as well as on Cerrillos Road. As such, on-street bike lane connectivity is not currently provided in the Richards Avenue corridor.

Existing, paved trails within the project limits include the Arroyo de las Chamisos trail along the south side of the ADLC and the Marc Brandt Park trail between the Siringo Road one-way pair. There are several unimproved paths or two-track roads (i.e., nature trails) through the undeveloped land where Richards Avenue does not currently exist. Two proposed trail connections are shown in **Exhibit 1-3**. The proposed improvements would address the trail connection between the ADLC and Marc Brandt Park trails, and would accommodate trail crossings of the new roadway as needed. The proposed improvements would provide improved ADA-compliant pedestrian facilities completing a connection across the arroyos/undeveloped land. Pedestrians would then have the option of walking on ADA-compliant facilities or continuing to walk on the unimproved paths/nature trails.

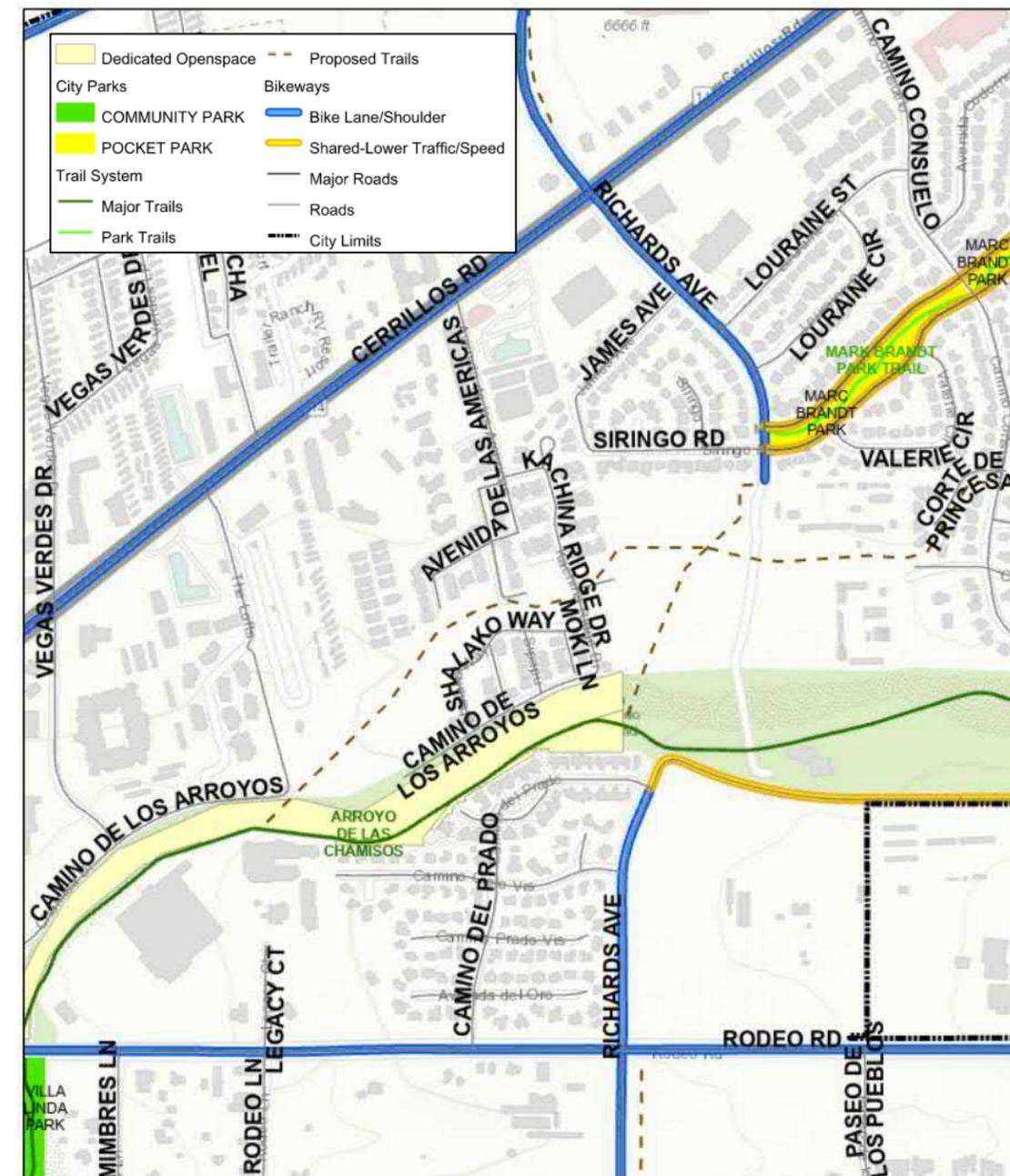
Phase IB Document Overview

This document presents the detailed evaluation of alternatives, identification of the preferred alternative, and a potential implementation phasing plan. The report is composed of the following sections:

- ◆ Executive Summary
- ◆ Chapter 1 - Introduction

- ◆ Chapter 2 - Description of Alternatives
- ◆ Chapter 3 - Public and Stakeholder Coordination
- ◆ Chapter 4 - Evaluation of Alternatives
- ◆ Chapter 5 - Preferred Alternative and Implementation Plan
- ◆ Attached Appendices
- ◆ *Electronic Appendices* of supplemental information

Exhibit 1-3, Map of Pedestrian and Bicycle Facilities



Source: City of Santa Fe Interactive GIS Mapping website



CHAPTER 2 – DESCRIPTION OF ALTERNATIVES

The No Build Alternative and two Build alternatives are described in this chapter. The preferred alignment from the Phase IA study is a direct connection across the Arroyo de los Chamisos (ADLC) in the Richards Avenue corridor. The Build alternatives were conceptually designed and evaluated in detail as documented in **Chapter 4**.

No Build Alternative

The No Build, or do nothing, Alternative consists of the existing street segments, sidewalks, all appurtenances, and no extension across the ADLC. The No Build Alternative includes continued maintenance of the streets including pavement, storm drainage, pavement markings, signs, and other basic roadway elements. Improvements beyond normal maintenance are not included in the No Build condition. Sidewalk and/or multi-use trail improvements and bike lanes are not included in the No Build Alternative for this project.

Build Alternatives

The two Build alternatives developed for evaluation are described below. Key aspects of the proposed improvements are discussed followed by descriptions of the improvements by unique segment of Richards Avenue. Conceptual drawings of the Build alternatives are provided in the **Appendix A** and **Appendix B**.

Functional Classification

The intended use of a street is typically defined by its functional classification. Richards Avenue is currently classified as a major collector from Siringo Road to Cerrillos Road and from Cerrillos Road to Rufina Street. It is an unclassified road from Rodeo Road to its terminus south of the ADLC where it turns east (referred to as Richards Avenue/Fire Station Road). South of Rodeo Road, Richards Avenue is classified as a principal arterial.

Based on its collector and unclassified roadway status within the project limits from Rodeo Road to Cerrillos Road, Richards Avenue is proposed to be a two-lane roadway with one lane in each travel direction and a functional classification of major collector. The street is intended for local travel by passenger vehicles, single-unit trucks, and potentially buses. Heavy commercial vehicles should only use the facility when there is a destination within the project limits (e.g., moving truck), no through trucks. It is important to emphasize that the proposed ADLC crossing is intended for local travel purposes meaning shorter trips at lower travel speeds considering the residential setting of the corridor.

Traffic Calming

As described above, it is recognized that Richards Avenue is and will be a local street that is residential and recreational in character so the design approach needs to include measures to encourage lower travel speeds. As a local roadway, users will be familiar with the street as they will be commuters and/or local traffic that drives it every day. In this case, motorists may become desensitized to certain features intended to calm traffic such as reduced lane widths. Enforcement is the most effective deterrent for speeding, but physical methods that reinforce compliance with posted speed can be effective. Travel speeds typically increase when there are few access points and a roadway corridor has an open feel or low side friction. In addition to a 25-30 mph posted speed limit, the types of traffic calming measures incorporated into one or both of the conceptual alternatives include:

- ◆ Roundabout: A roundabout, or traffic circle depending on side access needs, will be incorporated just south of the residential area in the north segment as a *gateway feature* for northbound travel as well as a speed control measure.

- ◆ Bulb-outs: Curb bulb-outs are used to narrow the traveled way as well as to develop recessed on-street parking. Bulb-outs will need to accommodate on-street bike lane and drainage continuity.
- ◆ Raised Crosswalks: Raised crosswalks exist between Siringo Road and James Street and will be incorporated into the proposed improvements for both Build alternatives.
- ◆ On-Street Parking: There are several residences with frontage along Richards Avenue in the north segment on the west side of the street. One Build alternative provides on-street parking on the west side of Richards Avenue for these single-family homes. Homes front the cross streets on the east side of Richards Avenue so on-street parking is provided on those cross streets rather than on Richards Avenue.
- ◆ Lane Widths: The proposed travel lane width will be between 10 feet and 11 feet. The Build alternatives described in this chapter show 10.5-foot and 11-foot lanes. For study purposes, using a wider typical section to establish the footprint needed to accommodate all travel modes and roadway embankment/slope limits is suggested. As the design is refined, the typical section elements can be changed within the right-of-way established for the proposed improvements.

Multi-Modal Features

Pedestrian and bicycle accommodations are incorporated in the proposed improvements, which will be compliant with the Americans with Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG). A sidewalk or trail will be provided on both sides of Richards Avenue for the length of the project. For reconstruction/new sidewalk, the minimum width will be six feet.

On-street bike lanes exist on Richards Avenue from Rodeo Road to the Fire Station Road. On the north segment, from Siringo Road to Cerrillos Road, there are no designated bike facilities. On-street bike lanes will be provided on Richards Avenue over the length of the project. The minimum width will be five feet exclusive of the gutter pan.

Existing, paved trails within the project limits include the Arroyo de las Chamisos trail along the south side of the ADLC and the Marc Brandt Park trail between the Siringo Road one-way pair. There are several unimproved paths or two-track roads (i.e., nature trails) through the undeveloped land where Richards Avenue does not currently exist. The proposed improvements will provide an eight to ten-foot trail connection between the Arroyo de las Chamisos and Marc Brandt Park trails, and will accommodate trail crossings of Richards Avenue as needed. Pedestrians will have the option of walking on ADA-compliant facilities and/or continuing to walk on the unimproved paths/nature trails.

Lighting

Lighting is currently provided at spot locations along Richards Avenue, primarily at intersections. This approach to lighting will be maintained as part of the proposed improvements and will be evaluated in preliminary design. Continuous corridor lighting is not proposed.

Build Alternative Segments

Based on the abutting land uses and street characteristics of the existing facility, proposed improvements to Richards Avenue are described in four segments as follows:

- ◆ Rodeo Road to Richards Avenue/Fire Station Road (south segment)
- ◆ Richards Avenue/Fire Station Road to Siringo Road (middle segment)
- ◆ Siringo Road to James Street (north segment)
- ◆ James Street to Cerrillos Road

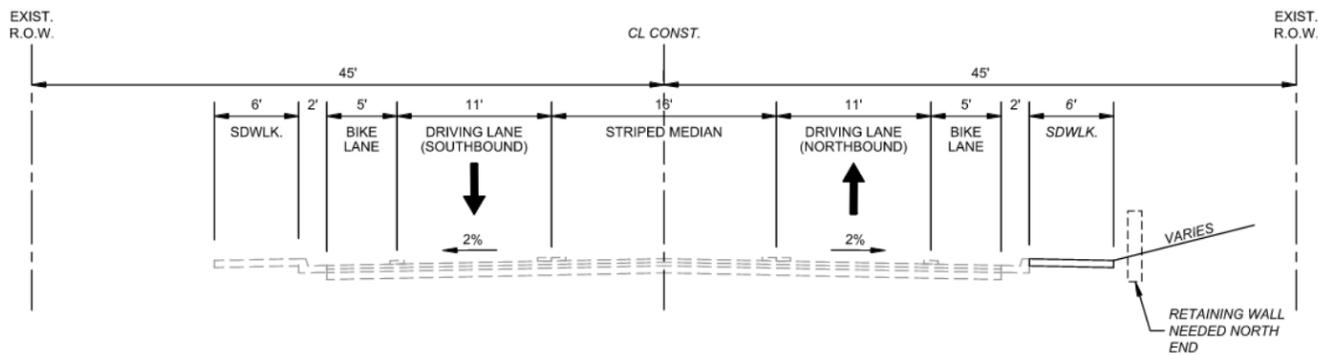


Note that the proposed drainage and major structure improvements are discussed in Chapter 4. The following descriptions focus on the street section needed for vehicular, pedestrian and bicycle travel.

Rodeo Road to Richards Avenue/Fire Station Road (South Segment)

The south segment of Richards Avenue is already built out except for a sidewalk along the east side of the street, starting south of the gated access to the Rodeo de Santa Fe grounds. Both Build alternatives propose a new 6-foot sidewalk at the back of the existing curb and gutter as shown in Exhibit 2-1. No other improvements are proposed up to Camino del Prado. The short section north of Camino del Prado to Fire Station Road will be reconstructed as part of the extension of Richards Avenue across the ADLC. The intersection of Richards Avenue and Fire Station Road will be a stop-controlled intersection with a stop-sign on Fire Station Road.

Exhibit 2-1, Typical Section from Rodeo Road to Camino del Prado – Build Alternatives 1 and 2



Richards Avenue/Fire Station Road to Siringo Road (Middle Segment)

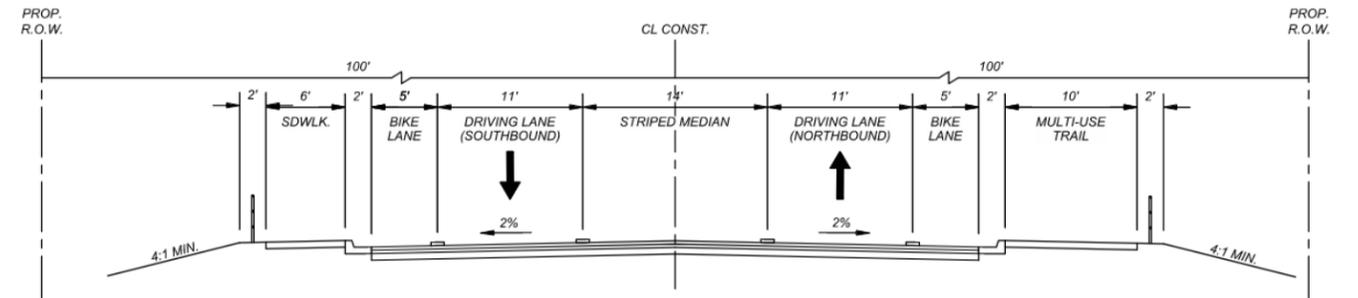
The middle segment primarily involves new construction crossing the ADLC, Arroyo de los Pinos (ADLP), and undeveloped land. There is a short segment of existing street south of Siringo Road that will be reconstructed. Three typical sections describe the proposed improvements for this segment. Build Alternative 1 is shown in Exhibit 2-2 and Build Alternative 2 is shown in Exhibit 2-3.

The primary differences between the two Build alternatives in this segment are:

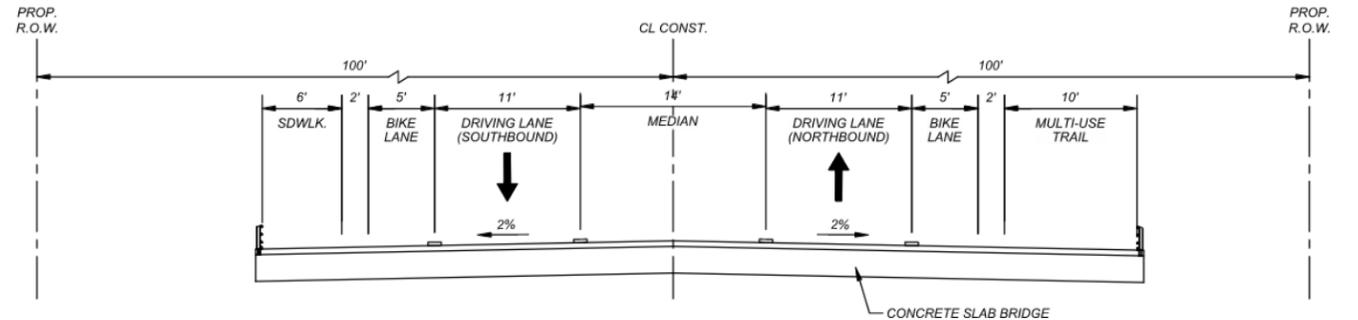
- ◆ Travel Lane Widths – Build Alternative 1 is based on 11-foot lanes, Build Alternative 2 has 10.5-foot lanes
- ◆ Median Width – Build Alternative 1 has a 14-foot median, Build Alternative 2 has a 12-foot median; except for the existing street segment where the median is 12-feet for Build Alternative 1 and 13-feet for Build Alternative 2
- ◆ Structure Type for Arroyo Crossings – Build Alternative 1 has concrete-slab bridges, Build Alternative 2 uses concrete box culverts (CBC); note, these are described in Chapter 4

Both alternatives include 5-foot on-street bike lanes, a 6-foot sidewalk on the west side, and an 8 to 10-foot multi-use trail on the east side connecting the Arroyo de las Chamisos trail to the Marc Brandt Park trail. Refer to the conceptual layouts in the Appendix for plan views of the proposed improvements for each alternative.

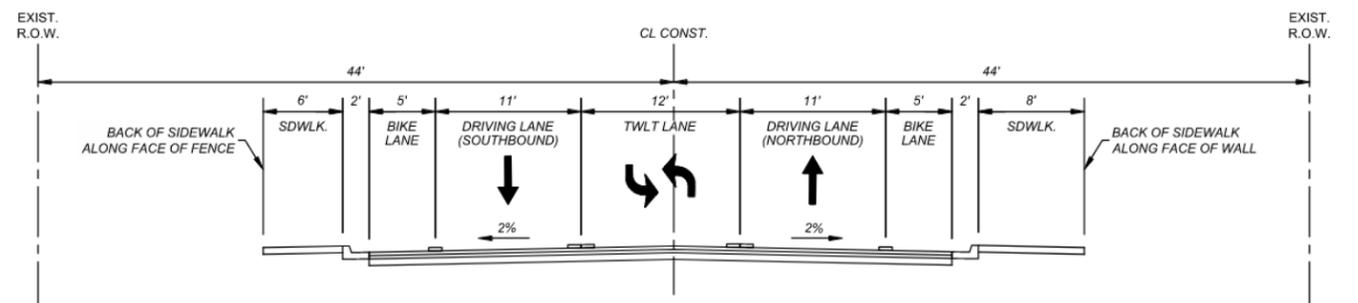
Exhibit 2-2, Proposed Typical Sections from Fire Station Road to Siringo Road – Build Alternative 1



**Fire Station Road to ADLC Crossing
ADLC Crossing to ADLP Crossing
ADLP Crossing to North Segment**



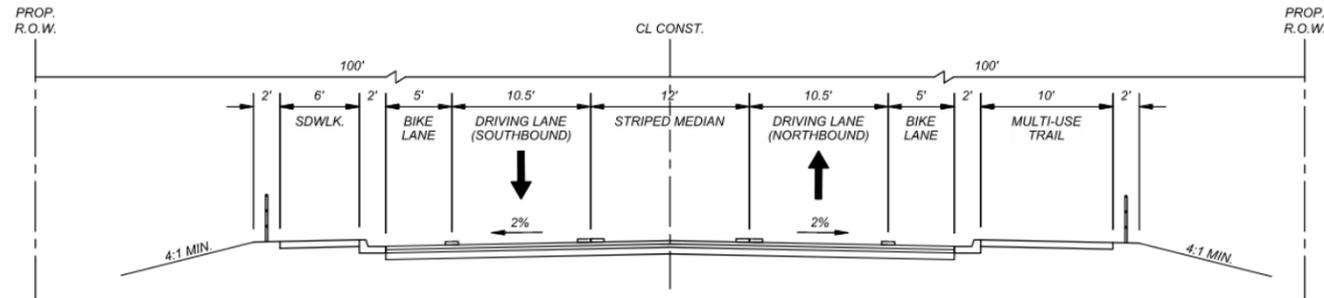
ADLC and ADLP Bridge Crossings



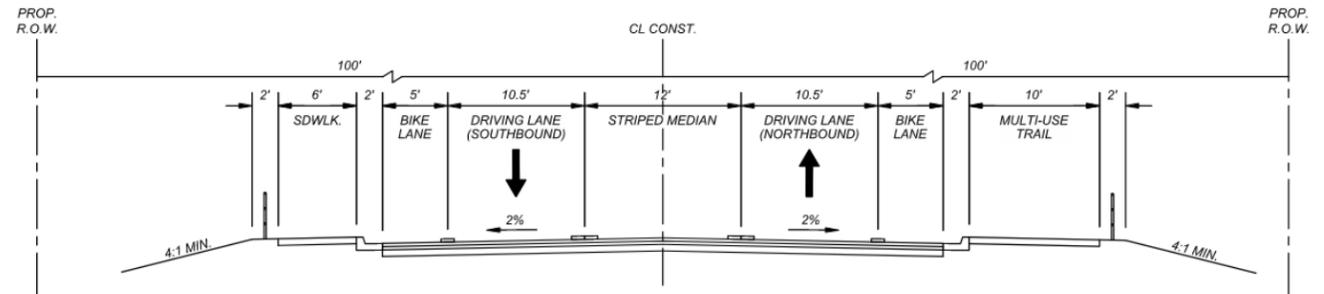
South of Siringo Road



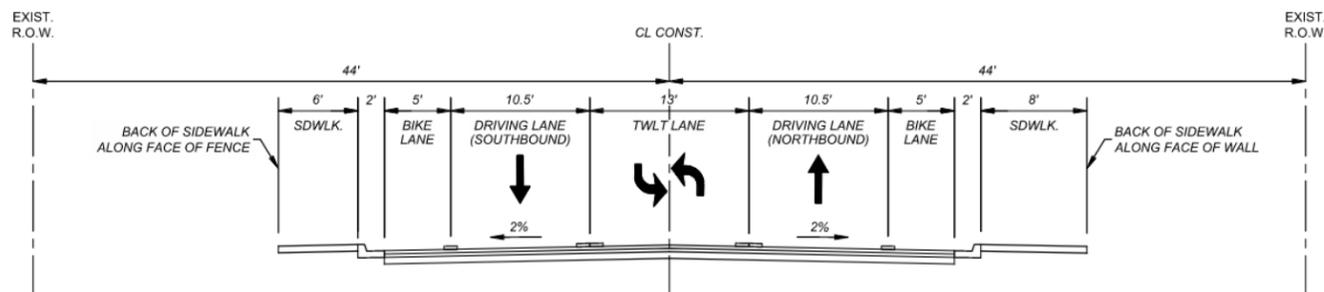
Exhibit 2-3, Proposed Typical Sections from Fire Station Road to Siringo Road – Build Alternative 2



Fire Station Road to ADLC Crossing
ADLC Crossing to ADLP Crossing
ADLP Crossing to the North Segment



ADLC and ADLP Bridge Crossings



South of Siringo Road

Siringo Road to James Street (North Segment)

The Build alternatives differ the most in the north segment of Richards Avenue. Build Alternative 1 is shown in Exhibit 2-4 and Build Alternative 2 is shown in Exhibit 2-5. Similarities include 5-foot minimum on-street bike lanes, a 6-foot sidewalk on the west side, and an 8-foot sidewalk on the east side. The sidewalk on the east side within Marc Brandt Park is offset from the street as exists today. The primary differences between the two Build alternatives in this segment are:

- ◆ Travel Lane Widths – Build Alternative 1 is based on 11-foot lanes, Build Alternative 2 has 10.5-foot lanes
- ◆ On-Street Parking – Build Alternative 1 provides a 9-foot on-street parking zone along the west side of the street which allows buffer space between parked vehicles and the bike lane; Build Alternative 2 does not provide an on-street parking zone so there may parking use of the bike lane and gutter pan
- ◆ Median – A median is not provided in Build Alternative 1 where on-street parking is proposed, where provided it is proposed to be 12-foot wide; Build Alternative 2 provides a 13-foot two-way left-turn lane (TWLTL) throughout this segment

Refer to the Appendix for the conceptual layouts of the Build alternatives.

James Street to Cerrillos Road

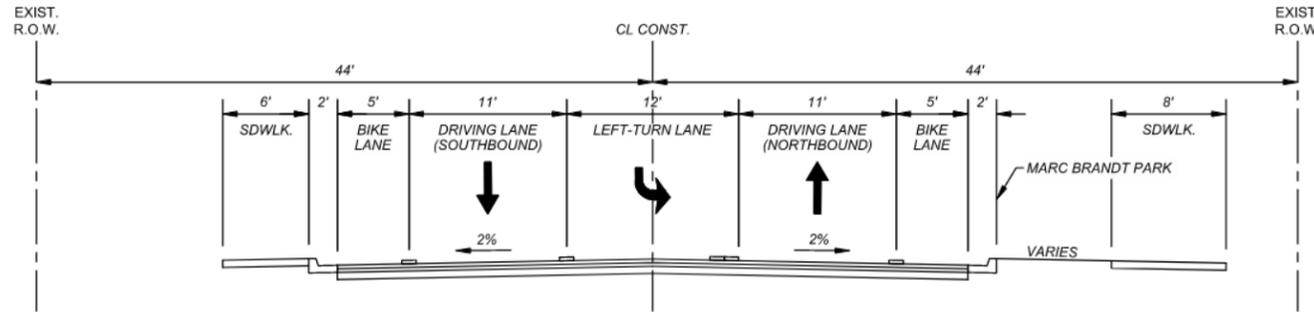
The proposed improvements within this segment of Richards Avenue are the same for both Build alternatives and are shown in Exhibit 2-6. This segment is adjacent to commercial land uses and is connected to the Cerrillos Road/Richards Avenue intersection. Raised median is provided in this segment along with 8-foot sidewalks on both sides of the street. On-street 5-foot bike lanes are proposed.

Major Intersections

The need for improvements to the Rodeo Road/Richards Avenue intersection, the Cerrillos Road/Richards Avenue intersection, and the Richards Avenue/Westbound Siringo Road intersection is discussed in the Traffic section in Chapter 4. The improvements will be limited to the addition of right-turn or left-turn lanes as needed to provide an acceptable level of traffic performance while also considering the multi-modal needs and right-of-way constraints at the intersections. The typical section in Exhibit 2-6 for the segment south of Cerrillos Road includes a 6-foot bike buffer and the addition of a 10-foot right-turn lane.

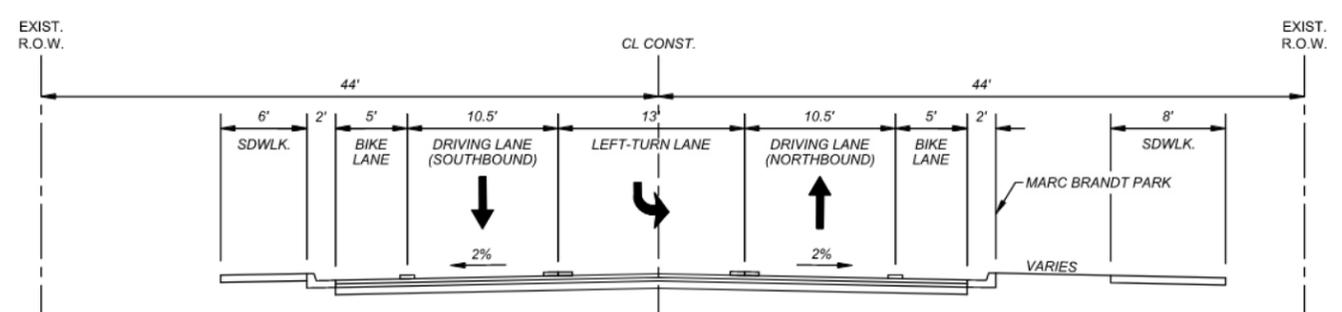


Exhibit 2-4, Proposed Typical Sections from Siringo Road to James Street – Build Alternative 1

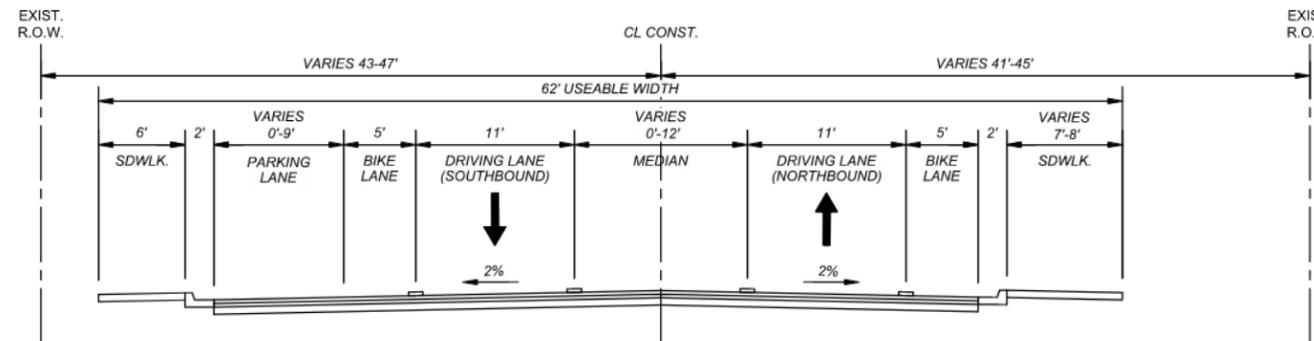


Siringo Road Eastbound to Siringo Road Westbound

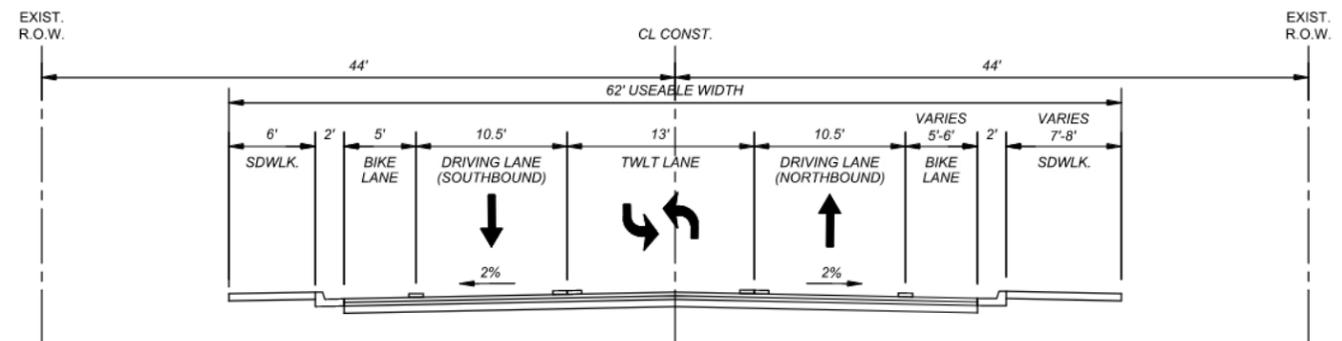
Exhibit 2-5, Proposed Typical Sections from Siringo Road to James Street – Build Alternative 2



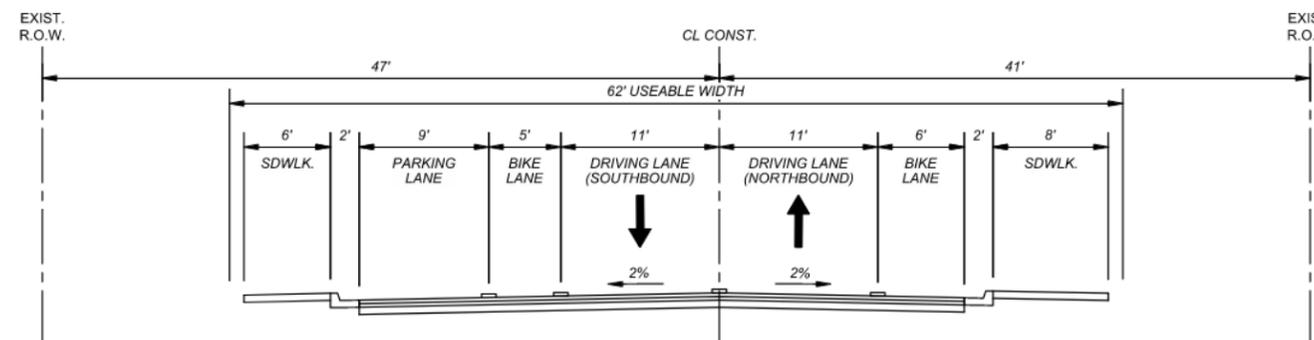
Siringo Road Eastbound to Siringo Road Westbound



Siringo Road Westbound to Louraine Circle
Louraine Street to James Street



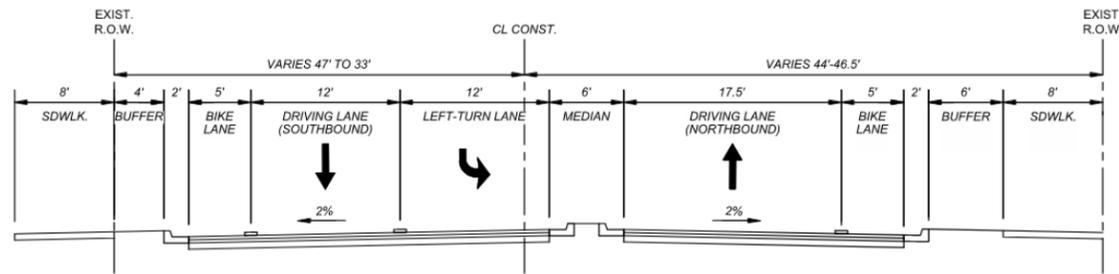
Siringo Road Westbound to James Street



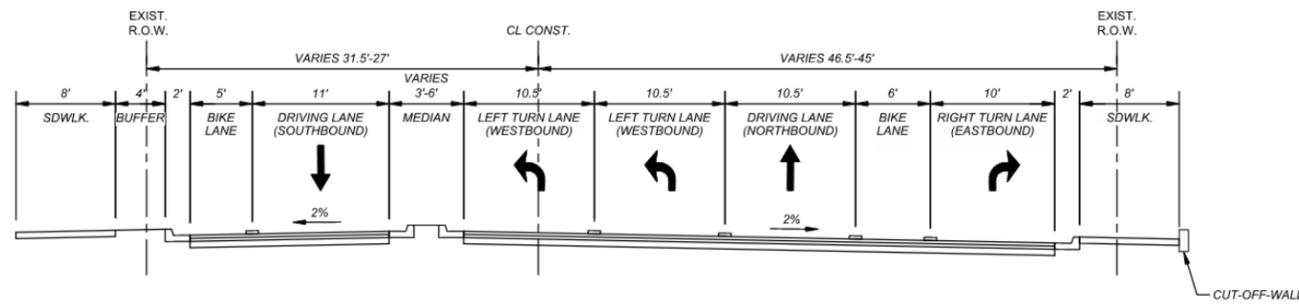
Louraine Circle to Louraine Street



Exhibit 2-6, Proposed Typical Sections from James Street to Cerrillos Road – Build Alternatives 1 and 2



North of Shopping Center Access



South Leg of Cerrillos Road/Richards Avenue Intersection



CHAPTER 3 – PUBLIC AND STAKEHOLDER COORDINATION

All public involvement and agency coordination for the Arroyo de los Chamisos Crossing Study Phase IB was conducted in compliance with the City’s Early Neighborhood Notification (ENN) and the NMDOT Location Study Procedures. The overall outreach approach was used to obtain feedback from the stakeholder and regulatory agencies, as well as the public, in an effort to ensure the preferred alternative meet the purpose and need established for the project.

During Phase IA, a project-specific Public Involvement Plan (PIP) was completed under NMDOT guidelines. The PIP is a dynamic document that evolves as the project progresses and can be found under separate cover. During Phase IB, in response to evolving concerns and identified, the process and methods to involve the public were refined to maximize outreach and to provide the best opportunities for input.

During the Phase IB Study, one virtual public outreach meeting was conducted, ongoing stakeholder communication was maintained, and updates to the project-specific website page ([Arroyo Chamiso Crossing | City of Santa Fe, New Mexico \(santafem.gov\)](#)) were completed. In addition, photo simulations of an improved scenario based on the build alternatives evaluated as part of this Phase IB study were prepared as part of the public engagement process.

Stakeholder List

An overall stakeholder list was developed at the beginning of the study, as part of the Public Involvement Plan (PIP). It included roadway users, organizations, and special interest groups, as well as agencies with some level of jurisdiction within the study area. Throughout the project development process, several coordination phone calls, virtual meetings, and other communication has been ongoing with key stakeholders and all input shared during these events documented and taken into consideration by the project team. The Phase IB stakeholder list includes the following:

- ◆ Public
 - General public
 - Residents within the ENN notification boundary
 - HOA Board Directors for the following neighborhood associations:
 - Pueblos de Rodeo Road
 - Las Americas, The Loft
 - Southwest Bellamah
 - Vista del Prado
 - Serenity Lucero
 - Rancho Viejo South
- ◆ Key Stakeholders
 - City of Santa Fe
 - Santa Fe County
 - Santa Fe Community College
 - Santa Fe Metropolitan Planning Organization
 - Bicycle & Trail Advisory Committee
 - New Mexico Department of Transportation
 - City of Santa Fe Fire and Police Departments
 - New Mexico Game and Fish
 - New Mexico Energy Minerals and Natural Resources Department
 - Federal Highway Administration
 - United States Corp of Engineers

Public Meeting

A virtual public meeting was held on March 31, 2022 at 6:00 PM. The meeting platform was on Zoom with 102 attendees. Meeting materials, including presentation slides and recordings, were made available after the meeting on the project-specific website page. The public meeting included a presentation about the study process, visuals of alternatives analyzed, summary of traffic operations, and overall recommendations. The public meeting concluded with an opportunity for the public to ask questions or provide comment. The presentation PowerPoint is provided in the [electronic appendices](#).

Advertisement for the public meeting was conducted via social media, display ads in the Santa Fe New Mexican, paper flyers posted in the study area and along the trail, direct emails to all previous meeting attendees, and postcards to area property owners in compliance with the City’s ENN process. The meeting was well advertised with the meeting invite flyer shared through the following mechanisms:

- ◆ Over 700 postcards were mailed per the City of Santa Fe Early Neighborhood Notification (ENN) process
- ◆ Numerous flyers were posted at public locations within and near the study area
- ◆ City of Santa Fe and Santa Fe MPO websites posted the meeting invite
- ◆ Newspaper display ads were placed in the Santa Fe New Mexican on March 16th and 27th
- ◆ Social media posts were made, as appropriate, via the City public information officer
- ◆ Neighborhood associations within and near the study area were notified through their individual leadership
- ◆ Previous meeting invite were sent an email invite with the meeting flyer

There were many opportunities for input with an open request for verbal comments during the meeting, chat box options for written comments, and texting options for those not able to join Zoom with the visual elements. Outside of the meeting comments were invited via email, phone calls, and written comments sent through the mail.

Public and Stakeholder Comments

Throughout Phase IB, a variety of input has been collected with the most comments shared at or associated with the public meeting on March 31. The primary topics of concern were identified and are as follows:

- ◆ Potential for increased traffic
- ◆ Need for right-of-way acquisition
- ◆ Concerns with noise, air pollution, lighting, and landscaping
- ◆ Inquiries around what type of crossing structure would be installed
- ◆ Concern around impacts to the arroyo resulting from the crossing structure
- ◆ Intentions around traffic calming
- ◆ Opportunity for the “No Build Alternative”
- ◆ Inquiries on the project timeline
- ◆ Maintenance of existing access points
- ◆ Inquiries about the Game & Fish property
- ◆ Concern regarding the trail crossing, whether at-grade or grade-separated
- ◆ Concerns around potential impacts to the existing disc golf course, loss of open space, and maintaining access to the arroyo

In response to the collection of comments received, a response for the primary topic areas was created and shared with the public via the project-specific website. Documentation on the public outreach process including the comment summary, advertisements, and the presentation are included in the [electronic appendices](#).



City Council Briefings

The Santa Fe City Council has been kept informed on this project through various communications. This includes a project briefing to the District 4 City Councilors on August 18, 2021, and post-public meeting discussion on April 19, 2022, as well as additional memorandums and briefings during subsequent meetings.

Agency Coordination

Coordination with Santa Fe Metropolitan Planning Organization (SFMPPO) has been ongoing since Phase IA. As the regional transportation agency, input and support for all recommendations from the SFMPPO is critical. During Phase IB, the proposed typical sections and conceptual layouts have been shared and input collected. Additional support is expected as the project moves into design, with a focus on the multi-modal elements for bicycles and pedestrians.

Coordination with the New Mexico Game and Fish Department (NMGF) has occurred. Starting with an initial meeting on December 29, 2021, there has been ongoing coordination between the City and the NMGF regarding purchase of their land allowing for the connection across the Arroyo de los Chamisos. This coordination will continue, requiring further communication and approvals within the City organization.

As part of the utility coordination for this project, input from City staff regarding City utilities was obtained and is summarized in **Chapter 4**.

Photo Simulations for Public Involvement

Exhibit 3-1 through **Exhibit 3-5** provide a before/after comparison of the simulated proposed improvements. The simulations are intended to illustrate the proposed improvements at a planning level and may not show refined details such as curb ramps.

Exhibit 3-1, North View Photo Simulation





Exhibit 3-2, Northeast View Photo Simulation



Exhibit 3-3, East View Photo Simulation

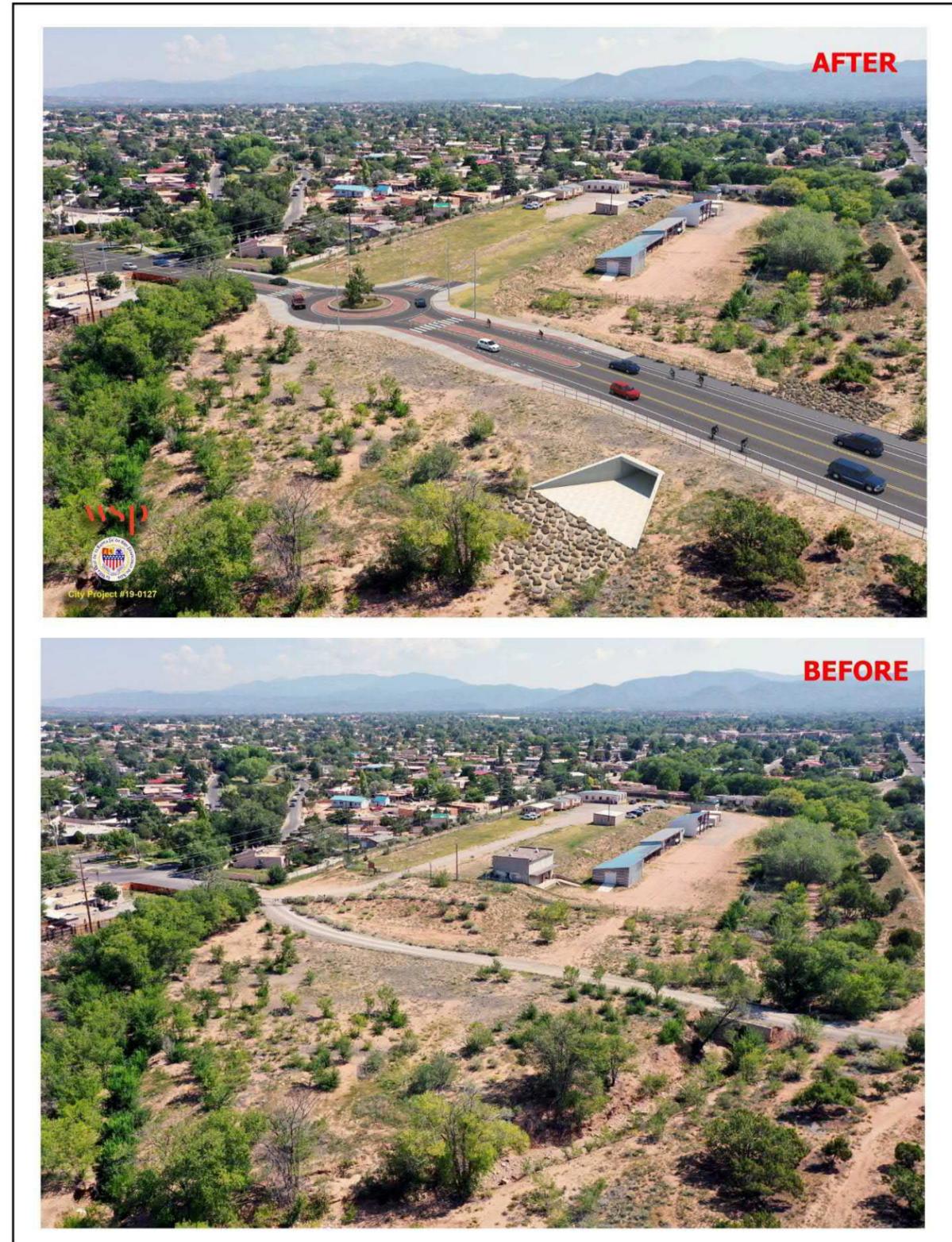
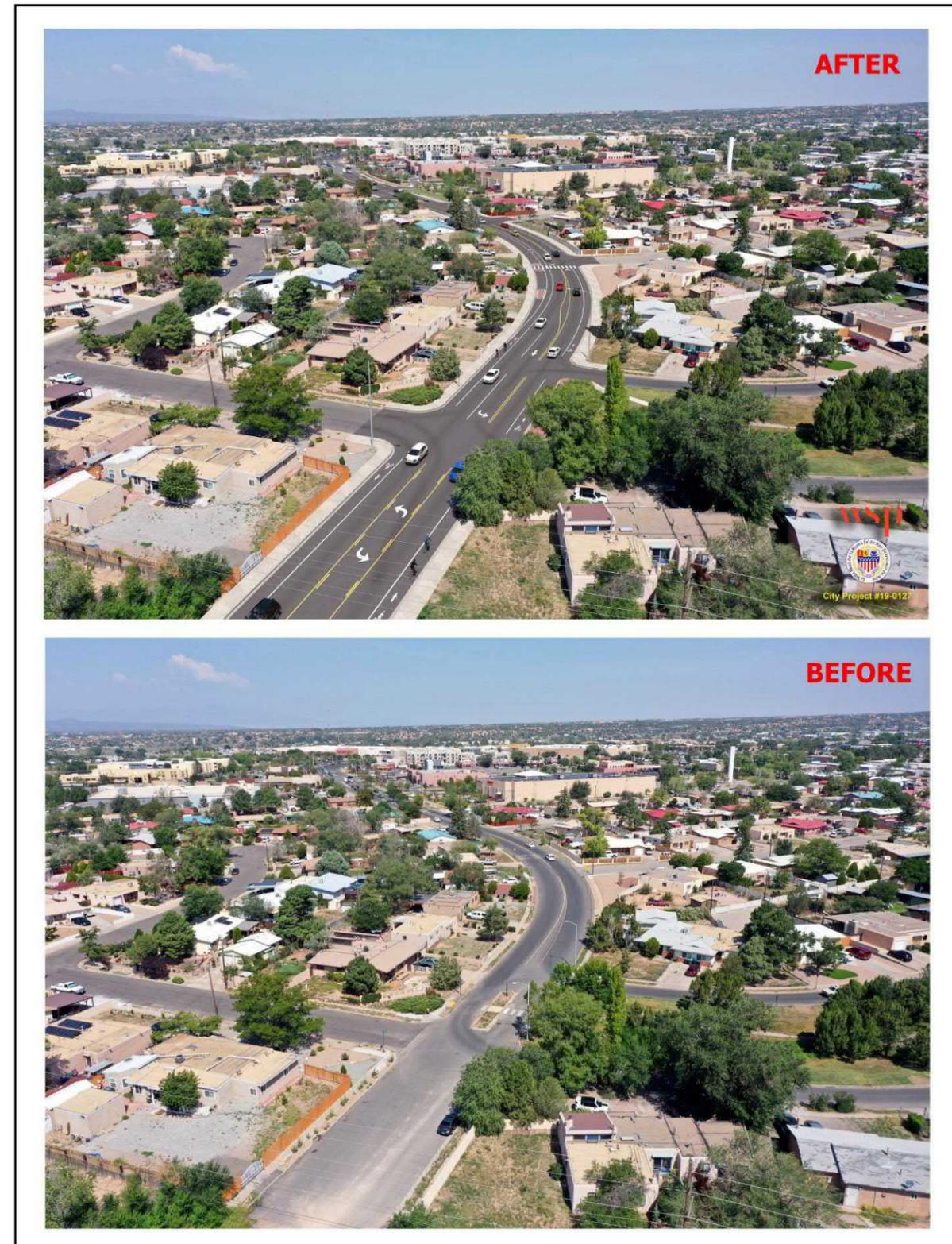




Exhibit 3-4, South View Photo Simulation



Exhibit 3-5, Northwest View Photo Simulation





CHAPTER 4 – EVALUATION OF ALTERNATIVES

The development of transportation improvements is an iterative process that considers various alternatives to satisfy the purpose and need for the project. The development of alternatives considers existing constraints, public and stakeholder input, design criteria, current objectives, and addresses all travel modes as part of providing multi-modal improvements for this project. Because this project involves a new roadway across undeveloped land, right-of-way impacts and property acquisitions will be needed.

During this study phase of project development, the focus was on establishing hardscape elements such as street and intersection configurations, sidewalk features, traffic calming measures, bridge crossings of arroyos, and other aspects that help define the footprint of the desired improvements and how continuity is provided within and through the project area for all travel modes. Details such as street lighting, aesthetic treatments, benches and other streetscape items will be developed as part of preliminary and final design once the approach to the improvements is established.

Roadway

The Build alternatives were described in **Chapter 2** and conceptual plans are provided in **Appendix A** and **Appendix B**. The following summarizes other key elements of the design approach for the development of the Build alternatives:

- ◆ Design speed of 30 mph with a posted speed of 25 to 30 mph. Use AASHTO Green Book design criteria for Low-Speed Streets in Urban Areas.
- ◆ Roadway cross slope will be normal crown, no superelevation.
- ◆ Roadside slopes will be minimum of 4:1 to minimize erosion and support natural vegetation.
- ◆ Pavement section may be 6" HMA over 6" base course (will be determined in final design).
- ◆ Standard curb and gutter, 6" barrier type.
- ◆ Profile grades of 2% or less for new construction; the existing profile through north segment is 4.6% and will not change.
- ◆ Minimum horizontal curvature radius of 333 feet for 30 mph and normal crown (Table 3-12 AASHTO Green Book).
- ◆ ADA/PROWAG compliant sidewalks, trails, and driveway crossings.
- ◆ Include a 2-foot minimum bench behind the sidewalk/trail; may include pedestrian hand railing along new street segment for access control (optional).
- ◆ Buffers were not included from back of curb to sidewalk due to presence of on-street bike lane and maintenance issues associated with buffers (e.g., weeds).

Both Build alternatives are feasible from an engineering perspective, both horizontally and vertically, and can be designed considering the local, low-speed environment that is desired for this segment of Richard's Avenue. The primary differences involve lane and median widths and the street configuration in the north segment. Public and stakeholder input will be key to the selection of a preferred alternative through this existing residential area, which is described in **Chapter 5**.

Traffic

This section discusses the detailed traffic operations analysis for key intersections within the project limits. Refer to the Phase IA Report for additional traffic analyses performed for the evaluation of alternative alignments.

Existing Conditions

Traffic Counts

Existing 2021 traffic data for the intersections on Richards Avenue were collected by Cleland Counts during a 9-hour period, highlighting usual morning, afternoon, and evening peak periods from 6 AM – 9 AM, 11 AM – 2 PM, and 4 PM – 7 PM. These counts included traffic turning movement volumes, peak hour factor (PHF), and heavy vehicle percentage. The turning movement counts were collected at the following locations:

- ◆ Richards Avenue and Cerrillos Road – existing signalized intersection
- ◆ Richards Avenue and Rodeo Road – existing signalized intersection
- ◆ Richards Avenue and Siringo Road – existing unsignalized intersection (Siringo Rd in the vicinity of Richards Avenue consists of a one-way pair with the intersections at Richards Road being located approximately 100 feet apart)
- ◆ Richards Avenue and Camino del Prado – existing unsignalized intersection

Since these counts were collected in 2021, it is within a time period when COVID-19 restrictions were imposed and therefore travel patterns may not reflect normal travel patterns. Using big data from a vendor named Streetlight, the pre-COVID travel data was compared against travel patterns when the counts were collected, and this information was used to adjust the traffic count turning movement volumes. These adjusted traffic count volumes are used in the analysis to determine the operational characteristics of the existing conditions at the intersections listed above. **Exhibit 4-1** summarizes the existing AM and PM peak-hour intersection turning movement volumes. The traffic count data are included in the [electronic appendices](#).

Exhibit 4-1, AM and PM Peak-Hour Intersection Turn Movement Volumes – Existing Conditions

2021 Existing Conditions Volume by Approach and Movement (vehicles per hour)													
Location Along Richards Avenue	Peak Hour	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Rodeo Road	AM	7	800	186	218	576	8	172	4	398	25	1	14
	PM	15	1130	321	316	1242	14	217	15	207	19	2	7
Camino del Prado	AM	5		5				5	10			10	5
	PM	5		5				5	15			30	5
Eastbound Siringo Road	AM	5	3	0				0	8	3	277	13	7
	PM	4	9	0				0	6	1	194	1	13
Westbound Siringo Road	AM				19		155		13			290	
	PM				29		415		10			195	
Cerrillos Road	AM	330	1965	145	21	1057	177	91	92	19	154	114	184
	PM	143	1442	160	106	2258	213	242	113	31	128	107	210



Existing Levels of Service

The existing intersection traffic volumes were analyzed using HCS7 software. This software uses methodology from the Sixth Edition of the Highway Capacity Manual (HCM) to analyze signalized and unsignalized intersections. The HCM is a publication of the Transportation Research Board of the National Academies of Sciences, Engineering, and Medicine in the United States. It contains concepts, guidelines, and computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, interchanges, rural highways, and the effects of mass transit, pedestrians, and bicycles on the performance of these systems. The intersection analysis methodology in HCM considers a wide variety of prevailing conditions, including the amount and distribution of traffic movements, traffic composition, geometric characteristics such as number of lanes, and for signalized intersection it considers details of signalization control. The HCM defines Level of Service (LOS) for signalized and unsignalized intersections as shown in **Exhibit 4-2**.

Exhibit 4-2, Level of Service (LOS) Definitions

Level of Service	Definition	Signalized (sec/veh)	Unsignalized (sec/veh)
A	Most vehicles do not stop.	<10	<10
B	Some vehicles stop.	>10 and <20	>10 and <15
C	Significant numbers of vehicles stop.	>20 and <35	>15 and <25
D	Many vehicles stop.	>35 and <55	>25 and <35
E	Limit of acceptable delay.	>55 and <80	>35 and <50
F	Unacceptable delay.	>80	>50

The City of Santa Fe follows the NMDOT State Access Management Manual (SAMM) guidelines for intersection capacity which indicates that an acceptable level of service (LOS) is LOS D or better. The analysis of the existing intersections within this study limits results in an acceptable levels of service (LOS) at all the intersections. The detailed HCS7 output for the existing conditions analysis is included in the [electronic appendices](#).

The Richards Avenue and Cerrillos Road intersection and the Richards Avenue and Rodeo Road intersection are both currently signalized, and both of those intersections operate at an acceptable LOS D or better. Richards Avenue and Cerrillos Road operates at LOS C in both the AM peak and PM peak periods. Richards Avenue and Rodeo Road operates at an overall LOS D in the AM peak period although the results show that it experiences a LOS E for the westbound left-turn movement during this AM peak period, during the PM peak period it operates at LOS C.

Exhibit 4-3 summarizes the existing signalized intersection results.

Exhibit 4-3, 2021 Existing Signalized Intersection Results

Intersection/Movement	2021 AM Peak			2021 PM Peak		
	Delay	v/c	LOS	Delay	v/c	LOS
Richards Ave and Cerrillos Rd	22.6	0.814	C	24.6	0.877	C
Richards Ave and Rodeo Rd	29.6	0.935	C	20.7	0.860	C

There are four unsignalized intersections within the project limits and they all operate within acceptable LOS, with no unsignalized movements worse than LOS C. **Exhibit 4-4** provides a summary of the results.

Exhibit 4-4, 2021 Existing Unsignalized Intersection Results

Intersection/Movement	2021 AM Peak				2021 PM Peak			
	Delay	v/c	Queue* (ft)	LOS	Delay	v/c	Queue* (ft)	LOS
Richards Ave and Siringo Rd (WB) WB Movement	- 9.5	- 0.20	- 25	- A	- 11.1	- 0.43	- 75	- B
Richards Ave and Siringo Rd (EB) EB Movement	- 17.6	- 0.03	- 25	- C	- 13.1	- 0.03	- 25	- B
SB Left	7.8	0.21	25	A	7.6	0.13	25	A
NB Left	7.3	0.0	0	A	7.3	0.0	0	A
Richards Ave and Camino del Prado EB Movement	- 8.72.4	- 0.01	- 0	- A	- 9.0	- 0.02	- 25	- A
NB Left		0.00	0	A	7.4	0.01	0	A

* – HCM 95th percentile queue rounded to next 25-foot increment

2040 No Build Scenario Traffic Analysis

The design year for this project is 2040 which is consistent with the current planning horizon of the Santa Fe Metropolitan Planning Organization (SFMPO). The 2040 No Build scenario is discussed below.

2040 No Build Traffic Projections

The horizon year (2040) conditions are based upon the traffic patterns presented by the SFMPO Regional Travel Demand Model, which considers the future anticipated development and changes to the transportation network as grown from the existing traffic volumes. The travel demand model utilizes the PTV VISUM software to estimate the 2040 traffic volumes. The 2040 No Build Scenario considers traffic patterns and volumes without the connection of Richards Avenue across the Arroyo de Los Chamisos.

It should be noted that travel patterns have changed during the COVID-19 pandemic because more people have been working from home, there is less commuting, and in some cases peak-hour traffic volumes are different than they were prior to the COVID-19 restrictions. There is always a possibility that traffic may not get back to pre-COVID levels during the peak hours. Because it is not clear yet how these changes will affect future driving decisions, the travel demand model was utilized as this is the best tool available to estimate 2040 traffic projections. The travel demand model uses socio-economic data for employment growth, population growth, and land use to determine origin and destination for travelers and then assigns trips to the roadway network to estimate the 2040 traffic volumes.

The 2040 No Build traffic analysis for this study uses this data as the basis for our capacity analysis. The traffic projections for the 2040 No Build are included in the [electronic appendices](#) and are summarized in **Exhibit 4-5**.



Exhibit 4-5, AM and PM Peak-Hour Intersection Turn Movement Volumes – 2040 No Build Scenario

2040 No Build Volume by Approach and Movement (vehicles per hour)													
Location Along Richards Avenue	Peak Hour	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Rodeo Road	AM	15	727	352	360	521	9	227	5	526	19	6	15
	PM	31	1170	560	669	1031	23	199	15	426	16	4	13
Camino del Prado	AM	5		10				10	20			20	10
	PM	5		10				10	30			60	10
Eastbound Siringo Road	AM	5	10	0				5	10	5	280	10	10
	PM	5	10	0				5	10	5	215	5	10
Westbound Siringo Road	AM				20		155		15			300	
	PM				30		460		15			230	
Cerrillos Road	AM	288	2139	174	101	1209	180	101	95	50	165	122	197
	PM	197	1497	256	171	2323	220	265	115	84	130	110	308

2040 No Build Intersection Capacity Analysis

The 2040 No Build projected intersection traffic volumes were analyzed using HCS7 software that uses signalized and unsignalized intersection methodology from the Sixth Edition of the HCM. Intersection output for the 2040 No Build conditions analysis are included in the *electronic appendices* and are summarized in **Exhibit 4-6**.

Exhibit 4-6, 2040 No Build Signalized Intersection Results

Intersection/Movement	2040 No Build AM Peak			2040 No Build PM Peak		
	Delay	v/c	LOS	Delay	v/c	LOS
Richards Avenue and Cerrillos Road	29.0	0.931	C	37.1	0.990	D
Richards Avenue and Rodeo Road	39.9	0.951	D*	55.8	1.066	E*
Richards Avenue and Rodeo Road (NBR Lane Addition Improvement)	30.4	0.827	C	30.3	0.924	C

* – Individual movements LOS E or worse

The Richards Avenue and Cerrillos Road intersection will operate at an acceptable LOS in the 2040 No Build scenario with LOS C in both the AM Peak period and the PM peak period. The Richards Avenue and Rodeo Road intersection operates at an acceptable LOS C in the PM Peak period but some movements begin to show signs of poor operations in the AM Peak period, with an overall LOS E. The northbound (NB) left has LOS E, the northbound (NB) shared through and right turn lane operates with LOS F, the eastbound (EB) left is LOS E, the eastbound (EB) through operates at LOS F, and the southbound (SB) left is also at LOS E. This can be mitigated by making improvements to the existing intersection. To get all movements to LOS D or better requires changing the currently northbound combined through and right turn lane into a lane for only northbound through movement and then adding another lane for a dedicated northbound right-turn only movement. By separating these movements into their own lanes, it provides the additional capacity needed at this intersection. However, the right-of-way impacts will need to be considered before this improvement can be implemented.

The analysis indicates all unsignalized intersections operate within an acceptable LOS, with no movement operating worse than LOS C as shown in **Exhibit 4-7**.

Exhibit 4-7, 2040 No Build Unsignalized Intersection Results

Intersection/Movement	2040 No Build AM Peak				2040 No Build PM Peak			
	Delay	v/c	Queue* (ft)	LOS	Delay	v/c	Queue* (ft)	LOS
Richards Ave and Siringo Rd (WB) WB Movement	-	-	-	-	-	-	-	-
	9.5	0.20	25	A	11.7	0.98	75	B
Richards Ave and Siringo Rd (EB) EB Movement	-	-	-	-	-	-	-	-
	18.6	0.06	25	C	14.1	0.04	25	B
SB Left	7.9	0.21	25	A	7.6	0.14	25	A
NB Left	7.3	0.0	0	A	7.3	0.0	0	A
Richards Ave and Camino del Prado EB Movement	-	-	-	-	-	-	-	-
	8.7	0.02	25	A	9.2	0.03	25	A
NB Left	7.3	0.01	0	A	7.5	0.01	0	A

* – HCM 95th percentile queue rounded to next 25-foot increment

2040 Build Scenario Traffic Analysis

The Phase IA study that was previously completed for this corridor demonstrated how a new connection over Arroyo de Los Chamisos at this location would attract traffic to use this new transportation link and reduce traffic on Avenida de Las Campanas, Camino Consuelo, and Camino Carlos Rey. The analysis for this Phase IB study does not reanalyze the results from the Phase IA study but instead focuses on a detailed analysis of the intersections along Richards to understand what intersection improvements are needed for the implementation of the new connection.

2040 Build Traffic Projections

The 2040 Build scenario is also based on the SFMPO Regional Travel Demand Model. It adds a new transportation link into the model for the construction of the Arroyo de Los Chamisos crossing. The travel demand model estimates the traffic pattern changes that would result by adding the crossing and completing the connection of Richards Ave between Rodeo Rd and Cerrillos Rd. The travel demand model utilizes the PTV VISUM software to estimate the 2040 traffic volumes.

The 2040 Build traffic analysis for this study uses the travel demand model traffic volume estimates the basis for our capacity analysis. The traffic projections for the 2040 Build are included in the *electronic appendices* and are summarized in **Exhibit 4-8**.

2040 Build Intersection Capacity Analysis

The 2040 Build projected intersection traffic volumes were analyzed using HCS7 software that uses signalized and unsignalized intersection methodology from the Sixth Edition of the HCM. Intersection output reports for the build conditions analysis based on existing lane configurations are included in the *electronic appendices* and are summarized in **Exhibit 4-9**.



Exhibit 4-8, AM and PM Peak-Hour Intersection Turn Movement Volumes – 2040 Build Scenario

2040 Build Volume by Approach and Movement (vehicles per hour)													
Location Along Richards Avenue	Peak Hour	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Rodeo Road	AM	62	675	286	312	497	16	180	284	444	48	258	25
	PM	67	1067	461	607	960	25	209	243	385	53	223	36
Camino del Prado	AM	5		5				10	398			406	10
	PM	10		10				10	431			534	10
Eastbound Siringo Road	AM	5	5	10				5	400	74	207	310	10
	PM	5	5	10				5	350	140	75	410	15
Westbound Siringo Road	AM				102		73		405			527	
	PM				185		279		355			345	
Cerrillos Road	AM	238	2127	139	281	1264	55	100	90	202	168	124	201
	PM	140	1475	256	275	2314	116	203	150	173	130	255	191
Richards Connection	AM				15		15		382	15	10	378	
	PM				35		35		404	20	15	501	

Exhibit 4-10, 2040 Build Unsignalized Intersection Results

Intersection/Movement	2040 Build AM Peak				2040 Build PM Peak			
	Delay	v/c	Queue* (ft)	LOS	Delay	v/c	Queue* (ft)	LOS
Richards Ave & Siringo Rd (WB)	-	-	-	-	-	-	-	-
WB Movement	30.4	0.59	100	D	52.7	0.93	300	F
Richards Ave & Siringo Rd (EB)	-	-	-	-	-	-	-	-
EB Left	28.8	0.04	25	D	17.4	0.02	25	C
EB Through/Right	23.5	0.08	25	C	16.1	0.05	25	C
NB Left	8.1	0.01	25	A	8.3	0.00	0	A
SB Movement	9.8	0.25	25	A	8.7	0.08	25	A
Richards Ave & Richards (Extension)	-	-	-	-	-	-	-	-
WB Movement	12.4	0.06	25	B	14.1	0.16	0.16	B
SB Movement	8.2	0.01	0	A	8.3	0.00	0	A
Richards Ave & Camino del Prado	-	-	-	-	-	-	-	-
EB Movement	12.4	0.02	25	B	20.3	0.13	2525	C
NB Left	8.4	0.01	0	A	10.1	0.02		B

* – HCM 95th percentile queue rounded to next 25-foot increment

Exhibit 4-9, 2040 Build Signalized Intersection Results with Existing Lane Configurations

Intersection	2040 Build AM Peak			2040 Build PM Peak		
	Delay	v/c	LOS	Delay	v/c	LOS
Richards Avenue and Cerrillos Road	60.2	1.385	E*	40.3	0.973	D*
Richards Avenue and Rodeo Road	51.6	1.026	D*	71.5	1.146	E*

* – Individual movements LOS E or worse

Both signalized intersections present in the site will require improvements to meet LOS requirements. Richards and Cerrillos experiences multiple movement failures, in the eastbound, westbound, and northbound movements, with a failing overall LOS E in both the AM and PM peak hours. Richards and Rodeo experience similar movement failures in the eastbound, westbound, and northbound movements, with an overall failing LOS F in both the AM and PM peaks.

Unsignalized intersections begin to experience failure at the 2040 Build scenario, as shown in Exhibit 4-10. Richards and Siringo (Westbound) fail in the PM peak, where the combined westbound movement operates at LOS E.

2040 Build Intersection Improvement Alternative Analysis

This section of the report evaluates potential intersection improvements to allow the operations to meet a LOS D or better. These alternatives investigate traffic signal optimization, roadway striping, and physical modifications to the existing intersections. Using the 2040 Build scenario traffic volumes, the intersection improvement alternatives were analyzed using HCS7 software in accordance with the methodology from the Sixth Edition of the HCM. Output from the intersection alternatives analysis is included in the electronic appendices, with a summary of the proposed intersection improvement alternatives provided below.

Signalized Intersections

Richards Avenue and Cerrillos Road

Based on the 2040 Build analysis, the existing configuration of Richards and Cerrillos experiences multiple movement failures, in the eastbound, westbound, and northbound movements, with a failing overall LOS E in both the AM and PM peak hours. Intersection improvement alternatives were evaluated to remedy failing movements of Richards and Cerrillos intersection. The intersection alternatives include:

- Existing Intersection Configuration. In the AM Peak the overall intersection LOS is E which is unacceptable. The PM Peak will have LOS D but there are some movements that are LOS E or worse.
- Existing Intersection Configuration plus the addition of a dedicated northbound right-turn lane, which would bring the AM Peak to LOS C. The PM peak will operate at LOS D overall, but the eastbound right turn lane would still have a LOS E.
- Existing Intersection Configuration plus the addition of a dedicated northbound right-turn lane and the addition of another westbound left-turn lane. This would convert the westbound left to a dual left turn westbound to southbound. This will remedy all the failing movements bring the overall intersection to LOS C, in both the AM and PM Peak hours.

A comparison of these proposed intersection improvement alternatives is shown in Exhibit 4-11.



Exhibit 4-11, 2040 Build Alternatives – Richards Avenue and Cerrillos Road

Intersection Alternative	2040 Build AM Peak			2040 Build PM Peak		
	Delay	v/c	LOS	Delay	v/c	LOS
Existing Intersection Configuration	60.2	1.385	E*	40.3	0.973	D*
Existing Intersection Configuration w/ Addition of NB Right Turn Lane	45.5	1.128	D*	29.4	0.3	C
Existing Intersection Configuration w/ Addition of NB Right Turn Lane & Addition of WB Left Turn Lane	34.4	0.955	C	27.0	0.849	C

* - Individual movements at this intersection experience LOS E or worse

Although the addition of the northbound right-turn lane and the addition of another westbound left turn lane results in the best LOS for this intersection, it will have right-of-way impacts on the south leg of the intersection and physical constraints may not allow for both of these improvements to be implemented. If it is not possible to implement both of these improvements, then the City may want to consider only implementing the northbound right turn lane and accepting that some movements will have less than desirable LOS during the PM peak period in the horizon year 2040. Especially since these traffic projections are estimated using the travel demand model based on growth assumptions and actually volumes may vary slightly.

Richards Avenue and Rodeo Road

The Richards and Rodeo 2040 intersection analysis results in a LOS F for both AM and PM peak hour periods in the 2040 Build scenario for the existing intersection configuration. To mitigate the failing movements, the following alternatives were evaluated:

- ◆ Existing Intersection Configuration
- ◆ Convert the existing northbound combined through/right turn lane to a dedicated through lane and add another lane that will be striped as a dedicated northbound right turn lane. This improved the intersection to a LOS C in the AM peak and LOS D in the PM peak, however, the NB through movement will still operate at LOS E.
- ◆ Modify the northbound approach to the intersection to include dual lefts, two dedicated through lanes, and a dedicated right turn lane. This will improve the intersection to LOS D or better for all movements.

A comparison of these proposed intersection improvement alternatives is shown in Exhibit 4-12. Both of the alternatives will require additional right-of-way and this will need to be taken into consideration if either of these intersection improvement alternatives is implemented.

Exhibit 4-12, 2040 Build Alternatives – Richards Avenue and Rodeo Road

Intersection Alternative	2040 Build AM Peak			2040 Build PM Peak		
	Delay	v/c	LOS	Delay	v/c	LOS
Existing Intersection Configuration	51.6	1.026	D*	71.5	1.146	E*
Existing Intersection Configuration plus add a lane NB to create a dedicated NB Through and dedicated NB Right-turn Lane	29.1	0.800	C	31.5	0.931	C
Existing Intersection Configuration plus add two NB lanes to create two dedicated NB Through Lanes and a dedicated NB Right-turn Lanes	29.1	0.797	C	31.3	0.932	C

* - The NB through is LOS E

Unsignalized Intersections

Richards Avenue and Siringo Road

While Richards and Siringo Eastbound leg will operate within the acceptable LOS, the Richards and Siringo Westbound leg begin to experience failure. The following two alternatives were evaluated as potential improvements:

- ◆ Existing Intersections Configuration
- ◆ Converting the westbound movement from a single lane into two lanes with a dedicated right turn lane and a dedicated left turn lane. This will bring the overall intersection to LOS D or better.
- ◆ Realigning the intersection to combine it into a single location and install a signal. This will improve the LOS to A in the AM peak and LOS C in the PM peak. However, this will have significant impacts and is not recommended.

The analysis of these proposed improvements are shown in Exhibit 4-13.

Exhibit 4-13, 2040 Build Alternatives – Richards Avenue and Siringo Road

Intersection Alternative	2040 Build AM Peak				2040 Build PM Peak				
	Delay	v/c	Queue* (ft)	LOS	Delay	v/c	Queue* (ft)	LOS	
Existing Intersection Configuration	30.4	0.59	100	D	52.7	0.93	300	F	
Existing Intersection Configuration with dedicated Left Turn & Right Turn	-	-	-	-	-	-	-	-	
	WB Left	30.8	0.46	75	D	24.5	0.51	75	C
	WB Right	11.9	0.14	25	B	14.0	0.42	75	B
Combine Eastbound and Westbound into Single Intersection and Install a Signal	9.6	0.640	N/A	A	14.3	0.81	N/A	B	

* – HCM 95th percentile queue rounded to next 25-foot increment



Richards Avenue and Camino del Prado

Under the 2040 Build scenario the intersection of Richards Avenue and Camino del Prado will have three intersection alternatives:

- ◆ Split Tee Configuration – With this alternative, the west leg of the intersection will be the existing Camino del Prado and the east leg will be the current Richards alignment that provides access to the fire station and other existing land uses located south of the arroyo. The Tee intersections will be offset from each other by approximately 150 feet. This configuration will operate within an acceptable LOS for both the AM peak and PM peak.
- ◆ Roundabout - As a roundabout, the intersection of Richards and Camino del Prado/Richards Extension will operate with no movement worse than LOS C.
- ◆ Full Intersection – This alternative will realign the legs to create a single intersection. This will require the alignment of Richards mainline to be shifted slightly east to allow the west leg and east leg to be aligned with each other which will require additional right-of-way. The intersection was evaluated as a signalized intersection. This will result in an overall LOS A for both the AM and PM peaks.

Implementation of these improvements are shown in **Exhibit 4-14**.

Exhibit 4-14, 2040 Build Alternatives – Richards Avenue and Camino del Prado

Intersection Alternative	2040 Build AM Peak				2040 Build PM Peak			
	Delay	v/c	Queue* (ft)	LOS	Delay	v/c	Queue* (ft)	LOS
Split Tee Alternative	-	-	-	-	-	-	-	-
East Leg								
WB Movement	12.4	0.06	25	B	14.1	0.16	25	B
SB Left	8.2	0.01	0	A	8.3	0.00	0	A
West Leg								
EB Movement	12.4	0.02	25	B	20.3	0.13	25	C
NB Left	8.4	0.01	0	A	10.1	0.02	25	B
Roundabout Alternative								
EB Right	4.6	0.01	25	A	8.78.6	0.08	25	A
WB Right	4.7	0.04	25	A	10.4	0.20	25	A
NB Right	6.0	0.36	50	A	16.3	0.62	125	B
SB Right	6.1	0.36	50	A		0.78	225	C
Signalized Full Access Intersection	4.5	0.459	N/A	A	6.3	0.63	N/A	A

* – HCM 95th percentile queue rounded to next 25-foot increment

Recommendations for Intersection Improvements

Based on the intersection alternatives analysis, proposed improvements have been made for the intersections within the project area. A summary of the potential improvements is provided below, which are based on traffic operations only. Other factors such as right-of-way, multi-modal priorities, environmental, and other corridor considerations will need to be taken into consideration before final intersection configurations can be determined. The intersection alternatives described below would provide reasonable traffic performance for the 2040 Build scenario traffic volumes. All recommended improvements should be designed to satisfy NMDOT SAMM, Manual on Uniform Traffic Control Devices (MUTCD), and American Association of State Highway Transportation Officials (AASHTO) design standards.

Richards Avenue and Cerrillos Road:

The following capacity enhancements were identified based on the traffic analysis:

- ◆ Addition of a dedicated northbound right-turn lane on Richards Avenue, which would result in dual left-turn lanes, a through lane and a right-turn lane on the northbound approach; and,
- ◆ Restriping to provide a westbound left-turn lane on Cerrillos which will result in dual left-turn lanes for the westbound-to-southbound movement, which would also require widening of southbound Richards Avenue to provide two-lanes on the departure from Cerrillos Road.

Because these proposed improvements will have right-of-way impacts on the south leg of this intersection, it may not be feasible to implement both of these recommendations due to the physical constraints.

Richards Avenue and Rodeo Road:

The following capacity enhancements were identified based on the traffic analysis:

- ◆ Addition of a dedicated northbound right-turn lane on Richards Avenue; and,
- ◆ Conversion of the shared northbound through/right-turn lane to a through lane, which will result in dual left-turn lanes, a through lane and a right-turn lane on the northbound approach.

This will require widening on Richards Avenue to provide the right-turn lane. Two northbound through lanes are not proposed because that would require widening of Richards Avenue north of Rodeo Road to accommodate two lanes and additional capacity may result in higher traffic volumes on Richards Avenue where one lane is provided further north.

Richards Avenue and Siringo Road:

The following capacity enhancements were identified based on the traffic analysis:

- ◆ Re-configure the westbound approach to create a separate left-turn and right-turn lane; and,
- ◆ Provide a southbound left-turn lane on Richards Avenue to eastbound Siringo Road.

Providing two approach lanes on westbound Siringo Road may impact the existing park between the current one-way pair as well as the residential property on the north side of the street and may not be feasible.

Richards Avenue and Camino del Prado/Fire Station Road:

Several alternatives were considered for these two intersections and the proposed configuration is to maintain the Split Tee Configuration as exists today. Realigning the streets to create a four-way intersection would require substantial ROW from the Rodeo de Santa Fe property and is not needed to provide acceptable traffic performance.

Conclusions

This traffic analysis has determined the Arroyo de Los Chamisos crossing project is feasible under the 2040 Build scenario. The new connection will reduce traffic on other roadways such as Avenida de Las Campanas, Camino Consuelo, and Camino Carlos Rey. Overall, the proposed Arroyo de Los Chamisos crossing will be beneficial to the area, will enhance mobility, and will improve the overall serviceability to the area.

Conceptual Layouts of Intersection Improvements

With the proposed Arroyo de los Chamisos crossing, intersection improvements would be required to provide reasonable traffic performance. These improvements include:



- ◆ Rodeo Road/Richards Avenue (**Exhibit 4-15**): Additional capacity is needed on northbound Richards Avenue to provide a separate through lane and a separate right-turn lane. The sidewalk would be reconstructed and a retaining wall would be needed due to the topography/elevation drop east of Richards Avenue. The existing traffic signal mast-arm may be able to remain at its current location, which will be determined in preliminary design based on additional survey and ROW investigations. Two pedestal poles would be relocated.
- ◆ Cerrillos Road/Richards Avenue (**Exhibit 4-16**): Additional capacity is needed on northbound Richards Avenue to provide a separate through lane and a separate right-turn lane. The sidewalk would be reconstructed and a cut-off wall would be needed for slope tie-in grade adjustments. The existing traffic signal mast-arm may be able to remain at its current location, which will be determined in preliminary design based on additional survey and ROW investigations. A pedestal pole with a push-button will be relocated. It is not recommended to provide south-to-east dual left-turn lanes because of insufficient ROW and the merging distance would be too short on Richards Avenue.
- ◆ Richards Avenue/WB Siringo Road (**Exhibit 4-17**): Additional capacity is needed on westbound Siringo Road to provide separate left-turn and right-turn lanes. The right-turn volume is much heavier than the left-turn volume and is the dominant movement. The proposed widening would not impact the residential driveway on the north side and would stay within ROW on the south side tapering in to avoid a tree removal.

Exhibit 4-16, Cerrillos Road/Richards Avenue Improvements

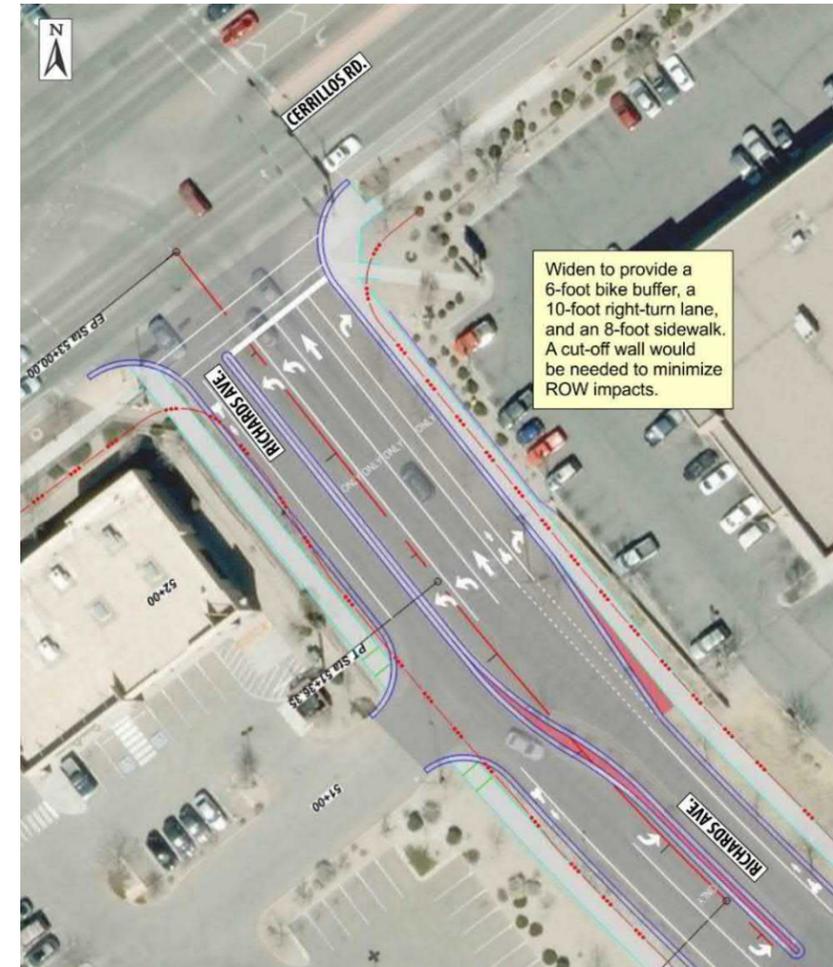


Exhibit 4-17, Richards Avenue/WB Siringo Road Improvements

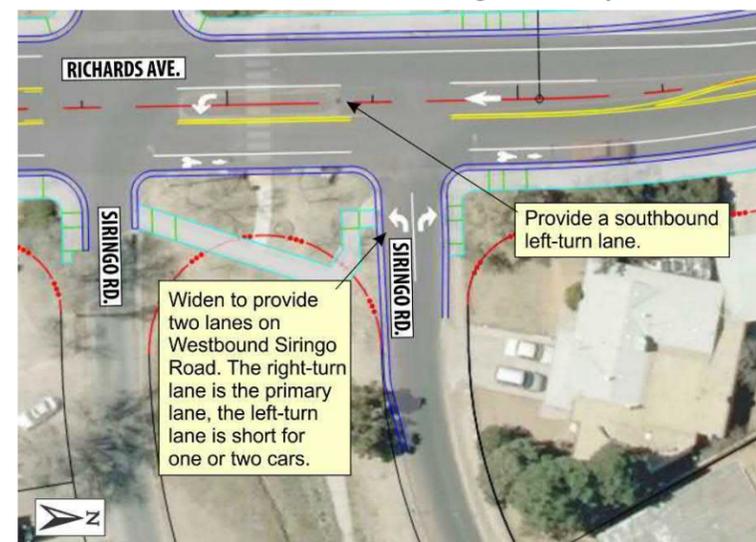
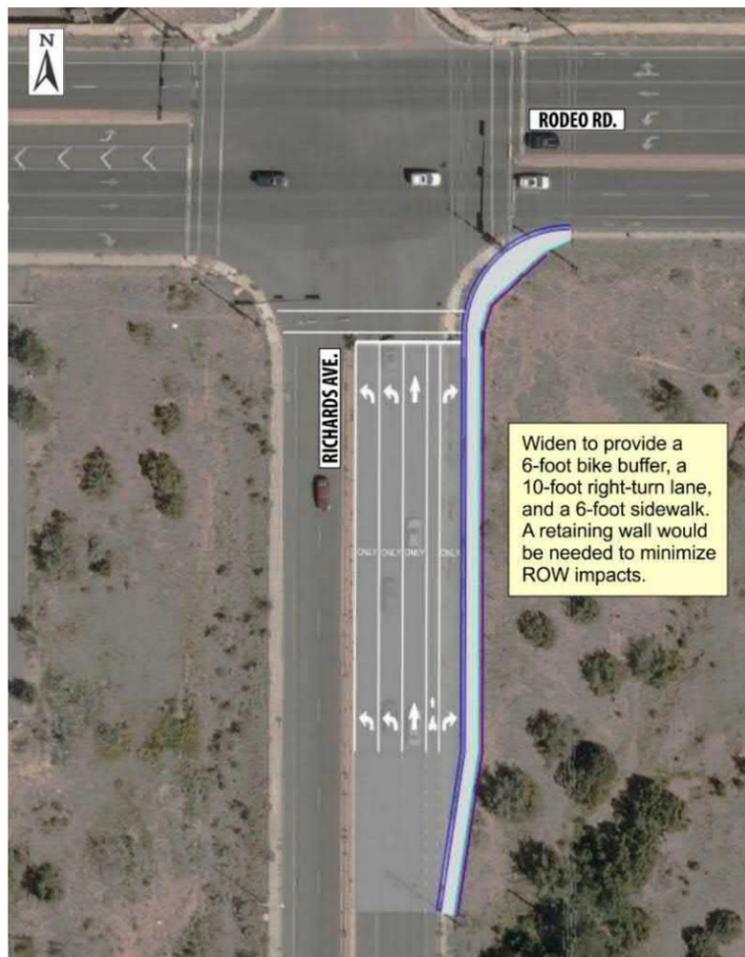


Exhibit 4-15, Rodeo Road/Richards Avenue Improvements





Streetlight Big Data

Streetlight Big Data was primarily intended to augment the existing condition traffic volume data obtained during the COVID-19 pandemic that was not representative of pre-pandemic conditions. Streetlight Big Data was also used to review how people currently use the local street system within the project vicinity by reviewing travel patterns at key locations within the project vicinity. The locations examined include:

- ◆ Northbound Richards Avenue south of Rodeo Road (**Exhibit 4-18**)
- ◆ Southbound Richards Avenue north of Cerrillos Road (**Exhibit 4-19**)
- ◆ Travel from Vista del Prado subdivision (**Exhibit 4-20**)
- ◆ Travel from La Resolana subdivision (**Exhibit 4-21**)

The analysis focused on where motorists go from the locations above on typical weekdays, Monday through Thursday, for all of 2019. The exhibits show daily travel patterns for pre-pandemic conditions which helps to provide insights on how much traffic may use the proposed Richards Avenue connection. The Streetlight findings support the results of the detailed traffic analysis which indicates that there is demand for making Richards Avenue continuous between Rodeo Road and Cerrillos Road and balancing north/south travel in this area of Santa Fe. Key observations are summarized below.

- ◆ **Exhibit 4-18:** The data indicate that 60% of the motorists traveling northbound on Richards Avenue turn east on Rodeo Road, while 40% turn west. About 35% travel north on Zafarano Drive, Avenida de las Campanas and Camino Carlos Rey within the study area. Based on the data, it is reasonable to expect that 20% to 25% of the traffic traveling north on Richards Avenue south of Rodeo Road, which is approximately 1,000 vehicles per day, would continue north on Richards Avenue if the proposed improvements were implemented.
- ◆ **Exhibit 4-19:** The data indicate that 57% of the motorists traveling southbound on Richards Avenue turn west on Cerrillos Road, 30% turn east on Cerrillos Road, and 13% travel south to Siringo Road. About 7% travel south on Zafarano Drive to Rodeo Road with 5% heading east. Based on the data, it is reasonable to expect that approximately 300 vehicles per day would continue south on Richards Avenue if the proposed improvements were implemented in addition to those already staying on Richards Avenue to Siringo Road.
- ◆ **Exhibit 4-20:** Residents of Vista del Prado travel west on Rodeo Road (56%), travel east on Rodeo Road (34%), and travel south on Richards Avenue (10%). The data indicate that less than 25 vehicles per day are destined for Cerrillos Road, which may utilize the Richards Avenue connection.
- ◆ **Exhibit 4-21:** Residents of La Resolana almost equally travel north to Cerrillos Road (55%) or east on Siringo Road (45%). The data indicate that less than 40 vehicles per day are destined for Rodeo Road, which may utilize the Richards Avenue connection.

Based on the detailed traffic analysis and Streetlight Big Data, the daily traffic volumes expected to utilize Richards Avenue between Rodeo Road and Cerrillos Road would be commensurate with a local collector street with one travel lane in each direction. It is expected that motorists would seek to balance north/south travel on the parallel streets within this area of Santa Fe, finding an equilibrium based on travel time and delay in each corridor.

Exhibit 4-18, Streetlight Daily Trips in 2019 - Northbound Richards Avenue, South of Rodeo Road

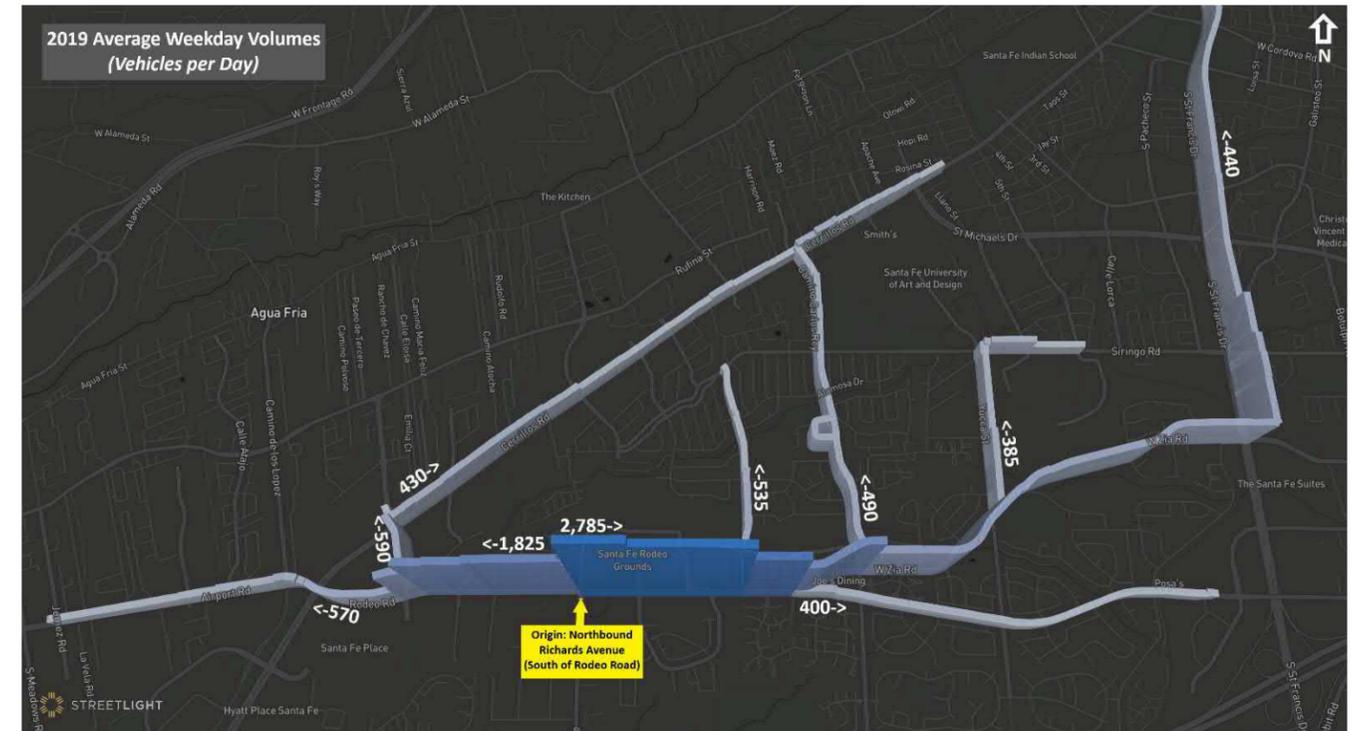


Exhibit 4-19, Streetlight Daily Trips in 2019 - Southbound Richards Avenue, North of Cerrillos Road

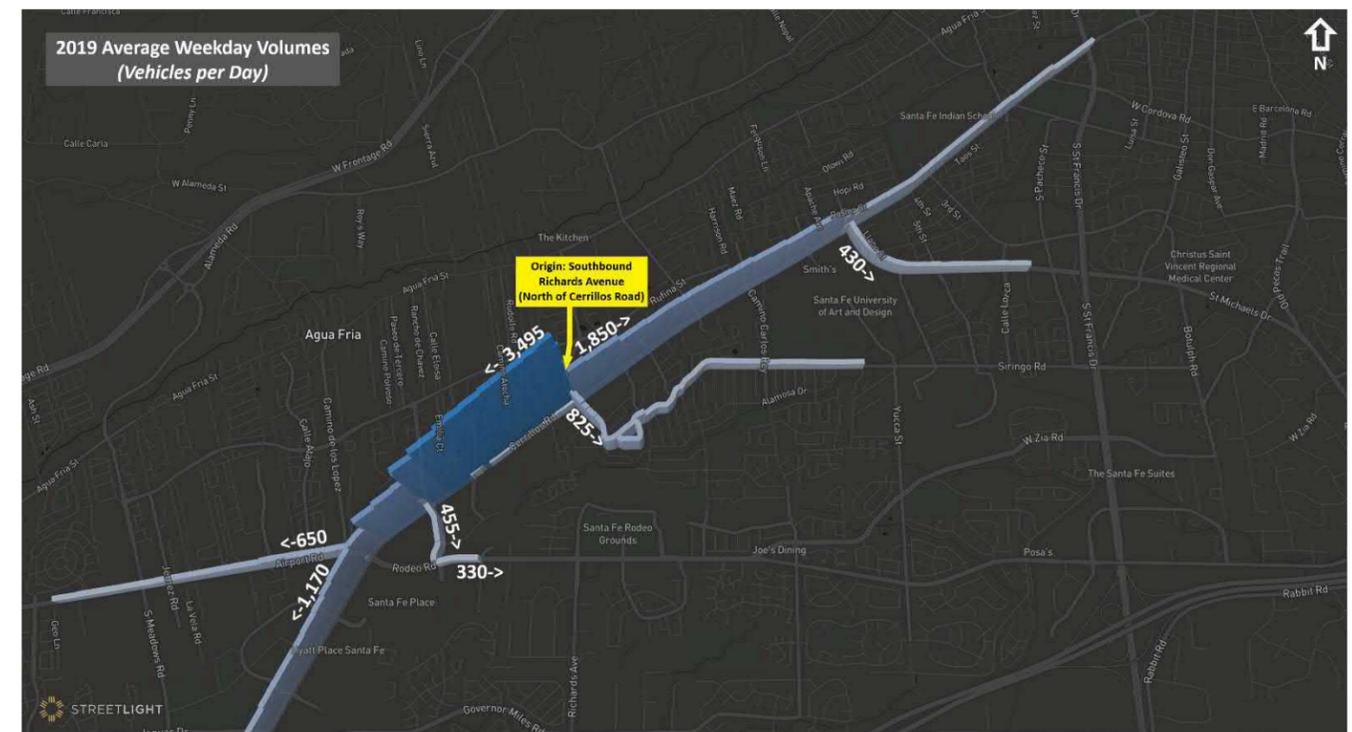




Exhibit 4-20, Streetlight Daily Trips in 2019 – From Vista del Prado Subdivision

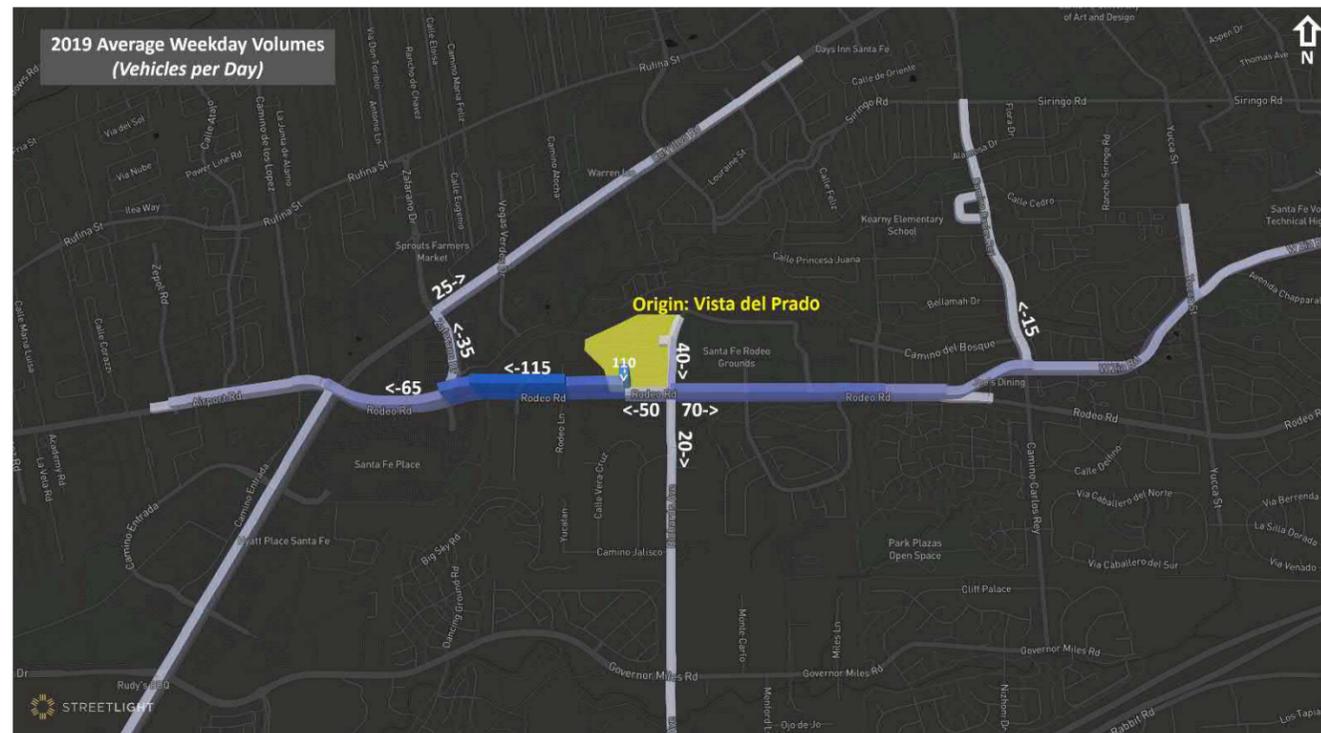
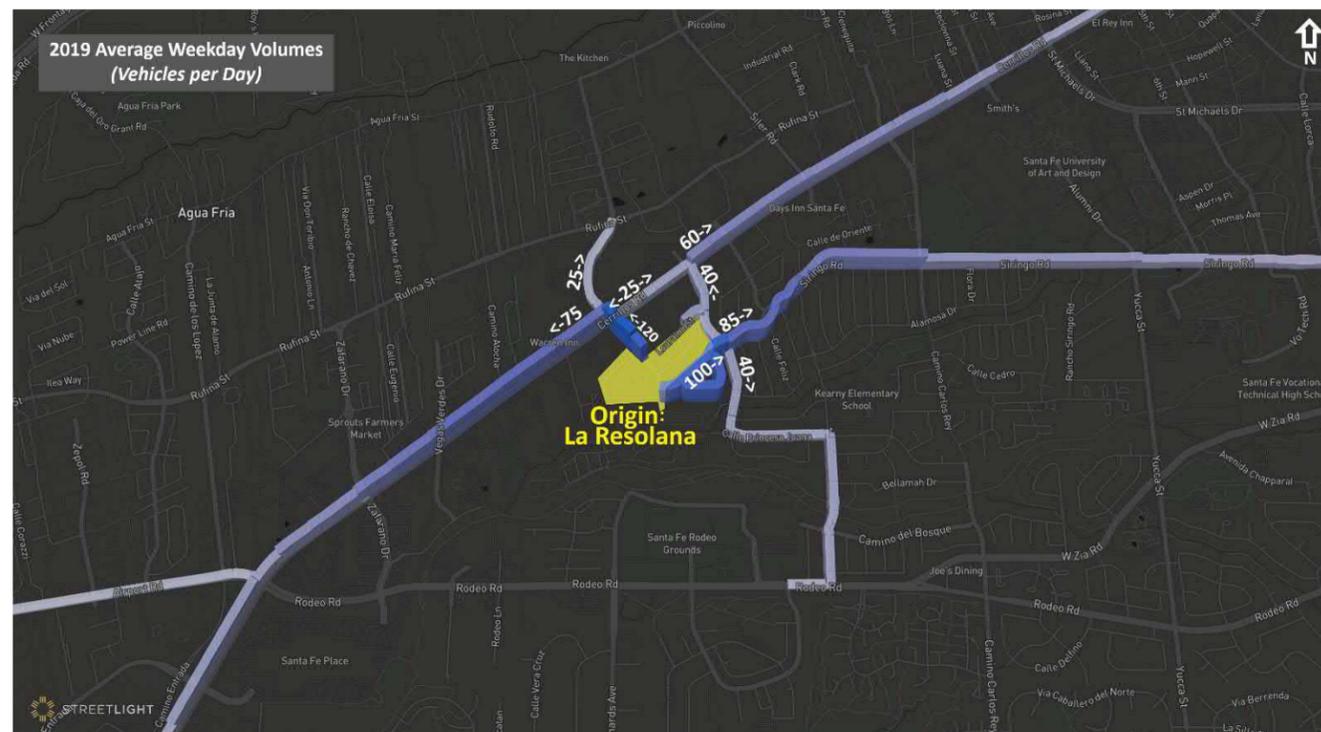


Exhibit 4-21, Streetlight Daily Trips in 2019, From La Resolana Subdivision



Major Structures

The proposed improvements will cross two arroyos which will require structures for vehicular and multi-modal travel over the arroyos and to allow storm water to pass under and through the structures. Structure alternatives include concrete box culverts and bridges. A comparative discussion of concrete box culverts and concrete slab bridges is next, followed by descriptions of structure alternatives for each arroyo crossing. Drainage conditions are discussed in the next section.

Concrete Box Culverts and Concrete Slab Bridges

While concrete box culverts (CBC) are often used for roadway crossings of waterways, reinforced concrete slab bridges are a good alternative for low clearance channel crossings. This type of bridge offers several advantages over concrete box culverts as described below.

The formwork is simpler and less costly for a slab bridge versus CBCs. Each barrel of a CBC has four sides that have to be formed and poured in multiple phases. For a concrete slab bridge, there is only two phases. Phase 1 is form and pour the two abutment caps and two pier caps. Phase 2 is form and pour the bridge deck. Because there is less forming and phasing involved for a concrete slab bridge, placement of concrete will be much easier, and construction will be quicker.

For the ADLC crossing, for instance, the concrete slab bridge would have two piers in the channel, whereas the CBC structure would have multiple vertical walls in the channel. Less obstructions in the channel will allow passage of debris more efficiently during flood events. Multiple-cell CBCs present a maintenance challenge, since passing driftwood and debris are frequently caught in the barrels and around the vertical cell walls. Presence of multiple barrel walls, shorter openings, and lower headroom provides greater opportunity for these problems to occur.

Research suggests that CBC floor slabs are known to have detrimental effects on river and stream hydraulics. As water flows across a concrete slab surface, its velocity increases. This change in stream velocity results in scour of channel bed material. Scour can also cause jumps in stream flow line elevation at the inlet and outlet of a CBC. A concrete slab bridge provides a natural channel bottom that satisfies environmental regulations. As water flows over natural soil, its velocity is relatively slow and reduces flow line jumps associated with scour and changes in stream flow characteristics. Avoiding all changes to the channel ensures that flow characteristics conducive to the natural environment are maintained. When these design practices are followed, numerous hydraulic and environmental problems are avoided without requiring mitigation specific to the project site.

Arroyo de los Chamisos Crossing

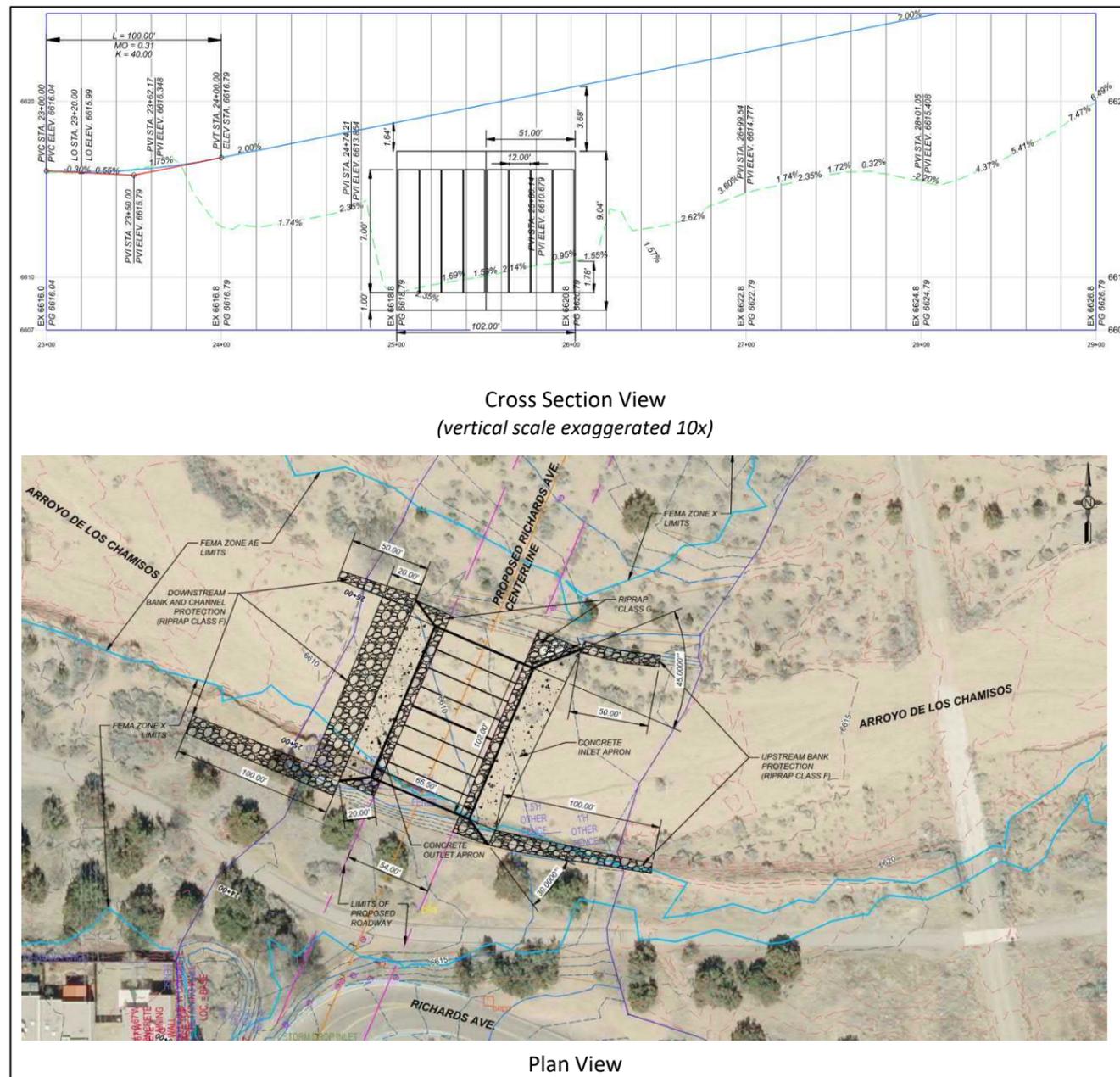
The existing width of the ADLC at the proposed crossing location is approximately 115-feet. The channel bottom slopes from south to north, deeper along the south bank. Based on conceptual design, Richards Avenue will ascend over the arroyo at a constant 2% profile grade.

Concrete Box Culvert Alternative - ADLC

Multiple CBC configurations were considered for the roadway crossing of the ADLC. For the purposes of this Phase IB study, the proposed CBC configuration consists of two NMDOT standard quadruple opening CBCs, for a total of 8 openings, each 12 feet wide and 7 feet high. The entire width of these CBCs together is 102 feet with a height of 8 feet 0.5 inches from existing ground to the top of CBC. One foot of the CBC is placed below existing ground so the CBC upstream invert is flush with existing ground. Assuming at least 1.5 feet is necessary between the top of CBC and roadway finished ground, this option provides a minimum and maximum separation of 1.64 feet and 3.68 feet, respectively. A cross section and plan view for the ADLC CBC structure alternative are provided in Exhibit 4-22.



Exhibit 4-22, Concrete Box Culvert Concept for Arroyo de los Chamisos

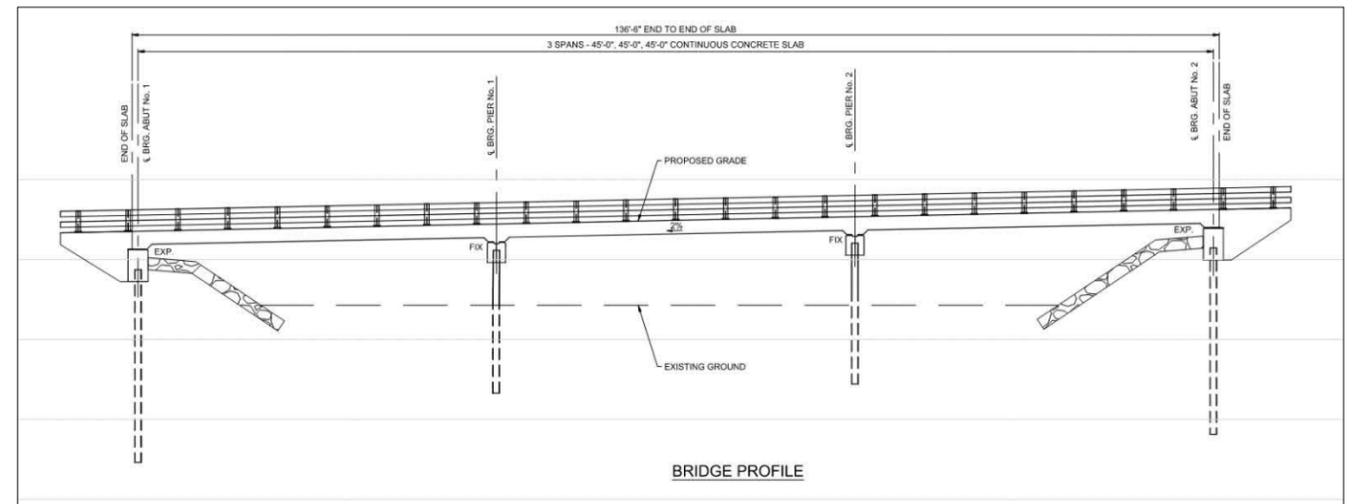


The conceptual layout shows concrete aprons on both the inlet and outlet sides, riprap at the downstream apron, embankment protection on both sides of ADLC, and slope protection between the roadway and the CBC headwalls. Scour and embankment protection on the south side of ADLC will be critical for the long-term viability of the CBC.

Concrete Slab Bridge Alternative - ADLC

A concrete slab bridge alternative for crossing the ADLC is expected to be a three-span bridge between 135 and 140 feet long. Each span would be approximately 45 feet. The bridge deck would typically be about 22 inches deep and the bridge pier may be two 16-inch driven piles or two 36-inch drilled shafts. The piles or shafts would reduce the available cross-sectional area of the arroyo, but not to the extent that the multi-barrel CBC would. The abutments under the bridge would be armored with rip-rap or slope paving. Similar to the CBC alternative, the embankments would be protected for scour but the bottom of the arroyo would remain natural. Scour protection would be needed for each pier. The south bridge abutment and scour protection will need to consider the location of a sanitary sewer easement near the south embankment. A conceptual bridge profile is shown in **Exhibit 4-23**.

Exhibit 4-23, Concrete Slab Bridge Concept for Arroyo de los Chamisos



In addition, the bridge alternative will provide the nearby community with more openness, attracting nearby pedestrians to interact with the area and provide a positive environment for the neighborhood, along with limiting confined spaces to house transient communities in and around the arroyos.

Arroyo de los Pinos Crossing

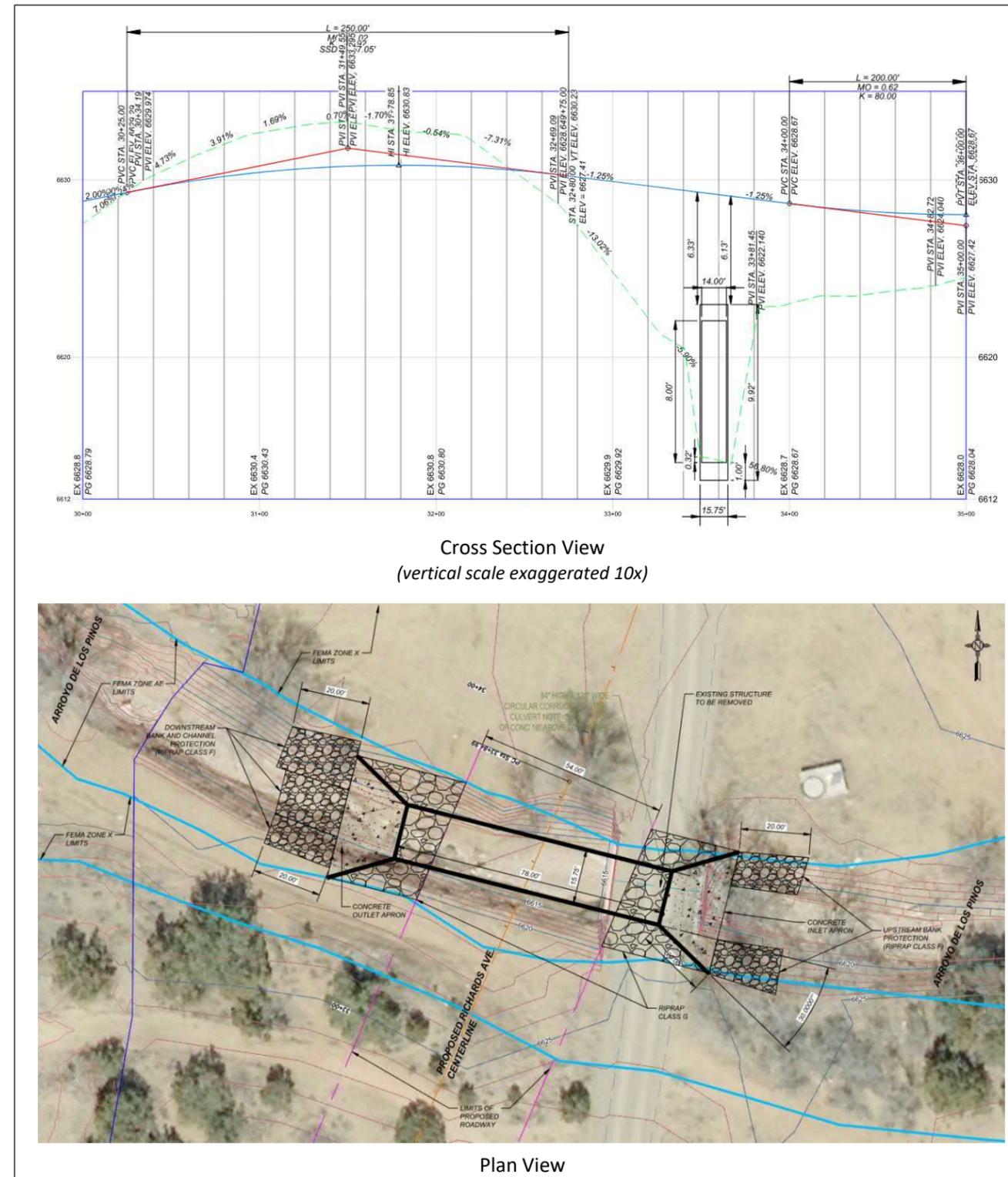
The existing channel bottom width of the Arroyo de los Pinos (ADLP) at the proposed crossing location is 10 to 15 feet. Based on conceptual design, Richards Avenue will span over the arroyo at a constant 1.25% profile grade.

Concrete Box Culvert Alternative - ADLP

For the CBC alternative at the ADLP, a NMDOT standard single-opening CBC 14'W x 8'H was considered. The entire width and height of the CBC is 15 feet 9 inches and 9 feet 11 inches, respectively. To ensure that the upstream CBC invert is flush with the lowest point of the uneven existing ground, one foot of the CBC would be partially buried and only 8 feet 11 inches would be above ground. This CBC would provide a minimum and maximum separation of 6.13 feet and 6.33 feet, respectively, from top of CBC to top of roadway. A conceptual cross section and plan view for the ADLP CBC structure alternative are provided in **Exhibit 4-24**.



Exhibit 4-24, Concrete Box Culvert Concept for Arroyo de los Pinos



The conceptual layout shows concrete aprons on both the inlet and outlet sides, riprap at the downstream apron, embankment protection on both sides of the channel, and slope protection between the roadway and the CBC headwalls. Scour and embankment protection will be critical for the long-term viability of the CBC.

Concrete Slab Bridge Alternative - ADLP

A concrete slab bridge alternative for crossing the ADLP is a single-span concrete-slab bridge approximately 60 feet long. No bridge piers would be within the arroyo allowing the existing ground to remain undisturbed. The bridge deck would typically be about 20 inches deep. The abutments under the bridge would be armored with rip-rap. Similar to the CBC alternative, the embankments would be protected for scour but the bottom of the arroyo would remain natural.

Drainage

A planning-level drainage evaluation was performed for this Phase IB study. Available public data, published regulations, and guidance were reviewed to understand the previous hydrologic and hydraulic studies and documentation pertinent to this project. Following the review of data and documentation, data gaps were identified and summarized to inform needs for preliminary and final design. The project area waterways include Arroyo de los Chamisos, Arroyo de los Pinos, and a tributary to Arroyo de los Pinos referred to as Siringo Drainage (see Exhibit 4-25).

Data Collection

Drainage Infrastructure

Drainage infrastructure was gathered based on the best available data. Five sources were examined to assess the location and condition of existing drainage infrastructure:

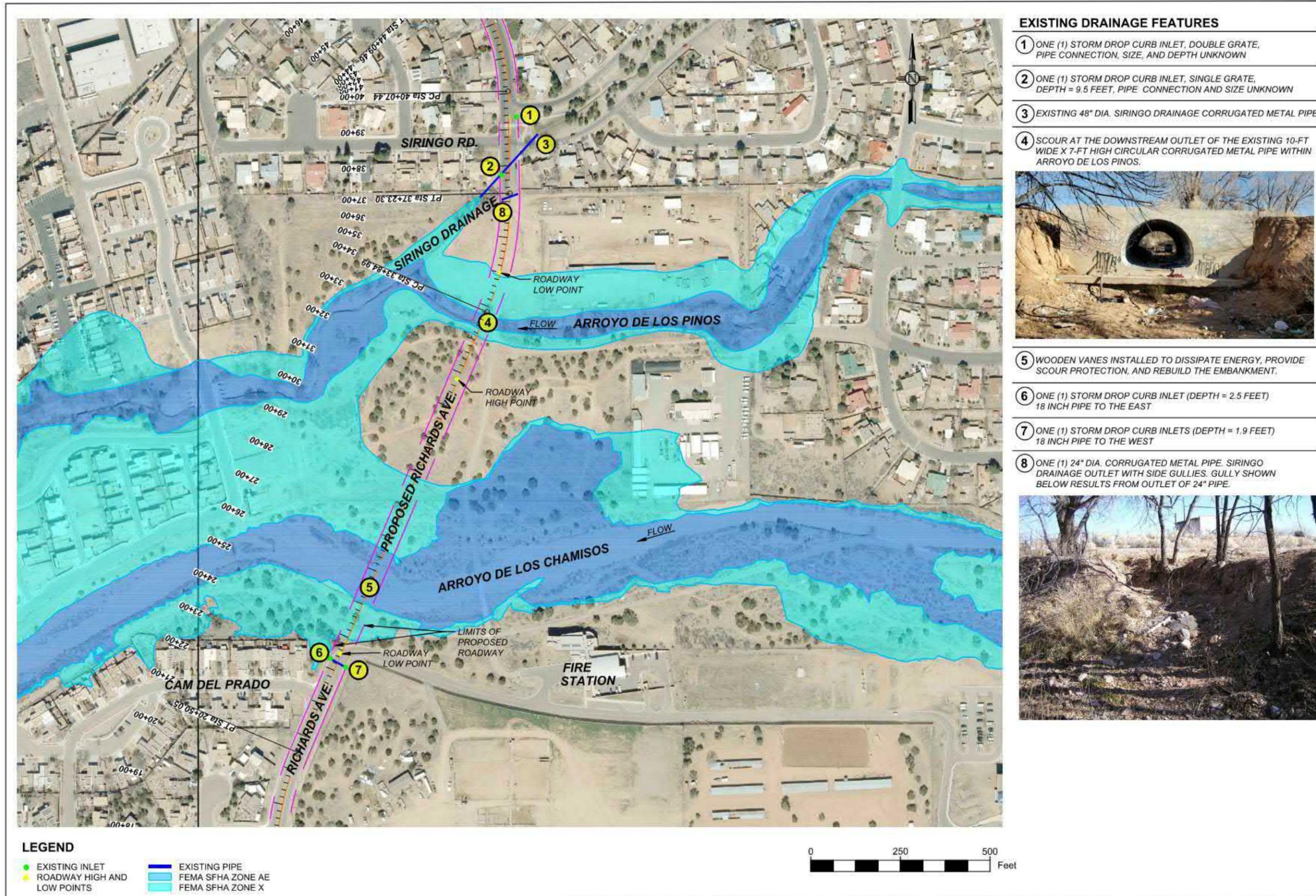
- ◆ Geographic Information System (GIS) Data from the City of Santa Fe
- ◆ Topographic and Site Survey Data from Bohannon Huston Inc.
- ◆ Google Earth
- ◆ Field Visit Photos from December 5, 2021
- ◆ As-Built Plans

Using the sources above, drainage infrastructure is number-logged in Exhibit 4-25 and referred to throughout this section.

The drainage infrastructure GIS data inventory obtained from the City includes culverts, inlets, outlets, channels, curb openings, open drains, ponds, detention ponds, and pond embankments. GIS data within the project boundary is limited to two stormwater inlets on the southern portion of Richards Ave (see Exhibit 4-25, Points 6 and 7). The inlets are located on the east and west side of the existing low point on Richards Avenue. The east inlet is inventoried as “needs immediate cleaning.” Site survey of Point 6 and Point 7 identify connectivity of at least one 18-inch pipe between inlet; however, connection to a trunkline along Richards Avenue or to an outlet due west has not been identified from any available source.



Exhibit 4-25, Existing Drainage Features





On the northern portion of Richards Avenue, site survey data includes one double-grate curb drop inlet north of Siringo Road at the east curb/gutter and one single grate curb drop inlet south of Siringo Road inset into the west curb/gutter (see Exhibit 4-25, Points 1 and 2). No information about storm drain pipes is known at Point 1 nor 2. However, it is expected that these inlets outfall into the Siringo Drainage. Existing culvert data was obtained from a combination of site survey and field visit photos.



Improvements are needed at the Siringo Drainage outlet

The Siringo Drainage crosses Richards Avenue via a 48-inch corrugated metal pipe (CMP) approximately 240 feet long. At the outlet, next to the main channel, there are side gullies where water flows into the drainage. One of these gullies is fed from a 24-inch CMP (see Figure 4-25, Point 8). Field observations indicate a need for improvements at the Siringo Drainage outlet (see photo to right) and the side gullies will also need to be addressed as part of the proposed improvements.

Arroyo de los Chamisos has existing scour countermeasures in the form of wooden vanes along the southern toe of bank (see photo to right). These vanes dissipate the energy from the flow of water near the curve in the arroyo and provide scour protection as well as improves sedimentation to re-build the embankment.

In Arroyo de los Pinos, site survey data includes one 10'W x 7'H culvert (see Exhibit 4-25, Point 4). Field observations indicate scour issues at the downstream end of this existing culvert as well as at the emergency road level at the edges of the culvert headwalls.

The 1996 Vista del Prado As-Built, obtained from the City for the development west of Richards Avenue and south of Camino De Prado, includes a pond constructed west of inlet Point 6. Unfortunately, the As-Built precedes the construction of inlets at Point 6 and Point 7 and additional survey is needed to determine where the flows captured by these inlets discharge. Based on recorded plats, the tract of land that the pond is located on is reserved for roadway purposes and thereby drainage from the roadway could be diverted to the pond if needed.

Topography

LiDAR topographical data from 2014 was reviewed for the project area, including the arroyos. Recent survey data (from May 2019) for a corridor approximately 200 feet wide provides more accurate information along the proposed extension of Richards Avenue from Camino Cielo Vista extending past Siringo Road. The contours on these two surfaces do not always match up and can cause discrepancies within the topography. For example, west and downstream of the proposed Richards Avenue roadway where the survey and LiDAR data meet displays a potential negative slope due to the connection of the two surfaces. This means the existing ground of the arroyo shows a ponded area where both upstream and downstream slopes upward. This major difference in data could be an effect of the "1,000-year" flood that occurred in 2018, which may have drastically changed the contours within the arroyos after the 2014 LiDAR data was obtained (Santa Fe New Mexican, 2018). Utilizing this data in drainage analysis software could create further issues and display unreal conditions that would otherwise not be present in the event of one consistent, updated surface.

Soil Types

YeDoma Consultants, LLC completed a technical memorandum evaluating the geological site conditions of the project area, including soil descriptions. The following is a list of soil descriptions in spatial order along the proposed new Richards Avenue centerline starting at the southern portion of Richards Avenue by Camino del Prado and ending at the northern portion of Richards Avenue by Siringo Road: tanoan encatado, altazano loamy sand, levante riverwash, altazano loamy sand, tanoan encatado, alire loam, tanoan encatado, altazano loamy sand, and alire-urban land complex. These soil types will be considered when selecting infiltration Best Management Practices (BMPs) and in the evaluation of channel bed and bank shear stresses.

Regulations and Guidance

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) prepared a Flood Insurance Study (FIS) for the nearby arroyos, and the flood zones were mapped in Flood Insurance Rate Maps (FIRM) panels 35049C0413E and 35049C0394D (FEMA, 2012 & 2008). The Arroyo de los Chamisos (a.k.a., North Fork) and Arroyo de los Pinos are both within Special Flood Hazard Areas (SFHA) Zone AE and are subject to inundation by the 1% annual chance flood. There are also sections within or nearby the arroyos that fall into Zone X defined as, "areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood," (FEMA, 2012 & 2008).

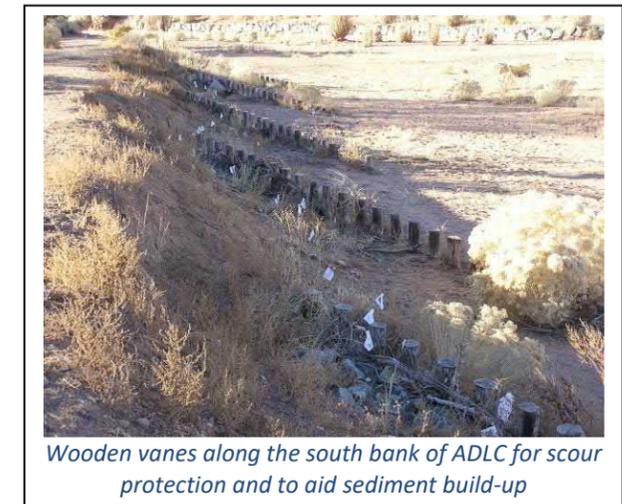
This project will need to comply with all FEMA regulations and will need to receive any necessary approvals and/or exceptions prior to the start of construction within SFHAs. Coordination with FEMA will occur during preliminary and final design.

New Mexico Department of Transportation (NMDOT)

The Standard Specifications and Standard Drawings for Highway and Bridge Construction (SSHBC/SDHBC) by NMDOT were last updated in 2019 and provides regulations for many features involved in this project. If fill is necessary and accepted by FEMA and the Floodplain Administrator, specifications for fill will comply with the SSHBC. Sections 511 and 517 of the SSHBC describe the requirements for concrete structures and precast concrete structures, respectively.

For slope and erosion protection, riprap and/or slope paving will be placed upstream and downstream of structures where side slopes may be impacted by the flow of the 100-year flood event. Sections 602 and 603 of the SSHBC contain specifications for slope and erosion protection structures and temporary erosion and sediment control. The NMDOT Drainage Design Manual (DDM) dated July 2018 states that the bridge freeboard should be a minimum of two (2) feet below the low chord for the 50-year flood event.

This project will comply with all NMDOT regulations, in collaboration with City of Santa Fe staff, and any necessary approvals and/or exceptions will be documented prior to completion of final design.



Wooden vanes along the south bank of ADLC for scour protection and to aid sediment build-up



Local Ordinance

Santa Fe County’s Ordinance No. 2008-10 provides regulations for flood damage prevention and stormwater management. Section 3.5 of the Ordinance states that proposed construction of roadways, bridges and other transportation facilities in Zone AE requires a Floodplain Development Permit and detailed technical analyses. The ordinance states that placement of fill or other improvements in the floodplain require a request submitted to FEMA. Section 3.4 of the Ordinance states that no development can increase the flood height by one (1) foot or greater due to floodplain storage area lost, without first obtaining a Conditional Letter of Map Revision (CLOMR) from FEMA. All arroyos in Santa Fe County cannot be altered, widened, deepened, filled or improved including the construction of drainage structures, unless first approved by the Floodplain Administrator and any other local, state or federal agencies having jurisdiction over such activity. The construction of new non-residential structures shall have the lowest floor at least two (2) feet above the base flood level or be floodproofed per Santa Fe County’s regulations.

The Ordinance also states that culverts, open channels, and storm drain systems shall have sufficient capacity to prevent roadway overtopping in the 100-year flood event, as well as provide a minimum of one foot of freeboard. Section 5.9(C) in the Ordinance states, in addition to the freeboard, that concrete channels and unlined channels shall not exceed a velocity of 35 ft/s and 4 ft/s, respectively.

This project will comply with all Santa Fe County and other local regulations and any necessary approvals and/or exceptions will be documented prior to the start of construction.

Data Gaps and Ongoing Coordination

To further assist with the detailed drainage evaluation during the design phase, it will be important to obtain an “effective FEMA model” to create proper HEC-RAS models. Additionally, a detailed survey of outfalls and all drainage structures within the proposed construction limits along with extended topography upstream and downstream of major structures, to replace the 2014 LiDAR, will be needed for sufficient drainage information. Continued coordination with City drainage staff will also be needed.

Conceptual Design and Evaluation

Existing Drainage Patterns

From Rodeo Road to ADLC, Richards Avenue has curb and gutter and the roadway low point just south of ADLC is drained by two inlets in sag. Note, this analysis does not consider storm drainage south of Camino del Prado.

The existing drainage patterns within the undeveloped area where the roadway extension is proposed is based on the current topography of the land. Within the undeveloped land in the proposed street alignment, a high point is located between ADLC and Arroyo de los Pinos. The flow within both arroyos travels westward toward a confluence west of Richard’s Avenue where the arroyo eventually connects with the Santa Fe River miles downstream. Each arroyo falls in SFHA Zone AE and Zone X. These zones have additional regulations because they are expected to flood during a 100-year flood event.

North of ADLC/undeveloped land to Cerrillos Road, Richards Avenue has curb and gutter along the east and west sides of the street and the roadway drains south to one inlet on both sides of the street. Based on downstream erosion patterns, runoff bypasses the inlets to the undeveloped land. Where the street and curb and gutter ends, concentrated channel flow along the curb face releases onto unprotected dirt surrounding the Siringo Drainage, which are thought to contribute to the existing gullies on the south side of the Siringo Drainage outlet. A culvert

pipe crossing Richards Avenue south of the existing pavement (**Exhibit 4-25**, Point 8) collects flow which outlets southeast of the Siringo drainage channel and eventually flows into the Siringo Drainage via a gully.

Drainage Design Criteria

Exhibit 4-26 provides a list of design criteria that must be satisfied when considering the multiple drainage infrastructure alternatives. The criteria are provided for informational purposes; a detailed drainage analysis and Preliminary Drainage Report will be prepared as part of preliminary design.

Exhibit 4-26, Drainage Design Criteria

	Criteria	Value	Reference	
Floodplain	100-Year Flood Peak Flow	1900 cfs (Chamisos) / 604 cfs (Pinos)	FEMA / Tetra Tech Report	
	Water Surface Elevation Rise (due to development)	1-ft (maximum)	Santa Fe County’s Ordinance No. 2008-10	
	Water Surface Elevation Freeboard	1-ft minimum (100-yr/culverts) / 2-ft minimum (50-yr/bridge)	Santa Fe County / NMDOT	
	Manning’s “n” for channel bed	0.022 (silty sand soil) / 0.012 (concrete)	USGS	
	CBC Wingwall Skew	45° (maximum)	NMDOT Std Plan 511-67-1/2	
	Bridge Scour	Design Storm Check Storm	100-yr Flood scour depth; coordinate w/bridge designer to protect bridge structure 500-yr Flood scour depth; coordinate w/ bridge designer to protect bridge structure	
Roadway Drainage	Existing Culvert	Design Storm Check Storm	NMDOT DDM Table 203-1	
	Urban and Rural Minor Arterials, Collectors and Local Roads (>=400 ADT)	New Culvert		Design Storm Check Storm Diameter Velocity
		Sidewalk Culvert		Design Storm Check Storm
		Roadside Ditches and Inlets		Design Storm Check Storm
	Curb Drop Inlets	Design Storm Check Storm Grate Clogging		
				50-yr 24-hr headwater spread limited to edge of driving lane 100-yr 24-hr headwater spread limited to ½ of a driving lane 50-yr 24-hr headwater spread limited to edge of driving lane 100-yr 24-hr headwater spread limited to ½ of a driving lane 18-in (minimum w/turnout); 24-in (minimum w/o turnout) 3 ft/s (minimum) 50-yr 24-hr headwater depth limited to top of sidewalk 100-yr 24-hr overtopping of sidewalk is allowed 50-yr 24-hr spread is limited to edge of shoulder 100-yr 24-hr spread limited to ½ of a driving lane 50-yr 24-hr spread is limited to ½ of a driving lane 100-yr 24-hr depth is limited to top of curb 25% on grade; 50% in sag



	Criteria	Value	Reference
	Storm Drain		
	Diameter (trunk, lateral)	24-in, 24-in (minimum)	NMDOT DDM Table 206-1
	Slope	0.3% (minimum)	
	Velocity	2.5 ft/s (minimum)	
	Time of Concentration	10 minutes (minimum)	NMDOT DDM Section 403.1
Green Infrastructure/ Water Quality Design	80 th percentile rainfall event	0.50 inches	EPA MS4 Permit, section V.7.B
	90 th percentile rainfall event	0.68 inches	
	Infiltration rate	05 in/hr (minimum)	EPA

Proposed Drainage Patterns

The proposed drainage patterns in the project area generally mimic the existing drainage pattern with a few deviations. The roadway low point north of Camino del Prado remains and the high point between the two arroyos remains. One new low point is created 120 feet north of Arroyo de los Pinos. The proposed roadway high point requires earthwork to achieve the roadway elevation. The roadway will be crowned and curbed allowing runoff to drain off to the edges of the road. In the existing undeveloped condition, the dominant flow regime is sheet flow whereas in the proposed condition, the dominant regime will be concentrated curb flow. The roadway increases the impervious area in the project zone and decreases the time of concentration for stormwater runoff to travel to its respective arroyo. The proposed drainage infrastructure must handle these potential changes impacting each arroyo. Drainage patterns in the north segment of Richards Avenue will remain as exists.

Proposed Drainage Infrastructure

Arroyo de los Chamisos (North Fork)

Multiple drainage structure design alternatives were analyzed for the roadway crossing of the ADLC. One approach is a concrete box culvert (CBC) with quadruple openings 12 feet wide and 7 feet high. The design consists of two NMDOT standard quadruple opening CBCs, for a total of 8 openings. The entire width of these CBCs together is 102 feet with a height of 8 feet 0.5 inches from existing ground to the top of CBC. One foot of the CBC is placed below existing ground so the CBC upstream invert is flush with existing ground. Assuming at least 1.5 feet is necessary between the top of CBC and roadway finished ground, this option provides a minimum and maximum separation of 1.64 feet and 3.68 feet, respectively. A cross section, plan view, and HY-8 calculation are provided in the *electronic appendices*. HY-8 calculations were used to analyze flow within culverts and to ensure flows do not overtop the roadway.

CBCs are typically considered as a design alternative at roadway crossings due to the ease of procuring and installing culvert materials. Standard Drawings are available for both CBC alternatives. However, due to the channel span of ADLC, the CBC structures are large and their cumulative wall thickness is a flow barrier as well as trapping debris. A bottleneck effect is likely and flows exiting the CBC have a higher scour potential. As a scour countermeasure, riprap and concrete aprons will be considered. These countermeasures, along with necessary maintenance, will ultimately cause the cost of this option to increase over its lifetime.

Another approach is a 3-span, concrete-slab bridge over the ADLC. The bridge deck is assumed to be 22 inches for preliminary analysis and the bridge pier alternatives are two 16-inch driven piles or two 36-inch drilled shafts. The piles or shafts reduce the available cross-sectional area of the channel, but not to the extent that CBCs would. A

channel cross section and HEC-RAS exhibit are provided in the *electronic appendices*. The HEC-RAS model was used to analyze changes in water surface elevations caused by the bridge deck, piles or shafts. The HEC-RAS model is rudimentary and does not consider ineffective flow areas.

A 3-span bridge may have higher upfront costs than a CBC alternative, but likely has lower costs over its lifetime. Knowing that scour potential is a threat at bridge piers, scour countermeasures can be focused at the two pier locations and along the bridge abutments. In comparison, the CBC alternative requires scour protections along the full arroyo bed and banks upstream and downstream of the roadway crossing. For the bridge and CBC alternatives, the existing wooden vanes that prevent further lateral movement along the southern ADLC toe of bank would be kept intact or replaced with a similar countermeasure.

Arroyo de los Pinos

CBC and bridge design alternatives were explored for Arroyo de los Pinos. For the CBC alternative, a NMDOT standard single-opening CBC 14’W x 8’H was considered. The entire width and height of the CBC is 15 feet 9 inches and 9 feet 11 inches, respectively. To ensure that the upstream CBC invert is flush with the lowest point of the uneven existing ground, one foot of the CBC would be partially buried and only 8 feet 11 inches would be above ground. This CBC would provide a minimum and maximum separation of 6.13 feet and 6.33 feet, respectively, from top of CBC to top of roadway. A cross section, plan view, and HY-8 calculation illustrations are provided in the *electronic appendices*.

The second option to cross the Arroyo de los Pinos is a single-span concrete-slab bridge. No bridge piers would be within the arroyo allowing the existing ground to remain undisturbed.

The advantages and disadvantages of a CBC from a drainage perspective are similar to those listed above in the ADLC section. One main difference is Arroyo de los Pinos is a narrower arroyo and a single opening CBC is sufficient. This eliminates the concern of CBC wall thickness impeding flow. Note that in the project area, scour is a known concern and existing culverts, albeit steel, are not in safe working condition. Due to the narrowness of Arroyo de los Pinos, the velocity will likely be higher than in ADLC and is presumed to be more prone to scour; having minimal flow barriers is optimal. Since the arroyo is narrow, a bridge can span the entirety of the arroyo. This produces minimal changes to the current flood patterns. A benefit of the bridge alternative over the CBC alternative is the ability to accommodate the bend of the arroyo. Design parameters will be determined in preliminary design.

Roadway Drainage Infrastructure

As the roadway design progresses, the drainage design will follow. Roadway curb drop inlets, new culverts, sidewalk culverts, and storm drains may be incorporated into the design, as needed. The roadway cross section includes travel lanes, bike lanes, curb and gutter and sidewalks. In order to treat roadway runoff, flow received at the curb will intermittently release via sidewalk culverts, or other means, to a roadside rundown. At the toe of the rundowns, linear BMPs will be sited. Roadway and bridge rundowns (NMDOT Std Dwg Section 515) will be needed on the east and west back of walks at each end of the crossing structures for each arroyo crossing and at the Siringo Drainage (10 total, minimum). In the vicinity of Siringo Drainage, the grading and earthwork required to build the proposed alignment will remedy the existing excessive scour/gullies. Additionally, the collapsed end of the 48” culvert will be restored. Calculations supporting adherence to the criteria in **Exhibit 4-26** will be provided in design.

Green Infrastructure

Other recent projects completed in the City of Santa Fe will be reviewed to cross-reference possible green infrastructure that could be used for this project. Following this review a compilation of green infrastructures will be generated and all viable options will be explored for further analysis. All potential locations where green



infrastructure can be utilized will be identified throughout the project footprint. Ultimately, a green infrastructure network will be chosen where it supports the drainage systems and is a cost-effective solution. Possible green infrastructure that can be incorporated into this project are rain gardens or planter boxes along the roadway, bioswales to safely carry stormwater to an appropriate location, or permeable pavement on the sidewalk which does not cross above an arroyo. The use of green infrastructure determination will be completed in design.

Municipal Separate Storm Sewer System (MS4)

Small Municipal Separate Storm Sewer Systems (MS4) discharges in the City of Santa Fe urbanized area are covered under National Pollutant Discharge Elimination System (NPDES) General Permit No. NMR040000 (herein Phase II “MS4 Permit”). Permittees include the City of Santa Fe, Santa Fe County, and NM Department of Transportation District 5. Under the Phase II MS4 Permit, each permittee must develop and implement a comprehensive Storm Water Management Plan (SWMP) (COSF, 2022). The SWMP must address the Six Minimum Control Measures: (1) Public Education/Outreach, (2) Public Involvement/Participation, (3) Illicit Discharge Detection and Elimination, (4) Construction Site Storm Water Runoff Control, (5) Post-Construction Storm Water Management, and (6) Pollution Prevention/Good Housekeeping.

The Phase II MS4 Permit includes conditions requiring controls to mimic predevelopment runoff for up to the 90th percentile storm event associated with new development sites and 80th percentile storm event associated with redevelopment sites intended to reduce the pollutants in discharges from new or significant redevelopment sites (EPA, 2015). As the design progresses, siting for the aforementioned detention control will be determined. Infiltration Best Management Practices (BMPs) are generally given high priority due to low maintenance costs and high pollutant removal efficiencies. Use of infiltration BMPs is highly dependent on water table depth, to be determined from future boring explorations. Inlet inserts that target oil, metals, and sediment are favorable in paved developments with limited right-of-way. These drainage components will be included within the drainage system as the design progresses.

Next Steps for Drainage

In the next phase, the preferred alternative for each arroyo will be advanced in greater detail. The drainage team will work closely with the roadway and structures teams in developing the designs. For floodplain studies, coordination with the local floodplain administrator will occur to secure the HEC-RAS effective model. This will allow for a baseline model against which preferred alternative developments in SFHA Zone AE will be modeled. The bed and bank shear stresses simulated in the HEC-RAS model will guide the design of scour countermeasures. The need for a Letter of Map Revision (LOMR) or Conditional Letter of Map Revision (CLOMR) shall be identified through discussions with the floodplain administrator.

Roadway drainage and Green Infrastructure design will advance as roadway geometrics are finalized and as the data gaps needed for drainage analysis are closed. In addition to inlets and swales, the location of rundown flumes will be identified in the next phase to safely convey flow to the base of the proposed cut/fill line. Hydrologic and hydraulic calculations will support the design. Coordination with NMDOT, City of Santa Fe, the FEMA Floodplain Administrator, and the Municipal Separate Storm Sewer System (MS4) Coordinator regarding all drainage issues and concerns will be performed.

Geotechnical

A technical memorandum documenting a geotechnical desktop study and field review was completed by YeDoma Consultants, LLC on May 5, 2021. Refer to the technical memorandum in the [electronic appendices](#) for further details. YeDoma evaluated the site with a desktop study, reviewing the Santa Fe County Area soil mapping in the area. The site is underlain by alluvium and riverwash deposits. The geologic mapping provides more context for the over-consolidated deposits that are on the north side of the Arroyo de los Chamisos. YeDoma determined that the project is feasible from a geotechnical viewpoint based on the Phase IA conceptual drawings and prepared an exploration map for project development purposes. The selection of the preferred alternative for the proposed improvements is not contingent on geotechnical conditions.

Key findings of the soil mapping review include:

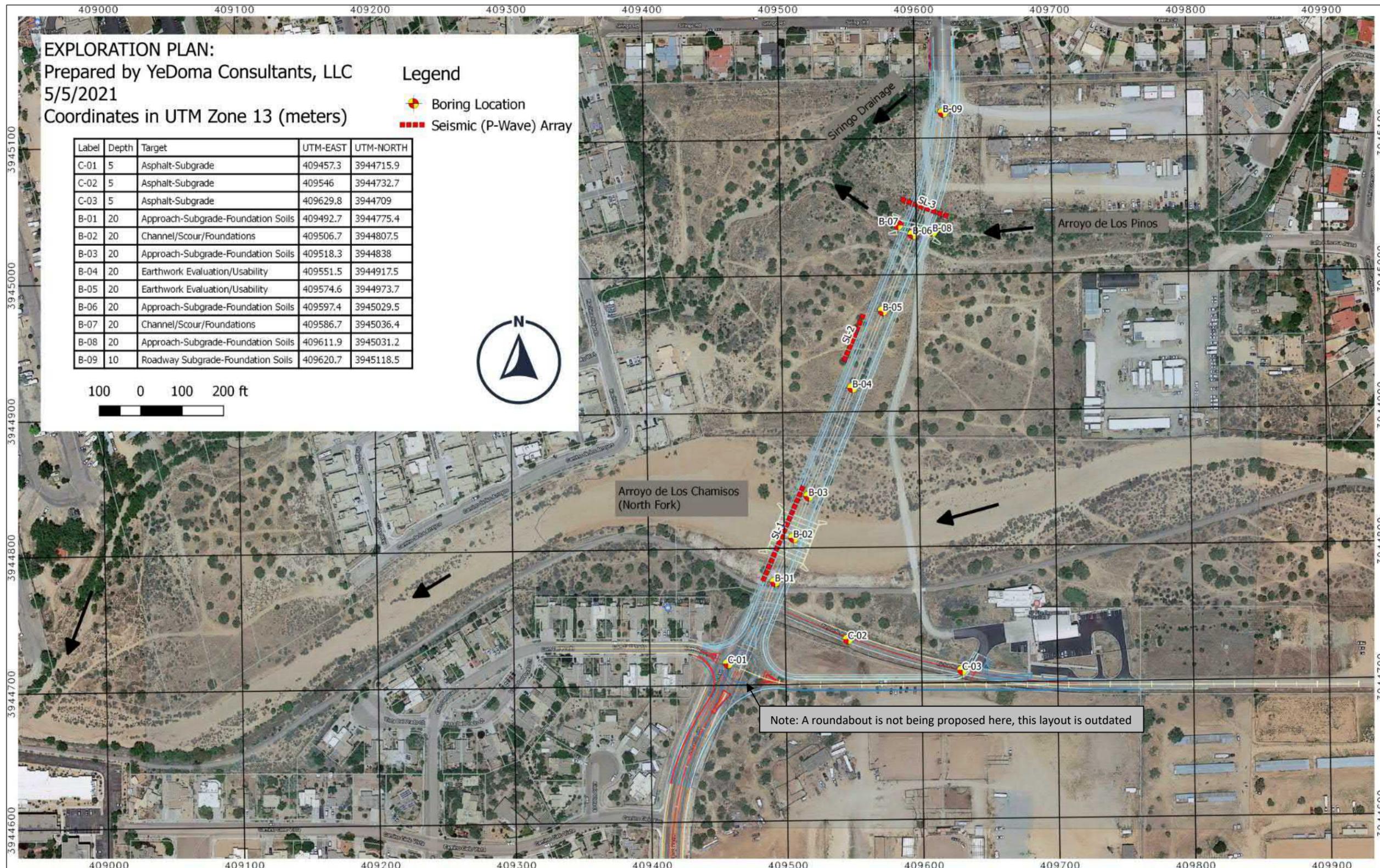
- ◆ Levante Riverwash is mapped in the active channel of Arroyo de Los Chamisos and is comprised of gently sloping gravelly coarse sand and may have lenses of clay stratification of low plasticity at depth. This material is generally high quality (A-1-b) for use as a roadway subgrade material and prone to flooding. There is slight cementing in the subsurface material with up to 10 percent calcium carbonate.
- ◆ Altazano loamy sand is present on each bank of the Arroyo de Los Chamisos and on gentle slopes (0-2%). The material (A-4) has fines of low plasticity in the upper two-feet, beneath which the soil increases in plasticity (A-6) to depths up to six feet with underlying gravelly silty sand (A-1-b). This material is mapped in the approach and departure fills of the proposed structure spanning Arroyo de Los Chamisos. As such, it is anticipated that the poor subgrade material will need to be tested as part of the design phase of the project.
- ◆ Tanoan-Encatado mantles sloping terrain along the upland portion of the project dividing the two drainage crossings. The usability of this material will be an important part of mass-balance earthwork computations. From the desktop study, this material has an engineering classification of A-4 which is not desirable for embankment material. The material is slightly cemented, calcium carbonate development is quantified up to 20 percent is anticipated. Typically, it has forty to fifty percent fines of low plasticity. This unit will require additional subsurface testing including index tests and Proctor testing to further evaluate.
- ◆ Alire loam is gently sloping (2-6%) on the higher elevation of the ridgeline separating the two drainage features within the project limits. The material classifies (A-4, A-6) as poor subgrade material and has fines that exceed 60-70% (clay) in the upper four feet, beneath the material is gravelly sand (A-2-4) with fines of low plasticity. The deposit is moderately cemented with up to 40 percent calcium carbonate.

Potential Exploration Plan Map

A potential exploration map to assess geotechnical conditions for the project is provided in **Exhibit 4-27**. It is anticipated that project development will include pavement design, foundation design, slope stability and earthwork recommendations. Three separate-covered reports (i.e., two foundation reports, one geotechnical report) are proposed to be developed such that each major drainage structure has a stand-alone Foundation Report, while pavement design, retaining walls, and earthwork factors, details and recommendations are collated into a Geotechnical Report. The work should include provisions for three pavement cores to determine the thickness of the existing pavement and subgrade conditions. Subgrade should be tested using the R-value (AASHTO T-190) as the basis for design; a total of nine geotechnical borings are proposed, which some of these could double up with pavement subgrade testing. It is recommended to test a total of five samples for R-Value by T-190 along with index testing and soil classifications. Geotechnical testing should include consolidation and swell testing of fine-grained



Exhibit 4-27, Potential Geotechnical Exploration Plan for Design



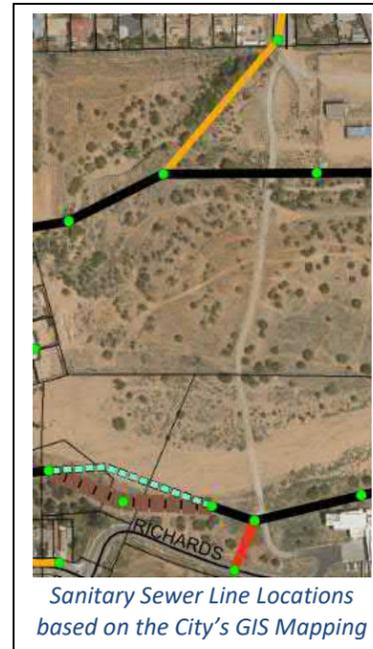


soils and recommendations that are anticipated to be used for embankment material. Direct shear testing AAHTO T-236 should be conducted at each structure crossing. Four tests of native material that is anticipated to be used for embankment material (remolded samples) are recommended. Each approach should be sampled and evaluated for bearing resistance, settlement potential and lateral earth pressures. Corrosivity testing is recommended (resistivity) based on AASHTO test methods. We included a total of nine borings for characterizing subgrade bearing conditions. Three seismic lines are recommended to build confidence in the lateral extent of the subsurface units and to evaluate the Arroyo de los Chamisos crossing for seismic site design classification purposes.

Utilities

Utility owners were contacted to request if they have utilities in the Richards Avenue corridor between Rodeo Road and Cerrillos Road. Based on the responses, there are overhead and underground utilities throughout the project limits. A summary of key findings follows:

- ◆ Reconstruction of the existing roadways is expected to require adjustments to grade for water valves, water meters, and manholes. Construction is expected to be two feet deep or less, so major utility impacts are not expected. There are currently no water lines within the undeveloped lands between the south and north segments of Richards Avenue. The City of Santa Fe Water Division also provided the following:
 - Because the 8” cast-iron water line within Richards Avenue in the north segment was built in the 1960’s, the City may consider replacing some or all of that section of water line.
 - The City would also consider making a water line connection across the undeveloped lands thereby completing a loop and improving pressure zone 6 of the City’s water system.
- ◆ New construction for the proposed roadway extension will cross two sanitary sewer trunklines, one on the south side of ADLC and one along the ADLP (see image to the right). There are distribution lines in Richards Avenue from the NMGF property to south of Cerrillos Road for which nine manholes will need to be adjusted.
 - A sanitary sewer line easement is shown in the property records that crosses into the ADLC (dashed line in image). However, the sewer line was washed away when the 500-year storm occurred. The original 15” clay sewer line was removed for the most part, and a new line was installed south of and outside the ADLC.
 - The sewer trunk line parallel to the ADLP will be a consideration in the structure design crossing the arroyo, particularly for the substructure design elements.
- ◆ Overhead electric and communication lines cross at several locations. The crossings are between Camino Cielo Vista and Camino del Prado, along the south side of the La Resolana subdivision, at the Walgreens/Savers shopping center access north of James Street, and near the Defined Fitness/Mattress Firm access south of Cerrillos Road. There are also utility poles along the east side of Richards Avenue from Louraine Circle to south of Cerrillos Road. One wood utility pole on the east side of Richards Avenue near James Street is expected to be in the middle of the proposed sidewalk. Further investigation is needed to determine if this pole or other poles may need to be relocated to provide acceptable walkability on the sidewalks.



- ◆ Gas lines exist along the east side of Richards Avenue, above-ground near James Street. A gas line also crosses east-west in the north part of the undeveloped land. A marker exists in the Siringo Drainage outfall area.
 - NM Gas has standard high pressure (HP) gas mains and a very high pressure (VHP) gas main within the project limits.
 - The VHP line (8” coated steel) runs along the east side of Richards from south of Rodeo Road to the NMGF property where it turns west as a 10” coated steel line up to the subdivision then turns east back to the Richards Avenue alignment. It continues north as a 4” coated steel line on the east side to Cerrillos Road. The Richards and James Street Regulator Station is on the east side of the road. The 4” VHP line changes to 8” north of the regulator station.
 - The HP lines are the distribution lanes serving properties throughout the project limits. From Rodeo Road to the current end of Richards Avenue, a 4” line is on the west side then turns to the Fire Station as a 2” line. There is a 1” HP line serving the New Mexico Forestry Division property that joins a 4” line at Richards Avenue south of Siringo Road. The 4” line runs along the west side of Richards to Cerrillos Road. It changes to an 8” line from James Street to Cerrillos Road.
- ◆ Overhead and buried fiber optic or telephone lines exist as follows:
 - Comcast is on PNM utility poles and has an underground line on the west side of Richards from Rodeo Road to the current end of Richards where it turns east and up to the emergency access road.
 - Conterra is on PNM poles only.
 - CenturyLink has buried copper lines and a fiber optic line from Rodeo Road to the current end of Richards where it turns east along the north side of the Fire Station Road. There are pull boxes and pedestals at the Richards/Fire Station road intersection so impacts to ducts, cables, pull boxes and pedestals are expected. There are buried copper lines on the west side of Richards Avenue up to Fire Station road. There is a duct bank with 8 ducts along Fire Station road from Richards Avenue. On the north segment, there is a buried copper cable midway between Louraine Circle and Louraine Street that crosses Richards Avenue.
 - Lumen has established a project number that will need to be referenced as the project moves forward which is P-234634 NM. The Lumen lines, both overhead and underground copper lines, mimic CenturyLink’s lines for the most part.
- ◆ Spot street lighting exists primarily at intersections. Lighting is provided on Type V poles and on wooden utility poles.

Subsurface utility engineering (SUE) will need to be performed as part of preliminary design to assess potential utility conflicts. Utility coordination per NMDOT procedures will also need to be performed, which will be a key requirement if federal funds are used for this project.

Right-of-Way

Apparent Right-of-Way Limits

The apparent right-of-way (ROW) limits in the Richards Avenue corridor were identified based on recorded plat information and the City’s GIS data. A boundary survey was not completed as part of the study phase of this project, which will be required to define ROW impacts. The ROW limits are summarized in **Exhibit 4-28**. A roadway corridor



exists except for crossing the arroyos/undeveloped land, which is owned by the New Mexico Game and Fish Department (NMGF). As such, the City will need to acquire ROW for the Arroyo de los Chamisos crossing from the NMGF and other modifications to existing agreements may be needed. The apparent ROW limits are shown on the conceptual design plans in the **Appendix** and included in the [electronic appendices](#).

Exhibit 4-28, Existing Richards Avenue Right-of-Way

Richards Avenue Segment	Right-of-Way Width (feet)	Comments
Rodeo Road to North of Camino del Prado	90'	recorded plat
North of Camino del Prado to NMGF Property	90'	recorded plat showing 90' corridor is intended up to ADLC; part of west boundary defined by Santa Fe Park Land; 12' trail easement crosses; 20' sewer line easement crosses; no corridor shown across ADLC
Across the NMGF Property	-	roadway corridor not platted
NMGF Property to North of James Street	88'	recorded plat
North of James Street to Cerrillos Road	~80' to 90'	estimated based on city GIS data

Proposed ROW Conditions

Additional ROW in the form of acquisitions, temporary construction permits (TCP), or construction maintenance easements (CME) will be required to implement the proposed improvements. The locations where additional ROW will be needed include:

- ◆ South of Rodeo Road: ROW impacts are expected to add a northbound right-turn lane at the Rodeo Road/Richards Avenue intersection. This will be determined in preliminary design. The property is owned by Pueblos de Rodeo Road Owners Association.
- ◆ North of Rodeo Road to North of Camino del Prado: Additional ROW and/or TCPs will be needed at spot locations to implement a sidewalk on the east side of Richards Avenue. The property is owned by Rodeo de Santa Fe Inc.
- ◆ Rodeo de Santa Fe Property south of the NMGF Property: Coordination will be required with Rodeo de Santa Fe to create a public roadway ROW or easement corridor for the Arroyo de los Chamisos Crossing and for embankment protection along both sides of the Arroyo de los Chamisos. The embankment protection could be part of the roadway easement/ROW or may require CMEs. There is also Santa Fe park land that may be impacted.
- ◆ Across NMGF Property: At a minimum, a roadway corridor for Richards Avenue will be needed across this property; the City is considering the entire NMGF parcel for other uses as the NMGF is ready to sell the property.
- ◆ South of Cerrillos Road: Existing sidewalks appear to be outside public ROW and additional ROW may be needed for intersection improvements. Multiple commercial property owners will be involved (DGG Holdings, LLC (NE corner), C/O Columbus Capital (south of DGG), and Cashway Building Materials (SW corner)).

Encroachments

Within the segment of Richards Avenue from the NMGF land to James Street, many encroachments into the public ROW exist. The existing ROW is 88 feet based on records research. Some property owners have placed walls and

fence lines which are encroaching onto the Richards Avenue ROW. Further research by the City is needed for each parcel to confirm ownership, their legal descriptions and if there are any agreements between the City of Santa Fe and the private owners to allow for the encroachments.

In most cases for such encroachments, the City should have licensed them to have the walls in the ROW if proper permitting was completed. However, there generally are provisions within the license agreements for surrender of the underlying lands and removal of any improvements when the land is needed for a public purpose. For those that are confirmed to have no permits or agreements, their improvements are at risk and the City could give them notice to remove their improvements prior to start of construction. This issue is not expected to be resolved during the Phase IB study, and it is expected that proposed improvements will not require changes to existing walls/fences.

Potential Prescriptive Use Sidewalks

Existing sidewalks south of Cerrillos Road appear to be outside of the apparent ROW limits. It is expected that the City will reconcile sidewalk ownership as part of the proposed improvements, if required. This will be determined based on a boundary survey and records searches. An example is the sidewalk on the east side within the property north of James Street owned by C/O Columbus Capital.

Public and Stakeholder Support

During the outreach process there was general support for the proposed improvements in response to the purpose and need established for the study. However, there were various comments, as previously noted, with a focus on traffic operations, multi-modal connectivity, and right-of-way acquisition. With consideration of these comments, the preliminary and final design will continue to evaluate opportunities to mitigate traffic impacts, provide connectivity for multi-modal facilities and crossings, and minimize right-of-way needs. All social, natural and economic concerns will be further evaluated and addressed during the environmental phase of the project.

Environmental

It is anticipated that future funding sources may include state and/or federal funding; therefore, this project is expected to comply with the National Environmental Policy Act (NEPA) during preliminary design and prior to final design and construction. The investigations and documentation for the NEPA process will be completed during Phase IC of the NMDOT Location Study Procedures and project development process, concurrent with preliminary and final design.

As a Tribal and Local Public Agency (T/LPA) project being led by the City of Santa Fe, the environmental level of effort will need to be coordinated with the NMDOT, per the NMDOT T/LPA Handbook (2020). The T/LPA Handbook requires the submittal of a Level of Effort (LOE) form with details on the potential impacts to the natural, social, and economic environment within the study area. With this information, the NMDOT Environmental Bureau determines what level of effort is required for Phase IC and the NMDOT Environmental Certification.

A few of the issues noted to date, in Phase IA and through the investigations in Phase IB, include potential impacts to the drainage features, potential changes in travel patterns and traffic volumes, opportunities to enhance bicycle and pedestrian facilities, consideration of potential traffic noise increases, right-of-way and encroachment issues, future benefits to economic development due to improved connectivity, and open space preservation. The proposed roadway would traverse the Arroyo Chamisos disc golf course and would require modifications to the course layout.

All ROW acquisition will follow federal requirements; however, there is one location along Siringo Road that may require acquisition of land from a city-owned park (Marcel Marc Brandt Park). Under this scenario, the potential for



Section 4(f) impacts may need to be considered. How the ROW encroachment issues are addressed by the City will also need to be considered and fully documented.

As an integral element to the NEPA process, the input received during the stakeholder and public outreach will be fully documented and considered during the design phase. This is critical to compliance with NEPA during Phase IC of project development. Stakeholder and Public Outreach activities are summarized in Chapter 2.

As stated, the proposed improvements will result in changes within the Richards Avenue corridor that will need to be evaluated and documented as part of the NEPA process and certification element of future project phases. Based on the current knowledge of the proposed improvements, it is expected that a Categorical Exclusion (CE) will be required for environmental clearance under NEPA and in alignment with the T/LPA process for the NMDOT. No fatal flaws have been identified for either of the Build alternatives evaluated in this report. In addition, both alternatives are expected to have similar impacts; therefore, the environmental analysis is not expected to be a delineating factor in the decision-making process. It is fully expected that with the appropriate completion of the CE, environmental clearance would be granted and the project would be eligible for federal funds under NEPA.

Estimates of Probable Costs

Exhibit 4-29 summarizes the estimated conceptual costs for the Build alternatives based on today’s dollars. Unit costs from reviews of recent bid tabs and engineering judgment were used. The costs do not include ROW acquisition, utility costs, nor regular maintenance after the initial installation of the major structures crossing the arroyos.

Exhibit 4-29, Estimates of Concept-Level Probable Costs for the Build Alternatives

Item Description	Build Alternative 1	Build Alternative 2
Roadway	\$3,189,440.00	\$3,174,860.00
Arroyo de los Chamisos Bridge	\$3,419,600.00	\$2,321,420.00
Arroyo de los Pinos Bridge	\$1,273,200.00	\$425,235.00
Drainage	\$283,420.00	\$283,420.00
Construction Signing	\$75,000.00	\$75,000.00
Construction Engineering	\$125,000.00	\$125,000.00
Permanent Signing and Striping	\$46,780.00	\$46,780.00
Lighting	\$95,180.00	\$95,180.00
Signalization Modifications	\$50,000.00	\$50,000.00
Landscaping/Aesthetics	\$75,000.00	\$75,000.00
Contingency (15% to 30%)	\$2,432,058.50	\$1,840,848.50
Subtotals	\$11,064,678.50	\$8,512,743.50
Traffic Control Management	\$185,117.08	\$184,718.09
Mobilization (10%)	\$772,347.10	\$622,498.82
Subtotals	\$12,022,142.68	\$9,319,960.40
Construction Augmentation (5%)	\$601,107.13	\$465,998.02
Subtotals	\$12,623,249.82	\$9,785,958.42
NMGRT	\$1,065,086.70	\$825,690.24
Overall Construction Totals	\$13,688,000.00	\$10,612,000.00

The key difference between the alternatives is the estimated cost of major structures and the associated increase in percentage-based items including the contingency, traffic control management, mobilization, construction

augmentation, and NMGRT. While the initial cost of the CBCs would be less, it is expected that concrete box culverts, particularly in the Arroyo de los Chamisos, would require more maintenance over time than the concrete-slab bridges. Full reconstruction was assumed for the north segment to update the facilities and to accommodate potential replacement of the water line that was built in the 1960’s. This assumption will be revisited in preliminary and final design to determine if full reconstruction is required.

The project is not funded at this time. Funding will need to be identified and programmed in the SFMPO Transportation Improvement Plan (TIP) and the NMDOT State Transportation Improvement Plan (STIP). Federal and/or State funding is anticipated to be needed for this project. Depending on available funding, the proposed improvements may be implemented in phases as discussed in Chapter 5. The estimates of probable costs will be refined as part of the preliminary and final design phases.

Selection of a Preferred Alternative

The three alternatives considered in this Phase IB study include the No Build Alternative and two Build alternatives. The No Build Alternative does not meet the purpose and need for the project, therefore is eliminated from further consideration. The two Build alternatives both meet the project purpose and need and have many similarities including one travel lane in each direction, intersection improvements, drainage system features, lighting locations, environmental conditions, pedestrian and bicycle multi-modal facilities, the connection across the undeveloped land, and right-of-way needs. The comparison to identify a preferred alternative focuses on the differences between the alternatives which primarily involve the following:

- ◆ On-street Parking versus a Median in the North Segment
 - Build Alternative 1: on-street parking provided along the west side of street next to the curb with a bike lane between parking and the travel lanes
 - Build Alternative 2: median provided with no dedicated space for on-street parking; on-street parking would utilize the bike lane space
 - Preferred: Build Alternative 1. On-street parking would benefit the homes fronting Richards Avenue.
- ◆ Bridge vs CBC crossing the ADLC
 - Build Alternative 1: concrete-slab bridge leaves natural arroyo bottom, two piers in the arroyo, and costs \$3.5M
 - Build Alternative 2: multi-barrel CBC has concrete and riprap arroyo bottom, multiple vertical CBC walls that require more maintenance due to catching debris, and cost \$2.4M
 - Preferred: Build Alternative 1. The initial cost of the Concrete-slab bridge is higher, but a bridge will be better for high flows in the arroyo and would require less maintenance over its design life
- ◆ Bridge vs CBC crossing the ADLP
 - Build Alternative 1: concrete-slab bridge leaves natural arroyo bottom, no piers in the arroyo, and costs \$1.3M
 - Build Alternative 2: single-barrel CBC, properly sized for design flows, and costs \$500k
 - Preferred: Build Alternative 2. Single-barrel CBC is a better fit for the roadway alignment and topography
- ◆ Public and Stakeholder input
 - Build Alternatives 1 and 2: Various elements of each build alternative were supported by the public.
 - Preferred: Combination of both Build alternatives refined to incorporate input received.

CHAPTER 5 – PREFERRED ALTERNATIVE AND IMPLEMENTATION PLAN

This chapter provides a summary of the preferred alternative for improvements to Richards Avenue for advancement to Phase IC and ID of the project development process. The proposed improvements will require a substantial capital investment, as well as right-of-way acquisition, and may be implemented in phases depending on funding availability. A possible implementation plan is provided below.

Description of Preferred Alternative

The preferred Build Alternative to advance to Phase IC and Phase ID incorporates features from both Phase IB Build Alternatives and is described in the following paragraphs starting from the south to north, from Rodeo Road to Cerrillos Road. The preferred alternative incorporates input from a wide range of stakeholders to provide improvements that balance the competing needs and technical constraints identified through the Phase IA and Phase IB study processes. Pedestrian and bicycle accommodations will be compliant with the Americans with Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG).

Rodeo Road/Richards Avenue Intersection

Improvements to the Rodeo Road/Richards Avenue intersection will include widening the northbound approach to provide a separate through lane and a separate right-turn lane (**Exhibit 5-1**). The sidewalk will be reconstructed and a retaining wall may be needed due to the topography/elevation drop east of Richards Avenue. The existing traffic signal mast-arm may be able to remain at its current location, which will be determined in preliminary design based on additional survey and ROW investigations. Two pedestal poles are expected to be relocated. No other changes to this intersection are anticipated.

Exhibit 5-1, Improvements to Northbound Richards Avenue at Rodeo Road



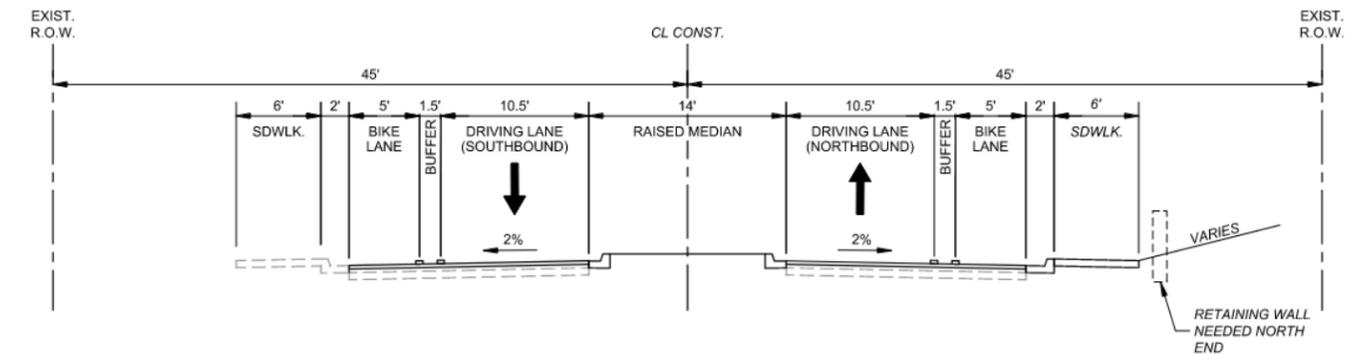
South Segment - Rodeo Road to Camino del Prado

Based on stakeholder input, this segment will be improved from the gated access to the Rodeo grounds, which is about 265 feet north of Rodeo Road, to Camino del Prado. The following modifications are recommended:

- ◆ Provide a new six-foot sidewalk along the east side abutting the back of the existing curb. Additional survey will be needed in preliminary design to determine where retaining walls will be needed to avoid/minimize impacts on Rodeo de Santa Fe property.
- ◆ Mill and inlay the street pavement between the existing curb and gutter on both sides of the street. The width of the street section is 48 feet, which will be reconfigured as follows (**Exhibit 5-2**):
 - 5-foot bike lane with a 1.5-foot striped buffer on both sides
 - 10.5-foot travel lanes in each direction
 - 14-foot median with 10.5-foot wide northbound left-turn lanes at Camino Cielo Vista and Camino del Prado. A raised median will be provided consisting of 1.5-foot curb and gutter resulting in an 11-foot raised median. The raised median will connect to the existing median north of Rodeo Road.
 - The need for a southbound left-turn lane at the access to the Rodeo grounds will be determined in preliminary design.

- ◆ Speed tables and/or mid-block pedestrian crossings will be provided where the raised median will provide a pedestrian refuge area. The locations of traffic calming devices will be determined in preliminary design. Based on the median layout, two pedestrian crossings are anticipated.
- ◆ Spot roadway lighting will be provided at the two intersections. Corridor lighting is not proposed.

Exhibit 5-2, Typical Section from Rodeo Road to Camino del Prado – Preferred Alternative



Middle Segment - Camino del Prado to Siringo Road Eastbound

This segment will primarily involve new construction which allows for flexibility in defining widths of the various elements of the street section based on stakeholder input. The proposed improvements will tie-in to the Camino del Prado intersection on the south and the Siringo Road Eastbound intersection on the north. A roundabout will be incorporated just south of the north segment as a gateway feature for northbound travel as well as a speed control measure before entering the residential area. The roundabout would be relatively small with low design speed, designed for fire trucks.

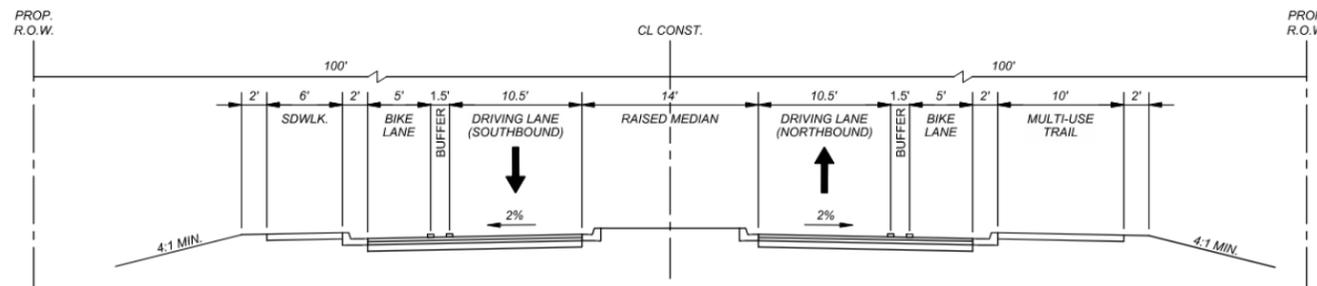
Street Section Elements

The recommended street section for the South Segment will be continued for the Middle Segment and will include (**Exhibit 5-3**):

- ◆ 5-foot bike lane with a 1.5-foot striped buffer on both sides from Camino del Prado to the proposed roundabout; a 5-foot bike lane without the buffer will be provided north of the roundabout.
- ◆ 10.5-foot travel lanes in each direction
- ◆ An overall 14-foot wide raised median consisting of 1.5-foot curb and gutter resulting in an 11-foot raised median. A 10.5-foot wide southbound left-turn lane will be provided at the road to the Fire Station. This left-turn lane will extend into the bridge over the Arroyo de los Chamisos. The median is recommended for safety, for continuity in the roadway section, and for pedestrian refuge at a proposed mid-block crossing between the arroyos (see Pedestrian Crossings below).
- ◆ A 6-foot sidewalk on the west side, and a 10-foot multi-use trail on the east side connecting the Arroyo de las Chamisos trail to the Marc Brandt Park trail. North of the roundabout, the multi-use trail will be 8-feet wide. The sidewalk and trail will abut the back of curb, no buffer will be provided.
- ◆ Lighting will be provided at the Fire Station road intersection and at the roundabout. Corridor lighting is not proposed.



Exhibit 5-3, Typical Section from Fire Station Road to Proposed Roundabout – Preferred Alternative



Structure Type for Arroyo Crossings

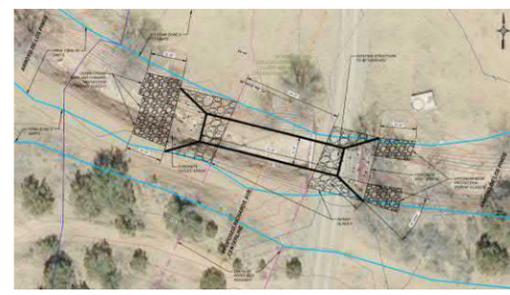
The recommended structure types for crossing the arroyos are as follows:

- ◆ **Arroyo de los Chamisos** - A concrete-slab bridge is recommended (Exhibit 5-4). It is expected to be a three-span bridge between 135 and 140 feet long. Each span will be approximately 45 feet. The bridge deck would typically be about 22 inches deep and the bridge piers may be two 16-inch driven piles or two 36-inch drilled shafts. This will be determined in preliminary design based on additional geotechnical investigations. The abutments under the bridge would be armored with rip-rap or slope paving, and the embankments will be protected for scour. The bottom of the arroyo will remain natural. Scour protection will be needed for each pier.
- ◆ **Arroyo de los Pinos** – A single-barrel, concrete box culvert (CBC) is recommended (Exhibit 5-5). The CBC will be a NMDOT standard single-opening CBC approximately 14'W x 8'H. The design will include concrete aprons on both the inlet and outlet sides, riprap at the downstream apron, embankment protection on both sides of the channel, and slope protection between the roadway and the CBC headwalls. Scour and embankment protection will be critical for the long-term viability of the CBC.

Exhibit 5-4, Concrete-Slab Bridge over the Arroyo de los Chamisos



Exhibit 5-5, Single-Barrel CBC under the Arroyo de los Pinos



Railings will be provided on both sides of the street at the arroyo crossing structures. No other roadside barriers are proposed because of the low-speed conditions of this urban street.

Pedestrian Crossings

Pedestrian crossings will be provided on each leg of the proposed roundabout on the north end of this segment. A mid-block crossing is proposed between the arroyos, with pedestrian refuge in the median, for users of the open space trails and potentially by users of the reconfigured disc golf course.

For the Arroyo de las Chamisos trail crossing of the new roadway, an at-grade crossing will be provided. The design details of this at-grade crossing will be determined in preliminary design. Based on stakeholder input, a grade-separated crossing for the Arroyo Chamisos trail is requested. An underpass crossing will be evaluated in

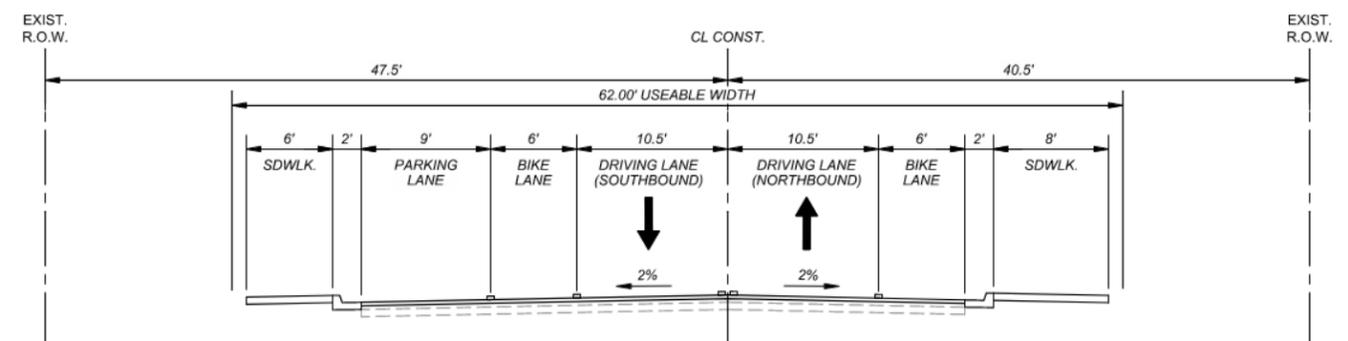
preliminary design to determine engineering feasibility and an estimate of associated probable costs will be developed. An overpass crossing will not be evaluated in preliminary design. Design and construction of a grade-separated trail crossing is not included in the Phase IB cost estimate, nor in the current scope of work for Phases IC and ID beyond the feasibility analysis previously described.

North Segment – Siringo Road Eastbound to Access to Savers/Walgreens

Phase IB Build Alternative 1 will be advanced as the preferred alternative for this segment with the travel lanes reduced to 10.5-foot lanes. The improvements will include 5-foot minimum on-street bike lanes, a 6-foot sidewalk on the west side, and an 8-foot sidewalk on the east side. The sidewalk on the east side within Marc Brandt Park will be offset from the street as exists today. The street section and sidewalks will be designed to fit between existing walls and fences, and no changes to existing access is proposed. The improvements will also include the following:

- ◆ Reconstruct the curb and gutter on both sides of the street to accommodate wider sidewalks. Mill and inlay the street pavement between the new curb and gutter.
- ◆ Reconstruct private driveways as part of the sidewalk improvements for ADA compliance.
- ◆ Provide raised crosswalks for pedestrian accessibility and traffic calming as follows:
 - At Siringo Road to access Marc Brandt Park (location to be determined)
 - On the south side of Louraine Circle
 - On the north side of Louraine Street
 - On the south side of James Street
- ◆ Provide a 9-foot on-street parking zone along the west side of the street which includes buffer space between parked vehicles and the bike lane. A median will not be provided where on-street parking is proposed (Exhibit 5-6).
- ◆ Provide a southbound left-turn lane on Richards Avenue to eastbound Siringo Road. A painted median will be provided for this left-turn lane which will be a minimum of 12-feet wide. The left-turn lane will extend north of Siringo Road Westbound to provide more storage length.
- ◆ Provide two approach lanes on westbound Siringo Road for separate left-turn and right-turn lanes. The configuration will be determined in preliminary design and may impact the existing park between the current one-way pair as well as the residential property on the north side of the street.
- ◆ Reconstruct the raised median between James Street and the Savers/Walgreens access to accommodate on-street bike lane improvements. The northbound left-turn lane and the southbound right-turn lane that are currently provided will be kept.
- ◆ Spot roadway lighting will be provided at the public street intersections. Corridor lighting is not proposed.

Exhibit 5-6, Typical Section from Louraine Circle to Louraine Street – Preferred Alternative





Cerrillos Road/Richards Avenue Intersection

Improvements to the Cerrillos Road/Richards Avenue intersection will include widening the northbound approach to provide a separate through lane and a separate right-turn lane (**Exhibit 5-7**). The sidewalk will be reconstructed and a cut-off wall may be needed for slope tie-in grade adjustments. Five trees in the landscape buffer on the east side will be removed with the widening. The existing traffic signal mast-arm may be able to remain at its current location, which will be determined in preliminary design based on additional survey and ROW investigations. A pedestal pole with a push-button will be relocated. It is not recommended to provide south-to-east dual left-turn lanes because of insufficient ROW and the merging distance would be too short on Richards Avenue.

The raised median and the southbound left-turn lane at the Savers/Walgreens access will be provided along with 8-foot sidewalks on both sides of the street.

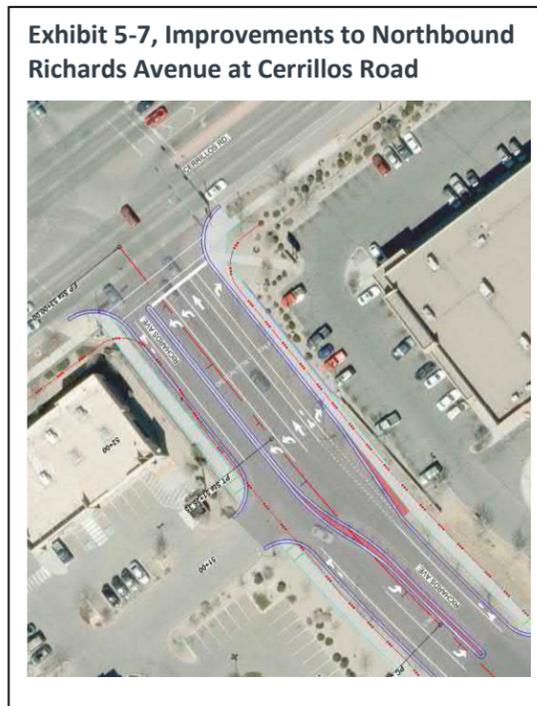


Exhibit 5-7, Improvements to Northbound Richards Avenue at Cerrillos Road

Potential Implementation Plan

The proposed improvements could be constructed as one project or in multiple projects depending on funding availability. A potential multi-phased implementation plan is presented below that implements the improvements considering the various unique segments of Richards Avenue within the project limits. While three phases are shown, the construction phasing can be refined as available funding and needs dictate.

Phase 1: North Segment – Siringo Road (Eastbound) to Cerrillos Road (0.29 miles)

The north segment includes Richards Avenue from Siringo Road to Cerrillos Road, including improvements to the Cerrillos Road intersection to get bike lanes and intersection lanes incorporated. Westbound Siringo Road may need to be widened to provide separate left-turn and right-turn lanes. Improvements within the north segment of the corridor are first because traffic volumes during construction will be lower without the proposed extension and so that traffic is calmed through the residential area once the new roadway extension to the south is opened up to traffic. Right-of-way acquisition is expected to be required to implement improvements to the Cerrillos Road intersection.

Phase 2: Middle Segment - Extension from Camino del Prado to Siringo Road (0.28 miles)

The middle segment connects Richards Avenue across the undeveloped land and includes Richards Avenue from Camino del Prado to Siringo Road. Right-of-way acquisition will be required for this phase. This is the highest cost segment for transportation improvements and right-of-way acquisition. This phase could be constructed with little to no maintenance of traffic and access (MOTA) during construction, which would reduce the construction duration. The Arroyo de las Chamisos multi-use trail will need to be kept open. As the second phase, the City will have time to identify and secure funding sources and to acquire the right-of-way needed for this segment.

Phase 3: South Segment - Rodeo Road to Camino del Prado (0.17 miles)

The south segment includes Richards Avenue from Rodeo Road to Camino del Prado, including improvements to the Rodeo Road intersection. Right-of-way impacts are expected and may involve acquisitions and/or TCPs. It is expected that traffic will be maintained in both directions of Richards Avenue during construction.

Utility Work

Utility relocations and/or reconstruction are expected to be needed with the implementation of the proposed improvements. Utility work in the north segment would be performed during construction of the roadway improvements because they involve adjustments to grade and possible replacement of a water line which would be constructed when the street is being improved. Utility work in the middle and south segments could be performed prior to construction with the exception of existing manholes and water valves/meters that would be adjusted to grade.

T/LPA Project

As a T/LPA project, close coordination with the NMDOT regarding the required certifications and associated schedules may also influence the phasing plan for the proposed improvements. Project phases will need to be fully funded in the SFMPO TIP and State TIP (STIP) to finalize construction plans and to be let for construction.

Environmental Clearance Level of Effort

During Phase IC and concurrent with preliminary and final design, an environmental clearance document evaluating the preferred alternative and its impact on the human and natural environment will be prepared. Based on a review of potential impacts to the human and natural environment during Phase IA/B and input from agencies to date, it is anticipated that the appropriate level of effort for environmental clearance and NEPA compliance will be a Categorical Exclusion (CE) document. The proposed action is expected to obtain approval for the entire corridor including the potential for implementing the project in multiple phases.



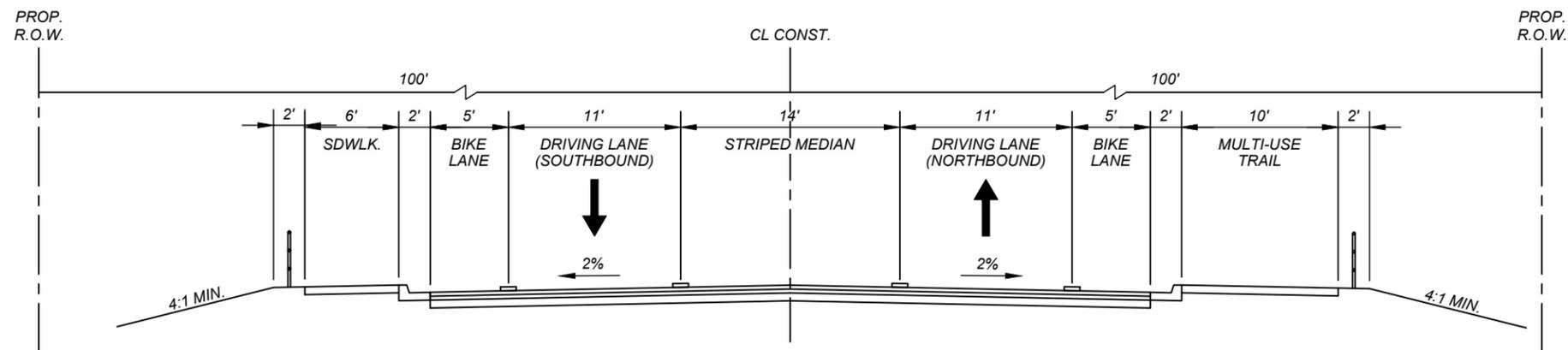
ATTACHED APPENDICES

- APPENDIX A BUILD ALTERNATIVE 1 CONCEPTUAL DESIGN PLANS**
- APPENDIX B BUILD ALTERNATIVE 2 CONCEPTUAL DESIGN PLANS**
- APPENDIX C CONCEPTUAL CONSTRUCTION COST ESTIMATES**

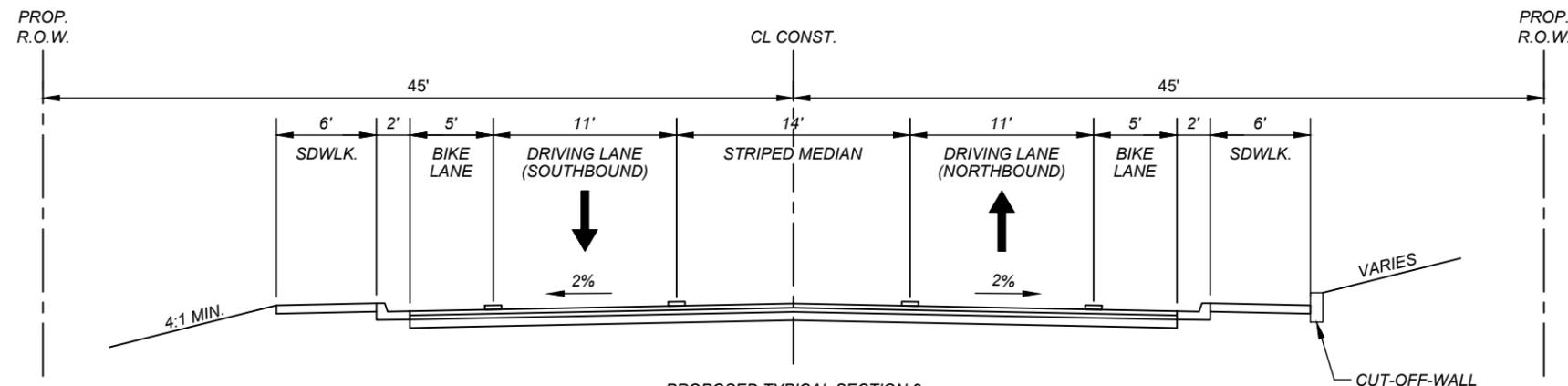


APPENDIX A

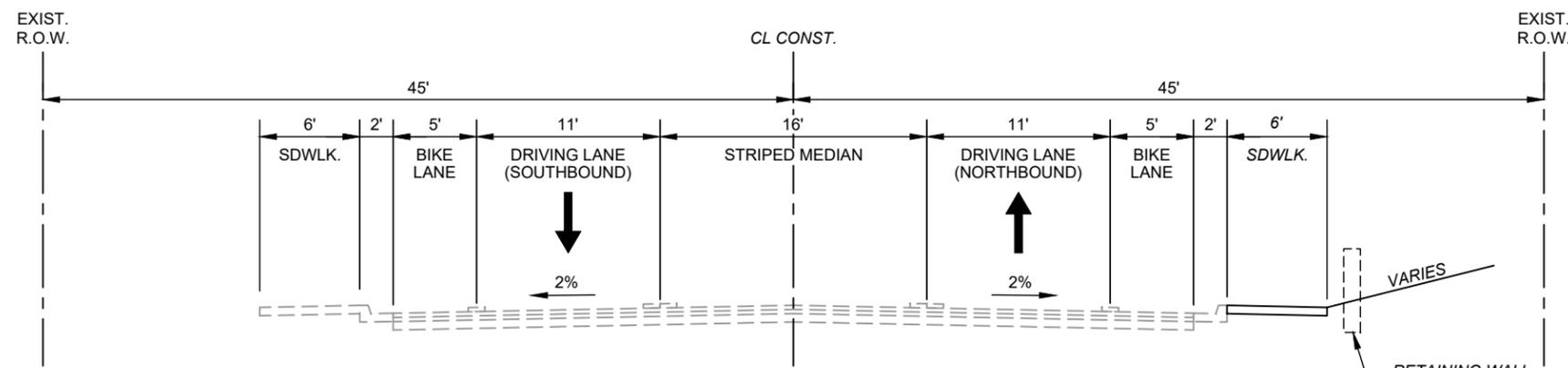
BUILD ALTERNATIVE 1 CONCEPTUAL DESIGN PLANS



PROPOSED TYPICAL SECTION 3
 FIRE STATION ROAD TO BRIDGE
 BRIDGE TO TURNOUT_01
 STA. 23+86.73 TO STA. 24+90.00
 STA. 26+30.00 TO STA. 36+10.00



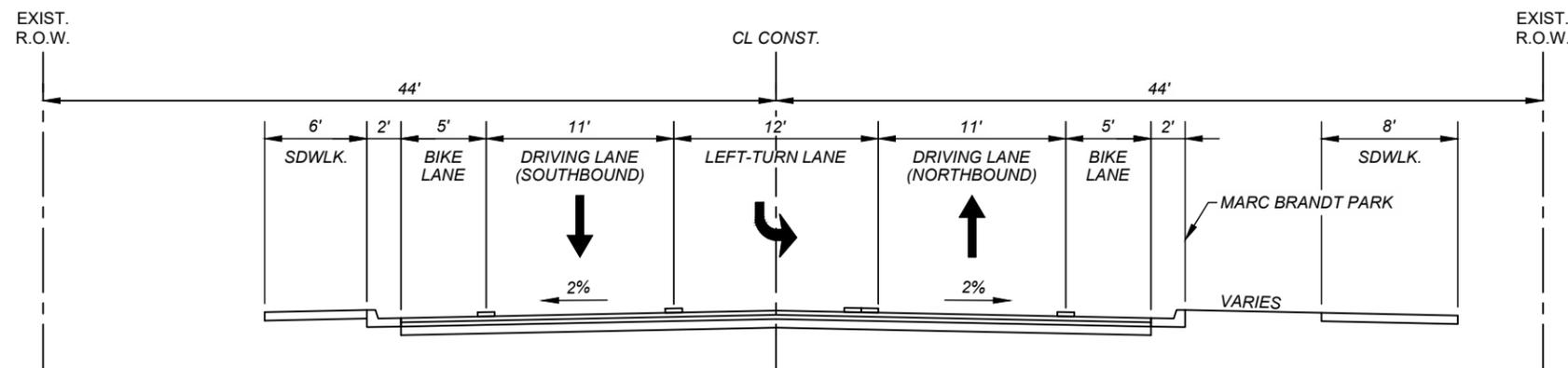
PROPOSED TYPICAL SECTION 2
 CAM DEL PRADO TO FIRE STATION ROAD
 STA. 22+00.00 TO STA. 23+86.73



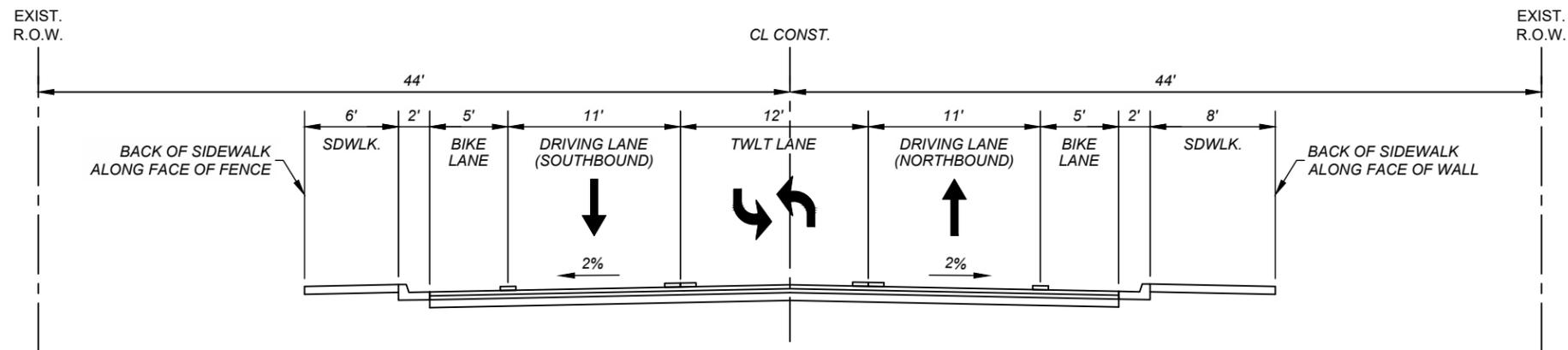
PROPOSED TYPICAL SECTION 1
 RODEO GROUNDS ENTRANCE TO CAM DEL PRADO
 STA. 13+07.51 TO STA. 22+00.00

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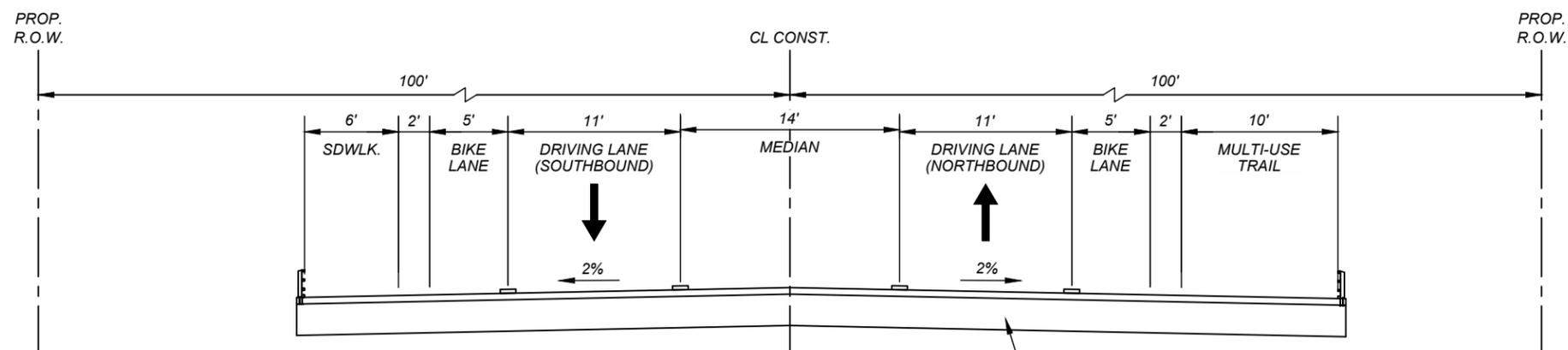
ARROYO DE LOS CHAMISOS
 PROPOSED TYPICAL SECTION FOR BUILD
 ALTERNATIVE 1



PROPOSED TYPICAL SECTION 6
SIRINGO ROAD EASTBOUND TO SIRINGO ROAD WESTBOUND
STA. 38+58.94 TO STA. 39+62.42



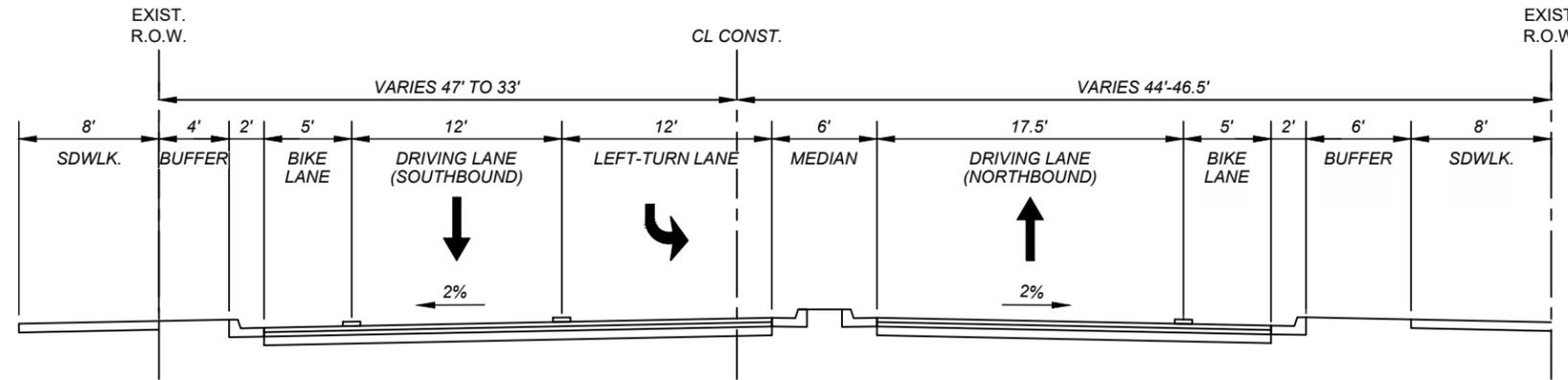
PROPOSED TYPICAL SECTION 5
TURNOUT_01 TO SIRINGO ROAD EASTBOUND
STA. 36+10.00 TO 38+58.94



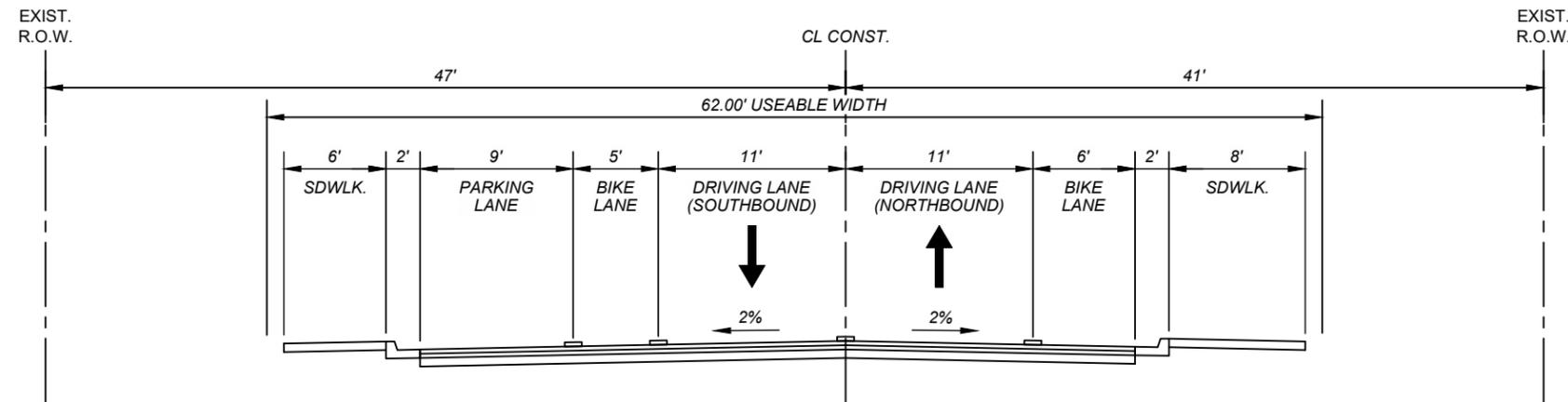
PROPOSED TYPICAL SECTION 4
BRIDGE OVER ARROYO DE LOS CHAMISOS
STA. 24+90.00 TO STA. 26+30.00

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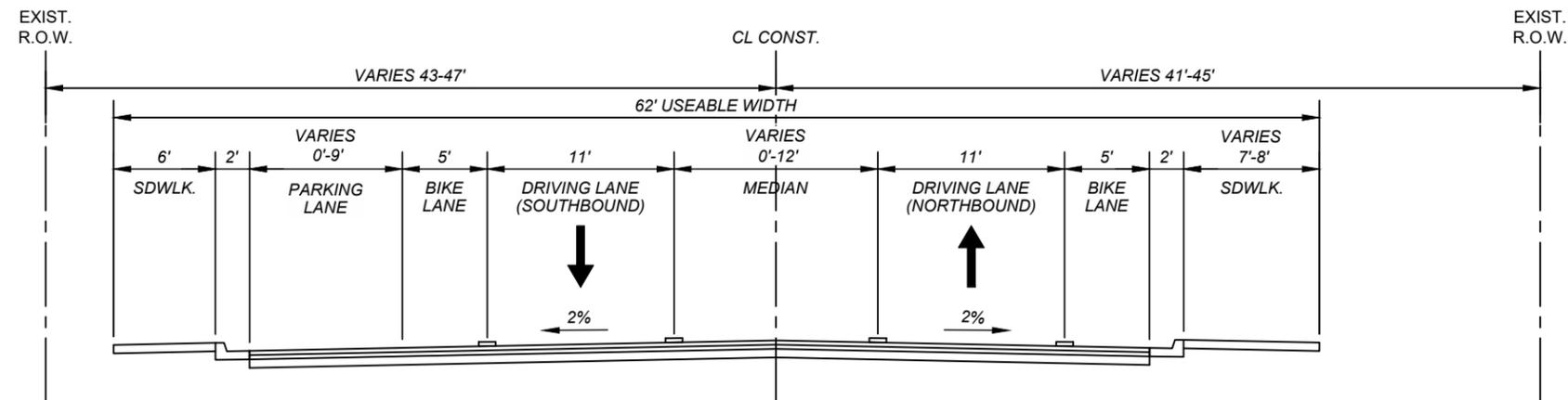
ARROYO DE LOS CHAMISOS
PROPOSED TYPICAL SECTION FOR BUILD
ALTERNATIVE 1



PROPOSED TYPICAL SECTION 9
WALGREENS ENTRANCE TO SHOPPING CENTER ENTRANCE
STA. 48+96.17 TO STA. 51+08.82



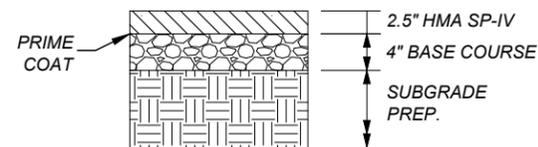
PROPOSED TYPICAL SECTION 8
LOURAINNE CIRCLE TO LOURAINNE STREET
STA. 41+98.64 TO STA. 44+97.23



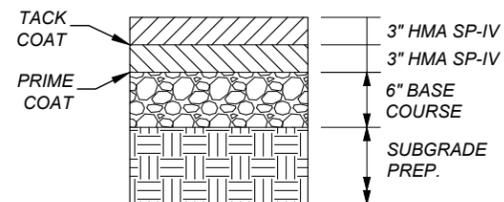
PROPOSED TYPICAL SECTION 7
SIRINGO ROAD WESTBOUND TO LOURAINNE CIRCLE
LOURAINNE STREET TO JAMES STREET
STA. 39+62.42 TO STA. 41+98.64
STA. 44+97.23 TO STA. 47+37.23

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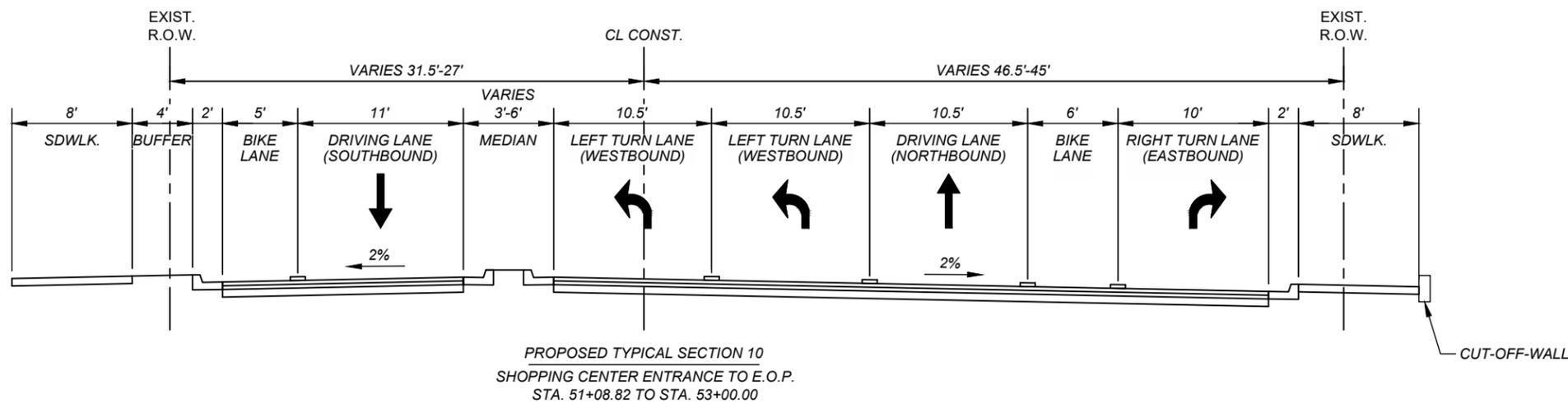
ARROYO DE LOS CHAMISOS
PROPOSED TYPICAL SECTION FOR BUILD
ALTERNATIVE 1



PROPOSED PAVEMENT SECTION NO. 2
MULTI-USE TRAIL



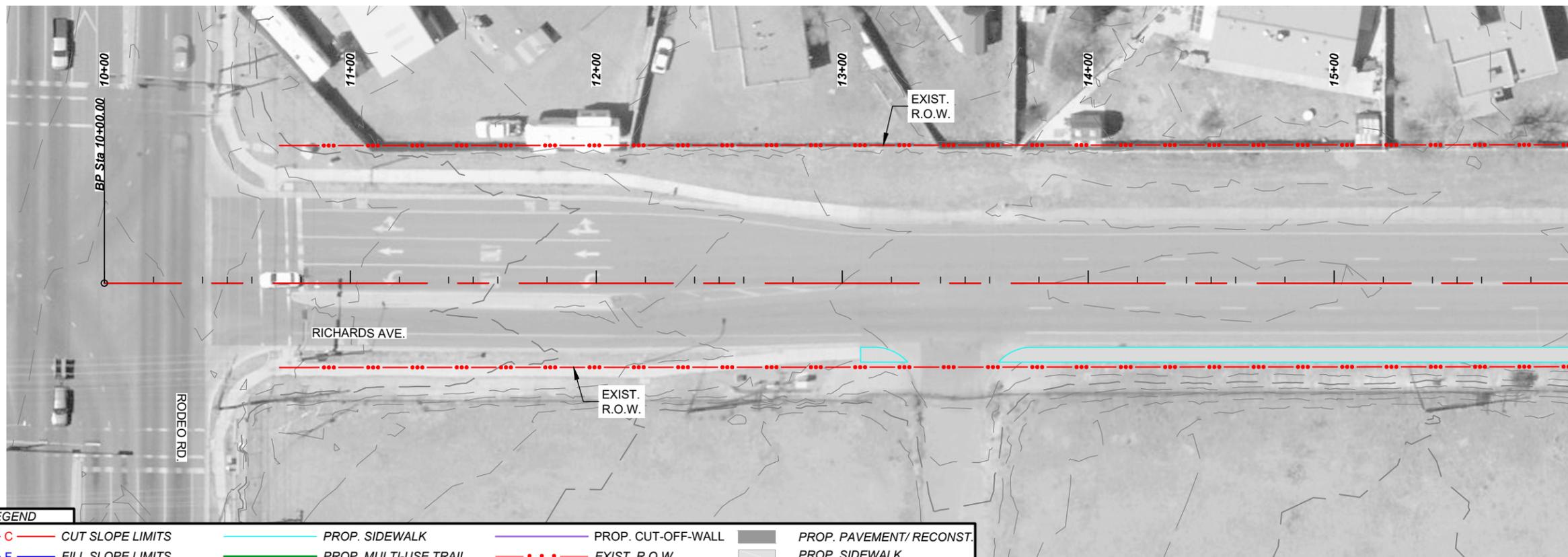
PROPOSED PAVEMENT SECTION NO. 1
RICHARDS AVENUE



PROPOSED TYPICAL SECTION 10
SHOPPING CENTER ENTRANCE TO E.O.P.
STA. 51+08.82 TO STA. 53+00.00

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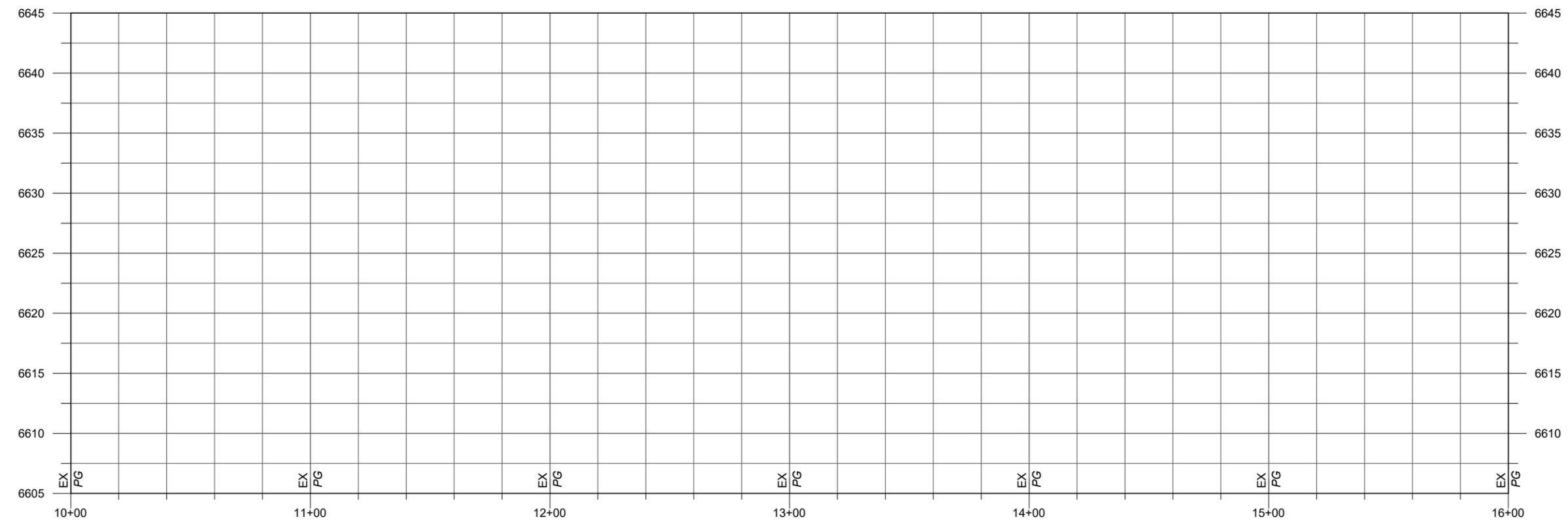
ARROYO DE LOS CHAMISOS
PROPOSED TYPICAL SECTION AND DETAILS FOR
BUILD ALTERNATIVE 1



LEGEND			
--- C	CUT SLOPE LIMITS	---	PROP. SIDEWALK
--- F	FILL SLOPE LIMITS	---	PROP. MULTI-USE TRAIL
---	PROP. CURB & GUTTER	---	PROP. RETAINING WALL
---	PROP. CUT-OFF-WALL	...	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.		PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

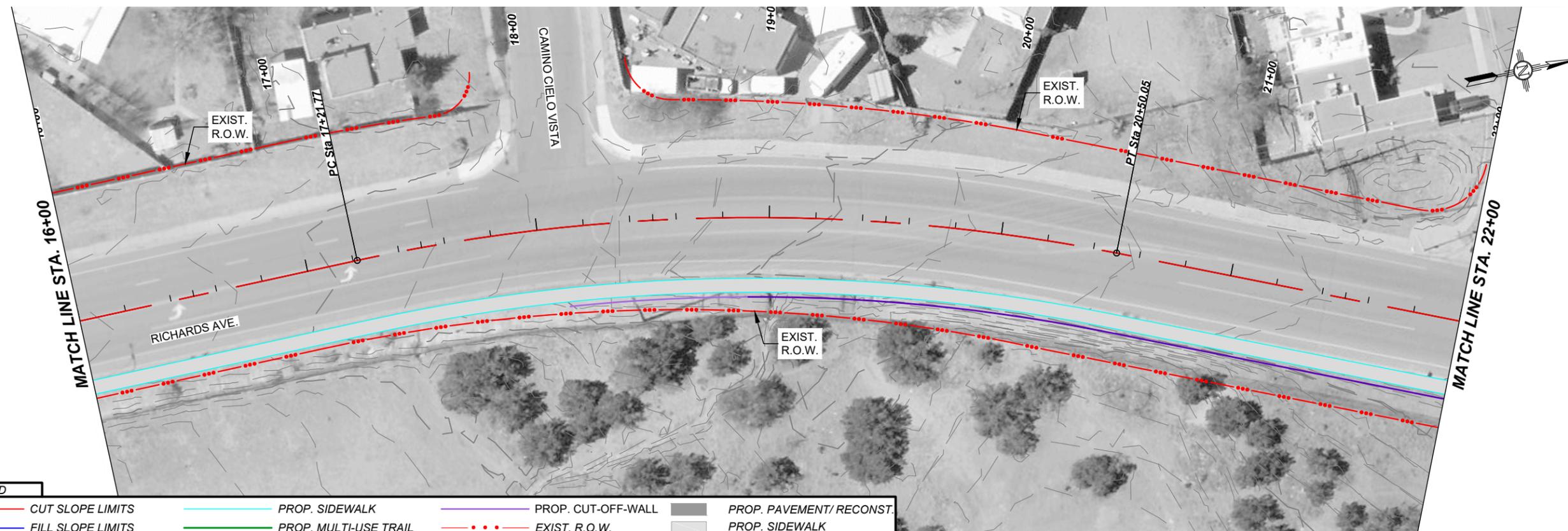
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HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



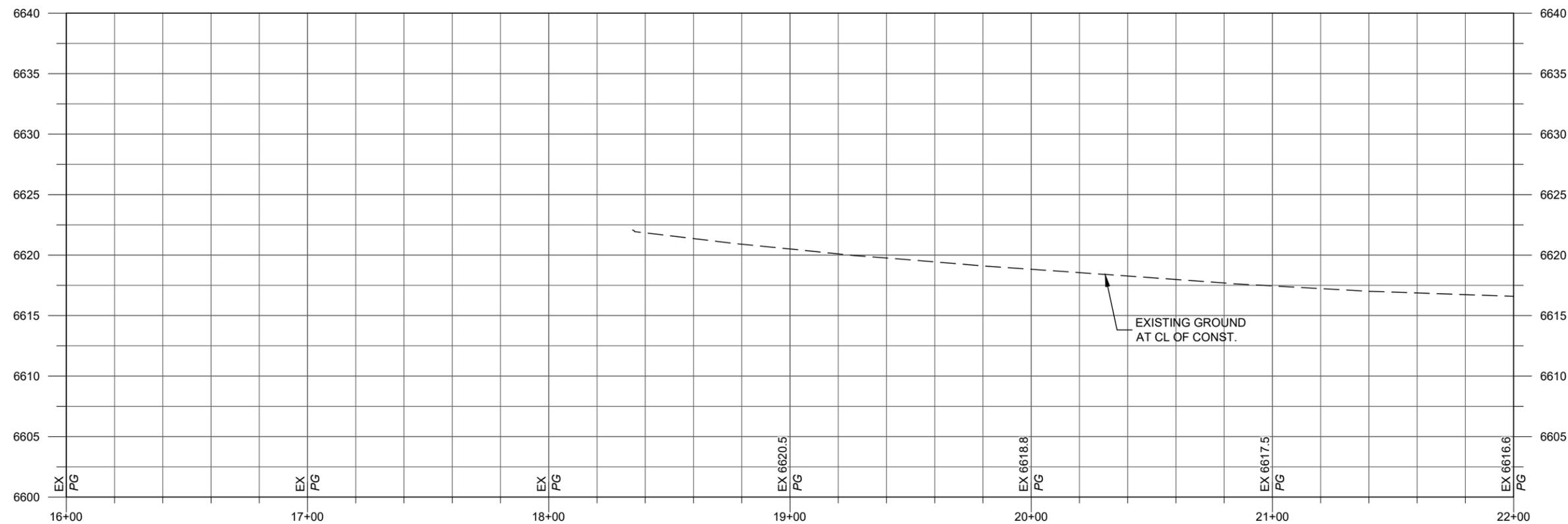
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ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 1



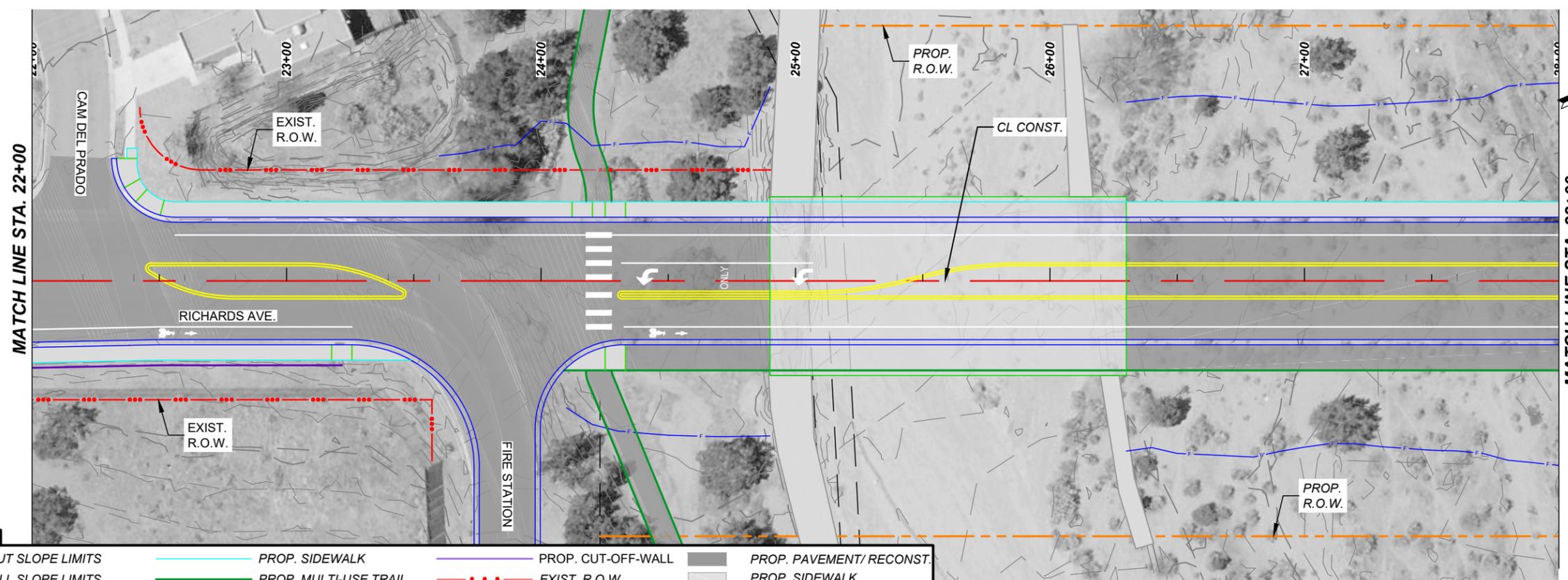
LEGEND			
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— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
- - -	EXIST. R.O.W.	- - -	PROP. R.O.W.
	PROP. PAVEMENT/ RECONST.		PROP. SIDEWALK
	PROP. MEDIAN PAVEMENT		

PLAN DRAWING SCALE: 1" = 50'
 HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



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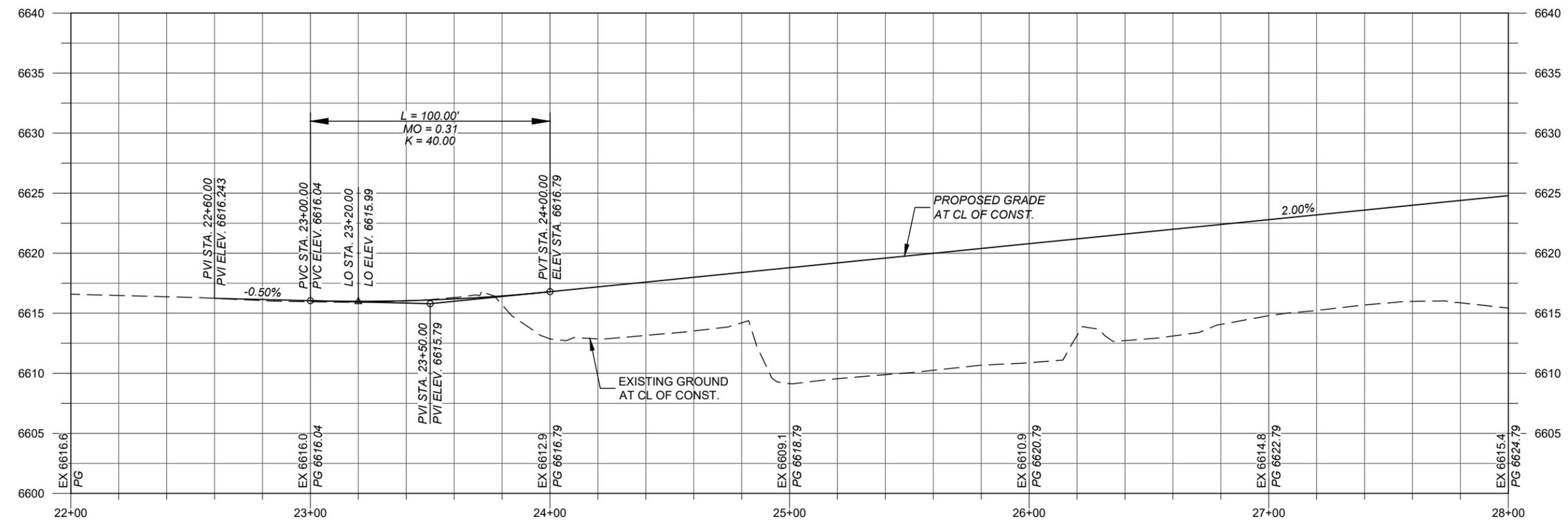
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 1



LEGEND			
— C	CUT SLOPE LIMITS	—	PROP. SIDEWALK
— F	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	· · ·	EXIST. R.O.W.
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	PROP. MEDIAN PAVEMENT	- - -	PROP. R.O.W.

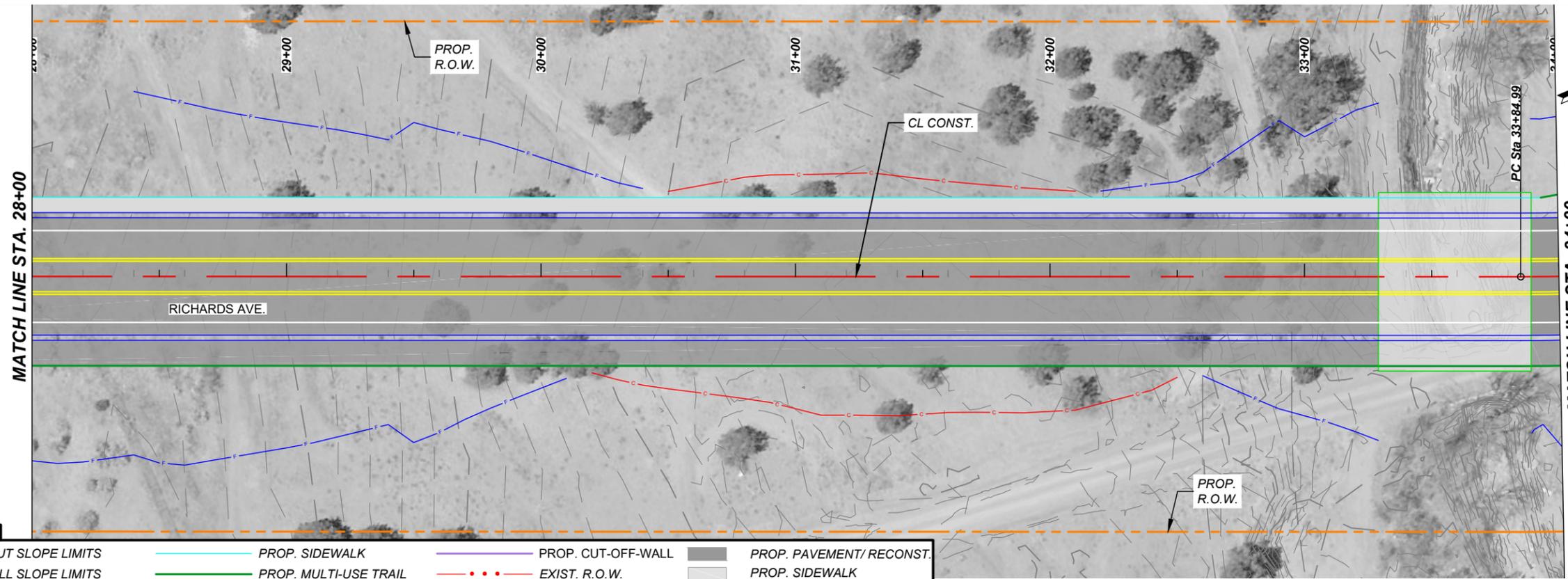
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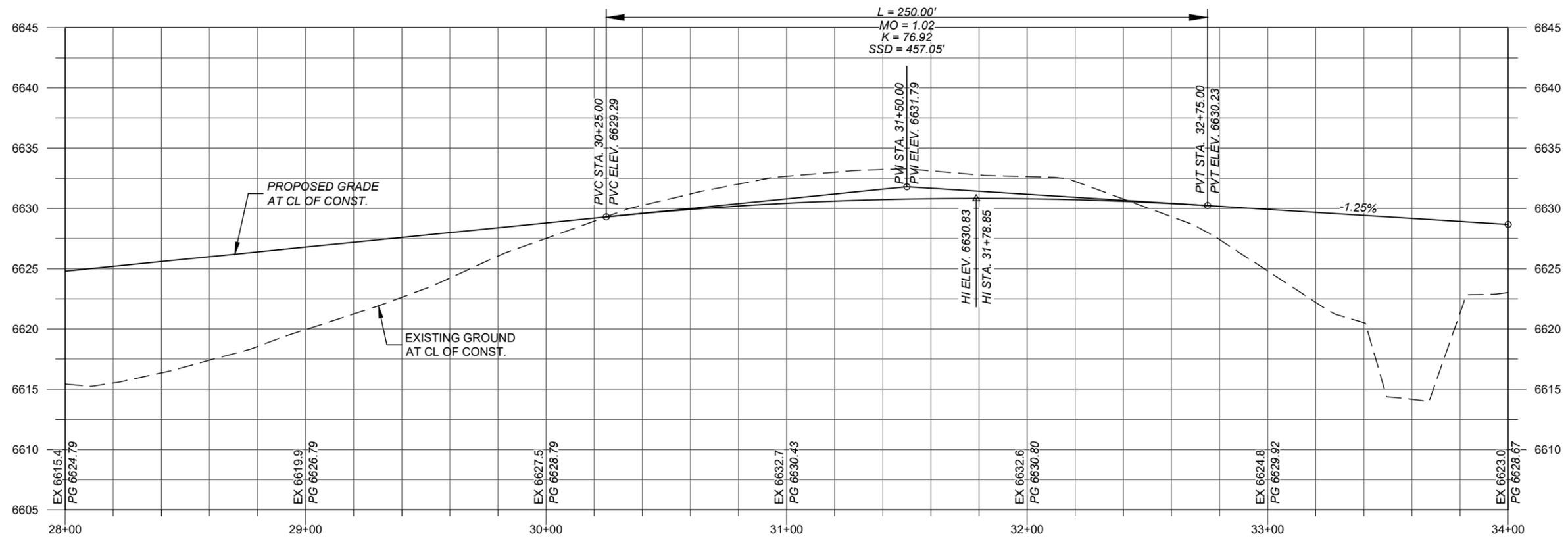
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 1



LEGEND			
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	FILL SLOPE LIMITS		PROP. MULTI-USE TRAIL
	PROP. CURB & GUTTER		PROP. RETAINING WALL
	PROP. CUT-OFF-WALL		EXIST. R.O.W.
	PROP. PAVEMENT/RECONST.		PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

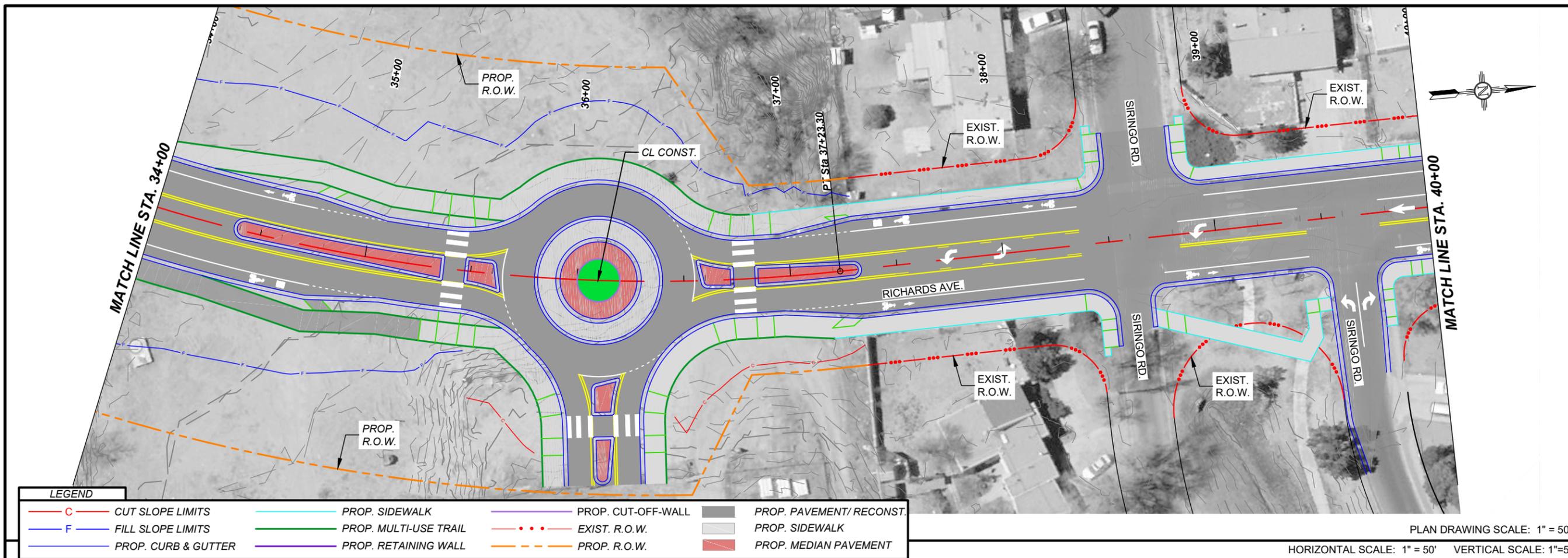
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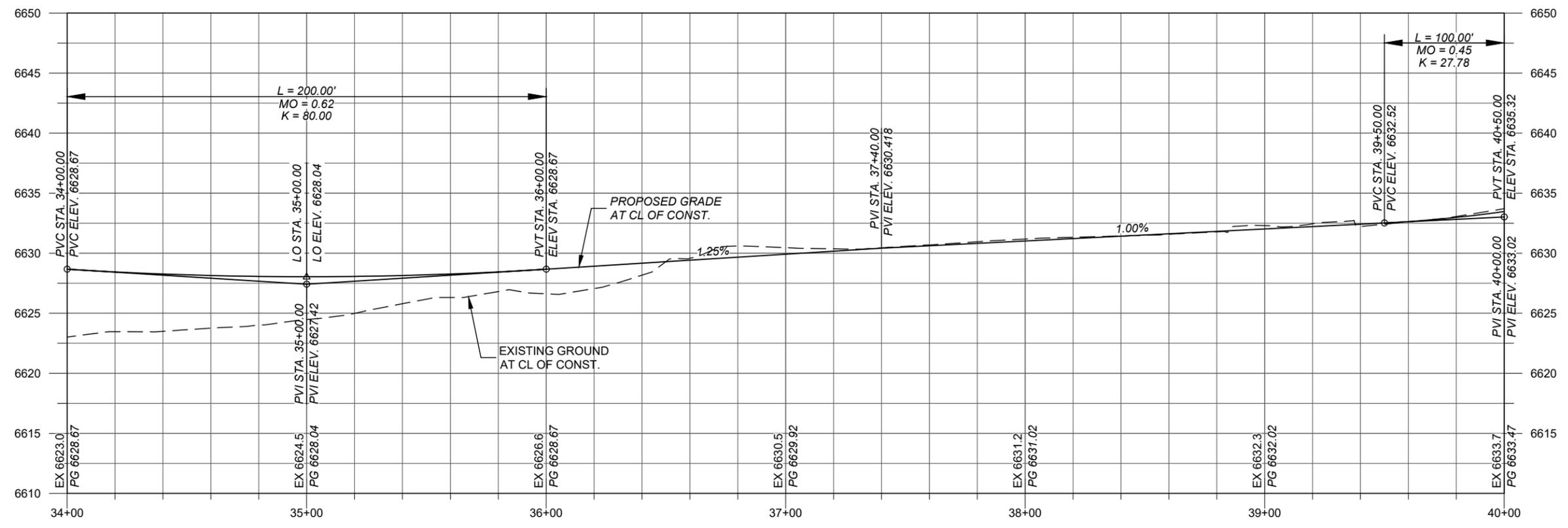
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ARROYO DE LOS CHAMISOS
ROADWAY PLAN AND PROFILE FOR
BUILD ALTERNATIVE 1



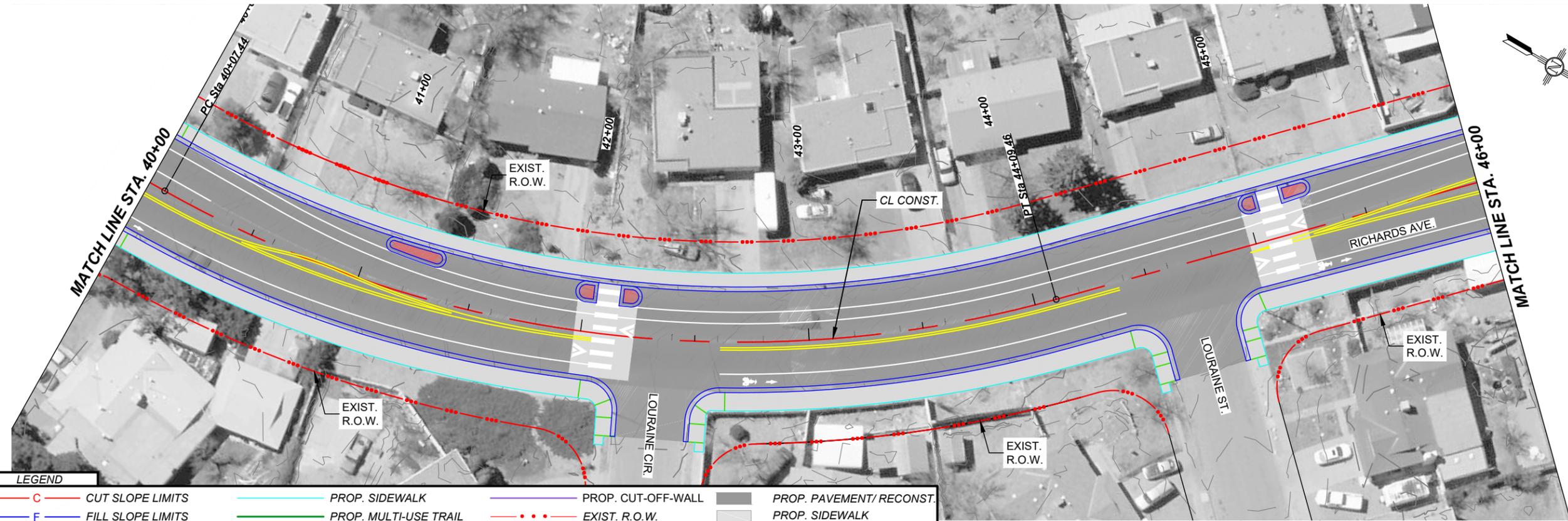
LEGEND			
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— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	- - -	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.		PROP. SIDEWALK
	PROP. MEDIAN PAVEMENT	- - - -	PROP. R.O.W.

PLAN DRAWING SCALE: 1" = 50'
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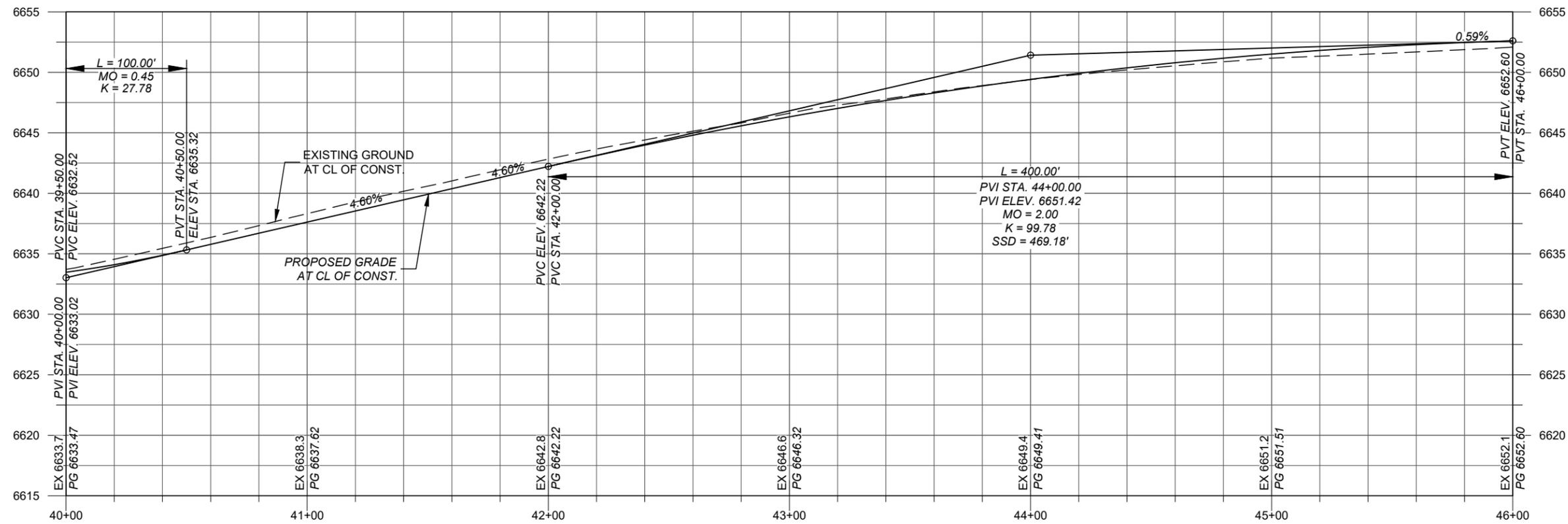
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 1



LEGEND

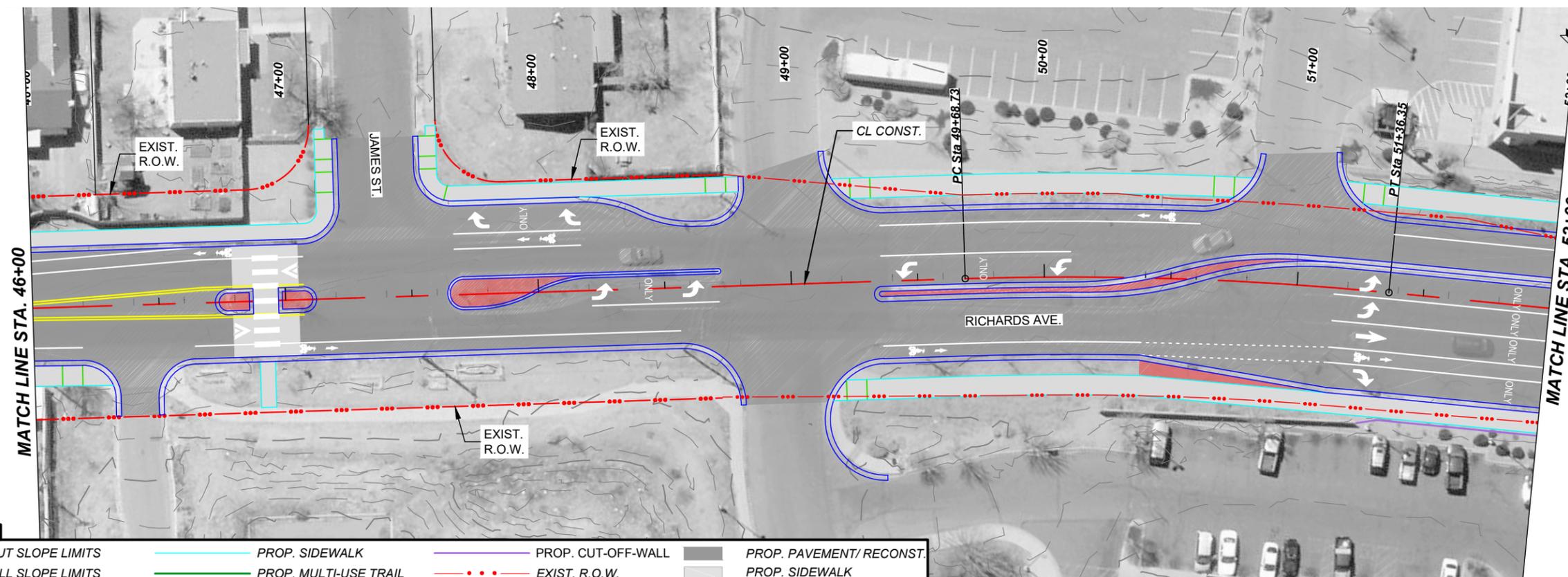
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— F	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL	· · ·	EXIST. R.O.W.		PROP. SIDEWALK
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL	- - -	PROP. R.O.W.		PROP. MEDIAN PAVEMENT

PLAN DRAWING SCALE: 1" = 50'
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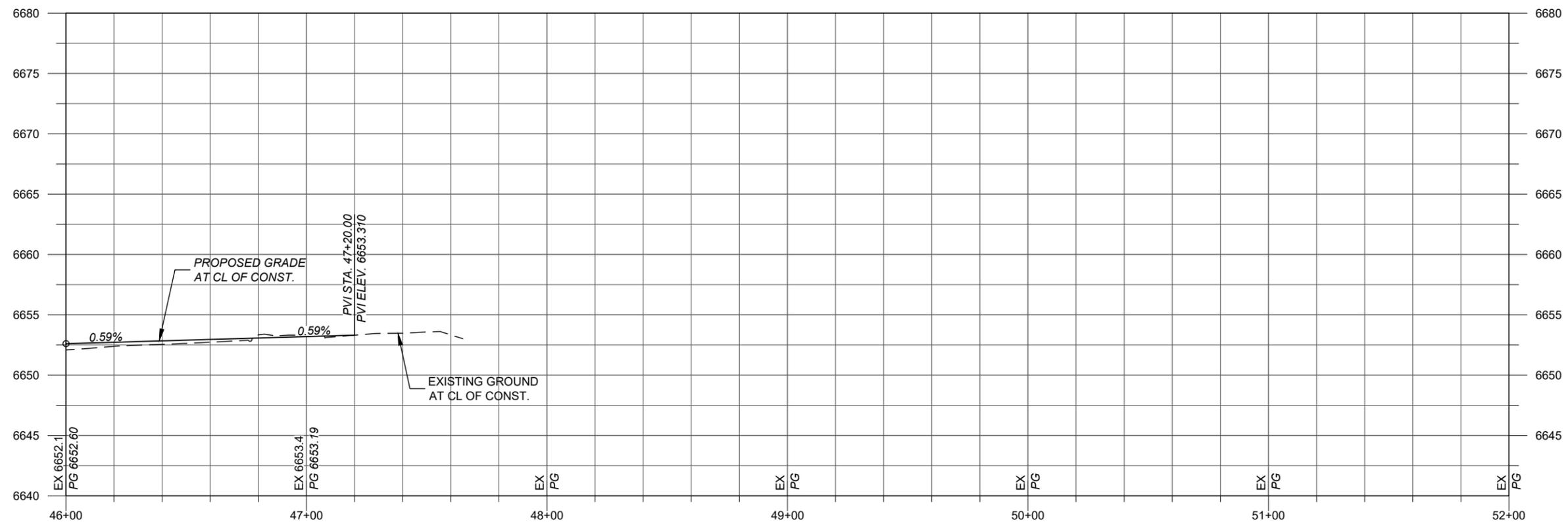
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 1



LEGEND			
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— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	· · ·	EXIST. R.O.W.
	PROP. PAVEMENT/RECONST.	- - -	PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

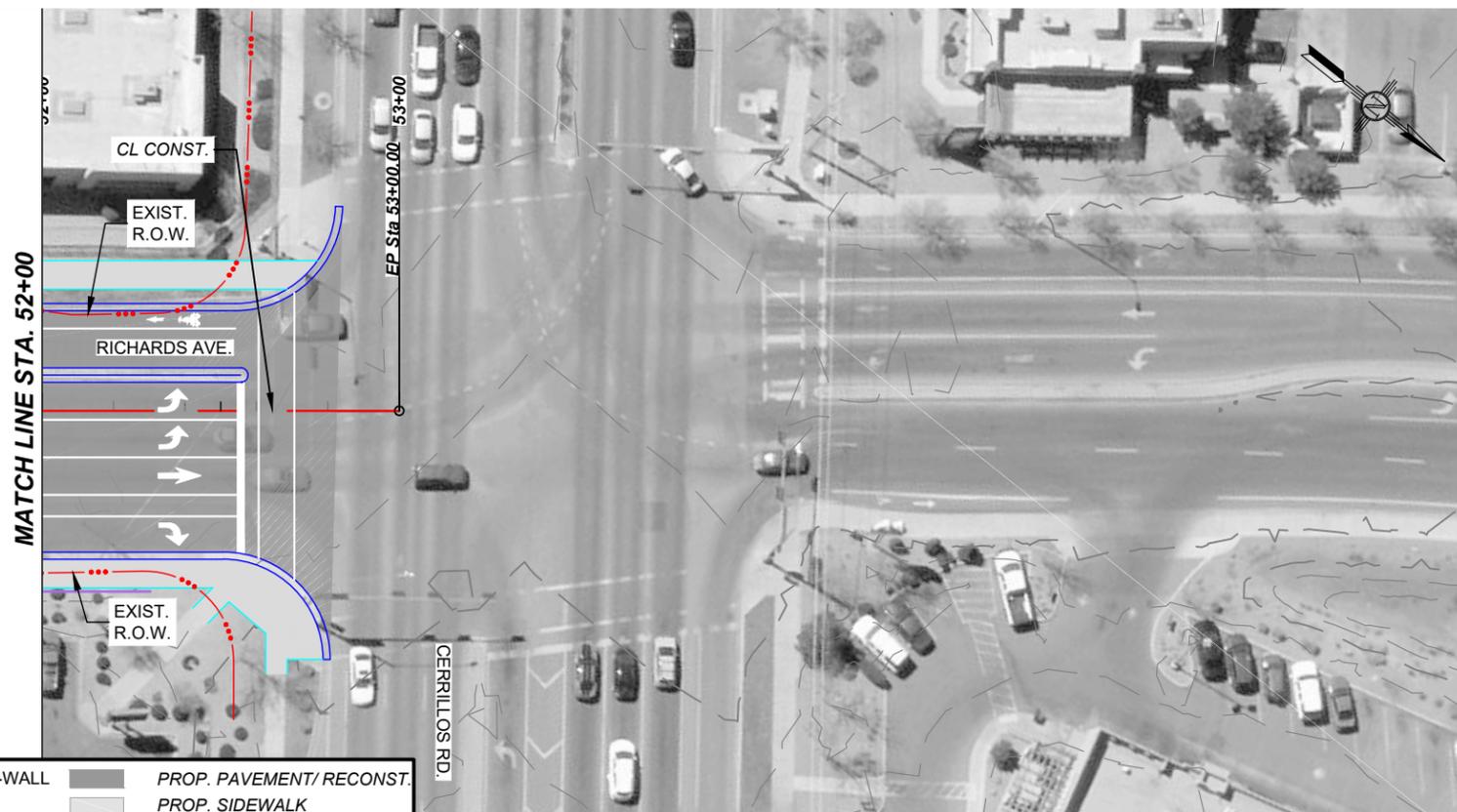
PLAN DRAWING SCALE: 1" = 50'

HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1" = 5'



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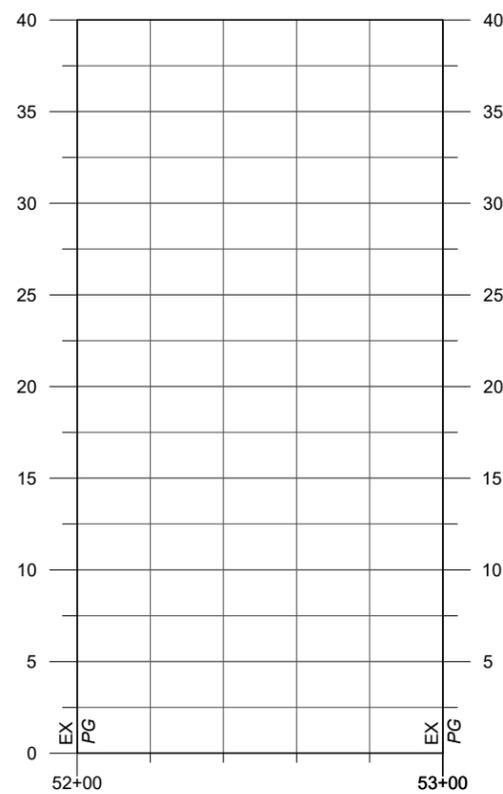
ARROYO DE LOS CHAMISOS
ROADWAY PLAN AND PROFILE FOR
BUILD ALTERNATIVE 1



LEGEND			
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— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	•••••	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.	- - - - -	PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

PLAN DRAWING SCALE: 1" = 50'

HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



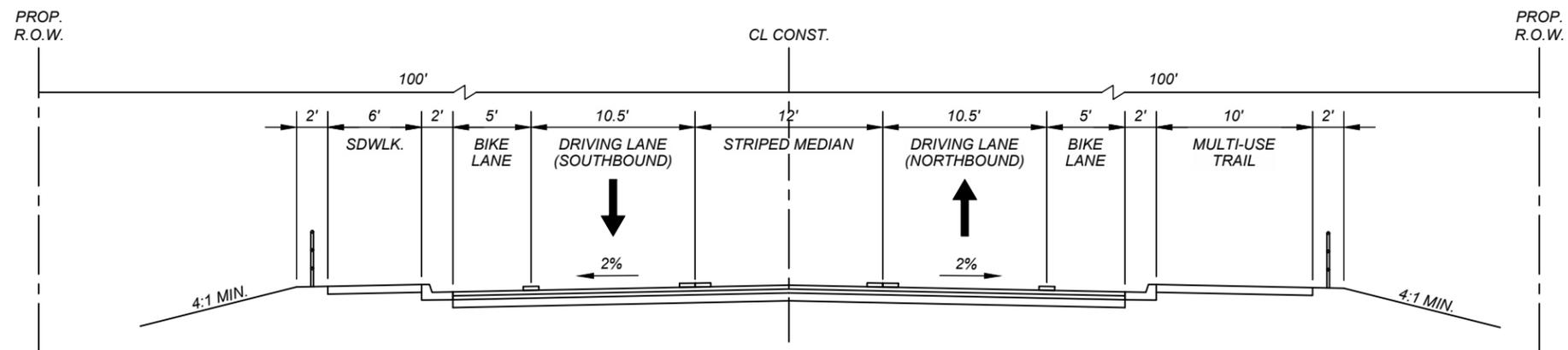
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ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 1

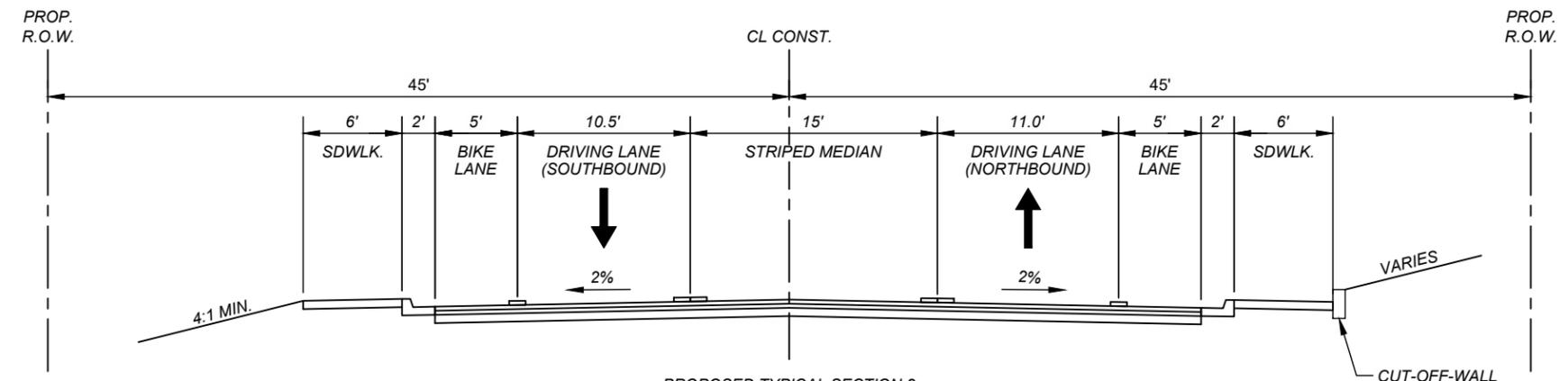


APPENDIX B

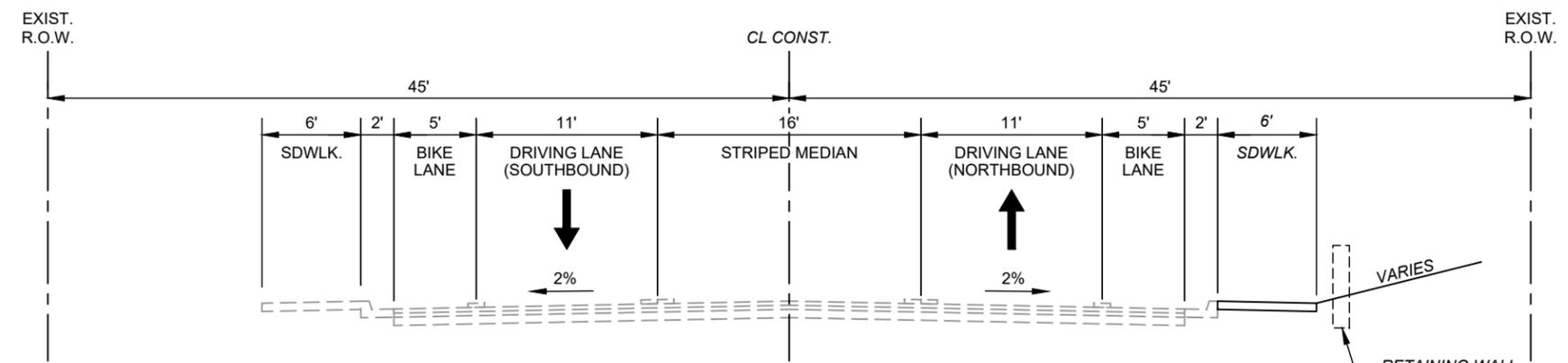
BUILD ALTERNATIVE 2 CONCEPTUAL DESIGN PLANS



PROPOSED TYPICAL SECTION 3
 FIRE STATION ROAD TO BRIDGE
 BRIDGE TO TURNOUT_01
 STA. 23+86.73 TO STA. 24+90.00
 STA. 26+30.00 TO STA. 36+10.00



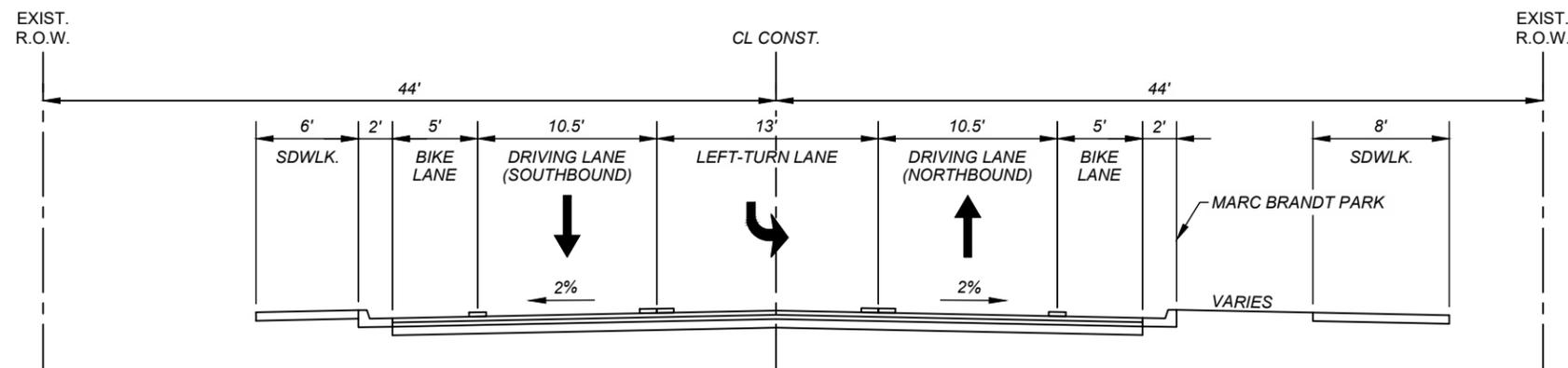
PROPOSED TYPICAL SECTION 2
 CAM DEL PRADO TO FIRE STATION ROAD
 STA. 22+00.00 TO STA. 23+86.73



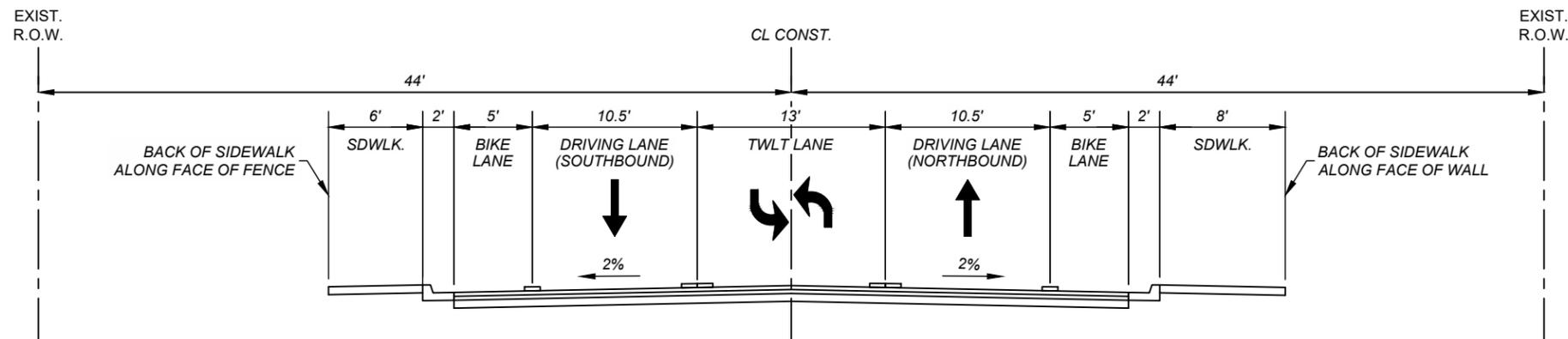
PROPOSED TYPICAL SECTION 1
 RODEO GROUNDS ENTRANCE TO CAM DEL PRADO
 STA. 13+07.51 TO STA. 22+00.00

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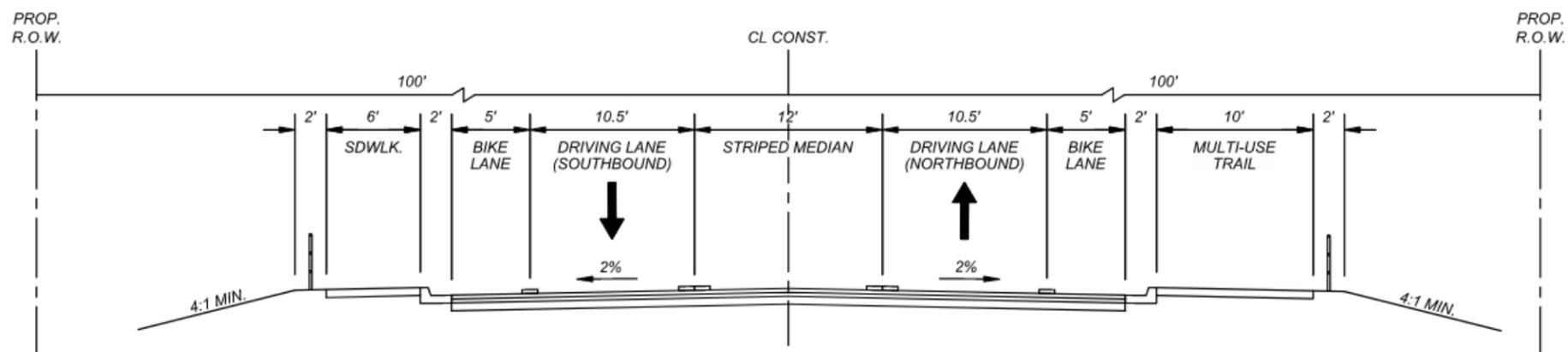
ARROYO DE LOS CHAMISOS
 PROPOSED TYPICAL SECTION FOR BUILD
 ALTERNATIVE 2



PROPOSED TYPICAL SECTION 6
SIRINGO ROAD EASTBOUND TO SIRINGO ROAD WESTBOUND
STA. 38+58.94 TO STA. 39+62.42



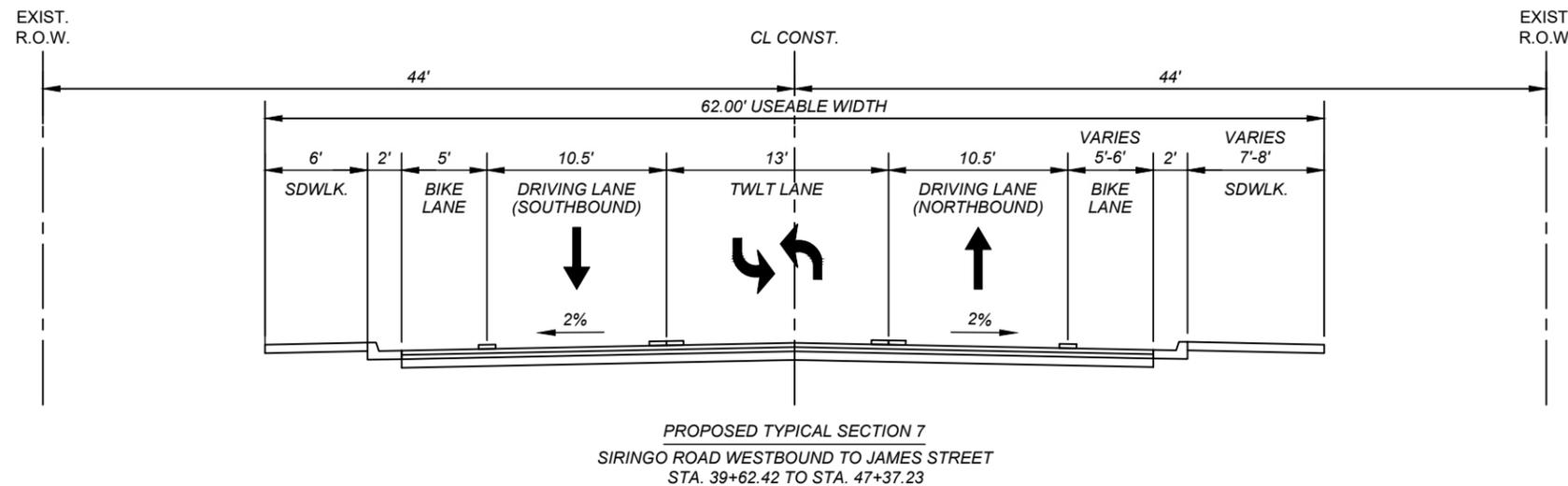
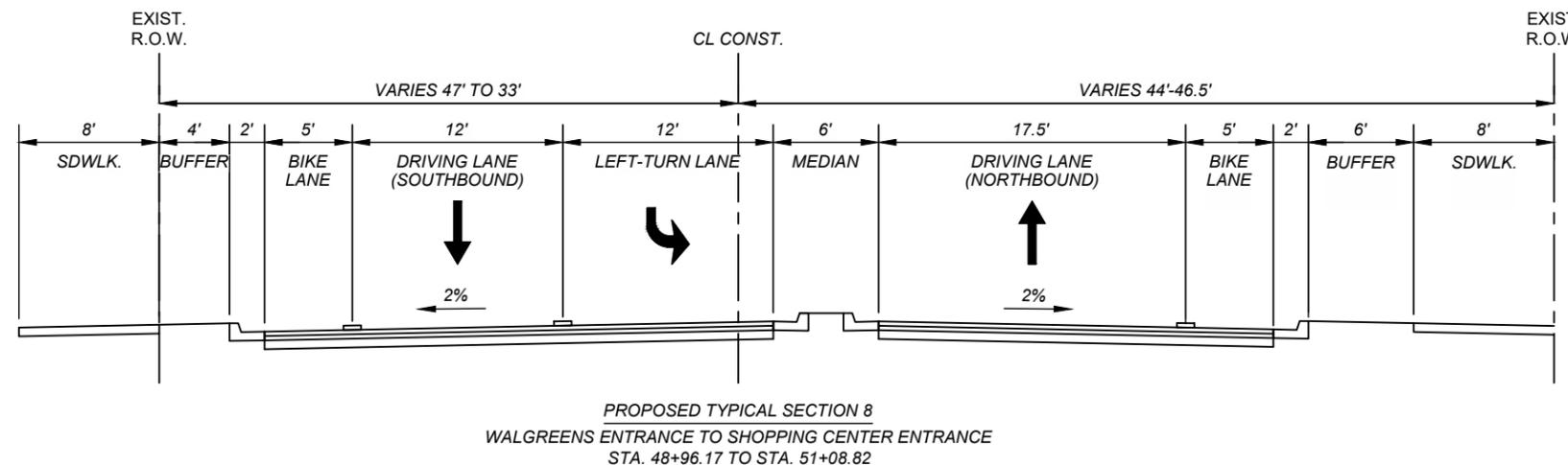
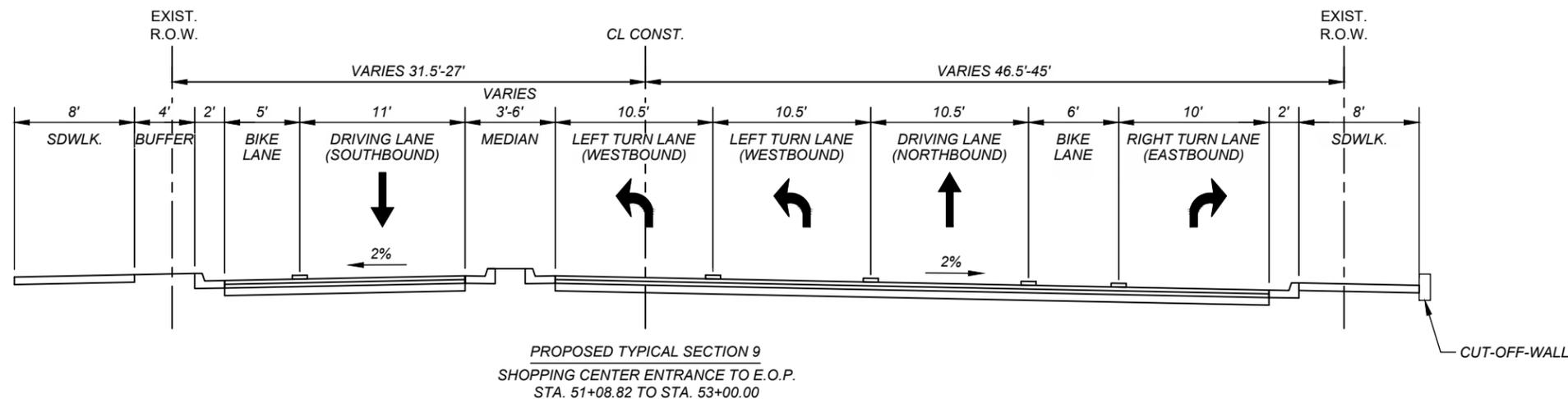
PROPOSED TYPICAL SECTION 5
TURNOUT_01 TO SIRINGO ROAD
STA. 36+10.00 TO 38+58.94



PROPOSED TYPICAL SECTION 4
BRIDGE OVER ARROYO DE LOS CHAMISOS
STA. 24+90.00 TO STA. 26+30.00
MULTI-BARREL CONCRETE BOX CULVERT

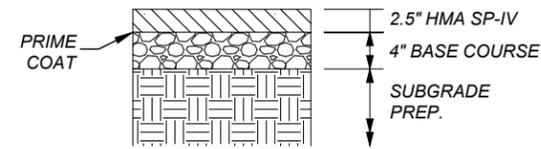
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ARROYO DE LOS CHAMISOS
PROPOSED TYPICAL SECTION FOR BUILD
ALTERNATIVE 2

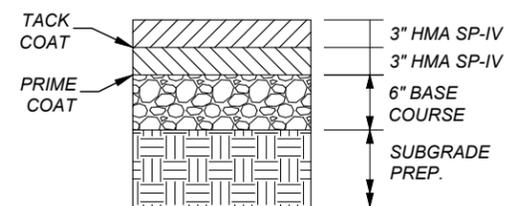


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ARROYO DE LOS CHAMISOS
PROPOSED TYPICAL SECTION FOR BUILD
ALTERNATIVE 2



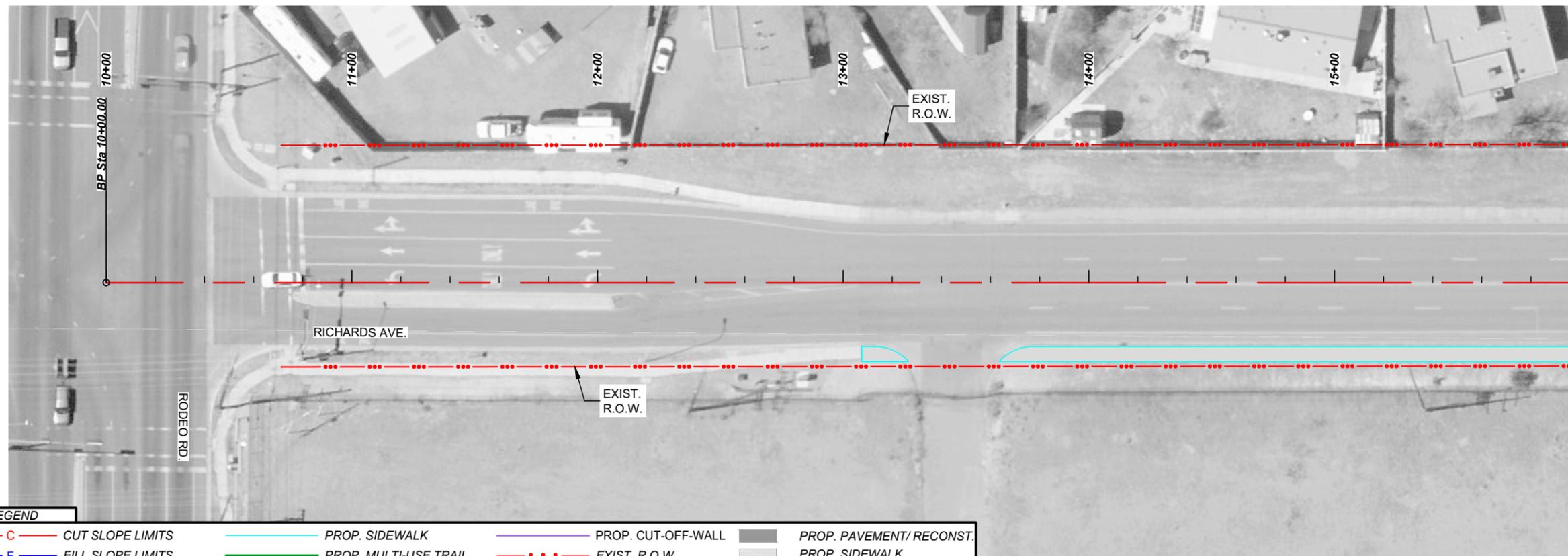
PROPOSED PAVEMENT SECTION NO. 2
MULTI-USE TRAIL



PROPOSED PAVEMENT SECTION NO. 1
RICHARDS AVENUE

NO.	DESCRIPTION	DATE	BY
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ARROYO DE LOS CHAMISOS
PROPOSED TYPICAL SECTION DETAILS FOR
BUILD ALTERNATIVE 2

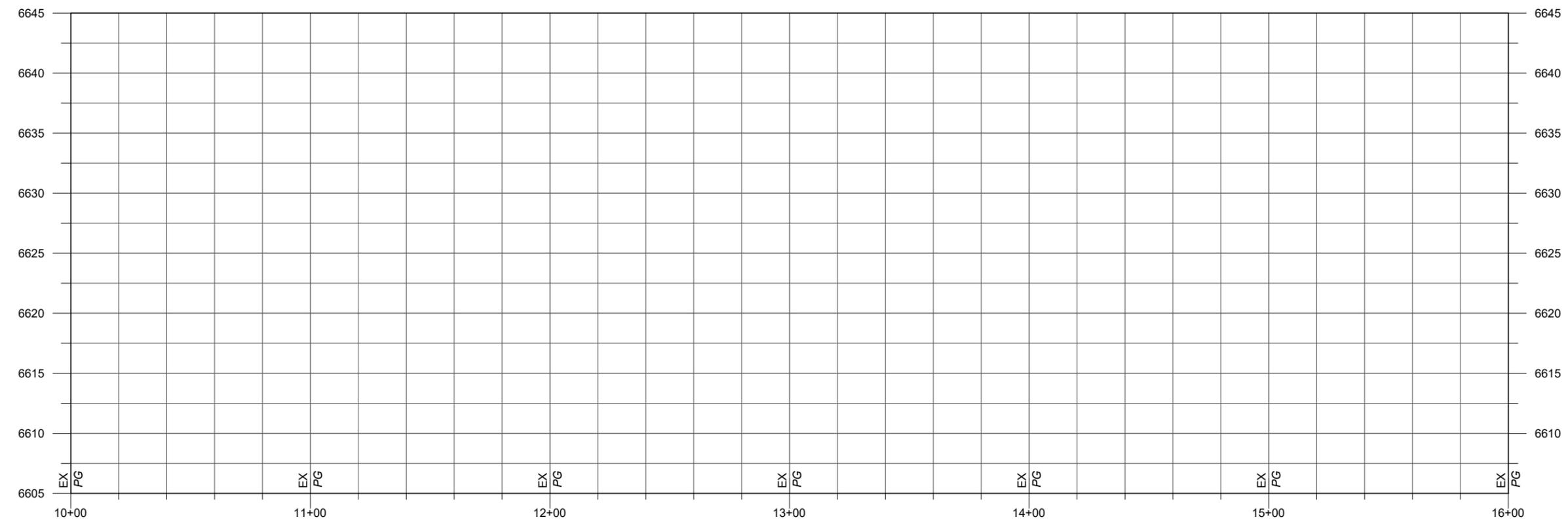


MATCH LINE STA. 16+00

LEGEND			
— C —	CUT SLOPE LIMITS	—	PROP. SIDEWALK
— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	- - -	EXIST. R.O.W.
	PROP. PAVEMENT/RECONST.		PROP. SIDEWALK
	PROP. MEDIAN PAVEMENT	- - -	PROP. R.O.W.

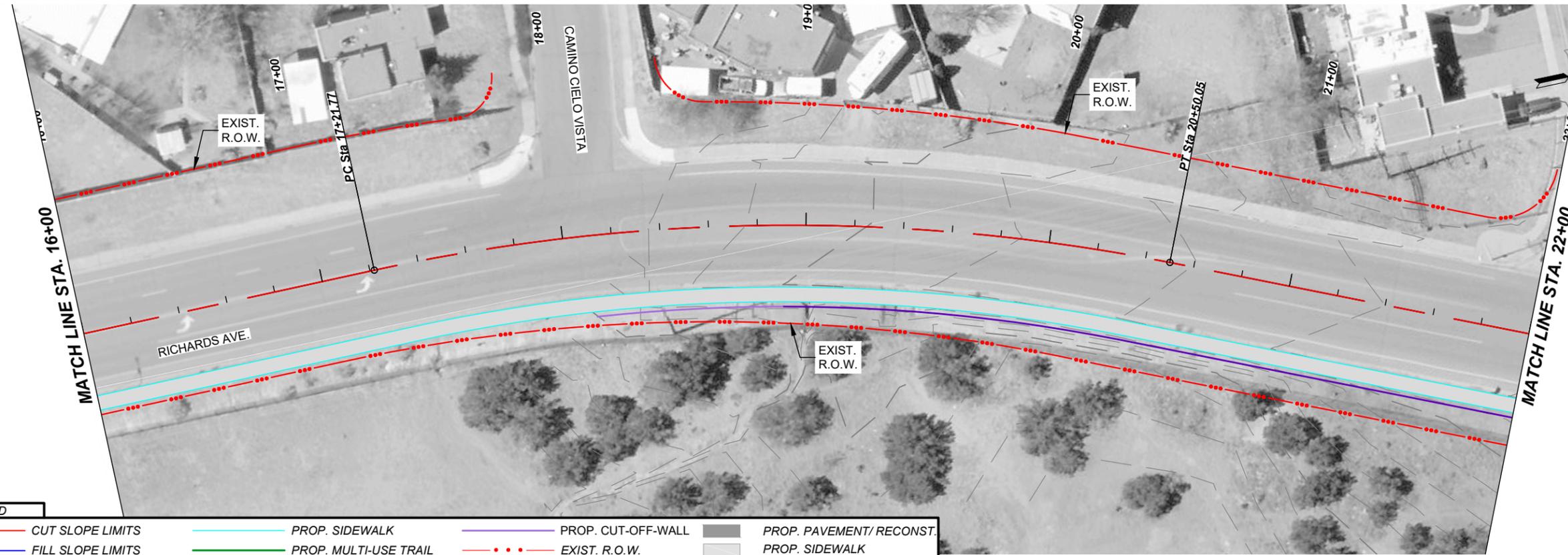
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HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



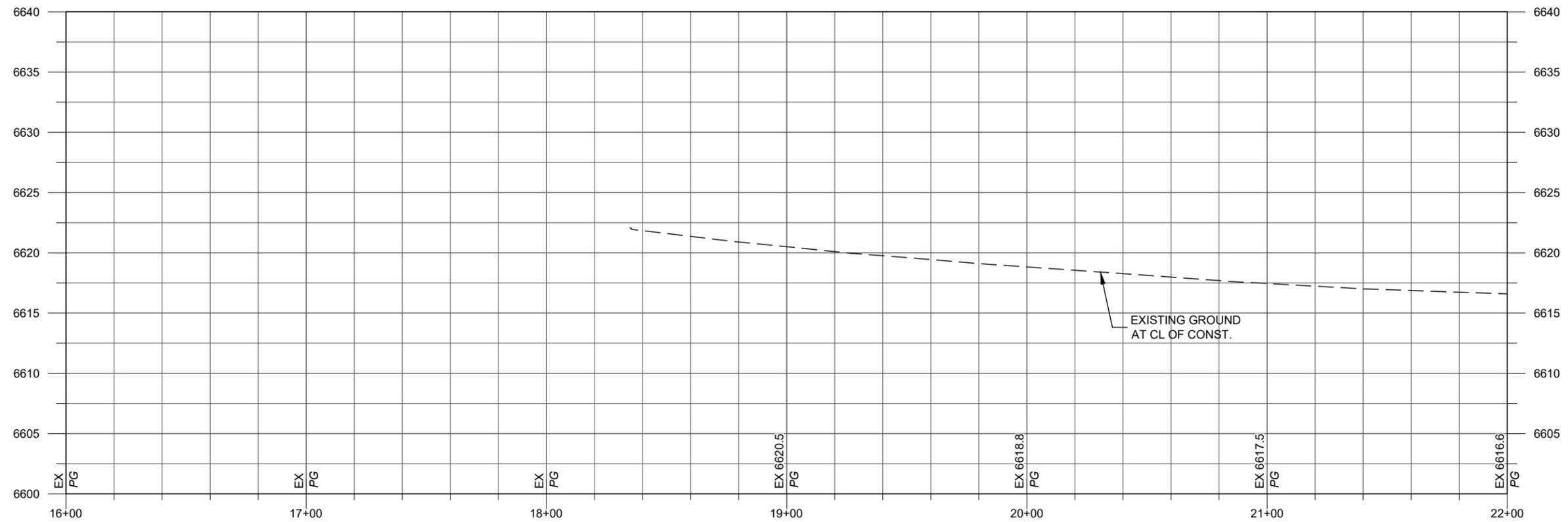
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ARROYO DE LOS CHAMISOS
ROADWAY PLAN AND PROFILE FOR
BUILD ALTERNATIVE 2



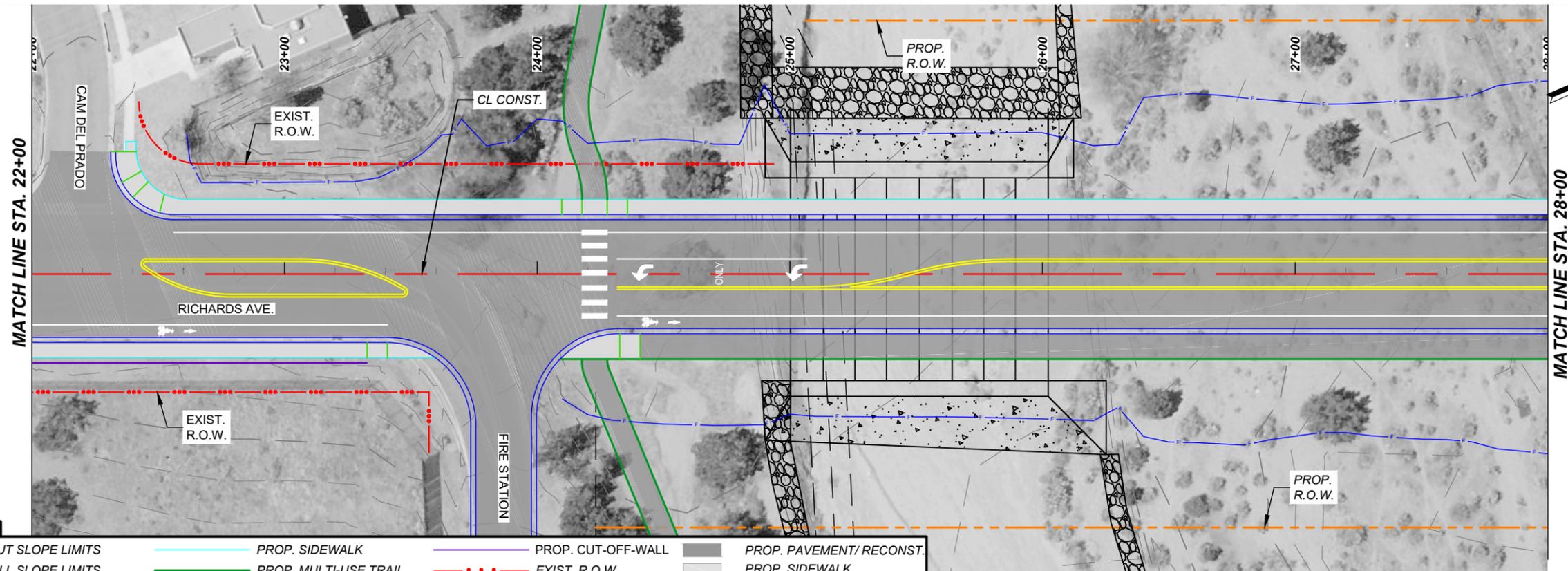
LEGEND			
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— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	· · ·	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.		PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

PLAN DRAWING SCALE: 1" = 50'
 HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



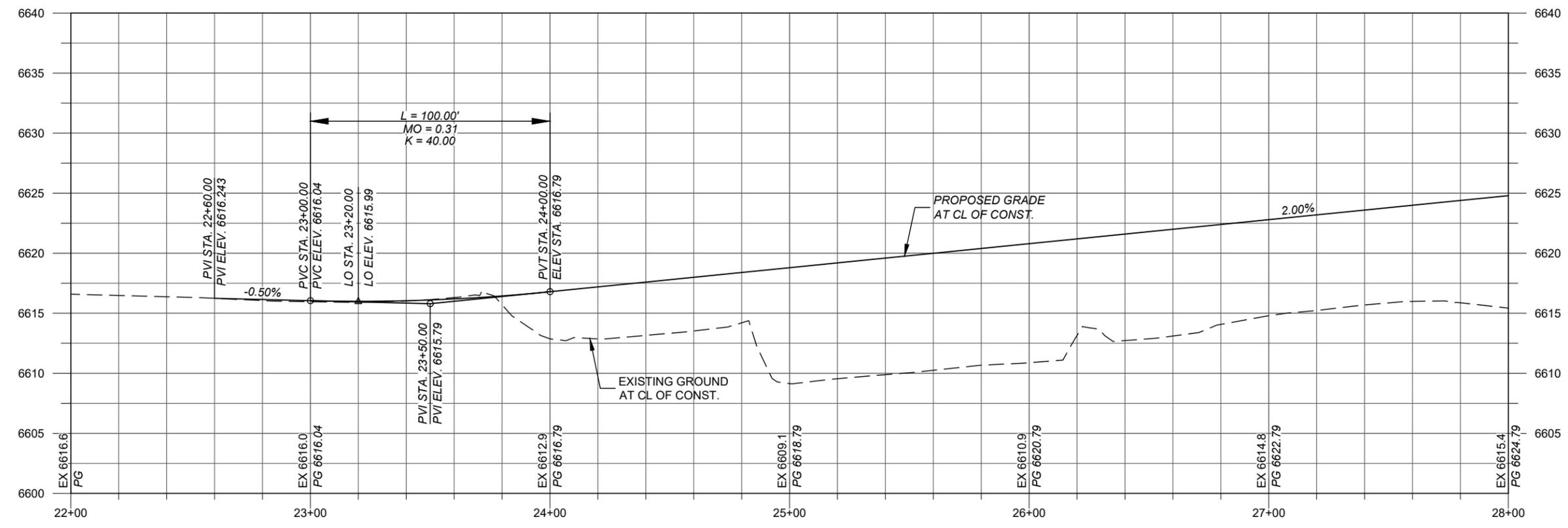
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ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 2



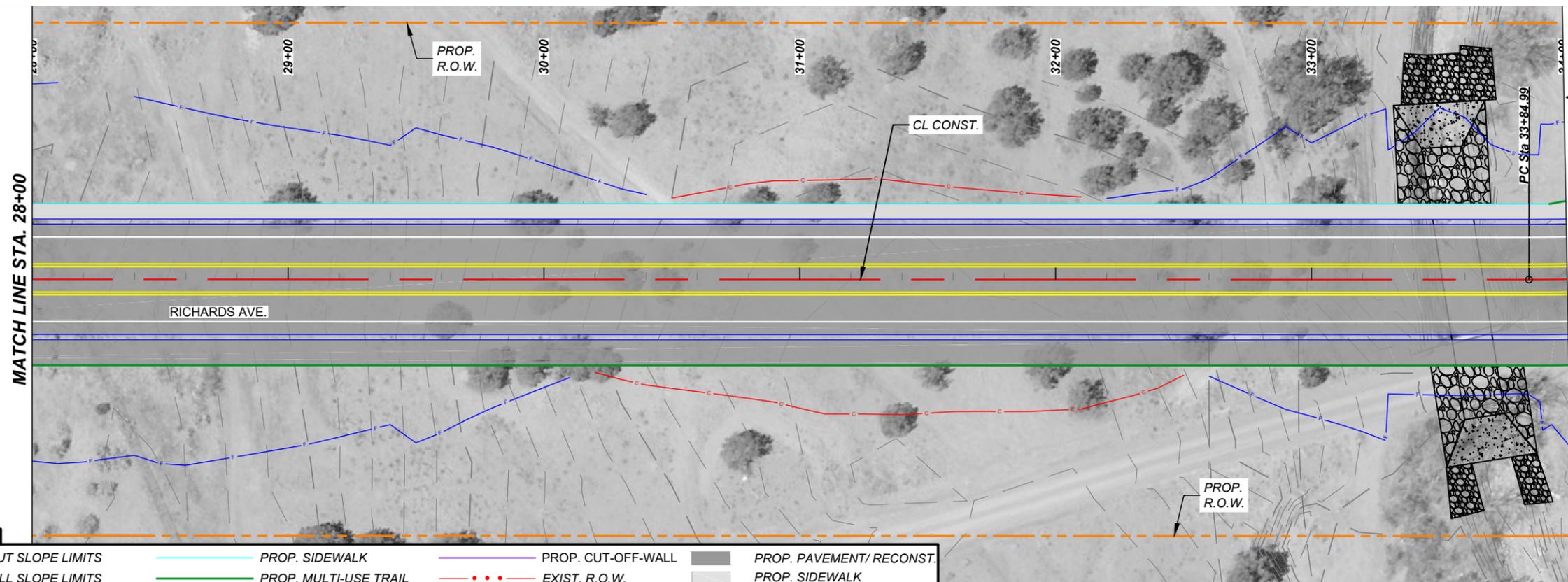
LEGEND			
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—	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	- - -	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.		PROP. SIDEWALK
	PROP. MEDIAN PAVEMENT	- - -	PROP. R.O.W.

PLAN DRAWING SCALE: 1" = 50'
 HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



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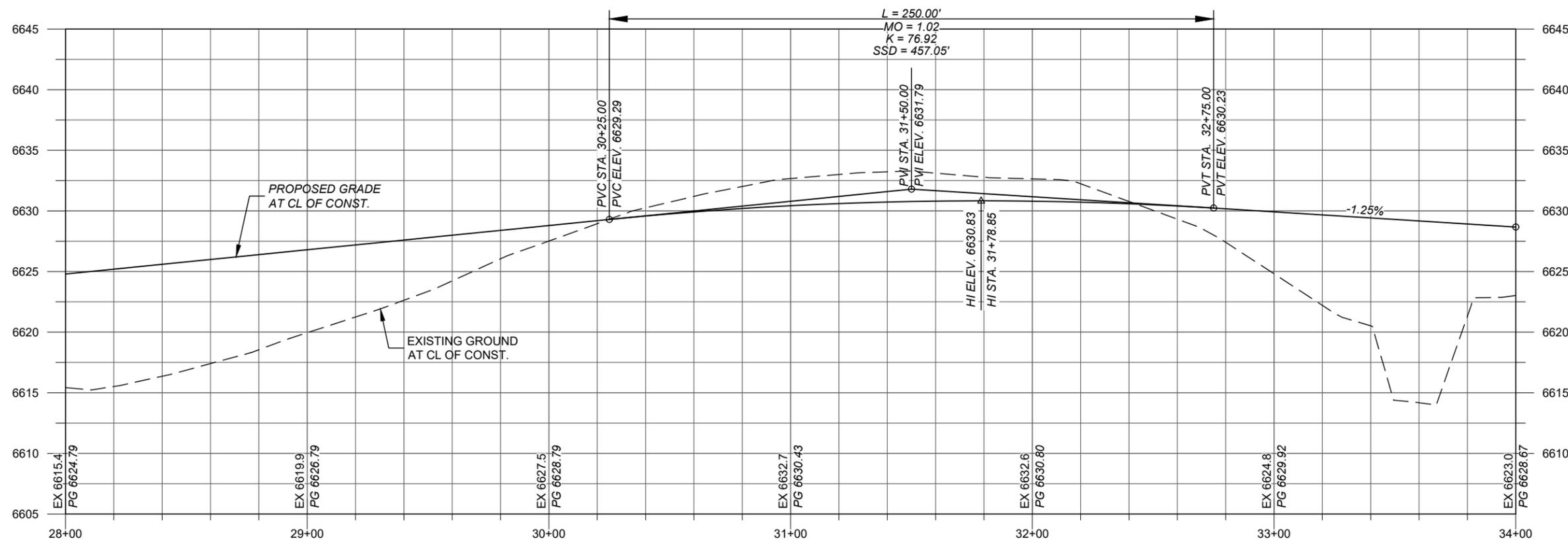
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 2



LEGEND			
	CUT SLOPE LIMITS		PROP. SIDEWALK
	FILL SLOPE LIMITS		PROP. MULTI-USE TRAIL
	PROP. CURB & GUTTER		PROP. RETAINING WALL
	PROP. CUT-OFF-WALL		EXIST. R.O.W.
	PROP. PAVEMENT/RECONST.		PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

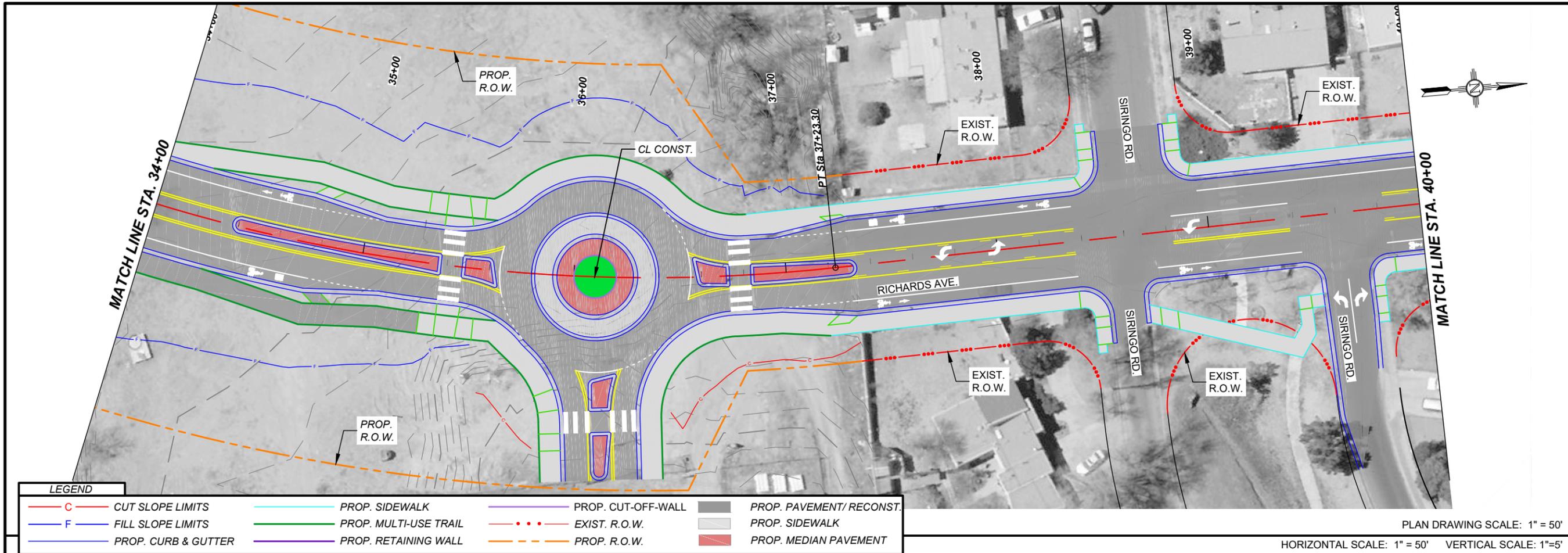
PLAN DRAWING SCALE: 1" = 50'

HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



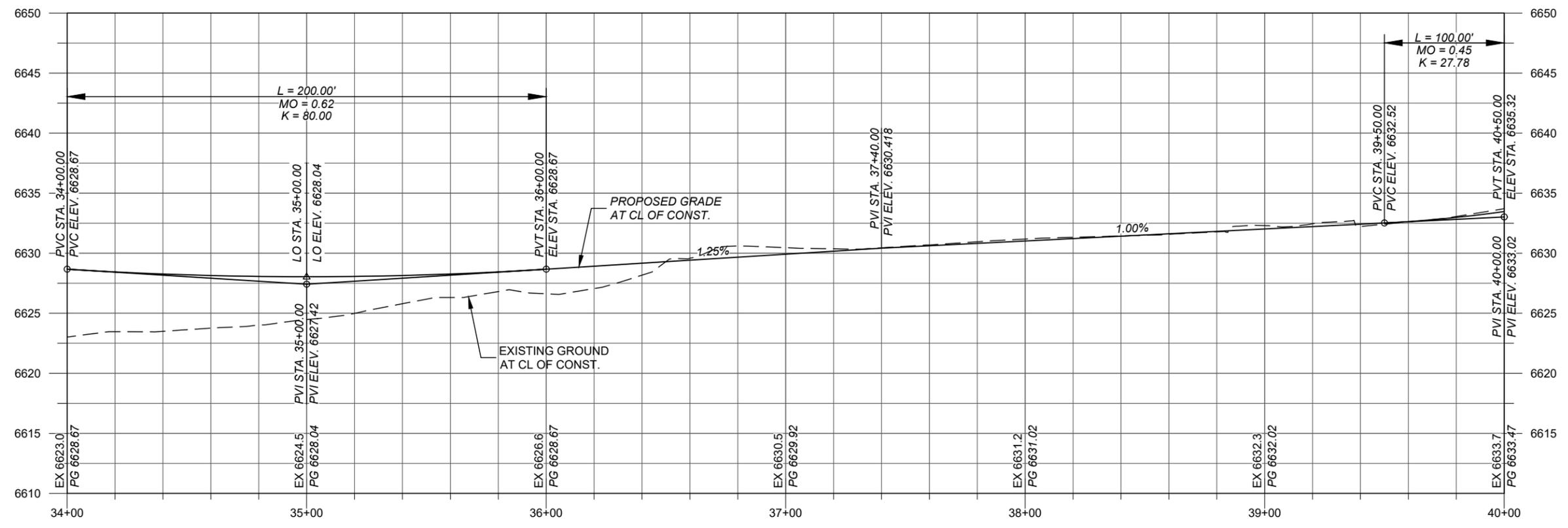
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ARROYO DE LOS CHAMISOS
ROADWAY PLAN AND PROFILE FOR
BUILD ALTERNATIVE 2



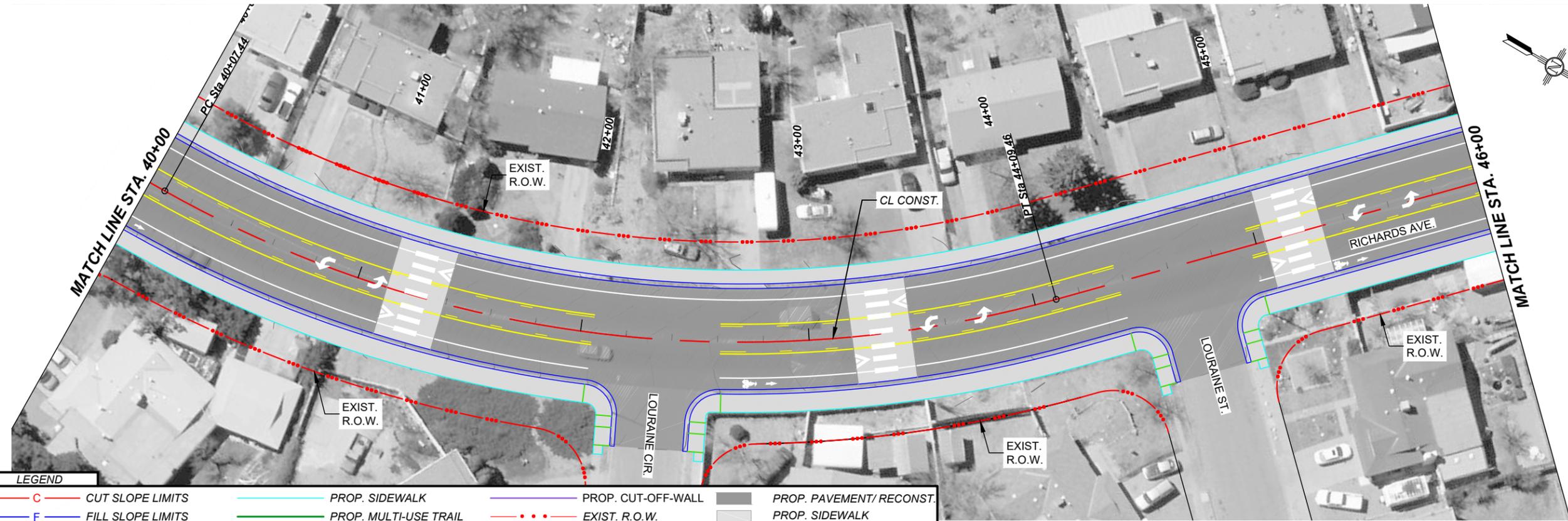
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— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	- - -	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.		PROP. SIDEWALK
	PROP. MEDIAN PAVEMENT	- - -	PROP. R.O.W.

PLAN DRAWING SCALE: 1" = 50'
 HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



NO.	DESCRIPTION	DATE	BY
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ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 2

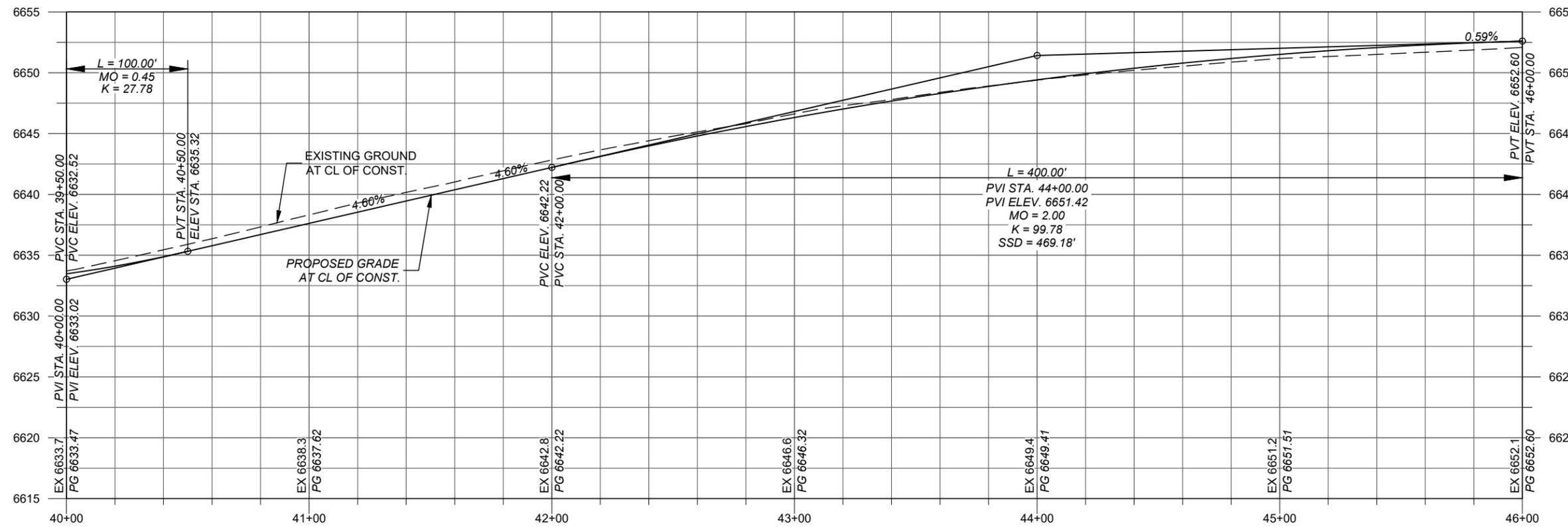


LEGEND

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— F	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL	—	EXIST. R.O.W.		PROP. SIDEWALK
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL	—	PROP. R.O.W.		PROP. MEDIAN PAVEMENT

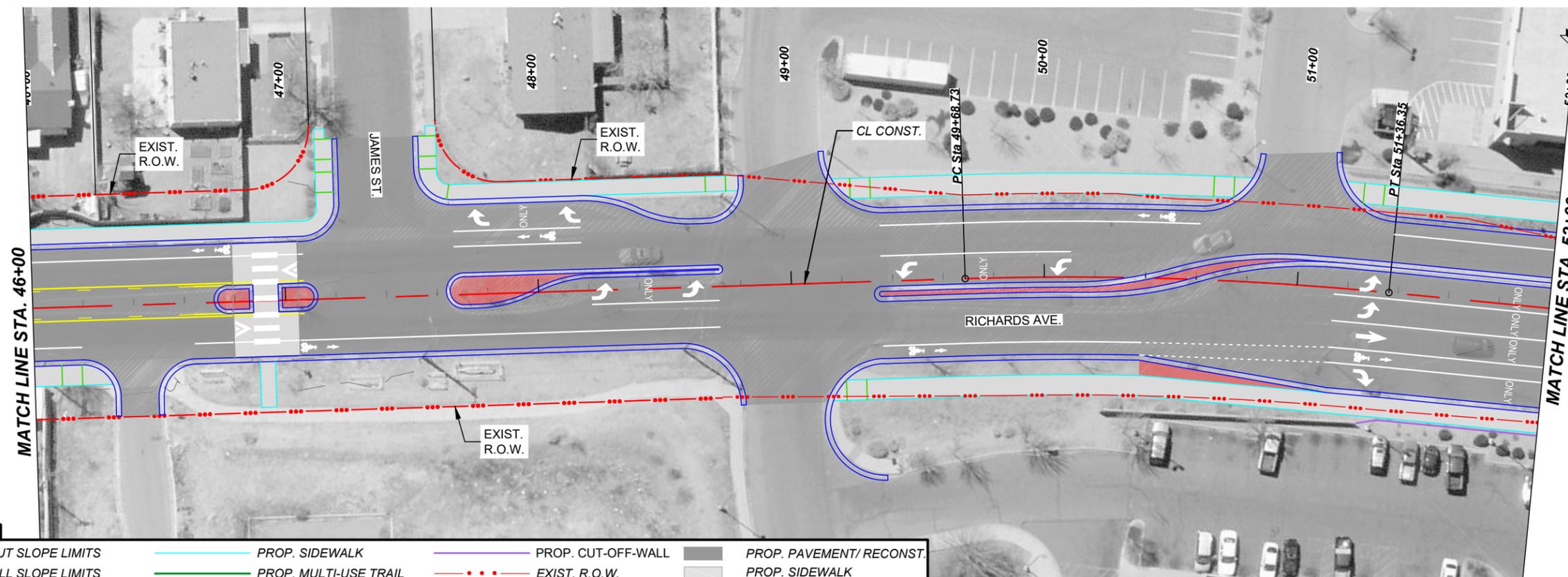
PLAN DRAWING SCALE: 1" = 50'

HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



NO.	DESCRIPTION	DATE	BY
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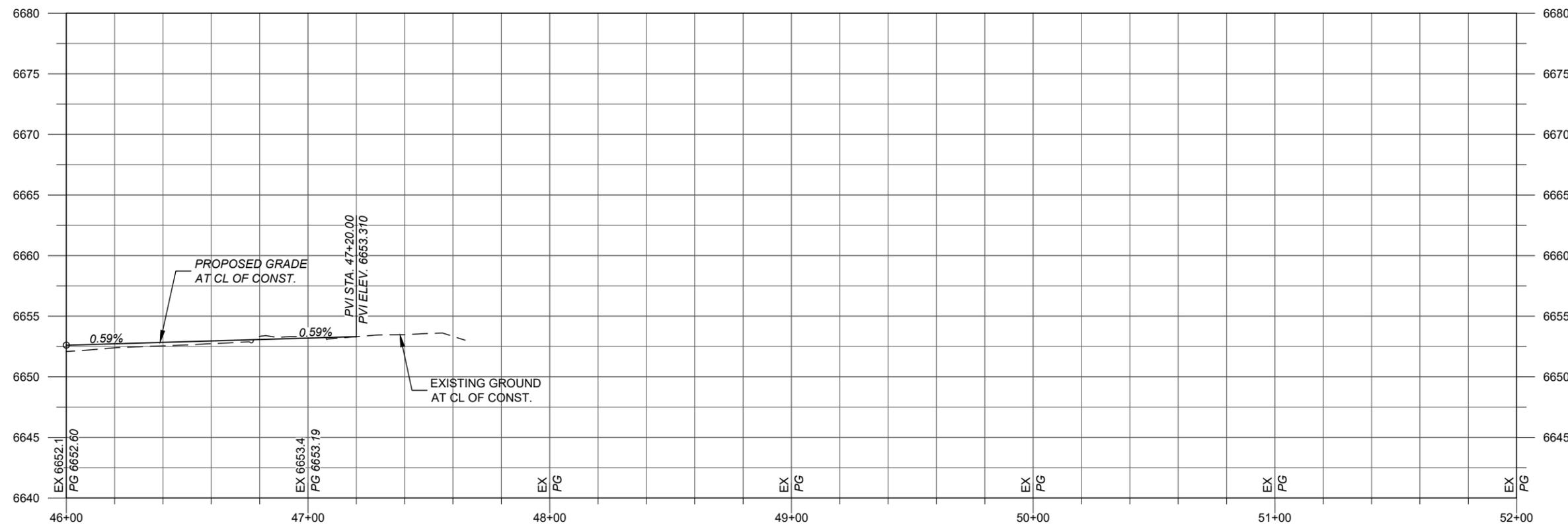
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 2



LEGEND			
— C —	CUT SLOPE LIMITS	—	PROP. SIDEWALK
— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	· · ·	EXIST. R.O.W.
—	PROP. PAVEMENT/RECONST.	- - -	PROP. R.O.W.
—	PROP. SIDEWALK	▭	PROP. MEDIAN PAVEMENT

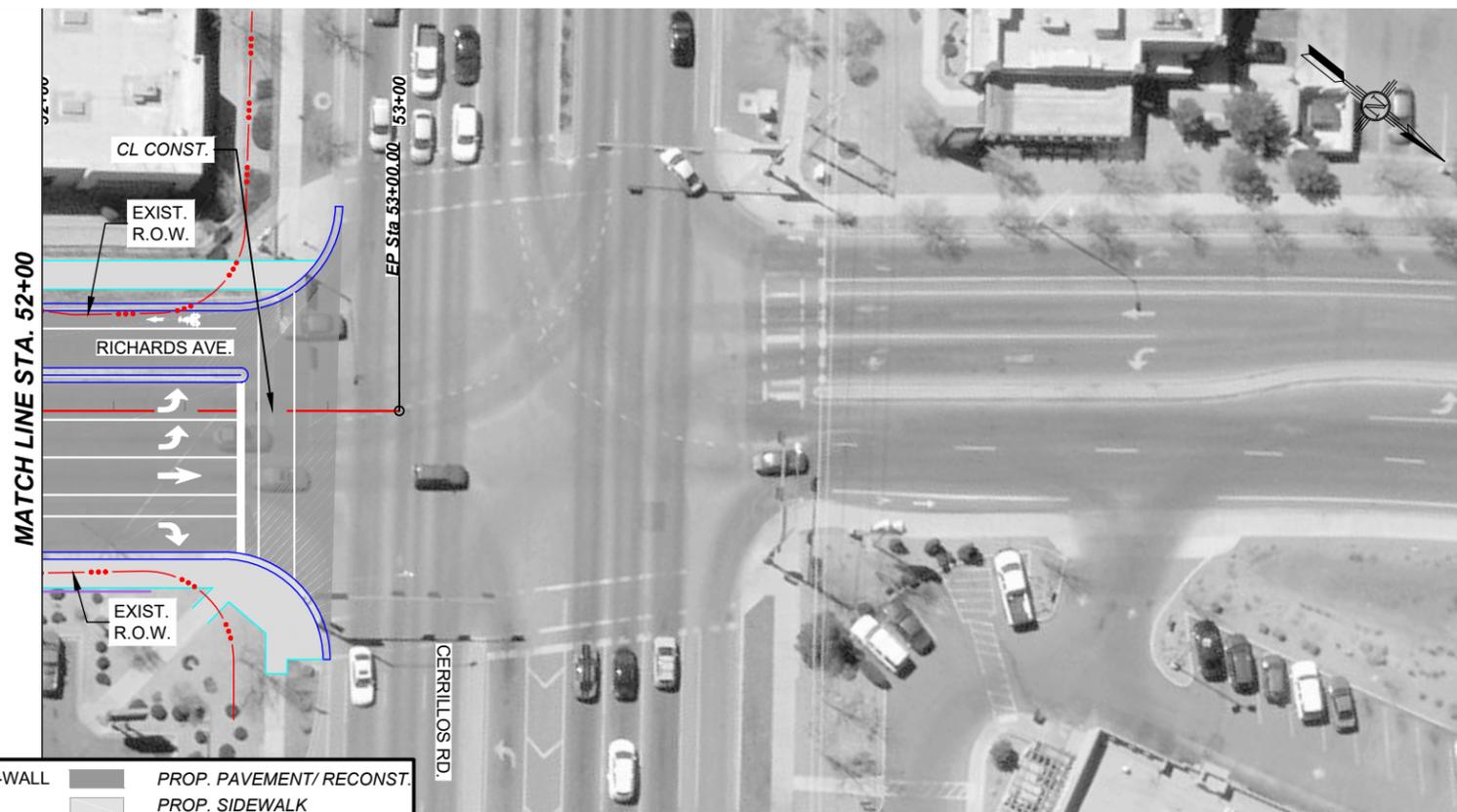
PLAN DRAWING SCALE: 1" = 50'

HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1" = 5'



NO.	DESCRIPTION	DATE	BY
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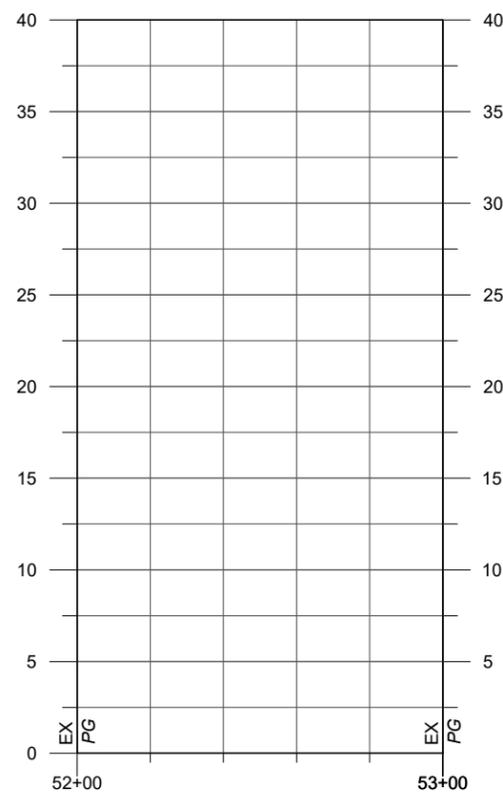
ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 2



LEGEND			
— C —	CUT SLOPE LIMITS	—	PROP. SIDEWALK
— F —	FILL SLOPE LIMITS	—	PROP. MULTI-USE TRAIL
—	PROP. CURB & GUTTER	—	PROP. RETAINING WALL
—	PROP. CUT-OFF-WALL	••••	EXIST. R.O.W.
	PROP. PAVEMENT/ RECONST.	- - - -	PROP. R.O.W.
	PROP. SIDEWALK		PROP. MEDIAN PAVEMENT

PLAN DRAWING SCALE: 1" = 50'

HORIZONTAL SCALE: 1" = 50' VERTICAL SCALE: 1"=5'



NO.	DESCRIPTION	DATE	BY
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ARROYO DE LOS CHAMISOS
 ROADWAY PLAN AND PROFILE FOR
 BUILD ALTERNATIVE 2



APPENDIX C

CONCEPTUAL CONSTRUCTION COST ESTIMATES



Estimate of Probable Cost for Build Alternative 1

Arroyo de los Chamisos Crossing
City of Santa Fe
19-0127
Not Assigned
Phase IB
3/19/2022

COST SUMMARY - BUILD ALTERNATIVE 1

TYPE OF CONSTRUCTION	SOUTH SEGMENT	MIDDLE SEGMENT	NORTH SEGMENT	ALT 1 TOTAL CONSTRUCTION COST
ROADWAY	\$585,640.00	\$1,585,150.00	\$1,018,650.00	\$3,189,440.00
ADLC BRIDGE		\$3,419,600.00		\$3,419,600.00
ADLP BRIDGE		\$1,273,200.00		\$1,273,200.00
DRAINAGE		\$241,130.00	\$42,290.00	\$283,420.00
CONSTRUCTION SIGNING	\$10,000.00	\$15,000.00	\$50,000.00	\$75,000.00
CONSTRUCTION ENGINEERING	\$7,000.00	\$67,500.00	\$50,500.00	\$125,000.00
PERMANENT SIGNING AND STRIPING		\$22,440.00	\$24,340.00	\$46,780.00
LIGHTING	\$3,880.00	\$62,090.00	\$29,210.00	\$95,180.00
SIGNALIZATION	\$35,000.00		\$15,000.00	\$50,000.00
LANDSCAPING		\$75,000.00		\$75,000.00
SUBTOTAL CONSTRUCTION ITEMS	\$641,520.00	\$6,761,110.00	\$1,229,990.00	\$8,632,620.00
CONTINGENCY (by segment: 15%, 30%, 25%)	\$96,228.00	\$2,028,333.00	\$307,497.50	\$2,432,058.50
SUBTOTAL	\$737,748.00	\$8,789,443.00	\$1,537,487.50	\$11,064,678.50
TRAFFIC CONTROL MANAGEMENT (% varies)	\$5,000.00	\$26,368.33	\$153,748.75	\$185,117.08
MOBILIZATION (10%)	\$74,274.80	\$528,948.68	\$169,123.63	\$772,347.10
SUBTOTAL	\$817,022.80	\$9,344,760.01	\$1,860,359.88	\$12,022,142.68
Construction Augmentation (5%)	\$40,851.14	\$467,238.00	\$93,017.99	\$601,107.13
SUBTOTAL	\$857,873.94	\$9,811,998.01	\$1,953,377.87	\$12,623,249.82
NM GROSS RECEIPTS TAX (see below)	\$72,383.11	\$827,887.33	\$164,816.26	\$1,065,086.70
ALTERNATIVE 1 TOTALS (Including NMGR)	\$930,257.05	\$10,639,885.34	\$2,118,194.13	\$13,688,000.00
	SOUTH	MIDDLE	NORTH	TOTAL

NMGR Rates: (January 1, 2022 to June 30, 2022):
Santa Fe, Santa Fe County

8.4375%

Estimate of Probable Cost for Build Alternative 2

Arroyo de los Chamisos Crossing
City of Santa Fe
19-0127
Not Assigned
Phase IB
3/19/2022

COST SUMMARY - BUILD ALTERNATIVE 2

TYPE OF CONSTRUCTION	SOUTH SEGMENT	MIDDLE SEGMENT	NORTH SEGMENT	ALT 1 TOTAL CONSTRUCTION COST
ROADWAY	\$585,640.00	\$1,510,720.00	\$1,078,500.00	\$3,174,860.00
ADLC MULTI-BARREL CBC		\$2,321,420.00		\$2,321,420.00
ADLP SINGLE BARREL CBC		\$425,235.00		\$425,235.00
DRAINAGE		\$241,130.00	\$42,290.00	\$283,420.00
CONSTRUCTION SIGNING	\$10,000.00	\$15,000.00	\$50,000.00	\$75,000.00
CONSTRUCTION ENGINEERING	\$7,000.00	\$67,500.00	\$50,500.00	\$125,000.00
PERMANENT SIGNING AND STRIPING		\$22,440.00	\$24,340.00	\$46,780.00
LIGHTING	\$3,880.00	\$62,090.00	\$29,210.00	\$95,180.00
SIGNALIZATION	\$35,000.00		\$15,000.00	\$50,000.00
LANDSCAPING		\$75,000.00		\$75,000.00
SUBTOTAL CONSTRUCTION ITEMS	\$641,520.00	\$4,740,535.00	\$1,289,840.00	\$6,671,895.00
CONTINGENCY (by segment: 15%, 30%, 25%)	\$96,228.00	\$1,422,160.50	\$322,460.00	\$1,840,848.50
SUBTOTAL	\$737,748.00	\$6,162,695.50	\$1,612,300.00	\$8,512,743.50
TRAFFIC CONTROL MANAGEMENT (% varies)	\$5,000.00	\$18,488.09	\$161,230.00	\$184,718.09
MOBILIZATION (10%)	\$74,274.80	\$370,871.02	\$177,353.00	\$622,498.82
SUBTOTAL	\$817,022.80	\$6,552,054.60	\$1,950,883.00	\$9,319,960.40
Construction Augmentation (5%)	\$40,851.14	\$327,602.73	\$97,544.15	\$465,998.02
SUBTOTAL	\$857,873.94	\$6,879,657.33	\$2,048,427.15	\$9,785,958.42
NM GROSS RECEIPTS TAX (see below)	\$72,383.11	\$580,471.09	\$172,836.04	\$825,690.24
ALTERNATIVE 1 TOTALS (Including NMGR)	\$930,257.05	\$7,460,128.42	\$2,221,263.19	\$10,612,000.00
	SOUTH	MIDDLE	NORTH	TOTAL

NMGR Rates: (January 1, 2022 to June 30, 2022):
Santa Fe, Santa Fe County

8.4375%

Submitted by:



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Bohannon  **Huston**

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