



Noise Abatement Decision Report

Supplemented by the July 2015 Noise Study Report

San Bernardino and Los Angeles Counties

07-LA-10 PM 44.9/48.3
08-SBD-10 PM 0.0/R37.0

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List of Acronyms and Abbreviated Terms

Benefited residence	A dwelling unit expected to receive a noise reduction of at least 5 dB from the proposed abatement measure
BNSF	Burlington Northern Santa FE
Caltrans	California Department of Transportation
CCD	Caltrans Cost Database
CEQA	California Environmental Quality Act
CFR	<i>Code of Federal Regulations</i>
CPI	Construction Price Index
dB	decibel—A measure of sound pressure level on a logarithmic scale
dBA	A-weighted decibel—A-weighted sound pressure level
ED	Environmental Document
FHWA	Federal Highway Administration
HOV	high-occupancy vehicle
I-10	Interstate 10
I-215	Interstate 215
LA/SB	Los Angeles/San Bernardino
MWD	Metropolitan Water District of Southern California
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
NSR	Noise Study Report
PM	Post Mile
Protocol	Caltrans Traffic Noise Analysis Protocol
Reasonable allowance	A single dollar value—a reasonable allowance per benefited residence that embodies three reasonableness factors
ROW	right-of-way
SANBAG	San Bernardino Associated Governments
SR	State Route
TNM	Traffic Noise Model
UPRR	Union Pacific Railroad

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Chapter 1 Introduction

The Noise Abatement Decision Report (NADR) presents the preliminary noise abatement decision as defined in the California Department of Transportation (Caltrans) Traffic Noise Analysis Protocol (Protocol). This report has been approved by a California licensed professional civil engineer. The project-level noise study report (NSR) (2015) prepared for this project is hereby incorporated by reference.

1.1 Noise Abatement Assessment Requirements

Title 23, *Code of Federal Regulations* (CFR), Part 772 of the Federal Highway Administration (FHWA) standards (23 CFR 772) and the Caltrans Traffic Noise Analysis Protocol (Protocol) require that noise abatement be considered for projects that are predicted to result in traffic noise impacts. A traffic noise impact is considered to occur when future predicted design-year noise levels with the project “approach or exceed” Noise Abatement Criteria (NAC) defined in 23 CFR 772 or when the predicted design-year noise levels with the project substantially exceed existing noise levels. A predicted design-year noise level is considered to “approach” the NAC when it is within 1 decibel (dB) of the NAC. A substantial increase is defined as being a 12-dB increase above existing conditions.

23 CFR 772 requires that noise abatement measures that are reasonable and feasible and are likely to be incorporated into the project be identified before adoption of the Final Environmental Document (ED).

The Protocol establishes a process for assessing the reasonableness and feasibility of noise abatement. Before publication of the Draft ED, a *preliminary noise abatement decision* is made. The preliminary noise abatement decision is based on the *feasibility* of evaluated abatement and the *preliminary reasonableness determination*. Noise abatement is considered to be acoustically feasible if it is predicted to provide noise reduction of at least 5 dB at an impacted receptor. Other nonacoustical factors relating to geometric standards (e.g., sight distances), safety, maintenance, and security can also affect feasibility.

The overall reasonableness of noise abatement is determined by the following three factors:

- The viewpoints of benefited receptors;
- The cost of noise abatement; and

- The noise reduction design goal.

The preliminary reasonableness determination reported in this document is based on the noise reduction design goal and the cost of abatement. The viewpoints of benefited receptors are determined by a survey that is normally conducted during the public review period for the project ED.

Caltrans' noise reduction design goal is that a barrier must be predicted to provide at least 7 dB of noise reduction at one or more benefited receptors. The cost reasonableness of abatement is determined by calculating a cost allowance that is considered to be a reasonable amount of money to spend on abatement. This *reasonable allowance* is then compared to the engineer's cost estimate for the abatement. If the engineer's cost estimate is less than the allowance and the abatement will provide at least 7 dB of noise reduction at one or more benefited receptors, then the preliminary determination is that the abatement is reasonable. If the cost estimate is higher than the allowance or if the design goal cannot be achieved, the preliminary determination is that abatement is not reasonable.

The NADR presents the preliminary noise abatement decision based on acoustical and nonacoustical feasibility factors, the design goal, and the relationship between noise abatement allowances and the engineer's cost estimate. The NADR does not present the final decision regarding noise abatement; rather, it presents key information on abatement to be considered throughout the environmental review process, based on the best available information at the time the Draft ED is published. The final overall reasonableness decision will take this information into account, along with the results of the survey of benefited receptors conducted during the environmental review process.

At the end of the public review process for the ED, the final noise abatement decision is made and is indicated in the Final ED. The preliminary noise abatement decision will become the final noise abatement decision unless compelling information received during the environmental review process indicates that it should be changed.

1.2 Purpose of the Noise Abatement Decision Report

The purpose of the NADR is to:

- Summarize the conclusions of the NSR relating to acoustical feasibility, the design goal, and the reasonable allowances for abatement evaluated;

- Present the engineer's cost estimate for evaluated abatement;
- Present the engineer's evaluation of nonacoustical feasibility issues;
- Present the preliminary noise abatement decision; and
- Present preliminary information on secondary effects of abatement (e.g., impacts on cultural resources, scenic views, hazardous materials, biology).

The NADR does not address noise barriers or other noise-reducing treatments required as mitigation for significant adverse environmental effects identified under the California Environmental Quality Act (CEQA).

1.3 Project Description

Caltrans, in cooperation with the San Bernardino Associated Governments (SANBAG), proposes to add freeway lanes through all or a portion of the 33-mile-long stretch of Interstate 10 (I-10) from the Los Angeles/San Bernardino (LA/SB) county line to Ford Street in San Bernardino County. The project limits, including transition areas, extend from approximately 0.4 mile west of White Avenue in Pomona at Post Mile (PM) 44.9 to Live Oak Canyon Road in Yucaipa at PM 37.0; however, for the purpose of the noise study, the project limits extend from Towne Avenue in Pomona (Los Angeles County) to 0.75 mile east of Ford Street in Redlands (San Bernardino County). Figures 1 and 2 show the project vicinity and project location, respectively.

The No Build Alternative (Alternative 1) and two build alternatives (Alternatives 2 and 3) are under consideration.

1.3.1 No Build Alternative

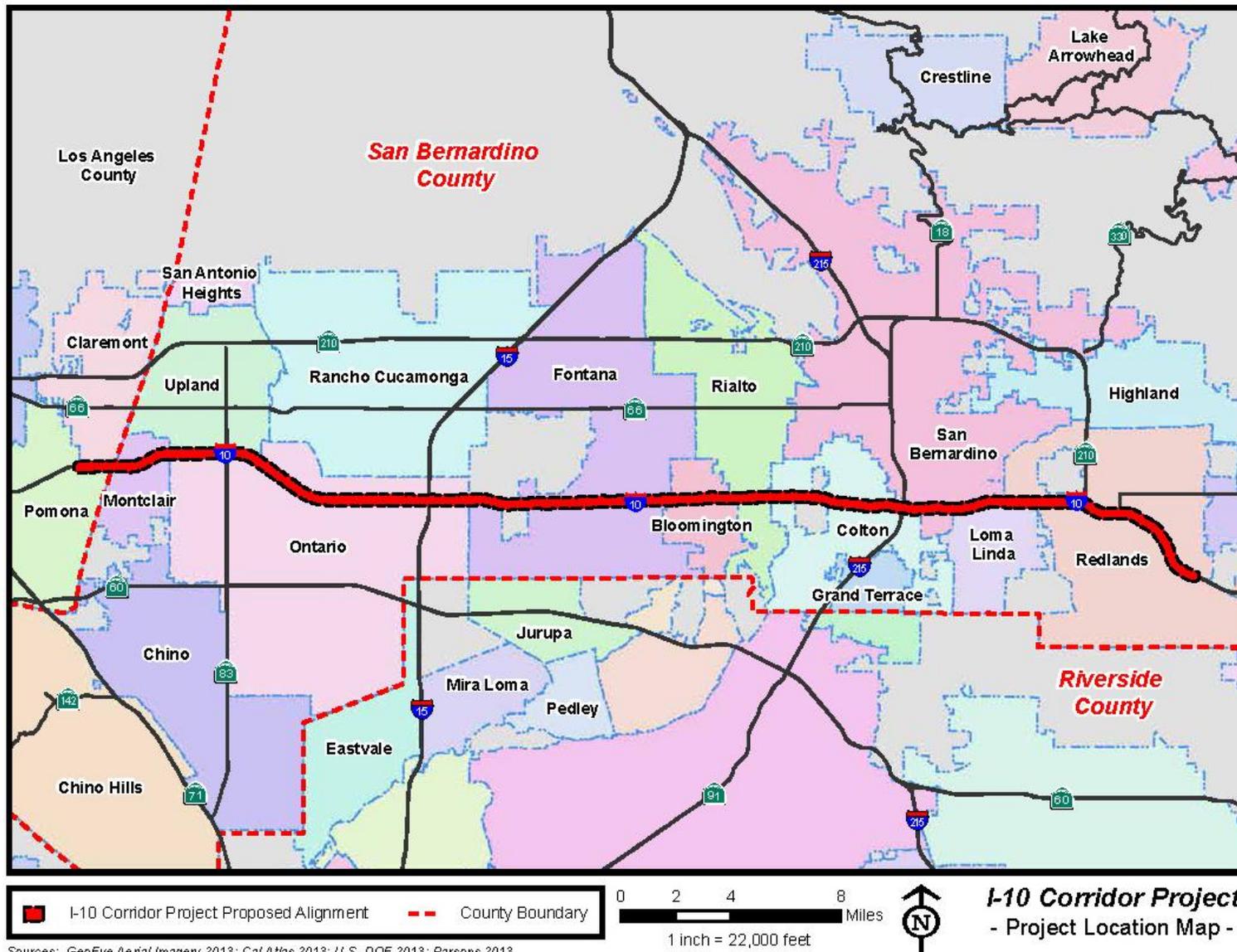
The No Build Alternative would maintain the existing lane configuration of I-10 within the project limits with no additional mainline lanes or associated improvements to be provided.

1.3.2 Build Alternatives

Two build alternatives are proposed for evaluation in the ED.

Alternative 2: One High-Occupancy Vehicle Lane in Each Direction

Alternative 2 would extend the existing high-occupancy vehicle (HOV) lane in each direction of I-10 from the current HOV terminus near Haven Avenue in Ontario to Ford Street in Redlands, a distance of approximately 25 miles.



Sources: GeoEye Aerial Imagery 2013; CalAtlas 2013; U.S. DOE 2013; Parsons 2013.

Figure 2. Project Location Map

Alternative 3: Two Express Lanes in Each Direction

Alternative 3 would provide two Express Lanes in each direction of I-10 from the LA/SB county line to California Street (near State Route [SR] 210) in Redlands and one Express Lane in each direction from California Street to Ford Street in Redlands, a total of 33 miles. The Express Lanes would be priced managed lanes in which vehicles not meeting the minimum occupancy requirement would pay a toll. West of Haven Avenue, a single new lane would be constructed and combined with the existing HOV lane to provide two Express Lanes in each direction; east of Haven Avenue, the Express Lanes would be constructed by the project.

1.4 Affected Land Uses

A detailed field investigation was conducted to identify land uses that could be subject to traffic noise impacts from the proposed project. Single-family and multi-family residences, as well as mobile homes, were identified as Activity Category B land uses. Five parks, eight schools, five churches, two preschools, a community center, a tennis club, a golf course, a picnic area, Boomers Entertainment Park, Splash Kingdom Water Park, a radio station, and a museum were identified as Activity Category C land uses. Several hotels/motels, schools, and places of worship were identified as Activity Category D land uses. Various hotels/motels, restaurants, and office buildings were identified as Activity Category E land uses. There are also multiple empty lots and some agricultural uses throughout the corridor. The interior rooms of hotels and motels have been considered Activity Category D throughout the study area. This is because when the project began in 2009, the interior criterion was still used for hotels/motels and analyzing the interior rooms of the hotels/motels was carried over from 2009.

As required by the Protocol, noise abatement is considered for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses primarily on locations with defined outdoor activity areas, such as residential backyards, common use areas at multi-family residences, parks, churches, schools, and hotels/motels.

This NADR analyzes 24 distinct segments that are based on major local interchanges. The 24 segments are:

Towne Avenue to Indian Hill Boulevard: The area north of I-10 is a mix of single-family and multi-family residences (Activity Category B); Rancho San Jose Park and the playground of Kinder Kountry Preschool (Activity Category C); and outdoor

seating areas of each room in Howard Johnson Hotel (Activity Category E). The area south of I-10 includes single-family residences (Activity Category B); and the playgrounds of Covenant United Methodist Church, a community center, and Jaycee Park (Activity Category C). The south side of I-10 also includes several commercial establishments, including the outdoor seating area of Norm's Restaurant (Activity Category E). There are existing soundwalls located at the shoulder and right-of-way (ROW) protecting Activity Category B and C land uses to the north and south of this segment from highway traffic noise. The adjacent land uses are at a lower elevation relative to I-10 except in the middle of the segment where the freeway is at grade.

Indian Hill Boulevard to Monte Vista Avenue: Areas north of I-10 are a mixture of single-family and multi-family residences, including Claremont Place Assisted Living (Activity Category B); the Claremont City Blessing Church School, Serrano Middle School, and the playground of a multi-family complex (Activity Category C); and the pool area of the Claremont Lodge (Activity Category E) and some commercial establishments. The area south of I-10 consists of single-family residences (Activity Category B) and the pool area of Hotel Claremont and Tennis Club (Activity Category C). There are also a couple of commercial establishments and utility south of I-10 in this segment. There are existing soundwalls located at the shoulder and ROW along eastbound and westbound I-10 that protect most of the Activity Category B and C land uses in this segment from highway traffic noise. Along this segment of I-10, the highway is elevated with respect to adjacent land uses.

Monte Vista Avenue to Central Avenue: Montclair Plaza Mall covers the areas along I-10 on the north side, with an outdoor seating area of Acapulco's Restaurant (Activity Category E). Land uses south of I-10 include multi-family residences (Activity Category B) and several commercial establishments, including two car dealerships. The land uses adjacent to I-10 are at a lower elevation than the highway at the west and east ends and at grade in the middle.

Central Avenue to Mountain Avenue: Areas north of I-10 contain multi-family residences and mobile homes (Activity Category B), Boomers Entertainment Park (Activity Category C), and Super 8 Motel with the pool exposed to the traffic noise (Activity Categories D and E). Areas south of I-10 contain single-family residences (Activity Category B), MacArthur Park (Activity Category C), a Cineplex, and some other commercial uses. There are existing soundwalls located along the eastbound shoulder protecting Activity Category B and C land uses from highway traffic noise.

Along this segment of I-10, the adjacent land uses are at a lower elevation relative to I-10.

Mountain Avenue to Euclid Avenue: The land use north of I-10 is a composite of single-family and multi-family residences (Activity Category B), as well as Westwood College (Activity Category D) and a couple of commercial establishments. The land use south of I-10 consists of a mixture of single-family residences (Activity Category B); Redeemer Lutheran School and outdoor use area of Church of Christ (Activity Category C); Church of Christ (Activity Category D); and commercial uses, including the outdoor seating area of Wingnuts Restaurant (Activity Category E). There are existing soundwalls located at the ROW along eastbound and westbound I-10 that protect most of the Activity Category B and C land uses in this segment from highway traffic noise. Along this segment of I-10, the highway is at a higher elevation with respect to the adjacent land uses at the west end and quickly transitions to become depressed for the remainder of the segment.

Euclid Avenue to 6th Street: The area north of I-10 is a mix of single-family and multi-family residences, including common use areas of multi-family complexes (Activity Category B); the OPARC Resource Center (Activity Category C); Kingdom Hall of Jehovah's Witness and medical offices (Activity Category D); and office buildings. The area south of I-10 includes single-family residences (Activity Category B) and Edison Elementary School (Activity Category C). There are existing soundwalls located at the ROW protecting most of the Activity Category B and C land uses to the north and south of this segment from highway traffic noise. The adjacent land uses are at a higher elevation relative to I-10.

6th Street to 4th Street: Areas north of I-10 are a mixture of single-family and multi-family residences, as well as mobile homes (Activity Category B), along with Little Learners Preschool (Activity Category C) and some commercial establishments. The area south of I-10 consists of single-family and multi-family residences (Activity Category B); West Coast Inn, Travelodge, and Days Inn (Activity Category D); and the pool areas of Travelodge and Days Inn (Activity Category E). There are also two large parcels of land on either side of I-10 that are owned by Metropolitan Water District of Southern California (MWD). There are existing soundwalls located at the shoulder and ROW along eastbound and westbound I-10 that protect most of the Activity Category B and C land uses in this segment from highway traffic noise. Along this segment of I-10, the highway is depressed with respect to adjacent land

uses at the west end, transitioning to become elevated with respect to adjacent land uses at the eastern half of this segment.

4th Street to Vineyard Avenue: The land use north of I-10 consists of single-family residences (Activity Category B), as well as a fire station and Motel 6 (Activity Category D), and a few commercial establishments. The land use south of I-10 consists of a mixture of single-family and multi-family residences, including a common use area of a multi-family complex (Activity Category B); Ontario Airport Inn and Ramada Inn (Activity Category D); and the pool areas of Ontario Airport Inn, Ramada Inn, and Quality Inn (Activity Category E). There are existing soundwalls located at the shoulder and ROW along both eastbound and westbound I-10, as well as existing 10- to 13-foot tall property walls on the south side of I-10 that protect most of the Activity Category B land uses in this segment from highway traffic noise. Along this segment of I-10, the highway is at a higher elevation with respect to the adjacent land uses at the west end and transitions to become depressed at the east end.

West of Cherry Avenue to Citrus Avenue: The land use north of I-10 consists of a mix between single-family and multi-family residences (Activity Category B) and commercial establishments (Activity Category E). The land use south of I-10 consists of pockets of single-family and multi-family residences, as well as mobile homes (Activity Category B) mixed with commercial uses (Activity Category E). There is an existing soundwall located at the ROW along westbound I-10 that protects most of the Activity Category B land uses to the north from highway traffic noise. Union Pacific Railroad (UPRR) train tracks also run parallel to eastbound I-10 on the south side in this segment. Land uses adjacent to I-10 are at grade compared to the highway.

Citrus Avenue to Sierra Avenue: The area north of I-10 is a mix of single-family residences (Activity Category B) and commercial uses, including Pancho Villas Restaurant (Activity Category E). The area south of I-10 includes single-family residences (Activity Category B) and a few commercial establishments (Activity Category E). UPRR train tracks run parallel to eastbound I-10 on the south side in this segment. The adjacent land uses are at grade relative to I-10.

Sierra Avenue to Cedar Avenue: Areas north of I-10 include single-family and multi-family residences, as well as Bloomington, Idle Wheels, and Log Cabin Mobile Home Parks (Activity Category B); along with Ayala Park (Activity Category C); Motel 6, and Econo Lodge (Activity Category D); and the pool area of the Motel 6

and several commercial establishments (Activity Category E). There is also a firehouse located north of I-10. The area south of I-10 consists of single-family residences (Activity Category B) and commercial uses (Activity Category E). There is an existing soundwall located at the ROW along westbound I-10 that protects the Bloomington, Idle Wheels, and Log Cabin Mobile Home Parks, as well as Ayala Park, from highway traffic noise. The UPRR West Colton Receiving Freight Yard runs parallel to eastbound I-10 in this segment where the yard runs between I-10 and the land uses south of I-10. Along this segment of I-10, the highway is at grade with respect to adjacent land uses.

Cedar Avenue to Riverside Avenue: Areas north of I-10 are a mixture of single-family residences (Activity Category B); Joe Baca Middle School and a picnic area next to the Teamsters Local 63 offices (Activity Category C); Days Inn (Activity Category D); and the pool area of Days Inn and other commercial establishments (Activity Category E). There is also an industrial park and empty lots north of I-10. The area south of I-10 contains a rail yard and commercial uses. Land uses south of the rail yard are too far from I-10 to be considered. There is an existing soundwall located on the ROW along westbound I-10 that protects some of the Activity Category B land uses. Along this segment of I-10, the highway's elevation is depressed compared to the adjacent land uses.

Riverside Avenue to Pepper Avenue: Along I-10 to the north, the Activity Category B land uses are three single-family residences. Other land uses include Sam Sanead Golf Course (Activity Category C); American Inn and Valley View Inn (Activity Category D); and Taco Joe's Restaurant with an outdoor seating area and other commercial establishments (Activity Category E). The area south of I-10 contains a rail yard where land uses south of the rail yard are too far from I-10 to be considered. The land uses adjacent to I-10 for this segment are elevated relative to I-10.

Pepper Avenue to Rancho Avenue: Areas north of I-10 are a mixture of single-family residences and mobile homes with one duplex (Activity Category B), Slover Mountain High School (Activity Category C), Lido Motel (Activity Category D), a school administration office (Activity Category E), and several commercial establishments, as well as large open lots. There are also railroad tracks that travel north/south in the northern area of this segment. The area south of I-10 contains a rail yard and a cement plant. Land uses south of the rail yard and cement plant are too far from I-10 to be considered. Along this segment of I-10, the land uses are at grade relative to I-10.

Rancho Avenue to La Cadena Drive: The land use north of I-10 consists of a mix between single-family and multi-family residences (Activity Category B) and commercial establishments (Activity Category E). The land use south of I-10 consists of single-family residences (Activity Category B), along with commercial uses (Activity Category E). There is an existing soundwall located at the ROW and shoulder along westbound I-10 that protects Activity Category B land uses to the north from highway traffic noise. UPRR train tracks run parallel to eastbound I-10 on the south side in this segment, and Burlington Northern Santa Fe (BNSF) train tracks run north/south in this segment. The UPRR tracks are elevated on a flyover through this segment. Land uses adjacent to I-10 are at grade compared to the highway at the west end and depressed compared to I-10 at the east end of the segment.

La Cadena Drive to I-215: The area north of I-10 is a mix of single-family residences and mobile homes (Activity Category B); Colony Motel and Colton Motel (Activity Category D); and commercial uses, including the pool areas of Hampton Inn, Colony Motel, and Comfort Inn (Activity Category E). There is also a church north of I-10 in this segment; however, there are no outdoor use areas associated with this church. The area south of I-10 includes single-family and multi-family residences (Activity Category B) and commercial establishments and an electrical substation. UPRR train tracks run parallel to eastbound I-10, as well as a rail yard on the south side in this segment. The UPRR tracks are elevated on a flyover through this segment. At the east end of the segment, Warm Creek and Santa Ana River pass under I-10. The adjacent land uses are depressed relative to I-10 at the west end of the segment but transitioning to become elevated compared to I-10 at the east end of the segment.

West of Tippecanoe Avenue to Mountain View Avenue: Areas north of I-10 are a mixture of single-family and multi-family residences (Activity Category B), along with the Fairfield Inn (Activity Category D) and some commercial establishments. The area south of I-10 consists of single-family residences and mobile homes (Activity Category B), as well as the International Christian Faith Church (Activity Category D), commercial establishments (Activity Category E), and some empty lots and a sod farm. There is an existing soundwall located at the ROW along westbound I-10 that protects the Activity Category B land uses immediately east of South Richardson Street in this segment from highway traffic noise. There is a second soundwall that is planned but has not been constructed yet east of Tippecanoe north of I-10. For the interchange of Tippecanoe Avenue, the existing westbound off-ramp configuration is different than the no-build configuration due to the approved

I-10/Tippecanoe Interchange Improvement Project. Along this segment of I-10, the highway is elevated with respect to adjacent land uses.

Mountain View Avenue to Nevada Street: The land use north of I-10 consists of commercial establishments, including Splash Kingdom Water Park, and San Bernardino County Museum (Activity Category C); a radio station (Activity Category D); and a couple of sod farms. The land use south of I-10 consists of multi-family residences (Activity Category B) and commercial uses (Activity Category E). Along this segment of I-10, the adjacent land uses are at a lower elevation compared to I-10.

Nevada Street to SR-210: Land use in this area is predominantly commercial, including retail establishments. There is also the playground of Redlands Day Nursery (Activity Category C) and Super 8 located to the north of I-10, as well as Good Nite Inn and Country Inn Suites located to the south (Activity Category D). In addition, both Super 8 and Country Inn Suites have a pool area facing I-10, and The Old Spaghetti Factory has an outdoor seating area (Activity Category E). The adjacent land uses are at a lower elevation relative to I-10 at the west end of this segment and transitions to be roughly at grade by the east end of the segment.

Tennessee Street to Orange Street: The land use north of I-10 is a composite of single-family and multi-family residences (Activity Category B), as well as commercial establishments, including Shakey's Restaurant (Activity Category E). The land use south of I-10 consists of a mixture of single-family residences and a trailer park (Activity Category B), Orangewood High School which includes We Care Baby Care (Activity Category C); Comfort Suites, Motel 6, and Ayres Hotel (Activity Category D); and commercial uses, including an outdoor patio area of Comfort Suites and the pool area of Motel 6 (Activity Category E). Along this segment of I-10, the highway is at a higher elevation with respect to the adjacent land uses.

Orange Street to East Cypress Avenue: The area north of I-10 is a mix of single-family and multi-family residences (Activity Category B); a Spiritual Treatment Center, Sylvan Park, and Ahrens Child Care Center (Activity Category C); Budget Inn (Activity Category D); the pool area of Stardust Motel (Activity Category E); and several commercial establishments. The area south of I-10 includes single-family and multi-family residences (Activity Category B); Redlands High School athletic fields (Activity Category C); The Living Word Fellowship Church and The Blessing Center (Activity Category D); and various commercial establishments (Activity Category E). There are existing soundwalls located at the shoulder protecting most of the Activity

Category B and C land uses to the north and south of this segment from highway traffic noise. The adjacent land uses are at a lower elevation relative to I-10.

East Cypress Avenue to East of Ford Street: Areas north of I-10 are a mixture of single-family and multi-family residences (Activity Category B); along with the outdoor use areas of Church on the Hill and Trinity Evangelical Free Church and a playground for a school (Activity Category C); The interior of Kingdom Hall of Jehovah Witness, Church on the Hill, and the school associated with Trinity Evangelical Free Church (Activity Category D); and an office building. The area south of I-10 consists of single-family residences and multi-family residences with a tennis court (Activity Category B), El Carmelo Retreat House (Activity Category C), and some commercial establishments. There are existing soundwalls located at the shoulder along eastbound and westbound I-10 that protect most of the Activity Category B land uses in this segment from highway traffic noise. Along this segment of I-10, the highway is elevated with respect to adjacent land uses except for the south side at the east end where the adjacent land uses are elevated with respect to I-10.

Areas not Analyzed using TNM

In addition, the following two segments have not been analyzed using Traffic Noise Model (TNM) modeling due to the lack of identifiable frequent human outdoor use areas; however, there are several isolated hotels, motels, and continuing education schools located in these areas.

Vineyard Avenue to West of Cherry Avenue: Land use in this area is predominantly commercial, including restaurants, hotels, continuing education schools, auto dealerships, and truck stops. Specifically, the areas north of I-10 contain American Career College, Best Western, Platt College, Extended Stay America, Country Inn Suites, and United Education Institute (Activity Category D). The pool areas of Best Western and Extended Stay America are shielded from freeway traffic noise by the hotels; however, the pool area for Country Inn Suites is exposed to freeway traffic noise (Activity Category E).

The areas south of I-10 include Residence Inn, Holiday Inn, West Coast University, Fairfield Inn, and Argosy University (Activity Category D), as well as Marie Callender's with an outdoor seating area on the opposite side of the restaurant than the freeway (Activity Category E). The Residence Inn is protected from freeway traffic noise by an existing soundwall located at the shoulder of eastbound I-10 and Holiday Inn, which is set farther back from I-10 and is shielded by an office building

and Marie Callender's Restaurant. The pool areas of Residence Inn, Holiday Inn, and Fairfield Inn are shielded by the hotel building from freeway traffic noise. The adjacent land uses are generally at grade relative to I-10 throughout this area.

I-215 to west of Tippecanoe Avenue: Land use in this area is predominantly commercial, including several restaurants without any outdoor use areas. There are also La Quinta Inn, Super 8, and Hilton Hotel located to the north of I-10 west of Waterman Avenue (Activity Category D). Along this area of I-10, the adjacent land uses are at a lower elevation compared to I-10.

Chapter 2 Results of the Noise Study Report

The noise study was conducted to determine future traffic noise impacts of the proposed project at frequent human use areas within the freeway corridor. The future worst-case traffic noise impact at frequent outdoor human use areas along the project corridor was modeled for the No Build Alternative and two build alternatives to determine appropriate abatement measures.

In accordance with Title 23 CFR 772, noise abatement is considered where traffic noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Potential noise abatement measures identified in the Protocol include the following:

- Avoiding the impact by using design alternatives, such as altering the horizontal and vertical alignment of the project
- Constructing noise barriers
- Acquiring property to serve as a buffer zone
- Using traffic management measures to regulate types of vehicles and speeds
- Acoustically insulating public use or nonprofit institutional structures

Due to the constrained configuration and suburban location of the project, abatement in the form of noise barriers is the only abatement measure considered to be feasible. Noise barrier analysis was conducted by placing soundwalls at the highway mainline shoulders, on-/off-ramp shoulders, ROW lines, and within State ROW.

Each noise barrier was evaluated for feasibility based on achievable noise reduction (5 dB or more). For each noise barrier determined to be acoustically feasible and meeting the design goal of achieving 7-dB noise reduction for at least one location, the estimated cost and total cost allowance for the noise barrier were calculated. If the estimated cost is found to be equal to or less than the total cost allowance, then that noise barrier would have met the reasonableness cost criteria. The total cost allowance is calculated by multiplying the number of benefited residences by the cost allowance per benefited receiver/residence. A \$71,000 cost allowance per benefited receiver/residence, which is based on the published Caltrans annual Construction Price Index (CPI), was used.

The noise analysis considered barrier heights ranging from 8 to 24 feet. The barrier heights and locations were evaluated to determine if a minimum 5-dB attenuation at the outdoor frequent use areas of the representative receivers could be achieved. Soundwalls proposed on Caltrans ROW were analyzed for heights up to 24 feet. For soundwalls located on the shoulder with a distance of 15 feet or more from the edge of travel way, heights were limited to 16 feet. Furthermore, the maximum height of a noise barrier located on the shoulder may not exceed 14 feet when located 15 feet or less from edge of travel way, per the Highway Design Manual (Caltrans, 2014). The minimum barrier height required to cut the line-of-sight from each receiver to the exhaust stacks of heavy trucks has been calculated for all feasible barriers. These heights were evaluated through calculations performed by Traffic Noise Model, Version 2.5 (TNM 2.5).

Throughout the project area, existing soundwalls currently protect some of the outdoor frequent use areas from freeway traffic noise. These existing soundwalls fall into one of two categories: soundwalls that will remain and soundwalls that will need to be demolished due to the project. For those soundwalls that would remain intact because the project widening would not encroach upon them, analysis was conducted for barrier heights above the existing heights at the same location. For soundwalls that would need to be demolished due to the widening of the alignment or due to other construction details such as the construction of retaining walls, it has been assumed that in-kind replacement soundwalls would be constructed as part of the project. These in-kind replacement soundwalls would be the same length and height as the soundwall it is replacing but at a new and typically similar location, and they have been included in the noise analysis. The noise prediction analysis for these in-kind replacement soundwalls are of heights that are greater than the in-kind soundwall heights.

The identified feasible soundwalls are new soundwalls, with the exception of one replace-in-kind soundwall extension.

The minimum heights and locations of the soundwalls that would provide feasible abatement and meet the design goal are shown graphically in Appendix H of the NSR. Table 2-1 presents feasible soundwalls that were considered for Alternative 2 and summarizes the data used to assess the reasonableness allowances at each of the considered barrier heights. Table 2-2 presents feasible soundwalls that were considered for Alternative 3 and summarizes the data used to assess the reasonableness allowances at each of the considered barrier heights. Soundwalls considered for the three easternmost segments of the proposed project (Tennessee

Street to Orange Street, Orange Street to Cypress Avenue, and East Cypress Avenue to East of Ford Street) are identical for both Alternatives 2 and 3; therefore, Table 2-3 applies to both of the build alternatives. Table 2-3 presents feasible soundwalls that were considered for Alternative 2 and Alternative 3 and summarizes the data used to assess the reasonableness allowances at each of the considered barrier heights.

Table 2-1. Summary of Barrier Evaluation from Noise Study Report (Alternative 2)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S1749	ROW (WB)	1748+11 to 1750+16	8	Yes	1	No	\$71,000	\$71,000
			10	Yes	1	Yes	\$71,000	\$71,000
			12	Yes	1	Yes	\$71,000	\$71,000
			14	Yes	1	Yes	\$71,000	\$71,000
			16	Yes	1	Yes	\$71,000	\$71,000
S1819	ROW (WB)	1809+81 to 1830+00	8	Yes	2	Yes	\$71,000	\$142,000
			10	Yes	3	Yes	\$71,000	\$213,000
			12	Yes	13	Yes	\$71,000	\$923,000
			14	Yes	13	Yes	\$71,000	\$923,000
			16	Yes	22	Yes	\$71,000	\$1,562,000
			18	Yes	33	Yes	\$71,000	\$2,343,000
S1833	ROW (WB)	1831+49 to 1838+55	8	No	N/A	No	N/A	N/A
			10	Yes	3	No	\$71,000	\$213,000
			12	Yes	3	No	\$71,000	\$213,000
			14	Yes	3	No	\$71,000	\$213,000
			16	Yes	4	Yes	\$71,000	\$284,000
			18	Yes	4	Yes	\$71,000	\$284,000
S1877	ROW (WB)	1876+59 to 1891+60	8	No	N/A	No	N/A	N/A
			10	No	N/A	No	N/A	N/A
			12	Yes	33	Yes	\$71,000	\$2,343,000
			14	Yes	44	Yes	\$71,000	\$3,124,000
			16	Yes	66	Yes	\$71,000	\$4,686,000

Table 2-1 (cont'd.). Summary of Barrier Evaluation from Noise Study Report (Alternative 2)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S1907	ROW (WB)	1905+60 to 1941+47	8	Yes	1	No	\$71,000	\$71,000
			10	Yes	13	No	\$71,000	\$923,000
			12	Yes	20	Yes	\$71,000	\$1,420,000
			14	Yes	35	Yes	\$71,000	\$2,485,000
			16	Yes	47	Yes	\$71,000	\$3,337,000
			Design Barrier	Yes	46	Yes	\$71,000	\$3,266,000
S1969	Shoulder (WB)	1969+61 to 1972+67	8	Yes	2	No	\$71,000	\$142,000
			10	Yes	2	No	\$71,000	\$142,000
			12	Yes	2	Yes	\$71,000	\$142,000
			14	Yes	2	Yes	\$71,000	\$142,000
			16	Yes	2	Yes	\$71,000	\$142,000
S2033	ROW (WB)	2033+00 to 2037+44	16	Yes	4	No	\$71,000	\$284,000
			18	Yes	4	No	\$71,000	\$284,000
			20	Yes	4	Yes	\$71,000	\$284,000
			22	Yes	4	Yes	\$71,000	\$284,000
			24	Yes	4	Yes	\$71,000	\$284,000
S2079	ROW (WB)	2075+70 to 2083+00	10	No	N/A	No	N/A	N/A
			12	Yes	1	No	\$71,000	\$71,000
			14	Yes	4	No	\$71,000	\$284,000
			16	Yes	4	Yes	\$71,000	\$284,000
			18	Yes	4	Yes	\$71,000	\$284,000

Table 2-1 (cont'd.). Summary of Barrier Evaluation from Noise Study Report (Alternative 2)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S2145	Shoulder & ROW (WB)	2136+70 to 2158+64	8	No	N/A	No	N/A	N/A
			10	Yes	3	No	\$71,000	\$213,000
			12	Yes	11	No	\$71,000	\$781,000
			14	Yes	33	Yes	\$71,000	\$2,343,000
			16	Yes	37	Yes	\$71,000	\$2,627,000
			18	Yes	40	Yes	\$71,000	\$2,840,000
			20	Yes	42	Yes	\$71,000	\$2,982,000
			22	Yes	45	Yes	\$71,000	\$3,195,000
			24	Yes	45	Yes	\$71,000	\$3,195,000
	Design Barrier	Yes	45	Yes	\$71,000	\$3,195,000		
S2382 & S2384	ROW (EB)	2378+98 to 2386+81/ 2380+95 to 2384+79	8	No	N/A	No	N/A	N/A
			10	No	N/A	No	N/A	N/A
			12	No	N/A	No	N/A	N/A
			14	Yes	1	No	\$71,000	\$71,000
			16	Yes	1	Yes	\$71,000	\$71,000
			Design Barrier	Yes	1	Yes	\$71,000	\$71,000
S2434A & S2438 (Option 1 of 2)	ROW & Shoulder (EB)	2427+00 to 2441+17/ 2432+35 to 2444+97	8	Yes	4	Yes	\$71,000	\$284,000
			10	Yes	10	Yes	\$71,000	\$710,000
			12	Yes	36	Yes	\$71,000	\$2,556,000
			14	Yes	38	Yes	\$71,000	\$2,698,000
			16	Yes	40	Yes	\$71,000	\$2,840,000
			Design Barrier	Yes	40	Yes	\$71,000	\$2,840,000

Table 2-1 (cont'd.). Summary of Barrier Evaluation from Noise Study Report (Alternative 2)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S2434B & S2438 (Option 2 of 2)	Shoulder (EB)	2427+00 to 2441+17/ 2432+35 to 2444+97	8	Yes	11	No	\$71,000	\$781,000
			10	Yes	30	Yes	\$71,000	\$2,130,000
			12	Yes	38	Yes	\$71,000	\$2,698,000
			14	Yes	40	Yes	\$71,000	\$2,840,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
			Design Barrier	Yes	40	Yes	\$71,000	\$2,840,000
S2435 & S2437	ROW and Shoulder (WB)	2432+67 to 2437+35/ 2431+00 to 2441+13	8	No	N/A	No	N/A	N/A
			10	Yes	3	No	\$71,000	\$213,000
			12	Yes	13	No	\$71,000	\$923,000
			14	Yes	15	Yes	\$71,000	\$1,065,000
			16	Yes	15	Yes	\$71,000	\$1,065,000
			Design Barrier	Yes	15	Yes	\$71,000	\$1,065,000
S2476	Shoulder (EB)	2464+98 to 2486+95	8	Yes	8	No	\$71,000	\$568,000
			10	Yes	28	No	\$71,000	\$1988,000
			12	Yes	70	Yes	\$71,000	\$4,970,000
			14	Yes	88	Yes	\$71,000	\$6,248,000
			16	No	-- ^a	Yes	-- ^a	-- ^a
			Design Barrier	Yes	74	Yes	\$71,000	\$5,254,000

ROW = right-of-way line

EP = edge of pavement

N/A = Not applicable. Barrier does not provide 5 dB of noise reduction.

* Barrier at park based on 800 feet of highway frontage.

^a Per the Highway Design Manual, the maximum height of a noise barrier should not exceed 14 feet when located 15 feet or less from edge of travel way.

Table 2-2. Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S699	Shoulder (WB)	696+56 to 701+05	14	Yes	16	No	\$71,000	\$1,136,000
			16	Yes	16	No	\$71,000	\$1,136,000
			18	Yes	16	No	\$71,000	\$1,136,000
			20	Yes	16	Yes	\$71,000	\$1,136,000
			22	Yes	16	Yes	\$71,000	\$1,136,000
			Design Barrier	Yes	16	Yes	\$71,000	\$1,136,000
S1117	ROW (WB)	1116+66 to 1118+86	10	No	N/A	No	N/A	N/A
			12	Yes	4	Yes	\$71,000	\$284,000
			14	Yes	4	Yes	\$71,000	\$284,000
			16	Yes	4	Yes	\$71,000	\$284,000
S1132	Shoulder (EB)	1130+36 to 1136+25	8	Yes	1	No	\$71,000	\$71,000
			10	Yes	1	No	\$71,000	\$71,000
			12	Yes	1	No	\$71,000	\$71,000
			14	Yes	2	Yes	\$71,000	\$142,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
S1190	ROW (SB)	1189+03 to 1197+75	8	Yes	1	No	\$71,000	\$71,000
			10	Yes	10	No	\$71,000	\$710,000
			12	Yes	20	Yes	\$71,000	\$1,420,000
			14	Yes	20	Yes	\$71,000	\$1,420,000
			16	Yes	20	Yes	\$71,000	\$1,420,000

Table 2-2 (cont'd). Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
			Design Barrier	Yes	10	Yes	\$71,000	\$1,420,000
S1244	Shoulder (EB)	1243+58 to 1245+33	14	N/A	N/A	N/A	N/A	N/A
S1262	Shoulder (EB)	1260+35 to 1263+33	8	Yes	1	No	\$71,000	\$71,000
			10	Yes	1	No	\$71,000	\$71,000
			12	Yes	1	No	\$71,000	\$71,000
			14	Yes	1	Yes	\$71,000	\$71,000
			16	Yes	-- ^a	-- ^a	-- ^a	-- ^a
S1266	Shoulder (EB)	1265+34 to 1270+18	8		1	No	\$71,000	\$71,000
			10	Yes	3	No	\$71,000	\$213,000
			12	Yes	3	Yes	\$71,000	\$213,000
			14	Yes	3	Yes	\$71,000	\$213,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
S1285	Shoulder (WB)	1283+77 to 1286+83	8	No	N/A	No	N/A	N/A
			10	Yes	12	No	\$71,000	\$852,000
			12	Yes	13	No	\$71,000	\$923,000
			14	Yes	25	Yes	\$71,000	\$1,775,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
S21	Shoulder (WB)	1318+34 to 1318+63	8	Yes	2	No	\$71,000	\$142,000
			10	Yes	2	No	\$71,000	\$142,000
			12	Yes	2	Yes	\$71,000	\$142,000

Table 2-2 (cont'd). Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
			14	Yes	2	Yes	\$71,000	\$142,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
S1276	Shoulder (EB)	1276+34 to 1278+50	8	Yes	3	Yes	\$71,000	\$213,000
			10	Yes	3	Yes	\$71,000	\$213,000
			12	Yes	3	Yes	\$71,000	\$213,000
			14	Yes	3	Yes	\$71,000	\$213,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
S1306	Shoulder (EB)	1296+87 to 1321+16	8	Yes	19	Yes	\$71,000	\$1,349,000
			10	Yes	34	Yes	\$71,000	\$2,414,000
			12	Yes	64	Yes	\$71,000	\$4,544,000
			14	Yes	84	Yes	\$71,000	\$5,964,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
			Design Barrier	Yes	78	Yes	\$71,000	\$5,538,000
S1819	ROW (WB)	1809+80 to 1829+96	8	Yes	2	Yes	\$71,000	\$142,000
			10	Yes	3	Yes	\$71,000	\$213,000
			12	Yes	17	Yes	\$71,000	\$1,207,000
			14	Yes	22	Yes	\$71,000	\$1,562,000
			16	Yes	29	Yes	\$71,000	\$2,059,000
			18	Yes	33	Yes	\$71,000	\$2,343,000
			Design Barrier	Yes	33	Yes	\$71,000	\$2,343,000
S1833	ROW (WB)	1831+47 to 1838+50	8	No	N/A	No	N/A	N/A
			10	Yes	3	No	\$71,000	\$213,000
			12	Yes	3	No	\$71,000	\$213,000

Table 2-2 (cont'd). Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
			14	Yes	4	Yes	\$71,000	\$284,000
			16	Yes	4	Yes	\$71,000	\$284,000
			18	Yes	4	Yes	\$71,000	\$284,000
S1877	ROW (WB)	1876+54 to 1891+55	8	No	N/A	No	N/A	N/A
			10	No	N/A	No	N/A	N/A
			12	Yes	24	No	\$71,000	\$1,704,000
			14	Yes	60	Yes	\$71,000	\$4,260,000
			16	Yes	72	Yes	\$71,000	\$5,112,000
			Design Barrier	Yes	72	Yes	\$71,000	\$5,112,000
S1907	ROW (WB)	1905+55 to 1941+42	8	Yes	1	Yes	\$71,000	\$71,000
			10	Yes	13	Yes	\$71,000	\$923,000
			12	Yes	21	Yes	\$71,000	\$1,491,000
			14	Yes	42	Yes	\$71,000	\$2,982,000
			16	Yes	63	Yes	\$71,000	\$4,473,000
			Design Barrier	Yes	63	Yes	\$71,000	\$4,473,000
S1969	Shoulder (WB)	1968+66 to 1972+27	8	No	N/A	No	N/A	N/A
			10	Yes	2	No	\$71,000	\$142,000
			12	Yes	2	Yes	\$71,000	\$142,000
			14	Yes	2	Yes	\$71,000	\$142,000
			16	Yes	2	Yes	\$71,000	\$142,000

Table 2-2 (cont'd). Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S2033	Shoulder (WB)	2032+93 to 2037+38	16	Yes	4	No	\$71,000	\$284,000
			18	Yes	4	No	\$71,000	\$284,000
			20	Yes	4	Yes	\$71,000	\$284,000
			22	Yes	4	Yes	\$71,000	\$284,000
			24	Yes	4	Yes	\$71,000	\$284,000
S2079	ROW (WB)	2075+60 to 2084+11	10	No	N/A	No	N/A	N/A
			12	No	N/A	No	N/A	N/A
			14	No	4	No	\$71,000	\$284,000
			16	No	4	No	\$71,000	\$284,000
			18	Yes	4	Yes	\$71,000	\$284,000
			Design Barrier	Yes	4	Yes	\$71,000	\$284,000
S2145	Shoulder & ROW (WB)	2135+62 to 2158+58	8	Yes	3	No	\$71,000	\$213,000
			10	Yes	5	No	\$71,000	\$355,000
			12	Yes	28	Yes	\$71,000	\$1,988,000
			14	Yes	40	Yes	\$71,000	\$2,840,000
			16	Yes	13	Yes	\$71,000	\$3,053,000
			Design Barrier	Yes	43	Yes	\$71,000	\$3,053,000
S2238	ROW & Shoulder (WB)	2230+90 to 2245+52	8	No	N/A	No	N/A	N/A
			10	No	N/A	No	N/A	N/A
			12	Yes	27	No	\$71,000	\$1,917,000
			14	Yes	45	Yes	\$71,000	\$3,195,000
			16	Yes	46	Yes	\$71,000	\$3,266,000

Table 2-2 (cont'd). Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
			Design Barrier	Yes	46	Yes	\$71,000	\$3,266,000
S2382 & S2384	Shoulder & ROW (EB)	2378+47 to 2386+73/ 2380+87 to 2384+71	8	Yes	N/A	No	N/A	N/A
			10	Yes	1	No	\$71,000	\$71,000
			12	Yes	1	No	\$71,000	\$71,000
			14	Yes	1	Yes	\$71,000	\$71,000
			16	Yes	1	Yes	\$71,000	\$71,000
			Design Barrier	Yes	1	Yes	\$71,000	\$71,000
S2434A & S2438 (Option 1 of 2)	ROW & Shoulder (EB)	2426+00 to 2441+10/ 2433+32 to 2445+33	8	Yes	4	No	\$71,000	\$284,000
			10	Yes	16	Yes	\$71,000	\$1,136,000
			12	Yes	25	Yes	\$71,000	\$1,775,000
			14	Yes	32	Yes	\$71,000	\$2,272,000
			16	Yes	40	Yes	\$71,000	\$2,840,000
			Design Barrier	Yes	40	Yes	\$71,000	\$2,840,000
S2434B & S2438 (Option 2 of 2)	Shoulder (EB)	2426+00 to 2441+10/ 2433+32 to 2445+33	8	Yes	10	No	\$71,000	\$710,000
			10	Yes	24	Yes	\$71,000	\$1,704,000
			12	Yes	36	Yes	\$71,000	\$2,556,000
			14	Yes	38	Yes	\$71,000	\$2,698,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
			Design Barrier	Yes	38	Yes	\$71,000	\$2,698,000

Table 2-2 (cont'd). Summary of Barrier Evaluation from Noise Study Report (Alternative 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S2435 & S2437	ROW & Shoulder (WB)	2432+67 to 2437+35	8	No	N/A	No	N/A	N/A
			10	No	N/A	No	N/A	N/A
			12	Yes	13	No	\$71,000	\$923,000
			14	Yes	15	Yes	\$71,000	\$1,065,000
			16	Yes	15	Yes	\$71,000	\$1,065,000
S2476	Shoulder (EB)	2465+32 to 2484+88	8	No	N/A	No	N/A	N/A
			10	Yes	8	No	\$71,000	\$568,000
			12	Yes	62	Yes	\$71,000	\$4,402,000
			14	Yes	76	Yes	\$71,000	\$5,396,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
			Design Barrier	Yes	70	Yes	\$71,000	\$4,970,000

ROW = right-of-way line
 EP = edge of pavement
 N/A = Not applicable. Barrier does not provide 5 dB of noise reduction.
 * Barrier at park based on 800 feet of highway frontage.
¹Per the Highway Design Manual, the maximum height of a noise barrier should not exceed 14 feet when located 15 feet or less from edge of travel way.

Table 2-3. Summary of Barrier Evaluation from Noise Study Report (Alternatives 2 and 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S2619	Shoulder (WB)	2605+75 to 2629+72	8	No	N/A	No	N/A	N/A
			10	Yes	11	No	\$71,000	\$781,000
			12	Yes	17	No	\$71,000	\$1,207,000
			14	Yes	17	Yes	\$71,000	\$1,207,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
			Design Barrier	Yes	17	Yes	\$71,000	\$1,207,000
S2638 & S2654	Shoulder (EB)	2632+41 to 2644+00/ 2639+10 to 2667+51	8	Yes	8	No	\$71,000	\$568,000
			10	Yes	9	No	\$71,000	\$639,000
			12	Yes	20	Yes	\$71,000	\$1,420,000
			14	Yes	20	Yes	\$71,000	\$1,420,000
			16	No	-- ^a	-- ^a	-- ^a	-- ^a
			Design Barrier	Yes	20	Yes	\$71,000	\$1,420,000
S2638B & S2638B	Shoulder (EB)	2638+73 to 2643+00/ 2639+10 to 2658+51	12	Yes	11	Yes	\$781,000	\$781,000
S2730	Shoulder (EB)	2726+83 to 2734+12	16	Yes	1	No	\$71,000	\$71,000
			18	Yes	1	No	\$71,000	\$71,000
			20	Yes	1	Yes	\$71,000	\$71,000
			22	Yes	1	Yes	\$71,000	\$71,000
			24	Yes	1	Yes	\$71,000	\$71,000
			Design Barrier	Yes	1	Yes	\$71,000	\$71,000

Table 2-3 (cont'd.). Summary of Barrier Evaluation from Noise Study Report (Alternatives 2 and 3)

Barrier	Location	Station	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
S2737	ROW (WB)	2726+36 to 2746+60	16	Yes	2	No	\$71,000	\$142,000
			18	Yes	3	No	\$71,000	\$213,000
			20	Yes	5	No	\$71,000	\$355,000
			22	Yes	5	No	\$71,000	\$355,000
			24	Yes	6	Yes	\$71,000	\$426,000
			Design Barrier	Yes	5	Yes	\$71,000	\$355,000
S2765	(WB)	2756+70 to 2771+22	8	Yes	14	Yes	\$71,000	\$994,000
			10	Yes	15	Yes	\$71,000	\$1,065,000
			12	Yes	16	Yes	\$71,000	\$1,136,000
			14	Yes	16	Yes	\$71,000	\$1,136,000
			16	No	-- ^a	Yes	-- ^a	-- ^a

ROW = right-of-way line
 EP = edge of pavement
 N/A = Not applicable. Barrier does not provide 5 dB of noise reduction.
 * Barrier at park based on 800 feet of highway frontage.
¹Per the Highway Design Manual, the maximum height of a noise barrier should not exceed 14 feet when located 15 feet or less from edge of travel way.

Chapter 3 Preliminary Noise Abatement Decision

3.1 Summary of Key Information

The NSR analyzes noise barriers with heights from 8 to 24 feet to determine the feasibility of noise abatement. Tables 3-1, 3-2 and 3-3 summarize the preliminary noise abatement decision for Alternatives 2 and 3 by investigating acoustical feasibility, number of benefited residences, total reasonableness allowance (\$71,000 per benefitted receiver/residence), engineer's cost estimate for the abatement, comparison of the estimated construction cost versus allowance, and if the 7-dB reduction design goal is met.

Wall construction cost estimates are based on masonry walls in accordance with Caltrans' standard plans and specifications. Cost estimates are based on the Caltrans Cost Database (CCD) (Caltrans, 2012-2014), which tabulates average unit costs of construction-related items from recent state transportation projects. Cost calculations for soundwalls include the cost of the wall, piles, earthwork, and traffic control. Several retaining walls and traffic barriers are required to construct soundwalls that would not otherwise be required for the project; in these cases, the cost of the retaining wall and traffic barrier was included in the cost estimate. If a wall is constructed on a bridge that would not otherwise be modified, the cost of modifying the bridge structure to accommodate the wall has been included. The final cost estimate also includes a 10 percent contingency. Tables in Appendices C and D summarize the engineer's cost estimate for constructing these walls.

Costs of related activities, such as clearing and grubbing, vine landscaping, and typical aesthetic treatments, have not been estimated because these items are variable and could change substantially depending on several project-per-project factors.

Tables 3-1, 3-2, and 3-3 summarize abatement key information, including reasonableness allowances and estimated construction costs for Alternatives 2 and 3.

Table 3-1. Summary of Abatement Key Information (Alternative 2)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S1749	8	Yes	1	No	\$71,000	\$56,660	Yes
	10	Yes	1	Yes	\$71,000	\$65,550	Yes
	12	Yes	1	Yes	\$71,000	\$74,980	No
	14	Yes	1	Yes	\$71,000	\$84,060	No
	16	Yes	1	Yes	\$71,000	\$93,140	No
S1819	8	Yes	2	Yes	\$142,000	\$612,900	No
	10	Yes	3	Yes	\$213,000	\$700,900	No
	12	Yes	13	Yes	\$923,000	\$794,200	Yes
	14	Yes	13	Yes	\$923,000	\$884,800	Yes
	16	Yes	22	Yes	\$1,562,000	\$975,200	Yes
	18	Yes	33	Yes	\$2,343,000	\$1,068,000	Yes
S1833	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	3	No	\$213,000	\$247,000	No
	12	Yes	3	No	\$213,000	\$277,400	No
	14	Yes	3	No	\$213,000	\$307,700	No
	16	Yes	4	Yes	\$284,000	\$336,100	No
	18	Yes	4	Yes	\$284,000	\$366,400	No
S1877	8	No	N/A	No	N/A	N/A	N/A
	10	No	N/A	No	N/A	N/A	N/A
	12	Yes	33	Yes	\$2,343,000	\$556,600	Yes
	14	Yes	44	Yes	\$3,124,000	\$622,600	Yes
	16	Yes	66	Yes	\$4,686,000	\$688,300	Yes

Table 3-1 (cont'd.). Summary of Abatement Key Information (Alternative 2)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S1907	8	Yes	1	No	\$71,000	\$1,207,000	No
	10	Yes	13	No	\$923,000	\$1,359,000	No
	12	Yes	20	Yes	\$1,420,000	\$1,521,000	No
	14	Yes	35	Yes	\$2,485,000	\$1,679,000	Yes
	16	Yes	47	Yes	\$3,337,000	\$1,836,000	Yes
	Design Barrier 12, 14, and 16	Yes	46	Yes	\$3,266,000	\$1,679,000	Yes
S1969	8	Yes	2	No	\$142,000	\$69,610	Yes
	10	Yes	2	No	\$142,000	\$83,570	Yes
	12	Yes	2	Yes	\$142,000	\$97,840	Yes
	14	Yes	2	Yes	\$142,000	\$111,880	Yes
	16	Yes	2	Yes	\$142,000	\$125,910	Yes
S2033	16	Yes	4	No	\$284,000	\$228,300	Yes
	18	Yes	4	No	\$284,000	\$248,300	Yes
	20	Yes	4	Yes	\$284,000	\$268,900	Yes
	22	Yes	4	Yes	\$284,000	\$290,500	No
	24	Yes	4	Yes	\$284,000	\$313,200	No
S2079	10	No	N/A	No	N/A	N/A	N/A
	12	Yes	1	No	\$71,000	\$364,400	No
	14	Yes	4	No	\$284,000	\$396,400	No
	16	Yes	4	Yes	\$284,000	\$428,300	No
	18	Yes	4	Yes	\$284,000	\$461,100	No

Table 3-1 (cont'd.). Summary of Abatement Key Information (Alternative 2)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S2145	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	3	No	\$213,000	\$699,300	No
	12	Yes	11	No	\$781,000	\$797,600	No
	14	Yes	33	Yes	\$2,343,000	\$895,800	Yes
	16	Yes	37	Yes	\$2,627,000	\$987,700	Yes
	18	Yes	40	Yes	\$2,840,000	\$1,086,000	Yes
	20	Yes	42	Yes	\$2,982,000	\$1,184,000	Yes
	22	Yes	45	Yes	\$3,195,000	\$1,282,000	Yes
	24	Yes	45	Yes	\$3,195,000	\$1,381,000	Yes
	Design Barrier 16, 20, and 22	Yes	45	Yes	\$3,195,000	\$1,131,242	Yes
S2382 & S2384	8	No	N/A	No	N/A	N/A	N/A
	10	No	N/A	No	N/A	N/A	N/A
	12	No	N/A	No	N/A	N/A	N/A
	14	Yes	1	No	\$71,000	\$469,300	No
	16	Yes	1	Yes	\$71,000	\$518,300	No
		Design Barrier 12 and 16	Yes	1	Yes	\$71,000	\$452,500
S2434A & S2438 (Option 1 of 2)	8	Yes	4	Yes	\$284,000	\$656,400	No
	10	Yes	10	Yes	\$710,000	\$764,000	No
	12	Yes	36	Yes	\$2,556,000	\$875,400	Yes
	14	Yes	38	Yes	\$2,698,000	\$984,800	Yes
	16	Yes	40	Yes	\$2,840,000	\$1,094,100	Yes
		Design Barrier 12, 14, and 16	Yes	40	Yes	\$2,840,000	\$909,100

Table 3-1 (cont'd.). Summary of Abatement Key Information (Alternative 2)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S2434B & S2438 (Option 2 of 2)	8	Yes	11	No	\$781,000	\$502,100	Yes
	10	Yes	30	Yes	\$2,130,000	\$607,100	Yes
	12	Yes	38	Yes	\$2,698,000	\$712,100	Yes
	14	Yes	40	Yes	\$2,840,000	\$817,100	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
	Design Barrier	Yes	40	Yes	\$2,840,000	\$757,000	Yes
S2435 & S2437	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	3	No	\$213,000	\$304,900	No
	12	Yes	13	No	\$923,000	\$363,100	Yes
	14	Yes	15	Yes	\$1,065,000	\$421,100	Yes
	16	Yes	15	Yes	\$1,065,000	\$478,000	Yes
	Design Barrier 10 and 14	Yes	15	Yes	\$1,065,000	\$380,800	Yes
S2476	8	Yes	8	No	\$568,000	\$408,700	Yes
	10	Yes	28	No	\$1,988,000	\$493,600	Yes
	12	Yes	70	Yes	\$4,970,000	\$578,400	Yes
	14	Yes	88	Yes	\$6,248,000	\$663,200	Yes
	16	No	-- ^a	Yes	-- ^a	-- ^a	-- ^a
	Design Barrier 12 and 14	Yes	74	Yes	\$5,254,000	\$608,200	Yes

Table 3-2. Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S699	14	Yes	16	No	\$1,136,000	\$363,000	Yes
	16	Yes	16	No	\$1,136,000	\$379,800	Yes
	18	Yes	16	No	\$1,136,000	\$396,700	Yes
	20	Yes	16	Yes	\$1,136,000	\$413,500	Yes
	22	Yes	16	Yes	\$1,136,000	\$430,300	Yes
	Design Barrier 16, 18, and 20	Yes	16	Yes	\$1,136,000	\$406,100	Yes
S1117	10	No	N/A	No	N/A	N/A	N/A
	12	Yes	4	Yes	\$284,000	\$101,200	Yes
	14	Yes	4	Yes	\$284,000	\$110,900	Yes
	16	Yes	4	Yes	\$284,000	\$120,700	Yes
S1132	8	Yes	1	No	\$71,000	\$66,410	Yes
	10	Yes	1	No	\$71,000	\$88,480	No
	12	Yes	1	No	\$71,000	\$110,600	No
	14	Yes	2	Yes	\$142,000	\$132,600	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
S1190	8	Yes	1	No	\$71,000	\$250,000	No
	10	Yes	10	No	\$710,000	\$287,200	Yes
	12	Yes	20	Yes	\$1,420,000	\$326,800	Yes
	14	Yes	20	Yes	\$1,420,000	\$365,100	Yes
	16	Yes	20	Yes	\$1,420,000	\$403,400	Yes
	Design Barrier 8, 10, and 12	Yes	10	Yes	\$1,420,000	\$284,600	Yes

Table 3-2 (cont'd.). Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S1244	14	N/A	N/A	N/A	N/A	N/A	N/A
S1262	8	Yes	1	No	\$71,000	\$34,020	Yes
	10	Yes	1	No	\$71,000	\$45,150	Yes
	12	Yes	1	No	\$71,000	\$56,270	Yes
	14	Yes	1	Yes	\$71,000	\$67,400	Yes
	16	Yes	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
S1266	8	Yes	1	No	\$71,000	\$54,710	Yes
	10	Yes	3	No	\$213,000	\$72,820	Yes
	12	Yes	3	Yes	\$213,000	\$90,940	Yes
	14	Yes	3	Yes	\$213,000	\$109,100	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
S1285	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	12	No	\$852,000	\$61,380	Yes
	12	Yes	13	No	\$923,000	\$76,600	Yes
	14	Yes	25	Yes	\$1,775,000	\$91,830	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
S21	8	Yes	2	No	\$142,000	\$126,600	Yes
	10	Yes	2	No	\$142,000	\$146,400	No
	12	Yes	2	Yes	\$142,000	\$167,400	No
	14	Yes	2	Yes	\$142,000	\$187,800	No
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a

Table 3-2 (cont'd.). Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S1276	8	Yes	3	Yes	\$213,000	\$24,990	Yes
	10	Yes	3	Yes	\$213,000	\$33,070	Yes
	12	Yes	3	Yes	\$213,000	\$41,140	Yes
	14	Yes	3	Yes	\$213,000	\$49,210	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
S1306	8	Yes	19	Yes	\$1,349,000	\$272,000	Yes
	10	Yes	34	Yes	\$2,414,000	\$363,500	Yes
	12	Yes	64	Yes	\$4,544,000	\$455,000	Yes
	14	Yes	84	Yes	\$5,964,000	\$638,100	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
	Design Barrier 10, 12, and 14	Yes	78	Yes	\$5,538,000	\$460,400	Yes
S1819	8	Yes	2	Yes	\$142,000	\$611,000	No
	10	Yes	3	Yes	\$213,000	\$698,500	No
	12	Yes	17	Yes	\$1,207,000	\$791,500	Yes
	14	Yes	22	Yes	\$1,562,000	\$881,600	Yes
	16	Yes	29	Yes	\$2,059,000	\$971,600	Yes
	18	Yes	33	Yes	\$2,343,000	\$1,064,000	Yes
	Design Barrier 16 and 18	Yes	33	Yes	\$2,343,000	\$999,100	Yes

Table 3-2 (cont'd.). Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S1833	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	3	No	\$213,000	\$247,200	No
	12	Yes	3	No	\$213,000	\$277,600	No
	14	Yes	4	Yes	\$284,000	\$308,000	Yes*
	16	Yes	4	Yes	\$284,000	\$336,400	No
	18	Yes	4	Yes	\$284,000	\$366,700	No
S1877	8	No	N/A	No	N/A	N/A	N/A
	10	No	N/A	No	N/A	N/A	N/A
	12	Yes	24	No	\$1,704,000	\$556,600	Yes
	14	Yes	60	Yes	\$4,260,000	\$622,600	Yes
	16	Yes	72	Yes	\$5,112,000	\$688,300	Yes
	Design Barrier 14 and 16	Yes	72	Yes	\$5,112,000	\$635,800	Yes
S1907	8	Yes	1	Yes	\$71,000	\$1,206,000	No
	10	Yes	13	Yes	\$923,000	\$1,359,000	No
	12	Yes	21	Yes	\$1,491,000	\$1,521,000	No
	14	Yes	42	Yes	\$2,982,000	\$1,679,000	Yes
	16	Yes	63	Yes	\$4,473,000	\$1,836,000	Yes
	Design Barrier 12, 14, and 16	Yes	63	Yes	\$4,473,000	\$1,707,000	Yes
S1969	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	2	No	\$142,000	\$115,600	Yes
	12	Yes	2	Yes	\$142,000	\$132,400	Yes
	14	Yes	2	Yes	\$142,000	\$148,600	No
	16	Yes	2	Yes	\$142,000	\$164,700	No

Table 3-2 (cont'd.). Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S2033	16	Yes	4	No	\$284,000	\$228,300	Yes
	18	Yes	4	No	\$284,000	\$248,300	Yes
	20	Yes	4	Yes	\$284,000	\$268,900	Yes
	22	Yes	4	Yes	\$284,000	\$290,500	No
	24	Yes	4	Yes	\$284,000	\$313,200	No
S2079	10	No	N/A	No	N/A	N/A	N/A
	12	No	N/A	No	N/A	N/A	N/A
	14	No	4	No	\$284,000	\$450,000	No
	16	No	4	No	\$284,000	\$487,300	No
	18	Yes	4	Yes	\$284,000	\$525,500	No
	Design Barrier	Yes	4	Yes	\$284,000	\$525,500	No
S2145	8	Yes	3	No	\$213,000	\$449,100	No
	10	Yes	5	No	\$355,000	\$544,000	No
	12	Yes	28	Yes	\$1,988,000	\$638,700	Yes
	14	Yes	40	Yes	\$2,840,000	\$733,400	Yes
	16	Yes	43	Yes	\$3,053,000	\$825,500	Yes
	Design Barrier 14, and 16	Yes	43	Yes	\$3,053,000	\$772,800	Yes
S2238	8	No	N/A	No	N/A	N/A	N/A
	10	No	N/A	No	N/A	N/A	N/A
	12	Yes	27	No	\$1,917,000	\$518,500	Yes
	14	Yes	45	Yes	\$3,195,000	\$581,300	Yes
	16	Yes	46	Yes	\$3,266,000	\$640,000	Yes
	Design Barrier 14 and 16	Yes	46	Yes	\$3,266,000	\$601,700	Yes

Table 3-2 (cont'd.). Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S2382 & S2384	8	Yes	N/A	No	N/A	N/A	N/A
	10	Yes	1	No	\$71,000	\$394,700	No
	12	Yes	1	No	\$71,000	\$448,600	No
	14	Yes	1	Yes	\$71,000	\$501,900	No
	16	Yes	1	Yes	\$71,000	\$552,900	No
	Design Barrier 12 and 14	Yes	1	Yes	\$71,000	\$466,000	No
S2434A & S2438 (Option 1 of 2)	8	Yes	4	No	\$284,000	\$642,100	No
	10	Yes	16	Yes	\$1,136,000	\$751,500	Yes
	12	Yes	25	Yes	\$1,775,000	\$864,900	Yes
	14	Yes	32	Yes	\$2,272,000	\$976,200	Yes
	16	Yes	40	Yes	\$2,840,000	\$1,087,300	Yes
	Design Barrier 14 and 16	Yes	40	Yes	\$2,840,000	\$1,010,200	Yes
S2434B & S2438 (Option 2 of 2)	8	Yes	10	No	\$710,000	\$555,040	Yes
	10	Yes	24	Yes	\$1,704,000	\$643,400	Yes
	12	Yes	36	Yes	\$2,556,000	\$735,300	Yes
	14	Yes	38	Yes	\$2,698,000	\$825,400	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
	Design Barrier 12 and 14	Yes	38	Yes	\$2,698,000	\$759,800	Yes
S2435 & S2437	8	No	N/A	No	N/A	N/A	N/A
	10	No	N/A	No	N/A	N/A	N/A
	12	Yes	13	No	\$923,000	\$278,050	Yes
	14	Yes	15	Yes	\$1,065,000	\$331,900	Yes
	16	Yes	15	Yes	\$1,065,000	\$385,700	Yes

Table 3-2 (cont'd.). Summary of Abatement Key Information (Alternative 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
S2476	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	8	No	\$568,000	\$290,800	Yes
	12	Yes	62	Yes	\$4,402,000	\$364,000	Yes
	14	Yes	76	Yes	\$5,396,000	\$437,200	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
	Design Barrier 12, 14	Yes	70	Yes	\$4,970,000	\$392,300	Yes

*Although estimated construction cost is greater than total reasonable allowance, the difference is within 10% of the allowance; therefore, the soundwall will be considered reasonable.

Table 3-3. Summary of Abatement Key Information (Alternatives 2 and 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S2619	8	No	N/A	No	N/A	N/A	N/A
	10	Yes	11	No	\$781,000	\$1,198,000	No
	12	Yes	17	No	\$1,207,000	\$1,297,000	Yes
	14	Yes	17	Yes	\$1,207,000	\$1,396,000	Yes
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
	Design Barrier 10, 12, and 14	Yes	17	Yes	\$1,207,000	\$1,284,000	Yes*
S2638A & S2654A	8	Yes	8	No	\$568,000	\$1,694,800	No
	10	Yes	9	No	\$639,000	\$1,863,800	No
	12	Yes	20	Yes	\$1,420,000	\$2,033,900	No
	14	Yes	20	Yes	\$1,420,000	\$2,202,900	No
	16	No	-- ^a	-- ^a	-- ^a	-- ^a	-- ^a
	Design Barrier 10 and 12	Yes	20	Yes	\$1,420,000	\$2,013,900	No
S2638B & S2654B	12	Yes	11	Yes	\$781,000	\$808,800	Yes*
S2730	16	Yes	1	No	\$71,000	\$347,800	No
	18	Yes	1	No	\$71,000	\$380,900	No
	20	Yes	1	Yes	\$71,000	\$415,100	No
	22	Yes	1	Yes	\$71,000	\$450,800	No
	24	Yes	1	Yes	\$71,000	\$488,500	No
	Design Barrier 12, 14, 16, 18, and 20	Yes	1	Yes	\$71,000	\$386,100	No

Table 3-3 (cont'd.). Summary of Abatement Key Information (Alternatives 2 and 3)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S2737	16	Yes	2	No	\$142,000	\$958,200	No
	18	Yes	3	No	\$213,000	\$1,050,000	No
	20	Yes	5	No	\$355,000	\$1,145,000	No
	22	Yes	5	No	\$355,000	\$1,244,000	No
	24	Yes	6	Yes	\$426,000	\$1,348,000	No
	Design Barrier 16, 18, 20, 22, and 24	Yes	5	Yes	\$355,000	\$1,118,000	No
S2765	8	Yes	14	Yes	\$994,000	\$374,500	Yes
	10	Yes	15	Yes	\$1,065,000	\$435,600	Yes
	12	Yes	16	Yes	\$1,136,000	\$496,800	Yes
	14	Yes	16	Yes	\$1,136,000	\$557,900	Yes
	16	No	-- ^a	Yes	-- ^a	-- ^a	-- ^a
<p>*Although estimated construction cost is greater than total reasonable allowance, the difference is within 10% of the allowance; therefore, the soundwall will be considered reasonable.</p>							

3.2 Nonacoustical Factors Relating to Feasibility

Based on the preliminary project and abatement design, no nonacoustical factors related to feasibility have been identified that would be considered out of the ordinary for soundwall construction. The nonacoustical factors considered are geometric standards (e.g., sight distances), safety, maintenance, security, geotechnical issues, and utility relocations. Some of these nonacoustical factors, including geotechnical issues, will have to be investigated at the design phase. Many soundwalls are proposed on existing or proposed bridges along the I-10 corridor, which could potentially increase the estimated construction cost of these walls.

Some barriers may be constructed on or near private property; therefore, all of the residences behind these barriers on private property would need to sign a Temporary Construction Easement Form prior to the beginning of construction. Barriers would not substantially affect the cost or design of the project in its entirety. Construction requirements are considered typical for soundwall construction.

3.3 Preliminary Recommendation and Decision

Several factors were considered in making each soundwall recommendation:

- Line-of-sight break between a receptor and an 11.5-foot-high truck stack;
- Number of benefited receptors;
- Cost per benefited receptor;
- Degree of noise reduction (a barrier that provides only 1 dB of improved noise reduction over a lower barrier and costs substantially more may not be favored over the lower barrier); and
- 15-year minimum life cycle.

The preliminary noise abatement decision presented in this report is based on preliminary project alignments and profiles, which may be subject to change. As such, the physical characteristics of noise abatement described herein also may be subject to change. If pertinent parameters change substantially during the final project design, the preliminary noise abatement decision may be changed or eliminated from the final project design. A final decision to construct noise abatement will be made upon completion of the project design.

The preliminary noise abatement decision presented here will be included in the Draft ED, which will be circulated for public review.

Alternative 2

Based on the information summarized in Table 3-1 and noise reductions specified in the NSR, the following discussion presents the engineer's recommendation on the proposed height and reasonableness of each feasible and proposed soundwall for Alternative 2.

West of Cherry Avenue to Citrus Avenue

Soundwall S1749: Soundwall S1749 would be 207 feet long and located on the ROW line, north of I-10 between Cherry Avenue and Citrus Avenue. Figure 76 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal. Soundwall S1749 meets the 7-dB noise reduction design goal at 10 feet, while all other wall height options exceed the reasonable cost allowance. The estimated total construction cost of \$65,550 for this 10-foot-high wall is less than the reasonable allowance of \$71,000; therefore, Soundwall S1749 is considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1749 is feasible and reasonable, and it is recommended to be a 10-foot-high masonry wall, as shown in Figure 76 in Appendix A of this report.

Citrus Avenue to Sierra Avenue

Soundwall S1819: Soundwall S1819 would be 2,065 feet long and located on the ROW line, north of I-10 between Citrus Avenue and Cypress Avenue. Figures 78 and 79 in Appendix H of the NSR show the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal. An 18-foot-high wall would achieve the 7-dB noise reduction design goal, and it would benefit 33 adjacent residences. The estimated total construction cost of \$1,068,000 for the recommended 18-foot-high wall is less than the reasonable allowance of \$2,343,000; therefore, this soundwall is considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1819 is feasible and reasonable, and it is recommended to be an 18-foot-high masonry wall, as shown in Figures 78 and 79 in Appendix A of this report.

Soundwall S1833: Soundwall S1833 would be 706 feet long and located north of I-10 on the ROW line between Cypress Avenue and Sierra Avenue. Figure 79 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal.

Soundwall S1833 meets the 7-dB noise reduction goal and provides feasible abatement at four residences as a 16-foot-high barrier. The estimated total construction cost of \$336,100 for this 16-foot-high wall is more than the reasonable allowance of \$284,000; therefore, this soundwall is not considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1833 is not reasonable; therefore, it is not recommended.

Sierra Avenue to Cedar Avenue

Soundwall S1877: Soundwall S1877 would be 1,502 feet long and located on the ROW line along westbound I-10 between Sierra Avenue and Cedar Avenue. Soundwall S1877 is raised higher than otherwise required in front of four receivers to achieve feasible abatement at adjacent receivers. Soundwall S1877 would be located adjacent to an existing 7-foot-high property wall located at the property line. Removal of the 7-foot-high property wall is required for construction of Soundwall S1877. Figures 80 and 81 in Appendix H of the NSR show the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. Soundwall S1877 meets the minimum design criteria and maximizes noise reduction benefits as a 16-foot-high barrier. The estimated total construction cost of \$688,300 for this 16-foot-high wall is less than the reasonable allowance of \$4,686,000; therefore, this soundwall is reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1877 is feasible and reasonable, and it is recommended to be constructed as a 16-foot-high masonry wall, as shown in Figures 80 and 81 in Appendix A of this report.

Soundwall S1907: Soundwall S1907 would be 3,587 feet long and located on the ROW line north of I-10, between Sierra Avenue and Cedar Avenue. Soundwall S1907 would tie into Soundwall SW1, which will be constructed as part of the Cedar Avenue Improvement Project, also located at the ROW line. Figures 81 and 82 in Appendix H of the NSR show the locations, minimum lengths, and heights required for this soundwall to provide feasible traffic noise abatement. The total reasonable allowance for the proposed 12-, 14-, and 16-foot-high design barrier benefitting 46 residents, is \$3,266,000. The estimated total construction cost of \$1,679,000 for this 12-, 14-, and 16-foot-high wall is less than the reasonable allowance; therefore, the cost of this soundwall is reasonable. The design barrier option for Soundwall S1907 also meets the 7-dB noise reduction design goal. A uniform 16-foot-high masonry

wall was also considered; however, only one residence would be benefited for an additional \$157,046.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1907 is reasonable and feasible, and it is recommended to be constructed as a combination 12-, 14-, and 16-foot-high masonry wall, as shown in Figures 81 and 82 in Appendix A of this report.

Soundwall S1969: Soundwall S1969 would be 354 feet long and would be located on the ROW line of westbound I-10, transitioning to edge of shoulder of the westbound on-ramp from Cedar Avenue. Figure 83 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. Soundwall S1969 is acoustically feasible and meets the 7-dB noise reduction goal as a 12-foot-high wall. The total reasonable allowance benefiting one residence and a fire station is \$142,000. The estimated total construction cost of \$97,840 for this 12-foot-high wall is less than the reasonable allowance; therefore, this soundwall is reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1969 is reasonable and feasible, and it is recommended as part of the I-10 Corridor Project, as shown in Figure 83 in Appendix A of this report.

Cedar Avenue to Riverside Avenue

Soundwall S2033: Soundwall S2033 would be 444 feet long and would be located on the ROW line along the westbound side of I-10 between Cedar Avenue and Riverside Avenue. Figure 85 in Appendix H of the NSR shows the location, minimum length, and height of Soundwall S2033 to provide feasible abatement and meet the design goal. The estimated total construction cost of \$268,900 for this wall height is less than the reasonable allowance of \$284,000; therefore, Soundwall S2033 is considered reasonable. Both a 22- and 24-foot-high wall would be reasonable based on the cost; however, the noise reduction benefits were negligible and did not benefit any additional receptors.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2033 is reasonable and feasible, and it is recommended to be a 20-foot-high masonry wall, as shown in Figure 85 in Appendix A of this report.

Riverside Avenue to Pepper Avenue

Soundwall S2079: Soundwall S2079 would be 729 feet long and would be located north of I-10 on the ROW line between Riverside Avenue and Pepper Avenue. Figure 87 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. Soundwall S2079 meets the 7-dB noise reduction goal as a 16-foot-high wall; however, the estimated total construction cost of \$428,300 for this wall is more than the reasonable allowance of \$284,000.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2079 is not reasonable; therefore, it is not recommended.

Pepper Avenue to Rancho Avenue

Soundwall S2145: Soundwall S2145 would be 2,289 feet long and would be located on the ROW line along westbound I-10 between Pepper Avenue and Rancho Avenue. Figure 89 in Appendix H of the NSR shows the location, minimum length, and heights of Soundwall S2145 to provide feasible abatement and meet the design goal. The estimated total construction cost of \$1,131,000 for this wall is less than the reasonable allowance of \$3,195,000; therefore, Soundwall S2145 is recommended for construction. Uniform wall heights of 22 and 24 feet were considered; however, the cost did not justify the noise benefits. If the entire wall is 22 or 24 feet, the additional cost for each case comparing to the proposed variable wall height would be \$1,282,000 and \$1,381,000, respectively. No additional receivers would get feasible abatement, and noise would be reduced by 1 or 2 dB at few of the benefited receivers. As shown in Table 3-1, the design barrier option for Soundwall S2145 is the most cost-effective option, benefitting 45 residences.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2145 is both reasonable and feasible; therefore, it is recommended to be a combination 16-, 20-, and 22-foot-high masonry wall, as shown in Figure 89 in Appendix A of this report.

West of Tippecanoe Avenue to Mountain View Avenue

Soundwalls S2382 and S2384: Soundwalls S2382 and S2384 work as a system where Soundwall S2382 would be located on top of a retaining wall along the eastbound shoulder of I-10 and Soundwall S2384 would be located on the ROW line along the eastbound off-ramp to Tippecanoe Avenue. Soundwall S2382 would be 792

feet long, and Soundwall S2384 would be 393 feet long. Figure 97 in Appendix H of the NSR shows the locations, minimum lengths, and heights of Soundwalls S2382 and S2384 to provide feasible abatement and meet the design goal. The estimated total construction cost of the recommended 12- and 16-foot-high walls is \$452,500, which is more than the reasonable allowance of \$71,000; therefore, these soundwalls are not reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2382 and S2384 are not reasonable; therefore, they are not recommended.

Soundwalls S2434A and S2438 (Option 1): Two options have been considered for the location of Soundwall S2434: the ROW line (S2434A) and the shoulder of eastbound off-ramp to Mountain View Avenue (S2434B). Soundwalls S2434A and S2438 would work as a system where Soundwall S2434A would be located on the ROW line and Soundwall S2438 would be located on the shoulder of eastbound I-10. Soundwall S2434A would be 1,418 feet long, and Soundwall S2438 would be 1,262 feet long. Figures 98-1 and 99-1 in Appendix A of this report show the locations, minimum lengths, and heights of Soundwalls S2434A and S2438 to provide feasible abatement and meet the design goal. The design barrier option with varying heights would benefit 40 residences and is well below the reasonable allowance. The estimated total construction cost of \$909,100 for the design barrier option is less than the reasonable allowance of \$2,840,000; therefore, these soundwalls are deemed reasonable. Uniform wall height of 14 feet was also considered for Soundwalls S2434A and S2438, but there would be no additional acoustical benefits; however, a uniform height would be desirable for visual improvement. With this uniform height, the total construction cost would be \$984,800, which is still below the reasonableness allowance.

With consideration of the acoustic benefit, aesthetics, and the incremental cost, Soundwalls S2434A and S2438 are both reasonable and feasible. Soundwall S2434A is recommended to be a 12-, 14-, and 16-foot-high masonry wall, and Soundwall S2438 is recommended to be 14 feet high. These soundwalls are shown in Figures 98-1 and 99-1 in Appendix A of this report.

Soundwalls S2434B and S2438 (Option 2): Soundwalls S2434B and S2438 would work as a system where Soundwall S2434B would be located on the shoulder of the eastbound off-ramp to Mountain View Avenue and Soundwall S2438 would be located on the shoulder of eastbound I-10. Soundwall S2434B would be 1,400 feet

long, and Soundwall S2438 would be 1,200 feet long. Figures 98-2 and 99-2 in Appendix A of this report show the locations, minimum lengths, and heights of Soundwalls S2434B and S2438 to provide feasible abatement. The estimated total construction cost of \$757,000 for these walls is less than the reasonable allowance of \$2,698,000; therefore, these soundwalls are reasonable. A uniform 14-foot-high wall was also considered for Soundwall S2438, but there would be no additional acoustic benefits. Furthermore, because the shoulder width is less than 15 feet, the maximum height of a noise barrier in this location cannot exceed 14 feet.

With consideration of the acoustic benefit, aesthetics, and the incremental cost, Soundwalls S2434B and S2438 are reasonable and feasible. Soundwall S2434B is recommended to be a 12-foot-high masonry wall, and Soundwall S2438 is recommended to be 14 feet high, as shown in Figures 98-2 and 99-2 in Appendix A of this report.

Both options that are considered for Soundwalls S2434 and S2438 provide feasible abatement for 36 mobile homes and 4 single-family homes; however, the estimated construction cost of Option 2 is \$525,400 less than Option 1. Therefore, Option 2 is considered the preferred option for this soundwall system.

Soundwalls S2435 and S2437: Soundwalls S2435 and S2437 would work as a system where Soundwall S2435 would be located on the ROW line north of I-10 and Soundwall S2437 would be located along the shoulder of westbound I-10. Soundwall S2435 would be 469 feet long, and Soundwall S2437 would be 1,016 feet long. Soundwall S2435 would tie into existing Soundwall SW264, which is also located at the ROW line. Figures 98-1, 99-1, 98-2, and 99-2 in Appendix H of the NSR show the locations, minimum lengths, and heights required for these soundwalls to provide feasible traffic noise abatement. The estimated total construction cost of \$380,800 for a 10- and 14-foot-high design barrier is less than the reasonable allowance of \$1,065,000; therefore, Soundwalls S2435 and S2437 are reasonable. A 14-foot-high soundwall was also considered for Soundwall 2435, but the acoustical benefits are minimal compared to the cost of this option.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2435 and S2437 are reasonable and feasible; therefore, they are recommended to be 10- and 14-foot-high masonry walls, as shown in Figures 98-1, 99-1, 98-2, and 99-2 in Appendix A of this report.

Mountain View Avenue to East of California Street

Soundwall S2476: Soundwall S2476 would be 2,098 feet long and would be located on the shoulder of eastbound I-10 between Mountain View Avenue and California Street. Figure 100 in Appendix H of the NSR shows the location, minimum length, and heights of Soundwall S2476 to provide feasible abatement and meet the design goal. The NSR proposed a 12- and 14-foot-high wall combination to provide feasible abatement to impacted receivers and to meet the design goal; however, after further analysis, it was determined that the 14-foot-high masonry soundwall would benefit 14 additional nonimpacted residences for an additional \$52,500. The estimated construction cost for a uniform 14-foot-high wall is \$469,700, which is well below the cost reasonable cost allowance of \$5,254,000.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2476 is reasonable and acoustically feasible; therefore, it is recommended to be a 14-foot-high masonry wall, as shown in Figure 100 in Appendix A of this report.

Alternative 3

Based on the information summarized in Table 3-2 and noise reductions specified in the NSR, the following discussion presents the engineer's recommendation on the proposed height and reasonableness of each feasible and proposed soundwall for Alternative 3.

Towne Avenue to Indian Hill Boulevard

Soundwall S699: Soundwall S699 would be 450 feet long and would be located along the shoulder of the westbound I-10 Indian Hill Boulevard on-ramp. The soundwall would be joined at its western terminus to existing Soundwall SW651. Figure 104 in Appendix H of the NSR shows the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement. The design barrier option for Soundwall S699 as a 16-, 18-, and 20-foot-high wall would provide feasible abatement and would meet the 7-dB noise reduction design goal. The estimated total construction cost of \$406,100 for this wall option is less than the reasonable allowance of \$1,136,000; therefore, Soundwall S669 is reasonable. However, Howard Johnson Hotel may not want this soundwall because it would block the view of the hotel from the I-10 corridor.

With consideration of the acoustic benefit and the incremental cost, Soundwall S699 is reasonable and feasible, and it is recommended to be a 16-, 18-, and 20-foot-high masonry wall, as shown in Figure 104 in Appendix B of this report.

Central Avenue to Mountain Avenue

Soundwall S1117: Soundwall S1117 would be 222 feet long and would be located on the ROW line along the westbound on-ramp from Mountain Avenue. Figure 109 in Appendix H in the NSR shows the location, minimum length, and height of Soundwall S1117 to provide feasible abatement to Super 8 Motel. The estimated total construction cost of \$101,200 for this 12-foot-high wall option is less than the reasonable allowance of \$284,000; therefore, this soundwall is deemed reasonable. Both 14- and 16-foot-high options were also considered for Soundwall S1117; however, the acoustical benefits were negligible, resulting in only 1 dB of noise reduction for every 2 feet added to the height.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1117 is reasonable and feasible, and it is recommended to be a 12-foot-high masonry wall, as shown in Figure 109 in Appendix B of this report.

Mountain Avenue to Euclid Avenue

Soundwall S1132: Soundwall S1132 would be approximately 590 feet in length and would be located on the shoulder of the eastbound on-ramp from Mountain Avenue and would end where existing Soundwall SW136 begins. Figure 110 in Appendix H in the NSR shows the location, minimum length, and height of Soundwall S1132 to provide feasible abatement and meet the design goal. The estimated total construction cost of \$132,600 for this soundwall is less than the reasonable allowance of \$142,000; therefore, this soundwall is considered reasonable. Soundwall options higher than 14 feet could not be considered due to the location of Soundwall S1132. Per the Highway Design Manual, the maximum height of this noise barrier cannot exceed 14 feet when located 15 feet or less from a traffic lane.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1132 is reasonable and acoustically feasible; therefore, Soundwall S1132 is recommended to be a 14-foot-high masonry wall, as shown in Figure 110 in Appendix B of this report.

Euclid Avenue to 6th Street

Soundwall S1190: Soundwall S1190 would be 973 feet long and would be located along the ROW line south of I-10. Figure 112 in Appendix H of the NSR shows the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement and meet the design goal. The estimated total construction cost of \$326,800 for this wall is less than the reasonable allowance of \$1,420,000; therefore, this soundwall is considered reasonable. An 8-, 10-, and 12-foot-high design barrier was considered for Soundwall S1190, which would benefit 10 residences; however, after further analysis, the uniform 12-foot-high soundwall option was determined to be the most cost effective. For an additional cost of \$42,200, the number of benefited residences doubles, resulting in a total of 20 benefited residences.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1190 is reasonable and feasible, and it is recommended to be a 12-foot-high masonry wall with the estimated construction cost of \$326,800, as shown in Figure 112 in Appendix B of this report.

6th Street to 4th Street

Soundwall S1244: Soundwall S1244 would be located along the shoulder of eastbound I-10. This soundwall would close a gap that would exist between replace-in-kind Soundwalls SW230 and SW246 because replace-in-kind Soundwall SW230 would end short of its current location at the east end due to design constraints. Therefore, the soundwall has been moved to the shoulder to provide seamless abatement for this area. Figure 114 in Appendix H of the NSR shows the location, minimum length, and height of Soundwall S1244. The estimated total construction cost of this 175-foot-long wall is \$40,080.

This soundwall does not provide feasible abatement to any receiver; therefore, no reasonableness allowance has been calculated. Although this soundwall would not provide feasible abatement for residences in this area, it does reduce the traffic noise exposure at the residences by closing the gap in replace-in-kind soundwalls. Soundwall S1244 is recommended to be a 14-foot-high masonry wall to close the 175-foot-long gap, as shown in Figure 114 in Appendix B of this report.

Soundwall S1262: Soundwall S1262 would be 297 feet long and would be located on the shoulder along eastbound I-10 providing abatement to the pool area of Travelodge Hotel. Figure 114 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. The

estimated total construction cost of \$67,400 for this 14-foot-high wall is less than the reasonable allowance of \$71,000; therefore, the cost of Soundwall S1262 is reasonable. Soundwall options higher than 14 feet could not be considered due to the location of Soundwall S1262. Per the Highway Design Manual, the maximum height of this noise barrier cannot exceed 14 feet when located 15 feet or less from a traffic lane.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1262 is both reasonable and acoustically feasible, and it is recommended to be a 14-foot-high masonry wall, as shown in Figure 114 in Appendix B of this report. Because Travelodge Hotel is the only beneficiary of this soundwall, they may choose to decline it to avoid blockage of the motorists' view of the hotel.

Soundwall S1266: Soundwall S1266 would be 484 feet long and would be located along the shoulder of eastbound I-10, as well as the eastbound off-ramp to 4th Street. Figures 114 and 115 in Appendix H of the NSR show the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal at Days Inn. The estimated total construction cost of \$90,940 for a 12-foot-high soundwall is less than the reasonable allowance of \$213,000; therefore, this soundwall is reasonable. A 14-foot-high masonry wall was also considered, but the acoustical benefits were not significant enough to justify the cost. Per the Highway Design Manual, the maximum height of this noise barrier cannot exceed 14 feet when located 15 feet or less from a traffic lane.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1266 is reasonable and feasible; therefore, it is recommended to be a 12-foot-high masonry wall, as shown in Figures 114 and 115 in Appendix B of this report. Because Days Inn is the only beneficiary of this soundwall, they may choose to decline it to avoid blockage of the motorists' view of the hotel.

4th Street to Vineyard Avenue

Soundwall S1285: Soundwall S1285 would be 407 feet long and would be located north of I-10 on the shoulder of the westbound off-ramp to 4th Street. Figure 115 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal at Motel 6. The estimated total construction cost of \$91,830 for this wall option is less than the reasonable allowance of \$1,775,000; therefore, this soundwall is considered reasonable. Soundwall options higher than 14 feet could not be considered due to the

location of Soundwall S1285. Per the Highway Design Manual, the maximum height of this noise barrier cannot exceed 14 feet when located 15 feet or less from a traffic lane.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1285 is reasonable and is recommended to be a 14-foot-high masonry wall, as shown in Figure 115 in Appendix B of this report. Because Motel 6 is the only beneficiary of this soundwall, they may choose to decline it to avoid blockage of the motorists' view of the hotel.

Soundwall S21: Soundwall S21 would be located north of I-10, on the shoulder of the westbound on-ramp from North Vineyard Avenue. Soundwall S21 would be approximately 464 feet long. The western terminus of the soundwall would overlap with the existing 14-foot-high Soundwall SW296. Figure 116 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. The estimated total construction cost of \$167,400 for this 12-foot wall exceeds the reasonable allowance of \$142,000.

With consideration of the acoustic benefit and the incremental cost, Soundwall S21 is not reasonable; therefore, it is not recommended.

Soundwall S1276: Soundwall S1276 would be 216 feet long and would be located south of I-10, on the shoulder of the eastbound on-ramp from East 4th Street. The soundwall would be joined at its eastern terminus with the in-kind replacement Soundwall SW278. Figure 115 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal. The estimated total construction cost of \$24,990 for this wall is less than the reasonable allowance of \$213,000; therefore, the cost of this soundwall is reasonable. A 10-foot-high barrier was also analyzed for Soundwall S1276. With a 10-foot-high wall, the number of benefited residences remains the same, but an additional 2 dB of noise reduction can be achieved. The estimated construction cost for a 10-foot-high soundwall is \$33,070, which is still less than the reasonableness allowance.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1276 is reasonable and is recommended to be a 10-foot-high masonry wall, as shown in Figure 115 in Appendix B of this report.

Soundwall S1306: Soundwall S1306 would be 2,448 feet long and would be located along the eastbound shoulder of I-10 and the shoulder of the eastbound off-ramp to North Vineyard Avenue. Soundwall S1306 would connect with replace-in-kind Soundwall SW278 at the west end. Figures 115 and 116 in Appendix H in the NSR show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement and meet the design goal. The estimated total construction cost of \$638,100 for this wall option is less than the reasonable allowance of \$5,964,000; therefore, this soundwall is considered reasonable. An 8-, 10-, 12-, and 14-foot-high design barrier was considered as a cost-effective option that would also meet the 7-dB noise reduction design goal. Results of further analysis of predicted noise levels showed that a uniform 14-foot-high wall would provide feasible abatement to six more hotel rooms with no additional benefit to any of the residential receivers.

With consideration of the acoustic benefit, Soundwall S1306 is reasonable and feasible, and it is recommended to be an 8-, 10-, 12-, and 14-foot-high masonry wall, as shown in Figures 115 and 116 in Appendix B of this report.

Citrus Avenue to Sierra Avenue

Soundwall S1819: Soundwall S1819 would be 2,055 feet long and would be located north of I-10 on the ROW line. Figures 133 and 134 in Appendix H of the NSR show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement and meet the design goal. A 16- and 18-foot-high design barrier was proposed for Soundwall S1819 to provide feasible abatement at impacted receivers and meet the design goal. The estimated total construction cost of \$999,100 for this wall option is less than the reasonable allowance of \$2,343,000; therefore, this soundwall is recommended for construction. A uniform 18-foot-high soundwall option was also analyzed. Even though the acoustical benefits were at most 1 dB, it was considered to recommend the 18-foot-high wall for an additional cost of \$64,900.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1819 is reasonable and feasible, and it is recommended to be an 18-foot-high masonry wall, as shown in Figures 133 and 134 in Appendix B of this report.

Soundwall S1833: Soundwall S1833 would be 707 feet in length and would be located north of I-10 on the ROW line. Figure 134 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide

feasible traffic noise abatement. The estimated total construction cost of \$308,000 for this wall height is more than the reasonable allowance of \$284,000. However, the difference between the estimated construction cost and the reasonable allowance is within 10%; therefore, the soundwall is considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1833 is reasonable and feasible, and it is recommended to be a 14-foot-high masonry wall, as shown in Figure 134 in Appendix B of this report.

Sierra Avenue to Cedar Avenue

Soundwall S1877: Soundwall S1877 would be 1,502 feet long and would be located on the ROW line along westbound I-10. Soundwall S1877 would be located adjacent to an existing 7-foot-high property wall located at the property line. Figures 135 and 136 in Appendix H of the NSR show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement. A design barrier consisting of both 14- and 16-foot-high segments was considered as an acoustically feasible option that would benefit 72 residences and would meet the design goal. The estimated total construction cost of the design barrier is \$635,800. The reasonable allowance for 72 benefited residences is \$5,112,000; therefore, this soundwall is considered reasonable. A uniform 16-foot-high wall was also analyzed; however, the acoustical benefits were negligible.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1877 is reasonable and feasible, and it is recommended to be a 14- and 16-foot-high masonry wall, as shown in Figures 135 and 136 in Appendix B of this report.

Soundwall 1907: Soundwall S1907 would be 3,587 feet in length. Soundwall S1907 would be located on the ROW line north of I-10 and would tie into Soundwall SW1, which will be constructed as part of the Cedar Avenue Improvement Project, also located at the ROW line. Figures 136 and 137 in Appendix H of the NSR show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement. The estimated total construction cost of \$1,707,000 for this wall option is less than the reasonable allowance of \$4,473,000; therefore, the cost of this soundwall is reasonable. A uniform 16-foot-high soundwall would be aesthetically beneficial in this location and would provide more acoustical benefits for an additional cost of \$129,000.

With consideration of the acoustic benefit, aesthetics, and the incremental cost, Soundwall S1907 is reasonable and feasible, and it is recommended to be a 16-foot-high masonry wall, as shown in Figures 136 and 137 in Appendix B of this report.

Soundwall S1969: Soundwall S1969 would be 369 feet long and would be located on the edge of shoulder of the westbound on-ramp from Cedar Avenue. Figure 138 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. The estimated total construction cost of \$132,400 for this wall height is less than the reasonable allowance of \$142,000; therefore, this soundwall is considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S1969 is reasonable and feasible; therefore, it is recommended to be a 12-foot-high masonry wall as shown in Figure 138 in Appendix B of this report.

Cedar Avenue to Riverside Avenue

Soundwall S2033: Soundwall S2033 would be 444 feet long and would be located on the ROW line along the westbound side of I-10. Figure 140 in Appendix H in the NSR shows the location, minimum length, and height of Soundwall S2033 to provide feasible abatement and meet the design goal. The estimated total construction cost of \$268,900 for this wall is less than the reasonable allowance of \$284,000; therefore, this soundwall is reasonable. Both 22- and 24-foot-high wall options were considered for Soundwall S2033, but neither of these options provided adequate additional noise abatement to justify using a higher wall.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2033 is reasonable and feasible, and it is recommended to be a 20-foot-high masonry wall, as shown in Figure 140 in Appendix B of this report.

Riverside Avenue to Pepper Avenue

Soundwall S2079: Soundwall S2079 would be 851 feet long and would be located north of I-10 on the ROW line. Figure 142 in Appendix H of the NSR shows the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement. The estimated total construction cost of \$525,500 for this wall height is more than the reasonable allowance of \$284,000; therefore, this soundwall is not reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2079 is not reasonable; therefore, it is not recommended.

Pepper Avenue to Rancho Avenue

Soundwall S2145: Soundwall S2145 would be 2,388 feet long and would be located on the shoulder and ROW line along westbound I-10. Because the shoulder would be less than 15 feet in width, per the Caltrans Highway Design Manual, the maximum height of a portion of the noise barrier located on the shoulder should not exceed 14 feet when located 15 feet or less from edge of traveled way. Figure 144 in Appendix H of the NSR shows the location, as well as the minimum length and heights, of Soundwall S2145 to provide feasible abatement. The estimated total construction cost of \$772,800 for this wall option is less than the reasonable allowance of \$3,053,000; therefore, this soundwall is considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2145 is reasonable and feasible, and it is recommended to be a 14- and 16-foot-high masonry wall, as shown in Figure 144 in Appendix B of this report.

9th Street to Interstate 215

Soundwall S2238: Soundwall S2238 would be 1,462 feet long and would be located north of I-10 on the ROW line and shoulder. Figure 147 in Appendix H of the NSR shows the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement and meet the design goal. A 14- and 16-foot-high design barrier was proposed for Soundwall S2238 to maximize acoustical benefits to adjacent residents. Because a portion of the shoulder would be less than 15 feet in width, the maximum height of this noise barrier could not exceed 14 feet when located 15 feet or less from edge of traveled way. The estimated total construction cost of \$601,700 for the 14- and 16-foot-high design barrier option is less than the reasonable allowance of \$3,266,000; therefore, this soundwall is reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2238 is reasonable and is recommended to be a 14- and 16-foot-high masonry wall, as shown in Figure 147 in Appendix B of this report.

West of Tippecanoe Avenue to Mountain View Avenue

Soundwalls S2382 and S2384: Soundwalls S2382 and S2384 work as a system where Soundwall S2382 would be located on top of a retaining wall along the eastbound shoulder of I-10 and Soundwall S2384 would be located on the ROW line

along the eastbound off-ramp to Tippecanoe Avenue. Soundwall S2382 would be 837 feet long, and Soundwall S2384 would be 395 feet long. Figure 152 in Appendix H of the NSR shows the locations, minimum lengths, and heights of Soundwalls S2382 and S2384 to provide feasible abatement and meet the design goal. A 12- and 14-foot-high design barrier was analyzed as an effective design; however, the estimated total construction cost of \$466,000 for these walls is more than the reasonable allowance of \$71,000.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2382 and S2384 are not reasonable; therefore, they are not recommended.

Soundwalls S2434A and S2438 (Option 1): Two options have been considered for the location of Soundwall S2434: the ROW line (S2434A) and the shoulder of eastbound off-ramp to Mountain View Avenue (S2434B). Soundwalls S2434A and S2438 would work as a system where Soundwall S2434A would be located on the ROW line and Soundwall S2438 would be located on the shoulder of eastbound I-10. Soundwall S2434A would be 1,513 feet long, and Soundwall S2438 would be 1,201 feet long. Figures 153-1 and 154-1 in Appendix B of this report show the locations, minimum lengths, and heights of Soundwalls S2434A and S2438 to provide feasible abatement and meet the design goal. According to the NSR predicted noise level analysis, the 14- and 16-foot-high design barrier option would benefit 40 residences and is well below the reasonable allowance. The estimated total construction cost of \$1,010,200 for these walls is less than the reasonable allowance of \$2,840,000; therefore, these soundwalls are reasonable. A uniform wall height of 16 feet was also considered for Soundwall S2434A, but no additional noise reduction can be achieved at the benefited receivers.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2434A and S2438 are reasonable and feasible. It is recommended that Soundwall S2434A be a 14- and 16-foot-high masonry wall, and Soundwall S2438 be a 12-foot high masonry wall, as shown in Figures 153-1 and 154-1 in Appendix B of this report.

Soundwalls S2434B and S2438 (Option 2): Soundwalls S2434B and S2438 would work as a system where Soundwall S2434B would be located on the shoulder of the eastbound off-ramp to Mountain View Avenue and Soundwall S2438 would be located on the shoulder of eastbound I-10. Soundwall S2434B would be 1,390 feet long, and Soundwall S2438 would be 772 feet long. Figures 153-2 and 154-2 in

Appendix B of this report show the locations, minimum lengths, and heights of Soundwalls S2434B and S2438 to provide feasible abatement. A 12- and 14-foot-high design barrier was proposed in the NSR as a means to maximize benefited residences, while also remaining cost effective. The estimated total construction cost of \$759,800 for this wall is less than the reasonable allowance of \$2,698,000; therefore, this soundwall is reasonable. A uniform 14-foot-high soundwall was also considered for both walls, but only 1-dB additional noise reduction can be achieved at some of the benefited receivers; therefore, higher wall heights are not recommended.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2434B and S2438 are reasonable and feasible. It is recommended that Soundwall S2434B be a 12- and 14-foot-high masonry wall and Soundwall S2438 be a 12-foot-high masonry wall, as shown in Figures 153-2 and 154-2 in Appendix B of this report.

Both options that are being considered for Soundwalls S2434 and 2438 provide feasible abatement for 36 mobile homes and 4 single family homes; however, the estimated construction cost of Option 2 is \$250,400 less than Option 1. Therefore, Option 2 is considered as the preferred option for this soundwall system.

Soundwalls S2435 and S2437: Soundwalls S2435 and S2437 would work as a system where Soundwall S2435 would be located on the ROW line north of I-10 and Soundwall S2437 would be located along the shoulder of westbound I-10. Soundwall S2435 would be 469 feet long, and Soundwall S2437 would be 971 feet long. Soundwall S2435 would tie into existing Soundwall SW264, which is also located at the ROW line. Figures 154-1 and 154-2 in Appendix H of the NSR show the locations, minimum lengths, and heights required for these soundwalls to provide feasible traffic noise abatement. The estimated total construction cost of these two soundwalls at 14 feet high is \$331,900, which is less than the reasonable allowance of \$1,065,000; therefore, these soundwalls are considered reasonable. A 16-foot-high wall was also analyzed for Soundwall S2435, but only 1-dB additional noise reduction can be achieved at few of the benefited receivers; therefore, a higher wall is not recommended. Soundwall S2437 cannot be higher than 14 feet because the shoulder is less than 15 feet wide.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2435 and S2437 are reasonable and feasible; therefore, they are recommended to

consist of two 14-foot-high masonry walls, as shown in Figures 154-1 and 154-2 in Appendix B of this report.

Mountain View Avenue to Nevada Street

Soundwall S2476: Soundwall S2476 would be 1,957 feet long and would be located on the shoulder of eastbound I-10. Figure 155 in Appendix H of the NSR shows the location, minimum length, and heights of 12 and 14 feet for Soundwall S2476 to provide feasible abatement and meet the design goal. Because the shoulder would be less than 15 feet in width, per the Caltrans Highway Design Manual, the maximum height of a noise barrier should not exceed 14 feet when located 15 feet or less from edge of traveled way; therefore, providing additional abatement by increasing the height of the existing soundwall could not be attempted. The estimated total construction cost of \$608,200 for this 14- and 12-foot-high wall option is less than the reasonable allowance of \$4,970,000; therefore, the cost of this soundwall is reasonable. A uniform height of 14 feet was also considered for Soundwall S2476. A 1-dB noise reduction can be achieved at numerous benefited receivers, and six second-story balconies would also receive feasible abatement for an additional cost of \$55,000. Therefore, a uniform height of 14 feet is recommended.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2476 is reasonable and feasible, and it is recommended to be a 14-foot-high masonry wall, as shown in Figure 155 in Appendix B of this report.

Alternatives 2 and 3

As previously stated, soundwalls considered for the three eastern segments of the proposed project (Tennessee Street to Orange Street, Orange Street to Cypress Avenue, and East Cypress Avenue to East of Ford Street) are identical for both Alternatives 2 and 3; therefore, the following discussions would apply to both of the build alternatives. Based on the information summarized in Table 3-3 and noise reductions specified in the NSR, the following discussion presents the engineer's recommendation on the proposed height and reasonableness of each feasible and proposed soundwall for Alternatives 2 and 3.

Tennessee Street to Orange Street

Soundwall S2619: Soundwall S2619 would be 2,301 feet in length and would be located along westbound I-10 at the edge-of-shoulder of the general purpose lanes, as well as the Orange Street on-ramp. Figures 159 and 160 in Appendix H of the NSR

show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement. The estimated total construction cost of \$1,284,000 for this wall is more than the reasonable allowance of \$1,207,000; therefore, this soundwall is reasonable. Although estimated construction cost is greater than total reasonable allowance, the difference is within 10% of the allowance; therefore, the soundwall is considered to be reasonable. A 10-foot-high portion of this wall is sandwiched between 12-foot-high segments. Raising this portion to 12 feet would provide an additional 1 dB of noise reduction at one receiver location, which would not justify a higher wall; however, raising the wall would improve aesthetics of the soundwall for an additional cost of \$39,000. Because the 10-, 12-, and 14-foot soundwall already exceeds the reasonable allowance, it is not recommended to raise the 10-foot-high portion to 12 feet.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2619 is reasonable and feasible, and it is recommended to be a 10-, 12- and 14-foot-high masonry wall, as shown in Figures 159 and 160 in Appendix A and Appendix B of this report.

Orange Street to East Cypress Avenue

Soundwalls S2638A and S2654A: Soundwalls S2638A and S2654A would act as a noise barrier system to provide feasible abatement for impacted receivers. Soundwall S2638A would be 1,142 feet long, and Soundwall S2654A would be 2,798 feet long. Soundwall S2638A would be located along the shoulder of the general purpose lanes of eastbound I-10 from the edge of the Orange Street overcrossing to the 6th Street on-ramp. Soundwall S2654A would begin along the shoulder of the 6th Street on-ramp and continue along the shoulder of eastbound I-10 until joining to existing Soundwall SW158A, which is located near the start of the eastbound I-10 University Street off-ramp. Figures 160 and 161 in Appendix H of the NSR show the locations, minimum lengths, and heights required for these soundwalls to provide feasible traffic noise abatement. A 10- and 12-foot-high design barrier was analyzed in the NSR as a cost-effective option; however, the estimated total construction cost of \$1,542,100 for this wall is more than the reasonable allowance of \$1,420,000.

With consideration of the acoustic benefit and cost, Soundwalls S2638A and S2654A are not reasonable; therefore, they are not recommended for construction.

Soundwalls S2638B and S2654B (Option): An optional design allowing for partial noise abatement was analyzed following calculations of the estimated construction

cost of Soundwalls S2638A and S2654A. The original soundwall system, as presented in the NSR, would need to cross over three existing overcrossing bridges; however, significant costs associated with widening and strengthening the existing bridges would result in an estimated total construction cost greater than the reasonable allowance. If the soundwall lengths were reduced and did not cross the bridges, the soundwall system would still provide feasible abatement to more than half of the impacted receivers. Eleven residences would be benefited by Soundwalls S2638B and S2654B; therefore, the current reasonable allowance of \$71,000 per benefited residence would produce a total reasonable allowance of \$781,000.

Soundwalls S2638B and S2654B would act as a noise barrier system to provide feasible abatement for impacted receivers. Soundwall S2638B would be 418 feet long (Stations 2638+73 to 2643+00), and Soundwall S2654B would be 1,898 feet long (Stations 2639+10 to 2658+51). Soundwall S2638B would be located along the shoulder of the general purpose lanes of eastbound I-10 from the edge of the 6th Street overcrossing to the 6th Street on-ramp. Soundwall S2654B would begin along the shoulder of the 6th Street on-ramp and continue along the shoulder of eastbound I-10 to the Church Street overcrossing. Per the Caltrans Highway Design Manual, because the shoulder width of eastbound I-10 would be less than 15 feet in this area, the maximum height of the analyzed noise barrier could not exceed 14 feet. Figures 160 and 161 in Appendix H of the NSR show the locations, minimum lengths, and heights required for these soundwalls to provide feasible traffic noise abatement. The estimated total construction cost of \$808,800 for this wall is more than the reasonable allowance of \$781,000. Although estimated construction cost is greater than total reasonable allowance, the difference is within 10% of the allowance; therefore, the soundwall is considered reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwalls S2638B and S2654B are reasonable and feasible, and are recommended to be a 12-foot-high masonry wall, as shown in Figures 160 and 161 in Appendix A and Appendix B of this report.

East Cypress Avenue to East of Ford Street

Soundwall S2730: Soundwall S2730 would provide feasible abatement for an impacted outdoor use area of the El Carmelo Retreat. Soundwall 2730 would be 736 feet long and would be connected to existing Soundwall SW172 along the shoulder of eastbound I-10. The soundwall would immediately transition from the shoulder of the roadway to the ROW line, which rises in elevation compared to I-10. Figures 163 and

164 in Appendix H of the NSR show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement. A 12-, 14-, 16-, 18-, and 20-foot-high design barrier was analyzed, and it was determined to be acoustically feasible and meet the design goal. The estimated total construction cost of \$386,100 for this wall is more than the reasonable allowance of \$71,000.

With consideration of the acoustic benefit and the cost, Soundwall S2730 is not reasonable; therefore, it is not recommended to be constructed.

Soundwall S2737: Soundwall S2737 would be approximately 2,043 feet in length and would be located at the ROW line along the westbound lanes of I-10. Figures 163 and 164 in Appendix H of the NSR show the location, minimum length, and heights required for this soundwall to provide feasible traffic noise abatement. The NSR proposed a 16-, 18-, 20-, 22-, and 24-foot-high soundwall for this location. The estimated total construction cost of \$1,118,000 for this wall is more than the reasonable allowance of \$355,000.

With consideration of the acoustic benefit and the cost, Soundwall S2737 is not reasonable; therefore, it is not recommended to be constructed.

Soundwall S2765: Soundwall S2765 would be 1,424 feet long and would provide feasible abatement for impacted receivers. This soundwall would be located along the shoulder of the general purpose lanes of westbound I-10. Figures 164 and 165 in Appendix H of the NSR show the location, minimum length, and height required for this soundwall to provide feasible traffic noise abatement and meet the design goal. The estimated total construction cost for this 14-foot-high wall is \$557,900, which is less than the reasonable allowance of \$1,136,000; therefore, this soundwall is reasonable.

With consideration of the acoustic benefit and the incremental cost, Soundwall S2765 is reasonable and is recommended to be a 14-foot-high masonry wall, as shown in Figures 164 and 165 in Appendix A and Appendix B of this report.

Chapter 4 Secondary Effects of Abatement

There are no additional impacts or secondary effects on cultural resources, scenic views, hazardous materials, biology, or other resources expected to occur.

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Chapter 5 References

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_____. 2011 (updated). Project Development Procedures Manual Appendix K – Preparation Guidelines for Project Report. Section 6H - Noise Abatement Decision Report Section

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Chapter 6 List of Preparers

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2 years of environmental planning experience. Contribution: Author of Noise Abatement Decision Report.

David Ovadia, P.E., Senior Project Engineer, B.S. Civil Engineering, California State University Long Beach, 20 years of experience. Contribution: Cost Estimates.

Areg Gharabegian, P.E., Program Director, B.S. Mechanical Engineering, Pahlavi University, M.S. Energy, Resources, and Environment, George Washington University, 36 years of experience in conducting noise and vibration studies. Contribution: Technical directions and quality control for the Noise Study Report and NADR.

Greg Berg, Senior Scientist - Noise and Vibration, B.A. Acoustics, Columbia College Chicago; 10 years of experience. Contribution: Author of Noise Study Report.

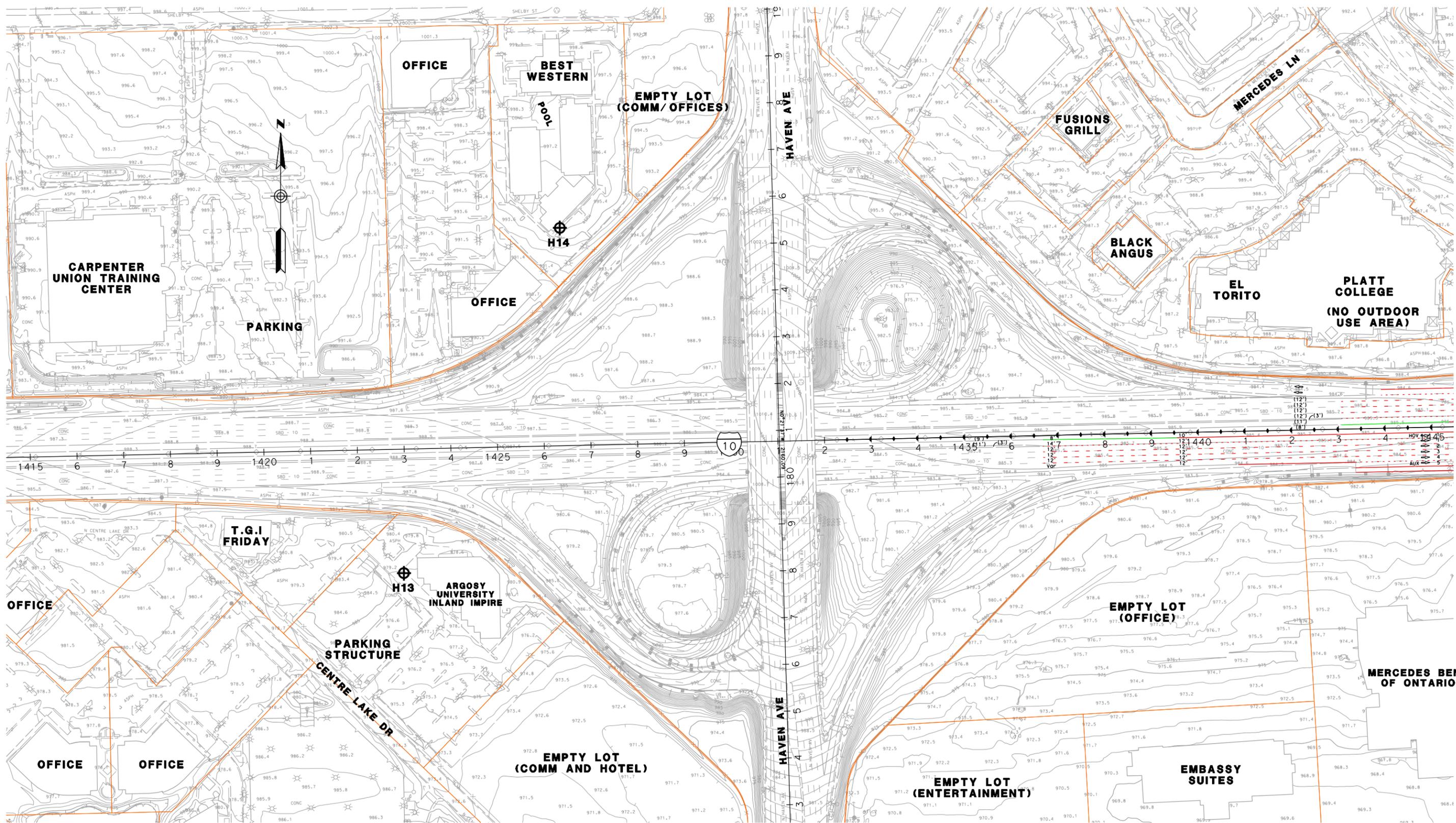
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Appendix A Alternative 2 – Figures
Showing Recommended
Barrier Heights and Locations

TABLE 1 – Noise Abatement Information (Alternative 2)

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Total Reasonable Allowance	Masonry Estimated Construction Cost	Cost Less than Allowance	Preliminary Noise Abatement Decision
S1749	10	Yes	1	\$71,000	\$65,550	Yes	Reasonable
S1818	20	Yes	9	\$639,000	\$433,500	Yes	Reasonable
S1819	18	Yes	33	\$2,343,000	\$1,068,000	Yes	Reasonable
S1833	16	Yes	4	\$284,000	\$336,100	No	Not Reasonable
S1834	18	Yes	8	\$568,000	\$398,300	Yes	Reasonable
S1877	16	Yes	66	\$4,686,000	\$688,300	Yes	Reasonable
S1907	12- 14- 16	Yes	46	\$3,266,000	\$1,679,000	Yes	Reasonable
S1969	12	Yes	2	\$142,000	\$97,840	Yes	Reasonable
S2033	20	Yes	4	\$284,000	\$268,900	Yes	Reasonable
S2079	16	Yes	4	\$284,000	\$428,300	No	Not Reasonable
S2145	16- 20- 22	Yes	45	\$3,195,000	\$1,131,000	Yes	Reasonable
S2382	12	Yes	1	\$71,000	\$452,500	No	Not Reasonable
S2384	16						
S2434A	12- 14- 16	Yes	40	\$2,840,000	\$909,100	Yes	Reasonable
S2438	14						
S2434B	12	Yes	40	\$2,840,000	\$757,000	Yes	Reasonable
S2438	14						
S2435	10	Yes	15	\$1,065,000	\$380,800	Yes	Reasonable
S2437	14						
S2476	14	Yes	88	\$6,248,000	\$663,200	Yes	Reasonable
S2619	10- 12- 14	Yes	17	\$1,207,000	\$1,284,000	Yes*	Reasonable*
S2638A	12	Yes	20	\$1,420,000	\$2,013,900	No	Not Reasonable
S2654A	10- 12						
S2638B	12	Yes	11	\$781,000	\$808,800	Yes*	Reasonable*
S2654B	12						
S2730	12- 14- 16- 18- 20	Yes	1	\$71,000	\$386,100	No	Not Reasonable
S2737	16- 18- 20- 22- 24	Yes	5	\$355,000	\$1,118,000	No	Not Reasonable
S2765	14	Yes	16	\$1,136,000	\$557,900	Yes	Reasonable

*Although estimated construction cost is greater than total reasonable allowance, the difference is within 10% of the allowance; therefore, the cost is considered less than the allowance.

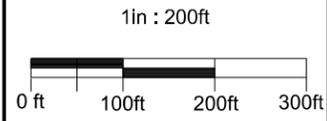


- LEGEND**
- ⊕RX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

- SFR OR S - SINGLE FAMILY RESIDENCE
- MFR OR M - MULTI-FAMILY RESIDENCE
- COMM OR C - COMMERCIAL/NO OUTDOOR USE AREA
- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

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- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

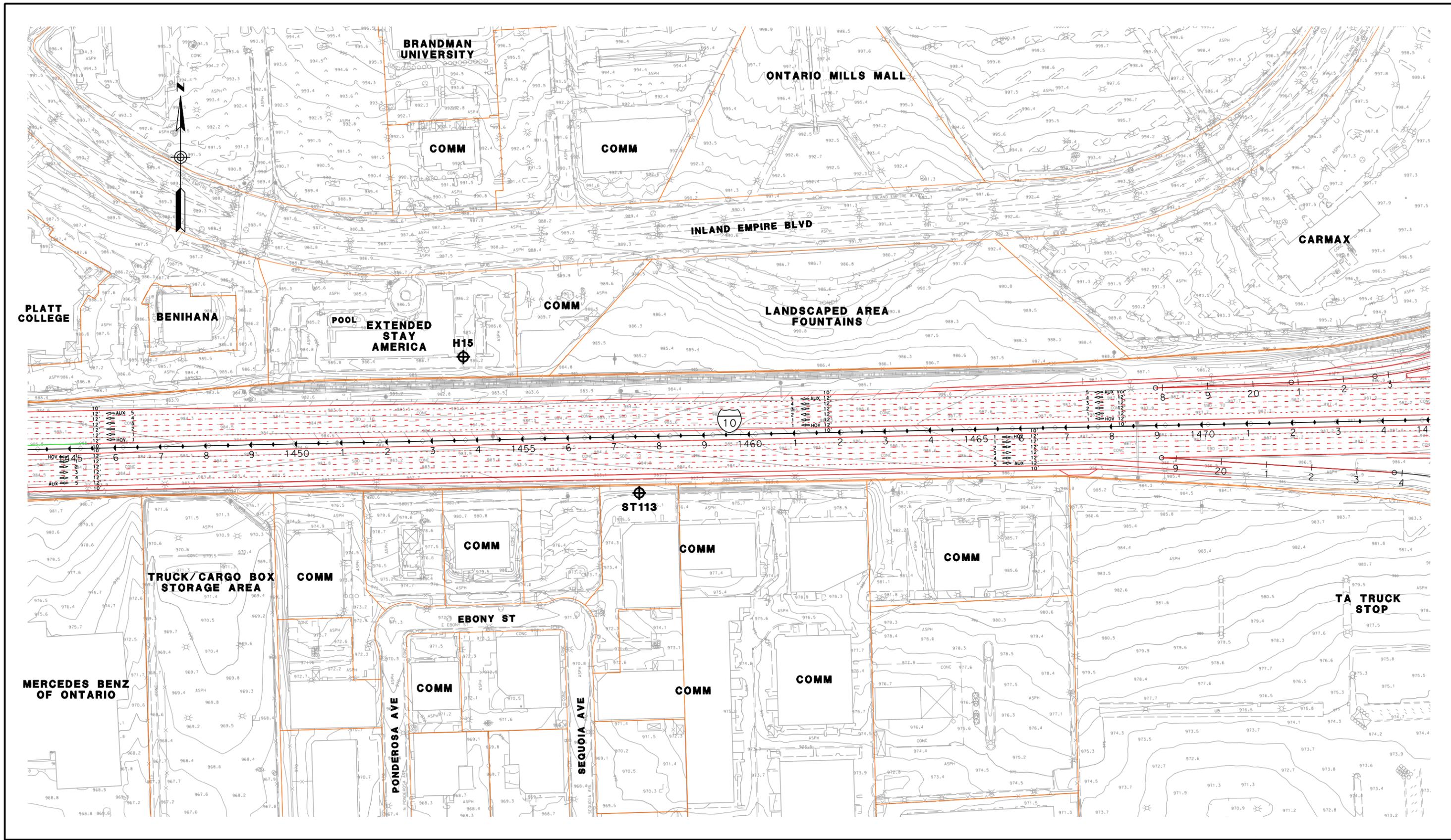
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- — — — — RETAINING WALL
- — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 65

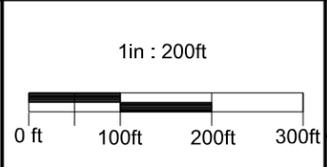


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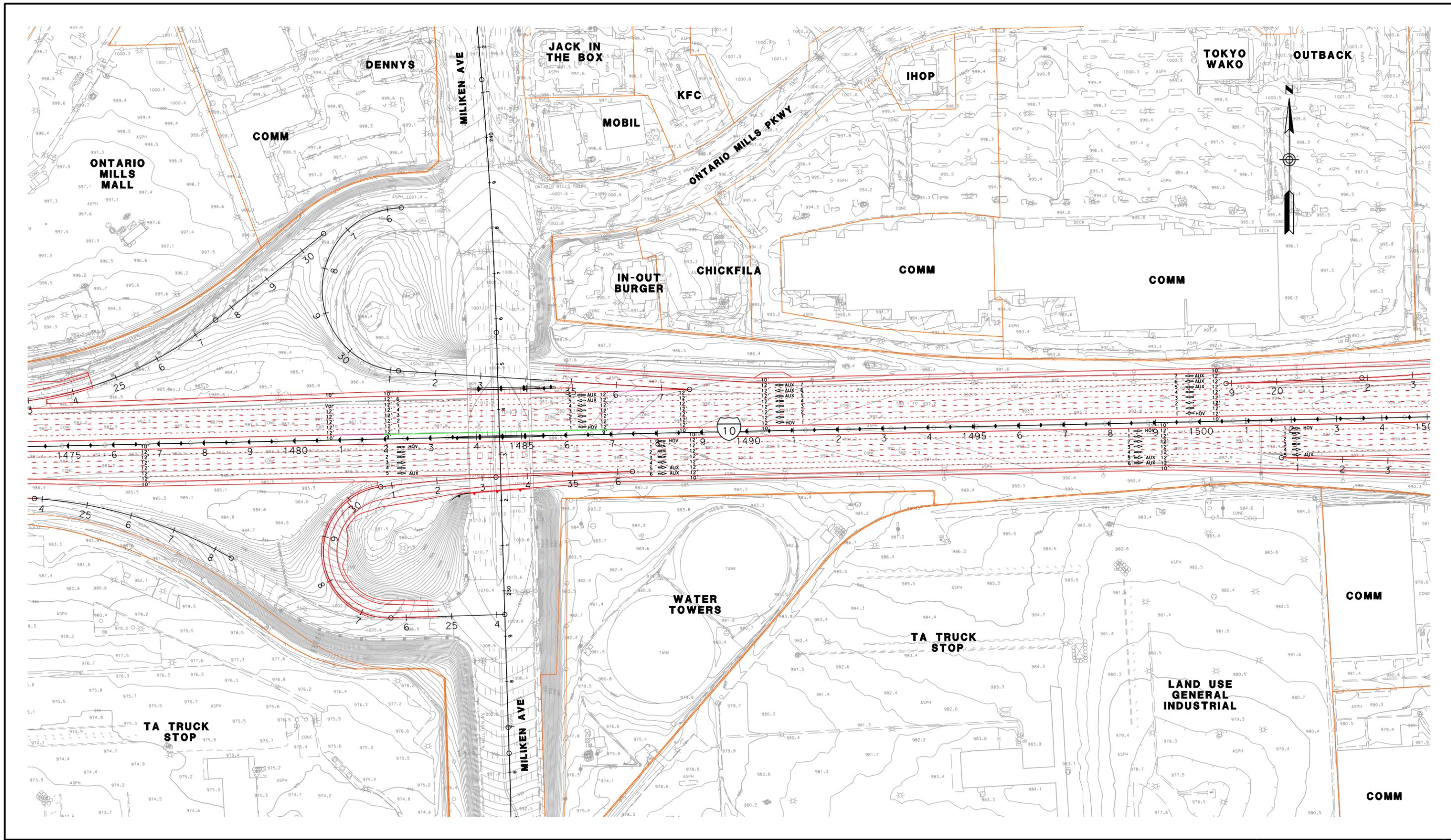
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**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 66

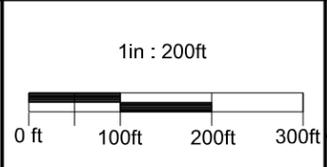


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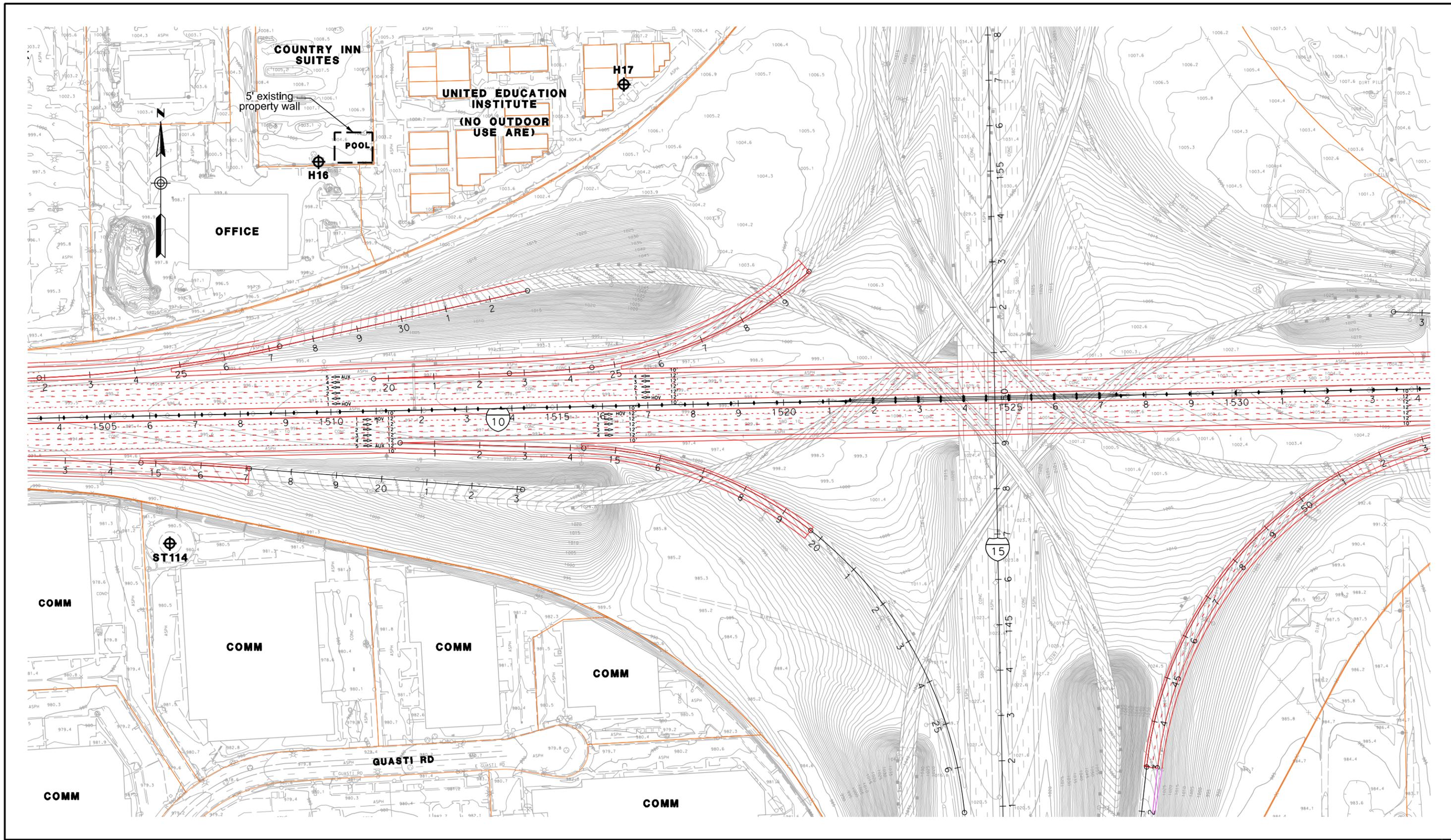
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**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 67

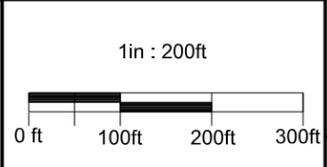


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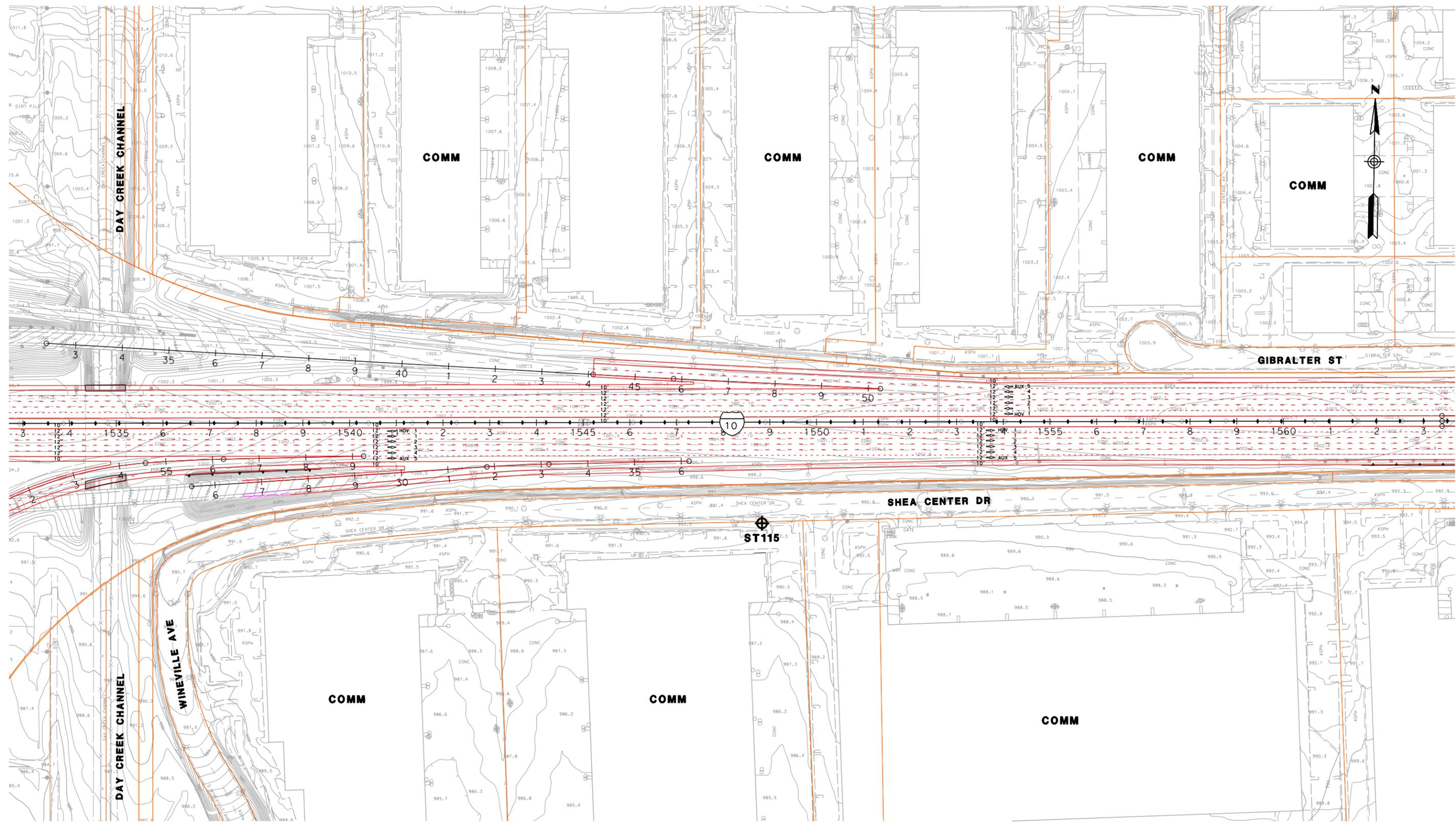
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- — — — — RETAINING WALL
- — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 68

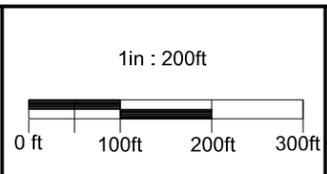


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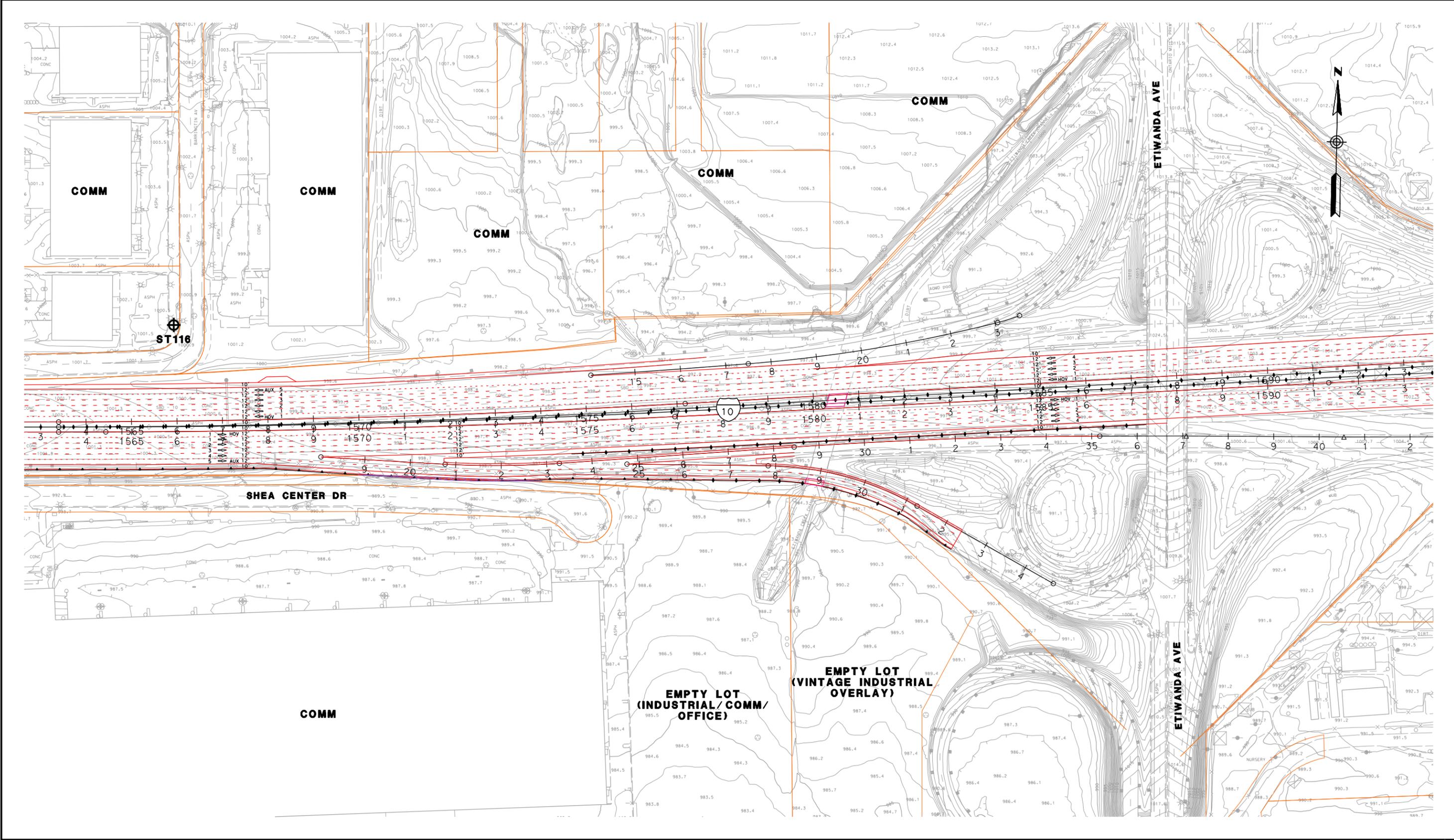
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- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 69

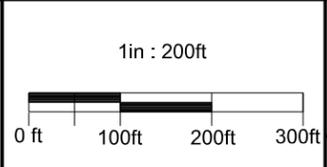


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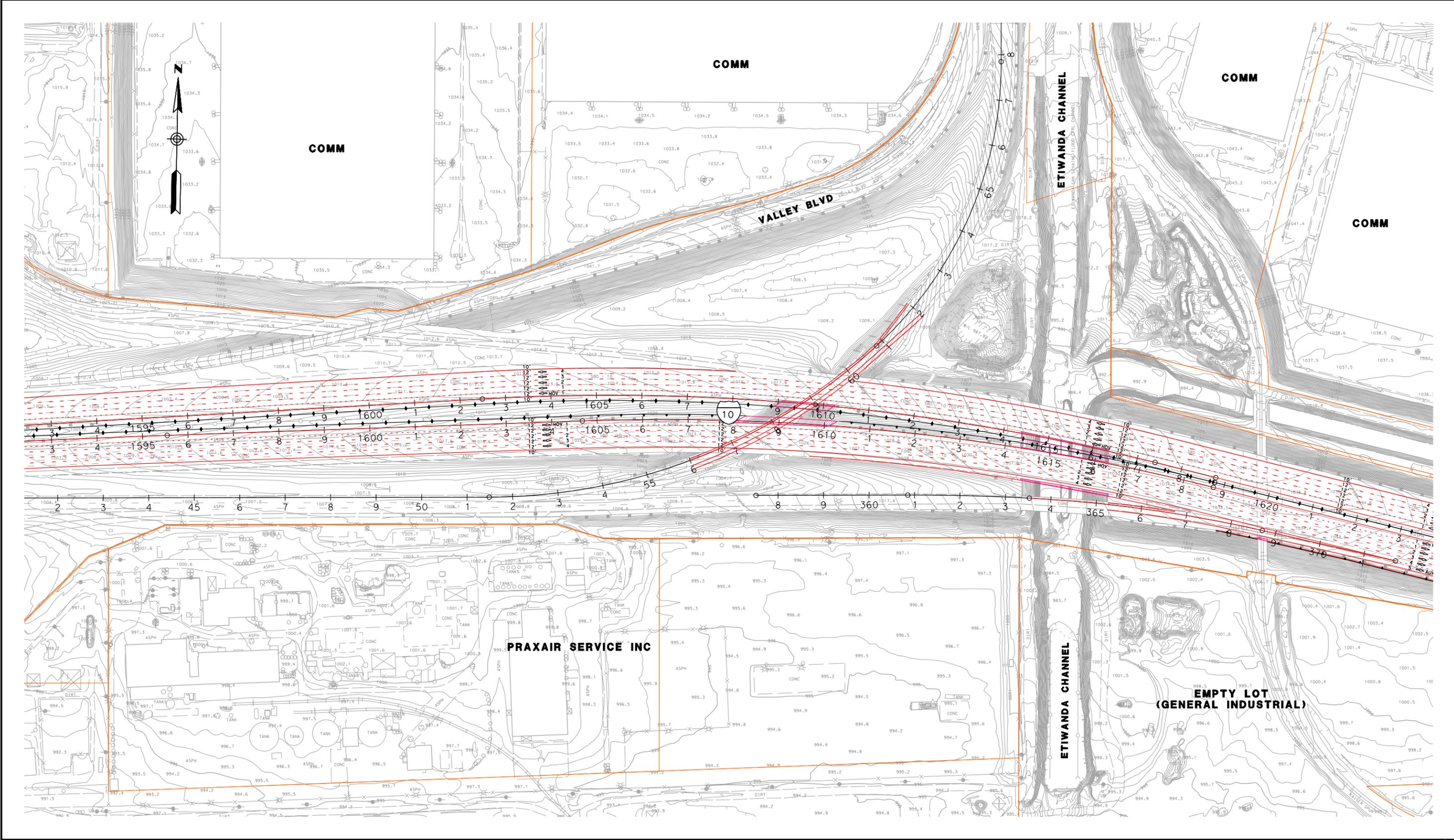
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- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL
- — — — — - NON-REASONABLE SOUNDWALL
- ▲ — — — — — - RETAINING WALL
- ◆ — — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 70

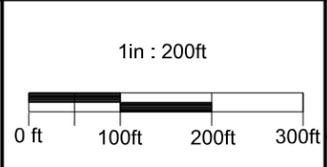


- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

- SFR OR S** - SINGLE FAMILY RESIDENCE
- MFR OR M** - MULTI-FAMILY RESIDENCE
- COMM OR C** - COMMERCIAL/NO OUTDOOR USE AREA
- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL

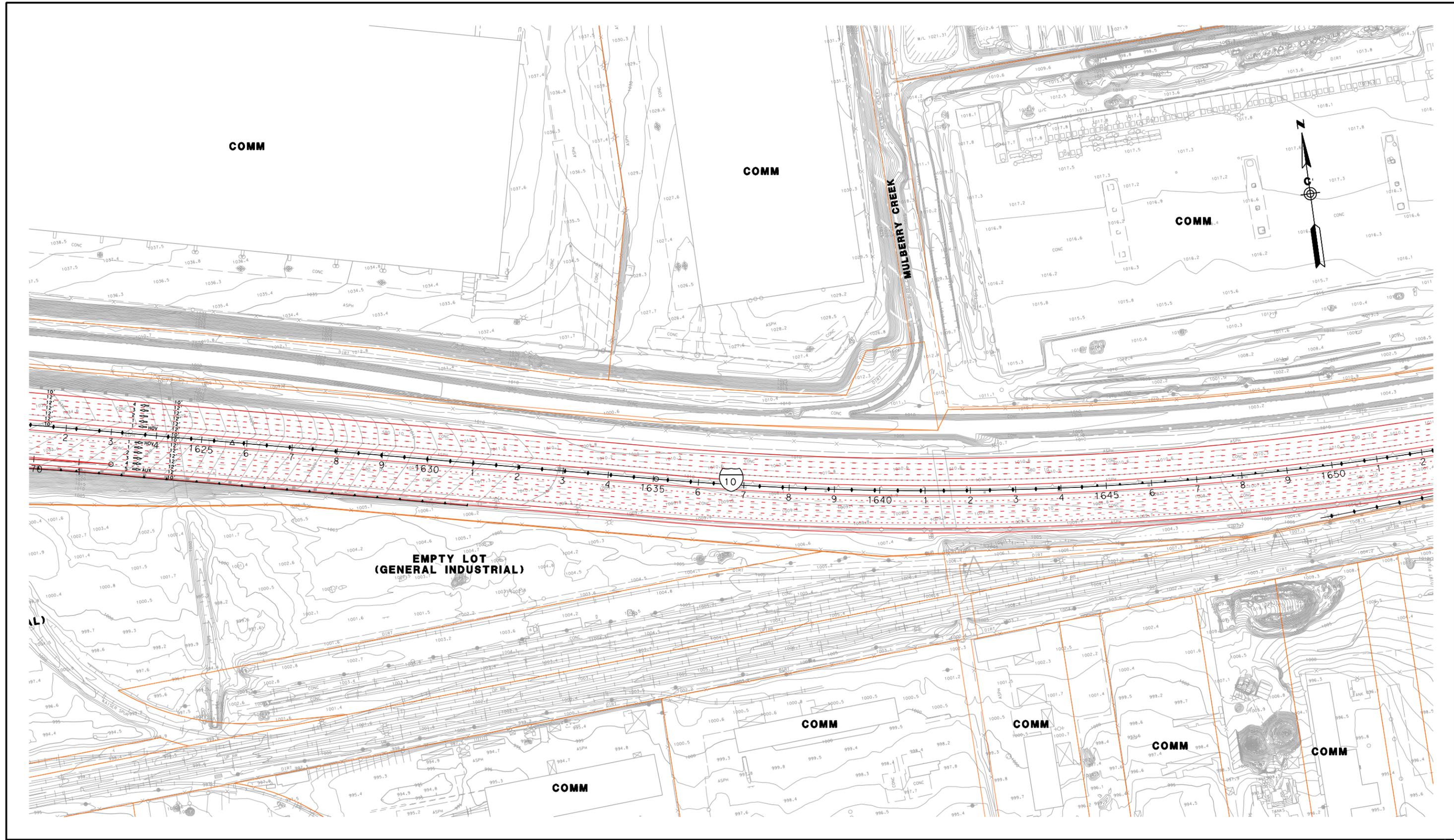
- — — — — - NON-REASONABLE SOUNDWALL
- — — — — - RETAINING WALL
- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 71

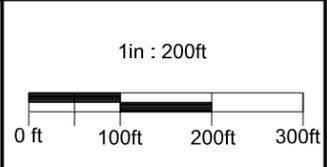


- LEGEND**
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- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL

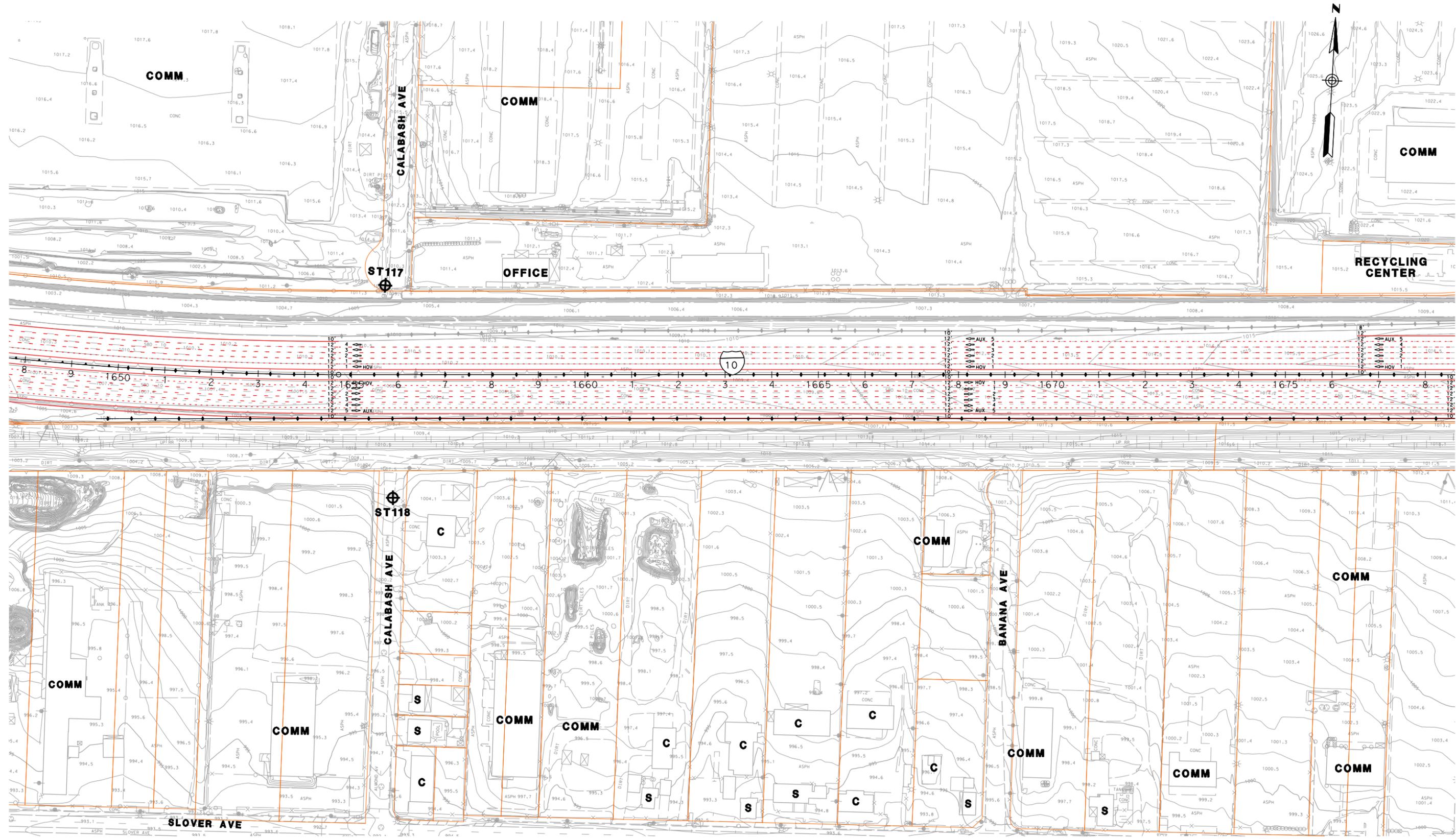
- — — — — - NON-REASONABLE SOUNDWALL
- — — — — - RETAINING WALL
- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 72

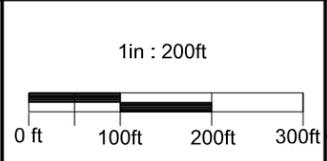


- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
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- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL

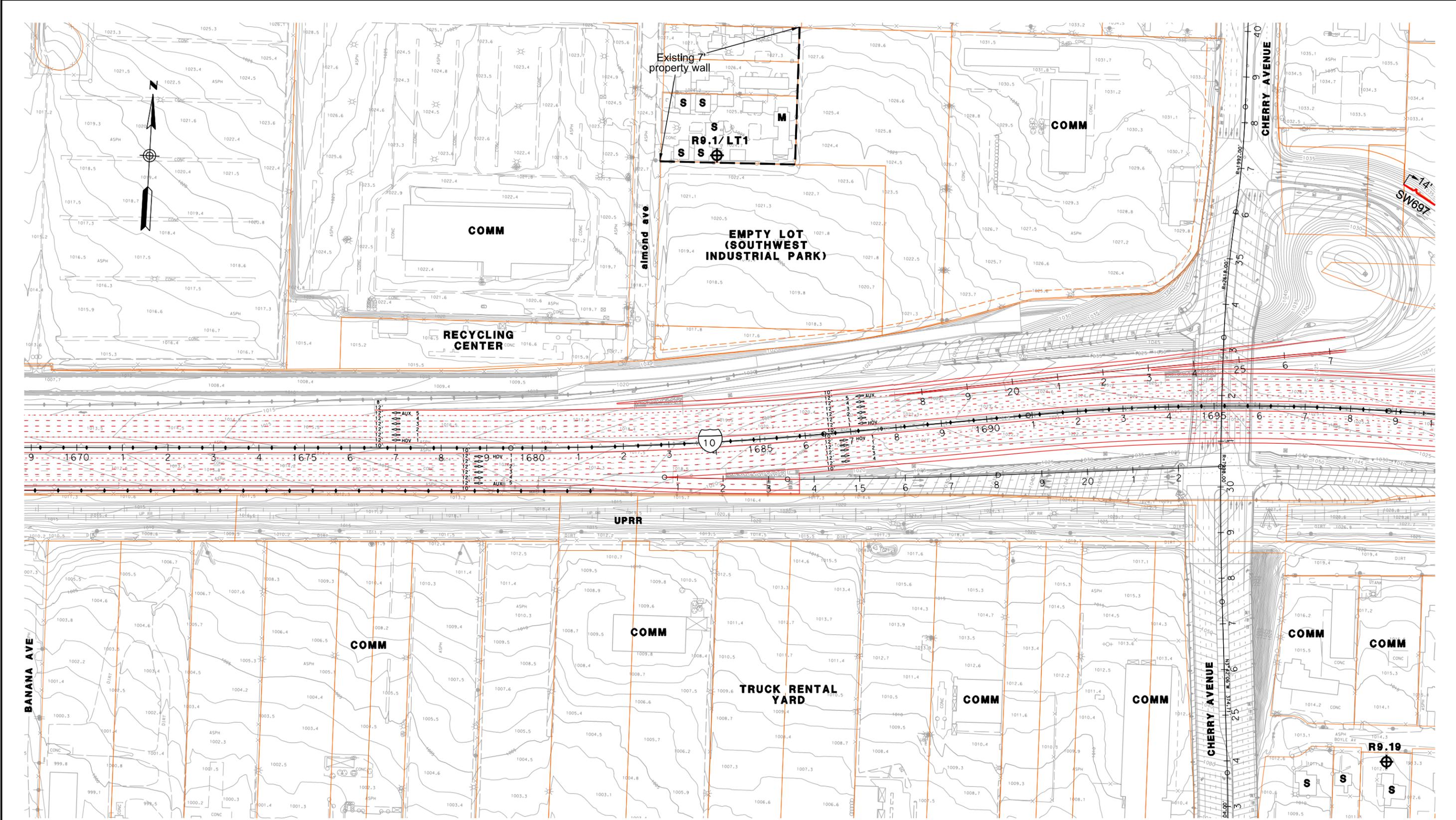
- — — — — - NON-REASONABLE SOUNDWALL
- — — — — - RETAINING WALL
- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 73

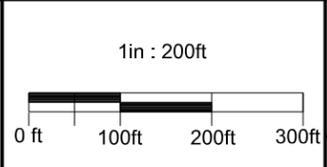


- LEGEND**
- ⊕**RXX** - RECEIVER SITE
 - ⊕**CAL** - CALIBRATION SITE
 - ⊕**LT** - LONG-TERM MEASUREMENT
 - ⊕**ST** - SHORT-TERM MEASUREMENT

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- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL

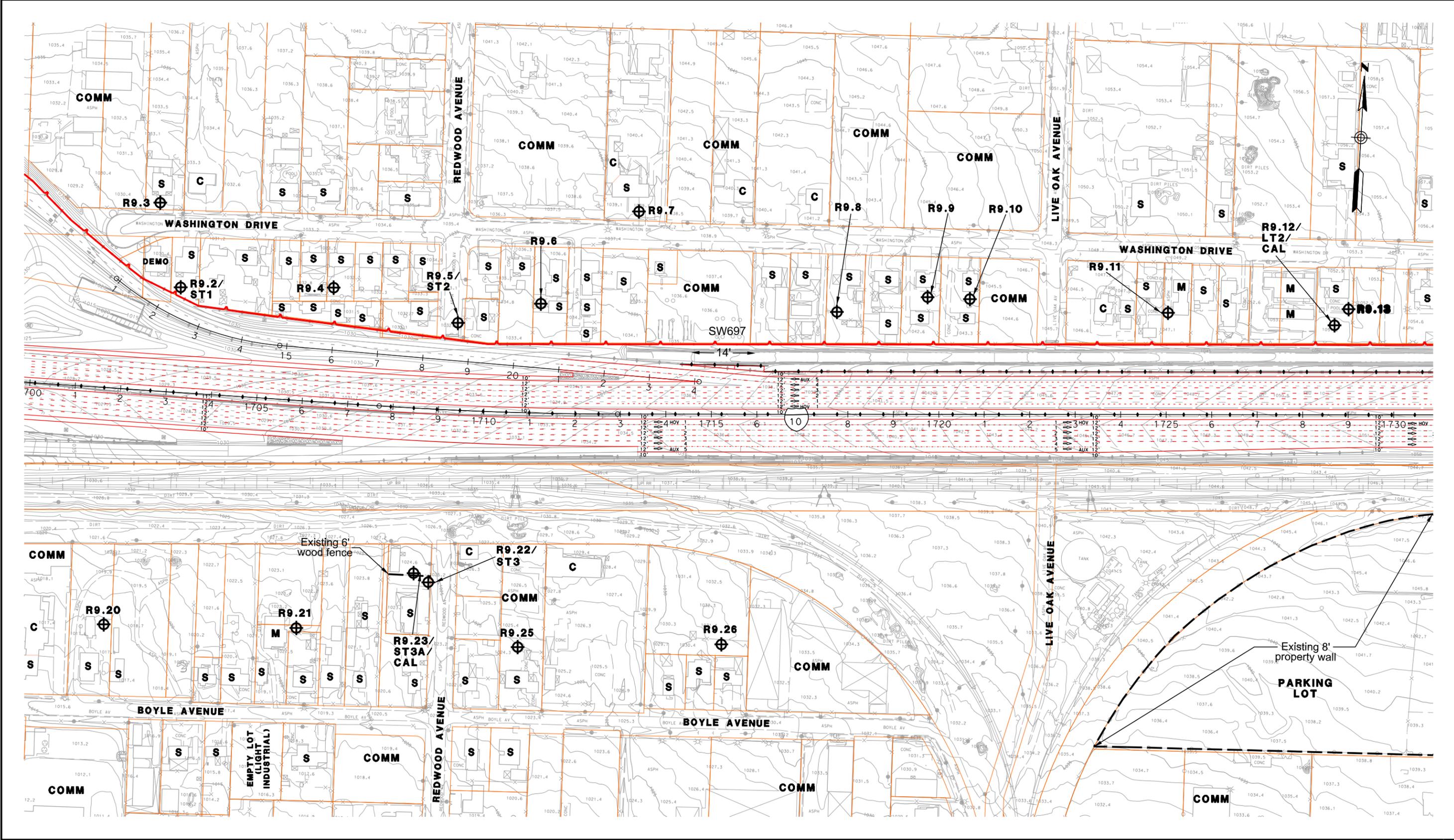
- — — — — - NON-REASONABLE SOUNDWALL
- — — — — - RETAINING WALL
- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 74



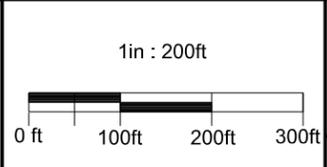
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
- ⊕LT - LONG-TERM MEASUREMENT
- ⊕ST - SHORT-TERM MEASUREMENT

SFR OR S - SINGLE FAMILY RESIDENCE
MFR OR M - MULTI-FAMILY RESIDENCE
COMM OR C - COMMERCIAL/NO OUTDOOR USE AREA
 b - BENEFITED RESIDENCE
 ⊕HXX - IN/OUTDOOR MEASUREMENT

— — — — — EXISTING PROPERTY WALL
 — — — — — EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

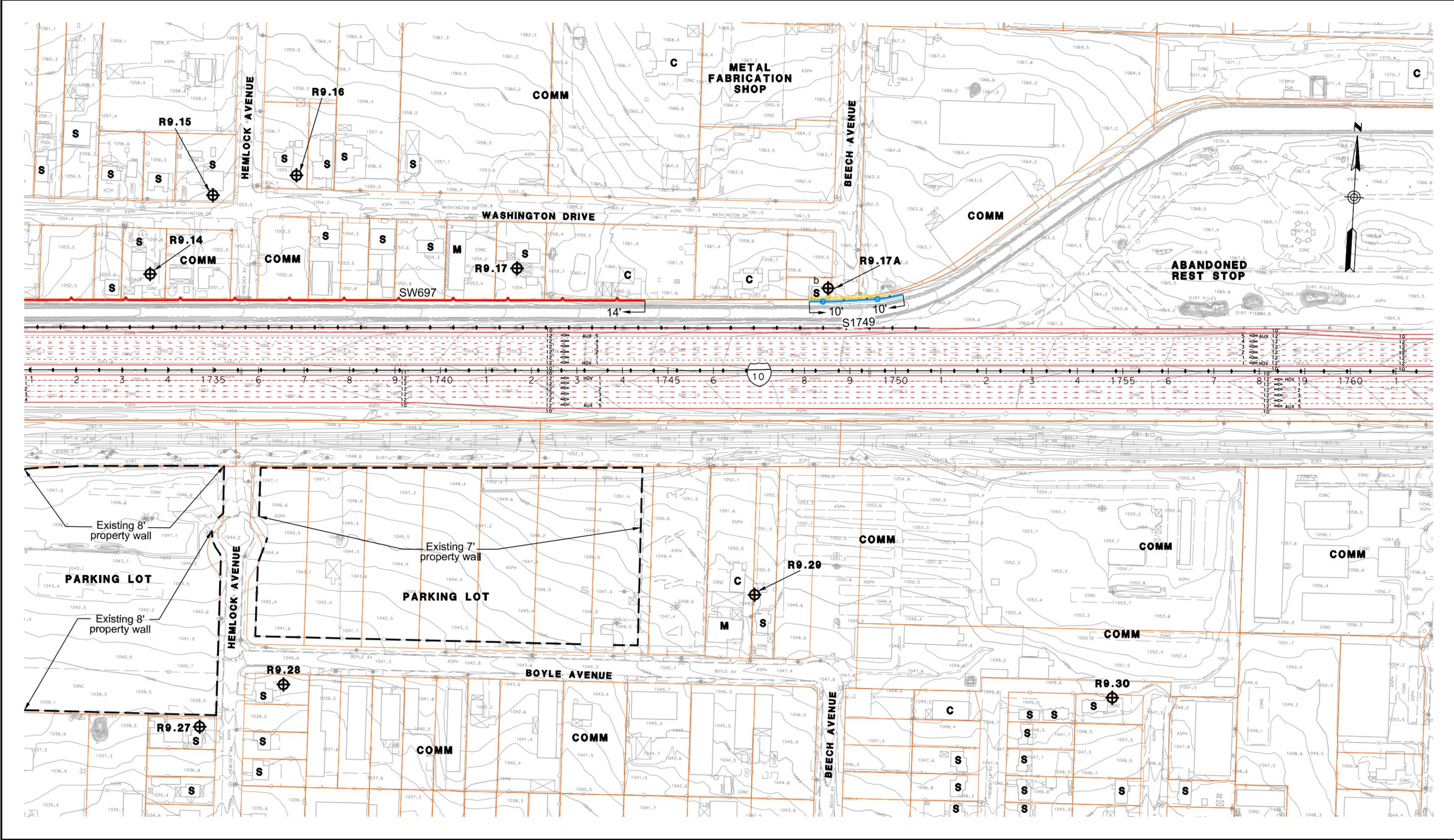
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 75

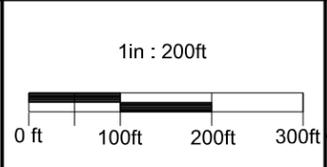


- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- ⊕HXX - IN/OUTDOOR MEASUREMENT

- - EXISTING PROPERTY WALL
- - EXISTING SOUNDWALL
- - PROPOSED SOUNDWALL
- - REPLACEMENT IN KIND SOUNDWALL

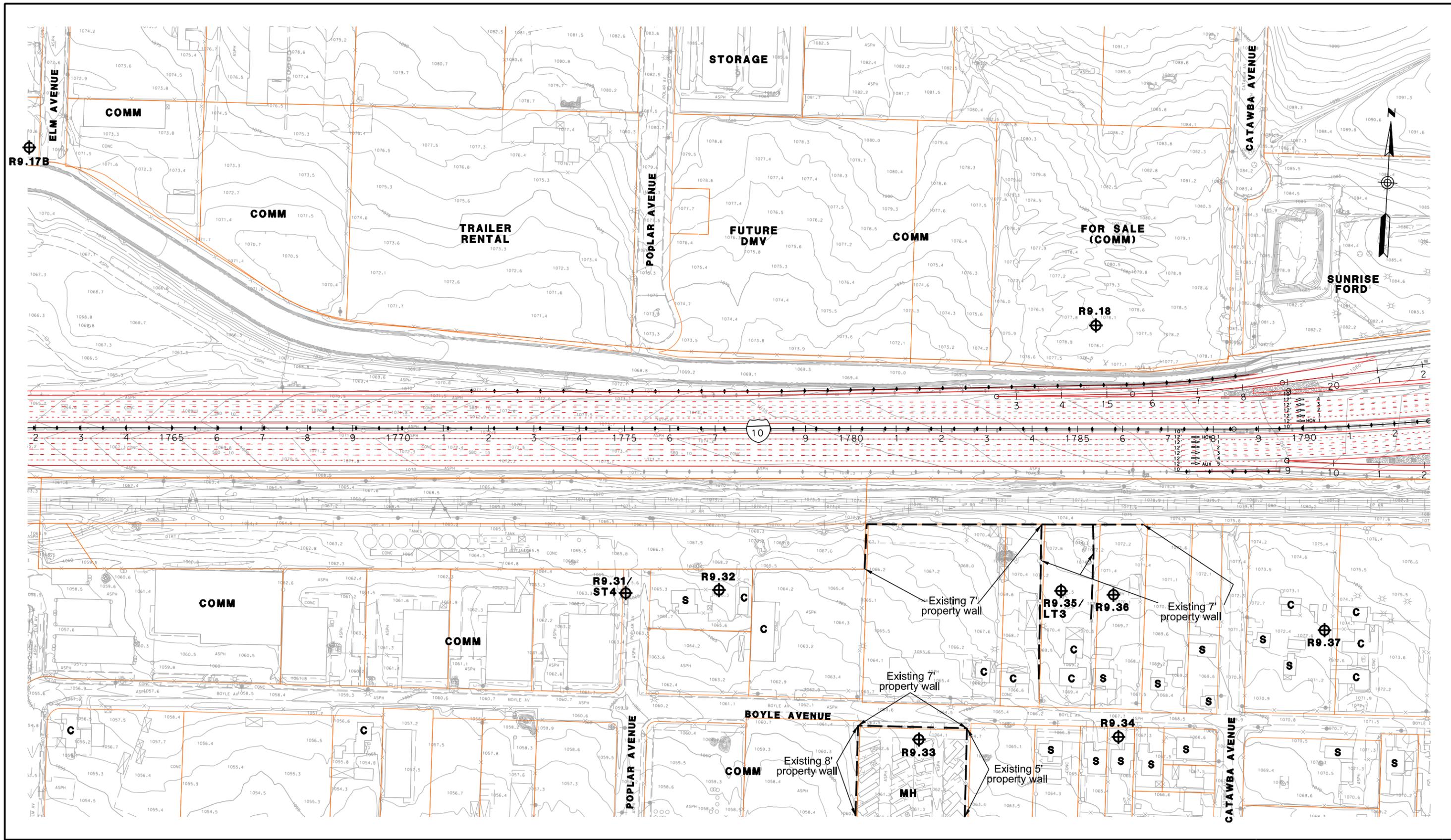
- - NON-REASONABLE SOUNDWALL
- - RETAINING WALL
- - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 76



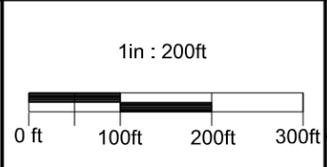
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
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- ⊕ST - SHORT-TERM MEASUREMENT

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— — — — — EXISTING PROPERTY WALL
 — — — — — EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

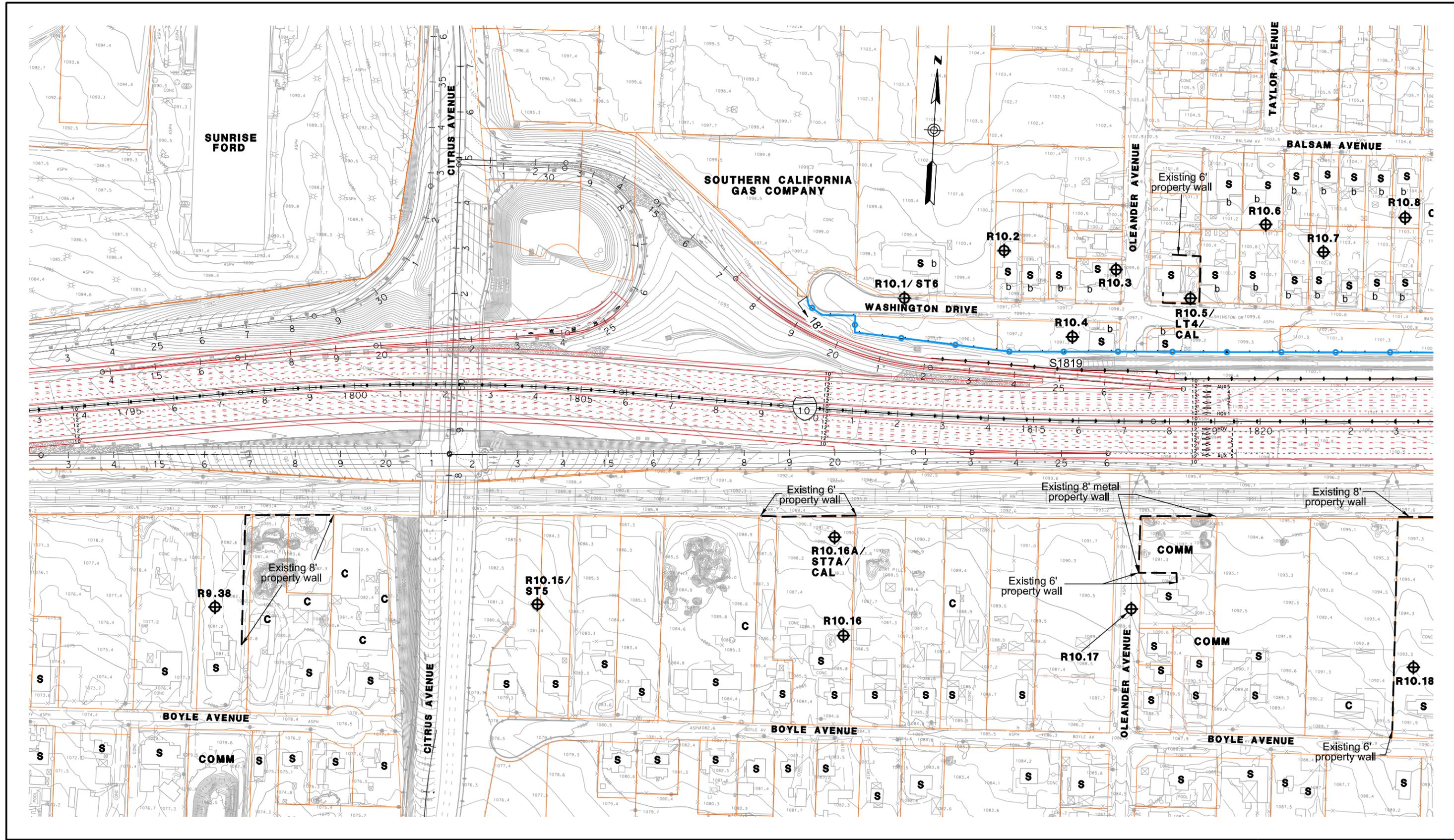
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 77



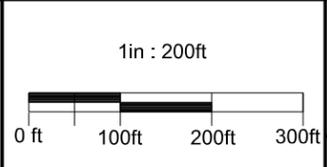
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
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- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

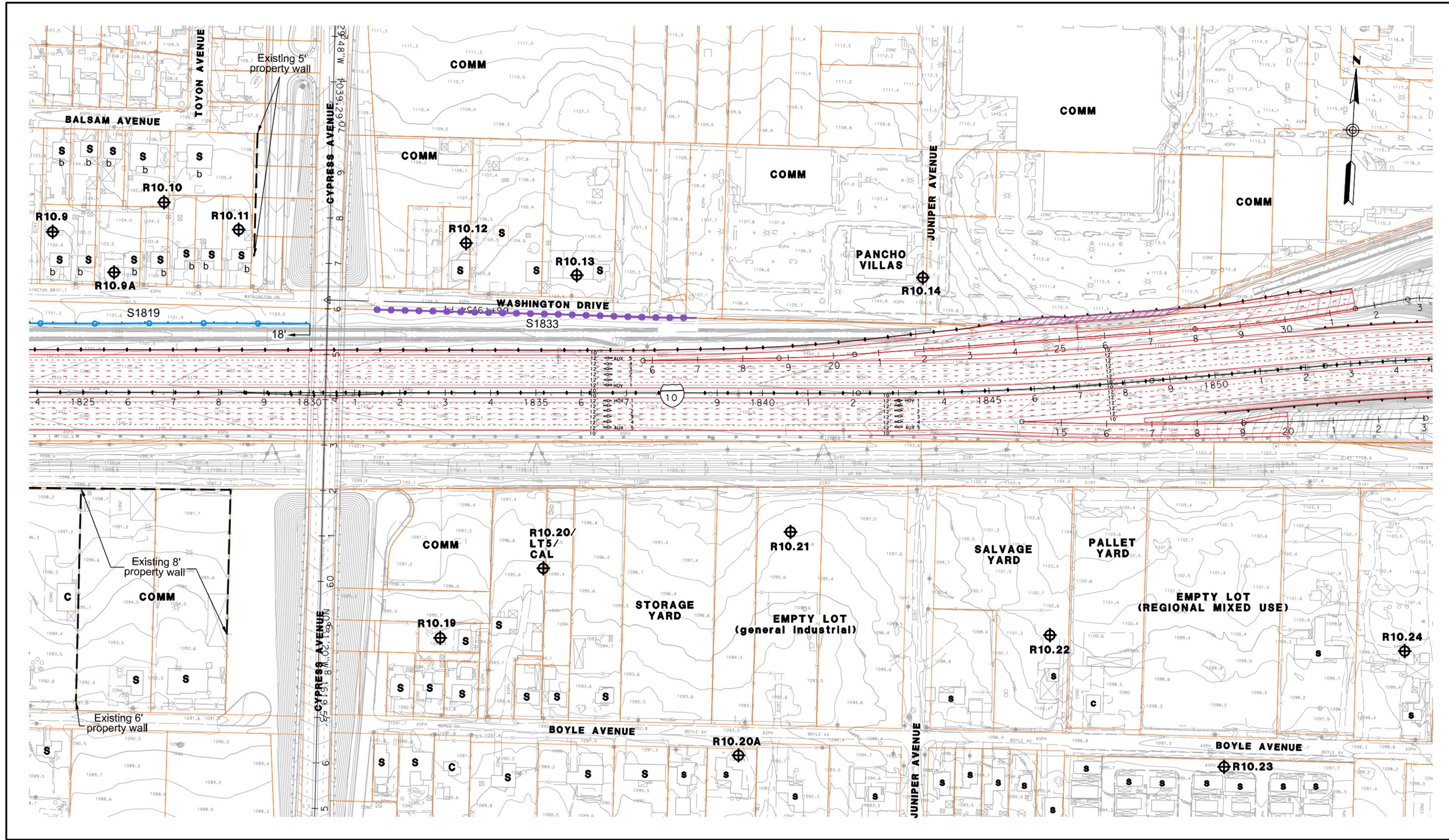
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — — — — — RETAINING WALL
- ◆ — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 78



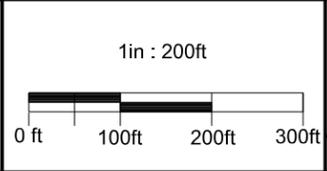
LEGEND

⊕RXX	- RECEIVER SITE
⊕CAL	- CALIBRATION SITE
⊕LT	- LONG-TERM MEASUREMENT
⊕ST	- SHORT-TERM MEASUREMENT

SFR OR S	- SINGLE FAMILY RESIDENCE
MFR OR M	- MULTI-FAMILY RESIDENCE
COMM OR C	- COMMERCIAL/NO OUTDOOR USE AREA
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⊕HXX	- IN/OUTDOOR MEASUREMENT

---	- EXISTING PROPERTY WALL
---	- EXISTING SOUNDWALL
---	- PROPOSED SOUNDWALL
---	- REPLACEMENT IN KIND SOUNDWALL

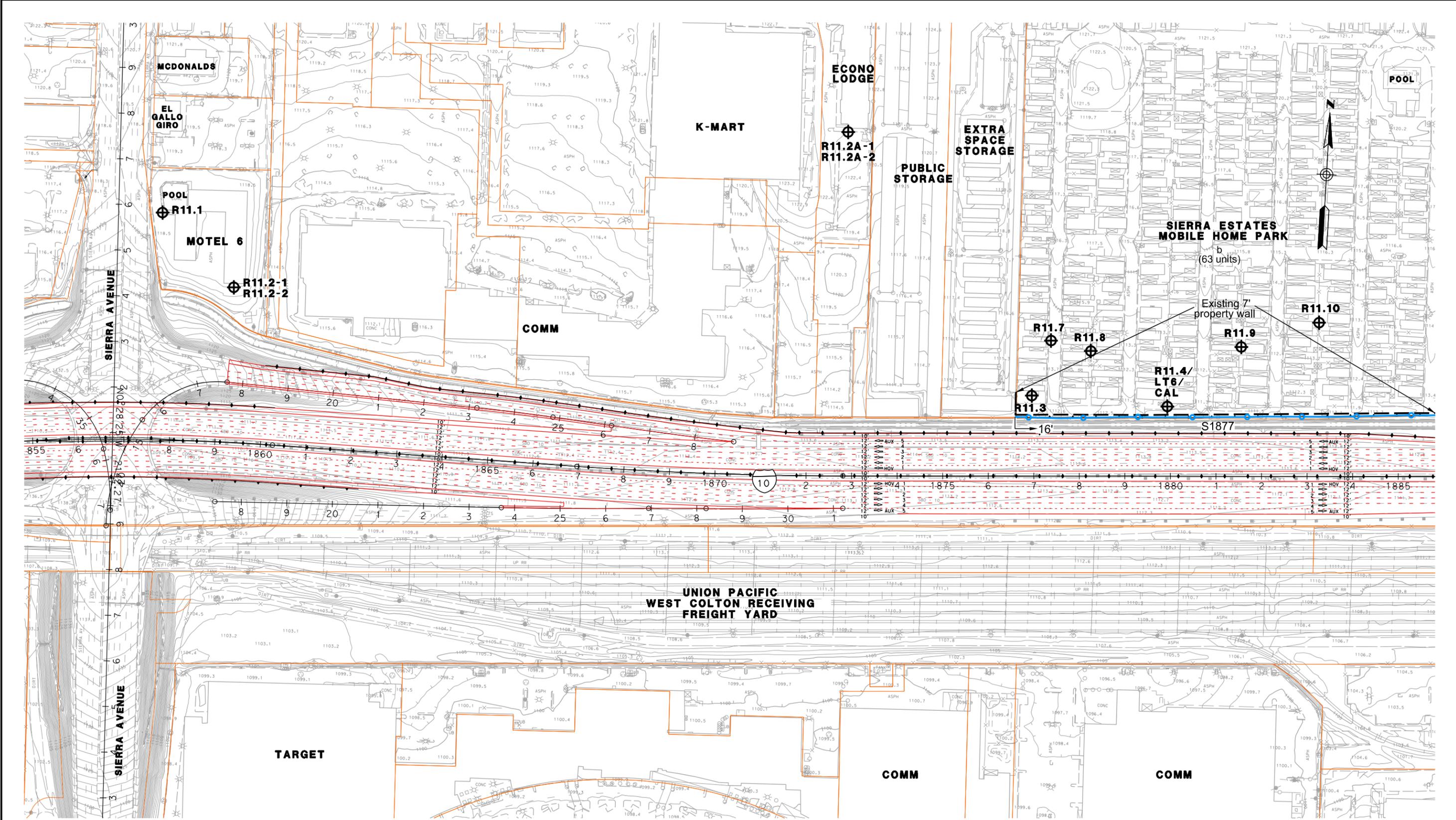
---	- NON-REASONABLE SOUNDWALL
---	- RETAINING WALL
---	- SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

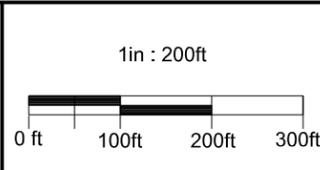
FIGURE 79



- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- COMM OR C** - COMMERCIAL/NO OUTDOOR USE AREA
- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

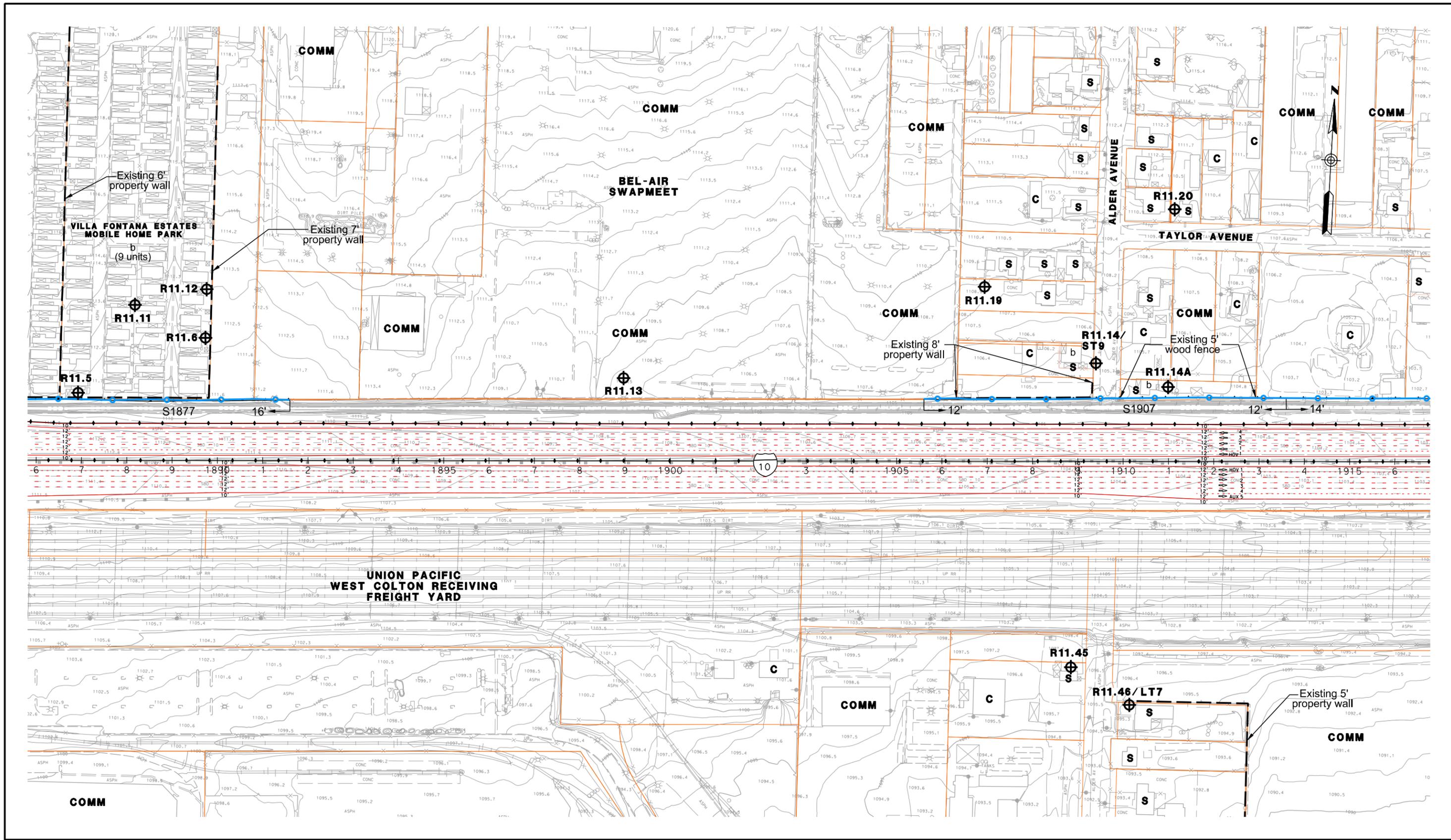
- — — — — EXISTING PROPERTY WALL
- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — — — — — RETAINING WALL
- ◆ — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 80



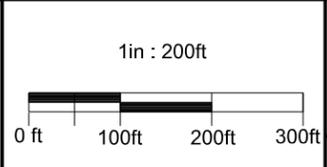
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
- ⊕LT - LONG-TERM MEASUREMENT
- ⊕ST - SHORT-TERM MEASUREMENT

SFR OR S - SINGLE FAMILY RESIDENCE
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 ⊕HXX - IN/OUTDOOR MEASUREMENT

— — — — — EXISTING PROPERTY WALL
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 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

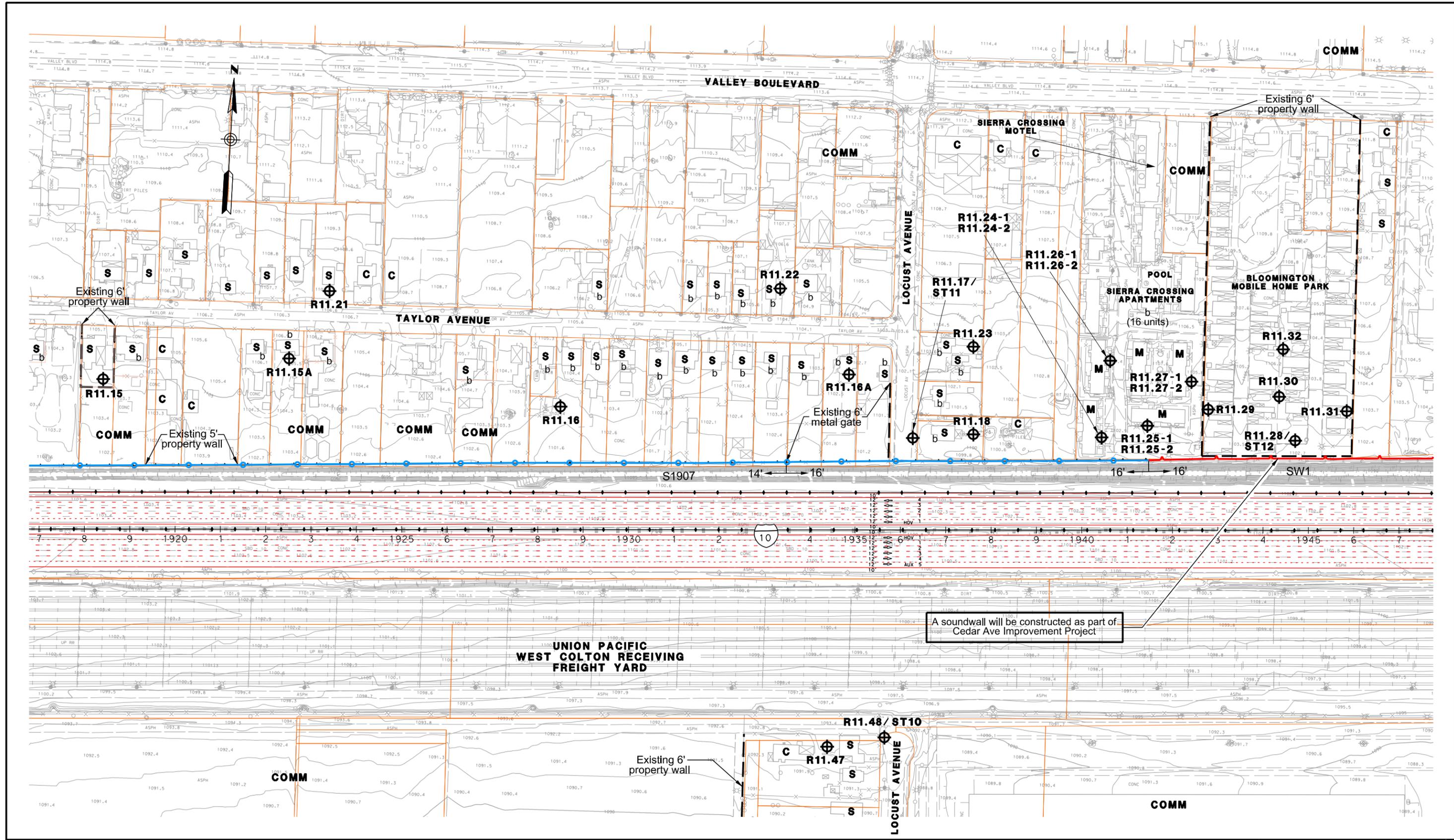
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

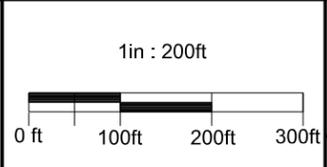
FIGURE 81



- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- ⊕HXX - IN/OUTDOOR MEASUREMENT

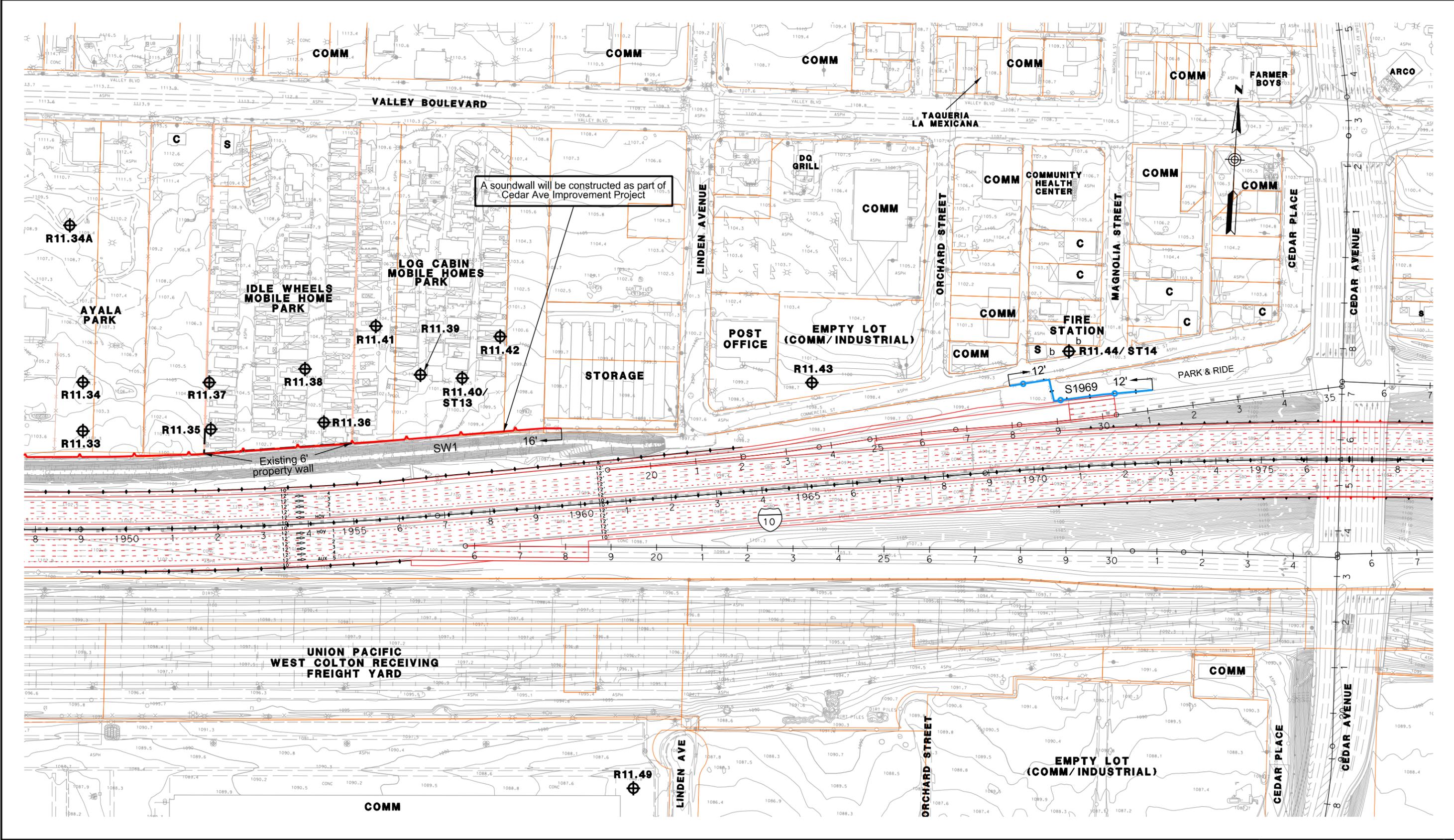
- - EXISTING PROPERTY WALL
- - EXISTING SOUNDWALL
- - PROPOSED SOUNDWALL
- - REPLACEMENT IN KIND SOUNDWALL
- - NON-REASONABLE SOUNDWALL
- - RETAINING WALL
- - SAFETY BARRIER



I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS

JULY 1, 2015

FIGURE 82

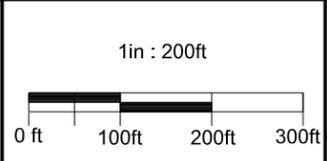


A soundwall will be constructed as part of Cedar Ave Improvement Project

- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

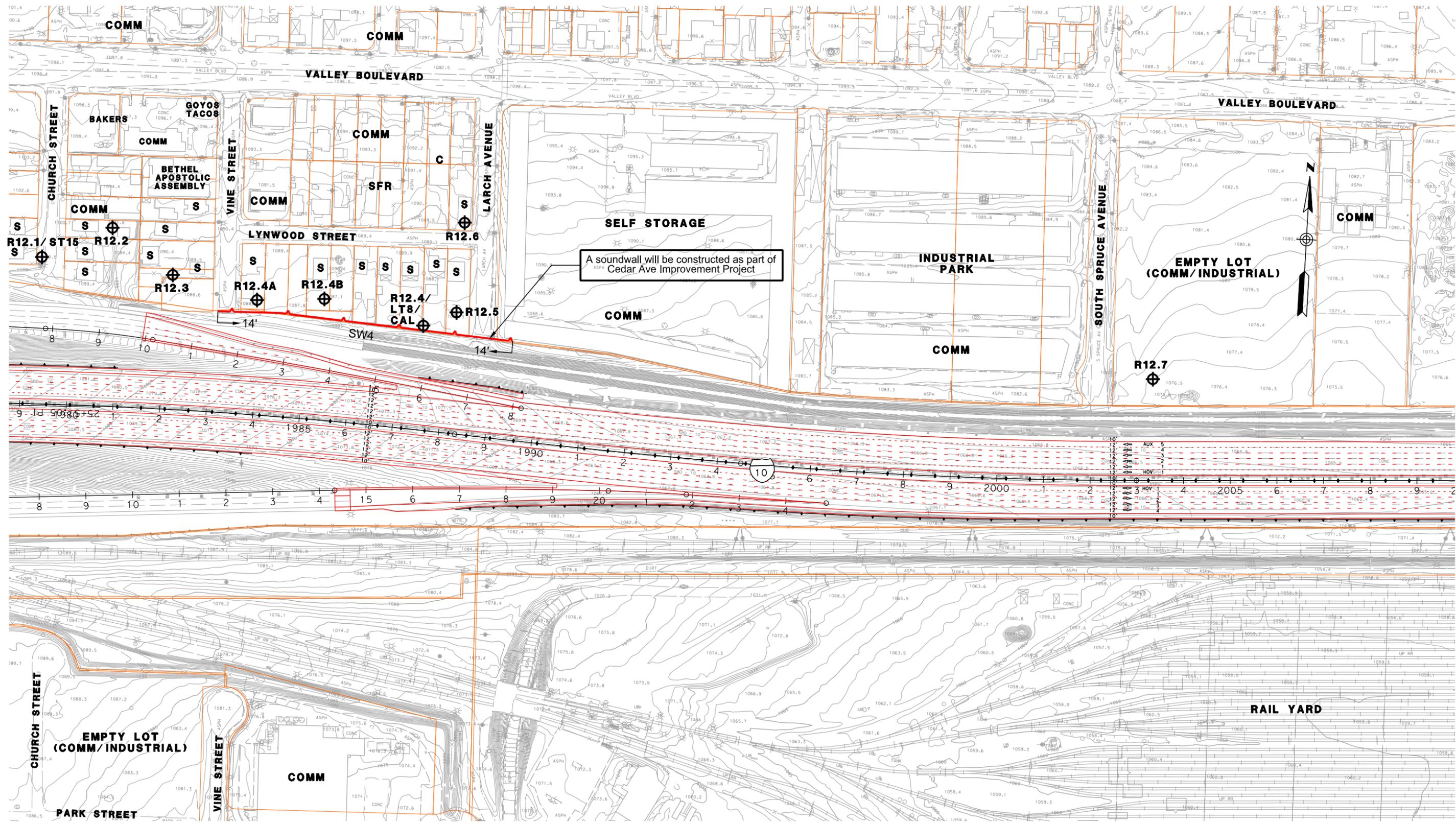
- — — — — EXISTING PROPERTY WALL
- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — ▲ — RETAINING WALL
- ◆ — ◆ — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 83

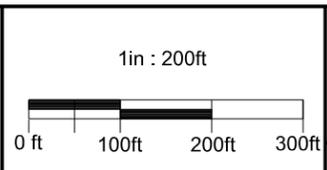


- LEGEND**
- ⊕RXX - RECEIVER SITE
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 - ⊕LT - LONG-TERM MEASUREMENT
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- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

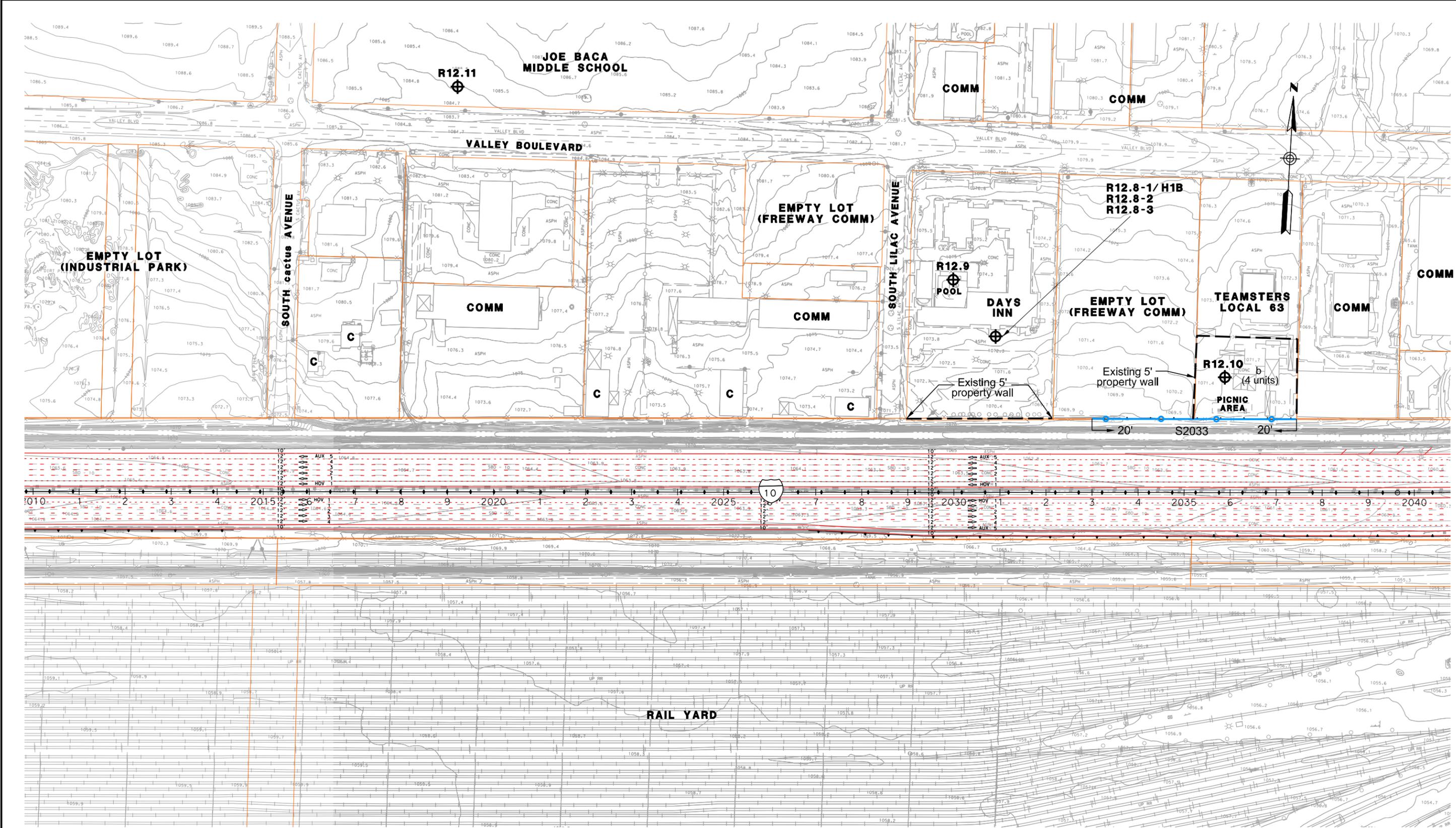
- — — — — NON-REASONABLE SOUNDWALL
- — — — — RETAINING WALL
- — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

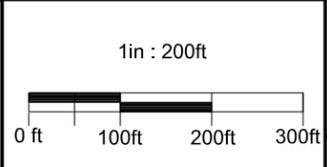
FIGURE 84



- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- ⊕HXX - IN/OUTDOOR MEASUREMENT

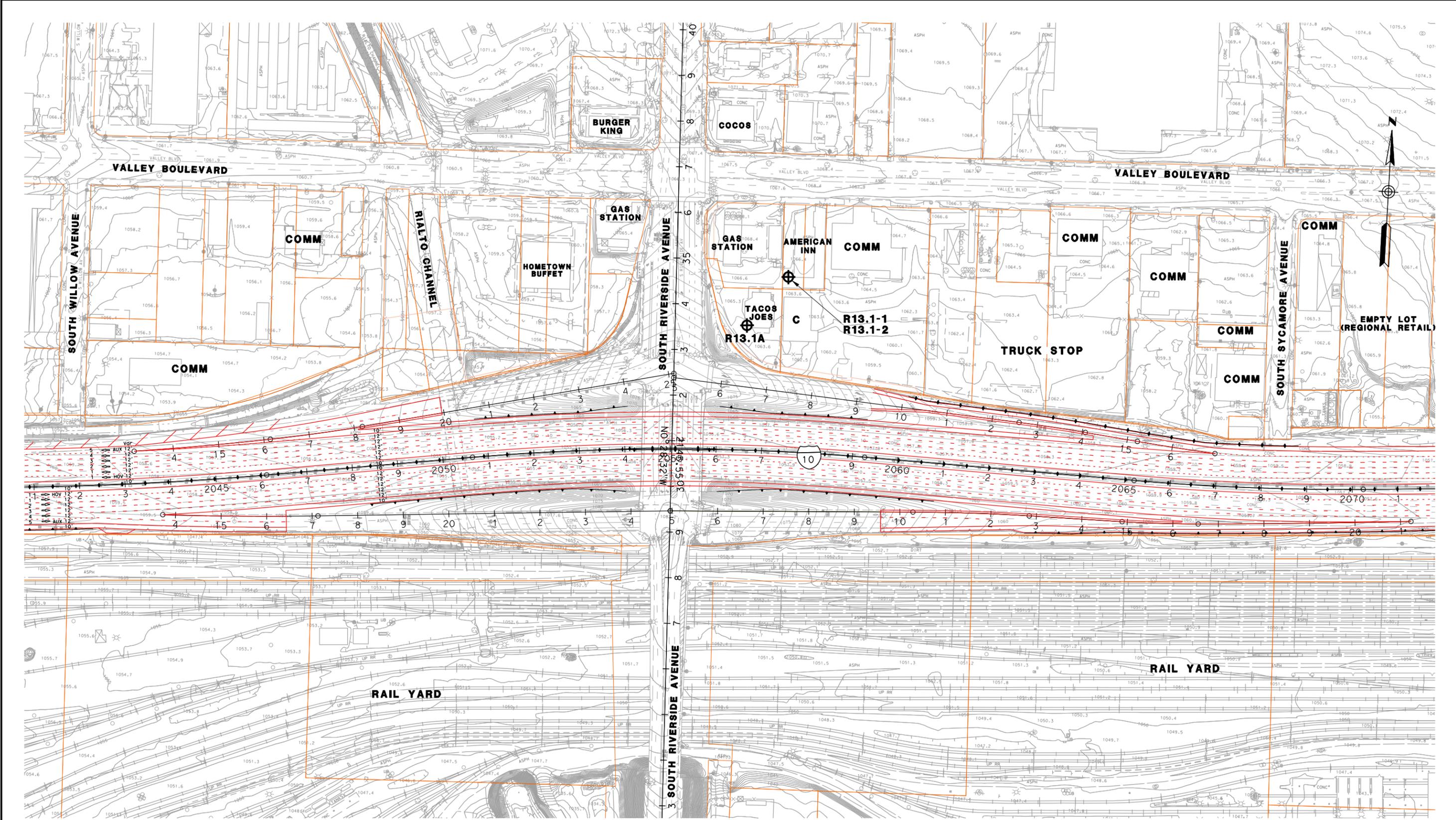
- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL
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**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

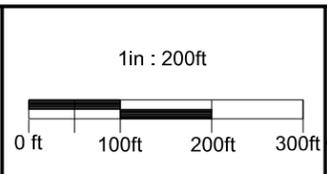
FIGURE 85



- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
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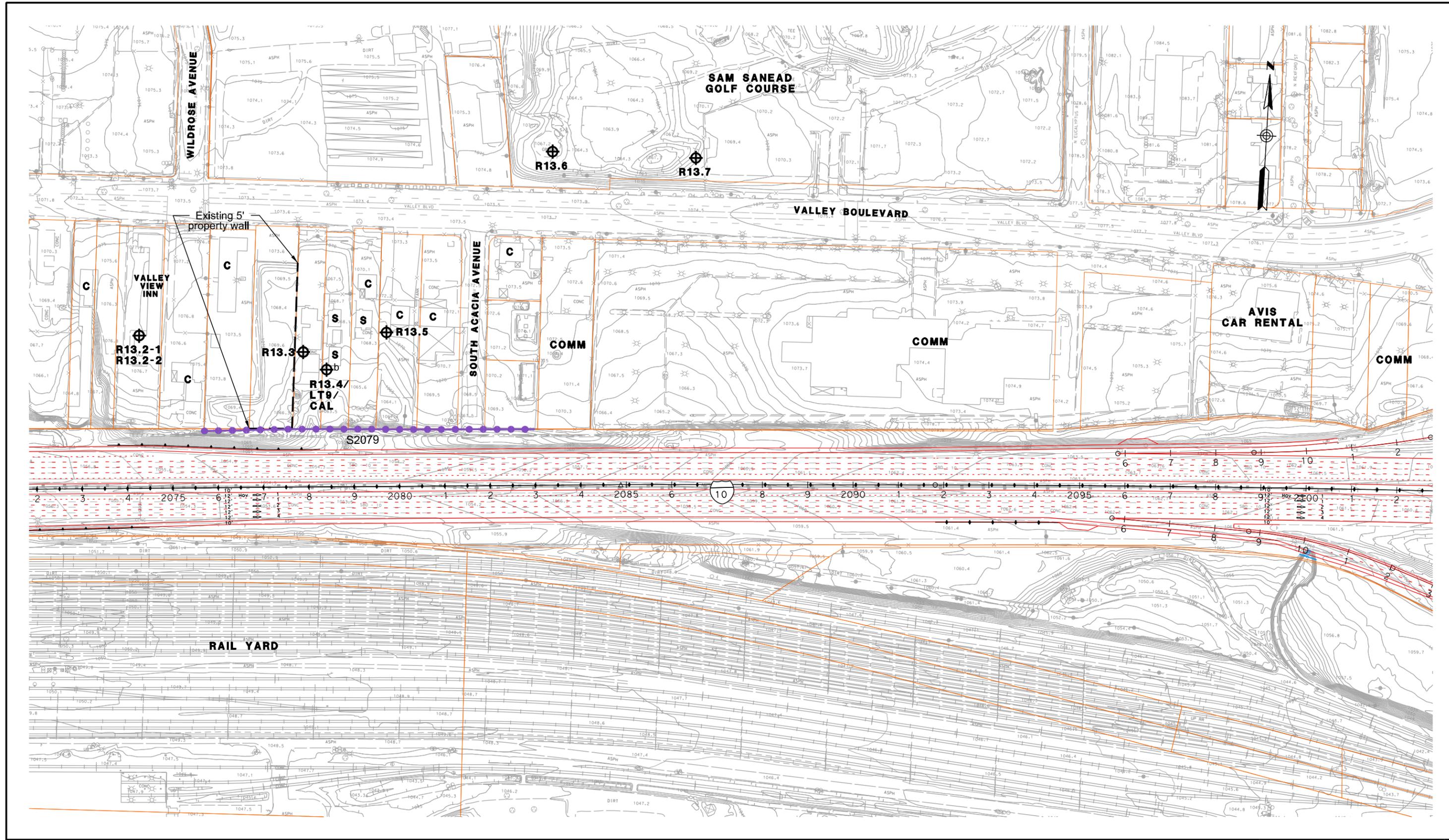
- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL
- — — — — - NON-REASONABLE SOUNDWALL
- ▲ — ▲ — ▲ — - RETAINING WALL
- ◆ — ◆ — ◆ — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 86

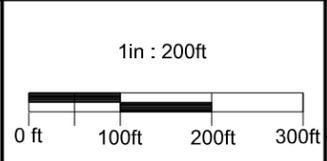


LEGEND
 ⊕RXX - RECEIVER SITE
 ⊕CAL - CALIBRATION SITE
 ⊕LT - LONG-TERM MEASUREMENT
 ⊕ST - SHORT-TERM MEASUREMENT

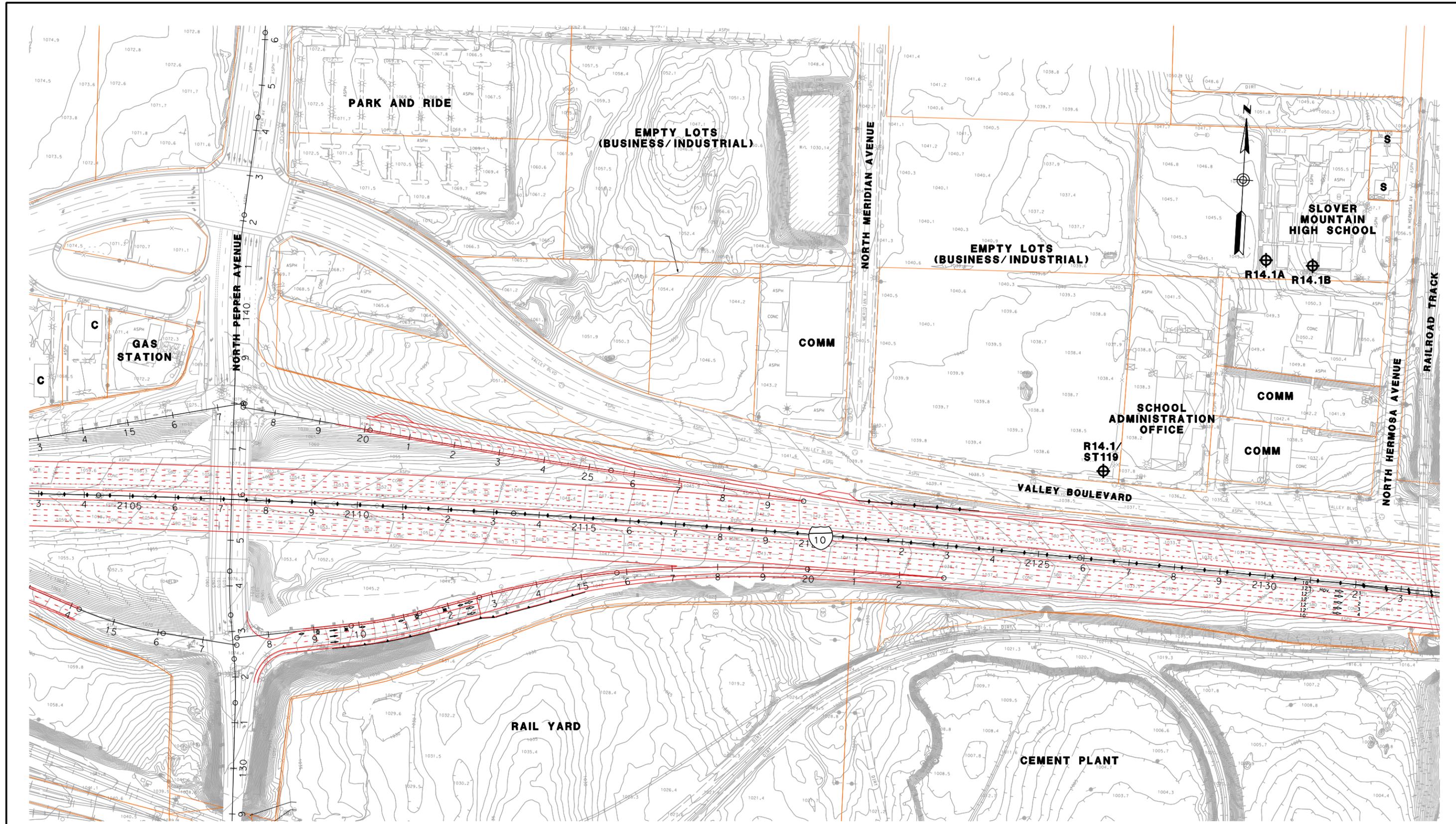
SFR OR S - SINGLE FAMILY RESIDENCE
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 — — — — — REPLACEMENT IN KIND SOUNDWALL

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 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**
 JULY 1, 2015 **FIGURE 87**

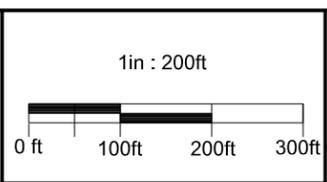


- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

- SFR OR S** - SINGLE FAMILY RESIDENCE
- MFR OR M** - MULTI-FAMILY RESIDENCE
- COMM OR C** - COMMERCIAL/NO OUTDOOR USE AREA
- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL

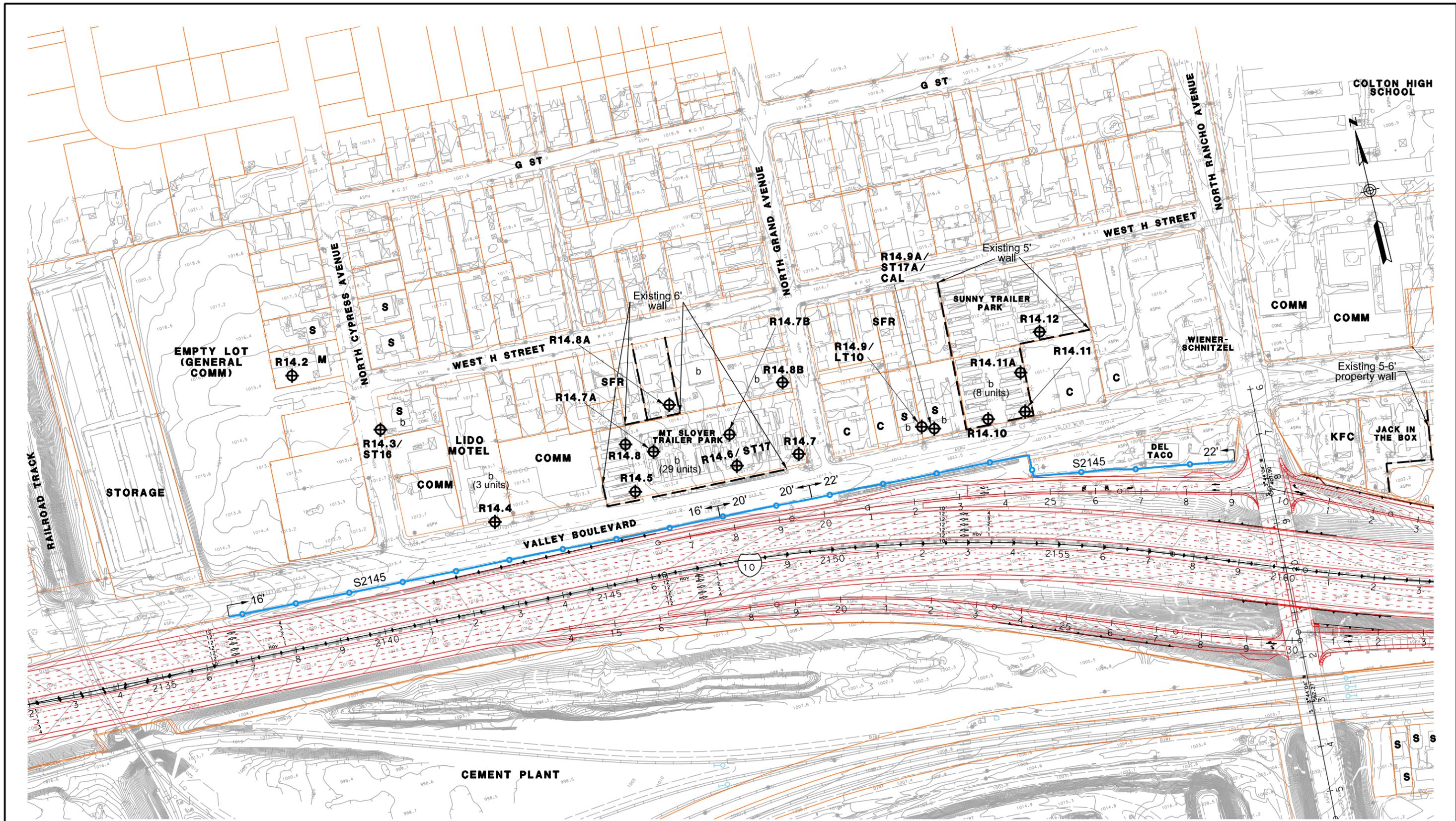
- — — — — - NON-REASONABLE SOUNDWALL
- — — — — - RETAINING WALL
- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 88

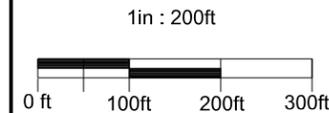


LEGEND
 ⊕RXX - RECEIVER SITE
 ⊕CAL - CALIBRATION SITE
 ⊕LT - LONG-TERM MEASUREMENT
 ⊕ST - SHORT-TERM MEASUREMENT

SFR OR S - SINGLE FAMILY RESIDENCE
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— — — — — EXISTING PROPERTY WALL
 — — — — — EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

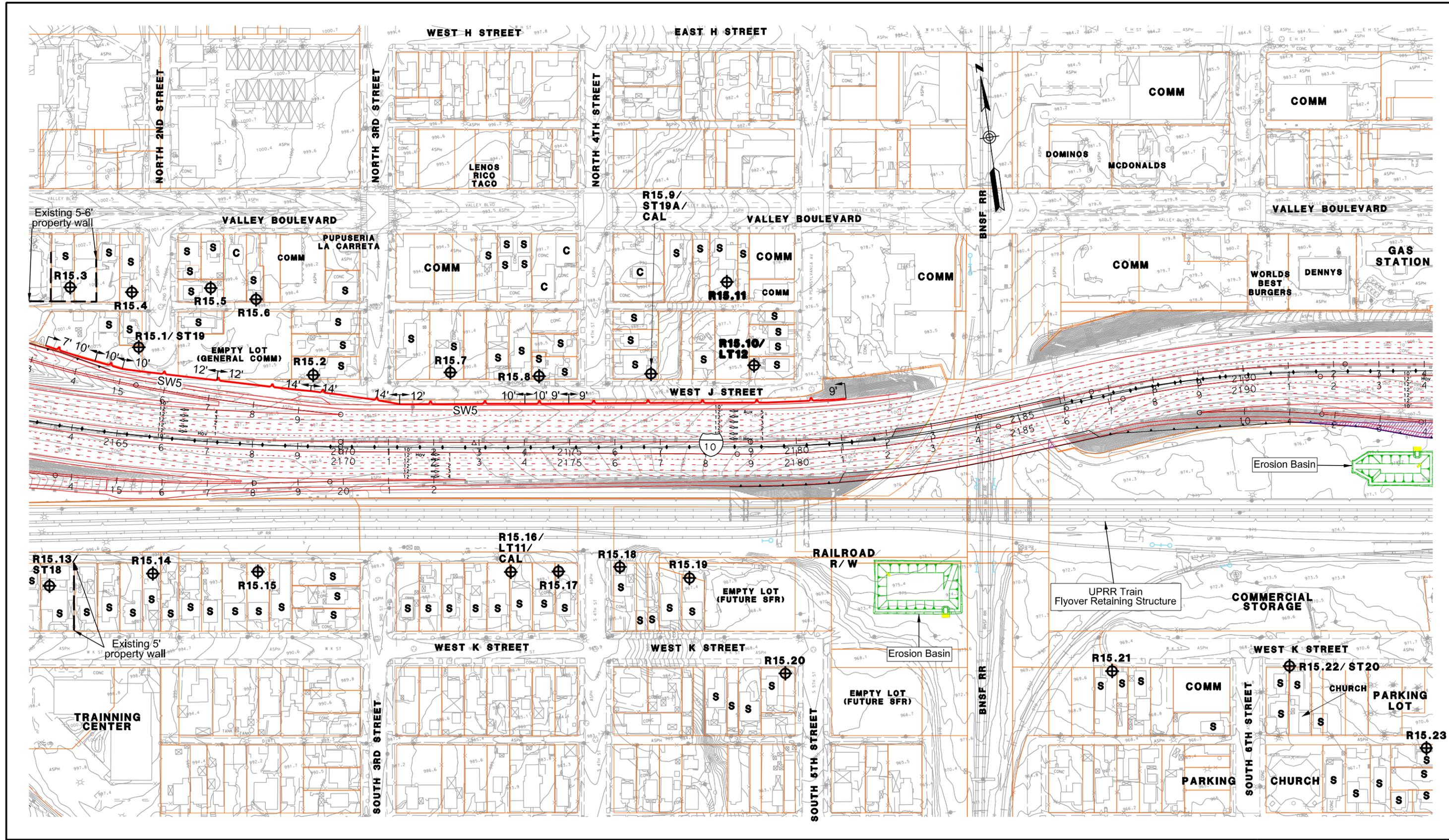
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 89



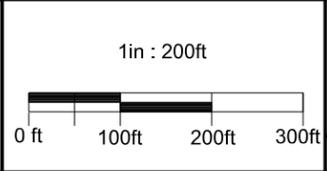
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
- ⊕LT - LONG-TERM MEASUREMENT
- ⊕ST - SHORT-TERM MEASUREMENT

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— — — — — EXISTING PROPERTY WALL
 — — — — — EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

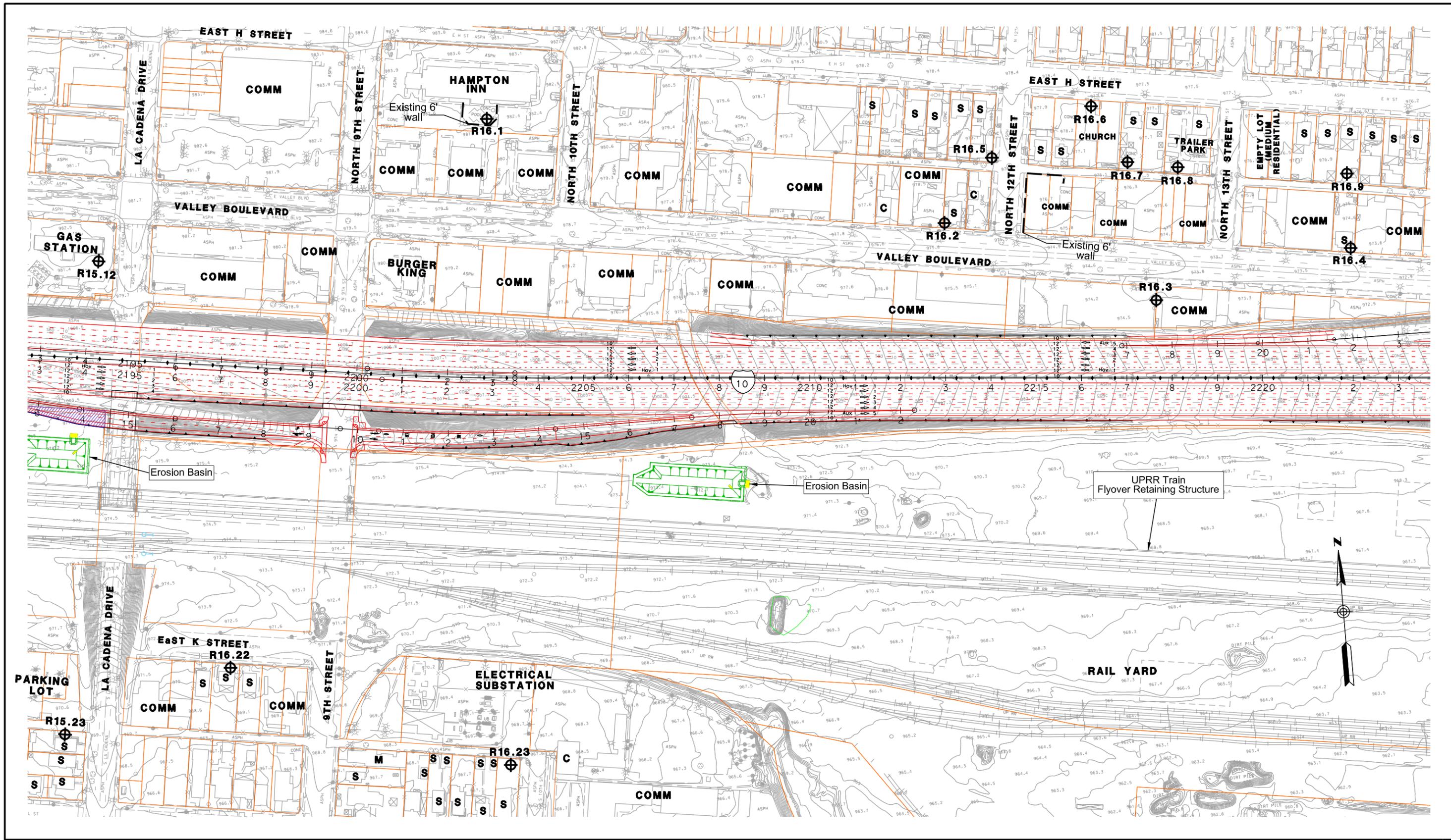
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 90



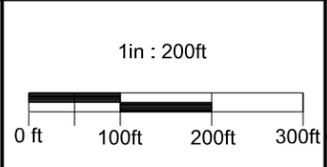
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
- ⊕LT - LONG-TERM MEASUREMENT
- ⊕ST - SHORT-TERM MEASUREMENT

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— — — — — EXISTING PROPERTY WALL
 — — — — — EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

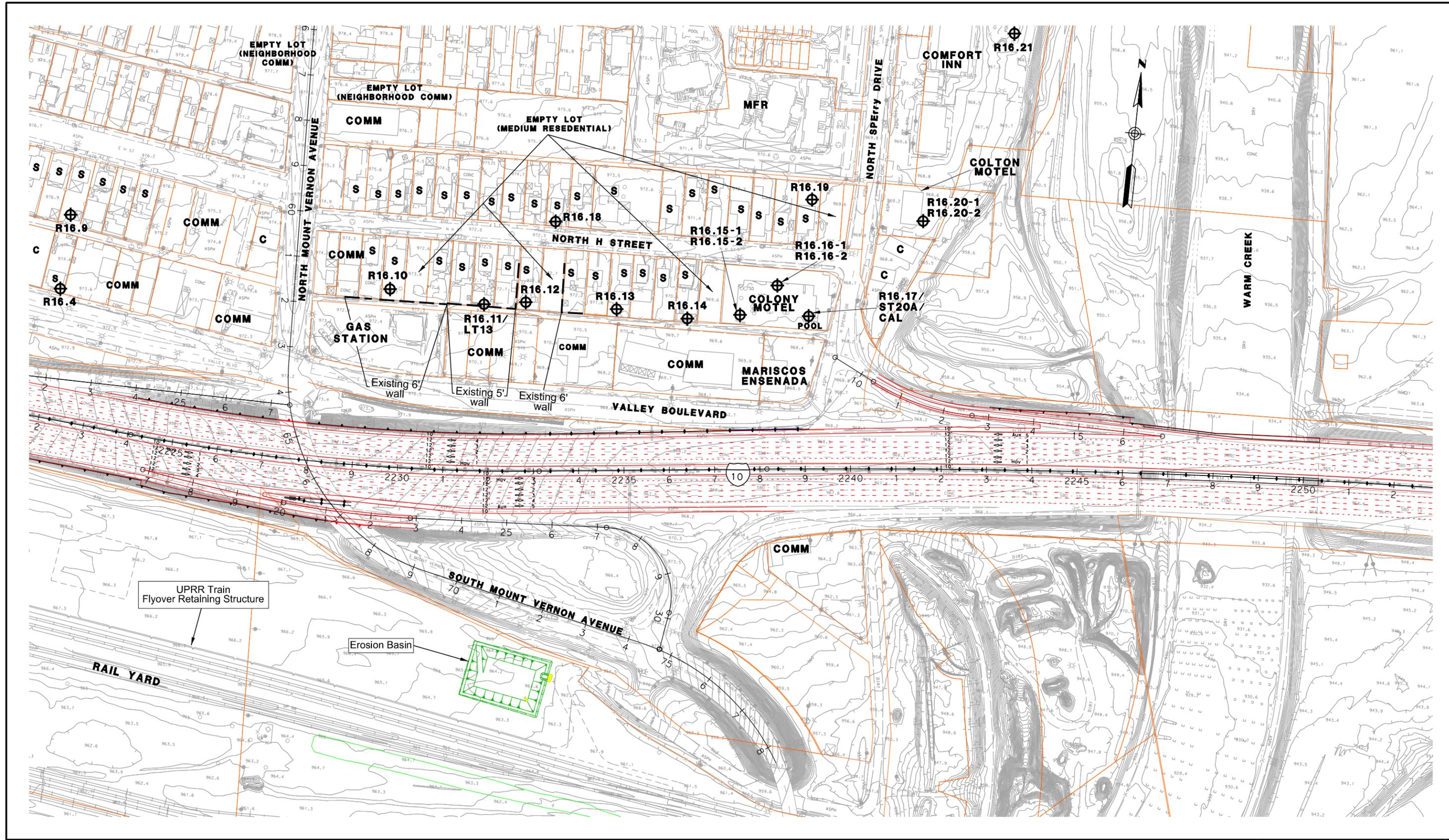
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 91



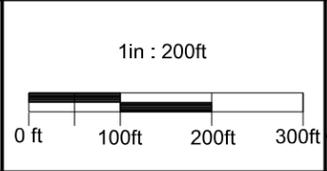
LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
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- ⊕ST - SHORT-TERM MEASUREMENT

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 b - BENEFITED RESIDENCE
 ⊕HXX - IN/OUTDOOR MEASUREMENT

— — — — — EXISTING PROPERTY WALL
 — — — — — EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

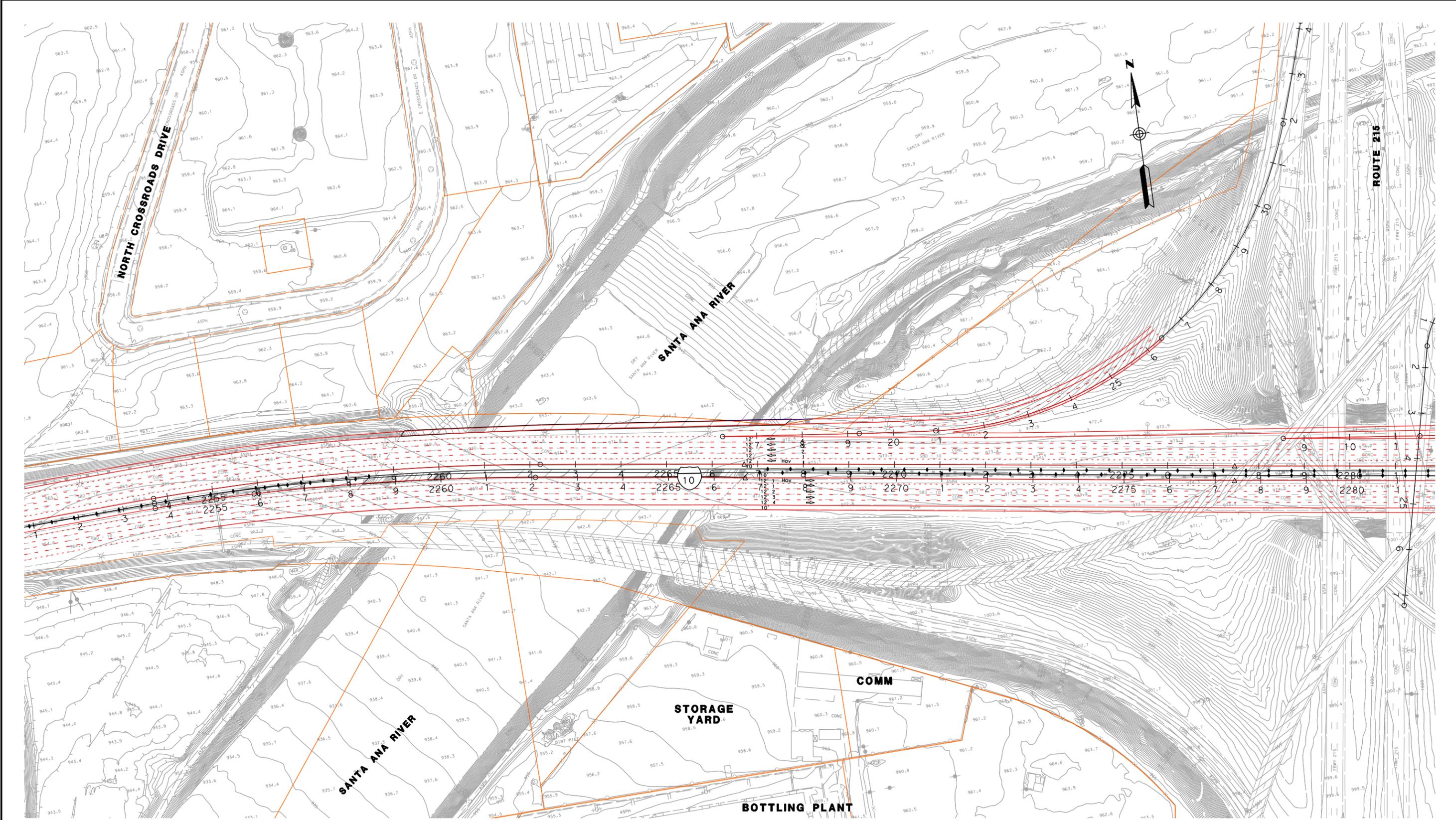
— — — — — NON-REASONABLE SOUNDWALL
 — — — — — RETAINING WALL
 — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 92

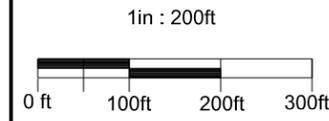


- LEGEND**
- ⊕RXX - RECEIVER SITE
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 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

- — — — — EXISTING PROPERTY WALL
- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

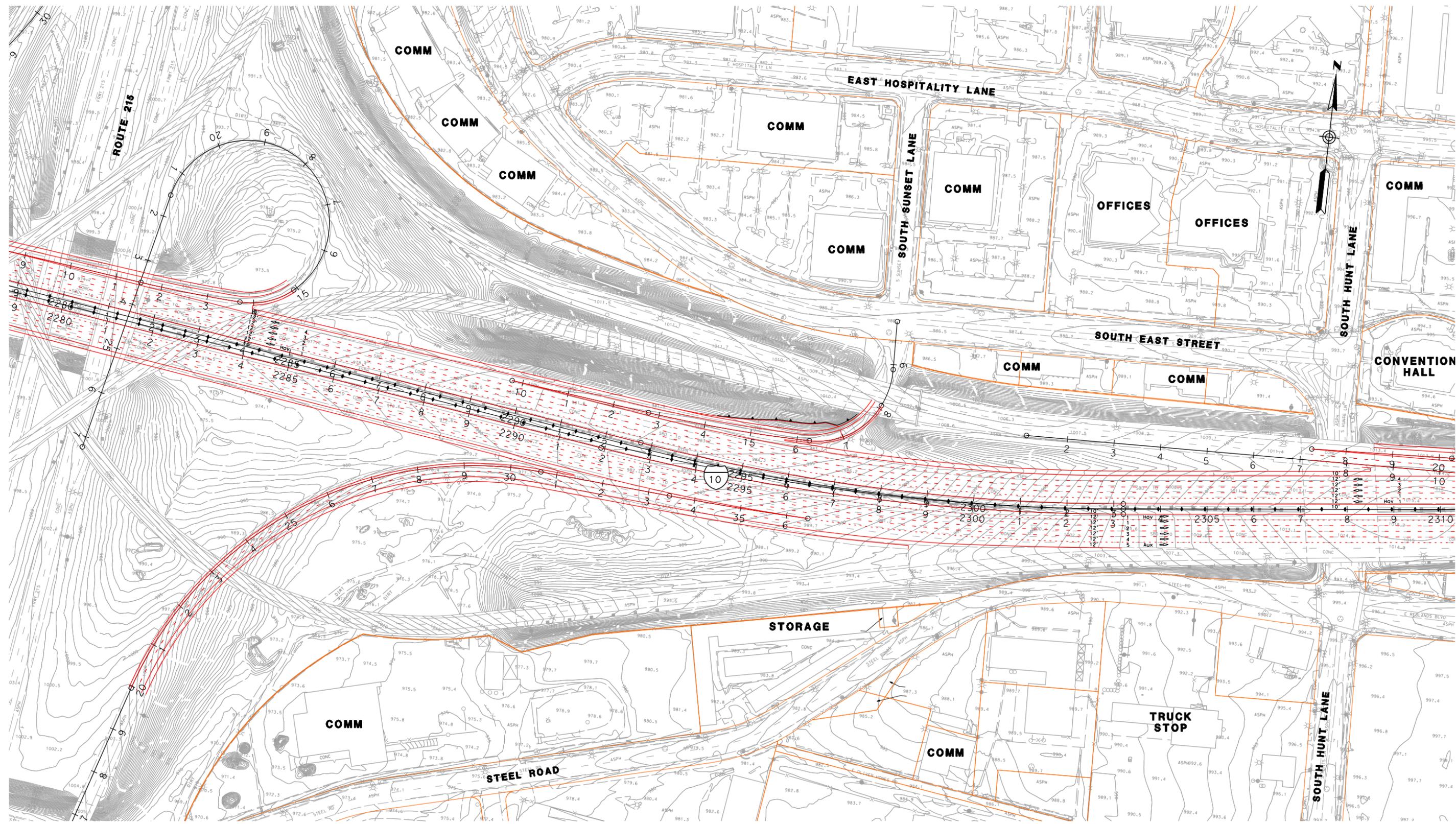
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — — — — — RETAINING WALL
- ◆ — — — — — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 93

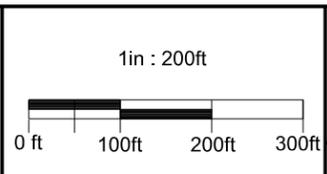


- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- ⊕HXX - IN/OUTDOOR MEASUREMENT

- — — — — EXISTING PROPERTY WALL
- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

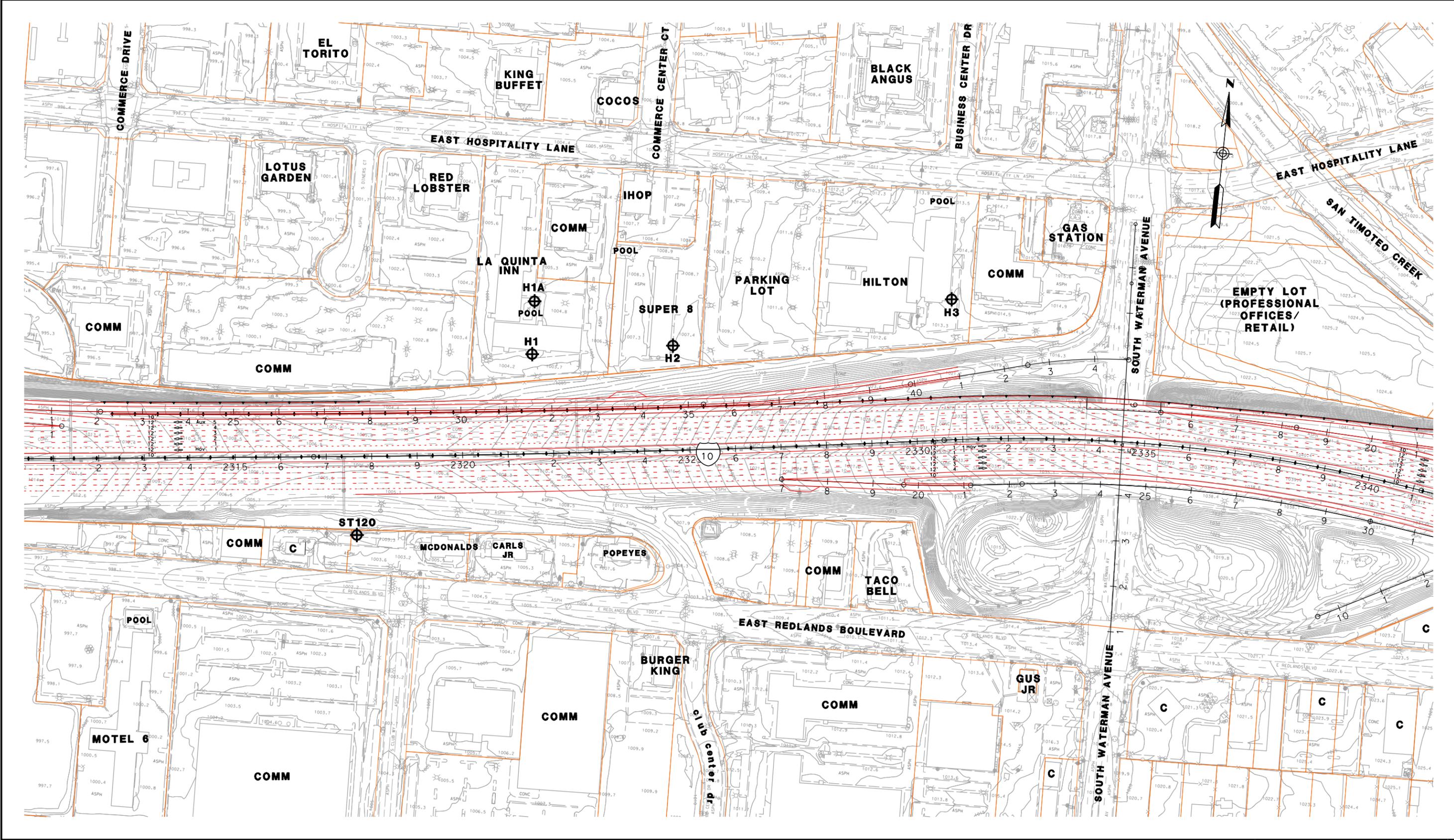
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — ▲ — RETAINING WALL
- ◆ — ◆ — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

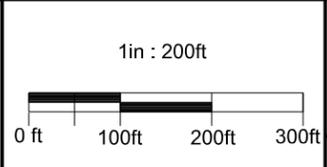
FIGURE 94



- LEGEND**
- ⊕RXX - RECEIVER SITE
 - ⊕CAL - CALIBRATION SITE
 - ⊕LT - LONG-TERM MEASUREMENT
 - ⊕ST - SHORT-TERM MEASUREMENT

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- COMM OR C - COMMERCIAL/NO OUTDOOR USE AREA
- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

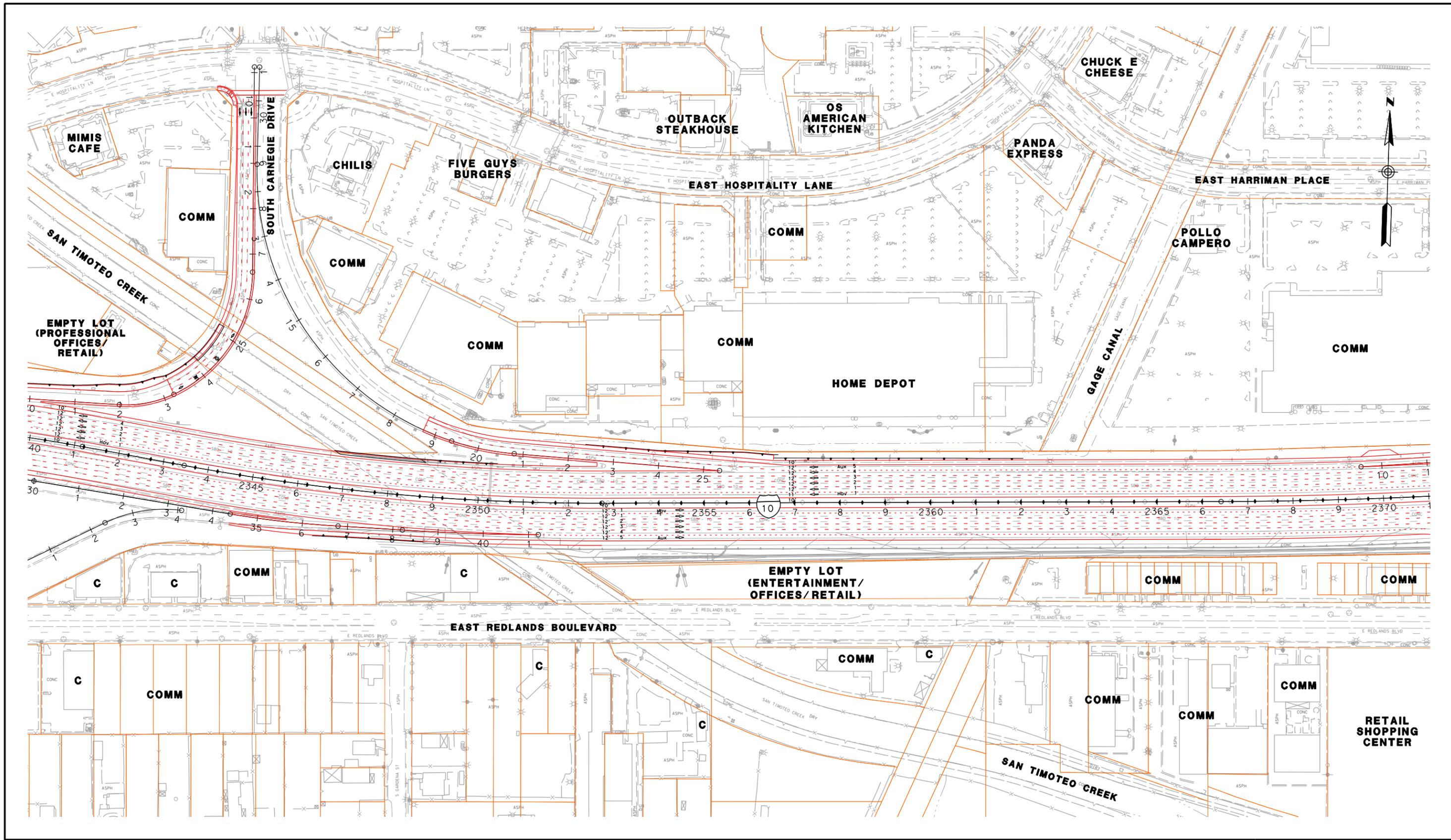
- — — — — - EXISTING PROPERTY WALL
- — — — — - EXISTING SOUNDWALL
- — — — — - PROPOSED SOUNDWALL
- — — — — - REPLACEMENT IN KIND SOUNDWALL
- — — — — - NON-REASONABLE SOUNDWALL
- — — — — - RETAINING WALL
- — — — — - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 95



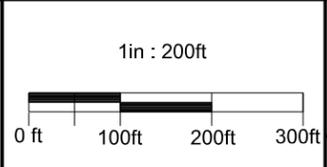
LEGEND

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— — — — — EXISTING PROPERTY WALL
 - - - - - EXISTING SOUNDWALL
 — — — — — PROPOSED SOUNDWALL
 — — — — — REPLACEMENT IN KIND SOUNDWALL

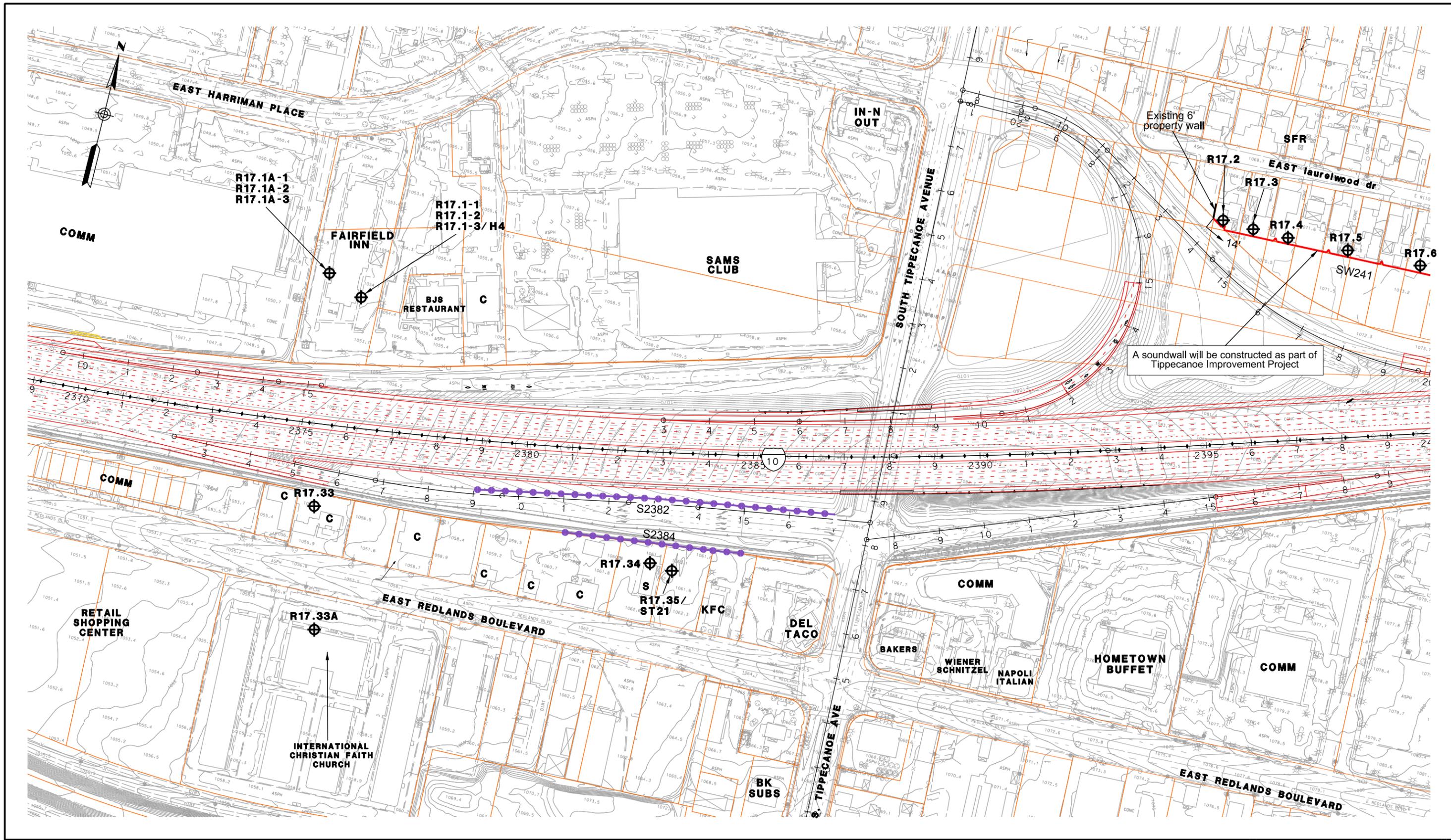
— — — — — NON-REASONABLE SOUNDWALL
 ▲ ▲ ▲ ▲ ▲ RETAINING WALL
 ◆ ◆ ◆ ◆ ◆ SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 96



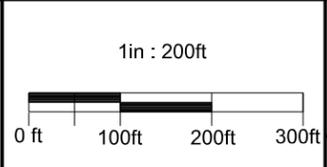
A soundwall will be constructed as part of Tippecanoe Improvement Project

- LEGEND**
- ⊕RXX - RECEIVER SITE
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 - ⊕LT - LONG-TERM MEASUREMENT
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- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

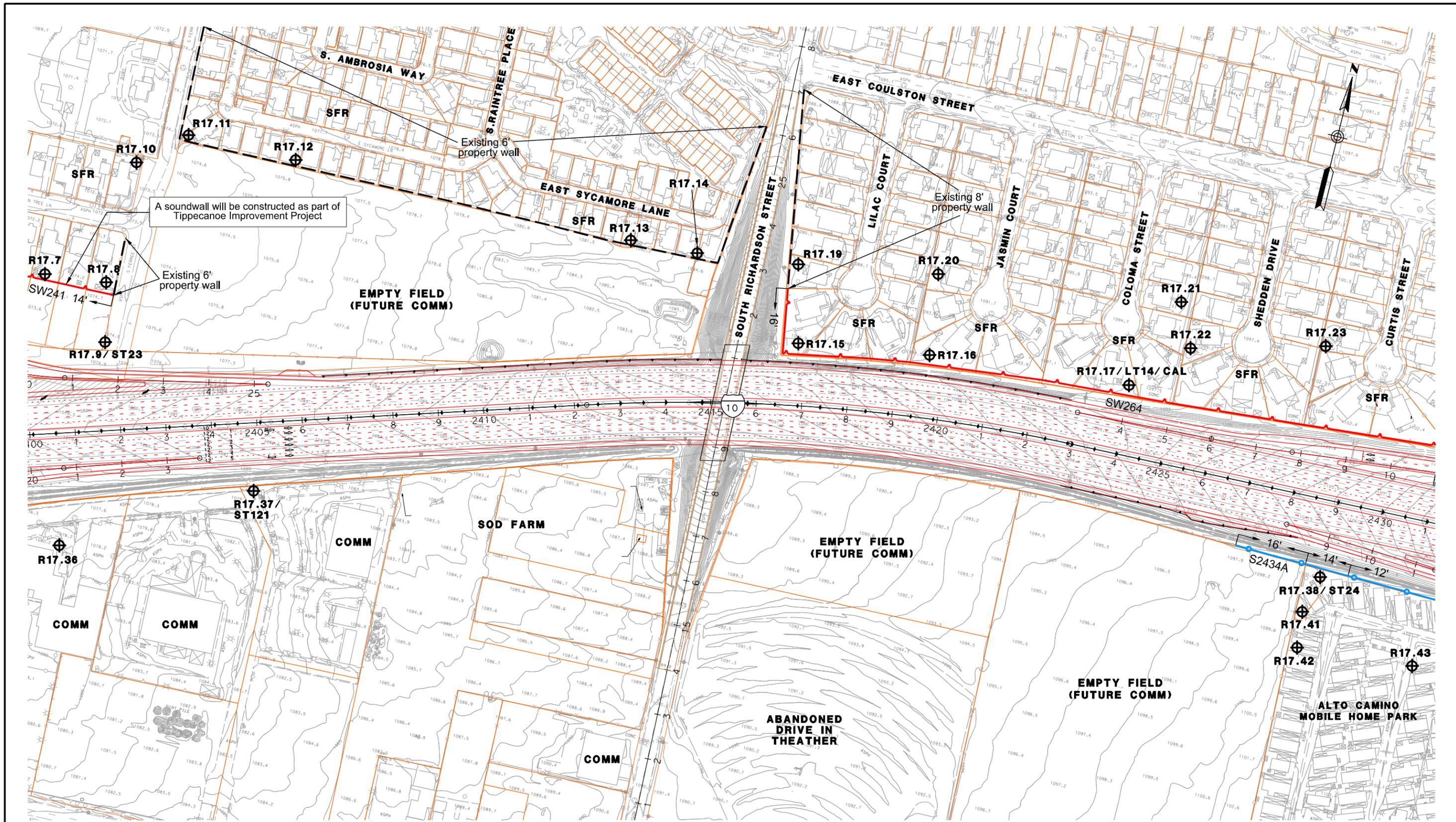
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — — — — — RETAINING WALL
- ◆ — — — — — SAFETY BARRIER



I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS

JULY 1, 2015

FIGURE 97



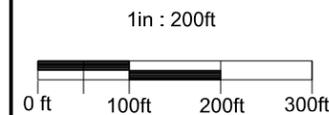
LEGEND

- ⊕RXX - RECEIVER SITE
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--- - EXISTING PROPERTY WALL
 --- - EXISTING SOUNDWALL
 --- - PROPOSED SOUNDWALL
 --- - REPLACEMENT IN KIND SOUNDWALL

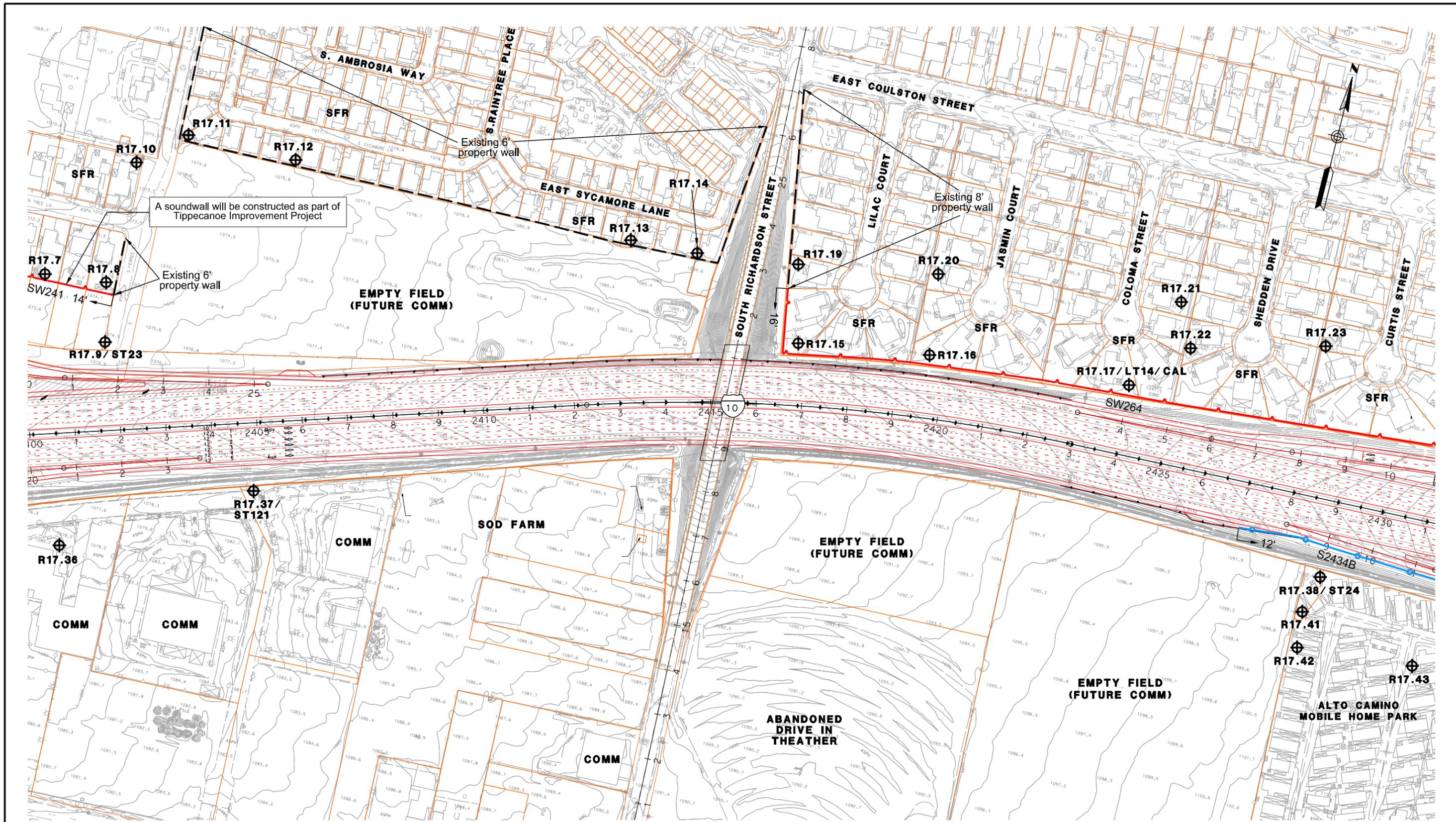
--- - NON-REASONABLE SOUNDWALL
 --- - RETAINING WALL
 --- - SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS
 (OPTION 1)**

JULY 1, 2015

FIGURE 98-1



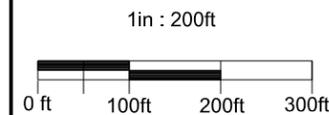
LEGEND

- ⊕RXX - RECEIVER SITE
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- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL

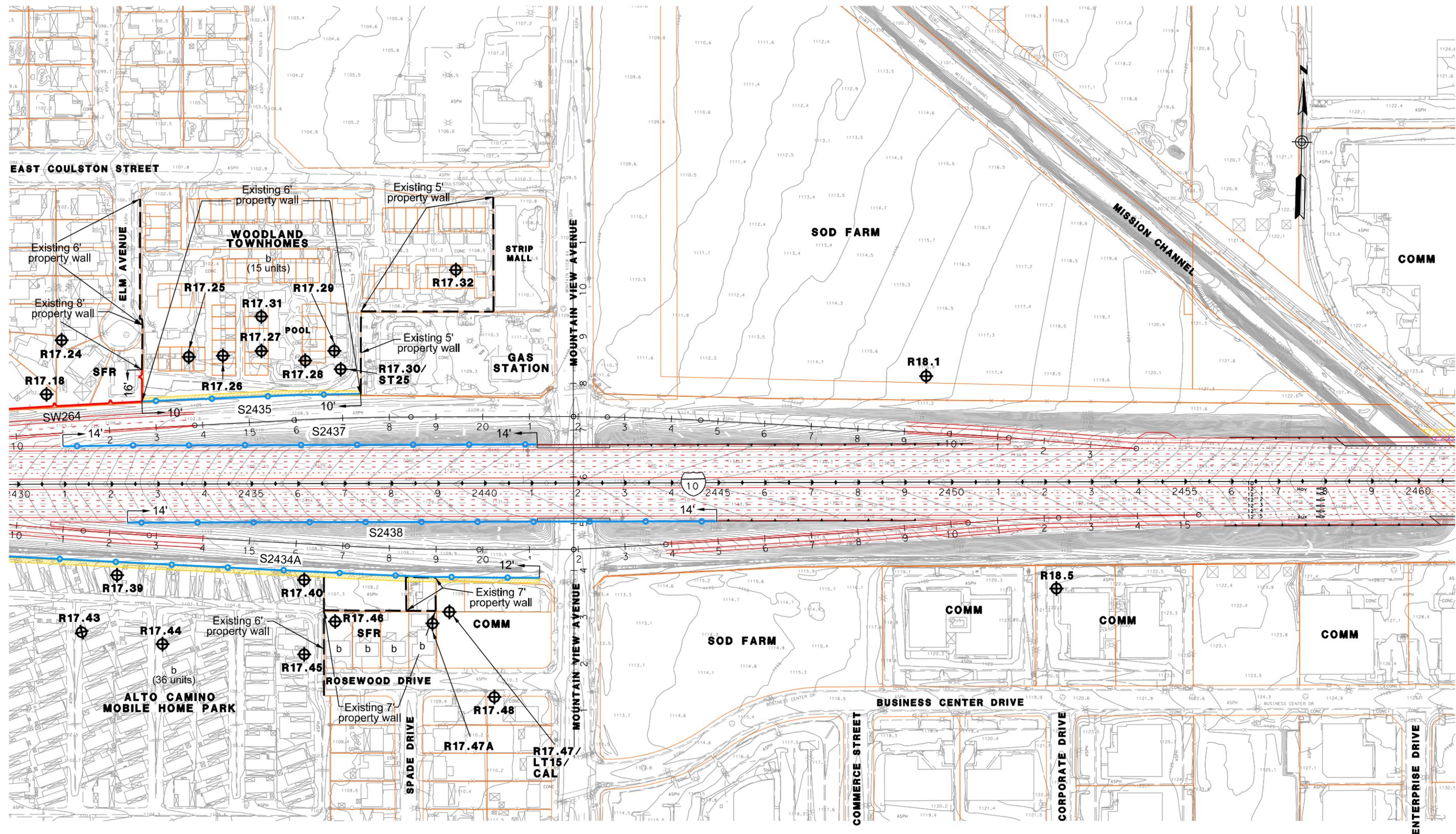
- — — — — NON-REASONABLE SOUNDWALL
- — — — — RETAINING WALL
- — — — — SAFETY BARRIER



I-10 CORRIDOR ALTERNATIVE 2
 NADR RECOMMENDED BARRIER
 HEIGHTS & LOCATIONS
 (OPTION 2)

JULY 1, 2015

FIGURE 98-2

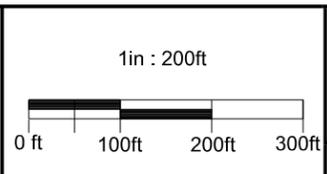


LEGEND

- ⊕RXX - RECEIVER SITE
- ⊕CAL - CALIBRATION SITE
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- b - BENEFITED RESIDENCE
- ⊕HXX - IN/OUTDOOR MEASUREMENT

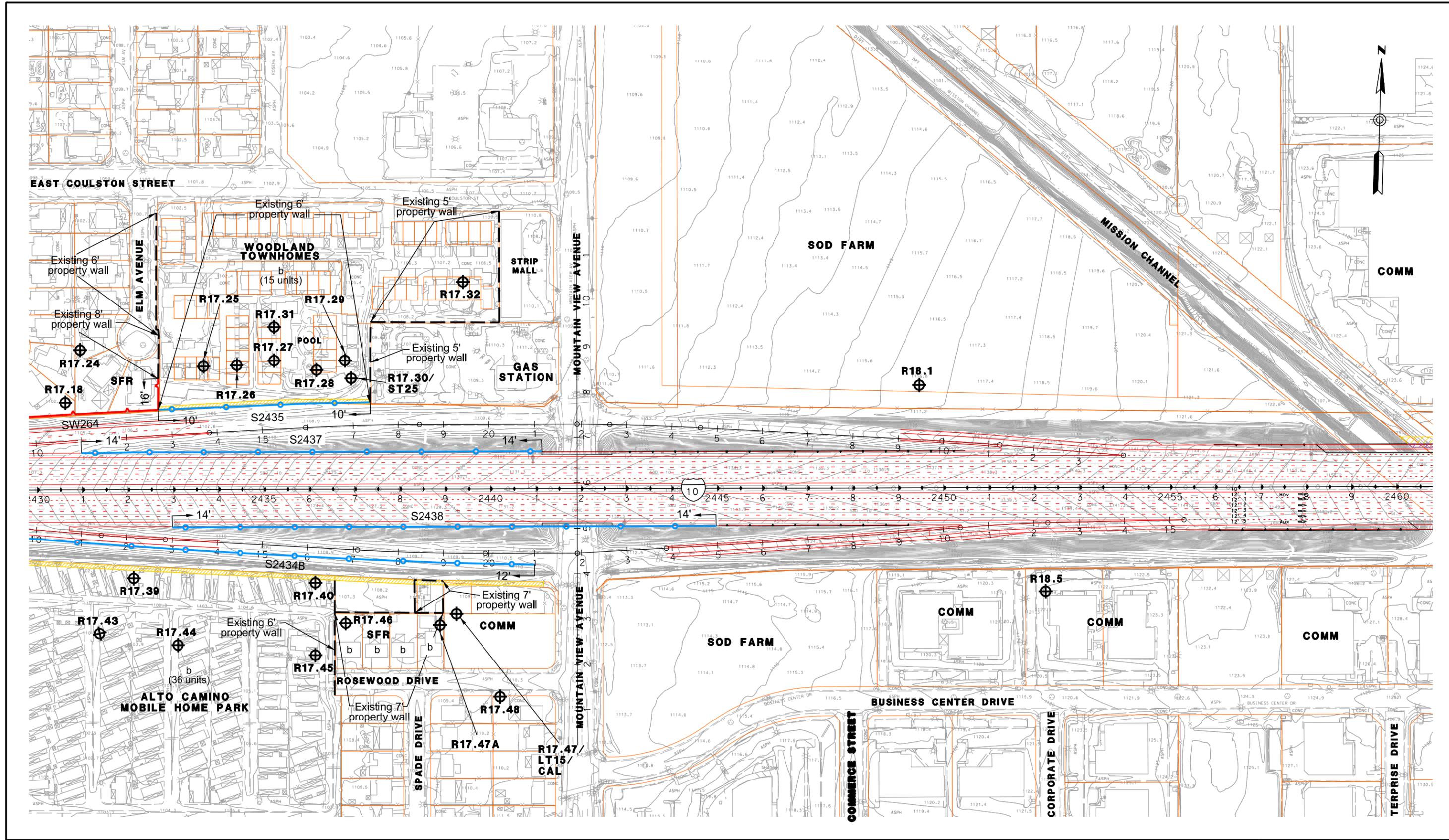
- — — — — EXISTING PROPERTY WALL
- — — — — EXISTING SOUNDWALL
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL
- — — — — NON-REASONABLE SOUNDWALL
- ▲ — ▲ — ▲ — RETAINING WALL
- ◆ — ◆ — ◆ — SAFETY BARRIER



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS
(OPTION 1)**

JULY 1, 2015

FIGURE 99-1

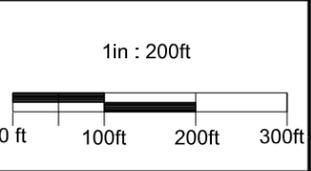


LEGEND

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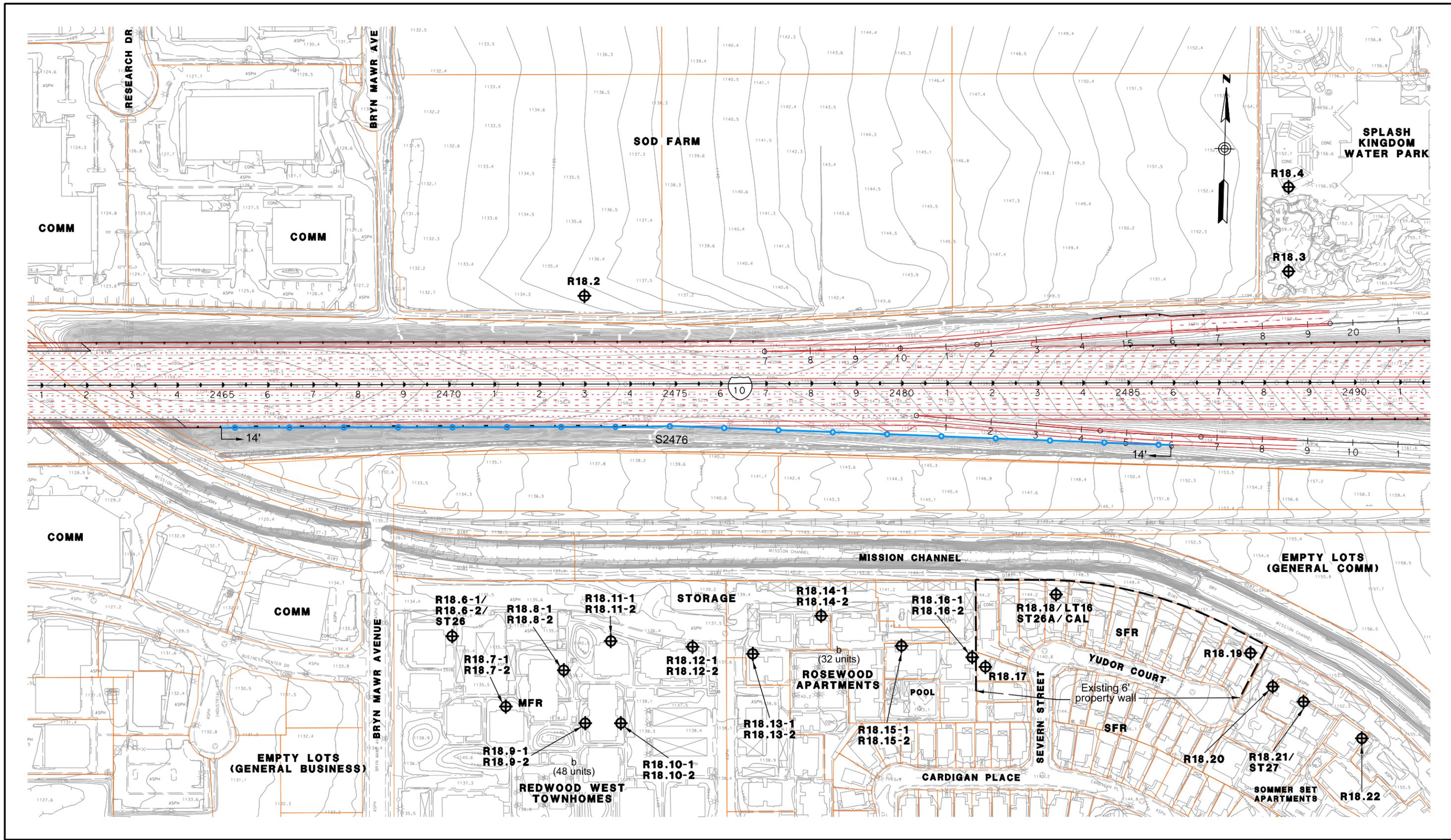
- — — — — EXISTING PROPERTY WALL
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- — — — — NON-REASONABLE SOUNDWALL
- — — — — RETAINING WALL
- — — — — SAFETY BARRIER
- — — — — PROPOSED SOUNDWALL
- — — — — REPLACEMENT IN KIND SOUNDWALL



**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS
(OPTION 2)**

JULY 1, 2015

figure 99-2

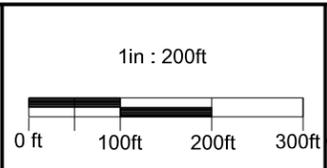


LEGEND

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- ▲ — — — — — RETAINING WALL
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**I-10 CORRIDOR ALTERNATIVE 2
NADR RECOMMENDED BARRIER
HEIGHTS & LOCATIONS**

JULY 1, 2015

FIGURE 100