

3 Project Description

This chapter provides a detailed description of the Newell Creek Pipeline (NCP) Improvement Project (Proposed Project). It includes information about the location and setting; existing facilities and operations; background on the City of Santa Cruz Water Department (City) and the NCP; Proposed Project purpose and objectives; Proposed Project components; construction schedule and activities; operations and maintenance (O&M); the City's Standard Construction Practices incorporated into the Proposed Project; and anticipated required permits and/or approvals for the Proposed Project. This chapter is based on the 30% design drawings and Basis of Design Reports prepared by the City's consulting design engineers for three of the proposed pipeline sections (Carollo 2021, Mott MacDonald 2021b), and other background studies prepared for the Proposed Project (HDR 2020, 2019a, 2019b, 2019c, 2018; Kennedy Jenks 2017; Mott MacDonald 2021a).

3.1 Project Location and Setting

The existing NCP is located in the Santa Cruz Mountains, primarily in the unincorporated San Lorenzo Valley area of Santa Cruz County, except for the portion of the NCP that extends onto the City's Graham Hill Water Treatment Plant (GHWTP) property, which is located within the City of Santa Cruz, but is surrounded by unincorporated lands. Both the existing NCP and the Proposed Project extend approximately 9 miles between GHWTP on the south and Newell Creek Dam, a City facility that impounds Loch Lomond Reservoir, on the north (see Figure 3-1).

The existing NCP and Proposed Project alignment are located within a primarily semi-rural area. The areas surrounding the existing NCP and Proposed Project are characterized by forested terrain with rural and semi-rural, low-density residential neighborhoods and limited commercial development, as well as areas of California State Parks land. Several streams are present in the general vicinity of the NCP, including San Lorenzo River, Zayante Creek, and Newell Creek.

The northern segment of the existing pipeline extends from just south of the existing Newell Creek Dam to the Felton Booster Pump Station (FBPS), located at the intersection of Graham Hill Road and East Zayante Road. The northern segment is located east of State Route 9 (locally referred to as Highway 9) and north of Mount Hermon Road, generally between the unincorporated communities of Felton and Ben Lomond and west of Lompico. The existing pipeline extends south from the toe of Newell Creek Dam and generally follows existing roads through residential neighborhoods, but also extends through undeveloped private property along an abandoned railroad bed in the Brackney Road and Rose Acres Lane neighborhoods. Additionally, the existing pipeline traverses a portion of a small shopping center located at the Graham Hill Road/Mount Hermon Road intersection. The Proposed Project would generally follow the existing pipeline alignment in the northern segment with some minor realignments as described in Section 3.5.2.1. Both the existing NCP and Proposed Project pipeline cross Newell Creek in two locations in the northern segment. The San Lorenzo River also is a major natural feature in the area, and is located just west and parallel to the existing pipeline and Proposed Project in some sections in the northern segment.

The southern segment of the existing NCP extends from the FBPS to the GHWTP. The existing pipeline extends from the FBPS under Zayante Creek and follows a dirt maintenance road in a 20-foot easement to

the San Lorenzo Lumber Yard where it continues southerly within a 20-foot easement to the border of Henry Cowell Redwoods State Park. The existing pipeline traverses the State Park within an easement along Pipeline Road until it intersects Graham Hill Road at Nepenthe Drive. The topography along Pipeline Road is mountainous terrain which results in several steeply sloped pipe sections. At the intersection of Graham Hill Road and Pipeline Road, the existing NCP continues southbound along Graham Hill Road for approximately one mile to the GHWTP. The Proposed Project would extend from the FBPS over Zayante Creek on abutments at a former railroad crossing in the northernmost portion of the southern segment and follow a short section along the existing NCP easement and alignment, before it would then be rerouted to Graham Hill Road as described in Section 3.5.2.2. The proposed pipeline would cross under the Santa Cruz Big Trees Rail line, a tourist railroad extending from the Roaring Camp rail depot, before entering Graham Hill Road. There is a mix of commercial, park and open space uses at the northern end of the southern segment for both the existing pipeline and the Proposed Project. The southern portion of the southern segment of the Proposed Project sections along Graham Hill Road traverse areas of open forested lands, state park lands, and residential uses.

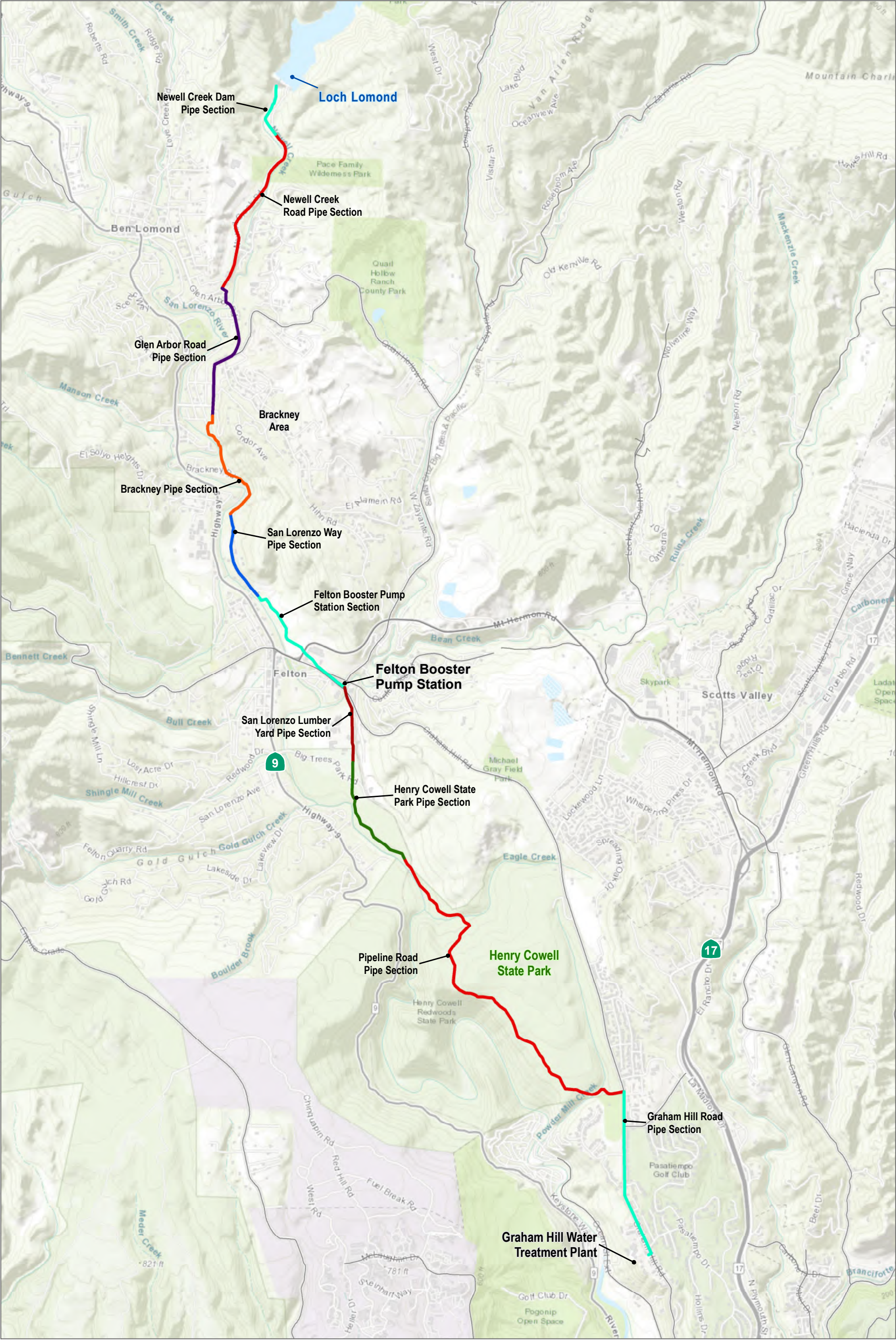
Access to the existing pipeline for maintenance and to the Proposed Project segments for construction and future maintenance is provided by both regional and local roads. Access to the existing pipeline and Proposed Project northern segment is provided by Graham Hill Road, Mount Hermon Road, and State Route 9 (locally referred to as Highway 9), as well as several County roads, including Glen Arbor Road, Newell Creek Road, Brackney Road, San Lorenzo Way, and Rose Acres Lane. Access to the existing NCP and the Proposed Project southern segment is provided from Graham Hill Road, Mount Hermon Road, and Highway 9. Pipeline Road, a partially paved trail through Henry Cowell Redwoods State Park, provides access to the existing NCP section in this location. In addition to the public roadways providing access to the existing and Proposed Project segments. City easements on private land serve portions of the existing alignments and would continue to serve the Proposed Project segments, with a few minor modifications.

3.2 Existing Facilities

The existing 9.25-mile NCP was constructed in 1960 in conjunction with construction of the Newell Creek Dam. The pipeline consists of two segments with the FBPS being the dividing point. The northern segment extends from just south of Newell Creek Dam to the FBPS; the southern segment extends from the FBPS to the GHWTP (see Figure 3-2). The pipeline material is predominantly concrete cylinder pipe, which is composed of a steel cylinder lined with cement mortar, and wrapped with steel bar and coated with concrete on the exterior. The existing NCP includes three creek crossings—two over Newell Creek in the northern segment and one under Zayante Creek in the southern segment—as well as numerous culverted creek and drainage crossings.

The existing pipeline size ranges in diameter from 18 inches to 27 inches, with the majority of the pipeline being 20 or 22 inches in interior diameter (HDR 2020). According to the 1960 Construction Specifications, the northern segment consists of approximately 22,670 linear feet of 22-inch pipeline. The southern segment consists of approximately 3,700 linear feet of 27-inch, 11,335 feet of 22-inch, 8,797 feet of 20-inch, and 1,151 feet of 18-inch-diameter pipeline.

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SOURCE: ESRI 2020, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

FIGURE 3-2
Existing Newell Creek Pipeline Alignment
Newell Creek Pipeline Improvement Project

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The NCP is a critical component of the City's raw water supply infrastructure. It conveys untreated water to and from the Loch Lomond Reservoir, which is the City's only raw water storage facility. The pipeline is critical to supplying the water system during dry seasons and during storm events when other water sources cannot be treated at GHWTP and also is critical in conveying untreated water from the existing Felton Diversion to the Reservoir for storage.

The NCP conveys water to the water system via the FBPS to the GHWTP for treatment and distribution into the City's water service area. The FBPS is located approximately midway along the NCP alignment at the intersection of Graham Hill Road and East Zayante Road. When the San Lorenzo River has high flows and storage is available in the Loch Lomond Reservoir, the NCP is also used to pump water from the Felton Diversion on the San Lorenzo River up to the Reservoir (via the FBPS) to store for later use. Although the NCP is not used continuously, it is a critical component to the City's water supply when needed during both wet and dry seasons. It is also a backup source should one of the City's other raw water supplies become inoperable (HDR 2020).

3.3 Project Background

3.3.1 Santa Cruz Water Department

The City serves approximately 24,590 connections in its approximately 20-square-mile service area, which includes the City of Santa Cruz, adjoining unincorporated areas of Santa Cruz County, a small part of the City of Capitola, and coastal agricultural lands north of the City of Santa Cruz. The population within this service area is approximately 96,170 persons. The City's water production is approximately 5 to 7 million gallons per day during the winter and approximately 7 to 10 million gallons per day during the summer. The City's service area and key existing facilities are shown on Figure 3-3.

The City has embarked on a multi-year Santa Cruz Water Program to renovate and upgrade its water system. The program includes water supply and infrastructure projects to improve reliability and resiliency and address aging infrastructure. The program includes plans and funding for numerous projects, including rehabilitation or replacement projects, upgrades and improvements projects, water supply reliability studies, and water main replacements (HDR 2020).

3.3.2 Newell Creek Pipeline

There are a number of known concerns regarding the condition and operation of the existing NCP. Generally, the pipeline, constructed approximately 60 years ago, is reaching the end of its reliable life and is experiencing increased frequency of breaks as a result of corrosion and land movement along portions of its alignment due to geological conditions. There is no functioning cathodic protection system¹ on the pipeline and corrosion has been observed, which presents risks of leaks and failure.

¹ Cathodic protection is a technique used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell. A simple method of protection connects the metal to be protected to a more easily corroded "sacrificial metal" to act as the anode. The sacrificial metal then corrodes instead of the protected metal. For structures such as long pipelines, where passive galvanic cathodic protection is not adequate, an external DC electrical power source is used to provide sufficient current.

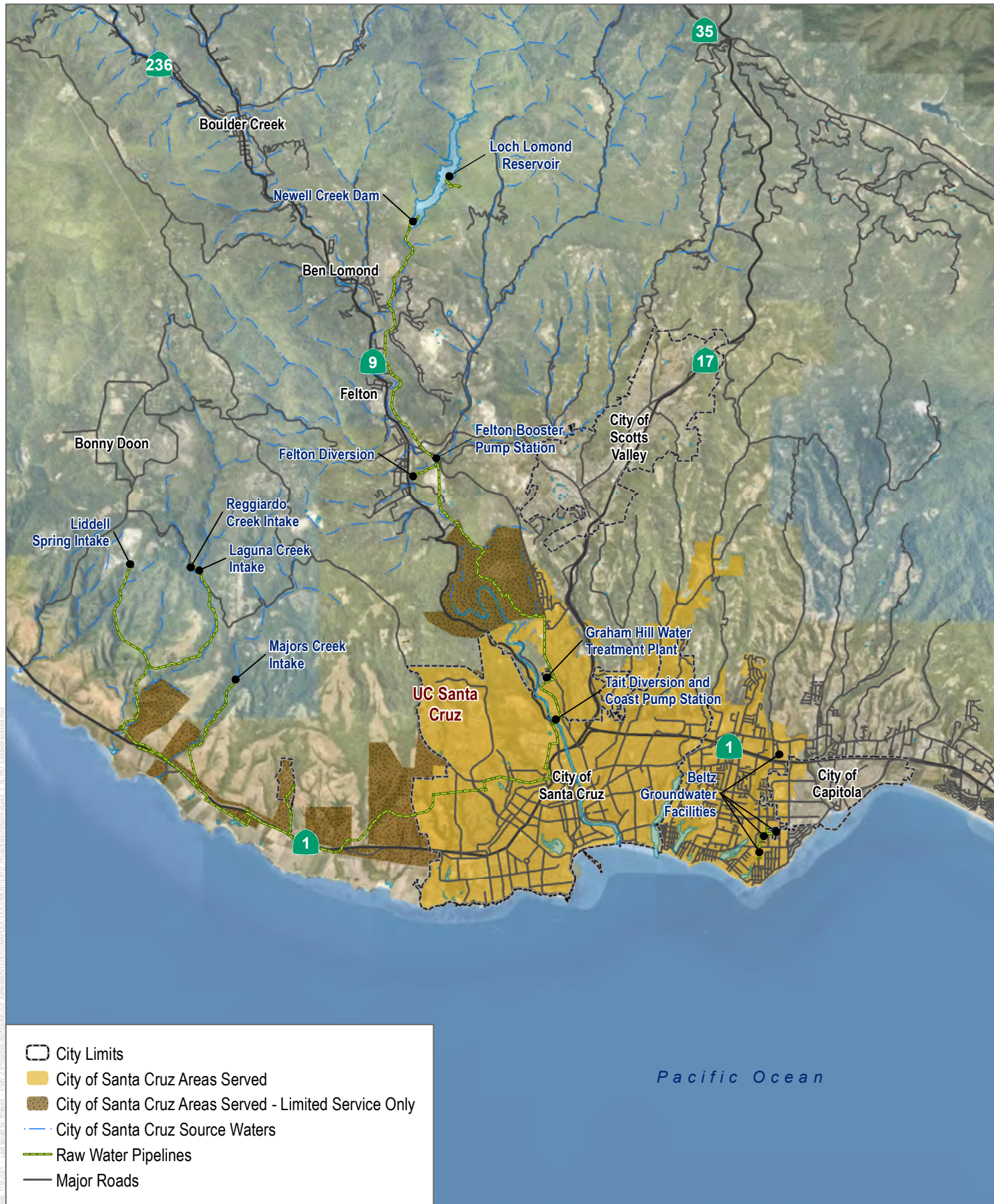
Due to steep terrain and landslides present in some locations, the existing NCP has been damaged and/or is located in areas that make access and repairs difficult. A portion of the existing NCP along Pipeline Road in Henry Cowell Redwoods State Park has the highest recent break history, and several areas of Pipeline Road have washed out, resulting in exposure of the pipeline. Another portion of the NCP was constructed in an old railroad bed along a steep hillside in the Brackney area, east of Highway 9 between Felton and Ben Lomond, which includes several landslide hazard areas that could cause stress or breakage of the pipeline as further explained below. Furthermore, some appurtenances, such as isolation valves are inoperable, or are in unknown locations, and some portions of the existing pipeline alignment have accessory structures (such as fences, retaining walls and sheds) constructed on top of the pipeline (HDR 2018).

The pipeline section that runs through the Brackney area has a history of landslides and geotechnical failures during heavy winter rains that threaten the integrity of the pipeline.. This section has been historically subject to repeated landslides during heavy winter rains. In addition, the NCP is located above and adjacent to the San Lorenzo River, which during high flows in winter storms has the potential to undermine the hillside and increase the risk of failure. Due to the evidence of unstable terrain due to the poor bearing capacity of the saturated soils, the continued buildup of landslide debris overburden over the pipeline, and the location of the pipeline next to the San Lorenzo River, the NCP is at a high risk of failure in the Brackney North area. In particular, the NCP is vulnerable to a leak, which may be exacerbated by other factors in the vicinity of the Brackney landslide including undermining by San Lorenzo River flooding and proximity to the Butano fault zone (Kennedy Jenks 2017). Additionally, the Brackney pipeline section is one of the few sections that is not accessible by paved road, making repairs and maintenance challenging (HDR 2019c).

Existing NCP pipeline segments were evaluated by the City and their consultants to determine sections with the greatest risk of failure. Both the likelihood of failure and consequence of failure were evaluated. As ranked in the *Newell Creek Pipeline Prioritization of Pipeline Risk Technical Memorandum* (HDR 2019c), the existing segment sections were prioritized in order of relative consequence and likelihood of failure (and, thus, order of priority for replacement and/or rehabilitation). The sections with the highest priority for replacement are the sections along Pipeline Road in Henry Cowell Redwoods State Park (a portion of the southern segment) and the Brackney North section (a portion of the northern segment).

Planning for the Proposed Project commenced in 2018, and a series of technical studies and reviews have been conducted to evaluate existing pipeline conditions and various replacement and/or rehabilitation alternatives, including alternative alignments. See Section 6, Alternatives, for further discussion. The Proposed Project alignment was selected based on an evaluation process that considered the following factors: public safety, environmental issues and compliance, O&M accessibility, encroachment permitting, construction and O&M costs, and impacts to other facilities (HDR 2019a).

A major capital improvement project at the Newell Creek Dam, consisting of replacement of the dam's inlet/outlet facilities and appurtenances, was approved and permitted in 2019, and construction was initiated in May 2020. It is noted that approximately 2,000 linear feet of the northernmost section of the existing NCP is not part of this Proposed Project, but was replaced in 2020 during the first phase of the Newell Creek Dam Inlet/Outlet Replacement Project from the toe of the dam to just upstream of the Newell Creek Road Access Bridge.



SOURCE: ESRI 2020, City of Santa Cruz 2020

FIGURE 3-3

Santa Cruz Water Department Service Area and Existing Facilities

Newell Creek Pipeline Improvement Project

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3.4 Project Purpose and Objectives

3.4.1 Purpose and Need

The purpose of the Proposed Project is to address the identified deficiencies in existing pipeline conditions, including mitigation of geological hazards, as well as provide improved access for maintenance and repair. As described in Section 3.3.2, having been constructed in approximately 1960, the NCP is reaching the end of its reliable life and is experiencing increased frequency of breaks due to corrosion and land movement along portions of its alignment due to geological conditions. In addition to the age of the existing pipeline, development throughout Santa Cruz County over the past 60 years has created differing conditions along the pipeline alignment from its original installation, which has resulted in constraints to accessing the pipeline for maintenance and repair activities due to intervening private development. Various surface improvements were made as part of the pipeline installation (unpaved access roads, drainage crossings, appurtenant features), which have also experienced approximately 60 years of wear, including pipe corrosion, and are in need of replacement and/or rehabilitation.

3.4.2 Project Objectives

Section 15124 of the CEQA Guidelines indicates that the EIR project description shall include a statement of the objectives sought by the Proposed Project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project.

The objectives of the Proposed Project are as follows:

1. Address identified deficiencies in the NCP conditions in order to maintain full system functioning without interruption, in order to protect water supply reliability and service to the City's customers.
2. Improve long-term reliability of the City's water supply infrastructure between Loch Lomond Reservoir and the GHWTP such that it can continue to function as an integral part of the City's overall water supply system.
3. Improve access to the NCP to facilitate inspection, maintenance, and repair of the pipeline system, while minimizing the potential for environmental and property damage impacts (such as may occur in State Parks and other sensitive areas).
4. Site the NCP to consider constructability, optimize accessibility for maintenance, minimize the potential for future failures due to unstable terrain, and avoid risks (e.g., public safety, property damage) and impacts to adjacent uses associated with pipeline failures during the life of the pipeline.
5. Implement NCP project segments that are cost-effective in terms of both capital and operation/maintenance costs.

3.5 Project Components

3.5.1 Project Overview

The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24-inch ductile iron, or polyvinyl chloride (PVC) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), which includes road pavement and unpaved shoulders adjacent to the paved road, and/or existing City easements. Additional easements would be acquired in some locations. In order to focus the environmental review on specific locations along the 8.75-mile pipeline, the alignment was separated into a northern segment and a southern segment; these segments were further delineated into specific sections as described below.

The proposed northern NCP segment from the Newell Creek Access Road Bridge to the FBPS generally follows the existing NCP alignment. The proposed southern NCP segment from the FBPS to the GHWTP generally includes a new pipeline section along Graham Hill Road, except the existing pipe would be removed and replaced in the southern part of the pipeline alignment. Figure 3-4 provides an overview of the proposed NCP alignment. Other components of the Proposed Project include cathodic protection and installation and/or replacement of minor appurtenances, such as air release valves and isolation valves. Key features of the Proposed Project are summarized in Table 3-1 and further described in Section 3.5.2. Pipe sections within the northern and southern segments are shown on Figures 3-5A and 3-5B, respectively.

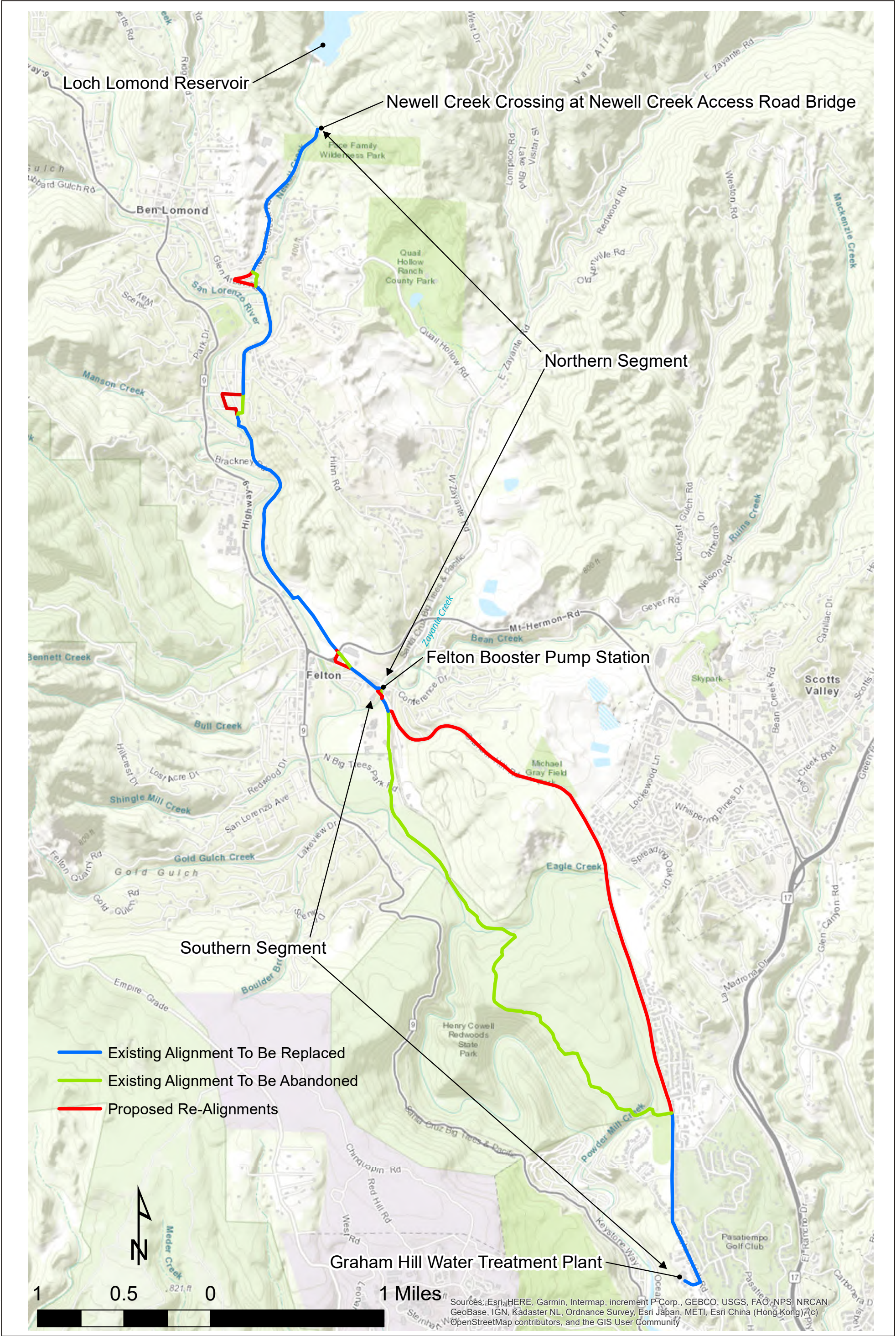
Table 3-1. Key Proposed Project Features

Project Feature	Northern Segment Newell Creek Road to FBPS	Southern Segment FBPS to GHWTP
Alignment Length (feet)	21,838	23,745
Number of Creek or River Crossings	3	1
Maximum Elevation (feet above mean sea level [AMSL])	392	727

Source: HDR 2019a.

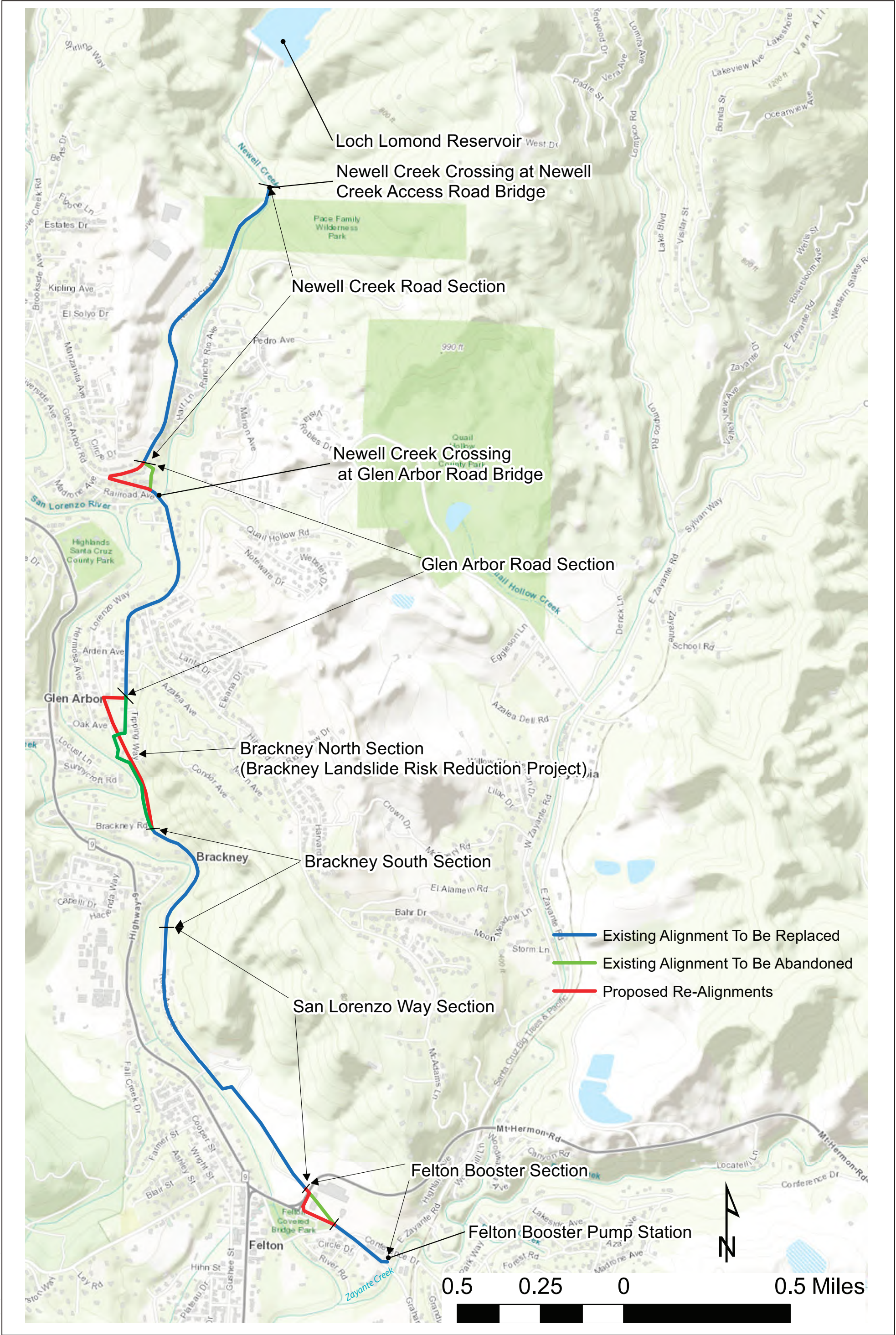
Once the new pipeline is installed and the interconnections are made, the existing NCP generally would be abandoned in place and above-ground appurtenances would be removed; see Section 3.5.2, Description of Pipeline Segments, for further details. Generally, all above-ground features of the existing pipeline would be removed including air valves, hydrants, and vent pipes.

Three pipeline sections have been prioritized for replacement in the near term: two sections along Graham Hill Road, comprising the entire southern segment that would replace the existing pipe through Henry Cowell Redwoods State Park, and the Brackney North section in the northern segment. The engineering design phase for these sections is underway. For the remainder of the pipeline alignment, a conservative project scenario is assumed, which includes installation of the new pipeline within specified construction disturbance corridors as identified in Section 3.5.2.



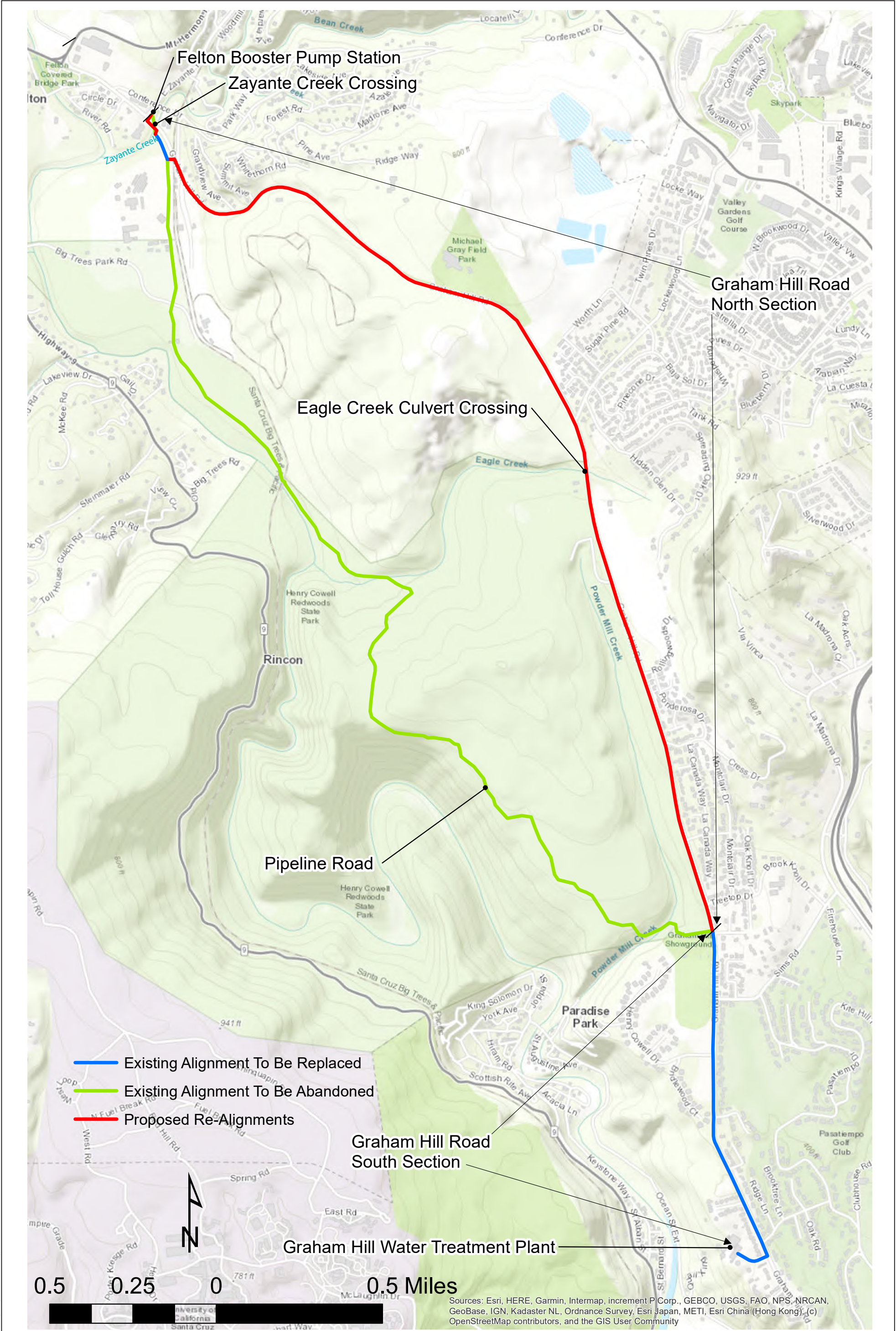
SOURCE: City of Santa Cruz Water Department 2020

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SOURCE: City of Santa Cruz Water Department 2020

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Standard construction practices would be implemented by the City or its contractors during construction of the Proposed Project to avoid or minimize erosion and water quality degradation, protect sensitive species and habitat, reduce potential impacts to cultural resources, and reduce air quality and noise impacts. Upon completion of construction, construction sites would be revegetated and/or restored, and disturbed roadways where trenching occurred to install the pipeline would be repaved in accordance with County requirements.

3.5.2 Description of Pipeline Segments

3.5.2.1 Northern Segment

The northern segment of the proposed NCP is planned within the same alignment as the existing pipeline with minor realignments to avoid private properties in some locations as shown on Figure 3-5A and on subsequent figures of each pipeline section. There are six distinct sections that comprise the northern segment as summarized in Table 3-2 and shown on Figure 3-5A.

Table 3-2. Proposed Project Northern Segment Summary

Section	Section Length (feet)	Pipeline Corridor Width (feet) ¹	Description ²
Newell Creek Road	5,035	60-100 Open cut trench	Runs along Newell Creek Road from the Newell Creek Access Road Bridge to the intersection where the pipeline passes between homes and connects at Glen Arbor Road. <i>Creek Crossing: Newell Creek</i>
Glen Arbor Road	5,120	40-100 Open cut trench	Continues along Newell Creek Road turning onto Glen Arbor Road, crossing Newell Creek, turning onto Hermosa Ave, Oak Ave, and Fremont Ave to north end of Brackney. <i>Creek Crossing: Newell Creek</i>
Brackney North (Brackney Landslide Area Pipeline Risk Reduction Project)	2,611	10 ³ Trenchless	Runs along an abandoned railroad bed alongside the San Lorenzo River between a Glen Arbor Road neighborhood and the Brackney Road neighborhood.
Brackney South	2,860	10 Open cut trench and/or trenchless	Extends from Brackney North section, partially along unpaved easement and paved road and ends at a property boundary at north end of San Lorenzo Way/Rose Acres Lane.
San Lorenzo Way	4,242	10 Open cut trench	Runs from north to south end of San Lorenzo Way/Rose Acres Lane and through private property to the edge of Mount Hermon Rd. <i>Creek Crossing: Unnamed ephemeral creek that is tributary to San Lorenzo River</i>
Felton Booster Pump Station	1,970	60-120 Open cut trench	Runs along Mount Hermon Road and Graham Hill Road to FBPS.
Total	21,838		

¹ Includes area in which new pipeline could be located and area of disturbance during pipeline installation. Construction method is identified.

² Sections where pipeline crosses a creek are noted.

³ Pipeline location specified in 30% design plans. City intends to acquire permanent 20-foot easement..

Source: HDR 2020,

The new pipeline would be installed within existing roadways, road ROWs, and/or City easements. The northern segment has a maximum surface elevation of approximately 392 feet AMSL, would gravity flow to the FBPS, and has two creek crossings over Newell Creek and one crossing over an unnamed tributary to San Lorenzo River. Three short sections of pipe are currently located within private property and would be rerouted as described below. Further description for each section is provided below.

Newell Creek Road Section

The northernmost pipeline section, Newell Creek Road, extends 5,035 feet within Newell Creek Road or ROW. This section begins on the north/upstream side of the bridge crossing of Newell Creek (Newell Creek Access Road Bridge), crosses Newell Creek and follows Newell Creek Road to Glen Arbor Road. The existing pipeline is located on the Newell Creek Access Road Bridge and is planned to be removed and replaced with the new pipe in either the same location or on the downstream side of the bridge. The alignment begins in a rural setting at the Newell Creek Access Road Bridge and transitions into residential neighborhoods before connecting to Glen Arbor Road on the south. The Proposed Project would place the new pipeline entirely within the 60- to 100-foot wide road ROW, and generally within the existing road pavement as shown on Figure 3-6.

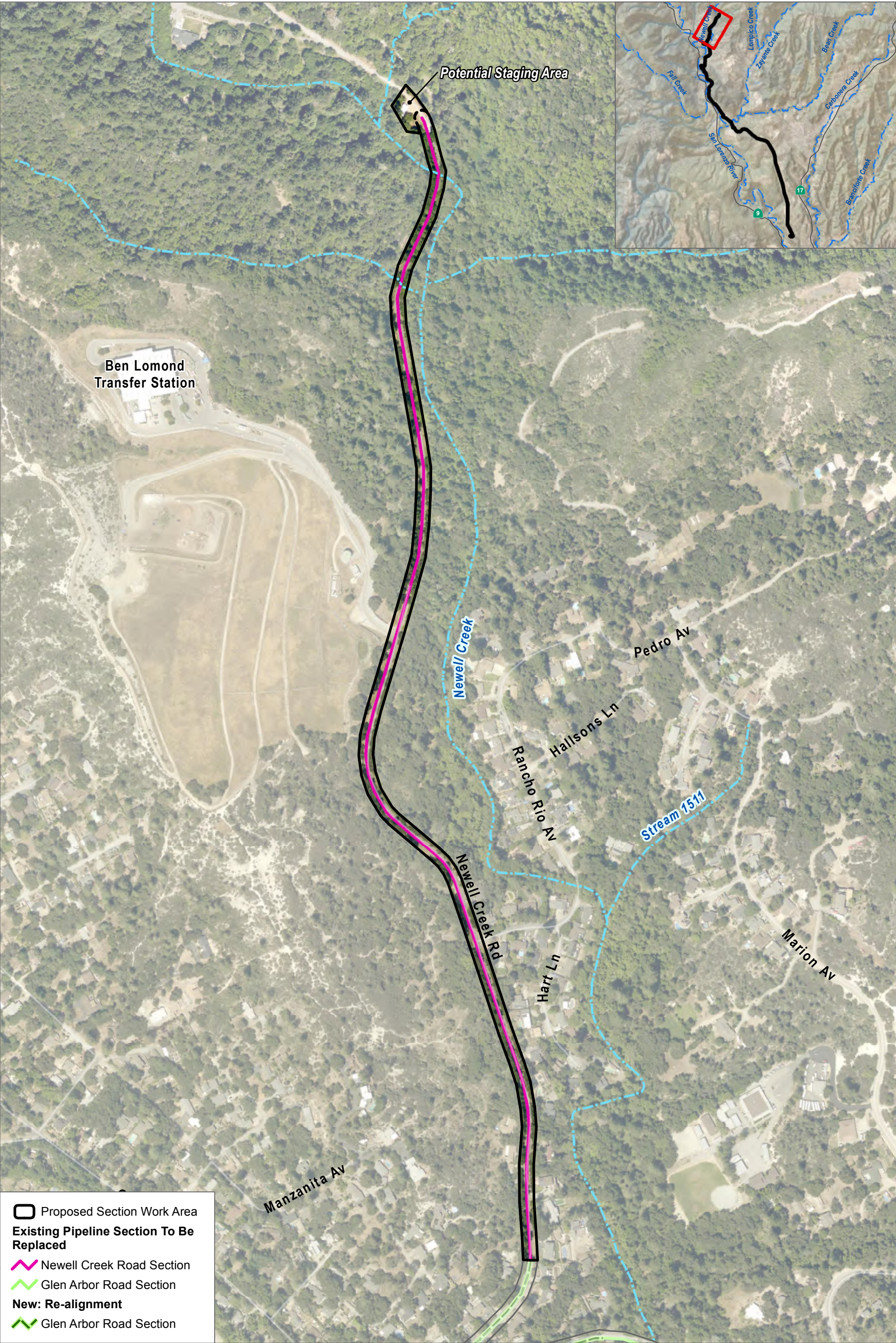
Glen Arbor Road Section

The Glen Arbor Road section extends 7,120 feet within public road ROWs. The existing pipeline crosses through private property from Newell Creek Road to Glen Arbor Road, where it again crosses Newell Creek and continues along Glen Arbor Road and onto Caledonium Avenue. The existing pipeline also crosses private property at the southern terminus of Caledonium Avenue, where it jogs across to Fremont Avenue before continuing southward to the Brackney Road neighborhood. The Proposed Project would avoid the private property between Newell Creek Road and Glen Arbor Road and place the new pipeline entirely within the 40- to 100-foot wide public road ROW, and generally within the existing road pavement of both roads as shown on Figure 3-7. Additionally, the Proposed Project would avoid the private property between Caledonium and Fremont Avenues by realigning the pipe within the public road ROWs of Glen Arbor Road and Schaaf Road.

Brackney North Section

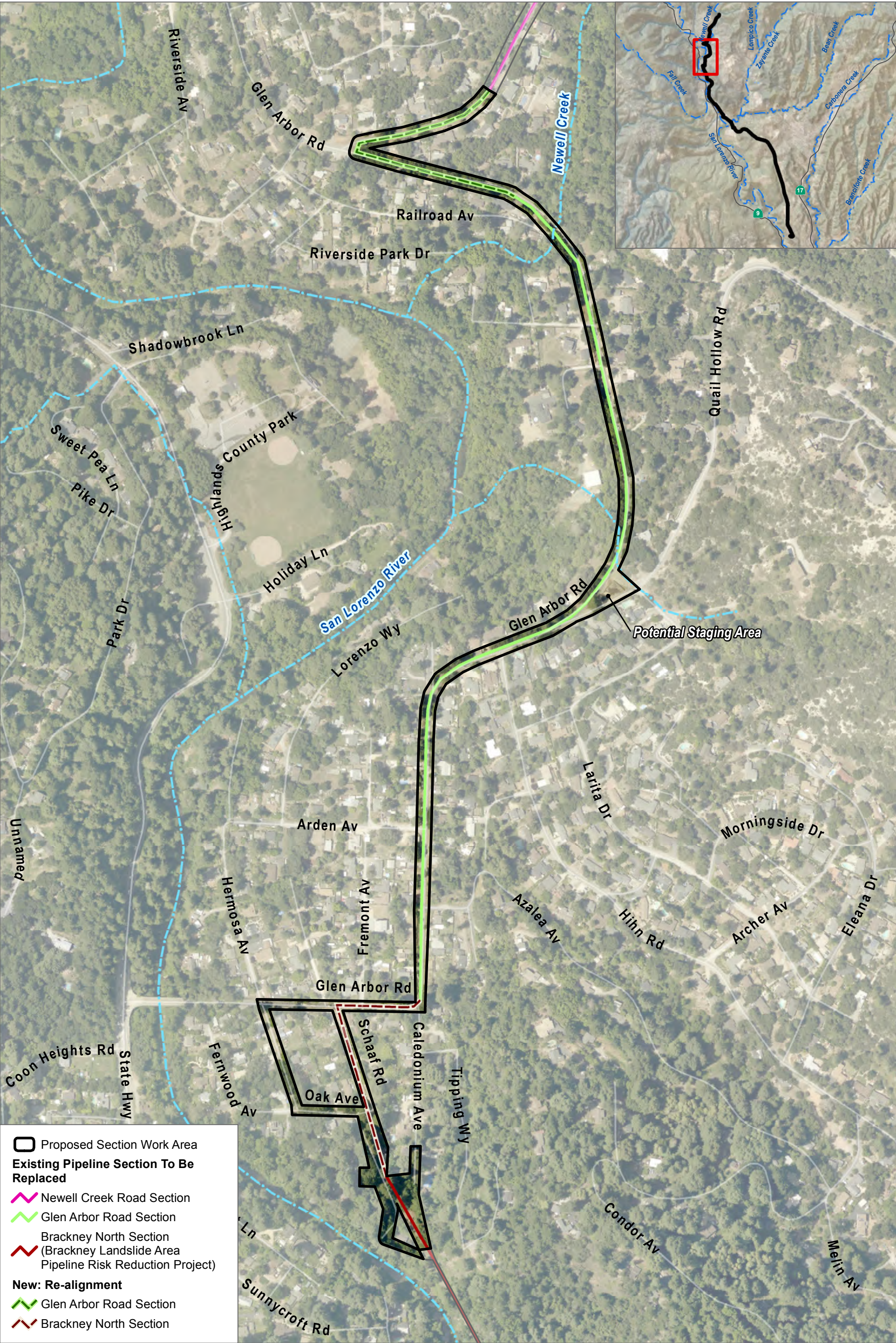
The Brackney North pipeline section extends approximately 2,610 feet between Glen Arbor Road, Schaaf Road and Brackney Road as shown on Figure 3-8. The majority of the pipeline would be a single fused pipeline of fusible polyvinyl chloride (FPVC) or HDPE, which would be installed using a horizontal directional drilling (HDD) trenchless method. Generally, the HDD method consists of a guided and steered trenchless construction technique to install the pipe into the subsurface as further described in Section 3.6.2.2. The pipe would be installed at depths of approximately 80 to 100 feet.

Installation of the Brackney North pipe section also will include open cut trench construction for approximately 720 linear feet within a 4-foot wide trench. Open trench construction would occur at the north tie-in along Schaaf to Glen Arbor to Caledonium, and also at the south tie-in. Acquisition of additional permanent and temporary construction easements or property would be required.



SOURCE: Bing 2021; County of Santa Cruz 2021

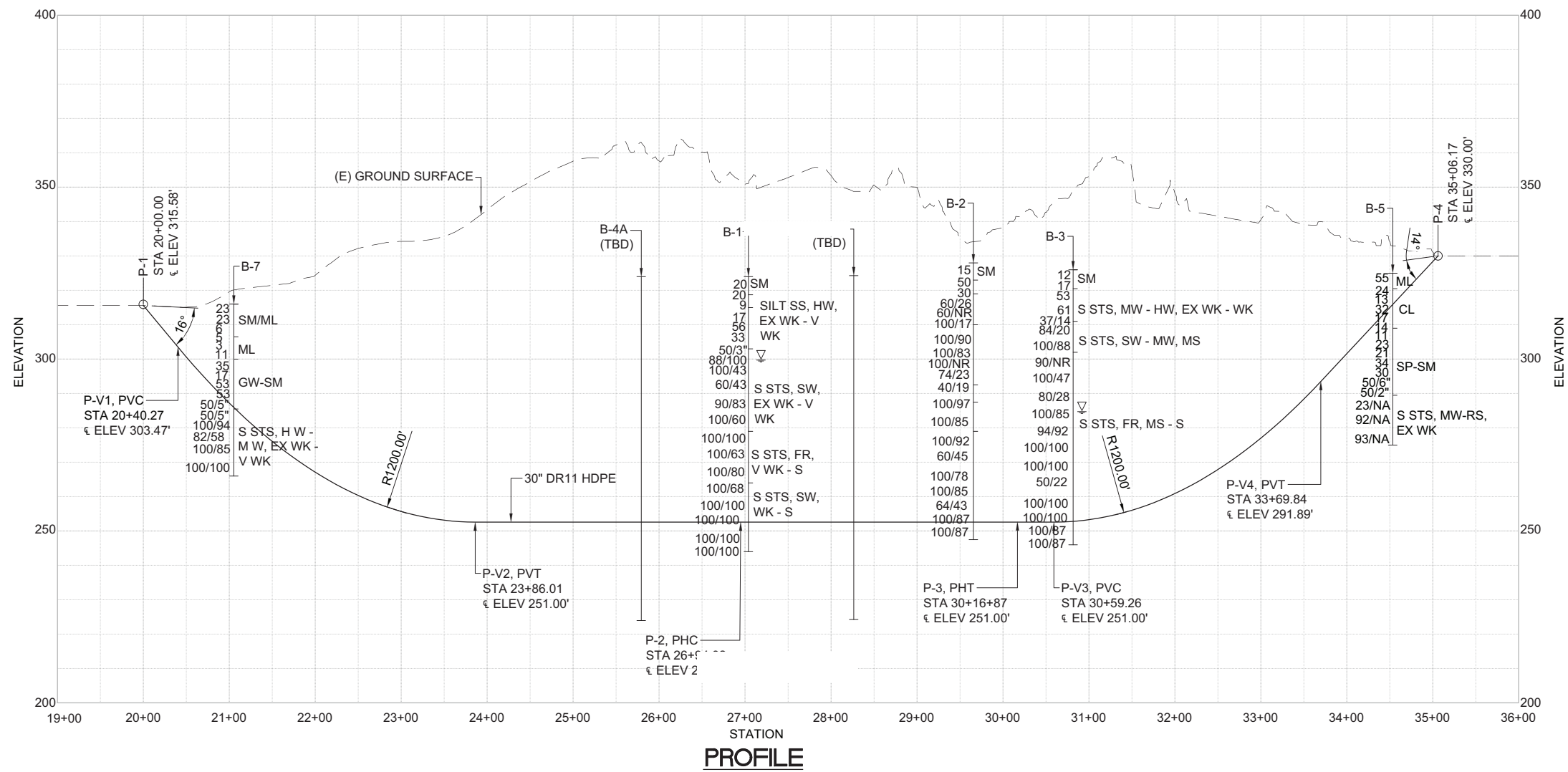
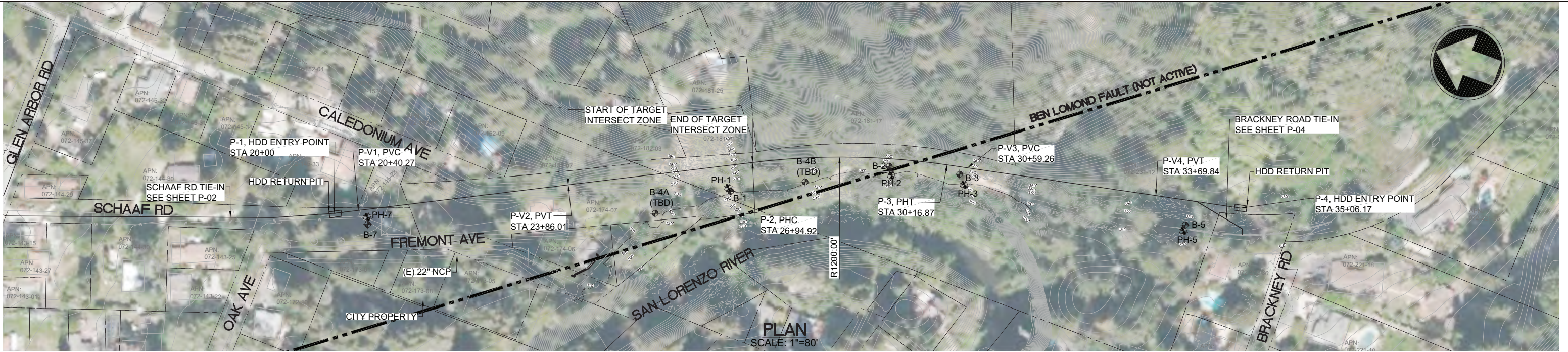
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SOURCE: Bing 2021; County of Santa Cruz 2021

FIGURE 3-7
Proposed Glen Arbor Road Pipeline Section Alignment
Newell Creek Pipeline Improvement Project

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SOURCE: Mott MacDonald 2021

FIGURE 3-8

Proposed Brackney North Pipeline Section Alignment

Newell Creek Pipeline Improvement Project

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This section traverses a steeply sloped area. The topography west of the easement slopes steeply downwards to the San Lorenzo River, and to the east, existing topography slopes steeply upwards. The section also is within an area of known landslides. The existing pipeline easement is generally level longitudinally, but is benched into a steep cross slope. The existing pipeline extends south from Fremont Avenue within a gravel driveway alongside an existing residence and continues south along a dirt road within the City's 10-foot easement to Brackney Road (Mott MacDonald 2021a).

Brackney South Section

The Brackney South section extends approximately 2,860 feet within a 10-foot wide City easement, partially unpaved and partially within road pavement. The section extends from the Brackney North section to San Lorenzo Way. The San Lorenzo River is located adjacent to portions of this section on the west. The Brackney South section ends at the property boundary near the northern intersection of San Lorenzo Way and Rose Acres Lane. The Proposed Project would result in installation of a new pipeline within the existing City 10-foot easement as shown on Figure 3-9.

The potential for deeper-seated landslides exists in the Brackney South section through most or all of the soil mass above the bedrock.. Construction of a cantilevered retaining wall is being considered for a portion of the Brackney South section, which would help prevent potential slides from moving downslope; see also discussion in Section 3.6.2.3. Installation may also occur with directional drilling or conventional open trench methods.

San Lorenzo Way Section

The San Lorenzo Way section extends approximately 4,242 feet south from San Lorenzo Way/Rose Acres Lane within a 10-foot wide City easement through private property. The San Lorenzo River is located adjacent to portions of this section on the west, and the pipeline crosses an unnamed creek. This pipe section ends at Mount Hermon Road. The Proposed Project would result in installation of a new pipeline within the existing City 10-foot easement as shown on Figure 3-10.

Felton Booster Pump Station Section

The Felton Booster Pump Station section extends 1,970 feet from Mount Hermon Road at Graham Hill Road to the FBPS. A portion of this section has been re-aligned to avoid passing through the parking lot of Felton Fair Shopping Center where the current pipeline is located. The proposed pipeline would be installed within Mount Hermon Road and Graham Hill Road, ending at the FBPS as shown on Figure 3-11.

3.5.2.2 Southern Segment

The southern segment of the proposed NCP extends from the FBPS to the GHWTP. This segment generally consists of the installation of a new 24-inch pipeline within easements and Graham Hill Road from the FBPS to Pipeline Road, and replacement of the southernmost section of existing pipeline located in Graham Hill Road from Pipeline Road to GHWTP (refer to Figure 3-12).

The southern segment is comprised of two sections, Graham Hill Road North and South. These two sections are discussed below, summarized on Table 3-3, and shown on Figure 3-5B. The paved roadway width of Graham Hill Road varies between 28 and 40 feet in a 40- to 100-foot wide County ROW. This alignment would

realign the portion of the existing NCP which passes through the San Lorenzo Lumber Yard, as well as the existing Pipeline Road sections through Henry Cowell Redwoods State Park into Graham Hill Road (see Figure 3-2).

Table 3-3. Proposed Project Southern Segment Summary

Segment Section	Section Length (feet)	Pipeline Corridor Width (feet) ¹	Description ²
Graham Hill Road North	17,880	40-100 ³ Open cut trench (except for creek crossing)	From FBPS, crosses Zayante Creek, runs alongside Graham Hill Road, crosses rail road tracks entering Graham Hill Road and follows Graham Hill Road to southern entrance of Henry Cowell Redwoods State Park <i>Creek Crossing: Zayante Creek</i> <i>Railroad Crossing</i>
Graham Hill Road South	5,865	65-120 ³ Open cut trench	Follows Graham Hill Road from southern entrance of Henry Cowell Redwoods State Park to GHWTP.
Total	23,745		

¹ Includes area in which new pipeline could be located and potential construction area of area of disturbance during pipeline installation. Construction method is identified.

² Sections where pipeline crosses a creek are noted.

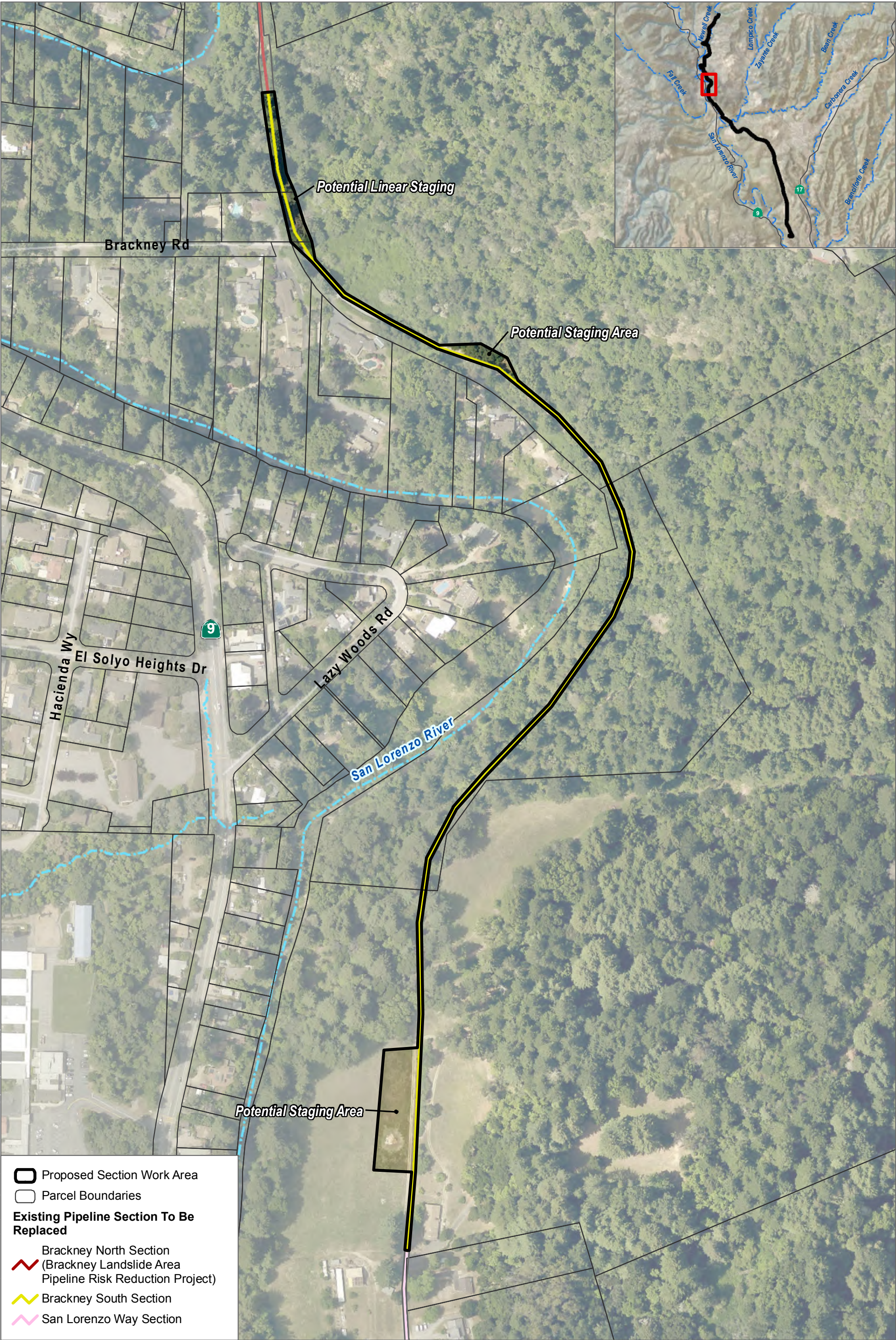
³ Pipeline location specified in 30% design plans

Source: HDR 2020.

The southern segment has a maximum elevation of approximately 727 feet AMSL, one creek crossing at Zayante Creek and two culverted creek crossings (Eagle Creek and Powder Mill Creek). The existing Graham Hill Road bridge crossing over Zayante Creek has a 3-foot-wide raised pedestrian crossing on one side of the bridge; the existing Felton Diversion pipeline crossing is located just west of the bridge on abandoned railroad abutments (HDR 2020).

Graham Hill Road North Section

The proposed Graham Hill Road North section extends 17,880 feet (approximately 3.4 miles) south from the FBPS to the Graham Hill Road intersection with Pipeline Road. The first portion of the proposed pipeline would extend across Graham Hill Road and over Zayante Creek adjacent to the City's Felton Diversion Pipeline (see Figure 3-13). The proposed pipeline would then be installed in the City's existing 20-foot wide easement, which also contains the existing pipeline within an unpaved, approximately 12-foot-wide path (see Figure 3-14). The proposed pipeline would cross the Santa Cruz Big Trees and Pacific Railway existing rail tracks via a trenchless method to Graham Hill Road (see Figure 3-15), where it would be installed within the Graham Hill Road pavement, primarily on the eastern side of the road. A representative site plan of the Graham Hill Road North section is shown on Figure 3-16. Further details regarding construction methods across Zayante Creek and the existing rail tracks are presented in Sections 3.6.2.4 and 3.6.2.5, respectively.



SOURCE: Bing 2021; County of Santa Cruz 2021

FIGURE 3-9
Proposed Brackney South Pipeline Section Alignment
Newell Creek Pipeline Improvement Project

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SOURCE: Bing 2021; County of Santa Cruz 2021

FIGURE 3-10
Proposed San Lorenzo Way Pipeline Section Alignment
Newell Creek Pipeline Improvement Project

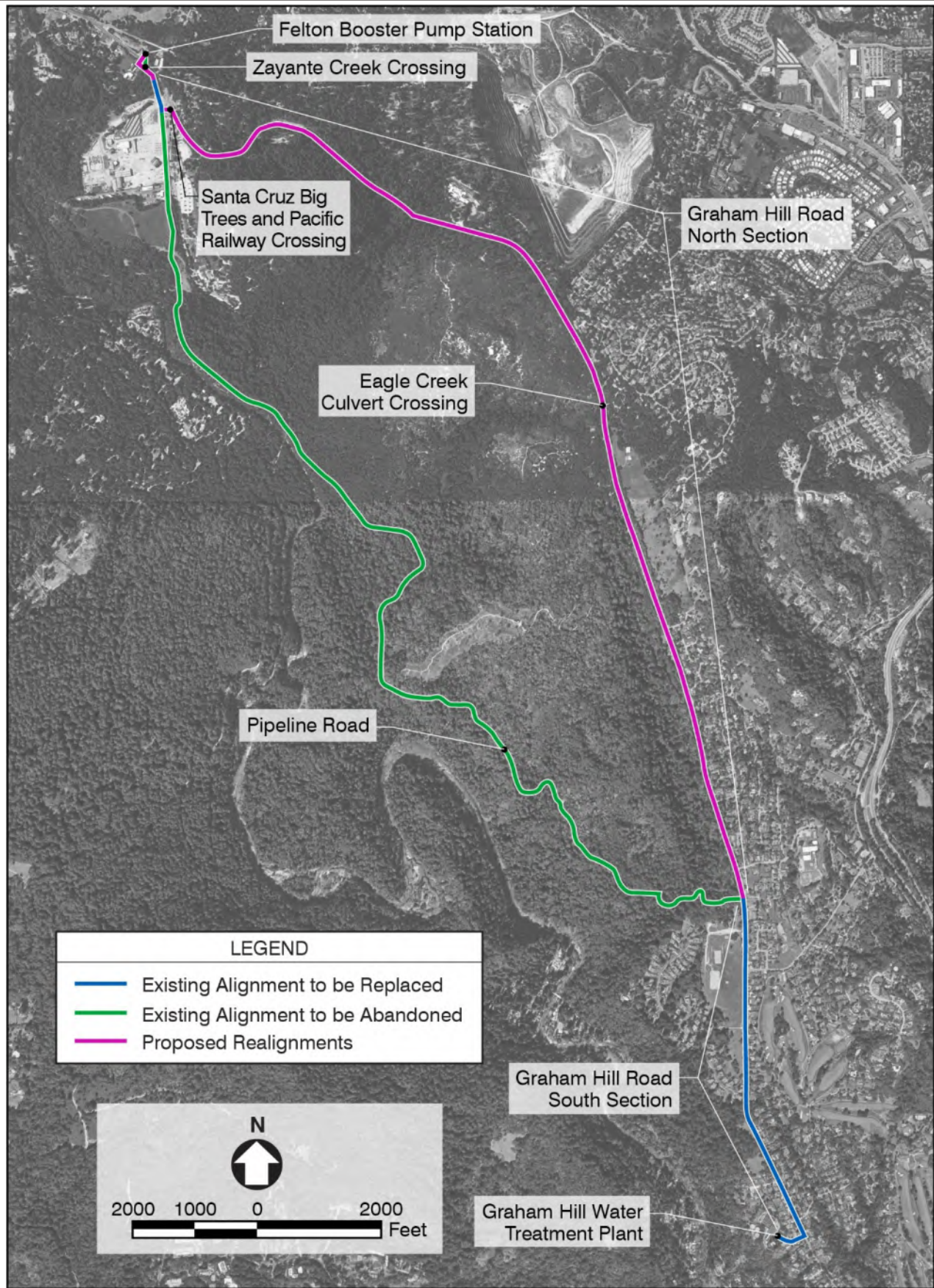
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SOURCE: Bing 2021; County of Santa Cruz 2021

FIGURE 3-11
Proposed Felton Booster Pipeline Section Alignment
Newell Creek Pipeline Improvement Project

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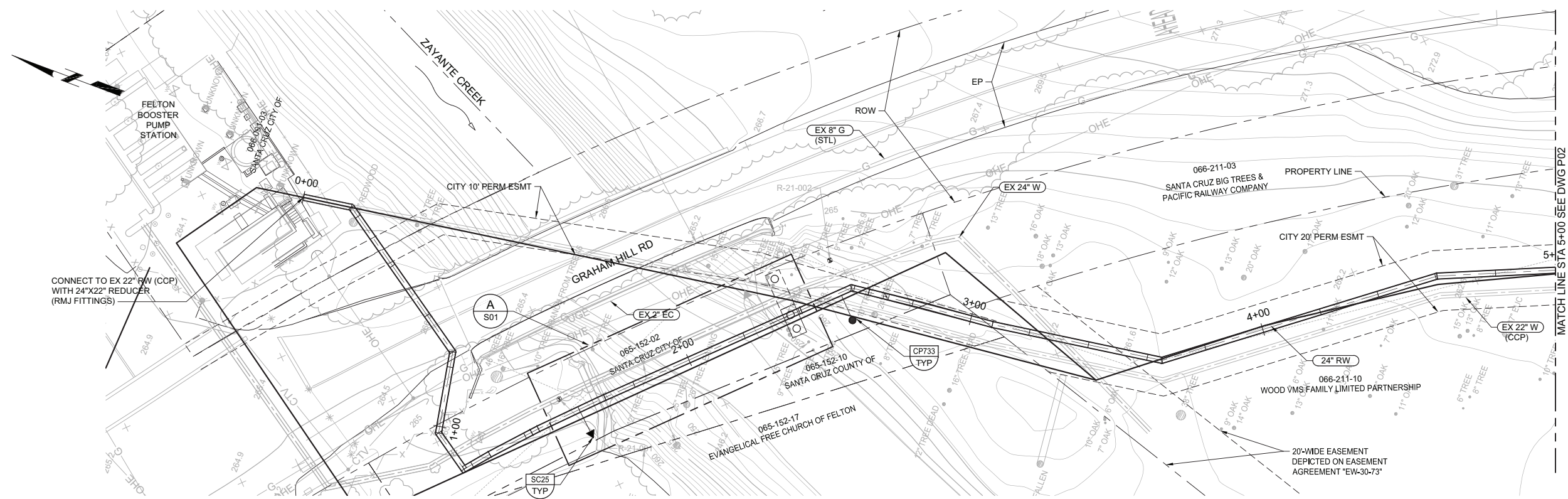
SOURCE: Carollo 2021

FIGURE 3-12

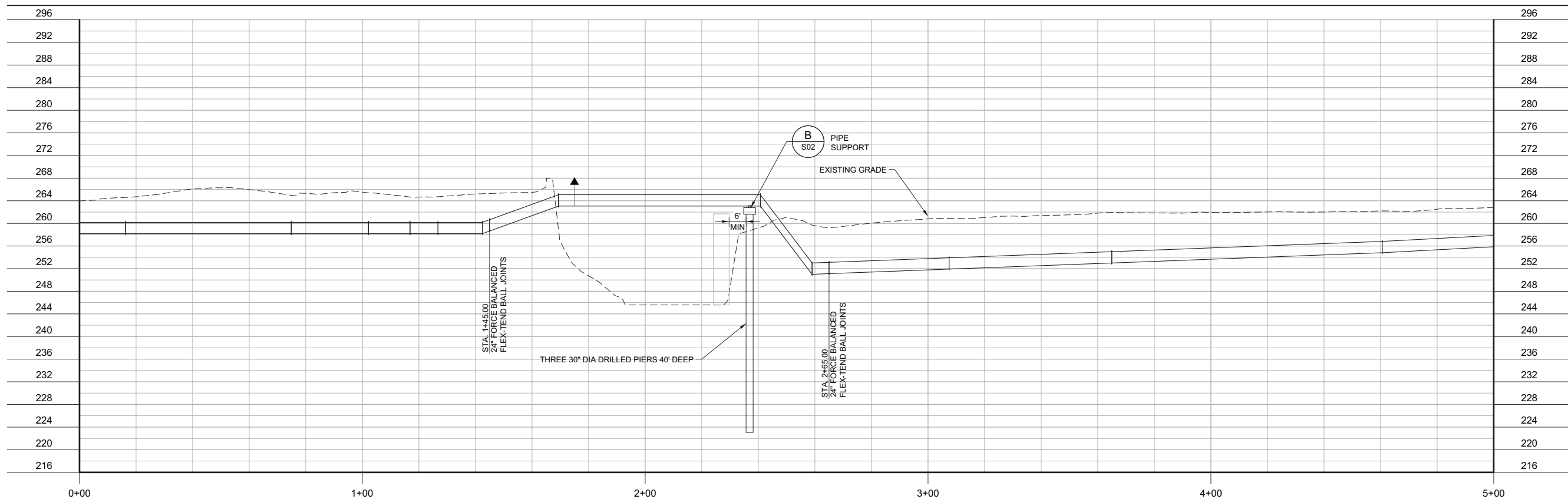
Graham Hill Road Pipeline Sections Overview

Newell Creek Pipeline Improvement Project

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PLAN



PROFILE

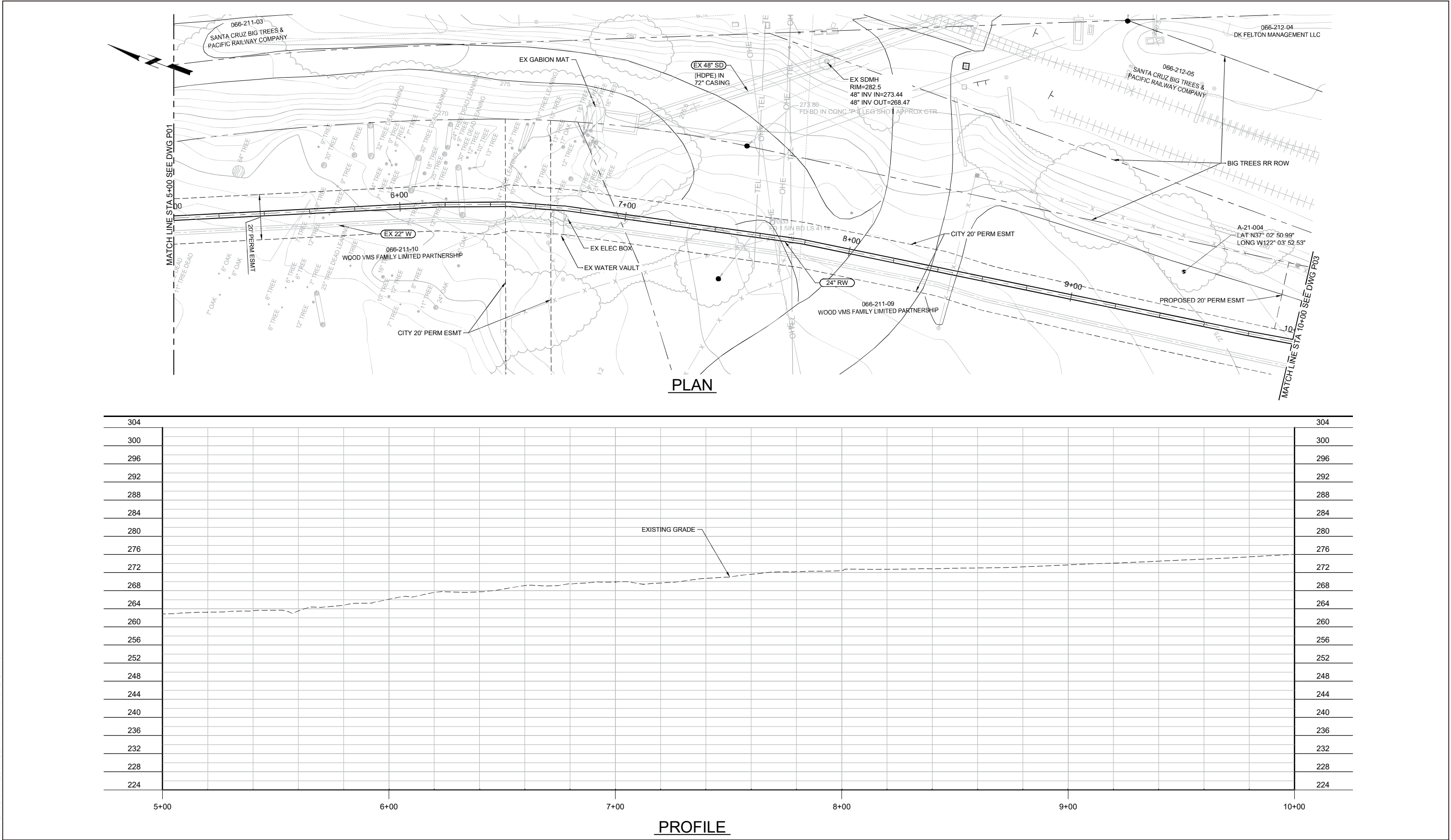
SOURCE: Carollo 2021

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FIGURE 3-13

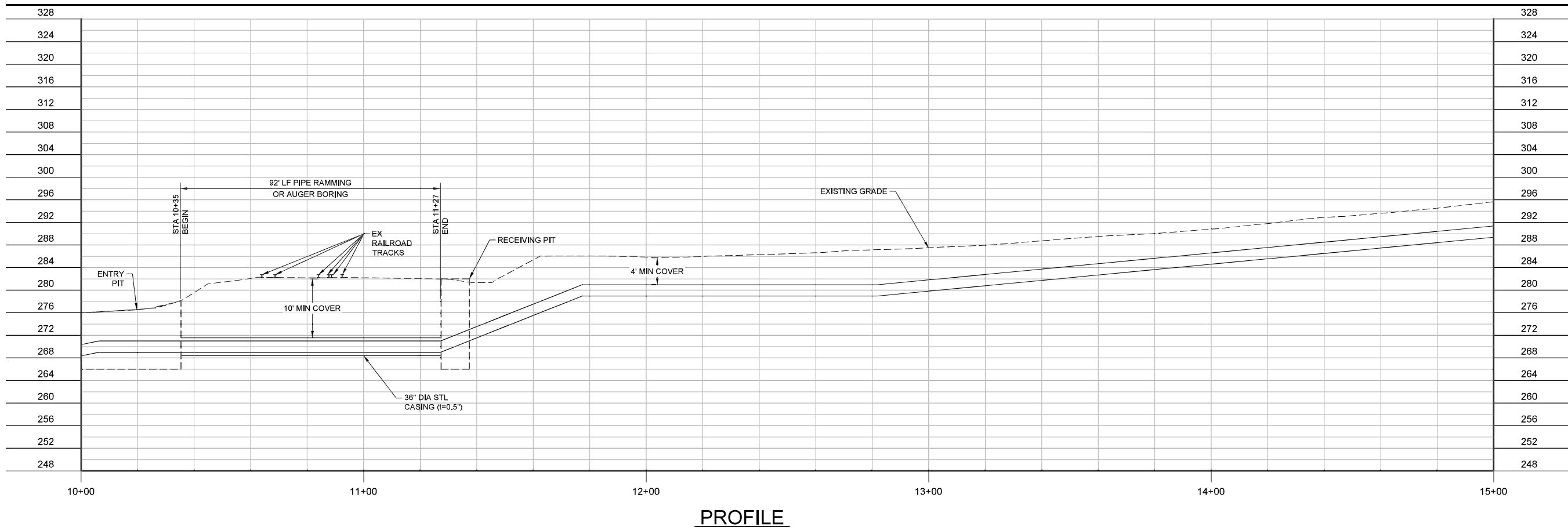
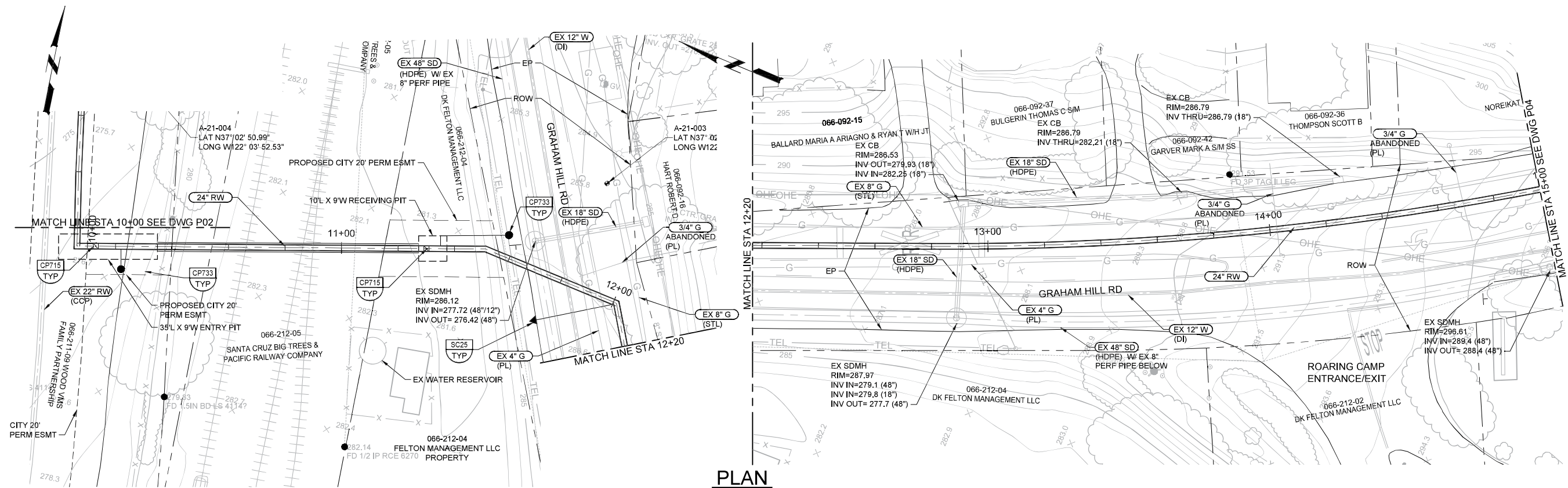
Graham Hill Road North Pipeline Section Site Plan - Zayante Creek Area
Newell Creek Pipeline Improvement Project

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SOURCE: Carollo 2021

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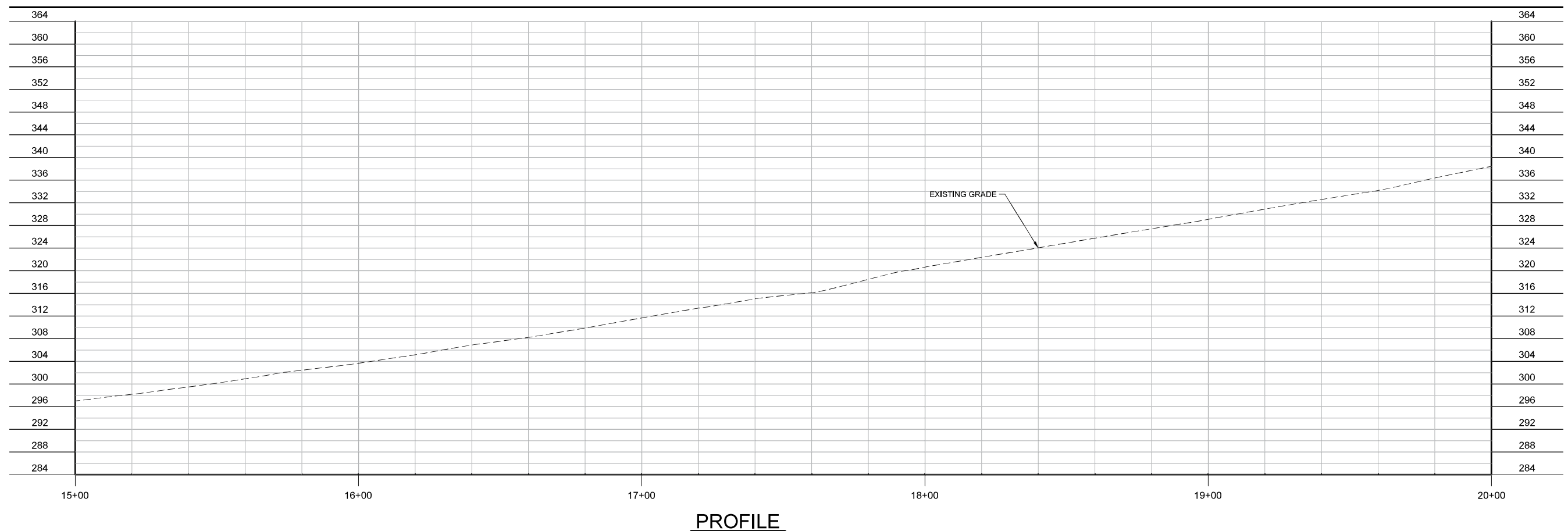
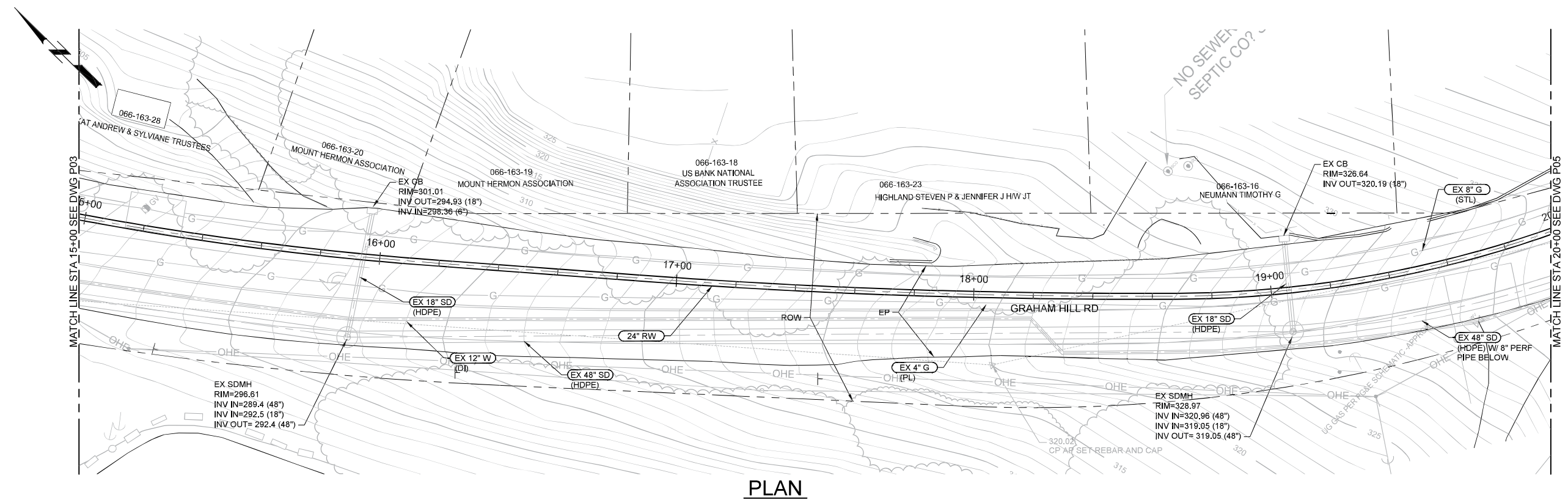


SOURCE: Carollo 2021

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FIGURE 3-15
 Graham Hill Road North Pipeline Section Site Plan - Rail Crossing
 Newell Creek Pipeline Improvement Project

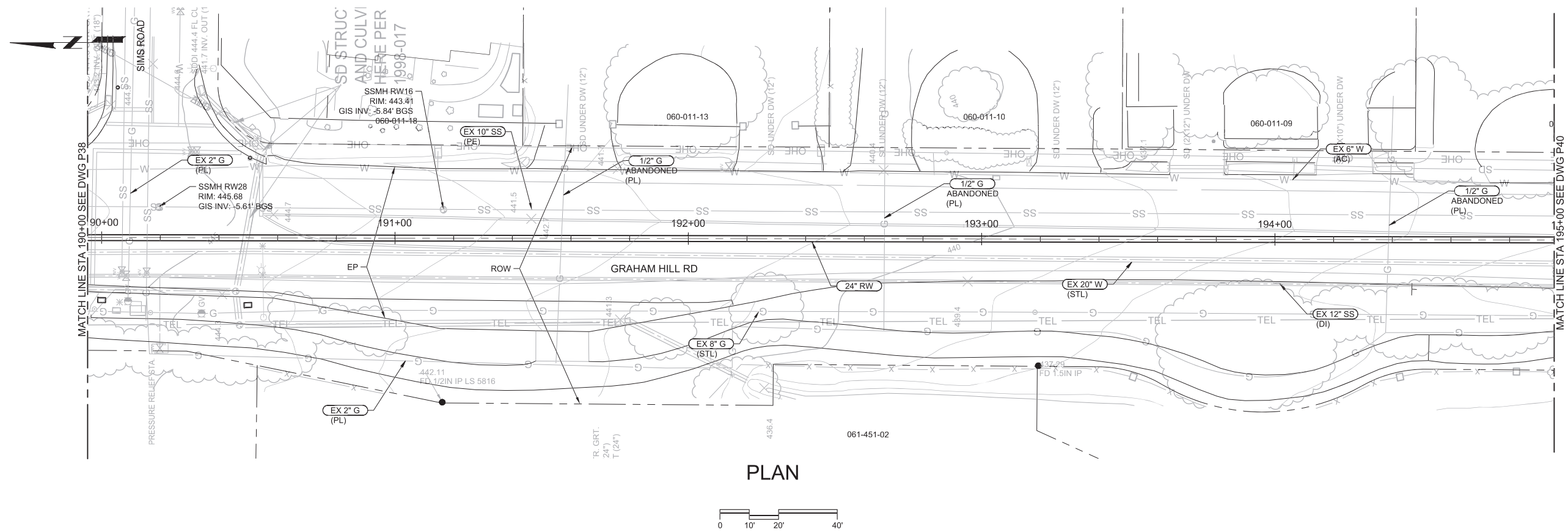
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SOURCE: Carollo 2021

FIGURE 3-16

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SOURCE: Carollo 2021

FIGURE 3-17
 Graham Hill Road South Pipeline Section Site Plan - Representative Road Area
 Newell Creek Pipeline Improvement Project

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Graham Hill Road South Section

This section extends 5,865 feet along Graham Hill Road from its intersection at Pipeline Road south to the GHWTP. The southern approximately 3,600-linear feet of this pipeline would entail removal of the existing NCP and installation of the new pipeline in the current NCP location, which is generally near the center or eastern side of the existing paved road. In this location, it is necessary to use the existing NCP alignment due to presence of other utilities in the roadway. A representative site plan of the Graham Hill Road North section is shown on Figure 3-17.

3.5.3 Other Project Components

3.5.3.1 Appurtenances and Improvements

Other components of the Proposed Project include installation of air release valves, isolation valves, blowoffs and other appurtenances that would be designed in accordance with City and American Water Works Association (AWWA) standards. The FBPS has been improved over the past decade, and no new pump stations are required. Additionally, cathodic protection would be implemented during pipeline installation.

New air valves will be required in new pipeline sections to manage air and vacuum conditions occurring in the pipeline. Releasing air is required when filling the pipeline and during normal operations. Combination air release valves and air/vacuum valves typically would be installed along the pipeline at 1/4 to 1/2 mile intervals. The air valves generally extend approximately 24 inches above ground and are anticipated to be approximately two-inch diameter size valves to accommodate pipeline filling (Carollo 2021). However, an 8-inch valve is proposed at the high point in the pipeline off of Graham Hill Road near the County Juvenile Center with three 2-inch valves are proposed at 300, 600, and 800 feet upstream of the high point per the recommendations of a surge analysis completed for the project. Isolation valves would be installed at strategic locations to facilitate isolating the pipeline into segments if dewatering as a result of pipeline maintenance or repair the pipeline was ever needed in the future. The isolation valves would be installed below ground with a valve box lid at the ground surface, flush with grade.

Blowoffs will be provided at selected low points and on the uphill side of isolation valves to facilitate pipeline dewatering. Blowoffs may also be used to maintain water quality during low flow conditions by opening the blowoff to flush aged water. Blowoffs would be located near sanitary sewer manholes, where feasible, to facilitate convenient disposal of water (Carollo 2021). Blowoffs would be located only at low points and at isolation valves and may be used to drain the pipe for maintenance or repairs. Blowoffs will look very similar to isolation valves with a valve box lid at the surface, flush with grade.

3.5.3.2 Post-Construction Revegetation/Restoration

Upon completion of construction, construction sites would be revegetated and/or restored in accordance with the City's Standard Construction Practices, and disturbed roadways would be repaved in accordance with County requirements.

3.5.3.3 Decommissioning of Existing Pipeline

Once the new NCP pipeline sections are installed and operational, the remaining existing pipeline sections would be decommissioned. This would involve capping off the existing pipeline, injecting the pipeline with grout, and abandoning in place. All existing pipe sections under roadways/travelways would be grouted with plugging or capping where the pipeline goes cross-country through flat areas. Generally, all above-ground features of the existing pipeline would be removed including air valves, hydrants, and vent pipes.

Approximately 13,200 linear feet of the existing NCP is within the paved Pipeline Road in Henry Cowell Redwoods State Park, except for 4,600 linear feet, which is not paved. Certain segments within the State Park are difficult to access due to narrow vehicle clearance, steep roadway grades, and few truck turnaround locations. In locations that are difficult to access, pipe segments would be plugged every 1,000 feet and/or where there are surface access points. Where the existing NCP is exposed and adjacent to a roadway bridge that crosses above a tributary stream to the San Lorenzo River, removal of the pipe segment presents risk of depositing sediment and debris into the stream. In addition, the pipe in this area is supporting the road crossing. In this location, the pipe segment would be cut at each end where it daylights, and concrete and rebar reinforcement would be installed to prevent impacts from abandonment activity and to increase longevity of the road.

3.5.4 Operations and Maintenance

After installation of the Proposed Project, operations would include continued implementation of pump start-up and valve operations at the FBPS, when needed to pump water to/from Loch Lomond Reservoir. Once installed, maintenance of the pipeline would include intermittent, periodic inspections and maintenance of air valves with access provided to the pipeline sections by existing roads and easements. The Brackney North pipeline section would have air valves on either end of the new pipeline and would not need to be accessed in the future unless replacement is necessary (HDR 2020).

3.6 Project Construction

This section describes the anticipated Proposed Project construction schedule, expected construction methods, construction routes and staging, estimated construction equipment and workers, and the City's Standard Construction Practices that are incorporated into the Proposed Project.

3.6.1 Construction Schedule

The Proposed Project is scheduled to be constructed in phases over multiple years from approximately late 2022/early 2023 to 2032. The Brackney North, Graham Hill Road North, and Graham Hill Road South pipe sections would be constructed first, with an estimated construction schedule of about 24 months for the Graham Hill Road sections and approximately 9 months for the Brackney North section, including pipeline installation, road repaving, abandonment of the existing NCP, and post-construction revegetation where needed. The remaining pipe sections in the northern segment are expected to be constructed by 2032. A summary of the planned construction schedule for each pipe sections is presented in Table 3-4.

Table 3-4. Project Construction Assumptions

Pipeline Section	Estimated Schedule ¹ / Total Work Days	Estimated Daily Workers	Construction Equipment
Newell Creek Road	March-June 2030 / 66 total work days	12	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, rollers, paving equipment
Glen Arbor Road	June-October 2030 / 94 total work days	12	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, rollers, paving equipment
Brackney North	-March-December 2023 / 306 total work days	8	Excavator, tractors, loaders, backhoes, dumpers, mud pumps, HDD drill rig, mud separation plant, forklift, dump truck, vacuum truck, water truck, welding truck, generators, flood lights, fusion machine, pavers, rollers, paving equipment, concrete mixer truck
Brackney South	March-May 2031 / 51 total work days	12	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, rollers, paving equipment
San Lorenzo Way	May-July 2031 / 55 total work days	12	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, rollers, paving equipment
Felton Booster Pump Station	July-September 2031 / 47 total work days	12	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, rollers, paving equipment
Graham Hill North	January 2023-July 2024 / 334 total work days	11-18	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, dumpsters, boring machine, bore/drill rigs, cranes, plate compactors, cement and mortar mixers, rollers, paving equipment, off-highway trucks
Graham Hill South	July 2024-February 2025 / 137 total work days ²	11-18	Excavator, tractors, loaders, backhoes, concrete/industrial saws, pavers, dumpsters, mixers, rollers, paving equipment, off-highway trucks, cement and mortar mixers,

¹ Includes post-construction road repaving, abandonment of existing pipeline, revegetation and construction demobilization.

² Includes 50 work days at end of Project construction to abandon existing pipeline in Henry Cowell Redwoods State Park between December 2024 and February 2025.

Source: Carollo Engineers for Graham Hill Road North and South; Mott MacDonald for Brackney North; Santa Cruz Water Department for all others.

3.6.2 Construction Methods

The majority of the Proposed Project would be installed using conventional (open cut) trenching methods, except in the Brackney North and potentially Brackney South sections, as well as under the existing rail crossing in the Graham Hill Road North section, where trenchless methods would be used. Special construction techniques would be utilized at creek crossings, as described below. As indicated in Section 3.5.1, the Proposed Project generally would be constructed within existing road pavement, road ROW and/or existing City easements, except acquisition of additional permanent and temporary construction easements and/or property would be required for the Brackney North section. In accordance with the City's Standard Construction Practices, described in Section 3.6.5, best management practices would be implemented where necessary to prevent erosion and water quality degradation and/or to protect sensitive natural resources.

3.6.2.1 Conventional Trenching Construction Methods

Conventional (open cut) trenching consists of excavation of the trench, removal of the excavated soil via truck, installation of the pipe on bedding, and backfilling the trench with engineered fill. It is expected that approximately 60-100 linear feet of pipeline can be installed per work day on average using conventional trenching. Installation of the new pipe in Graham Hill Road will require approval of an encroachment permit and traffic control plan from the County of Santa Cruz, and the City will use the County's standard trench construction detail for installation of the pipe.

The standard pipeline construction trench would be approximately 4 to 5 feet wide with varying depths to avoid existing utilities under paved roadways, but generally would be a minimum of 5 feet deep. Construction activities would be expected to occur within an approximate 10-to 15-foot-wide construction corridor, which includes the area of trenching, temporary road lane closures, and placement of equipment within and adjacent to the work area during the work day. Construction activities would occur within the closed road travel lane and activities that could encroach onto the adjacent roadway unpaved shoulder would include movement of construction workers and equipment, temporary parking and storage of pipeline, and temporary signage that would be used in that day's construction. No excavated or fill soils will be stockpiled on the side of the road. All construction materials, equipment and spoils would be stored at designated staging areas and would not remain along the road after daily construction work periods.

3.6.2.2 Construction Methods in Brackney North Section

The new pipe in the Brackney North section would be installed using the HDD method, which is a guided trenchless construction technique. This method uses a combination of vertical and horizontal curves to install a pipeline from the surface. The alignment is drilled in multiple passes. Following hole enlargement, a carrier pipe is pulled into the excavated hole and drilled to the other end.

Work areas will be needed at both ends of the HDD for the duration of installation. A typical work area required for HDD drill rig operations is an area of approximately 15,000 square feet. The width of work area at the point of pipe entry into the HDD bore is typically 50 feet. The pipe string must be fused into a single pipeline at the pipe entry side, approximately 100 ft longer than the length of the HDD. A laydown area will be required for the pipe string as well as work area(s) for fusion activities (approximately 30 feet wide). A private gravel turnout along Brackney Road would provide the required width to perform pipe fusion. The trenched pipeline construction will utilize the same staging areas as those designated for HDD construction (Mott MacDonald 2021b).

Pipe lifting equipment, such as cranes, would be required at the HDD pipe entry location (near the north end of the pipe string) to lift the pipe to the correct angle so that it can be pulled into the HDD bore. The installation would use a drill-and-intersect method, which requires a drill rig at each side of the HDD installation (Mott MacDonald 2021b).

3.6.2.3 Construction Methods in Brackney South Section

For the area of potential landslides in the Brackney South section, a conceptual design is construction of a cantilevered retaining wall, installed along the outside edge of the pathway where the existing pipeline is

situated that would consist of three-foot diameter soil-cement columns installed 3 feet on-center for a length of approximately 850 feet (HDR 2020). The retaining wall would be designed as a cantilevered system to stabilize the upper and lower slopes. The wall would be constructed on the downslope side of the existing trail in which the pipe would be located. If a slide were to occur, the wall would prevent the slide mass from advancing further downslope. The wall would consist of 3-foot-diameter soil cement columns installed 3 feet on center to a depth of 70 feet. Every other column would be a steel H-beam instead of the soil cement column (HDR 2019a). A directional drilling method similar to what is proposed for the Brackney North pipe section may also be utilized for all or part of the Brackney South section.

3.6.2.4 Creek Crossings

The Proposed Project includes four open creek crossings and numerous culverted creek and drainage crossings. Potential construction methods for the creek crossings are identified in this section. No creek dewatering will be required for any of the crossings.

At the northern end of the pipeline alignment, the NCP currently crosses Newell Creek as an attachment to the upstream side of the Newell Creek Access Road Bridge for a distance of approximately 116 feet. It is expected that the existing pipeline on the bridge would be replaced with the new pipeline in the same location or on the downstream side of the bridge. The Proposed Project alignment also crosses Newell Creek just south of the Newell Creek Road/Glen Arbor Road intersection. In this location, the Proposed Project would replace this short, approximately 80 linear-foot section with the new pipeline in the same above-grade location, although trenchless directional drilling is also an option. Construction activities would be staged on either side of the creek, and no construction is anticipated in the flowing channels. The Proposed Project also crosses two unnamed, culverted drainages in the San Lorenzo Way section at San Lorenzo Way and the northern area of Rose Acres. Open trench construction methods would be used for installation during dry periods as these ephemeral drainages do not flow year round. The pipeline would be installed over the culverts.

At the FBPS, the existing NCP crosses Zayante Creek in an underground pipeline. The proposed new pipeline would be installed on existing railroad abutments parallel to and south of the Graham Road bridge on which the City's existing 24-inch Felton Diversion pipeline is located. A free span of approximately 60 feet would be required for the new 24-inch pipe. On the north side of the creek, the pipeline would pass through an existing headwall by core drilling or cutting a hole in the wall that would be filled with grout at the end of installation. The crossing would be a high point in the pipeline (see Figure 3-18). On the south side of the creek, the pipeline will be supported by two new, 30-inch diameter reinforced concrete piers, installed beyond the top of bank on the south side of the existing abutment behind an existing unreinforced concrete pier.

The pipeline route along Graham Hill Road would cross at least two culverted creeks (Eagle Creek and Power Hill Creek). The pipeline would be installed over the existing culverts.

3.6.2.5 Rail Crossing

The Graham Hill Road North section will cross the existing Santa Cruz Big Trees Rail tracks using a trenchless method that would consist of either pipe ramming or auger boring. Figure 3-15 shows the rail crossing location. Pipe ramming is a trenchless installation method for driving an open-ended steel casing using a percussive hammer. Pipe ramming is a two-stage process: pipe casing installation and product pipe installation

inside the casing. Pipe ramming is used for the installation of steel casings from 8-inch to over 144-inch diameter with most installations less than 300 feet in length. The minimum recommended work area at a launch shaft is 10,000 sf in order to accommodate the launch shaft, crane, pipe storage, air compressor, end loader or other spoil removal equipment, and truck access for spoil removal. This method requires the least amount of equipment and staging when compared to other trenchless methods (Carollo 2021).

Auger-boring is a pipe jacking method for installing a casing pipe between two shafts by means of a rotating cutting head. Spoil is transported back to the drive shaft by helical wound auger flights rotating inside a steel pipe casing that is being jacked in place simultaneously. This process requires an auger boring machine to be placed in a launch pit on grade at the beginning of the pipeline segment as well as a reception pit at the end of the drive. Auger boring is traditionally a two-stage process: pipe casing installation and product pipe installation inside the casing. Reaches from 40 to 500 feet are common lengths for this type installation. A minimum of 10,000 sf is recommended for the launching and receiving shaft work areas (Carollo 2021).

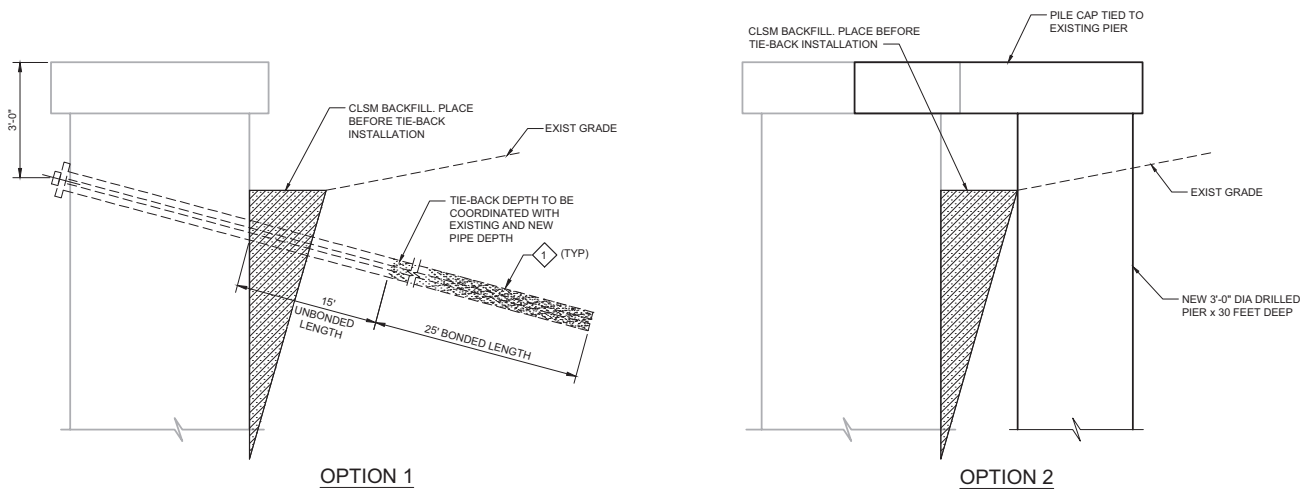
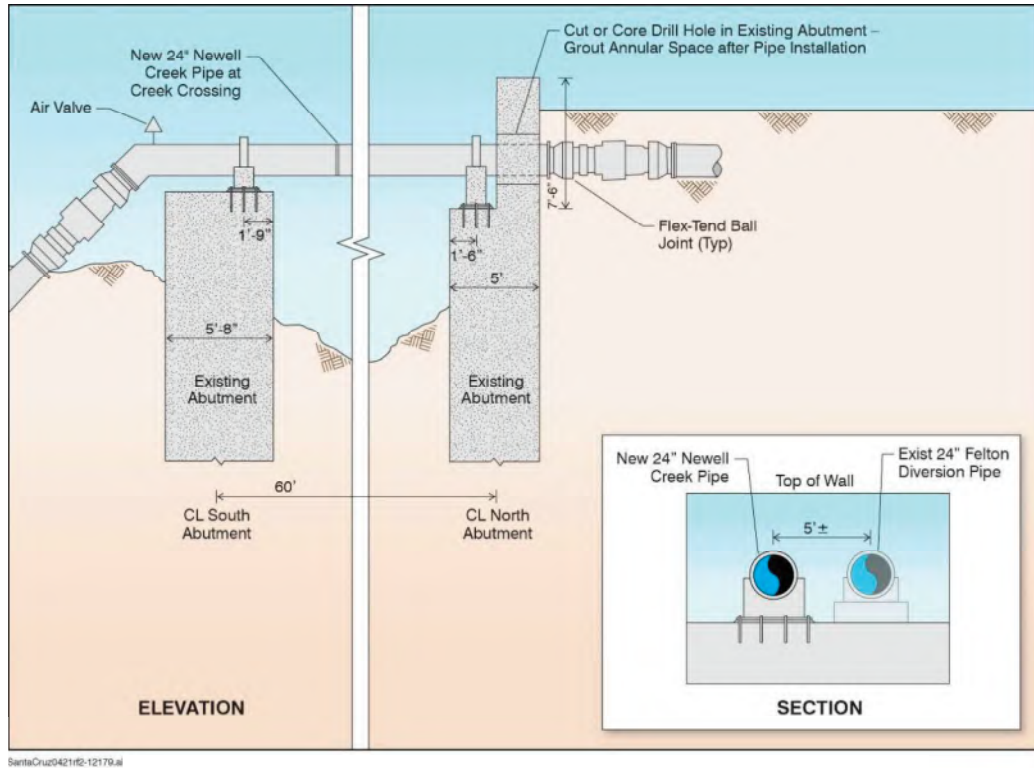
3.6.3 Project Access and Staging Areas

Access for vehicles carrying materials, equipment, and personnel to and from the project sites would be provided via existing roadways in the project vicinity. The primary routes for construction traffic would likely be from State Route 1 (locally referred to as Highway 1) or State Route 17 (locally referred to as Highway 17) via Graham Hill Road or Mount Hermon Road. Highway 9 also would provide access to local roads in the northern segment of the Proposed Project alignment.

The primary local roadways serving the northern segment of the Proposed Project include Newell Creek Road, Glen Arbor Road, Quail Hollow Road, Brackney Road, and San Lorenzo Way, as well as other local streets off of Glen Arbor Drive. Local roads serving the southern segment of the Proposed Project include Sims Road and Lockewood Lane, both of which connect Graham Hill Road and Mount Hermon Road. To facilitate project construction, one lane along public roads could be closed temporarily during the work day, with traffic controllers in place. Work within County roadways would require an encroachment permit from the County of Santa Cruz that would require specified traffic control measures in a Traffic Control Plan.

Construction staging/laydown areas have been identified in areas that are already fairly level along the existing roadways, and temporary work areas will be established for the Brackney North section as explained in Section 3.6.2.2. Staging areas would be used for storage of materials and products and equipment laydown. Minimal clearing may be required for certain staging areas. Proposed locations of staging areas in the northern segment have been identified within the following pipe sections: Newell Creek Road (see Figure 3-6), Glen Arbor Road (see Figure 3-7), Brackney South (see Figure 3-9), and San Lorenzo Way (see Figure 3-10). Proposed staging areas in the southern segment include a parking lot near Zayante Creek, parking lot on the San Lorenzo Lumber Yard property, and two areas along Graham Hill Road (see Figure 3-19).

In addition, an existing unpaved dirt road that is within the City's easement in the Graham Hill Road North section extends from the south bank of Zayante Creek to its intersection with the San Lorenzo Lumber Yard Driveway. This road is used for maintenance and construction access, and improvements may include placement of one to two inches of gravel, geocell reinforcement, wooden planks, or other acceptable means to provide for access along the easement.



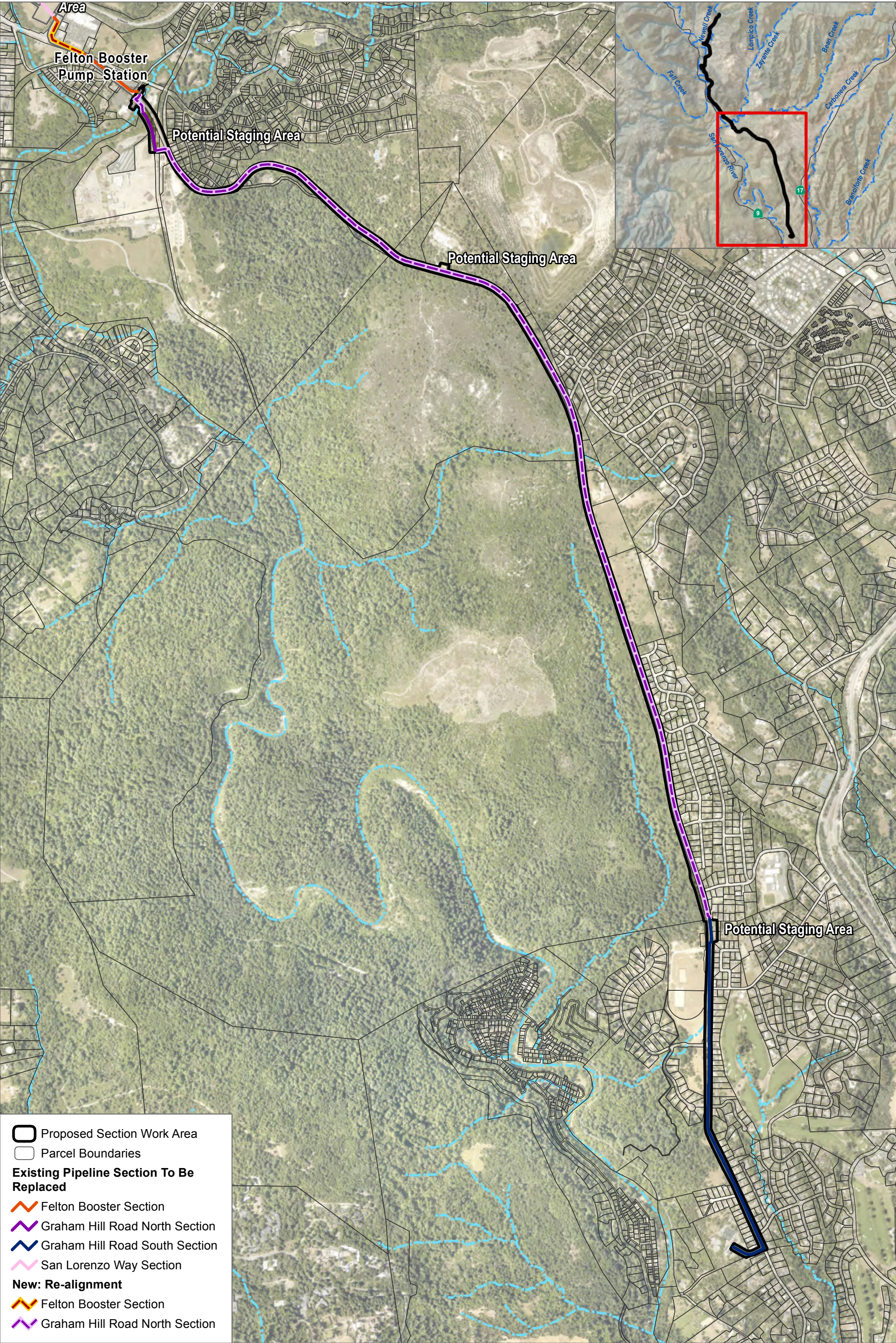
Options for Structural Support to Existing Southern Abutment

SOURCE: Carollo 2021

FIGURE 3-18

Zayante Creek Crossing Detail
Newell Creek Pipeline Improvement Project

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SOURCE: Bing 2021; County of Santa Cruz 2021

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3.6.4 Construction Workers, Work Hours and Equipment

On average, approximately 12-18 construction workers are estimated to be working at the Project site each day for construction in the southern segment and 8-12 daily construction workers are estimated for pipe sections in the northern segment. Construction generally would occur during normal weekday work hours, between 8 AM and 5 PM and in accordance with County of Santa Cruz encroachment permit requirements. However, construction along Graham Hill Road would be limited to the hours of 8 AM to 4 PM with temporary lane closures restricted to 9 AM to 3 PM. As previously indicated, the HDD installation method for the pipe in the Brackney North section would require approximately one day of continuous 24-hour installation.

Generally, the Proposed Project would require use of heavy equipment such as excavators, bulldozers, graders, rollers, dump trucks, loaders, backhoes, cranes, and generators. Haul trucks would be used to transport materials to the site and to transport any spoils off site to a permanent disposal location. Flatbed trucks would be used to transport smaller quantities of material at the site. Water trucks and fuel trucks would also be used at the site. Specialized drilling equipment would be required in locations where trenchless installation methods are proposed in the Brackney North section and under the rail tracks in the Graham Hill North section.

3.6.5 NCP Operations During Construction

Construction of the Graham Hill Road North and South pipe sections will be phased to keep the existing NCP in service as long as possible while the new pipeline is constructed. Prior to taking the existing pipeline out of service, the new pipeline would be pressure tested and ready for service, should it need to be put into service for an emergency. The existing pipeline also would need to be taken out of service to construct the new pipeline in the southern part of the alignment, approximately from Henry Cowell Drive to the GHWTP where the new pipeline is in the same location as the existing pipeline. Construction will progress from Henry Cowell Drive south to the GHWTP to allow for an emergency connection between the new pipeline and existing pipeline if an immediate return to service is needed. The northern tie-in at the FBPS will occur when the existing pipeline is taken out of service (Carollo 2021).

3.6.6 Standard Construction Practices

The City has adopted standard construction practices that would be implemented by the City or its contractors during construction activities associated with the Proposed Project, where relevant.

Erosion Control and Air Quality Control

1. Implement erosion control best management practices for all construction activities occurring in or adjacent to jurisdictional aquatic resources (resources subject to permitting under the Clean Water Act, Clean Water Act , Porter-Cologne Water Quality Act and/or California Fish and Game Code). These measures may include, but are not limited to, (1) installation of silt fences, fiber or straw rolls, and/or bales along limits of work/construction areas and from the edge of the water course; (2) covering of stockpiled spoils; (3) revegetation and physical stabilization of disturbed graded and staging areas; and (4) sediment control including fencing, dams, barriers, berms, traps, and associated basins.

2. Provide stockpile containment and exposed soil stabilization structures (e.g., Visqueen plastic sheeting, fiber or straw rolls, gravel bags, and/or hydroseed).
3. Provide runoff control devices (e.g., fiber or straw rolls, gravel bag barriers/chevrons) used during construction phases conducted during the rainy season. Following all rain events, runoff control devices shall be inspected for their performance and repaired immediately if they are found to be deficient.
4. Implement wind erosion (dust) controls, including the following:
 - Use a water truck;
 - Water active construction areas as necessary to control fugitive dust;
 - Hydro seed and/or apply non-toxic soil binders to exposed cut and fill areas after cut and fill operations;
 - Cover inactive storage piles;
 - Cover all trucks hauling dirt, sand, or loose materials off site; and
 - Install appropriately effective track-out capture methods at the construction site for all exiting trucks.

Water Quality Protection

5. Locate and stabilize spoil disposal sites and other debris areas such as concrete wash sites. Sediment control measures shall be implemented so that sediment is not conveyed to waterways or jurisdictional aquatic resources (resources subject to permitting under the Porter-Cologne Water Quality Act Section 13000 et seq, Clean Water Act Section 404, Clean Water Act Section 401, and/or California Fish and Game Code).
6. Minimize potential for hazardous spills from heavy equipment by not storing equipment or fueling within a minimum of 65 feet of any jurisdictional aquatic resource unless approved by permitting agencies along with implementation of additional spill prevention methods such as secondary containment and inspection.
7. Ensure that appropriate measures are taken to prevent gas, oil, or any other substances that could be hazardous to aquatic life or pollute habitat from contaminating the soil or entering jurisdictional aquatic resources by storing these types of materials within an established containment area. Vehicles and equipment will have spill kits available, be checked daily for leaks, and will be properly maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, and grease. Any gas, oil, or other substance that could be considered hazardous shall be stored in water-tight containers with secondary containment. Emergency spill kits shall be on site at all times.
8. Prevent equipment fluid leaks through daily equipment inspections.
9. Implement proper waste/trash management.

The City's Standard Construction Practices for In-Channel Work and Fish Species Protection (Practices #10-12) are not applicable to the Project because no work would occur within flowing water.

General Habitat Protection

13. Minimize disturbance of riparian vegetation to the maximum extent feasible when working in or adjacent to an active stream channel.
14. Restore all temporarily disturbed sensitive natural communities areas by replanting native vegetation using a vegetation mix appropriate for the site.

The City's Standard Construction Practice for decontamination of tools and equipment prior to entering waterways (Practice #15) is not applicable to the Project because no work would occur within flowing water.

16. A qualified biologist shall conduct a training-educational session for project construction personnel prior to any mobilization-construction activities within the project sites to inform personnel about species that may be present on site. The training shall consist of basic identification of special-status species that may occur on or near the project site, their habitat, their basic habits, how they may be encountered in the work area, and procedures to follow when they are encountered. The training will include a description of the project boundaries; general provisions of the Migratory Bird Treaty Act, California Fish and Game Code, and federal and state Endangered Species Acts; the necessity for adhering to the provision of these regulations; and general measures for the protection of special-status species, including breeding birds and their nests. Any personnel joining the work crew later shall receive the same training before beginning work.

The City's Standard Construction Practices for Dewatering (Practices #17-23) are not applicable to the Project because no work would occur within flowing water.

Inadvertent Discoveries of Archaeological Resources and Human Remains

24. Any unrecorded archaeological resources (sites, features, and/or artifacts) exposed during construction are subject to protection and consideration under CEQA and the California Public Resources Code (PRC) as well as Section 106 of the National Historic Preservation Act (NHPA) as detailed in the Code of Federal Regulations (CFR). The CEQA Guidelines Section 15064.5(f) specifically addresses provisions the City of Santa Cruz will make regarding accidental discovery of historical or unique archaeological resources during construction. The responsibilities of the lead federal agency to avoid, minimize or mitigate adverse effects to a "historic property" (36 CFR Section 800.16) are detailed in 36 CFR Section 800.13[b] and would be applicable for a project with federal involvement by way of funding, permitting, approval authority, or other means.

In general, the implementation procedures under CEQA and the NHPA in the case of an inadvertent archaeological discovery during construction are similar and are as follows:

- If archaeological resources are exposed immediately stop any construction work occurring within 100 feet which may further disturb the find. NOTE – This is a general guideline for the initial response, the exclusion zone may be contracted or expanded depending on the nature of discovery and type of construction activity proposed in the vicinity of the find. The duration of the exclusion zone will be determined by the City and the federal lead agency and is contingent on the approved course of action in response to the discovery.

- Immediately notify the City Project Manager who shall immediately notify the Water Department Deputy Director/Engineering Manager
 - A qualified archaeologist meeting the Secretary of the Interior's Professional Qualification Standards will evaluate the state and federal significance of the find for eligibility to the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP) in coordination with City staff.
 - The City will notify the lead federal agency within 24 hours of discovery. The notification shall describe the assessment of the NRHP eligibility of the resource, specify the NRHP criteria used to evaluate the property's eligibility, and propose actions to resolve any adverse effects.
 - The federal lead agency will contact the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), and any interested locally affiliated Native American tribes. The SHPO, ACHP, and Native American tribes will respond within 48 hours of the notification. The federal lead agency shall consider any recommendations regarding National Register eligibility and proposed actions and notify the City of the appropriate actions. The federal lead agency official shall provide the SHPO and the ACHP a report of the actions when they are completed.
 - Avoidance and/or minimization of impacts/effects is the preferred course of actions under both state and federal guidelines. If preservation in place is not feasible, additional study will likely be required. In coordination with the lead federal agency, the City will prepare a data recovery/treatment plan for retrieving important archaeological data relevant to the site's significance. The data recovery/treatment plan will be submitted to participating tribes and agencies for review and comment prior to implementation.
 - If the inadvertent discovery location cannot be avoided, and continuing work would have an adverse effect on the site, the federal agency, in coordination with the City, SHPO, and Native American tribes as appropriate, will need to draft and finalize a Memorandum of Agreement for the treatment of the historic property before work can proceed.
 - Implementation of the data recovery/treatment plan may include archaeological excavations, technical and laboratory analysis, and further consultation and coordination with Native American tribal representatives.
 - A full written report will be prepared to include the results of all technical analyses and special studies and will be provided to participating tribes and agencies for review and comment. The report will be filed with the Northwest Information Center and will also provide for the permanent curation of recovered materials.
25. In California, the illegal possession of human remains is a felony, punishable by imprisonment (California Penal Code Section 1170[h]; Public Resources Code 5097.99[a] and [b]). Inadvertent discoveries of human remains exposed during construction on non-federal lands are subject to protection under CEQA and the NHPA. In accordance with Section 7050.5 of the California Health and Safety Code and the NHPA, if potential human remains are found, immediately notify the City, the lead federal agency, and the Santa Cruz County Coroner of the discovery. The Santa Cruz County Coroner will provide a determination within 48 hours of notification. No further excavation or disturbance of

the identified material, or any area reasonably suspected to overlie additional remains, can occur until a determination has been made.

- If human remains are exposed **immediately stop any construction work occurring within 100 feet** which may further disturb the find. NOTE – This is a general guideline for the initial response, the exclusion zone may be contracted or expanded depending on the nature of discovery and type of construction activity proposed in the vicinity of the find. The duration of the exclusion zone is contingent on the course of action mandated by the City and lead federal agency.
- If the Santa Cruz County Coroner determines that the remains are, or are believed to be, Native American, the coroner will notify the Native American Heritage Commission (NAHC) within 24 hours and all the actions described in these Standard Construction Practices regarding Inadvertent Archaeological Discoveries shall be followed.
- In accordance with California Public Resources Code, Section 5097.98 and Section 106 of the NHPA, the NAHC must immediately notify those persons it believes to be the Most Likely Descendant (MLD) from the deceased Native American.
- Within 48 hours of this notification, the MLD will recommend to the City and lead federal agency her/his preferred treatment of the remains and associated grave goods.
- The ultimate disposition of the remains will be coordinated between the City, the federal agency, the MLD, the landowner, and the NAHC (if necessary).
- The lead federal agency will have additional government-to-government consultation requirements per the requirements of Section 106 [36 CFR § 800.2(c)(2)(ii)] which cannot be delegated to non-federal entities.

Other Practices

26. Notify adjacent property owners of nighttime construction schedules. A Construction Noise Coordinator will be identified. The contact number for the Construction Noise Coordinator will be included on notices distributed to neighbors regarding planned nighttime construction activities. The Construction Noise Coordinator will be responsible for responding to any local complaints about construction noise. When a complaint is received, the Construction Noise Coordinator shall notify the City within 48 hours of the complaint, determine the cause of the noise complaint, and implement as possible reasonable measures to resolve the complaint, as deemed acceptable by the City.
27. For construction in wildlands or in the wildland-urban interface, internal combustion engine equipment shall include spark arrestors, fire suppression equipment (e.g. fire extinguishers and shovels) shall be stored onsite during use of such mechanical equipment, and construction activities shall not be conducted during red flag warnings issued by the California Department of Forestry and Fire Protection (CAL FIRE) unless adequate fire protection measures are implemented in compliance with federal, state, and local fire prevention and protection regulations and guidance. Fire safety measures will be detailed in a Fire Safety Program on a project-by-project basis. Red flag warnings and fire weather watches are issued by CAL FIRE based on weather patterns (low humidity, strong winds, dry fuels, etc.) and listed on their website (<https://www.fire.ca.gov/programs/communications/red-flag-warnings-fire-weather-watches/>).

3.7 Project Permits and Approvals

3.7.1 Required Permits and Approvals

In addition to CEQA compliance, the Proposed Project would be subject to compliance and permitting requirements under federal, state, and local regulations. The anticipated agency permits/approvals necessary for the implementation of the Proposed Project are described below.

The City of Santa Cruz is the lead agency and is responsible for approving and implementing the Proposed Project. The Santa Cruz City Council is the decision-making body tasked with certification of the Final EIR, approval of the Proposed Project, including modification of existing easements, and adoption of CEQA findings and the mitigation monitoring and reporting program.

In addition to the City, other public agencies that have review or approval authority of the Proposed Project are outlined below. This EIR is intended to provide the information and environmental analysis necessary to assist federal and state permitting agencies (also known under CEQA as “responsible agencies”) in considering the approvals required for the Proposed Project.

- **U.S. Army Corps of Engineers (USACE).** Approval of a Clean Water Act Section 404 permit in areas of impacts to waters or wetlands of the U.S., including potential creek crossings
- **U.S. Fish and Wildlife Service.** Endangered Species Act Section 7 or Section 10 consultation
- **California Central Coast Regional Water Quality Control Board (RWQCB).** Approval of a Clean Water Act Section 401 Water Quality Certification Permit in areas of impacts to waters or wetlands of the U.S., including potential creek crossings, and a Notice of Intent for coverage under the National Pollutant Discharge Elimination System Construction General Permit
- **California Department of Fish and Wildlife (CDFW).** Approval of a California Fish and Game Code Section 1602 Lake or Streambed Alteration Agreement for any construction activity within CDFW jurisdiction (e.g., the existing City easement/pipeline route along Zayante Creek and construction areas near San Lorenzo River in the Brackney North pipe section)
- **California Water Boards, Division of Drinking Water.** Review of water pipelines 24 inches and larger in diameter
- **State Historic Preservation Office.** National Historic Preservation Act Section 106 consultation for Project components that require a USACE permit or if federal funding is involved
- **County of Santa Cruz.** Approval of encroachment permit and Traffic Control Plan

Although the project alignment is located within the unincorporated area of Santa Cruz County, the City is not required to obtain building or grading permits from the County, pursuant to state law. California Government Code Sections 53091(d) and (e) provide that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local zoning and building ordinances.

3.7.2 Potential Funding Sources

Several potential funding sources have been identified for the Proposed Project, including Federal Emergency Management Agency (FEMA) funding, the Water Infrastructure Finance and Innovation Act (WIFIA) Program (administered and funded by the U.S. Environmental Protection Agency [EPA]) and the Drinking Water State Revolving Fund (SRF) Program (administered by the State Water Resources Control Board [SWRCB]). Because of the federal nexus through funding, the Proposed Project would be subject to compliance with the National Environmental Policy Act (NEPA). Each agency has its own checklist that addresses federal laws and executive orders. FEMA will conduct its own NEPA review as part of the planning and design grant for the Brackney North pipeline section.

In March 2020, the City received “Phase 1” FEMA grant funding through its Hazard Mitigation Grant Program (HMGP). The grant covers field investigation, design and project management for the Brackney North pipeline section, also known as “Brackney Landslide Area Pipeline Risk Reduction.” Construction funding within FEMA’s grant program would be considered upon completion of Phase I.

EPA is the lead agency for the NEPA decision related to the WIFIA loan. Should the Proposed Project pursue a WIFIA loan, it would be covered under WIFIA’s Programmatic Environmental Assessment, and a WIFIA Questionnaire would be completed and submitted to the EPA concurrently with the CEQA process. A similar checklist is required for the SRF program, which will be completed and submitted to the SWRCB. Additional funding sources may be pursued depending on the implementation schedule for the various pipeline segments.

3.8 References

- City of Santa Cruz. 2017. Brackney Landslide Area Pipeline Damage Risk Reduction Project Hazard Mitigation Grant Program (HMGP) Application Package. Submitted to California Governor’s Office of Emergency Services. October 2017.
- Carollo. 2021. City of Santa Cruz Newell Creek Pipeline Felton/Graham Hill Replacement Project Technical Memorandum 1 Basis of Design. August 2021.
- HDR. 2018. “Newell creek Pipeline Rehab/Replacement Technical Memorandum, Subject: Newell Creek Pipeline Inventory.” Santa Cruz Water Program. November 8, 2018.
- HDR. 2019a. “Newell Creek Pipeline Alternatives Analysis Technical Memorandum.” Santa Cruz Water Program. October 9, 2019.
- HDR. 2019b. “Newell Creek Pipeline Rehab/Replacement Revised Technical Memorandum, Subject: Newell Creek Pipeline (NCP) Pipeline Prioritization of Pipeline Risk (Revised).” Santa Cruz Water Program. March 4, 2019.
- HDR. 2019c. “Newell Creek Pipeline Rehab/Replacement Technical Memorandum, Subject: Newell Creek Pipeline (NCP) Pipeline Replacement and Repair Identification.” Santa Cruz Water Program. March 4, 2019.

HDR. 2020. “Newell Creek Pipeline Improvements Technical Memorandum.” Santa Cruz Water Program. May 19, 2020

Kennedy Jenks. 2017. “Brackney Landslide Area Pipeline Damage Risk Reduction Project Engineering Report.” Prepared for City of Santa Cruz. October 2017.

Mott MacDonald. 2021a. Alternatives Analysis Memo Final- Brackney Landslide Area Pipeline Risk Reduction Project. May 14, 2021.

Mott MacDonald. 2021b. Basis of Design Brackney Landslide Area Pipeline Risk Reduction Project. August 27, 2021.