VTA's BART Silicon Valley— Phase II Extension Project Hydrology and Water Quality Technical Report

Prepared for:

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Summary

The Santa Clara Valley Transportation Authority (VTA) Bay Area Rapid Transit (BART) Silicon Valley Phase II Extension Project (Project) would consist of an approximately 6-mile extension of the BART system. The alignment would begin at the terminus of VTA's BART Silicon Valley Berryessa Extension Project (Phase I Project) south of Mabury Road in the City of San Jose. The Phase I Project is currently under construction and scheduled to be operational in late 2017 or early 2018. The four-station extension would descend into an approximately 5-mile-long subway tunnel, continue through downtown San Jose, and terminate at-grade in the City of Santa Clara near the Caltrain Station. There are two construction methods proposed for the 5-mile-long tunnel portion of the BART Extension—the Twin-Bore and Single-Bore Options—between the East and West Tunnel Portals. Under the Twin-Bore Option, two twin-bore tunnels would be excavated with one track in each. Under the Single-Bore Option, one large-diameter tunnel bore would be excavated, which would contain both the northbound and southbound tracks. Passenger service for the Project would start in 2025, assuming funding is available. VTA is also proposing Transit-Oriented Joint Development (TOJD) at the four proposed Project stations and at two mid-tunnel ventilation structure locations.

The purpose of this Hydrology and Water Quality Technical Report is to evaluate the potential for water quality impacts on existing surface water and/or groundwater resources within the Project limits due to the proposed Project improvements. This study considered all proposed Project activities that could result in impacts on water resources, erosion of stream banks, or an increase in sediment load and other pollutants to surface and groundwater.

The Project is within the San Francisco Bay Regional Water Quality Control Board's (RWQCB's) jurisdiction. VTA is subject to the State Water Resources Control Board's statewide Phase II Small Municipal Separate Storm Sewer Systems Permit (Phase II MS4 Permit) as a Non-traditional Permittee. The Project would be designed and operated in accordance with the post-construction stormwater treatment measures included in VTA's *Storm Water and Landscaping Design Criteria Manual* (2015). Post-construction for the Newhall Maintenance Facility would be covered under the National Pollutant Discharge Elimination System (NPDES) Industrial General Permit.

The runoff from the Project drains to one of the following watersheds: Lower Silver Creek, Coyote Creek, Guadalupe River, or Los Gatos Creek. All four watersheds within the Project limits ultimately discharge to South San Francisco Bay. Of the four water bodies associated with the San Francisco Bay, the following three are on the Clean Water Act's 303(d) list (2010) for Water Quality Limited Segments: Lower Silver Creek, Coyote Creek, and Guadalupe River. South San Francisco Bay, the ultimate receiving water body for these creeks, is also on the 303(d) List.

The estimated disturbed soil area (DSA) for the Project is approximately 130.18 acres with the Downtown San Jose Station East Option and 128.11 acres with the Downtown San Jose Station West Option. The total amount of added impervious area (AIA) is approximately 46.16 acres with the Downtown San Jose Station East Option and 46.09 acres with the Downtown San Jose West Option. Table S-1 shows the total DSA and the AIA per watershed.

The Project is within the Santa Clara Valley Groundwater Basin. The groundwater beneficial uses are municipal and domestic, industrial service, and agricultural water supply. According to the Project's Environmental Geotechnical Document (EGD), groundwater has been detected at depths averaging between 14 and 18 feet below ground surface in the Project area. According to the EGD, the groundwater table is anticipated to be encountered during the excavation of the tunnels regardless of the construction method (Twin-Bore and Single-Bore Options). Dewatering would be necessary, and methods to address dewatering would include a well-based dewatering system and/or pumping water from the excavation using pumps placed in sumps.

Temporary construction activities would include construction staging, storage, and parking for workers, but the temporary water quality impacts from the construction of the Project would be minimal with implementation of best management practices (BMPs). The National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) established three risk levels for projects based on potential erosion and transport to receiving water bodies. All four watersheds in the Project area were determined to be risk level 2.

Although the Project crosses four watersheds, runoff from the Project stations would only discharge to three watersheds: Lower Silver Creek, Los Gatos Creek, and Guadalupe River. Stormwater runoff from the Project has the potential to carry pollutants into natural flowing streams. Permanent erosion control and treatment BMPs would be implemented to address any impacts, promote infiltration, reduce erosion, and collect and treat runoff. The Phase II MS4 Permit includes hydromodification design requirements. However, it should be noted that the Project would not result in hydromodification impacts because the receiving catchments and subwatersheds are greater than or equal to 65% impervious area as highlighted in the Hydromodification Management Plan Maps for Santa Clara County.

The Project's design goals applicable to water resources are to avoid and minimize impacts on water resources to the maximum extent practicable, promote infiltration of stormwater runoff, maximize treatment of stormwater runoff, and reduce erosion by metering or detaining post-project runoff in accordance with the Phase II MS4 Permit. The Project is expected to have a less-than-significant impact on water resources by meeting these goals and incorporating other applicable NPDES and Project-specific permit or agreement requirements.

Table S-1. Impervious Areas and DSA by Watershed

Watershed	Project Option	Project Features	Total Impervious Area per Feature (acres)	Added Impervious Area (acres)	DSA[4]
Coyote Creek	Mabury Road and U.S. 101 CSA	CSA[1]	N/A	N/A	25.25
Lower Silver Creek	Alum Rock/28th Street Station	Station	9.25	2.54	17.68
	Alum Rock/28th Street CSA	CSA	N/A	N/A	3.31
Guadalupe River	Downtown San Jose Station East Option	Station	0.77	0.10	10.42
	Downtown San Jose Station West Option	Station	0.40	0.03	8.35
	Newhall Maintenance Facility		43.86[1]	41.86	46.93
	Santa Clara Station	Station	3.59	0.46	13.04
Los Gatos Creek	Diridon Station South Option	Station	3.47	Negligible	10.67
	Diridon Station North Option	Station	0.85	Negligible	10.49
Transit Oriented Joint Development					
Lower Silver Creek	Alum Rock/28th Street Station	TOJD[3]	5.09	0.77	
Guadalupe River	Santa Clara and 13th Street Ventilation	TOJD	1.15[1]	0.11	1.15
	Downtown San Jose Station East Option	TOJD	3.17	0.11	
	Downtown San Jose Station West Option	TOJD	0.35	0.10	
	Stockton Avenue Ventilation[2]	TOJD	1.73	Negligible	1.73
	Santa Clara Station	TOJD	3.53	0.11	
Los Gatos Creek	Diridon Station South Option	TOJD	2.24	Negligible	
	Diridon Station North Option	TOJD	2.24	Negligible	

[1] Assumed entire construction staging area (CSA) is impervious.
[2] Utilized largest of the three proposed lots for analysis.
[3] TOJD = Transit-Oriented Joint Development.
[4] Disturbed Soil Area (DSA) was not divided into station and TOJD, expect for the Santa Clara Street and Stockton Avenue locations.

Contents

Tables and Figures

Chapter 1
Project Description

The Phase II Project consists of an approximately six-mile extension of the BART system from the terminus of VTA's BART Silicon Valley—Berryessa Extension Project (Phase I) from San Jose to Santa Clara (see Figure 1). Phase I is currently under construction and scheduled to be operational in late 2017. The Phase II Project would include approximately five miles of subway tunnel from Berryessa Station, continuing through downtown San Jose, and terminating at grade near the Santa Clara Caltrain Station (see Figure 2). In addition, four passenger stations are proposed. Passenger service on the Phase II Project is scheduled to begin in 2025/2026.

There are two construction methods proposed for the five-mile-long tunnel portion of the BART extension—the Twin-Bore and Single-Bore Options—between the East and West Tunnel Portals. Under the Twin-Bore Option, two twin-bore tunnels would be excavated with one track in each. Each tunnel bore would have an outer diameter of approximately 20 feet. The depth of the tunnel would be between 10 and 75 feet below ground surface. The crown, or top, of the tunnel of the Twin-Bore Option would be, on average, 40 feet below the surface. Under the Single-Bore Option, one large-diameter tunnel bore would be excavated which would contain both northbound and southbound tracks. The tunnel bore would have an outer diameter of approximately 45 feet. The crown, or top, of the tunnel of the Single-Bore Option would be, on average, 70 feet below the surface.

1.1 Alignment and Station Features by City

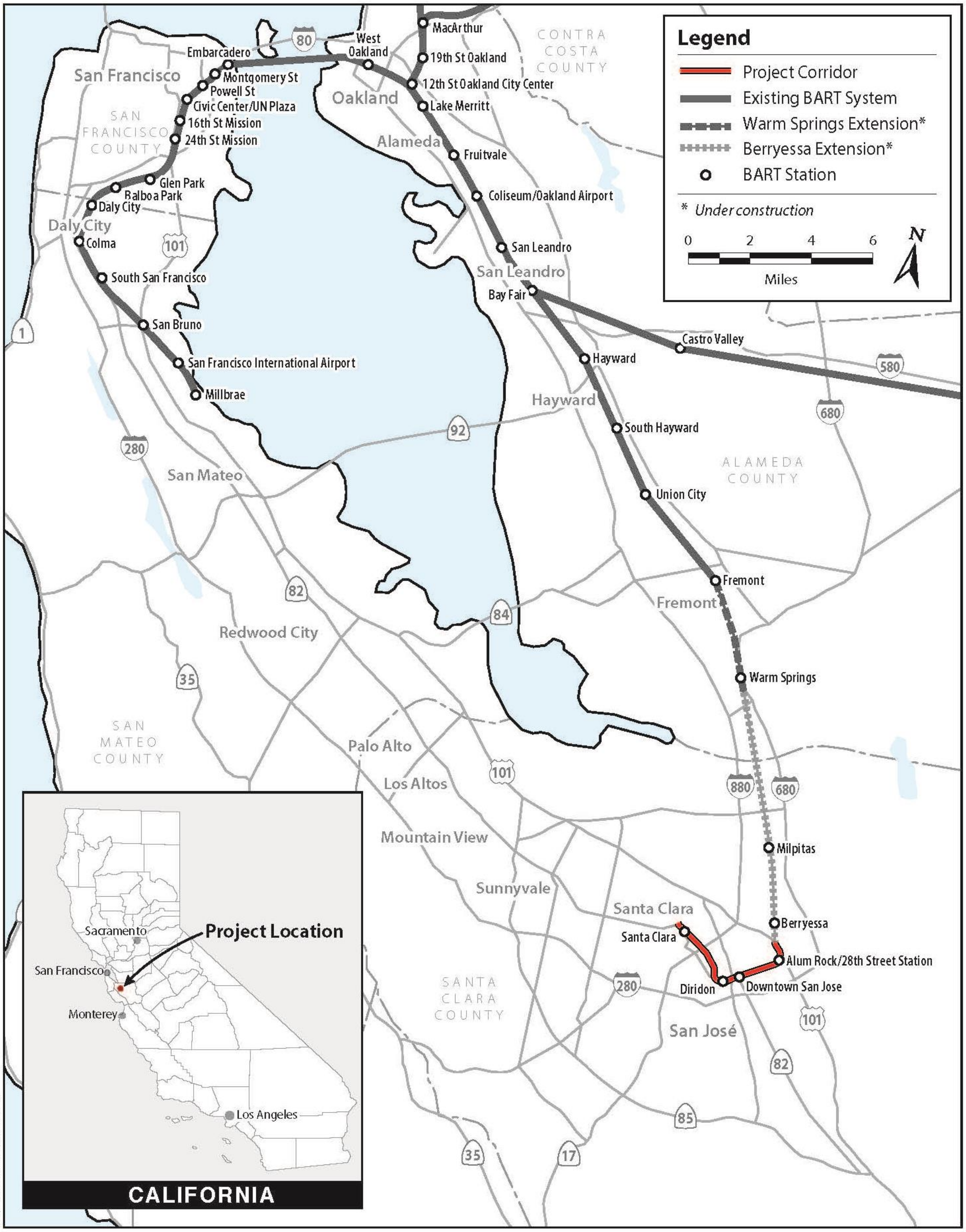
1.1.1 City of San Jose

1.1.1.1 Connection to Phase I Berryessa Extension

The BART extension would begin where the Phase I tail tracks end. The at-grade Phase I tail tracks would be partially removed to allow for construction of the bored tunnels, East Tunnel Portal, and supporting facilities.

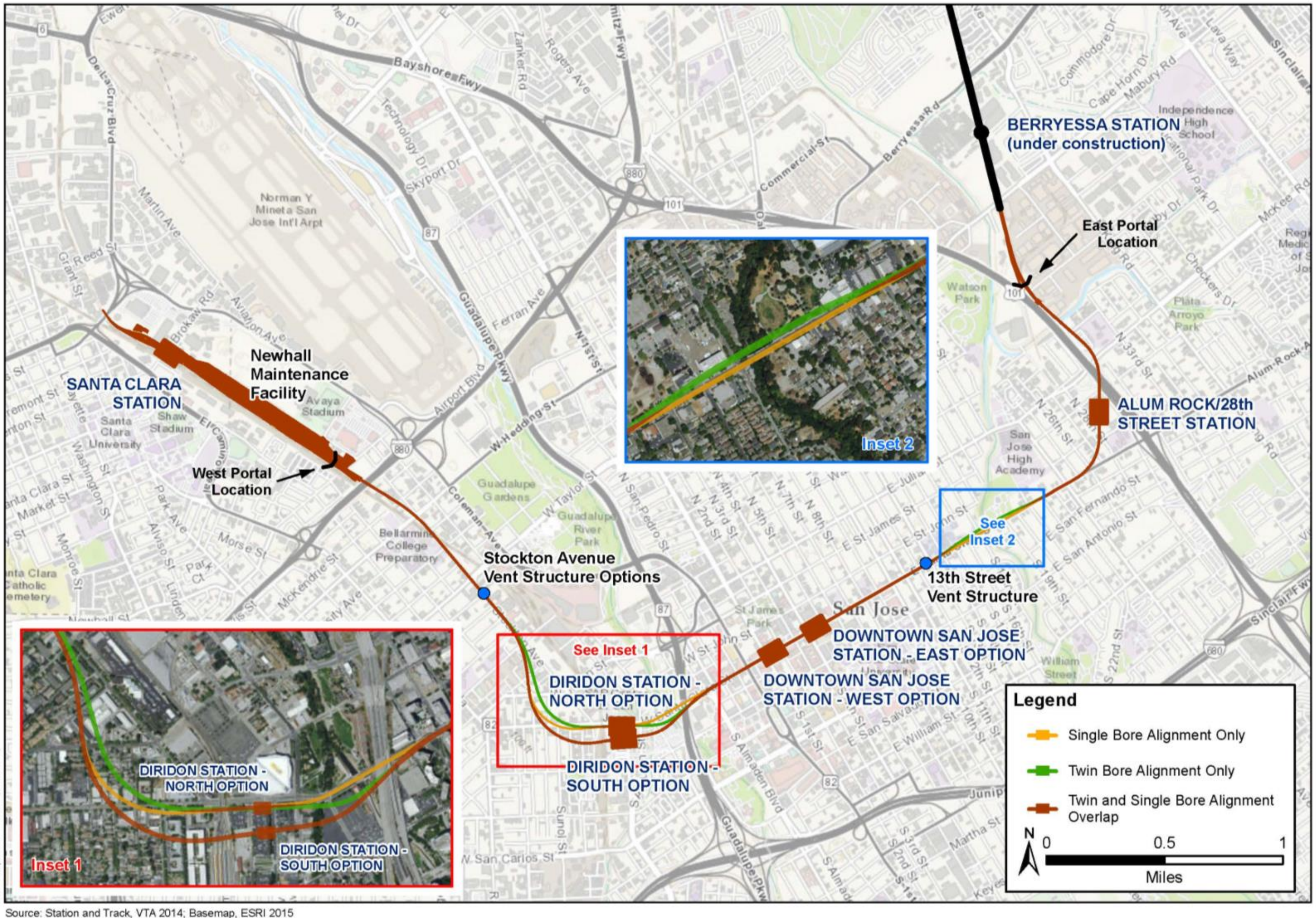
The alignment would transition from a retained-fill configuration east of U.S. 101 and south of Mabury Road near the end of the Phase I alignment into a retained-cut configuration and enter the East Tunnel Portal just north of Las Plumas Avenue.

South of the portal, the alignment would pass beneath North Marburg Way, then approximately 25 feet below the creek bed of Lower Silver Creek for the Twin-Bore Option, or approximately 30 feet for the Single-Bore Option, just to the east of U.S. 101, then curve under U.S. 101 south of the McKee Road overpass, and enter Alum Rock/28th Street Station.



Source: ICF International

Figure 1: Location Map



Source: ICF International

Figure 2: Station Map (with Options)

1.1.1.2 Alum Rock/28th Street Station

Alum Rock/28th Street Station would be located between U.S. 101 and North 28th Street and between McKee Road and Santa Clara Street. The station would be underground with street-level entrance portals with elevators, escalators, and stairs covered by canopy structures. In general, each station would have a minimum of two entrances. A parking structure of up to seven levels would accommodate BART park-and-ride demand with 1,200 parking spaces. The station would include systems facilities both above and below ground.

From Alum Rock/28th Street Station, the alignment would curve under North 28th Street, North 27th Street, and North 26th Street before aligning under Santa Clara Street. The alignment would continue under the Santa Clara Street right-of-way (ROW) until the alignment approaches Coyote Creek.

1.1.1.3 Tunnel Alignment near Coyote Creek

For the Twin-Bore Option, the alignment would transition north of Santa Clara Street beginning just west of 22nd Street and pass approximately 20 feet beneath the creekbed of Coyote Creek to the north of Santa Clara Street and avoid the Coyote Creek/Santa Clara Street bridge foundations. The alignment would transition back into the Santa Clara Street ROW near 13th Street, west of Coyote Creek. However, for the Single-Bore Option, the alignment would continue directly under Santa Clara Street and pass approximately 55 feet beneath the creekbed of Coyote Creek and approximately 20 feet below the existing bridge foundations.

1.1.1.4 13th Street Ventilation Structure

A systems facility site would be located at the northwest corner of Santa Clara and 13th Streets. This site would include a tunnel ventilation structure, which would be an aboveground structure with an associated ventilation shaft.

1.1.1.5 Downtown San Jose Station

There are two station location options for the Downtown San Jose Station: the Downtown San Jose Station East Option and the Downtown San Jose Station West Option, as described in detail below. The alignment for this area would be the same irrespective of the station option.

The station would consist of boarding platform levels and systems facilities aboveground and within the tunnel beneath Santa Clara Street, as well as entrances at street level. In general, each station would have a minimum of two entrances. Elevators, escalators, and stairs that provide pedestrian access to the mezzanine would be at station portal entrances. Escalators and stairs would be covered by canopy structures. The station would not have dedicated park-and-ride facilities. Under either Downtown San Jose Station Option, streetscape improvements, guided by San Jose's Master Streetscape Plan, would be provided along Santa Clara Street to create a pedestrian corridor. For the East Option, streetscape improvements would be between 7th and 1st Streets; for the West Option, streetscape improvements would be between 4th and Market Streets.

Downtown San Jose Station East Option

The alignment would continue beneath Santa Clara Street to the Downtown San Jose Station East Option. Under the Twin-Bore Option, crossover tracks would be located east of the Downtown San Jose Station between 7th and 5th Streets (within the cut and cover box). Under the Single-Bore Option, the crossover tracks would be located east of the station between 9th and 5th Streets.

Downtown San Jose Station West Option

The alignment would continue beneath Santa Clara Street to the Downtown San Jose Station West Option. Crossover tracks for the Twin-Bore Option would be located east of the Downtown San Jose Station between 2nd and 4th Streets (within the cut and cover box). Under the Single-Bore Option, the crossover tracks would be located east of the station between 7th and 2nd Streets.

1.1.1.6 Tunnel Alignment into Diridon Station

There are two station location options at Diridon Station: the Diridon Station South Option and the Diridon Station North Option, as described in detail below. The alignment into Diridon Station varies between the South and North Options and between the Twin-Bore and Single-Bore Tunnel Options as described below.

Tunnel Alignment into Diridon Station South Option

The alignment would continue beneath Santa Clara Street from the Downtown San Jose Station and shift south beginning just west of South Alamaden Boulevard to pass between the SR 87 bridge foundations. For the Twin-Bore Option, the alignment would pass 40 feet below the riverbed of the Guadalupe River and a retaining wall west of the river, and over 20 feet below the creek bed of Los Gatos Creek. For the Single-Bore Option, the alignment would pass 50 feet below the riverbed of the Guadalupe River, the retaining wall, and the creek bed of Los Gatos Creek. After passing under Los Gatos Creek, the alignment for both options would enter the Diridon Station between Los Gatos Creek and Autumn Street.

Tunnel Alignment east of Diridon Station North Option

Under the Twin-Bore Option, the alignment would continue beneath Santa Clara Street from the Downtown San Jose Station and shift south beginning just west of South Almaden Boulevard to pass between the SR 87 bridge foundations. The alignment would then pass 45 feet below the riverbed of the Guadalupe River and a retaining wall, then veer back north to a location just south of and adjacent to Santa Clara Street. The alignment passes 25 feet below the creek bed of Los Gatos Creek. After passing under Los Gatos Creek, the alignment would enter Diridon Station under Autumn Street and directly south of Santa Clara Street.

The Diridon Station North Option is closer to Santa Clara Street in comparison to the South Option.

Under the Single-Bore Option, the alignment would continue beneath Santa Clara Street, continue 50 feet below the riverbed of the Guadalupe River and 50 feet below the creek bed of Los Gatos Creek. After passing under Los Gatos Creek, the alignment would shift north and enter Diridon Station between Autumn and Montgomery Streets, directly south of Santa Clara Street. The Diridon Station North Option is closer to Santa Clara Street in comparison to the South Option.

1.1.1.7 Diridon Station

There are two station location options for the Diridon Station: the Diridon Station South Option and the Diridon Station North Option. The alignment varies by station location. Diridon Station would be generally located between Los Gatos Creek to the east, the San Jose Diridon Caltrain Station to the west, Santa Clara Street to the north, and West San Fernando Street to the south. The South Option would be located midway between Santa Clara Street and Stover Street. The North Option would be located adjacent to, and just south of, Santa Clara Street.

The station would consist of a boarding platform level, a mezzanine level, and entrances at street-level portals. The station would have a minimum of two entrances. Entrances would have elevators, escalators, and stairs covered by canopy structures. Systems facilities would be located aboveground and underground at each end of the station.

An existing VTA bus transit center would be reconfigured for better access and circulation to accommodate projected bus and shuttle transfers to and from the BART station. Kiss-and-ride facilities would be located along Cahill Street. No park-and-ride parking would be provided at this station.

Tunnel Alignment West of Diridon Station North Option

For the South Option, west of the station, the alignment for both the Twin-Bore and Single-Bore Options would continue beneath the Diridon Caltrain Station train tracks and White Street. The alignment would then turn towards the north, crossing under The Alameda at Cleaves Avenue and under West Julian Street at Morrison Avenue before aligning under Stockton Avenue.

Under the Diridon Station North Option and Twin-Bore Option, west of the station, the alignment would continue beneath the Diridon Caltrain Station train tracks and White Street. The alignment would then turn towards the north, crossing under The Alameda at Wilson Avenue and under West Julian Street at Cleaves Street before aligning under Stockton Avenue.

Under the Diridon Station North Option and Single-Bore Option, west of the station, the alignment would continue under White and Bush Streets south of The Alameda. The alignment would then turn towards the north, crossing under The Alameda at Sunol Street and under West Julian Street at Morrison Avenue before aligning under Stockton Avenue.

1.1.1.8 Tunnel Alignment along Stockton Avenue

Around Pershing Avenue, all of the options—the Twin-Bore and Single-Bore Options and the Diridon Station South and North Options—converge back onto the same alignment under Stockton Avenue.

1.1.1.9 Stockton Avenue Ventilation Structure

On the east side of Stockton Avenue between Schiele Avenue and West Taylor Street, there are three alternate locations for a systems facility site that would house a tunnel ventilation structure, which would be an aboveground structure with an associated ventilation shaft.

1.1.1.10 Tunnel Alignment near I-880

The alignment would continue north and cross under the Caltrain tracks and Hedding Street. The alignment would continue on the east side of the Caltrain tracks and cross under Interstate (I-) 880 before ascending and exiting the West Tunnel Portal near Newhall Street.

1.1.2 City of Santa Clara

The BART Extension Alternative in Santa Clara would consist of the Newhall Maintenance Facility, system facilities, storage tracks for approximately 200 BART revenue vehicles (passenger cars), the Santa Clara Station, and tail track. The San Jose/Santa Clara boundary is located approximately midway through the Newhall Maintenance Facility.

1.1.2.1 Newhall Maintenance Facility

The Newhall Maintenance Facility would begin north of the West Tunnel Portal at Newhall Street in San Jose and extend to Brokaw Road near the Santa Clara Station in Santa Clara. A single tail track would extend north from the Santa Clara Station and cross under the De La Cruz Boulevard overpass and terminate on the north side of the overpass. The maintenance facility would serve two purposes: (1) general maintenance, running repairs, and storage of up to 200 BART revenue vehicles and (2) general maintenance of non-revenue vehicles. The facility would also include maintenance and engineering offices and a yard control tower. Several buildings and numerous transfer and storage tracks would be constructed.

1.1.2.2 Santa Clara Station

The closest streets to the Santa Clara Station would be El Camino Real to the southwest, De La Cruz Boulevard to the northwest, and Coleman Avenue to the northeast near the intersection of Brokaw Road. The station would be at grade, centered at the west end of Brokaw Road, and would contain an at-grade boarding platform with a mezzanine one level below. Access to the mezzanine would be provided via elevators, escalators, and stairs covered by canopy structures. An approximately 240-foot-long pedestrian tunnel would connect from the mezzanine level of the BART station to the Santa Clara Caltrain plaza, and an approximately 175-foot-long pedestrian tunnel would connect from the mezzanine level to a new BART plaza near Brokaw Road. Kiss-and-ride, bus, and shuttle loading areas would be provided on Brokaw Road.

A parking structure of up to five levels would be located north of Brokaw Road and east of the Caltrain tracks within the station area and would accommodate 500 BART park-and-ride parking spaces in addition to public facilities on the site.

An approximately 150-foot-high radio tower and an associated equipment shelter would be located within the systems site.

1.2 VTA's Transit-Oriented Joint Development (CEQA Only)

VTA is proposing to construct Transit-Oriented Joint Development (TOJD) with office, retail, and residential land uses at the four BART stations (Alum Rock/28th Street, Downtown San Jose, Diridon, and Santa Clara), which offers the benefit of encouraging transit ridership. VTA is also proposing to construct TOJD at two mid-tunnel ventilation structure locations (the northwest corner of Santa Clara and 13th Streets and east of Stockton Avenue south of Taylor Street). VTA's primary objective for the proposed TOJD is to encourage transit ridership and support land use development patterns that make the most efficient and feasible use of existing infrastructure and public services while promoting a sense of community as envisioned by the San Jose and Santa Clara General Plans and relevant adopted specific plans. Estimates for VTA's TOJD at the station sites and at the mid-tunnel ventilation structure locations are provided below and are based on current San Jose and Santa Clara general plans, approved area plans, the existing groundwater table constraints, and market conditions.

Table 1 summarizes the land uses at each proposed TOJD location. The number of parking spaces is based on meeting the Cities of San Jose and Santa Clara parking requirements.

Table 1. Summary of Proposed TOJD

Location	Residential (dwelling units)	Retail (square feet)	Office (square feet)	Parking (spaces)
Alum Rock/28th Street Station	275	20,000	500,000	2,150
Santa Clara and 13th Streets Ventilation Structure	N/A	13,000	N/A	N/A
Downtown San Jose Station – East Option (at 3 sites)	N/A	160,000	303,000	1,398
Downtown San Jose Station – West Option	N/A	10,000	35,000	128
Diridon Station South Option	N/A	72,000	640,000	400
Diridon Station North Option	N/A	72,000	640,000	400
Stockton Ventilation Structure	N/A	15,000	N/A	N/A
Santa Clara Station	220	30,000	500,000	2,200

Chapter 2
Regulatory and Environmental Setting

This chapters provides a discussion of the federal, state, and local regulatory framework applicable to construction and implementation of the proposed Project, and describes the existing environmental setting.

For all issues related to water resources, VTA has coordinated and will continue to coordinate with Santa Clara Valley Water District (SCVWD), San Jose Department of Public Works, Santa Clara Department of Public Works, and resource agencies to ensure the design of the Project avoids or minimizes adverse effects on surface water and groundwater resources.

2.1 Regulatory Setting

2.1.1 Federal Laws and Requirements

2.1.1.1 Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the U.S. from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit program. Important CWA sections include the following.

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires that an applicant for a federal license or permit for any activity potentially resulting in a discharge to waters of the U.S. must obtain certification from the State that the discharge will comply with State water quality standards. (Most frequently required in tandem with a Section 404 permit request. See below.)
- Section 402 establishes the NPDES permit program for discharges (except for dredge or fill material) of any pollutant into waters of the U.S. The Regional Water Quality Control Boards (RWQCBs) administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and Municipal Separate Storm Sewer Systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

USACE issues two types of 404 permits: Standard and General permits. For General permits, there are two types: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are also two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide permit may be permitted under one of USACE's Standard permits. For Standard permits, the USACE's decision to approve is based on compliance with the U.S. Environmental Protection Agency's (EPA) Section 404 (b)(1) Guidelines (Code of Federal Regulations [CFR], Title 40, Part 230) and whether permit approval is in the public interest. The 404(b)(1) Guidelines were developed by the EPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative that would have less adverse effects. The 404(b)(1) Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative to the proposed discharge that would have fewer effects on waters of the U.S. and not have any other significant adverse environmental consequences. Per the 404(b)(1) Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures have been followed, in that order. The 404(b)(1) Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the USACE, even if not subject to the 404(b)(1) Guidelines, must meet general requirements; see 33 CFR 320.4.

2.1.2 State Laws and Requirements

2.1.2.1 Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., such as groundwater and surface waters not considered waters of the U.S. Additionally, the act prohibits discharges of "waste" as defined and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents, and the standards cannot be met through point source or non-source point controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

2.1.2.2 National Pollutant Elimination System Program

Small Municipal Separate Storm Sewer Systems (MS4) General Permit

The SWRCB's *Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (General Permit)* (Order No. 2013-0001-DWQ) (Phase II MS4 Permit) regulates stormwater discharges from municipalities and agencies not covered under an individual MS4 permit or Phase I MS4 Permit. The SWRCB has identified VTA and BART as Non-traditional Small MS4s covered under the Phase II MS4 Permit. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

The Project would be designed and operated in accordance with the Phase II MS4 Permit Section F.5.g for post-construction stormwater management conditions. Effective June 30, 2015, VTA has developed the *Storm Water and Landscaping Design Criteria Manual* (*Stormwater Manual*) to comply with the Phase II MS4 Permit. The Project would follow the guidance of this manual to comply with the requirements of the MS4 permit.

VTA Storm Water and Landscaping Design Criteria Manual

VTA's *Stormwater Manual* was developed to assist engineers with the post-construction stormwater requirements in the Small MS4 Permit, and were effective June 30, 2015. The criteria and standards are similar to the Santa Clara Valley Urban Runoff Pollution Prevention Program guidelines.

Industrial General Permit

The Industrial General Permit is an NPDES permit that regulates discharges associated with 10 broad categories of industrial activities. The Industrial General Permit requires the implementation of Best Available Technology Economically Achievable (BAT) and Best

Conventional Pollutant Control Technology (BCT) to achieve performance standards. The Industrial General Permit also requires the development of a Storm Water Pollution Prevention Plan (SWPPP) and monitoring plan. The SWPPP will identify the site-specific sources of pollutants and describe the measures at the facility applied to reduce stormwater pollution.

Construction General Permit

The SWRCB's National Pollutant Discharge Elimination System (NPDES) Permit for Storm water Discharges Associated with Construction and Land Disturbance Activities (Order No, 2009-0009-DWQ, as amended by subsequent orders), commonly known as the Construction General Permit (CGP), regulates stormwater discharges from construction sites that result in a disturbed soil area of one acre or greater. For all projects subject to the CGP, applicants are required to develop and implement an effective SWPPP. The CGP separates projects into risk levels 1, 2, or 3. Risk levels are determined based on potential erosion and sediment transport to receiving waters. Requirements apply according to the risk level determined.

2.2 Existing Conditions

Runoff from the Project area drains to the existing conveyance system that consists of pipes, culverts, inlets, earth ditches, and natural swales and ponds. This existing conveyance system is tied to the local rivers and creeks, which ultimately drain to the San Francisco Bay.

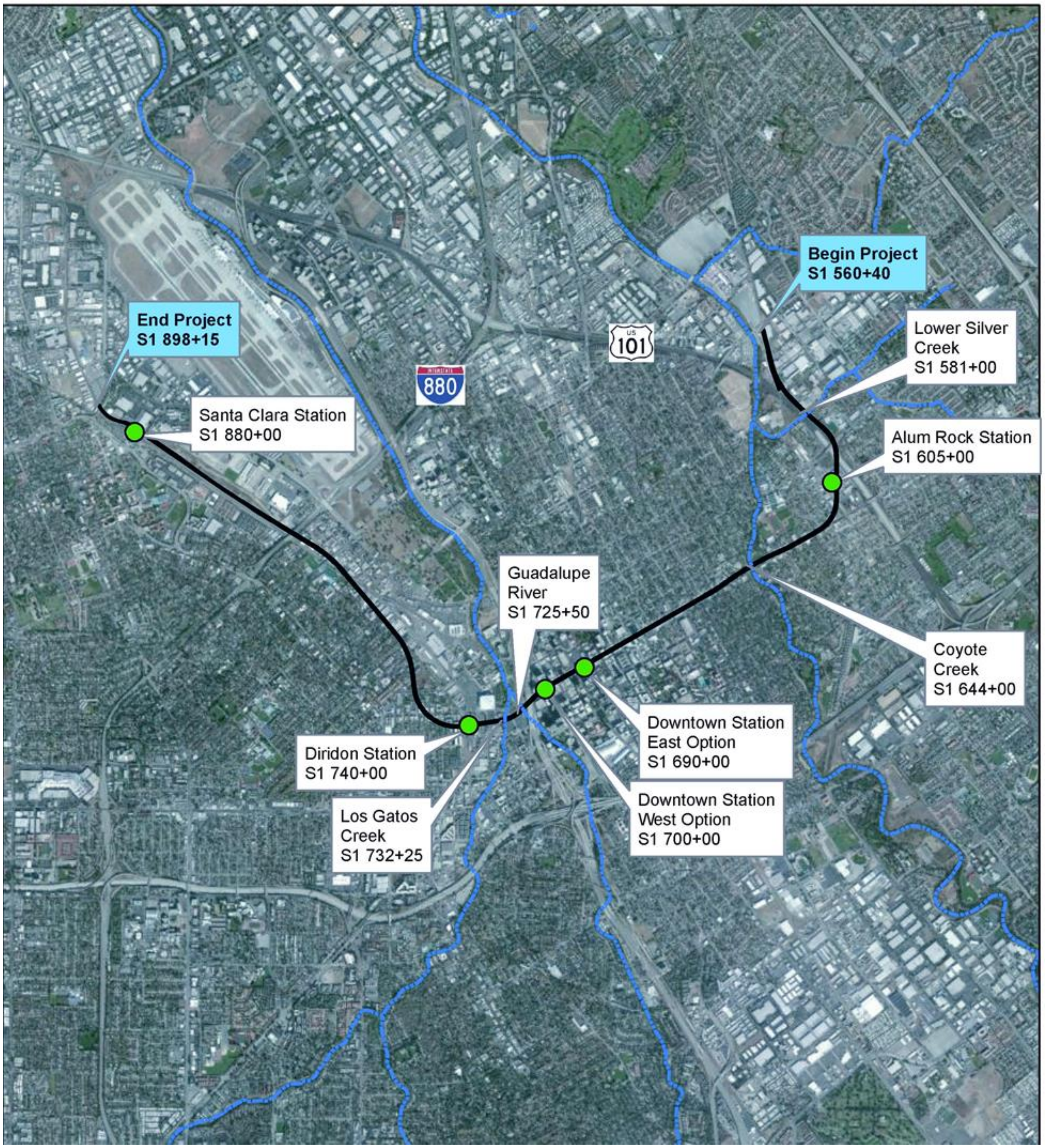
2.2.1 Creek and River Crossings

The proposed alignment would cross four water bodies: Lower Silver Creek, Coyote Creek, Los Gatos Creek, and Guadalupe River (Figure 3). These waters are also the receiving water bodies for the proposed Project stations. All of the creeks within the Project limits are currently maintained by the Santa Clara Valley Water District. The four water bodies are discussed below and summarized in Table 2.

2.2.1.1 Lower Silver Creek

Lower Silver Creek is one of the tributaries that drain to Coyote Creek. The Lower Silver Creek watershed drains approximately 44 square miles (28,160 acres). Lower Silver Creek originates near Silver Creek Road in San Jose and flows northerly to the Lake Cunningham area, then flows in a northwesterly direction to its confluence with Coyote Creek in the City of San Jose. The tributaries of Lower Silver Creek include, from south to north, Norwood Creek, Ruby Creek, Flint Creek, South Babb Creek, North Babb Creek, and Miguelita Creek.

The lowland areas within the Lower Silver Creek Watershed are predominantly urban. The upland areas are devoted to uses from rangelands to wildlife habitat, and are largely located outside of the City of San Jose and in unincorporated areas of Santa Clara County.



Source: Google Earth and WRECO

Figure 3: Creek and River Crossings within Project limits

The Project track alignment would pass beneath Lower Silver Creek approximately at Station 581+00 of Line S1 (see Appendix D), just northeast of the US 101/Lower Silver Creek crossing.

2.2.1.2 Coyote Creek

The Coyote Creek watershed is the largest watershed in the Santa Clara Basin. It drains approximately 247 square miles (158,080 acres) from the Diablo Range on the east side of the Santa Clara Basin. Coyote Creek originates from the mountains northeast of the City of Morgan Hill, flows northwest for 42 miles, and flows into Lower San Francisco Bay. At the base of the Diablo Range, Coyote Creek is impounded by two dams that form Coyote Reservoir and Anderson Reservoir.

Coyote Creek runs through unincorporated agricultural and rapidly urbanizing land between the cities of Morgan Hill and San Jose. It then runs through the urbanized area in the City of San Jose and the lower edge of Milpitas before reaching the Lower South San Francisco Bay.

The Project track alignment would pass beneath Coyote Creek approximately at Station 644+00 of Line S1 (see Appendix D). The track alignment would be to the north of Santa Clara Street at this creek crossing to avoid the Coyote Creek/Santa Clara Street bridge foundations.

2.2.1.3 Guadalupe River

The Guadalupe River watershed drains approximately 144 square miles (92,160 acres). It originates from the eastern Santa Cruz Mountains near the summit of Loma Prieta, Los Gatos. The Guadalupe River begins on the valley floor at the confluence of Alamitos Creek and Guadalupe Creek just downstream of Coleman Road in San Jose. It flows north for approximately 14 miles and discharges into the Lower South San Francisco Bay via Alviso Slough. It runs through the town of Los Gatos and the cities of San Jose, Campbell, and Santa Clara. The major tributaries include Ross Creek, Canoas Creek, and Los Gatos Creek. Six major reservoirs are in the Guadalupe River watershed: Calero Reservoir on Calero Creek, Guadalupe Reservoir on Guadalupe Creek, Almaden Reservoir on Alamitos Creek, Vasona Reservoir, Lexington Reservoir, and Lake Elsman on Los Gatos Creek.

The upper watershed is composed predominantly of heavily forested areas with pockets of low-density development. As the river runs through the alluvial foothills, residential density gradually increases to high density in the lower watershed. Commercial development is concentrated along major streets, and industrial development is concentrated closer to the bay, mostly downstream of the El Camino Real crossing, in San Jose.

The Project track alignment would pass beneath Guadalupe River approximately at Station 725+50 of Line S1 just west of State Route (SR) 87 and south of Santa Clara Street.

2.2.1.4 Los Gatos Creek

Los Gatos Creek originates in the Santa Cruz Mountains at an elevation of up to 3,483 feet and follows SR 17 as it winds through the mountains. The lower portions of the creek pass through the town of Los Gatos and the cities of Campbell and San Jose. Upstream of the SR 17 crossing, the creek flows primarily in a natural channel, though downstream of the crossing some portions have been straightened. Downstream of SR 85, the creek continues to parallel SR 17 until it outfalls into Guadalupe River in downtown San Jose.

The watershed area of Los Gatos Creek is approximately 54.8 square miles (35,072 acres) at the SR 85 crossing. Overall, the Los Gatos Creek watershed is 26 percent urbanized. The remaining 74 percent consists primarily of open space, but also includes small areas of vacant land, golf courses, and mines (Tetra Tech 2006). Most of the open space is upstream of the SR 85 crossing, so this area is less developed than the watershed as a whole. There are many water bodies in the Los Gatos Creek watershed including Lake Elsman, Lexington Reservoir, and Vasona Reservoir, all of which are upstream of the SR 85 crossing.

The Project track alignment would pass beneath Los Gatos Creek approximately at Station 732+25 of Line S1.

Table 2: Creek and River Crossing Information

Approximate Creek Crossing Station	Waterway	Drainage Area		1% Flood Discharge[1]
		(square miles)	(acres)	(cubic feet per second)
S1 581+00	Lower Silver Creek	44	28,160	2,670
S1 644+00	Coyote Creek	247	158,080	12,500
S1 725+50	Guadalupe River	144	92.160	10,000
S1 732+25	Los Gatos Creek	54.8	35,072	7,980
Federal Emergency Management Agency – Santa Clara County Flood Insurance Study				

2.2.2 Water Quality Objectives/Standards and Beneficial Uses

2.2.2.1 Surface Water Quality Objectives/Standard Beneficial Uses

The San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan) identifies narrative and numerical water quality objectives for the region. Excerpts from Chapter 3, *Water Quality Objectives*, of the Basin Plan are included in Appendix B of this report. The general objectives for the region include: bacteria, bioaccumulation, biostimulatory substances, color, dissolved oxygen, floating material, oil and grease, population and community ecology, pH, radioactivity, salinity, sediment, settleable material, suspended material, sulfide, taste and odors, temperature, toxicity, turbidity, and un ionized ammonia.

Beneficial uses are critical to water quality management in California. According to State law, the beneficial uses of California's water that may be protected against quality degradation include, but are not limited to, "domestic, municipal, agricultural and industrial supply, power generation, recreation, aesthetic enjoyment, navigation, and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050). Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning. Runoff from the Project goes into storm drain systems for both cities.

The Basin Plan identifies beneficial uses for water bodies within its jurisdiction. Detailed descriptions of the individual beneficial uses are provided in the excerpts from Chapter 2, *Beneficial Uses*, of the Basin Plan included in Appendix C of this report. The existing and potential beneficial uses for the water bodies within the Project limits are listed in Table 3.

Table 3: Existing and Potential Beneficial Uses

Water body	**MUN[1]**	**FRSH**	**GWR**	**COMM**	**COLD**	**MIGR**	**(RARE**	**SPWN**	**WARM**	**WILD**	**REC-1**	**REC-2**
Coyote Creek			E	E	E	E	E	E	E	E	E	E
Lower Silver Creek									E	E	E	E
Guadalupe River			E		E	E	E	E	E	E	E	E
Los Gatos Creek	E[2]	E	E		E	P[3]	E	P	E	E	E	P

Source: Basin Plan (2015)
[1] Abbreviations:
MUN = municipal and domestic supply
FRSH = freshwater replenishment
GWR = groundwater recharge
COMM = commercial and sport fishing
MIGR= fish migration
RARE = preservation of rare and endangered species
SPWN = fish spawning
WARM = warm freshwater habitat
WILD = wildlife habitat
REC-1 = water contact recreation
REC-2 = noncontact water recreation
[2] E = Existing beneficial use
[3] P = Potential beneficial use

2.2.3 Existing Water Quality

The Coyote Creek, Lower Silver Creek, and Guadalupe River are listed on the 303(d) list for pollutants (see Table 4 for listed pollutants).

Table 4: 303(d) Listed Water Bodies

Water Body	Pollutant	Expected TMDL Completion Date	EPA TMDL Approved Date	Potential Sources
Coyote Creek	Diazinon		5/16/2007	Urban Runoff/Storm Sewers
	Trash	2021		Illegal dumping
	Trash	2021		Urban Runoff/Storm Sewers
Lower Silver Creek	Trash	2021		Urban Runoff/Storm Sewers
	Trash	2021		Illegal dumping
Guadalupe River	Diazinon		5/16/2007	Urban Runoff/Storm Sewers
	Mercury	2008		Mine Tailings
	Trash	2021		Urban Runoff/Storm Sewers
	Trash	2021		Illegal dumping

Source: SWRCB
TMDL = Total maximum daily load

The receiving water bodies ultimately discharge into the South San Francisco Bay, which is identified on the 303(d) list in the Project region (see Table 5 for listed pollutants).

Table 5: 303(d) Listed Water Body – South San Francisco Bay

Pollutant	Expected TMDL[3] Completion Date	EPA TMDL Approved Date	Potential Sources
Chlordane	2013		Nonpoint Source
DDT[1]	2013		Nonpoint Source
Dieldrin	2013		Nonpoint Source
Dioxin compounds (including 2,3,7,8-TCDD)	2019		Atmospheric Deposition
Furan Compounds	2019		Atmospheric Deposition
Invasive Species	2019		Ballast Water
Mercury		2/29/2008	Nonpoint Source
Mercury		2/29/2008	Municipal Point Sources
Mercury		2/29/2008	Industrial Point Sources
Mercury		2/29/2008	Atmospheric Deposition
Mercury		2/29/2008	Natural Sources
Mercury		2/29/2008	Resource Extraction
PCBs[2]	2008		Unknown Nonpoint Source
PCBs (dioxin-like)	2008		Unknown Nonpoint Source
Selenium	2019		Domestic Use of Ground Water

Source: SWRCB
[1] DDT = Dichlorodiphenyltrichloroethane
[2] PCB = Polychlorinated biphenyls
[3] TMDL = Total maximum daily load

2.2.4 Groundwater

The Basin Plan lists beneficial uses for the groundwater basins within the Project limits. Groundwater sub-basins identified as having the existing groundwater beneficial uses of municipal and domestic water supply are subject to further narrative and numeric groundwater objectives for bacteria, organic and inorganic constituents, radioactivity, taste, and odor.

According to the Project's Environmental Geotechnical Document (EGD) (Parikh 2014), groundwater has been detected at depths averaging between 14 to 18 feet below ground surface (bgs) in the Project area. The Project is located within the Santa Clara Valley Groundwater Basin (the sub-basin is also known as Coyote Valley). The Santa Clara Valley Groundwater Basin's existing beneficial uses are municipal and domestic water supply (MUN), industrial process water supply (PROC), and industrial service water supply (IND); the basin also has the potential beneficial uses of agricultural water supply (AGR).

Groundwater sub-basins identified as having the potential beneficial use of agricultural water supply are subject to additional objectives for organic and inorganic chemical constituents stated in Section 3.4.2 of the Basin Plan.

SCVWD is the groundwater management agency; in July 2012, the District Board of Directors approved the 2012 Groundwater Management Plan that describes SCVWD's groundwater basin management objectives. In Santa Clara, almost half of all water used comes from groundwater. SCVWD manages two groundwater sub-basins: the Santa Clara and Llagas sub-basins. The Coyote Valley region of the Santa Clara sub-basin is fairly shallow, extending to a maximum depth of approximately 500 feet.

2.2.4.1 Groundwater Quality

The Project Initial Site Assessment (ISA) prepared by Baseline Environmental Consulting (2016) lists 12 known hazardous material release sites that could impact the soil and/or groundwater within the proposed Project limits and 11 potential hazardous materials that could impact the soil and/or groundwater.

Groundwater monitoring results in the SCVWD show that the water quality ranges from good to excellent for all of the major zones in the Santa Clara Groundwater Basin. Contaminants are generally not detected; however, in some areas groundwater contaminated by hazardous materials releases has spread underneath the railroad corridor. SCVWD has been largely successful in efforts to prevent groundwater overdraft, curb land subsidence, and protect water quality.

Chapter 3
Methodology

Construction impacts on water quality would be temporary and would only occur during the construction phase of the Project. Effects on water quality due to the construction activities were analyzed per the state and federal laws and requirements described in Chapter 2, *Regulatory and Environmental Setting*. The impacts analysis can be found in Chapter 4. The construction risk level, which determines the construction monitoring requirements and associated documentation, was determined in accordance with the CGP.

The water quality impacts during Project operations would be permanent. These impacts were analyzed following the guidelines of the Phase II MS4 Permit (see Chapter 2 for details). The impacts analysis can be found in Chapter 4.

Post-construction stormwater treatment best management practices (BMPs) were proposed to minimize the Project's impacts on stormwater runoff (see Chapter 5, *Design Commitments and Mitigation Measures*). The Project will follow the guidance of Section F.5.g for post-construction stormwater management conditions of the Phase II MS4 Permit. VTA design criteria and standards to comply with the Phase II MS4 Permit have been developed effective June 30, 2015, and these will be followed to determine the stormwater design requirements and BMPs.

Chapter 4
Impact Analysis

The following sections present the potential construction and permanent water quality impacts anticipated from the proposed Project activities. There are no wetlands or U.S. waterways within the Project limits that would be impacted; therefore, the impact analysis in the following sections only includes potential impacts on stormwater and groundwater.

4.1 Construction Impacts

4.1.1 General Impacts Due to Construction

During construction, general potential water quality impacts include sediment-laden discharges from DSAs and pollutant-laden discharges from storage and work areas. The DSAs are areas of exposed, erodible soil, including stock piles, that are within the construction limits and that result from construction activities. Generally, as the DSAs increase, the potential for temporary water quality impacts also increases.

The estimated DSA for the Project is approximately 130.18 acres with the Downtown San Jose Station East Option and 128.11 acres with the Downtown San Jose Station West Option. Based on the preliminary calculated area, the Project would have some potential short-term water quality impacts during construction. A summary of the DSAs per watershed is provided in Table 7.

The construction impacts from the BART stations and TOJD are similar, and are discussed together in this section. Construction of either the station or TOJD site would include an increase in impervious area and has the potential to increase the volume and velocity of stormwater flow to downstream receiving water bodies. Potential sources of pollutants include total suspended solids, nutrients, pesticides, litter, and total dissolved solids. Earth-moving and other construction activities could cause minor erosion and runoff of top soils into the drainage systems along the Project corridor during construction, which could temporarily affect water quality in local receiving waters.

Additionally, the stations and TOJD would have the potential to temporarily impact water quality due to grading and excavation activities during construction. These activities can cause increased erosion. Stormwater runoff from the station and TOJD sites could transport pollutants to nearby receiving waters and storm drains if BMPs are not properly implemented. During construction, potentially sediment-laden flow can result from runoff over DSAs that enter storm drainage facilities or directly discharge into receiving waters, increasing turbidity, decreasing clarity, and potentially impacting beneficial uses of the waterways. Additional sources of sediment that could result in increases in turbidity include uncovered or improperly covered active and non-active stockpiles, unstabilized slopes and construction staging areas, and improperly maintained or cleaned construction equipment.

Adverse impacts can occur during construction-related activities. Soil erosion, especially during heavy rainfall, can increase the suspended solids, dissolved solids, and organic pollutants in stormwater runoff. These conditions would likely persist until completion of construction activities and implementation of long-term erosion control measures.

If fueling or maintenance of construction vehicles occurs during construction, there is a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials could pose a threat to water quality if contaminants enter storm drains, open channels, or receiving water bodies. The magnitude of the impact from an accidental release depends on the amount and type of material spilled. Small spills can be cleaned up using spill cleanup and sorbent kits; however, a larger spill would trigger immediate response actions to report, contain, and mitigate the incident. The California Office of Emergency Services has developed a Hazardous Materials Incident Contingency Plan, which provides a program for response to spills involving hazardous materials. The plan designates a chain of command for notification, evacuation, response, and cleanup of larger spills.

Any stormwater impacts would be avoided or minimized through implementation of a SWPPP during construction, which outlines proper pollution prevention BMPs. The SWPPP is further discussed in Section 5.1.1, *List of Proposed Temporary Construction Site BMPs*.

4.1.2 Construction General Permit Risk Level Assessment

In accordance with the CGP, a risk assessment to determine the Project’s risk level is required. A three-year Project construction duration was assumed. Because there are multiple receiving water bodies, multiple risk assessments were completed based on the watersheds through which the Project traverses. Table 6 lists the planning watersheds and risk factors (sediment and receiving water risks) used to determine the risk levels for the Project.

The sediment risk factor is determined using the product of the rainfall runoff erosivity factor (R), the soil erodibility factor (K), and the length-slope factor (LS). The R factor was determined from the “CGP Risk Assessment R-Factor Calculation Notification,” and the combined K and LS factor was determined based on the California Department of Transportation (Caltrans) Water Quality Planning Tool. As shown in Table 6, the sediment risk for the Los Gatos watershed is low (R×K×LS = Less than 15). The sediment risks for the Coyote Creek and Guadalupe River are medium (R×K×LS = between 15 and 75). Refer to Appendix A for Risk Factor Assessment documents.

The RWQCB identifies Coyote Creek and Guadalupe River as having the combined existing beneficial uses of cold freshwater habitat, fish spawning, and fish migration; therefore, the Project is identified as having a high receiving water risk. All four watersheds were determined to be risk level 2 (see Appendix A). Risk level 2 projects are subject to temporary construction site BMP implementation and visual monitoring requirements. Additionally, risk level 2 projects are subject to Numeric Action Levels for pH and turbidity for stormwater runoff.

Table 6: Risk Assessment by Watershed

Watershed	Project Options	R	K	LS	R×K×LS	Sediment Risk	Receiving Water Risk	Risk Level
Coyote Creek	Mabury Rd CSA	119	0.32	0.68	25.89	Medium	High	2
Lower Silver Creek	Alum Rock/28th Street Station and TOJD	119	0.32	0.68	25.89	Medium	High	2
Guadalupe River	Downtown San Jose Stations (East and West Options) and Santa Clara	119	0.32	0.81	30.84	Medium	High	2
Los Gatos	Diridon Station and TOJD	119	0.32	0.36	13.71	Low	High	2

The Project risk levels will be further evaluated and verified during the plans, specifications, and estimate phase.

4.1.3 BART Stations and Facilities

The BART stations would include Alum Rock/28th Street Station, one of the Downtown San Jose Station options, one of the Diridon Station options, and the Santa Clara Station. The Newhall Maintenance Facility and the Construction Staging Areas (CSAs) were evaluated with the stations. In general, the stations would include system facilities. There would be parking at two stations (Alum Rock/28th Street and Santa Clara).

4.1.3.1 Alum Rock/28th Street Station

Alum Rock/28th Street Station would be located between US 101 and 28th Street and between McKee Road and Santa Clara Street. The approximately 17-acre station campus would include an underground station and aboveground facilities, such as a parking structure, system facilities, and roadway improvements to North 28th Street.

Effects on stormwater would be associated with polluted runoff from the DSAs in the construction phase. The DSA for the Alum Rock/28th Street Station is 17.7 acres, which includes the TOJD at the location.

4.1.3.2 Downtown San Jose Station

Two station location options are proposed for the Downtown San Jose Station.

Downtown San Jose Station East Option

The Downtown San Jose Station East Option would be an underground station on Santa Clara Street between 4th and 2nd Streets. Streetscape improvements would be incorporated into the proposed improvements between 7th and 1st Streets. Effects on stormwater would be associated with polluted runoff from the DSAs. The total DSA for this station option is 12.87 acres, including the TOJD.

Downtown San Jose Station West Option

The Downtown San Jose Station West option would also be an underground station on Santa Clara Street between 3rd and Market Streets. There would be streetscape improvements to this station located between 4th and San Pedro Streets. Effects on stormwater would be associated with polluted runoff from the DSAs. The total DSA for this station option is 10.7 acres, including the TOJD.

4.1.3.3 Diridon Station

Two station location options are proposed for the Diridon Station and would be generally located between Los Gatos Creek to the east, the San Jose Diridon Caltrain Station to the west, Santa Clara Street to the north, and West San Fernando Street to the south.

4.1.3.4 Diridon Station South Option

The Diridon Station South Option would be an underground station located between Los Gatos Creek and Autumn Street. The VTA bus transit center would be expanded. Effects on stormwater would be associated with polluted runoff from the construction phase (DSAs). The DSA for the Diridon Station South Option is 12.12 acres, including the TOJD.

4.1.3.5 Diridon Station North Option

The Diridon Station North Option would be an underground station located adjacent to, and just south of, Santa Clara Street. Effects on stormwater would be associated with polluted runoff from the construction phase (DSAs). The DSA for the Diridon Station North Option is 11.97 acres, including the TOJD.

4.1.3.6 Santa Clara Station

The Santa Clara Station would have parking adjacent to the station. This station would have an at-grade boarding platform. Brokaw Road would be widened in the station area and at Coleman Avenue. A five-level parking structure would be located north of Brokaw Road.

Effects on surface water would be associated with polluted runoff from the construction phase (DSAs). The DSA for Santa Clara Station is 10 acres, which does not include the TOJD.

4.1.3.7 Newhall Maintenance Facility

The Newhall Maintenance Facility would be constructed on the former UPRR Newhall Yard. The San Jose/Santa Clara boundary is located approximately midway through the Newhall Maintenance Facility. Service roads to all buildings on site, along with onsite parking spaces, would be constructed as part of the Project. Other than the general impacts mentioned before, the effects on surface water would be associated with polluted runoff from DSA during construction. The DSA for the Newhall Maintenance Facility is 62.72 acres.

4.1.3.8 Construction Staging Areas (CSA)

The staging areas for the Project are shown in Appendix E. The Mabury to U.S. 101 CSA has a DSA of 24.83 acres. The surrounding roadway area extends from U.S. 101 to south of Santa Clara Street and has a DSA of 4.3 acres. The CSAs would only be used temporarily during the construction of the Project, and it is anticipated that they would not result in permanent impacts on water quality; therefore, implementation of the construction-phase SWPPP would address temporary water quality impacts.

This analysis assumes that all DSAs would be under construction continuously. For example, as soon as the BART systems facilities are operational, the TOJD would start construction immediately thereafter, and there would be continuous construction activity at these locations. The CSAs would remain disturbed throughout construction of both the BART and TOJD sites.

4.1.4 Transit-Oriented Joint Development

In general, the TOJDs would include retail, residential, office, and parking. The TOJD sites would be at Alum Rock/28th Street Station, the 13th Street Ventilation Structure, Downtown San Jose Station (East and West Options), Diridon Station (South and North Options), the Stockton Avenue Ventilation Structure, and Santa Clara Station.

For the TOJD at Alum Rock/28th Street, Downtown San Jose (East and West options), Diridon, and Santa Clara Stations, the DSAs were included in Section 4.1.2, *Construction General Permit Risk Level Assessment*, with the stations. See Table 7 for the DSAs per watershed.

4.1.4.1 Santa Clara and 13th Streets Ventilation Structure TOJD

The Santa Clara and 13th Street Ventilation Structure TOJD would include BART systems facilities to ventilate the tunnel and retail at the surface. Effects on stormwater would be associated with polluted runoff from the DSAs during construction. The DSA for this Ventilation Structure is 1.42 acres.

4.1.4.2 Stockton Avenue Ventilation Structure TOJD

Effects on stormwater would be associated with polluted runoff from the DSAs during construction. The DSA for this Ventilation Structure is 2.07 acres.

Table 7: DSA Summarized by Watershed

Watershed	Project Option	Project Features	DSA (acres)		Total DSA (acres)
			CSA	Surrounding Roadway Area	
Coyote Creek	Mabury Road to U.S. 101 (East of U.S. 101)		24.83	0	24.83
	U.S. 101 to South of Santa Clara Street (West of U.S. 101)		0	4.3	4.3
Lower Silver Creek	Alum Rock/28th Street Station	Station and TOJD	11.3	6.4	17.7
Guadalupe River	Downtown San Jose Station East Option	Station and TOJD	10.45	2.42	12.87
	Downtown San Jose Station West Option	Station and TOJD	7.51	3.19	10.7
	Newhall Maintenance Facility		62	0.72	62.72
	Santa Clara Station	Station	10	0.19	10.19
	Santa Clara 13th Street Ventilation	TOJD	1.15	0.27	1.42
	Stockton Station and Taylor Ventilation Structure	Station and TOJD	1.74	0.33	2.07
Los Gatos Creek	Diridon Station North Option	Station and TOJD	10.49	1.45	11.94
	Diridon Station South Option	Station and TOJD	10.67	1.45	12.12

4.1.5 Temporary Impacts on Groundwater

During construction, potential water quality impacts include temporary impacts related to construction dewatering near the cut and cover stations and vent structures. If there are any localized contaminated groundwater plumes, they could migrate toward the Project as a result of dewatering. Several pumps would be included in the tunnel portions of the Project to collect groundwater seepage and/or rainwater during construction and operations.

The water collected by the pumps would discharge to the storm drain or sanitary sewer system and would be treated to meet all requirements of the NPDES permit to reduce pollutants.

Based on the EGD (Parikh 2014), dewatering of the shallow groundwater zone would be required during excavation activities. Dewatering activities should be conducted within the excavation limits by utilizing a well-based dewatering system and/or by pumping from excavation using pumps in low spots. A dewatering plan would be required as part of the Contractor's SWPPP for any dewatering proposed up to 10,000 gallons per day. Water quality sampling and analysis would be required prior to any discharge into the sanitary sewer, storm drainage system or downstream receiving water bodies. For areas of known contamination and where pumping will exceed 10,000 gallons per day, the CGP may not be used for dewatering, and a separate NPDES permit for Structural Dewatering, VOC contaminated groundwater, and/or a Project-specific WDR permit would be needed to address potential contamination of groundwater and treatment needed prior to discharge.

As mentioned in Section 2.2.4, *Groundwater,* there are 12 known hazardous material release sites that could impact the soil and/or groundwater within the Project limits and 11 potential hazardous material impacts on soil and/or groundwater. Groundwater makes up half of the water supply in Santa Clara County, and as a result of the potential hazardous release sites, the dewatering plan would need to address the potential contamination of the groundwater during excavation and dewatering.

From the Downtown San Jose Station East Option, the BART Extension would continue beneath Santa Clara Street, between the SR 87 bridge foundations, and then below Guadalupe River, a retaining wall, and Los Gatos Creek to Diridon Station. The BART tunnel would be at its deepest under Guadalupe River to avoid the retaining wall. For the Twin-Bore Option, the alignment would pass 40 feet below the riverbed of the Guadalupe River and a retaining wall west of the river, and over 20 feet below the creek bed of Los Gatos Creek. For the Single-Bore Option, the alignment would pass 50 feet below the riverbed of the Guadalupe River, the retaining wall, and the creek bed of Los Gatos Creek. The tunnel bores would be designed in accordance with BART Design Criteria; however, the normal flow of groundwater may be affected. The groundwater flow direction or gradient could also be impacted by construction techniques that seal the underground structures. The implementation of construction site BMPs would ensure that there is no contamination introduced to groundwater during construction activities.

4.2 Permanent Impacts

4.2.1 General Impacts on Stormwater

The Project would result in an increase of impervious areas and therefore could potentially slightly increase the volume and velocity of stormwater flow to downstream receiving water bodies. The added impervious areas created by the Project could also result in minimal impacts on the existing hydrograph, including minimal increases in low flow and peak flow velocity. Stormwater runoff from the Project would drain into nearby storm drain systems, which ultimately discharge into San Francisco Bay. New drainage systems would most likely be required to capture the drainage from the Project.

Effects on stormwater quality would be associated with polluted runoff from the parking and paved areas. Runoff from the paved areas would be directed to the storm drain system. Pumps would be installed at the tunnel low points, and this water would be discharged to the storm drain system.

The total amount of added impervious area (AIA) is approximately 46.16 acres with the Downtown San Jose Station East Option and 46.09 acres with the Downtown San Jose West Option. Table 8 shows the proposed AIA by watershed. Net added impervious area is pervious in the existing condition and would become impervious with the proposed stations and/or TOJD. All the work proposed would incorporate BMPs to reduce pollutants from stormwater runoff.

Any impacts due to the AIA would be minimized through treatment BMPs. The Project's design goal is to maximize and promote infiltration, or detain flows prior to discharge to receiving water bodies or to an MS4. By meeting this design goal, permanent water quality impacts are not expected to be significant.

During operations, potential water quality impacts include discharges of oil and grease-laden runoff from parking areas and other impervious surfaces, as well as an increase in the amount of flow. Also, there may be a reduction in the amount of the time it takes for flows to reach local streams, referred to as "hydromodification."

4.2.2 BART Stations and Facilities

4.2.2.1 Alum Rock/28th Street Station

Effects on stormwater would be associated with polluted runoff from the parking and paved areas in the operations phase. The total impervious area for the Alum Rock/28th Street Station is 9.25 acres, and the AIA is 2.54 acres.

4.2.2.2 Downtown San Jose Station East Option

Effects on stormwater would be associated with polluted runoff from the parking and paved areas in the operations phase. The total impervious area for the station is 0.77 acre, and the AIA is 0.10 acre.

4.2.2.3 Downtown San Jose Station West Option

Effects on stormwater would be associated with polluted runoff from the parking and paved areas in the operations phase. The total impervious area for the station is 0.40 acre; the AIA is 0.03 acre.

4.2.2.4 Diridon Station South Option

Effects on stormwater would be associated with polluted runoff from the operations phase (parking, systems facilities, and paved areas). The total impervious area for the station is 3.47 acres; the AIA is negligible.

4.2.2.5 Diridon Station North Option

Effects on stormwater would be associated with polluted runoff from the operations phase (parking, systems facilities, and paved areas). The total impervious area for the station is 0.85 acre; the AIA is negligible.

4.2.2.6 Santa Clara Station

Effects on surface water would be associated with polluted runoff from the operations phase (boarding platform and parking structure). The total impervious area for this station is 3.59 acres, and the AIA is 0.46 acre.

4.2.2.7 Newhall Maintenance Facility

The AIA is directly related to the potential permanent water quality impacts, as it may increase the volume and velocity of the stormwater discharge. The total impervious area for the Newhall Maintenance Facility is 43.86 acres, and the AIA is 41.86 acres. New drainage systems may be required to capture the drainage from the Project.

4.2.3 Transit-Oriented Joint Development

4.2.3.1 Alum Rock/28th Street TOJD

Alum Rock/28th Street TOJD would include office, retail, and residential buildings, along with corresponding parking. Effects on stormwater would be associated with polluted runoff from the added impervious areas during the operations phase. The total impervious area for the Alum Rock/28th Street TOJD is 5.09 acres, and the AIA is 0.77 acre.

4.2.3.2 Santa Clara and 13th Streets Ventilation Structure TOJD

Effects on stormwater would be associated with polluted runoff from the added impervious areas during the operations phase. Runoff would be associated with the above ground retail. The total impervious area for the Santa Clara and 13th Streets Ventilation Structure is 1.15 acres, and the AIA is 0.11 acre.

4.2.3.3 Downtown San Jose Station East Option TOJD

The Downtown San Jose Station East Option TOJD would include retail and underground parking. Effects on surface water would be associated with polluted runoff from the above ground facilities. The total impervious area for the TOJD is 3.17 acres, and the AIA is 0.11 acre.

4.2.3.4 Downtown San Jose Station West Option TOJD

The Downtown San Jose Station West Option TOJD would include retail and underground parking. Effects on surface water would be associated with polluted runoff from the above ground facilities. The total impervious area for the TOJD is 0.35 acre; the AIA is 0.10 acre.

4.2.3.5 Stockton Avenue Ventilation Structure TOJD

Effects on stormwater would be associated with polluted runoff from the paved areas. The total impervious area for the Stockton Avenue Ventilation Structure TOJD is 1.73 acres, and the AIA is negligible.

4.2.3.6 Diridon Station South Option TOJD

The Diridon Station South Option TOJD would include retail and office space. Effects on stormwater would be associated with polluted runoff from the added impervious areas during the operations phase. The total impervious area for the TOJD is 2.24 acres, and the AIA is negligible.

4.2.3.7 Diridon Station North Option TOJD

The Diridon Station North Option TOJD would include retail and office space. Effects on stormwater would be associated with polluted runoff from the added impervious areas during the operations phase. The total impervious area for the TOJD is 2.24 acres, and the AIA is negligible.

4.2.3.8 Santa Clara Station TOJD

The Santa Clara Station TOJD would include retail, office, residential, and parking. Effects on surface water would be associated with polluted runoff from the boarding platform and parking structure. The total impervious area for this TOJD is 3.53 acres, and the AIA is 0.11 acre.

Table 8: Impervious Areas by Watershed

Watershed	Project Option	Project Features	Total Impervious Area per Feature (acres)	Net Added Impervious Area (acres)
BART Facilities				
Lower Silver Creek	Alum Rock/28th Street Station	Station	9.25	2.54
Guadalupe River	Downtown San Jose Station East Option	Station	0.77	0.10
	Downtown San Jose Station West Option	Station	0.40	0.03
	Newhall Maintenance Facility		43.86[1]	41.86
	Santa Clara Station	Station	3.59	0.46
Los Gatos Creek	Diridon Station North Option	Station	0.85	Negligible
	Diridon Station South Option	Station	3.47	Negligible
Transit-Oriented Joint Development				
Lower Silver Creek	Alum Rock/28th Street Station	TOJD	5.09	0.77
Guadalupe River	Santa Clara and 13th Street Ventilation	TOJD	1.15[1]	0.11
	Downtown San Jose Station East Option	TOJD	3.17	0.11
	Downtown San Jose Station West Option	TOJD	0.35	0.10
	Stockton Avenue Ventilation[1]	TOJD	1.73	Negligible
	Santa Clara Station	TOJD	3.53	0.11
Los Gatos Creek	Diridon Station North Option	TOJD	2.24	Negligible
	Diridon Station South Option	TOJD	2.24	Negligible
[1] Utilized largest of the three proposed lots for analysis.				

4.2.4 Permanent Impacts on Groundwater

Several pump stations are proposed to collect groundwater seepage and/or rainwater at the lowest elevation points along the tunnel track alignment. BMPs such as temporary desilting basins or tanks, media filters, and bag filters can be used to provide water pollution control for the discharge of the water collected by the pump stations. For any contaminated groundwater, the water may be collected and off-hauled to a local sanitary sewer, or an active treatment system may be required to treat the water prior to discharge. More detailed analysis will be conducted during subsequent engineering phases of the Project.

Groundwater flow direction and pathways may be affected by the tunnel structures and underground stations, potentially causing the diversion of the normal flow of groundwater, the mounding of groundwater, or the localized rise of the water table. The water table in the area was measured at approximate depths of 14 to 18 feet bgs based on the EGD. The crown, or top, of the tunnel of the Twin-Bore Option would be constructed, on average, 40 feet below the surface, and the crown of the Single-Bore Option would be constructed, on average, 70 feet below the surface. Therefore, groundwater would be able to flow above and below the tunnel structure. Dewatering would be necessary inside the retained cuts, underground stations, and tunnels; the quantity of water is anticipated to be minimal. The Project would need to follow the SCVWD 2012 Groundwater Management Plan.

During operations, potential water quality impacts include ongoing discharges necessary for structural dewatering of any groundwater that infiltrates into the cut and cover stations and vent structures. Dewatering inside the retained cuts and tunnel may be necessary during the operation to keep the facilities dry. The total quantity of water removed is anticipated to be minimal, and no detectable changes to the groundwater supply would occur (VTA 2012). If necessary, the groundwater would be pretreated to meet the requirements of the applicable MS4 discharge permit.

4.3 Hydromodification

This Project will comply with the hydromodification management requirements under Section F of the Phase II MS4 permit. Similar to the Phase I permit issued to the Cities of San Jose and Santa Clara, the Phase II MS4 permit acknowledges that hydromodification management is not applicable for areas that are already equal to or greater than 65 percent impervious area. Figure 4 is the Hydromodification Management Plan (HMP) Map for Santa Clara County excerpted from the Phase I MS4 permit. Even where the City requirements are applied to the City right-of-way areas, the Project is exempt from hydromodification management requirements. Therefore, no impacts associated with hydromodification for the Project are anticipated.

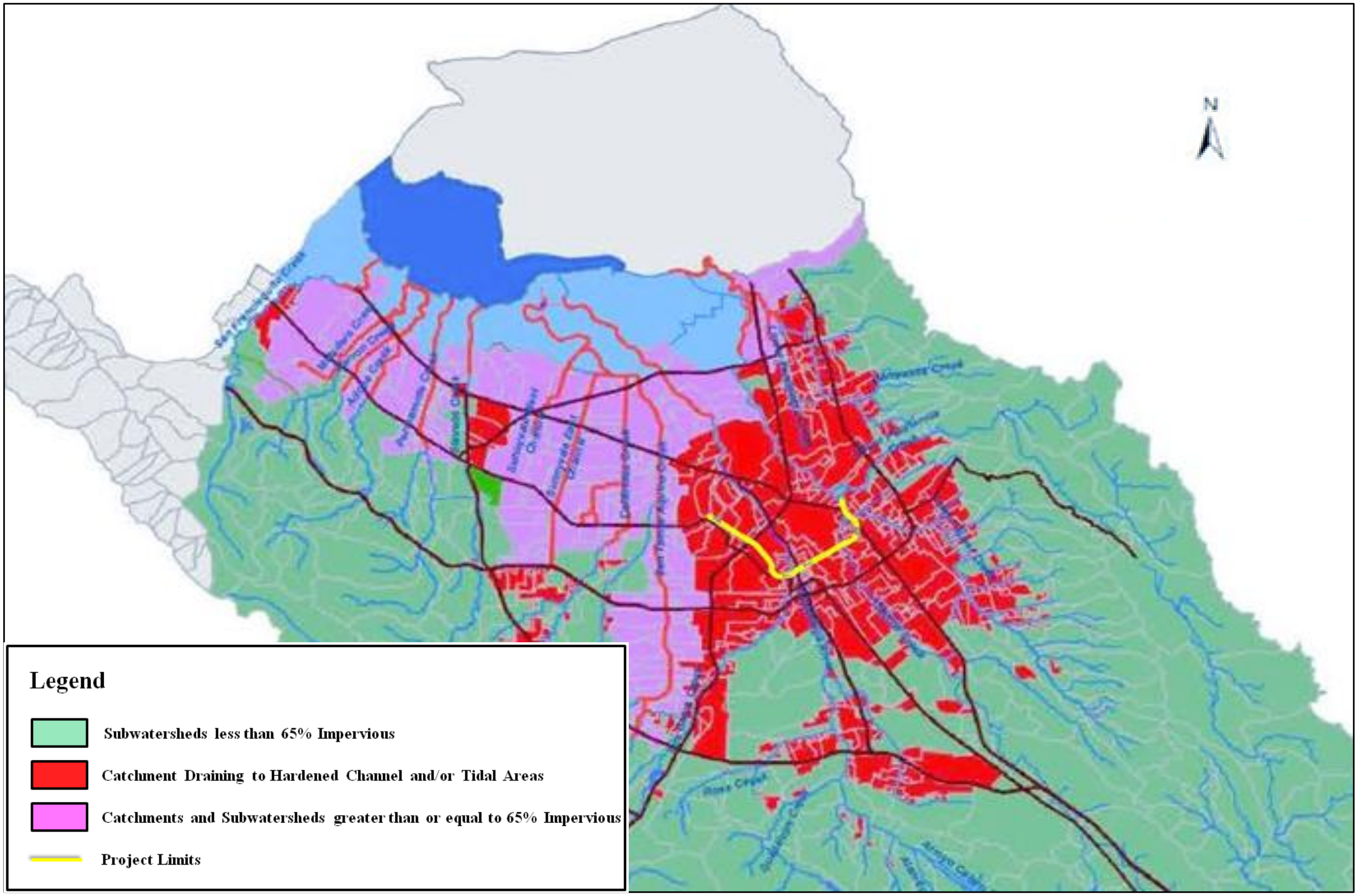


Figure 4: Santa Clara County Hydromodification Management Plan Map

Chapter 5
Design Commitments and Mitigation Measures

The Project is expected to result in less-than-significant impacts on water quality with the following avoidance, minimization, and proposed mitigation measures incorporated.

5.1 Design Commitments and Best Management Practices

5.1.1 Temporary Construction Site BMPs

5.1.1.1 Surface Water

Potential temporary impacts on water quality can be prevented or minimized by implementing standard construction site BMPs recommended for a particular construction activity, as described below.

Erosion control measures can be applied to all exposed areas during construction, and sediment control measures, including the trapping of sediments within the construction area through the placing of barriers (such as silt fences and rock entrance/exit pathways), can be placed at the perimeter of project areas and at downstream drainage points. In addition, temporary detention basins and drain inlet protection inserts can be installed to remove silt from construction runoff. Other methods of minimizing erosion and sedimentation impacts include the implementation of hydromulching and/or limiting the amount and length of exposure of graded soil. In addition to these erosion control and sediment control measures, the use of compost in landscape is strongly encouraged. Compost not only improves erosion resistance and vegetation establishment, but it also helps immobilize heavy metals that are commonly found on and near highways.

Based on the EGD (Parikh 2014), excavation to the groundwater level is anticipated to be encountered for the construction of the tunnels. A dewatering plan would be required as part of the Contractor's SWPPP. Water quality sampling and analysis would be required prior to any discharge into the sanitary sewer, storm drainage system, or downstream receiving water bodies.

BMPs such as temporary desilting basins or tanks, media filters, and bag filters would be used to provide water pollution control. For any contaminated groundwater, the water may be collected and off-hauled to the local sanitary sewer, or an active treatment system may be required to treat the water prior to discharge. More detailed information would be considered during the design phase of the Project.

None of the work is anticipated to take place in wetlands or waters of the U.S. or State; however, the contractor would be required to protect them when work is conducted in the adjacent areas.

Non-stormwater waste management would also essential to minimize the potential for water quality impacts on a project site. Accidental spills of petroleum hydrocarbons (such as fuels and lubricating oils), concrete wastewater, and sanitary wastes would also be of concern during construction activities. An accidental release of these wastes could adversely affect surface water quality, vegetation, and wildlife habitat. A spill prevention and cleanup plan would be included in the SWPPP to address these potential impacts.

The suggested minimum temporary control BMPs that would be necessary for the Project are included in Table 9. During construction, the contractor would be required to detail in the SWPPP the actual in-field implementation of BMPs and amend the SWPPP as necessary to match field conditions and phasing of the Project.

Table 9: Proposed Temporary Best Management Practices

Temporary BMP	Purpose
Erosion Control	
EC-1 Scheduling	Reduces the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.
EC-3 Hydraulic Mulch	Hydraulic Mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion.
EC-4 Hydroseed	Temporarily or permanently protects exposed soils from erosion by water and wind.
EC-7-Geotextiles and Mats	Natural or synthetic materials or a combination or the two used as covers for stockpiles.
Sediment Control	
SE-1 Silt Fence	Linear, permeable fabric barriers to intercept sediment-laden sheet flow. Placed downslope of exposed soil areas, along channels, and project perimeter.
SE-4 Check Dams	Small constructed device of rock or other product placed across a channel or ditch to reduce flow velocity.
SE-5 Fiber Rolls	Intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.
SE-6 Gravel Bag Berm	Single row of gravel bags installed end to end to form a barrier across a slope to intercept runoff. Can be used to divert or detain moderately concentrated flows.

Temporary BMP	Purpose
SE-7 Street Sweeping	Removal of tracked sediment to prevent it entering a storm drain or watercourse.
SE-10 Temporary Drainage Inlet Protection	Runoff detainment devices used at storm drain inlets that are subject to runoff from construction activities.
Tracking Control	
TC-1 Stabilized Construction Entrances/Exits	Points of entrance/exit to a construction site that are stabilized to reduce the tracking of mud and dirt onto public roads.
TC-2 Stabilized Construction Roadway	Reduces the tracking of mud and dirt onto public roads by construction vehicles.
Non-Stormwater Management	
NS-1 Water Conservation Practices	Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite.
NS-2 Dewatering Operations	Dewatering activities associated with stormwater and non-stormwater to prevent the discharge of pollutant from construction site.
NS-3 Paving and Grinding operations	Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent run-on and runoff pollution, properly disposing of wastes, and training employees and subcontractors.
NS-6 Illicit connection Discharge	Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.
NS-8 Vehicle and Equipment Cleaning	Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations.
NS-9 and NS 10 Vehicle and Equipment Fueling and Maintenance	Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site".
NS-12 and NS 13 Concrete Fueling and Finishing	Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods. Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances.

Temporary BMP	Purpose
Waste Management and Materials Pollution Control	
WM-1 Material Delivery and Storage	Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.
WM-02 Material Use	Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.
WM-3 Stockpile Management	Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called “cold mix” asphalt), and pressure treated wood.
WM-4 Spill Prevention and Control	Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.
WM-5 Solid Waste Management	Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.
WM-6 Hazardous Waste Management	Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.
WM-7 Contaminated Soil Management	Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.
WM-8 Concrete Waste Management	Specified vehicle washing areas to contain concrete waste materials.
WM-09 Sanitary-Septic Waste Management	Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.
WM-10 Liquid Use	Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.
Source: CASQA/VTA	

5.1.1.2 Groundwater

Minimal effects on groundwater paths and directions are anticipated as a result of the sealed tunnel, cut and cover areas, and portals; therefore, no mitigation is required.

Construction site BMPs would ensure that contamination is not introduced into the groundwater during construction and operation of the Project. BMPs would be included to manage any groundwater contamination. The proposed work in the tunnels would have to adhere to the SCVWD 2012 Groundwater Management Plan because basin management objective (BMO) number 2 is to protect groundwater from existing and potential contamination.

5.1.2 Pollution Prevention Design Measures

Design features to address water quality impacts would follow the guidance in VTA's *Stormwater Manual*, under which the Project would be required to use BMPs and permanent erosion control measures because the Project replaces or creates greater than 5,000 square feet of impervious surfaces.

Stormwater treatment would preferentially utilize site design measures, source control BMPs, and Low Impact Development (LID) treatment features. Generally, the LID measures would include vegetative improvements, which must comply with VTA's Sustainable Landscaping Policy. Site design measures to be considered include stream setbacks and buffers, soil quality improvement and maintenance, tree planting and preservation, rooftop and impervious area disconnections, porous pavement, green roofs, vegetated swales, rail barrels and cisterns, and other comparable measures in accordance with Section IV of VTA's *Stormwater Manual*. Coordination with the structures and geotechnical engineers is anticipated to determine if it would be possible to incorporate these features into the design. In accordance with the design guidelines in VTA's *Stormwater Manual* Section IV, runoff from impervious surfaces that cannot be addressed through these site design measures would be routed through LID biotreatment devices such as bioretention basins where feasible, or comparable measures such as tree well filters where bioretention features are not feasible due to design constraints.

5.1.2.1 BART Stations and Facilities

Proposed BMPs for Alum Rock/28th Street Station would include implementation of the construction-phase SWPPP, and post-construction bioretention and pervious pavement to address operational impacts. Proposed BMPs for the Downtown San Jose Station (East and West Options) and Santa Clara Station would include implementation of the construction-phase SWPPP, and post-construction LID measures from the Phase II Permit, such as bioretention and pervious pavement to address operational impacts. Post-construction requirements for the Newhall Maintenance Facility and associated systems facilities covered under the Industrial General Permit would include implementation of the construction-phase SWPPP and monitoring plan.

5.1.2.2 Transit-Oriented Joint Development

Generally, the effects on stormwater would be associated with polluted runoff from the paved areas associated with above ground facilities. Proposed treatment BMPs for the Alum Rock/28th Street TOJD would include bioretention and pervious pavement. Proposed BMPs for the Santa Clara and 13th Streets Ventilation Structure TOJD and above ground retail would include implementation of the construction-phase SWPPP, and post-construction LID measures from the Phase II Permit, such as bioretention and pervious pavement to address operational impacts. Proposed treatment BMPs for the Downtown San Jose Station TOJD for both options and Santa Clara Station TOJD would include bioretention and pervious pavement. The Stockton Avenue Ventilation Structure TOJD and the Diridon Station TOJD (both options) would incorporate LID treatment measures included in the Phase II Permit such as bioretention and pervious pavement.

Proposed BMPs for Santa Clara Station TOJD would include implementation of the construction-phase SWPPP, and post-construction LID measures from the Phase II Permit, such as bioretention and pervious pavement to address operational impacts.

5.1.2.3 Bioretention Design Criteria

The VTA *Stormwater Manual,* effective June 30, 2015, presents methods used to help evaluate, during the Project planning phase, whether sufficient land area has been allocated for stormwater treatment. As such, the size of the needed for biotreatment area was determined by assuming a surface area equal to 4 percent of the contributing impervious area. This method is called the *simplified sizing method*.

The estimated biotreatment surface area for the different Project features is listed in Table 10. The total biotreatment surface area required is approximately 139,322 square feet for the Project, which includes impervious areas for the Project features and the related service roads.

LID techniques could be used in the design of the Project in order to reduce the impact on water quality and beneficial uses. Self-treating areas, self-retaining areas, and increasing the pervious pavement area are some of the options mentioned in the *Stormwater Manual* (VTA 2015). There are other ways to reduce stormwater flooding and improve water quality elaborated in the *Stormwater Manual* that might be considered in the design phase. Some of these include using capturing surface flow with bioretention basins and rain gardens, and using tree well or and other media filters if vegetative treatment is infeasible.

Table 10: Estimated Biotreatment Area

Project Option	Total Impervious Area (acre)	Simplified Sizing Method Treatment Area (square feet)
Alum Rock/28th Street Station	9.25	16,117
Downtown San Jose Station East Option	0.87	1,516
Downtown San Jose Station West Option	0.43	749
Diridon Station South Option	3.47	6,046
Diridon Station North Option	0.85	1,481
Newhall Maintenance Facility	43.86	76,422
Santa Clara Station	4.05	7,057
TOJD Sites		
Alum Rock/28th Street Station	5.86	10,210
Santa Clara and 13th Street Ventilation Structure	1.15	2,004
Downtown San Jose Station East Option	3.17	5,523
Downtown San Jose Station West Option	0.35	610
Diridon Station South Option	2.24	3,903
Diridon Station North Option	2.24	3,903
Stockton Avenue Ventilation Structure	1.73	3,014
Santa Clara Station	3.53	6,151

Chapter 6
List of Preparers

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Chapter 7
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R Factor Erosivity Calculator

You are here: Water » Pollution Prevention & Control » Permitting (NPDES) » Stormwater » LEW Results

LEW Results

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Start Date:	1/01/2021
End Date:	1/01/2024
Latitude:	37.3511
Longitude:	-121.8655

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF **118.87** HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **1/01/2021 - 1/01/2024.**

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do NOT qualify for a waiver from NPDES permitting requirements.**

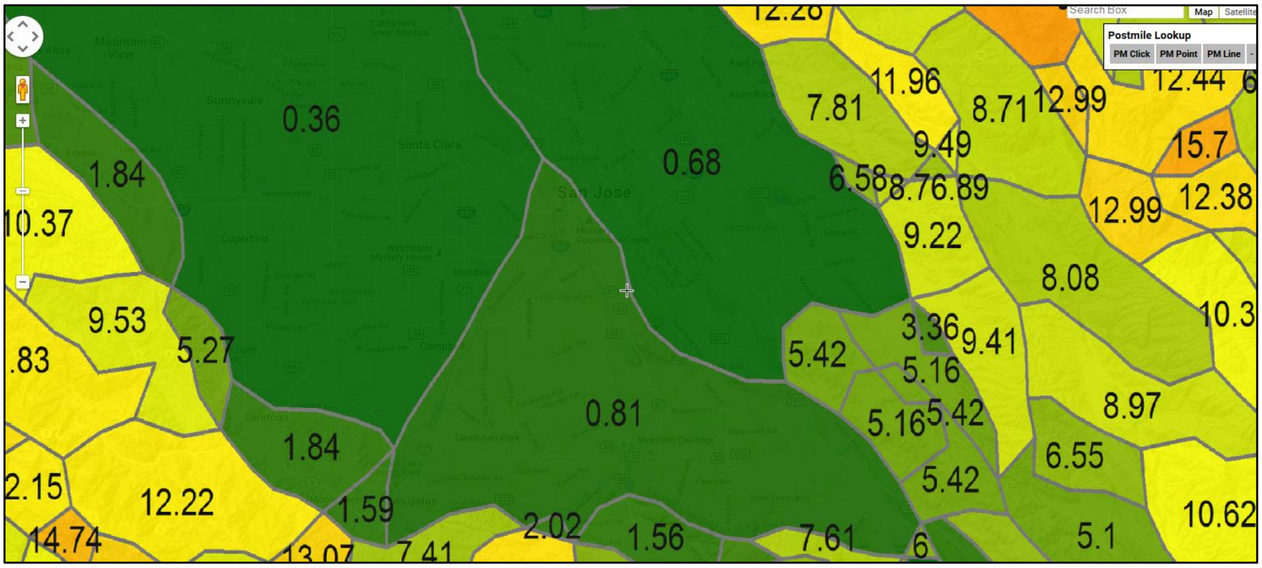
Start Over

Source: EPA Erosivity Calculator

K Factor

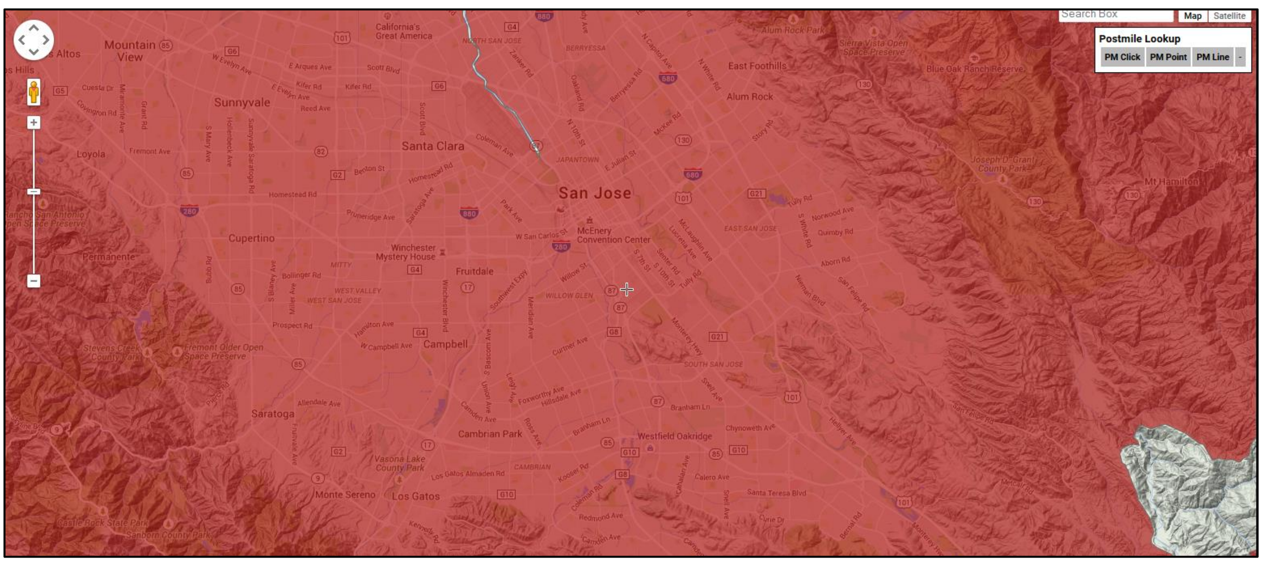
Source: WRECO

LS Factor



Source: Caltrans Water Quality Planning Tool

Receiving Water Risk



Source: Caltrans Water Quality Planning Tool

Appendix B.1 Objectives for Surface Waters

3.3 OBJECTIVES FOR SURFACE WATERS

The following objectives apply to all surface waters within the region, except the Pacific Ocean.

3.3.1 BACTERIA

Table 3-1 provides a summary of the bacterial water quality objectives and identifies the sources of those objectives. Table 3-2 summarizes U.S. EPA's water quality criteria for water contact recreation based on the frequency of use a particular area receives. These criteria will be used to differentiate between pollution sources or to supplement objectives for water contact recreation.

3.3.3.1 Implementation Provisions for Water Contact Recreation Bacteria Objectives

Water quality objectives for bacteria in Table 3-1 shall be strictly applied except when otherwise provided for in a TMDL. In the context of a TMDL, the Water Board may implement the objectives in fresh and marine waters by using a “reference system and antidegradation approach” as discussed below. Implementation of water quality objectives for bacteria using a “reference system and antidegradation approach” requires control of bacteria from all anthropogenic sources so that bacteriological water quality is consistent with that of a reference system. A reference system is defined as an area (e.g., a subwatershed or catchment) and associated monitoring point(s) that is minimally impacted by human activities that potentially affect bacteria densities in the reference receiving water body.

This approach recognizes that there are natural sources of bacteria (defined as non-anthropogenic sources) that may cause or contribute to exceedances of the objectives for indicator bacteria. It also avoids requiring treatment or diversion of water bodies or treatment of natural sources of bacteria from undeveloped areas. Such requirements, if imposed by the Water Board, could have the potential to adversely affect valuable aquatic life and wildlife beneficial uses supported by water bodies in the region.

Under the reference system approach, a certain frequency of exceedance of the single-sample objectives shall be permitted. The permitted number of exceedances shall be based on the observed exceedance frequency in a selected reference system(s) or the targeted water body, whichever is less. The “reference system and antidegradation approach” ensures that bacteriological water quality is at least as good as that of a reference system and that no degradation of existing bacteriological water quality is permitted where existing bacteriological water quality is better than that of the selected reference system(s).

The appropriateness of this approach, the specific exceedance frequencies to be permitted under it, and the permittees to whom it would apply will be evaluated within the context of TMDL development for a specific water body, and decided by the Water Board when considering adoption of a TMDL. These implementation provisions may only be used within the context of a TMDL addressing municipal stormwater (including discharges regulated under statewide municipal NPDES waste discharge requirements), discharges from confined animal facilities, and discharges from nonpoint sources.

3.3.2 BIOACCUMULATION

Many pollutants can accumulate on particles, in sediment, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.

3.3.3 BIOSTIMULATORY SUBSTANCES

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Changes in chlorophyll a and associated phytoplankton communities follow complex dynamics that are sometimes associated with a discharge of biostimulatory substances. Irregular and extreme levels of chlorophyll a or phytoplankton blooms may indicate exceedance of this objective and require investigation.

3.3.4 COLOR

Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.

3.3.5 DISSOLVED OXYGEN

For all tidal waters, the following objectives shall apply:

In the Bay:

Downstream of Carquinez Bridge	5.0 mg/l minimum
Upstream of Carquinez Bridge	7.0 mg/l minimum

For nontidal waters, the following objectives shall apply:

Waters designated as:

Cold water habitat	7.0 mg/l minimum
Warm water habitat	5.0 mg/l minimum

The median dissolved oxygen concentration for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation.

Dissolved oxygen is a general index of the state of the health of receiving waters. Although minimum concentrations of 5 mg/l and 7 mg/l are frequently used as objectives to protect fish life, higher concentrations are generally desirable to protect sensitive aquatic forms. In areas unaffected by waste discharges, a level of about 85 percent of oxygen saturation exists. A three-month median objective of 80 percent of oxygen saturation allows for some degradation from this level, but still requires a consistently high oxygen content in the receiving water.

3.3.6 FLOATING MATERIAL

Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

3.3.7 OIL AND GREASE

Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.

3.3.8 POPULATION AND COMMUNITY ECOLOGY

All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

3.3.9 pH

The pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the basin. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

3.3.10 RADIOACTIVITY

Radionuclides shall not be present in concentrations that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. Waters designated for use as domestic or municipal supply shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations (CCR), which is incorporated by reference into this Plan. This incorporation is prospective, including future changes to the incorporated provisions as the changes take effect (see Table 3-5).

3.3.11 SALINITY

Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.

3.3.12 SEDIMENT

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.

3.3.13 SETTLEABLE MATERIAL

Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.

3.3.14 SUSPENDED MATERIAL

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

3.3.15 SULFIDE

All water shall be free from dissolved sulfide concentrations above natural background levels. Sulfide occurs in Bay muds as a result of bacterial action on organic matter in an anaerobic environment.

Concentrations of only a few hundredths of a milligram per liter can cause a noticeable odor or be toxic to aquatic life. Violation of the sulfide objective will reflect violation of dissolved oxygen objectives as sulfides cannot exist to a significant degree in an oxygenated environment.

3.3.16 TASTES AND ODORS

Waters shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.

3.3.17 TEMPERATURE

Temperature objectives for enclosed bays and estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California," including any revisions to the plan.

In addition, the following temperature objectives apply to surface waters:

- The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.
- The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature

3.3.18 TOXICITY

All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species. There shall be no acute toxicity in ambient waters. Acute toxicity is defined as a median of less than 90 percent survival, or less than 70 percent survival, 10 percent of the time, of test organisms in a 96-hour static or continuous flow test.

There shall be no chronic toxicity in ambient waters. Chronic toxicity is a detrimental biological effect on growth rate, reproduction, fertilization success, larval development, population abundance, community composition, or any other relevant measure of the health of an organism, population, or community.

Attainment of this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, or toxicity tests (including those described in Chapter 4), or other methods selected by the Water Board. The Water Board will also consider other relevant information and numeric criteria and guidelines for toxic substances developed by other agencies as appropriate.

The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

3.3.19 TURBIDITY

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.

3.3.20 UN-IONIZED AMMONIA

The discharge of wastes shall not cause receiving waters to contain concentrations of un-ionized ammonia in excess of the following limits (in mg/l as N):

Annual Median	0.025
Maximum, Central Bay (as depicted in Figure 2-5) and upstream	0.16
Maximum, Lower Bay (as depicted in Figures 2-6 and 2-7):	0.4

The intent of this objective is to protect against the chronic toxic effects of ammonia in the receiving waters. An ammonia objective is needed for the following reasons:

- Ammonia (specifically un-ionized ammonia) is a demonstrated toxicant. Ammonia is generally accepted as one of the principle toxicants in municipal waste discharges. Some industries also discharge significant quantities of ammonia.

- Exceptions to the effluent toxicity limitations in Chapter 4 of the Plan allow for the discharge of ammonia in toxic amounts. In most instances, ammonia will be diluted or degraded to a nontoxic state fairly rapidly. However, this does not occur in all cases, the South Bay being a notable example. The ammonia limit is recommended in order to preclude any build up of ammonia in the receiving water.
- A more stringent maximum objective is desirable for the northern reach of the Bay for the protection of the migratory corridor running through Central Bay, San Pablo Bay, and upstream reaches.

3.3.21 OBJECTIVES FOR SPECIFIC CHEMICAL CONSTITUENTS

Surface waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use. Water quality objectives for selected toxic pollutants for surface waters are given in Tables 3-3, 3-3A, 3-3B, 3-3C, 3-4, and 3-4A.

The Water Board intends to work towards the derivation of site-specific objectives for the Bay-Delta estuarine system. Site-specific objectives to be considered by the Water Board shall be developed in accordance with the provisions of the federal Clean Water Act, the State Water Code, State Board water quality control plans, and this Plan. These site-specific objectives will take into consideration factors such as all available scientific information and monitoring data and the latest U.S. EPA guidance, and local environmental conditions and impacts caused by bioaccumulation. Pending the adoption of site-specific objectives, the objectives in Tables 3-3 and 3-4 apply throughout the region except as otherwise indicated in the tables or when site-specific objectives for the pollutant parameter have been adopted. Site-specific objectives have been adopted for copper in segments of San Francisco Bay (see Figure 7.2.1-01), for nickel in South San Francisco Bay (Table 3-3A), and for cyanide in all San Francisco Bay segments (Table 3-3C). Objectives for mercury that apply to San Francisco Bay are listed in Table 3-3B. Objectives for mercury that apply to Walker Creek, Soulajule Reservoir, and their tributaries, and to waters of the Guadalupe River watershed are listed in Table 3-4A.

South San Francisco Bay south of the Dumbarton Bridge is a unique, water-quality-limited, hydrodynamic and biological environment that merits continued special attention by the Water Board. Controlling urban and upland runoff sources is critical to the success of maintaining water quality in this portion of the Bay. Site-specific water quality objectives have been adopted for dissolved copper and nickel in this Bay segment. Site-specific objectives may be appropriate for other pollutants of concern, but this determination will be made on a case-by-case basis, and after it has been demonstrated that all other reasonable treatment, source control and pollution prevention measures have been exhausted. The Water Board will determine whether revised water quality objectives and/or effluent limitations are appropriate based on sound technical information and scientific studies, stakeholder input, and the need for flexibility to address priority problems in the watershed.

3.3.22 CONSTITUENTS OF CONCERN FOR MUNICIPAL AND AGRICULTURAL WATER SUPPLIES

At a minimum, surface waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the following provisions of Title 22, which are incorporated by reference into this plan: Table 64431-A (Inorganic Chemicals) of Section 64431, and Table 64433.2-A (Fluoride) of Section 64433.2, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (SMCLs-Consumer Acceptance Limits) and 64449-B (SMCLs-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. Table 3-5 contains water quality objectives for municipal supply, including the MCLs contained in various sections of Title 22 as of the adoption of this plan.

At a minimum, surface waters designated for use as agricultural supply (AGR) shall not contain concentrations of constituents in excess of the levels specified in Table 3-6.

Appendix B.2 Objectives for Groundwater

3.4 OBJECTIVES FOR GROUNDWATER

Groundwater objectives consist primarily of narrative objectives combined with a limited number of numerical objectives. Additionally, the Water Board will establish basin- and/or site-specific numerical groundwater objectives as necessary. For example, the Water Board has groundwater basin-specific objectives for the Alameda Creek watershed above Niles to include the Livermore-Amador Valley as shown in Table 3-7.

The maintenance of existing high quality of groundwater (i.e., "background") is the primary groundwater objective.

In addition, at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor in excess of the objectives described below unless naturally occurring background concentrations are greater. Under existing law, the Water Board regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards.

3.4.1 BACTERIA

In groundwater with a beneficial use of municipal and domestic supply, the median of the most probable number of coliform organisms over any seven-day period shall be less than 1.1 most probable number per 100 milliliters (MPN/100 mL) (based on multiple tube fermentation technique; equivalent test results based on other analytical techniques as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21 (f), revised June 10, 1992, are acceptable).

3.4.2 ORGANIC AND INORGANIC CHEMICAL CONSTITUENTS

All groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. To evaluate compliance with water quality objectives, the Water Board will consider all relevant and scientifically valid evidence, including relevant and scientifically valid numerical criteria and guidelines developed and/or published by other agencies and organizations (e.g., U.S. Environmental Protection Agency (U.S. EPA), the State Water Board, California Department of Health Services (DHS), U.S. Food and Drug Administration, National Academy of Sciences, California Environmental Protection Agency's (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA), U.S. Agency for Toxic Substances and Disease Registry, Cal/EPA Department of Toxic Substances Control (DTSC), and other appropriate organizations.)

At a minimum, groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the following provisions of Title 22, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) of Section

64431, Table 64433.2-A (Fluoride) of Section 64433.2, and Table 64444-A (Organic Chemicals) of Section 64444. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

Groundwater with a beneficial use of agricultural supply shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. In determining compliance with this objective, the Water Board will consider as evidence relevant and scientifically valid water quality goals from sources such as the Food and Agricultural Organizations of the United Nations; University of California Cooperative Extension, Committee of Experts; and McKee and Wolf's "Water Quality Criteria," as well as other relevant and scientifically valid evidence. At a minimum, groundwater designated for use as agricultural supply (AGR) shall not contain concentrations of constituents in excess of the levels specified in Table 3-6.

Groundwater with a beneficial use of freshwater replenishment shall not contain concentrations of chemicals in amounts that will adversely affect the beneficial use of the receiving surface water.

Groundwater with a beneficial use of industrial service supply or industrial process supply shall not contain pollutant levels that impair current or potential industrial uses.

3.4.3 RADIOACTIVITY

At a minimum, groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the MCLs specified in Table 4 (Radioactivity) of Section 64443 of Title 22, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

3.4.4 TASTE AND ODOR

Groundwater designated for use as domestic or municipal supply (MUN) shall not contain taste- or odor-producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, groundwater designated for use as domestic or municipal supply shall not contain concentrations in excess of the SMCLs specified in Tables 64449-A (Secondary MCLs-Consumer Acceptance Limits) and 64449-B (Secondary MCLs-Ranges) of Section 64449 of Title 22, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

Appendix C

Description of Beneficial Uses

CHAPTER 2: BENEFICIAL USES

State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Aquatic ecosystems and underground aquifers provide many different benefits to the people of the state. The beneficial uses described in detail in this chapter define the resources, services, and qualities of these aquatic systems that are the ultimate goals of protecting and achieving high water quality. The Water Board is charged with protecting all these uses from pollution and nuisance that may occur as a result of waste discharges in the region. Beneficial uses of surface waters, groundwaters, marshes, and wetlands presented here serve as a basis for establishing water quality objectives and discharge prohibitions to attain these goals.

Beneficial use designations for any given water body do not rule out the possibility that other beneficial uses exist or have the potential to exist. Existing beneficial uses that have not been formally designated in this Basin Plan are protected whether or not they are identified. While the tables in this Chapter list a large, representative portion of the water bodies in our region, it is not practical to list each and every water body.

2.1 DEFINITIONS OF BENEFICIAL USES

The following definitions (in italic) for beneficial uses are applicable throughout the entire state. A brief description of the most important water quality requirements for each beneficial use follows each definition (in alphabetical order by abbreviation).

2.1.1 AGRICULTURAL SUPPLY (AGR)

Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

The criteria discussed under municipal and domestic water supply (MUN) also effectively protect farmstead uses. To establish water quality criteria for livestock water supply, the Water Board must consider the relationship of water to the total diet, including water freely drunk, moisture content of feed, and interactions between irrigation water quality and feed quality. The University of California Cooperative Extension has developed threshold and limiting concentrations for livestock and irrigation water. Continued irrigation often leads to one or more of four types of hazards related to water quality and the nature of soils and crops. These hazards are (1) soluble salt accumulations, (2) chemical changes in the soil, (3) toxicity to crops, and (4) potential disease transmission to humans through reclaimed water use. Irrigation water classification systems, arable soil classification systems, and public health criteria related to reuse of wastewater have been developed with consideration given to these hazards.

2.1.2 AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS)

Areas designated by the State Water Board.

These include marine life refuges, ecological reserves, and designated areas where the preservation and enhancement of natural resources requires special protection. In these areas, alteration of natural water quality is undesirable. The areas that have been designated as ASBS in this Region are Bird Rock, Point Reyes Headland Reserve and Extension, Double Point, Duxbury Reef Reserve and Extension, Farallon Islands, and James V. Fitzgerald Marine Reserve, depicted in Figure 2-1. The California Ocean Plan prohibits waste discharges into, and requires wastes to be discharged at a sufficient distance from, these areas to assure maintenance of natural water quality conditions. These areas have been designated as a subset of State Water Quality Protection Areas as per the Public Resources Code.

2.1.3 COLD FRESHWATER HABITAT (COLD)

Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold freshwater habitats generally support trout and may support anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well-oxygenated. Life within these waters is relatively intolerant to environmental stresses. Often, soft waters feed cold water habitats. These waters render fish more susceptible to toxic metals, such as copper, because of their lower buffering capacity.

2.1.4 COMMERCIAL, AND SPORT FISHING (COMM)

Uses of water for commercial or recreational collection of fish, shellfish, or other organisms, including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

To maintain fishing, the aquatic life habitats where fish reproduce and seek their food must be protected. Habitat protection is under descriptions of other beneficial uses.

2.1.5 ESTUARINE HABITAT (EST)

Uses of water that support estuarine ecosystems, including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms.

Estuarine habitat provides an essential and unique habitat that serves to acclimate anadromous fishes (e.g., salmon, striped bass) migrating into fresh or marine water conditions. The protection of estuarine habitat is contingent upon (1) the maintenance of adequate Delta outflow to provide mixing and salinity control; and (2) provisions to protect wildlife habitat associated with marshlands and the Bay periphery (i.e., prevention of fill activities). Estuarine habitat is generally associated with moderate seasonal fluctuations in dissolved oxygen, pH, and temperature and with a wide range in turbidity.

2.1.6 FRESHWATER REPLENISHMENT (FRSH)

Uses of water for natural or artificial maintenance of surface water quantity or quality.

2.1.7 GROUNDWATER RECHARGE (GWR)

Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers.

The requirements for groundwater recharge operations generally reflect the future use to be made of the water stored underground. In some cases, recharge operations may be conducted to prevent seawater intrusion. In these cases, the quality of recharged waters may not directly affect quality at the wellfield being protected. Recharge operations are often limited by excessive suspended sediment or turbidity that can clog the surface of recharge pits, basins, or wells.

Under the state Antidegradation Policy, the quality of some of the waters of the state is higher than established by adopted policies. It is the intent of this policy to maintain that existing higher water quality to the maximum extent possible.

Requirements for groundwater recharge, therefore, shall impose the Best Available Technology (BAT) or Best Management Practices (BMPs) for control of the discharge as necessary to assure the highest quality consistent with maximum benefit to the people of the state. Additionally, it must be recognized that groundwater recharge occurs naturally in many areas from streams and reservoirs. This recharge may have little impact on the quality of groundwaters under normal circumstances, but it may act to transport pollutants from the recharging water body to the groundwater. Therefore, groundwater recharge must be considered when requirements are established.

2.1.8 INDUSTRIAL SERVICE SUPPLY (IND)

Uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

Most industrial service supplies have essentially no water quality limitations except for gross constraints, such as freedom from unusual debris.

2.1.9 MARINE HABITAT (MAR)

Uses of water that support marine ecosystems, including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

In many cases, the protection of marine habitat will be accomplished by measures that protect wildlife habitat generally, but more stringent criteria may be necessary for waterfowl marshes and other habitats, such as those for shellfish and marine fishes. Some marine habitats, such as important intertidal zones and kelp beds, may require special protection.

2.1.10 FISH MIGRATION (MIGR)

Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.

The water quality provisions acceptable to cold water fish generally protect anadromous fish as well. However, particular attention must be paid to maintaining zones of passage. Any barrier to migration or free movement of migratory fish is harmful. Natural tidal movement in estuaries and unimpeded river flows are necessary to sustain migratory fish and their offspring. A water quality barrier, whether thermal, physical, or chemical, can destroy the integrity of the migration route and lead to the rapid decline of dependent fisheries.

Water quality may vary through a zone of passage as a result of natural or human- induced activities. Fresh water entering estuaries may float on the surface of the denser salt water or hug one shore as a result of density differences related to water temperature, salinity, or suspended matter.

2.1.11 MUNICIPAL AND DOMESTIC SUPPLY (MUN)

Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.

The principal issues involving municipal water supply quality are (1) protection of public health; (2) aesthetic acceptability of the water; and (3) the economic impacts associated with treatment- or quality-related damages.

The health aspects broadly relate to: direct disease transmission, such as the possibility of contracting typhoid fever or cholera from contaminated water; toxic effects, such as links between nitrate and methemoglobinemia (blue babies); and increased susceptibility to disease, such as links between halogenated organic compounds and cancer.

Aesthetic acceptance varies widely depending on the nature of the supply source to which people have become accustomed. However, the parameters of general concern are excessive hardness, unpleasant odor or taste, turbidity, and color. In each case, treatment can improve acceptability although its cost may not be economically justified when alternative water supply sources of suitable quality are available.

Published water quality objectives give limits for known health-related constituents and most properties affecting public acceptance. These objectives for drinking water include the U.S. Environmental Protection Agency Drinking Water Standards and the California State Department of Health Services criteria.

2.1.12 NAVIGATION (NAV)

Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

2.1.13 INDUSTRIAL PROCESS SUPPLY (PRO)

Uses of water for industrial activities that depend primarily on water quality.

Water quality requirements differ widely for the many industrial processes in use today. So many specific industrial processes exist with differing water quality requirements that no meaningful criteria can be established generally for quality of raw water supplies. Fortunately, this is not a serious shortcoming, since current water treatment technology can create desired product waters tailored for specific uses.

2.1.14 PRESERVATION OF RARE AND ENDANGERED SPECIES (RARE)

Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.

The water quality criteria to be achieved that would encourage development and protection of rare and endangered species should be the same as those for protection of fish and wildlife habitats generally. However, where rare or endangered species exist, special control requirements may be necessary to assure attainment and maintenance of particular quality criteria, which may vary slightly with the environmental needs of each particular species. Criteria for species using areas of special biological significance should likewise be derived from the general criteria for the habitat types involved, with special management diligence given where required.

2.1.15 WATER CONTACT RECREATION (REC1)

Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.

Water contact implies a risk of waterborne disease transmission and involves human health; accordingly, criteria required to protect this use are more stringent than those for more casual water-oriented recreation.

Excessive algal growth has reduced the value of shoreline recreation areas in some cases, particularly for swimming. Where algal growths exist in nuisance proportions, particularly bluegreen algae, all recreational water uses, including fishing, tend to suffer.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

Public access to drinking water reservoirs is limited or prohibited by reservoir owner/operators for purposes of protecting drinking water quality and public health. In some cases, access to reservoir tributaries is also prohibited. For these water bodies, REC-1 is designated as E*, for the purpose of protecting water quality. No right to public access is intended by this designation.

2.1.16 NONCONTACT WATER RECREATION (REC2)

Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Water quality considerations relevant to noncontact water recreation, such as hiking, camping, or boating, and those activities related to tide pool or other nature studies require protection of habitats and aesthetic features. In some cases, preservation of a natural wilderness condition is justified, particularly when nature study is a major dedicated use.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

2.1.17 SHELLFISH HARVESTING (SHELL)

Uses of water that support habitats suitable for the collection of crustaceans and filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sport purposes.

Shellfish harvesting areas require protection and management to preserve the resource and protect public health. The potential for disease transmission and direct poisoning of humans is of considerable concern in shellfish regulation. The bacteriological criteria for the open ocean, bays, and estuarine waters where shellfish cultivation and harvesting occur should conform with the standards described in the National Shellfish Sanitation Program, Manual of Operation.

Toxic metals can accumulate in shellfish. Mercury and cadmium are two metals known to have caused extremely disabling effects in humans who consumed shellfish that concentrated these elements from industrial waste discharges. Other elements, radioactive isotopes, and certain toxins produced by particular plankton species also concentrate in shellfish tissue. Documented cases of paralytic shellfish poisoning are not uncommon in California.

2.1.18 FISH SPAWNING (SPWN)

Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Dissolved oxygen levels in spawning areas should ideally approach saturation levels. Free movement of water is essential to maintain well-oxygenated conditions around eggs deposited in sediments. Water temperature, size distribution and organic content of sediments, water depth, and current velocity are also important determinants of spawning area adequacy.

2.1.19 WARM FRESHWATER HABITAT (WARM)

Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

The warm freshwater habitats supporting bass, bluegill, perch, and other fish are generally lakes and reservoirs, although some minor streams will serve this purpose where stream flow is sufficient to sustain the fishery. The habitat is also important to a variety of nonfish species, such as frogs, crayfish, and insects, which provide food for fish and small mammals. This habitat is less sensitive to environmental changes, but more diverse than the cold freshwater habitat, and natural fluctuations in temperature, dissolved oxygen, pH, and turbidity are usually greater.

2.1.20 WILDLIFE HABITAT (WILD)

Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

The two most important types of wildlife habitat are riparian and wetland habitats. These habitats can be threatened by development, erosion, andsedimentation, as well as by poor water quality.

The water quality requirements of wildlife pertain to the water directly ingested, the aquatic habitat itself, and the effect of water quality on the production of food materials. Waterfowl habitat is particularly sensitive to changes in water quality. Dissolved oxygen, pH, alkalinity, salinity, turbidity, settleable matter, oil, toxicants, and specific disease organisms are water quality characteristics particularly important to waterfowl habitat. Dissolved oxygen is needed in waterfowl habitats to suppress development of botulism organisms; botulism has killed millions of waterfowl. It is particularly important to maintain adequate circulation and aerobic conditions in shallow fringe areas of ponds or reservoirs where botulism has caused problems.

2.2 EXISTING AND POTENTIAL BENEFICIAL USES

2.2 EXISTING AND POTENTIAL BENEFICIAL USES

2.2.1 SURFACE WATERS

Surface waters in the Region consist of non-tidal wetlands, rivers, streams, and lakes (collectively described as inland surface waters), estuarine wetlands known as baylands, estuarine waters, and coastal waters. In this Region, estuarine waters consist of the Bay system including intertidal, tidal, and subtidal habitats from the Golden Gate to the Region's boundary near Pittsburg and the lower portions of streams that are affected by tidal hydrology, such as the Napa and Petaluma rivers in the north and Coyote and San Francisquito creeks in the south.

Inland surface waters support or could support most of the beneficial uses described above. The specific beneficial uses for inland streams include municipal and domestic supply (MUN), agricultural supply (AGR),commercial and sport fishing (COMM), freshwater replenishment (FRESH), industrial process supply (PRO), groundwater recharge (GWR), preservation of rare and endangered species (RARE), water contact recreation (REC1), noncontact water recreation (REC2), wildlife habitat (WILD), cold freshwater habitat (COLD), warm freshwater habitat (WARM), fish migration (MIGR), and fish spawning (SPWN). The San Francisco Bay Estuary supports estuarine habitat (EST), industrial service supply (IND), and navigation (NAV) in addition to COMM, RARE, REC1, REC2, WILD, MIGR, and SPWN.

Coastal waters' beneficial uses include water contact recreation (REC1); noncontact water recreation (REC2); industrial service supply (IND); navigation (NAV); marine habitat (MAR); shellfish harvesting (SHELL); commercial and sport fishing (COMM); wildlife habitat (WILD), fish migration (MIGR), fish spawning (SPWN), and preservation of rare and endangered species (RARE). In addition, the California coastline within the Region is endowed with exceptional scenic beauty.

The beneficial uses of any specifically identified water body generally apply to all its tributaries. In some cases a beneficial use may not be applicable to the entire body of water, such as navigation in Richardson Bay or shellfish harvesting in the Pacific Ocean. In these cases, the Water Board's judgment regarding water quality control measures necessary to protect beneficial uses will be applied.

Beneficial uses of streams that have intermittent flows, as is typical of many streams in the region, must be protected throughout the year and are designated as "existing."

Beneficial uses of each significant water body have been identified and are organized according to the seven major Hydrologic Planning Areas within the Region (Figure 2-2). The maps locating each water body (Figures 2.3 through 2.9) were produced using a geographical information system (GIS) at the Water Board. The maps use the hydrologic basin information compiled by the California Interagency Watershed map, with supplemental information from the Oakland Museum of California Creek and Watershed Map series, the Contra Costa County Watershed Atlas, and the San Francisco Estuary Institute EcoAtlas. More detailed representations of each location can be created using this GIS version.

Table 2-1 contains the beneficial uses for many surface water bodies in the Region, organized geographically by the Region's seven Hydrologic Planning Areas. Within each Hydrologic Planning Area, water bodies are listed geographically, with tributaries indented below their receiving water body. In cases where a water body shares the same name with another water body (e.g., Redwood Creek), the location of the water body (county and/or other identifier) is given in parentheses. An alternative name for a water body, where known, is also shown in parentheses. In Table 2-1, beneficial uses are indicated as follows:

E – indicates the beneficial use exists in the water body.

E* – indicates public access to the water body is limited or prohibited for purposes of protecting drinking water quality and public health. REC-1 is designated as E* for the purpose of protecting water quality. No right to public access is intended by this designation.

P – indicates the water body could potentially support the beneficial use.

2.2.2 GROUNDWATER

Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it can be defined as an aquifer. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.

Water-bearing geologic units occur within groundwater basins in the Region that do not meet the definition of an aquifer. For instance, there are shallow, low permeability zones throughout the Region that have extremely low water yields. Groundwater may also occur outside of currently identified basins. Therefore, for basin planning purposes, the term "groundwater" includes all subsurface waters, whether or not these waters meet the classic definition of an aquifer or occur within identified groundwater basins.

The California Department of Water Resources (DWR) evaluated the characteristics of groundwater basins in the Region and throughout the state and summarized the results in California's Groundwater, Bulletin 118 (2003). Of special importance to the Region are the 28 groundwater basins and seven sub-basins classified by DWR that produce, or potentially could produce, significant amounts of groundwater (Figures 2-10 and 2-10A-D). The Water Board maintains a GIS for all water bodies in the Region and has the capacity to present information on each basin at a much higher level of resolution than is depicted in Figures 2-10A-D.

Existing and potential beneficial uses applicable to groundwater in the Region include municipal and domestic water supply (MUN), industrial water supply (IND), industrial process supply (PRO), agricultural water supply (AGR), groundwater recharge (GWR), and freshwater replenishment to surface waters (FRESH). Table 2-2 lists the 28 identified groundwater basins and seven sub-basins located in the Region and their existing and potential beneficial uses.

Unless otherwise designated by the Water Board, all groundwater is considered suitable, or potentially suitable, for municipal or domestic water supply (MUN). In making any exceptions, the Water Board will consider the criteria referenced in State Water Board Resolution No. 88-63 and Water Board Resolution No. 89-39, "Sources of Drinking Water," where:

- The total dissolved solids exceed 3,000 milligrams per liter (mg/L) (5,000 microSiemens per centimeter, µS/cm, electrical conductivity), and it is not reasonably expected by the Water Board that the groundwater could supply a public water system; or
- There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices (BMPs) or best economically achievable treatment practices; or

- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or
- The aquifer is regulated as a geothermal energy-producing source or has been exempted administratively pursuant to 40 Code of Federal Regulations (CFR) Part 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Part 261.3.

Appendix D
Layout Sheets

APPENDIX X
SILICON VALLEY SANTA CLARA EXTENSION
SINGLE-BORE OPTION PLANS AND PROFILES
INDEX OF DRAWINGS

Sheet No.	Title	Sheet No.	Title
0	LOCATION: CONNECTION TO PHASE I NEAR MABURY ROAD	10A & 10B & 11E	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
1	LOCATION: NEAR LAS PLUMAS AVE	10A & 10B & 11F	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
2	LOCATION: AT SANTA CLARA & 28TH STREETS STATION: ALUM ROCK/ 28th STREET STATION	10C & 10D & 11E	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
3	LOCATION: SANTA CLARA STREET EAST OF COYOTE CREEK	10C & 10D & 11F	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT W/ DIRIDON STATION NORTH OPTION ALIGNMENT
4	LOCATION: SANTA CLARA STREET WEST OF COYOTE CREEK	11A & 11B & 11E	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION SOUTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
5A & 5C	LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL STATION: DOWNTOWN SAN JOSE STATION EAST OPTION	11A & 11B & 11F	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
5B & 5D	LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL STATION: DOWNTOWN SAN JOSE STATION WEST OPTION	11C & 11D & 11E	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION SOUTH OPTION W/ DIRIDON STATION NORTH OPTION ALIGNMENT
6A	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION SOUTH OPTION W/ DOWNTOWN SAN JOSE STATION EAST OPTION	11C & 11D & 11F	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION NORTH OPTION ALIGNMENT
6B	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION SOUTH OPTION W/ DOWNTOWN SAN JOSE STATION WEST OPTION	12A & 12B & 12E	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
6C	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION NORTH OPTION W/ DOWNTOWN SAN JOSE STATION EAST OPTION	12A & 12B & 12F	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
6D	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION NORTH OPTION W/ DOWNTOWN SAN JOSE STATION WEST OPTION	12C & 12D & 12E	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
7A & 7B	LOCATION: NEAR THE ALAMEDA STATION: DIRIDON STATION SOUTH OPTION	12C & 12D & 12F	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
7C & 7D	LOCATION: NEAR THE ALAMEDA STATION: DIRIDON STATION NORTH OPTION	13E	LOCATION: NEWHALL MAINTENANCE FACILITY W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
8A & 8B	LOCATION: NEAR STOCKTON AVENUE STATION: DIRIDON STATION SOUTH OPTION	13F	LOCATION: NEWHALL MAINTENANCE FACILITY W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT
8C & 8D	LOCATION: NEAR STOCKTON AVENUE STATION: DIRIDON STATION NORTH OPTION	14E	LOCATION: NEWHALL MAINTENANCE FACILITY AND TRAIL TRACK W/ SANTA CLARA STATION SOUTH OPTION
9A & 9B	LOCATION: NEAR HEDDING STREET W/ DIRIDON STATION SOUTH OPTION ALIGNMENT	14F	LOCATION: NEWHALL MAINTENANCE FACILITY AND TRAIL TRACK W/ SANTA CLARA STATION NORTH OPTION
9C & 9D	LOCATION: NEAR HEDDING STREET W/ DIRIDON STATION NORTH OPTION ALIGNMENT	15E	LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
		15F	LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT

A SERIES = **DOWNTOWN SAN JOSE STATION EAST OPTION & DIRIDON STATION SOUTH OPTION**

B SERIES = **DOWNTOWN SAN JOSE STATION WEST OPTION & DIRIDON STATION SOUTH OPTION**

C SERIES = **DOWNTOWN SAN JOSE STATION EAST OPTION & DIRIDON STATION NORTH OPTION**

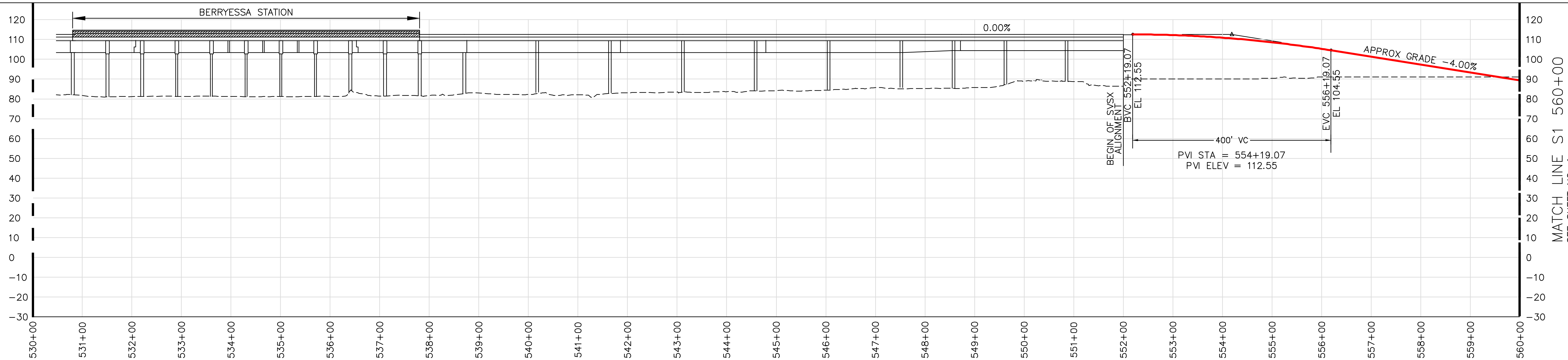
D SERIES = **DOWNTOWN SAN JOSE STATION WEST OPTION & DIRIDON STATION NORTH OPTION**

A & B SERIES = **DIRIDON STATION SOUTH OPTION/ ALIGNMENT**

C & D SERIES = **DIRIDON STATION NORTH OPTION/ ALIGNMENT**

E SERIES = **SANTA CLARA STATION SOUTH OPTION/ ALIGNMENT**

F SERIES = **SANTA CLARA STATION NORTH OPTION/ ALIGNMENT**



CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

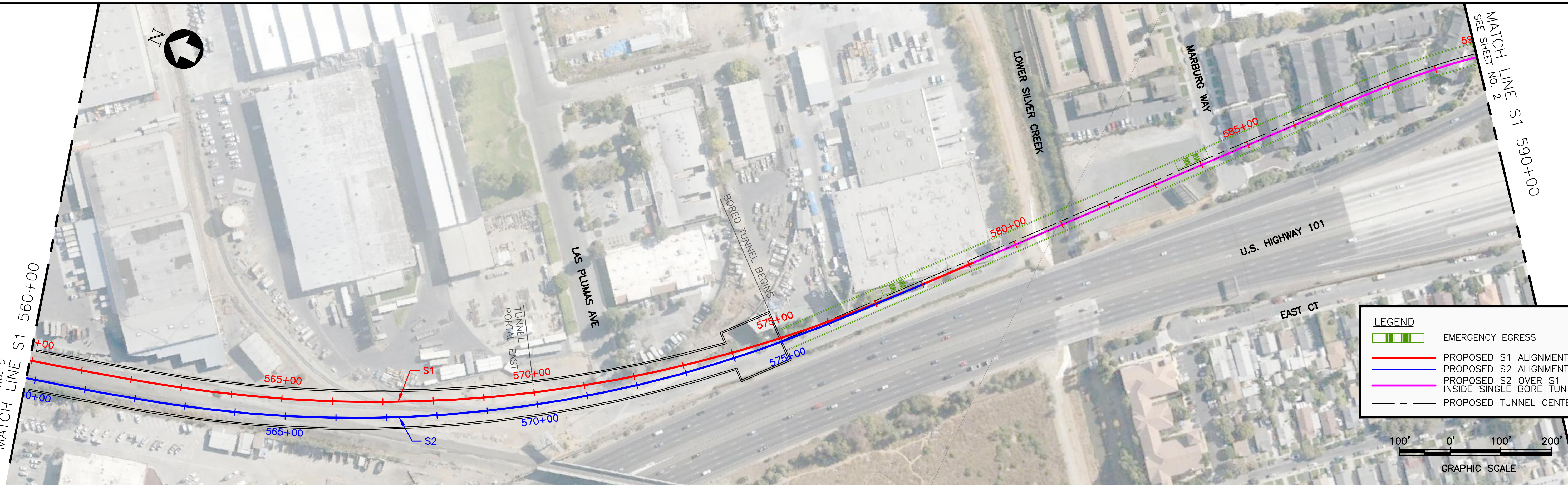
25' 0' 25' 50'
VERTICAL SCALE

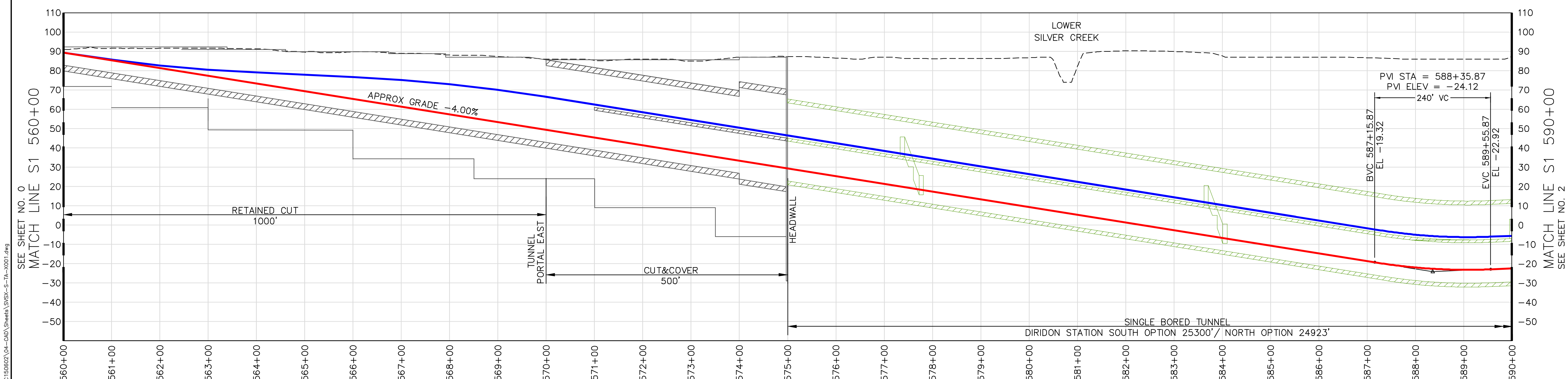
SINGLE BORE

LEGEND

SINGLE BORE TUNNEL
S2 - UPPER TRACK
S1 - LOWER TRACK
EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: CONNECTION TO PHASE I
NEAR MABURY ROAD
PLAN & PROFILE
SHEET 0





CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR LAS PLUMAS AVE

PLAN & PROFILE
SHEET 1

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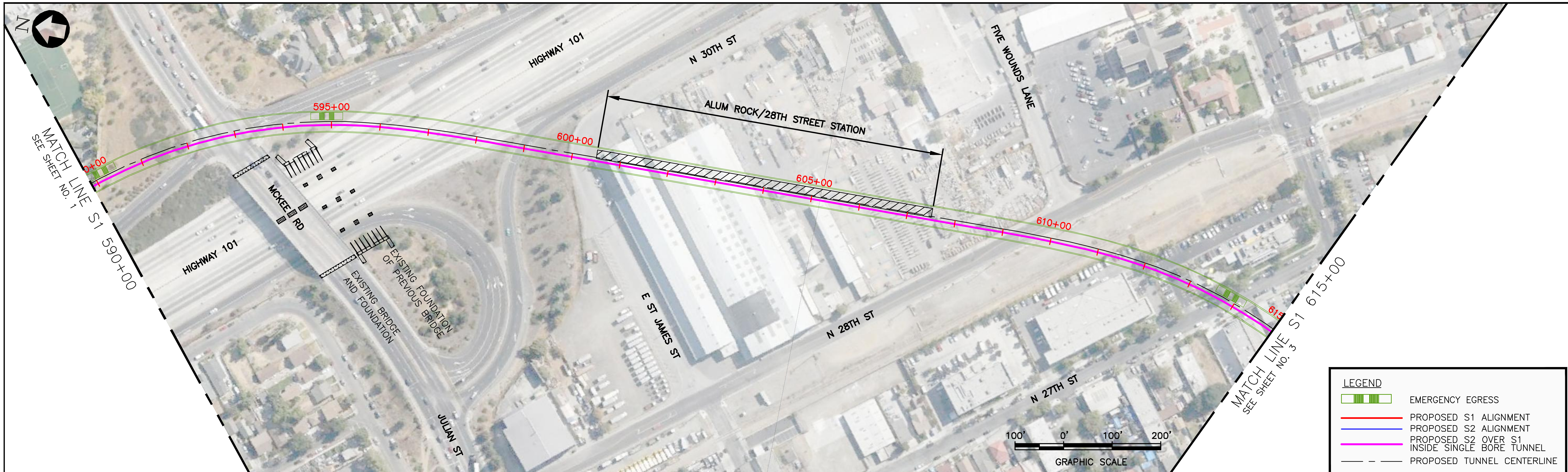
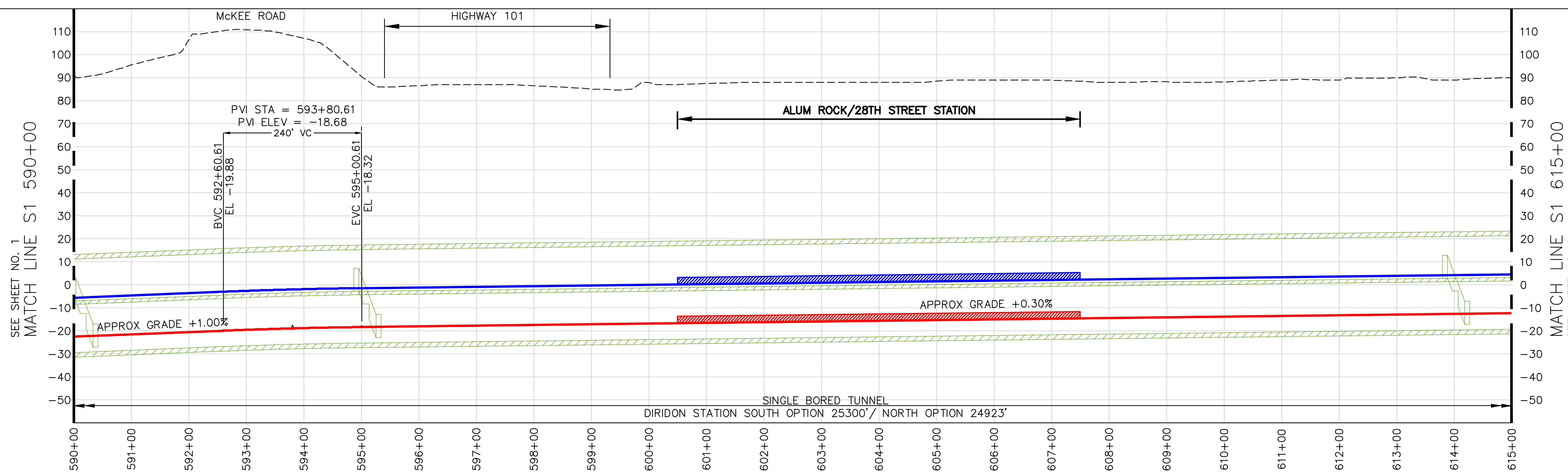




CONCEPTUAL PLANS

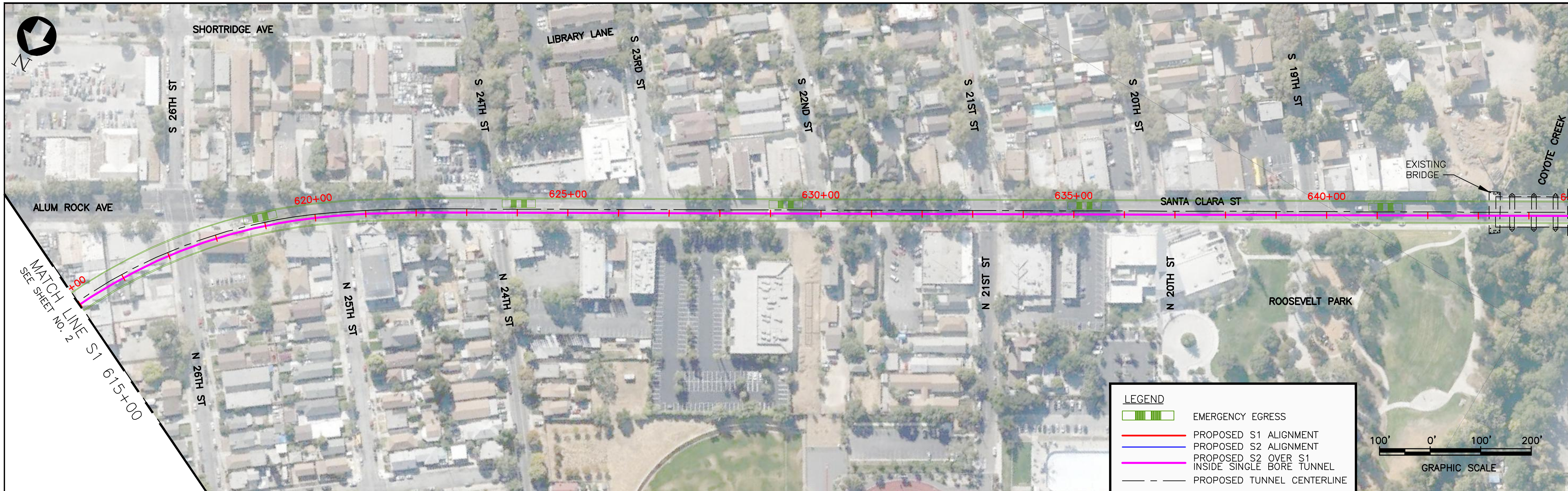
100' 0' 100' 200'
HORIZONTAL SCALE

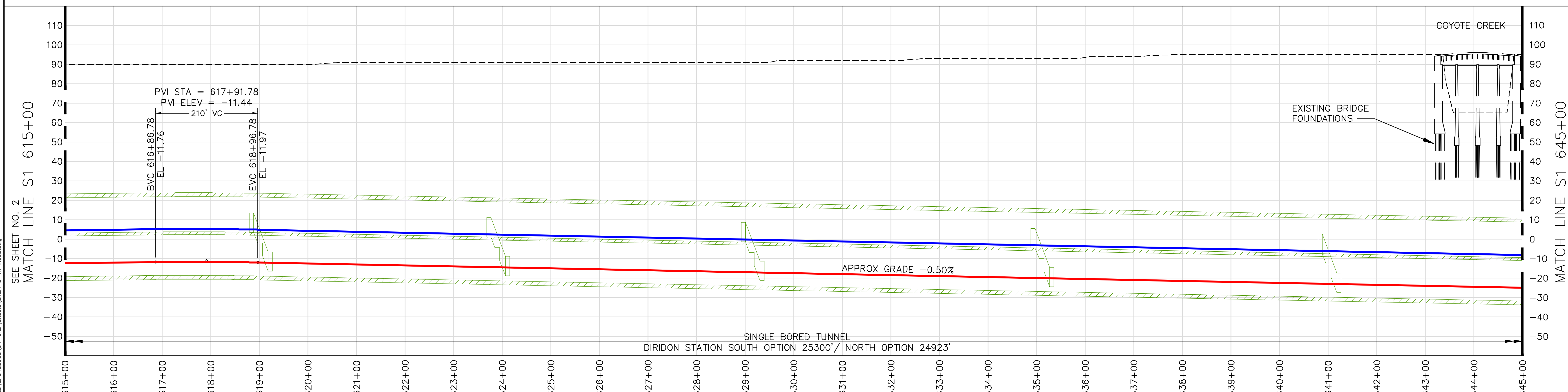
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
SINGLE BORE TUNNEL
S2 - UPPER TRACK
S1 - LOWER TRACK
EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: AT SANTA CLARA & 28TH STREETS
STATION: ALUM ROCK/28TH STREET STATION
PLAN & PROFILE
SHEET 2





CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND

SINGLE BORE TUNNEL
S2 - UPPER TRACK
S1 - LOWER TRACK
EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET EAST OF COYOTE CREEK

PLAN & PROFILE
SHEET 3

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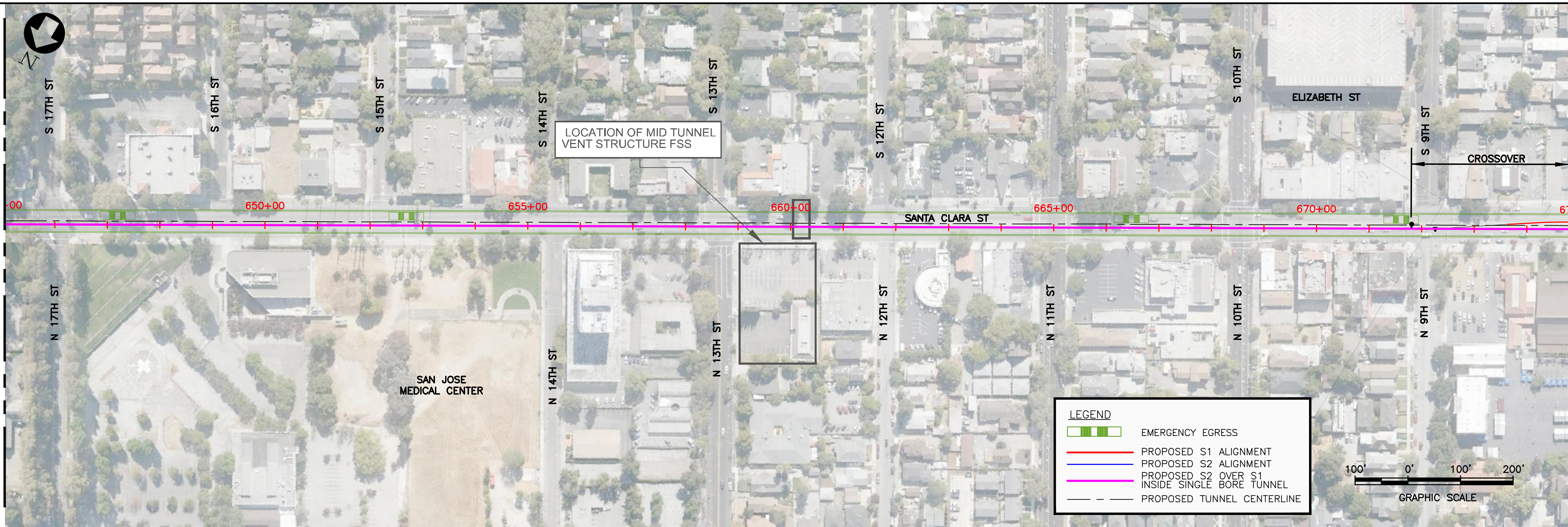
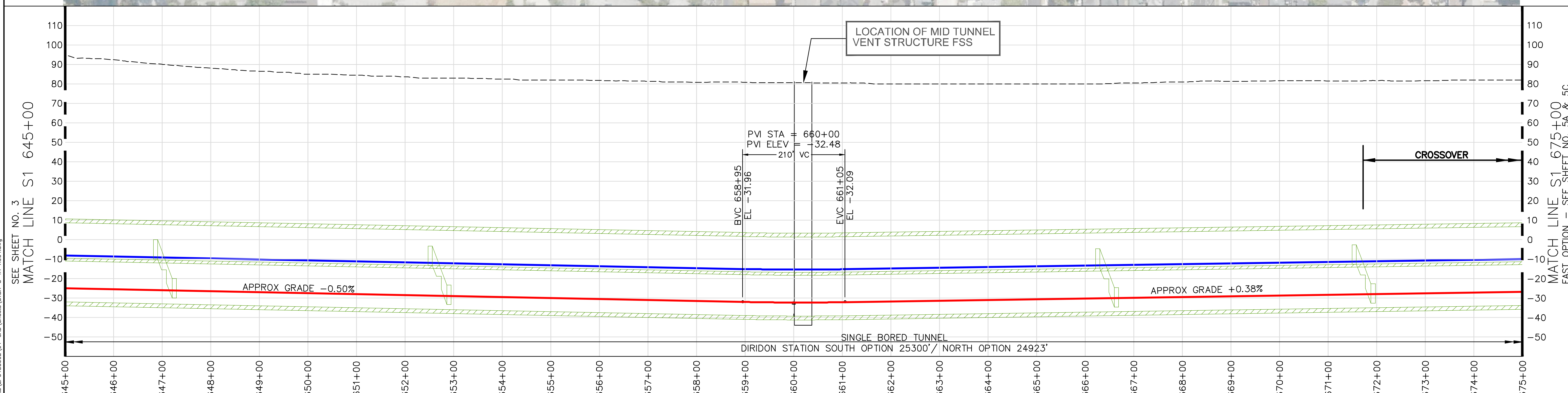




CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

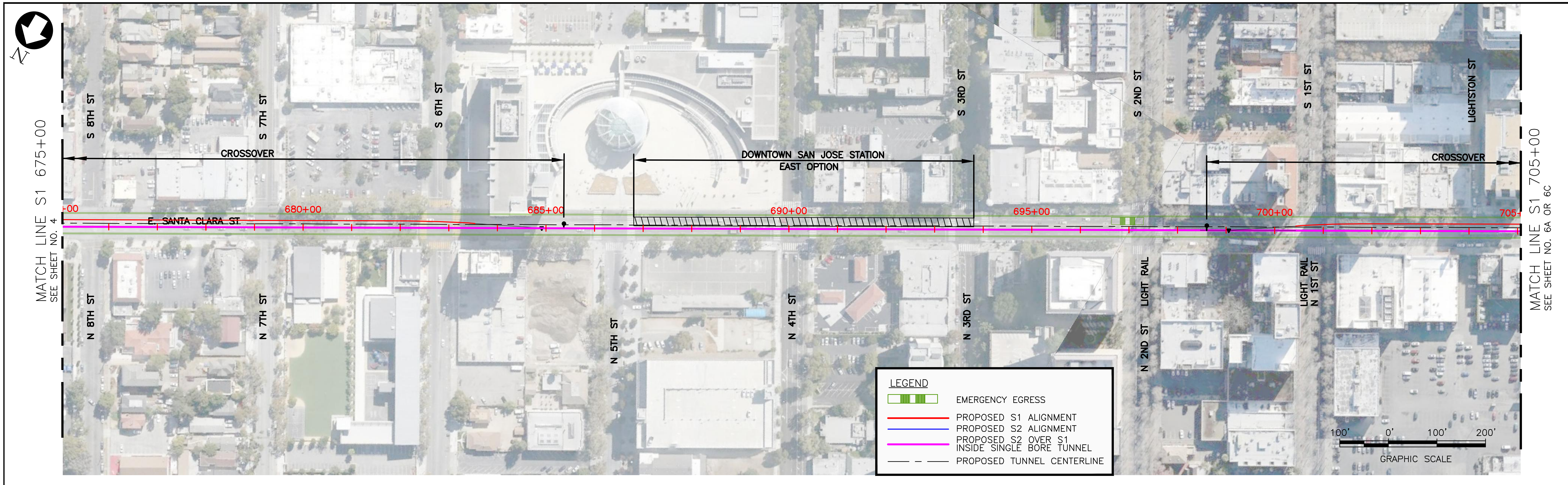
SINGLE BORE

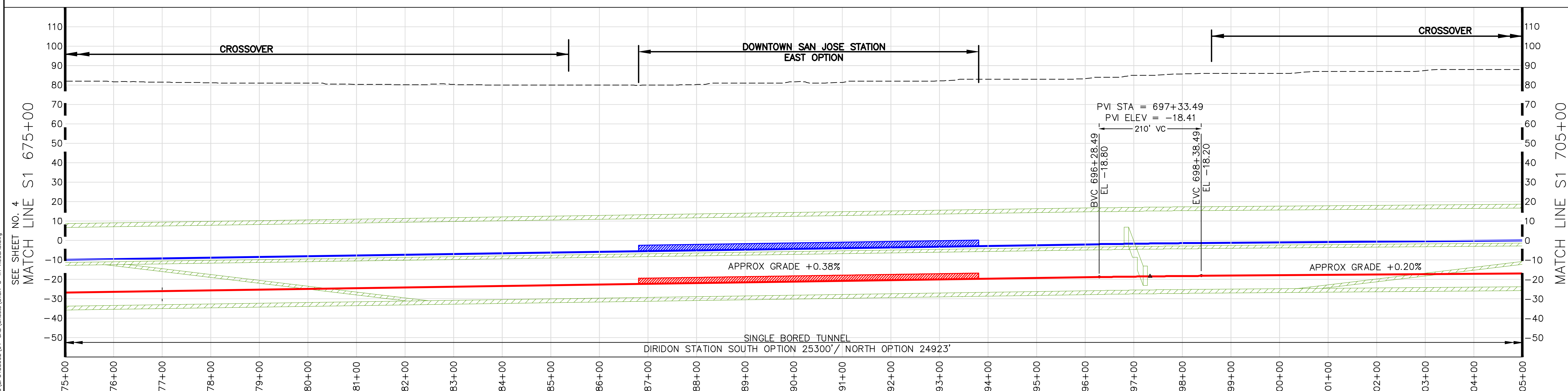
LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET WEST OF COYOTE CREEK

PLAN & PROFILE
SHEET 4





CONCEPTUAL PLANS

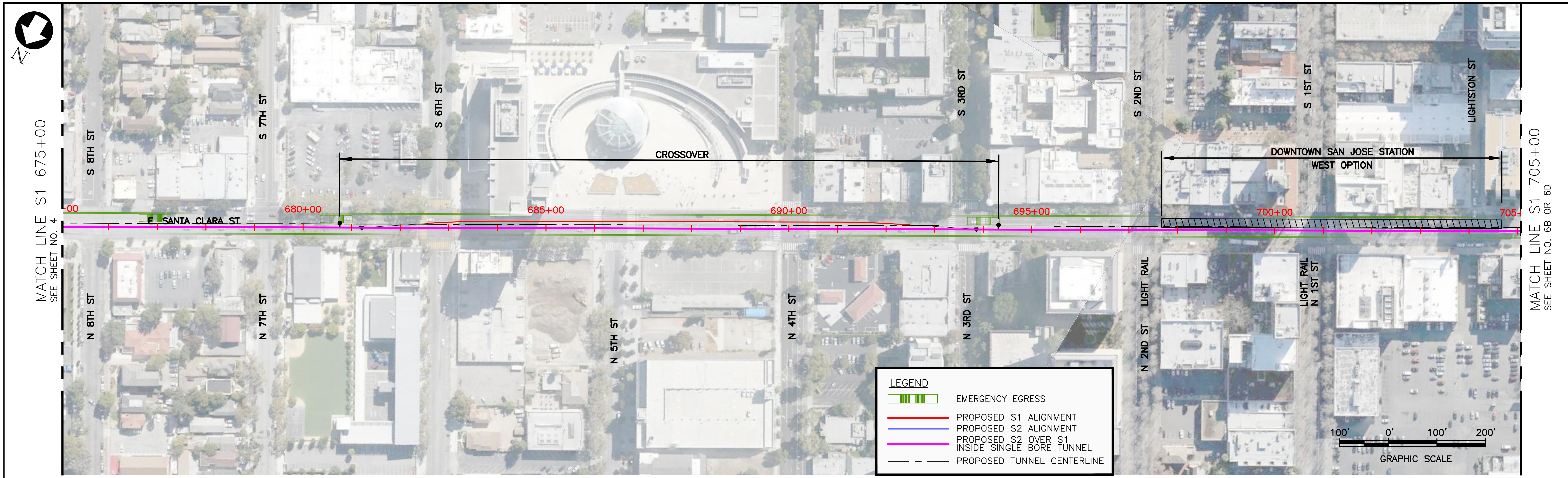
100' 0' 100' 200'
HORIZONTAL SCALE

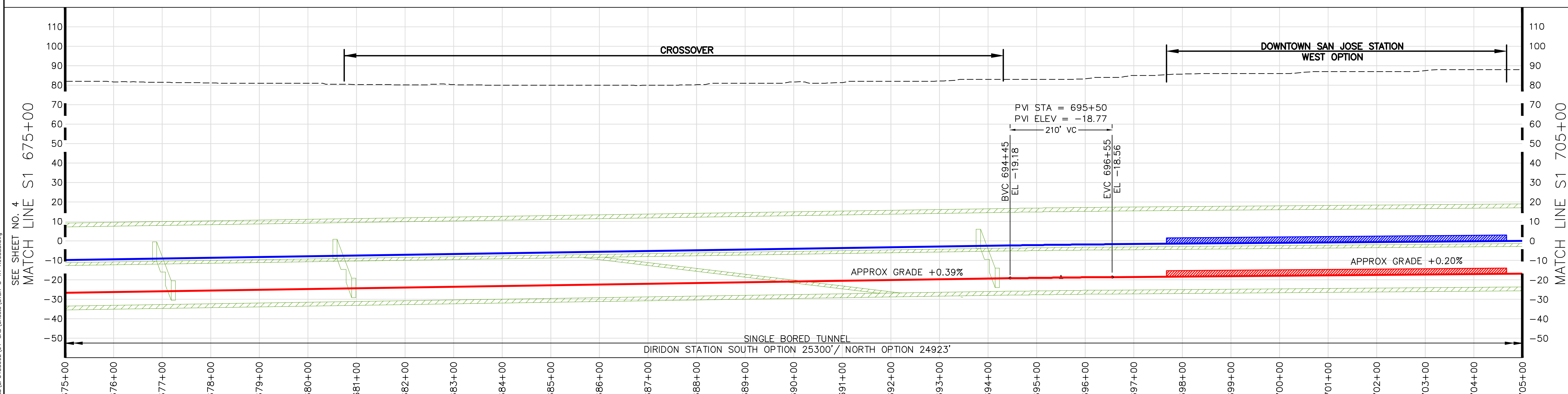
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
SINGLE BORE TUNNEL
S2 - UPPER TRACK
S1 - LOWER TRACK
EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL
STATION: DOWNTOWN SAN JOSE STATION EAST OPTION
PLAN & PROFILE
SHEET 5A & 5C





CONCEPTUAL PLANS

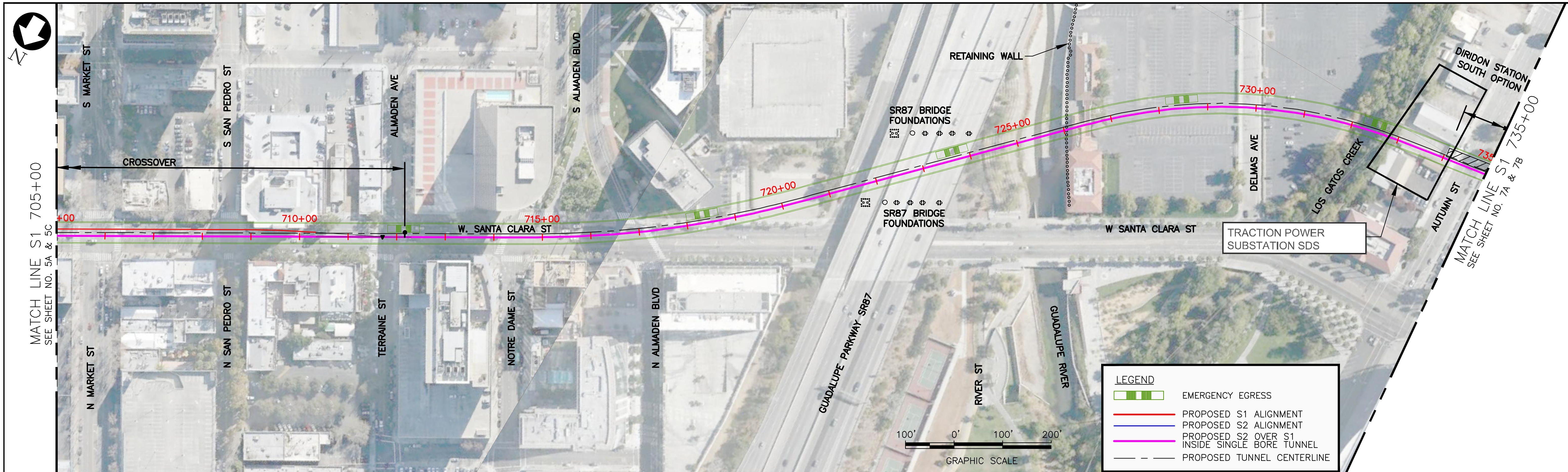
100' 0' 100' 200'
HORIZONTAL SCALE

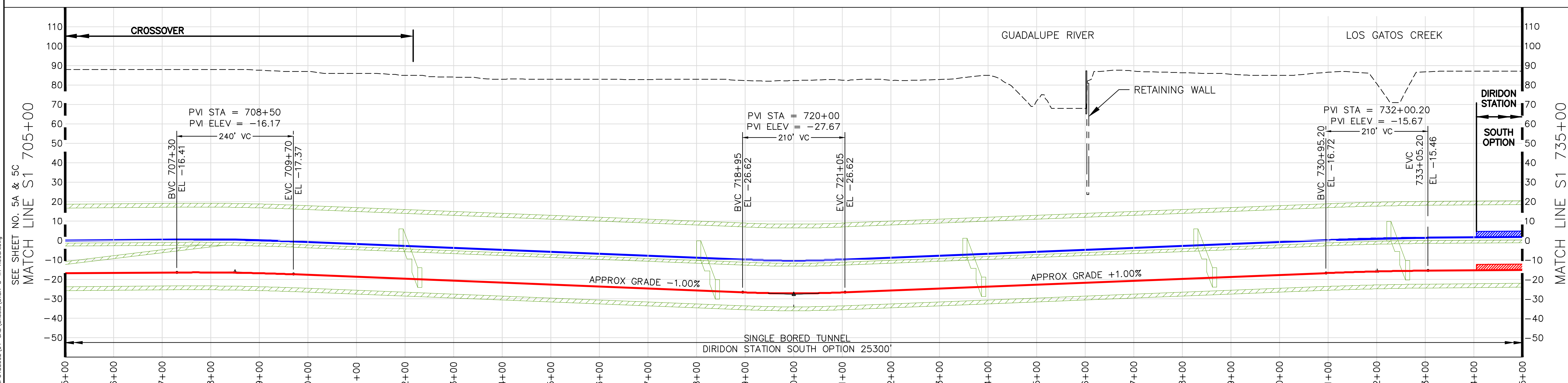
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL
STATION: DOWNTOWN SAN JOSE STATION WEST OPTION
PLAN & PROFILE
SHEET 5B & 5D





CONCEPTUAL PLANS

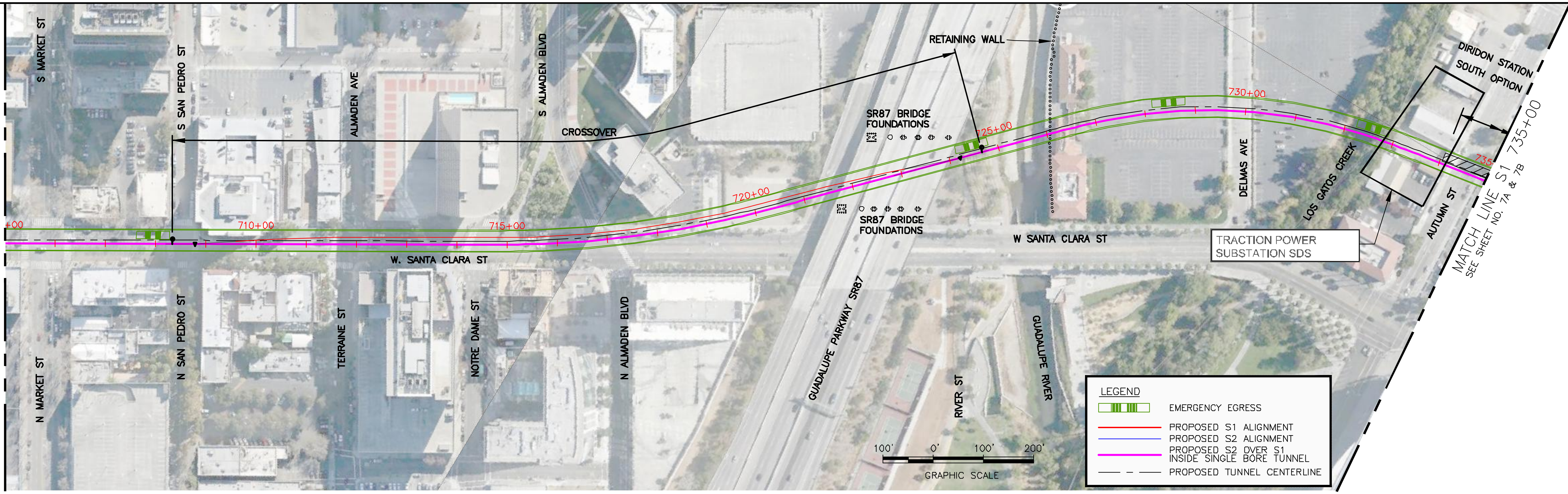
100' 0' 100' 200'
HORIZONTAL SCALE

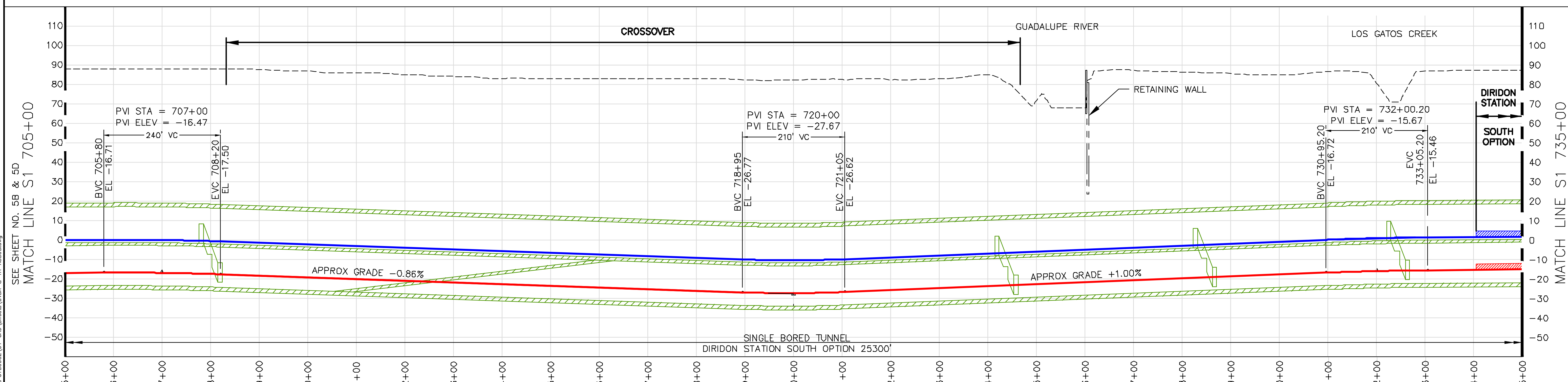
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION SOUTH OPTION W/ DOWNTOWN SAN JOSE STATION EAST OPTION
PLAN & PROFILE
SHEET 6A





CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION SOUTH OPTION W/ DOWNTOWN SAN JOSE STATION WEST OPTION
PLAN & PROFILE
SHEET 6B

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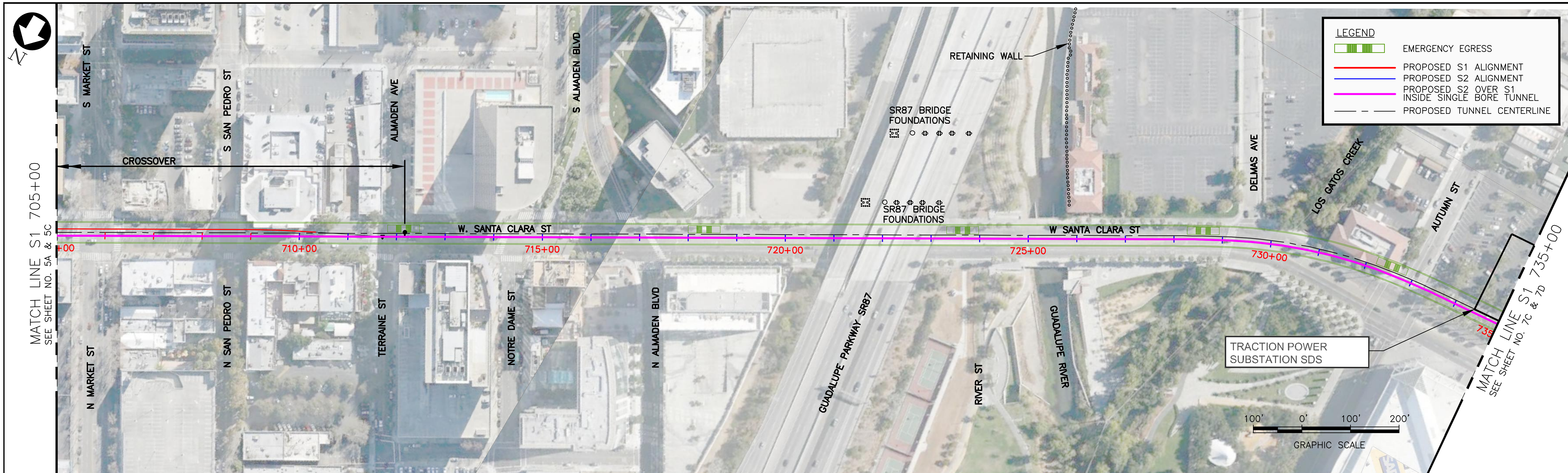

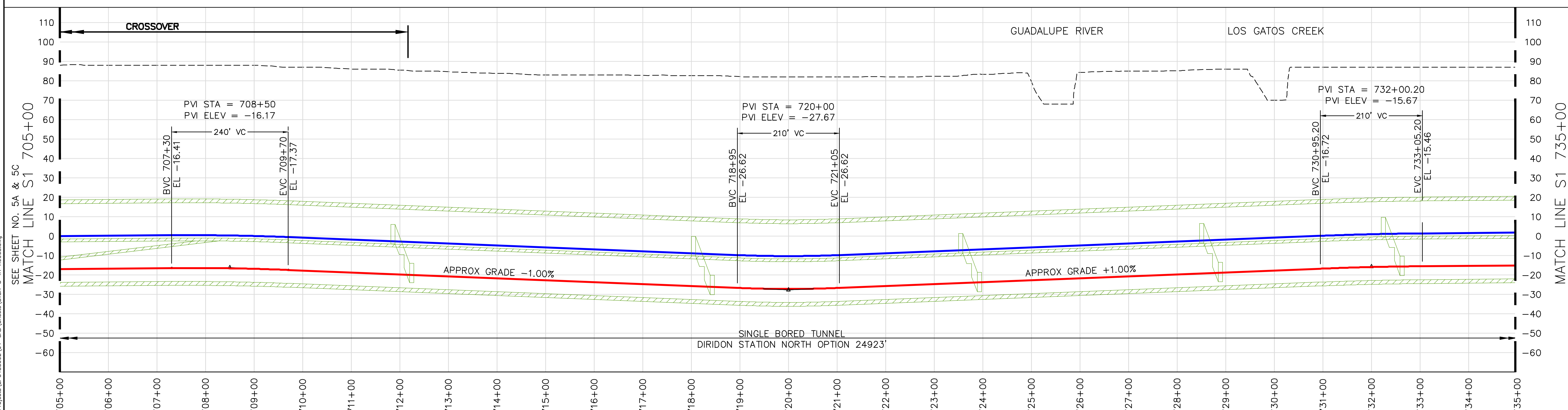

CONCEPTUAL PLANS

HORIZONTAL SCALE 100' 0' 100' 200'

VERTICAL SCALE 25' 0' 25' 50'

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION NORTH OPTION W/ DOWNTOWN SAN JOSE STATION EAST OPTION
PLAN & PROFILE
SHEET 6C

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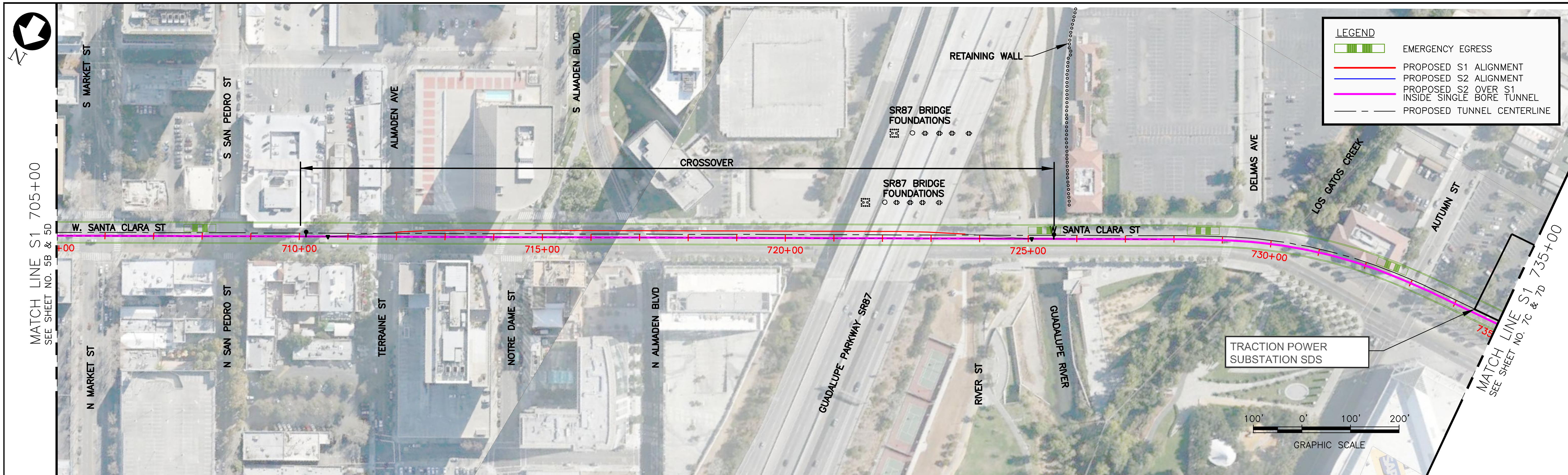

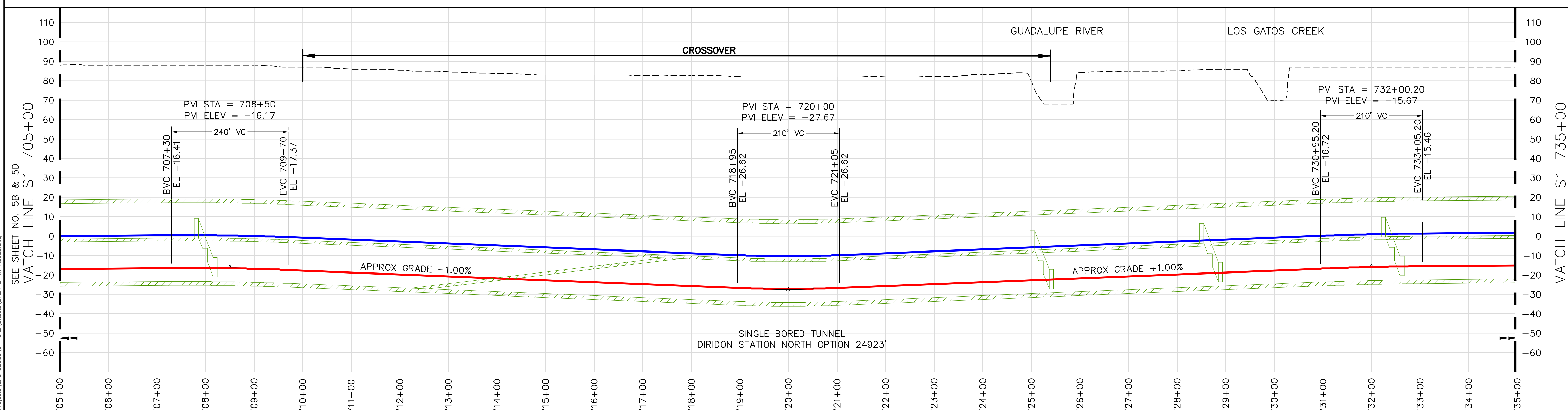

CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION NORTH OPTION W/ DOWNTOWN SAN JOSE STATION WEST OPTION
PLAN & PROFILE
SHEET 6D

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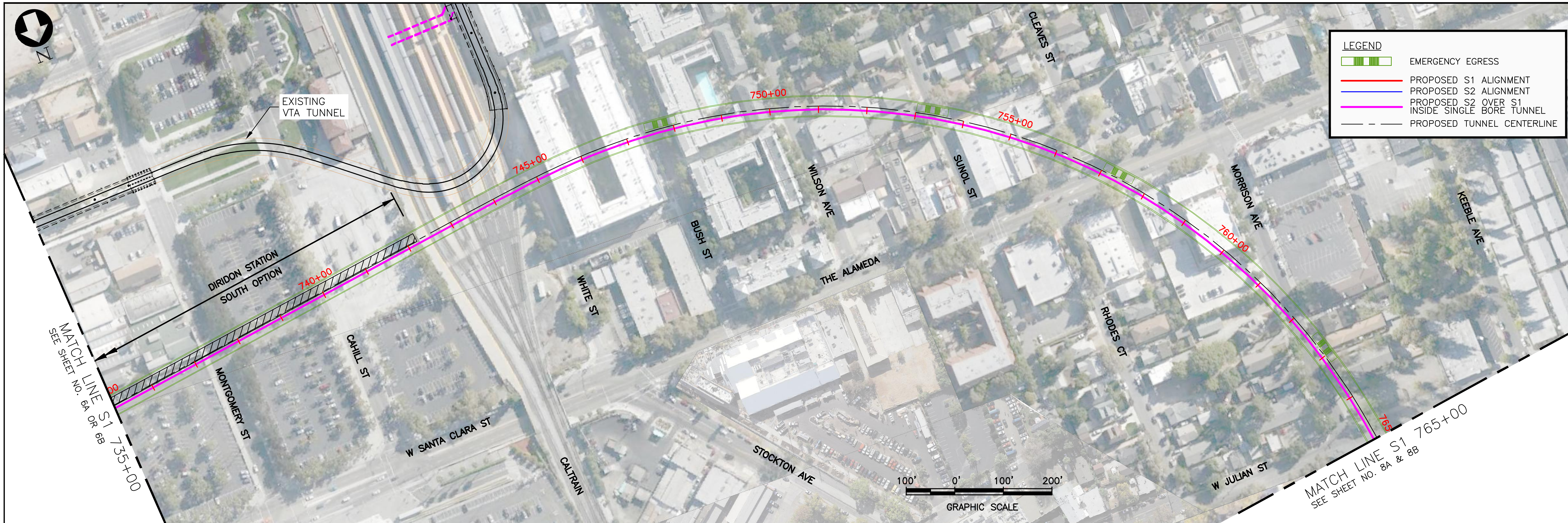

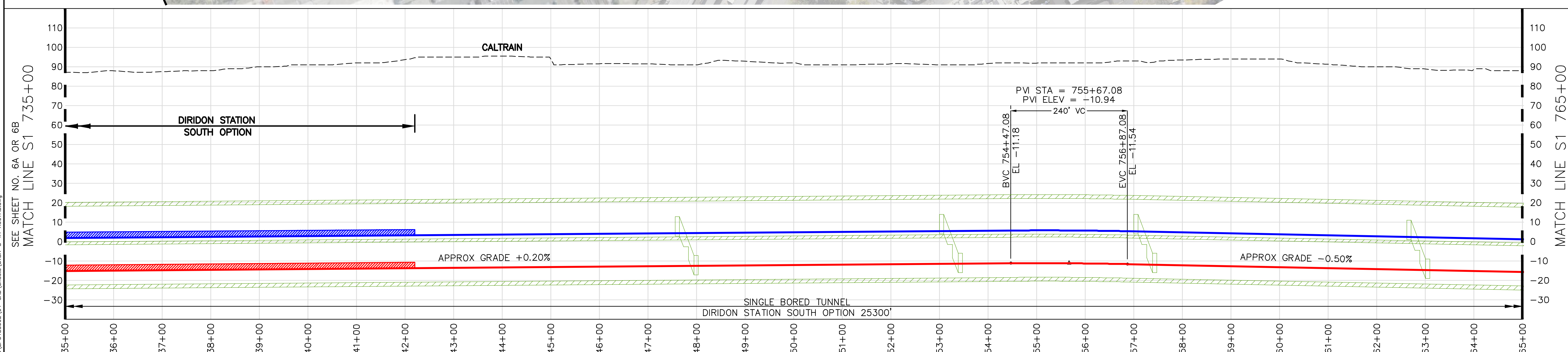

CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND

SINGLE BORE TUNNEL

S2 - UPPER TRACK

S1 - LOWER TRACK

EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR THE ALAMEDA
STATION: DIRIDON STATION SOUTH OPTION
PLAN & PROFILE
SHEET 7A & 7B

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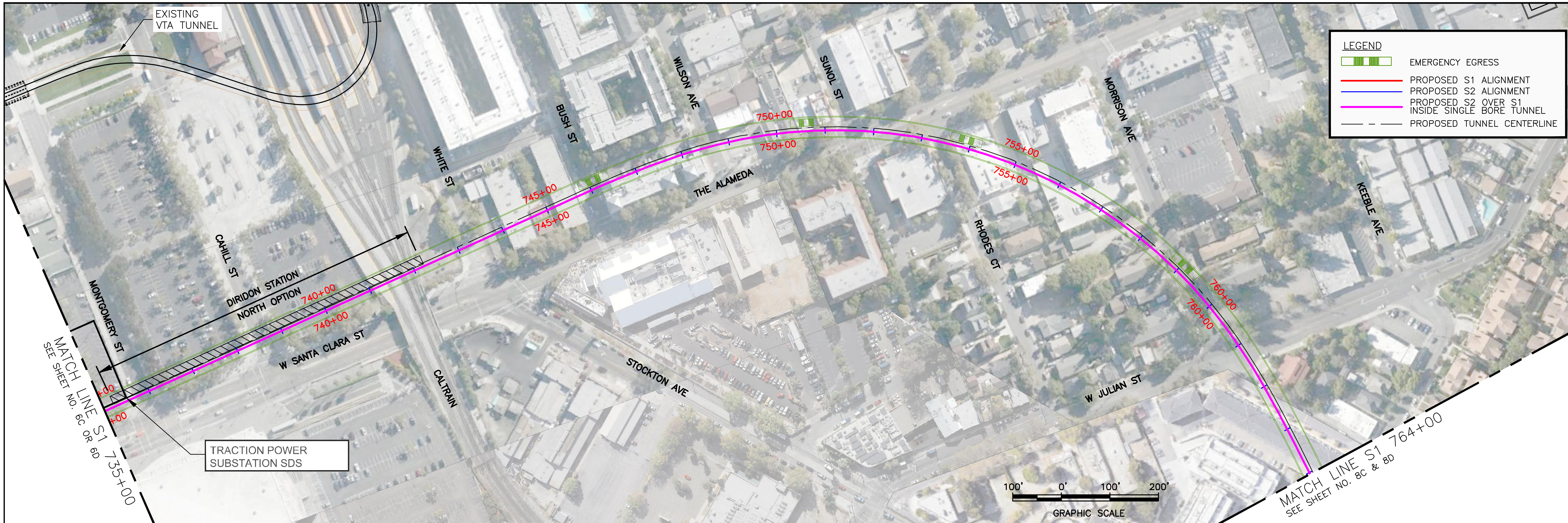
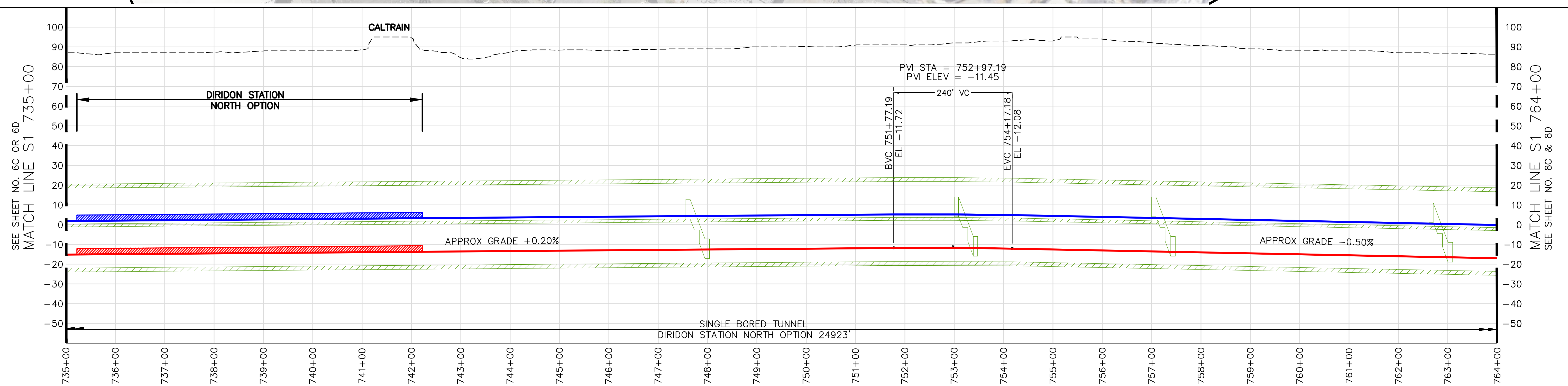




CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

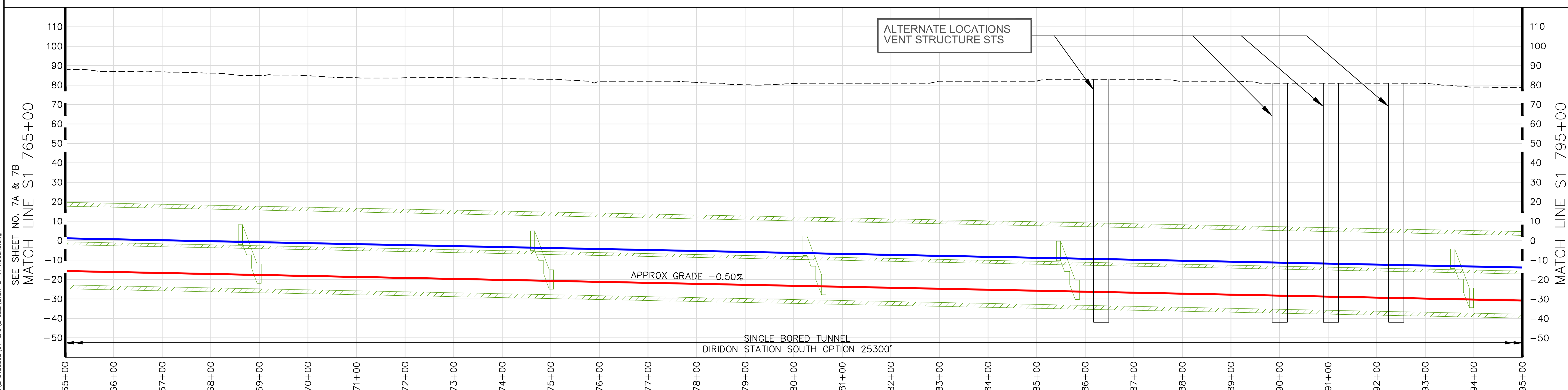
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR THE ALAMEDA
STATION: DIRIDON STATION NORTH OPTION
PLAN & PROFILE
SHEET 7C AND 7D



CONCEPTUAL PLANS

NOTE: THE ALIGNMENT FOR THE DIRIDON STATION NORTH AND DIRIDON STATION SOUTH OPTIONS CONVERGES AT THIS POINT AND OVERLAPS UNTIL THE PROJECT TERMINUS. HOWEVER, THE LENGTH OF THE ENTIRE PROJECT ALIGNMENT IS SLIGHTLY LONGER FOR THE DIRIDON STATION SOUTH OPTION COMPARED TO THE NORTH OPTION; THEREFORE, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS FOR THE REMAINING SHEETS.

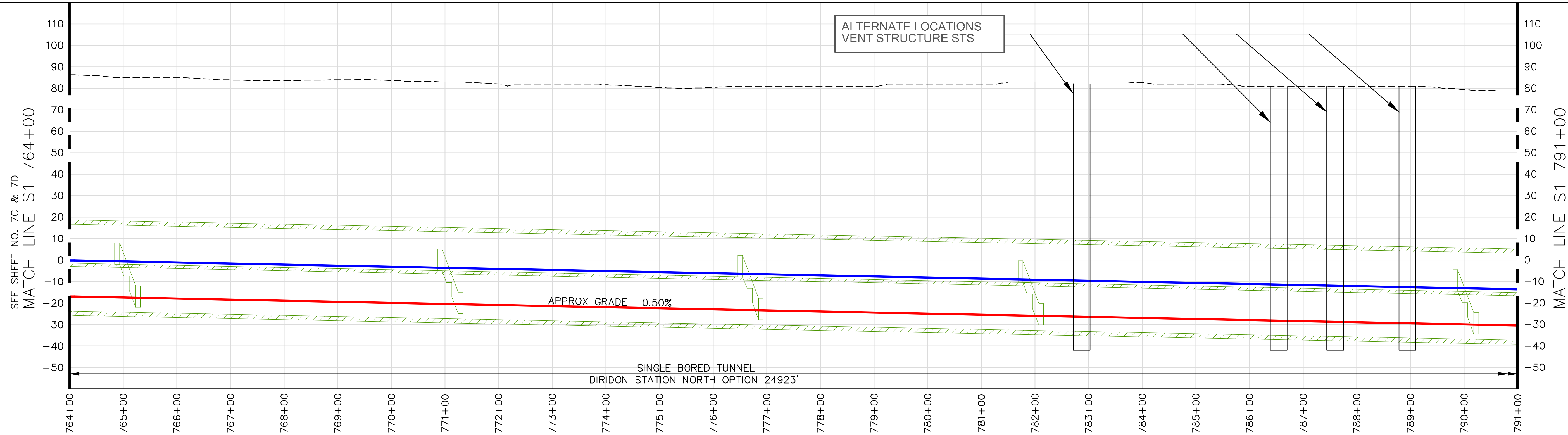
100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
SINGLE BORE TUNNEL
S2 - UPPER TRACK
S1 - LOWER TRACK
EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR STOCKTON AVENUE
STATION: DIRIDON STATION SOUTH OPTION
PLAN & PROFILE
SHEET 8A & 8B



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CONCEPTUAL PLANS

NOTE: THE ALIGNMENT FOR THE DIRIDON STATION NORTH AND DIRIDON STATION SOUTH OPTIONS CONVERGES AT THIS POINT AND OVERLAPS UNTIL THE PROJECT TERMINUS. HOWEVER, THE LENGTH OF THE ENTIRE PROJECT ALIGNMENT IS SLIGHTLY LONGER FOR THE DIRIDON STATION SOUTH OPTION COMPARED TO THE NORTH OPTION; THEREFORE, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS FOR THE REMAINING SHEETS.

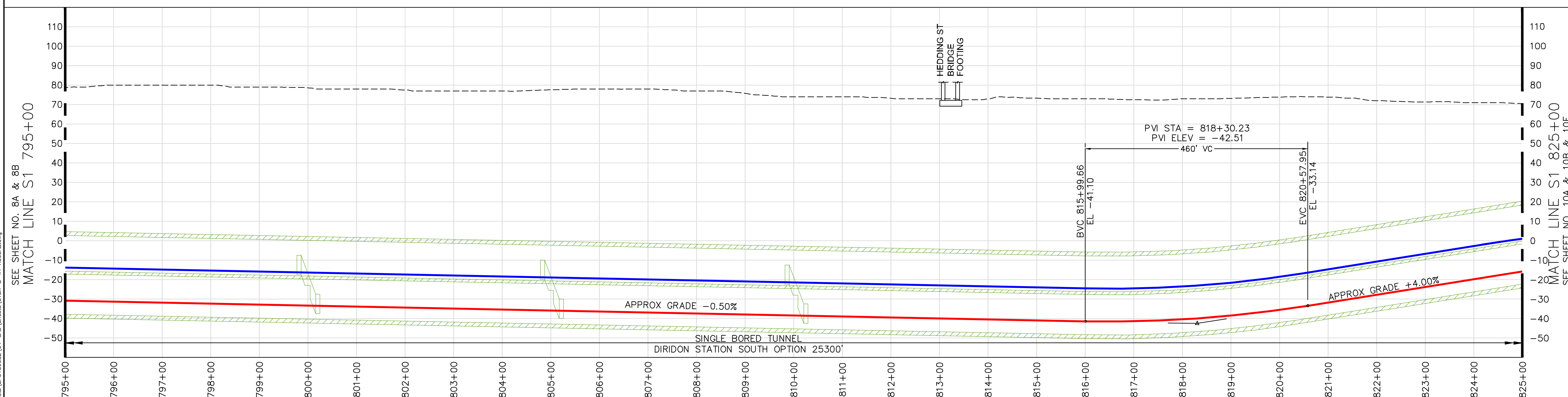
100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR STOCKTON AVENUE
STATION: DIRIDON STATION NORTH OPTION
PLAN & PROFILE
SHEET 8C & 8D



CONCEPTUAL PLANS

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

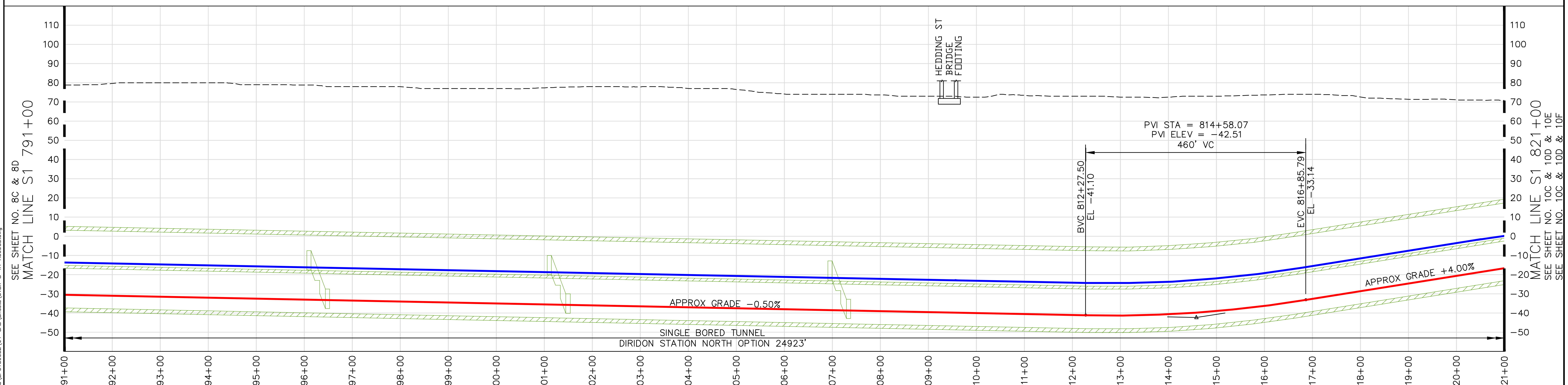
100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR HEDDING STREET
W/DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 9A & 9B



CONCEPTUAL PLANS

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

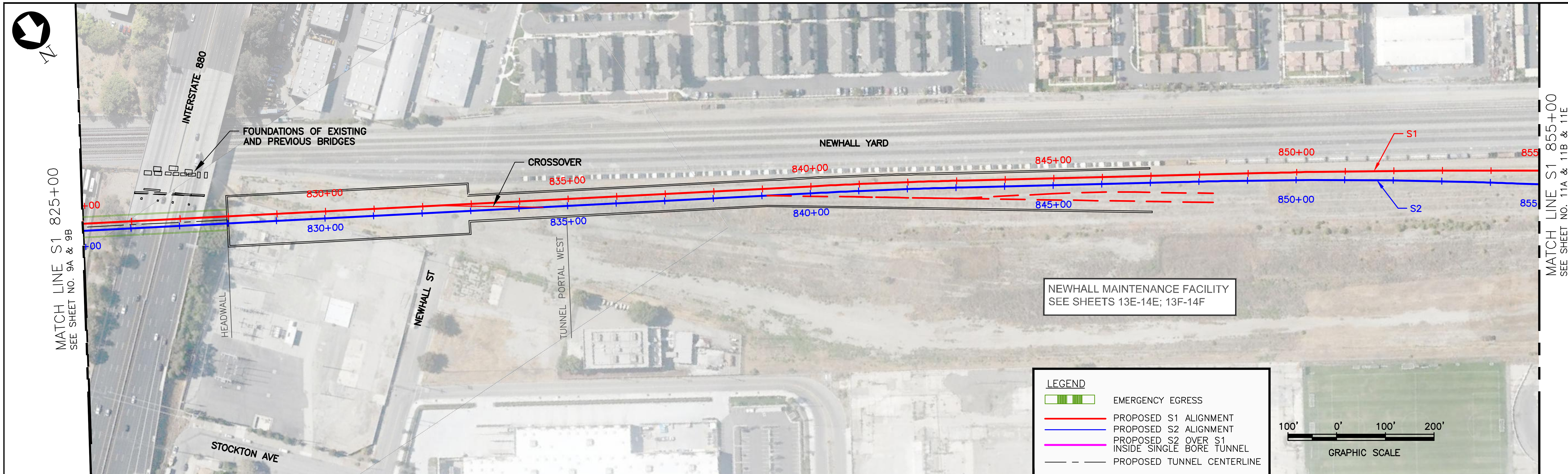
25' 0' 25' 50'
VERTICAL SCALE

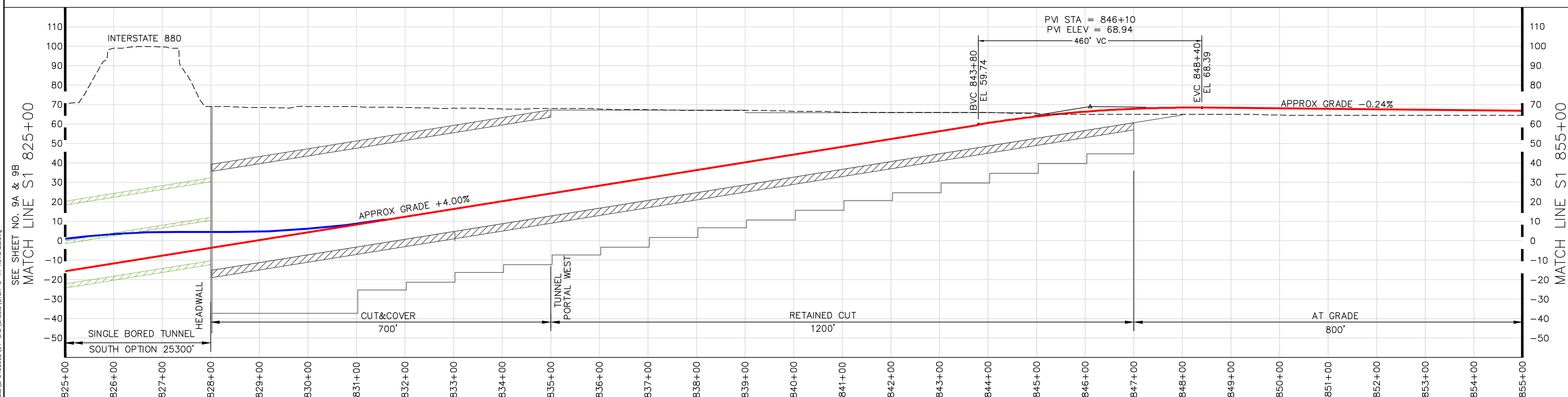
SINGLE BORE

LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR HEDDING STREET
W/DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 9C & 9D





CONCEPTUAL PLANS

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100' 0' 100' 200'
HORIZONTAL SCALE

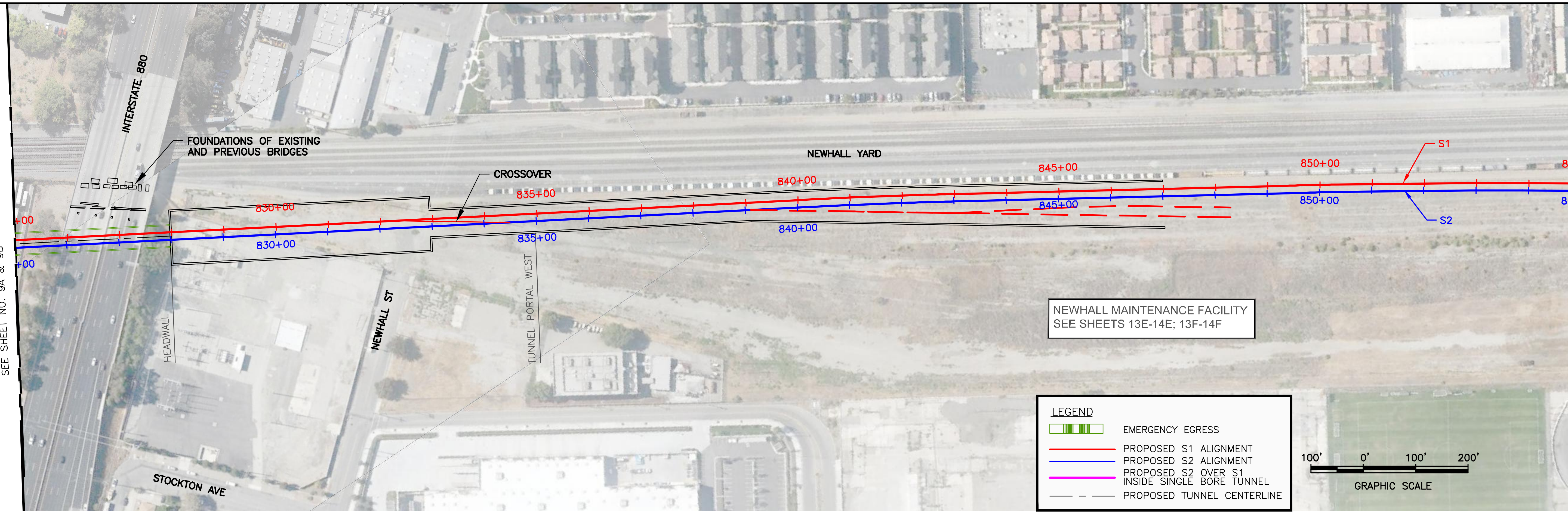
25' 0' 25' 50'
VERTICAL SCALE

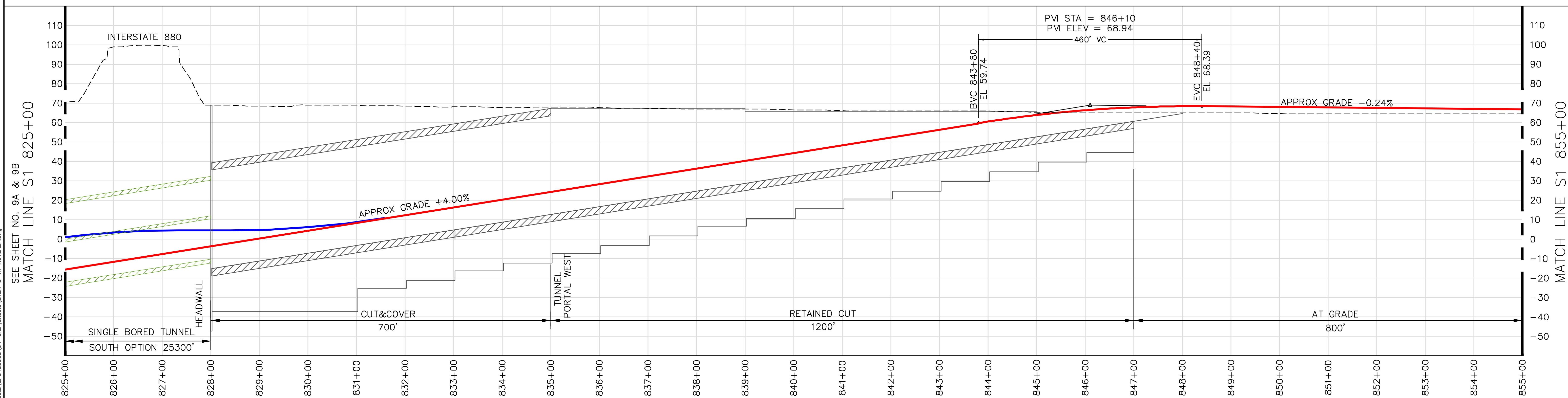
SINGLE BORE

LEGEND

- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I-880
W/SANTA CLARA STATION SOUTH OPTION ALIGNMENT&DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10A & 10B & 10E





CONCEPTUAL PLANS

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

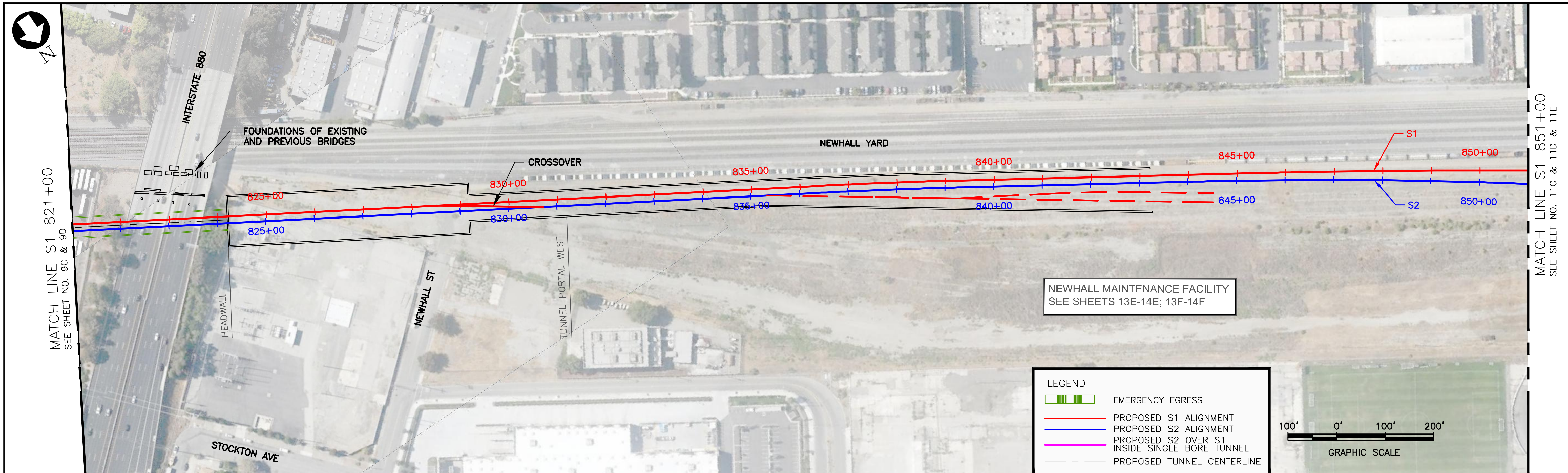
100' 0' 100' 200'
HORIZONTAL SCALE

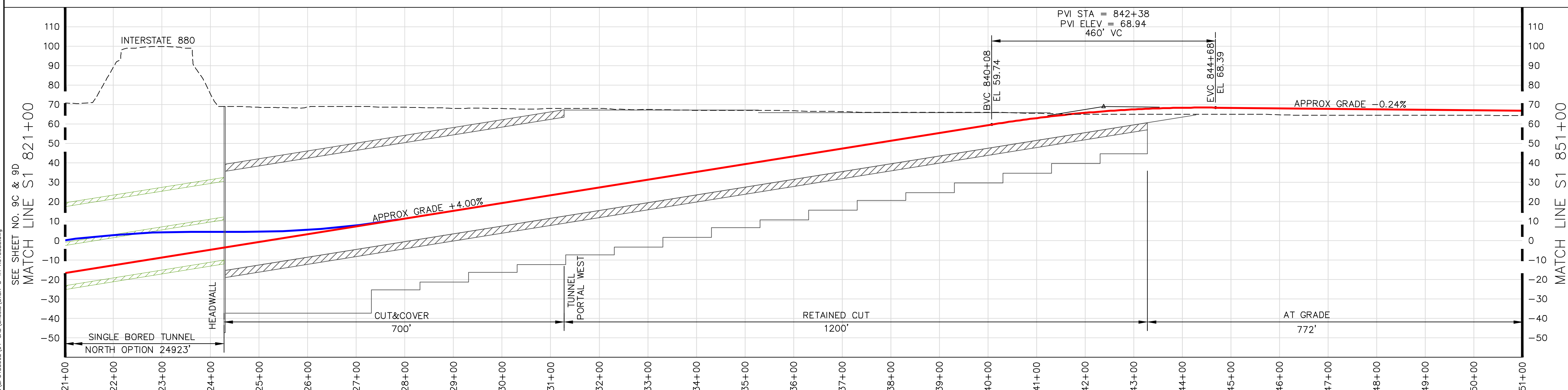
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I-880
W/SANTA CLARA STATION NORTH OPTION ALIGNMENT&DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10A & 10B & 10F





CONCEPTUAL PLANS

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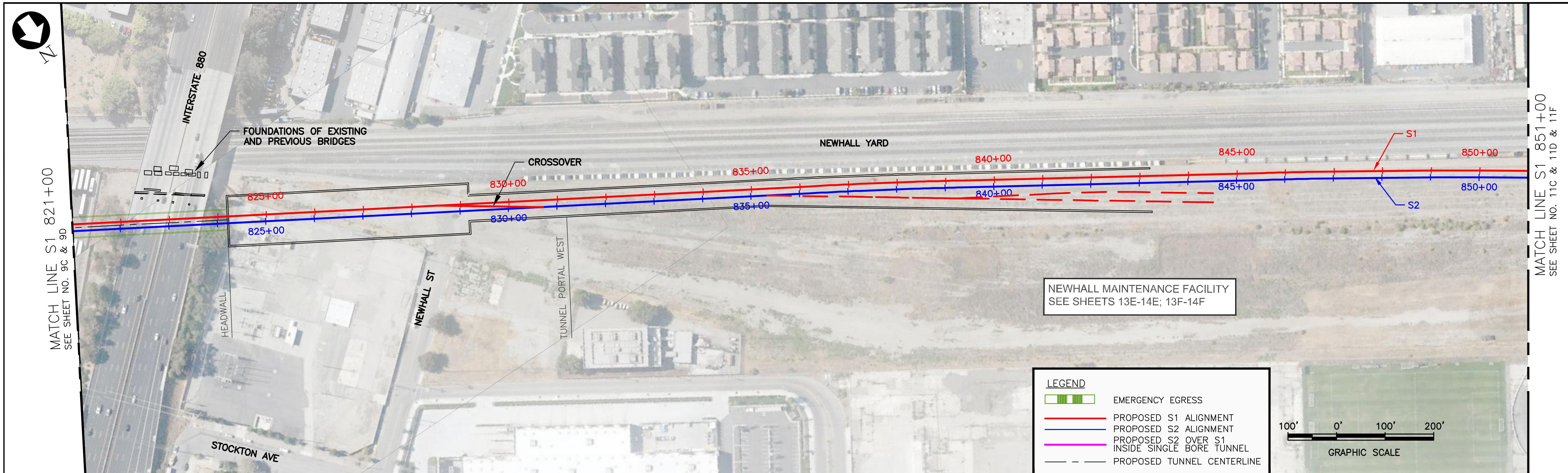
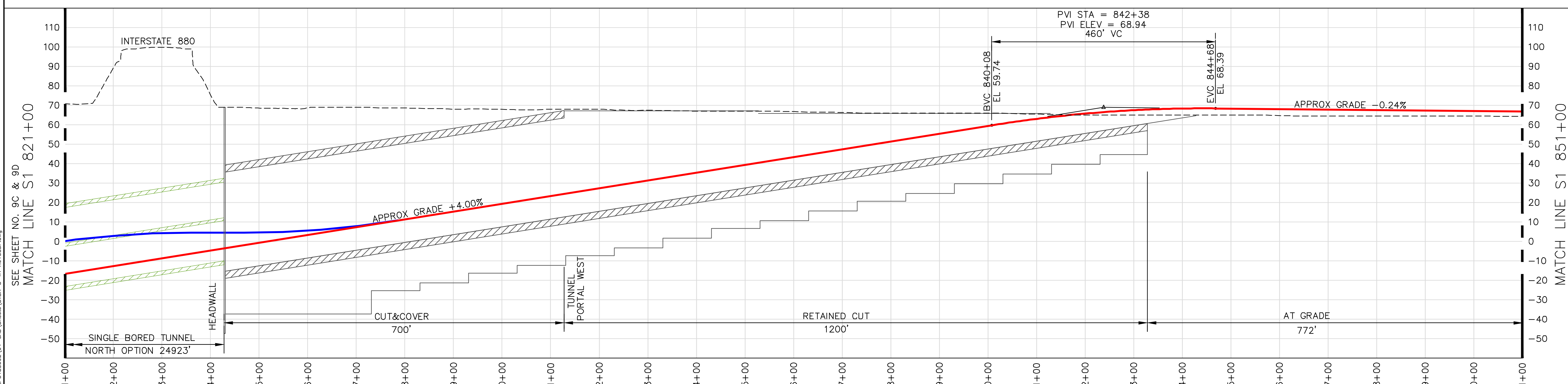
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I-880
W/SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10C & 10D & 10E





CONCEPTUAL PLANS

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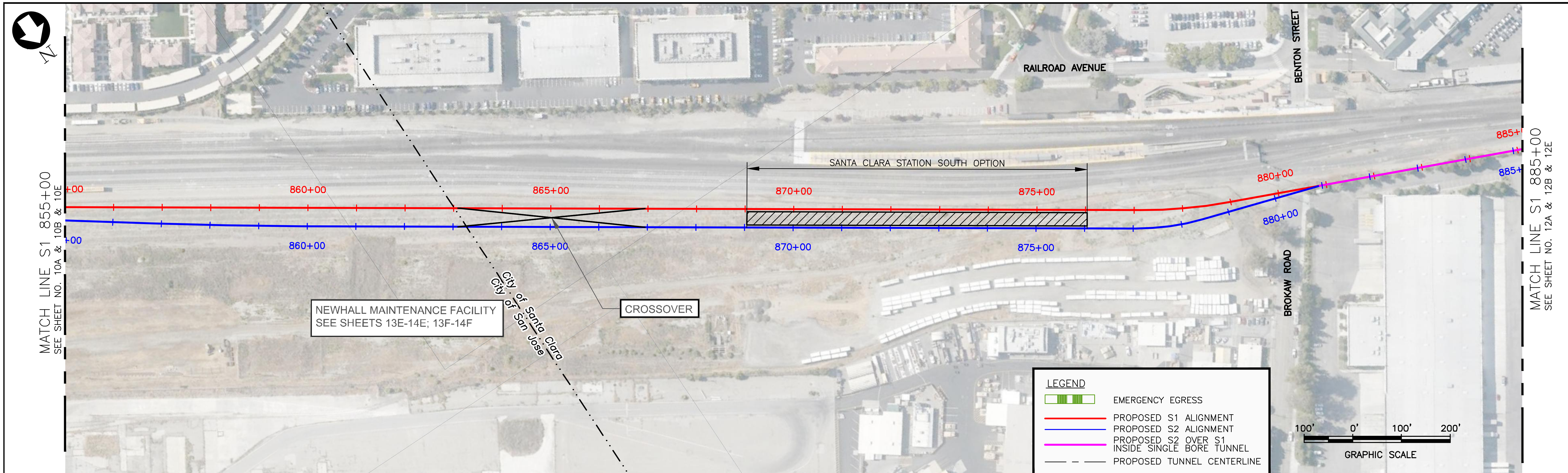
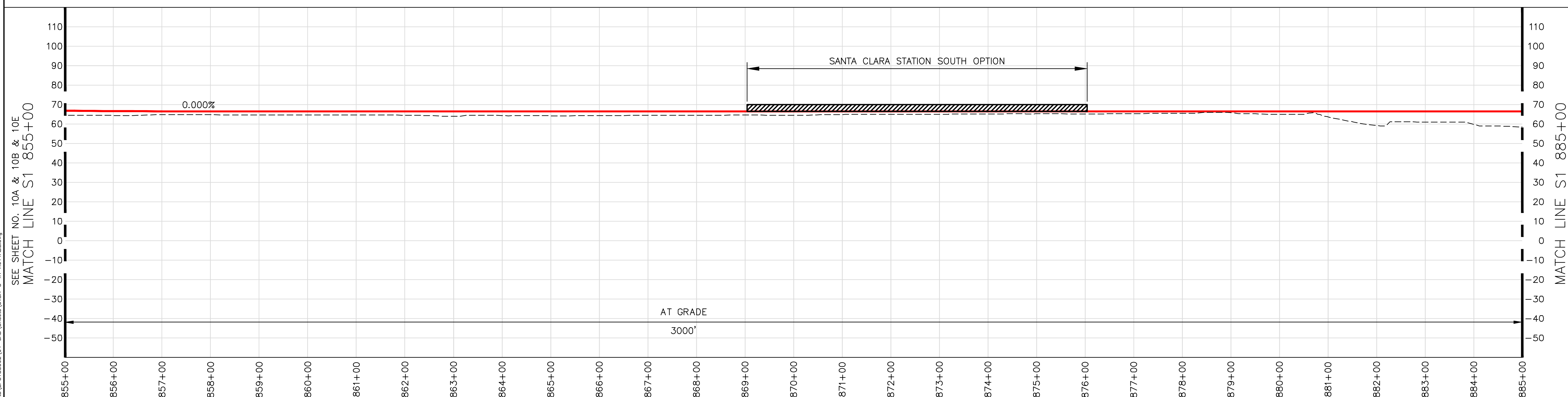
SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I-880
W/SANTA CLARA STATION NORTH OPTION ALIGNMENT W/DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10C & 10D & 10F





CONCEPTUAL PLANS

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HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION SOUTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11A & 11B &11E

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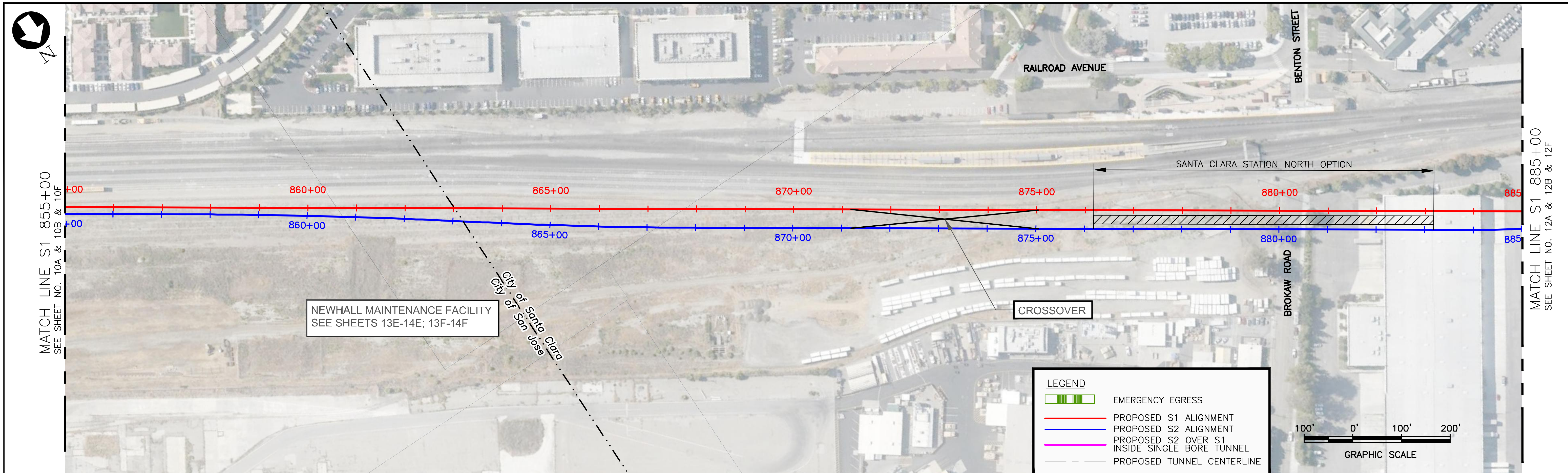

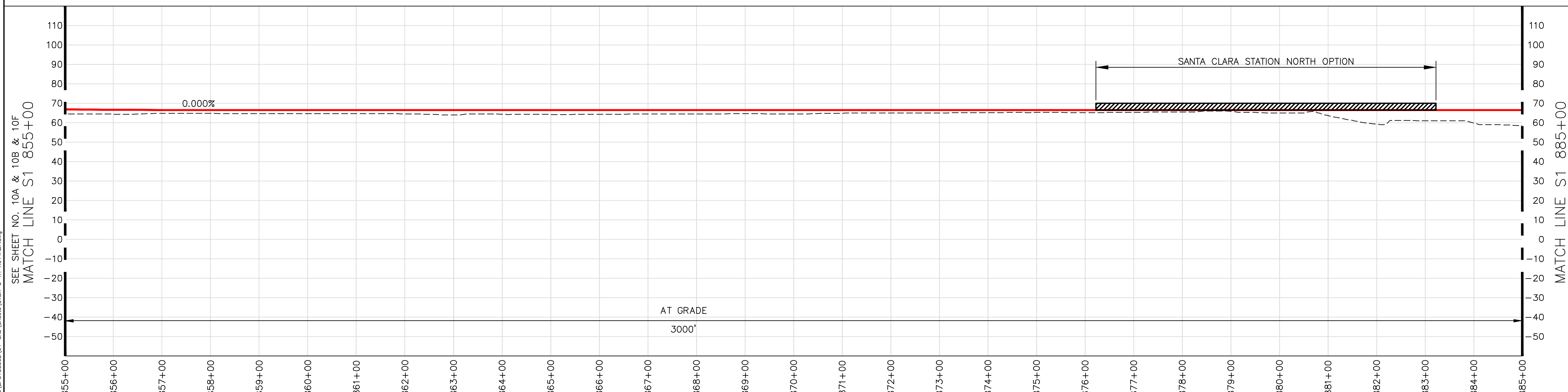

CONCEPTUAL PLANS

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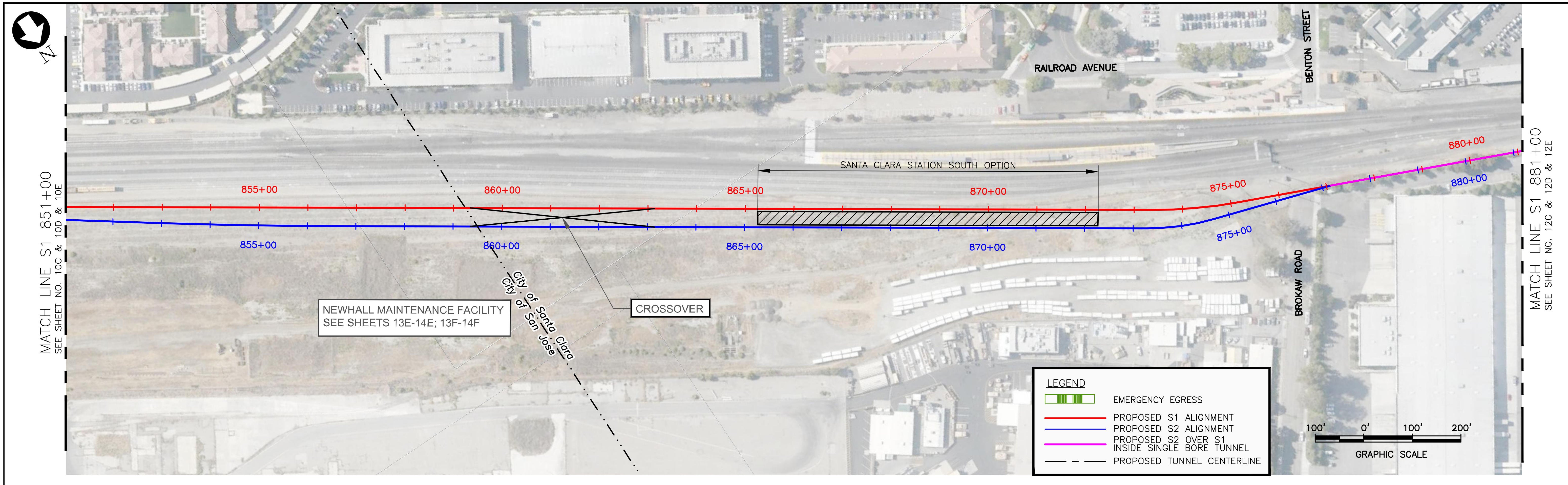
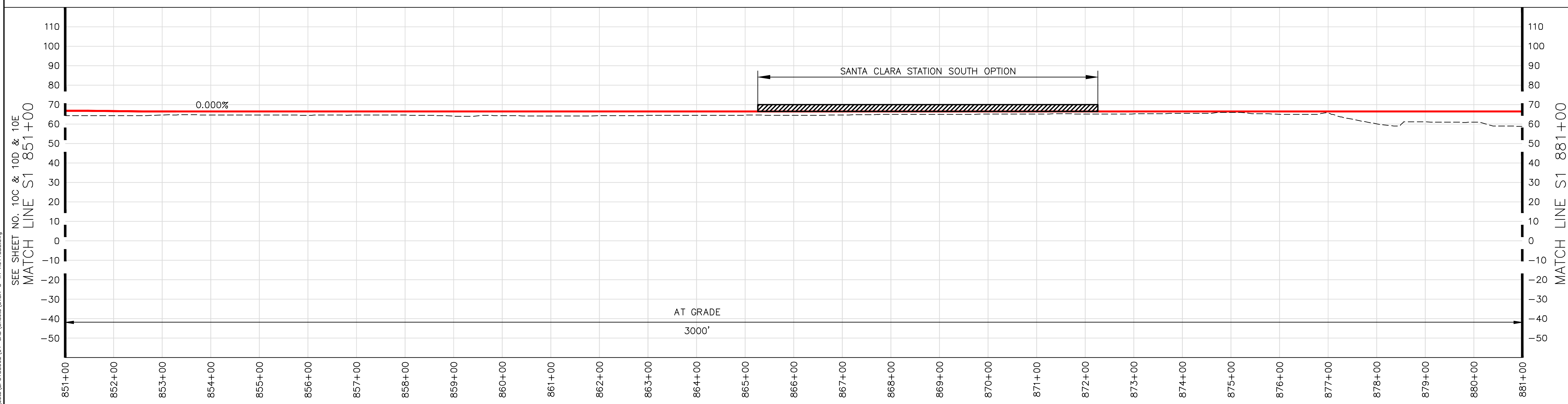
25' 0' 25' 50'
VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11A & 11B &11F





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SINGLE BORE

LEGEND

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- S2 - UPPER TRACK
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- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION SOUTH OPTION W/ DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11C & 11D & 11E

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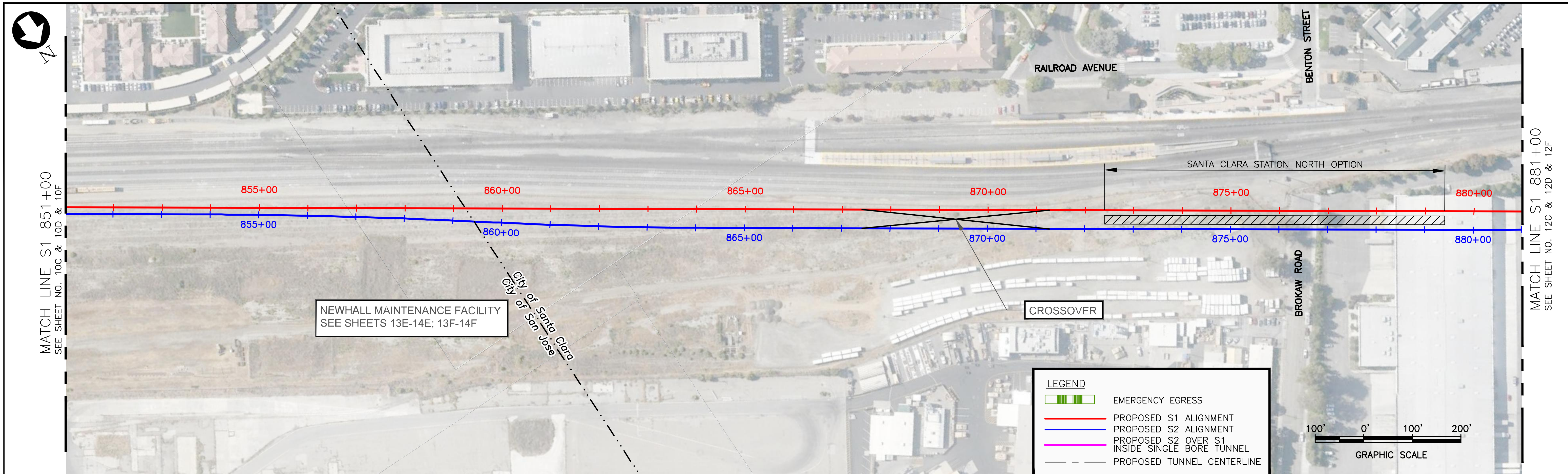

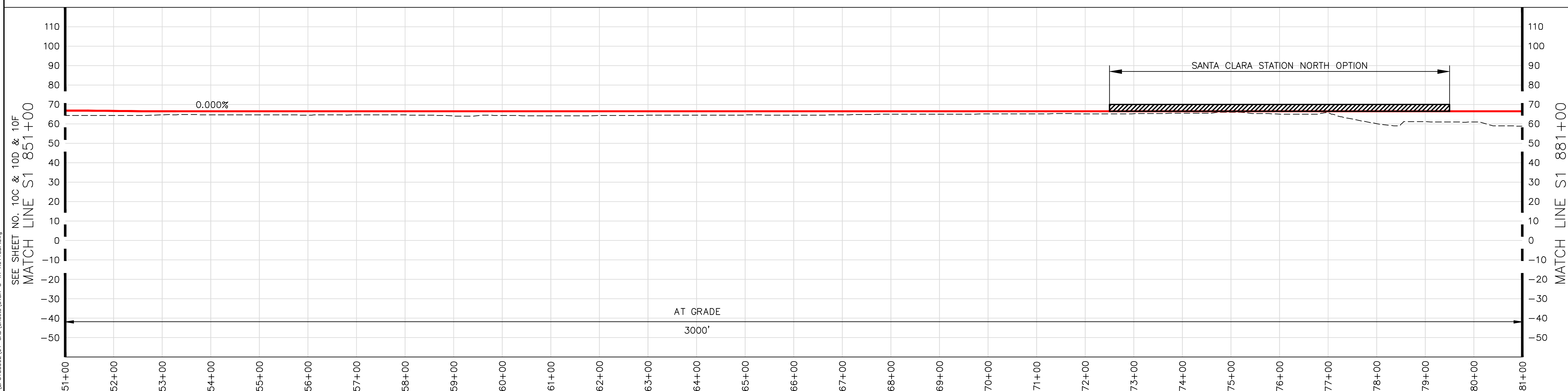

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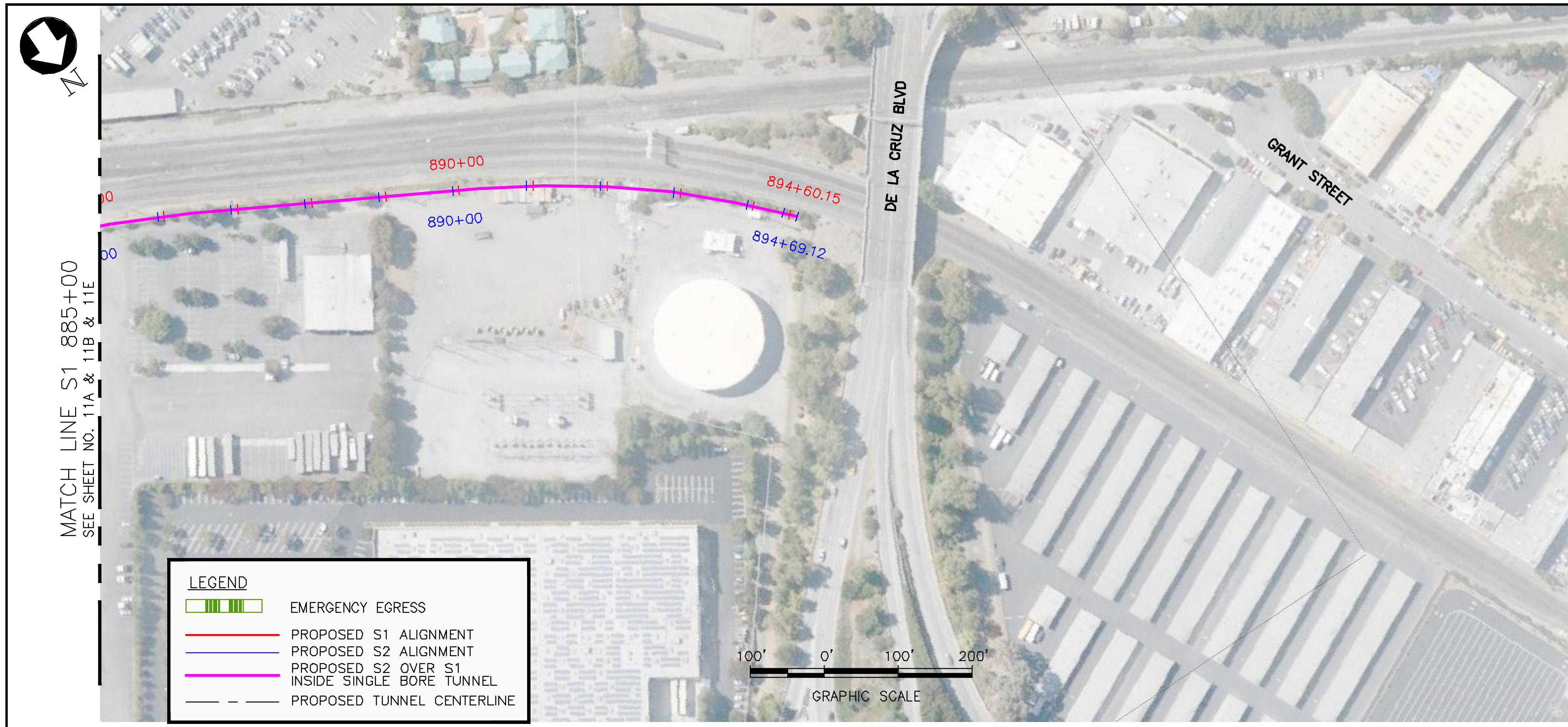
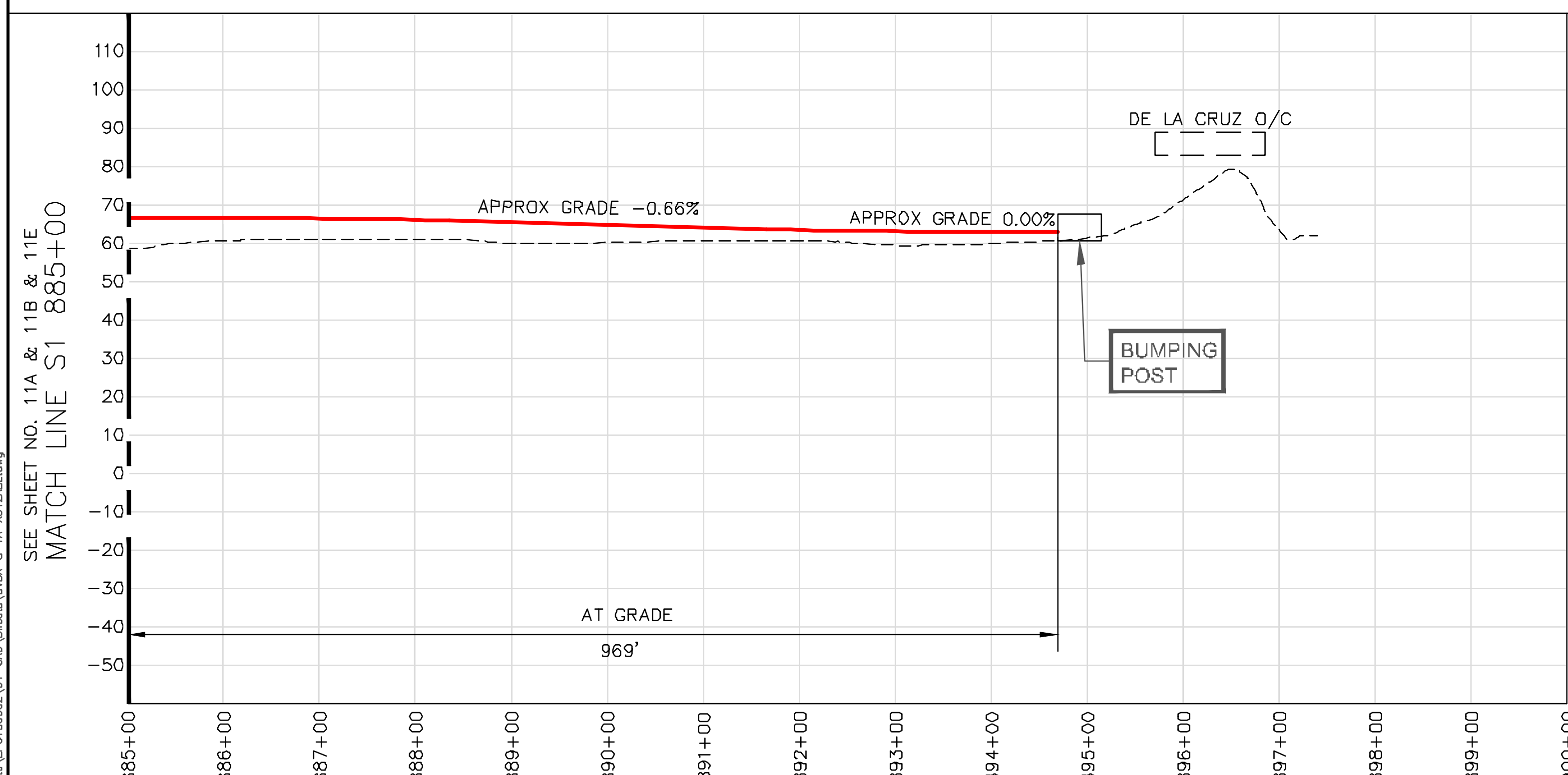
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11C & 11D &11F





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VERTICAL SCALE

SINGLE BORE

LEGEND
- SINGLE BORE TUNNEL
- S2 - UPPER TRACK
- S1 - LOWER TRACK
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNEMENT
PLAN & PROFILE
SHEET 12A & 12B &12E

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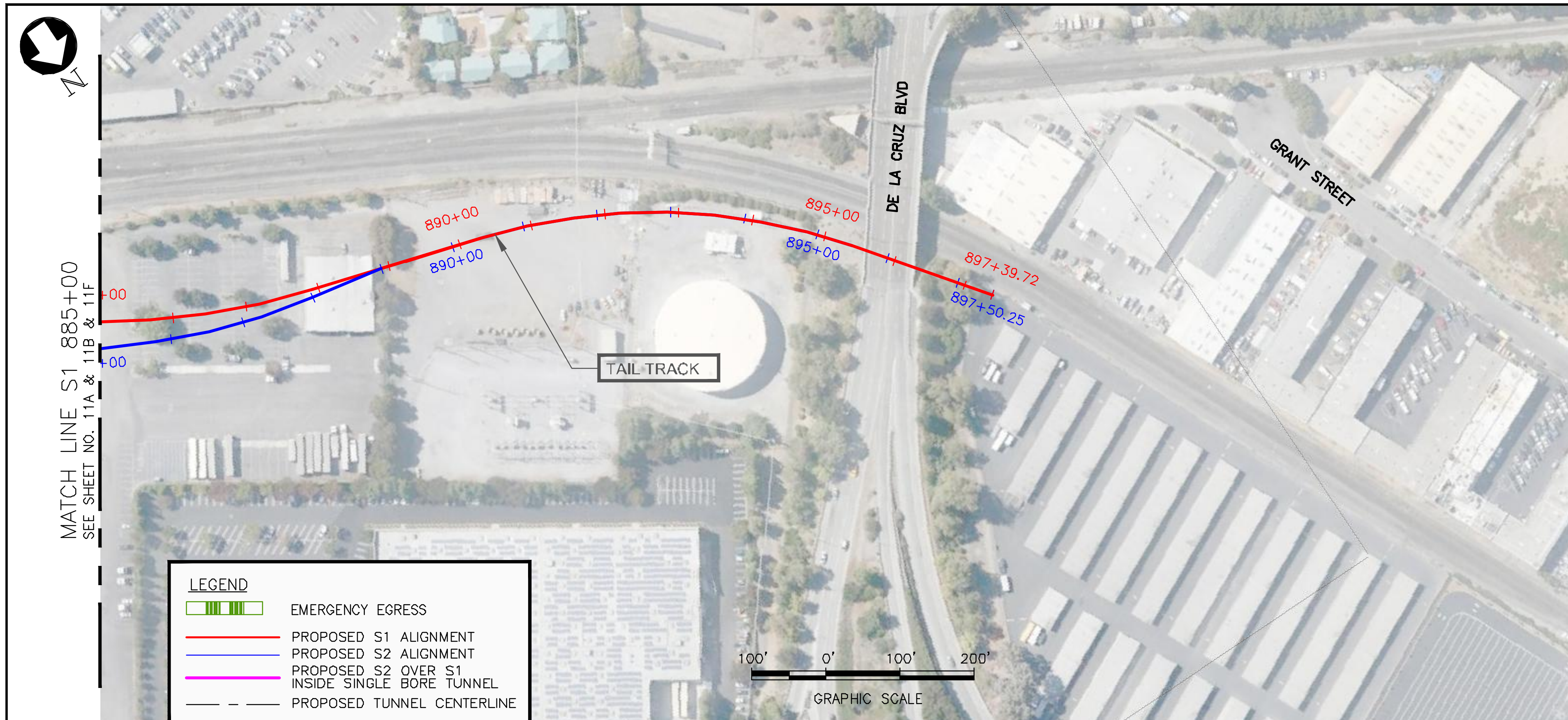

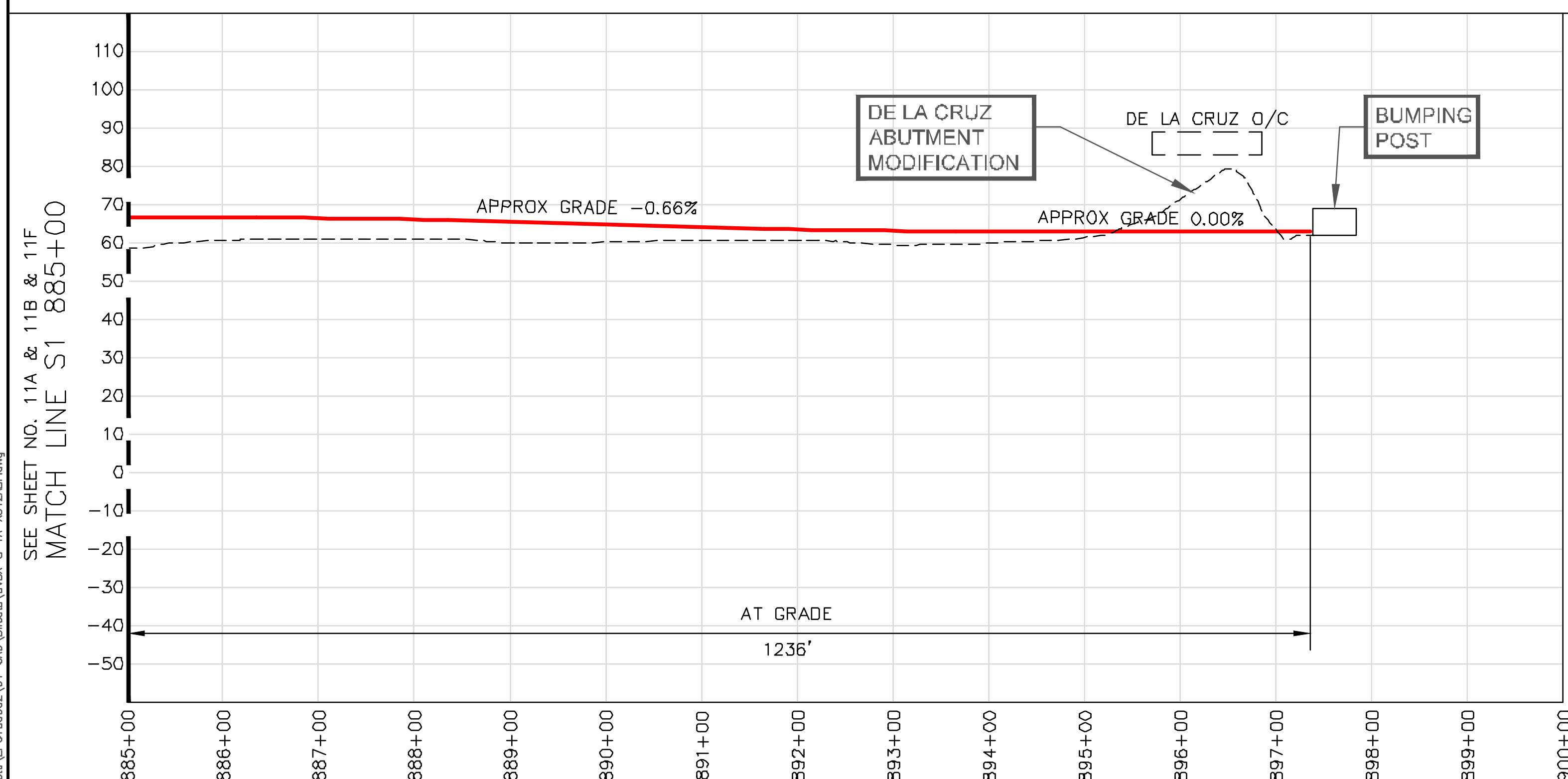

CONCEPTUAL PLANS

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25' 0' 25' 50'
VERTICAL SCALE

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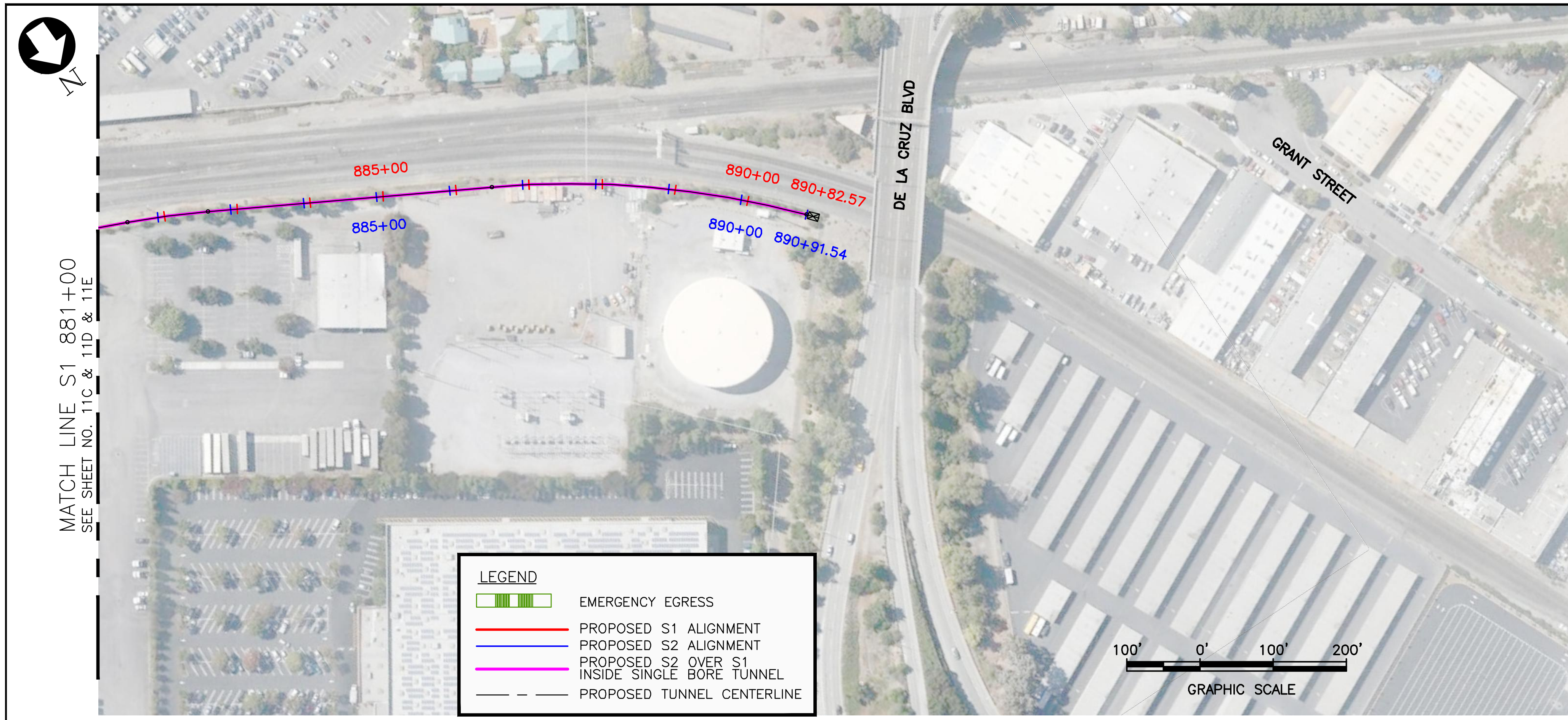
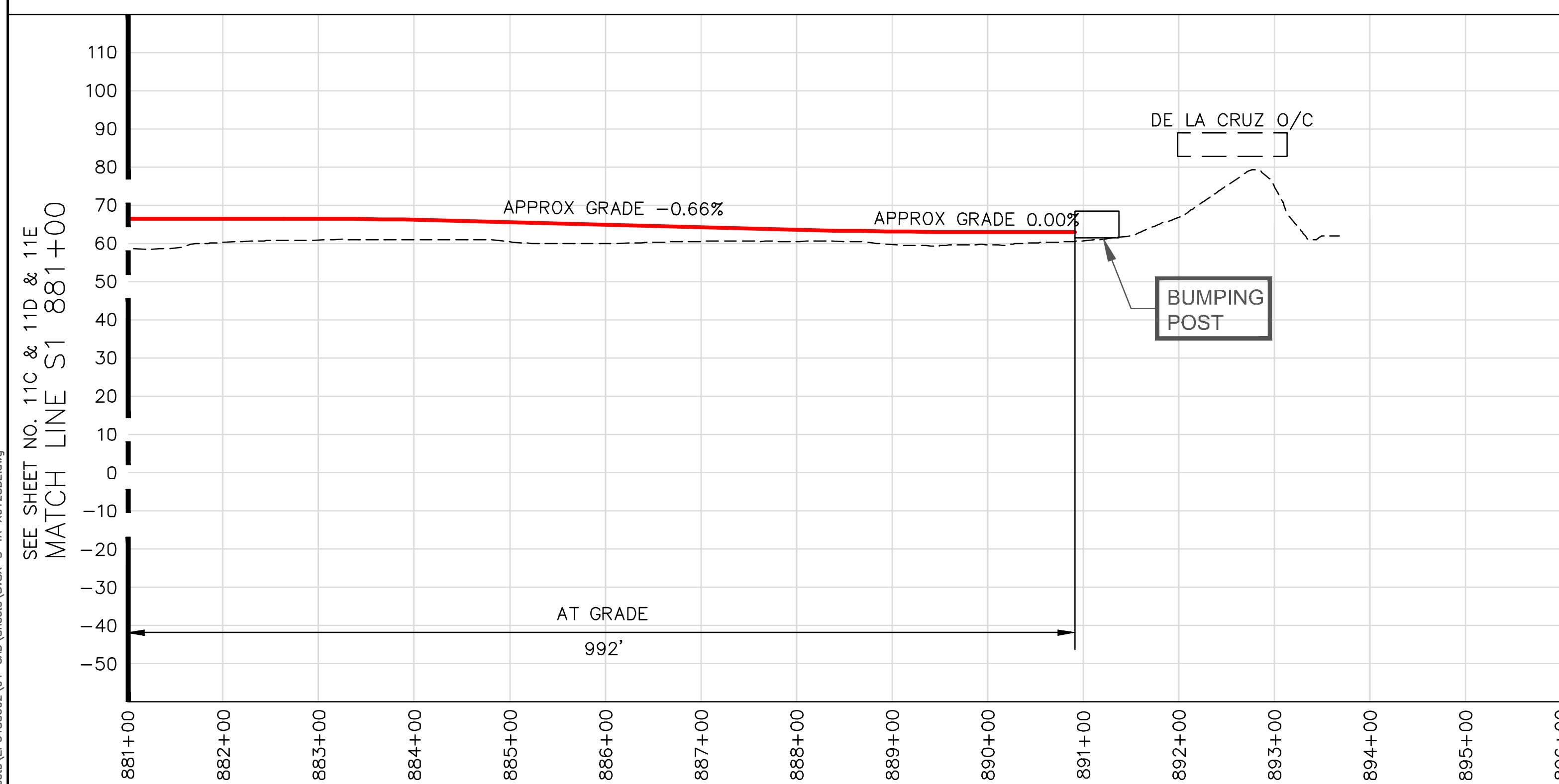
LEGEND
SINGLE BORE TUNNEL
S2 - UPPER TRACK
S1 - LOWER TRACK
EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNEMENT
PLAN & PROFILE
SHEET 12A & 12B & 12F





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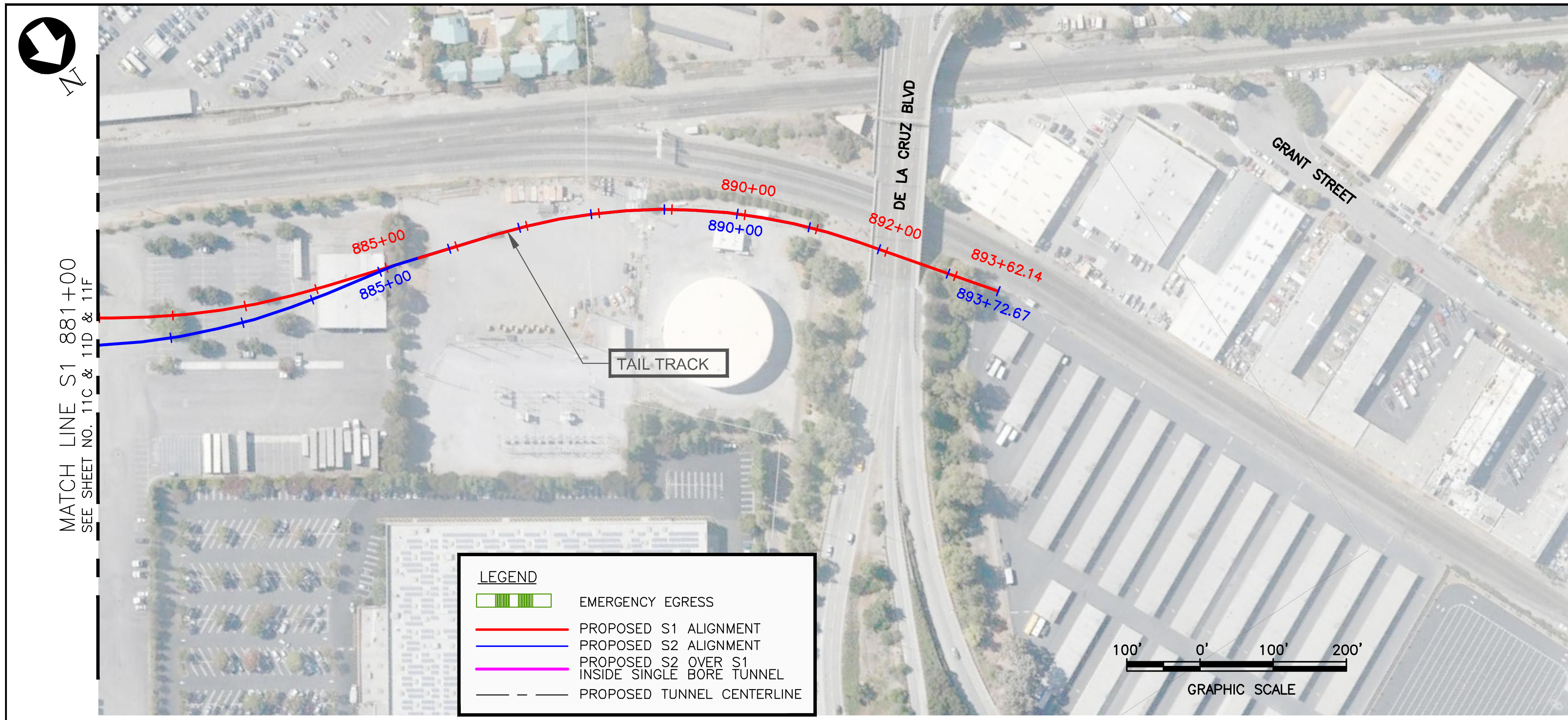
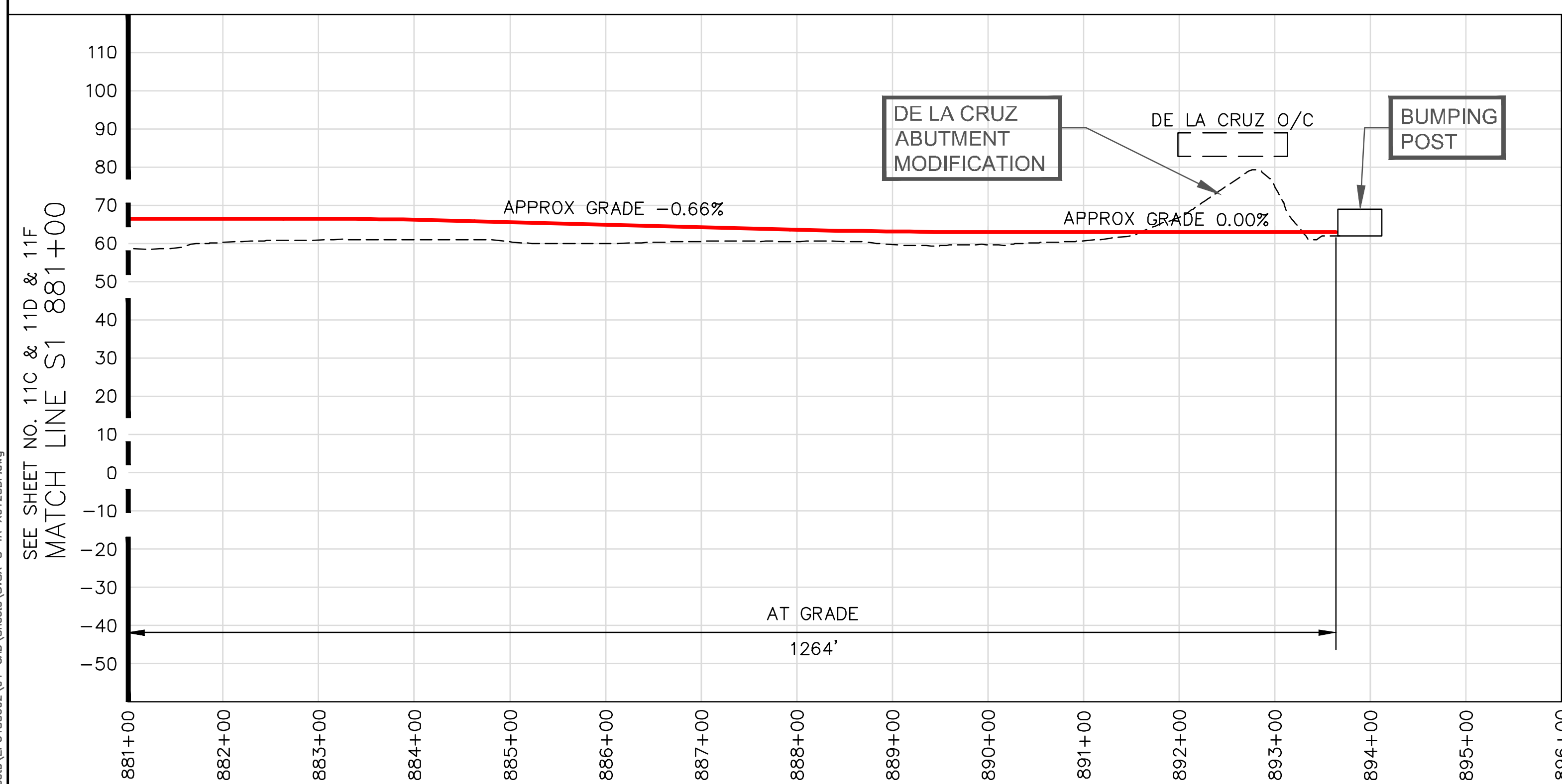
- EMERGENCY EGRESS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNEMENT
PLAN & PROFILE
SHEET 12C & 12D & 12E





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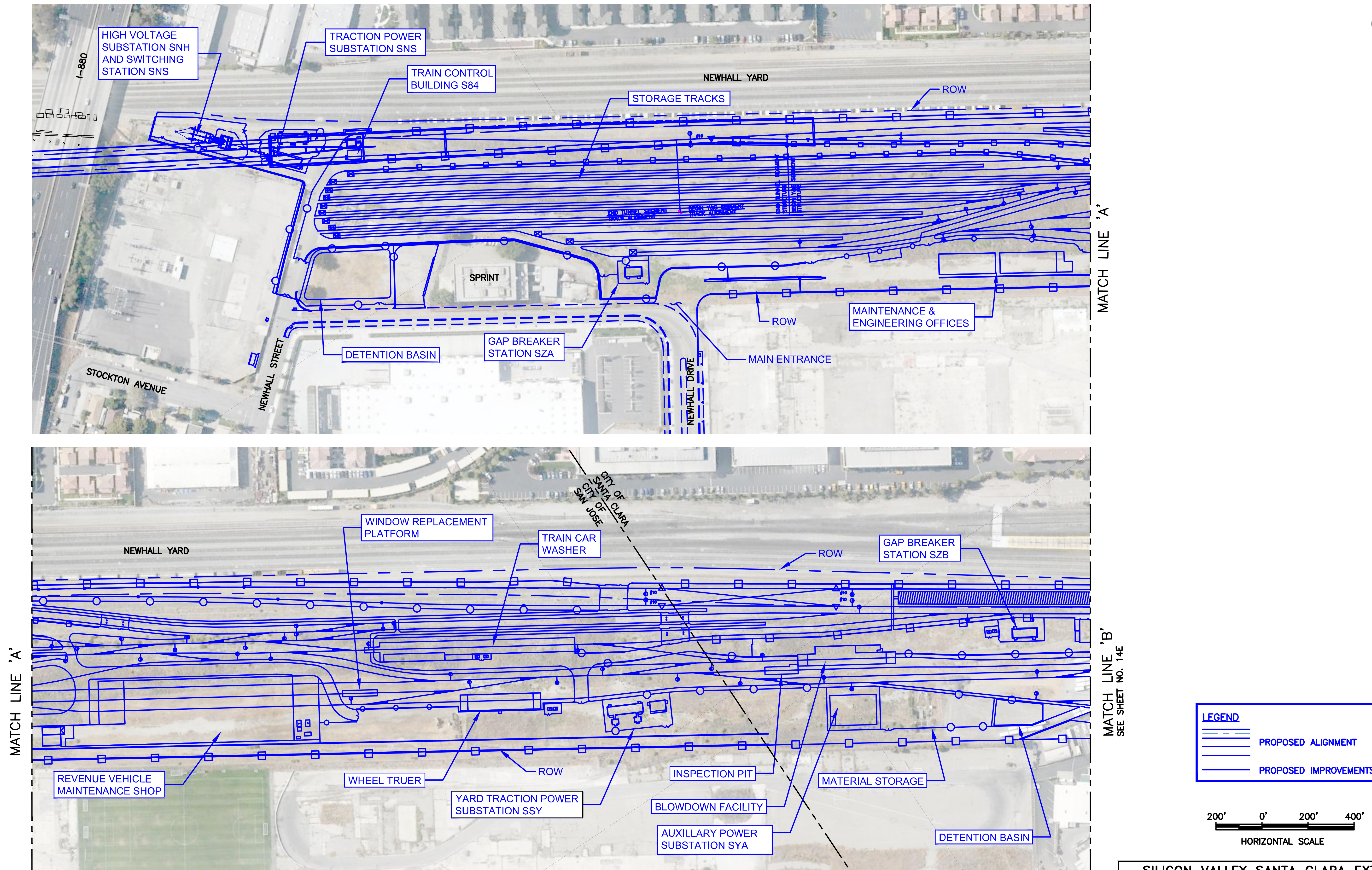
SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNEMENT
PLAN & PROFILE
SHEET 12C & 12D & 12F



CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT

PLAN
SHEET 13E

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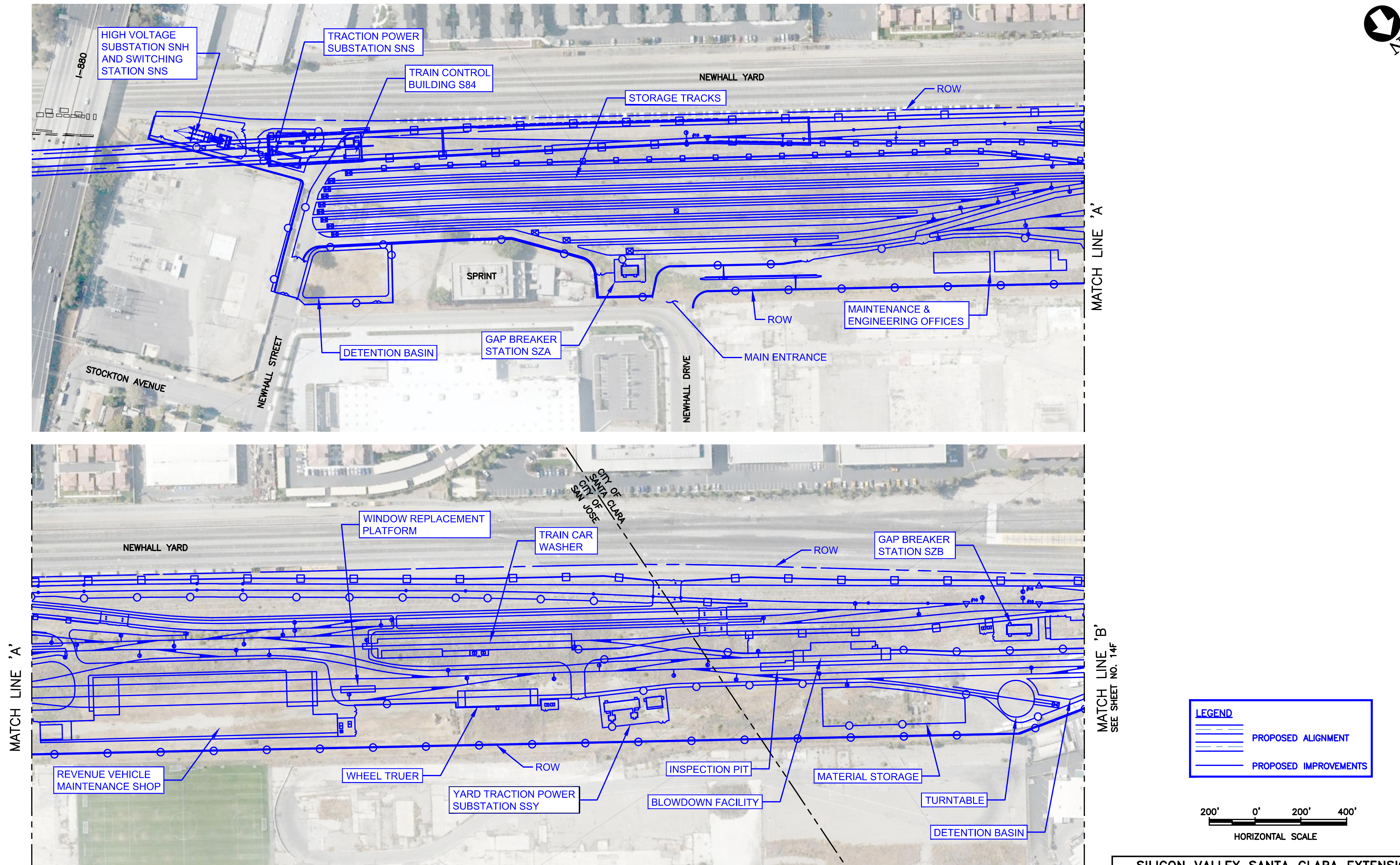

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT

PLAN
SHEET 13F

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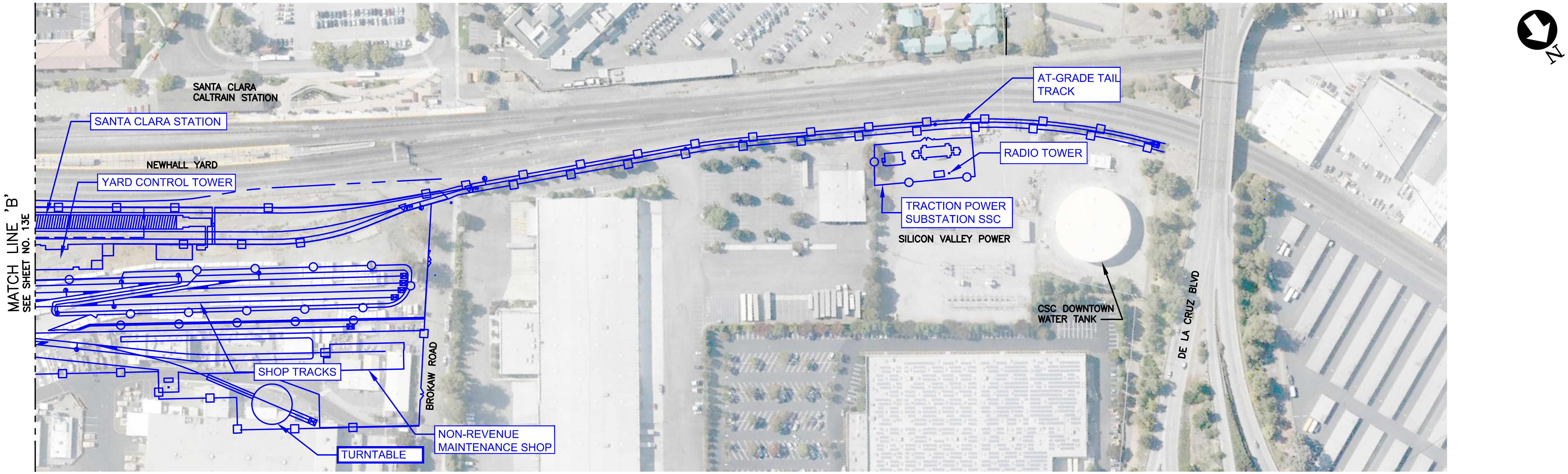

LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

200' 0' 200' 400'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY & TAIL TRACK
W/ SANTA CLARA STATION SOUTH OPTION

PLAN
SHEET 14E

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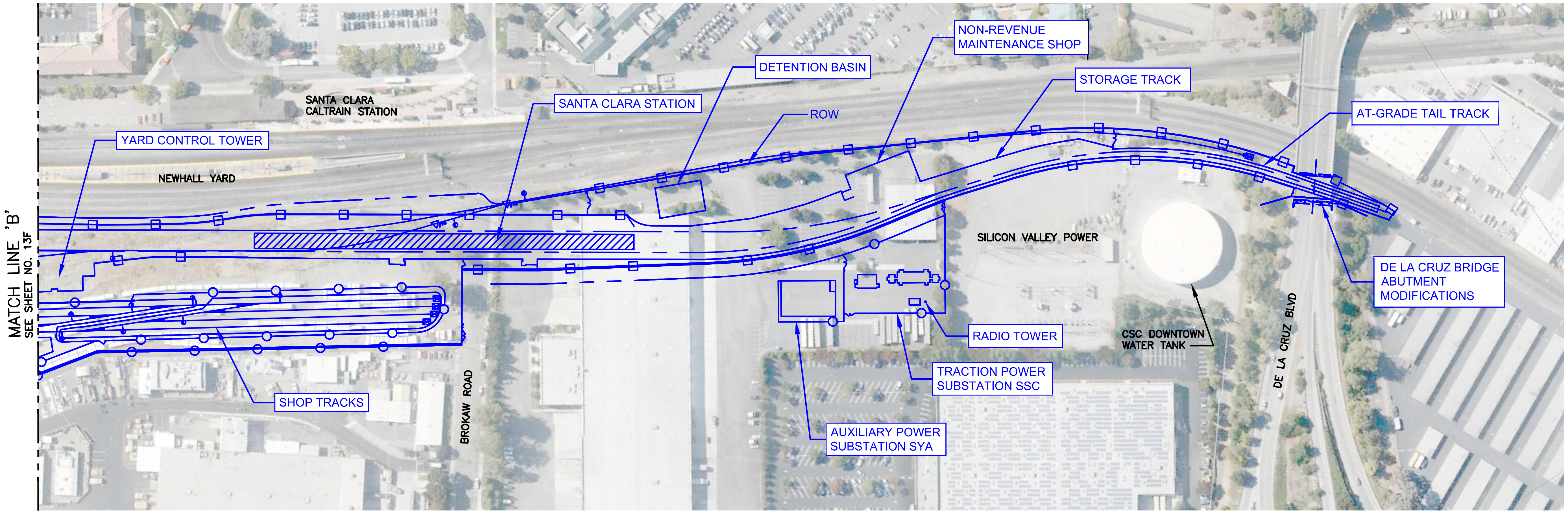

LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

200' 0' 200' 400'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY & TAIL TRACK
W/ SANTA CLARA STATION NORTH OPTION

PLAN
SHEET 14F

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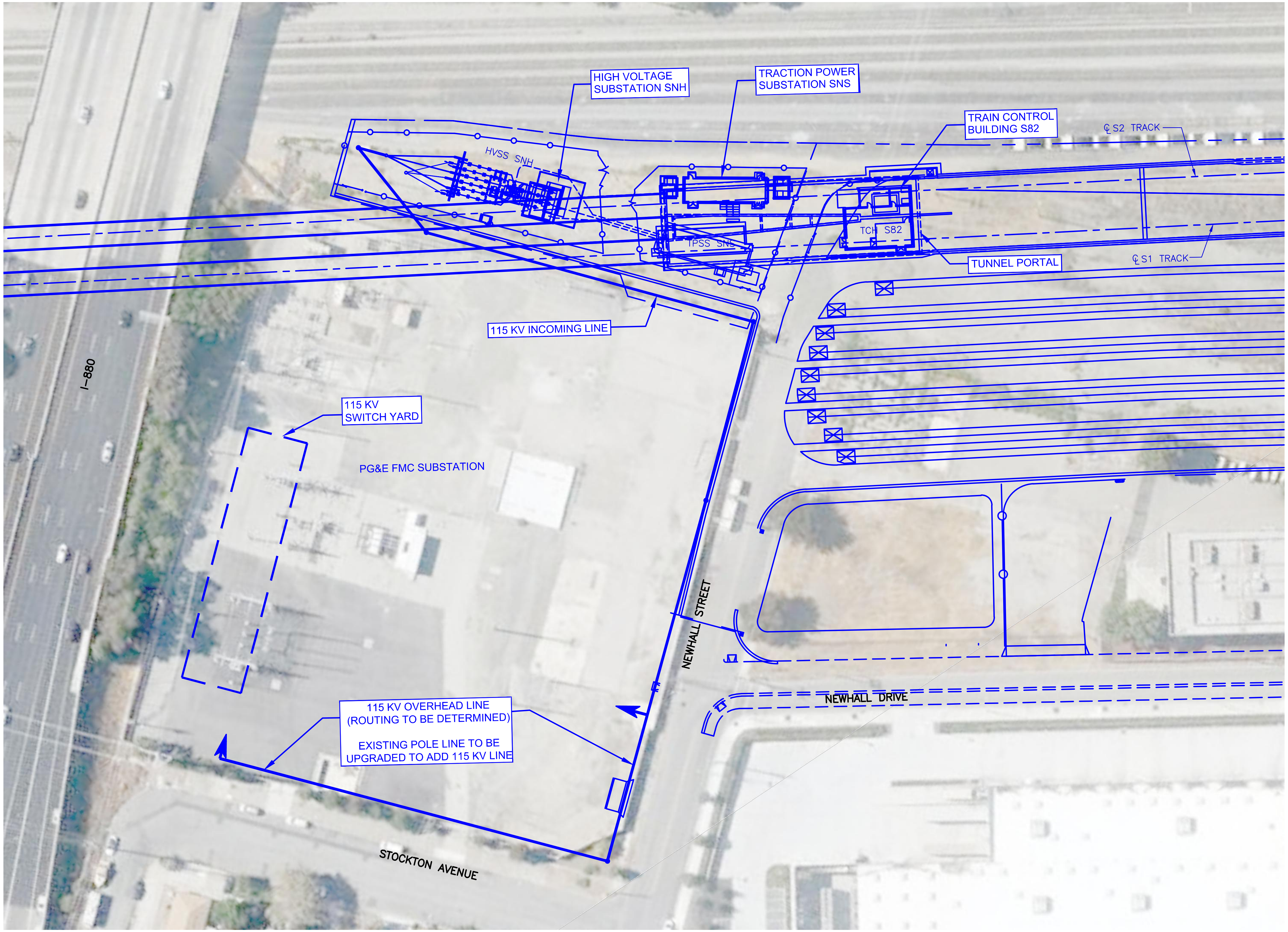

LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

40' 0' 40' 80'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION

LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT

SITE PLAN
SHEET 15E

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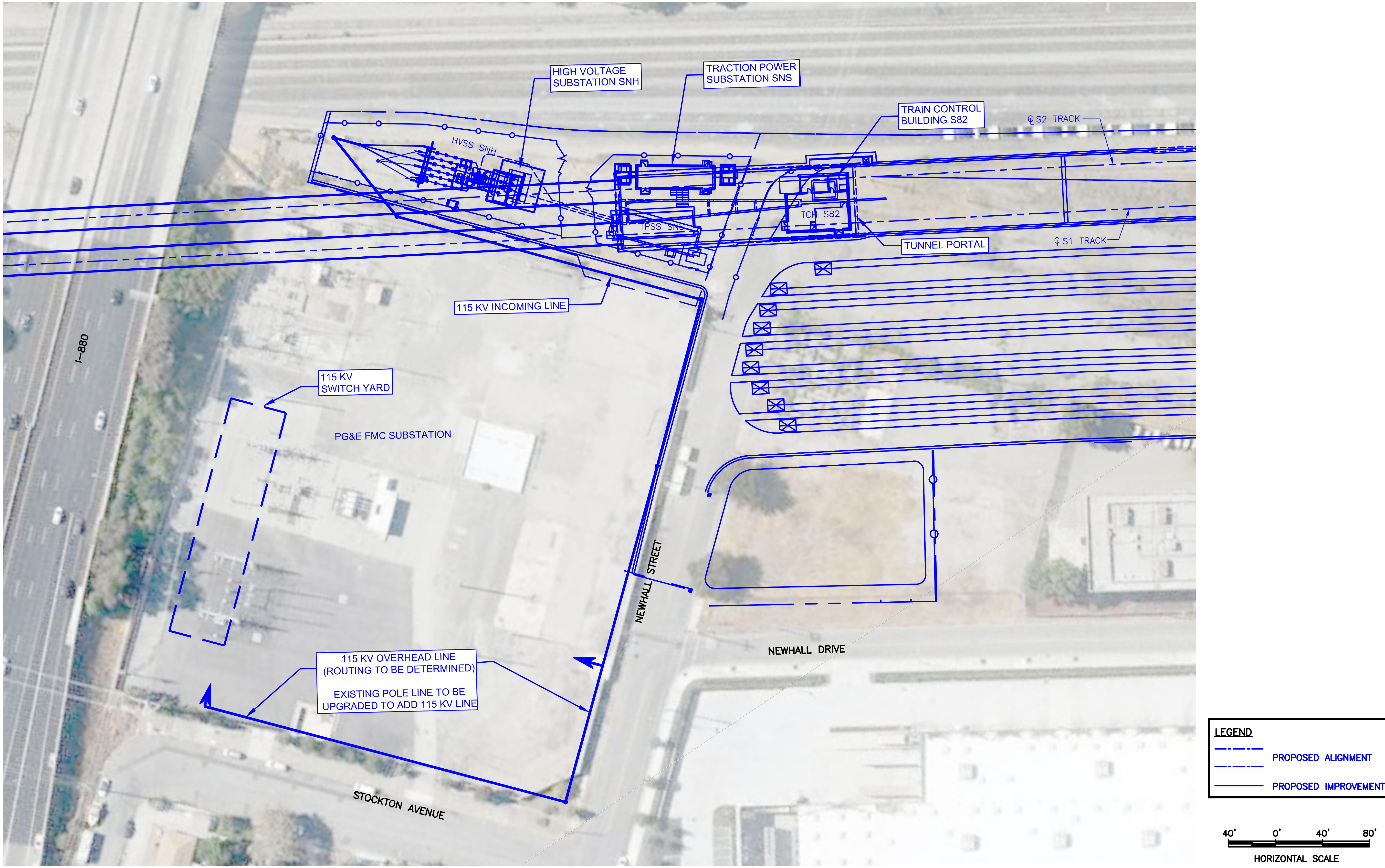

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CONCEPTUAL PLANS

SVSX–S–TA–X015.dwg

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: 115–kV LINE AND SYSTEMS FACILITIES NORTH OF I–880
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT

SITE PLAN
SHEET 15F

APPENDIX X
SILICON VALLEY SANTA CLARA EXTENSION
TWIN-BORE OPTION PLANS AND PROFILES
INDEX OF DRAWINGS

Sheet No.	Title	Sheet No.	Title
0	LOCATION: CONNECTION TO PHASE I NEAR MABURY ROAD	10A & 10B & 11E	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
1	LOCATION: NEAR LAS PLUMAS AVE	10A & 10B & 11F	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
2	LOCATION: AT SANTA CLARA & 28TH STREETS STATION: ALUM ROCK/ 28th STREET STATION	10C & 10D & 11E	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
3	LOCATION: SANTA CLARA STREET EAST OF COYOTE CREEK	10C & 10D & 11F	LOCATION: NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT W/ DIRIDON STATION NORTH OPTION ALIGNMENT
4	LOCATION: SANTA CLARA STREET WEST OF COYOTE CREEK	11A & 11B & 11E	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION SOUTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
5A & 5C	LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL STATION: DOWNTOWN SAN JOSE STATION EAST OPTION	11A & 11B & 11F	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
5B & 5D	LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL STATION: DOWNTOWN SAN JOSE STATION WEST OPTION	11C & 11D & 11E	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION SOUTH OPTION W/ DIRIDON STATION NORTH OPTION ALIGNMENT
6A	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION SOUTH OPTION W/ DOWNTOWN SAN JOSE STATION EAST OPTION	11C & 11D & 11F	LOCATION: SOUTH OF BROKAW ROAD STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION NORTH OPTION ALIGNMENT
6B	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION SOUTH OPTION W/ DOWNTOWN SAN JOSE STATION WEST OPTION	12A & 12B & 12E	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
6C	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION NORTH OPTION W/ DOWNTOWN SAN JOSE STATION EAST OPTION	12A & 12B & 12F	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION SOUTH OPTION ALIGNMENT
6D	LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87 STATION: DIRIDON STATION NORTH OPTION W/ DOWNTOWN SAN JOSE STATION WEST OPTION	12C & 12D & 12E	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
7A & 7B	LOCATION: NEAR THE ALAMEDA STATION: DIRIDON STATION SOUTH OPTION	12C & 12D & 12F	LOCATION: NEAR DE LA CRUZ BOULEVARD W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT & DIRIDON STATION NORTH OPTION ALIGNMENT
7C & 7D	LOCATION: NEAR THE ALAMEDA STATION: DIRIDON STATION NORTH OPTION	13E	LOCATION: NEWHALL MAINTENANCE FACILITY W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
8A & 8B	LOCATION: NEAR STOCKTON AVENUE STATION: DIRIDON STATION SOUTH OPTION	13F	LOCATION: NEWHALL MAINTENANCE FACILITY W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT
8C & 8D	LOCATION: NEAR STOCKTON AVENUE STATION: DIRIDON STATION NORTH OPTION	14E	LOCATION: NEWHALL MAINTENANCE FACILITY AND TRAIL TRACK W/ SANTA CLARA STATION SOUTH OPTION
9A & 9B	LOCATION: NEAR HEDDING STREET W/ DIRIDON STATION SOUTH OPTION ALIGNMENT	14F	LOCATION: NEWHALL MAINTENANCE FACILITY AND TRAIL TRACK W/ SANTA CLARA STATION NORTH OPTION
9C & 9D	LOCATION: NEAR HEDDING STREET W/ DIRIDON STATION NORTH OPTION ALIGNMENT	15E	LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
		15F	LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT

A SERIES = **DOWNTOWN SAN JOSE STATION EAST OPTION & DIRIDON STATION SOUTH OPTION**

B SERIES = **DOWNTOWN SAN JOSE STATION WEST OPTION & DIRIDON STATION SOUTH OPTION**

C SERIES = **DOWNTOWN SAN JOSE STATION EAST OPTION & DIRIDON STATION NORTH OPTION**

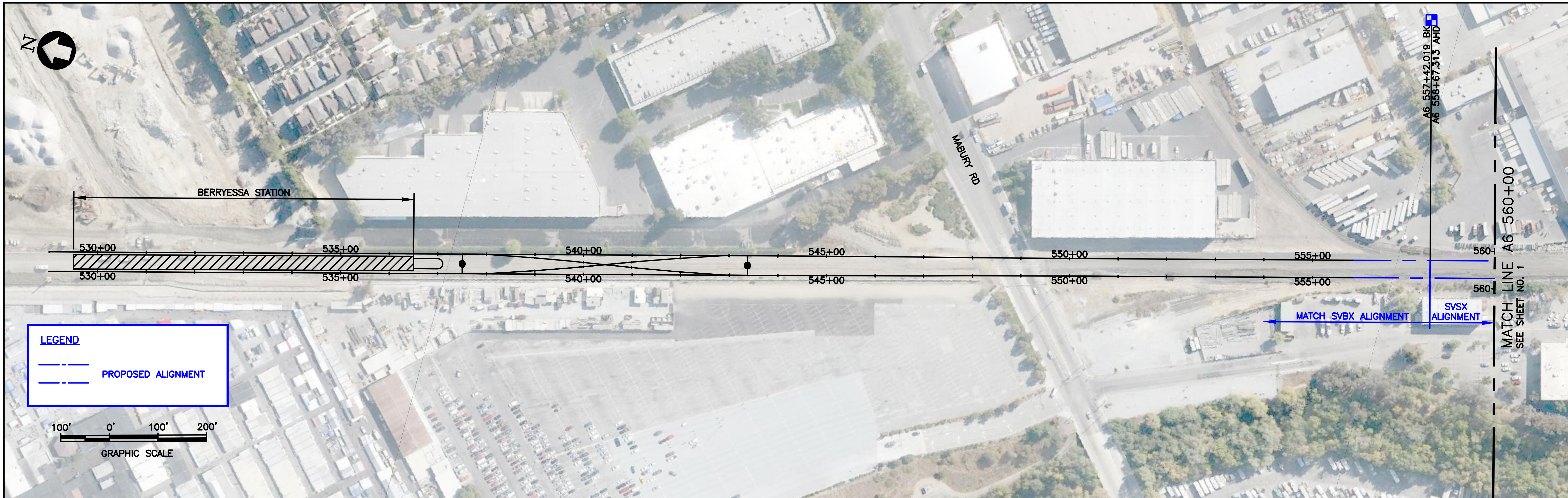
D SERIES = **DOWNTOWN SAN JOSE STATION WEST OPTION & DIRIDON STATION NORTH OPTION**

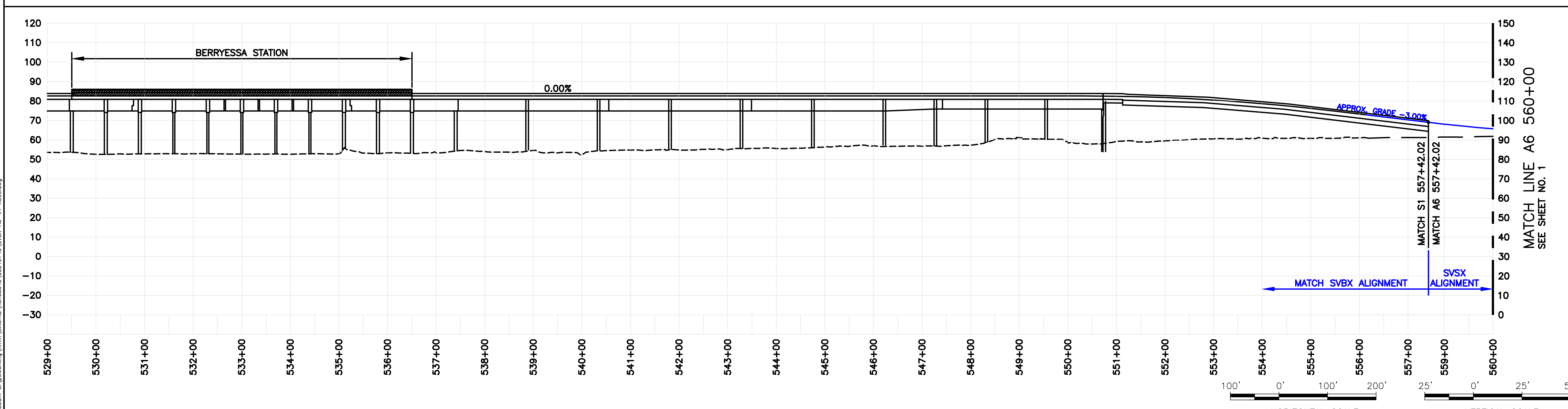
A & B SERIES = **DIRIDON STATION SOUTH OPTION/ ALIGNMENT**

C & D SERIES = **DIRIDON STATION NORTH OPTION/ ALIGNMENT**

E SERIES = **SANTA CLARA STATION SOUTH OPTION/ ALIGNMENT**

F SERIES = **SANTA CLARA STATION NORTH OPTION/ ALIGNMENT**





CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: CONNECTION TO PHASE I NEAR MABURY ROAD

PLAN & PROFILE
SHEET 0

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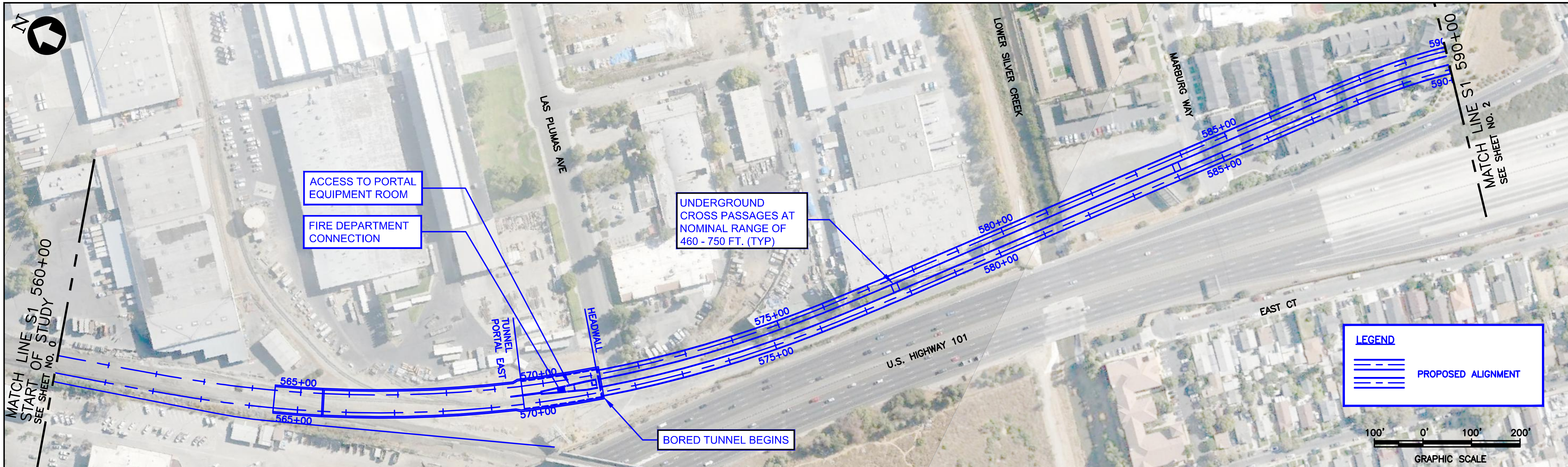

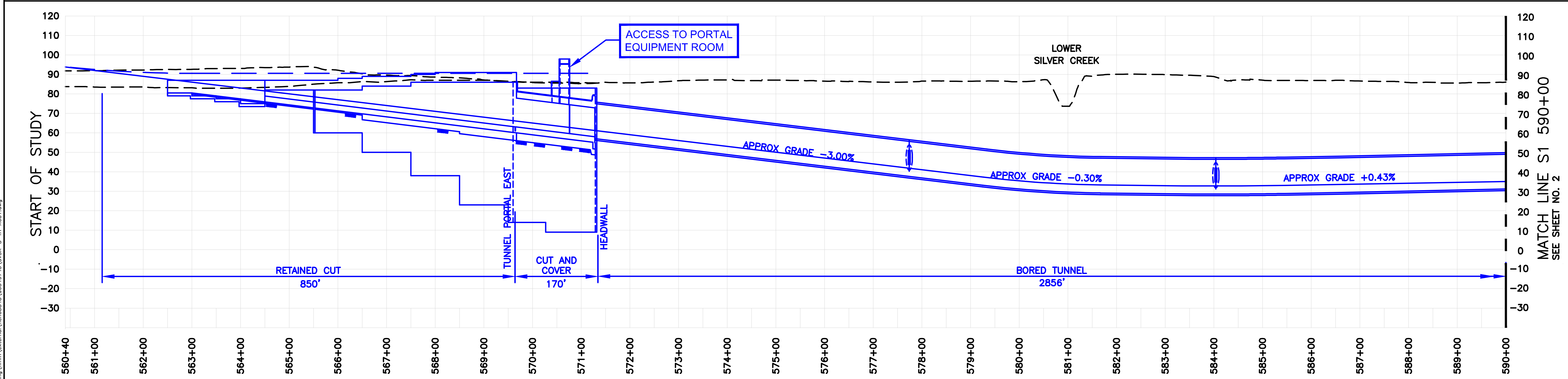

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR LAS PLUMAS AVE

PLAN & PROFILE
SHEET 1

SVSX-S-TA-X010.dwg

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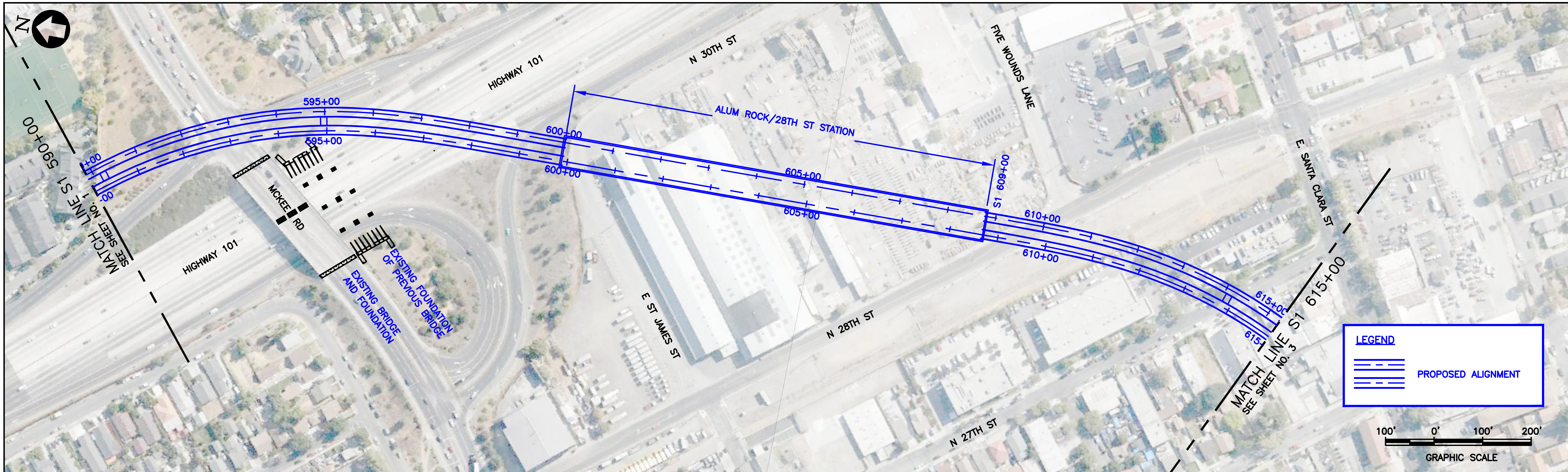

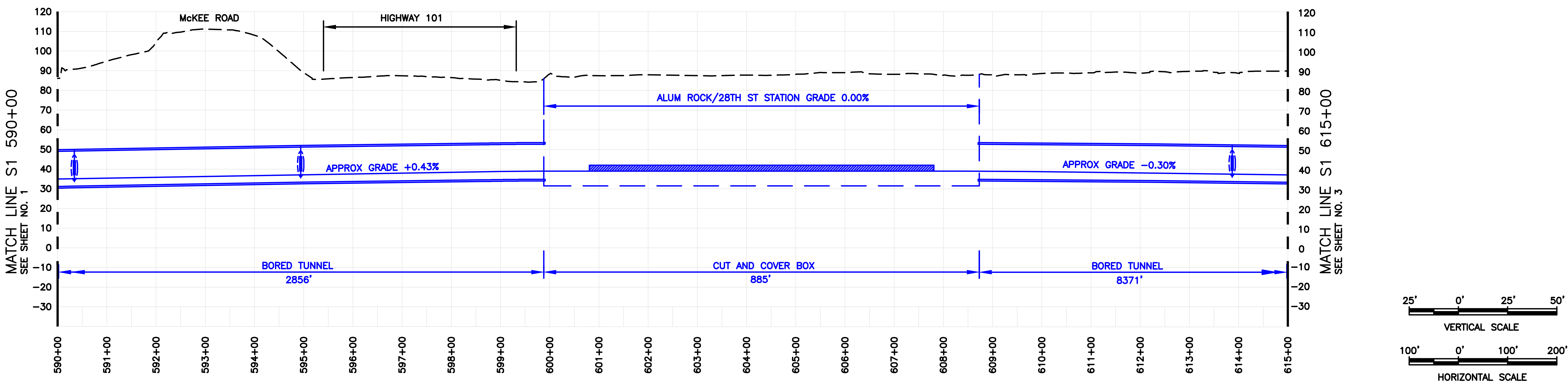

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: AT SANTA CLARA & 28TH STREETS
STATION: ALUM ROCK/28TH STREET STATION

PLAN & PROFILE
SHEET 2

SVSX−S−TA−X002.dwg

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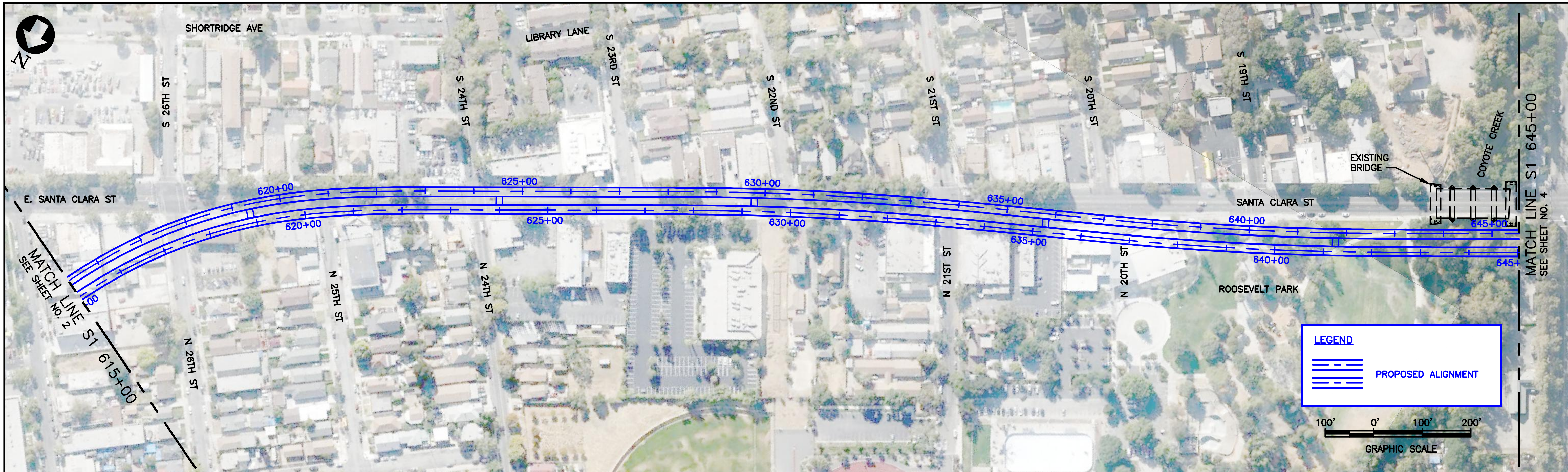
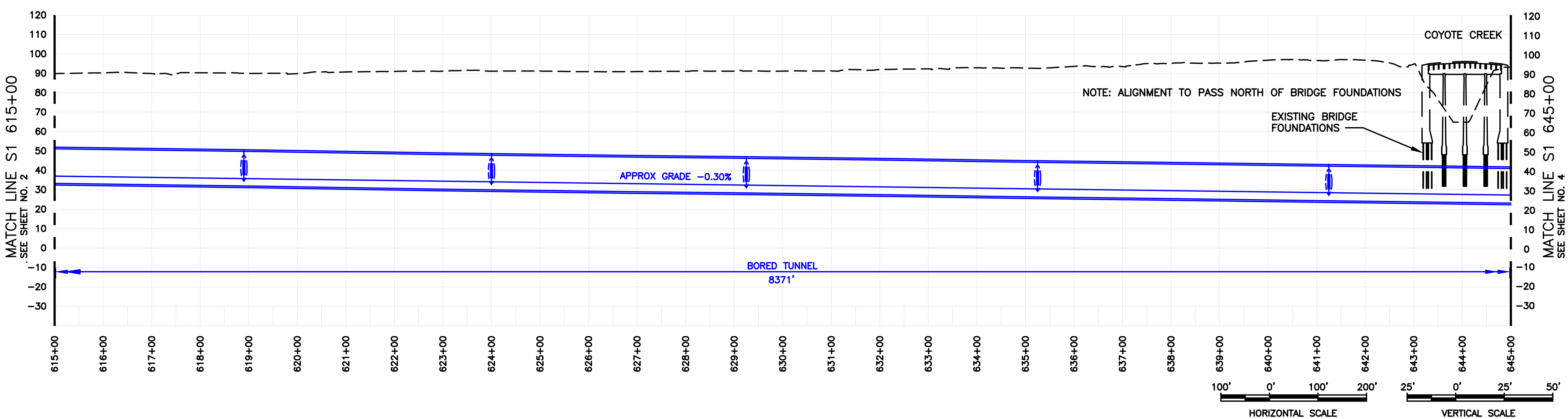




CONCEPTUAL PLANS

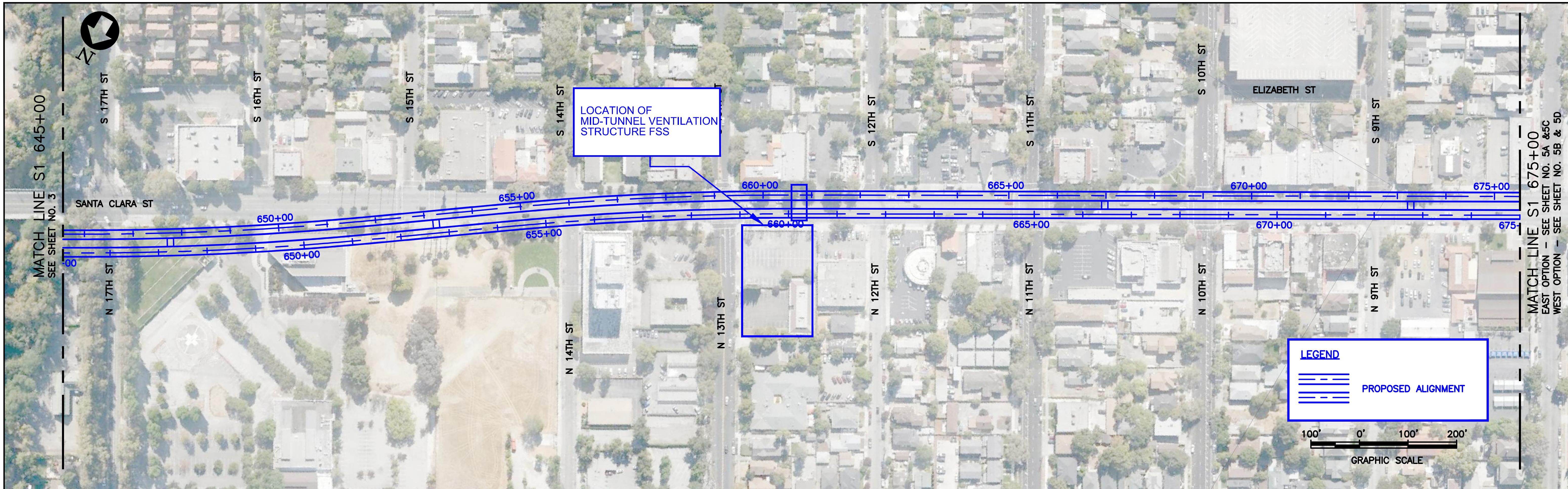
SILICON VALLEY SANTA CLARA EXTENSION

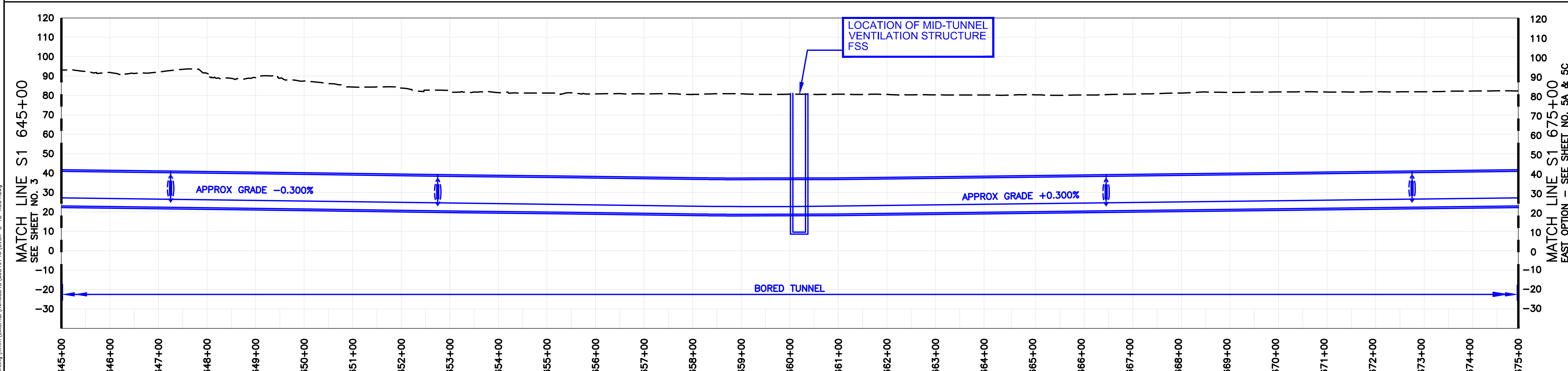
LOCATION: SANTA CLARA STREET EAST OF COYOTE CREEK

PLAN & PROFILE

SHEET 3

SVSX-S-TA-X003.dwg





CONCEPTUAL PLANS

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET WEST OF COYOTE CREEK

PLAN & PROFILE
SHEET 4

SVSX–S–TD–X004.dwg

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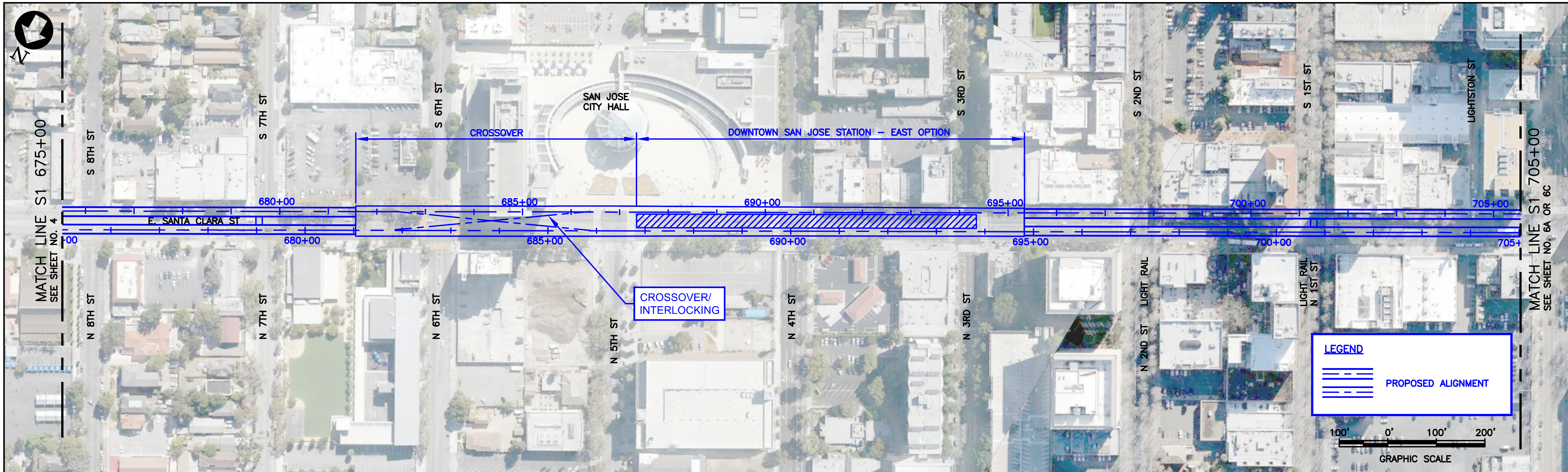

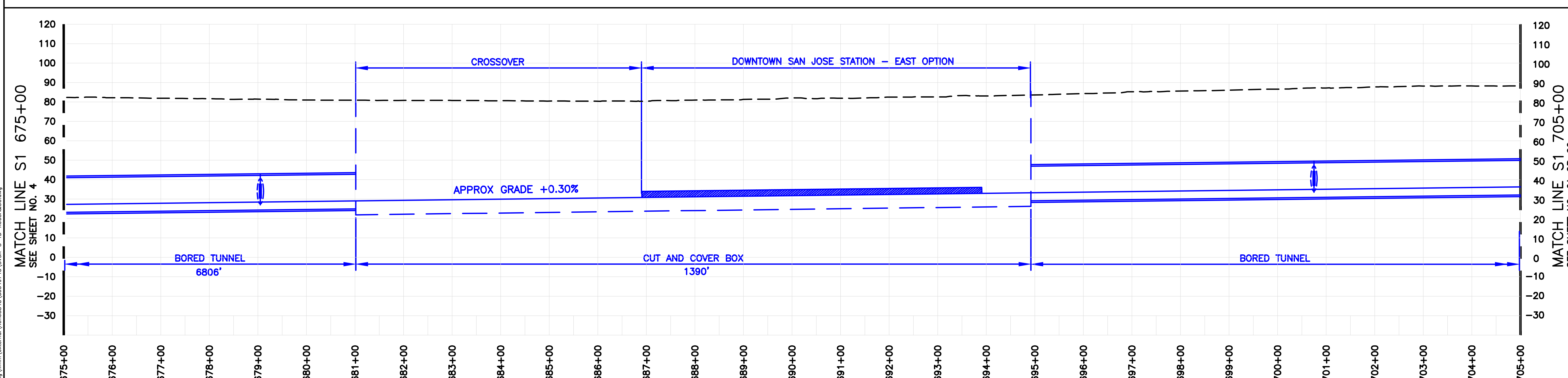

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL
STATION: DOWNTOWN SAN JOSE STATION EAST OPTION

PLAN & PROFILE
SHEET 5A & 5C

SVSX–S–TD–X005.dwg

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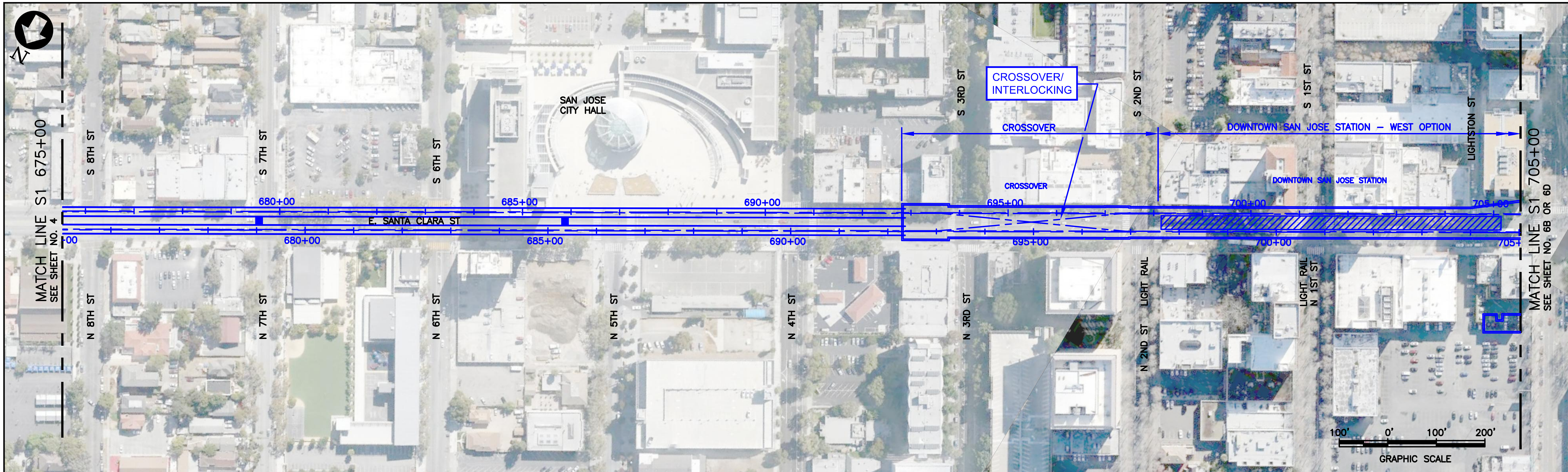
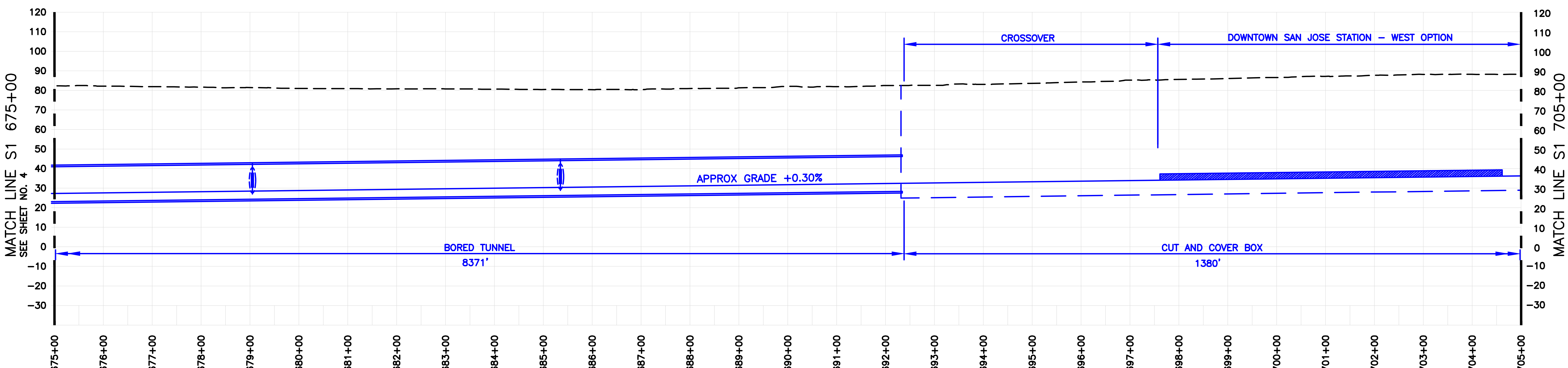




100' 0' 100' 200'
HORIZONTAL SCALE

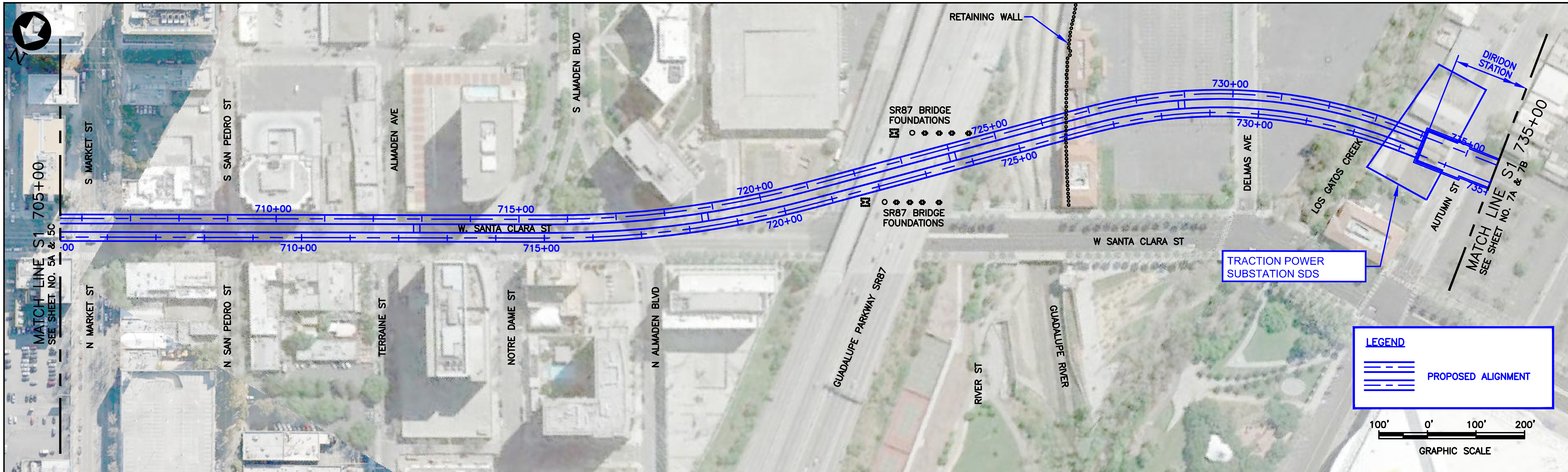
25' 0' 25' 50'
VERTICAL SCALE

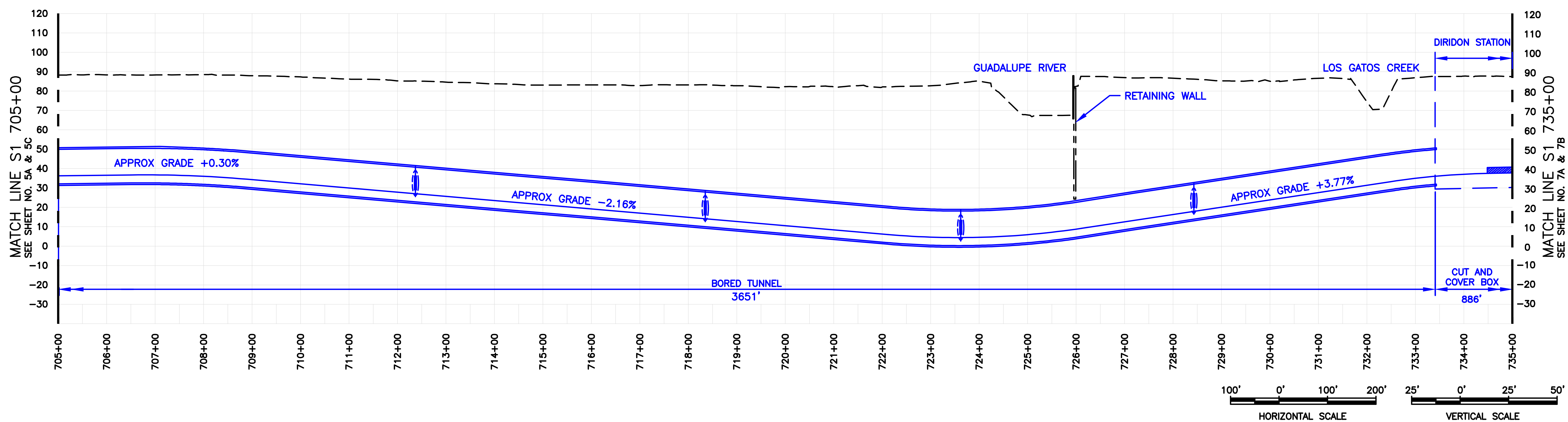
CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR SAN JOSE CITY HALL
STATION: DOWNTOWN SAN JOSE STATION WEST OPTION

PLAN & PROFILE
SHEET 5B & 5D

SVSX-S-TW-X005.dwg





CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION SOUTH OPTION
W/ DOWNTOWN SAN JOSE STATION EAST OPTION
PLAN & PROFILE
SHEET 6A

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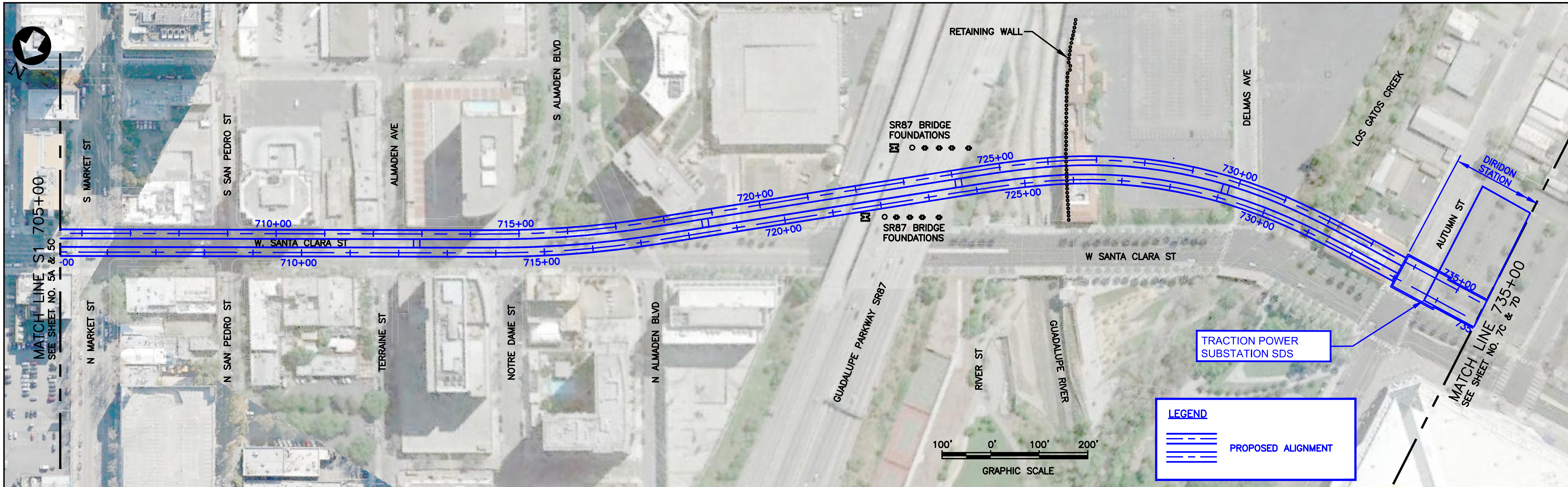

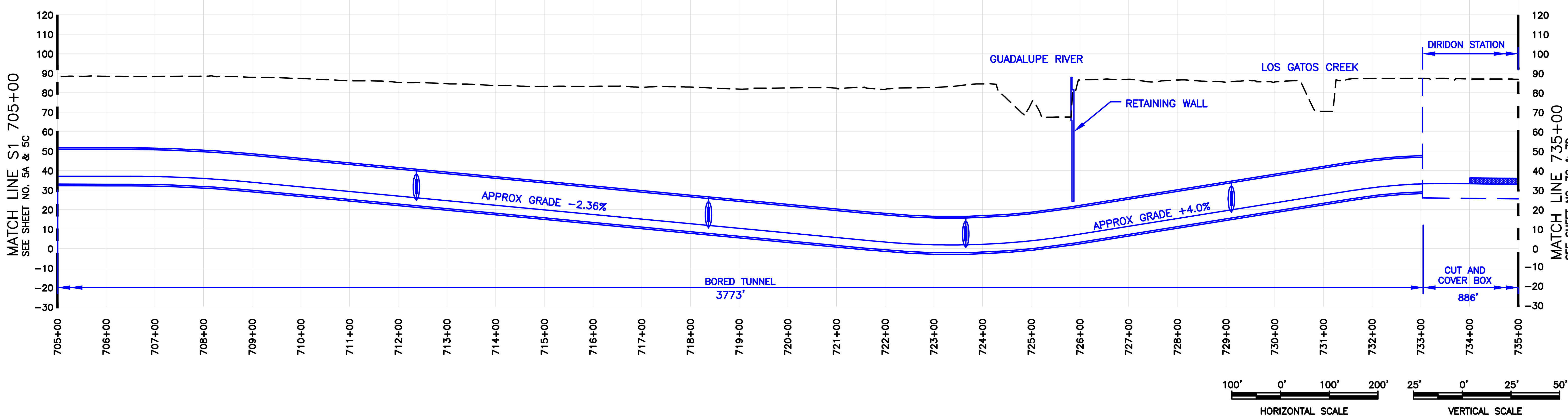

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION NORTH OPTION
W/ DOWNTOWN SAN JOSE STATION EAST OPTION
PLAN & PROFILE
SHEET 6C

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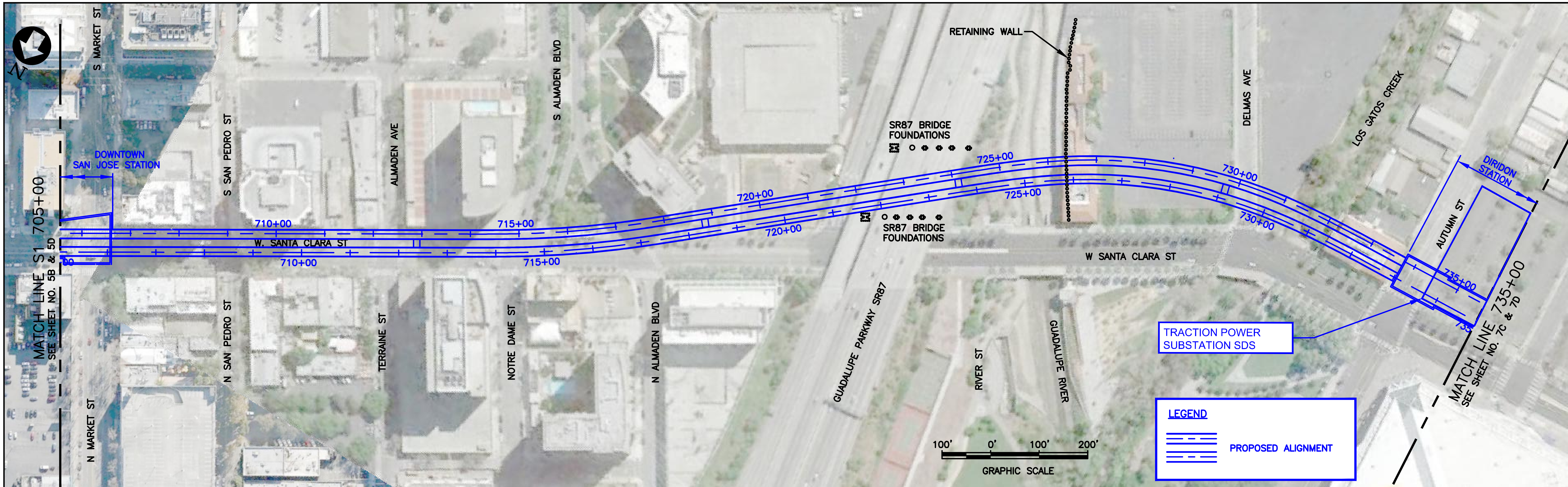
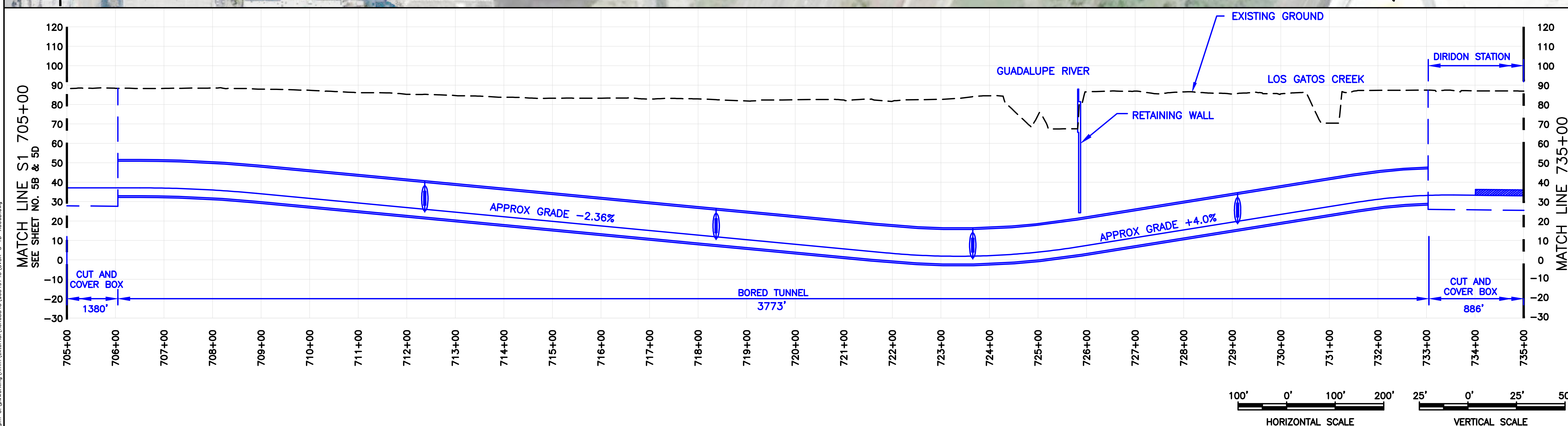
I NORTH OPTION

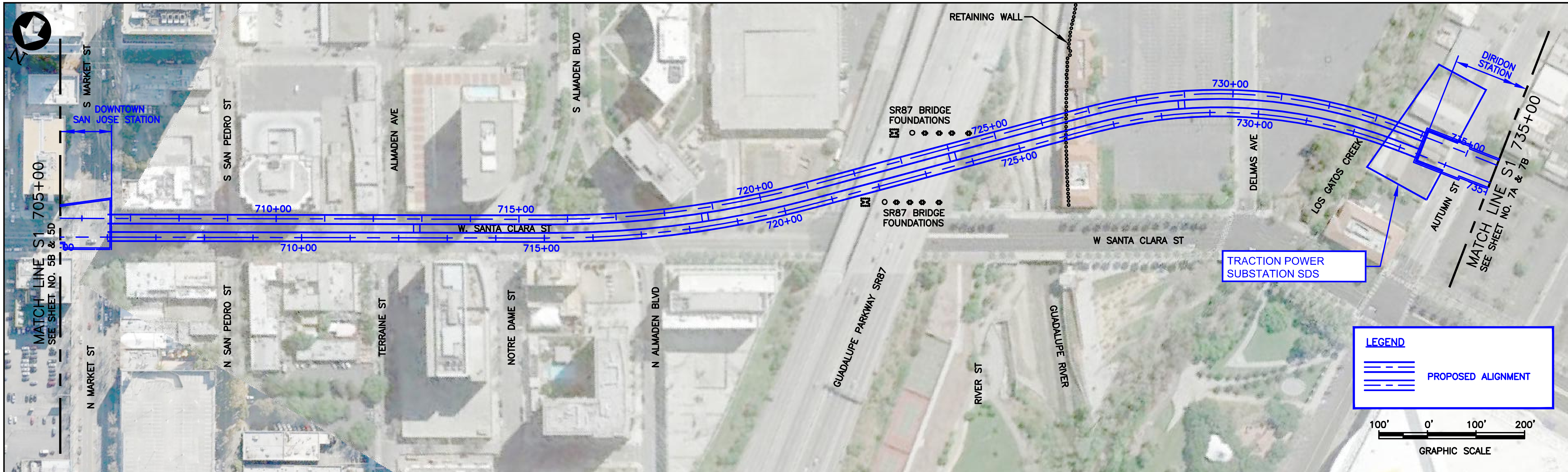


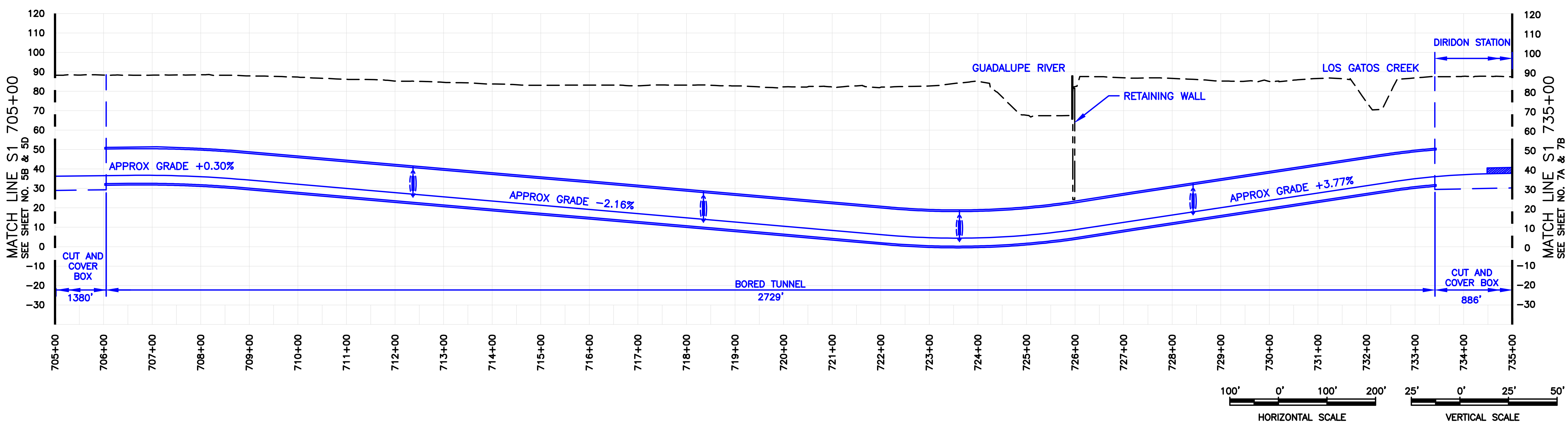


CONCEPTUAL PLANS

SVSX-S-TD-X006.dwg

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION NORTH OPTION
W/ DOWNTOWN SAN JOSE STATION WEST OPTION
PLAN & PROFILE
SHEET 6D





CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SANTA CLARA STREET NEAR STATE ROUTE 87
STATION: DIRIDON STATION SOUTH OPTION
W/ DOWNTOWN SAN JOSE STATION WEST OPTION
PLAN & PROFILE
SHEET 6B

SVSX-S-TW-X006.dwg

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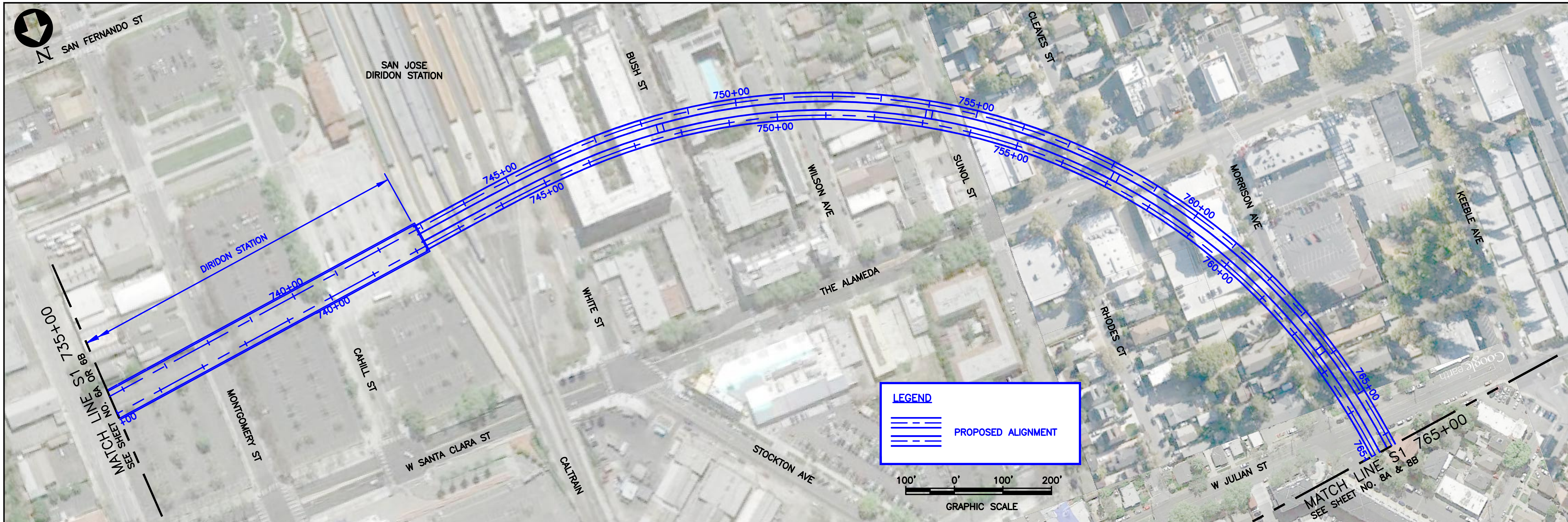

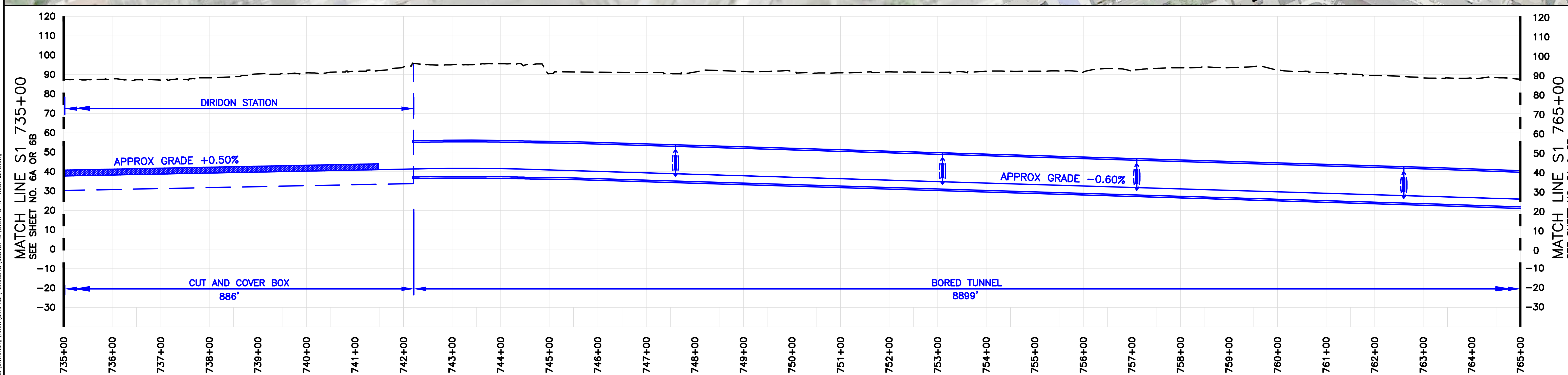

CONCEPTUAL PLANS

25' 0' 25' 50'
VERTICAL SCALE

100' 0' 100' 200'
HORIZONTAL SCALE

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR THE ALAMEDA
STATION: DIRIDON STATION SOUTH OPTION

PLAN & PROFILE
SHEET 7A & 7B

SVSX−S−TA−X007.dwg

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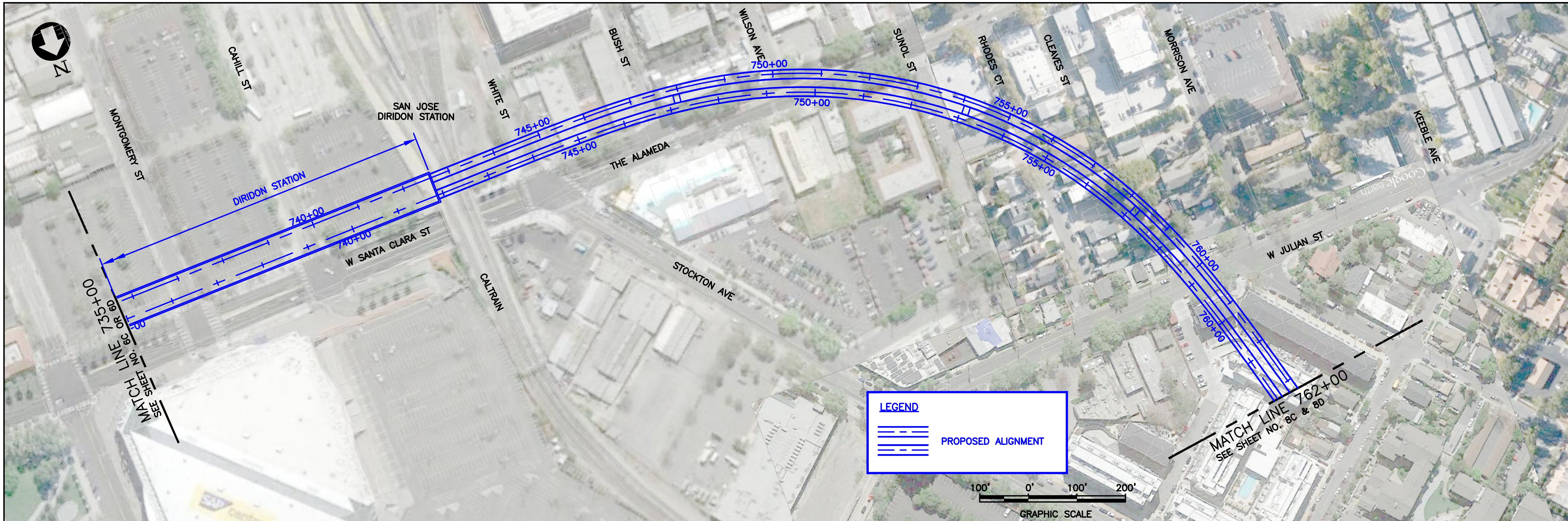

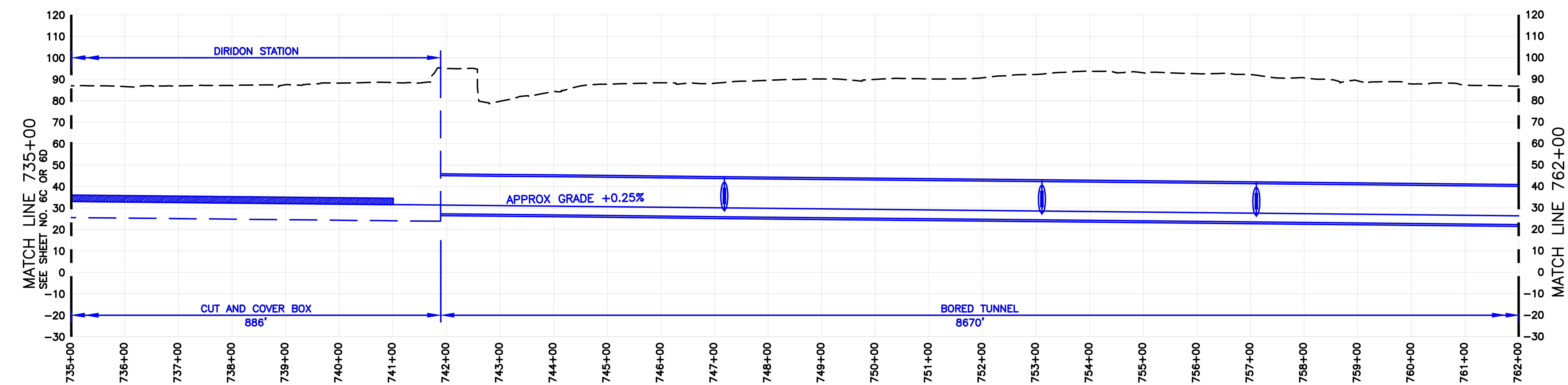

CONCEPTUAL PLANS

25' 0' 25' 50'
VERTICAL SCALE

100' 0' 100' 200'
HORIZONTAL SCALE

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR THE ALAMEDA
STATION: DIRIDON STATION NORTH OPTION
PLAN & PROFILE
SHEET 7C & 7D

SVSX−S−TA−X007.dwg

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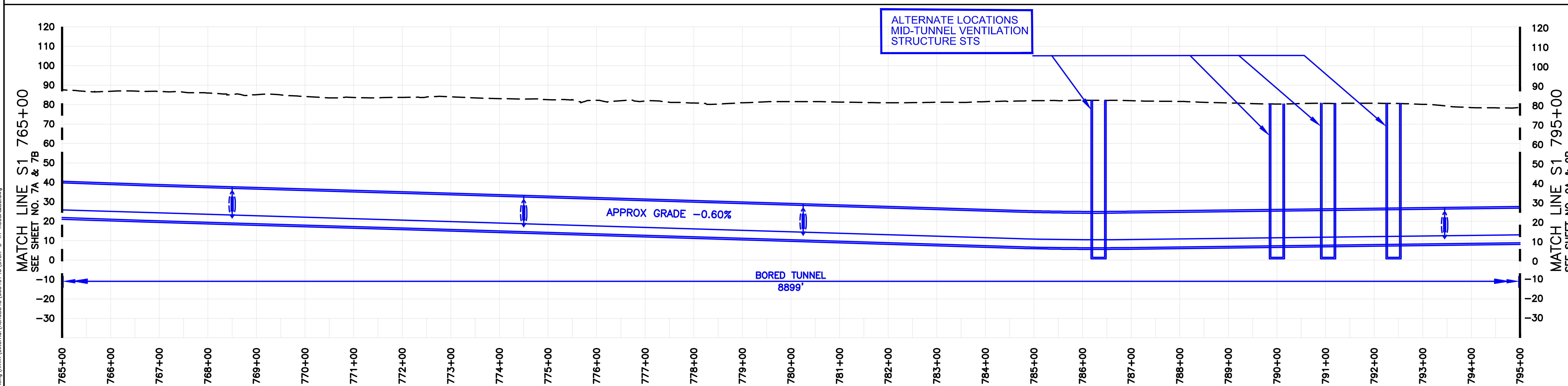

THE ALIGNMENT FOR THE DIRIDON STATION NORTH AND DIRIDON STATION SOUTH OPTIONS CONVERGES AT THIS POINT AND OVERLAPS UNTIL THE PROJECT TERMINUS. HOWEVER, THE LENGTH OF THE ENTIRE PROJECT ALIGNMENT IS SLIGHTLY LONGER FOR THE DIRIDON STATION SOUTH OPTION COMPARED TO THE NORTH OPTION; THEREFORE, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS FOR THE REMAINING SHEETS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR STOCKTON AVENUE

STATION: DIRIDON STATION SOUTH OPTION

PLAN & PROFILE
SHEET 8A & 8B

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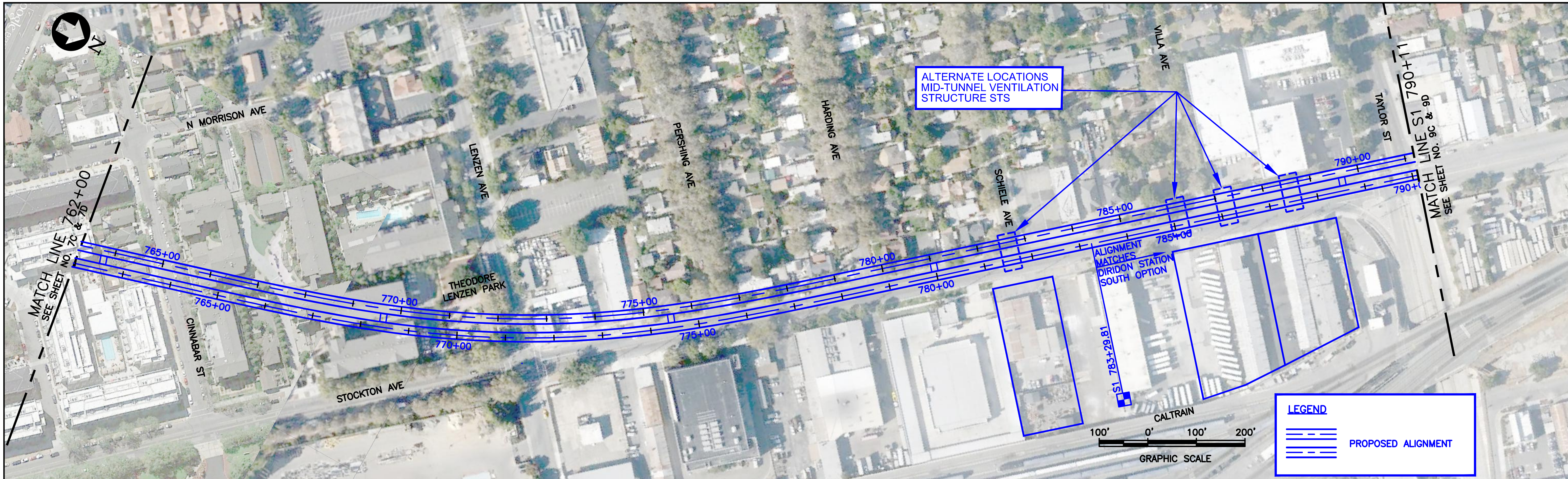

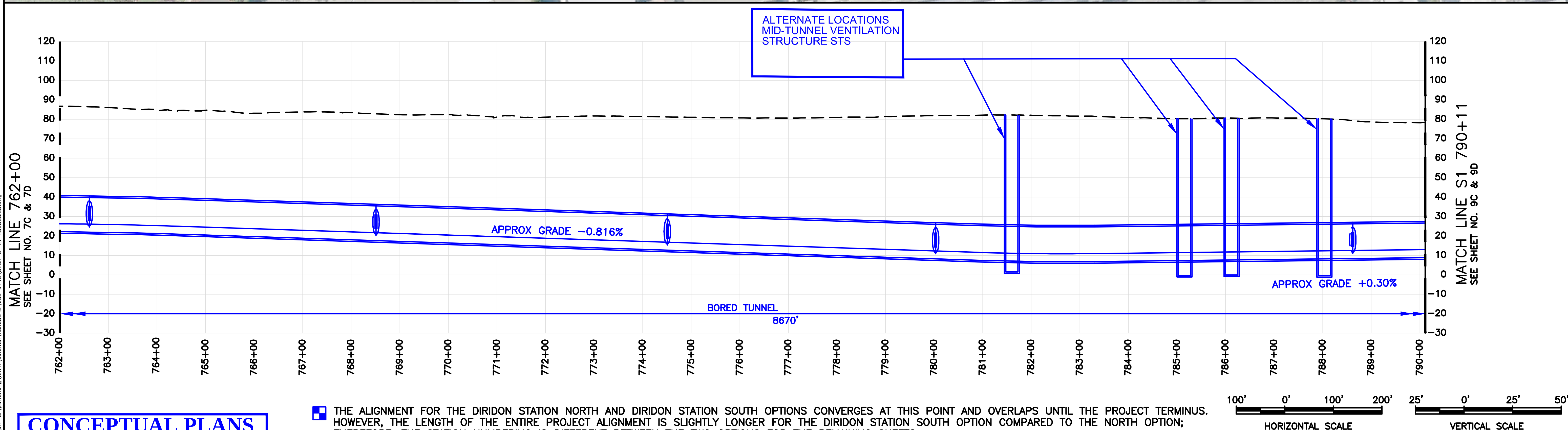

CONCEPTUAL PLANS

THE ALIGNMENT FOR THE DIRIDON STATION NORTH AND DIRIDON STATION SOUTH OPTIONS CONVERGES AT THIS POINT AND OVERLAPS UNTIL THE PROJECT TERMINUS. HOWEVER, THE LENGTH OF THE ENTIRE PROJECT ALIGNMENT IS SLIGHTLY LONGER FOR THE DIRIDON STATION SOUTH OPTION COMPARED TO THE NORTH OPTION; THEREFORE, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS FOR THE REMAINING SHEETS.

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR STOCKTON AVENUE

STATION: DIRIDON STATION NORTH OPTION

PLAN & PROFILE
SHEET 8C & 8D

SVSX-S-TA-X008.dwg

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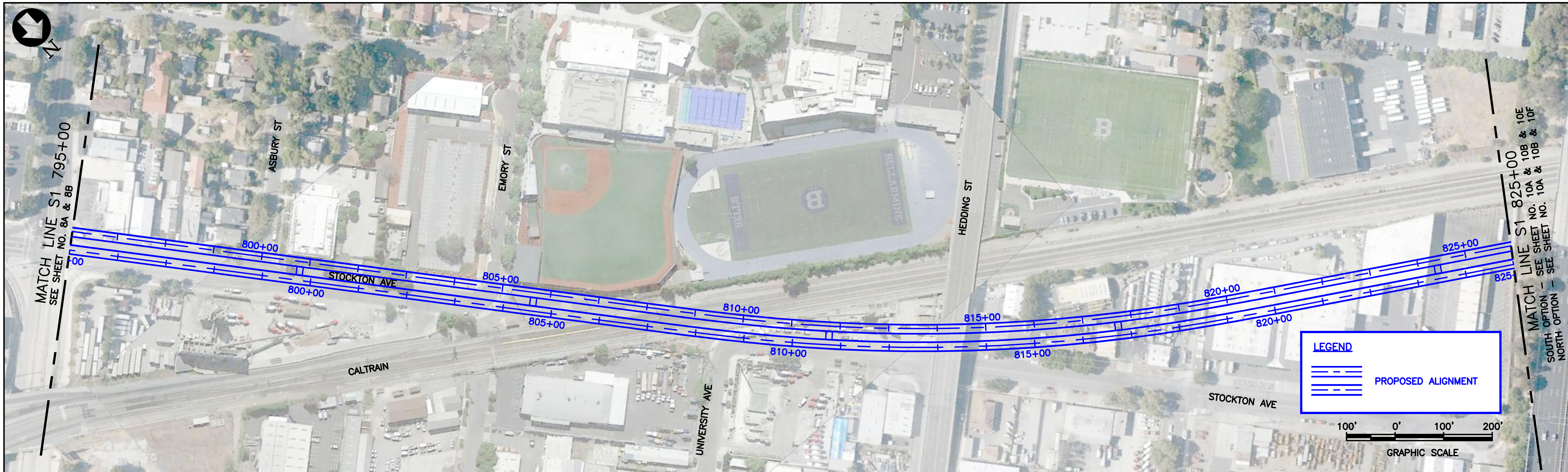

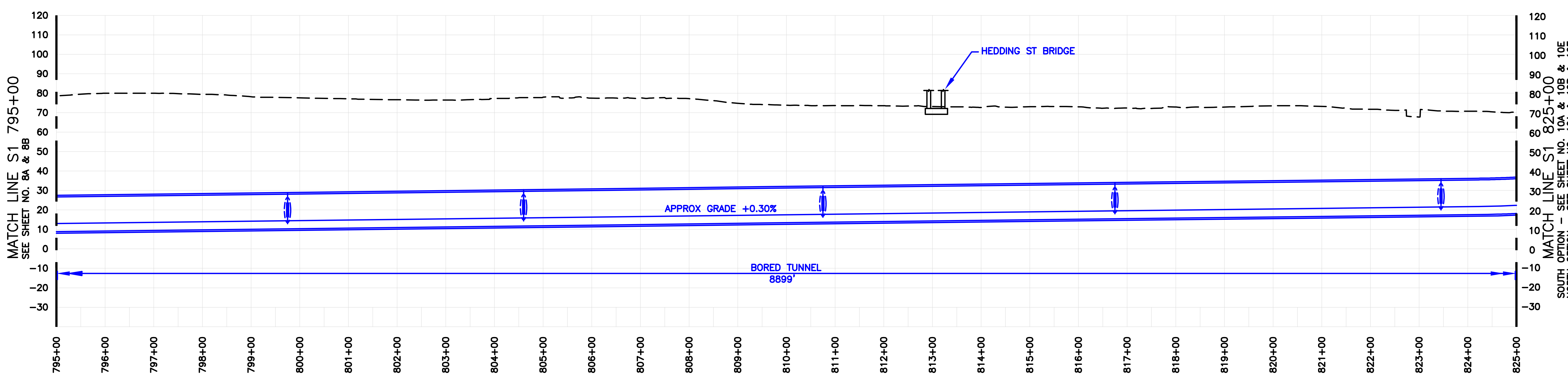

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR HEDDING STREET
W/ DIRIDON STATION SOUTH OPTION ALIGNMENT

PLAN & PROFILE
SHEET 9A & 9B

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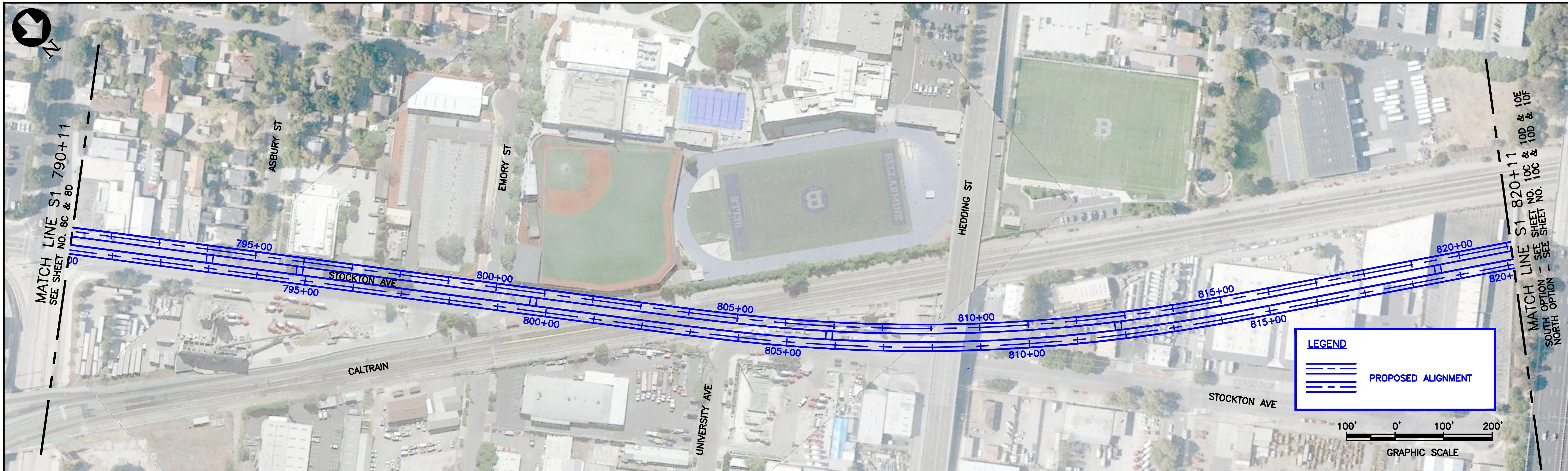
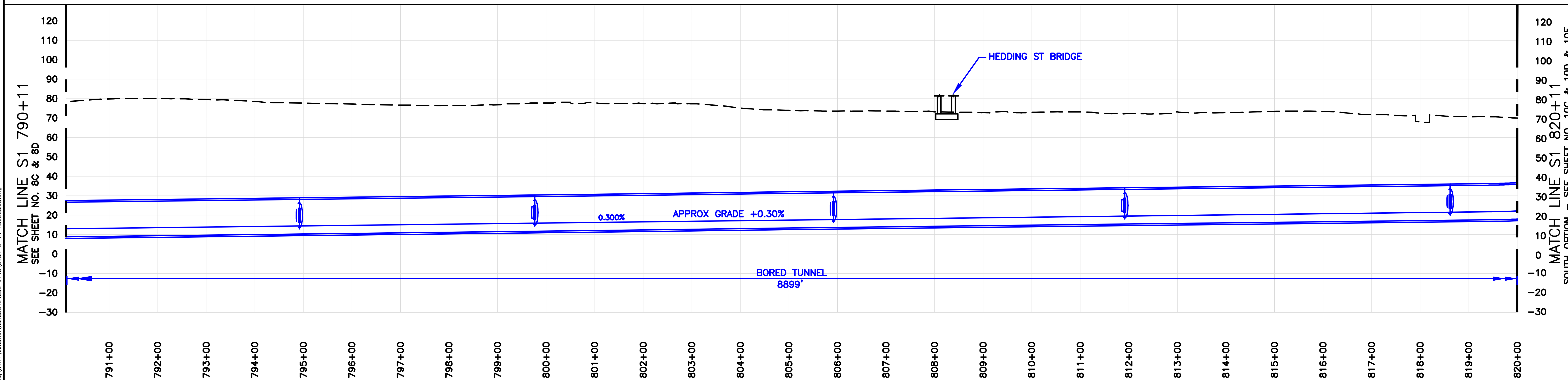
SVSX-S-TA-X009.dwg





NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

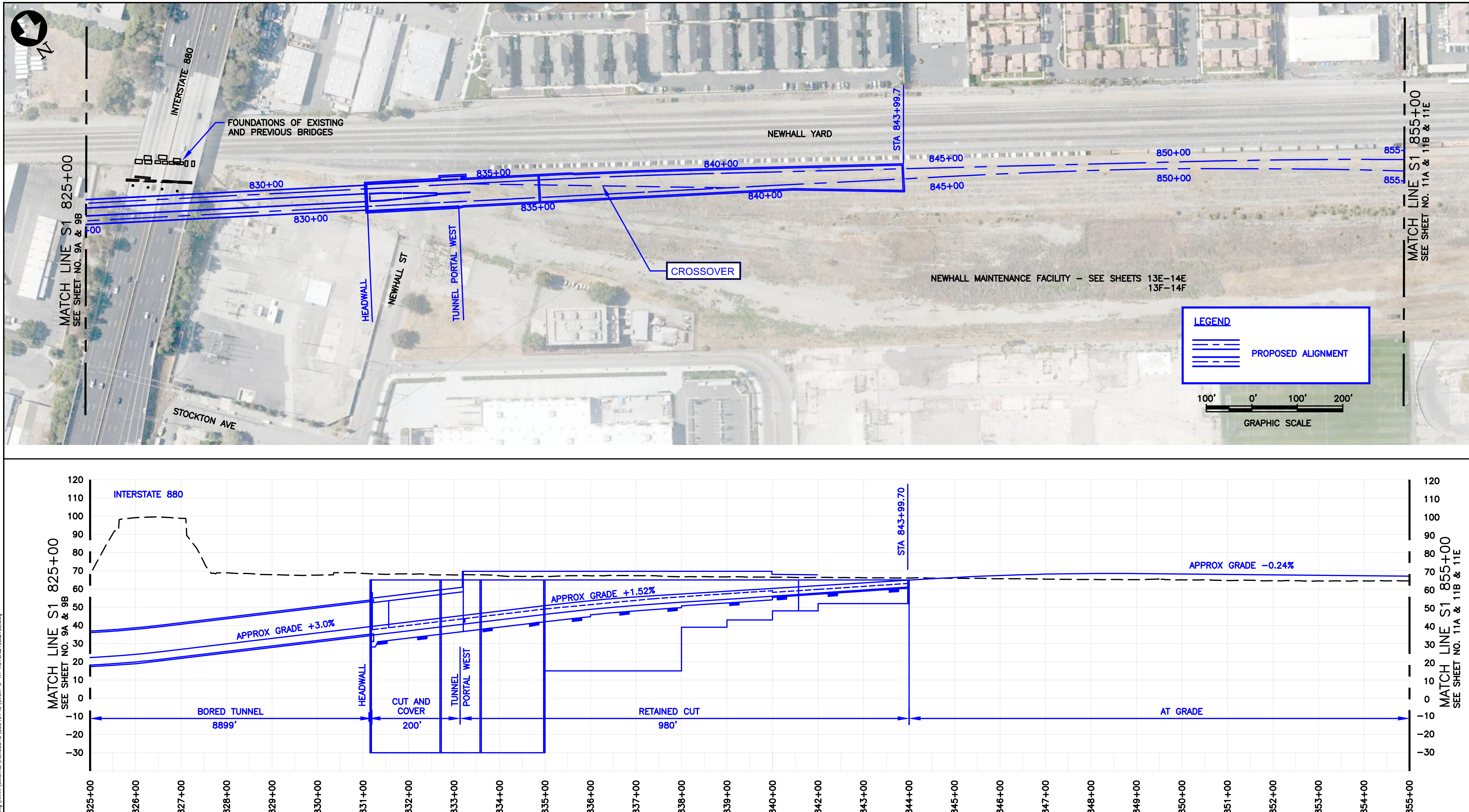
25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR HEDDING STREET
W/ DIRIDON STATION NORTH OPTION ALIGNMENT

PLAN & PROFILE
SHEET 9C & 9D

SVSX-S-TA-X009.dwg

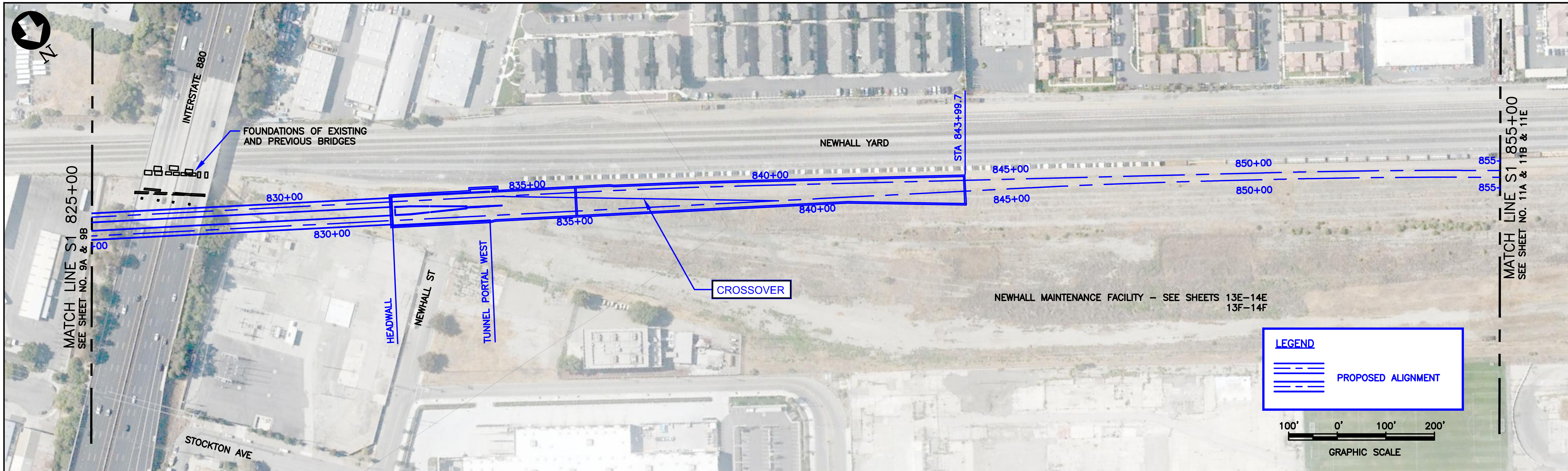


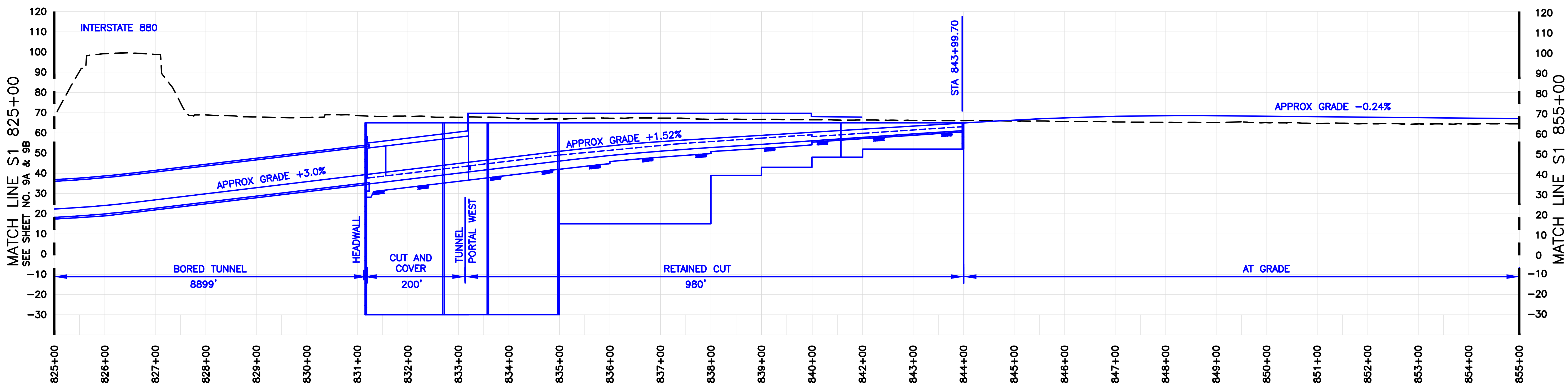
NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I–880
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
& DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10A & 10B & 10E

SVSX–S–TA–X010.dwg





NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I–880
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT
& DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10A & 10B & 10F

SVSX–S–TA–X010.dwg

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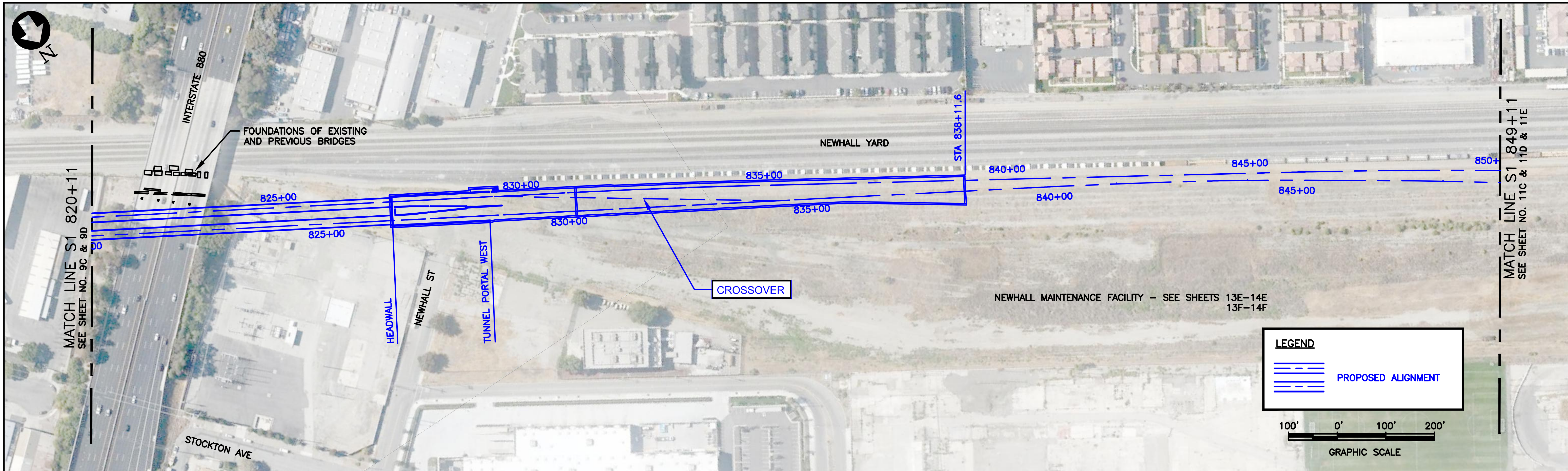
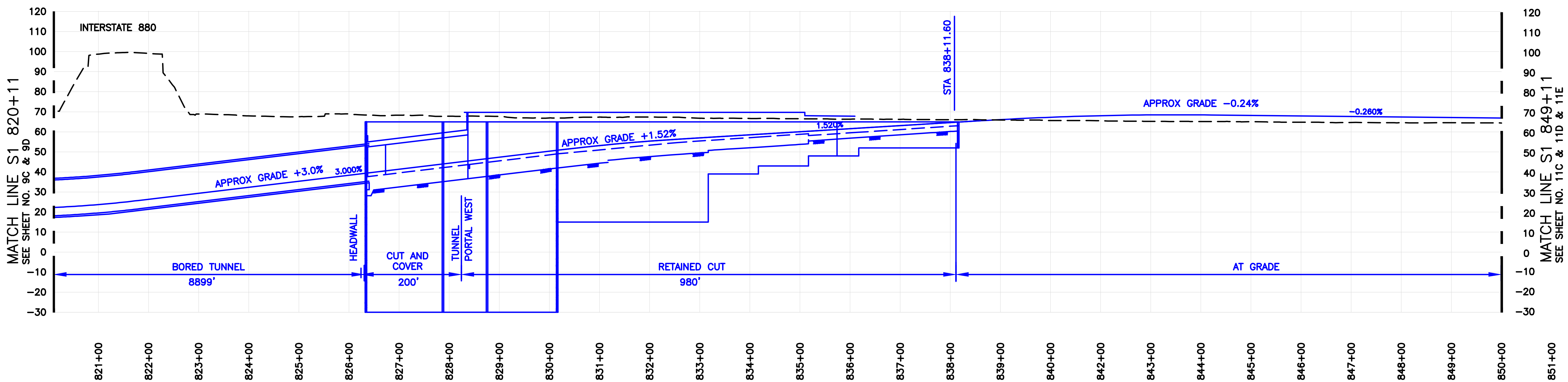




NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

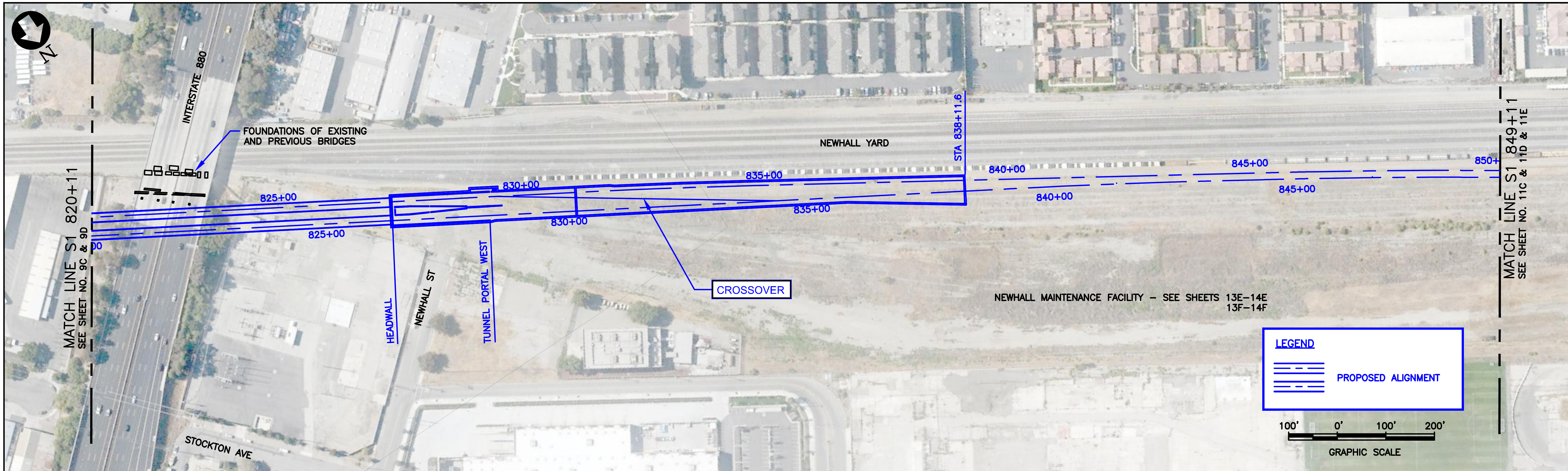
100' 0' 100' 200'
HORIZONTAL SCALE

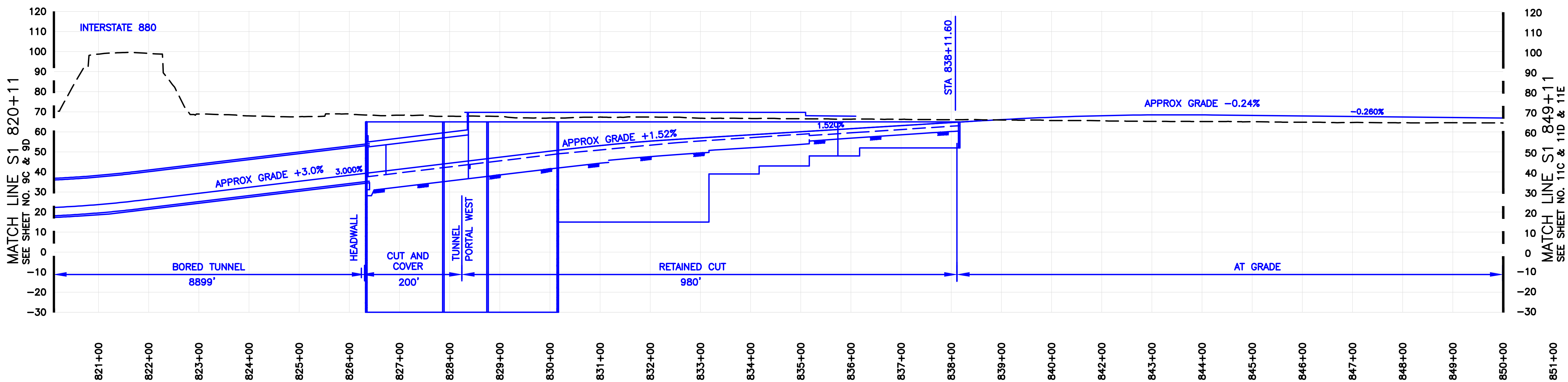
25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I–880
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
& DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10C & 10D & 10E

SVSX–S–TA–X010.dwg





NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

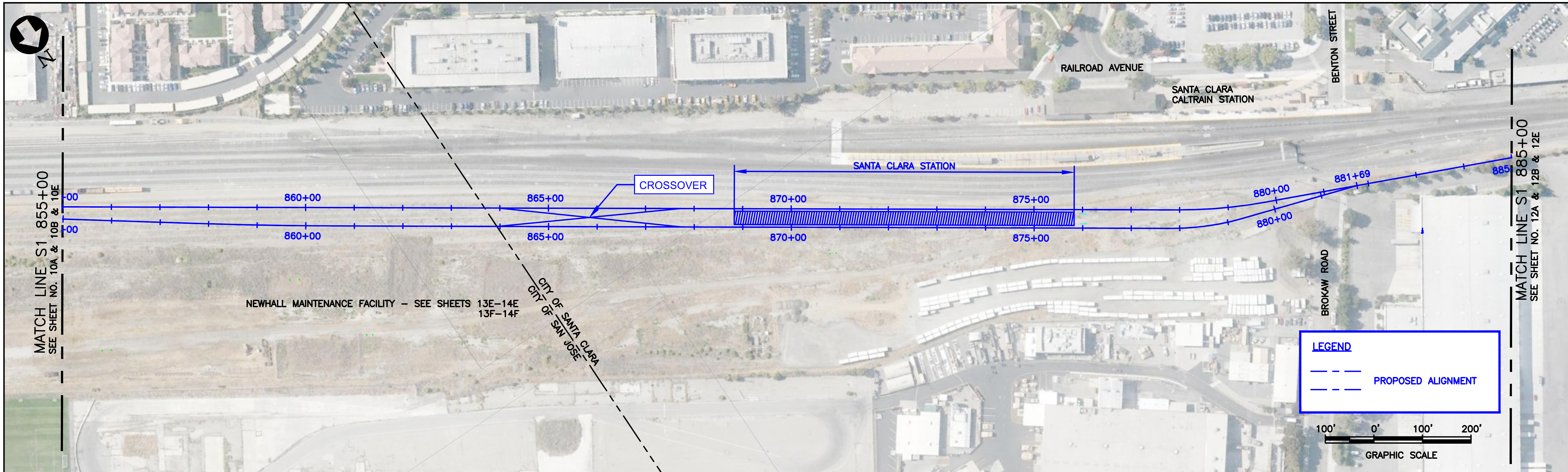
100' 0' 100' 200'
HORIZONTAL SCALE

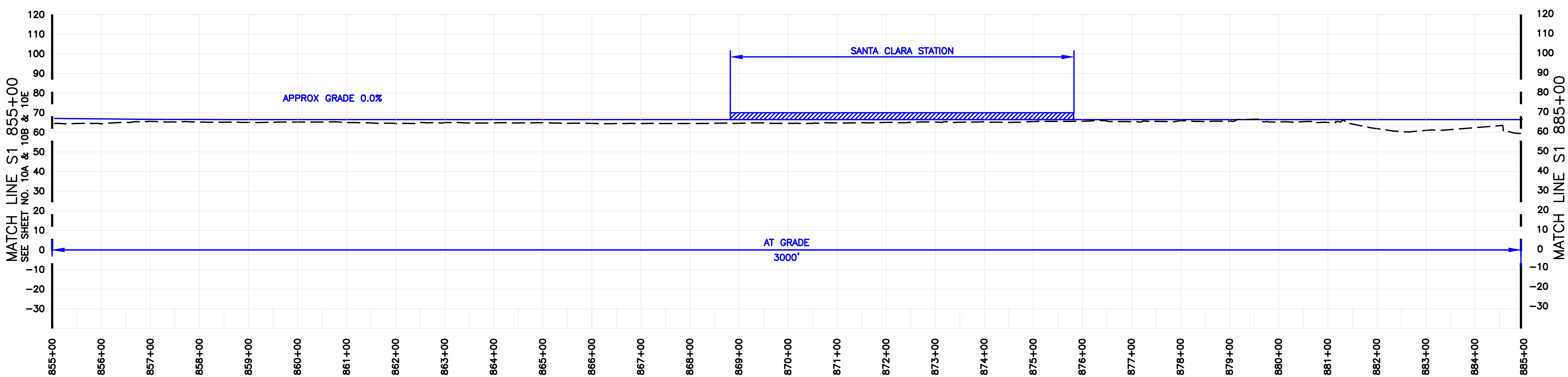
25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NORTH OF I–880
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT
& DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 10C & 10D &10F

SVSX–S–TA–X010.dwg





NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION SOUTH OPTION
W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11A & 11B & 11E

SVSX–S–TA–X011.dwg

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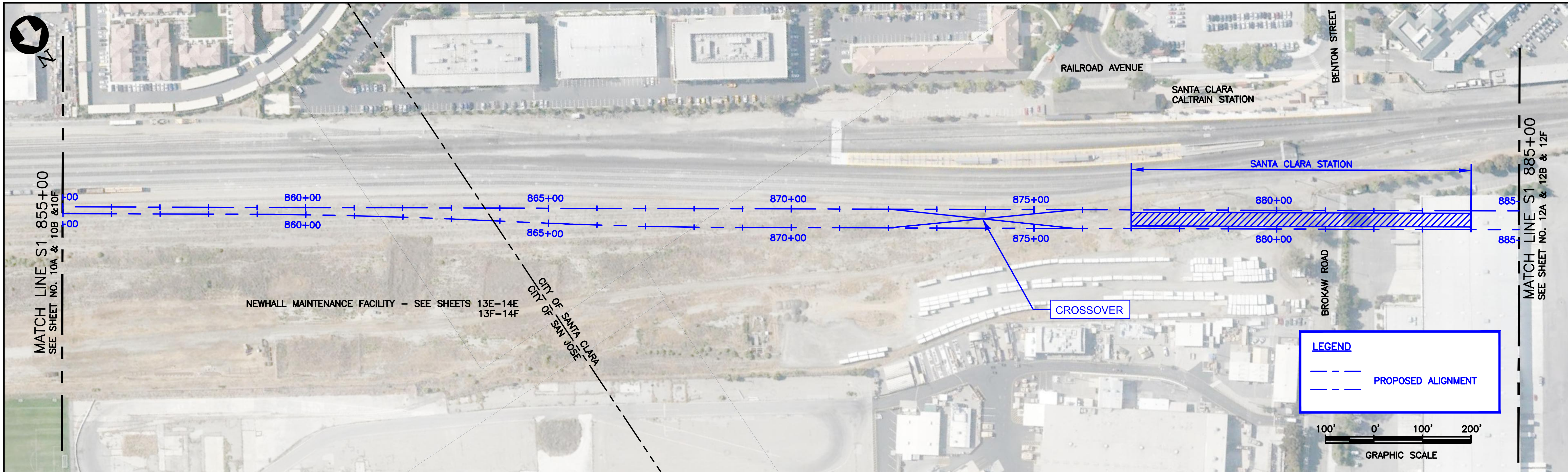

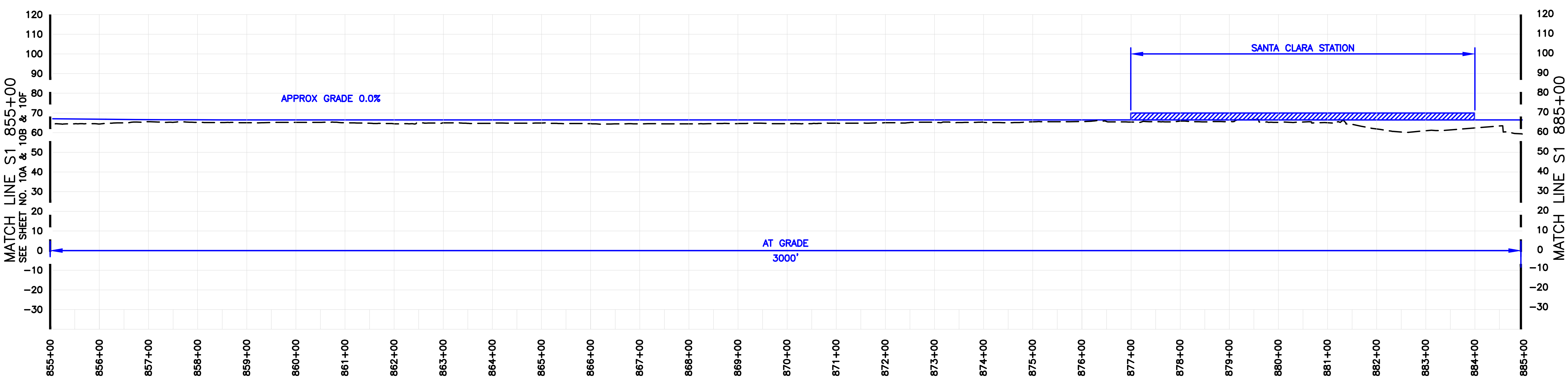

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION NORTH OPTION W/ DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11A & 11B & 11F

SVSX–S–TA–X011.dwg

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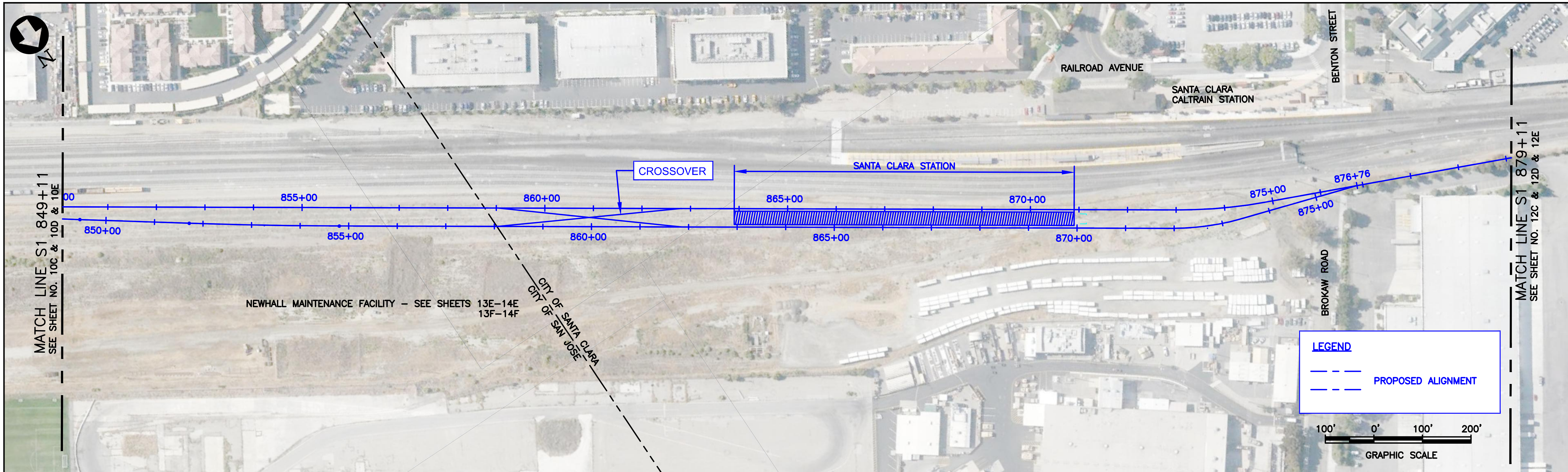

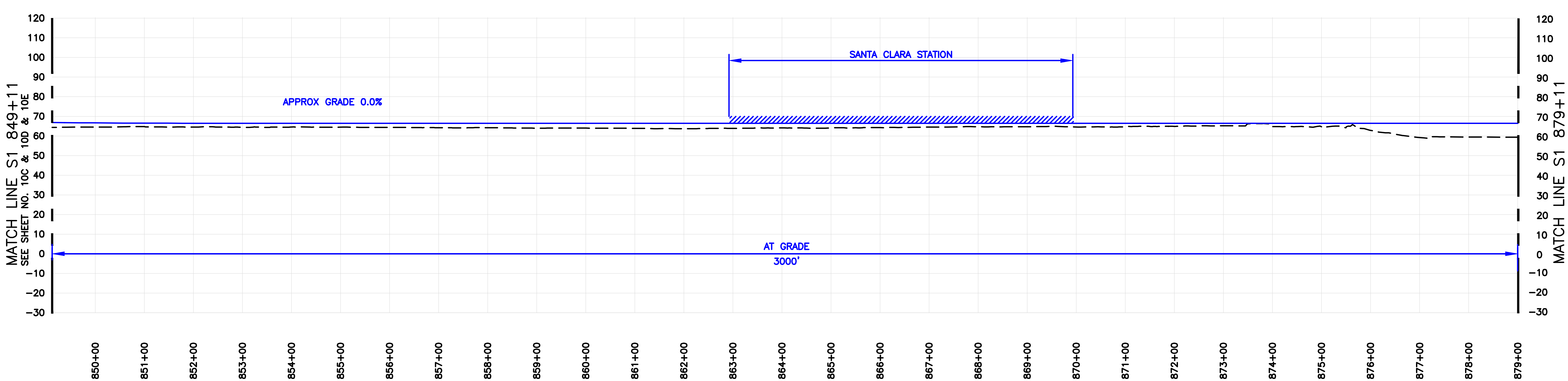

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION SOUTH OPTION
W/ DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11C & 11D & 11E

SVSX–S–TA–X011.dwg

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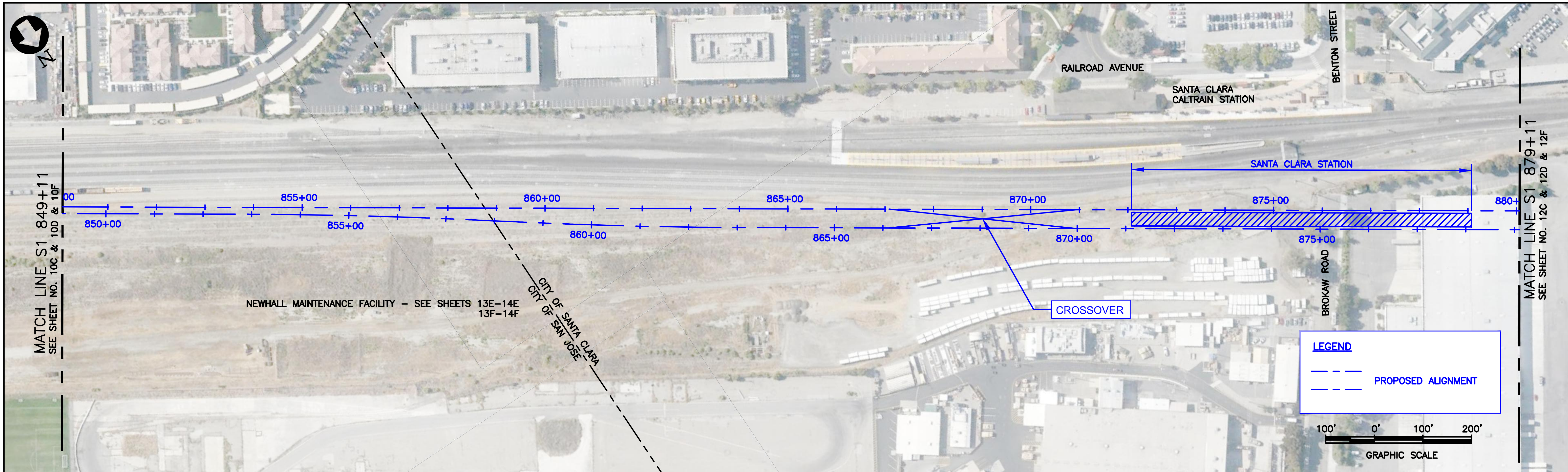

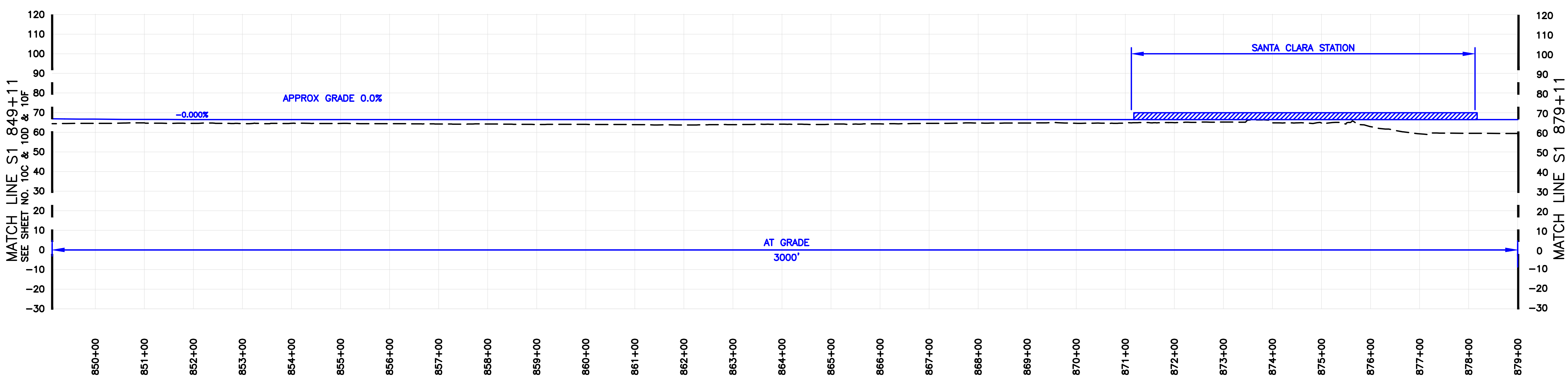

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

100' 0' 100' 200'
HORIZONTAL SCALE

25' 0' 25' 50'
VERTICAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: SOUTH OF BROKAW ROAD
STATION: SANTA CLARA STATION NORTH OPTION
W/ DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 11C & 11D & 11F

SVSX–S–TA–X011.dwg

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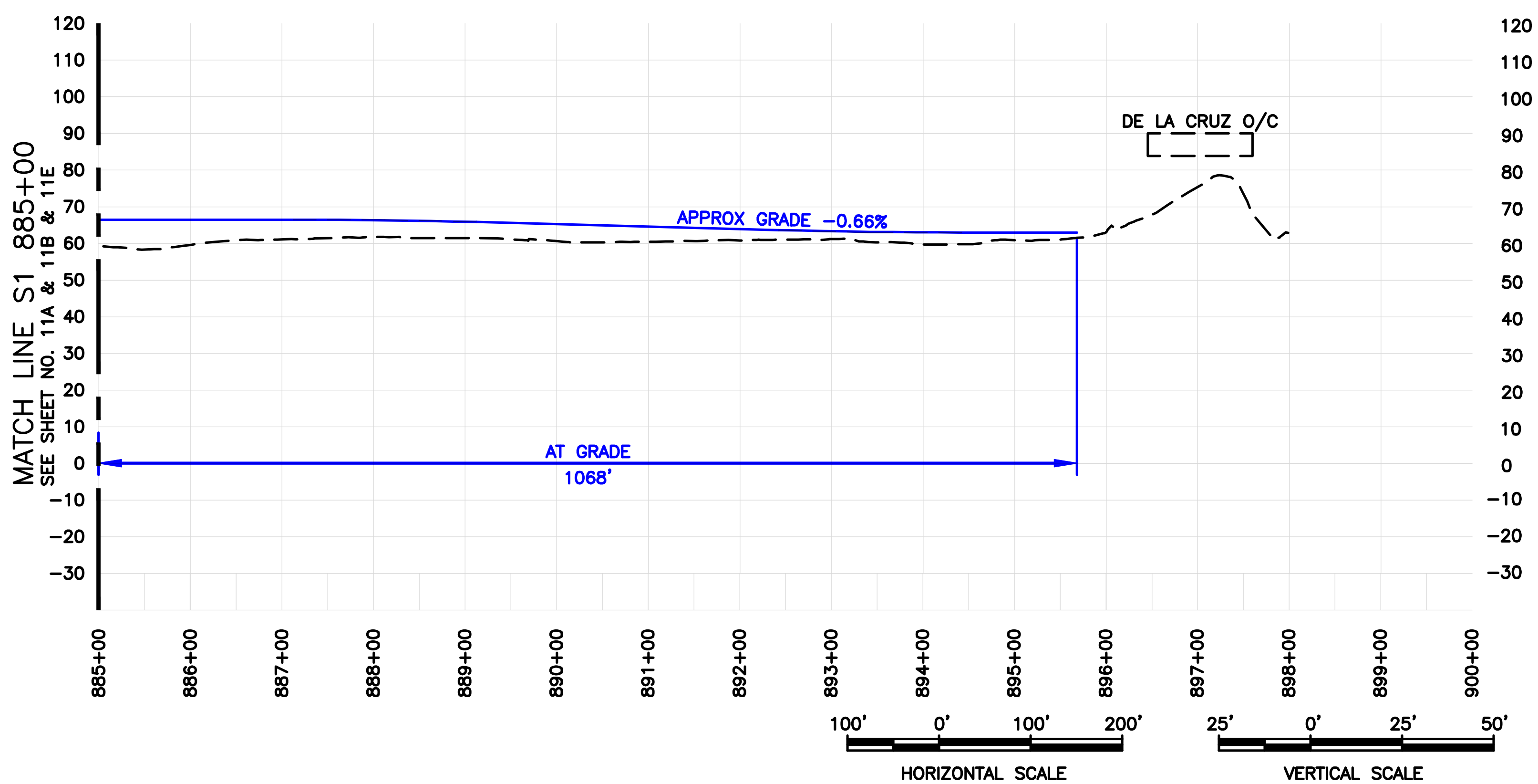

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
& DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 12A & 12B & 12E

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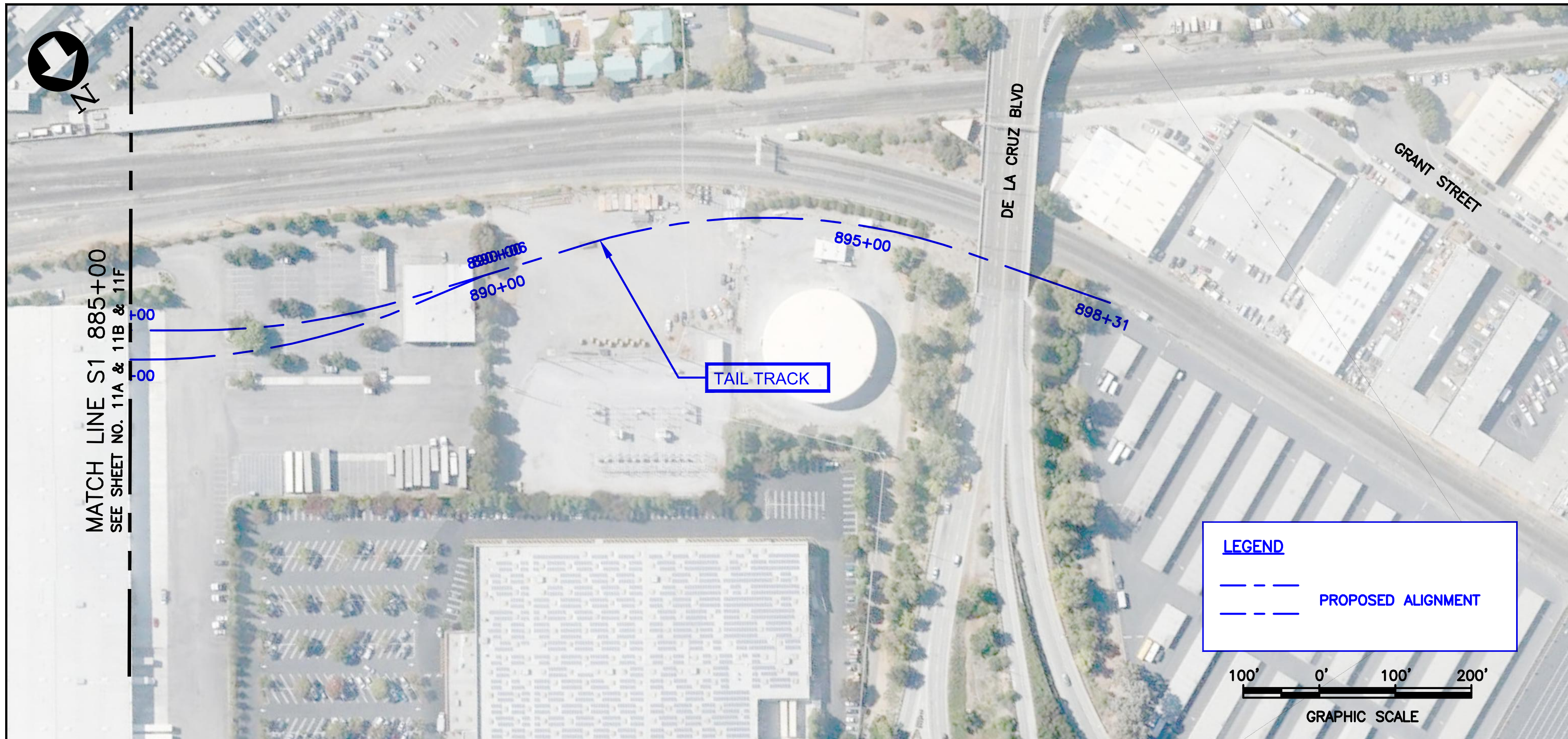

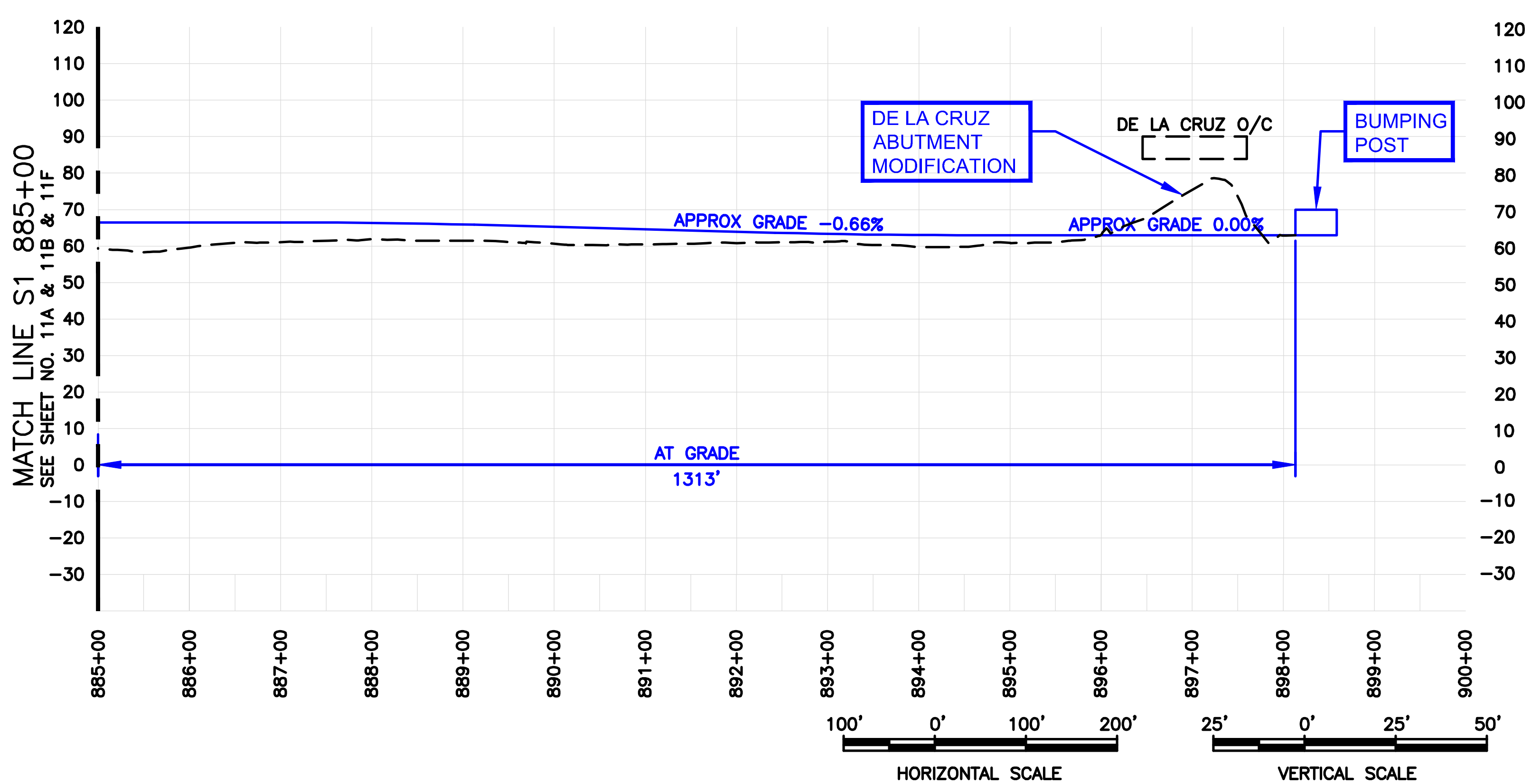

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

CONCEPTUAL PLANS

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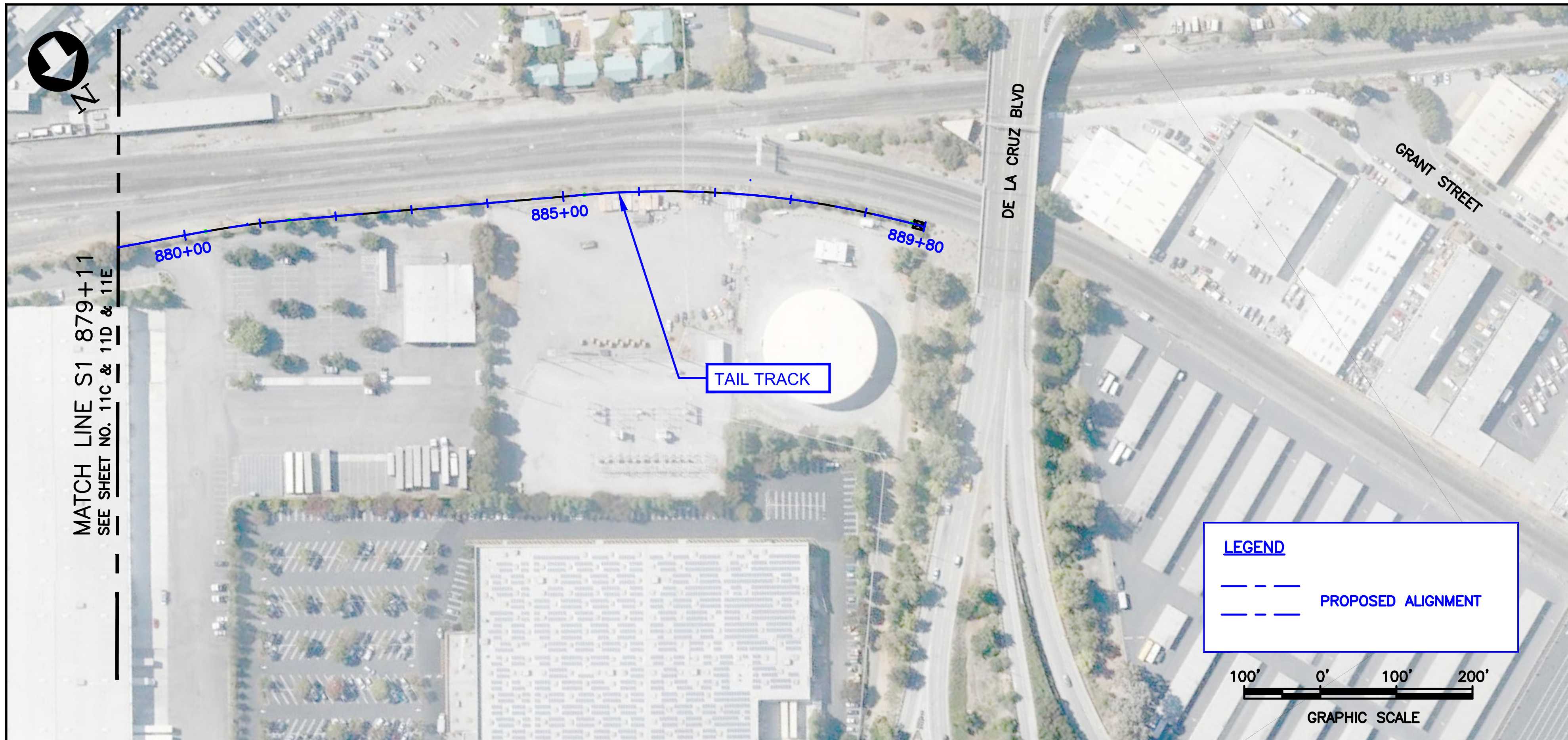
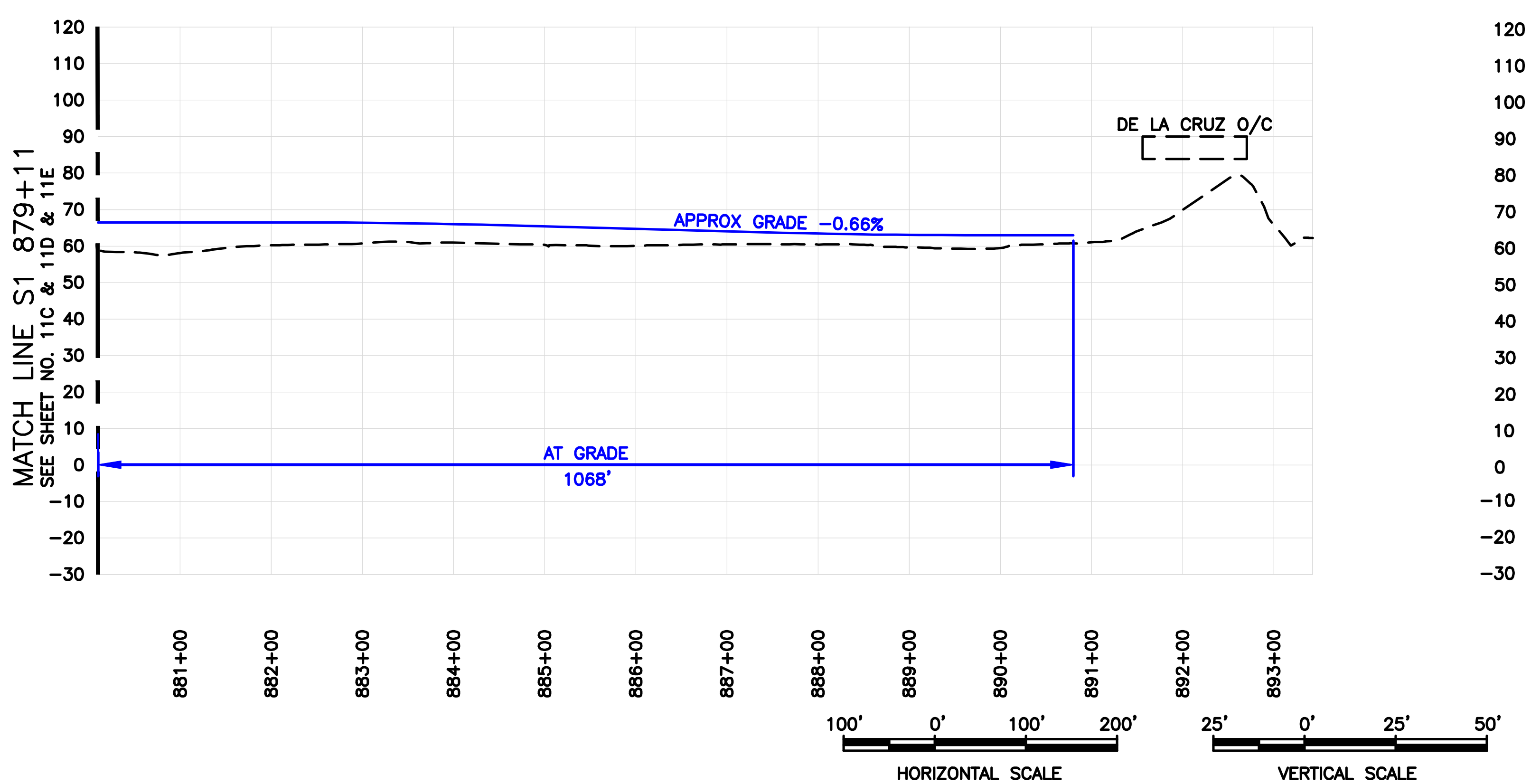
SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT
& DIRIDON STATION SOUTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 12A & 12B & 12F





NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT
& DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 12C & 12D & 12E

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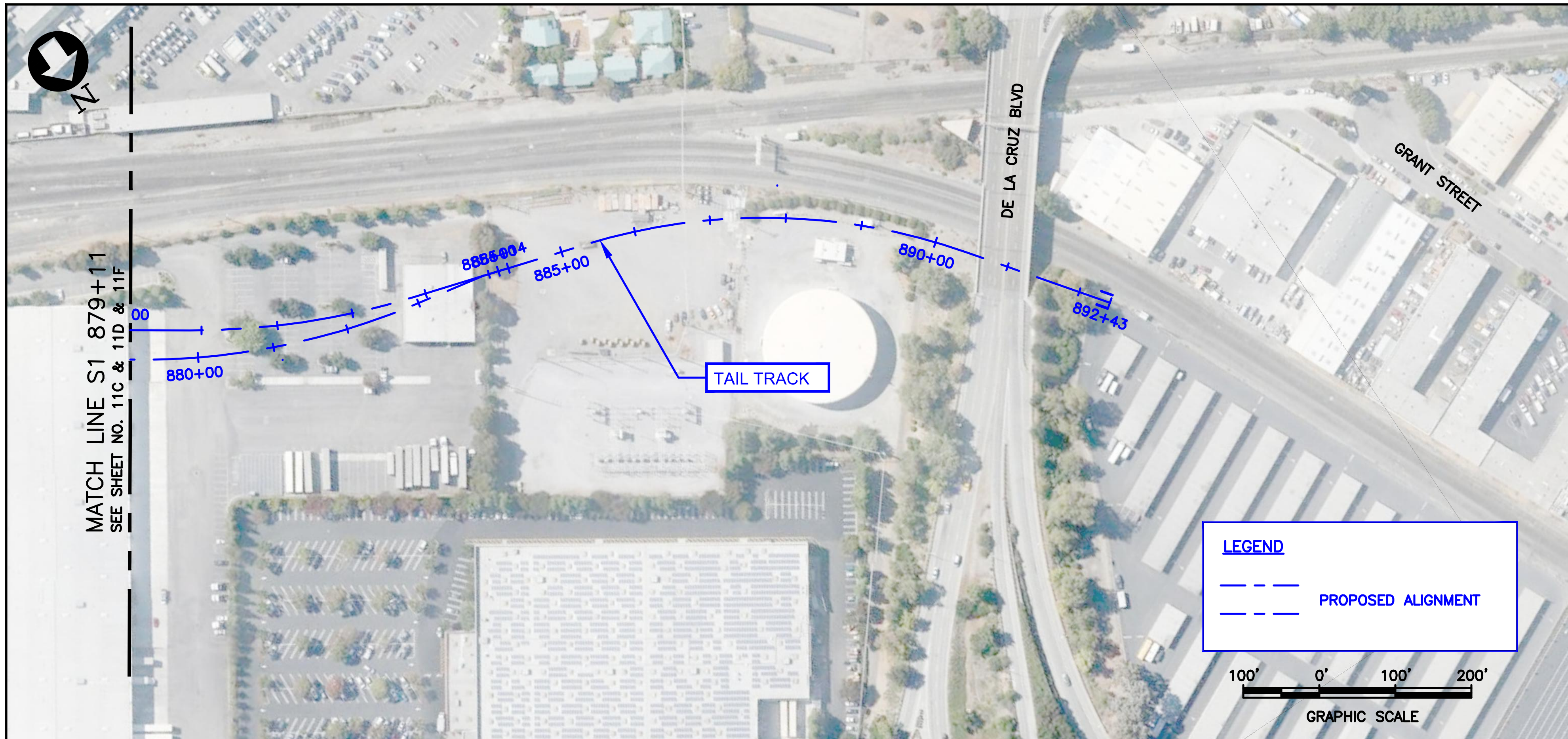

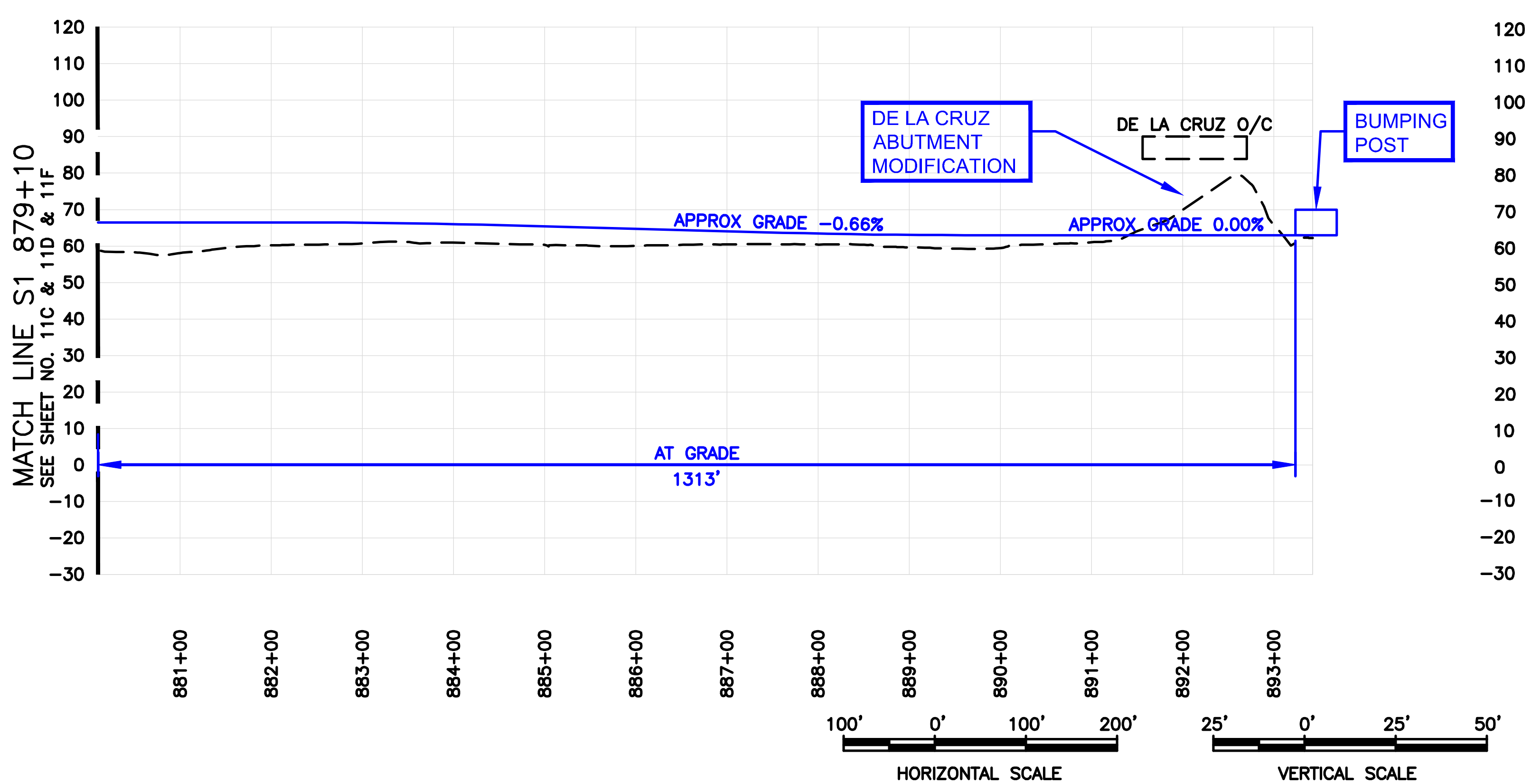

NOTE: DUE TO THE DIFFERENCE IN LENGTH OF THE ENTIRE PROJECT ALIGNMENT OF THE DIRIDON STATION NORTH OPTION VS. THE DIRIDON STATION SOUTH OPTION, THE STATION NUMBERING IS DIFFERENT BETWEEN THE TWO OPTIONS.

CONCEPTUAL PLANS

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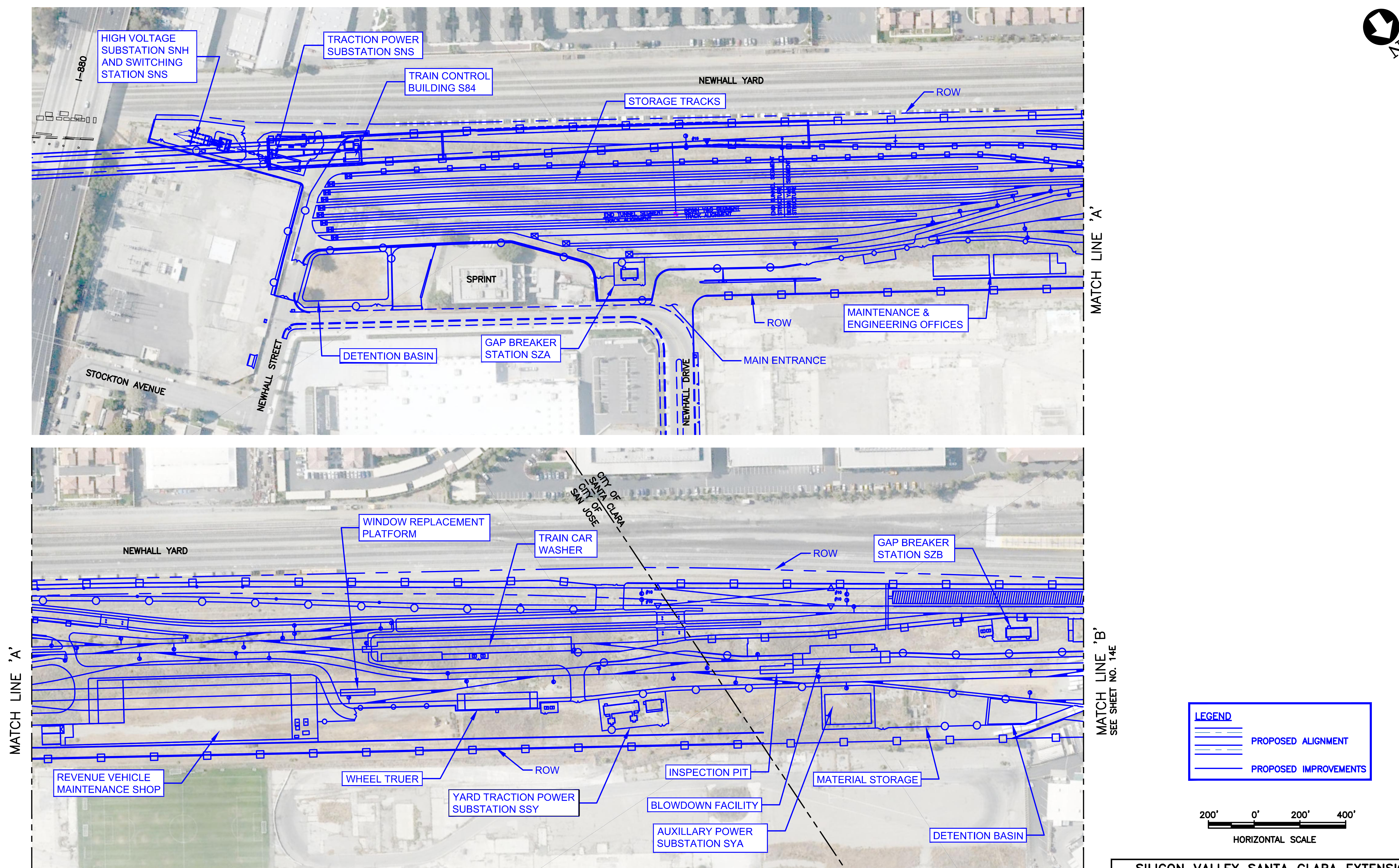
SVSX–S–TA–X012.dwg

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEAR DE LA CRUZ BOULEVARD
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT
& DIRIDON STATION NORTH OPTION ALIGNMENT
PLAN & PROFILE
SHEET 12C & 12D & 12F



LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

200' 0' 200' 400'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY
W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT

PLAN
SHEET 13E

SVSX-S-TA-X013.dwg

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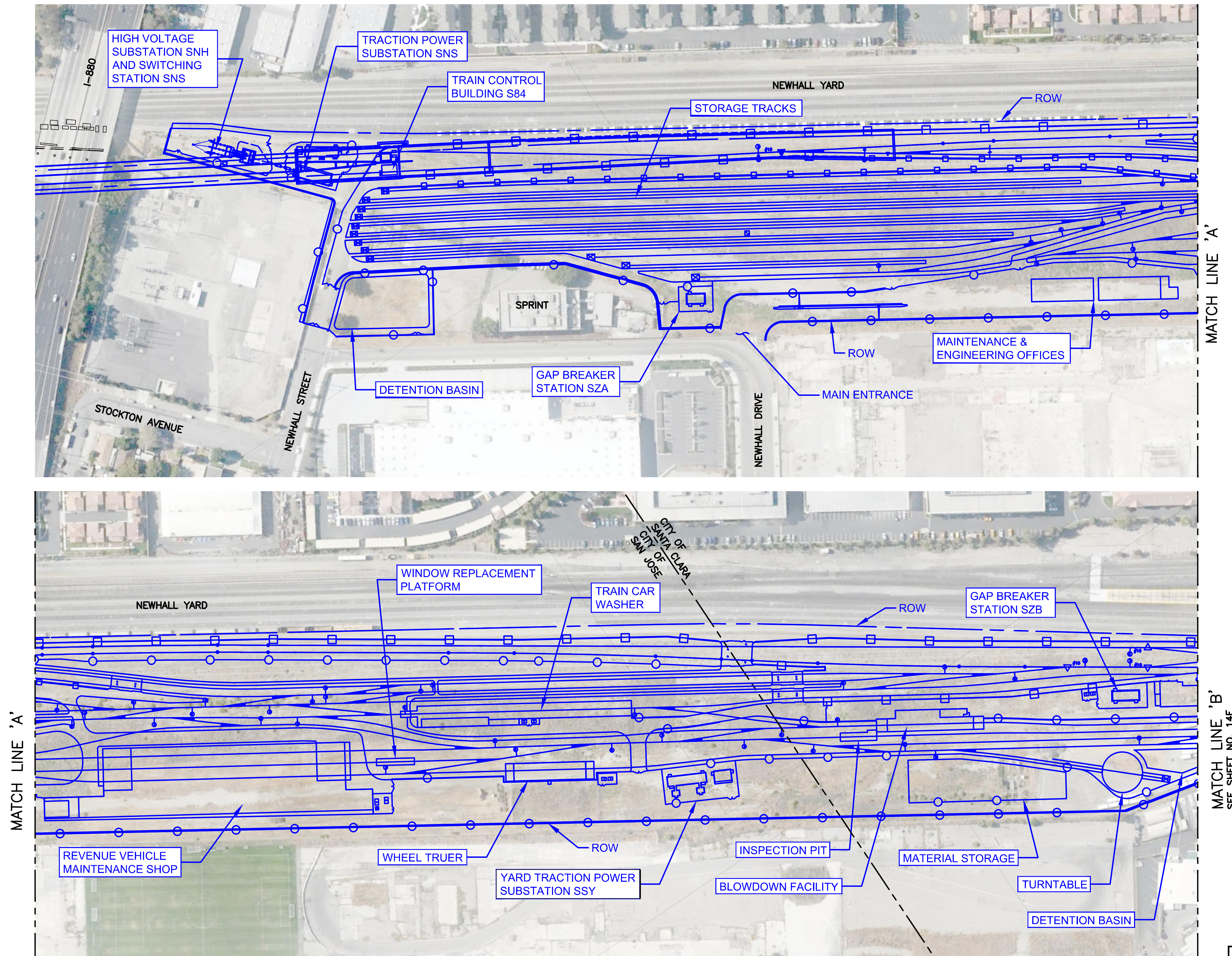

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LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

200' 0' 200' 400'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY
W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT

PLAN
SHEET 13F

SVSX-S-TA-X013.dwg

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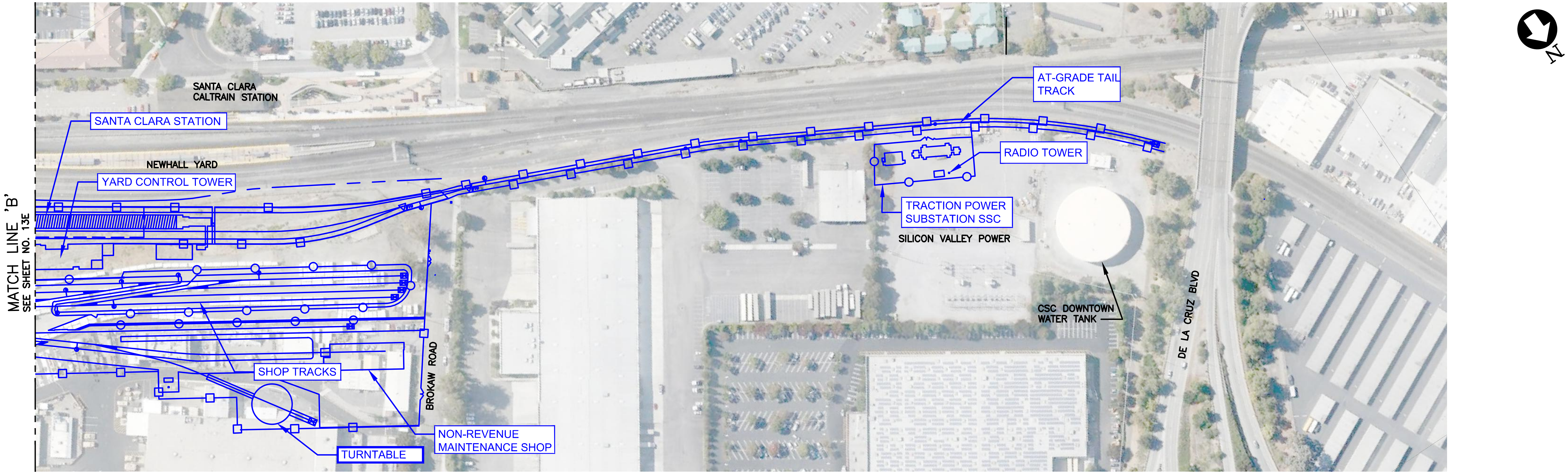

LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

200' 0' 200' 400'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION
LOCATION: NEWHALL MAINTENANCE FACILITY & TAIL TRACK
W/ SANTA CLARA STATION SOUTH OPTION

PLAN
SHEET 14E

SVSX-S-TA-X014.dwg

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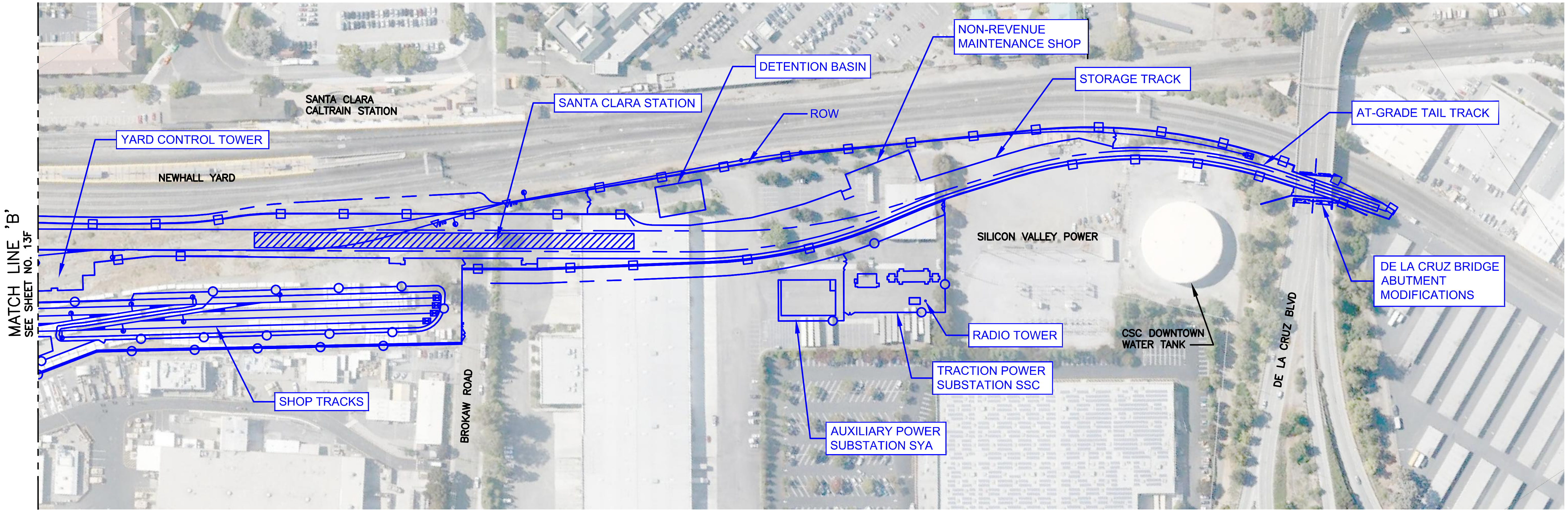

LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

200' 0' 200' 400'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION

LOCATION: NEWHALL MAINTENANCE FACILITY & TAIL TRACK W/ SANTA CLARA STATION NORTH OPTION

PLAN

SHEET 14F

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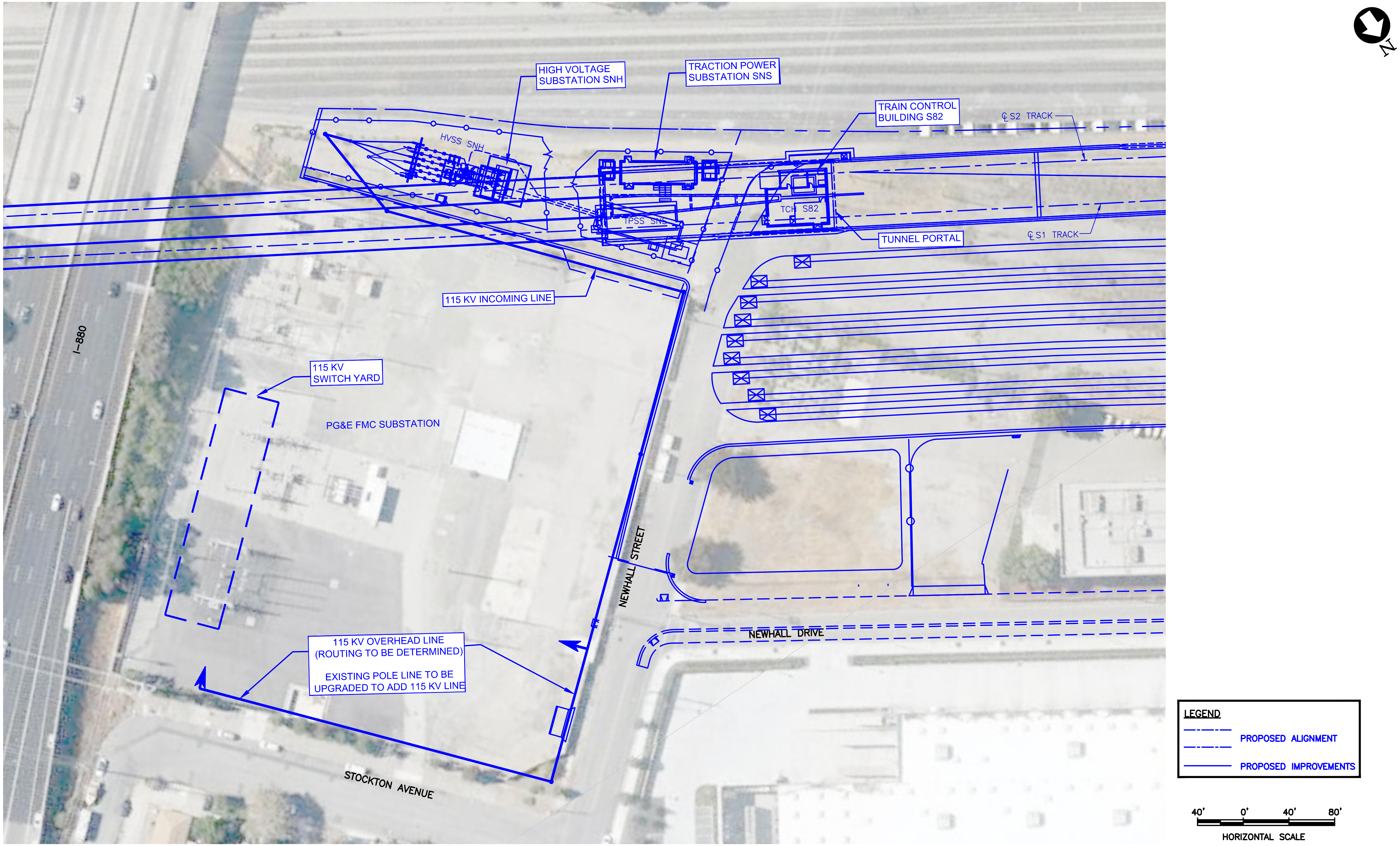

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION

LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION SOUTH OPTION ALIGNMENT

SITE PLAN
SHEET 15E

SVSX-S-TA-X015.dwg

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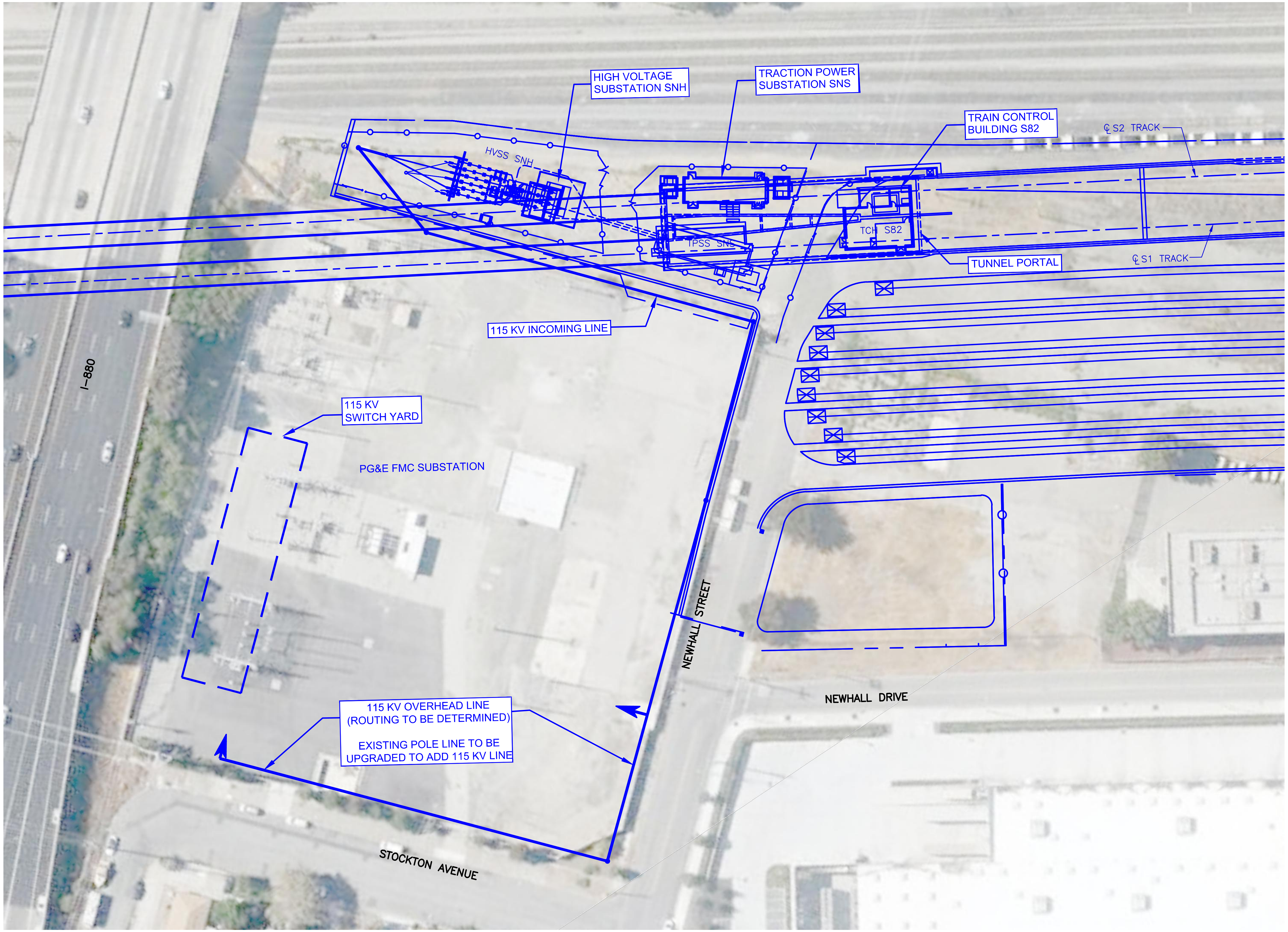

LEGEND

PROPOSED ALIGNMENT

PROPOSED IMPROVEMENTS

40' 0' 40' 80'

HORIZONTAL SCALE

CONCEPTUAL PLANS

SILICON VALLEY SANTA CLARA EXTENSION

LOCATION: 115-kV LINE AND SYSTEMS FACILITIES NORTH OF I-880 W/ SANTA CLARA STATION NORTH OPTION ALIGNMENT

SITE PLAN
SHEET 15F

SVSX-S-TA-X015.dwg

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Appendix E

Construction Staging Area Exhibits

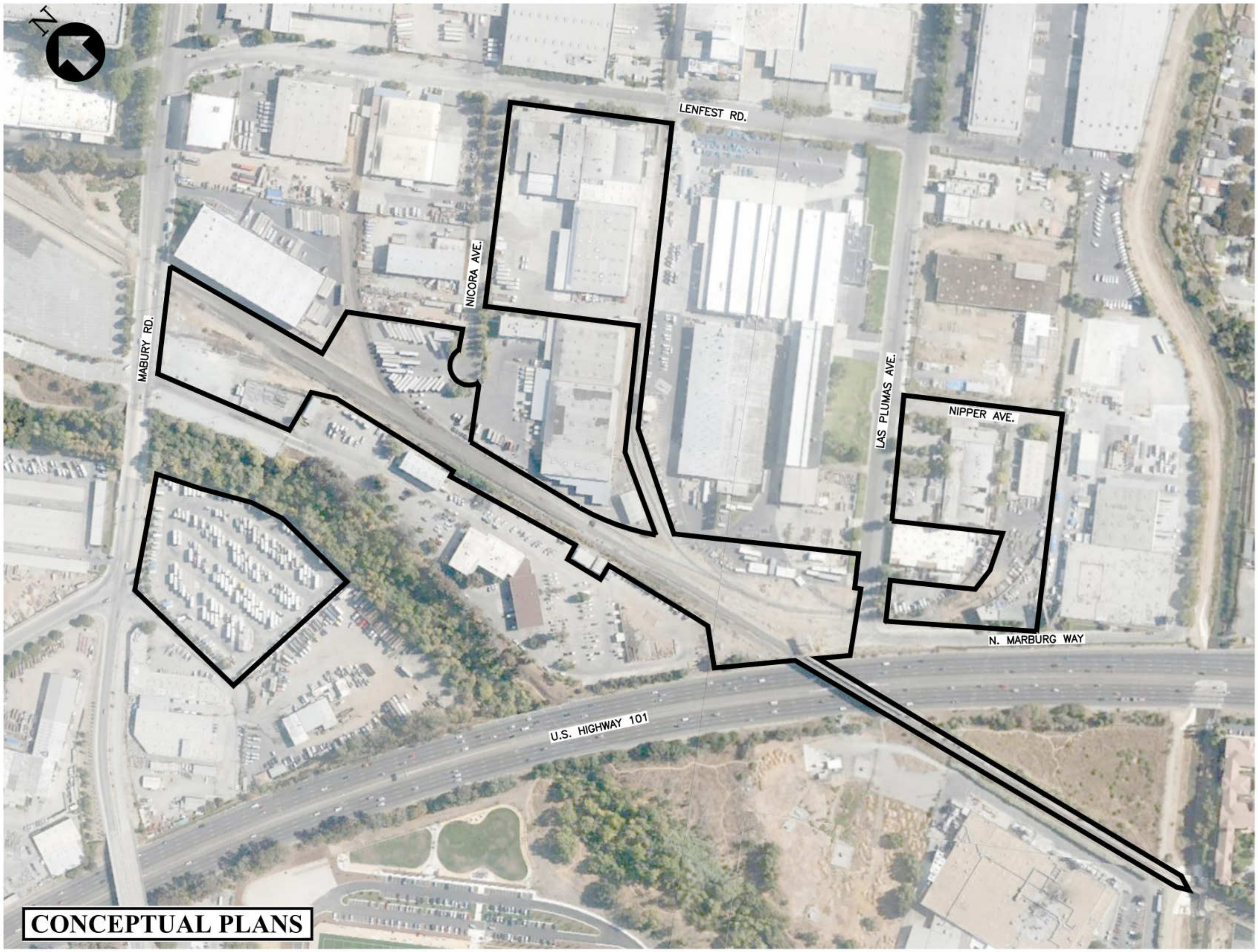

Figure X-X: Mabury Road and U.S. 101 Construction Staging Areas

Figure X-X: Alum Rock/28th Street Station Construction Staging Areas

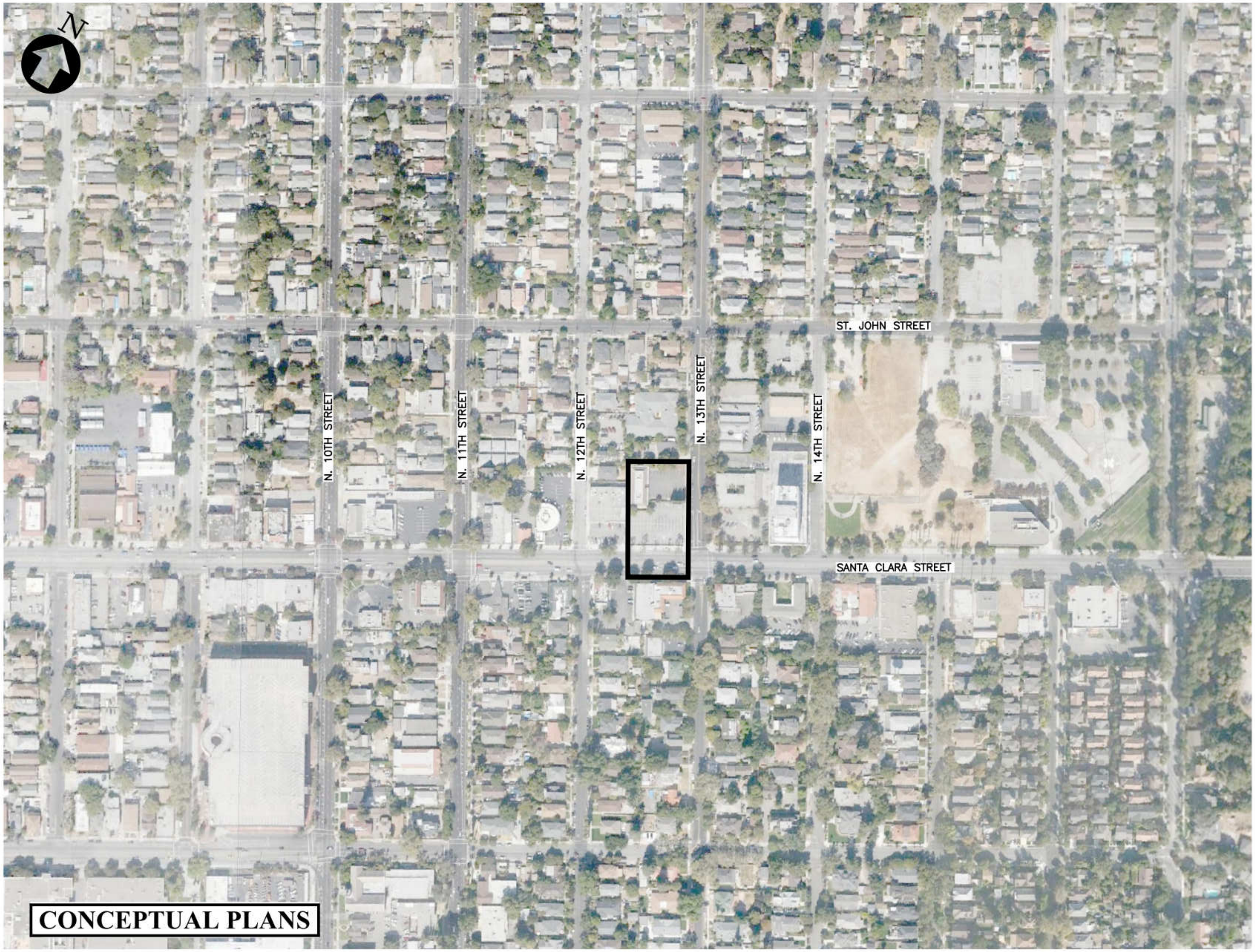

Figure X-X: 13th Street Ventilation Structure Construction Staging Area

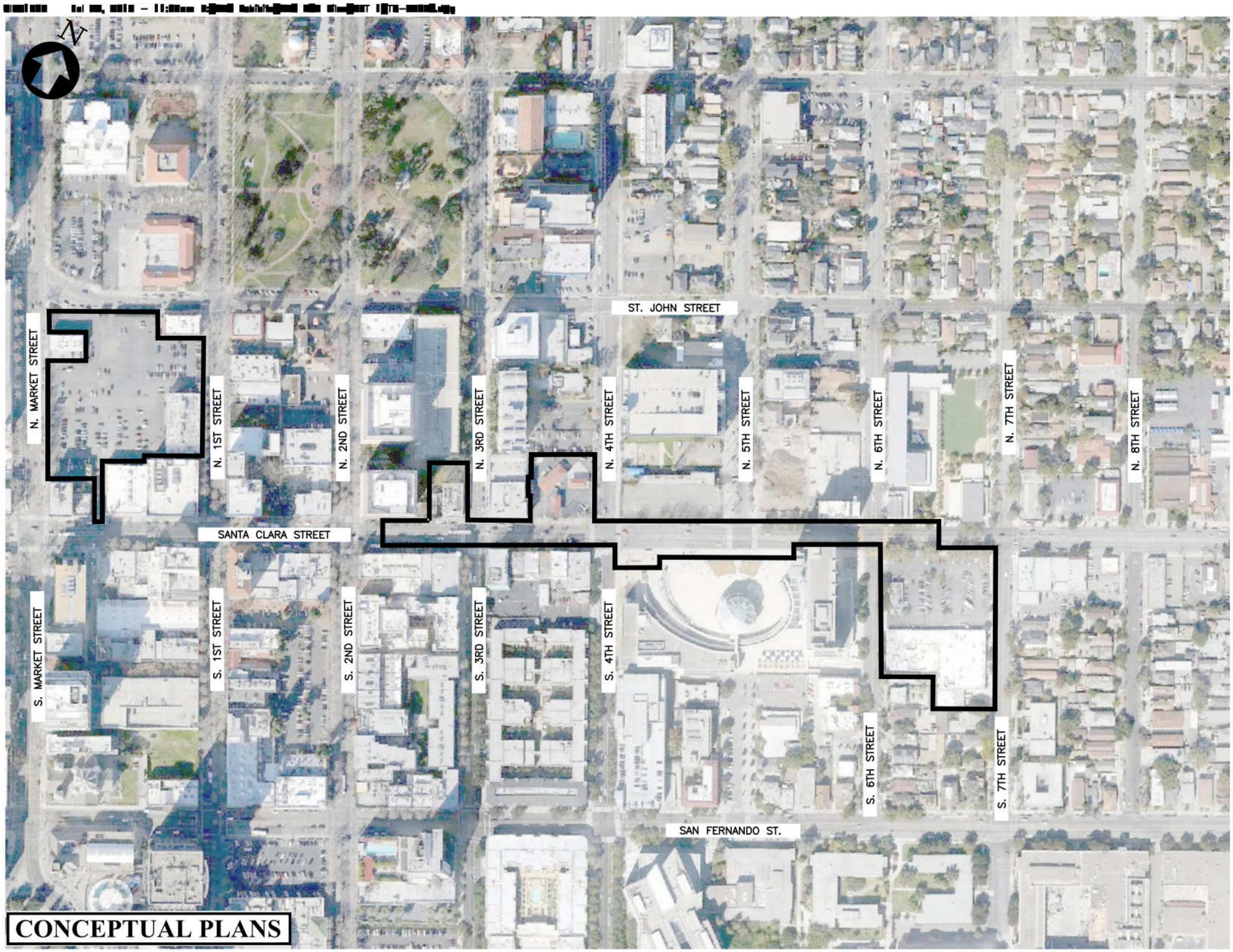

Figure X-X: Downtown San Jose Station East Option Construction Staging Areas

CAN65172 Mar 15, 2016 – 9:54am C:\Users\can65172\Documents\SVSX\20151001 For Krishna Base Enviro P&P\CSA's\Native\TR-CS09.dwg

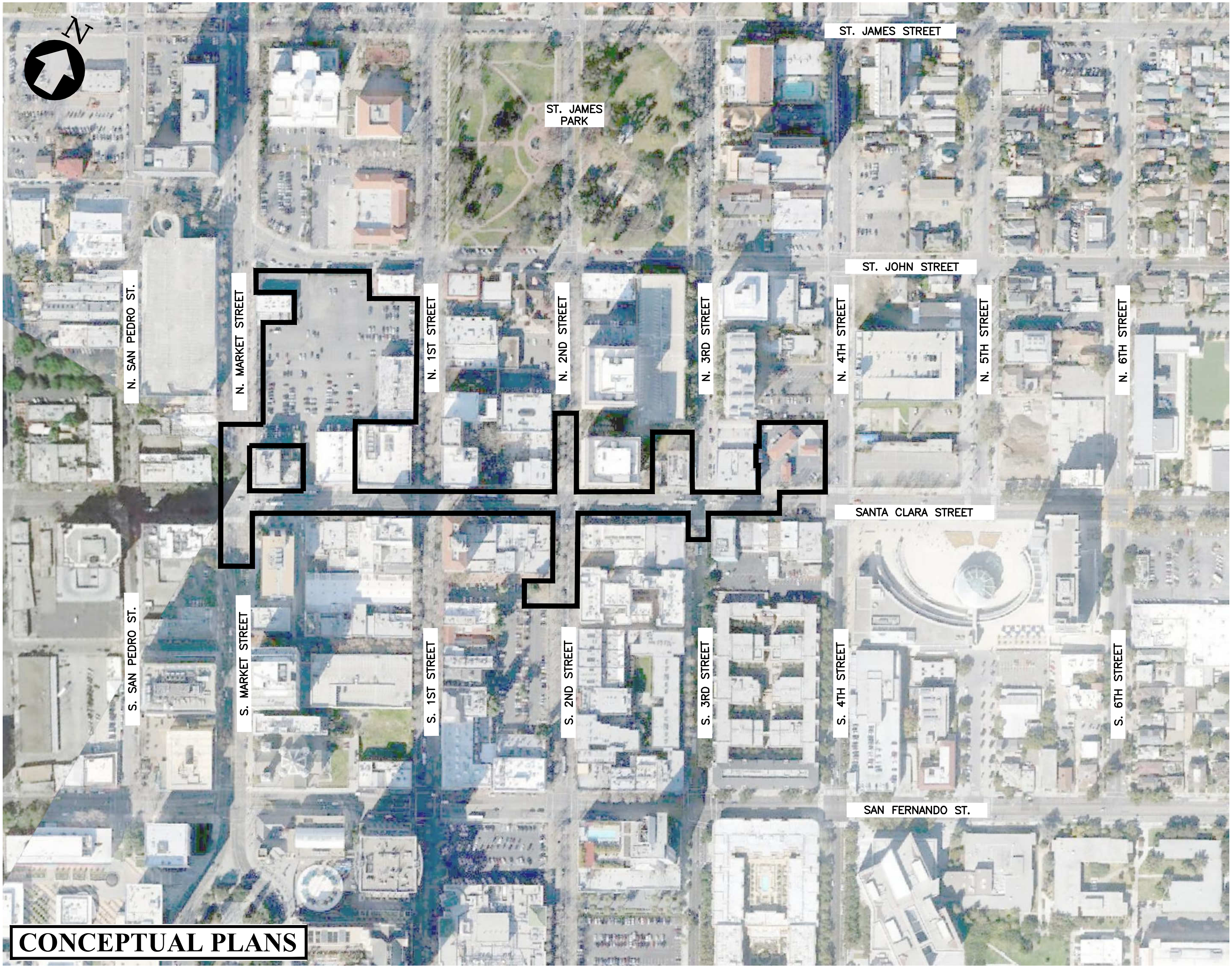

Figure X-X: Downtown San Jose Station West Option Construction Staging Areas

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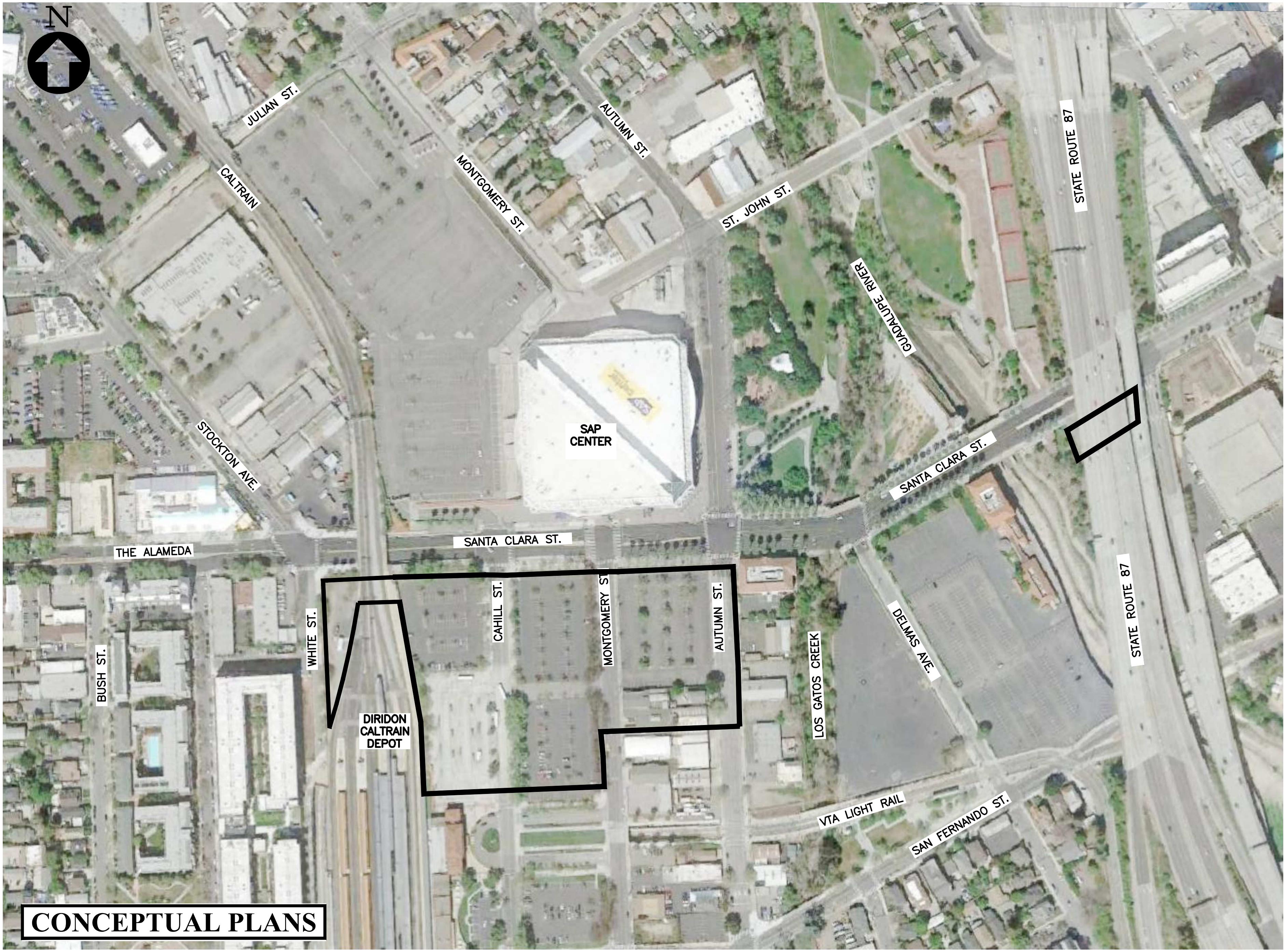

Figure X-X: Diridon Station North Option Construction Staging Areas

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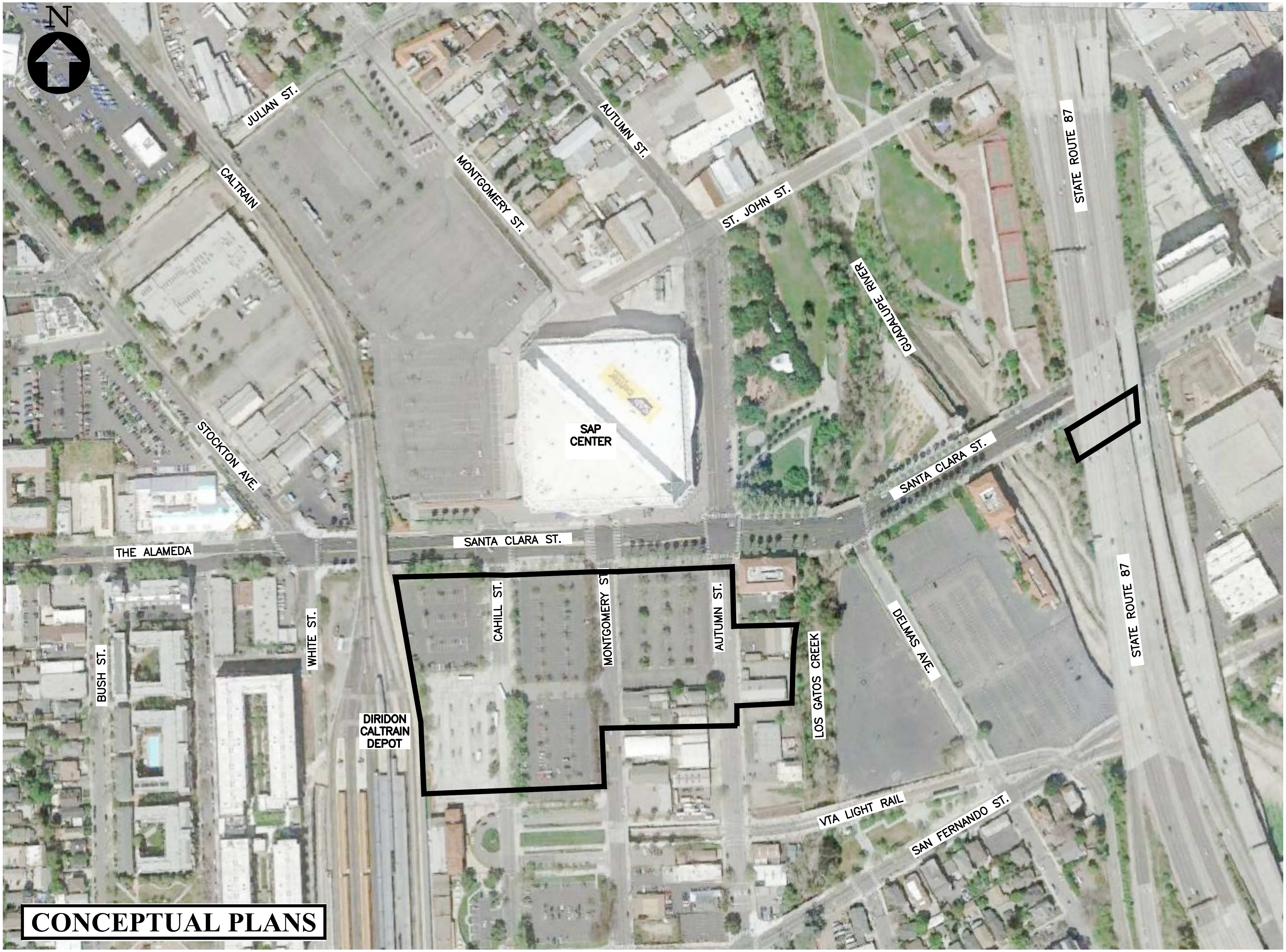

Figure X-X: Diridon Station South Option Construction Staging Areas

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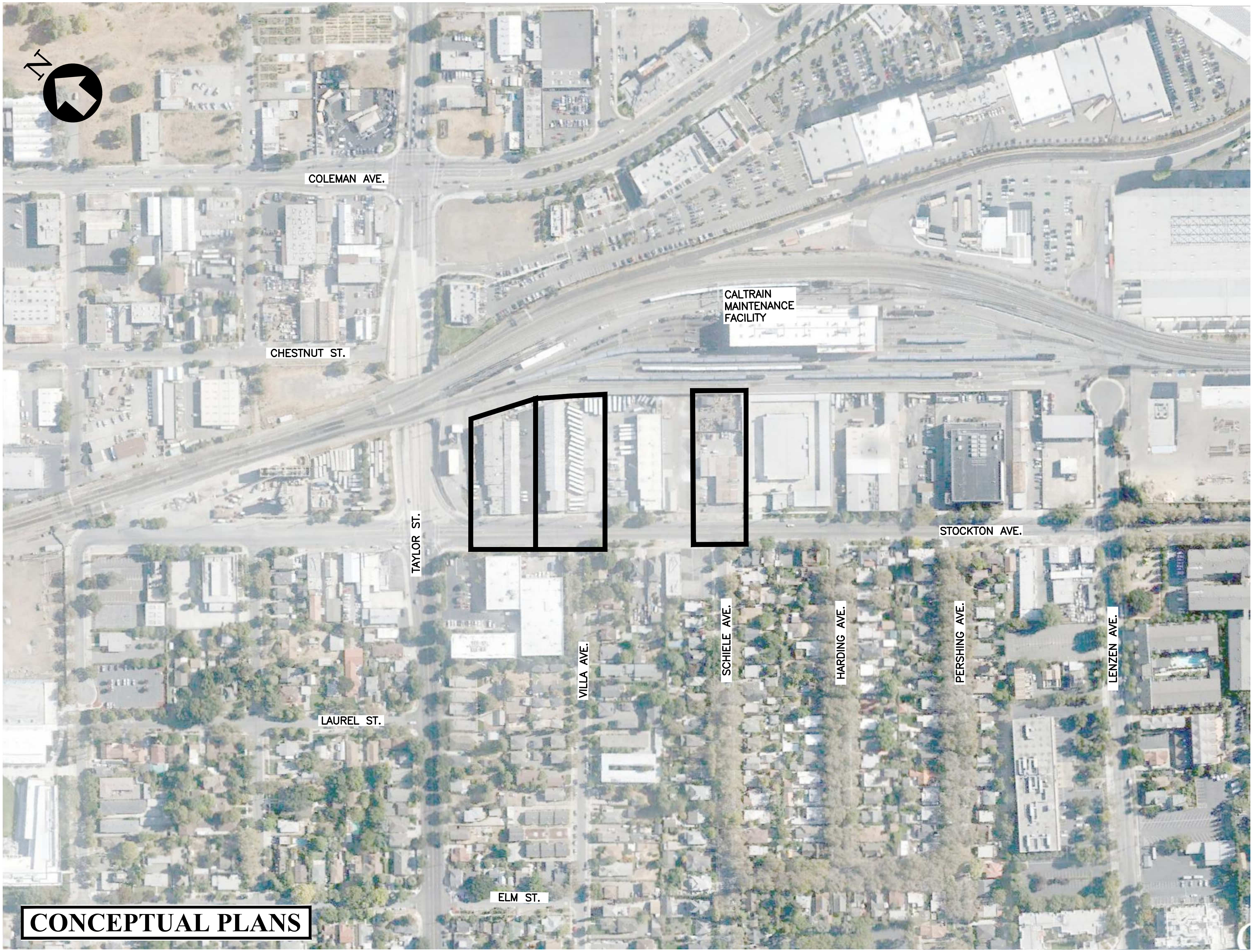

Figure X-X: Stockton Avenue Ventilation Structure Options Construction Staging Areas

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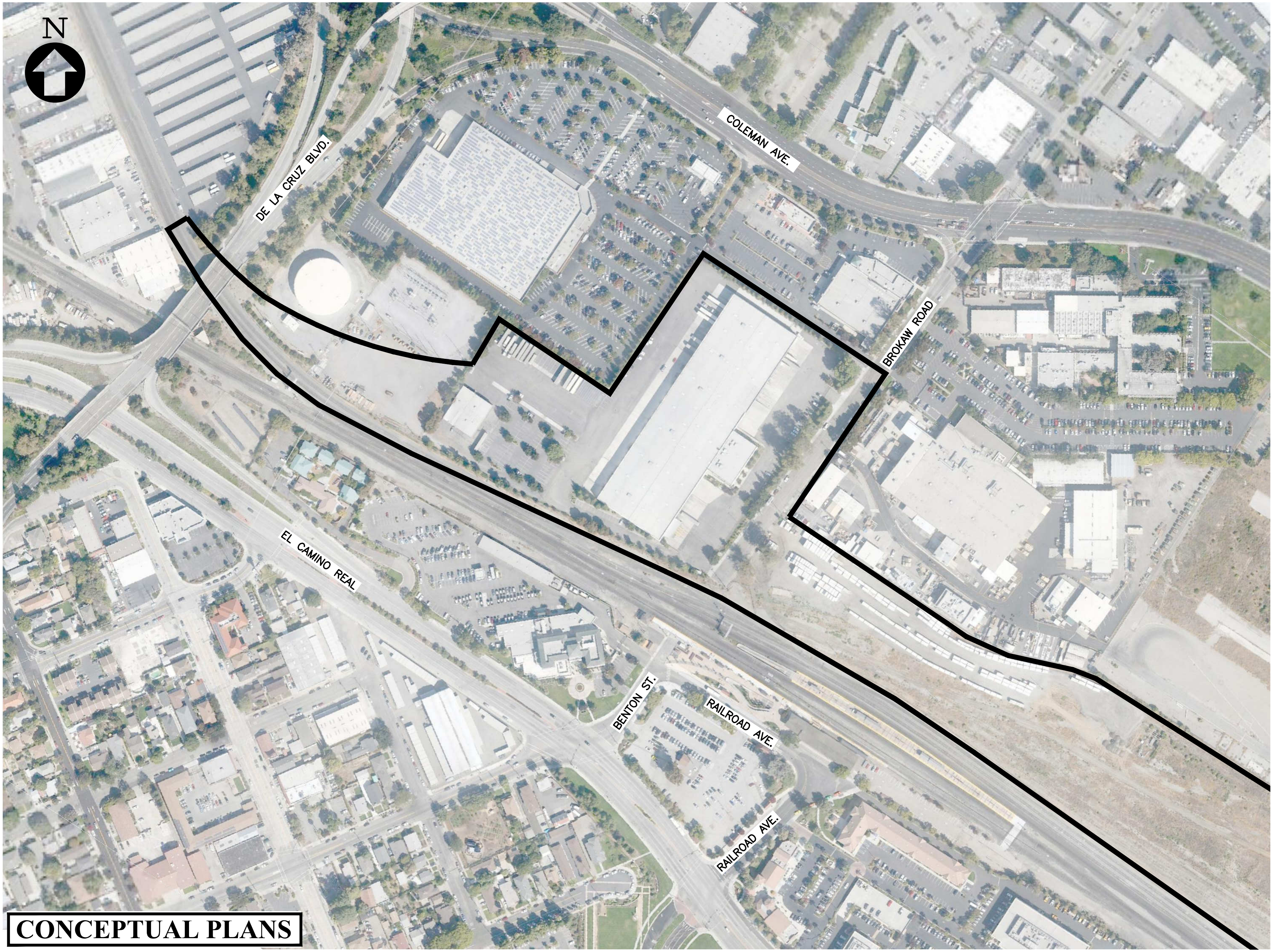

CONCEPTUAL PLANS

Figure X-X: Santa Clara Station North Option and Newhall Maintenance Facility Construction Staging Area

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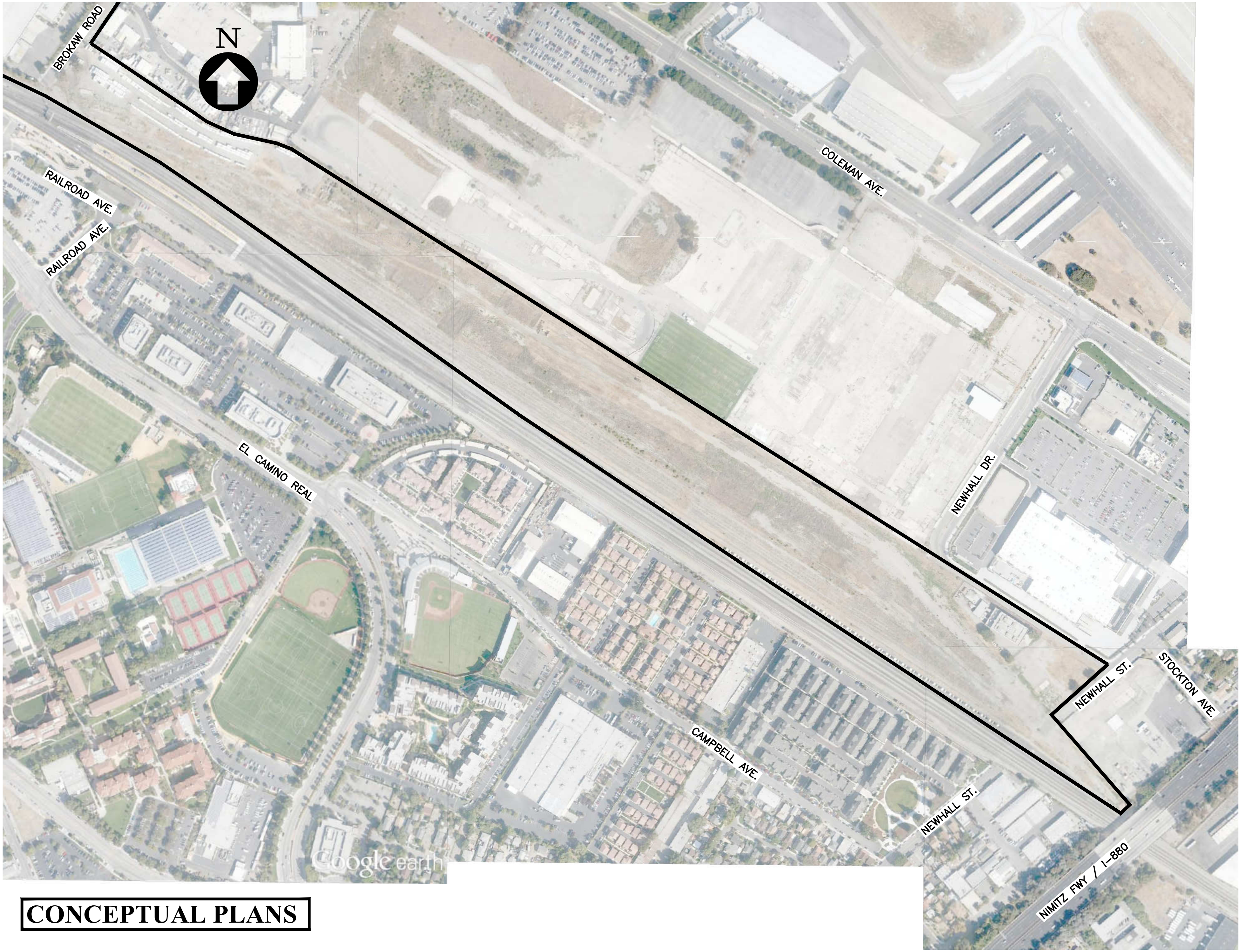

CONCEPTUAL PLANS

Figure X-X: Newhall Maintenance Facility Construction Staging Area with Santa Clara Station North Option