DISTRICT PRELIMINARY GEOTECHNICAL REPORT

San Diego Freeway (I-405) Improvement Project
SR-73 to I-605

Orange and Los Angeles Counties

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December 17, 2010 (revised 08-25-11, 11-04-11, & 12-14-11)

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Subject: **District Preliminary Geotechnical Report (DPGR)**
I-405 Widening from SR-73 to I-605, Orange County, CA
2-ORA-405-PM 9.3/24.2, EA0H1000
GDC Project No. I-487

Dear Jason:

We are pleased to submit our District Preliminary Geotechnical Report (DPGR) as part of the Project Report/ Environmental Document being developed by Parsons for widening of I-405 from SR-73 to I-605. This report was developed in general accordance with our Proposal No. I08-029 dated April 23, 2008. This report has been revised in response to Caltrans comments dated 2-17-11, 9-21-11, 11-18-11, and 12-12-11. The comments and our responses are included in Appendix B.

We appreciate the opportunity to assist you on this important project. Should you have any questions, please call us at (949) 450-2100.

Very truly yours,
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DISTRICT PRELIMINARY GEOTECHNICAL REPORT
I-405 FROM SR-73 TO I-605
12-ORA-405-PM 9.3/24.2, EA0H1000
ORANGE COUNTY, CALIFORNIA

1.0 INTRODUCTION

1.1 Project Description

The California Department of Transportation (Caltrans), in cooperation with the Orange County Transportation Authority (OCTA), proposes to improve the freeway mainline and interchanges on Interstate 405 (I-405) in northern Orange County to reduce congestion and improve lane continuity through the corridor. Three build alternatives and a No Build Alternative are being considered for this project.

Alternative 1 proposes to add one general purpose lane in each direction of I-405 from Euclid Street to Interstate 605 (I-605) with some improvements on State Route 22 (SR-22). **Alternative 2** proposes to add the general purpose lane included in Alternative 1 and a second general purpose lane northbound from Brookhurst Street to the SR-22/7th Street interchange and southbound from Seal Beach Boulevard to Brookhurst Street. Alternative 2 would also include some improvements on SR-22. **Alternative 3** proposes to add the general purpose lane included in Alternative 1 and an additional median lane in each direction from State Route 73 (SR-73) to SR-22 East to operate together with the existing High Occupancy Vehicle (HOV) lanes as express lanes in which eligible HOVs would travel without a toll charge and other vehicles would pay a toll. Alternative 3 would include some improvements on SR-22, SR-73, and I-605.

The proposed improvements are generally within Orange County with minor improvements under Alternative 3 in Los Angeles County. Alternative 1 and Alternative 2 are carried forward from the Project Study Report/Project Development Support (PSR/PDS), approved in July 2008, which was the document prepared for the Project Initiation phase of the project. Alternative 3 was introduced at the beginning of the Project Approval/Environmental Document (PA/ED) phase. A project vicinity map is included in Figure 1, and a preliminary Layout Plan for Alternative 3 is presented in Figure 2 (sheets 1-48). Preliminary Layout Plans for Alternatives 1 and 2 are presented in Appendix C. A schematic drawing of the various alternatives is shown in Figures 3A and 3B.

In addition to the mainline lane widening, all of the build alternatives would include mainline geometric and interchange improvements as described below:

- Additional auxiliary lanes linking upstream on-ramps with downstream off-ramps at appropriate locations
- Providing standard left and right shoulders for the freeway and interchange ramps
- Reconfiguration of various interchange ramps and provision of increased ramp storage capacity
- Additional through and turn lanes at ramp intersections with local streets
- Improvements at nearby arterial street intersections affecting interchange operations
- Removal of HOV preferential lane from on-ramps to increase ramp storage capacity
- A new on-ramp from eastbound Euclid Street/Ellis Avenue to southbound I-405
- Reconfiguration of the Brookhurst Street interchange
- Braided ramps in both directions between Warner Avenue and Magnolia Street
- Reconfiguration of the Beach Boulevard interchange
- Reconfiguration of the Westminster Boulevard interchange

The proposed improvements would require 8 new structures (10 in Alternative 3), 17 overcrossing structure replacements (18 in Alternative 3) including 1 pedestrian bridge, and 5 structure widening/modifications (6 in Alternative 3) including 2 railroad overheads. Several existing flood control channels would be upgraded and 1 new storm drain bypass system would be added.

The project is expected to proceed to final design upon approval of the Final Project Report and a Record of Decision (ROD)/Notice of Determination (NOD) for the final environmental document. Construction of the project is anticipated to begin in 2015, with estimated completion date of 2020. For Alternative 3, a design-build project delivery method or a design-build-operate strategy may be utilized.

1.2 Purpose and Scope of Work

This report was prepared to provide preliminary geotechnical information for the PR/ED based on site reconnaissance and review of existing as-built plans and Log of Test Borings (LOTBs), published geologic and seismic data, aerial photographs, historical topographic maps, and other available information. For geotechnical purposes, we evaluated the most comprehensive improvements, Alternative 3.

Specifically, our scope of work included:

- Summarize anticipated site conditions and geology based on review of available topographic maps, aerial photographs, published regional geologic maps, liquefaction and landslide hazard maps, and our site reconnaissance;
- Review and summarize subsurface data and general subsurface conditions, including soil and groundwater conditions, based on existing as-built Log of Test Boring (LOTB) sheets (no borings were performed for this phase);
- Provide preliminary recommendations for geotechnical and seismic design parameters;
- Perform a preliminary evaluation of liquefaction potential along the alignment;
- Recommend likely types of foundation for earth retaining structures, soundwalls, and overhead sign structures;
- Provide comments on constructability, excavation, embankment, foundation bearing capacity, and slope stability;
- Discuss scope of work for final geotechnical investigation; and
- Prepare this report.

As-built foundation information, preliminary seismic recommendations, and preliminary foundation recommendations for proposed new bridges, bridge widening, and bridge replacement were provided in separate Structure Preliminary Geotechnical Reports (SPGRs) submitted along with the Type Selection packages. Environmental issues for the project were evaluated in a separate Initial Site Assessment (ISA) report.

2.0 EXISTING FACILITIES AND PROPOSED IMPROVEMENTS

The length of the project is approximately 16 miles. Project stationing along centerline of I-405 runs from south to north as follows:

- **Begin Project (SR-73)**: Sta. 494+00 / Post Mile 9.3
- **End Project (I-605)**: Sta. 1339+00 / Post Mile 24.2

The project vicinity is shown in Figure 1. Schematic lane layout is shown in Figures 3A and 3B. The Key Map and Layout Plans illustrating existing facilities and proposed improvements for Alternative 3 are shown in Figure 2 (sheets 1 through 48). Layout Plans for Alternatives 1 and 2 are presented in Appendix C.

2.1 Existing Facilities

The project passes through the cities of Costa Mesa, Fountain Valley, Huntington Beach, Westminster, Garden Grove, and Seal Beach, and crosses the major drainages of Santa Ana River and San Gabriel River (just north of the project). The area has extensive residential, commercial, and other development and contains numerous existing improvements, which are summarized in the following sections.

2.1.1 Bridges and Local Roadways

I-405 has existing bridge structures or culverts where it crosses drainages or local roadways. Existing bridges are generally supported on driven pile foundations. The locations of the existing bridges and drainage structures are summarized for reference in Table 1. In general, existing overcrossings will be replaced, undercrossings will be widened, culverts will be extended, and new structures will be constructed for ramps and other improvements.

2.1.2 Retaining Walls

Since the alignment area was originally flat with limited topographic relief, grade separations were created primarily by placing embankments with maximum heights of about 30 feet, with relatively few retaining structures. Locally tieback walls below abutments, concrete walls of moderate height, channel walls, and other wall types are present.

2.1.3 Pavements

Existing I-405 has one HOV lane in each direction for the full length of project and four to seven general-purpose lanes in each direction. An auxiliary lane is present between Magnolia/Warner and Beach/Edinger interchanges. Existing median shoulder, HOV, HOV buffer, mainline, and auxiliary lane pavements are primarily Portland Cement Concrete Pavement (PCCP), except between Harbor Blvd. and Beach Blvd., where all pavements are Asphalt Concrete (AC). Outside shoulders, ramps, and local roads are primarily Asphalt Concrete Pavement (ACP). Existing lane configuration is shown in Figures 3A and 3B. As-built pavement information is presented later in this report.

2.1.4 Drainage Structures

South and southwesterly flowing drainages cross I-405 at a number of locations. The more significant ones are listed in Table 1 and include:

- Greeneville-Banning Channel (623+00, Post Mile 11.70);
- Santa Ana River (657+00, Post Mile 12.41);
- East Valley Channel (681+50, Post Mile 12.90);
- Ocean View Channel (791+50, Post Mile 15.00);
- Heil Avenue Drain (819+00, Post Mile 15.49);
- East Garden Grove Channel (839+50, Post Mile 15.87);
- Westminster Channel (943+50, Post Mile 17.80);
- Anaheim-Barber City Channel (1027+50, Post Mile 19.45);
- Bolsa Chica Ditch (1098+00, Post Mile 20.77);
- Los Alamitos Channel (1274+00, Post Mile 24.10); and
- San Gabriel River (1280+00).

Other minor drainage structures / culverts are also present.

2.1.5 Roadway Cut and Fill Slopes

Prior to the freeway construction the alignment area was relatively flat with limited topographic relief. No significant cut slopes are present. In general, most of the freeway is on shallow fill on the order of 5 feet above original grades; at selected locations the freeway is elevated up to about 25 to 30 feet above original grades (on

approaches to Harbor Blvd UC, Santa Ana River Bridge, Beach Boulevard (SR-39), Bolsa Overhead railroad crossing, and Navy Overhead railroad crossing). Approach embankments are present north and south of the freeway at all the overcrossings with heights on the order of 25 to 30 feet. Most fill slope inclinations vary between 2h:1v and 1.5h:1v.

2.1.6 Minor Structures

Numerous minor structures such as soundwalls and overhead signs are present along the alignment.

2.1.7 Surrounding Development

The surrounding area is fully developed, and includes residential, commercial, and municipal structures, schools, parks, military and other facilities.

2.2 Proposed Improvements

Figures 3A and 3B, respectively, show the northbound and southbound schematic of existing lanes and proposed lane additions for various alternatives. Figures 2-1 through 2-48 show the Key Map and Layout for Alternative 3. Layouts for Alternative 1 and 2 are presented in Appendix C. A summary of proposed retaining wall improvements based on Alternative 3 is included in Table 2. Anticipated improvements are summarized in the following sections.

2.2.1 Bridge Improvements

Bridge improvements will be performed and will need to be coordinated with the freeway, local roadway, and ramp modifications. Geotechnical information for bridges was provided in separate Structures Preliminary Geotechnical Reports (SPGRs).

2.2.2 Retaining Walls and Soundwalls

There are no natural slopes in the project area, and no permanent cuts are anticipated, so proposed retaining walls will generally retain new or existing fills. Where space is available embankment slopes will be used; where limited right of way is present, retaining walls will be built. Walls will be used for the following purposes:

- Mainline walls: to retain new embankment fills for the outboard sides of I-405 freeway and ramps; where the freeway is near original grades these walls are generally less than 10 feet in height; higher mainline walls up to about 18 feet

in height are proposed to retain the embankment widenings approaching existing railroad grade separations at Bolsa OH and Navy OH;

- Local roadway walls at Overcrossings: along the outsides of local roadways to retain new fill where existing Overcrossing approach embankments are widened and/or raised;
- New Structure Approaches: walls are proposed approaching new structures at 405/73 HOV Connector Separation, Euclid Street On Ramp Connectors, and Warner Ave On Ramp Connector Separation; and
- Cuts below existing abutments: To retain cuts into existing fills below abutments.

Current plans indicate most mainline and local roadway walls are planned as Standard Plan cast-in-place cantilever concrete walls (Type 1, Type 5, or similar). A tieback wall is proposed for widening of Beach Blvd. below Route 405/39 Separation. Mechanically Stabilized Embankment (MSE) Walls are proposed for approaches to some of the new bridge structures; MSE walls may also be considered as an alternative wall type to cast-in-place concrete walls. MSE walls are non-District items and are therefore not addressed in this report. Anticipated standard retaining wall improvements are summarized in Table 2.

Soundwalls, in general, may be based on the standard plans and supported on spread footings, CIDH piles, or trench footings. In absence of groundwater CIDH piles are normally the most economical; however, spread or trench footings may be more economical where shallow groundwater is present due to constructibility problems CIDH piles below groundwater. No information on soundwall locations or heights is currently available.

2.2.3 Fills and Cuts

No significant permanent cuts are anticipated. Fills will be placed to widen the freeway on the outside, to re-align ramps, and to widen existing abutment approaches to overcrossings and undercrossings.

2.2.4 Culverts

Placement of new outboard fills generally requires extension of existing channels and culverts.

2.2.5 Roadway Pavements

New pavements will mainly be required on the outboard sides of I-405, along ramp re-alignments, and for local streets. The new pavements will be Jointed Plain Concrete Pavement (JPCP) or Hot Mix Asphalt (HMA), and will be designed in accordance with the latest Caltrans Highway Design Manual, considering the actual tested R-Value of the site subgrade and the design traffic index. We anticipate that mainline pavement type will generally match the existing AC (HMA) or PCCP (JPCP), and that ramps and local roads will generally be HMA. Where expansive soils are encountered over-excavation of expansive soils below pavements will be required.

2.2.6 Overhead Signs

Overhead signs are anticipated as part of improvements. Foundations are generally Cast-in-Drilled-Hole (CIDH) piles using designs from Caltrans Standard Plans.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Conditions

The site is located on an alluvial flatland. Based on review of the USGS Newport Beach, Seal Beach, and Los Alamitos 7.5-Minute Quadrangles, original grades along the alignment between SR-73 and Bolsa Chica Rd OC are in a narrow range between about El. +23 feet to +30 feet above Mean Sea Level. Between Bolsa Chica Rd OC and I-605, original grades drop from El. +23 feet to a low of about El. +10 feet at the north end of the project. The freeway road bed in most areas is on shallow fill on the order of 3 to 8 feet (+/-) above the original grade (El. +30 to +36 feet from SR-73 to Springdale, El. +26 at Bolsa Chica Road, El. +14 at Seal Beach Blvd.); on approaches to undercrossings (Harbor, Santa Ana River, Bolsa OH, Navy OH, Beach Blvd) the freeway is elevated on embankment up to about 30 feet high with top of embankment elevations of about El. +52 to +59 feet. Top of embankments at Overcrossings are generally 25 to 30 feet above the freeway level or El. +48 to +59 feet. Regional drainage is by sheet flow toward the south and west, and is collected in storm drains and generally southwesterly flowing channels. The area is extensively developed.

3.2 Subsurface Conditions

3.2.1 Geology and Seismicity

3.2.1.1 Geology

Regionally the project lies entirely within the Orange County flatlands of the southern portion of the Central Block of the Los Angeles Basin. The basin is infilled with up to 4,200 feet of relatively unconsolidated Pleistocene marine and non-marine sediments overlain by up to 170 feet of unconsolidated non-marine Quaternary and Holocene alluvial sediments. The depth of the unconsolidated sediments is generally shallowest near the south end of the project, becoming deeper towards the north.

The surface geology of the corridor is illustrated in the regional geologic map shown in Figure 4. The entire project alignment is underlain by young Holocene age alluvium (Qya) and alluvial fan deposits (Qyf) associated with the Santa Ana River and San Gabriel River systems. The alluvial materials are poorly consolidated and generally consist of interbedded layers of sands, silts, and clays. Near surface alluvium generally contains soft to stiff clays and silts, and loose to medium dense sandy soils. Loose / medium dense and soft / medium stiff materials are generally present in the upper 30 to 60 feet. Alluvial clays and silts generally become stiff to

very stiff, and sands become dense to very dense, at variable depth below the less consolidated surface sediments. Man-made fills associated with roadways and other developments have been placed over the alluvial soils. High historical groundwater is generally at a depth of 5 to 20 feet below the natural site grades (see Figure 5). The site is located in a liquefaction hazard zone (see Figure 6).

3.2.1.2 Seismicity

Major active faults in the project area based on Caltrans 2007 Fault Database are shown on the Caltrans ARS Online Fault Maps in Figures 7A and 7B. The regional tectonics of the area includes a number of sub-parallel northwest-southeast trending right lateral strike slip faults (Newport-Inglewood, Palos Verdes, and Whittier-Elsinore Fault Zones) that are part of the larger San Andreas Fault system, and a series of reverse and blind thrust faults (San Joaquin Hills Blind Thrust, Compton-Los Alamitos Blind Thrust, THUMS Huntington Beach, and Puente Hills Blind Thrust Faults). The closest major active faults are:

- The San Joaquin Hills Blind Thrust Fault (Maximum Magnitude 6.6, Reverse), which dips to the southwest below the southern portion of the project, with minimum depth of 2 km; the surface projection of the shallowest portion of the fault is located at a closest distance of about 0.6 km to the northeast;
- The Newport-Inglewood-Rose Canyon Fault Zone (Maximum Magnitude 7.5, Strike Slip), which is located at a variable distance of about 2 to 5 km southwest of the alignment;
- The Compton-Los Alamitos Blind Thrust Fault (Maximum Magnitude 6.8, Reverse), which dips to the northeast below the entire project alignment, with a minimum depth of 5 km; the surface projection of the shallowest portion of the fault is located at a variable horizontal distance of 7 to 10 km to the southwest of the site.

Seismic hazards including fault rupture hazard, ground shaking, and liquefaction are discussed in a later section of the report.

3.2.2 Subsurface Conditions

At the DPGR level only a paper study was performed based on existing available subsurface soil and groundwater data. As-built LOTBs for the existing bridges were reviewed for general information. We also obtained and reviewed available geotechnical reports from Caltrans Headquarters on District roadway items such as existing soundwalls (Wall Nos. 103, 151, 350, 271, 311, 131, 287, 350, 319, 328, 374, 375, 109, 435, 502, 583, 695, 741, 1098) and Retaining Walls (Wall Nos. 74,

205, 324, 166, 80, 84, 86, 18, 5011, 5050, 5650, 5770, 5790, 6150, 6310, 6345, 6950, 101, 102, and 100). As-built LOTBs for these roadway structures are presented in Appendix A.

Based on review of existing data, the approach fill embankments generally consist of compacted fill above native alluvial soils. The top of embankments generally ranges between about El. 50 and El. 60 feet. The original grade ranges between El. 25 and El. 30 feet. Native alluvial soils along the alignment generally consist of interbedded sands, sandy silts, silty sands, silts, clayey silts, and clays with occasional gravel. Alluvial clays are generally medium stiff to stiff and sands are loose to medium dense. Alluvium generally increases in stiffness / relative density with depth. Dense sands and very stiff clays are generally present below El. 0 to El. -40 feet along the alignment.

Recommendations for the scope of future site-specific explorations based on LRFD Guidelines are presented in Section 4.10 and must be performed during PS&E level design.

3.2.3 Groundwater

Our overall assessment of groundwater depth along the alignment considered groundwater levels from as-built LOTBs, as well as published data on the historically high groundwater (see Figure 5). The groundwater data from existing roadway borings (Appendix A), bridge LOTB, and historical high contours (Figure 5) are summarized in Table 3. The table also presents recommended high groundwater elevation based on the higher of the mapped levels or LOTB data.

In summary:

- The highest known groundwater is near El. +22 feet in the vicinity of SR-73 and Fairview Rd OC, or at a depth of 12 to 16 feet below the freeway grade;
- At Harbor Blvd, highest known groundwater is El. +13 feet or about 15 feet below Harbor Blvd;
- At Santa Ana River, highest know groundwater level is near El. +25 feet, or 3 feet above the channel bed elevation. This data is from 1964 and may represent higher levels prior to lining the channel with concrete;
- From Ward St to Springdale St, highest known groundwater levels are very consistent and range from El. +18 to +24 feet (average El. +21 ft), which is generally 8 to 13 feet below the lower of the existing freeway grade or the existing grade of the local roads / railroads crossing the alignment;

- Highest known groundwater level in the vicinity of Bolsa Chica Rd OC is near El. +16 feet, or about 10 to 14 feet below the freeway grade; and
- Highest known groundwater is near El. 0 feet at the north end of the project in the vicinity of Seal Beach Blvd and 605/405 Separation, or about 16 to 21 feet below the freeway level.

4.0 DISCUSSION AND PRELIMINARY RECOMMENDATIONS

4.1 Seismic Design Considerations

The site is located in a moderately active seismic area of Southern California, and ground shaking will be considered in the project design. A summary of seismic information is presented in Table 4.

4.1.1 Ground Surface Fault Rupture

The site is not located in an Alquist-Priolo Fault Zone and no faults considered capable of surface rupture are mapped as crossing the site or projecting towards the site in the geologic literature reviewed. The shallowest portion of the San Joaquin Hills Blind Thrust Fault underlies the southern portion of the alignment (see Figure 7B), but the fault depth is about 2km and not likely to rupture at the surface. Therefore, the potential for ground surface fault rupture in the project area is low.

4.1.2 Seismic Shaking

As of September 30, 2009 Caltrans has adopted new seismic design criteria (Appendix B of Caltrans SDC revised 8-12-09). A ground motion analysis was performed following the new Caltrans procedure using Caltrans ARS Online and spreadsheet tools. Our experience in the project area and as-built blowcount data indicates soils generally classify as Type D. For preliminary assessment, we assumed average shear wave velocity of 270 meters per second (average for soil type D). Final analyses should be performed in PS&E stage based on site-specific shear wave velocity measurement. The upper bound envelope of deterministic and probabilistic (5% probability of exceedence in 50 years or 975 year average return period) was developed. USGS 2008 deaggregation (Beta) was used for probabilistic assessment since it is higher than ARS online. The site is located in a deep sedimentary basin, and appropriate basin effect was included. Hanging wall and near-source factors were also applied as appropriate. A summary of the seismic analyses are presented in Table 4. Based on the results, we conclude the following:

- Deterministic analyses rather than 975-year probabilistic analyses control the PGA values for the entire project alignment;
- Estimated Peak Ground Acceleration (PGA) for the entire alignment ranges from 0.51 to 0.60g's;
- The calculated PGA is controlled by:
    - San Joaquin Hills Blind Thrust Fault for the portion of alignment from SR-73 to Bushard Street;

- The Compton-Los Alamitos Blind Thrust Fault for the portion of alignment from Bushard Street to 405/605 Separation.

The seismic results should be considered a good preliminary estimate but may be subject to change in the final PS&E investigation. Details of the ground motion evaluations for each bridge were provided in the separate Structures Preliminary Geotechnical Reports (SPGRs) as part of the Advance Planning Study (APS) submittals.

4.1.3 Liquefaction Potential

The site is in a State of California mapped Liquefaction Hazard Zone (Figure 6), has relatively shallow groundwater, layers of loose to medium dense saturated granular soils, and moderate to high earthquake accelerations. Therefore, liquefaction potential should be considered high.

Existing as-built data is not adequate to provide good quantitative estimates of the hazard. ***The actual hazard should be expected to vary at different locations within the site, and could range from negligible to significant***. For example, in the West County Connectors Project at the SR-22 / I-405 interchange liquefaction was isolated to occasional thin layers and no significant mitigation was required.

Quantitative liquefaction assessment, potential impacts, and mitigation measures for each embankment, retaining wall, sign foundation, and other roadway structure should be addressed in the PS&E level geotechnical investigation. Depending on the groundwater levels and the actual density, depth, layer thickness, fines content, plasticity, and post-liquefaction strength of potentially liquefiable soils, these impacts may include ground settlement, reduced foundation bearing capacity, and/or seismic slope instability.

The peak ground accelerations listed in Table 4 and a magnitude of 7 would be appropriate for preliminary liquefaction analysis. If results of site-specific investigation indicate high potential for seismic slope instability or lateral spreading, additional mitigation such as soil improvement / ground modifications could be required.

4.1.4 Seismic-Induced Landslides

There are no natural slopes in the project area, and the site is not in a mapped landslide hazard zone. Potential for seismic induced slope failures in the project area would be limited lateral spreading of fill embankments due to ground shaking

combined with presence of soft soils and/or loss of soil shear strength due to liquefaction.

4.2 Retaining Walls

Selection of earth retaining system types should be based on consideration of foundation bearing capacity, anticipated settlement and ability of the system to tolerate settlements, overall slope stability, constructability, and cost. Currently cast-in-place concrete walls, tieback walls, and Mechanically Stabilized Embankment (MSE) walls are anticipated. Only District Standard Plan retaining walls are addressed in this report. A preliminary list of anticipated cast-in-place retaining walls for freeway and local road widening is presented in Table 2.

4.2.1 Cast-in-Place Concrete Walls

Caltrans Standard Type 1 through Type 6 walls (as shown in Sheets B3-1 through B3-11 of the 2006 Caltrans Standard Plans) and similar concrete walls including barriers or soundwalls and Type 7 walls (as shown in the Bridge Standard Details "xs14" series sheets) are considered feasible for applications in the project area, but the bearing capacity will be limited when footings are in close proximity to the alluvial soils and groundwater table. As shown in Table 2, planned cast-in-place (CIP) wall heights are expected to range from 4 feet up to about 24 feet. CIP walls higher than about 10 ft design height with footing elevations in native alluvium (below about El. +30 feet) in many areas will not have adequate bearing capacity for spread footings and may need to be supported on piles, or consider other options such as MSE walls or walls with lightweight cellular concrete backfill.

In general, the bearing capacity of a cast-in-place concrete wall footing is controlled by the soils within about 1 footing width below the bottom of the footing. Original grade elevations and groundwater elevations are listed in Table 3. Soils below the original grades (about El. +30 feet) are alluvium; portions above the groundwater table (between about El. +30 and +23 feet) may be stiff near the surface, becoming soft near and below the groundwater table. Near surface alluvial soils in most areas are soft and in their current state have inadequate bearing capacity, especially for the higher walls, and especially when close to the groundwater table.

Properly compacted granular fills are likely to have adequate bearing capacity. The foundation bearing capacity and feasibility of each cast-in-place wall on spread footings will depend on wall height, footing elevation, local soil and groundwater conditions, total/differential settlements, and remedial grading below the foundation; this will need to be confirmed by site specific foundation investigation and

recommendations for each wall in the PS&E studies. For cost estimation purposes, the following are recommended for cast-in-place concrete walls:

Bottom of Footing Elevation (feet)	Design Wall Height (feet)	Foundation Type	Subgrade or Remedial Grading Requirement
< +26	CIP Wall Foundations with bottom of footing below El. +26 or very close to groundwater and soft soils should be avoided, if possible.		
+26-30	Up to 10	Spread Footing	Overexcavate 3 feet and Replace (OX&R) with Structural Backfill (SBF), may require subgrade stabilization at bottom of OX since near groundwater
	>10	50' Long Class 90 Piles	None
+30-35	Up to 14	Spread Footing	OX&R and/or new engineered fill to provide minimum 5 feet of SBF below footing, may require subgrade stabilization at bottom of OX since near groundwater
	>14	55' Long Class 90 Piles	None
+35-40	Up to 18	Spread Footing	OX&R and/or new engineered fill to provide minimum 6 feet of SBF below footing
	>18	50' Long Class 90 Piles	None
>+40	Up to 24	Spread Footing	Minimum 10 feet new embankment (SBF) or Minimum 10 feet of existing competent compacted embankment (assume minimum 2 feet OX & recompact in existing embankment)

Where liquefaction settlement or settlement from placing embankment is too large, pile supported retaining walls may not be appropriate. Lightweight cellular concrete backfill or more flexible Mechanically Stabilized Embankment (MSE) walls, which have lower applied bearing pressures and are more tolerant of settlement, may be more appropriate.

4.2.2 Lightweight Fills

Where foundation settlements are excessive, bearing capacity is inadequate, and ground improvements are not economical, consideration may be given to use of lightweight backfill behind retaining walls. This type of backfill may consist of lightweight aggregates or cellular concrete, and may be used behind cast-in-place facing (similar to cast-in-place walls).

4.3 Culverts

A number of box culverts cross the alignment and will need to be extended for the outboard widening of I-405. Separate SPGRs were prepared for extension of culverts at the Service Road Undercrossing just east of Santa Ana River, and at the Greeneville-Banning Channel located between Harbor Blvd and Santa Ana River. The East Garden Grove-Wintersburg Channel will not be extended, but will have bridges spanning the channel; these bridges were addressed in a separate SPGR. For Wintersburg Channel, on the downstream side, a pier wall (18' in length) will be added in the channel. On the upstream side the new pier wall will be inside the RCB headwall so no channel encroachment is required.

Additional culvert extensions not addressed in SPGRs include East Valley Channel, Ocean View Channel, and Heil Avenue Drain. Culverts in the project area are generally supported on concrete slabs. The following general guidelines can be used for the design of extension of the culverts:

- Field data indicate that the foundation soils at the base of the culverts are generally at or near the water table, and in general, consist of loose to medium dense granular soils and soft to stiff clay and silt;
- We recommend that to provide uniform support, the upper 2 ft of soils below the bottom of the slab be excavated and replaced with granular soils compacted to 95% relative compaction. These compacted soils will have adequate bearing capacity to support the culverts;
- In some areas, groundwater and/or unsuitable soils may be encountered at the excavation subgrade level. If groundwater and/or loose, soft, wet soils, or otherwise unstable subgrade is encountered at the bottom of the excavation, dewatering and/or overexcavation and replacement with biaxial geogrid (Tensar BX 1100 or equivalent) and 1 to 2 feet of crushed rock may be used to stabilize the base prior to backfilling;
- Culverts should be designed to support the weight of the overburden and traffic surcharge. The overburden pressure on the box culvert can be calculated by multiplying the unit weight of the soil cover by the thickness of this cover. For design purposes, a soil unit weight of 135 pcf may be used;
- Caltrans Standard Plans and Section 19 of Caltrans Standard Specifications should be followed in the preparation of foundation soils, bedding, and backfill for the placement of culvert;
- Corrosion characteristics of the site soils and abrasion characteristics of the flow should be considered in accordance with the Highway Design Manual;

- Settlements due to placement of the weight of culvert and backfill should be anticipated. The magnitude of the settlement will depend on the local soil conditions and the weight of the culvert and depth of overlying backfill; some differential settlement could occur between the new extension and the existing culvert;
- Due to presence of saturated clayey layers some long-term consolidation settlement may occur; the actual time required for settlement to take place will be determined based on actual embankment geometry, soil types and consolidation properties, layer thickness, and single versus double drainage conditions; and
- If determined necessary based on the final investigation, the effects of the settlement may be mitigated by: 1) preloading the culvert extension, waiting for the settlement to be completed, then excavating and constructing the culvert extension; 2) use of lightweight backfill on top of the box, or 3) supporting on piles.

4.4 Construction Considerations

4.4.1 Rippability

Existing alluvial soils and fills in the project area may be excavated with moderate effort using conventional heavy duty grading equipment. No soils or rock requiring blasting or heavy ripping are known to exist in the project area.

4.4.2 Excavation, Groundwater, Soft Soils, and Dewatering

Groundwater levels along the alignment may be estimated from Table 3, and are generally within 10 feet of the lowest site elevations. In general, soils close to the groundwater are soft materials. Excavations extending close to El. +20 feet in most areas of the alignment are likely to encounter soft soils and the permanent groundwater table. Deeper open excavations will require dewatering. Depending on locations, drilled piles (for sign foundations or soundwalls) may extend below the groundwater and will require appropriate construction methods.

4.4.3 Site Preparation

In general, earthwork should be performed in accordance with Sections 6 and 19 of the Caltrans Standard Specifications. The new construction will have to be carefully planned to protect the many existing utilities in the area.

All areas to receive fill should be stripped of existing pavements, cleared of any structures, all existing vegetation, debris, and other unsuitable materials in accordance with Section 16 of Caltrans Standard Specifications. All construction debris and/or deleterious material encountered during the clearing operations should be removed from the site. After clearing and stripping, the surface should be excavated to a minimum of 2 feet before placement of new fill. Overexcavation may be waived by the geotechnical engineer if competent soils are present at the foundation level. The exposed surface should be proof-rolled with loaded heavy equipment. Any areas of loose or yielding soils should be overexcavated and recompacted. If soft materials are encountered near the water table and further removals are impractical, the bottom may be stabilized using biaxial geogrid (such as Tensar BX1200) and 12 to 24 inches of crushed rock. Any soils which cannot be compacted or are otherwise unsuitable for the planned use should be removed and disposed of offsite. The exposed surface should then be scarified and compacted to the specified density before placement of new fill.

4.4.4 Subgrade and Foundation Treatment

All compaction testing should be performed in accordance with Caltrans Test Method 216. A minimum relative compaction of 95%must be obtained for the subgrade soils to a minimum depth of 6 inches below the grading plane for the width between the outer edges of shoulders, whether in fill or in excavation. In addition, for the width of the traveled way plus a distance of 3 feet horizontally beyond, the subgrade materials to a depth of 2.5 feet below the finished grade should also be compacted to at least 95% relative compaction, whether in embankment or excavation.

Where poor near surface soil conditions exist, some remedial grading (removal and recompaction) will be required below cast-in-place wall foundations if walls are to be supported on spread footings, or below MSE walls. For planning purposes, the remedial grading recommended in Section 4.3.1 and 4.3.2 should be assumed for the alluvial areas. Where overexcavation will extend to near the water table, limited dewatering and stabilization with geogrid and crushed rock may be required prior to backfilling the overexcavation.

All new embankment (including replacement of unsuitable soils) supporting retaining walls within a zone defined by 1:1.5 planes extending down and out from lines 1 foot outside the edge of footing should be placed at a relative compaction of not less than 95 percent (Caltrans Standard Specification 19-5.03 and Standard Special Provision SSP 19-600).

4.4.5 Structural Backfill Behind Walls

All backfill placed behind retaining walls should be granular structural backfill compacted to a minimum of 95% relative compaction in accordance with Section 19-3.06 of Caltrans Standard Specifications. An additional specification is that no material greater than 3 inches should be used as structural backfill. Operation of heavy compaction equipment adjacent to walls can cause excessive lateral soil pressures to develop on the wall. For this reason, it is recommended that all fill placed within 3 feet of the walls should be compacted with hand-operated equipment.

4.4.6 Temporary Excavation and Shoring

Temporary shoring may be required for footing or wall excavations or other purposes. During construction, the maintenance of safe and stable slope angles and shoring is the responsibility of the contractor, and should consider the actual subsurface conditions encountered and the contractor's method of operation. Existing improvements should be protected. Temporary excavations should be shored, or in lieu of shoring, sloped at 1:1 (H:V) or flatter. Caving and sloughing can be anticipated for steep excavations. All shoring should be performed following applicable OSHA guidelines and Caltrans Trenching and Shoring Manual.

4.5 New Fills

4.5.1 Slope Stability

Static and seismic stability of fill slopes should be evaluated. Fill slopes should generally be limited to 2h:1v inclination; paved slopes below abutments should be limited to a maximum 1.5h:1v inclination. Most slopes are anticipated to be globally stable under static conditions. Seismic slope instability may occur where liquefiable or soft soils underlie embankment slopes; most of the site has soft and/or potentially liquefiable soils below embankments. This should be evaluated quantitatively and mitigated as necessary in the final design.

4.5.2 Settlement

Magnitude and time rate of settlement will be an issue where embankments are placed, since most of the site contains significant thickness of near surface soft alluvial soils. Due to thick layers of soft clays in many areas, where substantial fills are placed significant settlement should be anticipated, and long term consolidation should be anticipated. The settlement magnitude of time rate will depend on the

amount of fill placed and the local soil conditions. This should be evaluated quantitatively and mitigated as necessary in the final design.

4.5.3 Recommendations for Imported Fills

Any imported borrow materials used for embankment should have an R-Value of at least 40 (top 4 feet from finished grade) and be non-corrosive, low expansion and free of other deleterious properties that adversely affect all concrete/steel structures. The imported borrow shall conform to Section 19-7.02 of Caltrans Standard Specifications (May 2006) and be tested prior to placement.

4.6 Approach Slabs

Approach slabs are required to minimize the effect of any long-term settlement in the approach area, including seismically-induced movements. The type of approach should be selected in accordance with Section 5.3 of Caltrans Memo to Designers. Approach slabs should be designed in accordance with Caltrans Highway Design Manual which includes provisions for drainage behind abutments.

4.7 Corrosion Potential

In the West County Connectors Project near SR-22 interchange, soils were determined to be corrosive due to high chlorides and sulfates. Corrosive conditions are likely to be present in the remainder of the alignment. Corrosion mitigation for steel and concrete structures should generally follow Caltrans Corrosion Guidelines (2003 or latest). The latest Caltrans Highway Design Manual (Section 855) provides corrosion requirements for roadway structures (culverts, signs, etc) for a 50-yr design life (Caltrans, 2010).

The project engineer shall request for a Materials Report in the early stage of PS&E. The report shall include the results of field tests and sampling for Corrosion (pH, Sulfate, Chloride, and Minimum Resistivity) for use in recommending culvert materials and concrete mix designs. Sampling and testing shall be performed in accordance with Caltrans Corrosion Guidelines (2003 or latest).

4.8 Scour Potential

Most or all of the channels crossing the alignment are paved or lined with rip rap. Any unlined channels should be evaluated for scour and the scour depth considered in the foundation design.

4.9 Additional Field Exploration and Laboratory Testing

During PS&E stage subsurface conditions for the geo-structures (i.e. embankment fill, slopes, cut sections, etc.), bridge structures, and structures addressed in the GDR (sign structures, sound walls, etc.), must be based on site specific explorations following the latest LRFD guidelines. The results of the PS&E geotechnical investigations will be presented in separate reports as follows:

- **Geotechnical Design Report (GDR)** for general project grading, cuts, fills, and standard earth retaining systems, sound walls, standard signs, and conventional culverts;
- **Preliminary Foundation Report (PFR)** for type selection of each bridge structure and special design wall;
- **Foundation Reports (FRs)** for each bridge structure and special design wall, signs, culverts, or other structures;
- **Materials Report (MR):** A Materials Report for the alignment is required for Corrosion, culvert material selection, and Structural Sections recommendations.

The roadway and pavement investigations should address the potential impacts of expansive soils on the roadway, and recommend appropriate remediation measures, as necessary.

Additional studies may include Aerially Deposited Lead (ADL) or other environmental investigations.

An adequate number of borings and CPTs should be performed and should be advanced to sufficient depth to meet Caltrans LRFD requirements as outlined in the latest versions of:

- AASHTO LRFD Bridge Design Specifications with Caltrans Amendments;
- Caltrans Bridge Design Specifications;
- Caltrans Guidelines for Structures Foundation Reports;
- Caltrans Foundation Report Preparation for Bridge Foundations;
- Caltrans Guidelines for Preparing Geotechnical Design Reports; and
- Caltrans Geotechnical Manual.

Specific requirements for minimum number of exploration points, location of exploration points, and depth of explorations should follow Section 10.4.2 and Table 10.4.2-1 of the LRFD guidelines.

5.0 LIMITATIONS

The report is based on our review of limited existing structural, geotechnical and seismic data for the site. Our recommendations and evaluations were performed using generally accepted engineering approaches and principles available at this time, and the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers practicing in this area. No other representation, either expressed or implied, is included in our report.

6.0 REFERENCES

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TABLES

TABLE 1
SUMMARY OF EXISTING BRIDGE LOCATIONS

Postmile	Bridge Number	OU[1]	Structure Name or Route Information	City[2]	Bridge Length (feet)	Bridge Width (feet)	Number of Spans	Year Built	Year Ext/Wid	Year EQ Retrofit
_010.28	55-0434G	O / U	N73-N405 CONNECTOR OC	CMS	520	53	4	1968	-	-
_010.29	-	-	JCT RTE 73	CMS	-	-	-	-	-	-
_010.35	55-0435F	O / U	S405-S73 CONNECTOR OC	CMS	348	53	4	1968	-	-
_010.79	55-0432	U	FAIRVIEW ROAD OC	CMS	291	125	4	1968	1989	-
_011.45	55-0257	O	HARBOR BLVD UC	CMS	204	223	4	1966	1988	-
_011.70	55-0476	O	GREENVILLE-BANNING CHANN	CMS	39	-	3	1966	-	-
_012.40	55-0259	O	SERVICE ROAD UC	CMS	21	-	1	1966	2001	-
_012.41	55-0258	O	SANTA ANA RIVER	CMS	440	204	6	1966	2001	-
_012.90	55-0477	O	EAST VALLEY CHANNEL	FNV	22	-	2	1966	-	-
_013.15	55-0429	U	WARD STREET OC	FNV	252	37	4	1966	-	1996
_013.41	55-0260	U	TALBERT AVENUE OC	FNV	421	61	4	1966	-	1995
_013.78	55-0402	U	BROOKHURST STREET OC	FNV	447	120	4	1966	-	1995
_014.13	55-0261	U	SLATER AVENUE OC	FNV	316	64	4	1966	-	-
_014.50	55-0262	U	BUSHARD STREET OC	FNV	302	61	4	1966	-	-
_014.82	55-0263	U	WARNER AVENUE OC	FNV	422	111	5	1966	1998	1995
_015.00	55-0478	O	OCEAN VIEW CHANNEL	FNV	41	-	2	1966	-	-
_015.21	55-0264	U	MAGNOLIA STREET OC	HNTB	430	61	4	1966	-	1995
_015.48	55-0407	U	HEIL AVENUE POC	HNTB	614	10	7	1966	-	-
_015.49	55-0479	O	HEIL AVENUE DRAIN	HNTB	23	-	3	1966	-	-
_015.87	55-0480	O	EAST GARDEN GROVE CHANNEL	WTM	34	-	3	1966	-	-
_015.90	55-0265	U	NEWLAND STREET OC	HNTB	280	37	4	1966	-	1995
_016.28	55-0266	U	EDINGER AVENUE OC	HNTB	422	61	4	1966	-	1995
_016.52	55-0267	O	ROUTE 405/39 SEPARATION	HNTB	268	234	4	1965	1989	-
_016.54	-	-	JCT RTE 39	HNTB	-	-	-	-	-	-
_016.98	55-0268	U	MCFADDEN AVENUE OC	HNTB	359	40	4	1965	-	1995
_017.21	55-0269	O	BOLSA OVERHEAD	WTM	183	155	3	1965	1989	1996
_017.75	55-0270	U	BOLSA AVENUE OC	WTM	427	82	4	1965	-	-
_017.80	55-0462	O	WESTMINSTER CHANNEL	WTM	25	-	2	1965	-	-
_017.94	55-0271	U	GOLDEN WEST STREET OC	WTM	414	82	4	1965	-	-
_018.36	55-0272	O	NAVY OVERHEAD	WTM	177	155	3	1965	1989	1996
_018.60	55-0273	U	EDWARDS STREET OC	WTM	299	72	4	1965	1988	-
_019.16	55-0274	U	WESTMINSTER AVENUE OC	WTM	403	108	4	1965	-	-
_019.38	55-0275	U	SPRINGDALE STREET OC	WTM	378	64	4	1965	-	-
_019.45	55-0461	O	ANAHEIM-BARBER CITY CHANNEL	WTM	42	-	4	1965	-	-
_020.56	55-0276	U	BOLSA CHICA ROAD OC	WTM	255	83	4	1965	-	-
_20.66	55-1103F[3]	O / U	405-22 HOV CONNECTOR SEPARATION	WTM	1,110	59	5	2010-?		
_020.74	-	-	JCT RTE 22 EB	GGR	-	-	-	-	-	-
_020.75	55-0331F	O / U	S405-E22 CONNECTOR OC	SLB	586	52	4	1965	-	-
_20.75	55-1101F[3, 4]	O / U	S405-E22 CONNECTOR SEPARATION	SLB	759	59	3	2010-?		
_020.77	55-0334	O	BOLSA CHICA DITCH	SLB	38	-	3	1959	1965	-
_022.64	55-0365	U	SEAL BEACH BLVD OC	SLB	450	75	4	1965	1972	-
_023.27	-	-	JCT RTE 22 WB	SLB	-	-	-	-	-	-
_023.28	55-0333G	O / U	N405-W22 CONNECTOR OC	SLB	461	40	4	1965	-	-
_023.98	55-0412G	U	E22-N405/405 CONNECTOR SEPARATION	SLB	357	26	4	1966	-	-
_024.02	55-0412R	U	605/405 SEPARATION	SLB	436	41	4	1966	-	-
_024.04	55-0412L	U	605/405 SEPARATION	SLB	317	72	4	1966	-	-
_024.05	-	-	JCT RTE 605	SLB	-	-	-	-	-	-

NOTES:

1. OU: O=Freeway is "on" the structure, U=Freeway crosses "under" the structure
2. Cities: CMS=Costa Mesa, FNV=Fountain Valley, HNTB=Huntington Beach, WTM=Westminster, GGR=Garden Grove, SLB=Seal Beach
3. New structure being constructed as part of SR-22 improvements
4. Replaces Bridge No. 55-0331F.

TABLE 2
SUMMARY OF PROPOSED RETAINING WALLS

Location	Alignment Section	Purpose	Approx. Station	Side	Prelim. Wall Type	Height (feet)	
						from	to
I-405 Mainline	Euclid to Ward	outside lane widen	674+81 to 693+99	SB, Left	Type 5	4	6
	Ward to Talbert	outside lane widen	694+89 to 703+33	SB, Left	Type 5	4	6
	Talbert to Magnolia	<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< NO WALLS >>>>>>>>>>>>>>>>>>>>>>>>>>					
	Magnolia to Newland	outside lane widen	815+47 to 838+19	SB, Left	Type 5	4	4
	Newland to Edinger	outside lane widen	840+73 to 852+12	SB, Left	Type 5	4	4
	Edinger to Beach	<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< NO WALLS >>>>>>>>>>>>>>>>>>>>>>>>>>					
	Beach to McFadden	outside lane widen	891+19 to 897+71	SB, Left	Type 5	4	4
	McFadden to Bolsa Ave	outside lane widen, widen approach fills to Bolsa OH	897+37 to 910+50	NB, Right	Type 5 (or similar)	4	18
			911+50 to 923+58		Type 5 (or similar)	4	18
			900+49 to 908+19	SB, Left	Type 5	8	12
			909+68 to 919+32		Type 5 (or similar)	14	18
	Goldenwest to Edwards	outside lane widen, widen approach fills to Navy OH	952+40 to 963+50	NB, Right	Type 5	4	8
			963+50 to 969+00		Type 1	10	14
			970+50 to 975+00		Type 1	10	12
			975+00 to 981+54		Type 5	4	8
			965+55 to 969+00	SB, Left	Type 1	16	16
			972+82 to 974+18		Type 1	12	12
			976+77 to 980+62		Type 5	6	8
	Edwards to Westminster Ave	outside lane widen	989+74 to 993+67	SB, Left	Type 5	4	4
	Westminster Ave to Bolsa Chica	<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< NO WALLS >>>>>>>>>>>>>>>>>>>>>>>>>>					

TABLE 2
SUMMARY OF PROPOSED RETAINING WALLS

Location	Alignment Section	Purpose	Approx. Station	Side	Prelim. Wall Type	Height (feet)	
						from	to
Local Streets	Ward St	widen road and approach fill	15+50 to 20+07	NB, Right	Type 1	4	16
			19+30 to 20+47	SB, Left	Type 1	4	8
			24+47 to 25+50		Type 1	4	6
	Talbert Ave	widen road and approach fill	17+80 to 21+71	SB, Left	Type 1	4	14
			27+88 to 35+30		Type 1	6	10
	Brookhurst St	widen road and approach fill	14+00 to 16+50	NB, Right	Type 5	4	8
			31+30 to 33+50		Type 5	4	8
			33+30 to 33+70	SB, Left	Type 5	4	4
	Slater Ave	widen road and approach fill	20+70 to 22+56	NB, Left	Type 1	4	14
			27+40 to 31+60		Type 1	4	24
	Bushard St	widen road and approach fill	21+20 to 22+09	SB, Left	Type 1	4	4
			27+01 to 33+00		Type 1	4	6
			32+10 To 33+00		Type 5	4	4
	Warner Ave	widen road and approach fill	115+74 to 118+90	SB, Right	Type 1	4	16
	Magnolia St	widen road and approach fill	103+21 to 111+31	NB, Right	Type 1	4	4
			117+45 to 117+95		Type 1	4	12
			124+30 To 125+61		Type 1	4	4
			103+21 To 103+60	SB, Left	Type 1	4	4
	Newland St	widen road and approach fill	480+80 to 484+23	SB, Left	Type 1	4	20
			488+90 to 492+30		Type 1	4	16
	Edinger Ave	widen road and approach fill	182+70 to 186+03	NB, Left	Type 1	4	6
			191+57 to 192+50		Type 1	4	4
	McFadden Ave	widen road and approach fill	484+00 to 485+34	SB, Right	Type 5	4	4
			486+46 to 488+70		Type 5	4	4
			494+98 to 499+60		Type 1	4	10
			485+45 to 488+47	NB, Left	Type 1	4	14
			493+52 to 497+30		Type 1	4	18
	Bolsa Ave	widen road and approach fill	88+10 to 89+71	SB, Left	Type 1	4	14
	Goldenwest St	widen road and approach fill	102+10 to 102+80	NB, Right	Type 1	4	4
			113+50 To 115+50		Type 5	4	4
			100+85 to 102+80	SB, Left	Type 1	4	10
			111+30 to 113+39		Type 1	4	12
	Edwards St	widen road and approach fill	501+60 to 504+06	NB, Right	Type 1	6	12
			508+51 to 511+00		Type 1	4	16
	Westminster Ave	widen road and approach fill	95+25 to 97+10	SB, Right	Type 1	6	6
			98+50 to 99+35		Type 5	4	4
			85+60 to 88+08	NB, Left	Type 1	4	12
	Springdale St	widen road and approach fill	503+10 to 505+25	NB, Right	Type 1	4	18
			510+20 to 513+60		Type 1	4	22
			511+77 to 512+80	SB, Left	Type 1	4	6
	Bolsa Chica Rd	widen road and approach fill	26+60 to 34+82	NB, Right	Type 1	4	20

TABLE 3
SUMMARY OF GROUNDWATER DATA

Structure Name	Approximate Original Site Grades (USGS 7.5' Quads)	Approximate Existing Ground Elevation (ft)		Mapped Highest Historical Groundwater		Highest Groundwater Encountered in Borings				Recommended High Groundwater for Preliminary Design		
		At Freeway	At Crossing Roadway/ Creek	Depth (ft) assume with respect to Original Site Grades	Elev. (ft) with respect to Original Site Grades	Elevation (ft)	Depth Below Freeway (ft)	Depth Below Crossing Roadway/Creek (ft)	Exploration Reference and Year	Elevation (feet)	Depth (feet)	Depth referenced to current grade at:
Soundwall No. 103	33	32	N/A	12	21	17	15	N/A	CT 1987	21	11	Freeway
Bristol Street OC	33	32	N/A	12	21	17	15	N/A	CT 1993	21	11	Freeway
Retaining Wall RW5011	33	32	N/A	12	21	19	13	N/A	CT 1999	21	11	Freeway
RW / SW No. 4980	33	32	N/A	12	21	18	14	N/A	CT 1998	21	11	Freeway
Soundwall No. 131	32	32	N/A	12	20	16	16	N/A	CT1986	20	12	Freeway
Soundwall No. 151	32	32	N/A	12	20	17	15	N/A	CT1986	20	12	Freeway
Retaining Wall RW5050	32	32	N/A	12	20	16	16	N/A	CT 1998	20	12	Freeway
73/405 Connector OC	30	31	55	12	18	18	13	37	CT 1965	18	13	Freeway
MSE Walls 108, 109	30	31	N/A	12	18	15	16	N/A	CT 1993	18	13	Freeway
Fairview Rd OC	30	34	58	18	12	18	16	40	CT 1964	18	16	Freeway
Soundwall No. 251	30	34	N/A	18	12	22	12	N/A	CT 1986	22	12	Freeway
Retaining Wall RW6150	30	34	N/A	18	12	15	19	N/A	CT 1998	15	19	Freeway
Retaining Wall RW5650	30	34	N/A	18	12	16	18	N/A	CT 1998	16	18	Freeway
Retaining Wall RW5770	30	34	N/A	18	12	15	19	N/A	CT 1998	15	19	Freeway
Retaining Wall RW5790	30	34	N/A	18	12	14	20	N/A	CT 1998	14	20	Freeway
Retaining Wall RW6310	30	34	N/A	18	12	12	22	N/A	CT 1998	12	22	Freeway
Retaining Wall RW6345	30	34	N/A	18	12	14	20	N/A	CT 1998	14	20	Freeway
Harbor Blvd UC	30	58	28	25	5	13	45	15	EMI 1998	13	15	Harbor Blvd
Harbor Blvd UC RW	30	58	N/A	25	5	3	55	N/A	CT 1995	5	53	Freeway
Retaining Wall RW6950	30	58	N/A	25	5	10	48	N/A	CT 1998	10	48	Freeway
Retaining Wall RW18	30	58	N/A	25	5	7	51	N/A	CT 1998	7	51	Freeway
Santa Ana River Bridge	27	51	22	5	22	25	26	-3	CT 1964	25	-3	SAR Channel
Ward St OC	23	30	49	5	18	15	15	34	CT 1992	18	12	Freeway
Talbert Ave OC	25	31	59	5	20	14	17	45	CT 1964	20	11	Freeway
Soundwall No. 319	25	31	N/A	5	20	16	15	N/A	CT 1986	20	11	Freeway
Soundwall No. 328	25	31	N/A	5	20	17	14	N/A	CT 1986	20	11	Freeway
Soundwall No. 374	26	32	N/A	5	21	19	13	N/A	CT 1986	21	11	Freeway
Brookhurst St OC	27	33	56	5	22	18	15	38	CT 1962	22	11	Freeway
Slater Ave OC	28	33	56	5	23	22	11	34	CT 1963	23	10	Freeway
Soundwall No. 375	28	33	N/A	5	23	21	12	N/A	CT 1986	23	10	Freeway
Bushard St OC	29	34	56	5	24	20	14	36	CT 1962	24	10	Freeway
Warner Ave OC	23	31	51	5	18	1	30	50	EMI 1996	18	13	Freeway
Magnolia St OC	28	36	56	5	23	17	19	39	CT 1963	23	13	Freeway
Heil Ave POC	28	36	-	5	23	18	18	N/A	CT 1962	23	13	Freeway
Newland St OC	25	31	52	5	20	18	13	34	CT 1992	20	11	Freeway
Edinger Ave OC	26	33	56	6	20	15	18	41	CT 1962	20	13	Freeway
Retaining Wall No. 74	26	33	N/A	6	20	15	18	N/A	CT 1962	20	13	Freeway
Beach Blvd. UC (SR-39)	27	52	30	6	21	15	37	15	CT 1959	21	9	Beach Blvd.
Mc Fadden Ave OC	26	33	56	5	21	8	25	48	CT 1959	21	12	Freeway
Bolsa OH	27	59	32	6	21	18	41	14	CT 1958	21	11	RR Tracks
Bolsa Ave OC	27	31	49	6	21	8	23	41	CT 1959	21	10	Freeway
Goldenwest St OC	28	32	52	7	21	21	11	31	CT 1959	21	11	Freeway
Navy OH	28	59	32	8	20	15	44	17	CT 1958	20	12	RR Tracks
Edward St OC	29	36	57	8	21	22	14	35	CT 1958	22	14	Freeway
Westminster Ave OC	29	33	52	9	20	20	13	32	CT 1959	20	13	Freeway
Springdale St OC	28	34	57	9	19	21	13	36	CT 1959	21	13	Freeway
Bolsa Chica Rd OC	23	30	52	15	8	16	14	36	GDC 2008	16	14	Freeway
Seal Beach Blvd. OC	12	16	31	19	-7	0	16	31	EMI 2008	0	16	Freeway
605/405 Separation OC	10	20	50	20	-10	-1	21	51	EMI 2008	-1	21	Freeway

NOTE: LOTB for walls where groundwater was not measured or reported were not included.

TABLE 4
SEISMIC SUMMARY

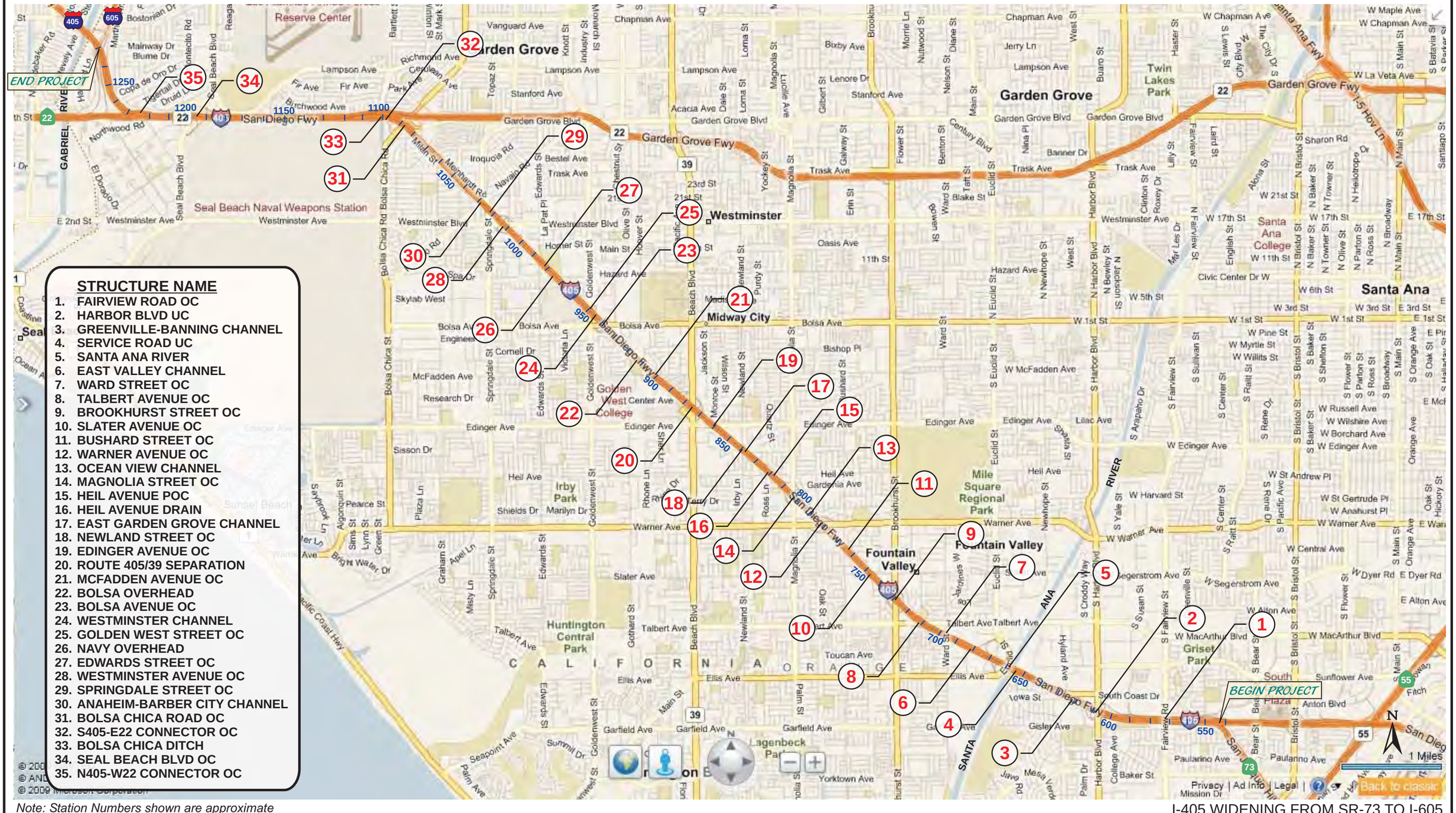
Bridge Location	Site Coordinates[1]		Distance, Rx (km)[2]			Peak Ground Acceleration PGA[3]	Fault(s) Controlling the PGA
	Latitude	Longitude	San Joaquin Hills [M=6.6] Blind Thrust	Newport Inglewood [M=7.5] Strike Slip	Compton-Los Alamitos [M=6.8] Blind Thrust		
73/405 Connector OC	33.6876	-117.8985	0.8	2.9	not controlling	0.60	San Joaquin Hills BT (Deterministic)
Fairview Rd OC	33.6879	-117.9078	0.9	2.5	not controlling	0.60	San Joaquin Hills BT (Deterministic)
Harbor Blvd UC	33.6892	-117.9194	0.9	2.1	not controlling	0.60	San Joaquin Hills BT (Deterministic)
Santa Ana River Bridge	33.6954	-117.9345	0.6	2.1	8.1	0.58	San Joaquin Hills BT (Deterministic)
Ward St OC	33.7000	-117.9456	0.9	2.2	8.1	0.54	San Joaquin Hills BT (Deterministic)
Talbert Ave OC	33.7017	-117.9494	1.0	2.2	8.1	0.53	San Joaquin Hills BT (Deterministic)
Brookhurst St OC	33.7054	-117.9543	1.1	2.5	7.2	0.52	San Joaquin Hills BT (Deterministic)
Slater Ave OC	33.7089	-117.9586	1.1	2.7	7.4	0.52	San Joaquin Hills BT (Deterministic)
Bushard St OC	33.7126	-117.9631	1.2	3.0	7.5	0.51	San Joaquin Hills BT / Compton Los Alamitos BT (Deterministic)
Warner Ave OC	33.7159	-117.9670	1.2	3.2	7.7	0.51	San Joaquin Hills BT / Compton Los Alamitos BT (Deterministic)
Magnolia St OC	33.7201	-117.9720	not controlling	3.6	7.9	0.51	Compton-Los Alamitos BT (Deterministic)
Heil Ave POC	33.7227	-117.9752	not controlling	3.7	8.0	0.51	Compton-Los Alamitos BT (Deterministic)
Newland St OC	33.7267	-117.9807	not controlling	4.0	8.1	0.51	Compton-Los Alamitos BT (Deterministic)

TABLE 4
SEISMIC SUMMARY

Bridge Location	Site Coordinates[1]		Distance, Rx (km)[2]			Peak Ground Acceleration PGA[3]	Fault(s) Controlling the PGA
	Latitude	Longitude	San Joaquin Hills [M=6.6] Blind Thrust	Newport Inglewood [M=7.5] Strike Slip	Compton-Los Alamitos [M=6.8] Blind Thrust		
Edinger Ave OC	33.7302	-117.9857	not controlling	4.2	8.2	0.51	Compton-Los Alamitos BT (Deterministic)
Beach Blvd. UC (SR-39)	33.7327	-117.9894	not controlling	4.3	8.3	0.51	Compton-Los Alamitos BT (Deterministic)
Mc Fadden Ave OC	33.7368	-117.9952	not controlling	4.5	8.4	0.52	Compton-Los Alamitos BT (Deterministic)
Bolsa OH	33.7392	-117.9983	not controlling	4.6	8.5	0.52	Compton-Los Alamitos BT (Deterministic)
Bolsa Ave OC	33.7446	-118.0047	not controlling	4.8	8.7	0.53	Compton-Los Alamitos BT (Deterministic)
Goldenwest St OC	33.7465	-118.0070	not controlling	4.8	8.8	0.53	Compton-Los Alamitos BT (Deterministic)
Navy OH	33.7510	-118.0124	not controlling	5.0	9.0	0.53	Compton-Los Alamitos BT (Deterministic)
Edward St OC	33.7533	-118.0151	not controlling	5.4	9.1	0.54	Compton-Los Alamitos BT (Deterministic)
Westminster Ave OC	33.7590	-118.0220	not controlling	5.5	9.3	0.54	Compton-Los Alamitos BT (Deterministic)
Springdale St OC	33.7613	-118.0246	not controlling	5.4	9.4	0.55	Compton-Los Alamitos BT (Deterministic)
Bolsa Chica Rd OC	33.7733	-118.0392	not controlling	5.3	9.9	0.56	Compton-Los Alamitos BT (Deterministic)
Seal Beach Blvd. OC	33.7744	-118.0750	not controlling	3.1	8.4	0.53	Compton-Los Alamitos BT (Deterministic)
605/405 Separation OC	33.7842	-118.0916	not controlling	2.9	8.6	0.52	Compton-Los Alamitos BT (Deterministic)

Notes: 1. Site Coordinates are from Google Earth.
2. Perpendicular distance from the site to the surface projection of top of fault, from ARS online
3. Assumes shear wave velocity in upper 100 feet (30 m) is V_{S30}=270 m/s

FIGURES



Note: Station Numbers shown are approximate
Ref. Base Map is from Microsoft's Bing Maps

I-405 WIDENING FROM SR-73 TO I-605
ORANGE COUNTY, CALIFORNIA
FIGURE 1
VICINITY MAP

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

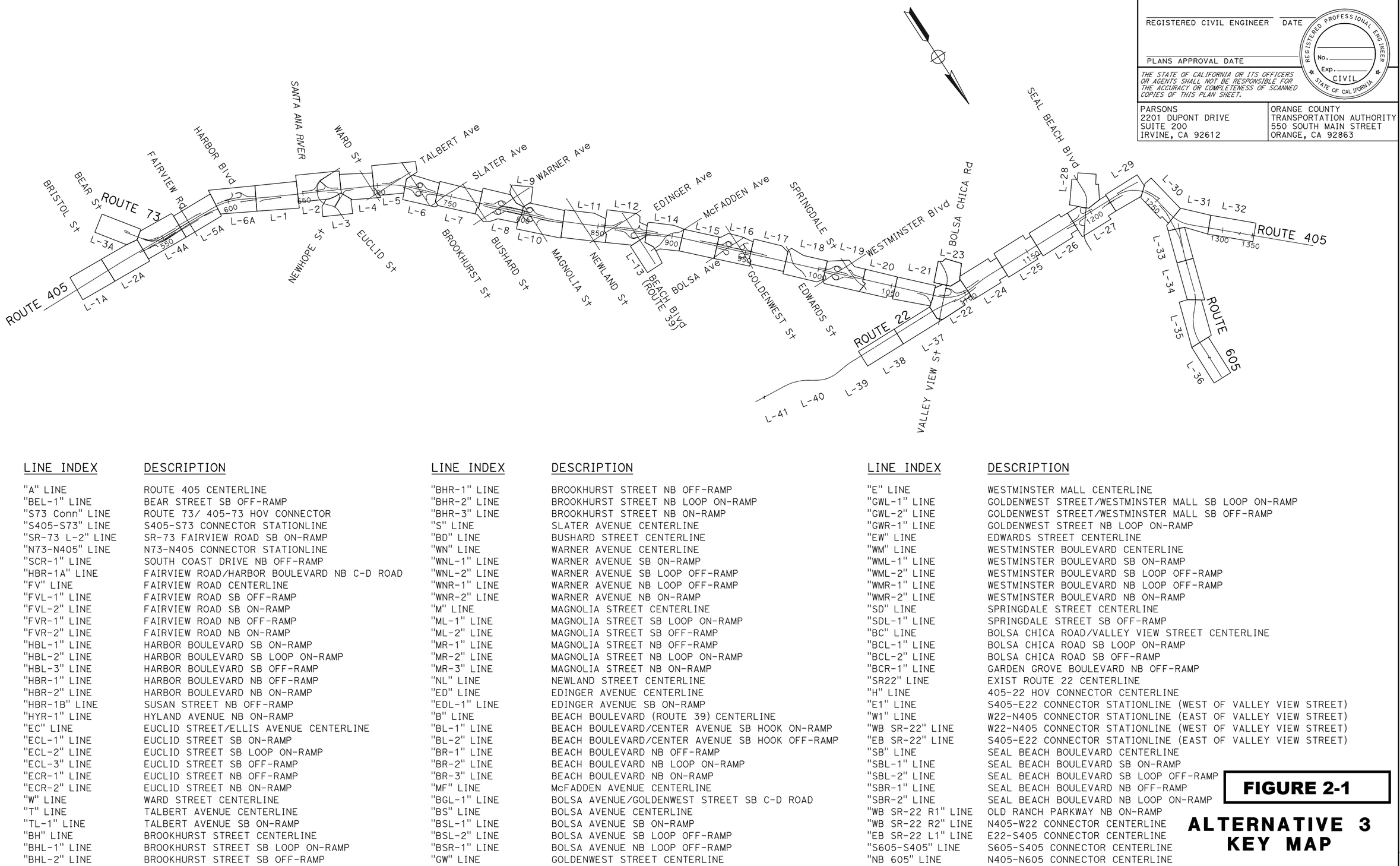
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



LINE INDEX / DESCRIPTION

LINE INDEX	DESCRIPTION
"A" LINE	ROUTE 405 CENTERLINE
"BEL-1" LINE	BEAR STREET SB OFF-RAMP
"S73 Conn" LINE	ROUTE 73/ 405-73 HOV CONNECTOR
"S405-S73" LINE	S405-S73 CONNECTOR STATIONLINE
"SR-73 L-2" LINE	SR-73 FAIRVIEW ROAD SB ON-RAMP
"N73-N405" LINE	N73-N405 CONNECTOR STATIONLINE
"SCR-1" LINE	SOUTH COAST DRIVE NB OFF-RAMP
"HBR-1A" LINE	FAIRVIEW ROAD/HARBOR BOULEVARD NB C-D ROAD
"FV" LINE	FAIRVIEW ROAD CENTERLINE
"FVL-1" LINE	FAIRVIEW ROAD SB OFF-RAMP
"FVL-2" LINE	FAIRVIEW ROAD SB ON-RAMP
"FVR-1" LINE	FAIRVIEW ROAD NB OFF-RAMP
"FVR-2" LINE	FAIRVIEW ROAD NB ON-RAMP
"HBL-1" LINE	HARBOR BOULEVARD SB ON-RAMP
"HBL-2" LINE	HARBOR BOULEVARD SB LOOP ON-RAMP
"HBL-3" LINE	HARBOR BOULEVARD SB OFF-RAMP
"HBR-1" LINE	HARBOR BOULEVARD NB OFF-RAMP
"HBR-2" LINE	HARBOR BOULEVARD NB ON-RAMP
"HBR-1B" LINE	SUSAN STREET NB OFF-RAMP
"HYR-1" LINE	HYLAND AVENUE NB ON-RAMP
"EC" LINE	EUCLID STREET/ELLIS AVENUE CENTERLINE
"ECL-1" LINE	EUCLID STREET SB ON-RAMP
"ECL-2" LINE	EUCLID STREET SB LOOP ON-RAMP
"ECL-3" LINE	EUCLID STREET SB OFF-RAMP
"ECR-1" LINE	EUCLID STREET NB OFF-RAMP
"ECR-2" LINE	EUCLID STREET NB ON-RAMP
"W" LINE	WARD STREET CENTERLINE
"T" LINE	TALBERT AVENUE CENTERLINE
"TL-1" LINE	TALBERT AVENUE SB ON-RAMP
"BH" LINE	BROOKHURST STREET CENTERLINE
"BHL-1" LINE	BROOKHURST STREET SB LOOP ON-RAMP
"BHL-2" LINE	BROOKHURST STREET SB OFF-RAMP
"BHR-1" LINE	BROOKHURST STREET NB OFF-RAMP
"BHR-2" LINE	BROOKHURST STREET NB LOOP ON-RAMP
"BHR-3" LINE	BROOKHURST STREET NB ON-RAMP
"S" LINE	SLATER AVENUE CENTERLINE
"BD" LINE	BUSHARD STREET CENTERLINE
"WN" LINE	WARNER AVENUE CENTERLINE
"WNL-1" LINE	WARNER AVENUE SB ON-RAMP
"WNL-2" LINE	WARNER AVENUE SB LOOP OFF-RAMP
"WNR-1" LINE	WARNER AVENUE NB LOOP OFF-RAMP
"WNR-2" LINE	WARNER AVENUE NB ON-RAMP
"M" LINE	MAGNOLIA STREET CENTERLINE
"ML-1" LINE	MAGNOLIA STREET SB LOOP ON-RAMP
"ML-2" LINE	MAGNOLIA STREET SB OFF-RAMP
"MR-1" LINE	MAGNOLIA STREET NB OFF-RAMP
"MR-2" LINE	MAGNOLIA STREET NB LOOP ON-RAMP
"MR-3" LINE	MAGNOLIA STREET NB ON-RAMP
"NL" LINE	NEWLAND STREET CENTERLINE
"ED" LINE	EDINGER AVENUE CENTERLINE
"EDL-1" LINE	EDINGER AVENUE SB ON-RAMP
"B" LINE	BEACH BOULEVARD (ROUTE 39) CENTERLINE
"BL-1" LINE	BEACH BOULEVARD/CENTER AVENUE SB HOOK ON-RAMP
"BL-2" LINE	BEACH BOULEVARD/CENTER AVENUE SB HOOK OFF-RAMP
"BR-1" LINE	BEACH BOULEVARD NB OFF-RAMP
"BR-2" LINE	BEACH BOULEVARD NB LOOP ON-RAMP
"BR-3" LINE	BEACH BOULEVARD NB ON-RAMP
"MF" LINE	McFADDEN AVENUE CENTERLINE
"BGL-1" LINE	BOLSA AVENUE/GOLDENWEST STREET SB C-D ROAD
"BS" LINE	BOLSA AVENUE CENTERLINE
"BSL-1" LINE	BOLSA AVENUE SB ON-RAMP
"BSL-2" LINE	BOLSA AVENUE SB LOOP OFF-RAMP
"BSR-1" LINE	BOLSA AVENUE NB LOOP OFF-RAMP
"GW" LINE	GOLDENWEST STREET CENTERLINE
"E" LINE	WESTMINSTER MALL CENTERLINE
"GWL-1" LINE	GOLDENWEST STREET/WESTMINSTER MALL SB LOOP ON-RAMP
"GWL-2" LINE	GOLDENWEST STREET/WESTMINSTER MALL SB OFF-RAMP
"GWR-1" LINE	GOLDENWEST STREET NB LOOP ON-RAMP
"EW" LINE	EDWARDS STREET CENTERLINE
"WM" LINE	WESTMINSTER BOULEVARD CENTERLINE
"WML-1" LINE	WESTMINSTER BOULEVARD SB ON-RAMP
"WML-2" LINE	WESTMINSTER BOULEVARD SB LOOP OFF-RAMP
"WMR-1" LINE	WESTMINSTER BOULEVARD NB LOOP OFF-RAMP
"WMR-2" LINE	WESTMINSTER BOULEVARD NB ON-RAMP
"SD" LINE	SPRINGDALE STREET CENTERLINE
"SDL-1" LINE	SPRINGDALE STREET SB OFF-RAMP
"BC" LINE	BOLSA CHICA ROAD/VALLEY VIEW STREET CENTERLINE
"BCL-1" LINE	BOLSA CHICA ROAD SB LOOP ON-RAMP
"BCL-2" LINE	BOLSA CHICA ROAD SB OFF-RAMP
"BCR-1" LINE	GARDEN GROVE BOULEVARD NB OFF-RAMP
"SR22" LINE	EXIST ROUTE 22 CENTERLINE
"H" LINE	405-22 HOV CONNECTOR CENTERLINE
"E1" LINE	S405-E22 CONNECTOR STATIONLINE (WEST OF VALLEY VIEW STREET)
"W1" LINE	W22-N405 CONNECTOR STATIONLINE (EAST OF VALLEY VIEW STREET)
"WB SR-22" LINE	W22-N405 CONNECTOR STATIONLINE (WEST OF VALLEY VIEW STREET)
"EB SR-22" LINE	S405-E22 CONNECTOR STATIONLINE (EAST OF VALLEY VIEW STREET)
"SB" LINE	SEAL BEACH BOULEVARD CENTERLINE
"SBL-1" LINE	SEAL BEACH BOULEVARD SB ON-RAMP
"SBL-2" LINE	SEAL BEACH BOULEVARD SB LOOP OFF-RAMP
"SBR-1" LINE	SEAL BEACH BOULEVARD NB OFF-RAMP
"SBR-2" LINE	SEAL BEACH BOULEVARD NB LOOP ON-RAMP
"WB SR-22 R1" LINE	OLD RANCH PARKWAY NB ON-RAMP
"WB SR-22 R2" LINE	N405-W22 CONNECTOR CENTERLINE
"EB SR-22 L1" LINE	E22-S405 CONNECTOR CENTERLINE
"S605-S405" LINE	S605-S405 CONNECTOR CENTERLINE
"NB 605" LINE	N405-N605 CONNECTOR CENTERLINE
"I605" LINE	ROUTE 605 CENTERLINE

FIGURE 2-1

ALTERNATIVE 3 KEY MAP

NO SCALE

K-1

REVISED BY | DATE REVISED | CALCULATED-DESIGNED BY | CHECKED BY | CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION | DATE PLOTTED => 9/15/2011
00-00-00 | TIME PLOTTED => 3:22:08 PM

BORDER LAST REVISED 7/2/2010 | USERNAME => p0027660 DGN FILE => ALT_3_ Key_Map.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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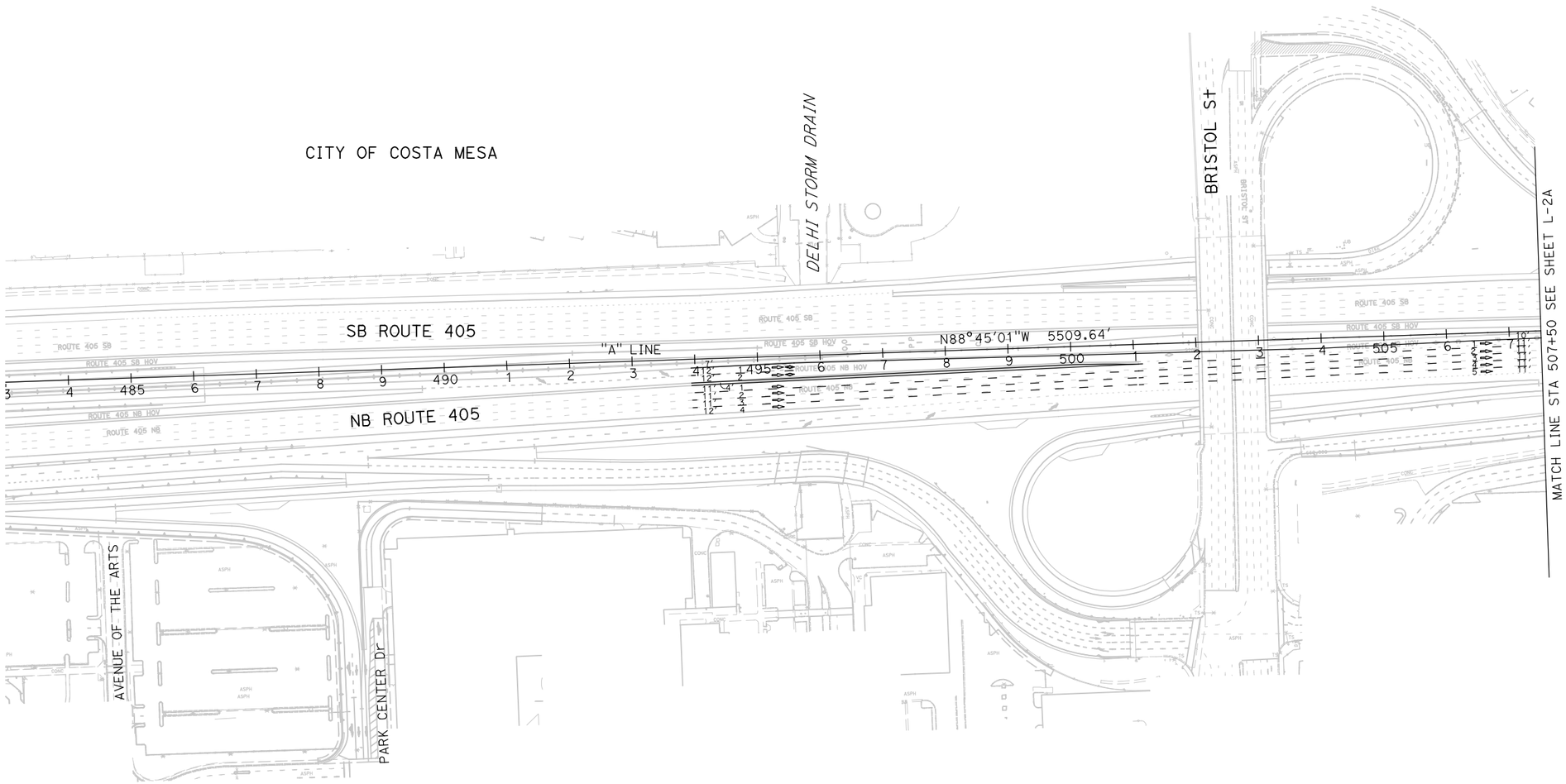

FIGURE 2-2

ALTERNATIVE 3 LAYOUT

SCALE 1"=100' **L-1A**

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12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
(7)	22500.00′	1°19′54"	261.48′	522.94′

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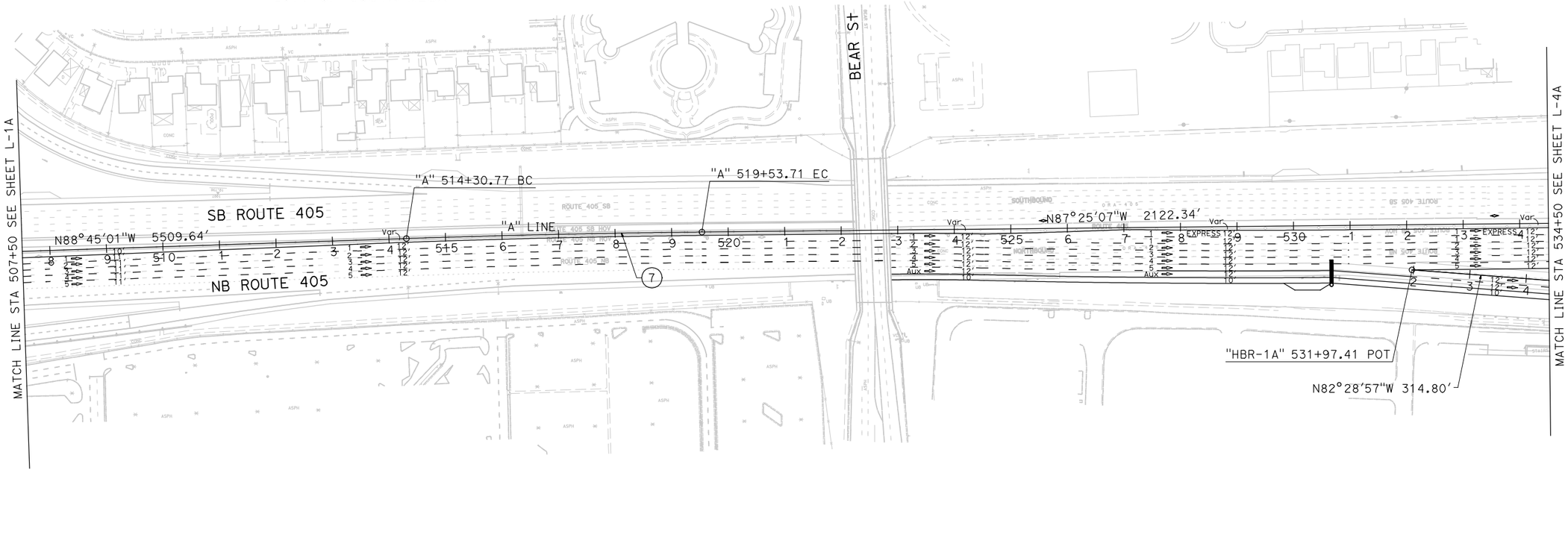

FIGURE 2-3

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-2A**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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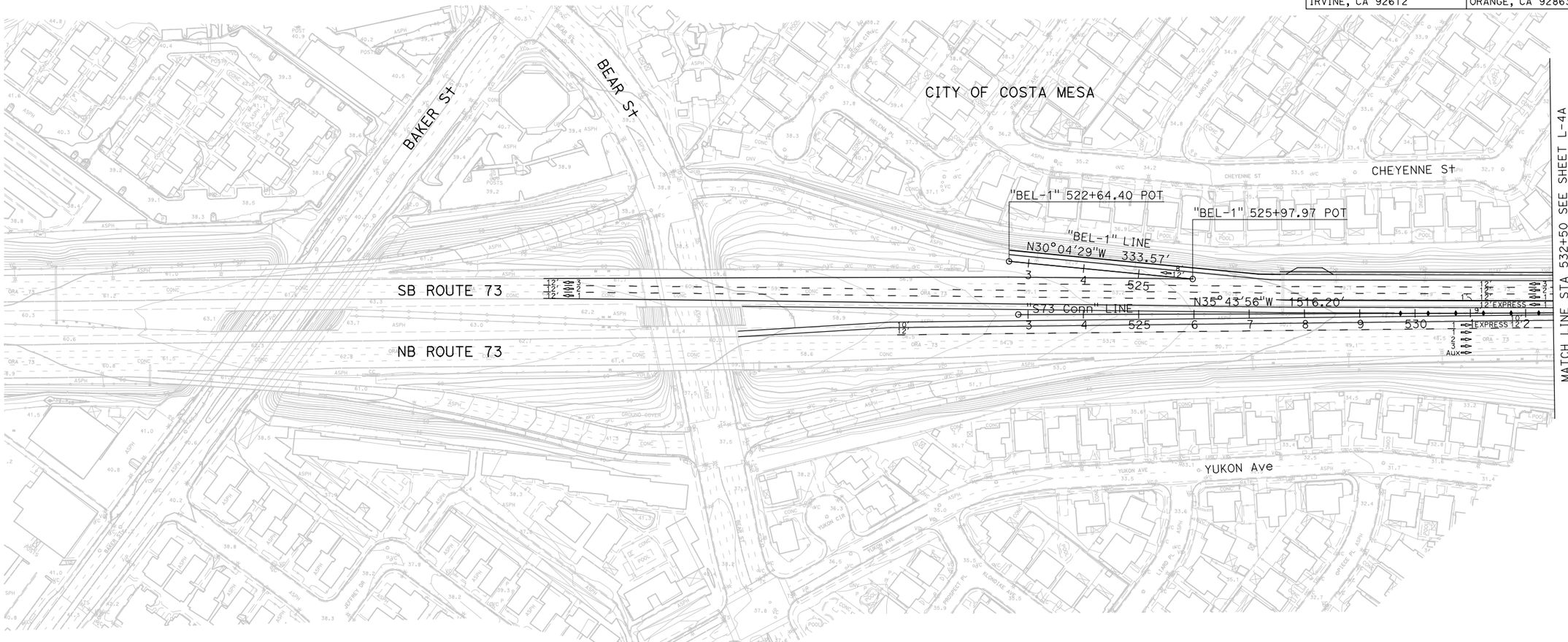

FIGURE 2-4

ALTERNATIVE 3 LAYOUT

SCALE 1"=100' **L-3A**

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12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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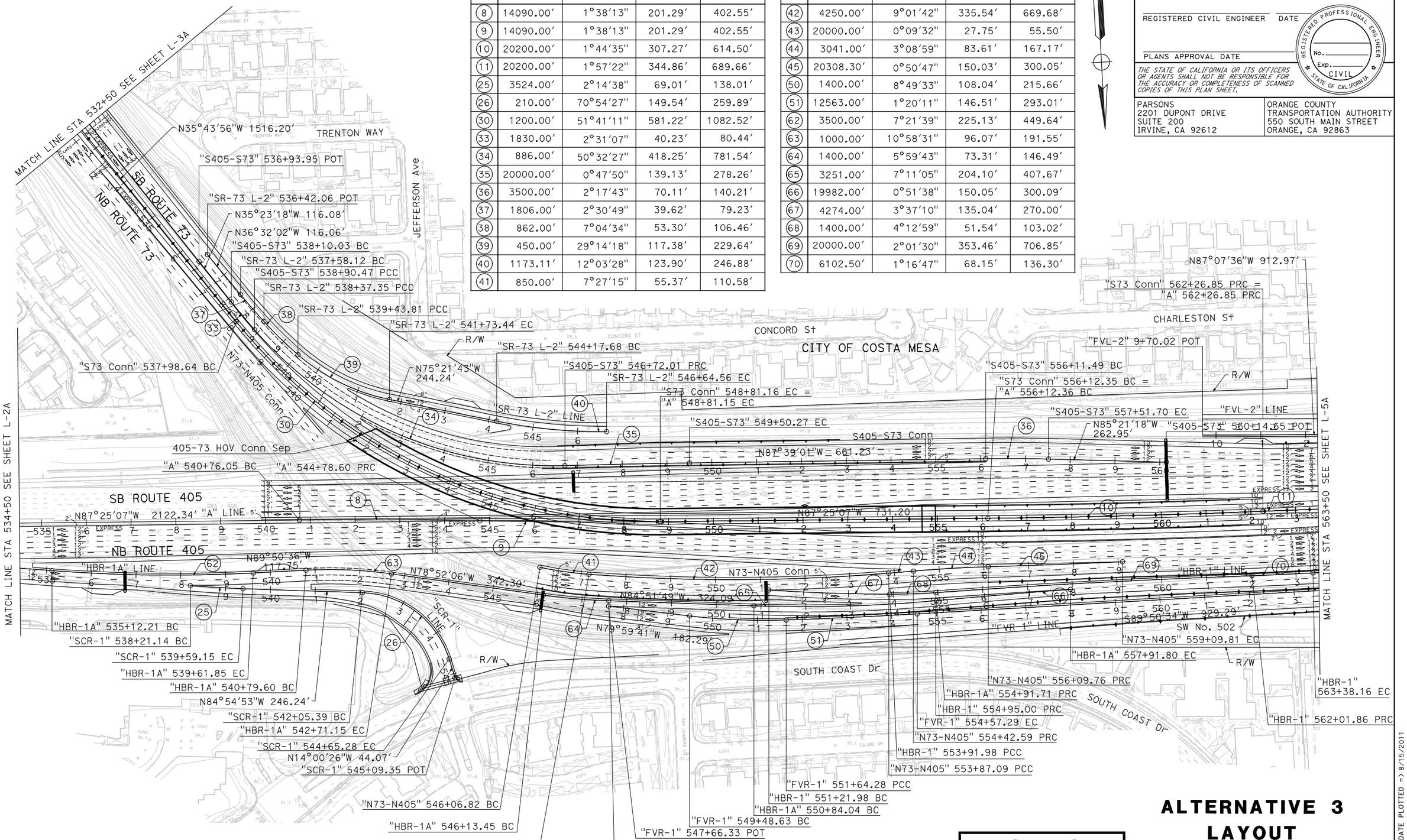
CURVE DATA

No.	R	Δ	T	L
8	14090.00′	1°38′13"	201.29′	402.55′
9	14090.00′	1°38′13"	201.29′	402.55′
10	20200.00′	1°44′35"	307.27′	614.50′
11	20200.00′	1°57′22"	344.86′	689.66′
25	3524.00′	2°14′38"	69.01′	138.01′
26	210.00′	70°54′27"	149.54′	259.89′
30	1200.00′	51°41′11"	581.22′	1082.52′
33	1830.00′	2°31′07"	40.23′	80.44′
34	886.00′	50°32′27"	418.25′	781.54′
35	20000.00′	0°47′50"	139.13′	278.26′
36	3500.00′	2°17′43"	70.11′	140.21′
37	1806.00′	2°30′49"	39.62′	79.23′
38	862.00′	7°04′34"	53.30′	106.46′
39	450.00′	29°14′18"	117.38′	229.64′
40	1173.11′	12°03′28"	123.90′	246.88′
41	850.00′	7°27′15"	55.37′	110.58′

No.	R	Δ	T	L
42	4250.00′	9°01′42"	335.54′	669.68′
43	20000.00′	0°09′32"	27.75′	55.50′
44	3041.00′	3°08′59"	83.61′	167.17′
45	20308.30′	0°50′47"	150.03′	300.05′
50	1400.00′	8°49′33"	108.04′	215.66′
51	12563.00′	1°20′11"	146.51′	293.01′
62	3500.00′	7°21′39"	225.13′	449.64′
63	1000.00′	10°58′31"	96.07′	191.55′
64	1400.00′	5°59′43"	73.31′	146.49′
65	3251.00′	7°11′05"	204.10′	407.67′
66	19982.00′	0°51′38"	150.05′	300.09′
67	4274.00′	3°37′10"	135.04′	270.00′
68	1400.00′	4°12′59"	51.54′	103.02′
69	20000.00′	2°01′30"	353.46′	706.85′
70	6102.50′	1°16′47"	68.15′	136.30′



ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-4A**

FIGURE 2-5

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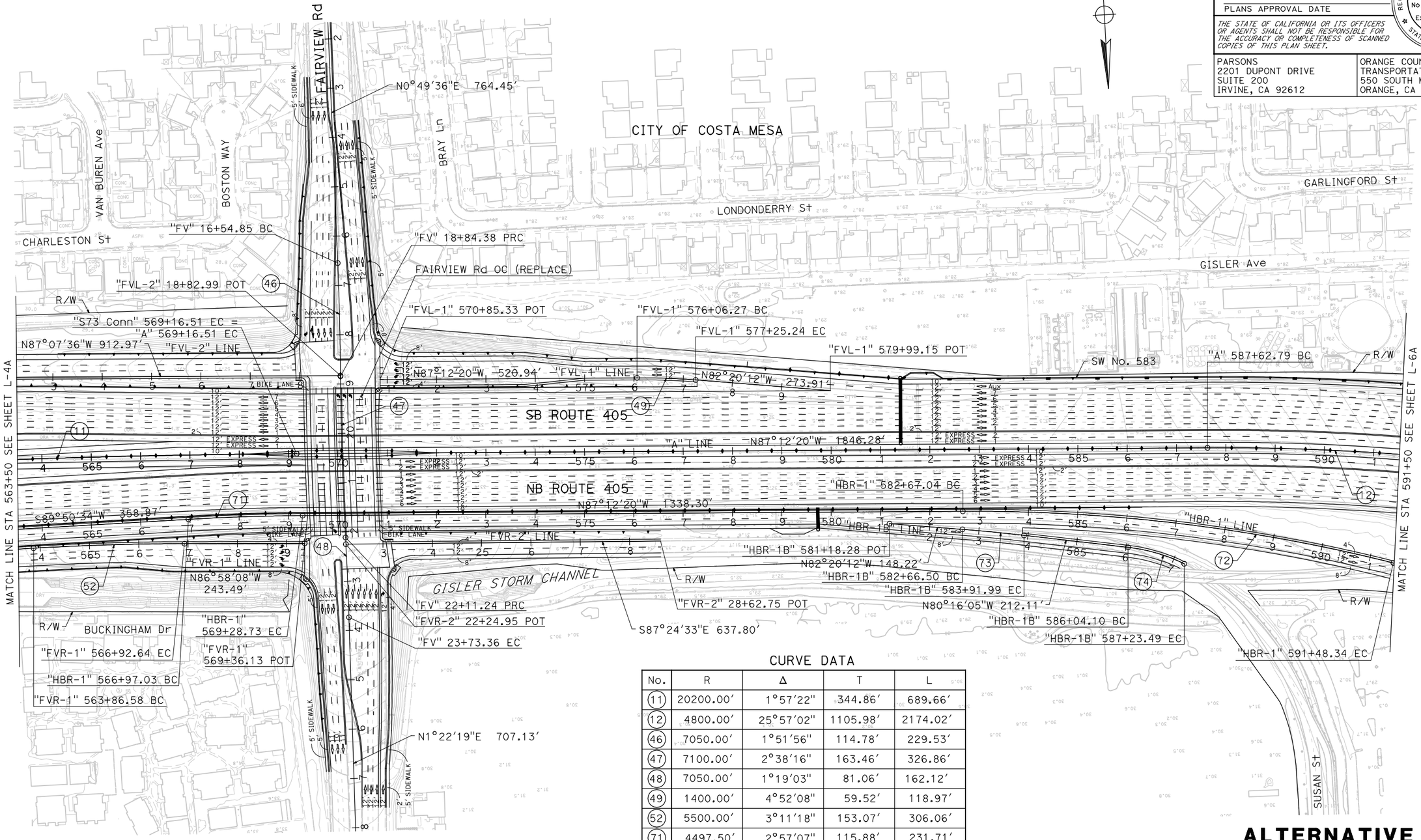

CURVE DATA

No.	R	Δ	T	L
(11)	20200.00′	1°57′22"	344.86′	689.66′
(12)	4800.00′	25°57′02"	1105.98′	2174.02′
(46)	7050.00′	1°51′56"	114.78′	229.53′
(47)	7100.00′	2°38′16"	163.46′	326.86′
(48)	7050.00′	1°19′03"	81.06′	162.12′
(49)	1400.00′	4°52′08"	59.52′	118.97′
(52)	5500.00′	3°11′18"	153.07′	306.06′
(71)	4497.50′	2°57′07"	115.88′	231.71′
(72)	3500.00′	14°25′38"	442.99′	881.30′
(73)	3476.00′	2°04′06"	62.75′	125.49′
(74)	350.00′	19°32′44"	60.28′	119.40′

FIGURE 2-6

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-5A**

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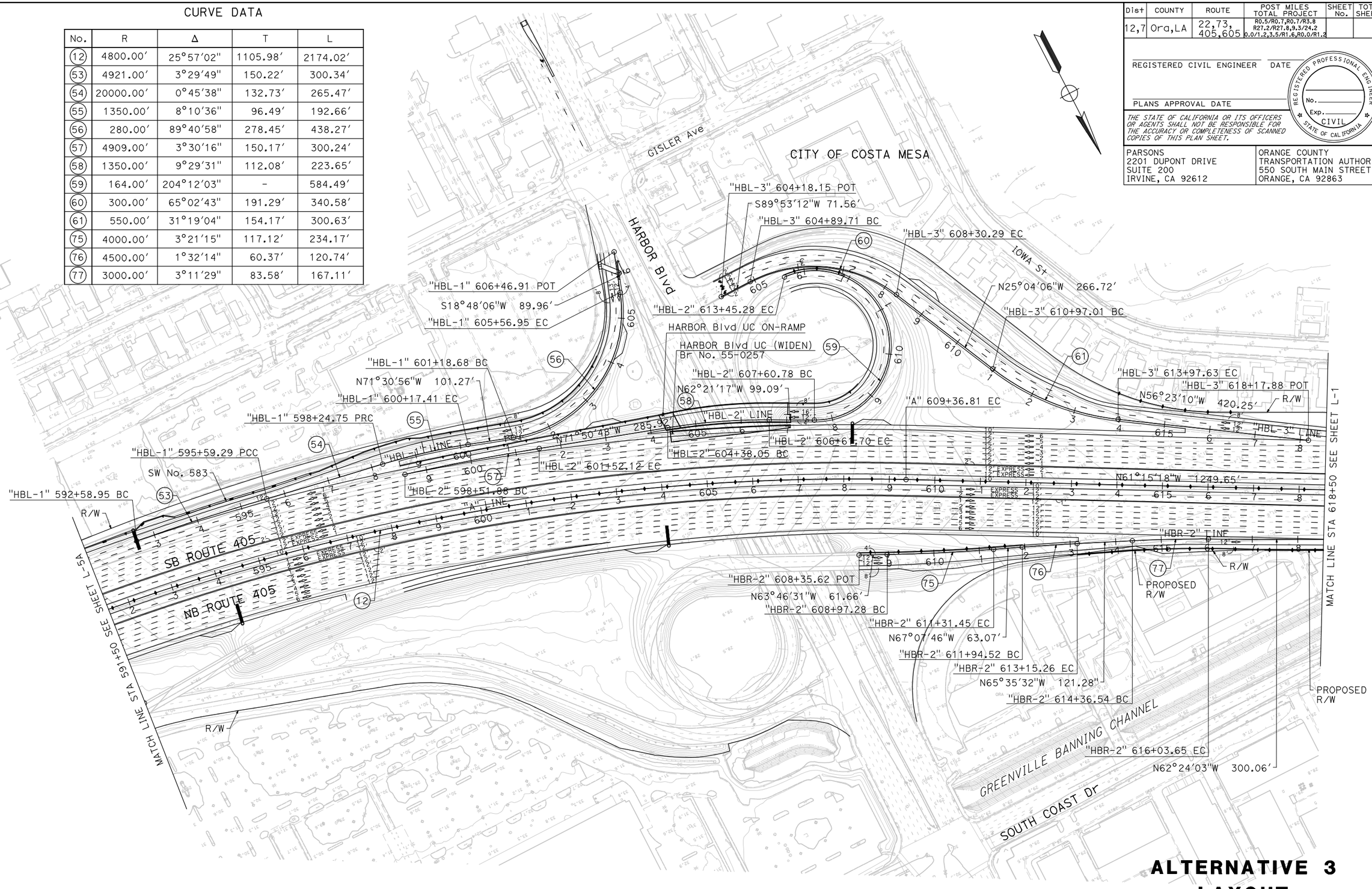
CURVE DATA

No.	R	Δ	T	L
(12)	4800.00′	25°57′02"	1105.98′	2174.02′
(53)	4921.00′	3°29′49"	150.22′	300.34′
(54)	20000.00′	0°45′38"	132.73′	265.47′
(55)	1350.00′	8°10′36"	96.49′	192.66′
(56)	280.00′	89°40′58"	278.45′	438.27′
(57)	4909.00′	3°30′16"	150.17′	300.24′
(58)	1350.00′	9°29′31"	112.08′	223.65′
(59)	164.00′	204°12′03"	-	584.49′
(60)	300.00′	65°02′43"	191.29′	340.58′
(61)	550.00′	31°19′04"	154.17′	300.63′
(75)	4000.00′	3°21′15"	117.12′	234.17′
(76)	4500.00′	1°32′14"	60.37′	120.74′
(77)	3000.00′	3°11′29"	83.58′	167.11′



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12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 R0.0/1.2,3.5/R1.6,R0.0/R1.2		

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ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-6A**

FIGURE 2-7

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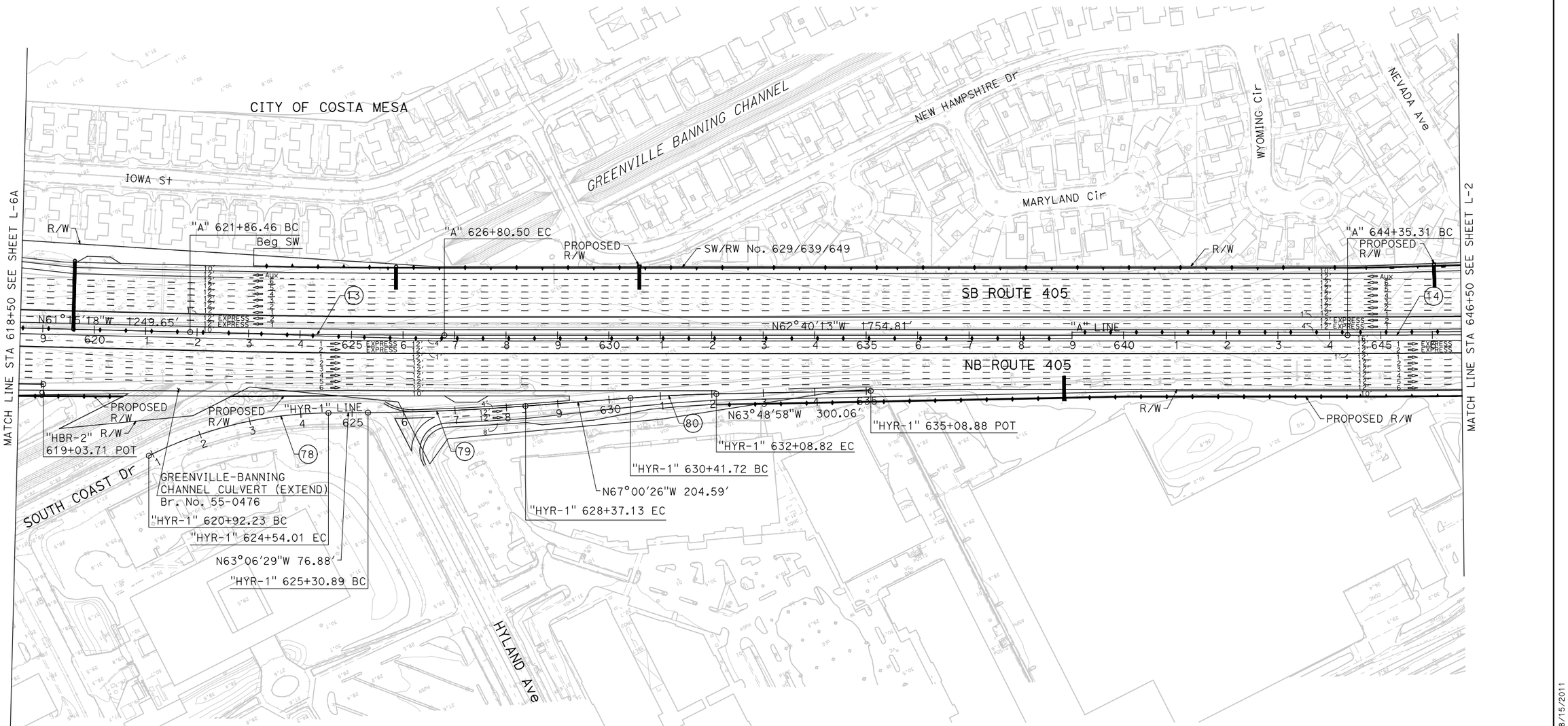
CURVE DATA

No.	R	Δ	T	L
(13)	20000.00′	1°24′55"	247.03′	494.04′
(14)	20000.00′	0°45′13"	131.52′	263.04′
(78)	800.00′	25°54′40"	184.04′	361.79′
(79)	4500.00′	3°53′57"	153.18′	306.24′
(80)	3000.00′	3°11′29"	83.57′	167.10′



ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-1**

FIGURE 2-8

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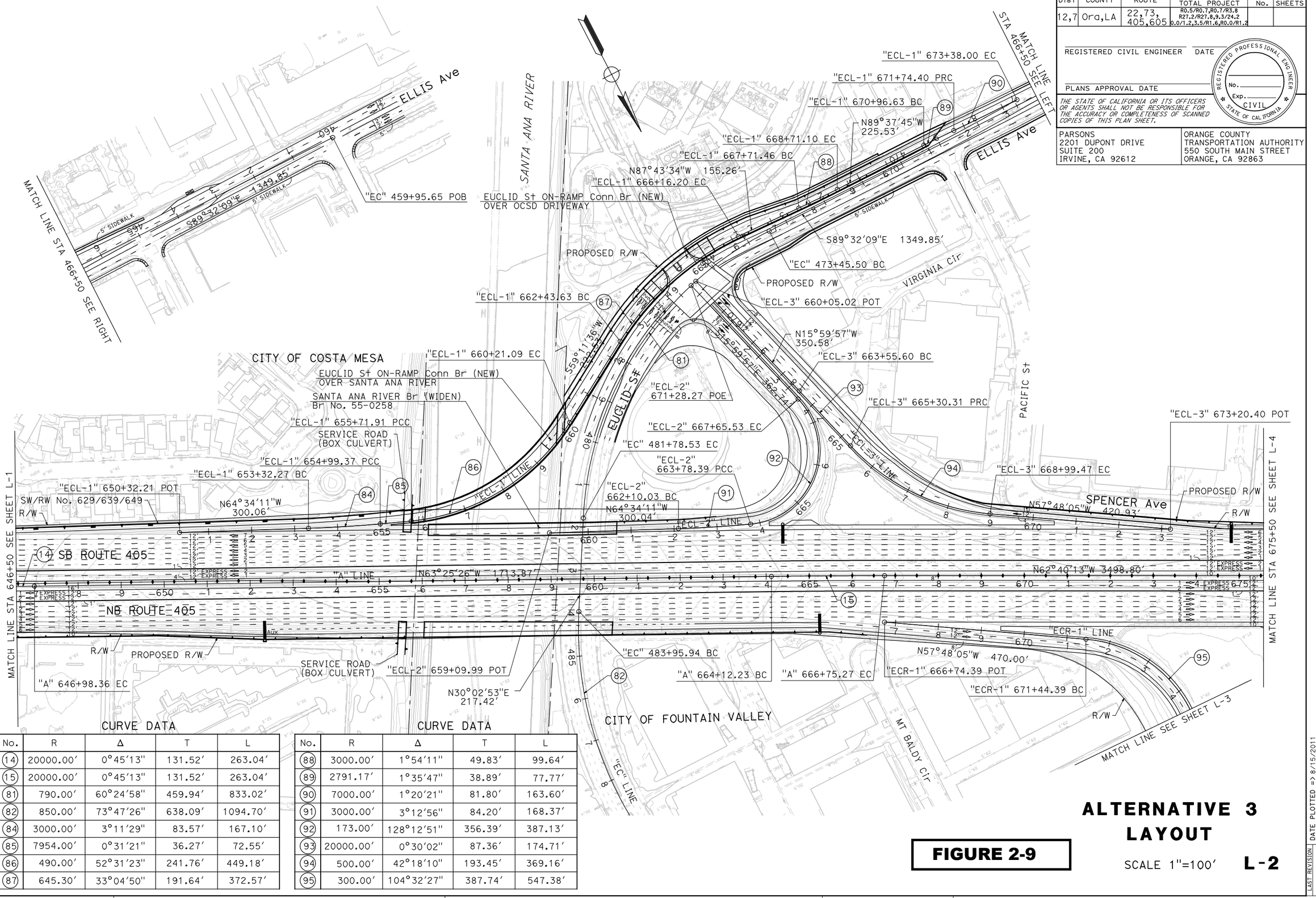

CURVE DATA

No.	R	Δ	T	L
14	20000.00′	0°45′13"	131.52′	263.04′
15	20000.00′	0°45′13"	131.52′	263.04′
81	790.00′	60°24′58"	459.94′	833.02′
82	850.00′	73°47′26"	638.09′	1094.70′
84	3000.00′	3°11′29"	83.57′	167.10′
85	7954.00′	0°31′21"	36.27′	72.55′
86	490.00′	52°31′23"	241.76′	449.18′
87	645.30′	33°04′50"	191.64′	372.57′

CURVE DATA

No.	R	Δ	T	L
88	3000.00′	1°54′11"	49.83′	99.64′
89	2791.17′	1°35′47"	38.89′	77.77′
90	7000.00′	1°20′21"	81.80′	163.60′
91	3000.00′	3°12′56"	84.20′	168.37′
92	173.00′	128°12′51"	356.39′	387.13′
93	20000.00′	0°30′02"	87.36′	174.71′
94	500.00′	42°18′10"	193.45′	369.16′
95	300.00′	104°32′27"	387.74′	547.38′

FIGURE 2-9

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-2**

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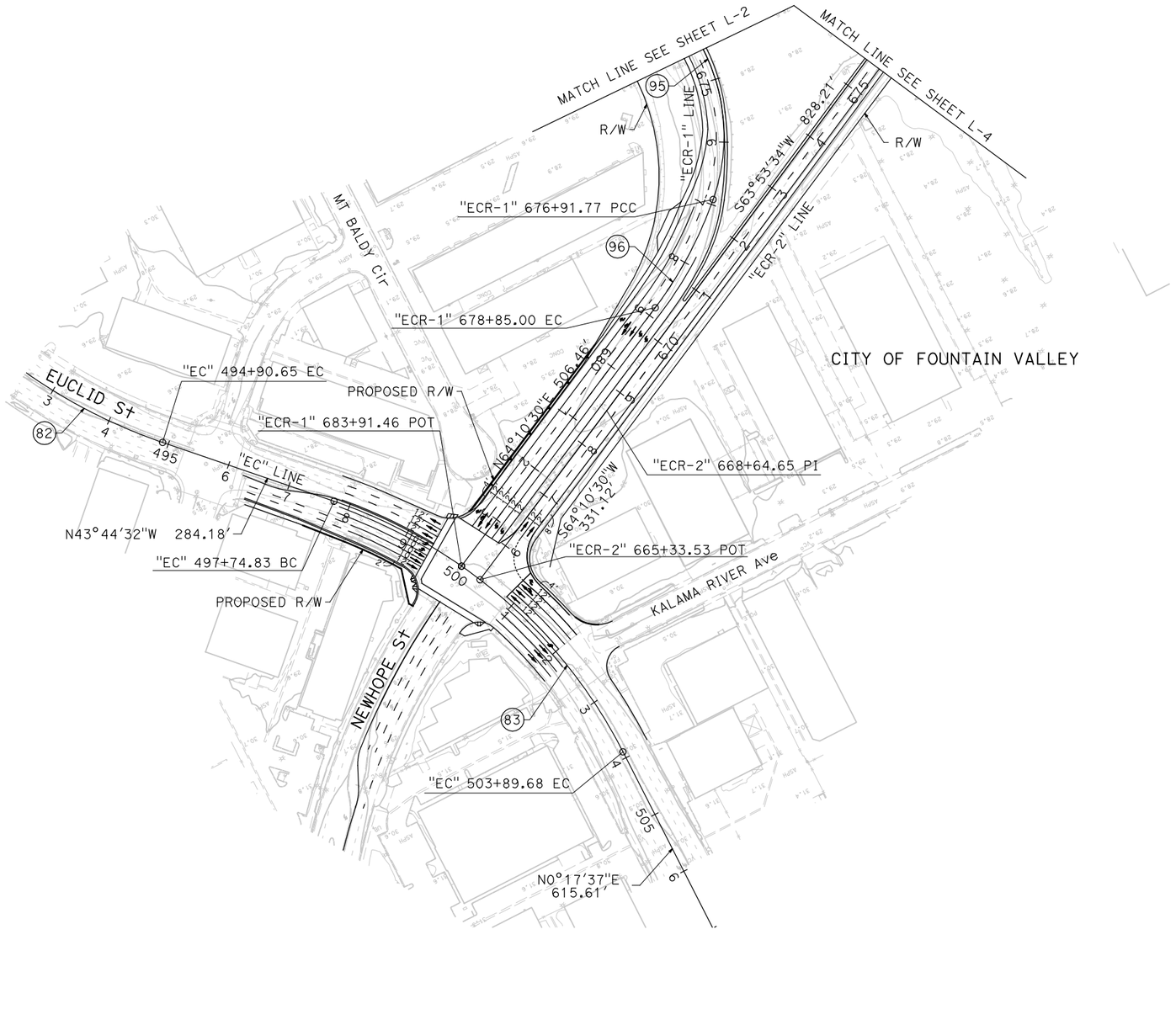

CURVE DATA

No.	R	Δ	T	L
(82)	850.00′	73°47′26"	638.09′	1094.70′
(83)	800.00′	44°02′09"	323.51′	614.86′
(95)	300.00′	104°32′27"	387.74′	547.38′
(96)	635.00′	17°26′08"	97.37′	193.23′

FIGURE 2-10

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-3**

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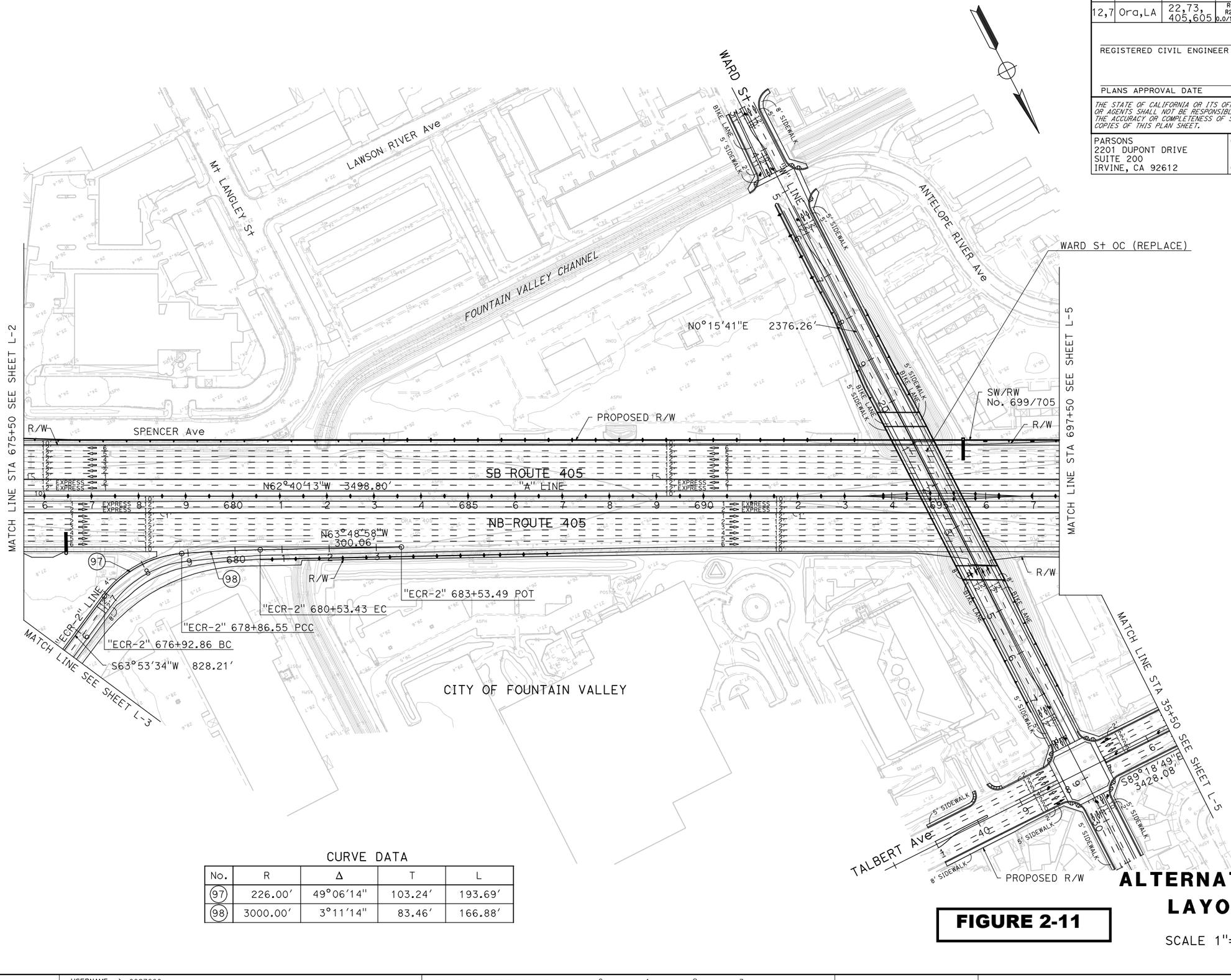

CURVE DATA

No.	R	Δ	T	L
(97)	226.00′	49°06′14"	103.24′	193.69′
(98)	3000.00′	3°11′14"	83.46′	166.88′

FIGURE 2-11

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-4**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
(16)	6000.00′	18°56′16"	1000.70′	1983.15′
(99)	6096.00′	2°49′19"	150.16′	300.26′
(100)	5927.13′	1°37′07"	83.72′	167.43′
(101)	440.00′	23°21′27"	90.95′	179.37′
(107)	5904.00′	4°08′45"	213.69′	427.19′

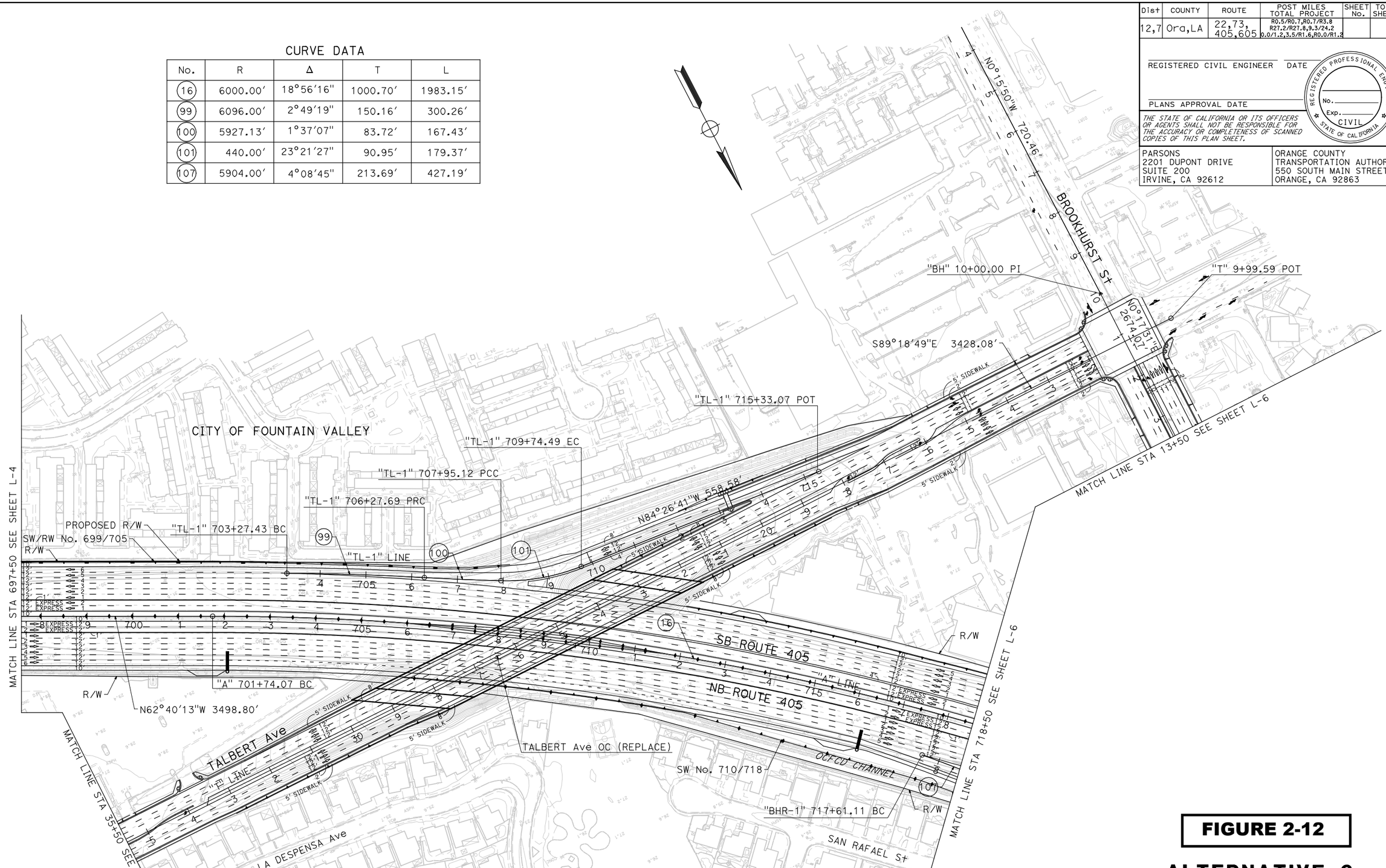

FIGURE 2-12

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-5**

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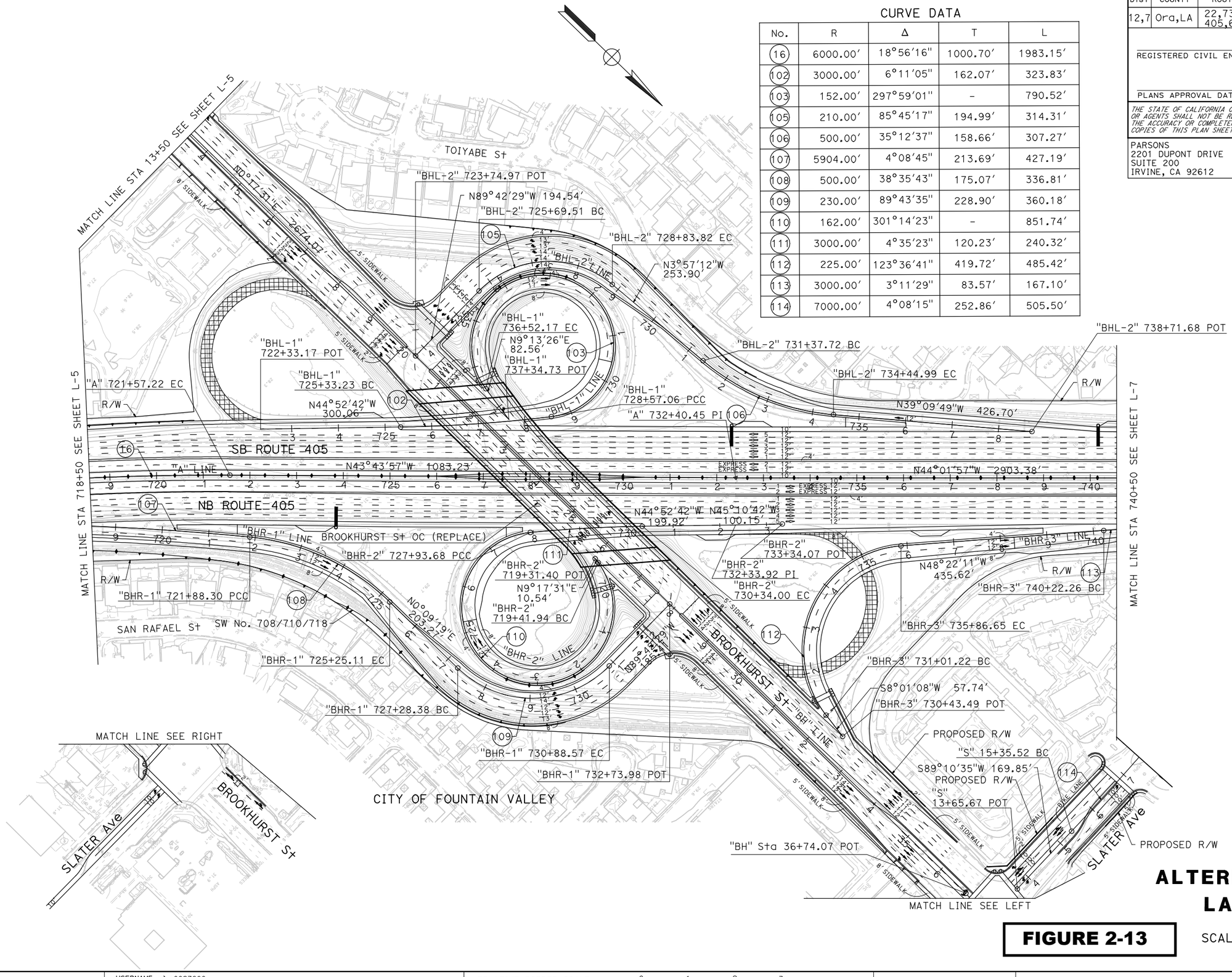
CURVE DATA

No.	R	Δ	T	L
16	6000.00′	18°56′16"	1000.70′	1983.15′
102	3000.00′	6°11′05"	162.07′	323.83′
103	152.00′	297°59′01"	-	790.52′
105	210.00′	85°45′17"	194.99′	314.31′
106	500.00′	35°12′37"	158.66′	307.27′
107	5904.00′	4°08′45"	213.69′	427.19′
108	500.00′	38°35′43"	175.07′	336.81′
109	230.00′	89°43′35"	228.90′	360.18′
110	162.00′	301°14′23"	-	851.74′
111	3000.00′	4°35′23"	120.23′	240.32′
112	225.00′	123°36′41"	419.72′	485.42′
113	3000.00′	3°11′29"	83.57′	167.10′
114	7000.00′	4°08′15"	252.86′	505.50′



ALTERNATIVE 3 LAYOUT

FIGURE 2-13 SCALE 1"=100′ **L-6**

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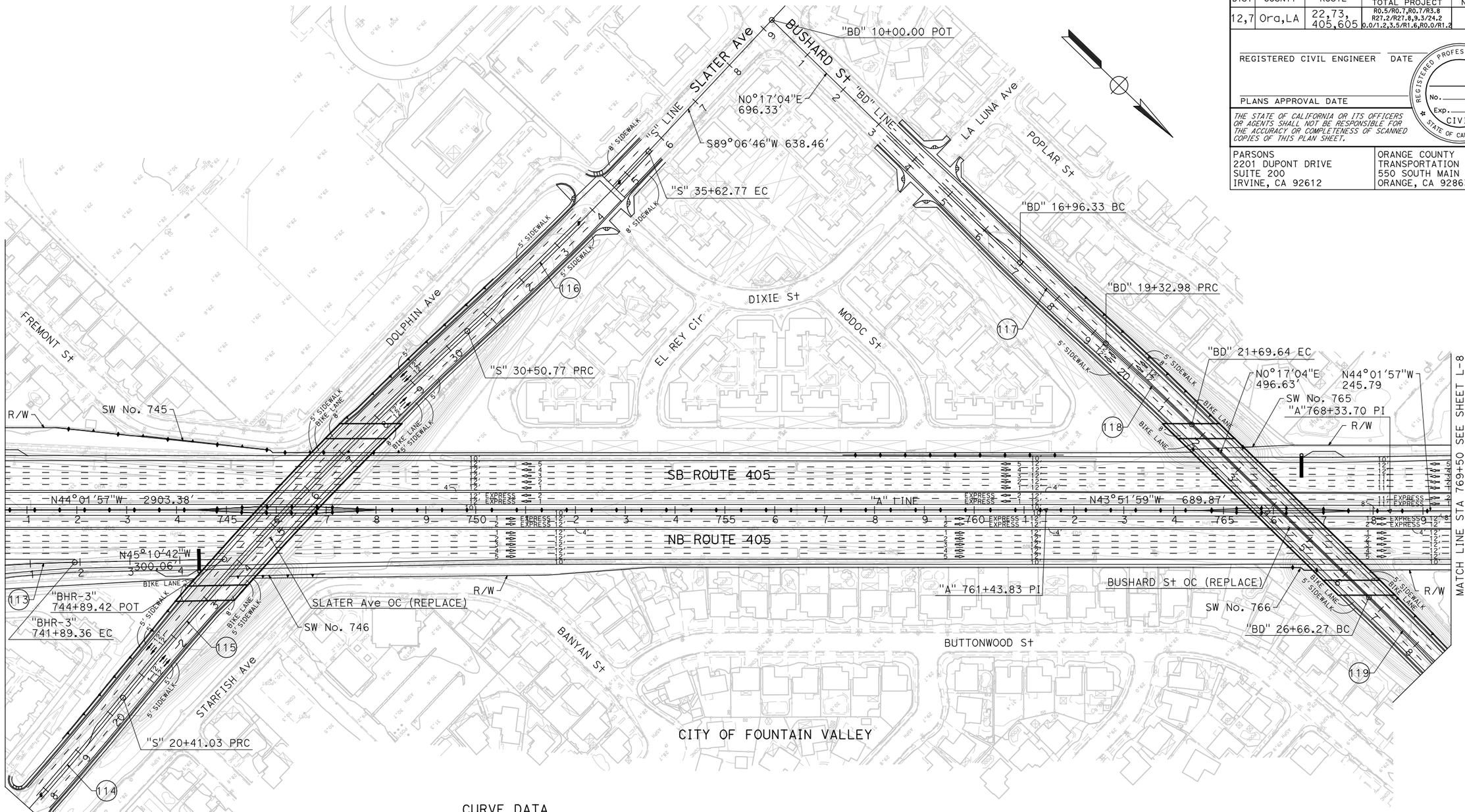

CURVE DATA

No.	R	Δ	T	L
113	3000.00′	3°11′29"	83.57′	167.10′
114	7000.00′	4°08′15"	252.86′	505.50′
115	7000.00′	8°15′54"	505.75′	1009.75′
116	7000.00′	4°11′27"	256.11′	511.99′
117	7000.00′	1°56′13"	118.34′	236.65′
118	7000.00′	1°56′13"	118.34′	236.65′
119	7000.00′	1°56′13"	118.34′	236.65′

FIGURE 2-14

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-7**

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CURVE DATA

No.	R	Δ	T	L
119	7000.00′	1°56′13"	118.34′	236.65′
120	7000.00′	1°56′13"	118.34′	236.65′
121	7000.00′	2°46′55"	169.98′	339.89′
122	7000.00′	2°46′55"	169.98′	339.89′
123	7000.00′	2°35′26"	158.28′	316.50′
124	7000.00′	2°13′02"	135.46′	270.88′
127	3000.00′	4°01′44"	105.52′	210.95′
128	393.00′	37°58′23"	135.22′	260.46′
129	350.00′	83°48′55"	314.12′	512.00′
130	158.00′	225°48′46"	-	622.71′
131	3500.00′	8°37′19"	263.84′	526.68′
132	2700.00′	4°55′57"	116.29′	232.44′
133	1600.00′	7°27′30"	104.28′	208.27′
134	154.00′	217°37′31"	-	584.93′
135	300.00′	88°27′07"	292.00′	463.13′
136	400.00′	42°53′42"	157.14′	299.46′

CURVE DATA

No.	R	Δ	T	L
137	2700.00′	3°54′18"	92.04′	184.02′
143	3000.00′	4°01′52"	105.58′	211.07′
144	1350.00′	6°02′05"	71.16′	142.19′
145	1350.00′	7°17′22"	85.99′	171.75′
146	850.00′	12°23′15"	92.25′	183.77′
150	1350.00′	4°22′43"	51.61′	103.17′
151	500.00′	37°28′32"	169.61′	327.03′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 R0.0/1.2,3.5/R1.6,R0.0/R1.2		

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FIGURE 2-15

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-8**

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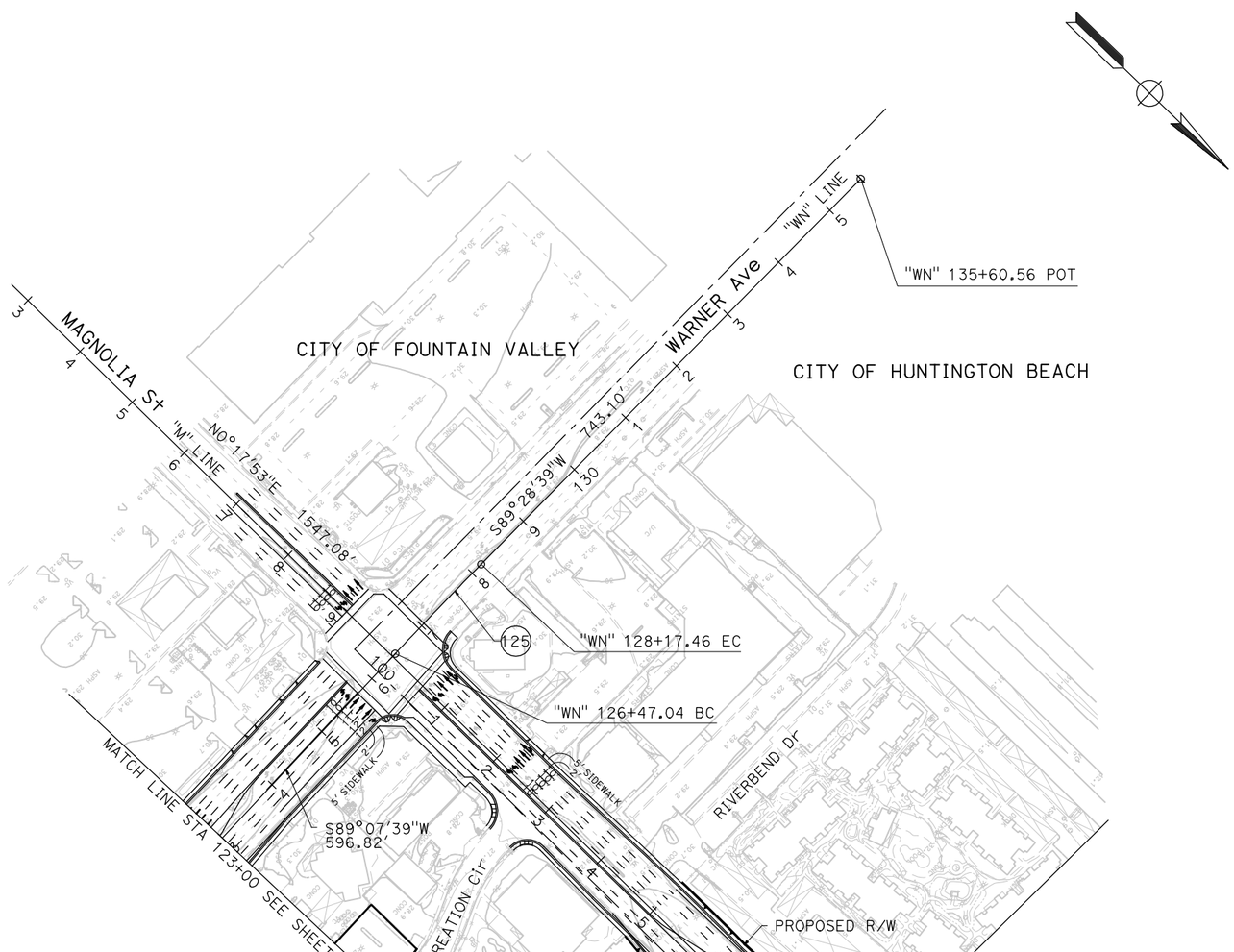

CURVE DATA

No.	R	Δ	T	L
125	7000.00′	1°23′42"	85.21′	170.42′
139	7000.00′	2°09′57"	132.31′	264.59′

FIGURE 2-16

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-9**

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CURVE DATA

No.	R	Δ	T	L
17	11606.00′	5°39′44"	573.94′	1146.95′
137	2700.00′	3°54′18"	92.04′	184.02′
138	3000.00′	3°10′32"	83.16′	166.27′
139	7000.00′	2°09′57"	132.31′	264.59′
140	7000.00′	2°09′57"	132.31′	264.59′
141	7000.00′	2°09′57"	132.31′	264.59′
142	7000.00′	2°09′57"	132.31′	264.59′
147	160.00′	230°27′07"	-	643.54′
148	250.00′	95°50′42"	276.90′	418.20′
149	500.00′	45°49′39"	211.35′	399.92′
151	500.00′	37°28′32"	169.61′	327.03′

CURVE DATA

No.	R	Δ	T	L
152	250.00′	83°08′42"	221.75′	362.79′
153	172.00′	224°33′27"	-	674.11′
154	10000.00′	2°03′39"	179.86′	359.67′
155	20000.00′	0°55′53"	162.54′	325.08′
156	3000.00′	4°42′12"	123′.20′	246.26′
157	12097.00′	1°25′18"	150.07′	300.13′
158	130.00′	48°47′31"	58.96′	110.71′
159	450.00′	33°05′47"	133.71′	259.94′
160	250.00′	40°22′28"	91.92′	176.17′
161	3000.00′	3°11′32"	83.59′	167.15′

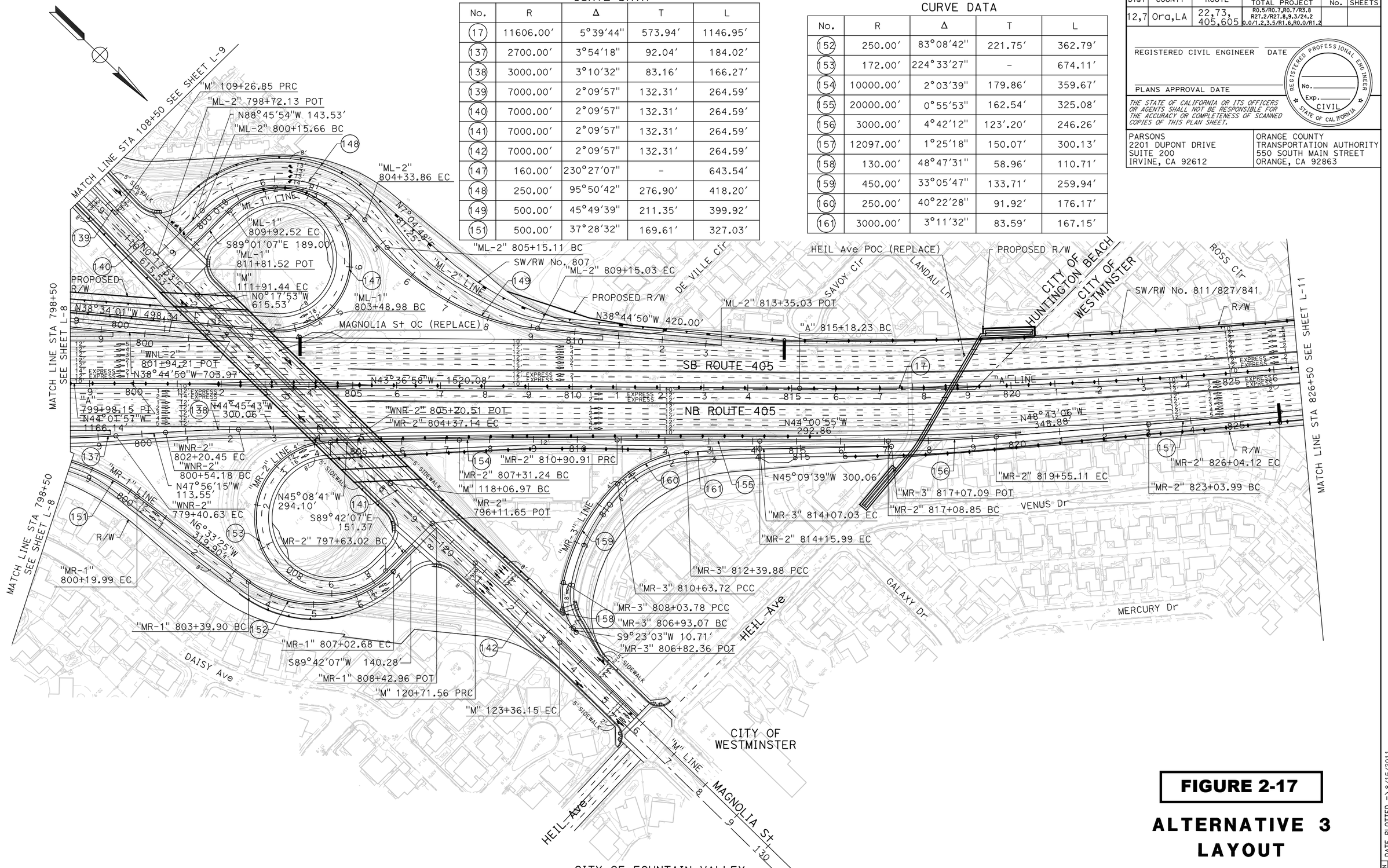

FIGURE 2-17

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-10**

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CURVE DATA

No.	R	Δ	T	L
17	11606.00′	5°39′44"	573.94′	1146.95′
162	7000.00′	2°39′09"	162.06′	324.07′
163	7000.00′	2°39′09"	162.06′	324.07′
164	7000.00′	2°39′09"	162.06′	324.07′
165	7000.00′	2°39′09"	162.06′	324.07′
166	7000.00′	2°16′16"	138.75′	277.47′

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N0°19'15"E 1114.64'

"NL" 478+10.86 BC

"NL" 481+34.92 PRC

"NL" 484+58.99 EC

"A" 826+65.19 EC

SW/RW No. 811/827/841

NEWLAND St OC (REPLACE)

EAST GARDEN GROVE CHANNEL SB Br (NEW)

BARRY Pl

TIMOTHY Ln

LAURA WAY

CITY OF WESTMINSTER

CITY OF HUNTINGTON BEACH

VILLA YORBA

"EDL-1" 852+13.90 POT

N50°18'02"W 300.06'

"EDL-1" LINE

SB ROUTE 405

"A" LINE

N49°16'42"W 2371.29'

N49°09'17"W 4530.93'

NB ROUTE 405

EDINGER STORM CHANNEL

"A" 850+36.47 PI

N0°19'15"E 468.24'

"NL" 489+27.23 BC

"NL" 492+51.30 PRC

"NL" 495+75.36 EC

"ED" 182+86.54 BC

N89°58'40"W 155.84'

SW/RW No. 834

EAST GARDEN GROVE CHANNEL NB Br (NEW)

PROPOSED R/W

EAST GARDEN GROVE WINTERSBURG CHANNEL

NEWLAND STORM CHANNEL

LUNAR St

UNIVERSE Ave

JENNER St

N0°19'15"E 1140.93'

CITY OF HUNTINGTON BEACH

CITY OF WESTMINSTER

NEWLAND St

EDINGER Ave

"ED" LINE

EDERMAN Ave

MATCH LINE STA 826+50 SEE SHEET L-10

MATCH LINE STA 854+50 SEE SHEET L-12

FIGURE 2-18

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-11**

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CURVE DATA

No.	R	Δ	T	L
166	7000.00′	2°16′16"	138.75′	277.47′
167	7000.00′	0°28′51"	29.38′	58.75′
168	7000.00′	1°24′36"	86.13′	172.26′
169	3000.00′	6°57′00"	182.17′	363.90′
170	600.00′	25°22′47"	135.10′	265.78′
171	3000.00′	3°11′29"	83.57′	167.10′
172	2100.00′	4°20′50"	79.70′	159.33′
173	180.00′	75°32′44"	139.49′	237.33′
174	216.00′	89°06′49"	212.68′	335.95′
176	500.00′	36°25′34"	164.52′	317.88′
177	376.00′	66°54′04"	248.40′	439.03′
178	180.00′	205°42′30"	-	646.25′
179	2100.00′	4°26′22"	81.40′	162.71′
180	3000.00′	3°11′29"	83.57′	167.10′
181	1000.00′	21°16′08"	187.77′	371.21′

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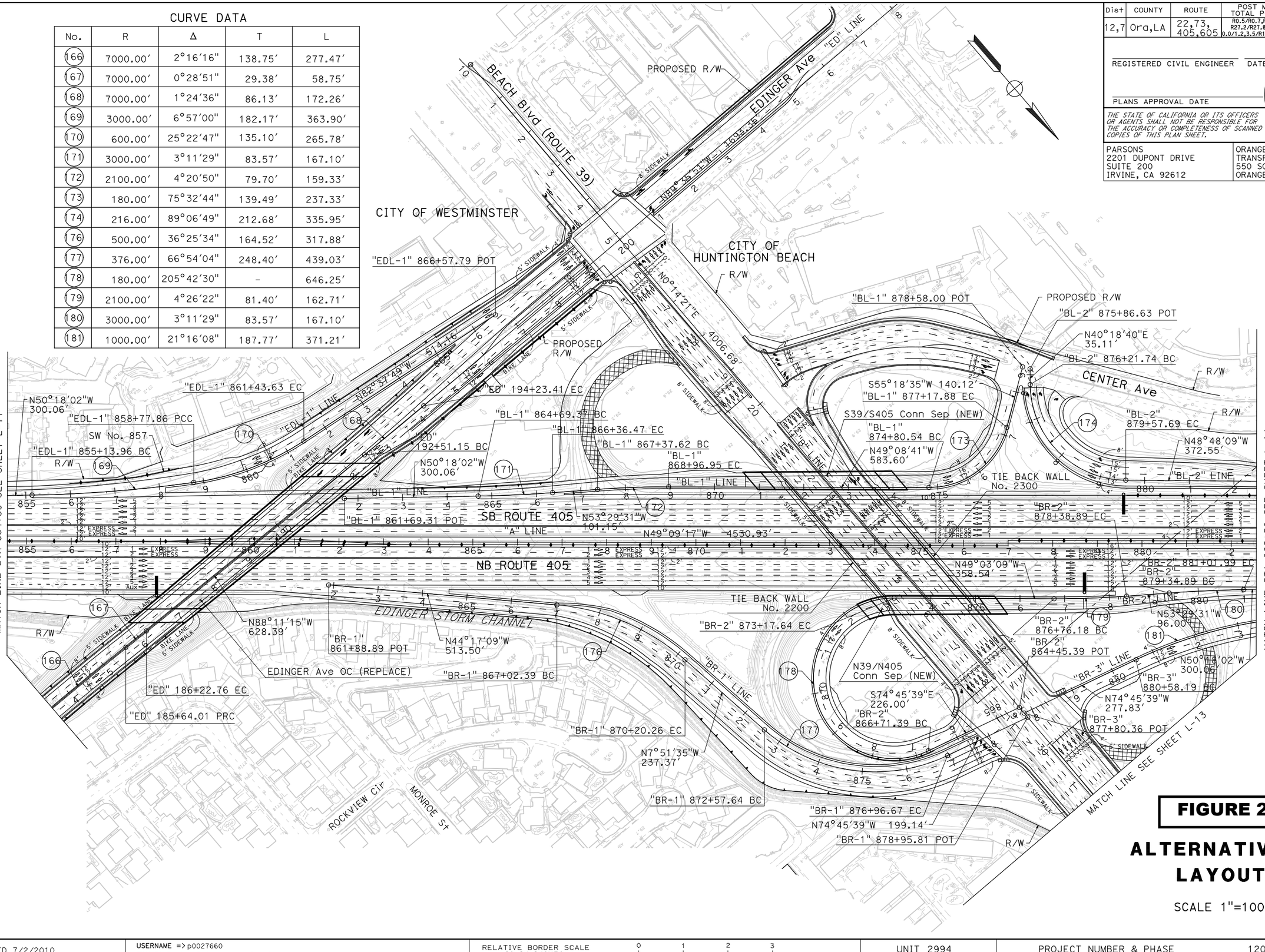

FIGURE 2-19

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-12**

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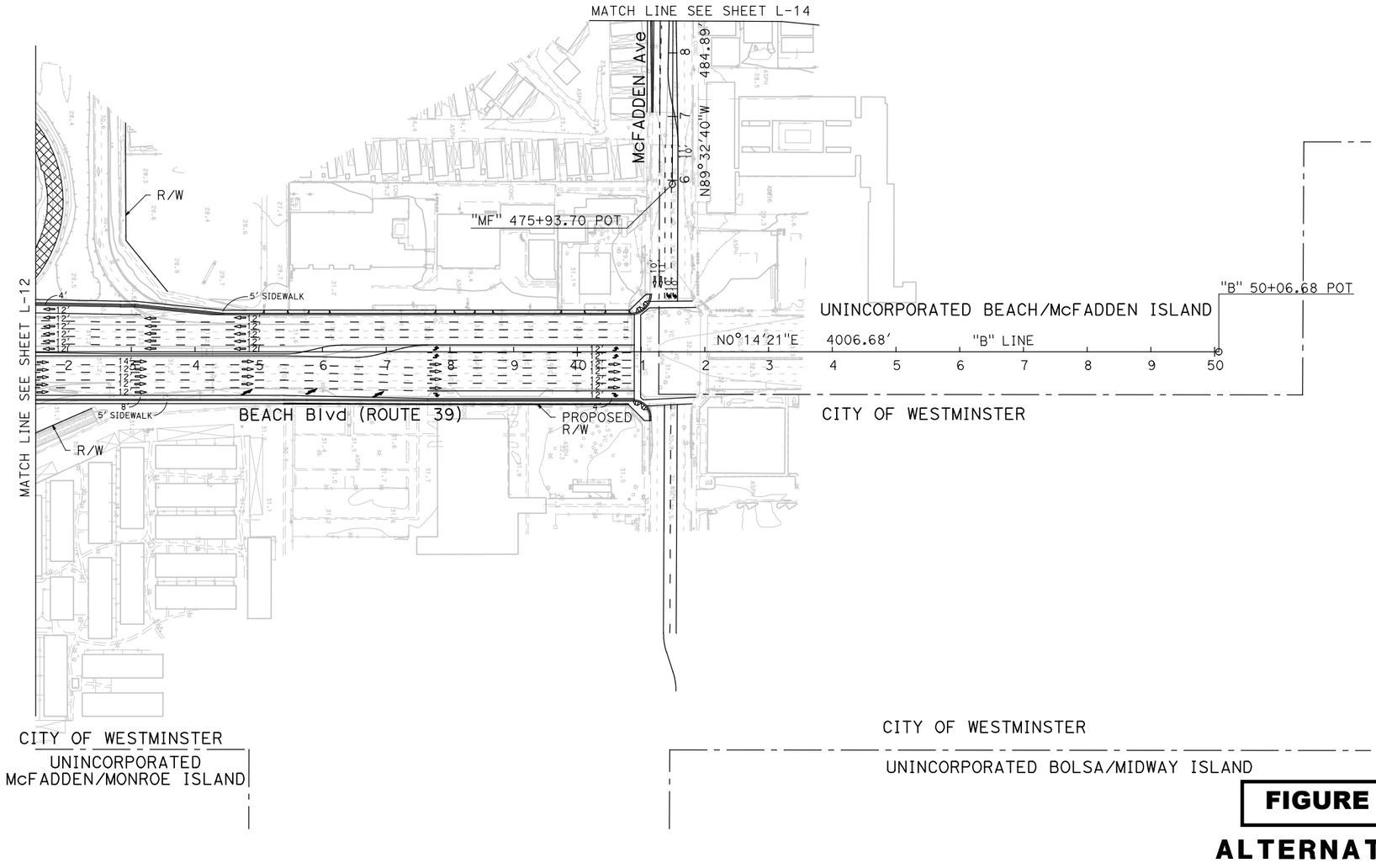

FIGURE 2-20

ALTERNATIVE 3 LAYOUT

SCALE 1"=100' **L-13**

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CURVE DATA

No.	R	Δ	T	L
18	12000.00′	5°07′29"	537.02′	1073.33′
175	3900.00′	4°31′00"	153.80′	307.44′
181	1000.00′	21°16′08"	187.77′	371.21′
182	3000.00′	3°11′29"	83.57′	167.10′
183	1000.00′	20°34′03"	181.44′	358.97′
184	1016.50′	43°01′24"	400.65′	763.29′
185	700.00′	10°40′53"	65.44′	130.50′
186	700.00′	33°08′04"	208.24′	404.81′

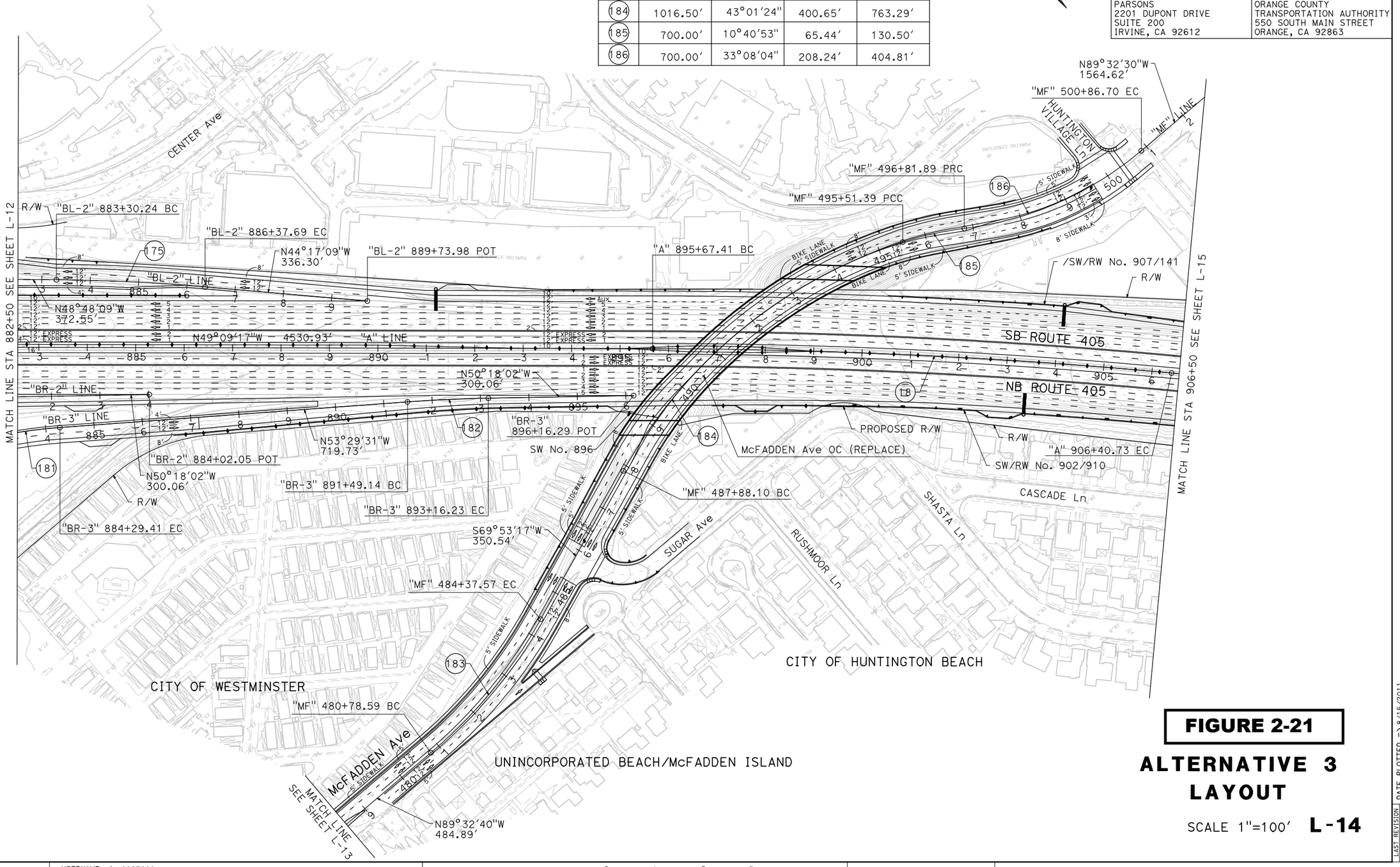

FIGURE 2-21

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-14**

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PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
190	20000.00′	0°57′46"	168.02′	336.03′
191	4500.00′	2°36′24"	102.38′	204.73′

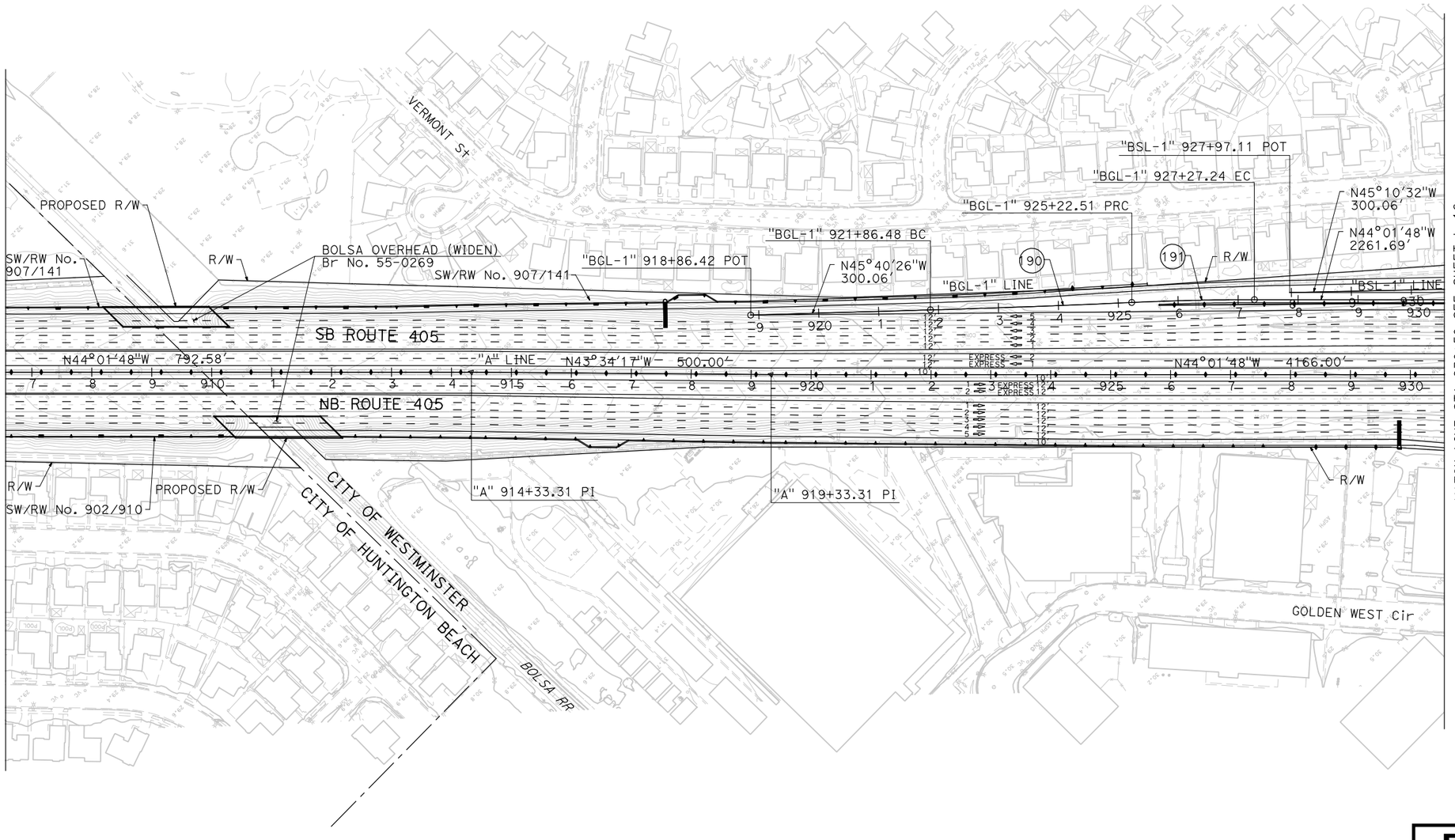

FIGURE 2-22

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-15**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R21.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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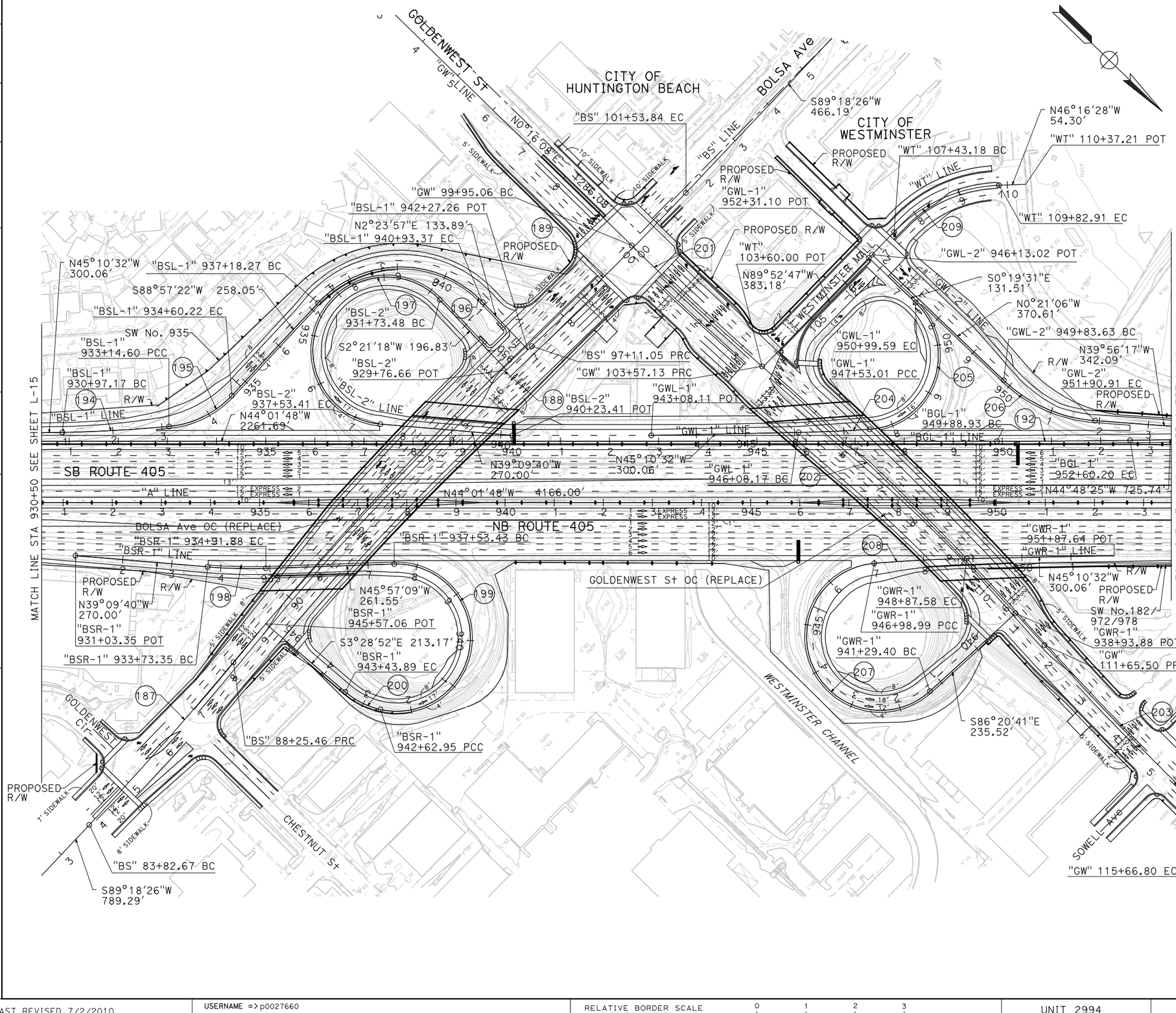

CURVE DATA

No.	R	Δ	T	L
187	7000.00′	3°37′28"	221.47′	442.79′
188	7000.00′	7°14′55"	443.38′	885.59′
189	7000.00′	3°37′28"	221.47′	442.79′
192	20000.00′	0°46′38"	135.64′	271.27′
194	3000.00′	4°09′10"	108.76′	217.43′
195	200.00′	41°42′56"	76.20′	145.61′
196	230.00′	93°26′34"	244.25′	375.10′
197	150.00′	221°30′58"	-	579.93′
198	1000.00′	6°47′29"	59.34′	118.53′
199	150.00′	194°37′24"	-	509.52′
200	166.53′	27°50′52"	41.29′	80.94′
201	7000.00′	2°57′49"	181.07′	362.07′
202	7000.00′	6°37′00"	404.63′	808.37′
203	7000.00′	3°17′05"	200.71′	401.30′
204	3000.00′	2°45′59"	72.43′	144.84′
205	150.00′	132°23′00"	339.96′	346.58′
206	300.00′	39°35′11"	107.97′	207.27′
207	150.00′	217°34′02"	-	569.59′
208	3000.00′	3°36′06"	94.33′	188.59′
209	315.00′	43°36′18"	126.01′	239.73′

FIGURE 2-23

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-16**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
193	1400.00′	5°15′50"	64.36′	128.62′

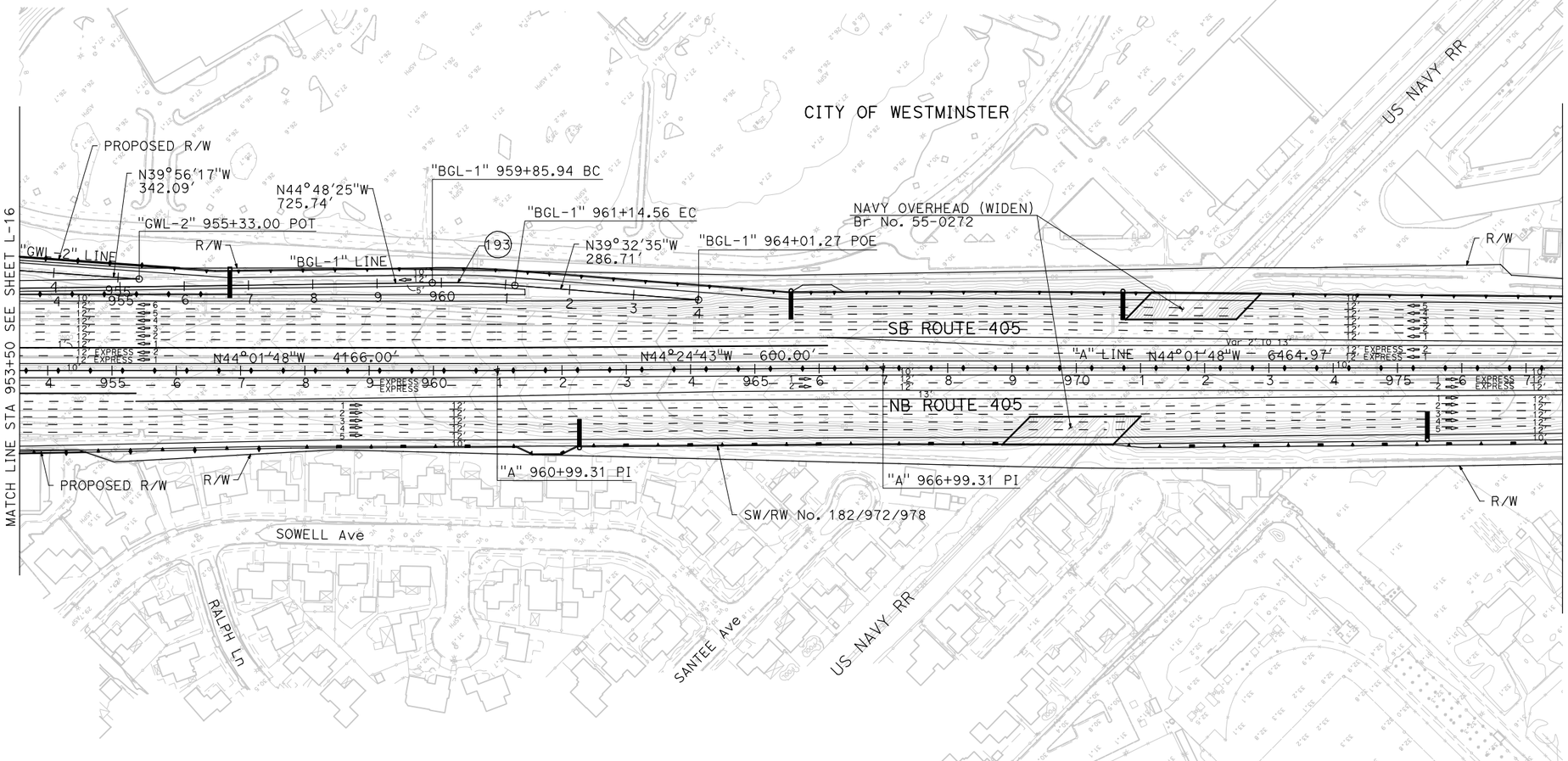

FIGURE 2-24

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-17**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R21.2/R27.6,R9.3/24.2 R0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
210	700.00′	18°37′07"	114.75′	227.47′
211	950.00′	40°16′07"	348.30′	667.68′
212	600.00′	21°14′01"	112.47′	222.36′
213	3000.00′	3°11′29"	83.57′	167.10′

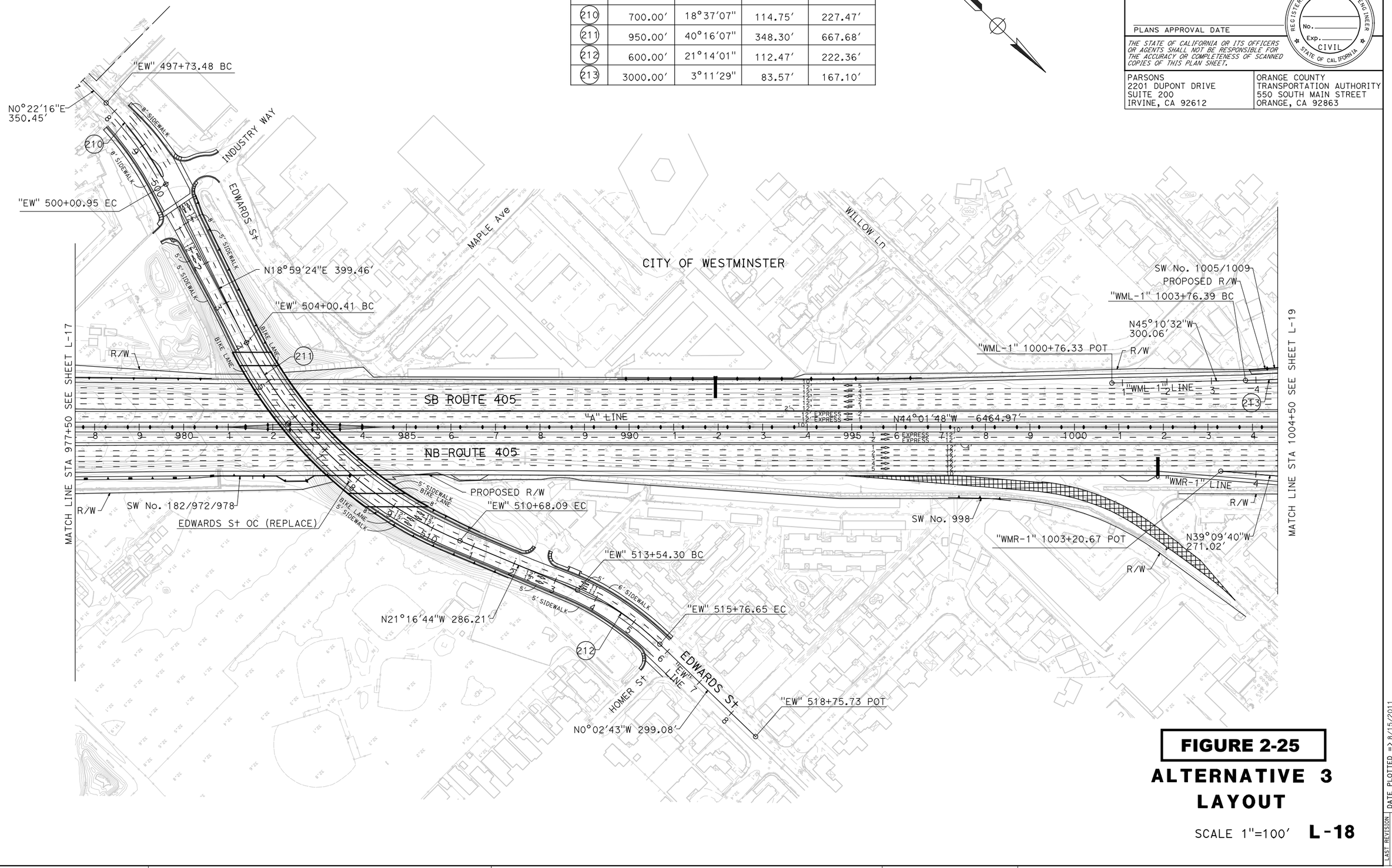

FIGURE 2-25

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-18**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 R0.0/1.2,3.5/R1.6,R0.0/R1.2		

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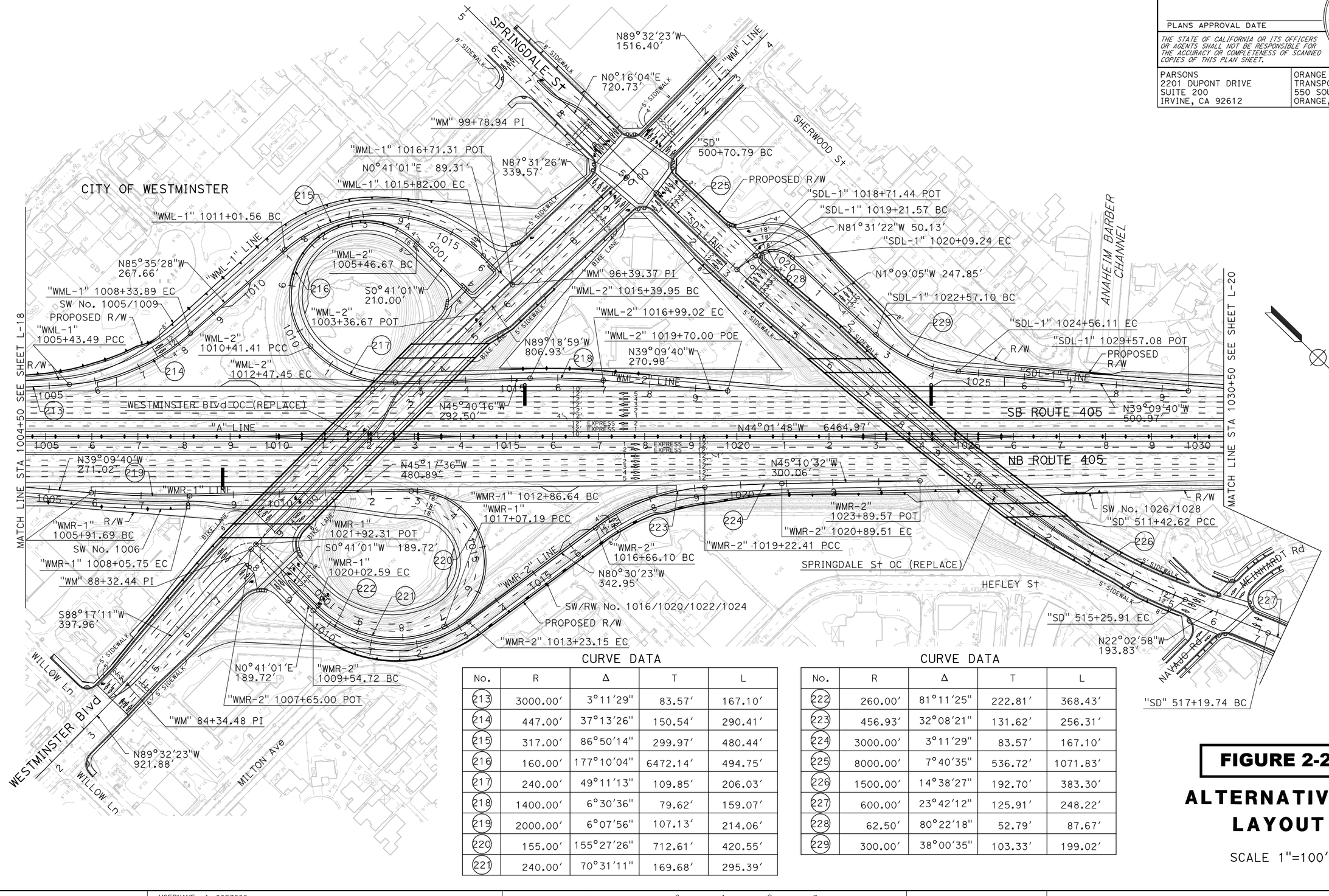

CURVE DATA

No.	R	Δ	T	L
213	3000.00′	3°11′29"	83.57′	167.10′
214	447.00′	37°13′26"	150.54′	290.41′
215	317.00′	86°50′14"	299.97′	480.44′
216	160.00′	177°10′04"	6472.14′	494.75′
217	240.00′	49°11′13"	109.85′	206.03′
218	1400.00′	6°30′36"	79.62′	159.07′
219	2000.00′	6°07′56"	107.13′	214.06′
220	155.00′	155°27′26"	712.61′	420.55′
221	240.00′	70°31′11"	169.68′	295.39′

CURVE DATA

No.	R	Δ	T	L
222	260.00′	81°11′25"	222.81′	368.43′
223	456.93′	32°08′21"	131.62′	256.31′
224	3000.00′	3°11′29"	83.57′	167.10′
225	8000.00′	7°40′35"	536.72′	1071.83′
226	1500.00′	14°38′27"	192.70′	383.30′
227	600.00′	23°42′12"	125.91′	248.22′
228	62.50′	80°22′18"	52.79′	87.67′
229	300.00′	38°00′35"	103.33′	199.02′

FIGURE 2-26

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-19**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R21.2/R21.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
227	600.00′	23°42′12"	125.91′	248.22′

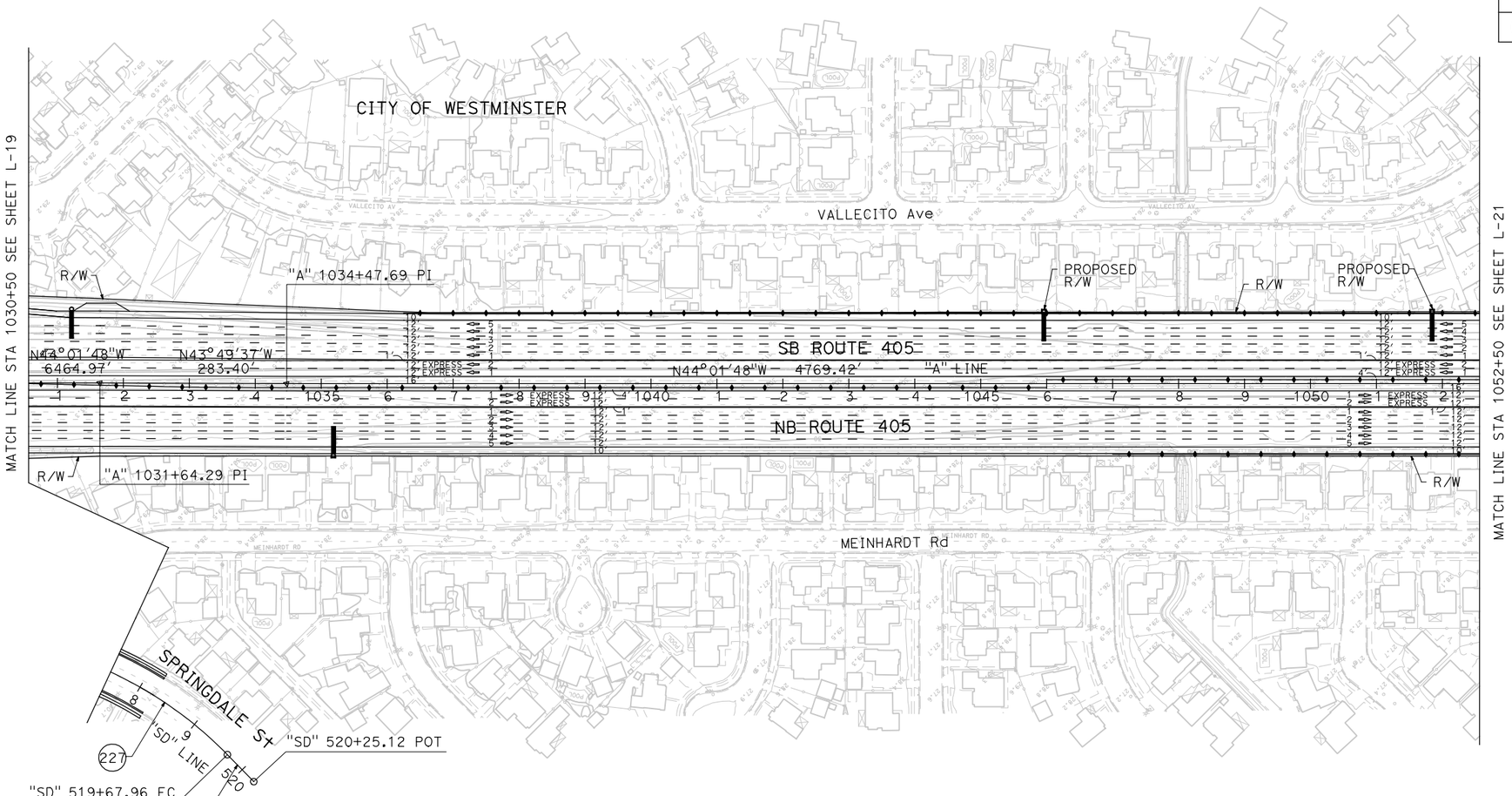

FIGURE 2-27

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-20**

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UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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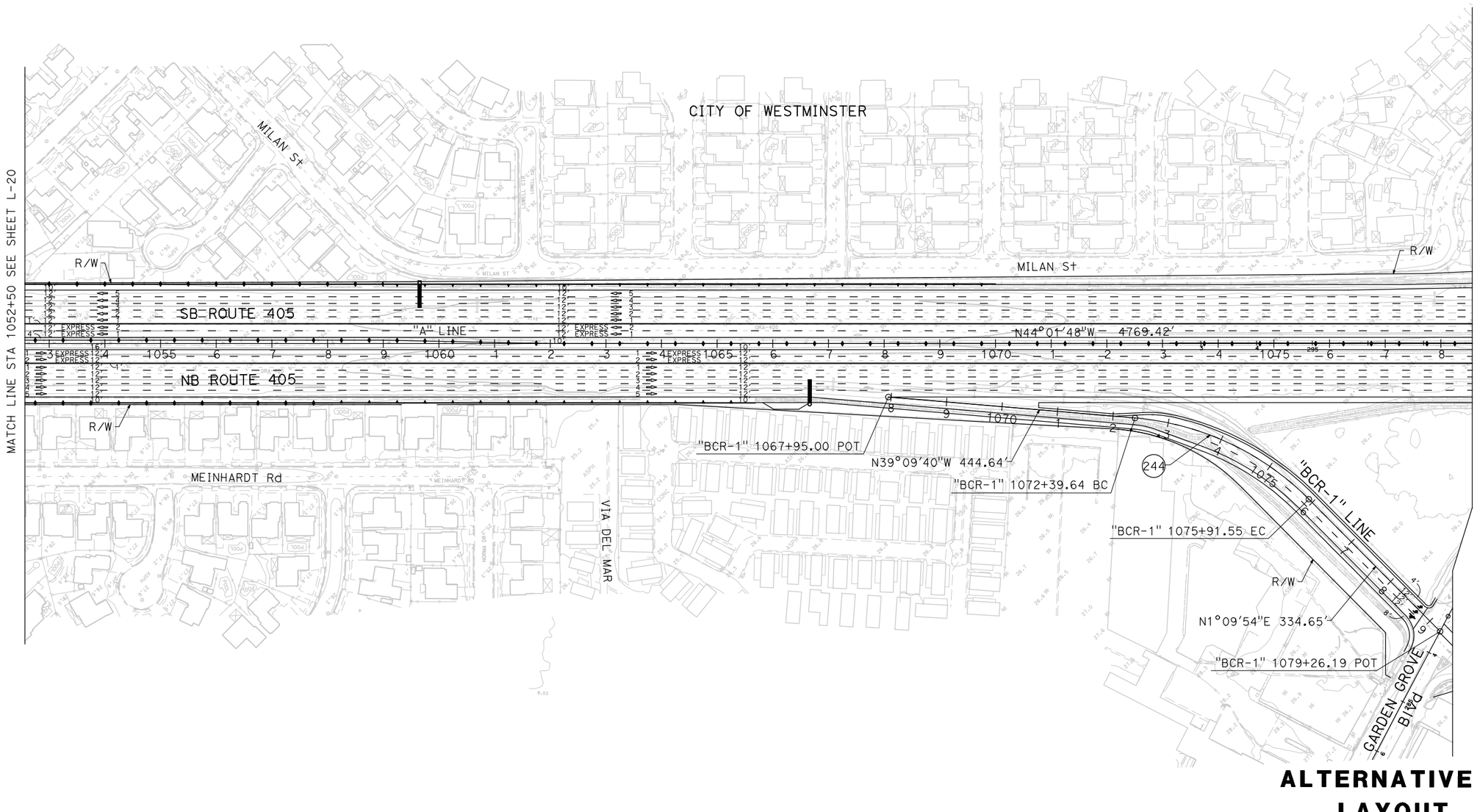
CURVE DATA

No.	R	Δ	T	L
244	500.00′	40°19′33"	183.60′	351.91′



ALTERNATIVE 3 LAYOUT

SCALE 1"=100′

FIGURE 2-28

L-21

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R21.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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STRATFORD Ave

MATCH LINE STA 1078+50 SEE SHEET L-21

MATCH LINE SEE SHEET L-23

"BCL-2" 1087+06.52 POT

"BCL-1" 1096+22.39 POE

N45°00'19"E 861.98'

R/W

"BCL-1" 1082+20.00 BC

"BCL-1" 1085+20.55 PCC

SW No. 1083

MILAN STORM DRAIN

5' SIDEWALK

BOLSA CHICA Rd

N45°38'20"W 220.37'

CITY OF WESTMINSTER

CITY OF SEAL BEACH

"BCL-2" 1089+26.89 BC

"BCL-2" 1090+76.77 EC

S43°38'20"E 187.30'

"BCL-1" 1094+35.09 EC

BOLSA CHICA CHANNEL

N18°06'51"W 260.90'

"BCL-2" 1093+37.67 BC

"BCL-2" 1095+66.19 PCC

PERMANENT Hwy EASEMENT

"BCL-2" 1098+33.29 PCC

R/W

S405-E22 Conn

"BCL-2" 1103+20.00 EC

"BCL-2" LINE

MATCH LINE SEE SHEET L-24

"A" 1082+17.10 BC

"A" LINE

GARDEN GROVE BLVd

"BCL-1" 1088+55.31 PCC

"BCL-1" LINE

SB ROUTE 405

NB ROUTE 405

"BC" 40+24.54 EC

"BC" 35+84.44 BC

BOLSA CHICA Rd OC (REPLACE)

"BC" 38+04.49 PRC

"E1" 3294+93.75 BC

CITY OF WESTMINSTER

CITY OF GARDEN GROVE

"E1" 3300+70.20 PCC

"E1" LINE

MATCH LINE SEE SHEET L-37

"H" LINE

"H" 1300+69.50 EC

N81°44'37"W 690.09'

"W1" 2300+28.45 EC

N81°12'33"W 1003.82'

N45°00'19"E 525.62'

"BC" 45+50.16 BC

EB ROUTE 22

WB ROUTE 22

"WB SR-22" 1091+39.17 BC

N81°12'33"W 52.95'

"WB SR-22" 1090+86.22 POB

"WB SR-22" LINE

CITY OF GARDEN GROVE

W22-N405 Conn

CITY OF SEAL BEACH

UTILITY EASEMENT

"BC" 49+58.17 PRC

VALLEY VIEW St

UTILITY EASEMENT

R/W

BAILEY St

MATCH LINE SEE SHEET L-37

CURVE DATA

No.	R	Δ	T	L
19	2503.00′	50°51′40"	1190.15′	2221.90′
233	7000.00′	1°48′04"	110.03′	220.05′
234	7000.00′	1°48′04"	110.03′	220.05′
235	7000.00′	3°20′23"	204.06′	408.01′
236	7000.00′	3°20′52"	204.56′	409.00′
237	2615.00′	6°35′07"	150.44′	300.55′
238	1386.70′	13°49′54"	168.20′	334.76′
239	210.00′	158°11′04"	1089.72′	579.78′
240	312.00′	27°31′29"	76.42′	149.88′
241	300.00′	43°38′39"	120.13′	228.52′

CURVE DATA

No.	R	Δ	T	L
242	1000.00′	15°18′15"	134.35′	267.11′
243	2115.00′	9°07′17"	168.71′	336.71′
245	4686.90′	14°35′16"	599.90′	1193.32′
275	5000.00′	7°01′44"	307.08′	613.39′
279	4816.00′	6°51′29"	288.57′	576.45′
280	20016.00′	1°23′02"	241.74′	483.46′
284	6635.00′	7°33′49"	438.57′	875.87′

FIGURE 2-29

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-22**

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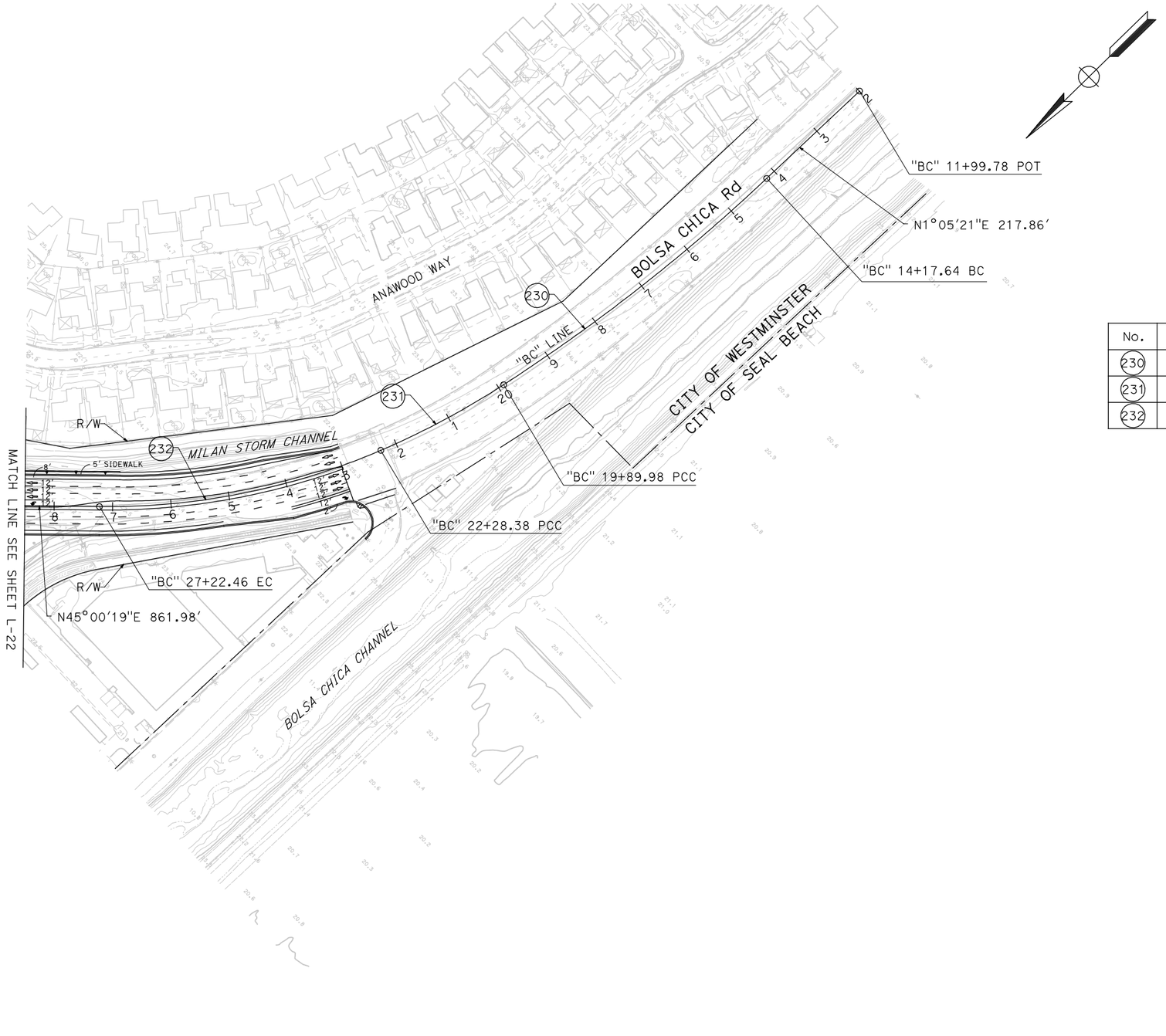

CURVE DATA

No.	R	Δ	T	L
230	3178.45′	10°19′02"	286.94′	572.34′
231	1412.63′	9°40′09"	119.48′	238.40′
232	1183.00′	23°55′47"	250.70′	494.08′

FIGURE 2-30

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-23**

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12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
19	2503.00′	50°51′40"	1190.15′	2221.90′
20	5930.00′	4°33′33"	236.06′	471.87′
21	20000.00′	1°33′48"	272.86′	545.69′
246	34963.56′	0°16′29"	83.83′	167.65′
247	3838.00′	6°00′30"	201.42′	402.47′
248	3821.00′	1°45′43"	58.76′	117.51′

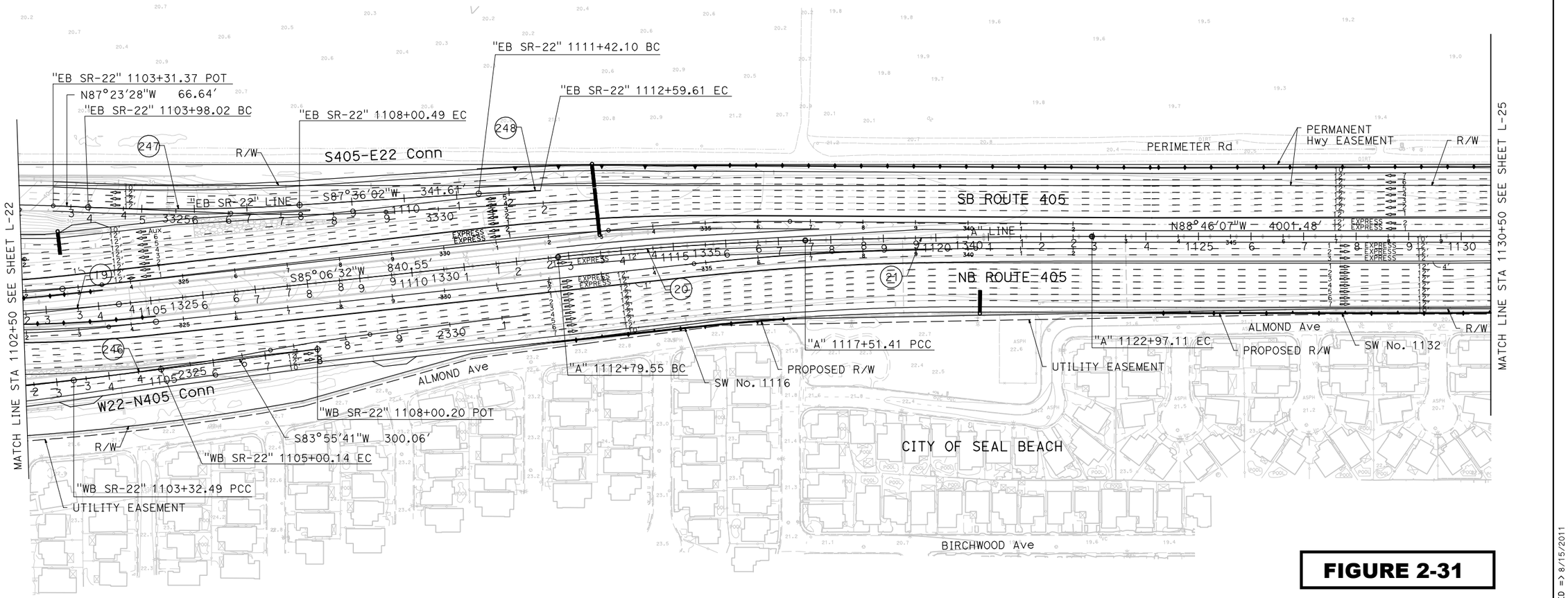

FIGURE 2-31

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-24**

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UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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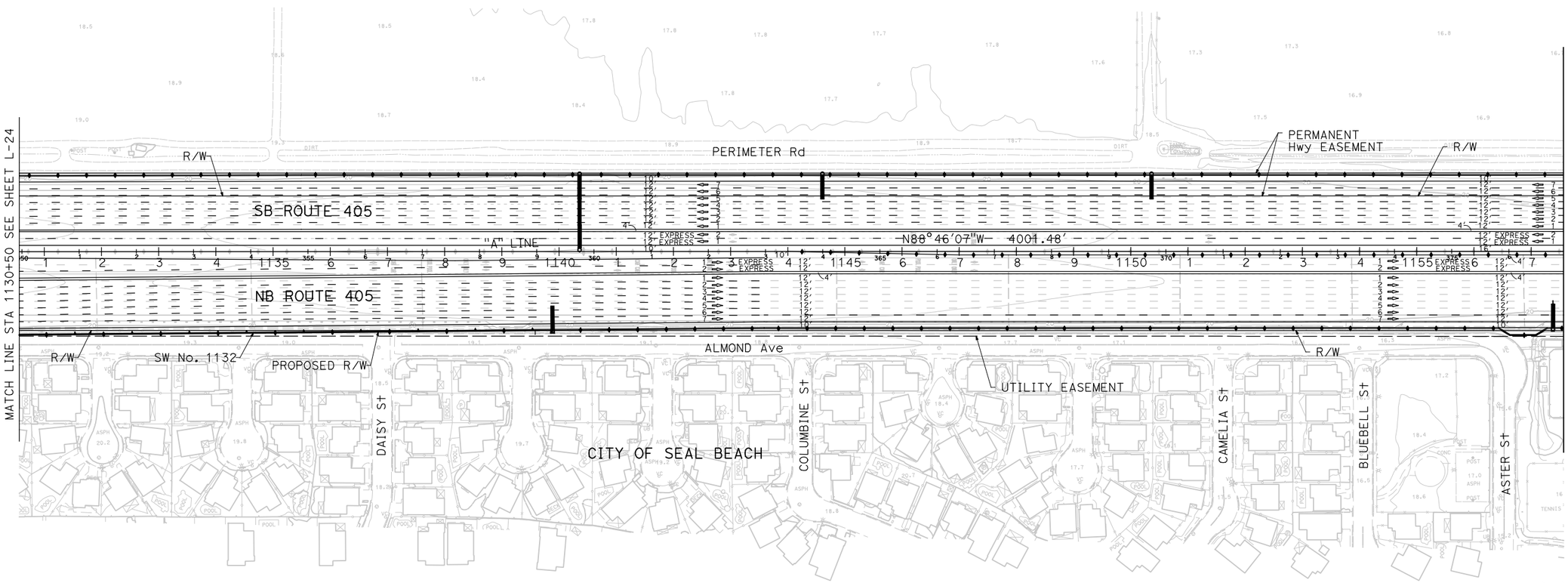

FIGURE 2-32

ALTERNATIVE 3 LAYOUT

SCALE 1"=100' **L-25**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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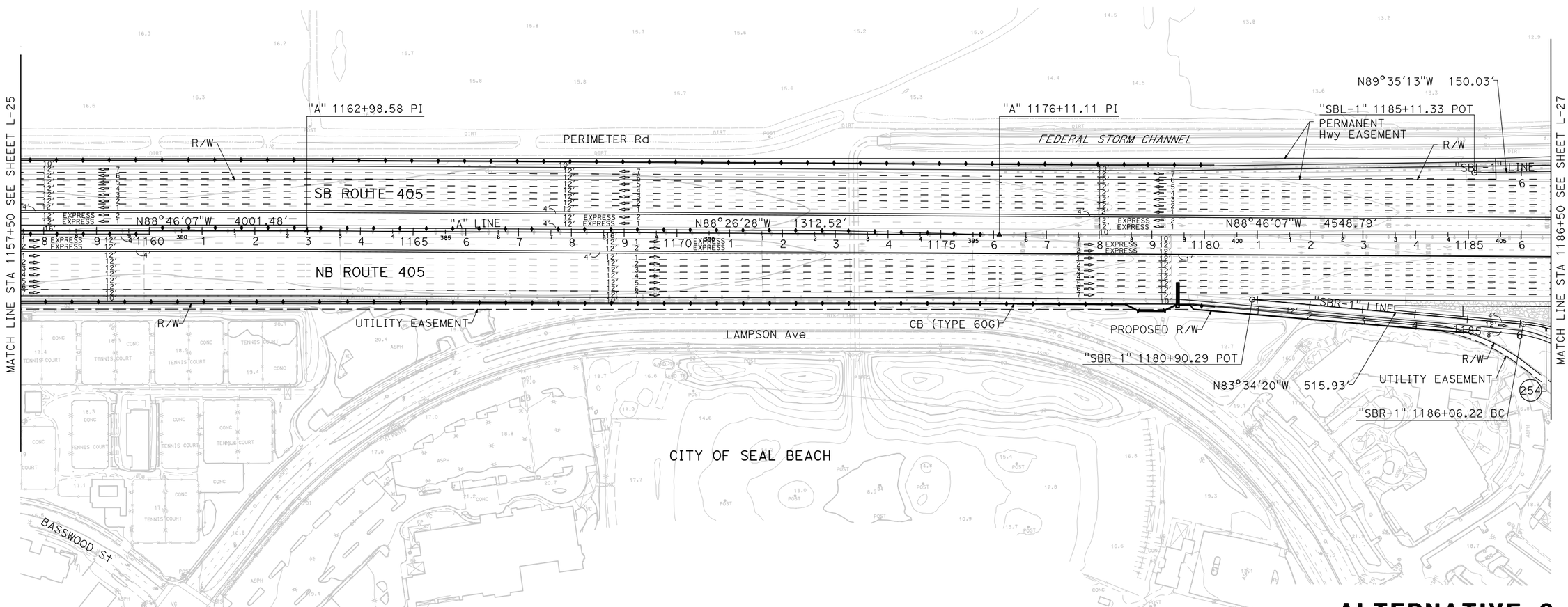
CURVE DATA

No.	R	Δ	T	L
254	300.00′	35°18′36"	95.48′	184.88′



ALTERNATIVE 3 LAYOUT

FIGURE 2-33 SCALE 1"=100′ **L-26**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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MATCH LINE STA 1186+50 SEE SHEET L-26

MATCH LINE STA 1214+50 SEE SHEET L-29

MATCH LINE SEE SHEET L-28

"SBL-2" 1190+40.65 POT

PERIMETER Rd

FEDERAL STORM CHANNEL

N47°14'03"E 150.00'

"SBL-2" 1191+90.65 BC

"SBL-1" 1192+87.15 EC

"SBL-1" 1189+78.47 PCC

"SBL-1" 1186+61.36 PI

"SBL-1" 1188+11.37 BC

"SBL-1" LINE

N89°54'52"W 150.01'

SB ROUTE 405

NB ROUTE 405

"A" LINE

N88°46'07"W 4548.79'

"SBL-2" 1195+68.29 EC

N83°53'59"W 574.06'

"SBL-2" LINE

"SBL-2" 1201+42.35 POT

PROPOSED R/W

SW/RW No. 431/445

BEVERLY MANOR Dr

"SBR-2" LINE

"SBR-2" 1195+81.04 POT

N89°54'51"W 300.06'

"SBR-2" 1191+00.32 PCC

"SBR-2" 1192+80.98 EC

"SBR-2" 1187+23.61 BC

"SBR-1" LINE

"SBR-1" 1187+91.10 EC

N37°44'16"E 2014.16'

S48°15'44"E 217.62'

"SBR-2" 1185+05.99 POT

"WB SR-22 R1" 1216+94.37 BC

"WB SR-22 R1" 1218+81.29 PRC

"WB SR-22 R1" 1221+31.18 PRC

"WB SR-22 R1" 1222+98.27 EC

"WB SR-22 R2" LINE

"WB SR-22 R1" LINE

SW/RW No. 434

"WB SR-22 R2" 1213+00.63 POT

N85°54'22"W 445.46'

OLD RANCH PKWY

YELLOWTAIL Dr

SEAL BEACH Blvd

CITY OF SEAL BEACH

COMMUNITY OF ROSSMOOR

"SB" 64+67.14 BC

BIKE LANE

5' SIDEWALK

4' SIDEWALK

R/W

CURVE DATA

No.	R	Δ	T	L
250	1200.00′	36°30′33"	395.81′	764.64′
251	3000.00′	3°11′29"	83.57′	167.10′
252	445.94′	39°39′36"	160.81′	308.68′
253	165.00′	131°08′02"	363.18′	377.64′
254	300.00′	35°18′36"	95.48′	184.88′
255	160.00′	134°53′51"	385.30′	376.70′
256	3000.00′	3°27′02"	90.36′	180.66′
257	400.00′	26°46′25"	95.20′	186.92′
258	20000.00′	0°42′57"	124.95′	249.89′
259	3000.00′	3°11′29"	83.57′	167.10′

ALTERNATIVE 3 LAYOUT

FIGURE 2-34

SCALE 1"=100′ **L-27**

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12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
249	1186.00′	36°18′58"	388.98′	751.73′

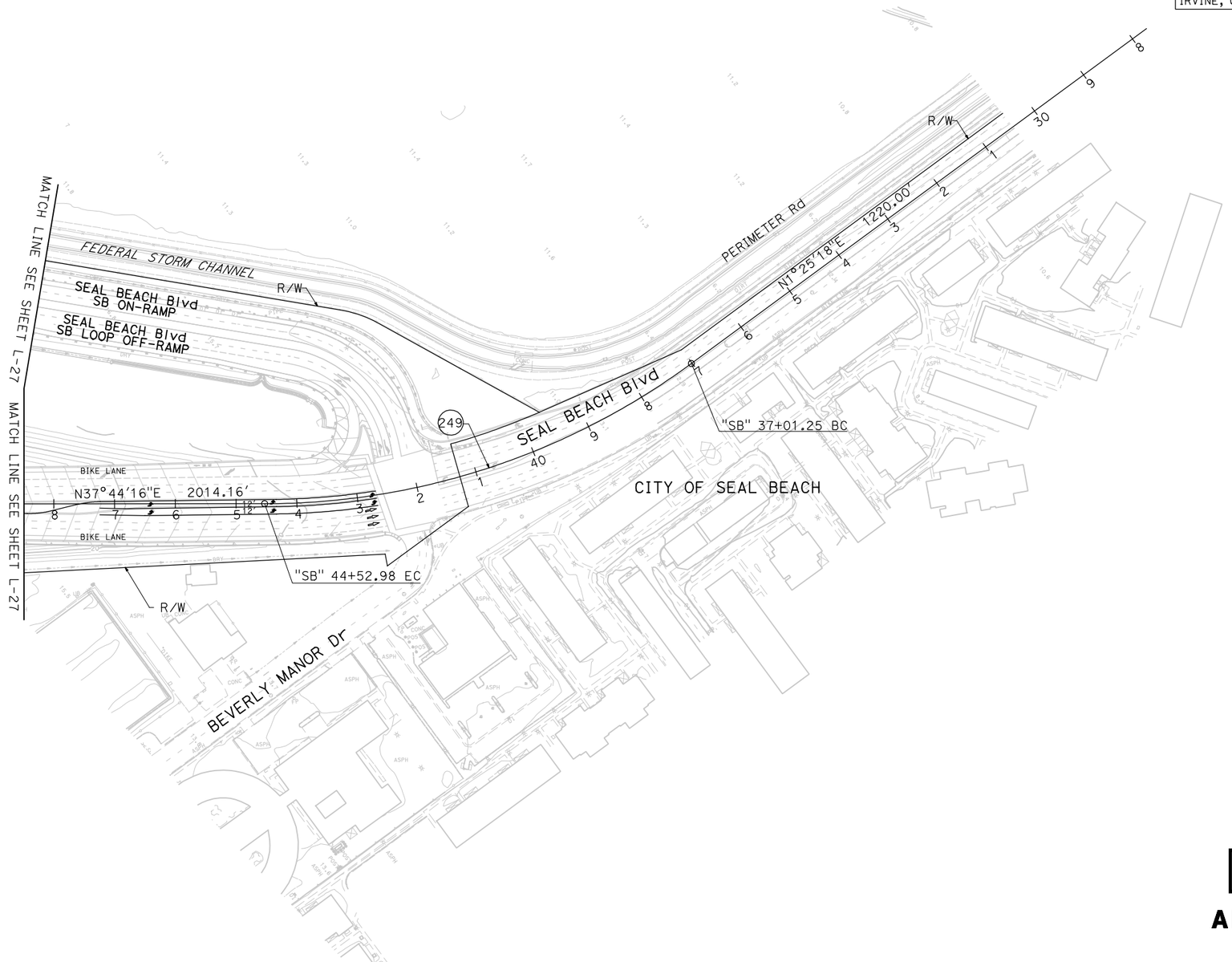

FIGURE 2-35

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-28**

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CURVE DATA

No.	R	Δ	T	L
22	2000.00′	58°25′06"	1118.18′	2039.19′
260	20000.00′	1°14′05"	215.53′	431.04′
261	3967.24′	2°58′57"	103.28′	206.51′
262	2072.00′	3°54′25"	70.67′	141.29′
263	20000.00′	0°38′43"	112.61′	225.21′
264	20000.00′	3°16′22"	571.38′	1142.44′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R21.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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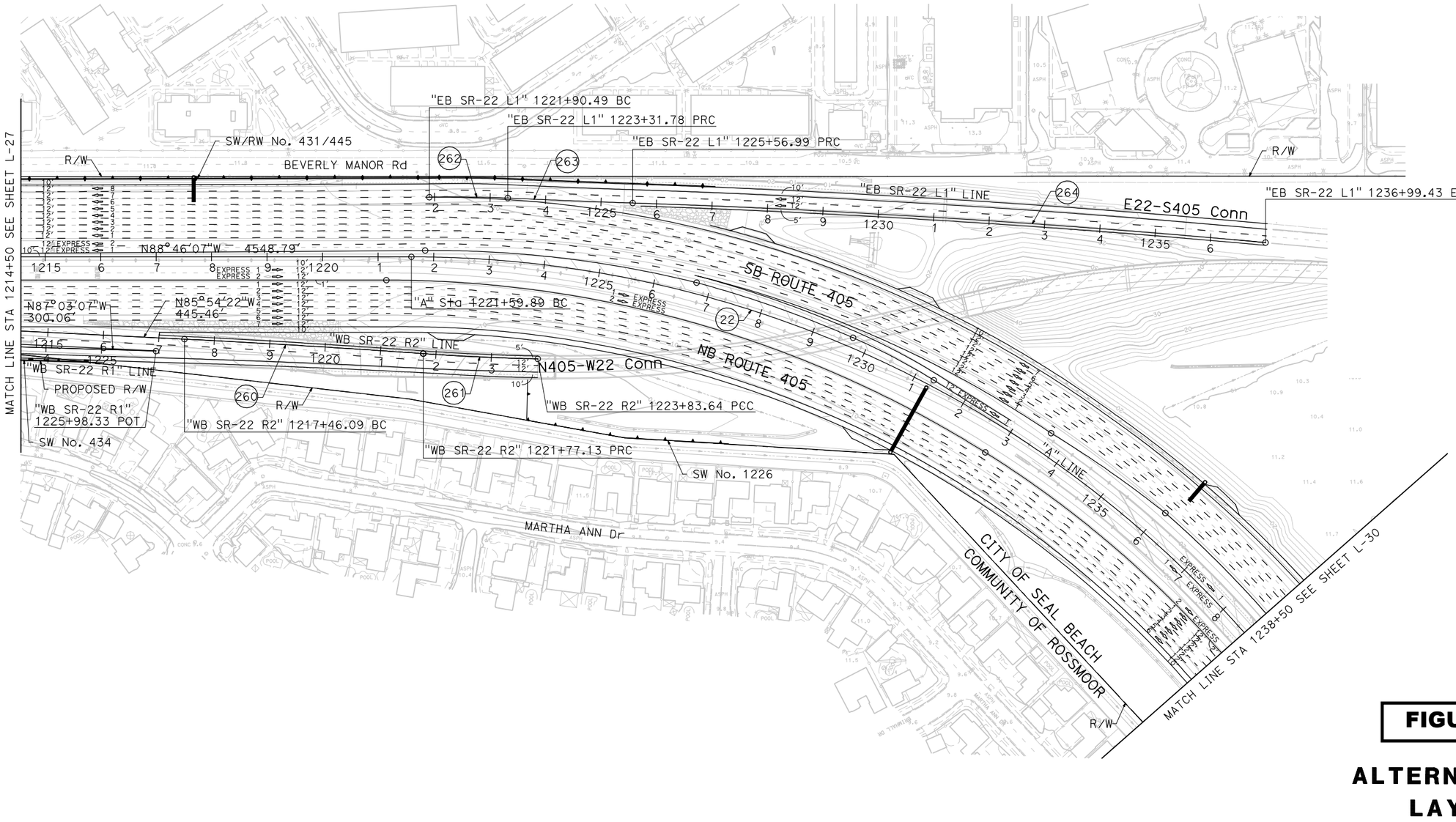

FIGURE 2-36

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-29**

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CURVE DATA

No.	R	Δ	T	L
22	2000.00′	58°25′06"	1118.18′	2039.19′
23	2357.00′	19°30′42"	405.25′	802.65′
24	2400.00′	36°15′41"	785.86′	1518.91′
265	2060.00′	8°22′54"	150.94′	301.35′
266	6624.34′	1°27′06"	83.93′	167.84′
267	6532.32′	2°20′45"	133.74′	267.44′
268	3910.75′	5°02′49"	172.35′	344.48′
269	1500.00′	12°44′27"	167.47′	333.55′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.8,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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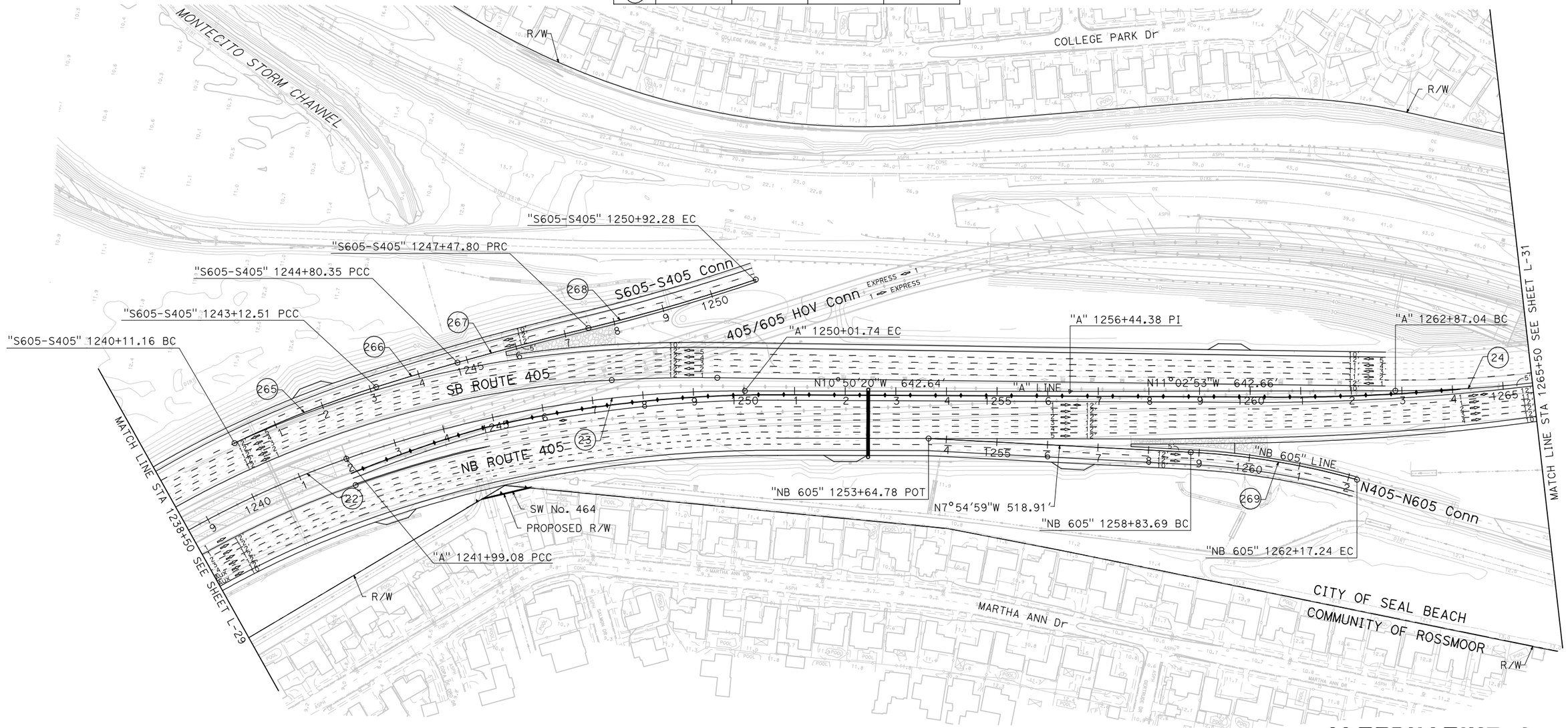

ALTERNATIVE 3 LAYOUT

FIGURE 2-37

SCALE 1"=100′ **L-30**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 R0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
(24)	2400.00′	36°15′41"	785.86′	1518.91′

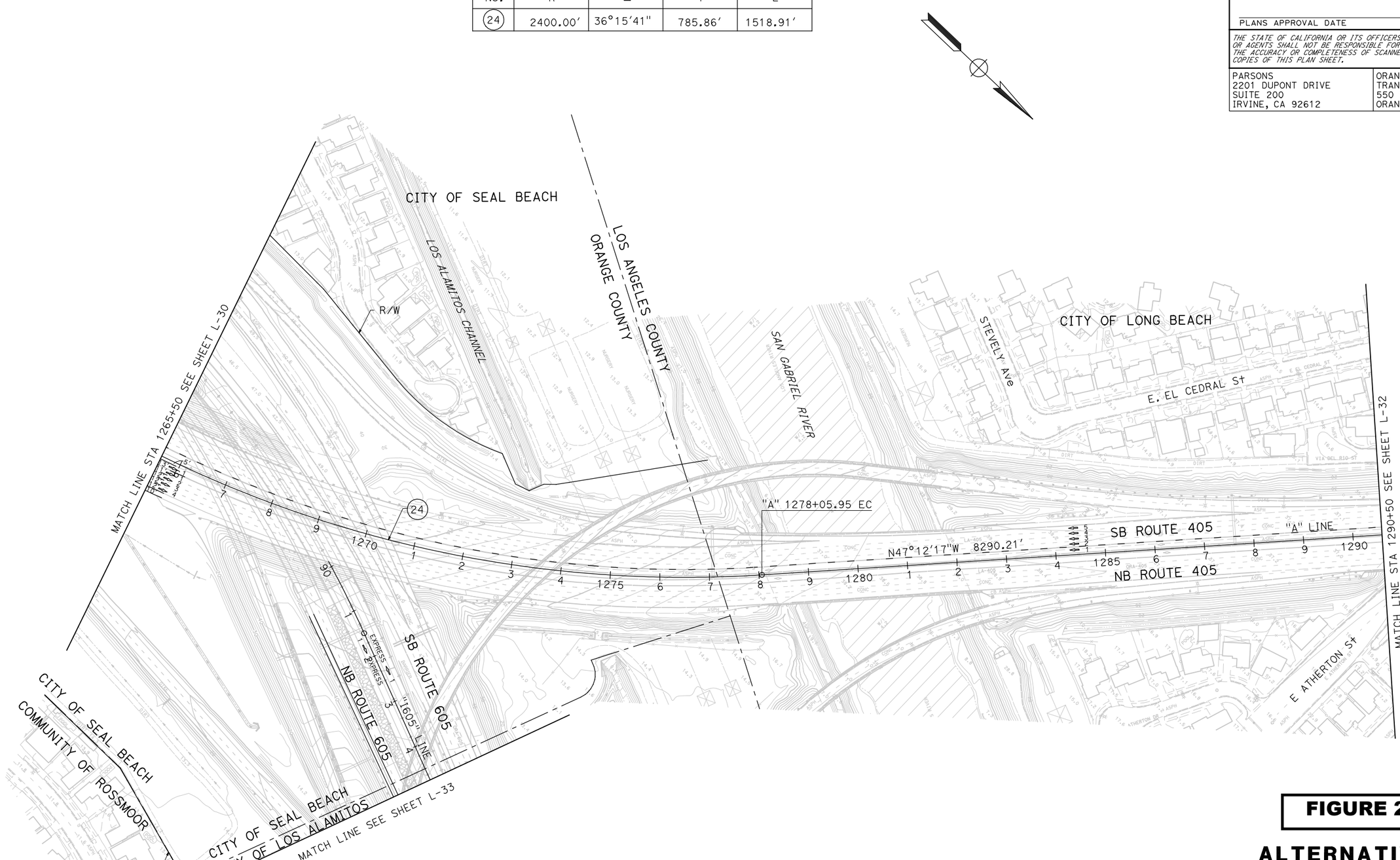

FIGURE 2-38

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-31**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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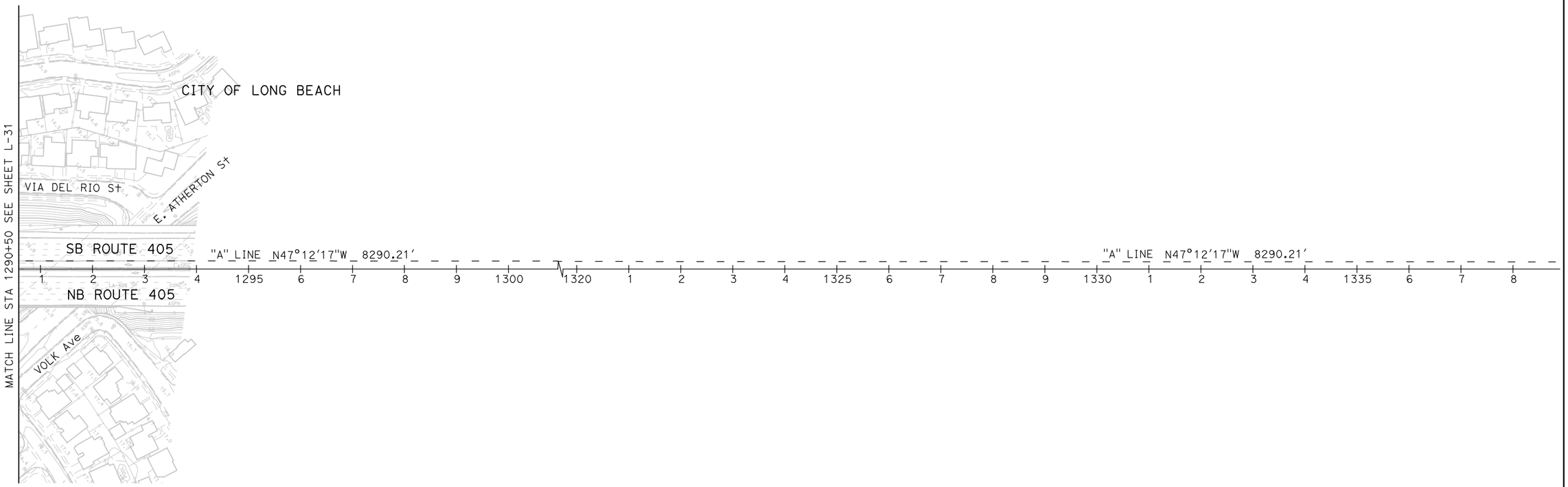

FIGURE 2-39

ALTERNATIVE 3 LAYOUT

SCALE 1"=100' **L-32**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
(27)	11350.00′	4°40′34"	463.41′	926.30′

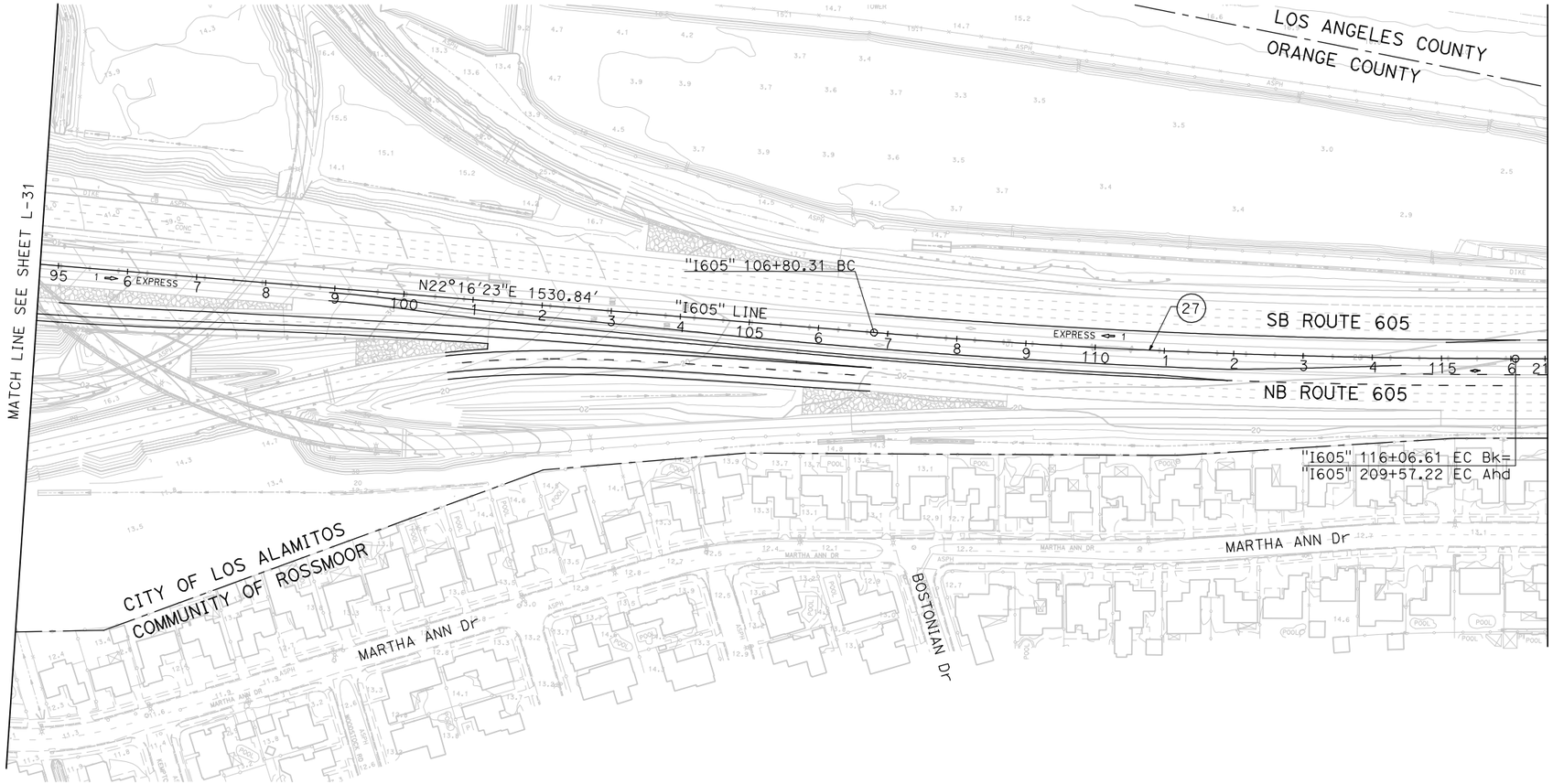

FIGURE 2-40

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-33**

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12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
(28)	2700.00′	24°24′00"	583.76′	1149.82′

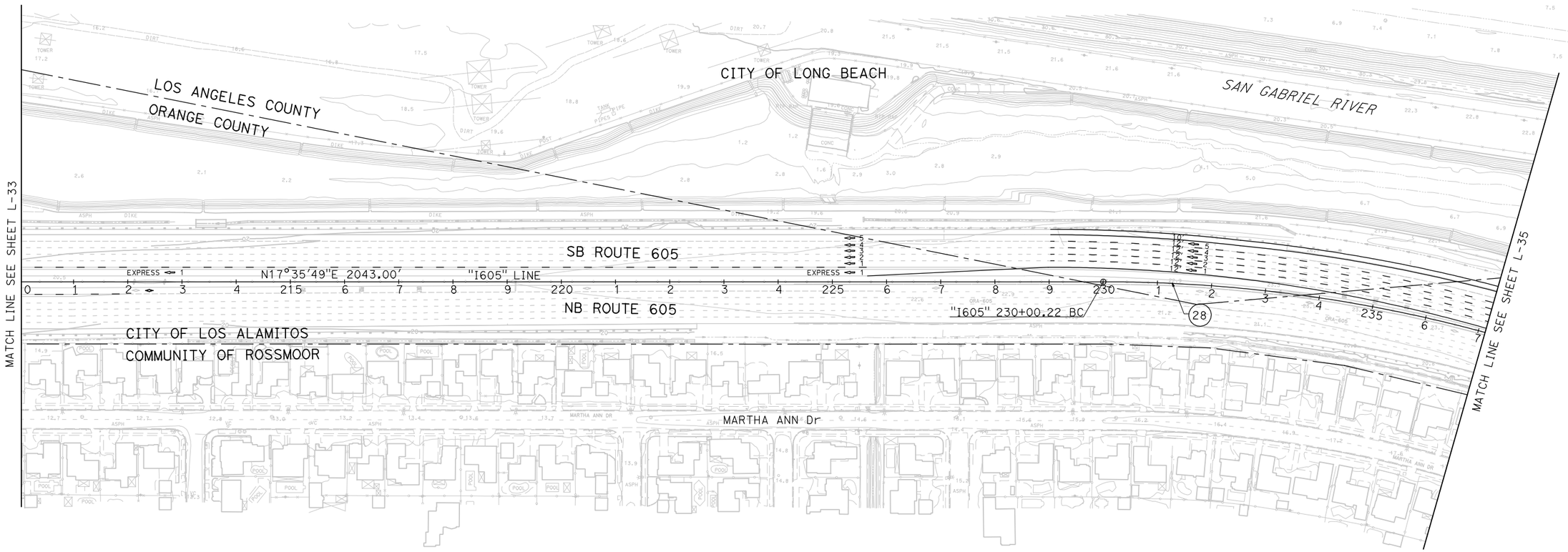

FIGURE 2-41

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-34**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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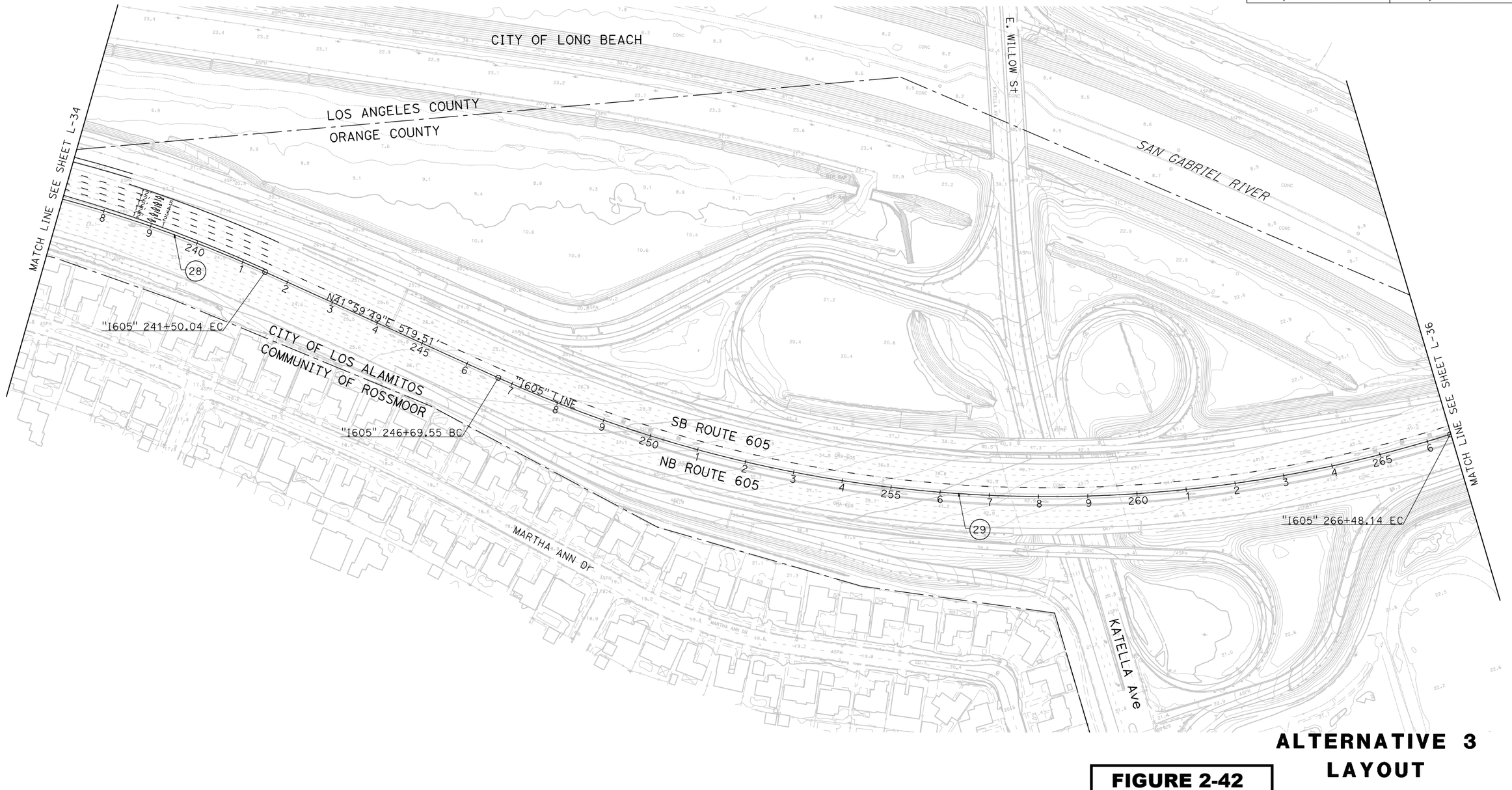
ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
(28)	2700.00′	24°24′00"	583.76′	1149.82′
(29)	2700.00′	41°59′13"	1036.08′	1978.59′



ALTERNATIVE 3 LAYOUT

FIGURE 2-42

SCALE 1"=100′ **L-35**

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UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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CURVE DATA

No.	R	Δ	T	L
(31)	25000.00′	1°06′39"	242.34′	484.67′
(32)	10000.00′	5°38′35"	492.85′	984.81′

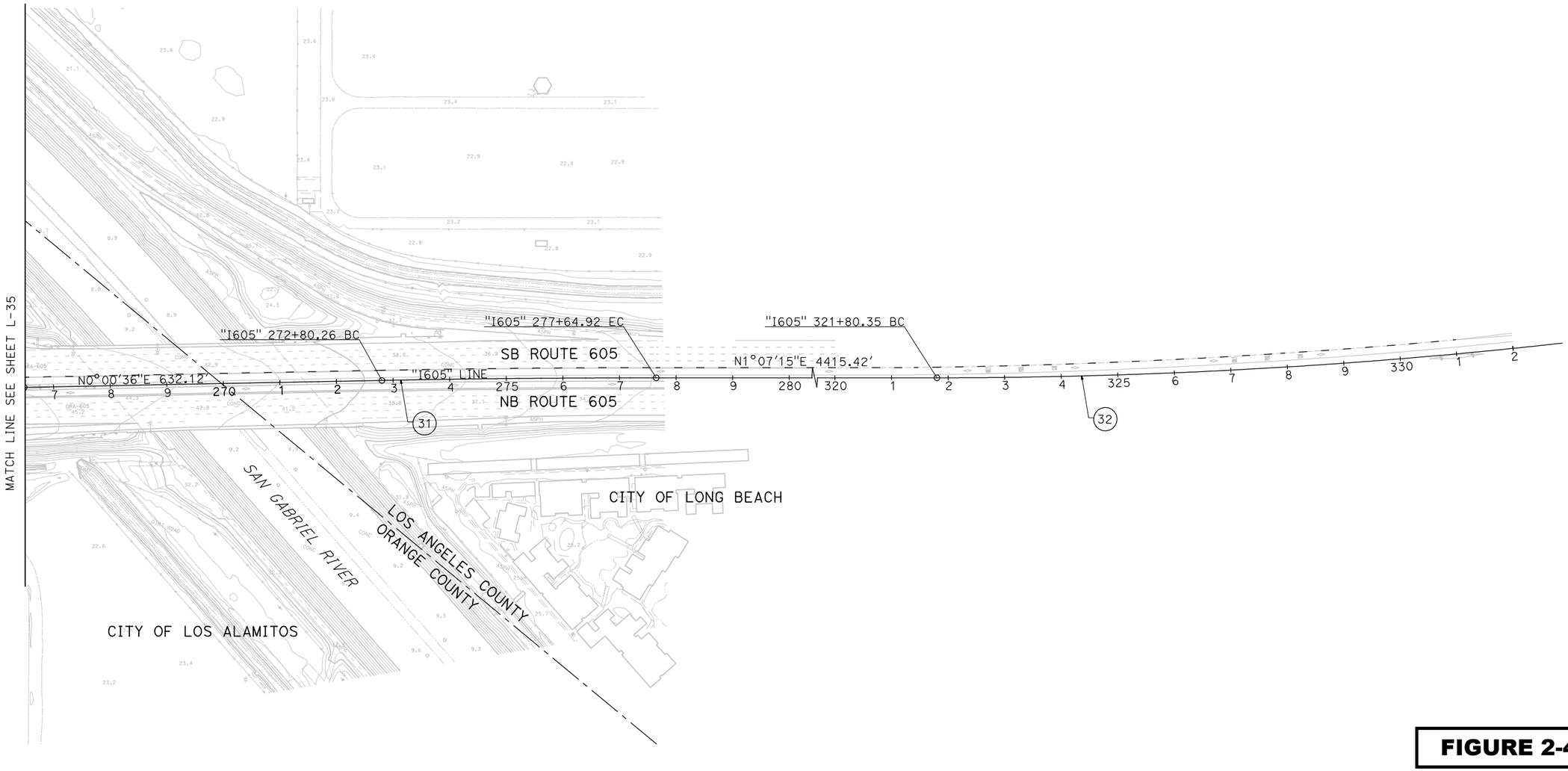

FIGURE 2-43

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-36**

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UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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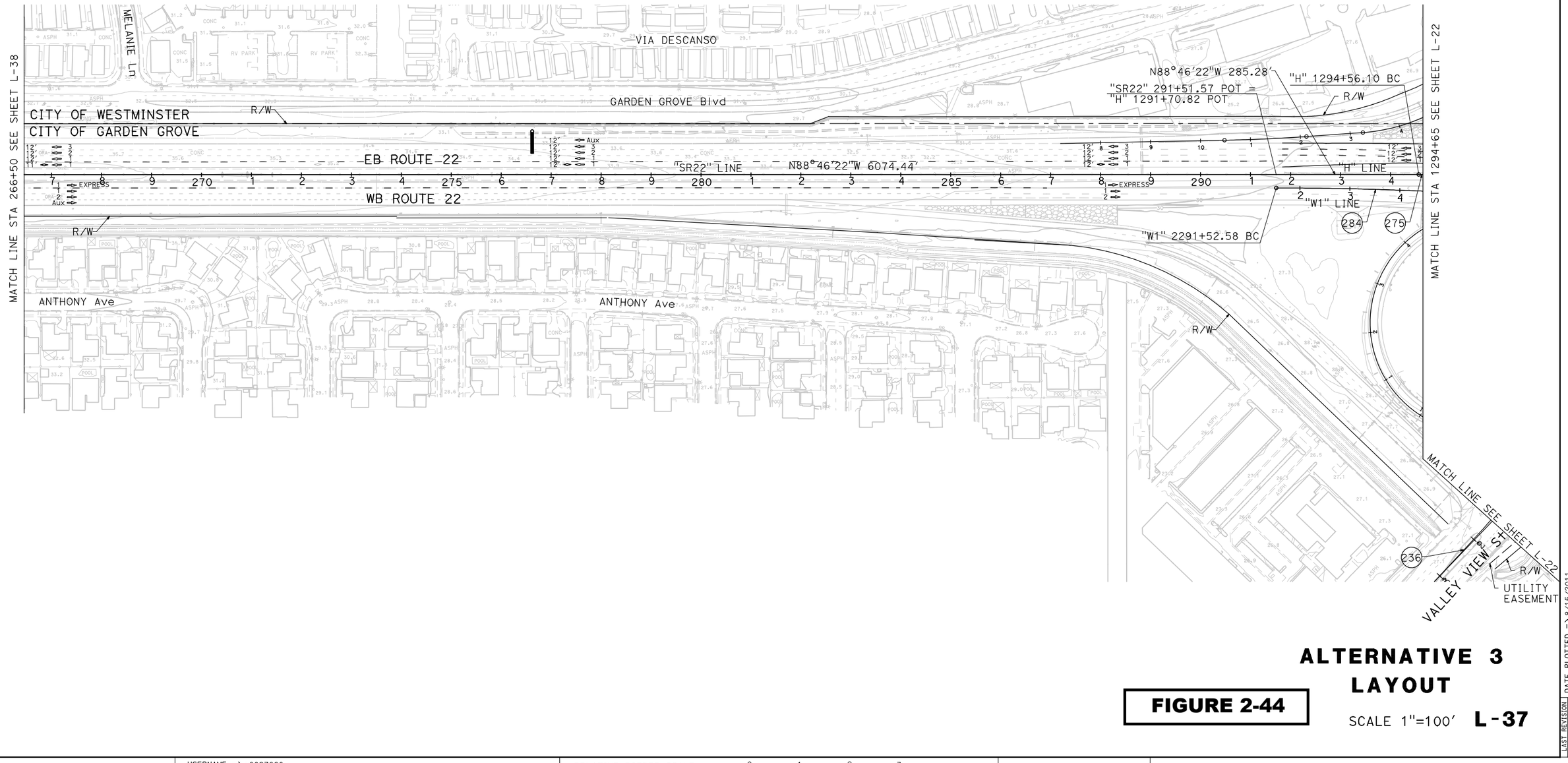
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
236	7000.00′	3°20′52"	204.56′	409.00′
275	5000.00′	7°01′44"	307.08′	613.39′
284	6635.00′	7°33′49"	438.57′	875.87′



ALTERNATIVE 3 LAYOUT

FIGURE 2-44

SCALE 1"=100′ **L-37**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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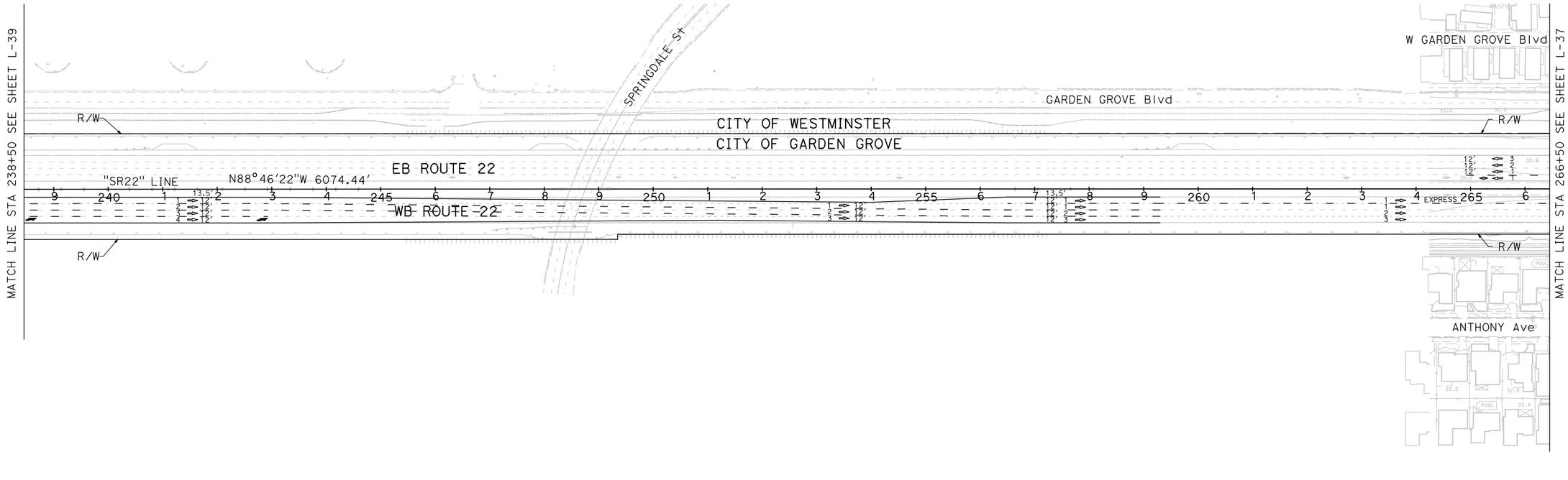

FIGURE 2-45

ALTERNATIVE 3 LAYOUT

SCALE 1"=100' **L-38**

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
276	4000.00′	7°46′10"	271.62′	542.41′
277	2250.00′	39°44′45"	813.29′	1560.82′

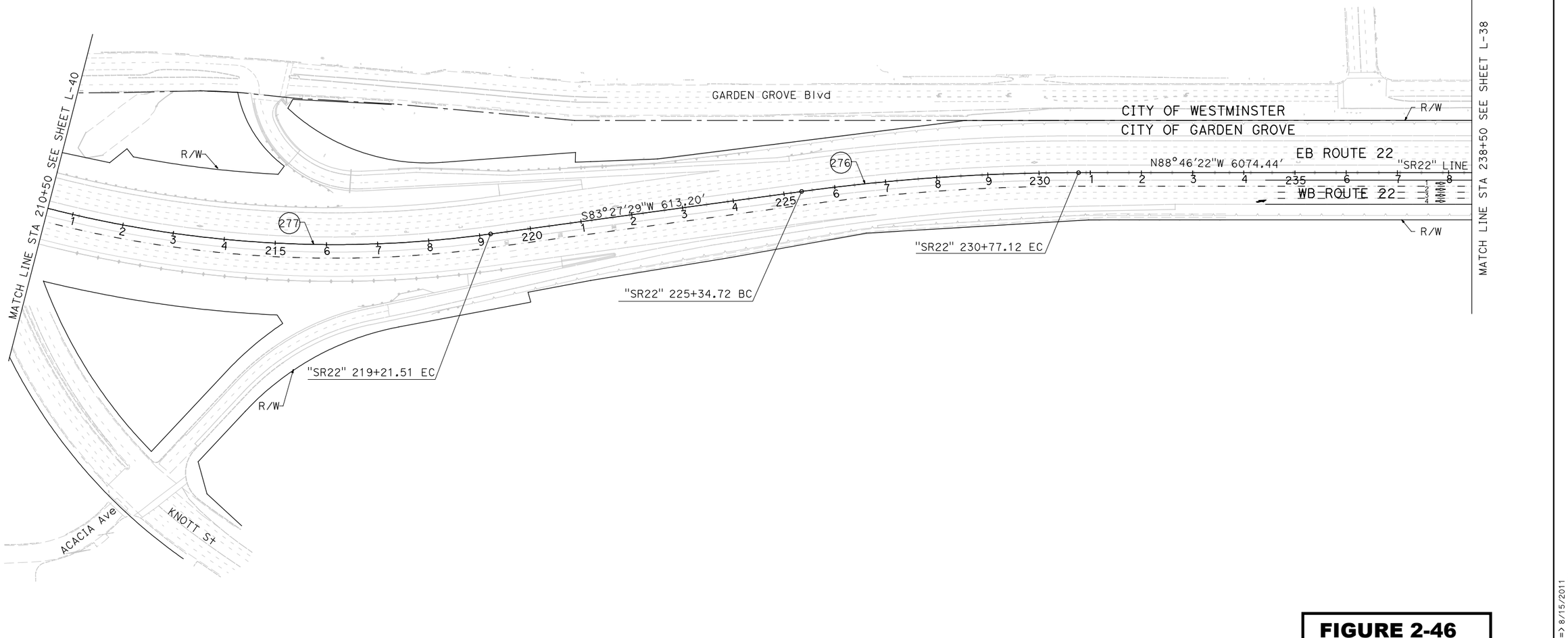

FIGURE 2-46

ALTERNATIVE 3
LAYOUT

SCALE 1"=100′ **L-39**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,R9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
277	2250.00′	39°44′45"	307.08′	613.39′
278	3300.00′	28°18′27"	813.29′	1560.82′

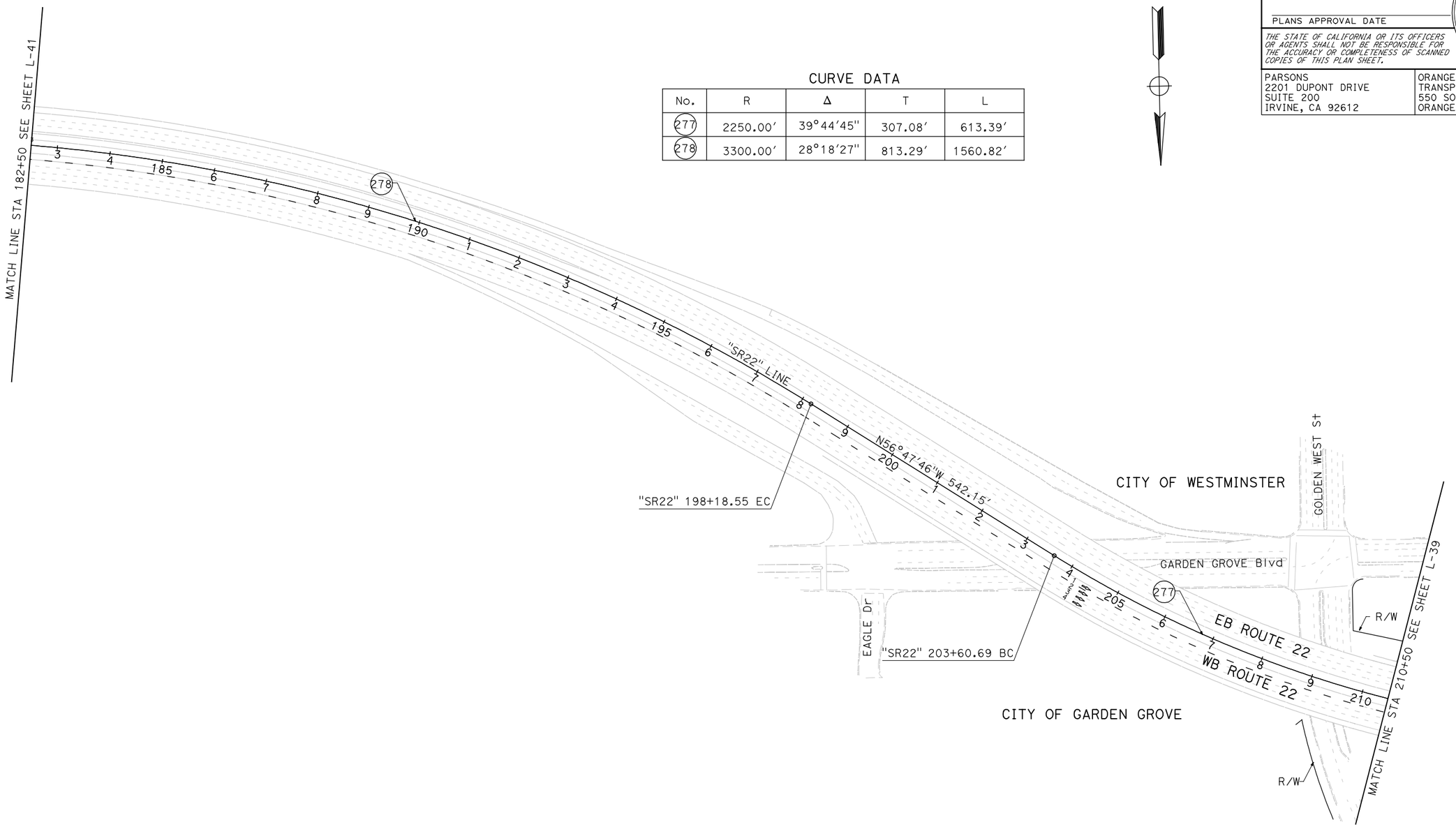

FIGURE 2-47

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-40**

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	R0.5/R0.7,R0.7/R3.8 R27.2/R27.6,9.3/24.2 0.0/1.2,3.5/R1.6,R0.0/R1.2		

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PLANS APPROVAL DATE

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2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
278	3300.00′	28°18′27"	832.19′	1630.40′

CITY OF WESTMINSTER

N85°06′13"W 4861.18′

EB ROUTE 22

N85°06′13"W 4861.18′

"SR22" LINE

WB ROUTE 22

278

CITY OF GARDEN GROVE

"SR22" 181+88.15 BC

MATCH LINE STA 182+50 SEE SHEET L-41

FIGURE 2-48

ALTERNATIVE 3 LAYOUT

SCALE 1"=100′ **L-41**

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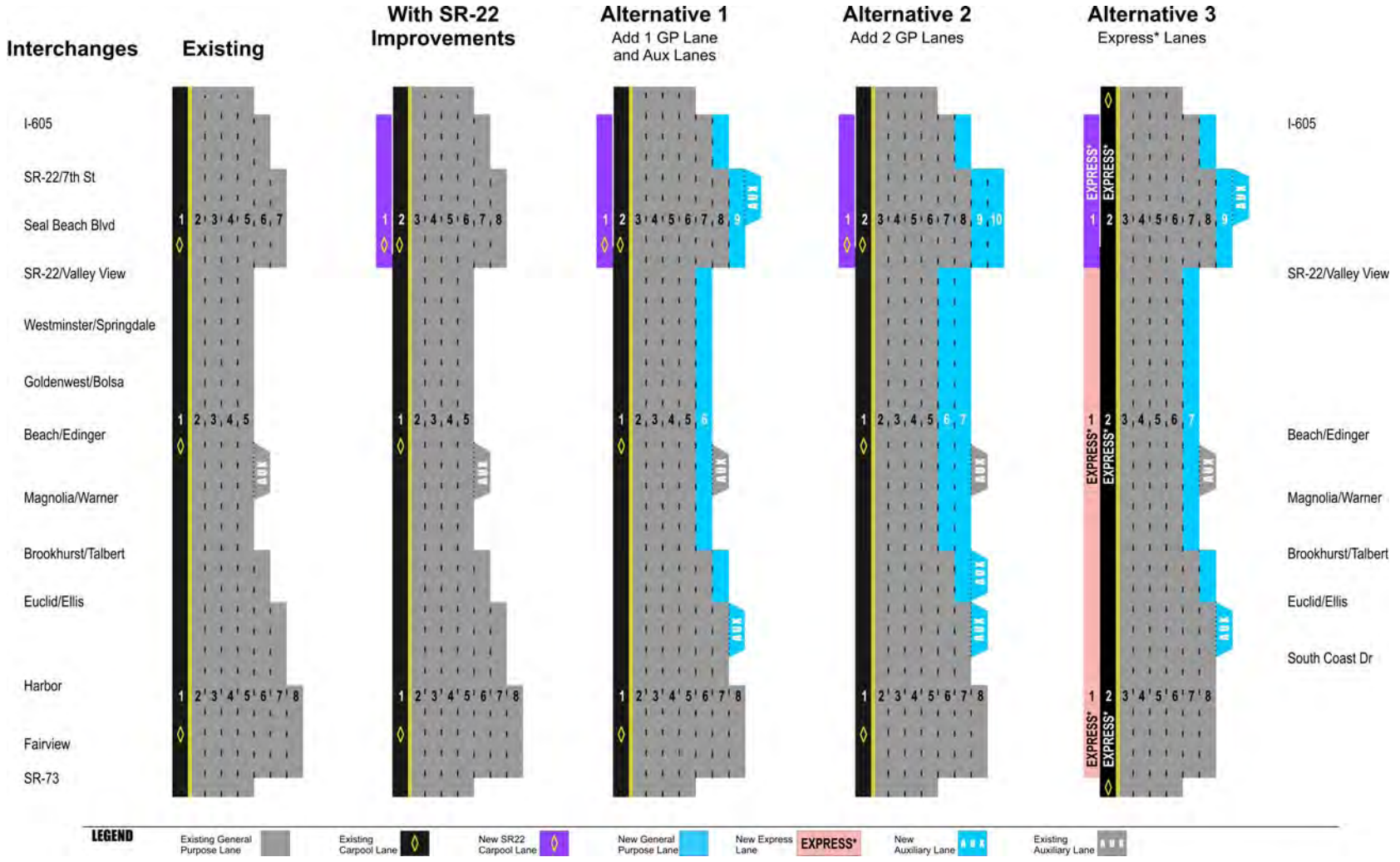
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

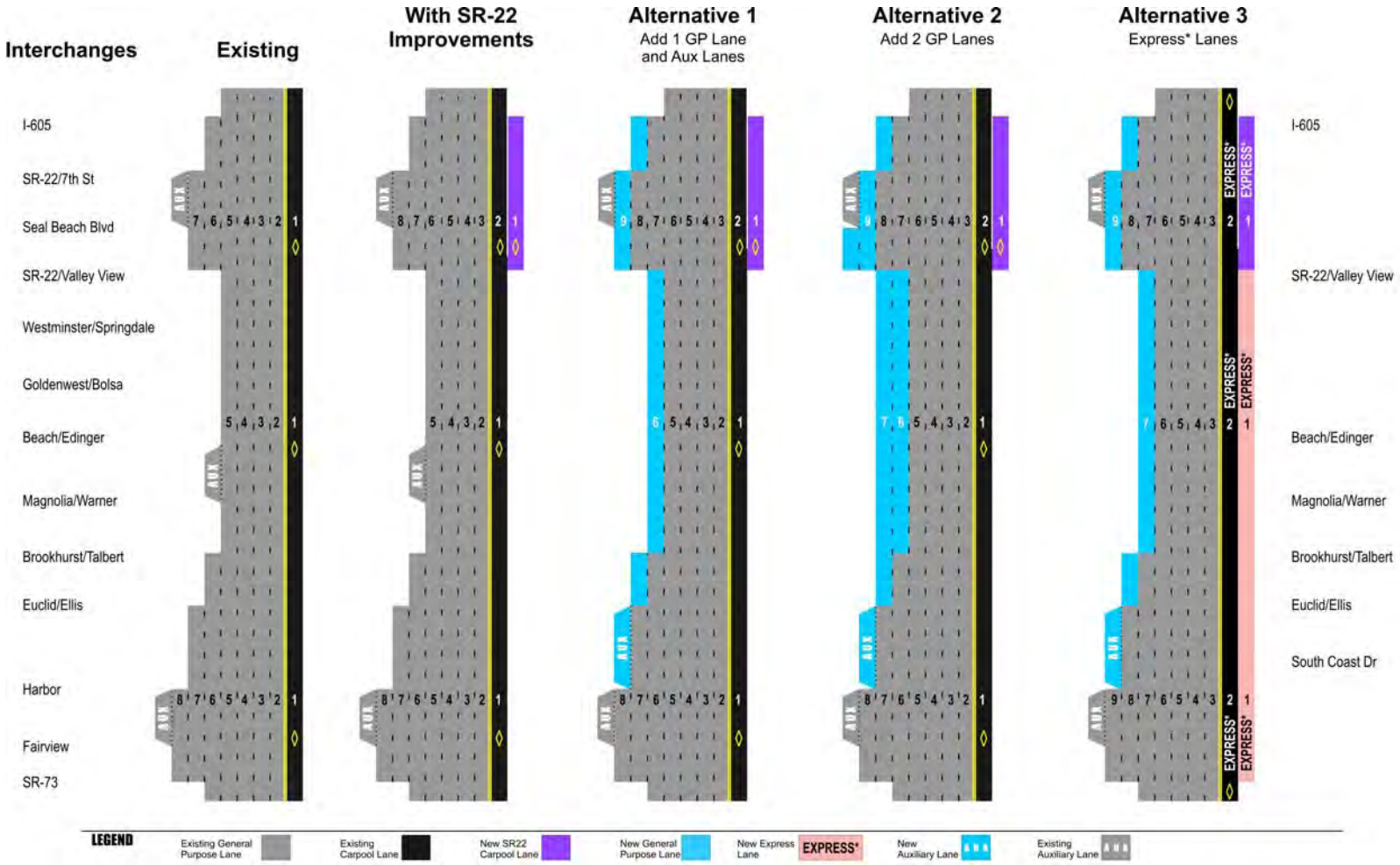


GDC Project No. I-487

I-405 Widening SR-73 to I-605, PR / ED
Orange County, California

SCHEMATIC OF IMPROVEMENTS (NORTHBOUND)

Figure 3A

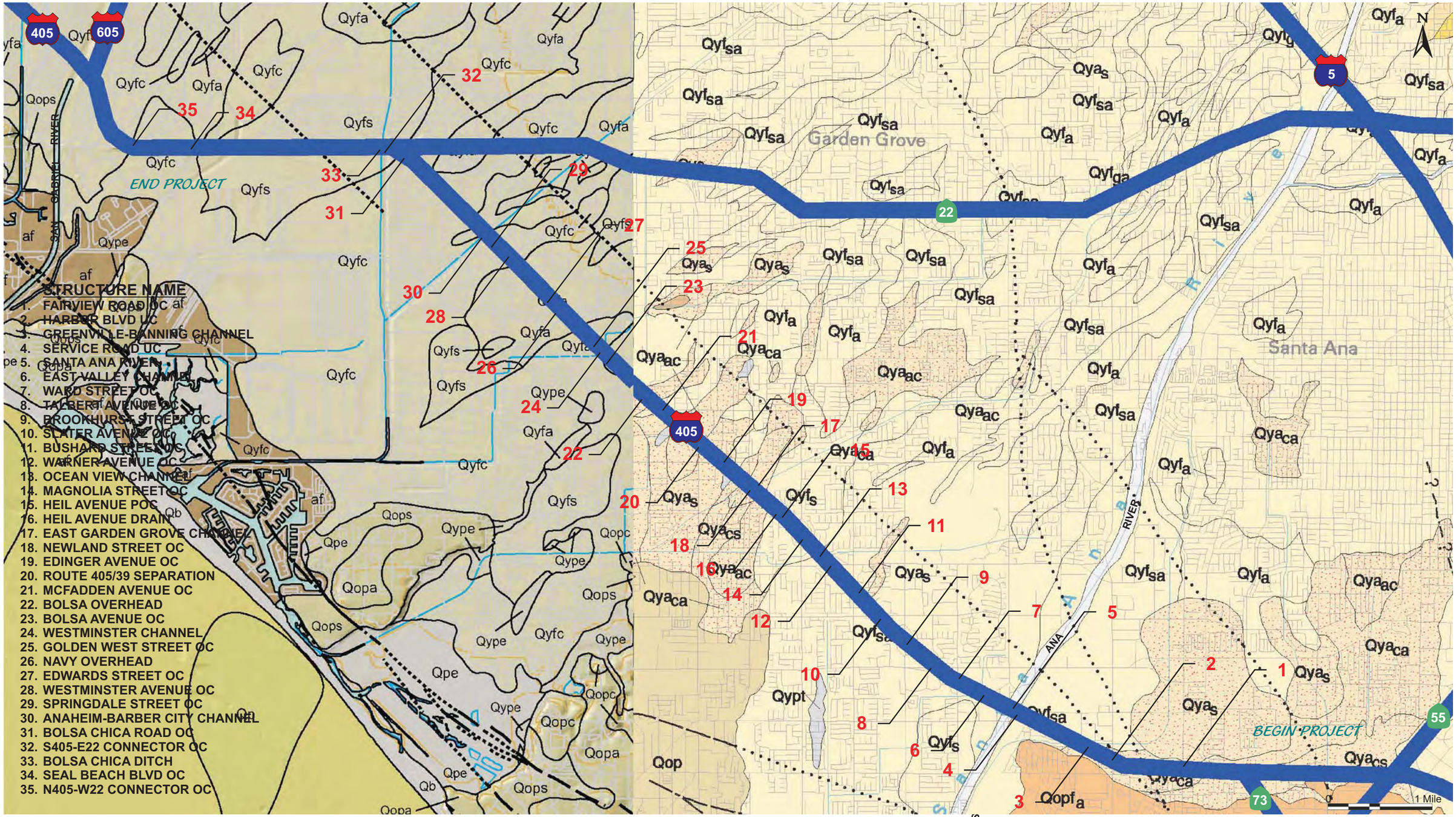


GDC Project No. I-487

I-405 Widening SR-73 to I-605, PR / ED
Orange County, California

SCHEMATIC OF IMPROVEMENTS (SOUTHBOUND)

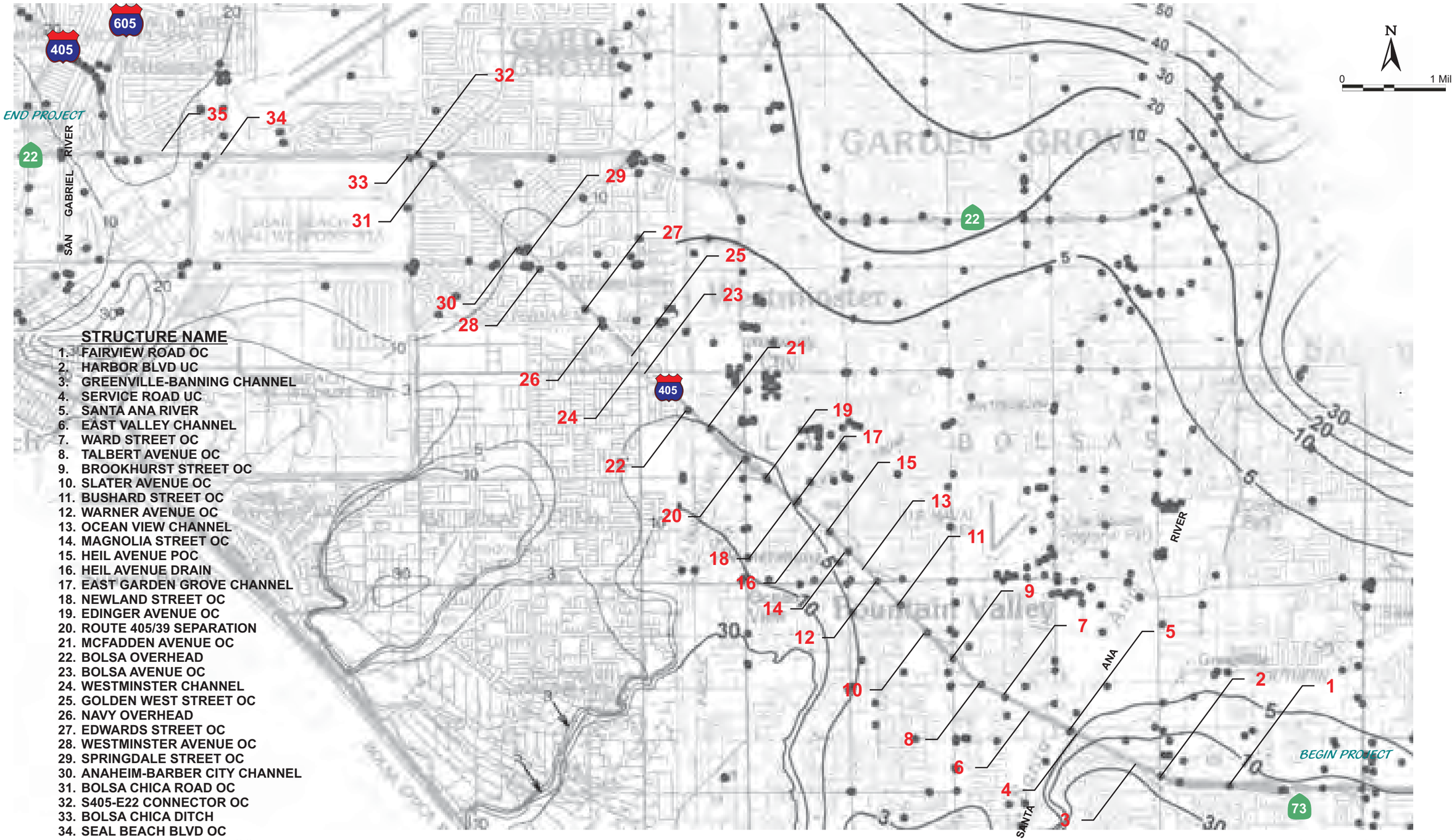
Figure 3B



Ref. : State of California, Geologic Map Of The Long Beach and Santa Ana 30' X 60' Quadrangle

LEGEND
Qya = Young Alluvial Deposits
Qyf = Young Alluvial Fan Deposits
Qop = Old Paralic Deposits

I-405 WIDENING FROM SR-73 TO I-605
ORANGE COUNTY, CALIFORNIA
FIGURE 4
GEOLOGIC MAP

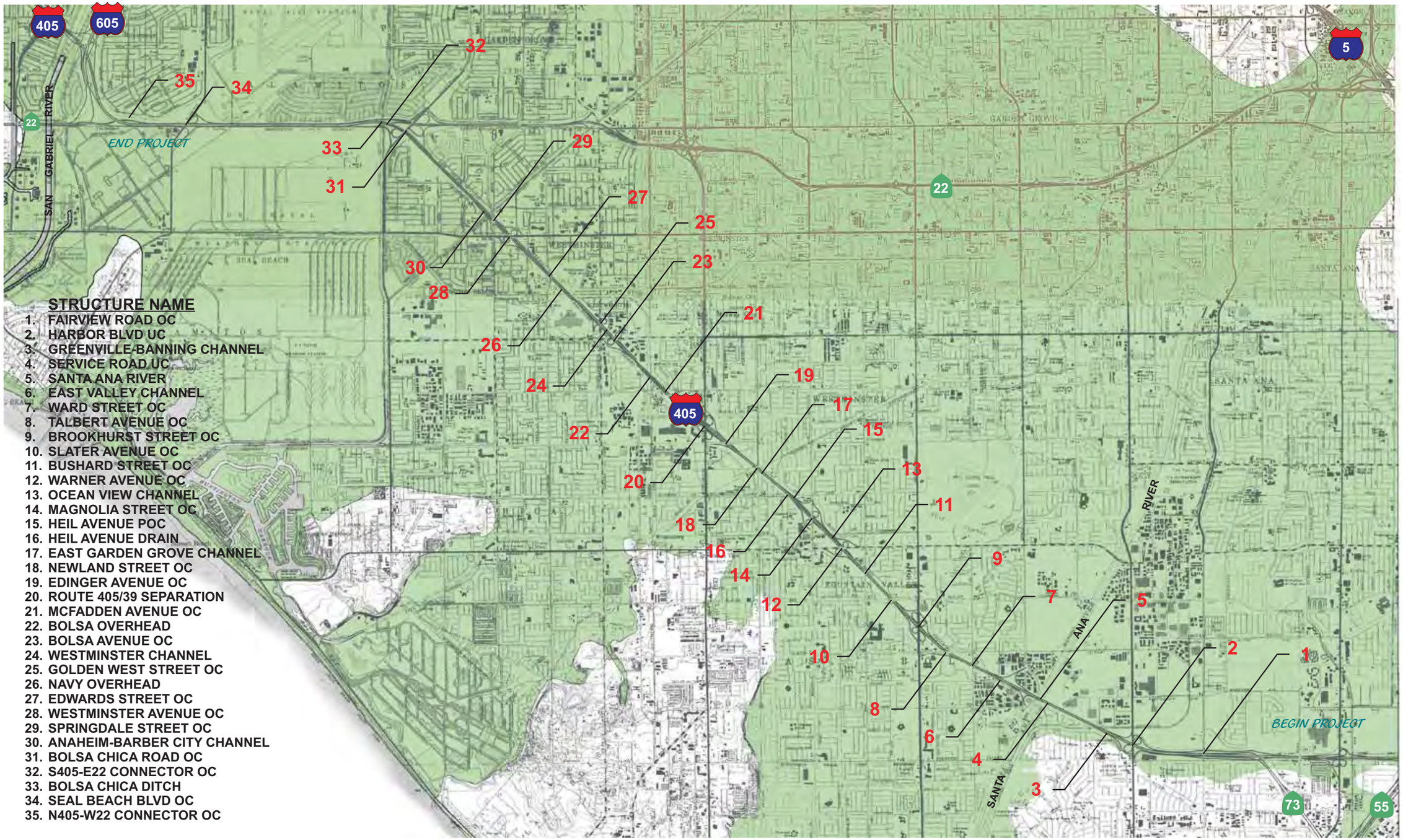


STRUCTURE NAME

1. FAIRVIEW ROAD OC
2. HARBOR BLVD UC
3. GREENVILLE-BANNING CHANNEL
4. SERVICE ROAD UC
5. SANTA ANA RIVER
6. EAST VALLEY CHANNEL
7. WARD STREET OC
8. TALBERT AVENUE OC
9. BROOKHURST STREET OC
10. SLATER AVENUE OC
11. BUSHARD STREET OC
12. WARNER AVENUE OC
13. OCEAN VIEW CHANNEL
14. MAGNOLIA STREET OC
15. HEIL AVENUE POC
16. HEIL AVENUE DRAIN
17. EAST GARDEN GROVE CHANNEL
18. NEWLAND STREET OC
19. EDINGER AVENUE OC
20. ROUTE 405/39 SEPARATION
21. MCFADDEN AVENUE OC
22. BOLSA OVERHEAD
23. BOLSA AVENUE OC
24. WESTMINSTER CHANNEL
25. GOLDEN WEST STREET OC
26. NAVY OVERHEAD
27. EDWARDS STREET OC
28. WESTMINSTER AVENUE OC
29. SPRINGDALE STREET OC
30. ANAHEIM-BARBER CITY CHANNEL
31. BOLSA CHICA ROAD OC
32. S405-E22 CONNECTOR OC
33. BOLSA CHICA DITCH
34. SEAL BEACH BLVD OC
35. N405-W22 CONNECTOR OC

Ref. : CGS's Seismic Hazard Zone Report For the Los Alamitos, Seal Beach, and Newport Beach 7.5-minute Quadrangles, Los Angeles And Orange Counties, California

I-405 WIDENING FROM SR-73 TO I-605
ORANGE COUNTY, CALIFORNIA
FIGURE 5
HISTORIC HIGH DEPTH TO GROUNDWATER



STRUCTURE NAME

1. FAIRVIEW ROAD OC
2. HARBOR BLVD UC
3. GREENVILLE-BANNING CHANNEL
4. SERVICE ROAD UC
5. SANTA ANA RIVER
6. EAST VALLEY CHANNEL
7. WARD STREET OC
8. TALBERT AVENUE OC
9. BROOKHURST STREET OC
10. SLATER AVENUE OC
11. BUSHARD STREET OC
12. WARNER AVENUE OC
13. OCEAN VIEW CHANNEL
14. MAGNOLIA STREET OC
15. HEIL AVENUE POC
16. HEIL AVENUE DRAIN
17. EAST GARDEN GROVE CHANNEL
18. NEWLAND STREET OC
19. EDINGER AVENUE OC
20. ROUTE 405/39 SEPARATION
21. MCFADDEN AVENUE OC
22. BOLSA OVERHEAD
23. BOLSA AVENUE OC
24. WESTMINSTER CHANNEL
25. GOLDEN WEST STREET OC
26. NAVY OVERHEAD
27. EDWARDS STREET OC
28. WESTMINSTER AVENUE OC
29. SPRINGDALE STREET OC
30. ANAHEIM-BARBER CITY CHANNEL
31. BOLSA CHICA ROAD OC
32. S405-E22 CONNECTOR OC
33. BOLSA CHICA DITCH
34. SEAL BEACH BLVD OC
35. N405-W22 CONNECTOR OC

Ref. : State of California Seismic Hazard Zone Map For the Los Alamitos, Seal Beach, and Newport Beach 7.5-minute Quadrangles, Los Angeles And Orange Counties

Liquefaction
Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

N

0 1 Mile

I-405 WIDENING FROM SR-73 TO I-605
ORANGE COUNTY, CALIFORNIA
FIGURE 6
SEISMIC HAZARD ZONE MAP

Ref. : Caltrans ARS Online

GROUP DELTA CONSULTANTS	**GROUP DELTACONSULTANTS, INC.** ENGINEERS AND GEOLOGISTS 32 MAUCHLY, SUITE B IRVINE , CA 92618 (949) 450-2100	FIGURE NUMBER 7A
	PROJECT NAME I-405 WIDENING FROM SR-73 TO I-605 ORANGE COUNTY, CALIFORNIA	PROJECT NUMBER I-487
	REGIONAL FAULT MAP	

Ref. : Caltrans ARS Online

GROUP DELTA CONSULTANTS

GROUP DELTACONSULTANTS, INC.
ENGINEERS AND GEOLOGISTS
32 MAUCHLY, SUITE B
IRVINE , CA 92618 (949) 450-2100

FIGURE NUMBER
7B

PROJECT NAME
I-405 WIDENING FROM SR-73 TO I-605
ORANGE COUNTY, CALIFORNIA

PROJECT NUMBER
I-487

PROJECT AREA FAULT MAP

APPENDIX A
AS-BUILT LOG OF TEST BORING SHEETS

DIST.	COUNTY	ROUTE	POST MILES - TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST

DATE APPROVED

224' LT 512+94.92 CL FWY
SOUNDWALL

SOUNDWALL NO. 103

153' LT 114+00 CL FWY
END WALL

B-2 (3") B-3 (3") B-1 (3") (BR NO. 55-431) B-5 (BR NO. 55-431) B-4 (3")

515+00 100+00 520+00 ℄ FWY 105+00 110+00 115+00 120+00 EXIST. BRISTOL ST. O.C.

EQUATION
STA. 100+00.00 AHEAD
STA. 520+94.92 BACK

BENCH MARK

BM V-206 ELEV. 36.36
AERIAL "X", S/B SHOULDER, RTE 405 FWY,
ABOUT 0.3 MI NORTH OF RTE 55/405 SEP.

PLAN

1"=100'

DIST.	COUNTY	ROUTE	POST MILES - TOTAL PROJECT	Sheet No.	Total Sheets
12	ORA	405			

ENGINEERING GEOLOGY BRANCH - TRANSPORTATION MATERIALS & RESEARCH

W. C. Cain
CERTIFIED ENGINEERING GEOLOGIST - PROJECT GEOLOGIST

SOUND WALL # 103 MODIFICATION

LOG OF TEST BORINGS 2 OF 2

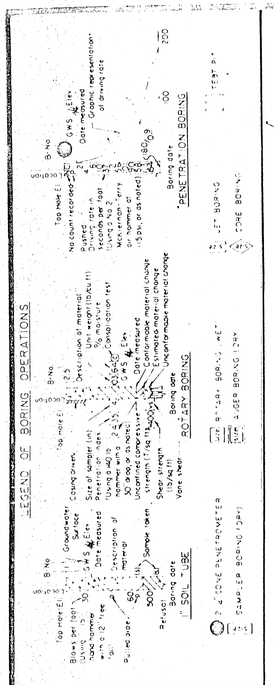
NOTE: THIS LOG OF TEST BORINGS IS AVAILABLE ON MICROFILM AT OFFICE OF STRUCTURES DESIGN SACRAMENTO CALIFORNIA.

CU: 12208
EA: 025400

BRIDGE No.

REGISTERED GEOLOGIST
W.C. CAIN
No. 732
Exp. 6-30-94
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SANDY CLAY · CLAYEY SAND · SILTY SAND · SILTY SAND · ORGANIC MATERIAL · CRYSTALLINE ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK

NOTE: Classification of earth materials as shown on this log is in accordance with the classification system described in this manual.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Blows/Ft.	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Typical Names	Information required for describing soils	Laboratory Classification Criteria
Coarse Grained Soils	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	GW Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics
		GP Poorly graded gravels, gravel-sand mixtures, little or no fines		Example: Silty, fine to coarse GRAVEL, with sand, angular gravel particles, brown, slightly compact, moist, cobbles, (GM)
		GM Silty gravels, gravel-sand-silt mixtures		
		GC Clayey gravels, gravel-sand-clay mixtures		
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	SW Well graded sands, gravelly sands, little or no fines		
		SP Poorly graded sands, gravelly sands, little or no fines		
		SM Silty sands, sand-silt mixtures		
		SC Clayey sands, sand-clay mixtures		
Fine Grained Soils	Silts and Clays (Liquid limit less than 50)	ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Give typical name; indicate degree and character of plasticity; amount and maximum size of coarse grains; color in wet condition, odor if any, local or geologic name and other pertinent descriptive information; and symbol in parentheses	Dry strength, dilatancy, toughness, plasticity
		CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		OL Organic silts and organic silty clays of low plasticity		
	Silts and Clays (Liquid limit greater than 50)	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
		CH Inorganic clays of high plasticity, fat clays		
		OH Organic clays of medium to high plasticity, organic silts		
Highly Organic Soils		Pt Peat and other highly organic soils		

B-2

515+00 · 159' LT Sta. 515+69 ℄ Fwy

3"	32	16 21 27	1.4 1.4 1.4
		11	1.4
		24	1.4
		24	1.4
		23	1.4

Slightly compact to compact, fine SANDY SILT with CLAY binder, dry.
Stiff to very stiff, brown, fine, SANDY, highly plastic CLAY; damp.
Compact, brown, interbeds of SILTY, fine SAND and tan, highly plastic, partially cemented CLAY; damp.
Compact, brown, clean, medium SAND; damp.
Compact, brown, fine, SANDY SILT; damp.

5-1-86

B-3

520+00 · 100+00 · 154' LT Sta. 100+73 ℄ Fwy

3"	32	6	1.4
		11 14 18	1.4 1.4 1.4
		14	1.4
		26	1.4
		15	1.4
		17	1.4

Stiff, dark, brown, fine SANDY, medium plastic CLAY, with occasional PEBBLES, damp, grading to:
Stiff, brown, highly plastic CLAY, moist.
Slightly compact, brown, fine to medium SAND, moist, grading to:
Compact, brown, fine SAND with CLAY binder, moist.
Stiff, brown, sticky, highly plastic CLAY with minor fine SAND, moist.

5-1-86

B-1

105+00 · 156' LT Sta. 107+58 ℄ Fwy

3"	31	9	1.4
		14 12 9	1.4 1.4 1.4
		15	1.4
		21	1.4
		16	1.4

Loose, dark brown, fine SANDY SILT with CLAY binder, damp.
Stiff, dark gray, highly plastic CLAY with sparse fine SAND; damp.
Soft, brown, medium plastic CLAY with minor very fine SANDY CLAY; damp
Slightly compact, brown, CLAYEY SILT, moist.
Stiff to very stiff, light brown, medium plastic to highly plastic CLAY with sparse medium SAND and numerous PEBBLES; damp.

5-1-86

APPROXIMATE GROUND LINE ALONG WALL E.O.L.

B-4

110+00 · 104' LT Sta. 120+90 ℄ Fwy

3"	33	0	3
		29	1.4
		13	1.4
		17	1.4
		15	1.4

Slightly compact, to compact, brown to red brown SILT, CLAYEY very fine SAND.
Slightly compact, red-brown, medium SAND.
Slightly compact and compact, olive-brown, micaceous SILT to very fine SAND with some interbedded calcareous, gray, slightly CLAYEY SILT with concretions.

GWS ELEV. 16.3 8-13-64

8-12-64

B-5 (BR NO. 55-431)

115+00 · 166' LT Sta. 121+48 ℄ Fwy

3"	33	3	3
		33	1.4
		29	1.4
		13	1.4
		17	1.4
		15	1.4

GWS ELEV. 17.3 8-12-64

8-12-64

8-4-64

PROFILE

HOR. 1"=100' VERT. 1"=10'

JUL 2 2 1993

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY						
DRAWN BY	Leony L. Lopez 8/86	Approved Recommended By		CHARGE UNIT	EXPEND AUTHOR	SPEC DESIGN
CHECKED BY	ROBERT C. DORIA 8/86	Robert Carl Doria PROJECT GEOLOGIST	W.C. Cain 732 ENGINEERING GEOLOGIST C.E.G. NO			

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO.	
NONE	
POST MILE	
0.2/10.3	

SOUNDWALL NO. 103

LOG OF TEST BORINGS

SEP 10 1986

REVISION DATES (PRELIMINARY STAGE ONLY) — SHEET — OF

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2

CU 07210
WO 019641

Disregard prints bearing earlier revision dates →

05 0146

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405			

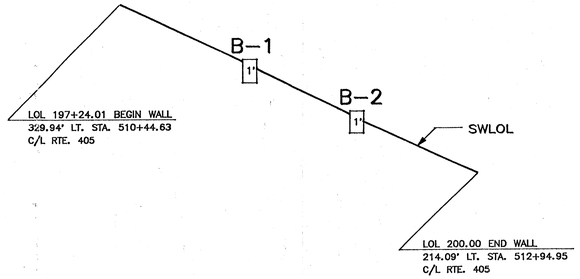
W.C. Cain
CERTIFIED ENGINEERING GEOLOGIST

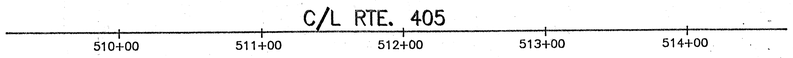
REGISTERED GEOLOGIST — W.C. CAIN No. 732 Exp. 6-30-94 CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

BENCH MARK

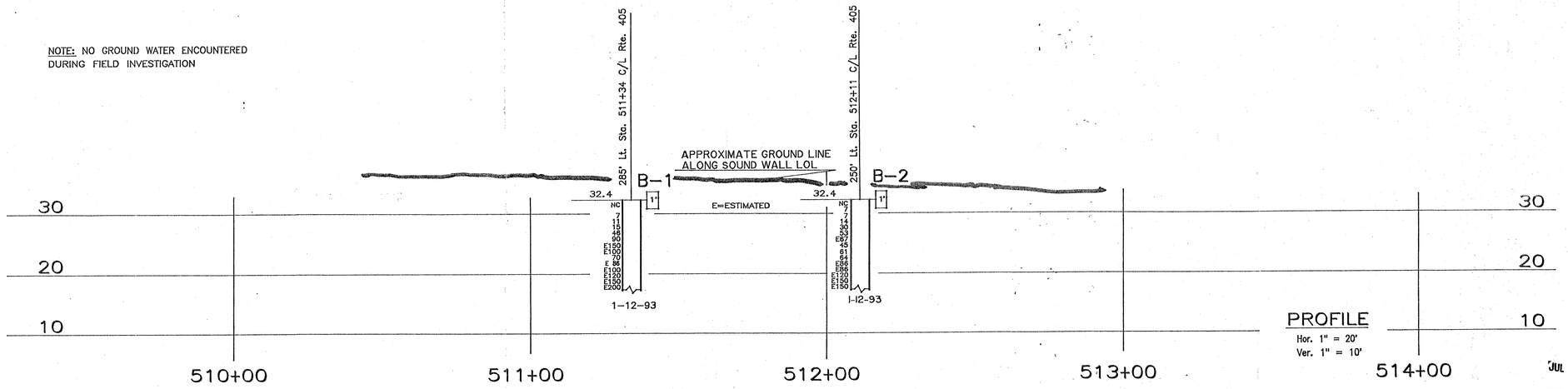
BM #V-206 Elev. 36.36'
AERIAL TARGET ON SBND RTE. 405 FWY. SHLDR.
ABOUT 0.3-mi. NORTH OF RTE. 55/405 SEP.





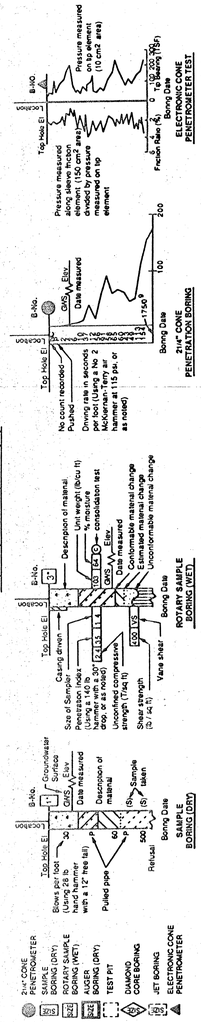
PLAN
1" = 50'

NOTE: NO GROUND WATER ENCOUNTERED DURING FIELD INVESTIGATION



PROFILE
Hor. 1" = 20'
Ver. 1" = 10'

JUL 22 1993



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · SILTY CLAY · CLAYEY SILT · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS
According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DIVISION OF NEW TECHNOLOGY, MATERIALS AND RESEARCH	OFFICE OF ENGINEERING GEOLOGY
DRAWN BY I. GAMARRA 2/93	
CHECKED BY R.W.C. Cain 6/93	

FIELD INVESTIGATION BY: R. DORIA

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO.	55-WALL
POST MILE	8.7/9.5

SOUND WALL NO. 103 (EXTENSION)
LOG OF TEST BORINGS 1 OF 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 12208
EA 025400

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

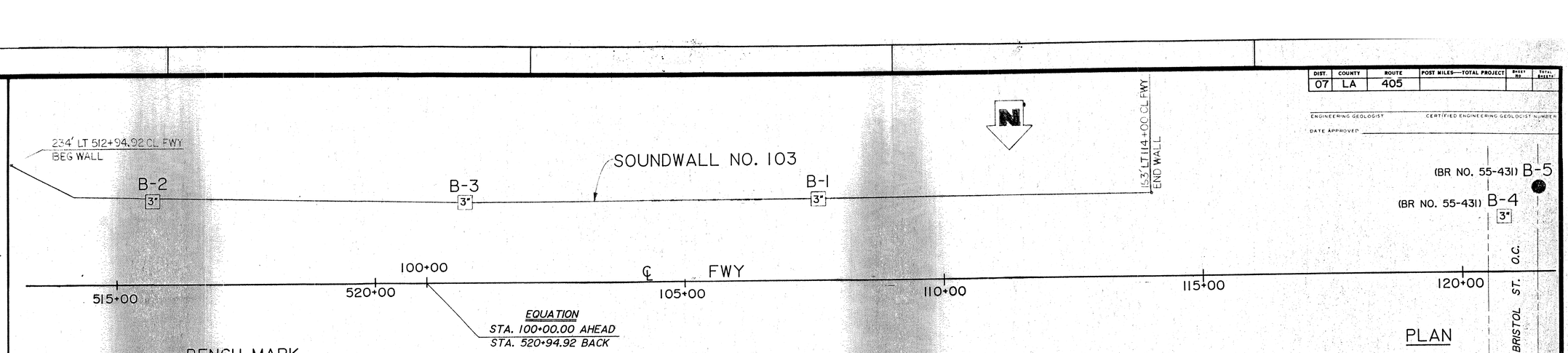
REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

TL 6051 REV. 2/92 92 64014

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405			

ENGINEERING GEOLOGIST _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER _____

DATE APPROVED _____

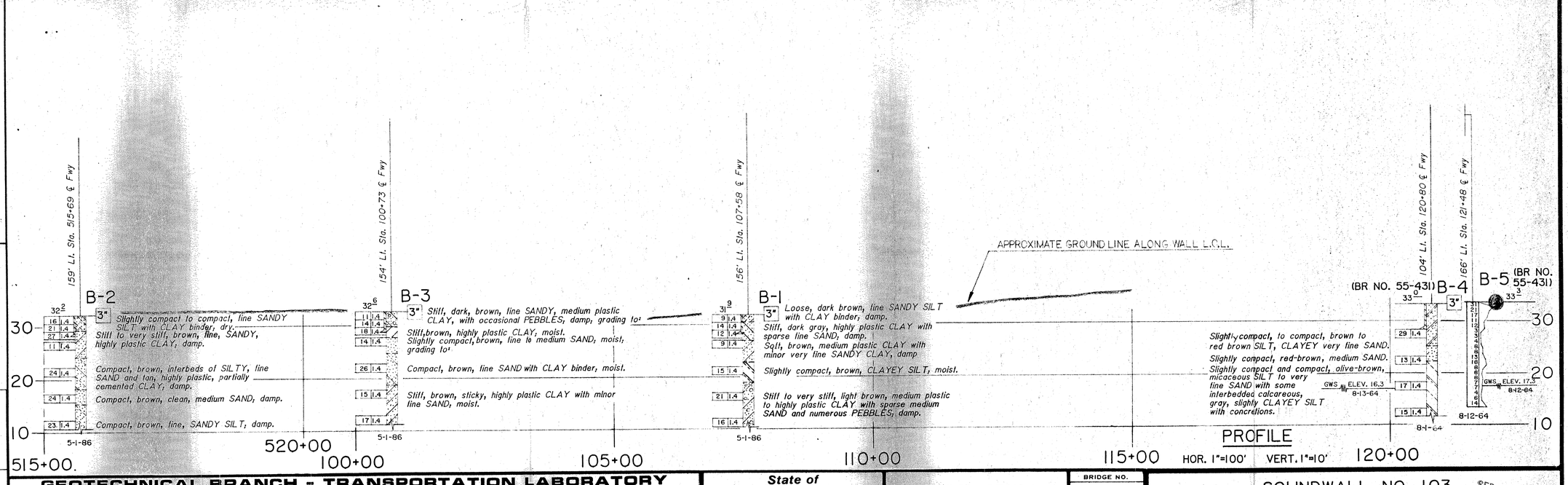


BENCH MARK

BM V-206 ELEV. 36.36
AERIAL "X", S/B SHOULDER, RTE 405 FWY,
ABOUT 0.3 MI NORTH OF RTE 55/405 SEP.

PLAN

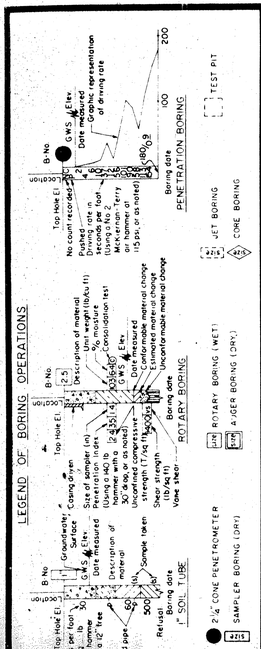
1"=100'



PROFILE

HOR. 1"=100' VERT. 1"=10'

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SILTY CLAY or CLAYEY SILT · SILTY SAND · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft.)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Group Symbols	Typical Names
Fine grained soils — Silts and Clays — Liquid limit less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays — Liquid limit greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils
Coarse grained soils — Gravels — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel sand silt mixtures
	GC	Clayey gravels, gravel sand clay mixtures
Sands — Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand silt mixtures
	SC	Clayey sands, sand clay mixtures

DRAWN BY	Leony L. Lopez 8/86	Approved Recommended By	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
CHECKED BY	ROBERT C. DORIA 8/86	PROJECT GEOLOGIST: Robert Carl Doria; ENGINEERING GEOLOGIST: W. P. Cain 732 CEG NO.			

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

State of **CALIFORNIA** **DEPARTMENT OF TRANSPORTATION**

STRUCTURES - DESIGN

PROJECT ENGINEER _____ REGISTERED CIVIL ENGINEER NO. _____

BRIDGE NO. NONE

POST MILE 0.2/10.3

SOUNDWALL NO. 103

LOG OF TEST BORINGS

SEP 10 1986

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07210
WO 019641

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

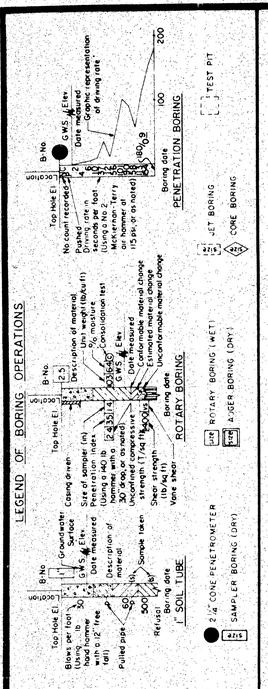
DS 0146

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	Total SHEETS
07	LA	405			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SILTY CLAY or CLAYEY SILT · PEAT and other ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

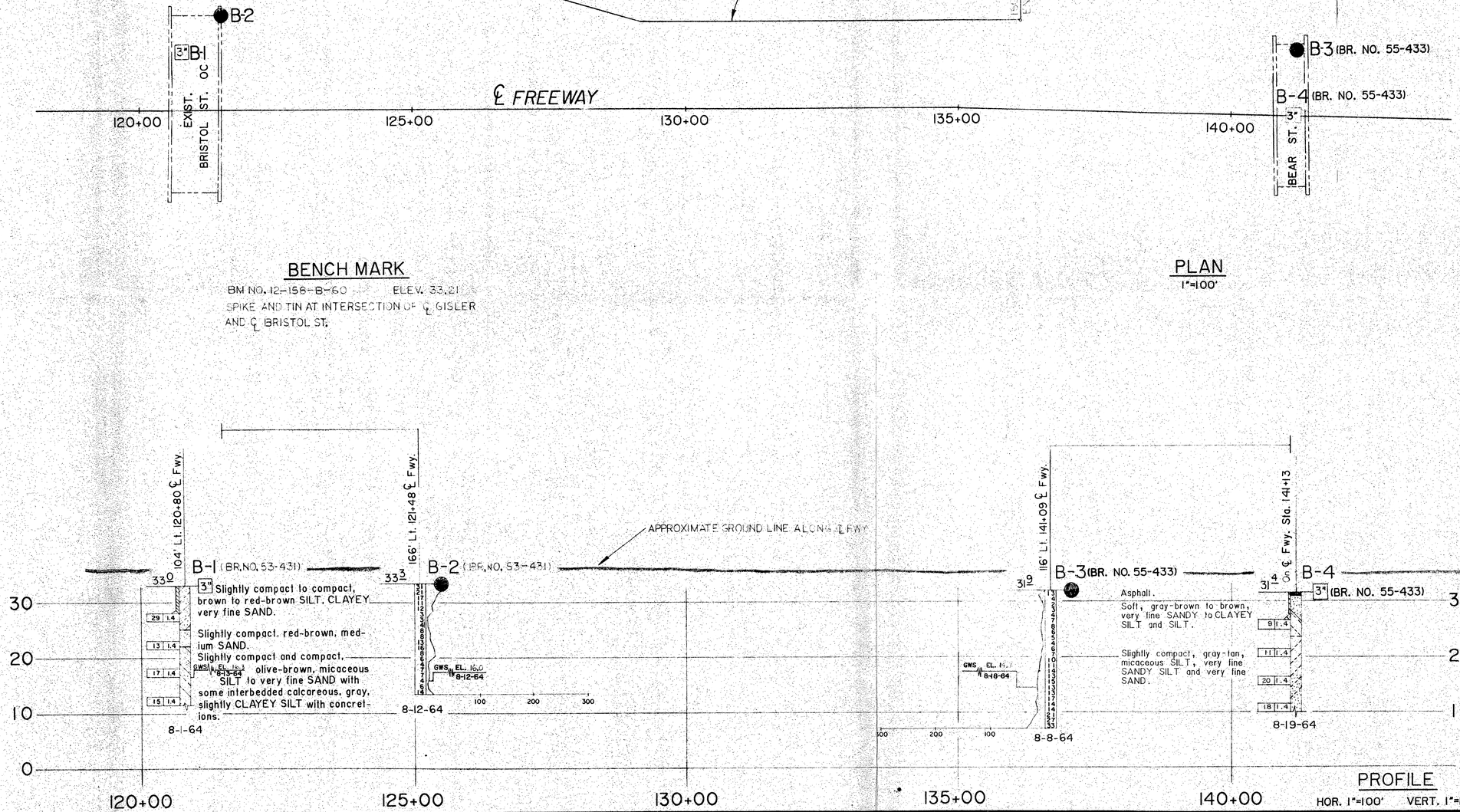
Penetration Index (Blows / Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70-	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Grp. Symbols	Typical Names	Grp. Symbols	Typical Names
Coarse grained Soils — Gravels — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines	GW-GM	Well graded gravels, gravel sand mixtures with silty binder
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines	GP-GC	Poorly graded gravels, gravel sand clay mixtures with clayey binder
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel sand silt mixtures	GC	Clayey gravels, gravel sand clay mixtures
Coarse grained Soils — Sands — Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines	SW-SM	Well graded sands, gravelly sands with silty binder
	SP	Poorly graded sands, gravelly sands, little or no fines	SP-SC	Poorly graded sands, gravelly sands with clayey binder
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand silt mixtures	SC	Clayey sands, sand clay mixtures
Fine grained Soils — Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	CL-ML	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts	PT	Peat and other highly organic soils
Highly Organic Soils				

NOTE: Soil classification and group symbols are based upon the Unified Soil Classification System as developed by the U.S. Bureau of Reclamation and the Corps of Engineers.



BENCH MARK

BM NO. 12-156-B-60 ELEV. 33.21

SPIKE AND TIN AT INTERSECTION OF ℄ GISLER AND ℄ BRISTOL ST.

PLAN

1"=100'

PROFILE

HOR. 1"=100' VERT. 1"=10'

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	B. COHOLAN 8-86	Approved Recommended By	CHARGE UNIT	EXPEND. AUTHOR.	SPEC. DESIGN.
CHECKED BY	ROBERT C. DORIA 8/86	Robert & Carol Doria PROJECT GEOLOGIST	W. C. Cain 732 ENGINEERING GEOLOGIST C.E.G. NO.		

State of **CALIFORNIA** **DEPARTMENT OF TRANSPORTATION**

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. NONE

POST MILE 0.2 / 10.3

SOUNDWALL NO. 131

LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

07210 WO 019641

Disregard prints bearing earlier revision dates →

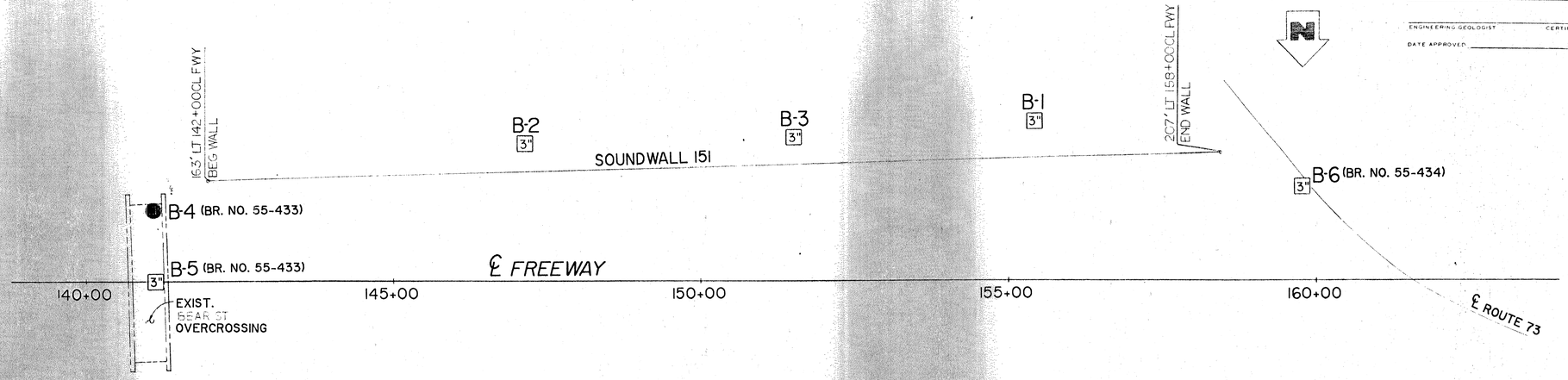
REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

05 0146

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED:

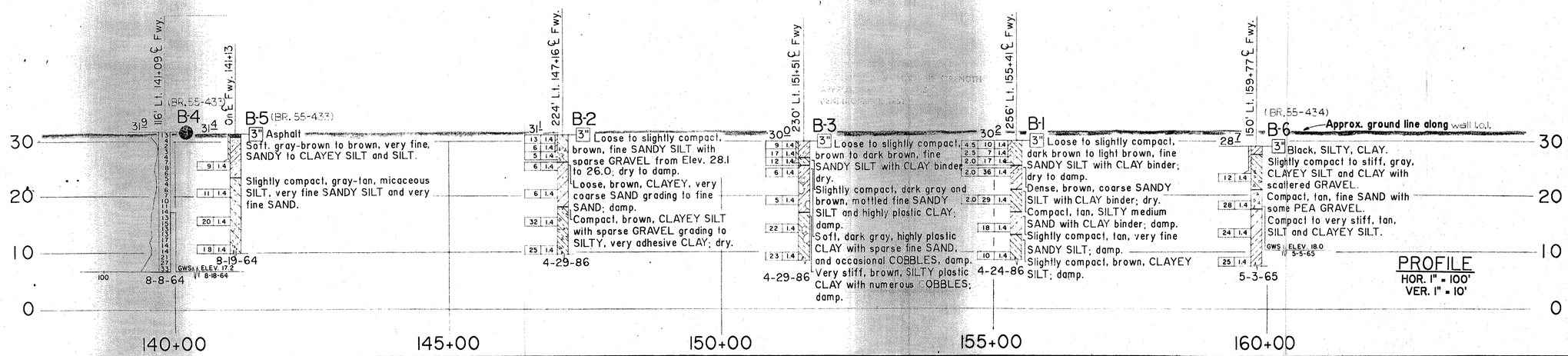


PLAN

1" = 100'

BENCH MARK

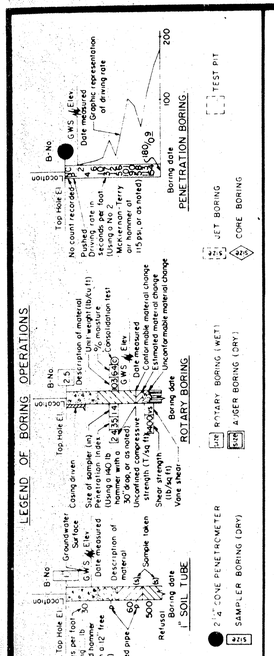
Elev. 31.87
Aerial "X" on S/B shoulder, Rte 405 Fwy., about 0.1 mi. south of Jct. Rte 73/405 Sep.



PROFILE

HOR. 1" = 100'
VER. 1" = 10'

LEGEND OF BORING OPERATIONS



CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY or CLAYEY SAND
- SANDY SILT or SILTY SAND
- SILTY CLAY or CLAYEY SILT
- ORGANIC SILT or ORGANIC CLAY
- ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse Grained Soils — Gravels — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
	GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Sands — Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines	
	SP	Poorly graded sands, gravelly sands, little or no fines	
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
	SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Fine Grained Soils — Silts and Clays — Liquid limit less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
	OL	Organic silts and organic silty clays of low plasticity	
Silts and Clays — Liquid limit greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
	CH	Inorganic clays of high plasticity, fat clays	
	OH	Organic clays of medium to high plasticity, organic silts	
Highly Organic Soils	Pt	Peat and other highly organic soils	

DS 8146

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY					
DRAWN BY	B. COHOLAN 8-86	Approval Recommended By: W. C. Cox 732	CHARGE UNIT	EXPEND. AUTHOR.	SPEC. DESIGN.
CHECKED BY	ROBERT C. DORIA 8/86	Robert Carl Doria PROJECT GEOLOGIST / ENGINEERING GEOLOGIST / CEG NO.			

ORIGINAL SCALE IN INCHES

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

CU 07210

BRIDGE NO. NONE

POST MILE 0.2/10.3

SOUNDWALL NO. 151

SEP 10 1986

LOG OF TEST BORINGS

Disregard prints bearing earlier revision dates →

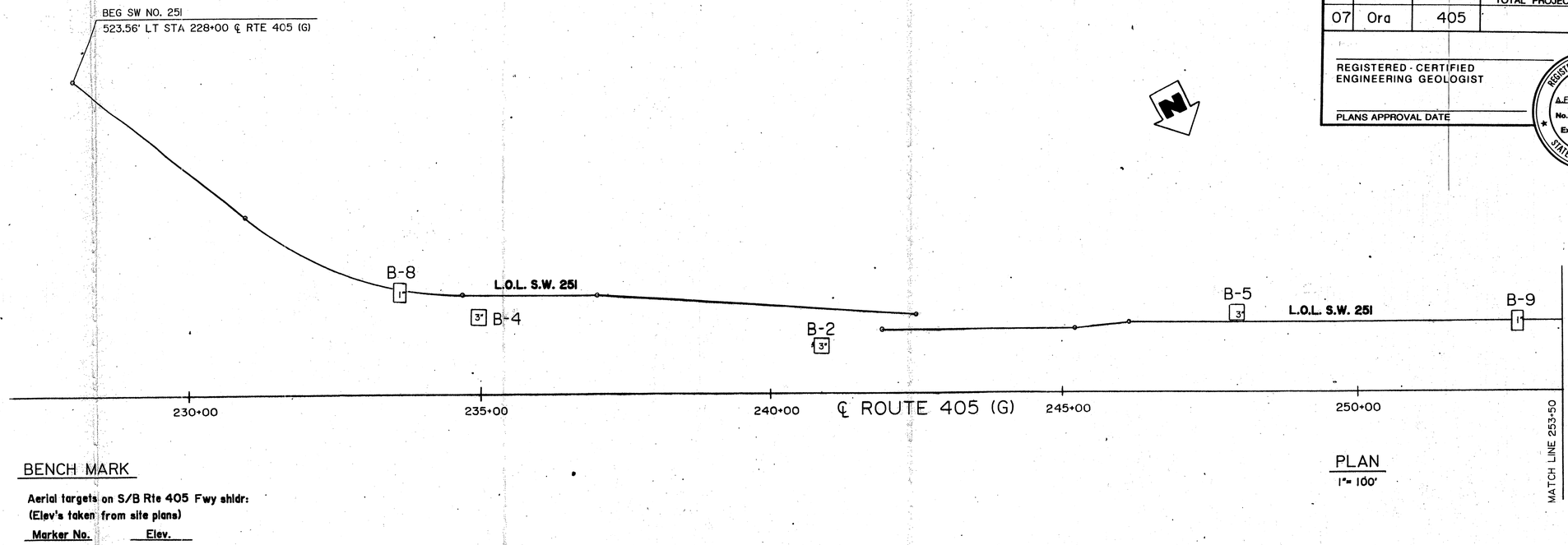
REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

REGISTERED - CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

REGISTERED GEOLOGIST
A.F.GOLDSCHMIDT
No. 596
Exp. 6-30-88
STATE OF CALIFORNIA



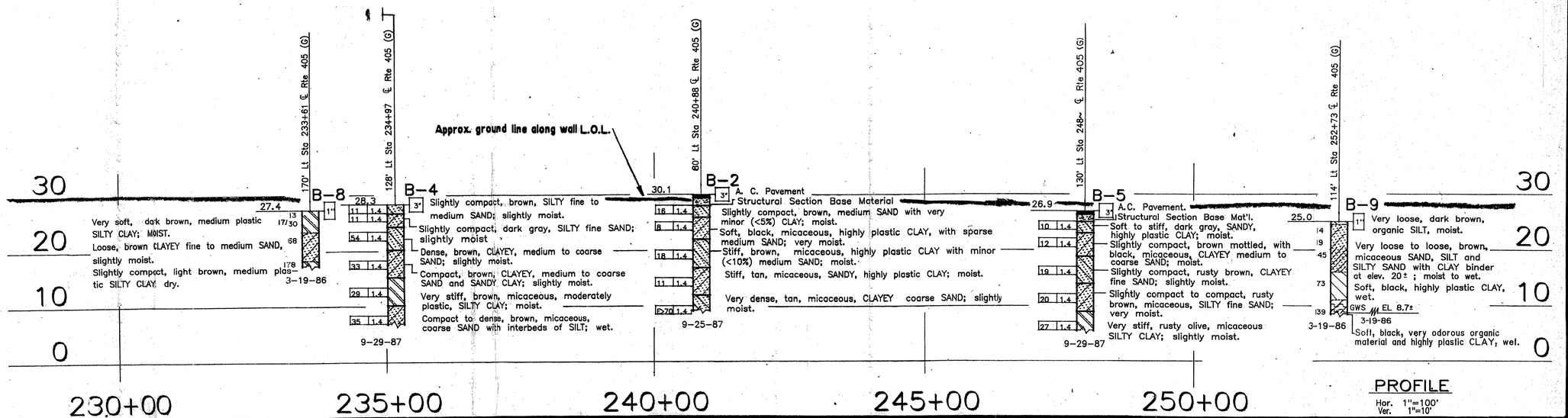
PLAN
1"= 100'

BENCH MARK

Aerial targets on S/B Rte 405 Fwy shldr:
(Elev's taken from site plans)

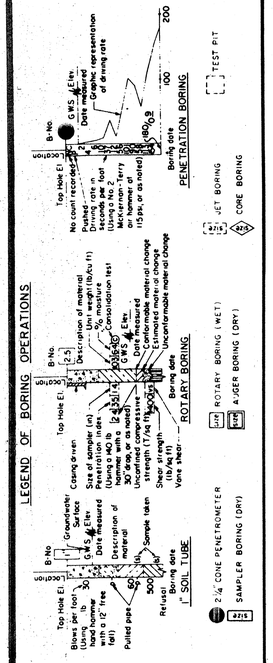
Marker No.	Elev.
V-159	31.31
V-161	29.55
V-162	29.58
V-164	31.19
V-166	30.05
V-167	30.02

NOTE:
GROUND WATER WAS NOT ENCOUNTERED ALONG THE WALL L.O.L. DURING THE SEPTEMBER 1987 SUBSURFACE INVESTIGATION.



PROFILE
Hor. 1"=100'
Ver. 1"=10'

LEGEND OF BORING OPERATIONS



CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration (Blows/Ft)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SILTY CLAY or CLAYEY SILT · PEAT and/or HIGHLY ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Group Symbols	Typical Names
Fine-grained Soils: Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity fat clays
	OH	Organic clays of medium to high plasticity organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils
Coarse-grained Soils: Gravels (More than half of coarse fraction is larger than No. 4 sieve size) — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
Sands (More than half of coarse fraction is smaller than No. 4 sieve size) — Clean sands (Little or no fines)	SW	Well graded gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	P. Hamblin 11/87	Approved Recommended By:	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
CHECKED BY	Robert Carl Doria 11/87	Robert Carl Doria PROJECT GEOLOGIST A CEG NO	W. C. O'Brien 732 ENGINEERING GEOLOGIST CEG NO		

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. -------
POST MILE R10.3/R12.4

SOUNDWALL NO. 251

LOG OF TEST BORINGS 1 of 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07210
EA 019654

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

DS 8146

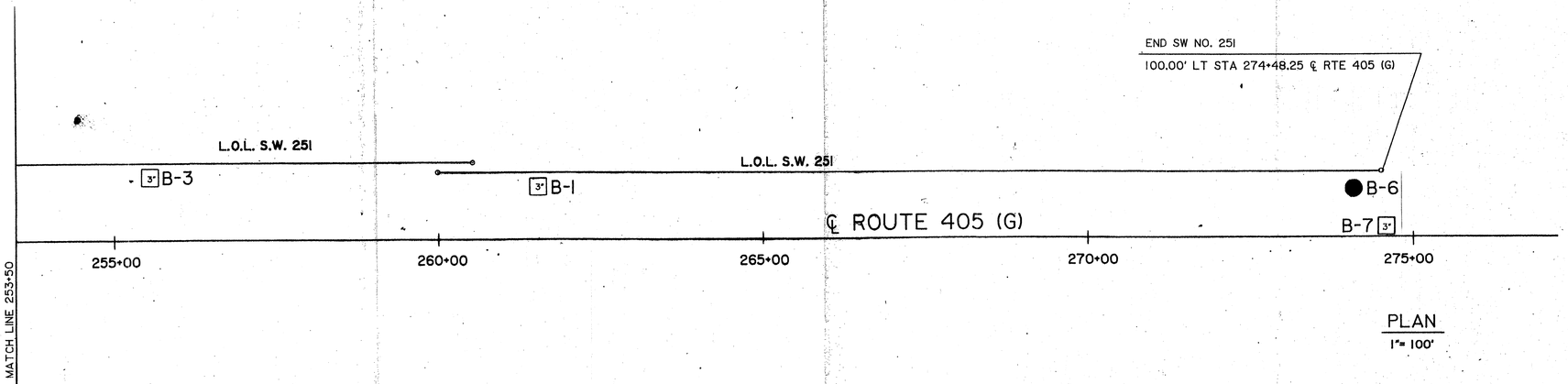
88 38060

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

REGISTERED · CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

REGISTERED GEOLOGIST — A.F. GOLDSCHMIDT — No. 596 — Exp. 6-30-88 — STATE OF CALIFORNIA

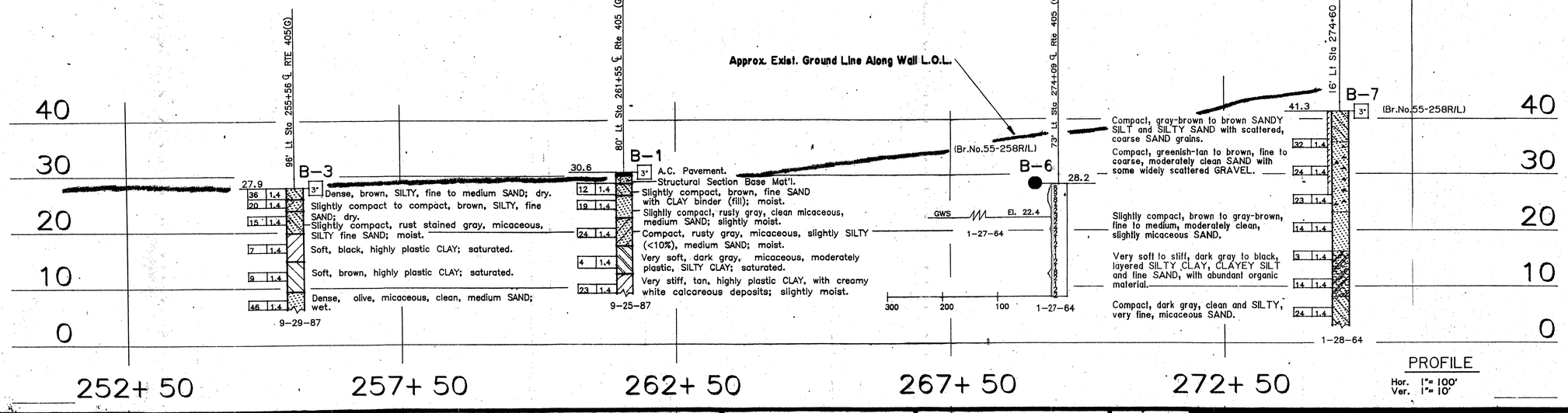


PLAN
1"= 100'

BENCH MARK

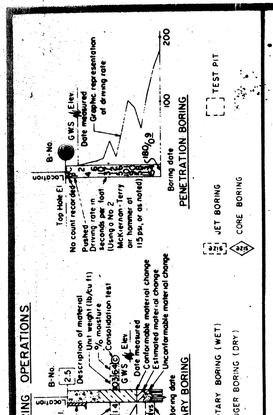
See Sheet 1 of 2.

Note: Ground water was not encountered along the wall L.O.L. during the September. 1987 subsurface investigation.



PROFILE
Hor. 1"= 100'
Ver. 1"= 10'

LEGEND OF BORING OPERATIONS



CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft.)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very stiff
35-69	Dense	Hard
> 70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY or CLAYEY SILT; PEAT and/or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC ROCK

UNIFIED SOIL CLASSIFICATION SYSTEM

Main Divisions	Group Symbols	Typical Names
Fine grained soils: Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Fine grained soils: Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils
Coarse grained soils: Gravels (More than half of coarse fraction is larger than No. 4 sieve size): Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel sand silt mixtures
	GC	Clayey gravels, gravel sand clay mixtures
Sands (More than half of coarse fraction is smaller than No. 4 sieve size): Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand silt mixtures
	SC	Clayey sands, sand clay mixtures

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

				CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
DRAWN BY	R. Franklin 11/87	Approved Recommended By	W.C. Cain 732			
CHECKED BY	Robert Carl Doria 11/87	Robert Carl Doria PROJECT GEOLOGIST CEG NO.	W.C. Cain ENGINEERING GEOLOGIST CEG NO.			

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. ---
POST MILE R10.3/R12.4

SOUNDWALL NO. 251
LOG OF TEST BORINGS 2 of 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07210
EA 019654

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

05 0146

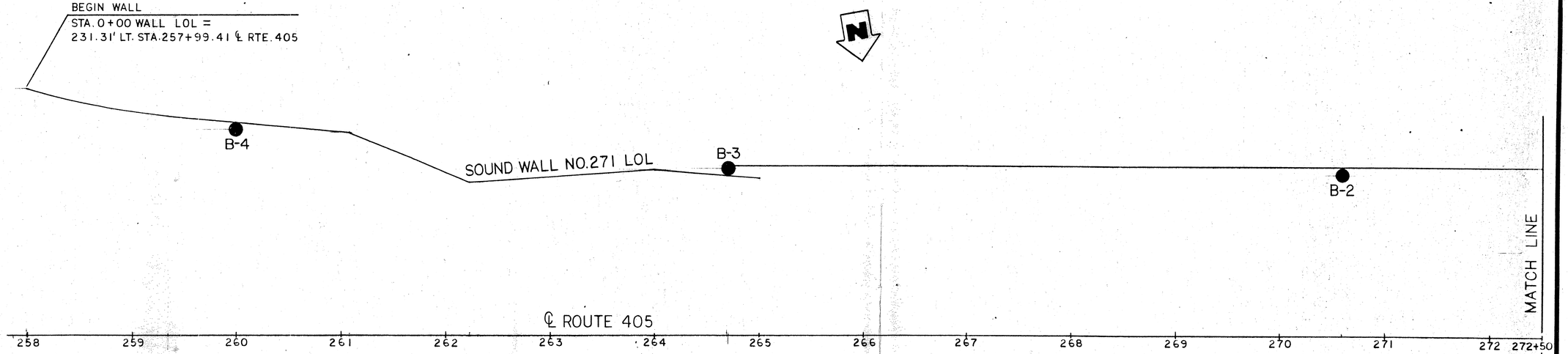
05 38560

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	ORA	405			

ENGINEERING GEOLOGIST • CERTIFIED ENGINEERING GEOLOGIST NUMBER

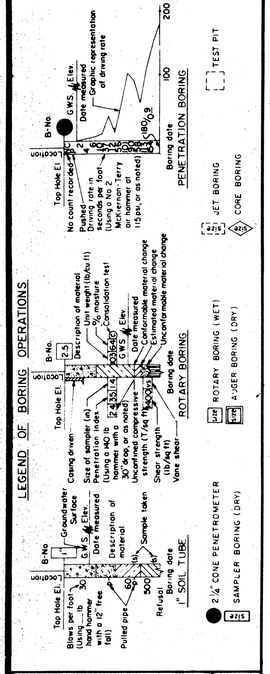
DATE APPROVED

BEGIN WALL
STA. 0+00 WALL LOL =
231.31' LT. STA. 257+99.41 ℄ RTE. 405



PLAN
1" = 50'

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SILTY CLAY or CLAYEY SILT
- PEAT and/or ORGANIC MATTER
- FILL MATERIAL
- SANDY CLAY or CLAYEY SAND
- SANDY SILT or SILTY SAND
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Group Symbols	Typical Names
Coarse-grained Soils: Gravels: Clean gravels (Little or no fines)		GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
Sands: Clean sands (Little or no fines)		SW	Well graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
Sands with fines (Appreciable amount of fines)		SM	Silty Sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine grained Soils: Silts and Clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils		Pt	Peat and other highly organic soils

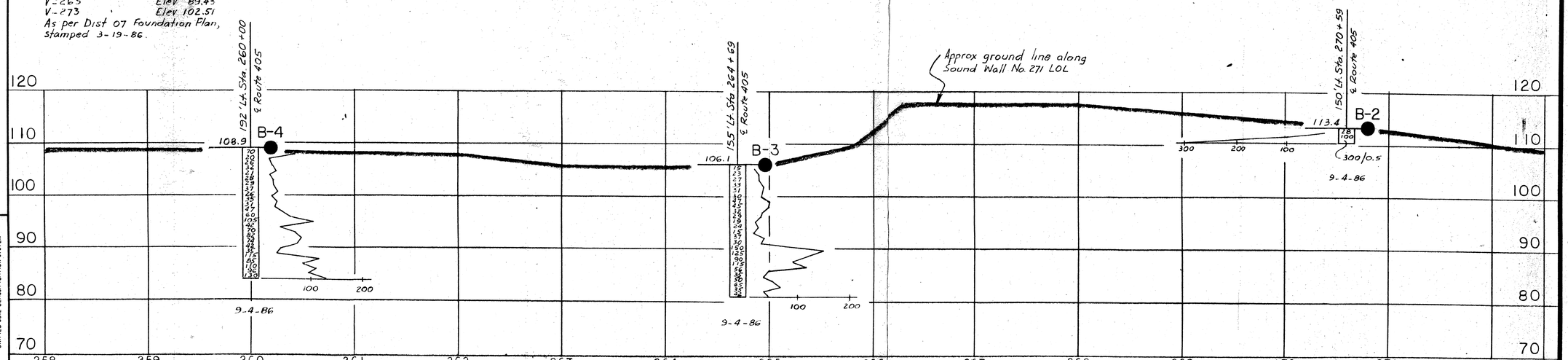
BENCH MARKS

TBM "C" Elev. 97.39
Found nail in steel disc approx. 500 ft N. of Yale St P.O.C. on shoulder, S/B Rte 405
Aerial Bench Marks:

V-274	Elev. 105.45
V-276	Elev. 109.18
V-278	Elev. 110.84
V-265	Elev. 89.43
V-273	Elev. 102.51

As per Dist 07 Foundation Plan, stamped 3-19-86.

NO GROUND WATER ENCOUNTERED DURING THIS INVESTIGATION BY CALTRANS LABORATORY ENGINEERING GEOLOGY AND TECHNICAL SERVICES BRANCH
DATE 3-11-86



PROFILE
HORIZ. 1" = 50'
VERT. 1" = 10'

SHEET 1 OF 2

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY						
DRAWN BY	VICTOR SESTOKAS 10-8-86	R.C. DORIA PROJECT GEOLOGIST	Approval Recommended By: [signature] ENGINEERING GEOLOGIST	732 CEG NO.	CHARGE UNIT	EXPEND. AUTHOR
CHECKED BY	CHRIS BRACE 10-21-86					SPEC. DESIGN.

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO.
POST MILE 0.2 / 10.3

SOUND BARRIER WALL NO. 271 OCT 28 1986
LOG OF TEST BORINGS

REVISION DATES (PRELIMINARY STAGE ONLY) — SHEET — OF

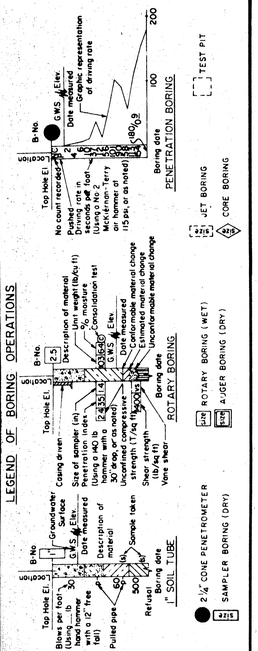
DS 0148 — ORIGINAL SCALE IN INCHES — CU 07210

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT
07	ORA	405	

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST

DATE APPROVED

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL
SAND
SILT
CLAY
SANDY CLAY or CLAYEY SAND
SANDY SILT or SILTY SAND
SILTY CLAY or CLAYEY SILT
ORGANIC MATTER
FILL MATERIAL
IGNEOUS ROCK
SEDIMENTARY ROCK
METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

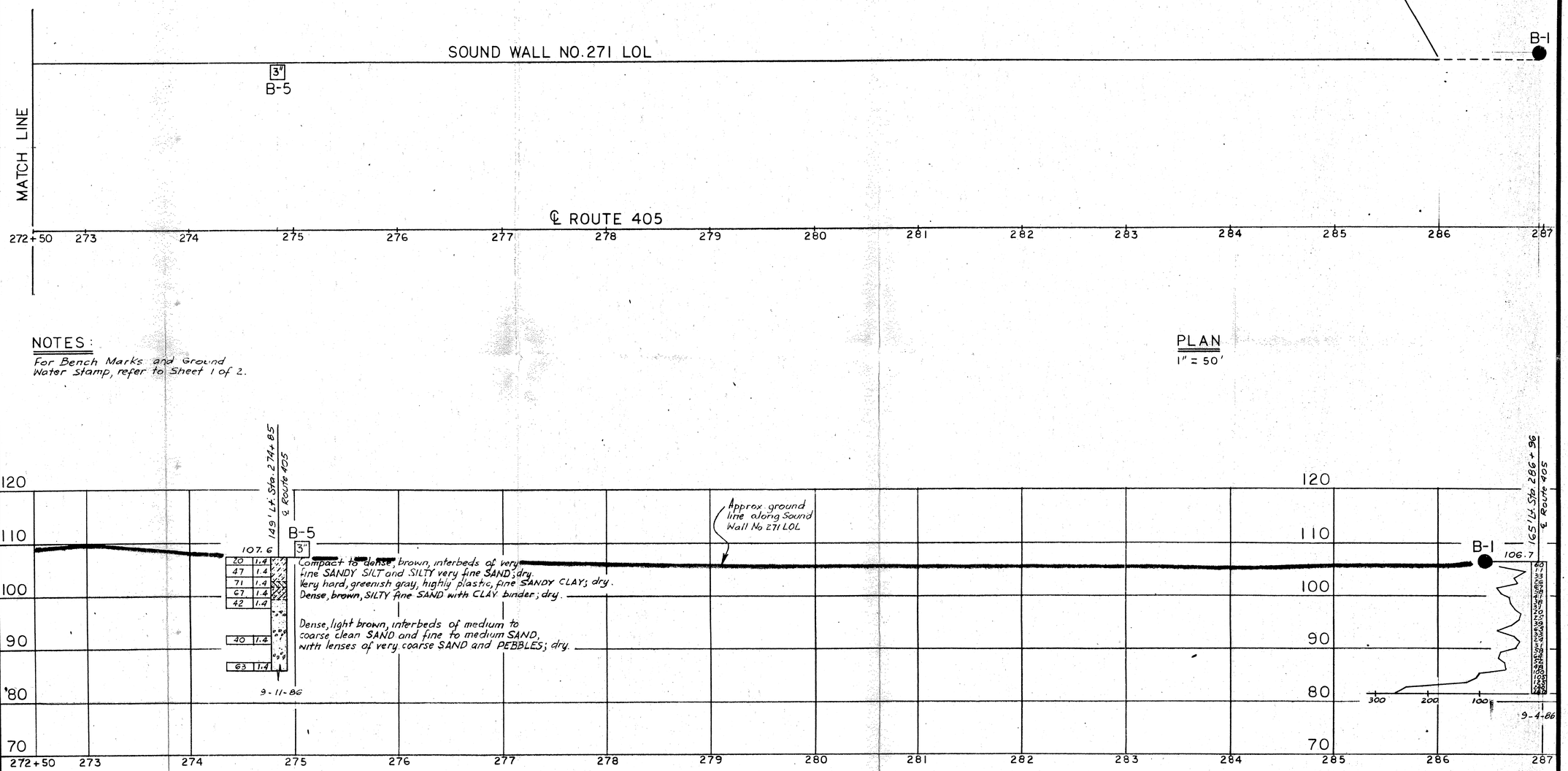
According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Main Divisions	Group Symbols	Typical Names
Fine-grained Soils: Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils
Coarse-grained Soils: Gravels (More than half of coarse fraction is larger than No. 4 sieve size): Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
Sands (More than half of coarse fraction is smaller than No. 4 sieve size): Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures



PLAN
1" = 50'

PROFILE
HORIZ. 1" = 50'
VERT. 1" = 10'

NOTES:
For Bench Mark's and Ground Water Stamp, refer to Sheet 1 of 2.

SHEET 2 OF 2

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	VICTOR SESTOKAS, 10-9-86	R.C. DORIA, PROJECT GEOLOGIST, C.E.G. NO.	Approved Recommended By: W. C. Cain, ENGINEERING GEOLOGIST, 737 C.E.G. NO.	CHARGE UNIT	EXPEND. AUTHOR.
CHECKED BY	CHRIS BRACE 10-21-86				SPEC. DESIGN.

ORIGINAL SCALE IN INCHES

State of **CALIFORNIA** **DEPARTMENT OF TRANSPORTATION**

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

CU 07210

BRIDGE NO.

POST MILE 0.2/10.3

SOUND BARRIER WALL NO 271 LOCATION

LOG OF TEST BORINGS

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

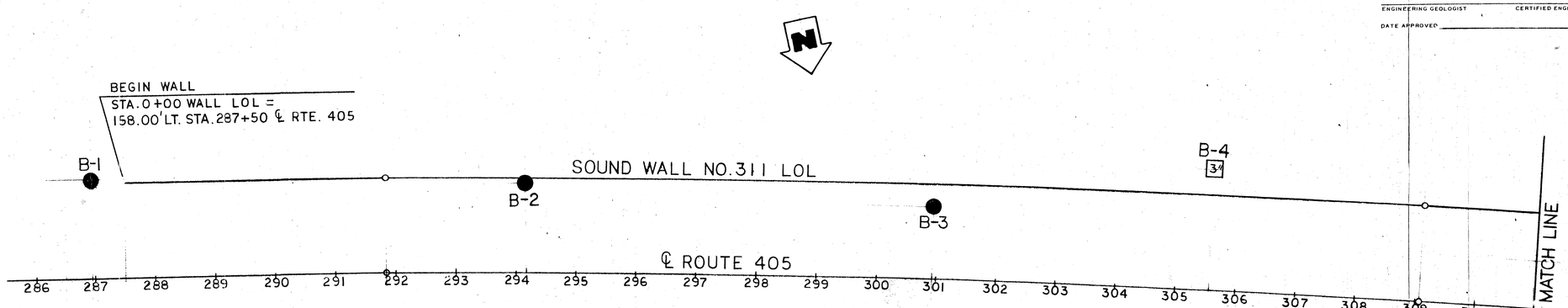
DS 0148

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	ORA	405			

ENGINEERING GEOLOGIST ____ CERTIFIED ENGINEERING GEOLOGIST NUMBER ____

DATE APPROVED ____

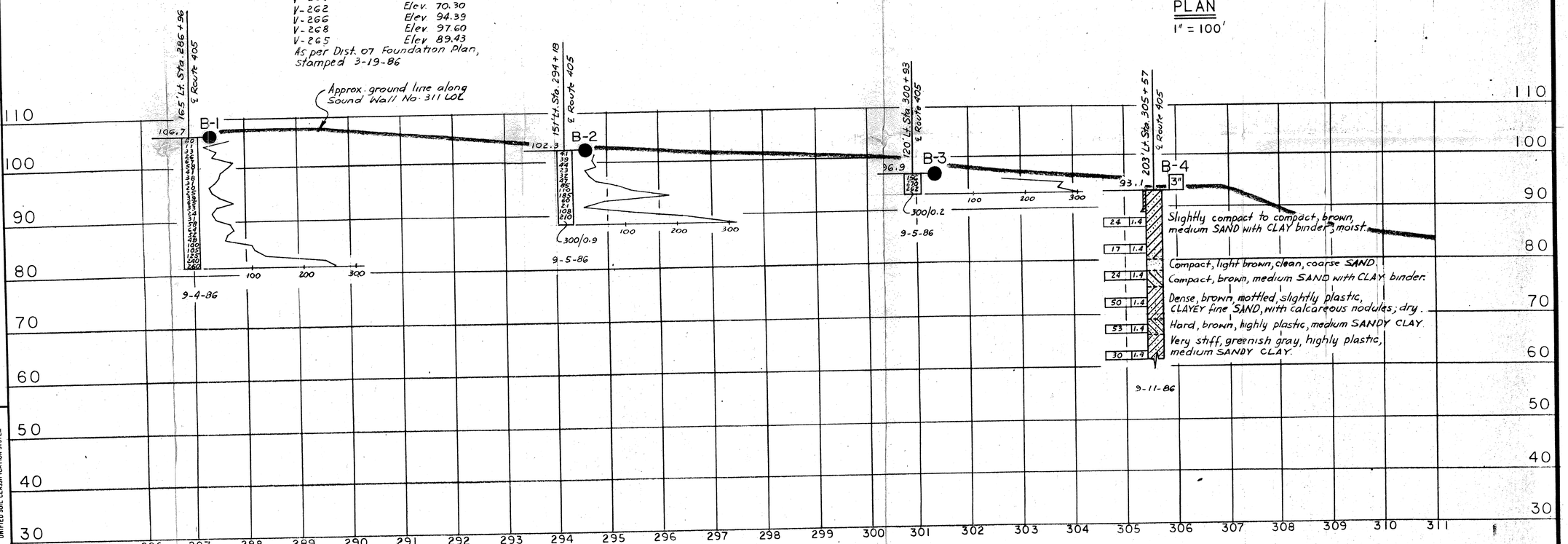
BEGIN WALL
STA. 0+00 WALL LOL =
158.00' LT. STA. 287+50 ℄ RTE. 405



PLAN
1" = 100'

BENCH MARKS

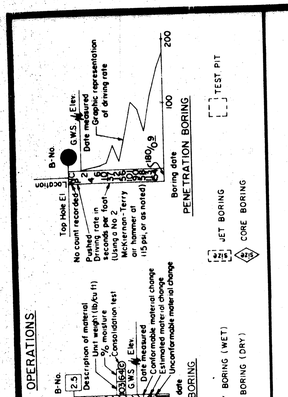
TBM "C" Elev. 97.39
Found nail in steel disc approx. 500 ft. N. of Yale St. P.O.C. on shoulder, S/B Rte. 405.
Aerial Bench Marks:
V-257 Elev. 53.82
V-260 Elev. 61.31
V-262 Elev. 70.30
V-266 Elev. 94.39
V-268 Elev. 97.60
V-265 Elev. 89.43
As per Dist. 07 Foundation Plan, stamped 3-19-86



PROFILE
HORIZ. 1" = 100'
VERT. 1" = 10'

SHEET 1 OF 2

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SILTY CLAY or CLAYEY SILT · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK · SANDY CLAY or CLAYEY SAND · GRAVELLY CLAY or SILTY SAND

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
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20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Grp. Symbols	Typical Names
Coarse-grained Soils — Gravels — Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
Sands — Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
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Fine-grained Soils — Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	VICTOR SESTOKAS 10-17-86	Approval Recommended By		CHARGE UNIT	
CHECKED BY	CHRIS BRACE 1-21-86	R.C. DORIA, PROJECT GEOLOGIST, C.E.G. NO.	R. C. Cain, ENGINEERING GEOLOGIST, 732, C.E.G. NO.	EXPEND. AUTHOR.	SPEC. DESIGN.

ORIGINAL SCALE IN INCHES

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER ____ REGISTERED CIVIL ENGINEER NO. ____

CU 07210

BRIDGE NO. ____

POST MILE 0.2/10.3

SOUND BARRIER WALL NO. 311 VCI 28 1986

LOG OF TEST BORINGS

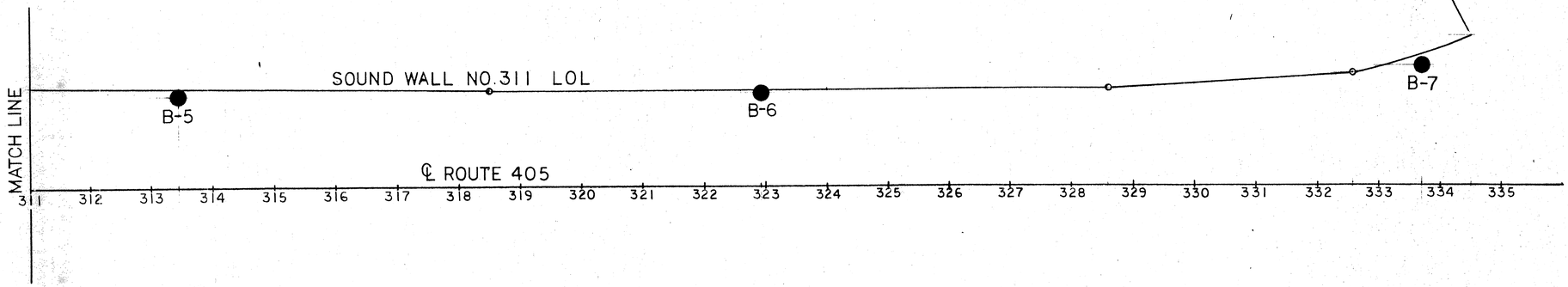
Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO	TOTAL SHEETS
07	ORA	405			

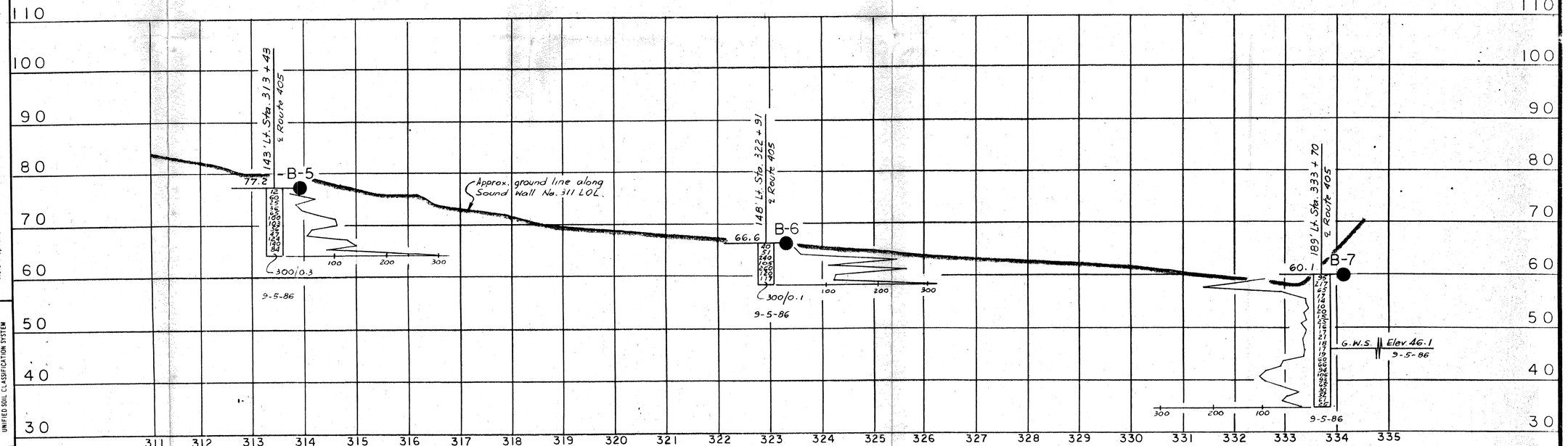
ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED



PLAN
1" = 100'

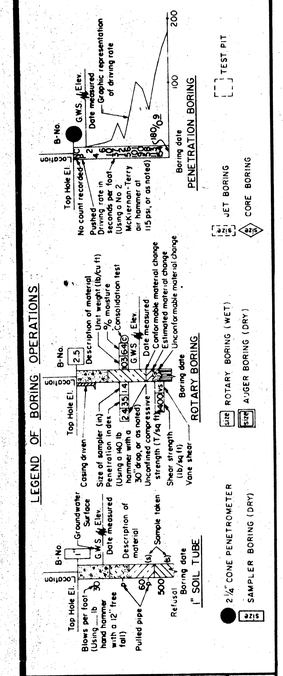
NOTES:
For Bench Marks refer to Sheet 1 of 2.



PROFILE
HORIZ. 1" = 100'
VERT. 1" = 10'

SHEET 2 OF 2

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SILTY CLAY or CLAYEY SILT · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/ft.)	Granular	Cohesive
0-5	Very loose	Very soft
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20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Main Divisions	Grp. Symbols	Typical Names
Coarse-grained Soils: Gravels: Clean gravels (Little or no fines)	GW	Well graded gravel and gravel-sand mixtures, little or no fines
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	SC	Clayey sands, sand-clay mixtures
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	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils

GEOTECHNICAL BRANCH — TRANSPORTATION LABORATORY					
DRAWN BY	VICTOR SESTOKAS 10-86	Approved Recommended By		CHARGE UNIT	EXPEND. AUTHOR.
CHECKED BY	CHRIS BRACE 11-86	R.C. DORIA — PROJECT GEOLOGIST — C.E.G. NO.	W. C. Cain 732 — ENGINEERING GEOLOGIST — C.E.G. NO.		SPEC. DESIGN.

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN — PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO.

POST MILE 0.2 / 10.3

SOUND BARRIER WALL NO. 311 OCT 28 1986

LOG OF TEST BORINGS

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

ORIGINAL SCALE IN INCHES

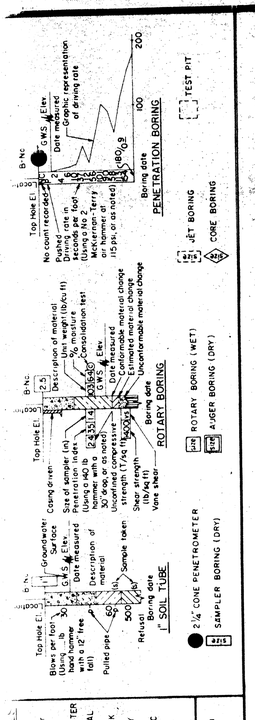
CU 07210

DS 0148

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

ENGINEERING GEOLOGIST _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER _____

DATE APPROVED _____



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SILTY CLAY or CLAYEY SILT · ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · SEDIMENTARY ROCK · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

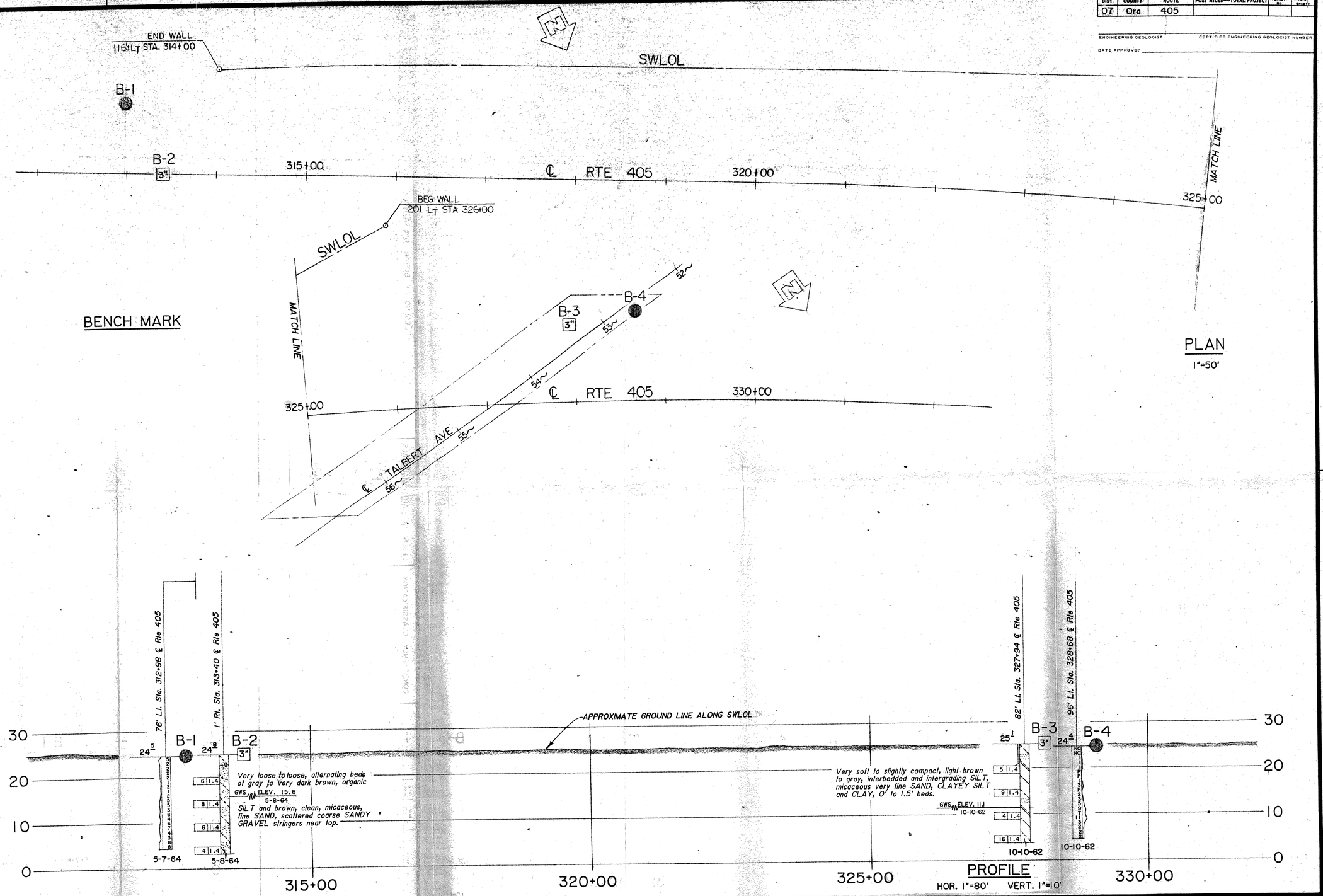
According to the Standard Penetration Test

Penetration (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Typical Names	Information required for describing soils	Laboratory Classification Criteria
Coarse grained Soils: More than half of material is larger than No. 200 sieve size	Gravels: More than half of coarse fraction is larger than No. 4 sieve size	Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel, maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics. Example: Silty sand, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM)
			GP	Poorly graded gravels, gravel sand mixtures, little or no fines	
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; color in wet condition, odor if any, local or geologic name and other pertinent descriptive information; and symbol in parentheses	Example: Clayey gravel, well graded mixtures; 40% fine to coarse angular gravel particles; rounded and subangular sand grains coarse to fine, about 20% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (GC)
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	
	Sands: More than half of coarse fraction is smaller than No. 4 sieve size	Clean sands (Little or no fines)	SW	Well graded gravelly sands, little or no fines		Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; color in wet condition, odor if any, local or geologic name and other pertinent descriptive information; and symbol in parentheses	Example: Silty sand, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM)
			SP	Poorly graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	
Fine grained Soils: More than half of material is smaller than No. 200 sieve size	Silts and Clays: Liquid limit less than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL	Organic silts and organic silty clays of low plasticity			
	Silts and Clays: Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity, organic silts			
Highly Organic Soils			Pt	Peat and other highly organic soils			



GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY						
DRAWN BY	Leony L. Lopez 3/86			CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN
CHECKED BY	Robert Carl Dorsa 4/86	Robert Carl Dorsa PROJECT GEOLOGIST	CEG NO.	Approved Recommended By: W. C. Cain ENGINEERING GEOLOGIST	732 C.E.G. NO.	

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER _____ REGISTERED CIVIL ENGINEER NO. _____

BRIDGE NO.

POST MILE 13.15/14.50

CU 07210
WO 019651

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

SOUNDWALL NO. 319

LOG OF TEST BORINGS

0146 32 04-32124

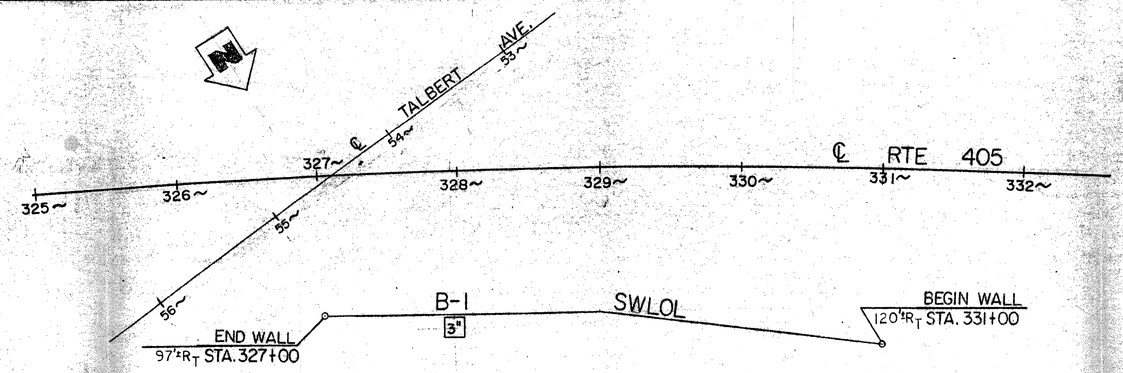
DIST.	COUNTY	ROUTE	POST MILES — TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

ENGINEERING GEOLOGIST _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER

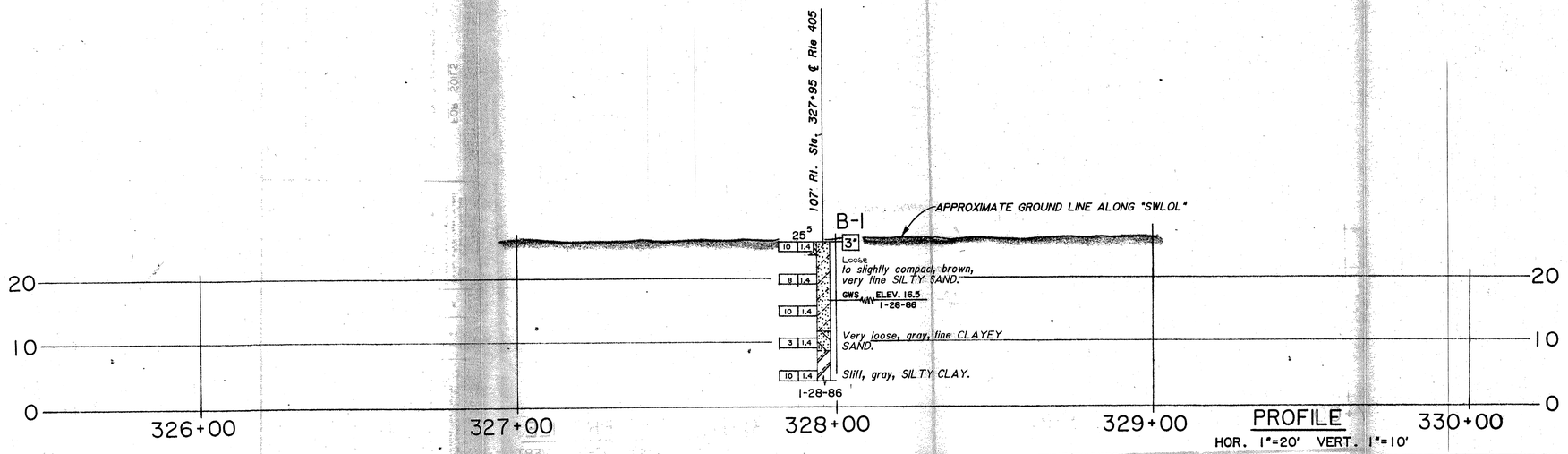
DATE APPROVED _____

BENCH MARK

BM V-141 AERIAL "X" S.B. SIDE RTE 405 ON SHOULDER APPROX. 112' N/O TALBERT AVE. O.C. ELEV. 30.32'

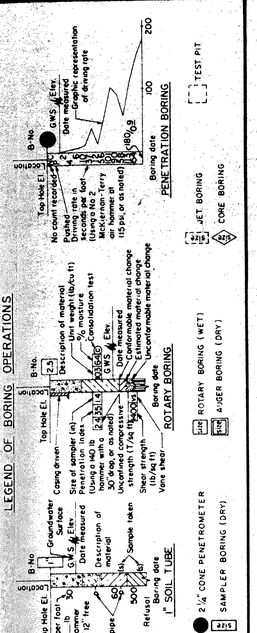


PLAN
1"=50'



PROFILE
HOR. 1"=20' VERT. 1"=10'

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SILTY CLAY or CLAYEY SILT · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK · SANDY CLAY or CLAYEY SAND · SILTY CLAY or CLAYEY SILT · SILTY SAND

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0 - 5	Very loose	Very soft
5 - 10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Group Symbols	Typical Names
Coarse-grained Soils — Gravels — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures
	GC	Clayey gravels, poorly graded gravel-sand-clay mixtures
Sands — Clean sands (Little or no fines)	SW	Well graded sandy gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
Sands with fines (Appreciable amount of fines)	SM	Silty Sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
Fine-grained Soils — Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	Leony L. Lopez 3/86	Approved Recommended By	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
CHECKED BY	Robert Carl Doria 4/86	Robert Carl Doria PROJECT GEOLOGIST C.E.G. NO.	W. T. Coin 732 ENGINEERING GEOLOGIST C.E.G. NO.		

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER REGISTERED CIVIL ENGINEER NO.

BRIDGE NO.
POST MILE 13.15/14.50

CU 07210
WO 019651

SOUNDWALL NO. 328
LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

OS 0148

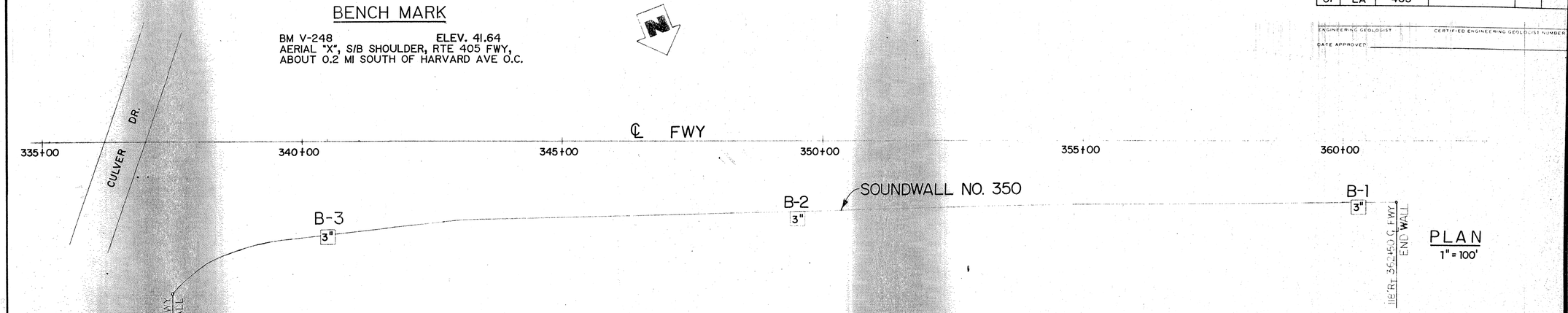
DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

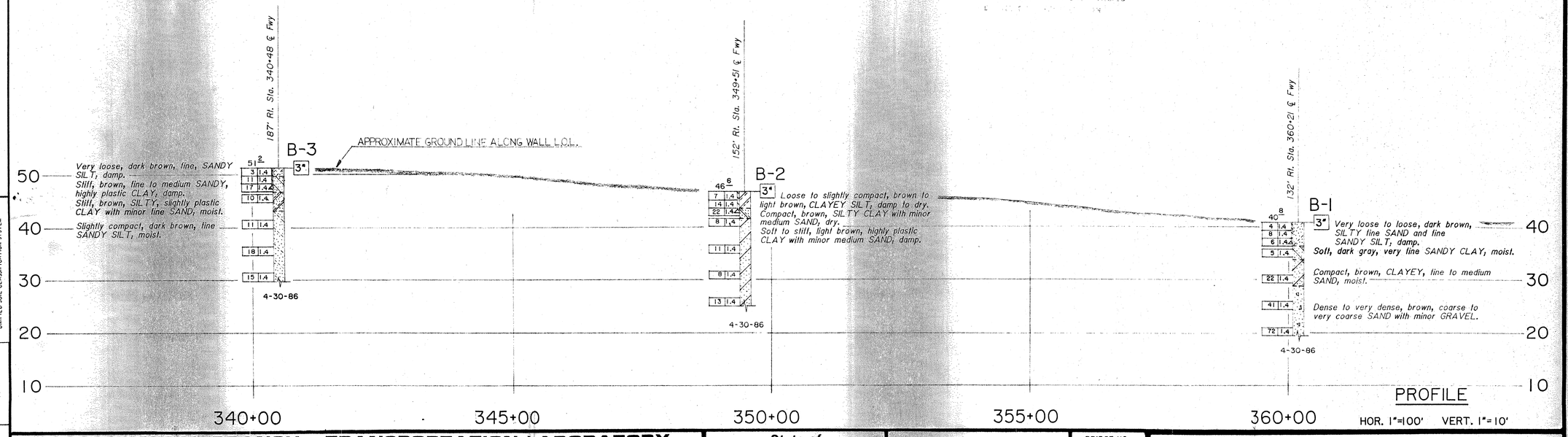
DATE APPROVED

BENCH MARK

BM V-248 ELEV. 41.64
AERIAL "X", S/B SHOULDER, RTE 405 FWY,
ABOUT 0.2 MI SOUTH OF HARVARD AVE O.C.



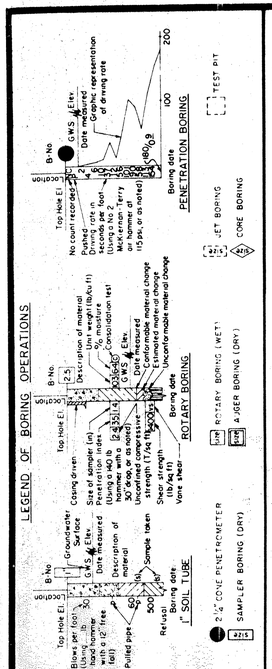
PLAN
1" = 100'



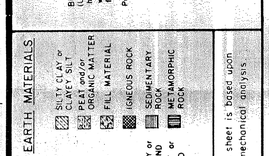
PROFILE
HOR. 1"=100' VERT. 1"=10'

NOTE:
NO GROUND WATER ENCOUNTERED

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS



CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Grid Symbols	Typical Names
Coarse grained Soils — Gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines
Gravels (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
Sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
Sands (Appreciable amount of fines)	SM	Silty Sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
Fine grained Soils — Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils	Pt	Peat and other highly organic soils

DRAWN BY Leony L. Lopez 8/86
CHECKED BY ROBERT C. DORIA 8/86 — PROJECT GEOLOGIST
Approved Recommended By: ENGINEERING GEOLOGIST — C.E.G. NO. 732

CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.

ORIGINAL SCALE IN INCHES

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

CU 07210

BRIDGE NO.	POST MILE
NONE	0.2/10.3

SOUNDWALL NO. 350
LOG OF TEST BORINGS

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

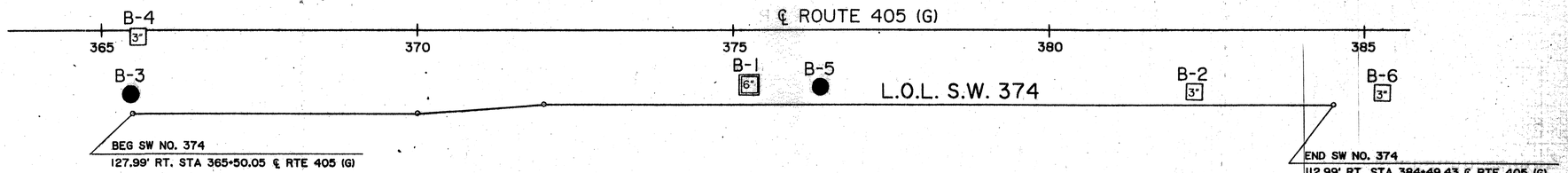
DS 0146

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

REGISTERED · CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

REGISTERED GEOLOGIST
A.F. GOLDSCHMIDT
No. 596
Exp. 6-30-88
STATE OF CALIFORNIA

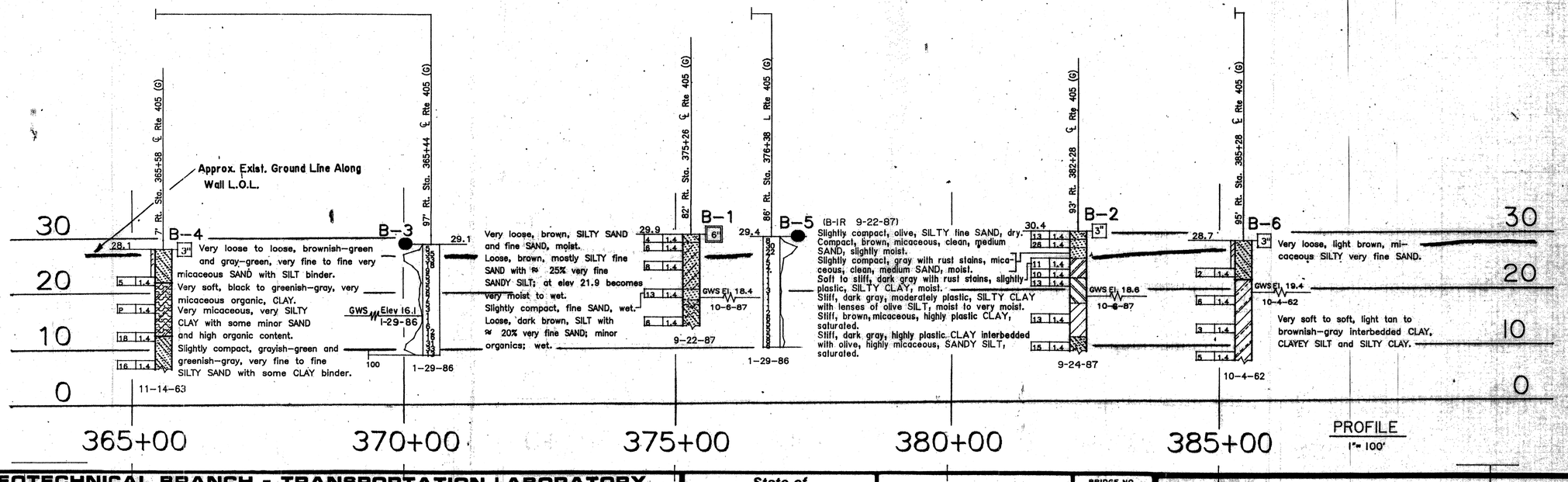


PLAN
1"= 100'

BENCH MARK

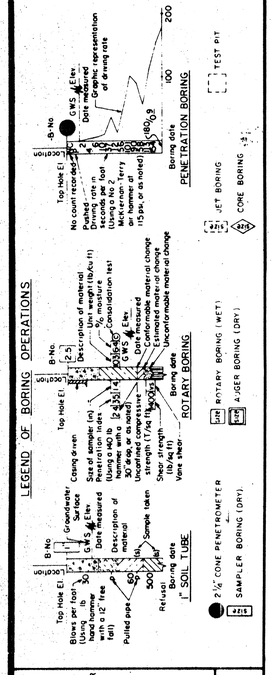
Aerial Targets on S/B Rte 405 Fwy Shldr
(Elev's Taken From Site Plans)

Marker No.	Elev.
V-128	31.05
V-129	30.49
V-131	29.22



PROFILE
1"= 100'

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · SILTY CLAY or CLAYEY SILT · PEAT or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Grp. Symbols	Typical Names	Lab. Classification Criteria
Coarse-grained Soils — Gravels — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines	
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines	
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel sand silt mixtures	Atterberg limits below "A" line or P.I. less than 4
	GC	Clayey gravels, gravel sand clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Sands — Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines	
	SP	Poorly graded sands, gravelly sands, little or no fines	
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand silt mixtures	Atterberg limits below "A" line or P.I. less than 4
	SC	Clayey sands, sand clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Fine-grained Soils — Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
	OL	Organic silts and organic silty clays of low plasticity	
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
	CH	Inorganic clays of high plasticity, fat clays	
	OH	Organic clays of medium to high plasticity, organic silts	
Highly Organic Soils	Pt	Peat and other highly organic soils	

DS B146

DRAWN BY	P. Franklin 11/87	Approval Recommended By	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
CHECKED BY	Robert Carl Doria 11/87	Robert Carl Doria PROJECT GEOLOGIST — W. C. Bain 733 ENGINEERING GEOLOGIST CEG NO.			

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

State of **CALIFORNIA** **DEPARTMENT OF TRANSPORTATION**

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. ——

POST MILE R3.2/R5.5

SOUNDWALL NO. 374
LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07210
EA 019654

Disregard prints bearing earlier revision dates →

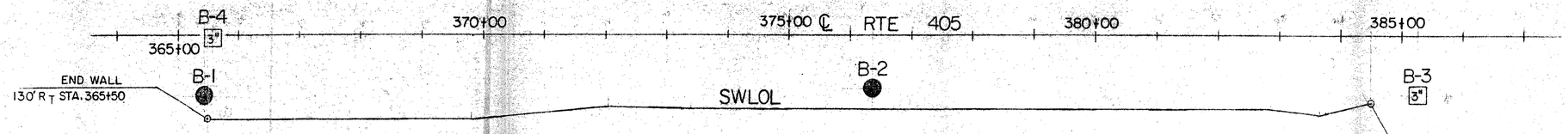
REVISION DATES (PRELIMINARY STAGE ONLY) — SHEET — OF

BS 30656

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	Sheet No.	Total Sheets
07	Ora	405			

ENGINEERING GEOLOGIST _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER _____

DATE APPROVED _____

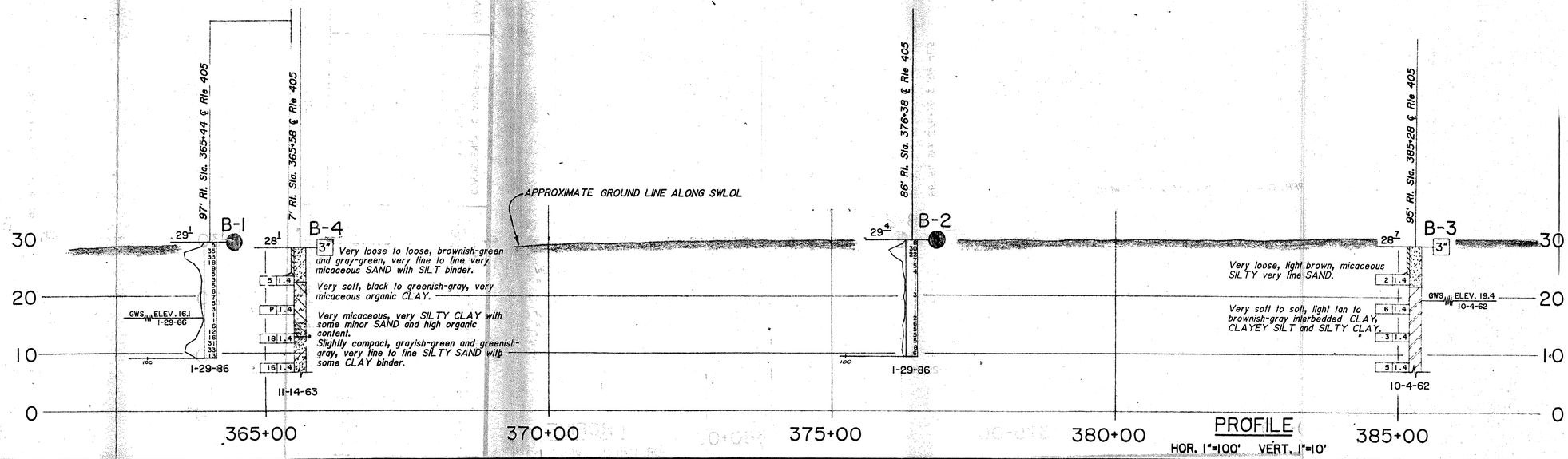


BENCH MARK

BM V-131' AERIAL BENCH MARK PAINTED "X"
LOCATED S.B. RTE 405 ON SHOULDER ≈ 300'
N/O SLATER O.C. ELEV. 29.22

PLAN

1"=100'



PROFILE

HOR. 1"=100' VERT. 1"=10'

LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SILTY CLAY or CLAYEY SILT
- PEAT and/or ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK
- SANDY CLAY or CLAYEY SAND
- SANDY SILT or SILTY SAND

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test		
Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

LEGEND OF BORING OPERATION

- Top Hole El.
- Blow per foot (Using ___ lb hand hammer fall 0 12" free)
- Pulled pipe
- Groundwater Surface
- Date measured
- Description of material
- Sample taken
- Refusal
- Driving date
- 1" SOIL TUBE
- Casing driven
- Size of sample (in)
- Recovery (in)
- (Using a 140 lb hammer with a 30" free fall)
- Unconfined compressive strength (T/sq ft)
- Shear strength (lb/sq ft)
- Vane shear
- Boring date
- ROTARY BORING
- 2½" CONE PENETROMETER
- SAMPLER BORING (DRY)
- No count recorded
- Plotted
- Driving rate in blows per foot (Using a No 2 McKernan-Terry hammer with a 2½" cone, 115 psi, or as noted)
- Graphic representation of driving rate
- Boring date
- PENETRATION BORING
- TEST PIT
- JET BORING
- CORE BORING
- ROTARY BORING (WET)
- AUGER BORING (DRY)
- Description of material
- Date measured
- Confinement material change
- Uncomfortable material change

UNIFIED SOIL CLASSIFICATION SYSTEM

Fine grained soils	Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity				
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays				
		OL	Organic silts and organic silty clays of low plasticity				
	Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts				
		CH	Inorganic clays of high plasticity, fat clays				
		OH	Organic clays of medium to high plasticity, organic silts				
Highly Organic Soils		Pt	Peat and other highly organic soils				
Coarse grained Soils	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines			
			GP	Poorly graded gravels, gravel sand mixtures, little or no fines			
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel sand silt mixtures			
			GC	Clayey gravels, gravel sand clay mixtures			
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines			
			SP	Poorly graded sands, gravelly sands, little or no fines			
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand silt mixtures			
			SC	Clayey sands, sand clay mixtures			

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY						
DRAWN BY	Leony L.Lopez	3/86	Approved Recommended By	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
CHECKED BY	Robert Carl Doria	4/86	Robert Carl Doria PROJECT GEOLOGIST CEG NO.			
			W. C. Cain 732 ENGINEERING GEOLOGIST C.E.G. NO.			

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER REGISTERED CIVIL ENGINEER NO.

BRIDGE NO.

POST MILE 13.15 / 14.50

SOUNDWALL NO. 374

LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07210
WO 019651

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

0146 332

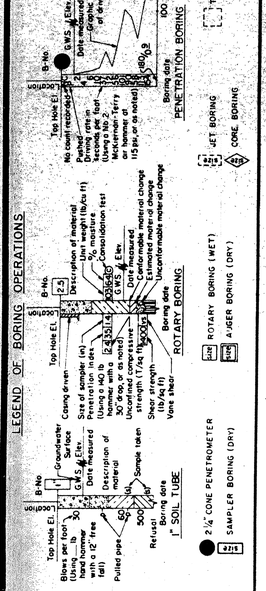
84 3213

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY or CLAYEY SAND
- SANDY SILT or SILTY SAND
- SILTY CLAY or CLAYEY SILT
- ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

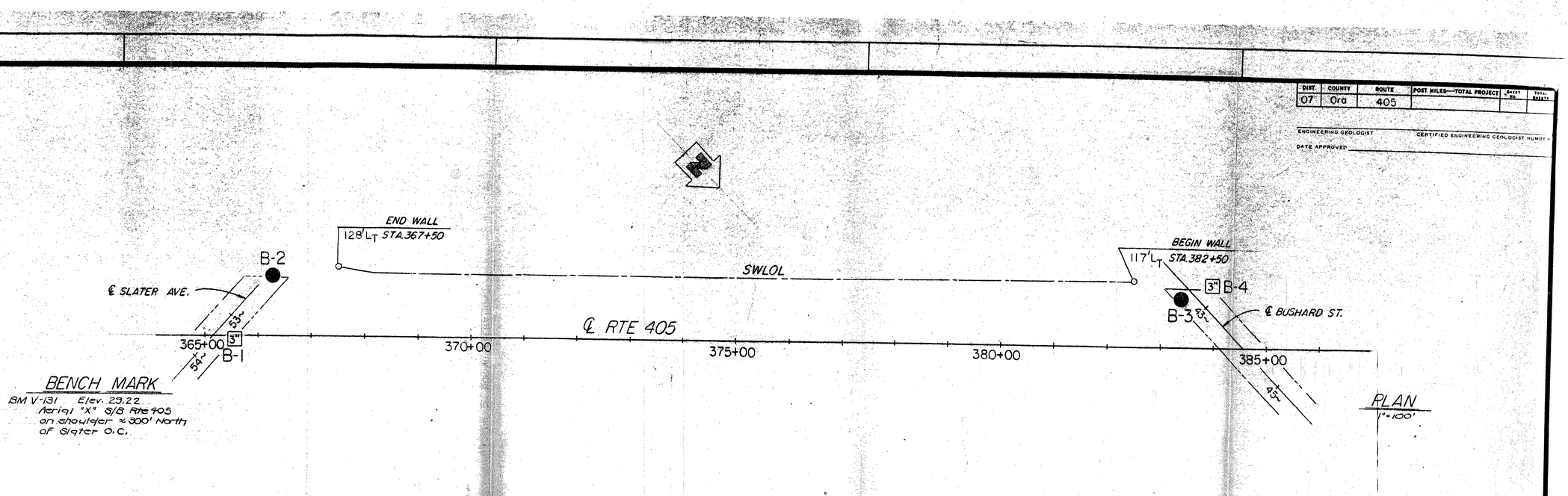
Penetration Index (Blows/Ft)	Granular	Cohesive
0 - 5	Very loose	Very soft
5 - 10	Loose	Soft
10 - 20	Slightly compact	Stiff
20 - 35	Compact	Very stiff
35 - 70	Dense	Hard
70	Very dense	Very hard

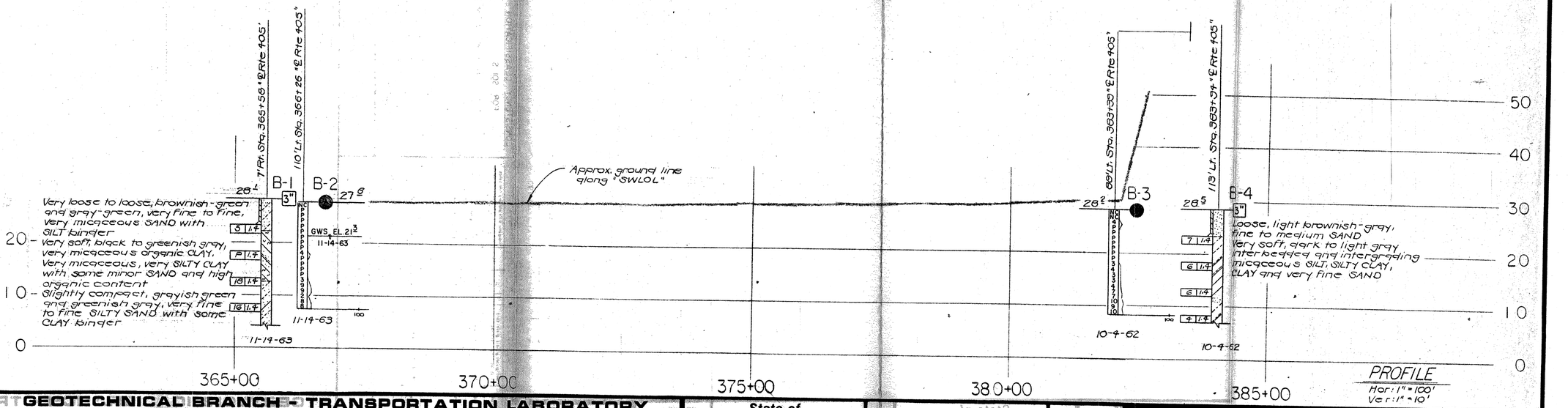
UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Group Symbols	Typical Names	Group Symbols	Typical Names
Coarse grained Soils — Gravels — Clean gravels (Little or no fines)	GW	Well graded gravels, gravel sand mixtures, little or no fines		
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines		
Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures		
	GC	Clayey gravels, gravel-sand-clay mixtures		
Sands — Clean sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines		
	SP	Poorly graded sands, gravelly sands, little or no fines		
Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures		
	SC	Clayey sands, sand-clay mixtures		
Fine grained Soils — Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity		
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
	OL	Organic silts and organic silty clays of low plasticity		
Silts and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
	CH	Inorganic clays of high plasticity, fat clays		
	OH	Organic clays of medium to high plasticity, organic silts		
Highly Organic Soils	Pt	Peat and other highly organic soils		

BENCH MARK

BM V-131 Elev. 23.22
Aerial "X" S/B Rte 405
on shoulder ≈ 300' North
of Slater O.C.





PROFILE
Hor: 1" = 100'
Ver: 1" = 10'

DRAWN BY	ED FONG	3/86
CHECKED BY	Robert C. Doria	4/86

Robert Carl Doria — PROJECT GEOLOGIST — C.E.G. NO.

Approved Recommended By: M. C. Cain 732 — ENGINEERING GEOLOGIST — C.E.G. NO.

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

CHARGE UNIT	EXPEND. AUTHOR.	SPEC. DESIGN.

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO.

POST MILE 13.15/14.50

SOUNDWALL NO. 375
LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 1 2 3

cu 07210
wo 019651

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

05 0148

84 32124

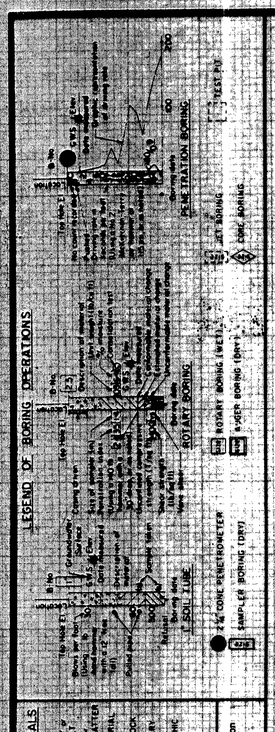
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	Ora	405			

REGISTERED · CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

REGISTERED GEOLOGIST — A.F. GOLDSCHMIDT — No. 596 — Exp. 6-30-88 — STATE OF CALIFORNIA

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL — SILTY CLAY or CLAYEY SILT — ORGANIC MATTER — FILL MATERIAL — IGNEOUS ROCK — SEDIMENTARY ROCK — METAMORPHIC ROCK — SAND — SILT — CLAY — SANDY CLAY or CLAYEY SAND — SANDY SILT or SILTY SAND

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Resistance (Blows/Ft.)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very stiff
35-69	Dense	Hard
≥ 70	Very dense	Very hard

NOTE:- Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions	Group Symbols	Typical Names	Laboratory Classification Criteria	Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse grained soils: more than half of material is larger than No. 200 sieve size	GW	Well graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW	SW	Well graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		SP	Poorly graded sands, gravelly sands, little or no fines	
	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
	GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Fine grained soils: more than half of material is smaller than No. 200 sieve size	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
	OL	Organic silts and organic silty clays of low plasticity		OL		
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		CH	Inorganic clays of high plasticity, fat clays	
	OH	Organic clays of medium to high plasticity, organic silts		OH		
Highly Organic Soils	Pt	Peat and other highly organic soils				

* Fine grained soils

Sands and Gravels (more than half of coarse fraction is smaller than No. 4 sieve size): Clean sands or gravels (little or no fines); Sands or gravels with fines (appreciable amount of fines)

Silts and Clays (liquid limit less than 50): Inorganic; Organic

Silts and Clays (liquid limit greater than 50): Inorganic; Organic

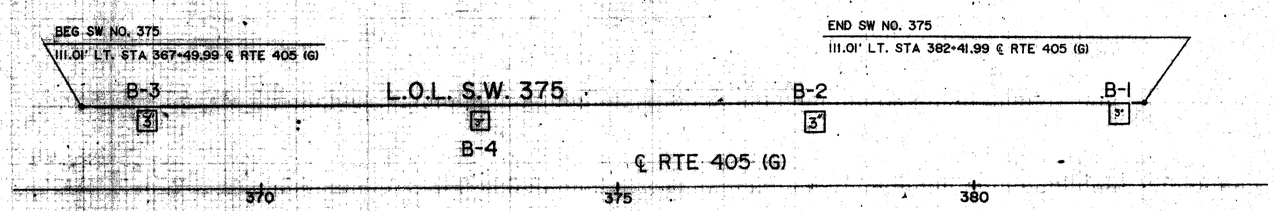
Highly Organic Soils: Peat and other highly organic soils

Boundary Classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well graded gravel-sand mixture with clay binder.

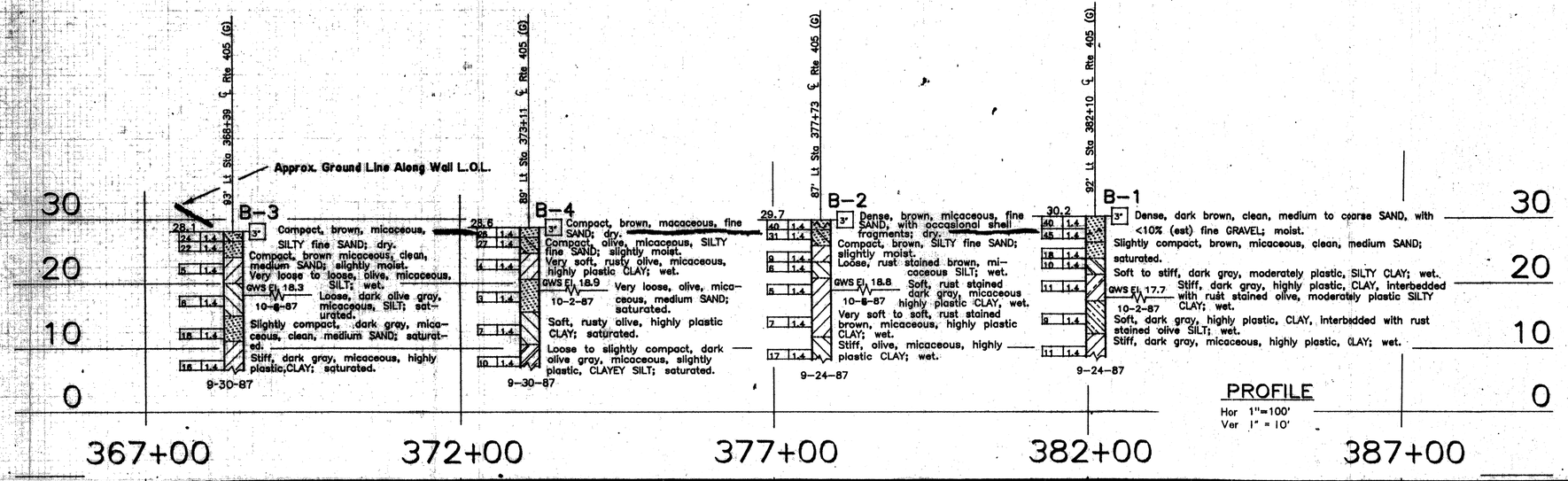
BENCH MARK

AERIAL TARGETS ON S/B RTE 405 FWY SHLDR ELEV. TAKEN FROM SITE PLANS.

MARKER NO.	ELEV.
V-128	31.05'
V-129	30.49'



PLAN
1"= 100'



PROFILE
Hor 1"=100'
Ver 1" = 10'

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY					
DRAWN BY: P. Franklin 11/87	Approval Recommended by:	CHARGE UNIT	EXPEND AUTHOR	SPEC. DESIGN
CHECKED BY: Robert Carl Doria 11/87	Robert Carl Doria 732			
PROJECT GEOLOGIST — C.E.G. NO.	ENGINEERING GEOLOGIST — C.E.G. NO.			

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. ------
POST MILE R13.2/R15.5

SOUND WALL NO. 375
LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07210
EA 109654

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

(Old V11-Ora-158-B)

FED. ROAD DIV NO	STATE	PROJ No	FISCAL YEAR	SHEET NO	TOTAL SHEETS
7	CAL.				

DIST	COUNTY	ROUTE	SECTION	SHEET NO	TOTAL SHEETS
07	Ora	405		297	297

DATE APPROVED 3-31-04

BRIDGE DEPARTMENT

Bench Mark 45-158B-60

Set chisel on No. side of irrigation riser, 1.5' above ground in field between flood control channel and Sneltzer Ave. 511' North of intersection of channel and ℄ of Newland Ave and 20.0' East of ℄ Newland Ave.

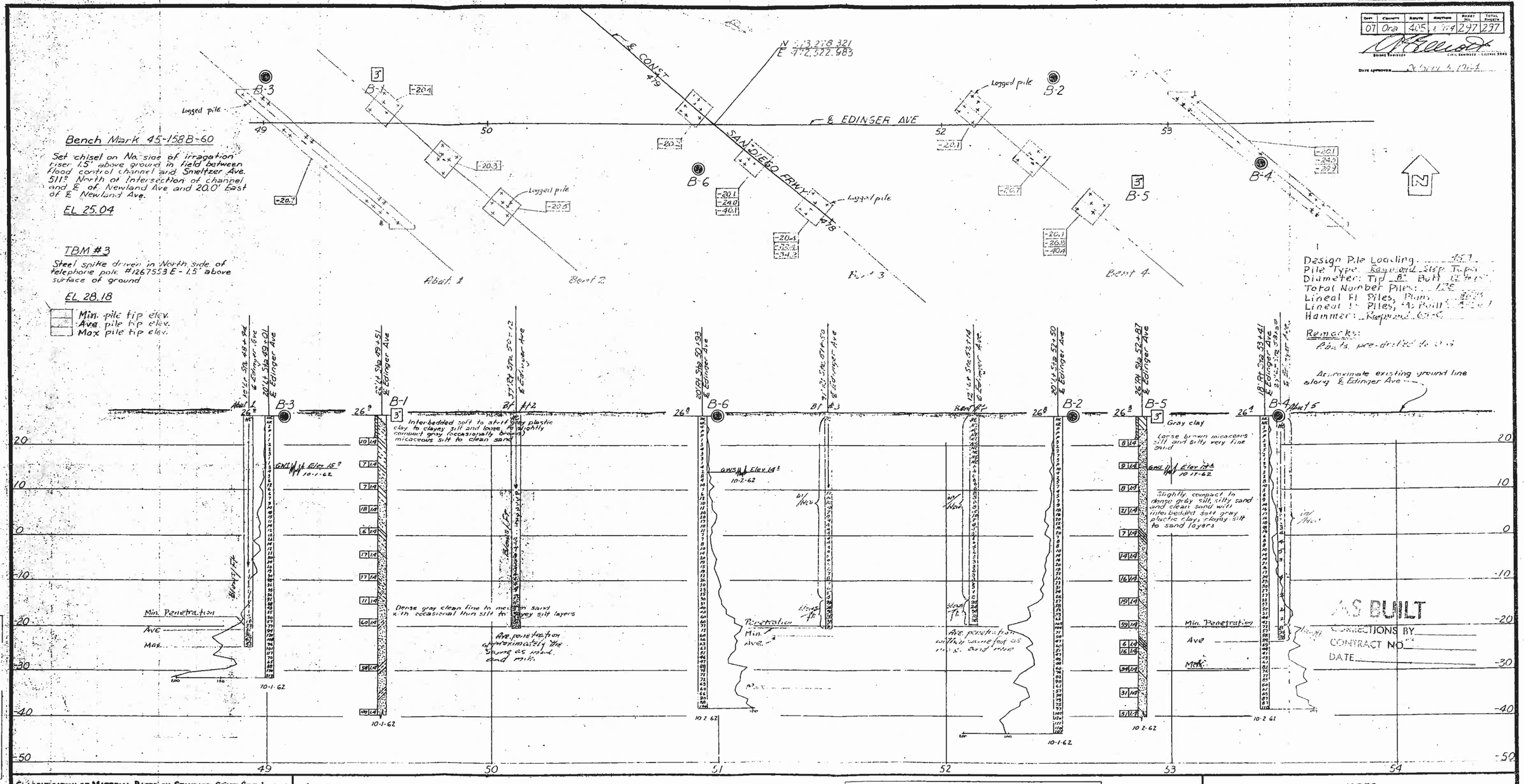
EL 25.04

TBM #3

Steel spike driven in North side of telephone pole #1267553 E - 1.5' above surface of ground

EL. 28.18

Min. pile tip elev.
Ave pile tip elev.
Max pile tip elev.



CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

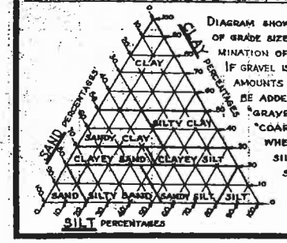


DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.

IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAYEY
- SANDY SILTY

Revisions made to this Log of Test Borings from the original 1962 Log of Test Borings are the addition of the following table and notes:

Boring	Station	Offset from C/L Edinger Ave
B-1	9+54.491	6.705 m Lt
B-2	10+45.622	6.096 m Lt
B-3	9+39.252	6.096 m Lt
B-4	10+73.357	5.486 m Rt
B-5	10+56.899	7.924 m Rt
B-6	9+97.771	6.096 m Rt

Notes:

1. See the General Plan and/or Foundation Plan for Metric Stationing.
2. Structure Design produced the data presented in the table above. The data are the metric locations for the As-Built Test Borings referenced to the proposed new structure location. This table is presented on the As-Built Log of Test Boring sheet for the convenience of any bidder, contractor or other interested party.

DIVISION OF ENGINEERING SERVICES - GEOTECHNICAL SERVICES

As-Built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date confirm that this is a true and accurate copy of the original document. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST.	COUNTY	ROUTE	KILOMETER POST-TOTAL PROJECT	Sheet No.	Total Sheets
12	Ora	405			

REGISTERED CIVIL ENGINEER — DATE 09/23/2004

RETAINING WALL NO. 74
LOG OF TEST BORINGS 2 OF 2

NOTE: A COPY OF THIS LOG OF TEST BORINGS IS AVAILABLE AT OFFICE OF STRUCTURE MAINTENANCE AND INVESTIGATIONS, SACRAMENTO, CALIFORNIA

CU: 12
EA: 0A7611

BRIDGE No. 55E0001

Sheet | of

REGISTERED PROFESSIONAL ENGINEER
Deepa Watnugala
No. C63838
Exp. 9-30-06
CIVIL
STATE OF CALIFORNIA

NOTE

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

SHEET 10 OF 15

EDINGER AVENUE OVERCROSSING

LOG OF TEST BORINGS

SCALE Horiz: 1"=20' Vert: 1"=10' | BRIDGE 55-266 | FILE | DRAWING 55266-10

PREL. DRAWING NO P.

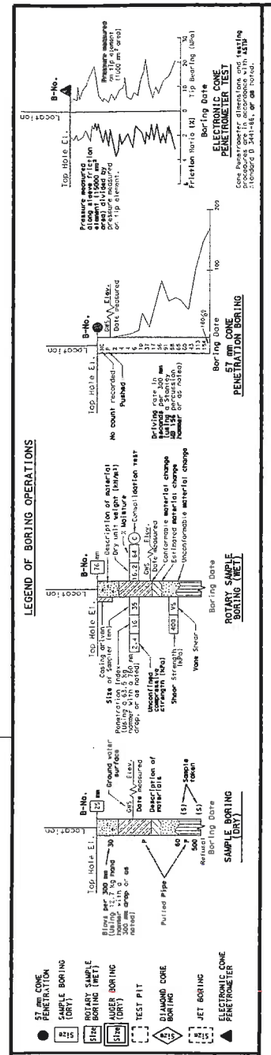
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
12	Ora	405			

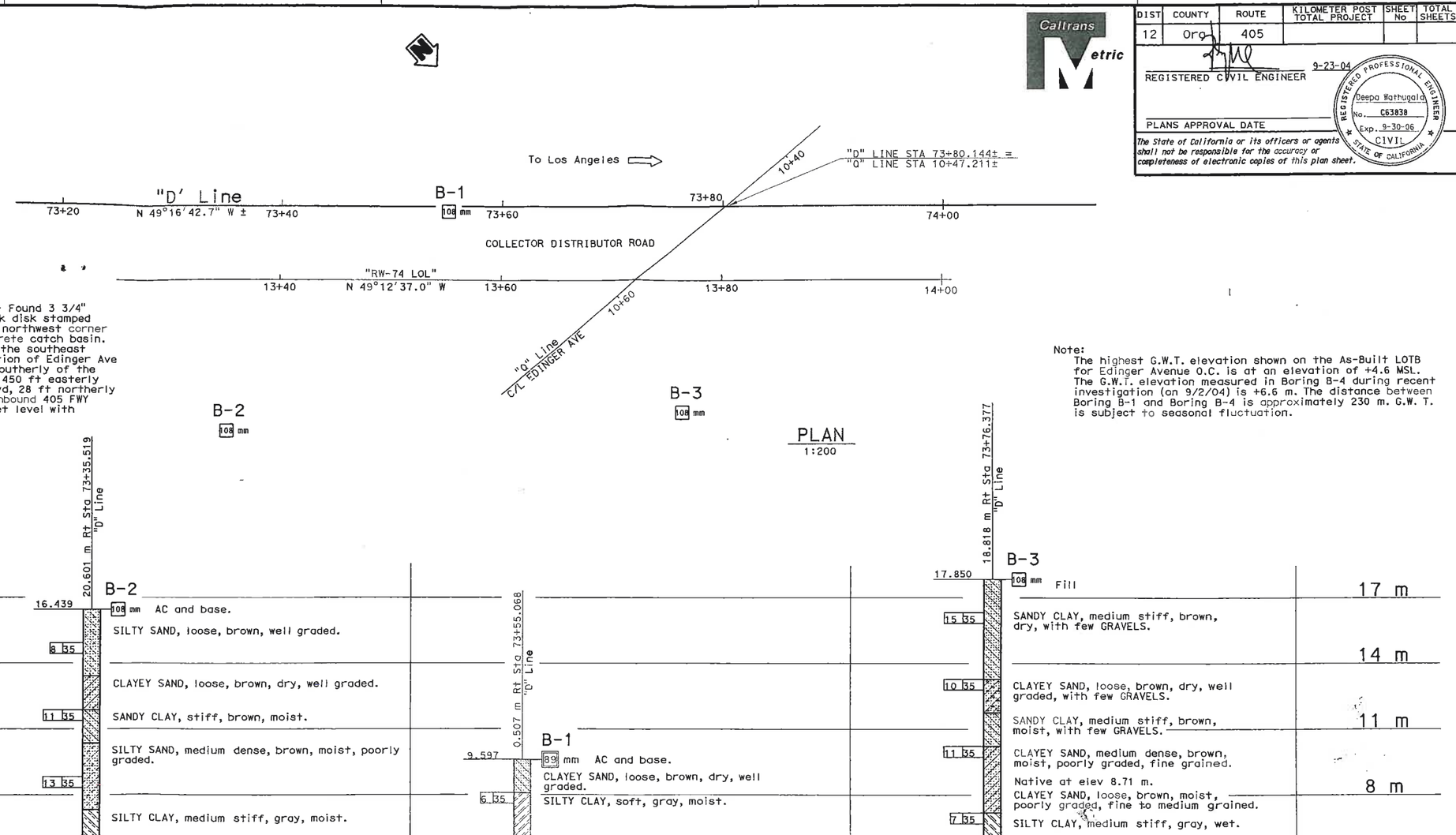
REGISTERED CIVIL ENGINEER — 9-23-04

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Deepa Wathugala — No. C63838 — Exp. 9-30-06 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.





PROFILE
HOR. 1:100
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

Note:
The highest G.W.T. elevation shown on the As-Built LOTB for Edinger Avenue O.C. is at an elevation of +4.6 MSL. The G.W.T. elevation measured in Boring B-4 during recent investigation (on 9/2/04) is +6.6 m. The distance between Boring B-1 and Boring B-4 is approximately 230 m. G.W.T. is subject to seasonal fluctuation.

BENCH MARK

Elev. 12.010 m

Described by OCS 2002 - Found 3 3/4" OCS aluminium benchmark disk stamped "HB-231-75", set in the northwest corner of a 4 ft by 8 ft concrete catch basin. Monument is located in the southeast corner of the intersection of Edinger Ave and Beach Blvd, 39 ft southerly of the C/L of Edinger Ave and 450 ft easterly of the C/L of Beach Blvd, 28 ft northerly of the C/L of the southbound 405 FWY On-Ramp. Monument is set level with the sidewalk.

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	FIELD INVESTIGATION BY:	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 55E0001	RETAINING WALL NO. 74
DRAWN BY W. Tang 08/04		D. Wathugala			KILOMETER POST 25.6/26.3	LOG OF TEST BORINGS 1 OF 2
CHECKED BY D. Wathugala						

OGS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 3/02)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 12
EA 0A7611
FILE => rw74.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY): 9-16-04

SHEET | OF

USERNAME = rpommerd DATE PLOTTED = 24-SEP-2004 TIME PLOTTED = 14:46

BENCHMARK:

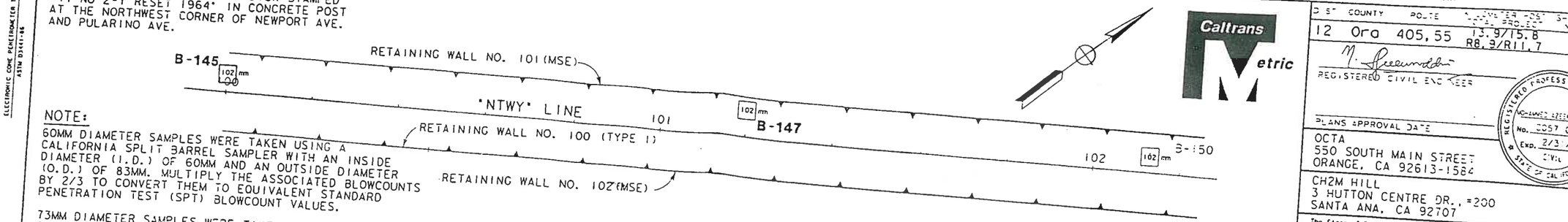
TTS-2Y RESET 1964. ELEV. 12.49
STANDARD USC&GS BENCHMARK DISK STAMPED
"TT NO 2-Y RESET 1964" IN CONCRETE POST
AT THE NORTHWEST CORNER OF NEWPORT AVE.
AND PULARINO AVE.

NOTE:

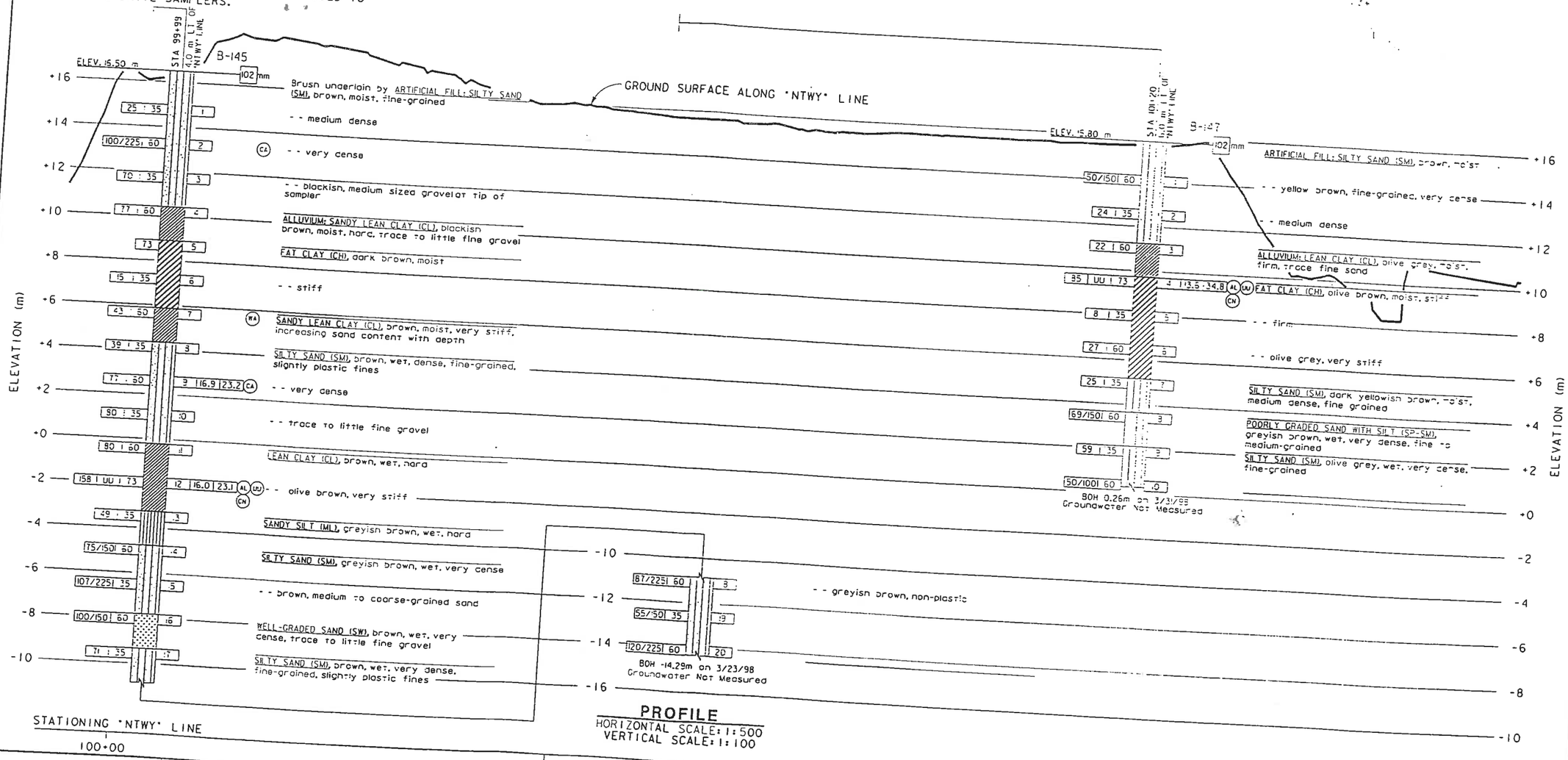
60MM DIAMETER SAMPLES WERE TAKEN USING A CALIFORNIA SPLIT BARREL SAMPLER WITH AN INSIDE DIAMETER (I.D.) OF 60MM AND AN OUTSIDE DIAMETER (O.D.) OF 83MM. MULTIPLY THE ASSOCIATED BLOWCOUNTS BY 2/3 TO CONVERT THEM TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOWCOUNT VALUES.

73MM DIAMETER SAMPLES WERE TAKEN USING A SHELBY SAMPLER, PUSHED HYDRAULICALLY AND RETAINED IN 73MM I.D. AND 76MM O.D. THIN-WALL SAMPLE TUBES.

A ROPE AND CATHEAD HAMMER SYSTEM WAS USED TO ADVANCE THE DRIVE SAMPLERS.

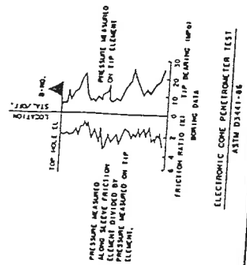


PLAN
SCALE: 1:500



PROFILE
HORIZONTAL SCALE: 1:500
VERTICAL SCALE: 1:100

LEGEND OF BORING OPERATIONS



NOTES:
1. TYPES OF BORINGS
- 3" CORE PENETROMETER
- ROTARY WASH
- ELECTRONIC CONE PENETROMETER
- AUGER BORING (DRY)
- TEST PIT
2. SOIL TEST DESIGNATIONS
- (CL) CONSOLIDATION
- (HY) HYDROMETER ANALYSIS
- (GS) GRAIN SIZE ANALYSIS
- (UC) UNCONFINED COMPRESSION
- (UU) UNCONSOLIDATED UNDRAINED TRIAXIAL
- (SA) WASH ANALYSIS
- (AL) ATTERBERG LIMITS
- (CA) CHEMICAL ANALYSIS
- (MD) MAX. DRY DENSITY
- (CU) CONSOLIDATED UNDRAINED TRIAXIAL
- (DS) DIRECT SHEAR
- (R) R-VALUE

BASED ON ASTM D2487, D2488

- CL, CLAYEY GRAVEL
- SW, WELL-GRADED SAND
- SP, POORLY-GRADED SAND
- SM, SILTY SAND
- SC, CLAYEY SAND
- CL-ML, SILTY CLAY
- SHALE
- CLAYSTONE
- SILTSTONE
- CL, LEAN CLAY
- ML, SILT
- OL, ORGANIC CLAY OR SILT
- CH, FAT CLAY
- MH, ELASTIC SILT
- OH, ORGANIC CLAY OR SILT
- GW, WELL-GRADED GRAVEL
- GP, POORLY-GRADED GRAVEL
- GM, SILTY GRAVEL

BASED ON ASTM D1586 AND SOWERS, 1979

SANDS AND GRAVELS

CONSISTENCY	BLOWS/305mm
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CLAYS AND SILTS

CONSISTENCY	BLOWS/305mm
VERY SOFT	0 - 2
SOFT	3 - 4
FIRM	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	OVER 30

CALTRANS DESIGN OVERSIGHT	DRAWN BY	K. REYES	M. AZEEMUDDIN (ENG)/ CH2M HILL & K. RAEKUL (TECH)/AP ENG
	CHECKED BY	B. HARDESTY	FIELD INVESTIGATOR
			DATE 3/23/98 - 3/31/98

FOR REDUCED PLANS
ORIGINAL SCALE IN MILLIMETERS
0 10 20 30 40 50

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRADLEY MIELKE
PROJECT ENGINEER

DISTRICT	COUNTY	ROUTE	KILOMETER POST	SHEET NO.
12	Ora	405, 55	13.9/15.8 R8.9/R11.7	PROJECT NO. SHEETS

M. Azeemuddin
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER
No. 52057 CE
Exp. 2/3 /01
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

OCTA
550 SOUTH MAIN STREET
ORANGE, CA 92613-1584

CH2M HILL
3 HUTTON CENTRE DR., #200
SANTA ANA, CA 92707

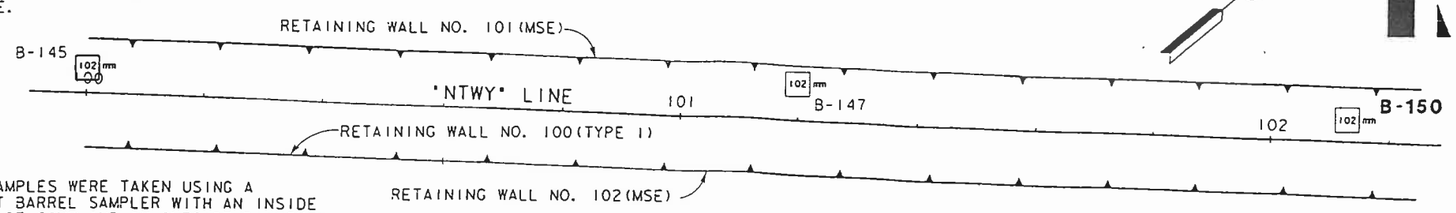
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

BRIDGE NO.	
X	
KILOMETER POST	
R9.3	

RET WALLS 100, 101 AND 102
LOG OF TEST BORINGS NO.

BENCHMARK:

TTS-2Y RESET 1964. ELEV. 12.49
STANDARD USC&GS BENCHMARK DISK STAMPED
'TT NO 2-Y RESET 1964' IN CONCRETE POST
AT THE NORTHWEST CORNER OF NEWPORT AVE.
AND PULARINO AVE.



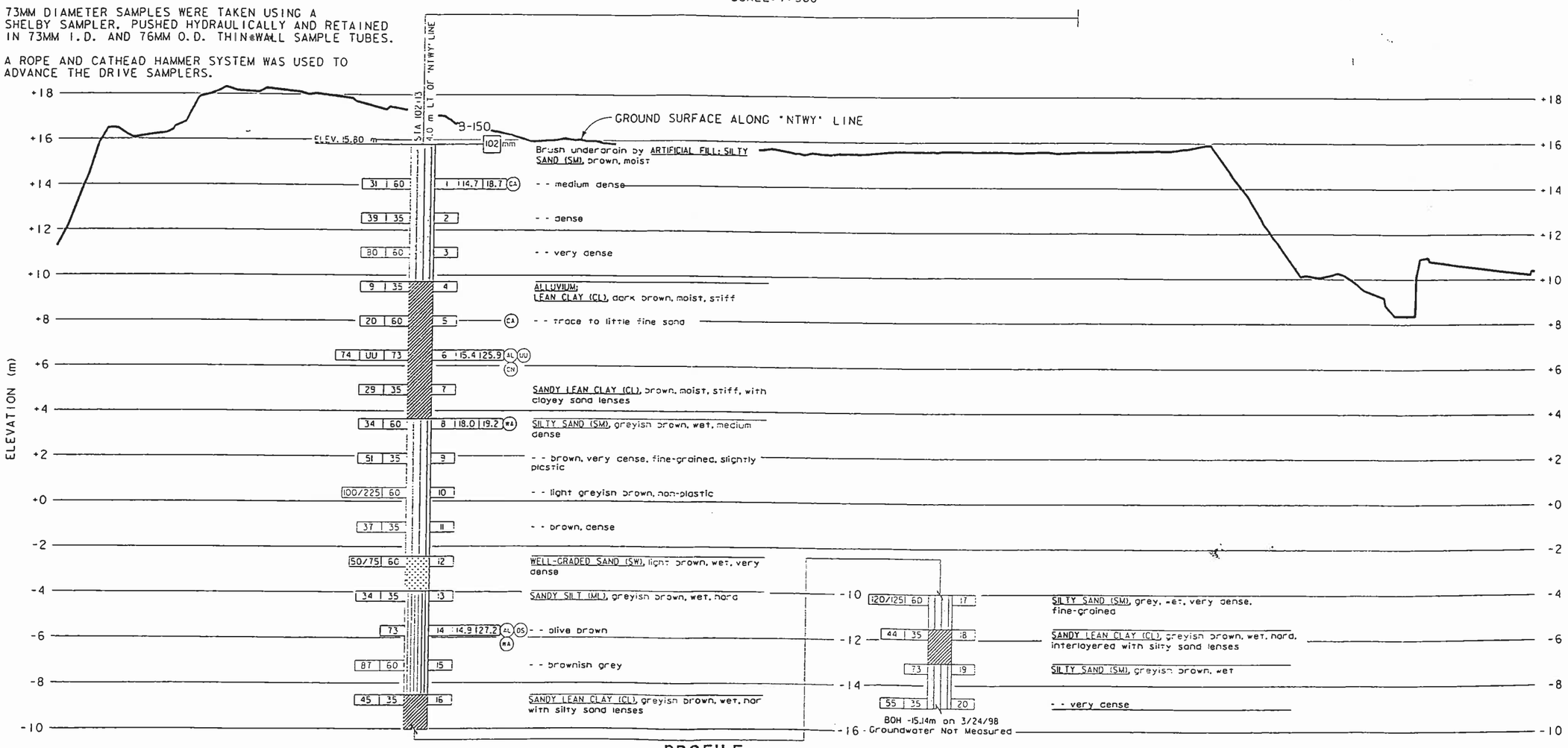
NOTE:

60MM DIAMETER SAMPLES WERE TAKEN USING A CALIFORNIA SPLIT BARREL SAMPLER WITH AN INSIDE DIAMETER (I.D.) OF 60MM AND AN OUTSIDE DIAMETER (O.D.) OF 83MM. MULTIPLY THE ASSOCIATED BLOWCOUNTS BY 2/3 TO CONVERT THEM TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOWCOUNT VALUES.

73MM DIAMETER SAMPLES WERE TAKEN USING A SHELBY SAMPLER, PUSHED HYDRAULICALLY AND RETAINED IN 73MM I.D. AND 76MM O.D. THIN-WALL SAMPLE TUBES.

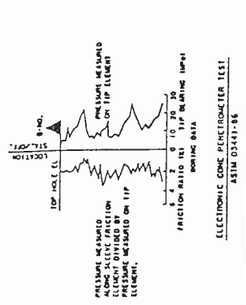
A ROPE AND CATHEAD HAMMER SYSTEM WAS USED TO ADVANCE THE DRIVE SAMPLERS.

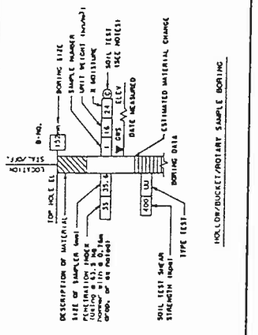
PLAN
SCALE: 1:500



PROFILE
HORIZONTAL SCALE: 1:500
VERTICAL SCALE: 1:100

STATIONING 'NTWY' LINE
100+00 101+00 102+00 103+00





NOTES:
1. TYPES OF BORINGS
- 3" OD CORE PENETROMETER
- ROTARY WASH
- ELECTRONIC CONE PENETROMETER
- AUGER BORING (DRY)
- TEST PIT
2. SOIL TEST DESIGNATIONS
- (AL) ATTERBERG LIMITS
- (CA) CHEMICAL ANALYSIS
- (DS) MAX. DRY DENSITY
- (CD) CONSOLIDATED UNDRAINED TRIAXIAL
- (DS) DIRECT SHEAR
- (R) R-VALUE
- (CN) CONSOLIDATION
- (H) HYDROMETER ANALYSIS
- (SA) GRAIN SIZE ANALYSIS
- (UU) UNCONFINED COMPRESSION
- (UC) UNCONSOLIDATED UNDRAINED TRIAXIAL
- (EI) WASH ANALYSIS

LEGEND OF EARTH MATERIALS (USCS) BASED ON ASTM D2487, D2488

- CL, LEAN CLAY
- ML, SILT
- OL, ORGANIC CLAY OR SILT
- CH, FAT CLAY
- MH, ELASTIC SILT
- OH, ORGANIC CLAY OR SILT
- GC, CLAYEY GRAVEL
- GW, WELL-GRADED GRAVEL
- GP, POORLY-GRADED GRAVEL
- GM, SILTY GRAVEL
- SC, CLAYEY SAND
- SW, WELL-GRADED SAND
- SP, POORLY-GRADED SAND
- SM, SILTY SAND
- CL-ML, SILTY CLAY
- SHALE
- CLAYSTONE
- SILTSTONE

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION BASED ON ASTM D1586 AND SOWERS, 1979

SANDS AND GRAVELS

CONSISTENCY	BLOWS/305mm
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CLAYS AND SILTS

CONSISTENCY	BLOWS/305mm
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	OVER 30

CALTRANS DESIGN OVERSIGHT	DRAWN BY	K. REYES	M. AZEEMUDDIN (ENG)/ CH2M HILL
	CHECKED BY	B. HARDESTY	FIELD INVESTIGATOR
			DATE 3/24/98

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRADLEY MIELKE
PROJECT ENGINEER

FOR REDUCED PLANS ORIGINAL SCALE IN MILLIMETERS 0 10 20 30 40 50

DIST	COUNTY	ROUTE	TOTAL PROJECT NO.	SHEET NO.	TOTAL SHEETS
12	Ora	405, 55	13.9/15.8 R8.9/R11.7		

M. Azeemuddin
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. 50578 — EXP. 2/3/00 — CIVIL — STATE OF CALIFORNIA

OCTA
550 SOUTH MAIN STREET
ORANGE, CA 92613-1584

CH2M HILL
3 HUTTON CENTRE DR., #200
SANTA ANA, CA 92707

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

BRIDGE NO.	RET WALLS 100, 101 AND 102
X	LOG OF TEST BORINGS NO. 2
KILOMETER POST R9.3	
POST MILE R8.8	DISREGARD PRINTS BEARING EARLIER REVISION DATES
CU 12208	REVISION DATES (PRELIMINARY STAGE ONLY)
EA 12-060511	SHEET X OF X

Caltrans Metric

10/10/2240.dlv 13-AUG-1998 15:32:29

BENCHMARK:

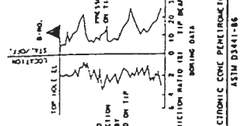
TTS-2Y RESET 1964, ELEV. 12.49
STANDARD USC&GS BENCHMARK DISK STAMPED
'TT NO 2-Y RESET 1964' IN CONCRETE POST
AT THE NORTHWEST CORNER OF NEWPORT AVE.
AND PULARINO AVE.

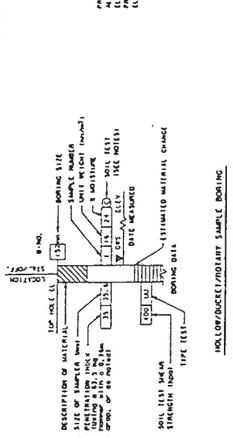
NOTE:

60MM DIAMETER SAMPLES WERE TAKEN USING A CALIFORNIA SPLIT BARREL SAMPLER WITH AN INSIDE DIAMETER (I.D.) OF 60MM AND AN OUTSIDE DIAMETER (O.D.) OF 83MM. MULTIPLY THE ASSOCIATED BLOWCOUNTS BY 2/3 TO CONVERT THEM TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOWCOUNT VALUES.

73MM DIAMETER SAMPLES WERE TAKEN USING A SHELBY SAMPLER, PUSHED HYDRAULICALLY AND RETAINED IN 73MM I.D. AND 76MM O.D. THIN-WALL SAMPLE TUBES.

A ROPE AND CATHEAD HAMMER SYSTEM WAS USED TO ADVANCE THE DRIVE SAMPLERS.





NOTES:
1. TYPES OF BORINGS
   - 3.0mm CONE PENETROMETER
   - ROTARY WASH
   - ELECTRONIC CONE PENETROMETER
   - AUGER BORING (DRY)
   - TEST PIT
2. SOIL TEST DESIGNATIONS
   - (AT) ATTERBERG LIMITS
   - (CA) CHEMICAL ANALYSIS
   - (DD) MAX. DRY DENSITY
   - (CU) CONSOL. (CD) UNDRAINED TRIAXIAL
   - (DS) DIRECT SHEAR
   - (RV) R-VALUE
   - (CN) CONSOLIDATION
   - (HY) HYDROMETER ANALYSIS
   - (GS) GRAIN SIZE ANALYSIS
   - (UC) UNCONFINED COMPRESSION
   - (CD) UNCONSOLIDATED UNDRAINED TRIAXIAL
   - (SA) WASH ANALYSIS

LEGEND OF EARTH MATERIALS (USCS) BASED ON ASTM D2487, D2488

CL, LEAN CLAY	GC, CLAYEY GRAVEL		
ML, SILT	SW, WELL-GRADED SAND		
OL, ORGANIC CLAY OR SILT	SP, POORLY-GRADED SAND		
CH, FAT CLAY	SM, SILTY SAND		
MH, ELASTIC SILT	SC, CLAYEY SAND		
OH, ORGANIC CLAY OR SILT	CL-ML, SILTY CLAY		
GW, WELL-GRADED GRAVEL	SHALE		
GP, POORLY-GRADED GRAVEL	CLAYSTONE		
GM, SILTY GRAVEL	SILTSTONE		

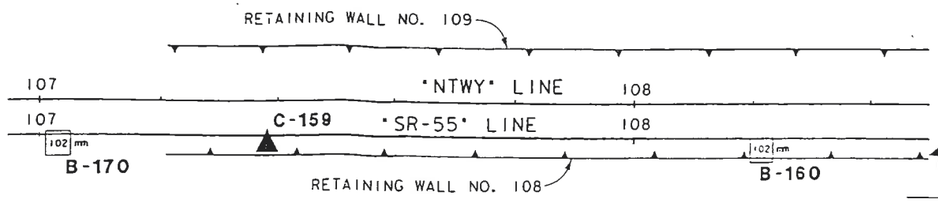
RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION BASED ON TERZAGHI AND PECK, 1948 AND SOWERS, 1979

SANDS AND GRAVELS

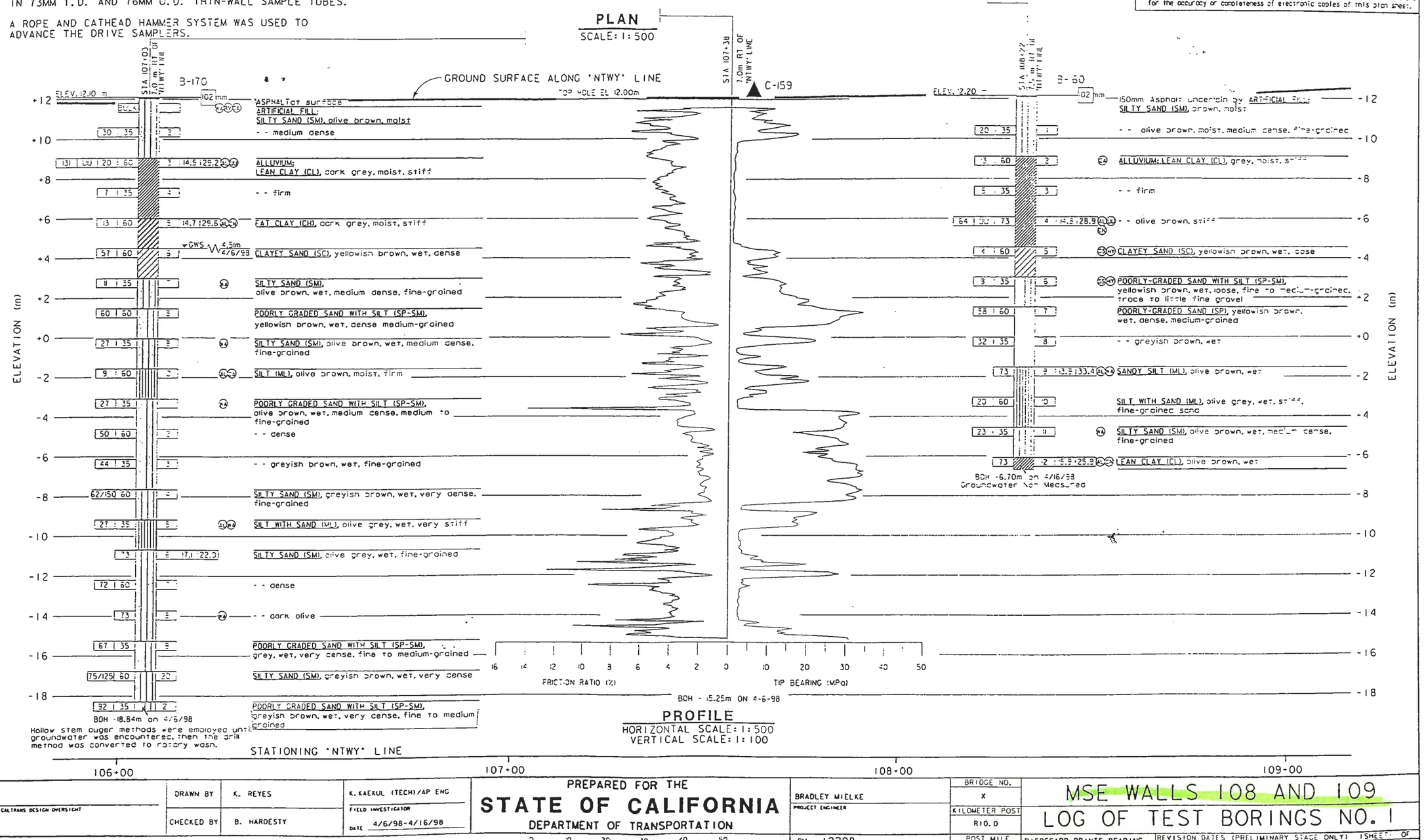
CONSISTENCY	BLOWS/305mm
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CLAYS AND SILTS

CONSISTENCY	BLOWS/305mm
VERY SOFT	< 2
SOFT	2 - 4
FIRM	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	OVER 30



PLAN
SCALE: 1:500



PROFILE
HORIZONTAL SCALE: 1:500
VERTICAL SCALE: 1:100

STATIONING 'NTWY' LINE
106+00 107+00 108+00 109+00

Caltrans Metric

DIST	COUNTY	ROUTE	POST MILE	TOTAL PROJECT NO.	SHEET NO.
12	Ora	405, 55	13.9/15.8 R8.9/R11.7		

M. Lauenstein
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER
No. 2057 CE
Exp. 2/31/00
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

OCTA
550 SOUTH MAIN STREET
ORANGE, CA 92613-1584

CH2M HILL
3 HUTTON CENTRE DR., #200
SANTA ANA, CA 92707

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CALTRANS DESIGN OVERSIGHT	DRAWN BY	K. REYES	K. KAEKUL (TECH)/AP ENG
	CHECKED BY	B. HARDESTY	FIELD INVESTIGATOR
			DATE 4/6/98-4/16/98

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRADLEY MIELKE
PROJECT ENGINEER

CU 12208

BRIDGE NO. X
KILOMETER POST R10.0
POST MILE

MSE WALLS 108 AND 109
LOG OF TEST BORINGS NO. 1

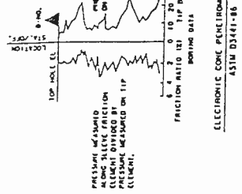
DISREGARD PRINTS BEARING EARLIER REVISION DATES

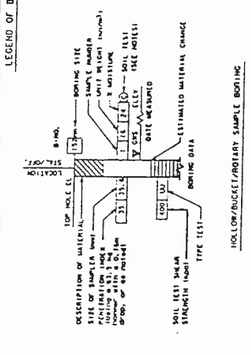
REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF
X | X

FOR REDUCED PLANS

BENCHMARK:

TTS-2Y RESET 1964. ELEV. 12.49
STANDARD USC&GS BENCHMARK DISK STAMPED
'TT NO 2-Y RESET 1964' IN CONCRETE POST
AT THE NORTHWEST CORNER OF NEWPORT AVE.
AND PULARINO AVE.





LEGEND OF BORING OPERATIONS

NOTES:
1. TYPES OF BORINGS
- ● 3"mm (CDM) PENETROMETER
- SIZE ROTARY WASH
- ▲ ELECTRONIC CONE PENETROMETER
- AUGER BORING (DRY)
- TYPE TEST PIT
2. SOIL TEST DESIGNATIONS
- (AT) ATTERBERG LIMITS
- (CA) CHEMICAL ANALYSIS
- (D) MAX. DRY DENSITY
- (CD) CONSOLIDATED UNDRAINED TRIAXIAL
- (DS) DIRECT SHEAR
- (R) R-VALUE
- (C) CONSOLIDATION
- (H) HYDROMETER ANALYSIS
- (G) GRAIN SIZE ANALYSIS
- (UC) UNCONFINED COMPRESSION
- (UU) UNCONSOLIDATED UNDRAINED TRIAXIAL
- (W) WASH ANALYSIS

LEGEND OF EARTH MATERIALS (USCS)
BASED ON ASTM D2487, D2488

- GC, CLAYEY GRAVEL
- GW, WELL-GRADED SAND
- SP, POORLY-GRADED SAND
- SM, SILTY SAND
- SC, CLAYEY SAND
- CL-ML, SILTY CLAY
- SHALE
- CLAYSTONE
- SILTSTONE
- CL, LEAN CLAY
- ML, SILT
- OL, ORGANIC CLAY OR SILT
- CH, FAT CLAY
- MH, ELASTIC SILT
- OH, ORGANIC CLAY OR SILT
- GW, WELL-GRADED GRAVEL
- SP, POORLY-GRADED GRAVEL
- GM, SILTY GRAVEL

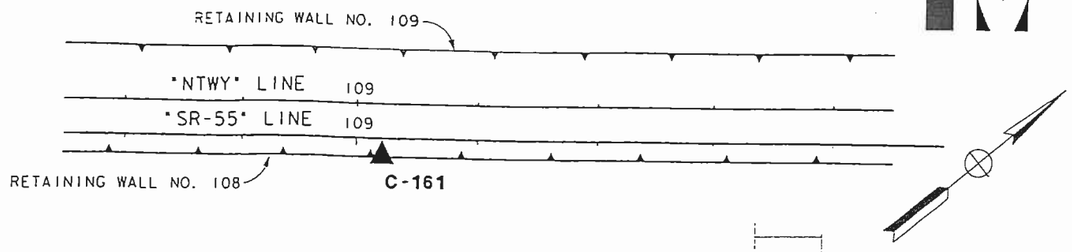
RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION BASED ON ASTM D1586 AND SOWERS, 1979

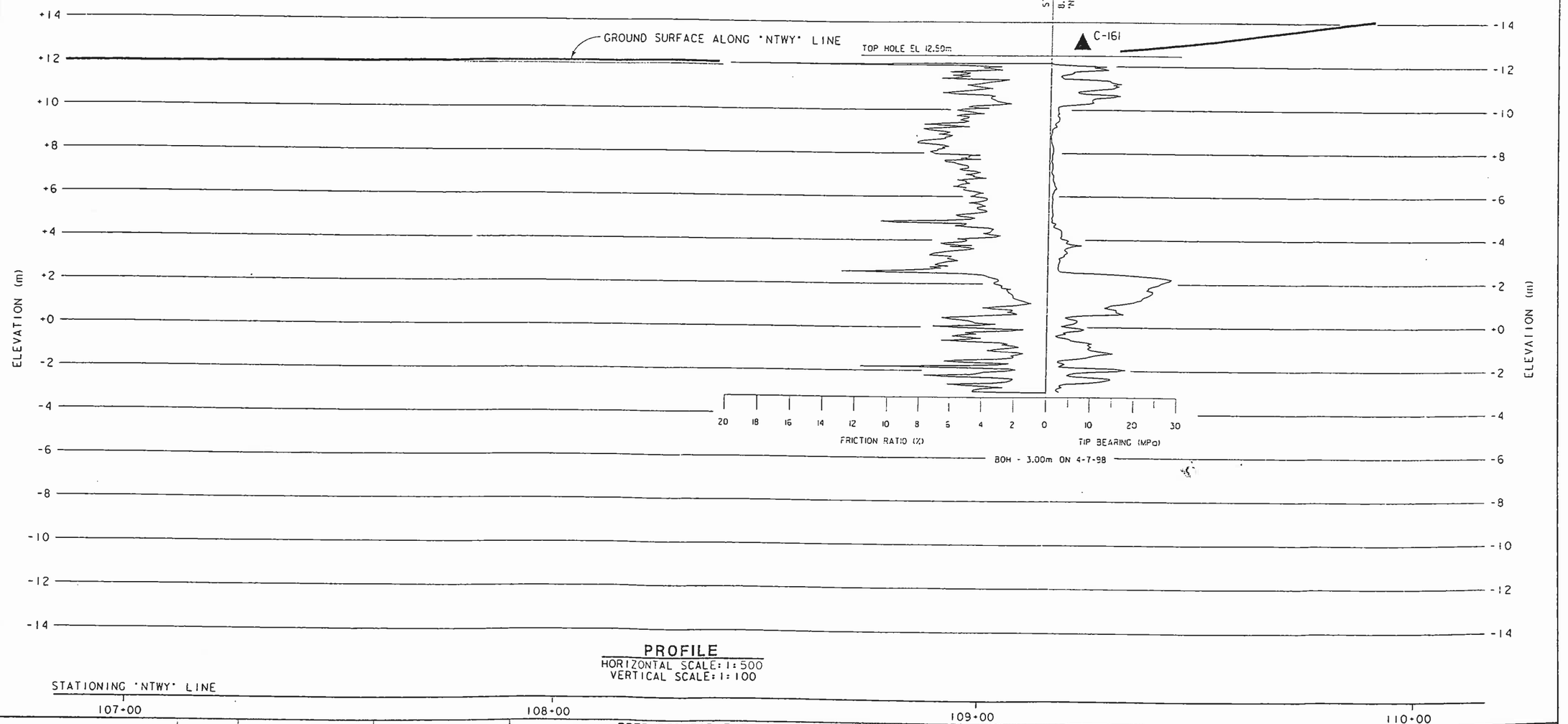
SANDS AND GRAVELS

CONSISTENCY	BLOWS/305mm
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CLAYS AND SILTS

CONSISTENCY	BLOWS/305mm
VERY SOFT	< 2
SOFT	2 - 4
FIRM	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	OVER 30





Caltrans Metric

DISTRICT	COUNTY	ROUTE	TOTAL PROJECT MILES	TOTAL PROJECT KILOMETERS	SHEET NO.	TOTAL SHEETS
12	Ora	405, 55	13.9/15.8 R8.9/R11.7			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. 20577 — Exp. 3-31-00 — CIVIL — STATE OF CALIFORNIA

OCTA
550 SOUTH MAIN STREET
ORANGE, CA 92613-1584

CH2M HILL
3 HUTTON CENTRE DR., #200
SANTA ANA, CA 92707

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CALTRANS DESIGN OVERSIGHT	DRAWN BY	K. REYES	K. KAEKUL (TECH)/AP ENG	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRADLEY MIELKE, PROJECT ENGINEER
	CHECKED BY	B. HARDESTY	FIELD INVESTIGATOR DATE 4/7/98		

BRIDGE NO. X
KILOMETER POST R10.0
POST MILE R6.2
CU 12208
EA 12-0695U1

MSE WALLS 108 AND 109
LOG OF TEST BORINGS NO. 2

DISREGARD PRINTS BEARING EARLIER REVISION DATES
REVISION DATES (PRELIMINARY STAGE ONLY)
SHEET 1 OF X X

FOR REDUCED PLANS ORIGINAL SCALE IN MILLIMETERS 0 10 20 30 40 50

plotted: 07-AUG-1998 13:47:25

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	ORG	405	11.5 TO 11.5	1	2

REGISTERED CIVIL ENGINEER
PRINCIPAL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — JALAL VAHDI — No. 045350 — Exp. 09-30-98 — CIVIL — STATE OF CALIFORNIA

NINYO & MOORE
9272 JERONIMO RD. STE. 123A
IRVINE, CA 92718

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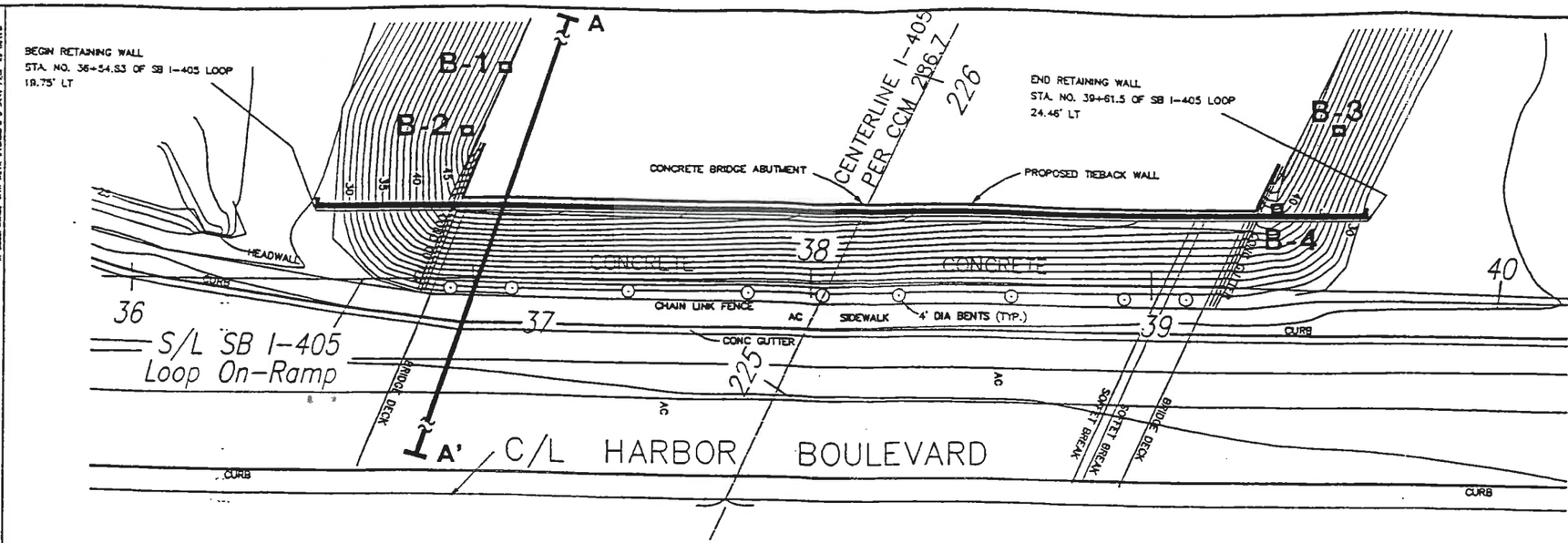
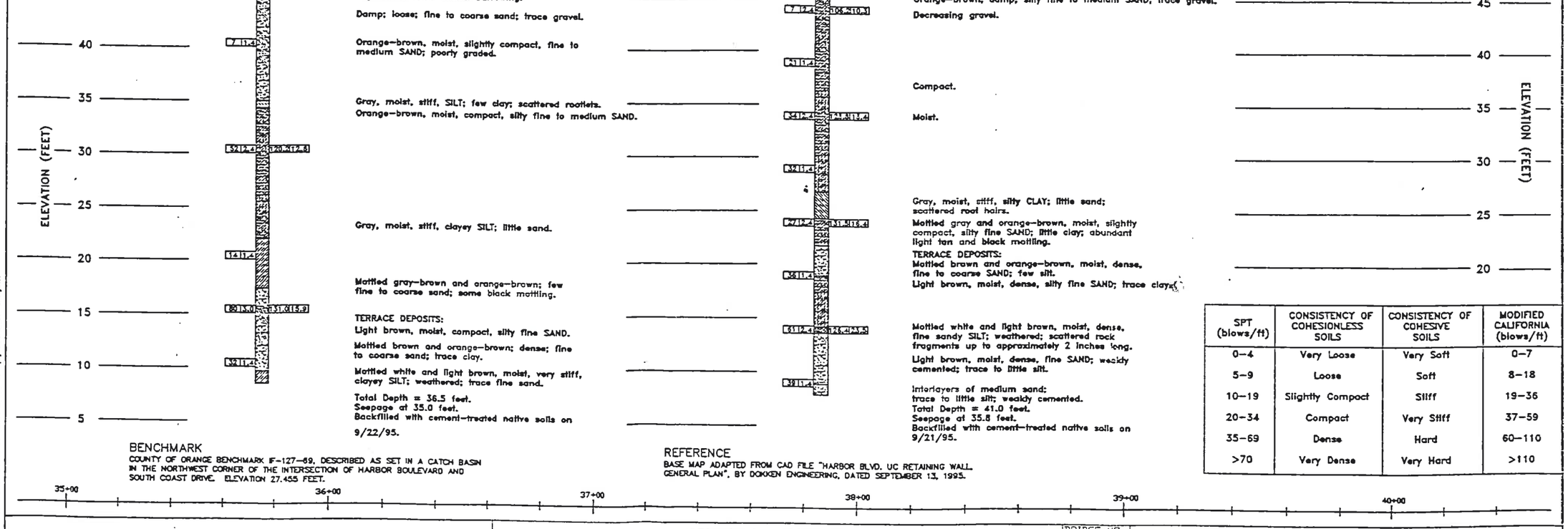
NOTE:
FOR BORING B-3 AND B-4, SEE SHEET 2.

SCALE:
PLAN 1"=20'
PROFILE
VERTICAL 1"=5'
HORIZONTAL 1"=100'





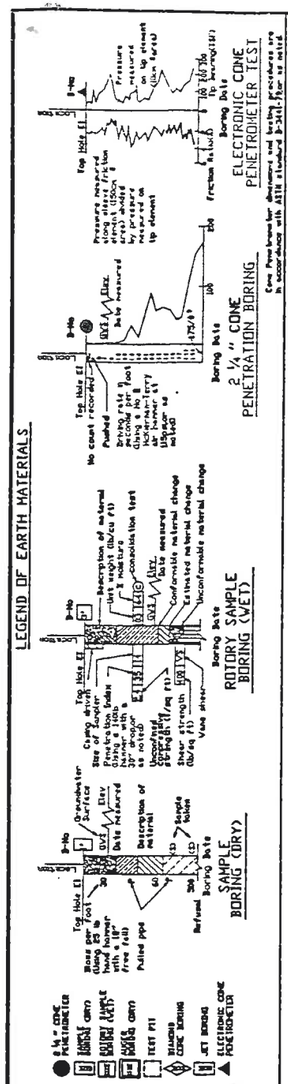
SPT (blows/ft)	CONSISTENCY OF COHESIONLESS SOILS	CONSISTENCY OF COHESIVE SOILS	MODIFIED CALIFORNIA (blows/ft)
0-4	Very Loose	Very Soft	0-7
5-9	Loose	Soft	8-18
10-19	Slightly Compact	Stiff	19-36
20-34	Compact	Very Stiff	37-59
35-69	Dense	Hard	60-110
>70	Very Dense	Very Hard	>110

BENCHMARK
COUNTY OF ORANGE BENCHMARK IF-127-69, DESCRIBED AS SET IN A CATCH BASIN IN THE NORTHWEST CORNER OF THE INTERSECTION OF HARBOR BOULEVARD AND SOUTH COAST DRIVE. ELEVATION 27.455 FEET.

REFERENCE
BASE MAP ADAPTED FROM CAD FILE "HARBOR BLVD. UC RETAINING WALL GENERAL PLAN", BY DOKKEN ENGINEERING, DATED SEPTEMBER 13, 1995.

35+00 36+00 37+00 38+00 39+00 40+00

LEGEND OF EARTH MATERIALS



NOTE:
Classification of earth material as shown on this sheet is based upon field observation and is not to be construed to imply mechanical analysis.

DRAWN BY	LR	DERON VAN HOFF, SENIOR STAFF ENGINEER FIELD INVESTIGATOR
CHECKED BY	JV	SEPTEMBER 1995 DATE

PREPARED FOR STATE OF:
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRIDGE NO
55-257 R/W
POST MILE
11.5

HARBOR BOULEVARD UC RETAINING WALL
LOG OF TEST BORINGS

ORIGINAL SCALE IS IN INCHES FOR REDUCED PLANS 0 1 2 3

EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 1 OF 2

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	ORG	405	11.5 TO 11.5	2	2

REGISTERED CIVIL ENGINEER
PRINCIPAL ENGINEER

PLANS APPROVAL DATE

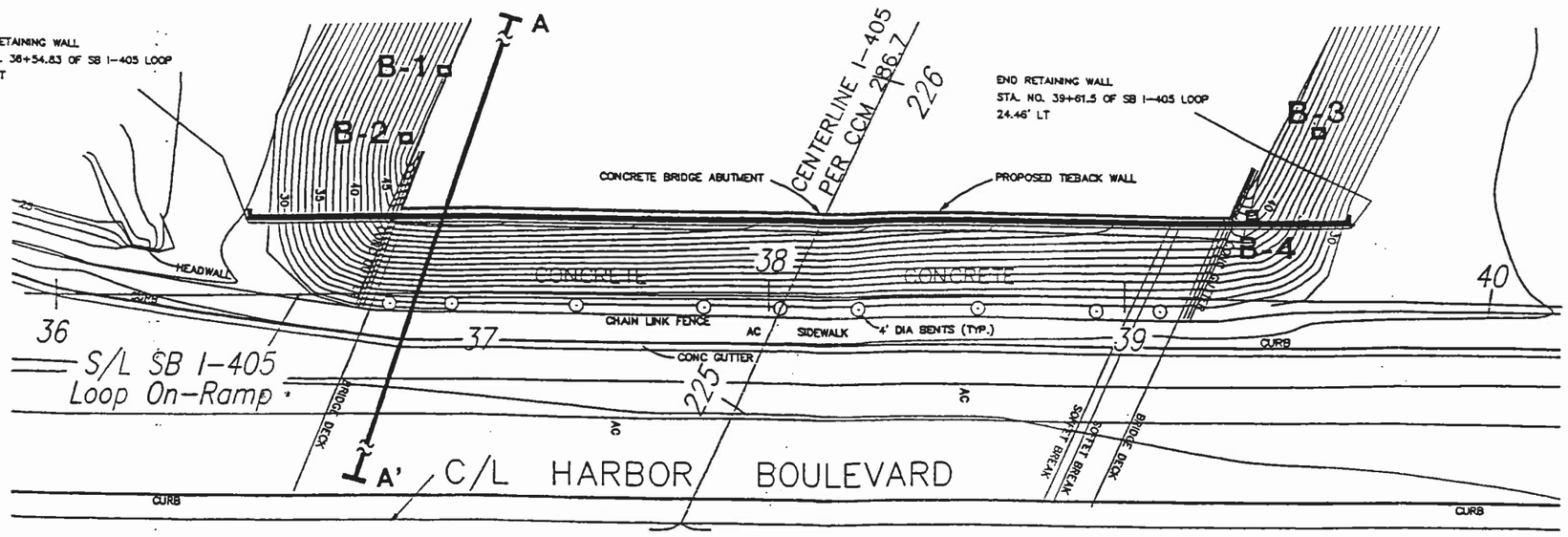
REGISTERED PROFESSIONAL ENGINEER — JALAL YAMIN — No. 045350 — Exp. 09-30-98 — CIVIL — STATE OF CALIFORNIA

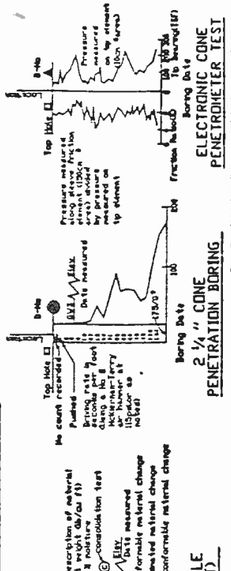
NINYO & MOORE
9272 JERONIMO RD. STE. 123A
IRVINE, CA 92718

The State of California or its officers or agents shall not be responsible for this accuracy or completeness of electronic copies of this plan sheet.

NOTE:
FOR BORINGS B-1 AND B-2, SEE SHEET 1.

SCALE:
PLAN 1"=40'
PROFILE
VERTICAL 1"=5'
HORIZONTAL 1"=100'





STA. NO. 39+38
23' LT OF S/L SB I-405 LOOP ON-RAMP

B-4
41' +/-MSL
6"

Brown, dry, compact, gravelly SAND; scattered asphalt concrete and portland cement concrete debris.

Damp.

Orange-brown, damp, slightly compact, fine to medium sand; trace silt.

30 19.4 — 17 14.7

Moist.

Dark grayish brown, moist, stiff, silty CLAY; few sand; some orange-brown mottling; scattered rootlets; scattered gravel.

15 11.4

TERRACE DEPOSITS:
Brown, moist, stiff, fine sandy SILT; few clay; few medium to coarse sand.

24 12.4 — 37 25.5

Interlayered light brown, moist, very stiff, fine sandy SILT; trace clay and light brown, moist, compact, medium SAND; few fine sand; trace coarse sand; trace clay.

22 11.4

Total Depth = 31.5 feet.
No groundwater encountered.
Backfilled with cement-treated native soils on 9/22/95.

STA. NO. 39+52
47' LT OF S/L SB I-405 ON-RAMP

B-3
38' +/-MSL
6"

Brown, dry, compact, gravelly SAND; sparse vegetation.

Damp; slightly compact; fine to medium sand.

Orange-brown; trace silt.

Moist.

Brown, moist, compact, silty fine to medium SAND; few clay.

Dark grayish brown, moist, stiff, silty CLAY; few sand.

TERRACE DEPOSITS:
Mottled brown and orange-brown, moist, slightly compact, silty fine to coarse SAND; few clay.
Light brown, moist, compact to dense, medium to coarse SAND.
Mottled light brown and black, moist, very stiff, fine sandy SILT; trace medium to coarse sand, trace clay.

15 11.4

45 12.4 — 31.4 20.2

28 11.4

Light brown, moist, compact, fine to coarse SAND; trace fine to medium gravel.

Total Depth = 31.5 feet.
No groundwater encountered.
Backfilled with cement-treated native soils on 9/22/95.

ELEVATION (FEET)
40 35 30 25 20 15 10 5

SPT (blows/ft)	CONSISTENCY OF COHESIONLESS SOILS	CONSISTENCY OF COHESIVE SOILS	MODIFIED CALIFORNIA (blows/ft)
0-4	Very Loose	Very Soft	0-7
5-9	Loose	Soft	8-18
10-19	Slightly Compact	Stiff	19-36
20-34	Compact	Very Stiff	37-59
35-69	Dense	Hard	60-110
>70	Very Dense	Very Hard	>110

BENCHMARK

COUNTY OF ORANGE BENCHMARK IF-127-69, DESCRIBED AS SET IN A CATCH BASIN IN THE NORTHWEST CORNER OF THE INTERSECTION OF HARBOR BOULEVARD AND SOUTH COAST DRIVE. ELEVATION 27.455 FEET.

REFERENCE

BASE MAP ADAPTED FROM CAD FILE "HARBOR BLVD UC RETAINING WALL GENERAL PLAN," BY DOKKEN ENGINEERING, DATED SEPTEMBER 13, 1995.

37+00 38+00 39+00 40+00 41+00 42+00

DRAWN BY	LR	DERON VAN HOFF, SENIOR STAFF ENGINEER FIELD INVESTIGATOR
CHECKED BY	JV	SEPTEMBER 1995 DATE

PREPARED FOR STATE OF:
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRIDGE NO 55-237 R/L
POST MILE 11.5

HARBOR BOULEVARD UC RETAINING WALL
LOG OF TEST BORINGS

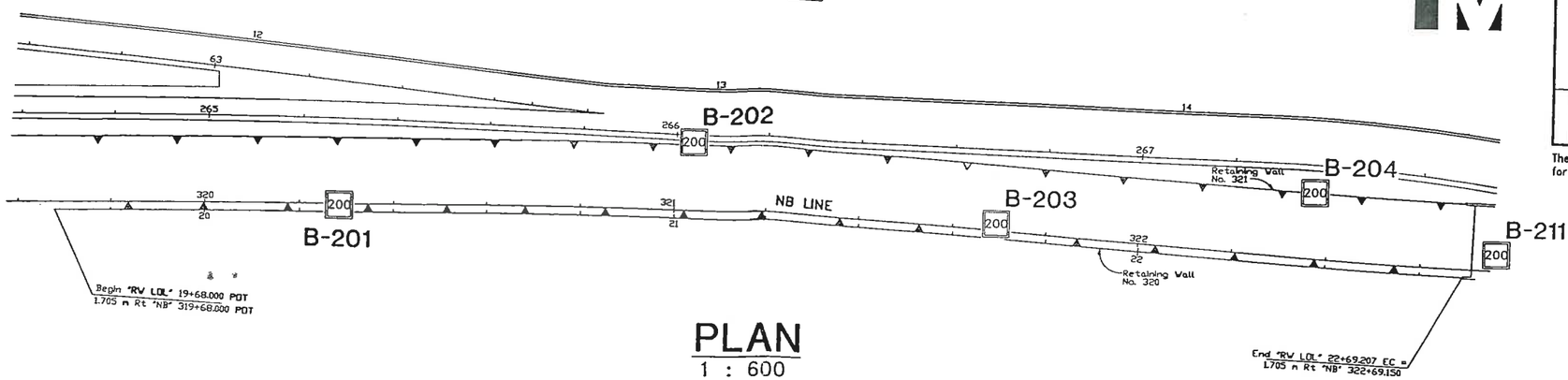
ORIGINAL SCALE IS IN INCHES FOR REDUCED PLANS 0 1 2 3

EARLIER REVISION DATES

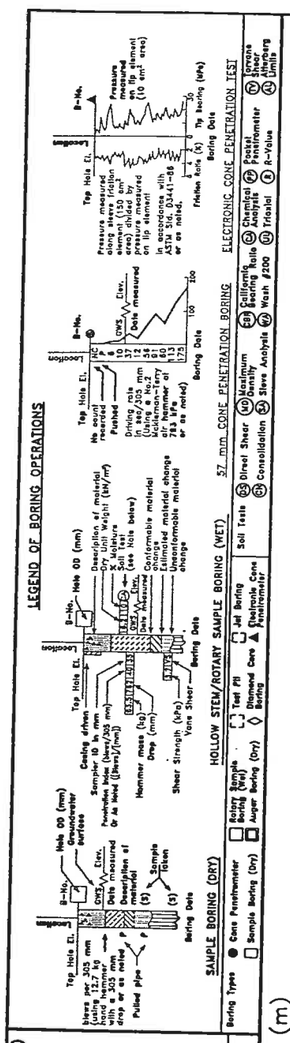
REVISION DATES (PRELIMINARY STAGE ONLY)

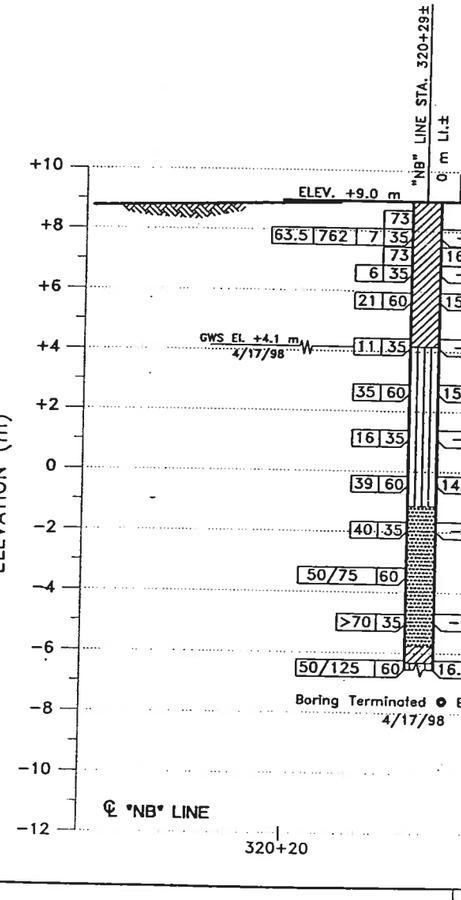
BENCHMARK

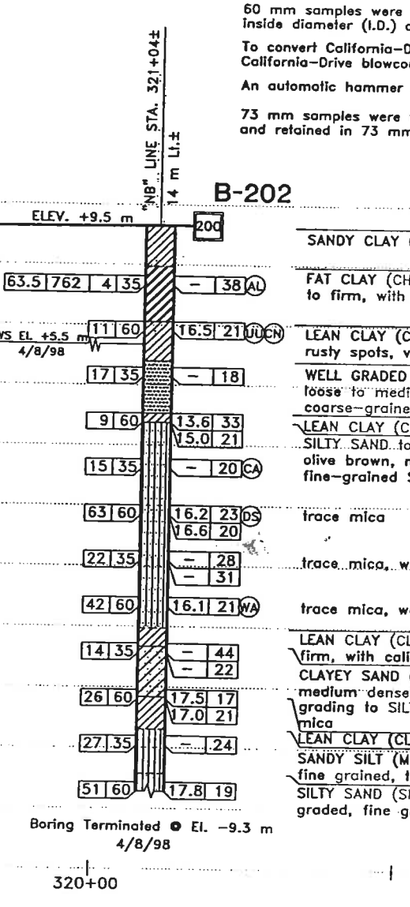
TTS-2Y reset 1964, Elev. +12.49
Standard USC&GS Benchmark disk stamped "TT NO 2-Y RESET 1964" in concrete post at the northwest corner of Newport Ave. and Paularino Ave.



PLAN
1 : 600







PROFILE
VERTICAL 1 : 100
HORIZONTAL 1 : 200

NOTES:

60 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 60 mm and an outside diameter (O.D.) of 75 mm.

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65.

An automatic hammer system was used to advance the drive samplers.

73 mm samples were taken using a Shelby sampler, pushed hydraulically and retained in 73 mm I.D. and 76 mm O.D. thin-walled sample tubes.

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTA SHEE
12	ORA	55			

Caltrans Metric

REGISTERED CIVIL ENGINEER

PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER KANDIAH ARULMOLI NO. GE-002090 EXP. 12-31-2001 GEOTECHNICAL STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

The State of California or its officers or agents shall not be responsible for the completeness or accuracy of electronic copies of this plan sheet

DESIGN	M. CHOW	7/1/98	B. SCHELL/GEOLOGIST
CHECKED	T. POE	7/9/98	4/8/98, 4/17/98

DESIGN OVERSIGHT Ba Nguyen
SIGNOFF DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

K. ARULMOLI
PROJECT ENGINEER

CU 12208

BRIDGE No.
KILOMETER POST KP 9.1/9.2
POST MILE

MSE WALL RW 320 & RW 321
LOG OF TEST BORINGS NO. 1

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	ORA				

REGISTERED CIVIL ENGINEER

PLAN APPROVAL DATE

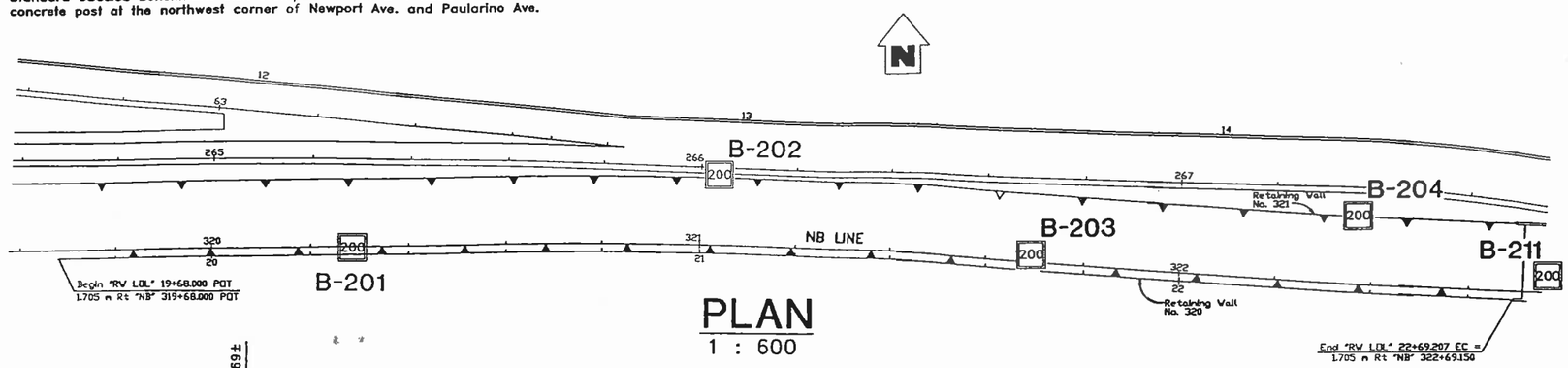
REGISTERED PROFESSIONAL ENGINEER — KAMRAN ARULMOLI — NO. GE-002090 EXP. 12-31-2001 — GEOTECHNICAL — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

The State of California or its officers or agents shall not be responsible for the completeness or accuracy of electronic copies of this plan sheet.

BENCHMARK

TTS-2Y reset 1964, Elev. +12.49
Standard USC&GS Benchmark disk stamped "TT NO 2-Y RESET 1964" in concrete post at the northwest corner of Newport Ave. and Paularino Ave.



PLAN
1 : 600

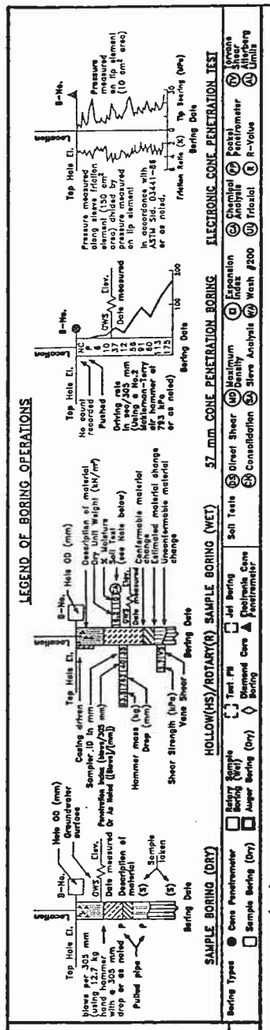
NOTES:

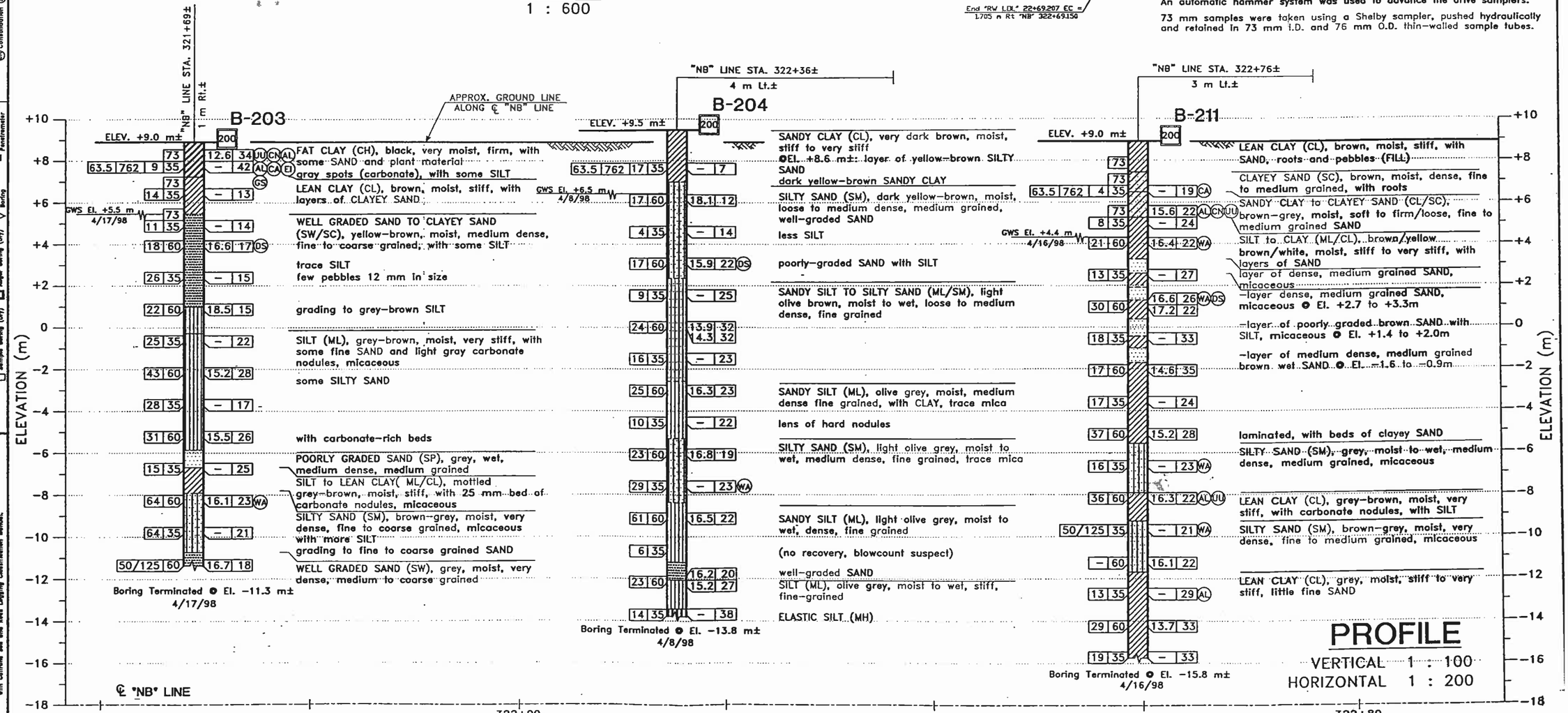
60 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 60 mm and an outside diameter (O.D.) of 75 mm.

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65.

An automatic hammer system was used to advance the drive samplers.

73 mm samples were taken using a Shelby sampler, pushed hydraulically and retained in 73 mm I.D. and 76 mm O.D. thin-walled sample tubes.





PROFILE
VERTICAL 1 : 100
HORIZONTAL 1 : 200

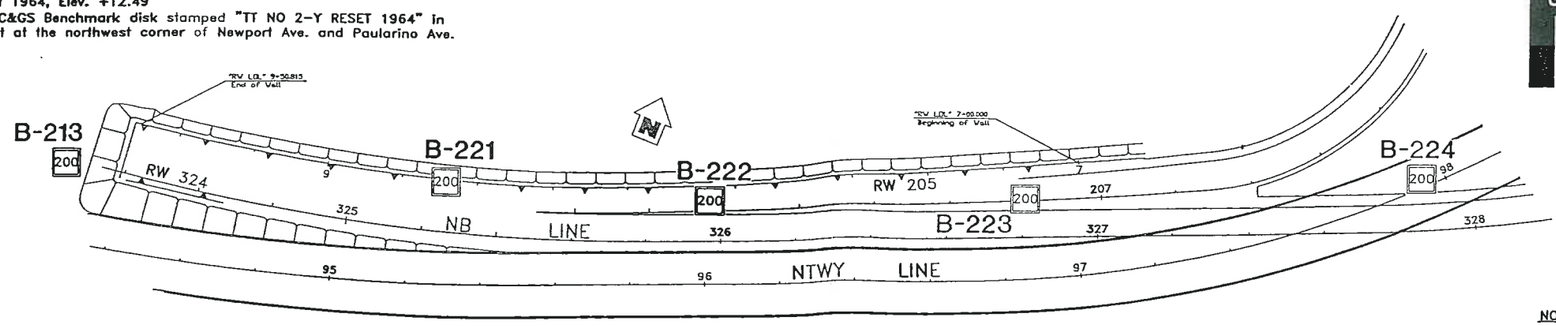
DESIGN	BY M. KAPUSKAR 7/8/98	R. JIE/FIELD TECHNICIAN B. SCHELL/GEOLOGIST	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI	BRIDGE No.
CHECKED	BY T. POE 7/9/98	DATE 4/8/98, 4/17/98			KILOMETER POST KP 9.1/9.2
REVISION DIVERSION	Be Nguyen	ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100	CU 12208 EA 12-0695U1		POST MILE P 14.7/14.8
ENGR'G DATE					DISREGARD PRINTS BEARING EARLIER REVISION DATES

MSE WALL RW 320 & RW 321
LOG OF TEST BORINGS NO. 2

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET 17 | OF 19

BENCHMARK

TTS-2Y reset 1964, Elev. +12.49
Standard USC&GS Benchmark disk stamped "TT NO 2-Y RESET 1964" in concrete post at the northwest corner of Newport Ave. and Paularino Ave.



DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEET
12	ORA				

REGISTERED CIVIL ENGINEER

PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER KARNAH ARULMOLI NO. GE-002090 EXP. 12-31-2001 GEOTECHNICAL STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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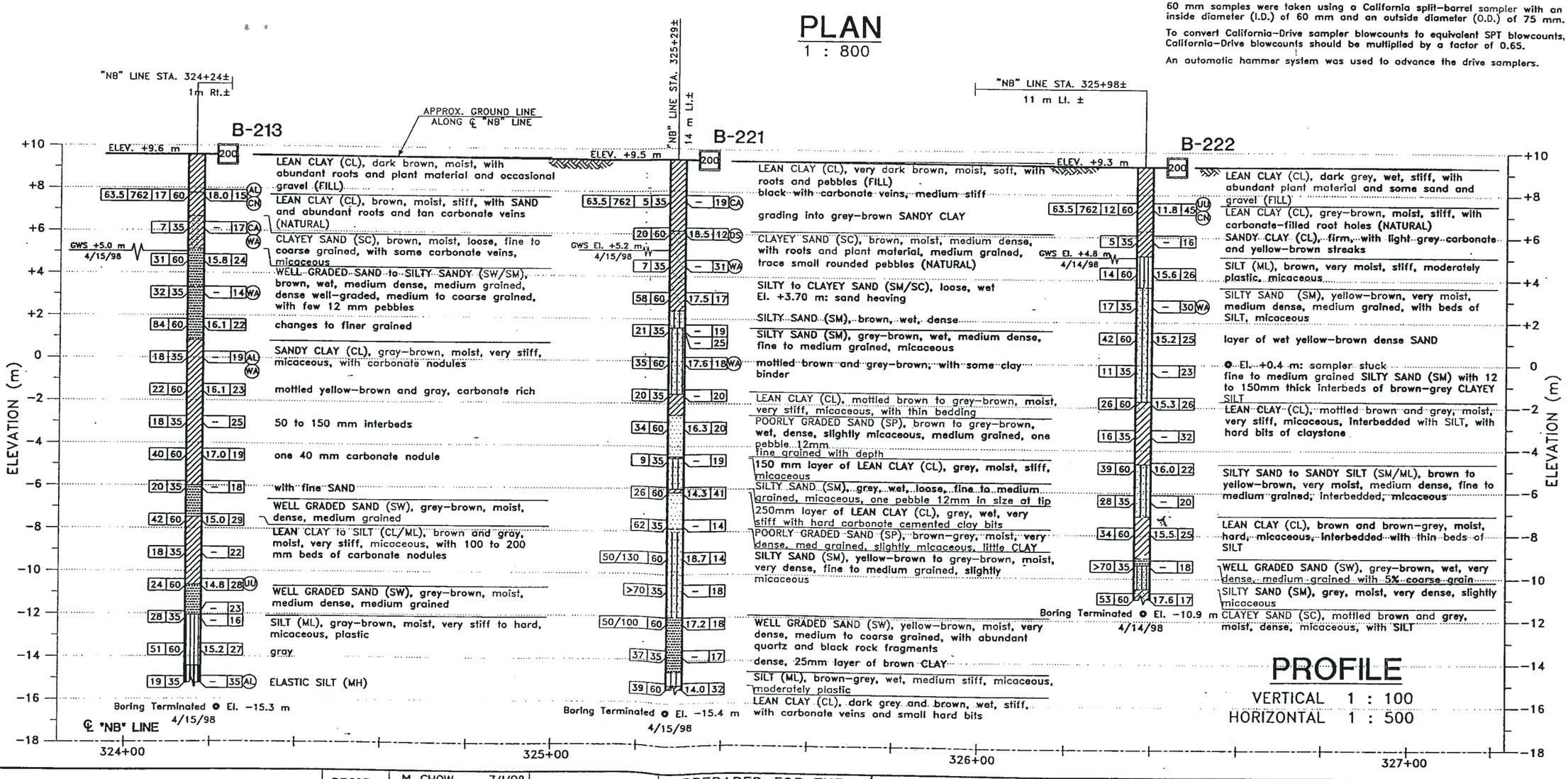
NOTES:

60 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 60 mm and an outside diameter (O.D.) of 75 mm.

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65.

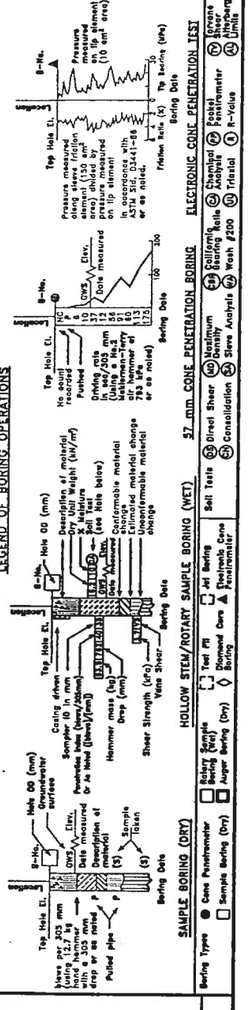
An automatic hammer system was used to advance the drive samplers.

PLAN
1 : 800

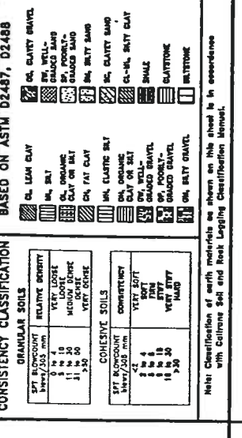


PROFILE
VERTICAL 1 : 100
HORIZONTAL 1 : 500

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS (USCS) BASED ON ASTM D2487, D2488



Note: Classification of earth materials as shown on this sheet is in accordance with Caltrans Soil and Rock Logging Classification Manual.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

GRANULAR SOILS			COHESIVE SOILS	
SPT BLOWCOUNT blows/300 mm	RELATIVE DENSITY		SPT BLOWCOUNT blows/300 mm	CONSISTENCY
0 to 4	VERY LOOSE		<2	VERY SOFT
5 to 10	LOOSE		2 to 4	SOFT
11 to 30	MEDIUM DENSE		5 to 8	FIRM
31 to 50	DENSE		9 to 15	STIFF
>50	VERY DENSE		16 to 30	VERY STIFF
			>30	HARD

DESIGN	BY M. CHOW 7/1/98 M. KAPUSKAR 7/8/98	B. SCHELL/GEOLOGIST FIELD INVESTIGATOR/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE No.
CHECKED	BY T. POE 7/9/98	DATE 4/14/98, 4/15/98			KILOMETER POST 14.3
				CU 12208	POST MILE

DESIGN OVERSIGHT Be Nguyen
SIGNOFF DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

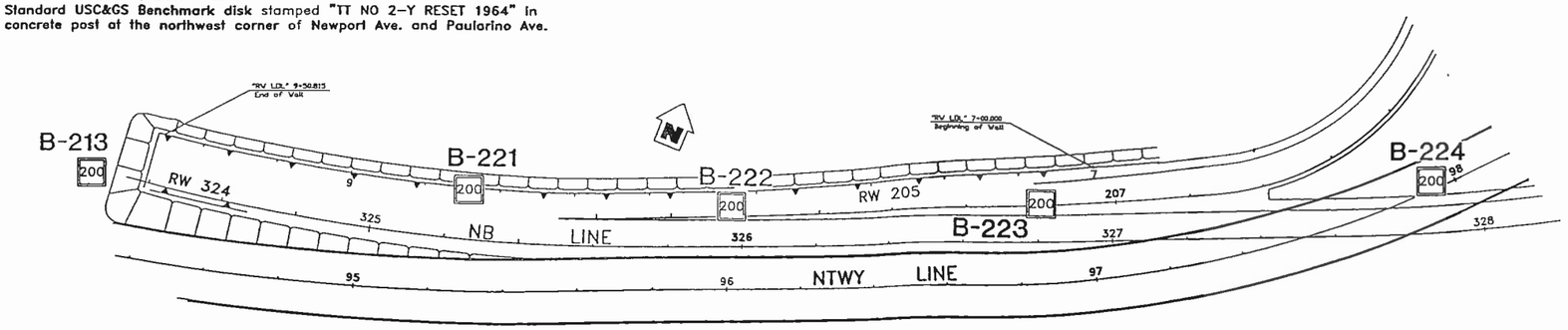
DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) SHEET OF

MSE WALL RW 205 & RW 324
LOG OF TEST BORINGS NO. 1

BENCHMARK

TTS-2Y reset 1964, Elev. +12.49
Standard USC&GS Benchmark disk stamped "TT NO 2-Y RESET 1964" in concrete post at the northwest corner of Newport Ave. and Paularino Ave.



PLAN
1 : 800

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	ORA				

REGISTERED CIVIL ENGINEER

PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KAMRAN ARJMAND — NO. GE-002090 EXP. 12-31-2001 — GEOTECHNICAL — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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NOTES:

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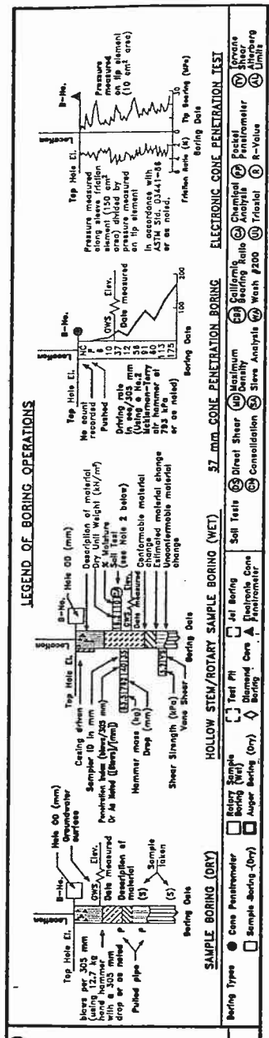
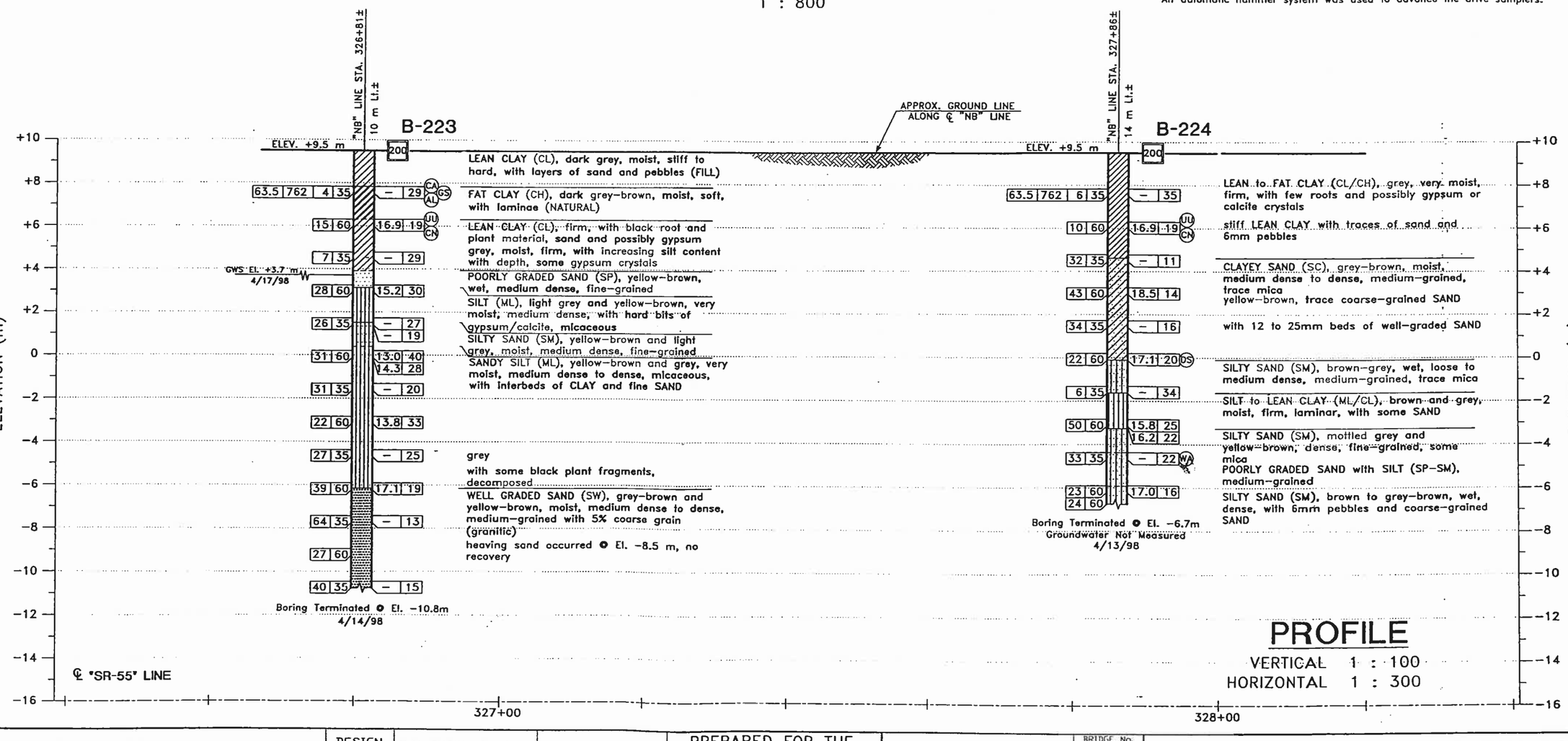




PROFILE
VERTICAL 1 : 100
HORIZONTAL 1 : 300

DESIGN OVERSIGHT Be Nguyen	DESIGN BY M. CHOW 7/1/98	B. SCHELL/GEOLOGIST FIELD INVESTIGATORS/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE No.
SIGNOFF DATE	CHECKED BY T. POE 7/9/98	DATE 4/13/98, 4/14/98			KILOMETER POST 14.3
		ORIGINAL SCALE IN mm FOR REDUCED PLANS		CU 12208	POST MILE

MSE WALLS RW 205 & RW 324
LOG OF TEST BORINGS NO. 2

DISREGARD PRINTS BEARING | REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

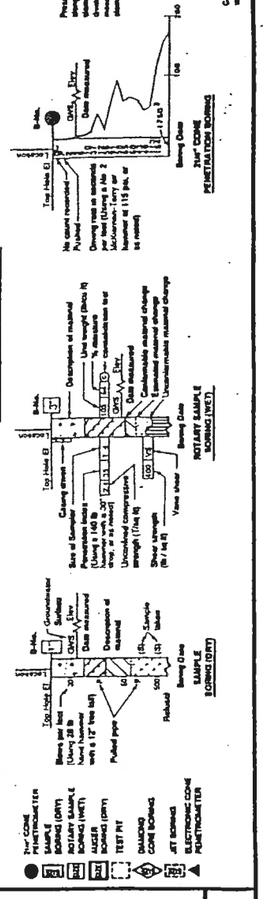
TOTAL PROJECT				SHEETS	
12	ORA	405	R9.3/R9.9	117	

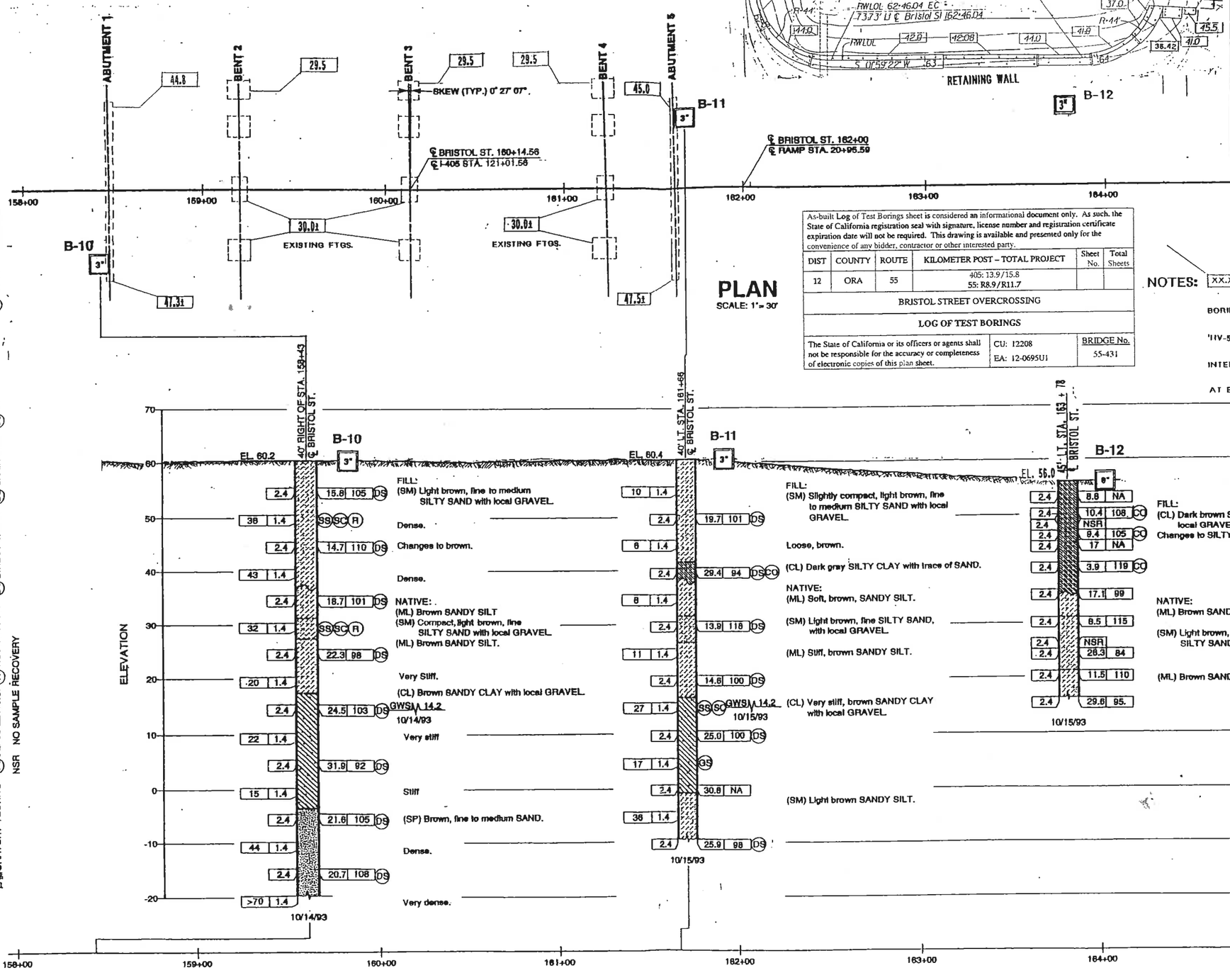
Bernard J. La Rue
GEOTECHNICAL PROFESSIONAL

REGISTERED PROFESSIONAL ENGINEER — BERNARD J. LA RUE — No. 496 — 12/31/97 — GEOTECHNICAL

PLANS APPROVAL DATE

THE LKR GROUP
2341 W. 205th. Street, Suite 103
Torrance, California 90501-1437
Project No.: 93-1019





PLAN
SCALE: 1"= 30'

As-built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date will not be required. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST	COUNTY	ROUTE	KILOMETER POST – TOTAL PROJECT	Sheet No.	Total Sheets
12	ORA	55	405: 13.9/15.8 55: R8.9/R11.7		
BRISTOL STREET OVERCROSSING					
LOG OF TEST BORINGS					
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.			CU: 12208 EA: 12-0695U1	BRIDGE No. 55-431	

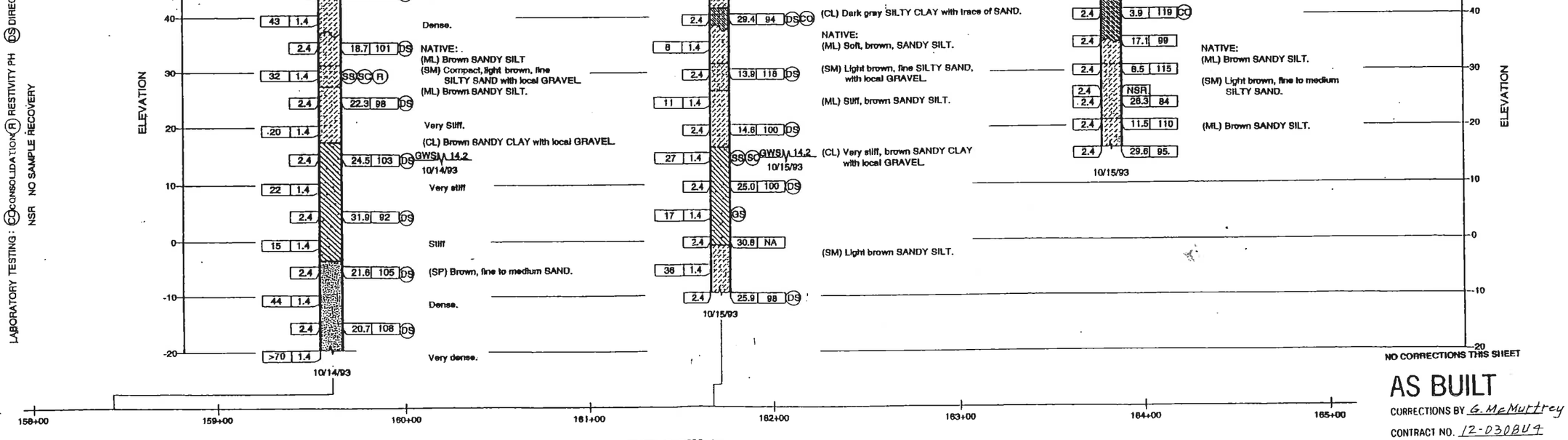
NOTES: XX.X DENOTES BOTTOM OF NEW FOOTING ELEVATION

BORING ELEVATIONS BASED ON BENCHMARK,

'IIV-5, ORANGE COUNTY WELL MONUMENT' AT THE

INTERSECTION OF ANTON AND BRISTOL.

AT ELEVATION 31.118.



PROFILE
VERTICAL SCALE: 1"= 10'

AS BUILT
CORRECTIONS BY G. McMurtrey
CONTRACT NO. 12-030804
DATE 4-17-96
KE 7-26-97

in folder for RW #1616

DRAWN BY	JAP	JAP		Prepared for CITY OF COSTA MESA	Mark Lamoreaux PROJECT ENGINEER	BRIDGE NO. 55-431	BRISTOL STREET OVERCROSSING
CHECKED BY	EK	FIELD INVESTIGATOR				POST MILE 9.5	LOG OF TEST BORINGS NO. 1
		DATE 10/14 and 10/15/93			CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)

Engineer's Design Manager — SIGN OFF DATE 2-16-95

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

SHEET 5 OF 6

Hz "E-139:E-60 Elev. 93.21

Sp.Le and Tin at intersection of E Gaker and E Bristol St.

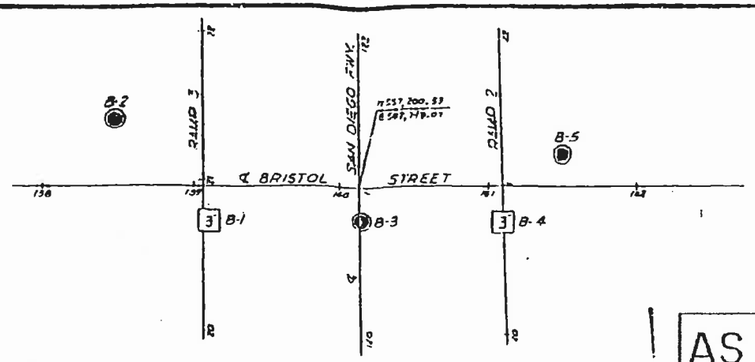
As-built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date will not be required. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST	COUNTY	ROUTE	KILOMETER POST – TOTAL PROJECT	Sheet No.	Total Sheets
12	ORA	55	405: 13.9/15.8 55: R8.9/R11.7		

BRISTOL STREET OVERCROSSING

LOG OF TEST BORINGS

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.	CU: 12208 EA: 12-0695U1	BRIDGE No. 55-431

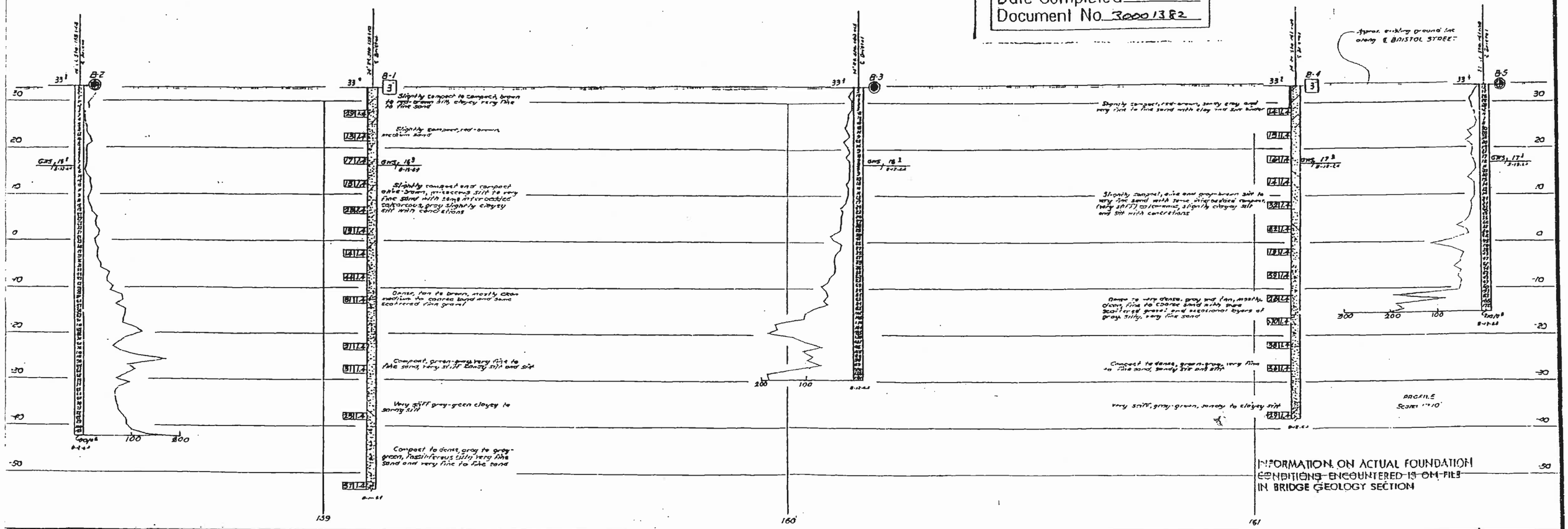


07	ORA	405	9.5	55	55	

June 22, 1965

PLAN
Scale: 1"=50'

AS BUILT PLANS
Contract No. 03-055414
Date Completed
Document No. 3000138 2



Classification of Material Based on Standard Grade Size Limits

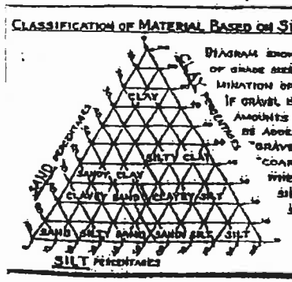


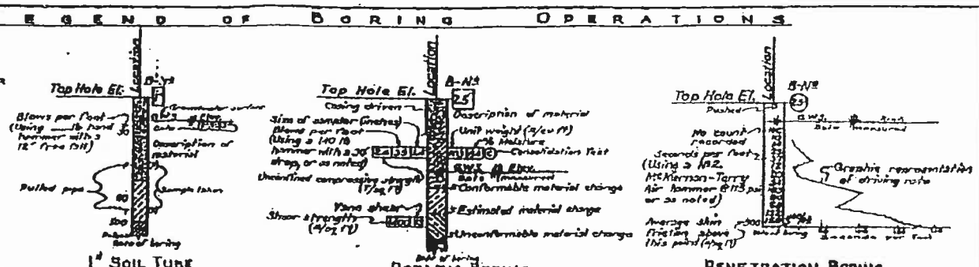
Diagram showing the basis for estimates of grade size distribution used in determination of class names. If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand." The terms "coarse," "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Penetrometer
- 2½" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



NOTE

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

SHEET	OF
15	15

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

BRISTOL STREET OVERCROSSING

LOG OF TEST BORINGS NO. 2

SCALE As Noted	BRIDGE 55-431	DIST 12	COUNTY ORA	ROUTE 55	DRAWING 55431-14

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO	TOTAL SHEETS
12	Ora	405	16.4/20.0	608	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-00
PLAN APPROVAL DATE

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

REGISTERED PROFESSIONAL ENGINEER — KENNETH ARULMOLI — No. GE-002095 — EXP 12-31-2001 — STATE OF CALIFORNIA

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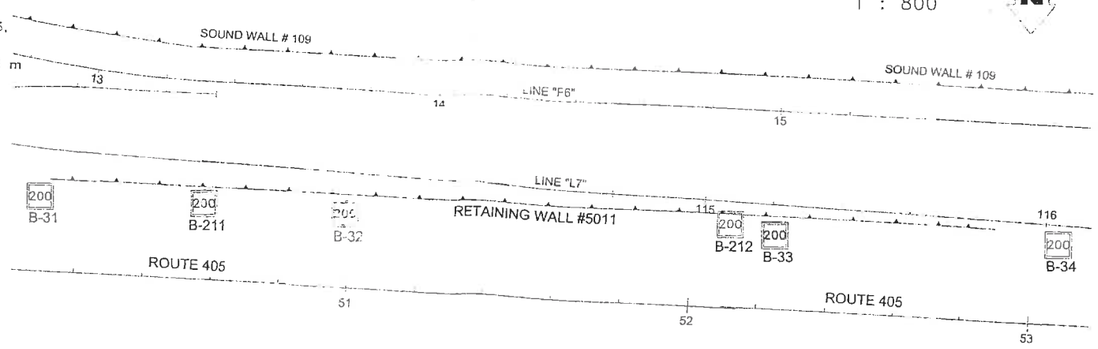
Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.

PLAN
1 : 800

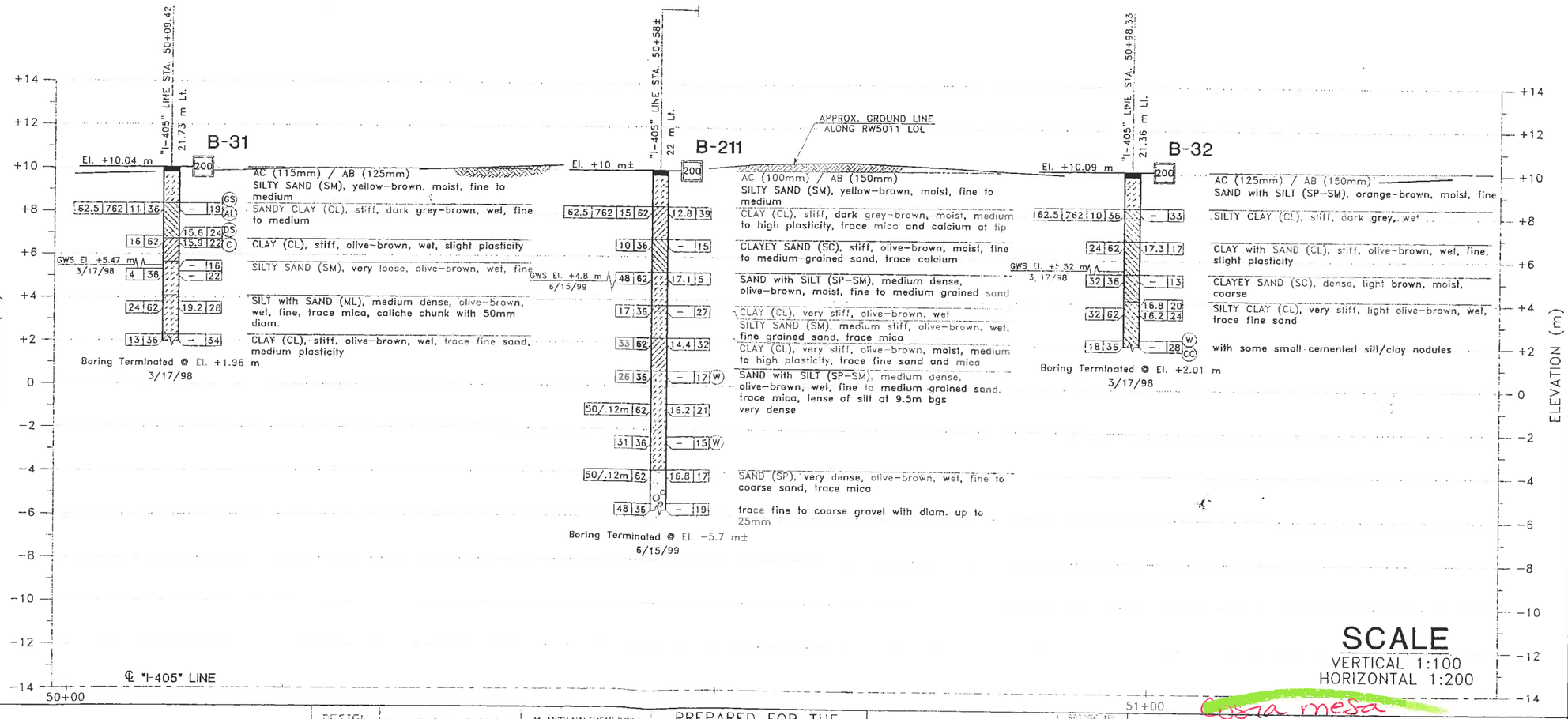


NOTES:

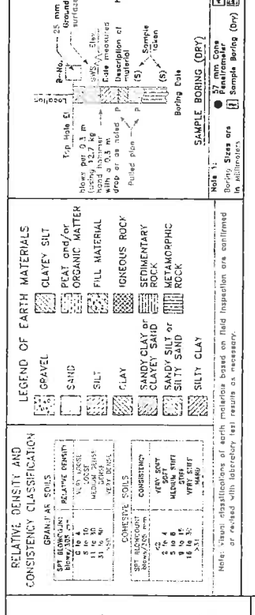
62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



SCALE
VERTICAL 1:100
HORIZONTAL 1:200



Ken Arulmoli 3/3/00
DESIGN ENGINEER — Le Nguyen — DATE

DESIGN	BY M. CHOW	7/21/99
CHECKED	BY E. BROWN	7/23/99

M. MCDONALD/ENGINEER
E. JIE/TECHNICIAN
FIELD INVESTIGATION REPRESENTATIVE
DATE 3/17/98-6/15/99

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

K. ARULMOLI
PROJECT ENGINEER

ORIGINAL SCALE IN mm FOR REDUCED PLANS: 0 20 40 60 80 100

BRIDGE NO.	
KILOMETER POST	16.89
CU	12202
EA	0R3A01

Costa mesa

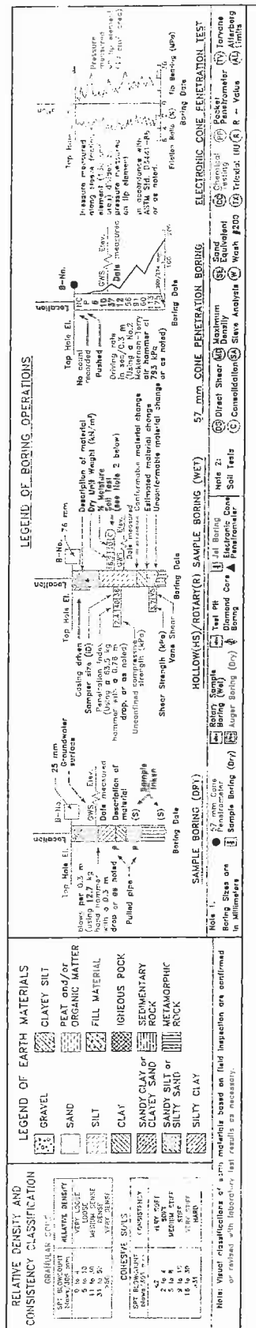
RETAINING WALL RW5011 (NO. 1 OF 2)
LOG OF TEST BORINGS

DIFFERENCE PRINTS BEARING EARLIER REVISION DATE: ——→

REVISION DATES (PRELIMINARY STAGE ONLY): 1 2 3 4 5

SHEET 6 OF 7

retwall5011#06of07.tif



BENCHMARK

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Elevation 11.756m NAVD88 1995 adj.

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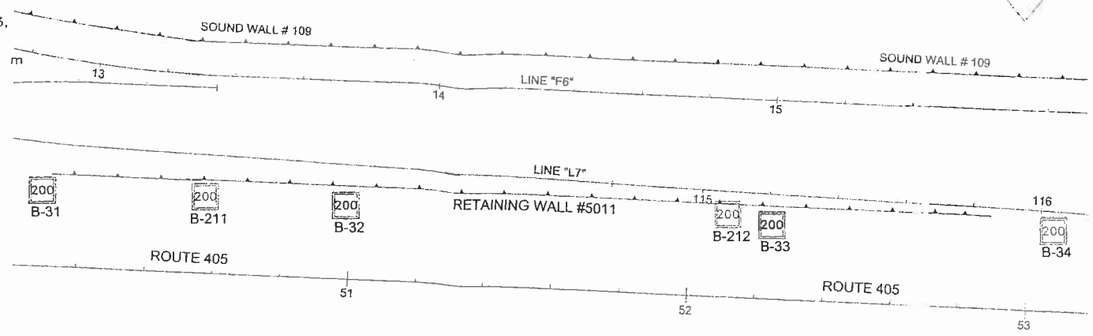
PLAN
1 : 800



DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	609	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-00
PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — ROBERT ARULMOLI — NO. GE-002898 EXP. 12-31-2001 — REGISTERED GEOTECHNICAL ENGINEER — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

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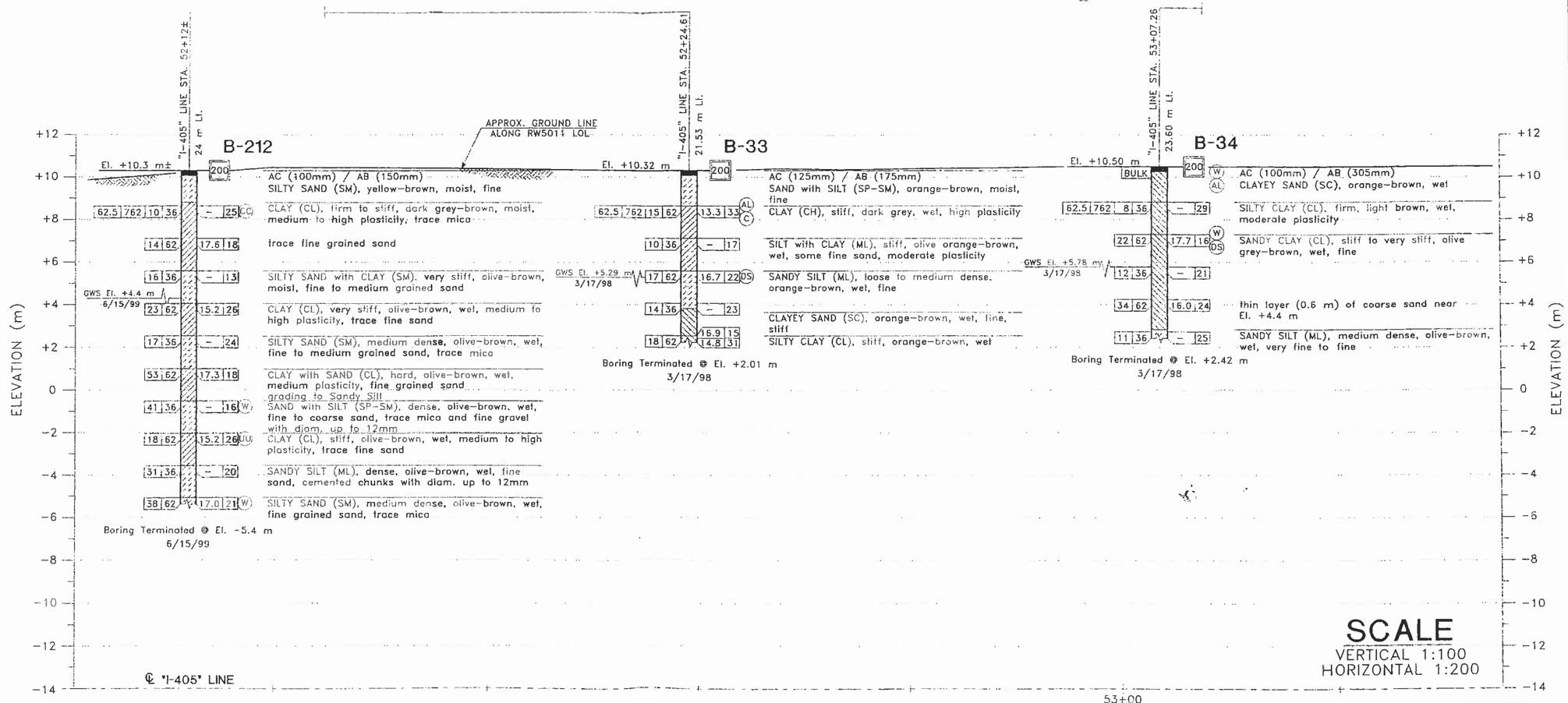

SCALE
VERTICAL 1:100
HORIZONTAL 1:200

DESIGNED Jim Hamaguchi 3/3/00	DESIGN M. CHOW 7/21/99	M. MCDONALD (ENGINEER) R. GIE/TECHNICIAN FIELD INVESTIGATION/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE NO. — ALIGNMENT FOR EQUIV. 16.89
DRAWN Be Nguyen	CHECKED E. BROWN 7/23/99	DATE 3/17/98-6/15/99			
SIGNOFF DATE					

RETAINING WALL RW5011 (NO. 2 OF 2)
LOG OF TEST BORINGS

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12226
EA 063801

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 7 OF 7

retwall5011#07of07.tif

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	525	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-00
PLAN APPROVAL DATE

LINO C. CHEANG
NO. 2345
EXP. 9/30/00
REGISTERED PROFESSIONAL ENGINEERS
GEOTECHNICAL
STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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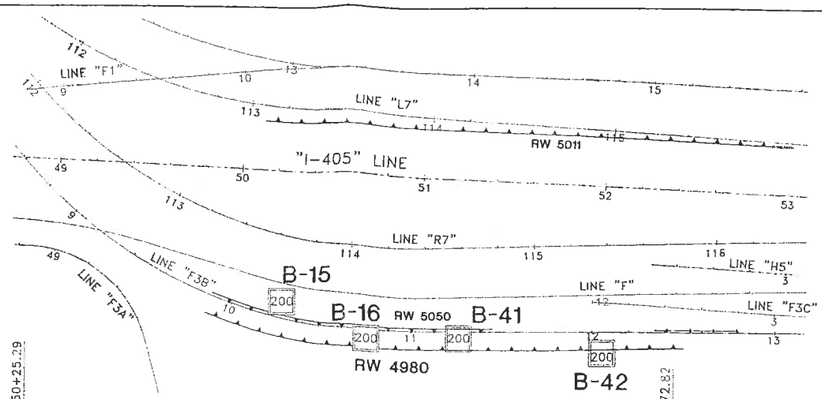
BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



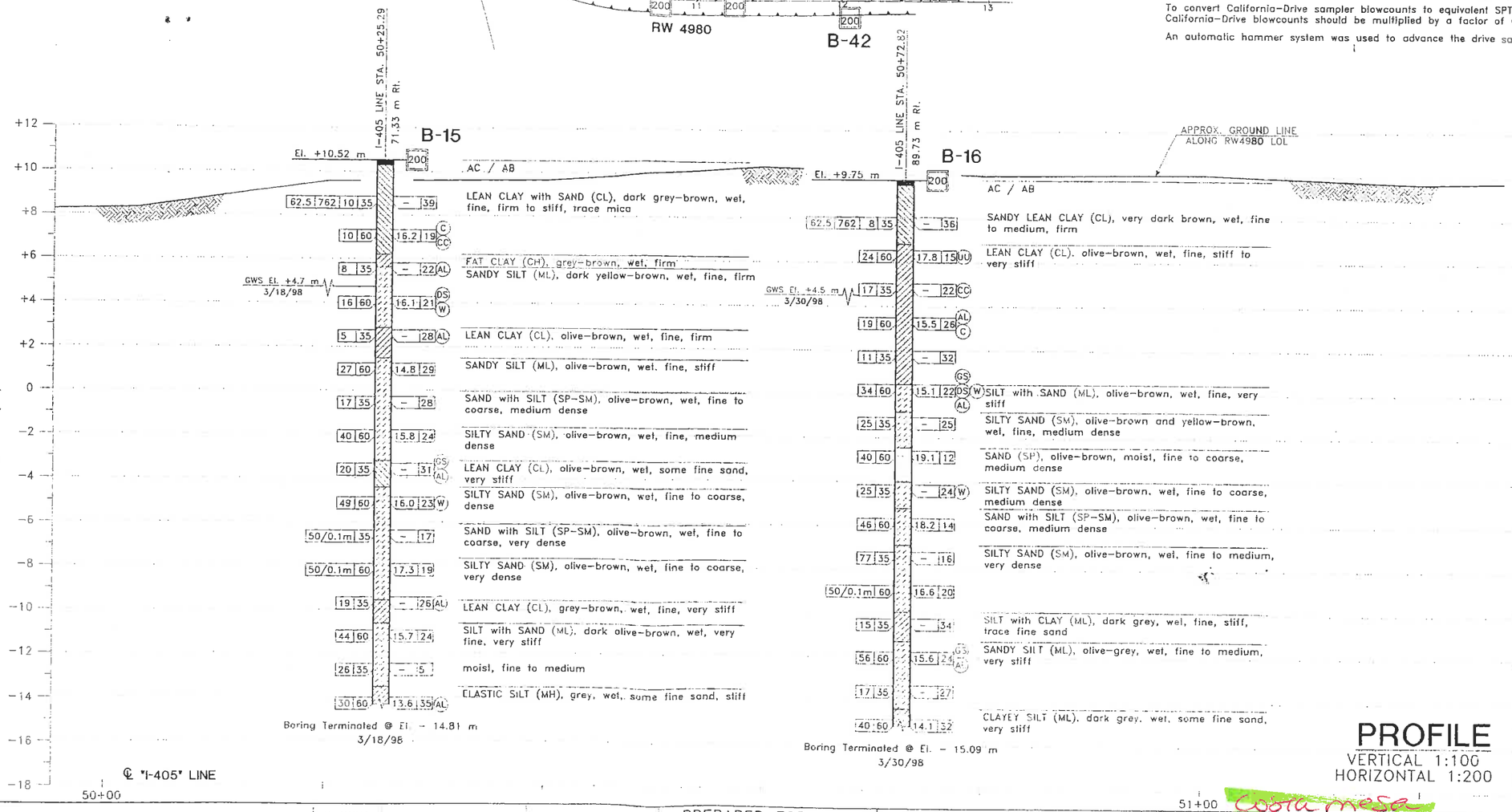
PLAN
1 : 1500

NOTES:

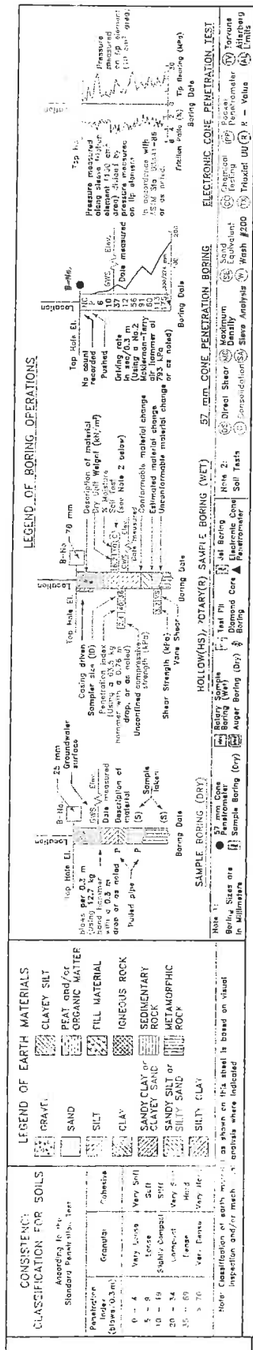
62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



PROFILE
VERTICAL 1:100
HORIZONTAL 1:200



DESIGN	BY M. CHOW 8/20/98	M. MCDONALD ENGINEER FIELD INVESTIGATOR(S)/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	L. CHEANG PROJECT ENGINEER	BRIDGE NO.	RETAINING/SOUND WALL NO. 4980
CHECKED	BY E. BROWN 8/27/98	DATE 3/18/98, 3/30/98			KILOMETER POST 16.86	LOG OF TEST BORINGS (1 of 2)

DESIGN SUPERVISOR — DATE 3/3/00
ENGINEER DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

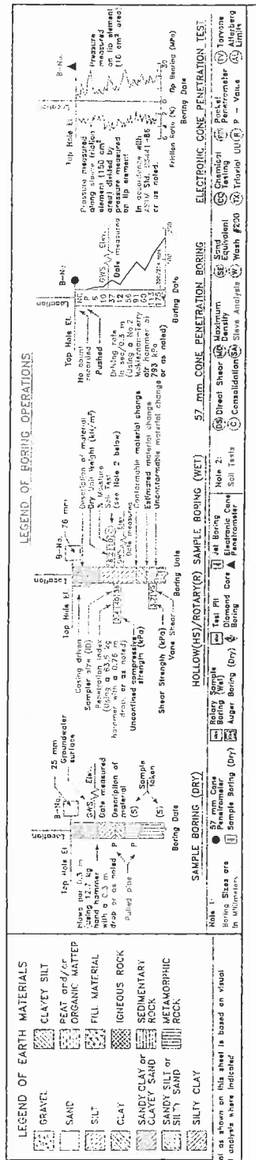
CU 12222
EA 083801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 12 OF 13

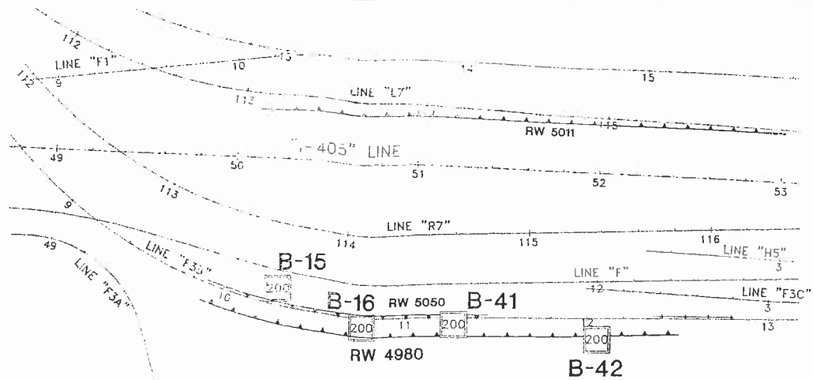
rswall4980#12of13.tif



BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



PLAN
1 : 1500

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	526	651

REGISTERED GEOTECHNICAL ENGINEER
7-10-00
PLAN APPROVAL DATE
EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

REGISTERED PROFESSIONAL ENGINEER — LINO C. CHEANG — NO. 2365 — EXP. 9/30/02 — GEOTECHNICAL — STATE OF CALIFORNIA

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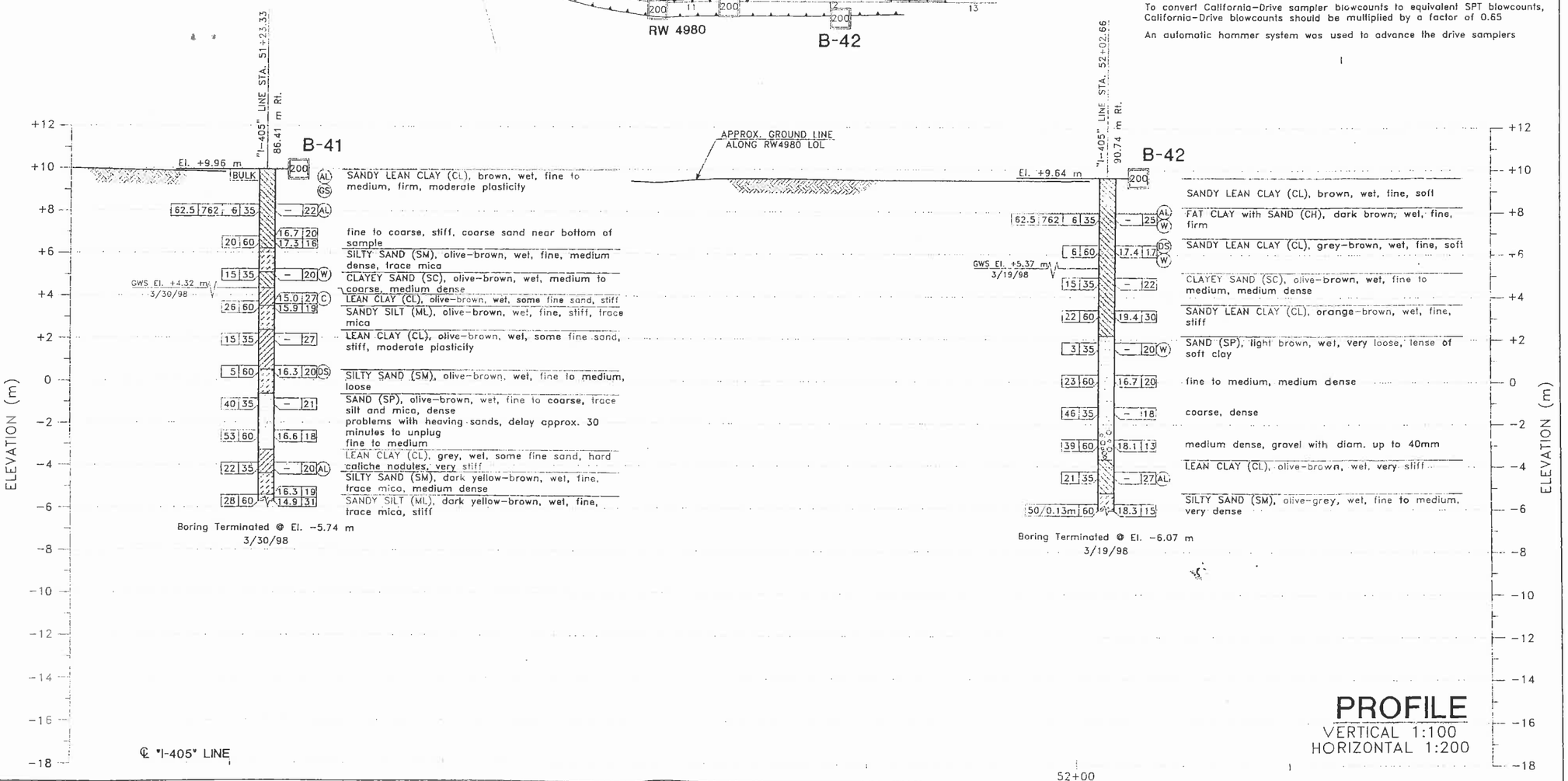
NOTES:

62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



PROFILE
VERTICAL 1:100
HORIZONTAL 1:200

DESIGN	C. CHOW 8/20/98	M. MOHASSEL/ENGINEER E. BEATTY/TECHNICIAN FIELD INVESTIGATOR(S)/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
CHECKED	E. BROWN 8/27/98	DATE 3/19/98, 3/30/98	L. CHEANG PROJECT ENGINEER

Jim Hommerich — Se Nguyen
REVISION/REVISION — 3/3/00 — SIGNOFF DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 083801

52+00 BRIDGE NO.
16.86 KILOMETER POST

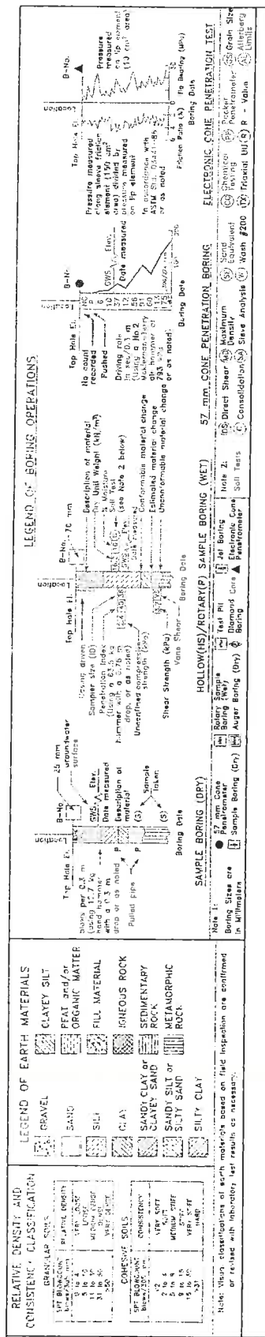
DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

RETAINING/SOUND WALL NO. 4980
LOG OF TEST BORINGS (2 OF 2)

SHEET 13 OF 13

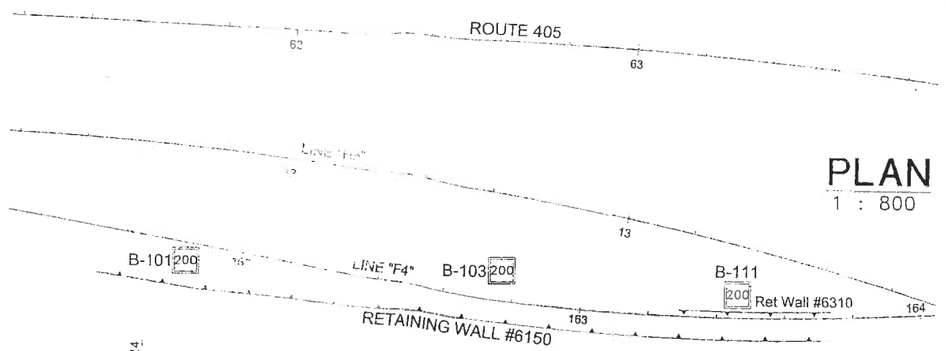
rswall4980#13of13.tif



BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



PLAN
1 : 800

N

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	628	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

PROFESSIONAL ENGINEER — RAVI KARUNAKARAN — No. GE 2117 — EXP. 12-31-2000 — STATE OF CALIFORNIA

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NOTES:

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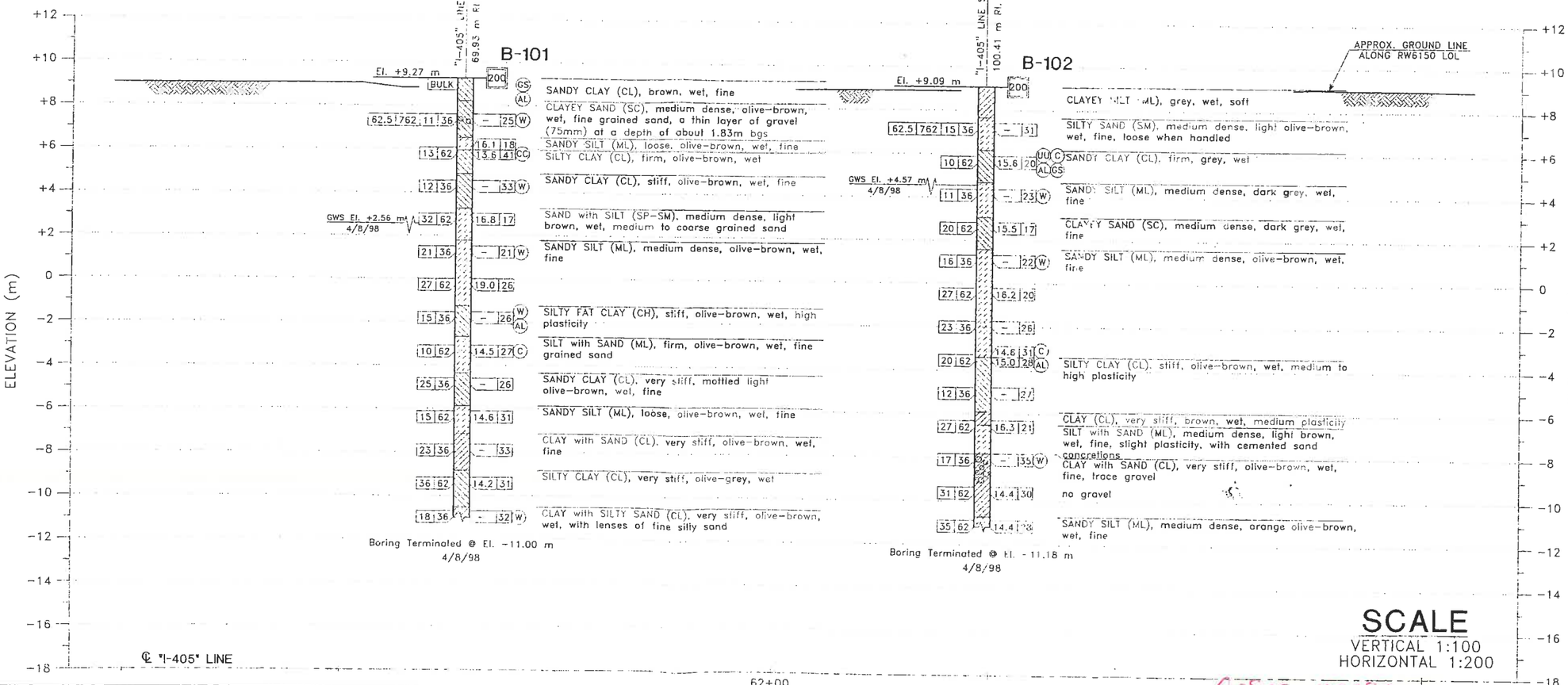
To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



SCALE

VERTICAL 1:100
HORIZONTAL 1:200

DESIGN	M. CHOW 7/21/99	M. MEDINA ENGINEER / FIELD INVESTIGATION SUPV.	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	DISTRICT NO. 12
CHECKED	E. BROWN 7/22/99	DATE 4/8/98			SUBMITTED NO. 16.04

Be Nguyen
3/3/00

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 7/21/99 7/22/99 7/28/99

Costa Mesa

RETAINING WALL RW6150 (NO. 1 OF 2)

LOG OF TEST BORINGS

SHEET	OF
5	6

retwall6150#05of06.tif

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	629	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — PAUL KARKOSKA — NO 780717 EXP 12-31-2000 — CIVIL — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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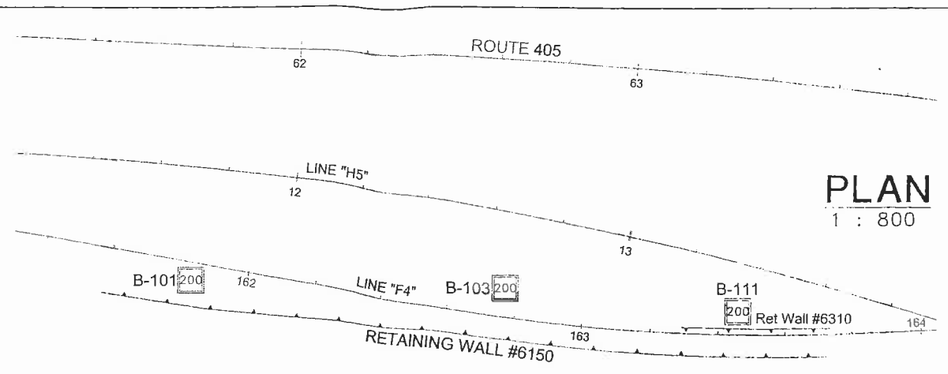
BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.

PLAN
1 : 800



NOTES:

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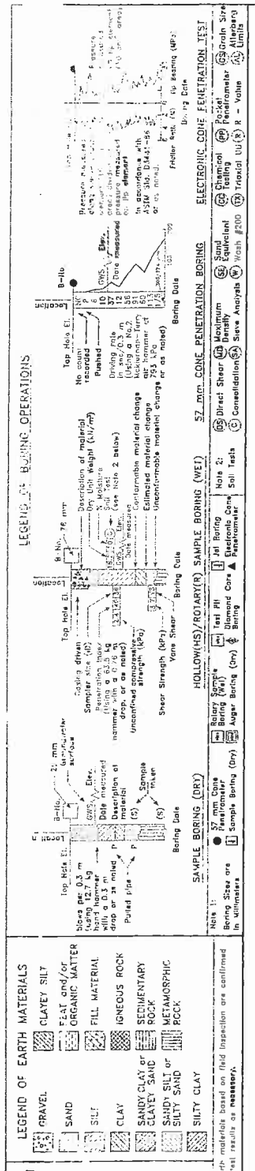
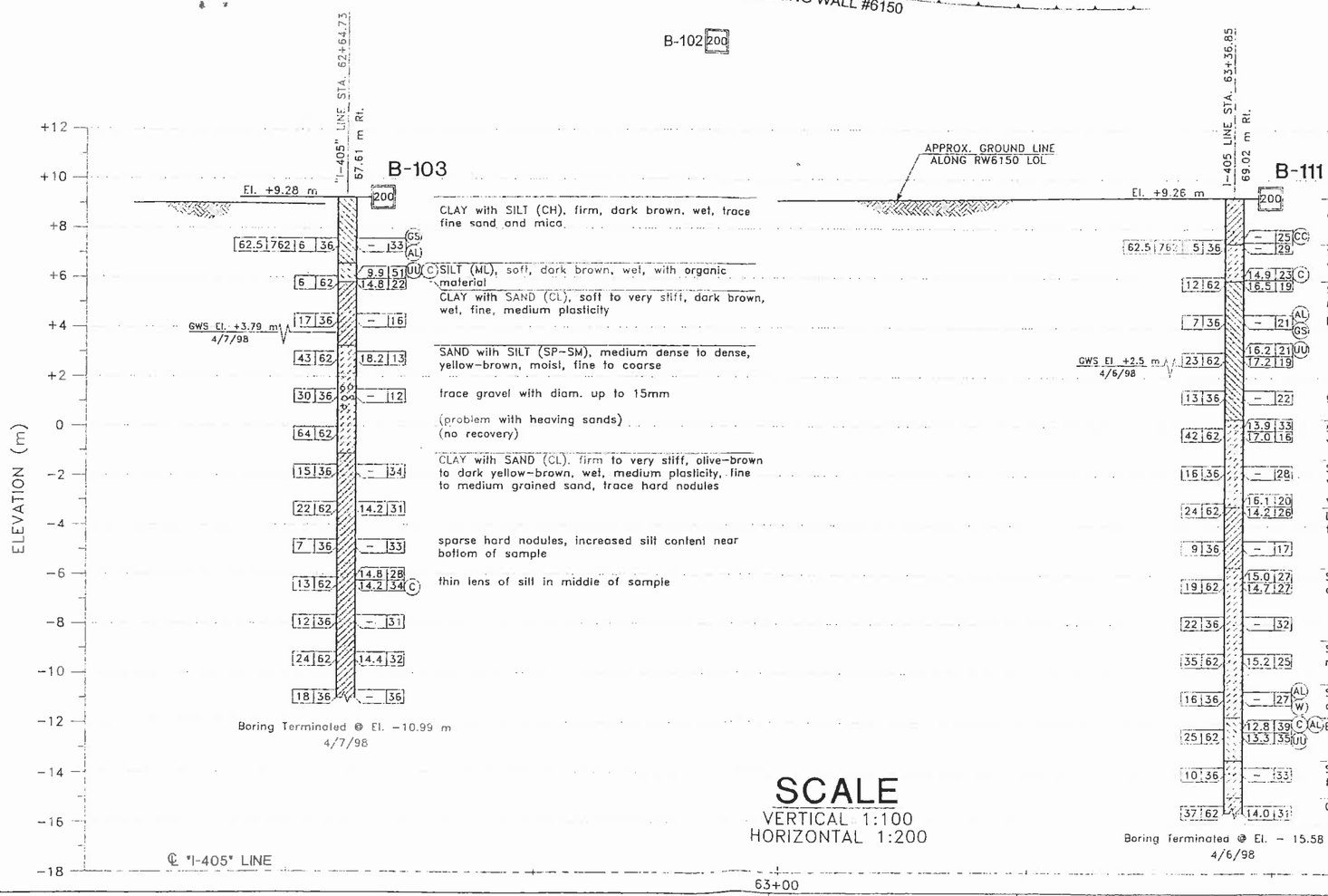
To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers





SCALE
VERTICAL 1:100
HORIZONTAL 1:200

DESIGN	M. CHOW 7/21/99	R. JEFFNICHAS FIELD INVESTIGATION BY	DATE 4/6/98, 4/7/98	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE NO.	RETAINING WALL RW6150 (NO. 2 OF 2)
CHECKED	E. BROWN 7/22/99					KILOMETER POST 18.04	LOG OF TEST BORINGS

E. Nguyen
DESIGN OVERSIGHT
3/3/00
DATE

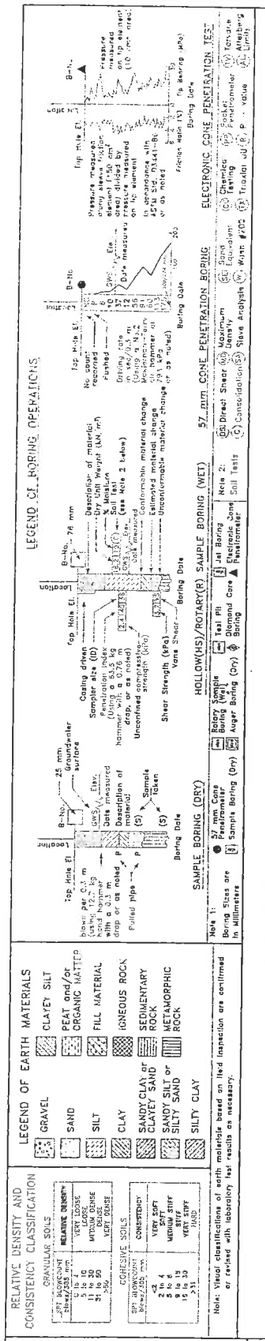
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 2in 4 6 8 10

C 12202
A 0R320

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF
6 | 6

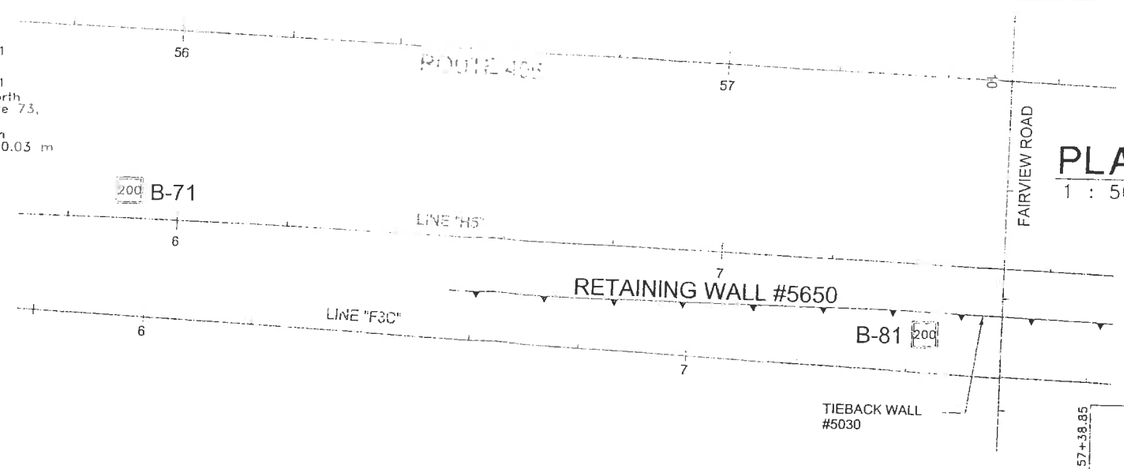
retwall6150#06of06.tif



BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



Caltrans Metric

PLAN
1 : 500

N

DIST	COUNTY	ROUTE	KILOMETER POST / POSTA PROJECT	SHEET	TOTAL SHEETS
12	Ora	405	16.4/20.0	616	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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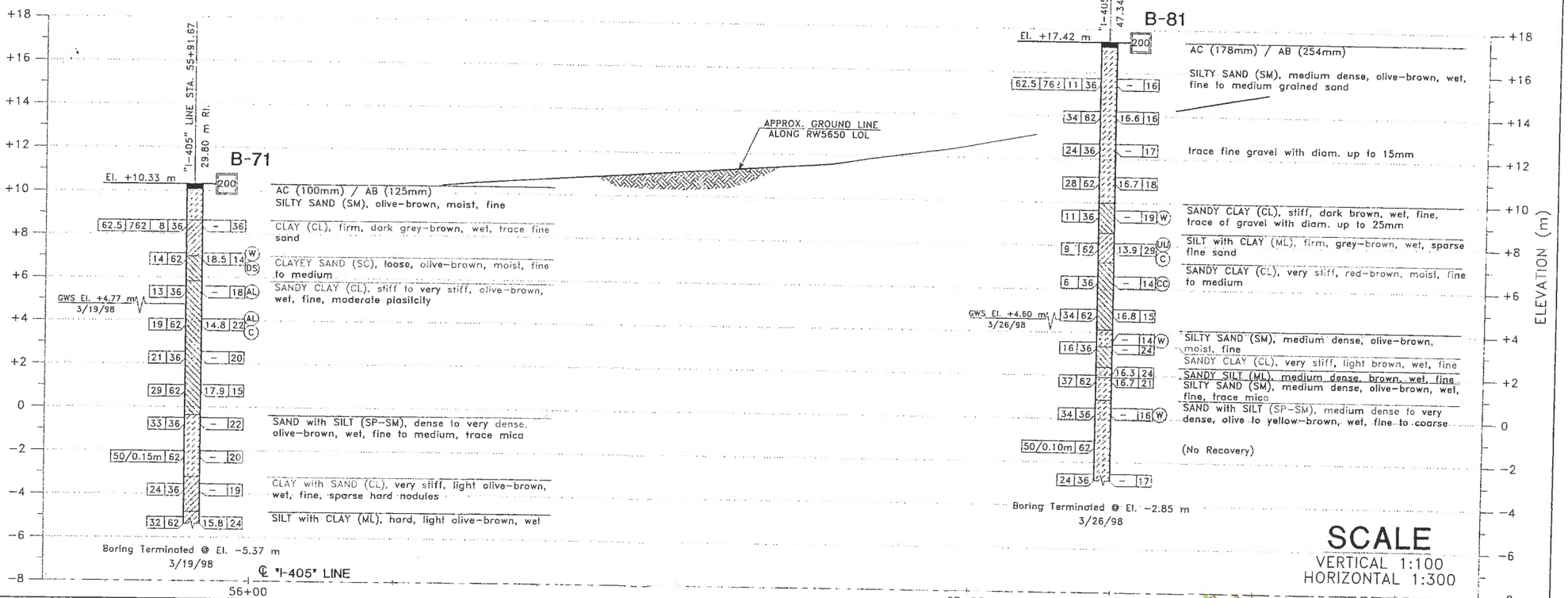


SCALE
VERTICAL 1:100
HORIZONTAL 1:300

Be Nguyen
3/3/00
ENGINEER'S DATE

DESIGN	BY A. DODDS 7/21/99
CHECKED	BY E. BROWN 7/22/99

R. JE/TECHNICIAN FIELD INVESTIGATOR/SKETCH
DATE 3/19/98, 3/26/98

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

K. ARULMOLI
PROJECT ENGINEER

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 083801

BRIDGE NO.

KILOMETER POST 17.53

Costa Mesa

RETAINING WALL RW5650

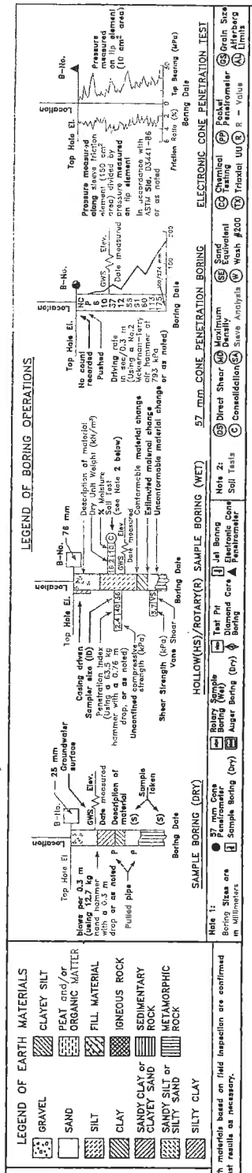
LOG OF TEST BORINGS

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 3 OF 3

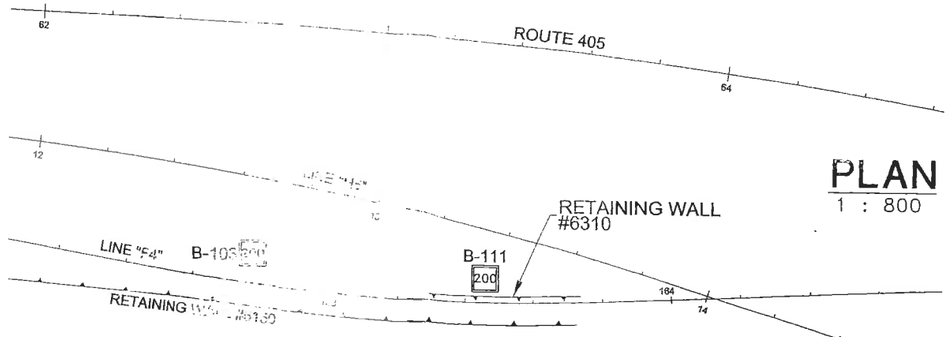
retwall5650#03of03.tif



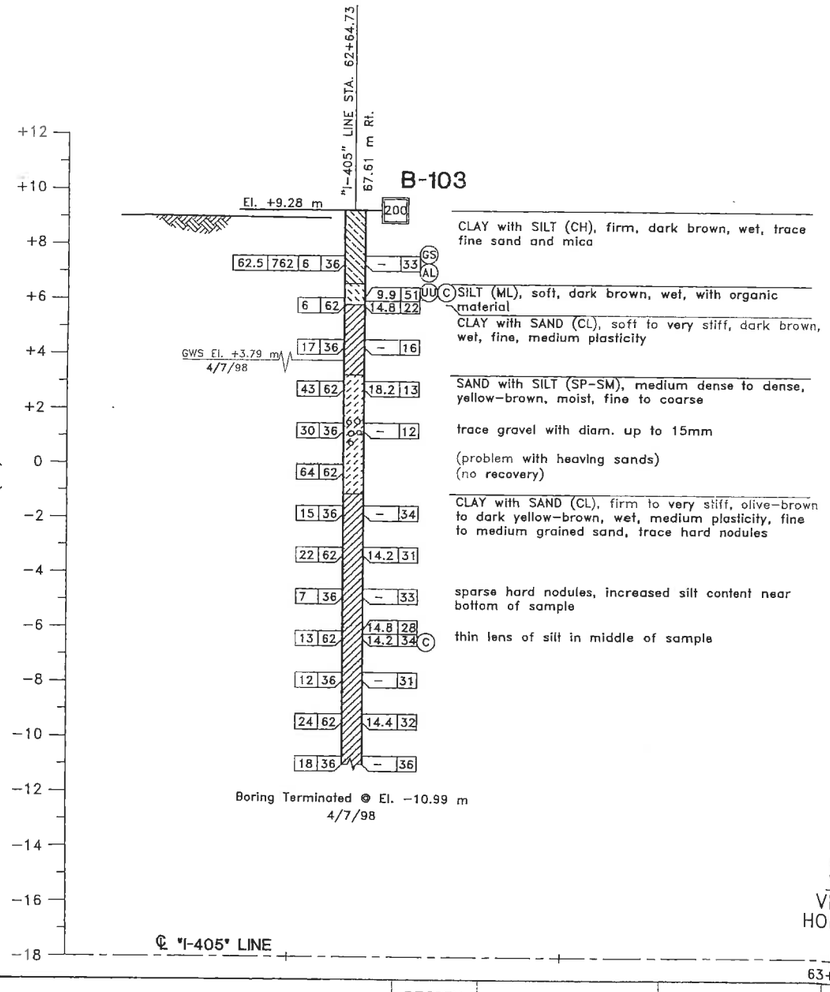
BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



PLAN
1 : 800



SCALE
VERTICAL 1:100
HORIZONTAL 1:200

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	632	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER ARKE KARDJIAN NO. CS5717 EXP. 12-31-2000 CIVIL STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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An automatic hammer system was used to advance the drive samplers

Costa Mesa

DESIGN	BY M. CHOW 7/21/99	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE No.
CHECKED	BY E. BROWN 7/22/99	K. ARULMOLI PROJECT ENGINEER	KILOMETER POST 18.19
DATE 4/6/98, 4/7/98	R. JIE/TECHNICIAN FIELD INVESTIGATORS/TITLE	CU 12222 EA 083801	RETAINING WALL RW6310 LOG OF TEST BORINGS

Jan Hamayeli / Ba Nguyen
RESIDENT OVERSIGHT
3/3/00
SIGNOFF DATE

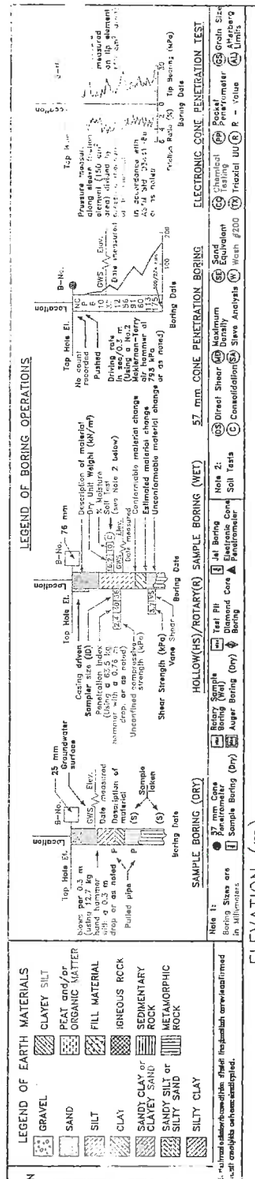
ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) 7/20/99 7/21/99 7/22/99

SHEET 3 OF 3

rw6310#03of03.tif

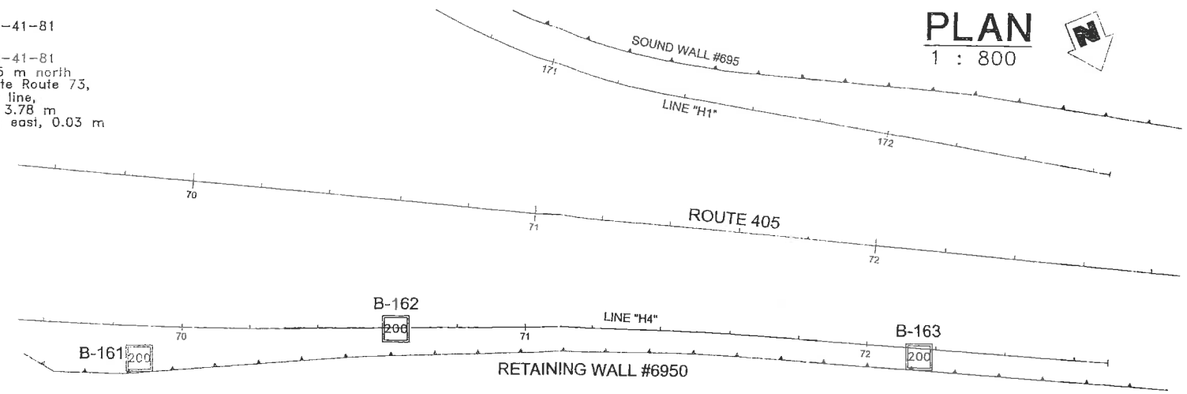


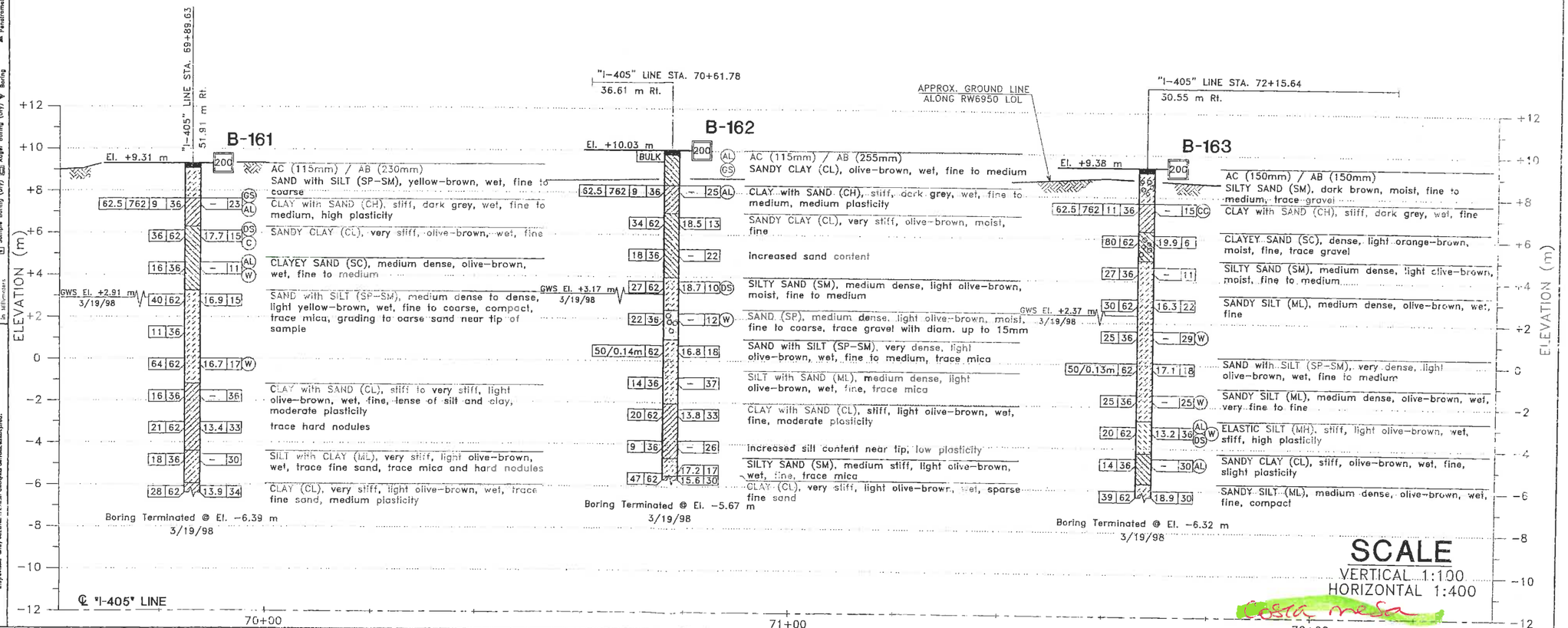
BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.

PLAN
1 : 800





DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	651	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-00
PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER KAMRAN ARJOMAND NO. GE-002090 EXP. 12-31-2001 GEOTECHNICAL STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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NOTES:

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To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers

SCALE
VERTICAL 1:100
HORIZONTAL 1:400

DESIGN	BY M. CHOW 7/21/99	M. MCDONALD/ENGINEER R. JIE/TECHNICIAN FIELD INVESTIGATOR(S)/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
CHECKED	BY E. BROWN 7/22/99	DATE 3/19/98	K. ARULMOLI PROJECT ENGINEER

DESIGN OVERSIGHT 3/3/00
SIGNATURE DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 083801

BRIDGE NO.
KILOMETER POST 18.83

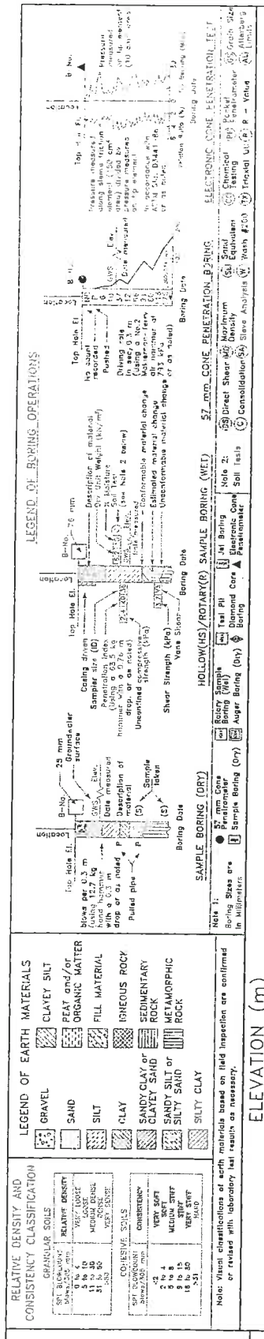
RETAINING WALL RW6950
LOG OF TEST BORINGS

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 7/15/99 9/20/99 10/18/99

SHEET 5 OF 5

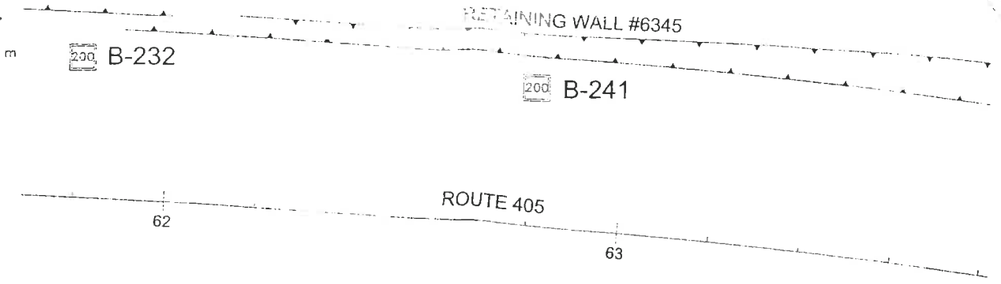
rw6950#05of05.tif



BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



Caltrans Metric

PLAN
1 : 600

DIST	COUNTY	ROUTE	COLUMBIA POLITICAL PROJECT	SHEET	TOTAL SHEETS
12	Ora	405	16.4/20.0	644	651

REGISTERED GEOTECHNICAL ENGINEER
7-10-00
PLAN APPROVAL DATE
EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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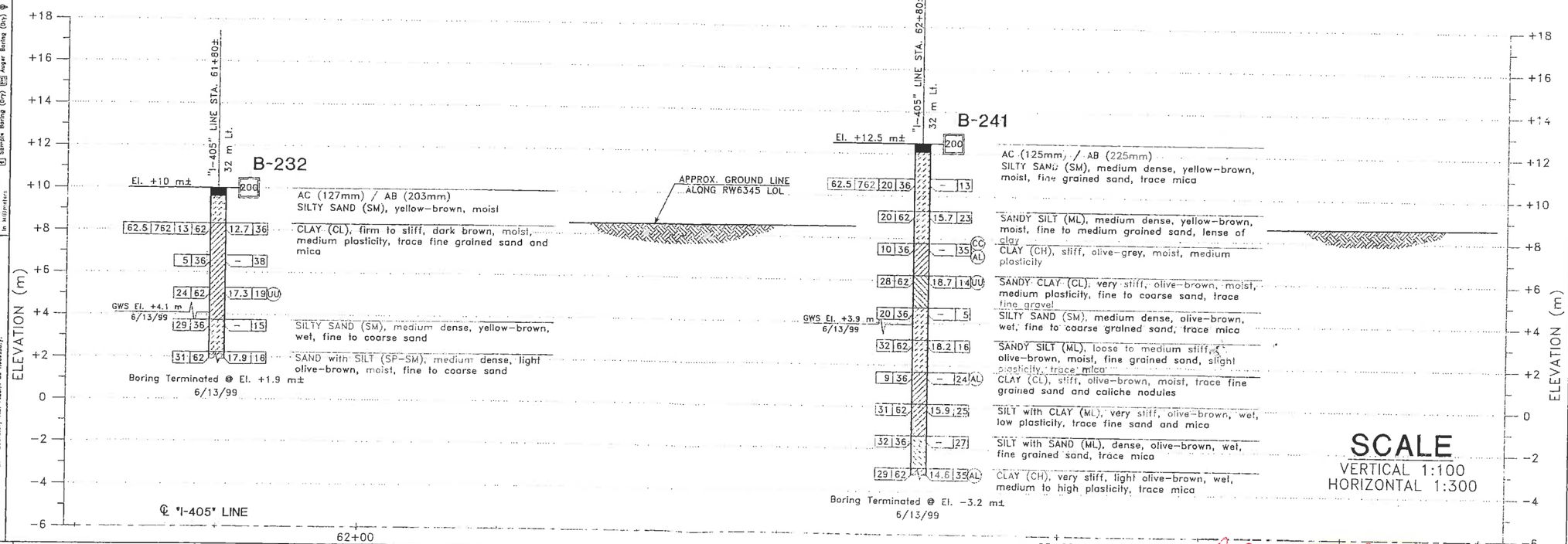
CalTrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

NOTES:

62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



SCALE
VERTICAL 1:100
HORIZONTAL 1:300

Logia mesa

DESIGN	BY M. CHOW 7/21/99	R. JE/TECHNICIAN FIELD INVESTIGATOR(S)/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE No.
CHECKED	BY E. BROWN 7/22/99	DATE 6/13/99			KILOMETER POST 18.09

DESIGN OVERSIGHT By Nguyen
SIGNATURE DATE 3/3/00

RETAINING WALL RW6345 (No. 1 of 3)

LOG OF TEST BORINGS

CU 12222
EA 083801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

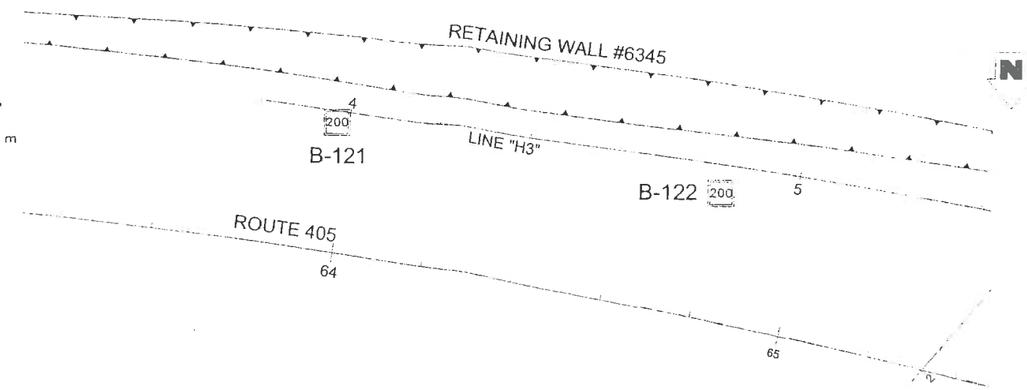
SHEET 12 OF 14

retwall6345#12of14.tif

BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST/ TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	645	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-00
P.M.I. APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KRISHNA P. MALI — No. GE-2003080 — EXP. 12-31-2001 — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

PLAN
1 : 600

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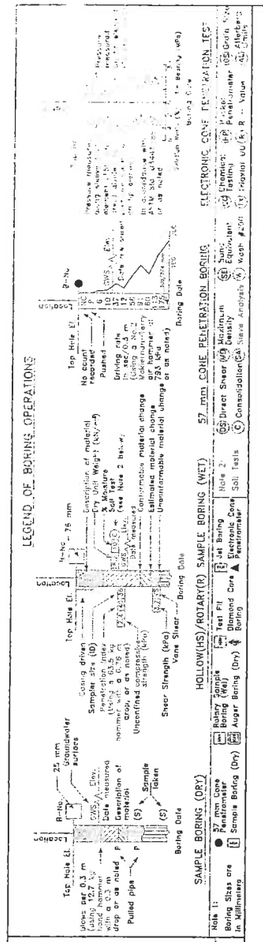
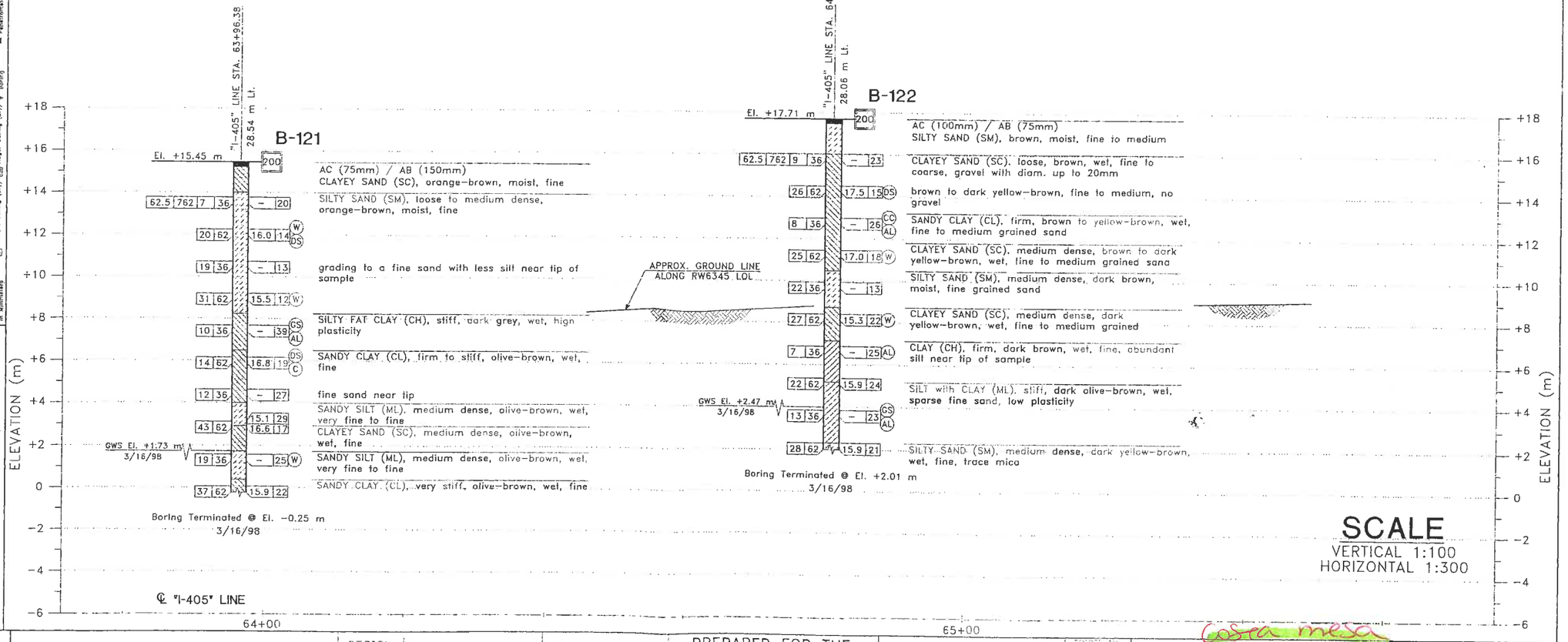




SCALE
VERTICAL 1:100
HORIZONTAL 1:300

DESIGN	BY M. CHOW 7/21/99	M. McDONALD/ENGINEER R. JIE/TECHNICIAN FIELD INVESTIGATION/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
CHECKED	BY E. BROWN 7/22/99	DATE 3/16/98	K. ARULMOLI PROJECT ENGINEER

DESIGN SUPERVISOR — DATE 3/3/00 — STAMP DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU	12222
EA	08380
BRIDGE NO.	
KILOMETER POST	18.09

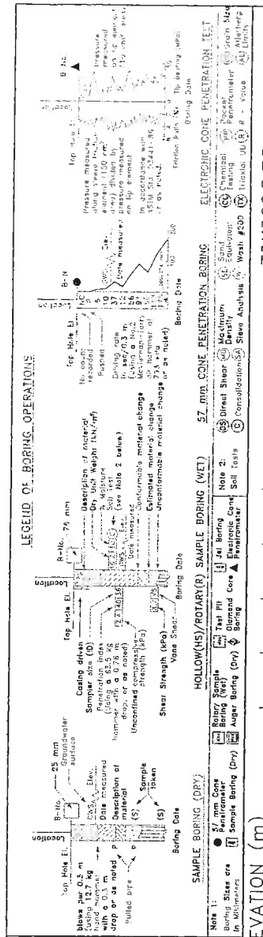
DISREGARD PRINTS BEARING EARLIER REVISION DATES

RETAINING WALL RW6345 (No. 2 of 3)

LOG OF TEST BORINGS

REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET	OF
7/21/99 9/24/99 10/18/99	13	14

retwall6345#13of14.tif



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Elevation 11.756m NAVD88 1995 adj.

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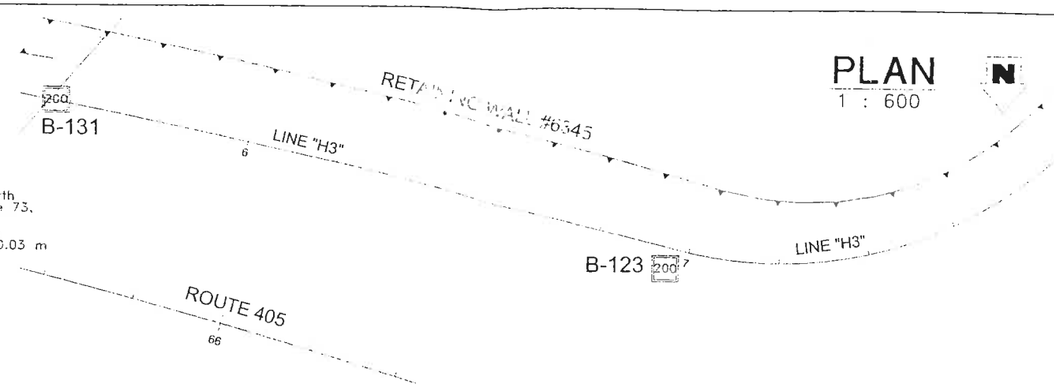
PLAN
1 : 600



DIST	CO	ROUTE	TOTAL PROJECT MILES	POST MILES	TOTAL SHEETS
12	Ora	405	16.4/20.0	646	651

REGISTERED CIVIL ENGINEER

7-10-00
PLANS APPROVAL DATE

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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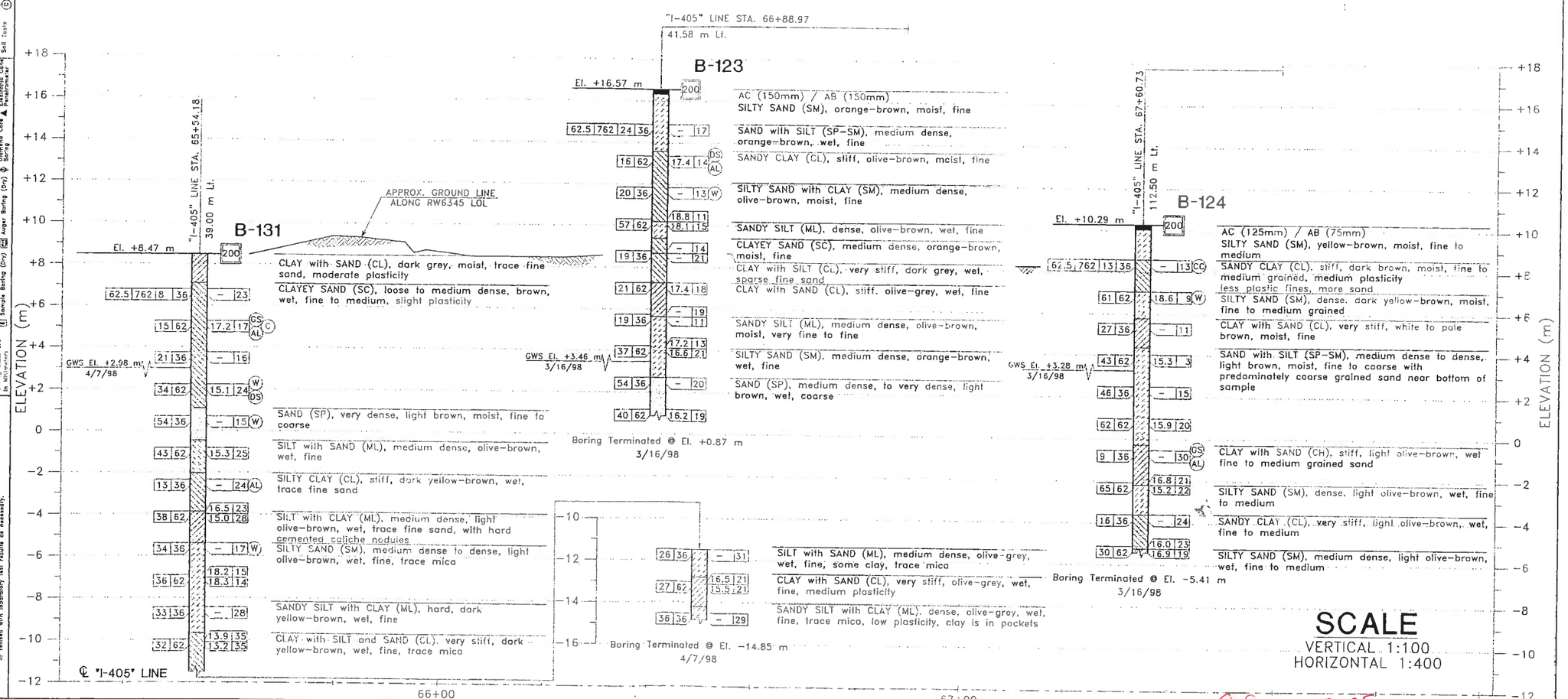


Note: Visual classifications of earth materials based on field inspection are confirmed or revised with laboratory test results as necessary.

SCALE
VERTICAL 1:100
HORIZONTAL 1:400

Costa Mesa

DESIGN	BY M. CHOW 7/21/99	M. MCDONALD/ENGINEER R. JIE/TECHNICIAN FIELD INVESTIGATORS/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. APULMOLI PROJECT ENGINEER	BRIDGE NO.
CHECKED	BY E. BROWN 7/22/99	DATE 3/16/98, 4/7/98			KILOMETER POST 18.09

RETAINING WALL RW6345 (No. 3 of 3)

LOG OF TEST BORINGS

Jon Hauenstein
REGISTERED ENGINEER
3/3/00 By Nguyen
SIGNOFF DATE

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 083801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 7/22/99 8/30/00 10/15/99

SHEET 14 OF 14

retwall6345#14of14.tif

55 RW

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
12	Ora	405			

REGISTERED CIVIL ENGINEER — 4-11-03

PLANS APPROVAL DATE

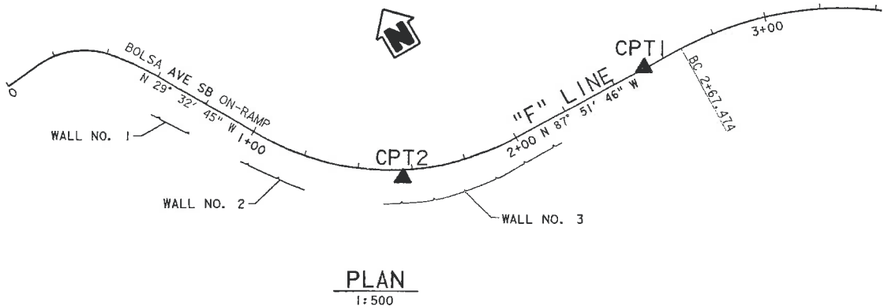
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Deepa Wathugala — No. C63838 — Exp. 9-30-06 — CIVIL — STATE OF CALIFORNIA

BENCH MARK

BM FV-47-70 Elev. 8.216 m

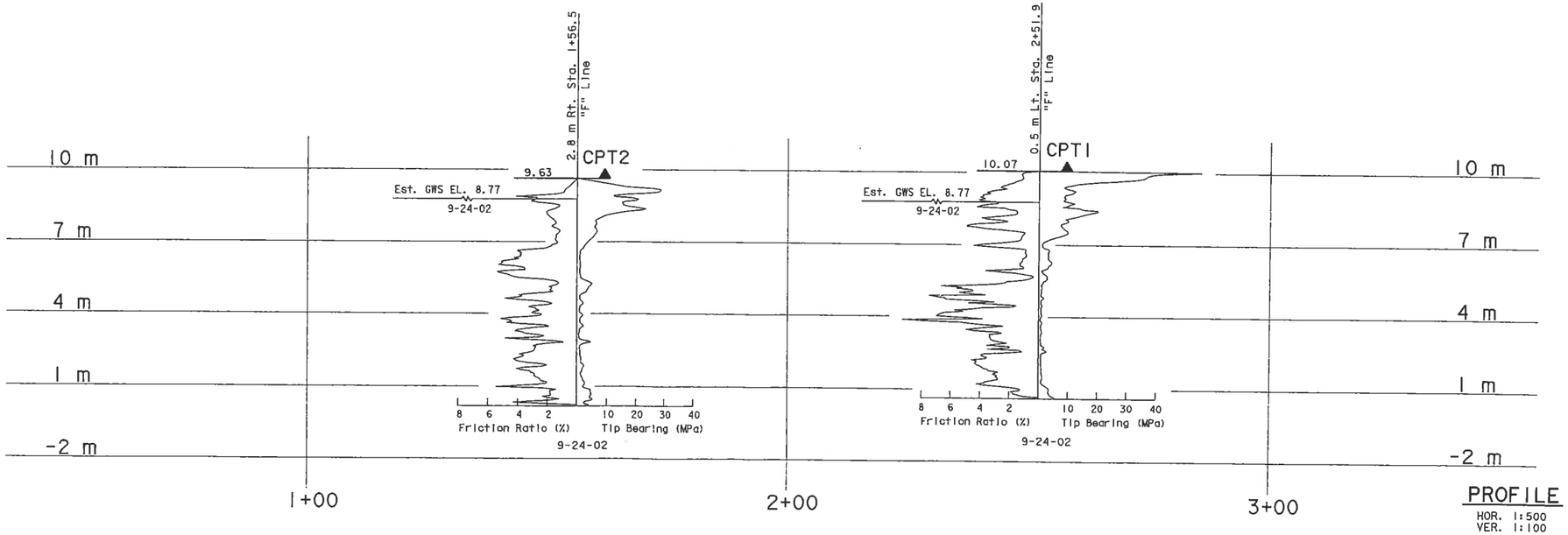
Located at the northwest part of the intersection of Newland St. and Edinger Ave.



PLAN
1:500

NOTE:

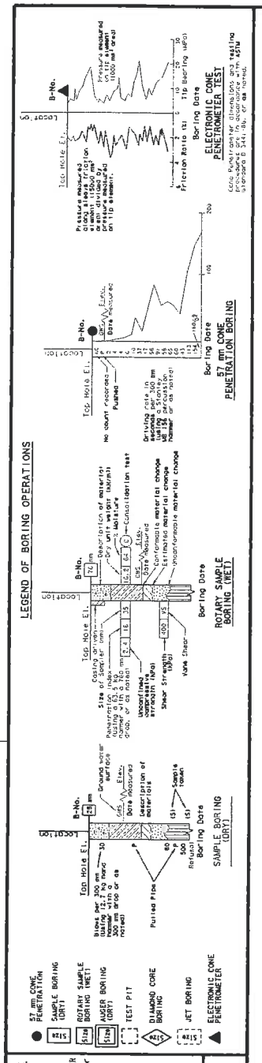
The ground water elevation (8.77 m) was calculated using the data obtained by piezometric cone penetration and pore water dissipation measurements. This high elevation may be due to irrigation. The highest G.W.T. table at the vicinity of the site (Log of Test Borings for Bolsa Ave. Overcrossing, Bridge No. 55-270, dated 1959) is 6.4 m. G.W.T. elevation is subject to seasonal fluctuations.



PROFILE
HOR. 1:500
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL, SAND, SILT, CLAY, CLAYEY SILT, SANDY CLAY or CLAYEY SAND, SANDY SILT or SILTY SAND, SILTY CLAY, PEAT AND/OR ORGANIC MATTER, COBBLES AND/OR BOULDERS, IGNEOUS ROCK, SEDIMENTARY ROCK, METAMORPHIC

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

SPT N-Value (Blows/0.3m)	Granular	SPT N-Value (Blows/0.3m)	Cohesive
0-4	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-30	Medium Dense	5-8	Firm
31-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		>30	Hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

ENGINEERING SERVICES	GEOTECHNICAL SERVICES
DRAWN BY: Irma G-Remmen 4/03	FIELD INVESTIGATION BY: K Barker
CHECKED BY: D. Wathugala	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO.
KILOMETER POST

RETAINING WALL NO. 1

LOG OF TEST BORINGS

OGS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 3/02)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

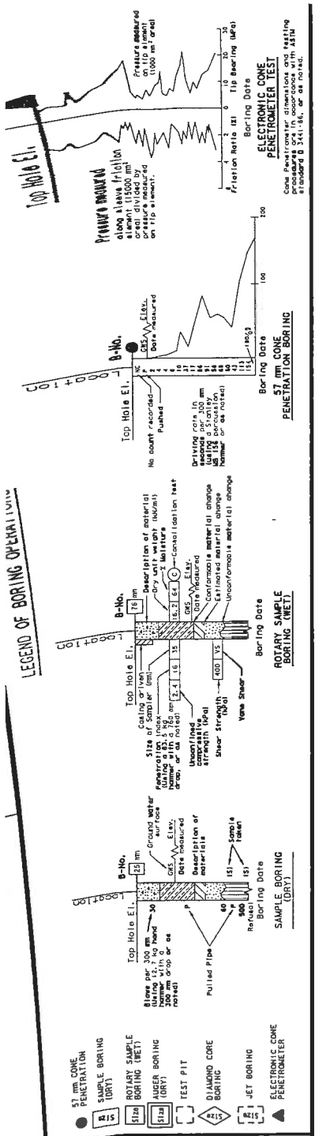
CU 12
EA 099401
FILE => rwl.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY): 4-11-03

SHEET OF

USERNAME => tnguyen DATE PLOTTED => 11-APR-2003 TIME PLOTTED => 09:52



BENCH MARK

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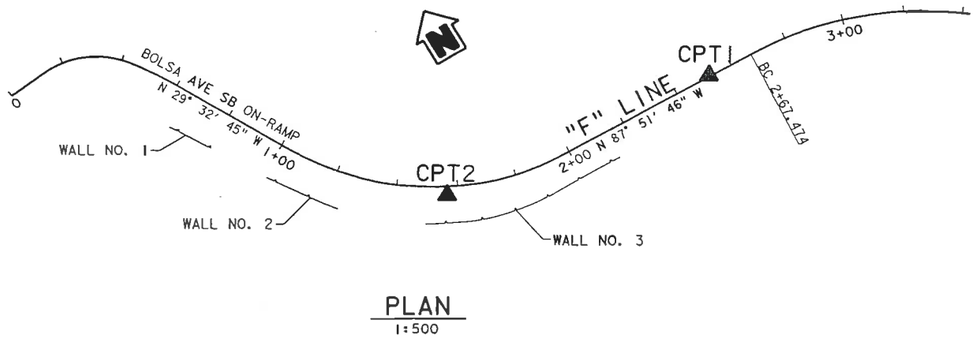
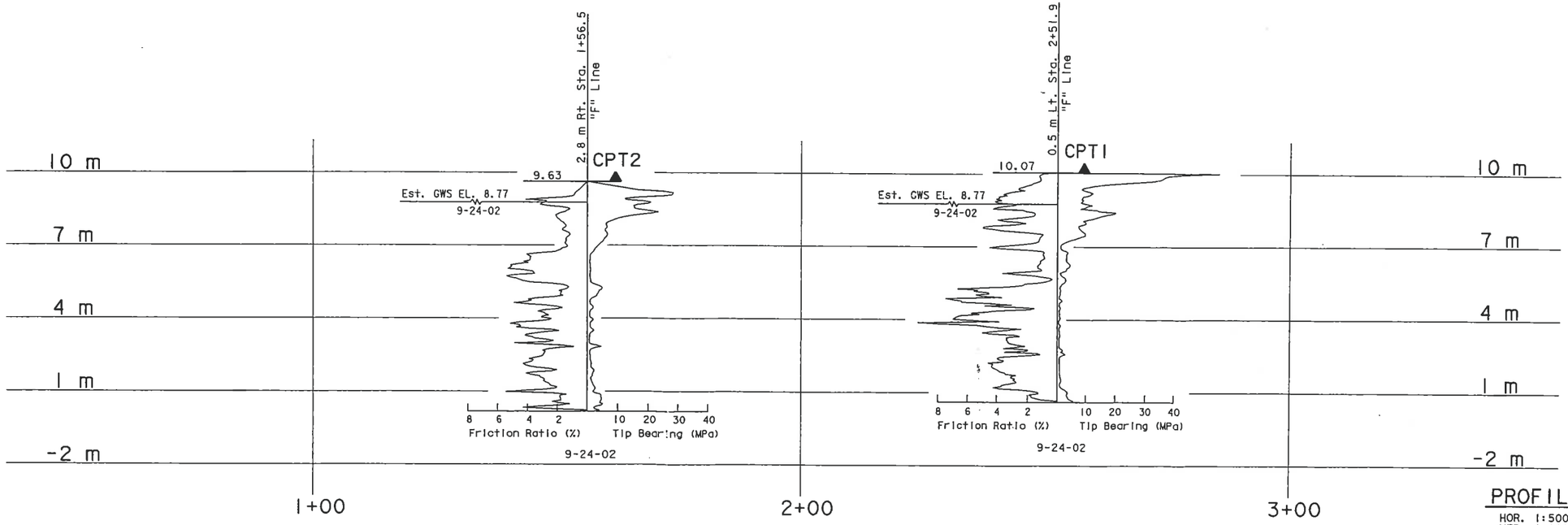


PLAN
1:500



PROFILE
HOR. 1:500
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
12	Ora	405			

REGISTERED ~~CIVIL~~ ENGINEER 4-11-03

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Deepa Wathugala — No. C63838 — Exp. 9-30-06 — CIVIL — STATE OF CALIFORNIA

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ENGINEERING SERVICES	GEOTECHNICAL SERVICES
DRAWN BY	Irma G-Remmen 4/03
CHECKED BY	D. Wathugala

FIELD INVESTIGATION BY: K. Barker

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO.
KILOMETER POST

RETAINING WALL NO. 2

LOG OF TEST BORINGS

CU 12
EA 099401

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)
4-11-03

SHEET OF

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

DGS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 3/02)

FILE => rw2.dgn

USERNAME => laamarro DATE PLOTTED => 16-APR-2003 TIME PLOTTED => 08:53

DISTRICT	COUNTY	ROUTE	TOTAL PROJECT	No	SHEETS
12	Ora	405			

REGISTERED CIVIL ENGINEER 4-11-03

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
Deepa Wathugala
No. C63838
Exp. 9-30-06
CIVIL
STATE OF CALIFORNIA

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BM FV-47-70 Elev. 8.216 m

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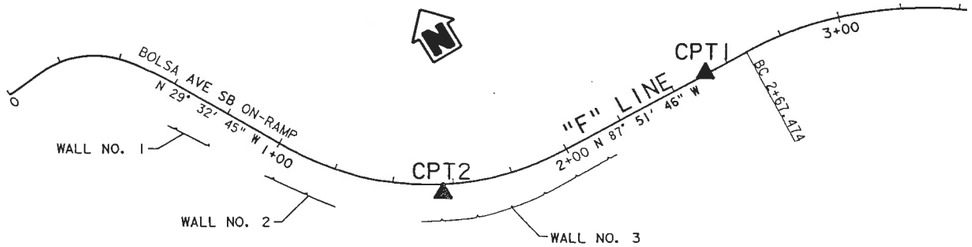

PLAN
1:500

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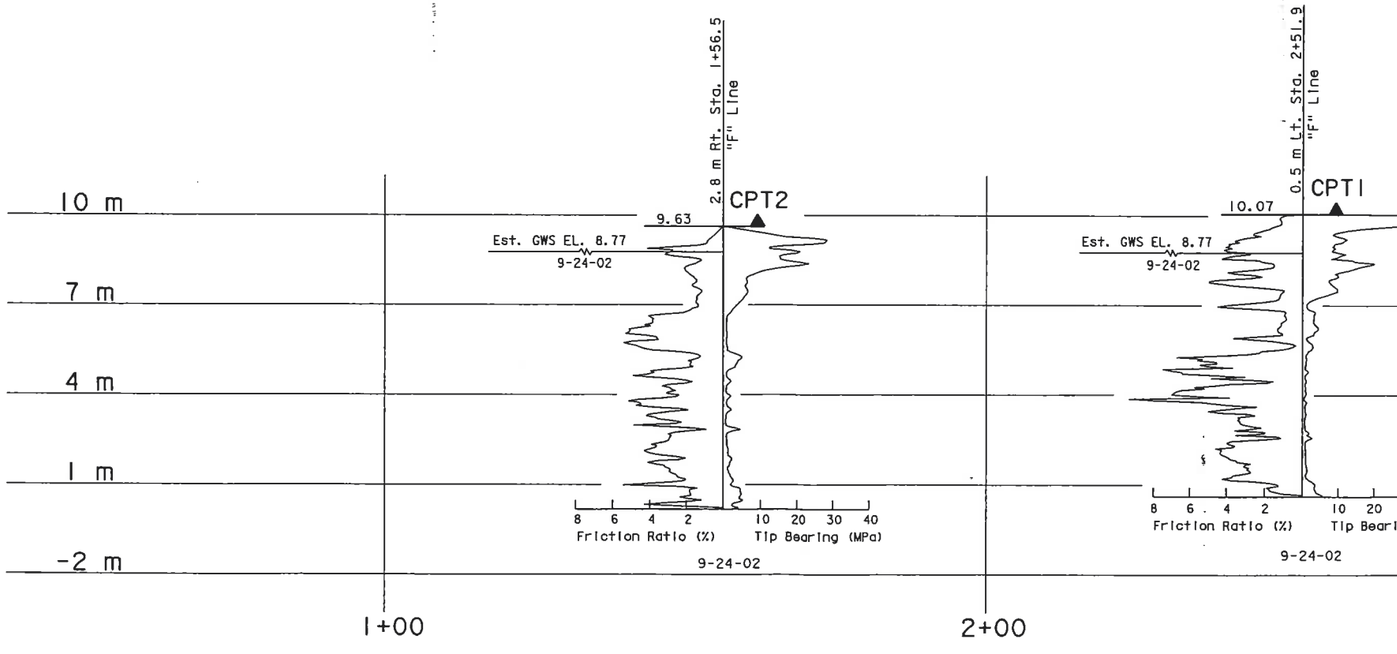
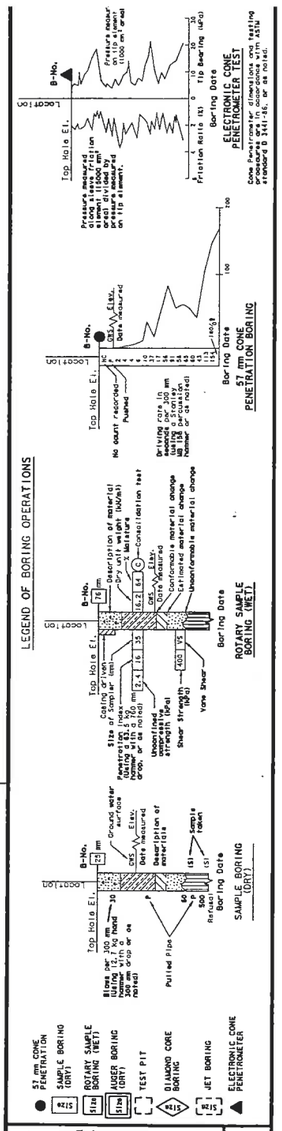


PROFILE
HOR. 1:500
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · SILTY CLAY · CLAYEY SILT · PEAT and/or ORGANIC MATTER · COBBLES and/or BOULDERS · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

CONSISTENCY CLASSIFICATION FOR SOILS
According to the Standard Penetration Test

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5-10	Loose	2-4	Soft	
11-30	Medium Dense	5-8	Firm	
31-50	Dense	9-15	Stiff	
>50	Very Dense	16-30	Very stiff	
		>30	Hard	

ENGINEERING SERVICES	GEOTECHNICAL SERVICES
DRAWN BY	Irma G-Remmen 4/03
CHECKED BY	D. Wathugala

FIELD INVESTIGATION BY: K. Barker

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO.
KILOMETER POST

RETAINING WALL NO. 3
LOG OF TEST BORINGS

OGS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 3/02)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 12
EA 099401

FILE => rw3.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
4-11-03											

USERNAME => lgamarra DATE PLOTTED => 16-APR-2003 TIME PLOTTED => 08:54

BENCHMARK:

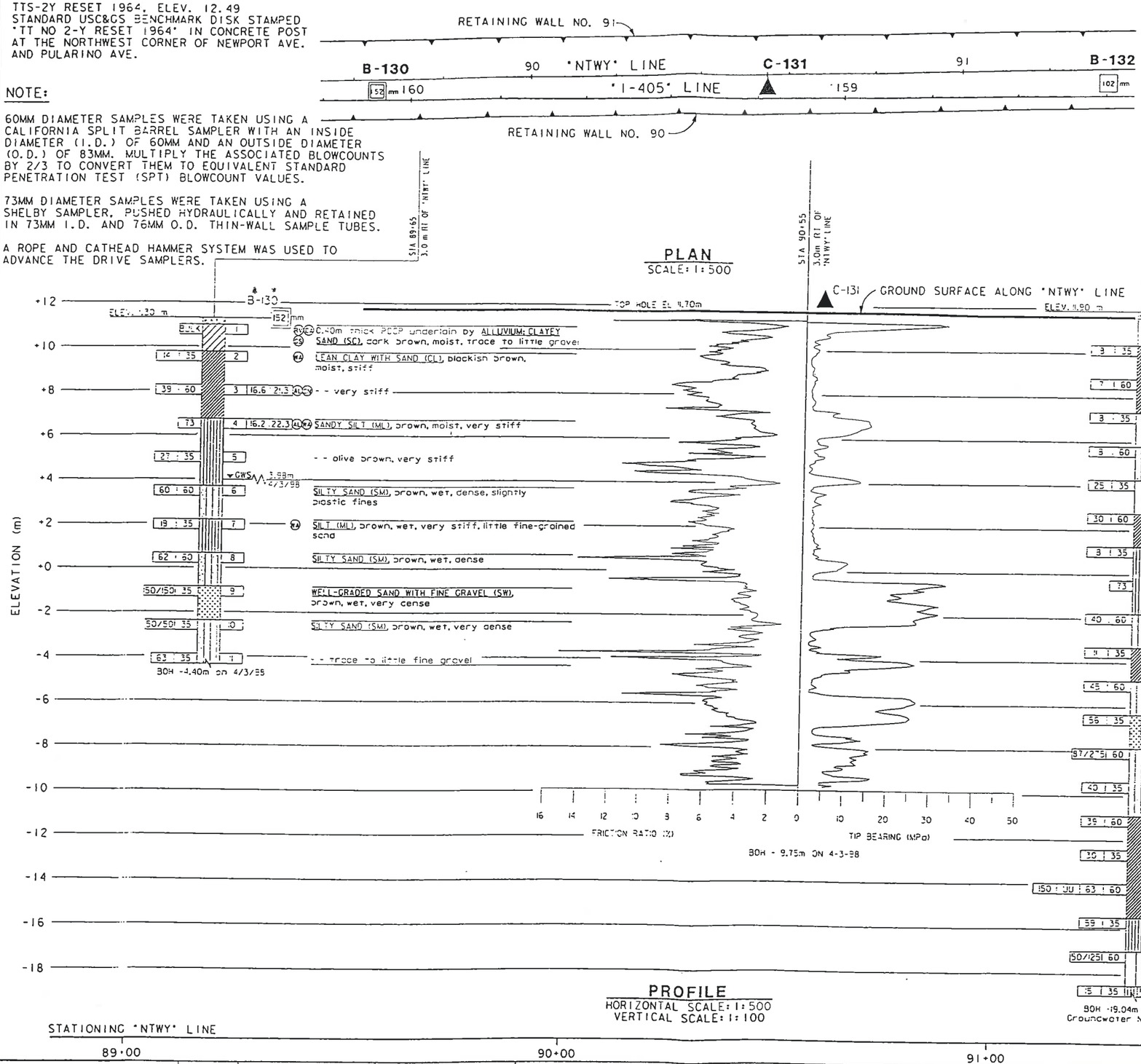
TTS-2Y RESET 1964, ELEV. 12.49
STANDARD USC&GS BENCHMARK DISK STAMPED
"TT NO 2-Y RESET 1964" IN CONCRETE POST
AT THE NORTHWEST CORNER OF NEWPORT AVE.
AND PULARINO AVE.

NOTE:

60MM DIAMETER SAMPLES WERE TAKEN USING A CALIFORNIA SPLIT BARREL SAMPLER WITH AN INSIDE DIAMETER (I.D.) OF 60MM AND AN OUTSIDE DIAMETER (O.D.) OF 83MM. MULTIPLY THE ASSOCIATED BLOWCOUNTS BY 2/3 TO CONVERT THEM TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOWCOUNT VALUES.

73MM DIAMETER SAMPLES WERE TAKEN USING A SHELBY SAMPLER, PUSHED HYDRAULICALLY AND RETAINED IN 73MM I.D. AND 76MM O.D. THIN-WALL SAMPLE TUBES.

A ROPE AND CATHEAD HAMMER SYSTEM WAS USED TO ADVANCE THE DRIVE SAMPLERS.



Caltrans Metric

D ST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
	ORA	405, 55	13.9/15.8 R8.9/R11.7		

REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER — MOHAMED AZEEMUDDIN — No. C057108 — Exp. 2/31/99 — CIVIL — STATE OF CALIFORNIA

PLANS APPROVAL DATE

OCTA
550 SOUTH MAIN STREET
ORANGE, CA 92613-1584

CH2M HILL
3 HUTTON CENTRE DR., #200
SANTA ANA, CA 92707

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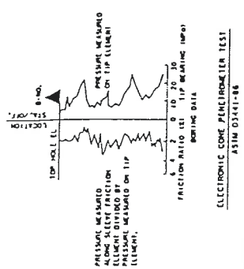

LEGEND OF EARTH MATERIALS (USCS)
BASED ON ASTM D2487, D2488

- CL, LEAN CLAY
- ML, SILT
- OL, ORGANIC CLAY OR SILT
- CH, FAT CLAY
- MH, ELASTIC SILT
- OH, ORGANIC CLAY OR SILT
- GW, WELL-GRADED GRAVEL
- GP, POORLY-GRADED GRAVEL
- GM, SILTY GRAVEL
- GC, CLAYEY GRAVEL
- SW, WELL-GRADED SAND
- SP, POORLY-GRADED SAND
- SM, SILTY SAND
- SC, CLAYEY SAND
- CL-ML, SILTY CLAY
- SHALE
- CLAYSTONE
- SILTSTONE

NOTES:
1. TYPES OF BORINGS
   - 31mm CONE PENETROMETER
   - ROTARY WASH
   - ELECTRONIC CONE PENETROMETER
   - AUGER BORING (DRY)
   - SIZE TEST PIT
2. SOIL TEST DESIGNATIONS
   - (H) ATTERBERG LIMITS
   - (C) CHEMICAL ANALYSIS
   - (M) MAX. DRY DENSITY
   - (CU) CONSOLIDATED UNDRAINED TRIAXIAL
   - (DS) DIRECT SHEAR
   - (R) R-VALUE
   - (CN) CONSOLIDATION
   - (H) HYDROMETER ANALYSIS
   - (GS) GRAIN SIZE ANALYSIS
   - (UC) UNCONFINED COMPRESSION
   - (UU) UNCONSOLIDATED UNDRAINED TRIAXIAL
   - (E) WASH ANALYSIS

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION
BASED ON ASTM D1586 AND D3966

SANDS AND GRAVELS

CONSISTENCY	BLOWS/305mm
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CLAYS AND SILTS

CONSISTENCY	BLOWS/305mm
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	OVER 30

CALTRANS DESIGN OVERSIGHT	DRAWN BY	K. REYES	M. AZEEMUDDIN (ENG)/ CH2M HILL & K. KAEKUL (TECH)/AP ENG
	CHECKED BY	B. HARDESTY	FIELD INVESTIGATOR
			DATE 4/3/98 - 4/14/98

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRADLEY MIELKE
PROJECT ENGINEER

BRIDGE NO.	
	X
KILOMETER POST	14.7
POST MILE	

MSE WALLS 90 AND 91
LOG OF TEST BORINGS

FOR REDUCED PLANS ORIGINAL SCALE IN MILLIMETERS 0 10 20 30 40 50

CU 12208

DISREGARD PRINTS BEARING | REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	ORA	405	11.5		

TO ACCOMPANY PLANS DATED

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DESIGN	B. Meyer	CHECKED H. Hamzawi	LOAD FACTOR DESIGN		
DETAILS	T-Dee	CHECKED H. Hamzawi	LAYOUT	BY B. Meyer	CHECKED H. Hamzawi
QUANTITIES	J. Cern	CHECKED K. Hallsten	SPECIFICATIONS	BY K. Hallsten	PLANS AND SPECS COMPARED H. Hamzawi

DESIGN OVERSIGHT

SIGNOFF DATE

PREPARED FOR THE
CITY OF COSTA MESA

D. Vandershaf
PROJECT ENGINEER

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

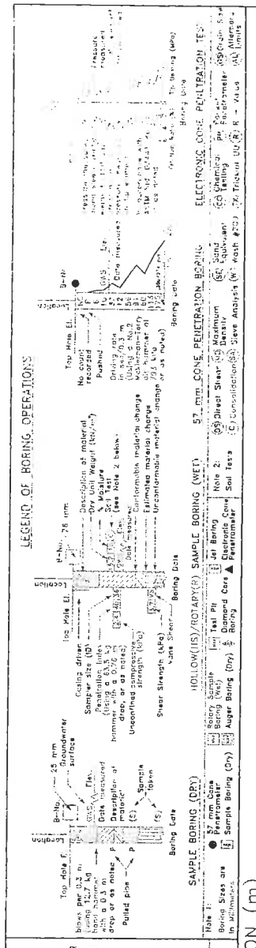
BRIDGE NO. 55-257 R/L
POST MILE 11.5

HARBOR BLVD UC RETAINING WALL
AS-BUILT LOG OF TEST BORINGS

DISREGARD PRINTS BEARING EARLIER REVISION DATES → REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 13 OF 13

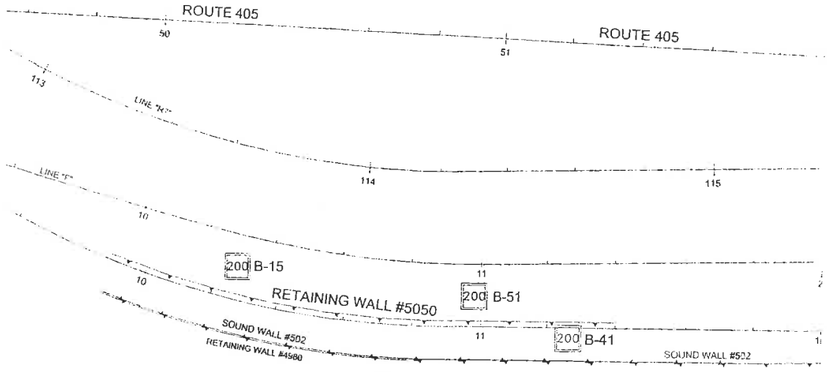
949LTB.DWG REV00 T-DEE 12/13/95



BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81
at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



PLAN
1 : 800

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	613	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

REGISTERED GEOTECHNICAL ENGINEER — No. GE-662096 — EXP. 12-31-2001 — GEOTECHNICAL — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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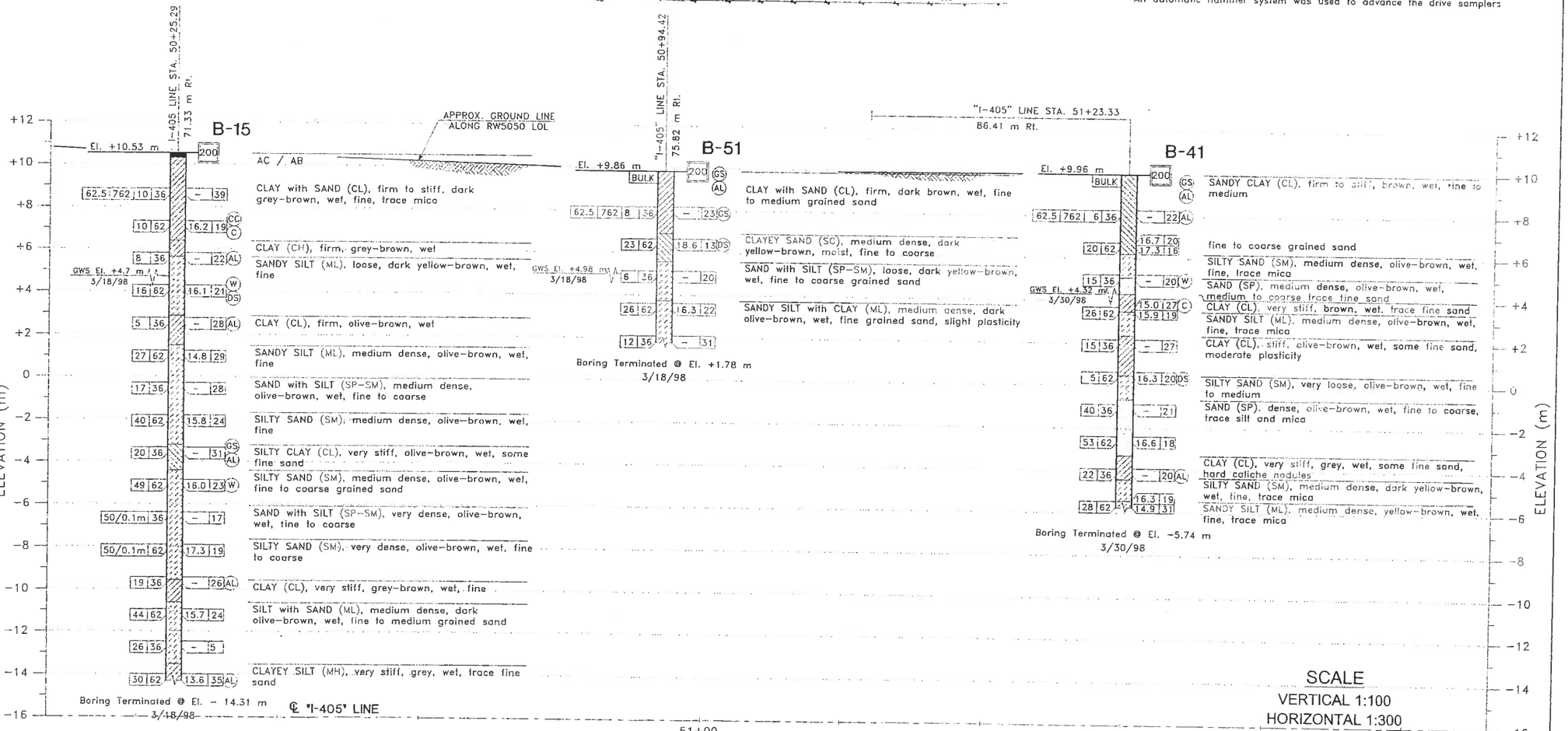
NOTES.

62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



SCALE
VERTICAL 1:100
HORIZONTAL 1:300

Costa mesa

DESIGN	BY M. CHOW 7/19/99	R. JIE/TECHNICIAN FIELD INVESTIGATOR/SYSTEM	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE NO.
CHECKED	BY E. BROWN 7/22/99	DATE 3/18/98, 3/30/98			ADDENDUM NO. 16.86

RETAINING WALL RW5050
LOG OF TEST BORINGS

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 08390

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 4 OF 4

RECOMMENDED FOR APPROVAL: J. JERSEIGHT Be Nguyen 3/3/00
DESIGN ENGINEER DATE

retwall5050#04of04.tif

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	619	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER GRUNWALD — No. GE-002890 EXP. 12-31-2001 — REGISTERED GEOTECHNICAL ENGINEER — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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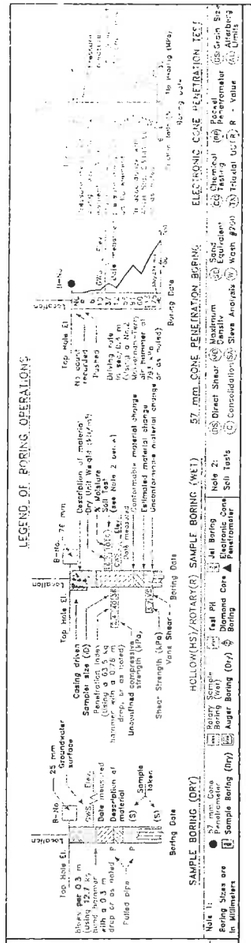
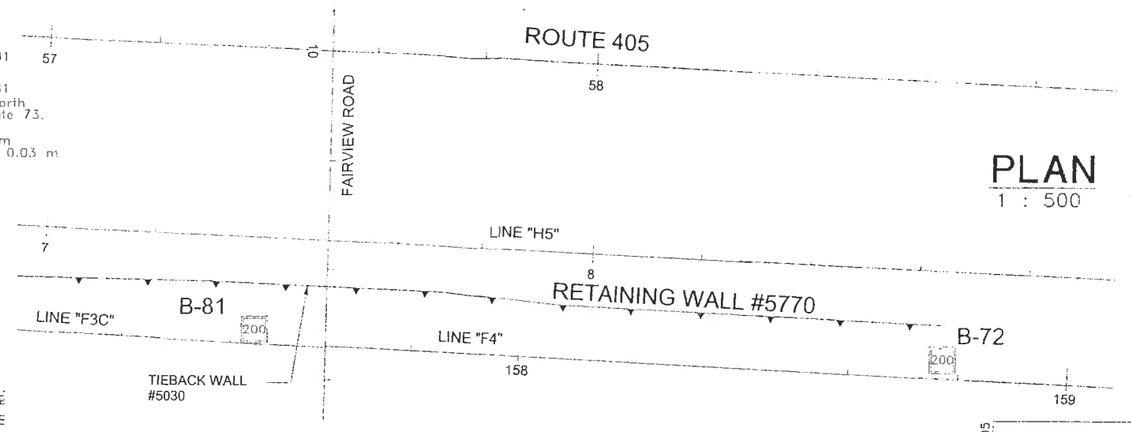
BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



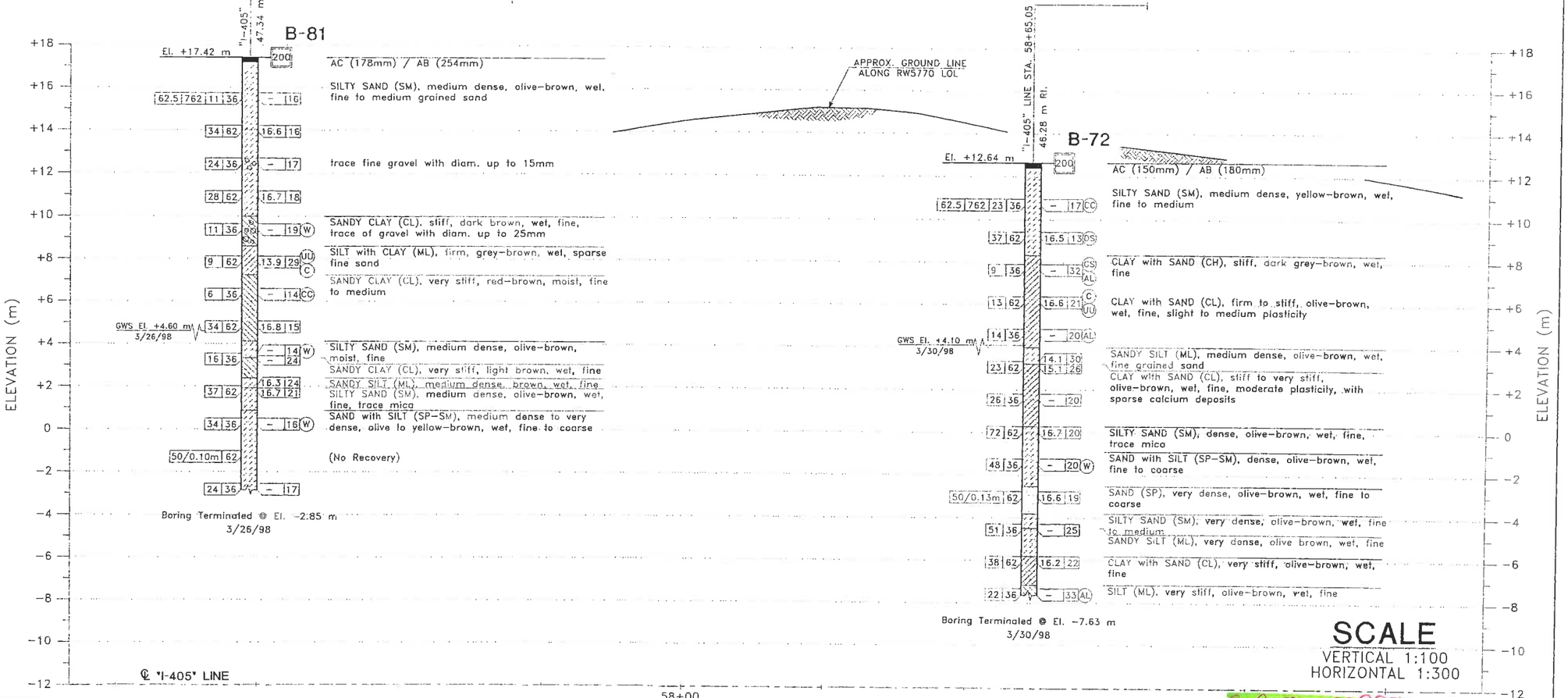


NOTES:

62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



SCALE
VERTICAL 1:100
HORIZONTAL 1:300

Caltrans vm 69,100

DESIGN	M. CHOW 7/21/99	R. JIE/TECHNICIAN FIELD INVESTIGATOR(S)/TITLE	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	BRIDGE NO.
CHECKED	E. BROWN 7/22/99	DATE 3/26/98, 3/30/98			ALIGNMENT POST 17.65

RETAINING WALL RW5770

LOG OF TEST BORINGS

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 083801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 7/23/99 8/26/99 10/15/99

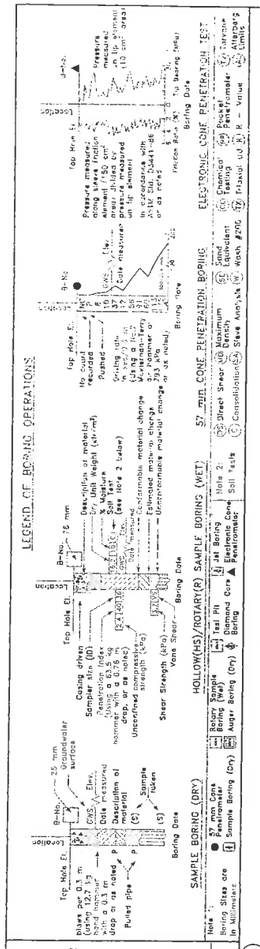
SHEET 3 OF 3

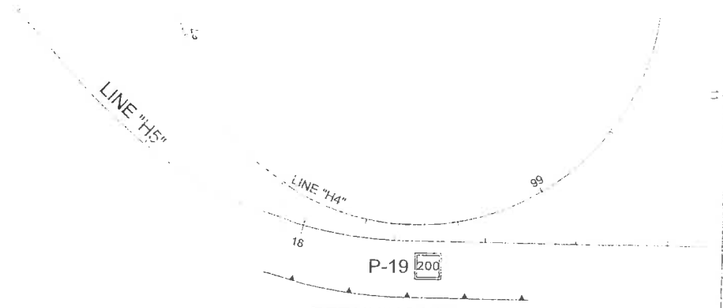
retwall5770#03of03.tif

BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81
at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.





Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST / TOTAL PROJECT	POST MILE	SHEET
12	Ora	405	16.4/20.0	602	651

REGISTERED GEOTECHNICAL ENGINEER
7-10-00
PLAN APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER — No. GE 2705 — EXP. 12-31-01 — CIVIL — GEOTECHNICAL — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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PLAN
1 : 600

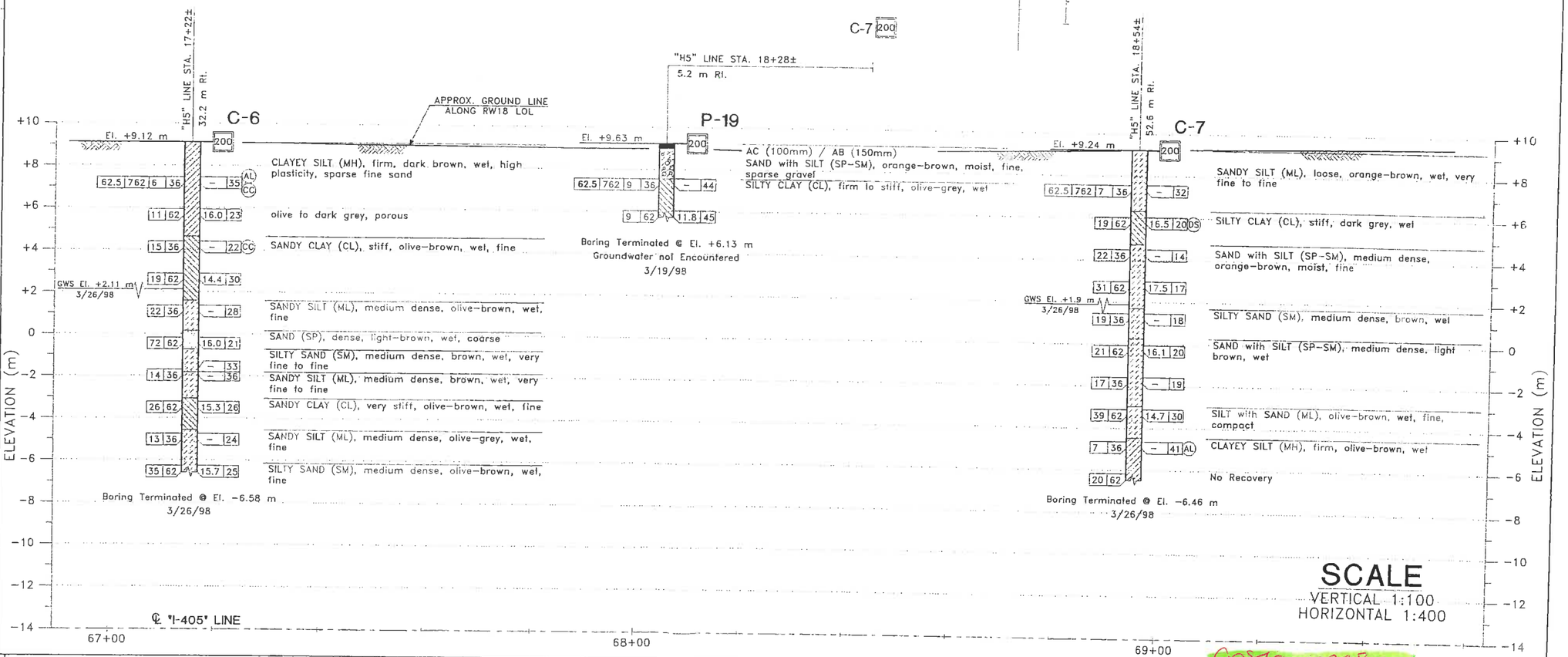
N

NOTES

62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

To convert California-Drive sampler blowcounts to equivalent SPT blowcounts, California-Drive blowcounts should be multiplied by a factor of 0.65

An automatic hammer system was used to advance the drive samplers



SCALE
VERTICAL 1:100
HORIZONTAL 1:400

Costa Mesa

DESIGN	BY M. CHOW 7/21/99
CHECKED	BY E. BROWN 7/22/99

M. MCDONALD/ENGINEER FIELD INVESTIGATOR'S TITLE — DATE 3/19/98, 3/26/98

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

K. ARULMOLI PROJECT ENGINEER

Jon Hamayeeii DESIGN INVESTIGATION — Bo Nguyen SIGNED — 3/3/00 DATE

BRIDGE NO.
KILOMETER POST 18.68

RETAINING WALL RW18
LOG OF TEST BORINGS

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

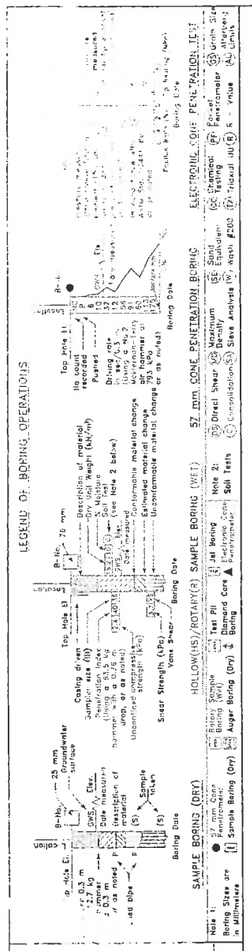
CU 12222
EA 083801

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 3 OF 3

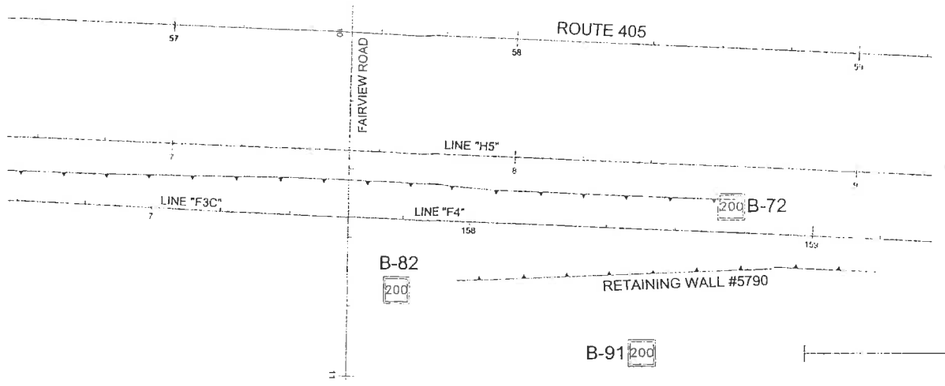
retwall18#03of03.tif



BENCHMARK

Orange County Surveyor Benchmark CM-41-81
Elevation 11.756m NAVD88 1995 adj.

Orange County Surveyor Benchmark CM-41-81 at the east side of Bear Street, 134.15 m north of Baker Street, 27.44 m south of State Route 73, measured from the southerly abutment line, 2.90 m back of Bear Street curbface, 3.78 m north of north curb of on-ramp going east, 0.03 m higher than the walk.



PLAN
1 : 800

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POSTS TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	405	16.4/20.0	623	651

REGISTERED GEOTECHNICAL ENGINEER

7-10-99
PLAN APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KAMBIZ ARJOMAND — NO. GC-992699 EXP. 12-31-2001 — GEOTECHNICAL — STATE OF CALIFORNIA

EARTH MECHANICS, INC.
17660 NEWHOPE ST., SUITE E
FOUNTAIN VALLEY, CA. 92708

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NOTES:

62 mm samples were taken using a California split-barrel sampler with an inside diameter (I.D.) of 62 mm and an outside diameter (O.D.) of 76 mm

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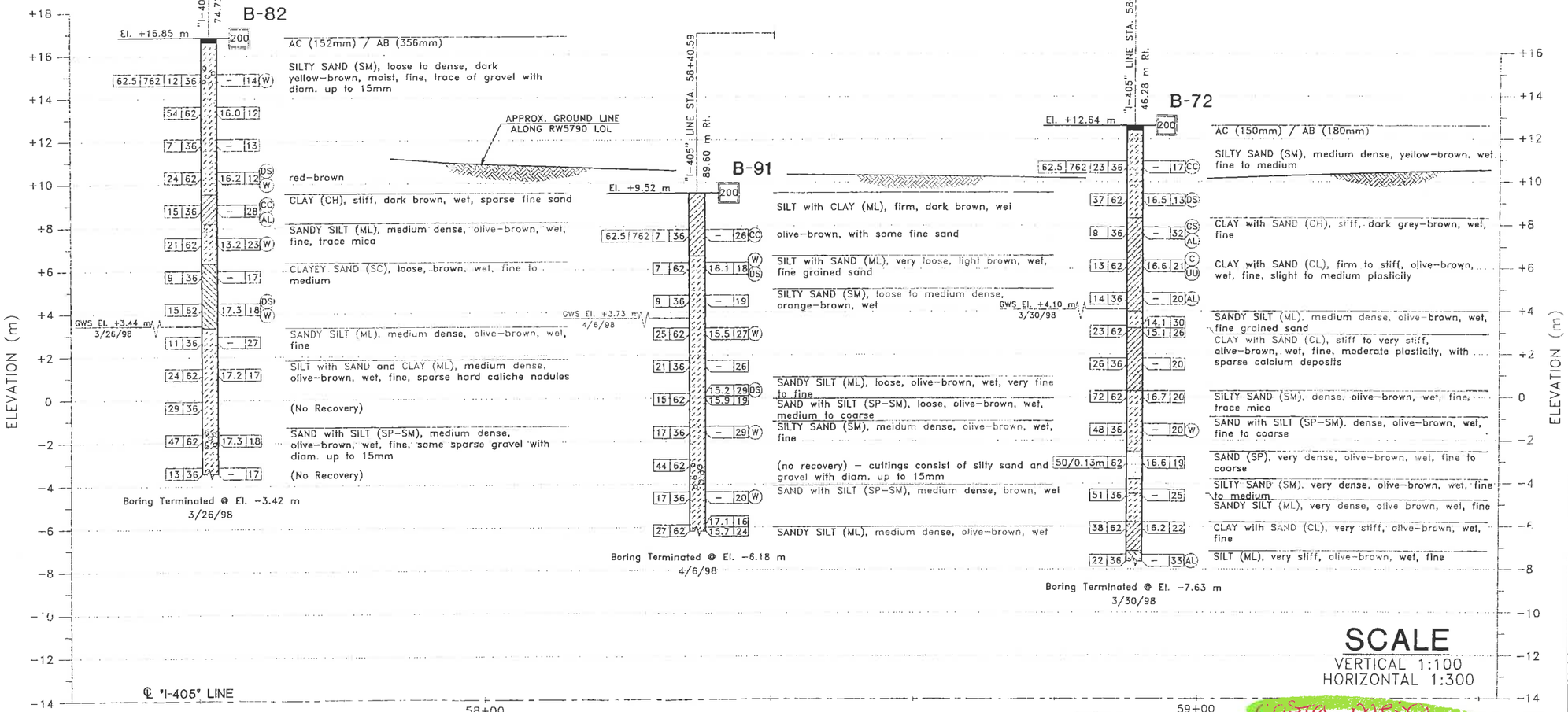

SCALE
VERTICAL 1:100
HORIZONTAL 1:300

DESIGN	BY M. CHOW 7/21/99	M. MCDONALD/ENGINEER R. JIA/TECHNICIAN FIELD INVESTIGATION/TEST DATE 3/26/98-4/6/98	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	K. ARULMOLI PROJECT ENGINEER	ENGINEER NO.
CHECKED	BY E. BROWN 7/22/99				KILOMETER POST 17.67

ORIGINAL SCALE IN mm FOR REDUCED PLANS 0 20 40 60 80 100

CU 12222
EA 083801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 7/23/99 8/20/99 10/19/99

RETAINING WALL RW5790

LOG OF TEST BORINGS

SHEET 4 OF 4

Be Nguyen
DESIGN OFFICE CHIEF
3/3/00
SIGNOFF DATE

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APPENDIX B
CALTRANS COMMENTS AND RESPONSES

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

12-12-11 COMMENTS

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MR. MATTHEW CUGINI,
D-12

Date: December 12, 2011

File: 12-ORA-405
PM 9.3/24.2
EA 120H100

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1

Subject: District Preliminary Geotechnical Report (DPGR)

The Office of Geotechnical Design South 1 (OGDS1) has reviewed the subject submittal titled: "District Preliminary Geotechnical Report, I-405 Widening from SR-73 to I-605, 12-ORA-405-PM 9.3/24.2, EA0H1000, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010 (revised August 25,November 4 and December 8, 2011) and received by our office on December 9, 2011. During our review we made reference to the following:

1. "Preliminary Geotechnical Report for Project Report/Environmental Document, I-405 Widening from SR-73 to I-605, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010.
2. OGDS1 Review Comment Memorandum dated February 17, 2011.
3. Response to item No.2 above listed in the "Review Comment Disposition Form", undated, submitted as part of the subject submittal.
4. "District Preliminary Geotechnical Report, I-405 Widening from SR-73 to I-605, 12-ORA-405-PM 9.3/24.2, EA 0H1000, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010, (Revised August 25, 2011)
5. OGDS1 Review Comment Memorandum dated September 21, 2011.
6. Over the shoulder review meeting conducted on December 9, 2011.

We have the following comment:

- Take out "section deleted" from the subject report and revise the report accordingly as was discussed during the December 9, 2011 meeting.

Any questions, please call me at (949) 724-2599.

SHARID K. AMIRI, Ph.D., P.E.
Senior Transportation Engineer
Office of Geotechnical Design South-1

RESPONSE TO 12-12-11 COMMENTS

I-405 WIDENING PA/ED
Review Comment Disposition Form

SUBMITTAL No. :	**PROJECT : I-405 Improvement Project PA/ED**
SUBMITTAL: ☐ Screencheck ☐ Draft ☐ Final ☒ _____	**SUBMITTAL NAME: District Preliminary Geotechnical Report**
REVIEW AGENCY: ☐ OCTA ☒ Caltrans ☐ FHWA ☐ _____	**SUBMITTAL DATE: 12-08-11**
REVIEW BY: Sharid K. Amiri, Ph.D., P.E. **REVIEW DATE: 12-12-11**	**CONTACT: Parsons/Jason Majzoub 949.333.4513**

No.	Dwg./ Pg.	Comment	Initial Disp.	Response	Final Disp.	LS or RI	Veri -fier	Verify Date
1	General	Take out "section deleted" from the subject report and revise the report accordingly as was discussed during the December 9, 2011 meeting.	C	GDC has made the requested changes as discussed in our meeting on December 9, 2011.				

I certify that all comments on this form have been addressed and incorporated in the resubmitted document.

Curt Scheyhing 12-14-11

_____ _____

Project Manager / Task Manager / Document Originator *Date*

INITIAL DISPOSITION CODES BY ORIGINATOR: **C** = Will Comply **D** = Discuss **N** = No Change **A** = Agency Action
FINAL DISPOSITION CODES BY REVIEWER: **D** = Done or Approved **N/C** = No Change Required **LS** =Revise in Later Submittal **RI** = Revise Immediately

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

11-18-11 COMMENTS

Memorandum

Flex your power!
Be energy efficient!

To: MR. MATTHEW CUGINI,
D-12

Date: November 18, 2011

File: 12-ORA-405
PM 9.3/24.2
EA 120H100

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1

Subject: District Preliminary Geotechnical Report (DPGR)

The Office of Geotechnical Design South 1 (OGDS1) has reviewed the subject submittal titled: "District Preliminary Geotechnical Report, I-405 Widening from SR-73 to I-605, 12-ORA-405-PM 9.3/24.2, EA0H1000, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010 (revised August 25 and November 4, 2011) and received by our office on November 9, 2011. During our review we made reference to the following:

1. "Preliminary Geotechnical Report for Project Report/Environmental Document, I-405 Widening from SR-73 to I-605, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010.
2. OGDS1 Review Comment Memorandum dated February 17, 2011.
3. Response to item No.2 above listed in the "Review Comment Disposition Form", undated, submitted as part of the subject submittal.
4. "District Preliminary Geotechnical Report, I-405 Widening from SR-73 to I-605, 12-ORA-405-PM 9.3/24.2, EA 0H1000, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010, (Revised August 25, 2011)
5. OGDS1 Review Comment Memorandum dated September 21, 2011.

Our office has the following comments:

1. Provide a clear and complete description of the proposed improvements in the text of the report for all 3 proposed alternatives; revise Section 2 of the subject report accordingly. In doing so make it consistent with the project report.(PR)
2. Was the groundwater depth based only on the previous exploration performed for the structures? If so, explain why the data for groundwater based on the past roadway/Retaining Walls explorations is not included.
3. Take out section 4.2
4. Include Layout sheets for Alternatives 1 and 2 in the Appendix.

5. Take out all LOTB related to the bridge structures from the report. Include all available As-Built LOTB referring to the roadway items (i.e. main line, ramps, sound walls and standard retaining walls)
6. Revise the Table of Contents to reflect the revisions.
7. Reference for Caltrans existing reports is incomplete and does not have any date or the actual title as reflected on the reports. Revise accordingly.
8. Take out Table 2A and any reference to it in the text.
9. Revise Table 3 to include groundwater for District items such as Roadway and Walls. State if groundwater was not encountered during the past geotechnical investigations for District items in a footnote.
10. Revise Section 4.1.4 to reflect only district items. Take out reference to bridges.
11. What is the potential for expansion and its impact on the roadway, based on the literature search conducted during the preparation of the subject report? Explain and include it in the subject report where it applies.

Any questions, please call me at (949) 724-2599.

SHARID K. AMIRI, Ph.D., P.E.
Senior Transportation Engineer
Office of Geotechnical Design South-1

RESPONSE to 11-18-11 COMMENTS

I-405 WIDENING PA/ED
Review Comment Disposition Form

SUBMITTAL No. :	**PROJECT : I-405 Improvement Project PA/ED**
SUBMITTAL: ☐ Screencheck ☐ Draft ☐ Final ☒ _____	**SUBMITTAL NAME: District Preliminary Geotechnical Report**
REVIEW AGENCY: ☐ OCTA ☒ Caltrans ☐ FHWA ☐ _____	**SUBMITTAL DATE: 11-04-11**
REVIEW BY: Sharid K. Amiri, Ph.D., P.E. **REVIEW DATE: 11-18-11**	**CONTACT: Parsons/Jason Majzoub 949.333.4513**

No.	Dwg./ Pg.	Comment	Initial Disp.	Response	Final Disp.	LS or RI	Veri -fier	Verify Date
1	Section 2	Provide a clear and complete description of the proposed improvements in the text of the report for all 3 proposed alternatives; revise Section 2 of the subject report accordingly. In doing so make it consistent with the project report.(PR)	C	Section 1.1 has been revised and includes a clear and complete description of all 3 alternatives for the proposed improvements consistent with the PR. Section 2.2 has been revised accordingly.				
2	Table 3	Was the groundwater depth based only on the previous exploration performed for the structures? If so, explain why the data for groundwater based on the past roadway/Retaining Walls explorations is not included.	C	GDC has obtained LOTB for roadway and retaining walls from Caltrans and summarized the available groundwater data from these LOTB in Table 3 of the revised report.				
3	Section 4.2	Take out Section 4.2.	C	Section 4.2 has been taken out.				
4	Appendices	Include Layout sheets for Alternatives 1 and 2 in the Appendix.	C	Layout sheets for Alternatives 1 and 2 are provided in Appendix D.				
5	Appendix A	Take out all LOTB related to the bridge structures from the report. Include all available As-Built LOTB referring to the roadway items (i.e. main line, ramps, sound walls and standard retaining walls)	C	All bridge LOTB have been taken out of Appendix A, and replaced with all available LOTB for mainline, ramps, soundwalls, and standard retaining walls.				
6	TOC	Revise the Table of Contents to reflect the revisions.	C	TOC has been revised to reflect the changes.				
7	References	Reference for Caltrans existing reports is incomplete and does not have any date or the actual title as reflected on the reports. Revise accordingly.	C	A complete list of detailed references is provided in the revised report.				

INITIAL DISPOSITION CODES BY ORIGINATOR: **C** = Will Comply **D** = Discuss **N** = No Change **A** = Agency Action
FINAL DISPOSITION CODES BY REVIEWER: **D** = Done or Approved **N/C** = No Change Required **LS** =Revise in Later Submittal **RI** = Revise Immediately

No.	Dwg./ Pg.	Comment	Initial Disp.	Response	Final Disp.	LS or RI	Veri -fier	Verify Date
8	Table 2A	Take out Table 2A and any reference to it in the text.	C	Table 2A and all references have been taken out.				
9	Table 3	Revise Table 3 to include groundwater for District items such as Roadway and Walls. State if groundwater was not encountered during the past geotechnical investigations for District items in a footnote.	C	Groundwater data for District LOTB have been added to Table 3 and a footnote has been added regarding those LOTB where groundwater was not encountered or measured.				
10	Section 4.1.4	Revise Section 4.1.4 to reflect only district items. Take out reference to bridges.	C	Section 4.1.4 (liquefaction) has been revised accordingly.				
11		What is the potential for expansion and its impact on the roadway, based on the literature search conducted during the preparation of the subject report? Explain and include it in the subject report where it applies.	C	No laboratory data for expansive soils or evidence of roadway problems due to expansive soils was discovered in the literature reviewed. In section 2.2.5 we have added a sentence indicating that roadway over-excavation will be required below pavements where expansive soils are present. We have also added a statement in Section 4.10 "The roadway and pavement investigations should address the potential impacts of expansive soils on the roadway, and recommend appropriate remediation measures, as necessary."				

I certify that all comments on this form have been addressed and incorporated in the resubmitted document.

Curt Scheyhing 12-08-11

Project Manager / Task Manager / Document Originator *Date*

INITIAL DISPOSITION CODES BY ORIGINATOR: **C** = Will Comply **D** = Discuss **N** = No Change **A** = Agency Action
FINAL DISPOSITION CODES BY REVIEWER: **D** = Done or Approved **N/C** = No Change Required **LS** =Revise in Later Submittal **RI** = Revise Immediately

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

New comments and responses

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MR. MATTHEW CUGINI,
D-12

Date: September 21, 2011

File: 12-ORA-405
PM 9.3/24.2
EA 120H100

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1

Subject: District Preliminary Geotechnical Report (DPGR)

The Office of Geotechnical Design South 1 (OGDS1) has reviewed the subject submittal titled: "District Preliminary Geotechnical Report, I-405 Widening from SR-73 to I-605, 12-ORA-405-PM 9.3/24.2, EA0H1000, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010, revised August 25, 2011 and received by our office on September 1, 2011. During our review we made reference to the following:

1. "Preliminary Geotechnical Report for Project Report/Environmental Document, I-405 Widening from SR-73 to I-605, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010.
2. OGDS1 Review Comment Memorandum dated February 17, 2011.
3. Response to item No.2 above listed in the "Review Comment Disposition Form", undated, submitted as part of the subject submittal.

We have the following comments:

1. The scope of the subject report must include district items only. Revise the entire report to reflect it, per Caltrans guidelines. All bridge items have been removed as per reviewer's original comments.
2. Are there any data available per previous geotechnical investigations and reports for the district items? Explain and include a text in the report, where appropriate. We obtained and reviewed existing soundwall and retaining wall reports along the alignment. The reports reviewed are referenced in Section 3.2.2 of the report.

Any questions, please call me at (949) 724-2599.

SHARID K. AMIRI, Ph.D., P.E.
Senior Transportation Engineer
Office of Geotechnical Design South-1

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MR. FRED FAIZI
D-12

Date: February 17, 2011

Original Comments

File: 12-ORA-405
PM ?

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1

Subject: District Preliminary Geotechnical Report (DPGR)

The Office of Geotechnical Design South 1 (OGDS1) has reviewed the subject submittal titled: "Preliminary Geotechnical Report for Project Report/Environmental Document, I-405 Widening from SR-73 to I-605, Orange County, California," prepared by Group Delta Consultants, Inc., dated December 17, 2010 and received by our office on December 24, 2010. We have the following comments:

- Replace "Preliminary Geotechnical Report for Project Report/Environmental Document" by "District Preliminary Geotechnical Report (DPGR)" in the subject submittal.
- Include PM for both the beginning and end of the project.
- Include the EA of the project.
- Take out Section 1.3
- Take out section 3.2.2
- Subsurface conditions for the geo-structures (i.e. embankment fill, slopes, cut sections, etc…) must be based on site specific explorations based on the LRFD guidelines. Explain why your report does not follow the latter guidelines.
- Any structures included in the GDR such as sign structures must have site specific explorations.
- If tiebacks are type selected and a type selection meeting is scheduled, preliminary foundation reports must be prepared and submitted to Caltrans for review. Revise section 4.3.4 accordingly.
- Include the compaction test method in Section 4.5.4
- Take out section 4.10
- Include a section in the report for future scope of work. The section should elaborate on the scope of geotechnical investigation and laboratory testing, based on the LRFD guidelines.

Any questions, please call me at (949) 724-2599.

SHARID K. AMIRI, Ph.D., P.E.
Senior Transportation Engineer
Office of Geotechnical Design South-1

Original Response

I-405 WIDENING PA/ED
Review Comment Disposition Form

SUBMITTAL No. :	**PROJECT : I-405 Improvement Project PA/ED**
SUBMITTAL: ☐ **Screencheck** ☒ **Draft** ☐ **Final** ☐ _____	**SUBMITTAL NAME: District Preliminary Geotechnical Report (DPGR)**
REVIEW AGENCY: ☐ **OCTA** ☒ **Caltrans** ☐ **FHWA** ☐ _____	**SUBMITTAL DATE: December 27, 2010**
REVIEW BY: Sharid K. Amiri, Ph.D., PE **REVIEW DATE: 2-17-11**	**CONTACT: Parsons/ Jason Majzoub**

No.	Dwg./ Pg.	Comment	Initial Disp.	Response	Final Disp.	LS or RI	Veri -fier	Verify Date
1	3	Replace "Preliminary Geotechnical Report for Project Report/Environmental Document" by "District Preliminary Geotechnical Report (DPGR)" in the subject submittal.	C	The replacement has been made in the revised report.				
2		Include PM for both the beginning and end of the project	C	This is included in the revised report.				
3		Include the EA of the project.	C	This is included in the revised report.				
4		Take out Section 1.3	N	Section 1.3 "Key Geotechnical Issues" is a summary of the most critical issues from a geotechnical viewpoint, therefore this section is relevant and should remain.				
5		Take out section 3.2.2	N	The scope of the DPGR was a paper review based on existing data following Section 150.15.20 of Caltrans Work Breakdown Structure (WBS). The subsurface data from as-built LOTB presented in this section are the only available subsurface data and therefore are an essential part of this report and this section should remain.				

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No.	Dwg./ Pg.	Comment	Initial Disp.	Response	Final Disp.	LS or RI	Veri -fier	Verify Date
6		Subsurface conditions for the geo-structures (i.e. embankment fill, slopes, cut sections, etc…) must be based on site specific explorations based on the LRFD guidelines. Explain why your report does not follow the latter guidelines.	C	We agree that adequate subsurface investigation is required at the PS+E stage in full conformance with LRFD and other Caltrans Guidelines. The DPGR was prepared following Section 150.15.20 of Caltrans Work Breakdown Structure (WBS) using only available existing information and the scope did not include subsurface exploration, which is normal practice at the PA/ED level. Scope of site specific exploration for final design should be finalized by the geotechnical engineer of record in the PS+E stage when more detailed plans are available. Preliminary guidelines for the scope of additional investigations are presented in Section 4.11.				
7		Any structures included in the GDR such as sign structures must have site specific explorations.	C	Agreed. This is included in Section 4.11.				
8		If tiebacks are type selected and a type selection meeting is scheduled, preliminary foundation reports must be prepared and submitted to Caltrans for review. Revise section 4.3.4 accordingly.	C	Agreed. An SPGR for tieback walls was prepared for this project as part of Advanced Planning Studies (APS) following Section 150.15.30 of Caltrans WBS. A PFR will be required prior to Type Selection Meeting in accordance with Section 240.65 of WBS in the early stages of PS+E, and we have added this statement to Section 4.3.4.				
9		Include the compaction test method in Section 4.5.4	C	We have referenced Caltrans Test Method 216 in this section of the revised DPGR.				
10		Take out section 4.10	C	We have moved this section as well as former Tables 5A, 5B, and 6 out of the main report and into Appendix B for use by Parsons. It is understood that Caltrans Geotechnical Design South is not reviewing this section.				

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No.	Dwg./ Pg.	Comment	Initial Disp.	Response	Final Disp.	LS or RI	Veri -fier	Verify Date
11		Include a section in the report for future scope of work. The section should elaborate on the scope of geotechnical investigation and laboratory testing, based on the LRFD Guidelines.	C	Preliminary guidelines and LRFD references are provided in Section 4.11. The geotechnical engineer responsible for the PS+E studies should prepare the final detailed exploration plan based on updated project plans and the Caltrans guidelines in effect at that time.				

I certify that all comments on this form have been addressed and incorporated in the resubmitted document.

Curt Scheyhing

Project Manager / Task Manager / Document Originator

08-19-11

Date

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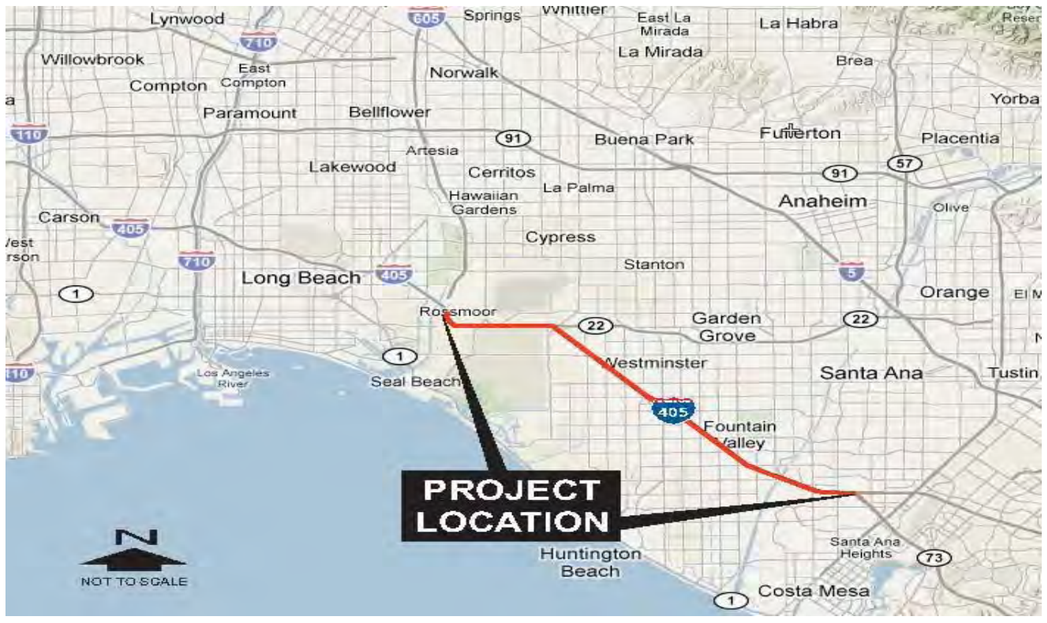
APPENDIX C
LAYOUT PLANS FOR ALTERNATIVES 1 AND 2

ALTERNATIVE 1
LAYOUT SHEETS

Draft Project Report

I-405 Improvement Project



ATTACHMENT D

Alternative 1 Drawings

INDEX OF PLANS

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN LOS ANGELES AND ORANGE COUNTIES
IN COSTA MESA, FOUNTAIN VALLEY, WESTMINSTER, HUNTINGTON BEACH, GARDEN GROVE, SEAL BEACH, ROSSMOOR, AND LONG BEACH
ON ROUTE 22 FROM ROUTE 405 TO 0.3 MILE WEST OF VALLEY VIEW STREET OVERCROSSING
ON ROUTE 22 FROM 0.3 MILE WEST OF ROUTE 605 TO ROUTE 405
ON ROUTE 405 FROM 0.5 MILE SOUTH OF EUCLID STREET UNDERCROSSING TO 0.2 MILE SOUTH OF 405/605 SEPERATION

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

LOCATION MAP

BEGIN CONSTRUCTION
(ROUTE 405)
Sta "A" 644+17
PM 12.1 (Ora)

END CONSTRUCTION
(ROUTE 22)
Sta "EB-SR22-L1" 1219+41
PM R0.7 (Ora)

BEGIN CONSTRUCTION
(ROUTE 22)
Sta "EB-SR22-L1" 1230+45
PM R0.6 (Ora)

Begin Work
Sta 1283+25

END CONSTRUCTION
(ROUTE 405)
Sta "NB605" 1262+95
PM 23.9 (Ora)

BEGIN CONSTRUCTION
(ROUTE 22)
Sta "WB SR-22" 1097+13
PM 1.0 (Ora)

END CONSTRUCTION
(ROUTE 22)
Sta "E" 1117+20
PM R0.7 (Ora)

Begin Work
Sta 591+37

Begin Work
Sta 264+95

End Work
Sta 1311+57

ROUTE 405
ROUTE 73
ROUTE 22
ROUTE 605
BEAR St
BRISTOL St
FAIRVIEW Rd
HARBOR Blvd
SANTA ANA RIVER
NEWHOPE St
EUCLID St
WARD St
BROOKHURST St
TALBERT Ave
SLATER Ave
BUSHARD St
WARNER Ave
NEWLAND St
MAGNOLIA St
EDINGER Ave
BEACH Blvd (ROUTE 39)
BOLSA Ave
McFADDEN Ave
GOLDENWEST St
SPRINGDALE St
EDWARDS St
WESTMINSTER Blvd
BOLSA CHICA Rd
VALLEY VIEW St
SEAL BEACH Blvd
SAN GABRIEL RIVER
ATHERTON St
STUDEBAKER St

COSTA MESA
FOUNTAIN VALLEY
WESTMINSTER
GARDEN GROVE
HUNTINGTON BEACH
SEAL BEACH
ROSSMOOR
LONG BEACH
LOS ANGELES COUNTY
ORANGE COUNTY

SERVICE Rd UC
BRIDGE No.55-0259
SANTA ANA RIVER Br/EUCLID St UC
BRIDGE No.55-0258
EUCLID St ON-RAMP Br
(SANTA ANA RIVER)
BRIDGE No.55-XXXX
EUCLID St ON-RAMP Br
(OCSD DRIVEWAY)
BRIDGE No.55-XXXX
WARD St OC
BRIDGE No.55-0429
TALBERT Ave OC
BRIDGE No.55-0260
BROOKHURST St OC
BRIDGE No.55-0402
SLATER Ave OC
BRIDGE No.55-0261
BUSHARD St OC
BRIDGE No.55-0262
HEIL Ave POC
BRIDGE No.55-0407
NEWLAND St OC
BRIDGE No.55-0265
EDINGER Ave OC
BRIDGE No.55-0266
ROUTE EB 39/NB 405 RAMP Conn
BRIDGE No.55-XXXX
WARNER Ave OC
BRIDGE No.55-0263
WARNER Ave
BRAIDED ON-RAMP
BRIDGE No.55-XXXX
MAGNOLIA St
BRAIDED ON-RAMP
BRIDGE No.55-XXXX
MAGNOLIA St OC
BRIDGE No.55-0264
ROUTE WB 39/SB 405 RAMP Conn
BRIDGE No.55-XXXX
McFADDEN Ave OC
BRIDGE No.55-0268
BOLSA OH
BRIDGE No.55-0269
GOLDENWEST St OC
BRIDGE No.55-0271
NAVY OH
BRIDGE No.55-0272
WESTMINSTER Blvd OC
BRIDGE No.55-0274
SPRINGDALE St OC
BRIDGE No.55-0275
SEAL BEACH Blvd OC
BOLSA Ave OC
BRIDGE No.55-0270
EDWARDS St OC
BRIDGE No.55-0273
BOLSA CHICA Rd OC
BRIDGE No.55-0276

PROJECT ENGINEER DATE
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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PARSONS 2201 DUPONT DRIVE SUITE 200 IRVINE, CA 92612	ORANGE COUNTY TRANSPORTATION AUTHORITY 550 SOUTH MAIN STREET ORANGE, CA 92863
CONTRACT No.	12-0H1000
PROJECT ID	12000001800

PROJECT REPORT PLANS FOR ALTERNATIVE 1

NO SCALE

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

APPROVED AS TO IMPACT ON STATE FACILITIES AND CONFORMANCE WITH APPLICABLE STATE STANDARDS AND PRACTICES AND THAT TECHNICAL OVERSIGHT WAS PERFORMED.

CONSULTANT DESIGN ENGINEER | CALTRANS DESIGN OVERSIGHT APPROVAL | REGISTRATION No. | LICENSE Exp DATE | DATE SIGNED

LAST REVISION 00-00-00 | DATE PLOTTED => 11/3/2011 TIME PLOTTED => 7:13:06 PM

BORDER LAST REVISED 7/2/2010 | CALTRANS WEB SITE IS: HTTP//WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => p0027660 DGN FILE => ALT_1_ Title_Sheet.dgn | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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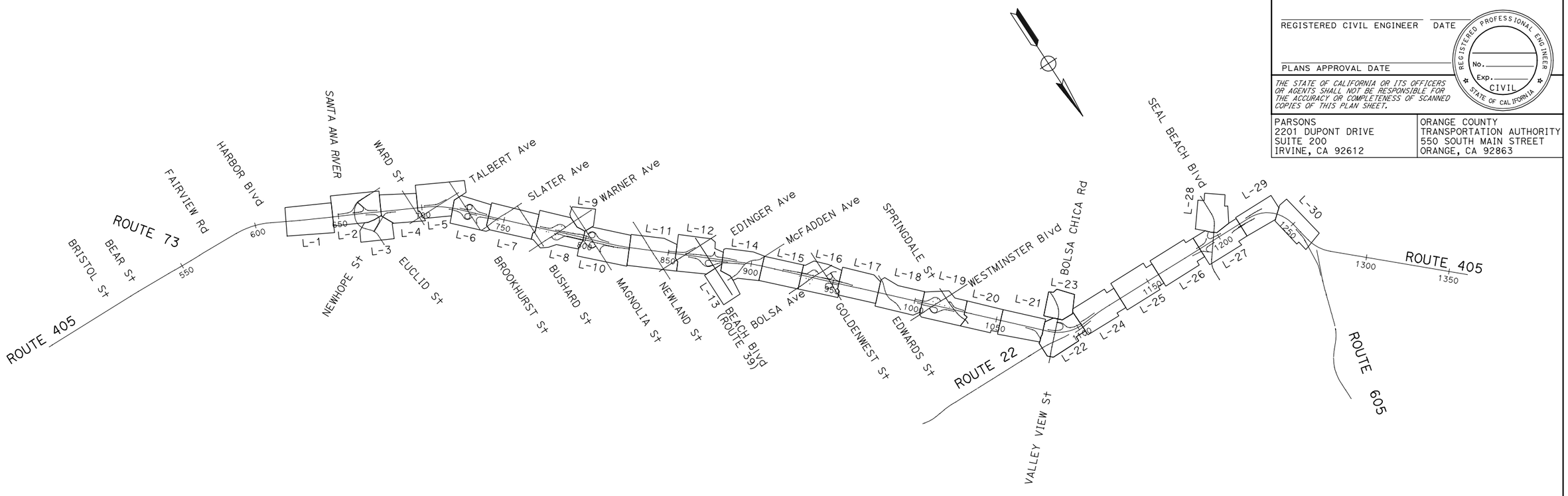
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



LINE INDEX	DESCRIPTION
"A" LINE	ROUTE 405 CENTERLINE
"EC" LINE	EUCLID STREET/ELLIS AVENUE CENTERLINE
"ECL-1" LINE	EUCLID STREET SB ON-RAMP
"ECL-2" LINE	EUCLID STREET SB LOOP ON-RAMP
"ECL-3" LINE	EUCLID STREET SB OFF-RAMP
"ECR-1" LINE	EUCLID STREET NB OFF-RAMP
"ECR-2" LINE	EUCLID STREET NB ON-RAMP
"W" LINE	WARD STREET CENTERLINE
"T" LINE	TALBERT AVENUE CENTERLINE
"TL-1" LINE	TALBERT AVENUE SB ON-RAMP
"BH" LINE	BROOKHURST STREET CENTERLINE
"BHL-1" LINE	BROOKHURST STREET SB LOOP ON-RAMP
"BHL-2" LINE	BROOKHURST STREET SB OFF-RAMP
"BHR-1" LINE	BROOKHURST STREET NB OFF-RAMP
"BHR-2" LINE	BROOKHURST STREET NB LOOP ON-RAMP
"BHR-3" LINE	BROOKHURST STREET NB ON-RAMP
"S" LINE	SLATER AVENUE CENTERLINE
"BD" LINE	BUSHARD STREET CENTERLINE
"WN" LINE	WARNER AVENUE CENTERLINE
"WNL-1" LINE	WARNER AVENUE SB ON-RAMP
"WNL-2" LINE	WARNER AVENUE SB LOOP OFF-RAMP
"WNR-1" LINE	WARNER AVENUE NB LOOP OFF-RAMP
"WNR-2" LINE	WARNER AVENUE NB ON-RAMP
"M" LINE	MAGNOLIA STREET CENTERLINE
"ML-1" LINE	MAGNOLIA STREET SB LOOP ON-RAMP
"ML-2" LINE	MAGNOLIA STREET SB OFF-RAMP

LINE INDEX	DESCRIPTION
"MR-1" LINE	MAGNOLIA STREET NB OFF-RAMP
"MR-2" LINE	MAGNOLIA STREET NB LOOP ON-RAMP
"MR-3" LINE	MAGNOLIA STREET NB ON-RAMP
"NL" LINE	NEWLAND STREET CENTERLINE
"ED" LINE	EDINGER AVENUE CENTERLINE
"EDL-1" LINE	EDINGER AVENUE SB ON-RAMP
"B" LINE	BEACH BOULEVARD (ROUTE 39) CENTERLINE
"BL-1" LINE	BEACH BOULEVARD/CENTER AVENUE SB HOOK ON-RAMP
"BL-2" LINE	BEACH BOULEVARD/CENTER AVENUE SB HOOK OFF-RAMP
"BR-1" LINE	BEACH BOULEVARD NB OFF-RAMP
"BR-2" LINE	BEACH BOULEVARD NB LOOP ON-RAMP
"BR-3" LINE	BEACH BOULEVARD NB ON-RAMP
"MF" LINE	McFADDEN AVENUE CENTERLINE
"BGL-1" LINE	BOLSA AVENUE/GOLDENWEST STREET SB C-D ROAD
"BS" LINE	BOLSA AVENUE CENTERLINE
"BSL-1" LINE	BOLSA AVENUE SB ON-RAMP
"BSL-2" LINE	BOLSA AVENUE SB LOOP OFF-RAMP
"BSR-1" LINE	BOLSA AVENUE NB LOOP OFF-RAMP
"GW" LINE	GOLDENWEST STREET CENTERLINE
"E" LINE	WESTMINSTER MALL CENTERLINE
"GWL-1" LINE	GOLDENWEST STREET/WESTMINSTER MALL SB LOOP ON-RAMP
"GWL-2" LINE	GOLDENWEST STREET/WESTMINSTER MALL SB OFF-RAMP
"GWR-1" LINE	GOLDENWEST STREET NB LOOP ON-RAMP
"EW" LINE	EDWARDS STREET CENTERLINE
"WM" LINE	WESTMINSTER BOULEVARD CENTERLINE
"WML-1" LINE	WESTMINSTER BOULEVARD SB ON-RAMP

LINE INDEX	DESCRIPTION
"WML-2" LINE	WESTMINSTER BOULEVARD SB LOOP OFF-RAMP
"WMR-1" LINE	WESTMINSTER BOULEVARD NB LOOP OFF-RAMP
"WMR-2" LINE	WESTMINSTER BOULEVARD NB ON-RAMP
"SD" LINE	SPRINGDALE STREET CENTERLINE
"SDL-1" LINE	SPRINGDALE STREET SB OFF-RAMP
"BC" LINE	BOLSA CHICA ROAD/VALLEY VIEW STREET CENTERLINE
"BCL-1" LINE	BOLSA CHICA ROAD SB LOOP ON-RAMP
"BCL-2" LINE	BOLSA CHICA ROAD SB OFF-RAMP
"BCR-1" LINE	GARDEN GROVE BOULEVARD NB OFF-RAMP
"SR22" LINE	EXIST ROUTE 22 CENTERLINE
"H" LINE	405-22 HOV CONNECTOR CENTERLINE
"E1" LINE	S405-E22 CONNECTOR STATIONLINE (WEST OF VALLEY VIEW STREET)
"W1" LINE	W22-N405 CONNECTOR STATIONLINE (EAST OF VALLEY VIEW STREET)
"WB SR-22" LINE	W22-N405 CONNECTOR STATIONLINE (WEST OF VALLEY VIEW STREET)
"EB SR-22" LINE	S405-E22 CONNECTOR STATIONLINE (EAST OF VALLEY VIEW STREET)
"SB" LINE	SEAL BEACH BOULEVARD CENTERLINE
"SBL-1" LINE	SEAL BEACH BOULEVARD SB ON-RAMP
"SBL-2" LINE	SEAL BEACH BOULEVARD SB LOOP OFF-RAMP
"SBR-1" LINE	SEAL BEACH BOULEVARD NB OFF-RAMP
"SBR-2" LINE	SEAL BEACH BOULEVARD NB LOOP ON-RAMP
"WB SR-22 R1" LINE	OLD RANCH PARKWAY NB ON-RAMP
"WB SR-22 R2" LINE	N405-W22 CONNECTOR CENTERLINE
"EB SR-22 L1" LINE	E22-S405 CONNECTOR CENTERLINE
"NB 605" LINE	N405-N605 CONNECTOR CENTERLINE
"I605" LINE	ROUTE 605 CENTERLINE

ALTERNATIVE 1
KEY MAP

NO SCALE

K-1

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 11/7/2011 | TIME PLOTTED => 2:18:13 PM

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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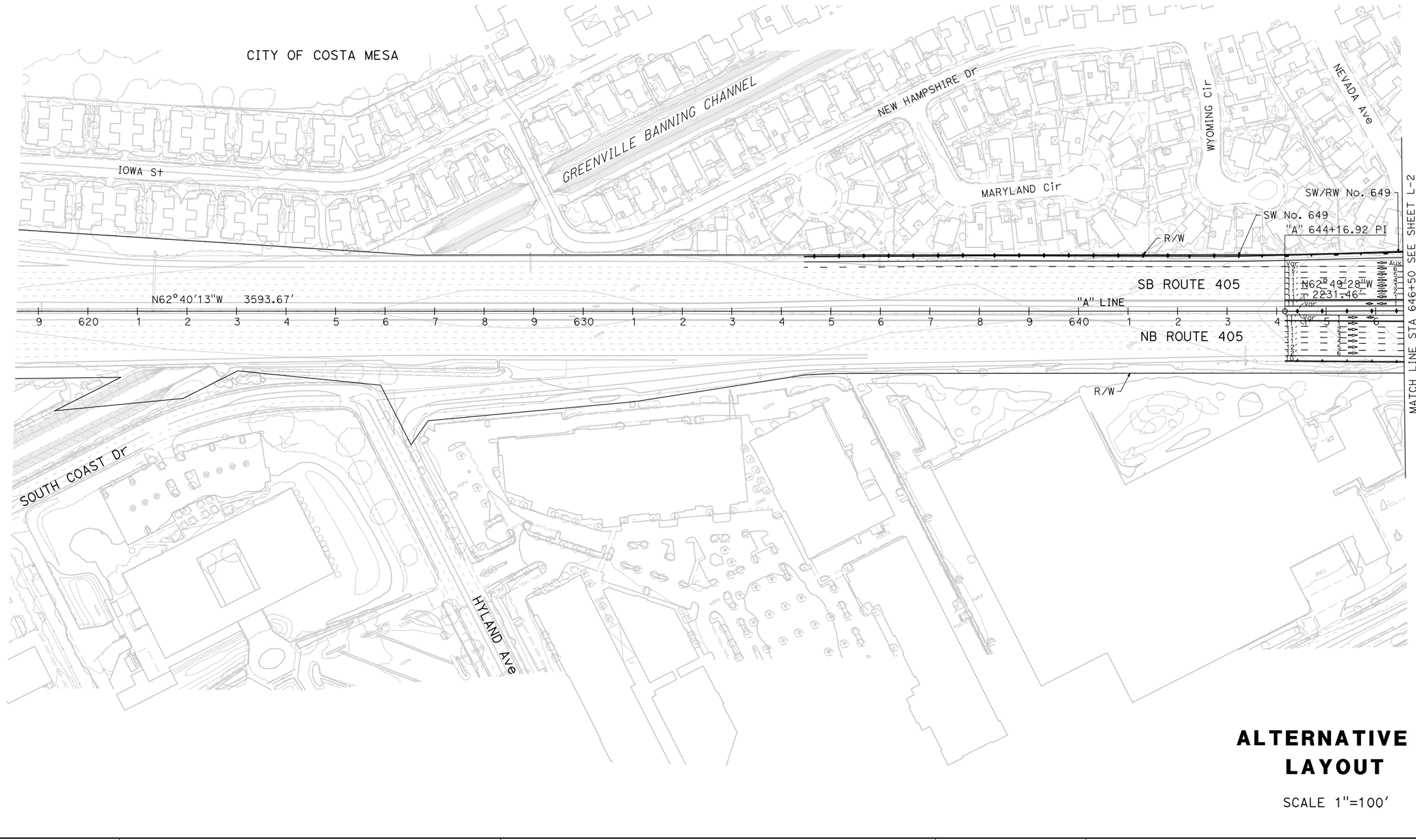
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



ALTERNATIVE 1 LAYOUT

SCALE 1"=100' **L-1**

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00

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TIME PLOTTED => 10:55:23 AM

BORDER LAST REVISED 7/2/2010

USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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ORANGE, CA 92863

REVISED BY | DATE REVISED

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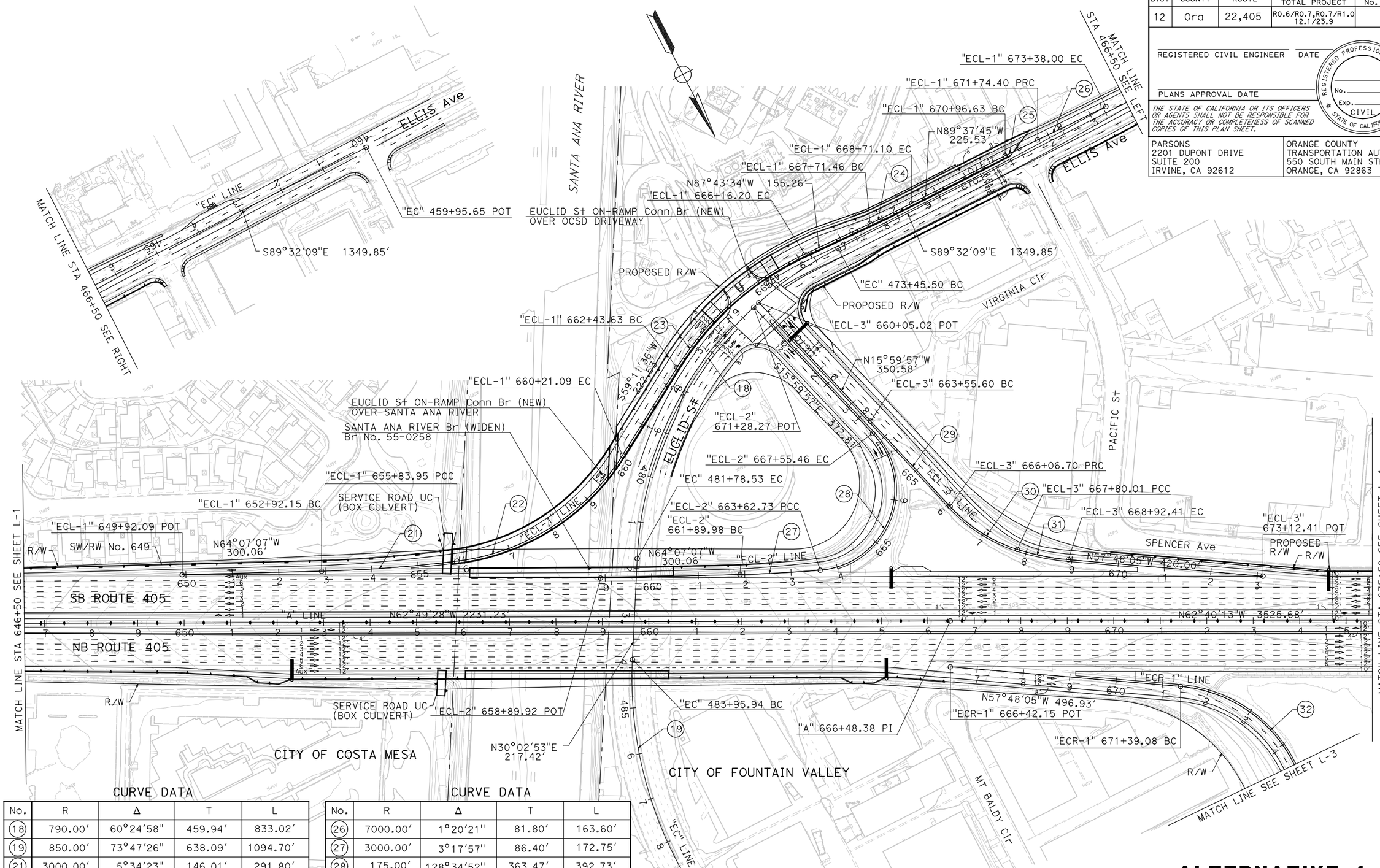
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR | Caltrans



CURVE DATA

No.	R	Δ	T	L
(18)	790.00'	60°24'58"	459.94'	833.02'
(19)	850.00'	73°47'26"	638.09'	1094.70'
(21)	3000.00'	5°34'23"	146.01'	291.80'
(22)	490.00'	51°06'55"	234.32'	437.14'
(23)	645.30'	33°04'50"	191.64'	372.57'
(24)	3000.00'	1°54'11"	49.83'	99.64'
(25)	2791.17'	1°35'47"	38.89'	77.77'

CURVE DATA

No.	R	Δ	T	L
(26)	7000.00'	1°20'21"	81.80'	163.60'
(27)	3000.00'	3°17'57"	86.40'	172.75'
(28)	175.00'	128°34'52"	363.47'	392.73'
(29)	20000.00'	0°43'10"	125.55'	251.10'
(30)	335.00'	29°38'29"	88.64'	173.31'
(31)	500.00'	12°52'49"	56.44'	112.40'
(32)	300.00'	102°24'12"	373.15'	536.18'

ALTERNATIVE 1 LAYOUT

SCALE 1"=100' **L-2**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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PARSONS
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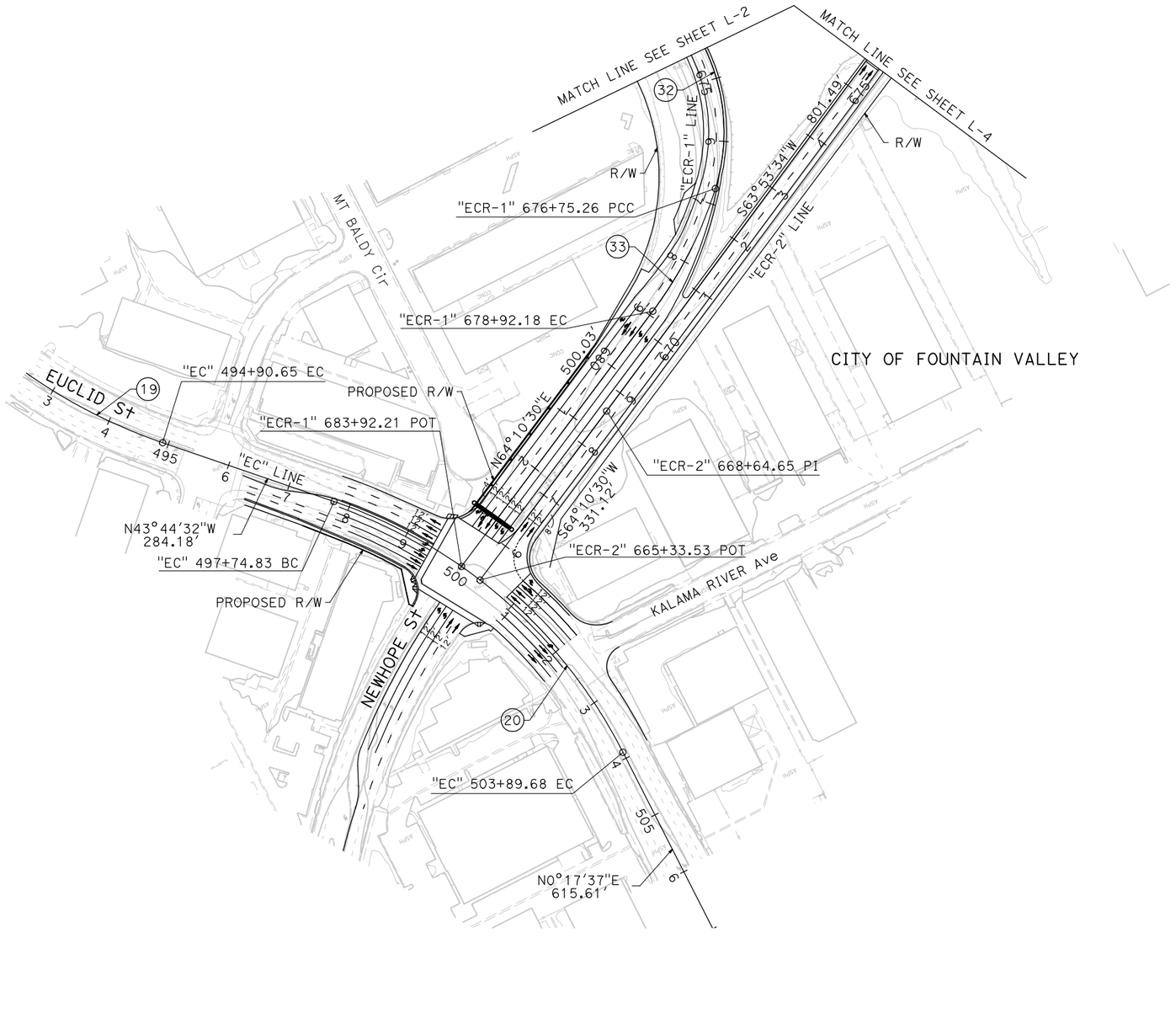
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



CURVE DATA

No.	R	Δ	T	L
19	850.00′	73°47′26"	638.09′	1094.70′
20	800.00′	44°02′09"	323.51′	614.86′
32	300.00′	102°24′12"	373.15′	536.18′
33	635.00′	19°34′23"	109.53′	216.92′

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-3**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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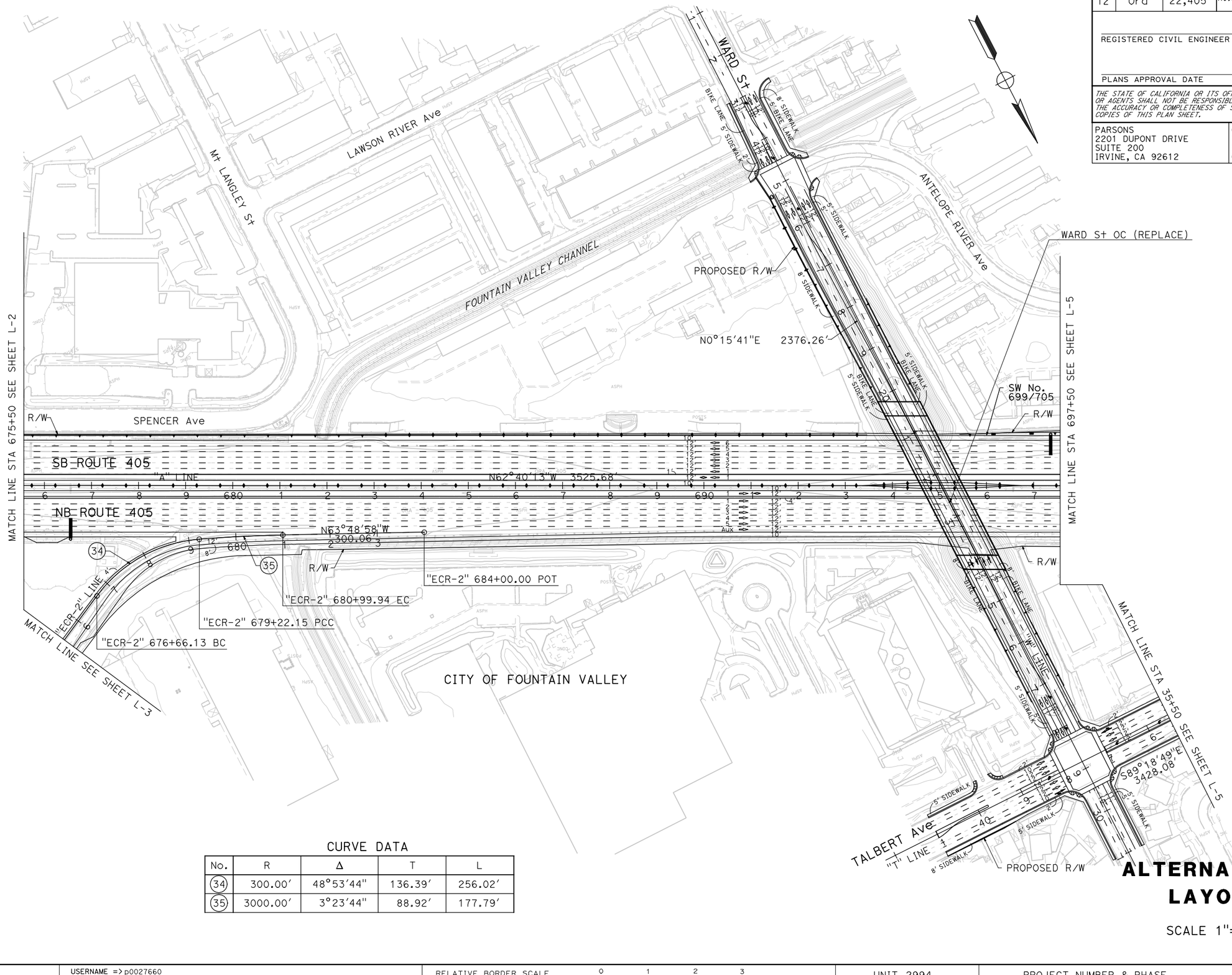

CURVE DATA

No.	R	Δ	T	L
(34)	300.00′	48°53′44"	136.39′	256.02′
(35)	3000.00′	3°23′44"	88.92′	177.79′

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-4**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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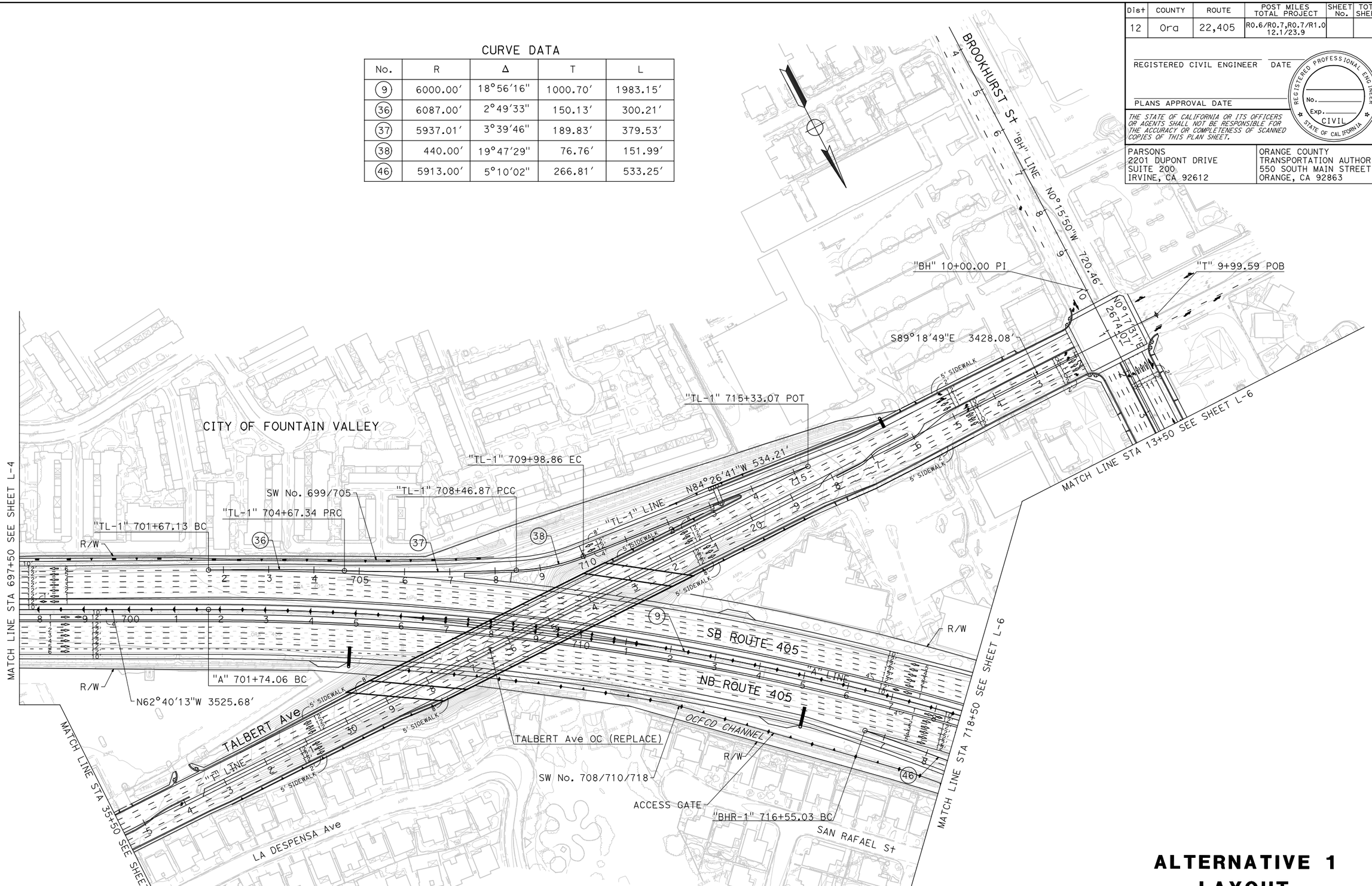
CURVE DATA

No.	R	Δ	T	L
(9)	6000.00′	18°56′16"	1000.70′	1983.15′
(36)	6087.00′	2°49′33"	150.13′	300.21′
(37)	5937.01′	3°39′46"	189.83′	379.53′
(38)	440.00′	19°47′29"	76.76′	151.99′
(46)	5913.00′	5°10′02"	266.81′	533.25′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-5**

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

CURVE DATA

No.	R	Δ	T	L
(9)	6000.00′	18°56′16"	1000.70′	1983.15′
(40)	3000.00′	2°59′47"	78.46′	156.88′
(41)	477.00′	20°06′45"	84.59′	167.44′
(42)	152.00′	281°03′35"	-	745.62′
(44)	210.00′	85°45′17"	194.99′	314.31′
(45)	500.00′	35°12′37"	158.66′	307.27′
(46)	5913.00′	5°10′02"	266.81′	533.25′
(47)	500.00′	38°35′55"	175.09′	336.84′
(48)	230.00′	89°43′35"	228.90′	360.18′
(49)	162.00′	278°29′03"	-	787.40′
(50)	313.00′	24°29′54"	67.95′	133.83′
(51)	3000.00′	3°12′54"	84.19′	168.33′
(52)	225.00′	123°36′41"	419.72′	485.42′
(54)	7000.00′	4°08′15"	252.86′	505.50′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

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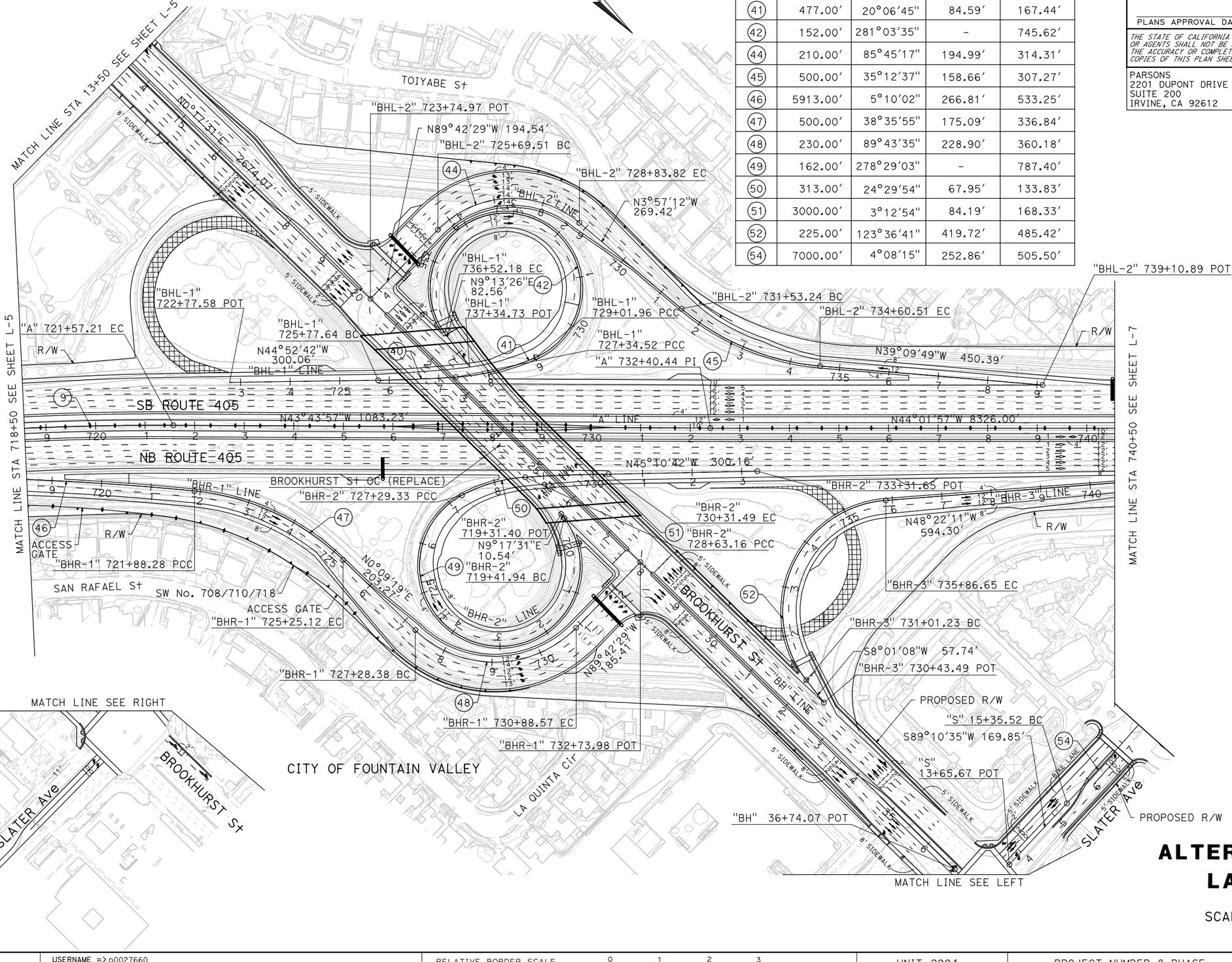

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-6**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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PLANS APPROVAL DATE

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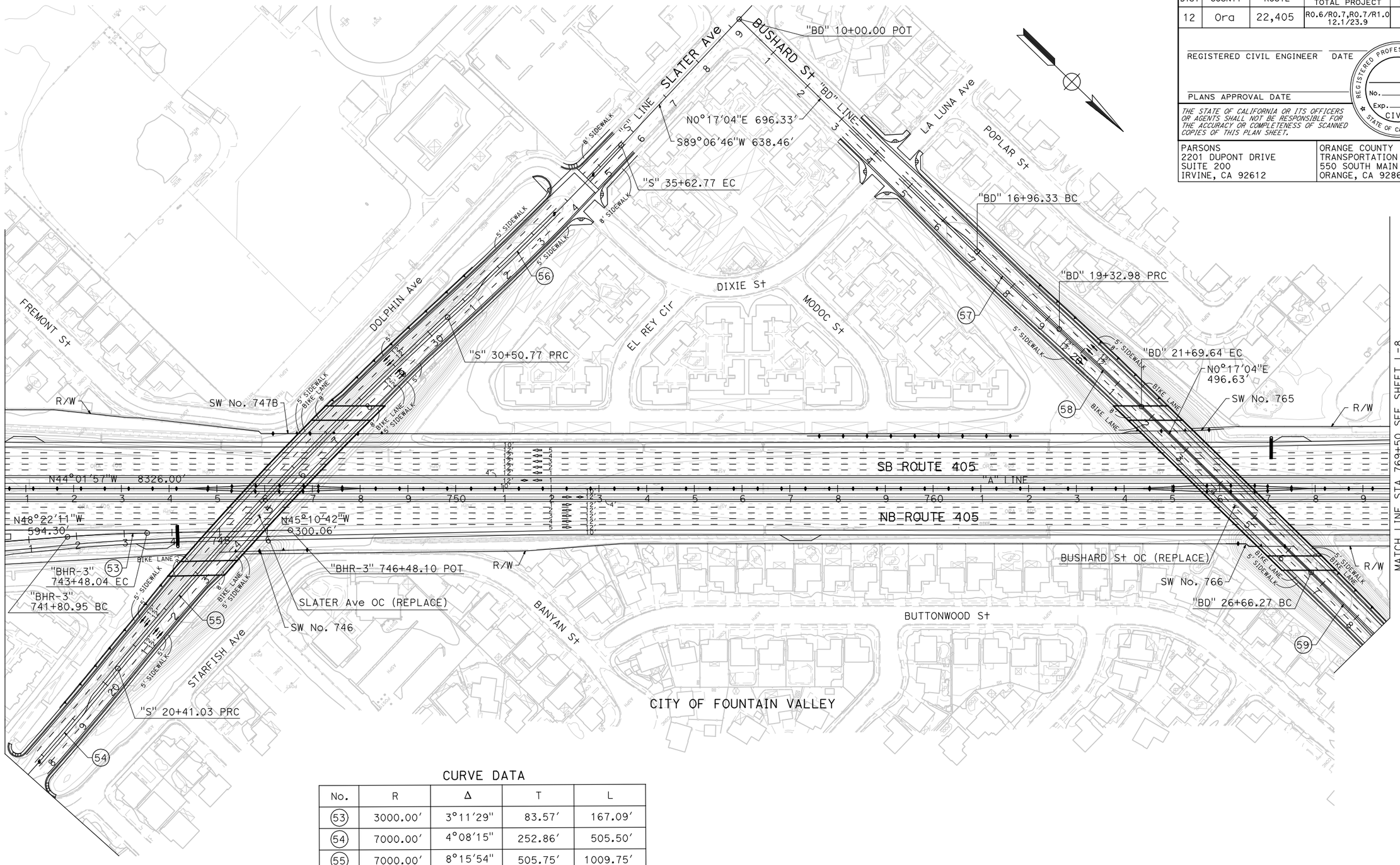
ORANGE, CA 92863



CURVE DATA

No.	R	Δ	T	L
(53)	3000.00′	3°11′29"	83.57′	167.09′
(54)	7000.00′	4°08′15"	252.86′	505.50′
(55)	7000.00′	8°15′54"	505.75′	1009.75′
(56)	7000.00′	4°11′27"	256.11′	511.99′
(57)	7000.00′	1°56′13"	118.34′	236.65′
(58)	7000.00′	1°56′13"	118.34′	236.65′
(59)	7000.00′	1°56′13"	118.34′	236.65′

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-7**

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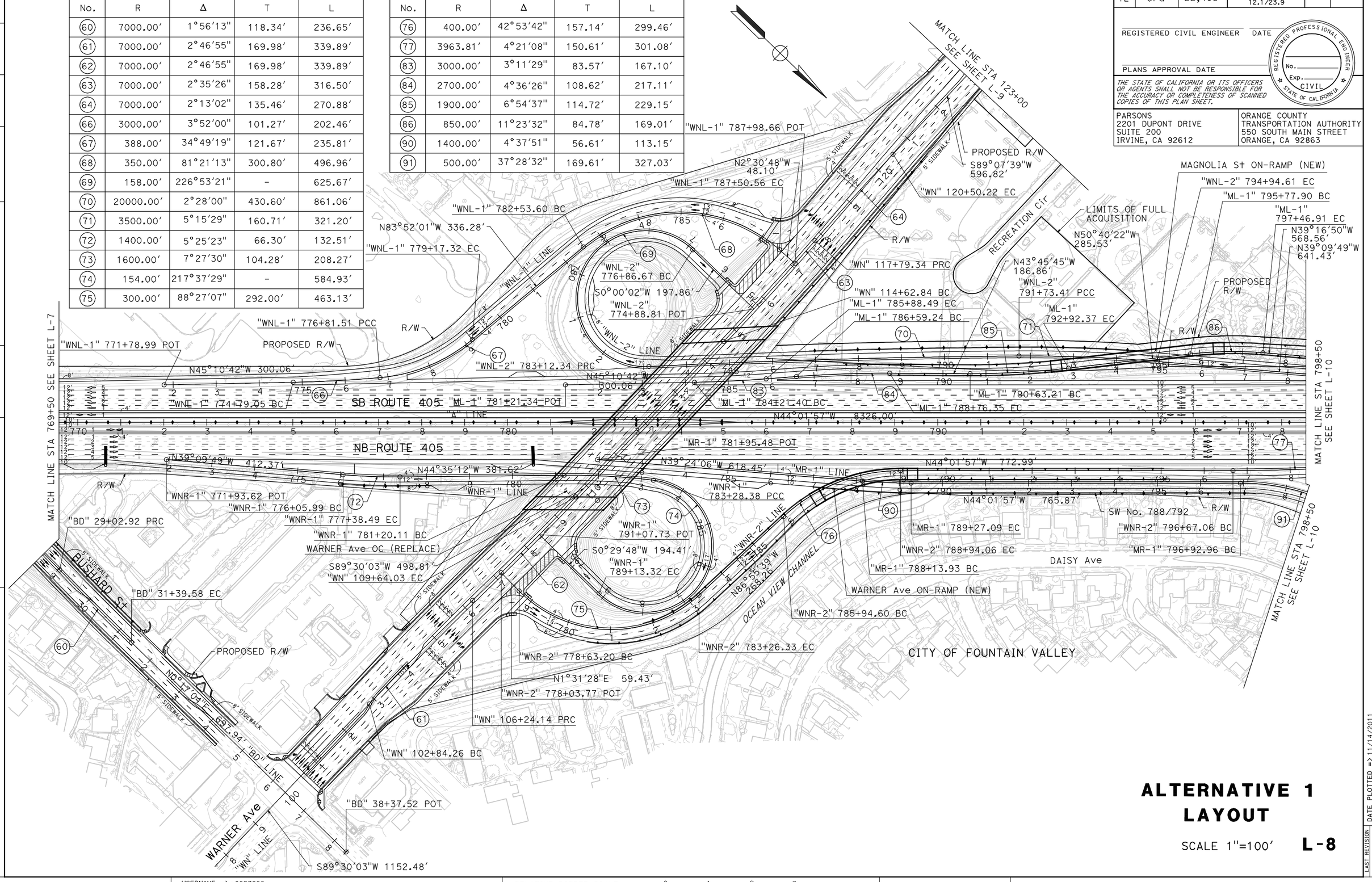
CURVE DATA

No.	R	Δ	T	L
(60)	7000.00′	1°56′13"	118.34′	236.65′
(61)	7000.00′	2°46′55"	169.98′	339.89′
(62)	7000.00′	2°46′55"	169.98′	339.89′
(63)	7000.00′	2°35′26"	158.28′	316.50′
(64)	7000.00′	2°13′02"	135.46′	270.88′
(66)	3000.00′	3°52′00"	101.27′	202.46′
(67)	388.00′	34°49′19"	121.67′	235.81′
(68)	350.00′	81°21′13"	300.80′	496.96′
(69)	158.00′	226°53′21"	-	625.67′
(70)	20000.00′	2°28′00"	430.60′	861.06′
(71)	3500.00′	5°15′29"	160.71′	321.20′
(72)	1400.00′	5°25′23"	66.30′	132.51′
(73)	1600.00′	7°27′30"	104.28′	208.27′
(74)	154.00′	217°37′29"	-	584.93′
(75)	300.00′	88°27′07"	292.00′	463.13′

CURVE DATA

No.	R	Δ	T	L
(76)	400.00′	42°53′42"	157.14′	299.46′
(77)	3963.81′	4°21′08"	150.61′	301.08′
(83)	3000.00′	3°11′29"	83.57′	167.10′
(84)	2700.00′	4°36′26"	108.62′	217.11′
(85)	1900.00′	6°54′37"	114.72′	229.15′
(86)	850.00′	11°23′32"	84.78′	169.01′
(90)	1400.00′	4°37′51"	56.61′	113.15′
(91)	500.00′	37°28′32"	169.61′	327.03′



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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ORANGE, CA 92863

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-8**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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PLANS APPROVAL DATE

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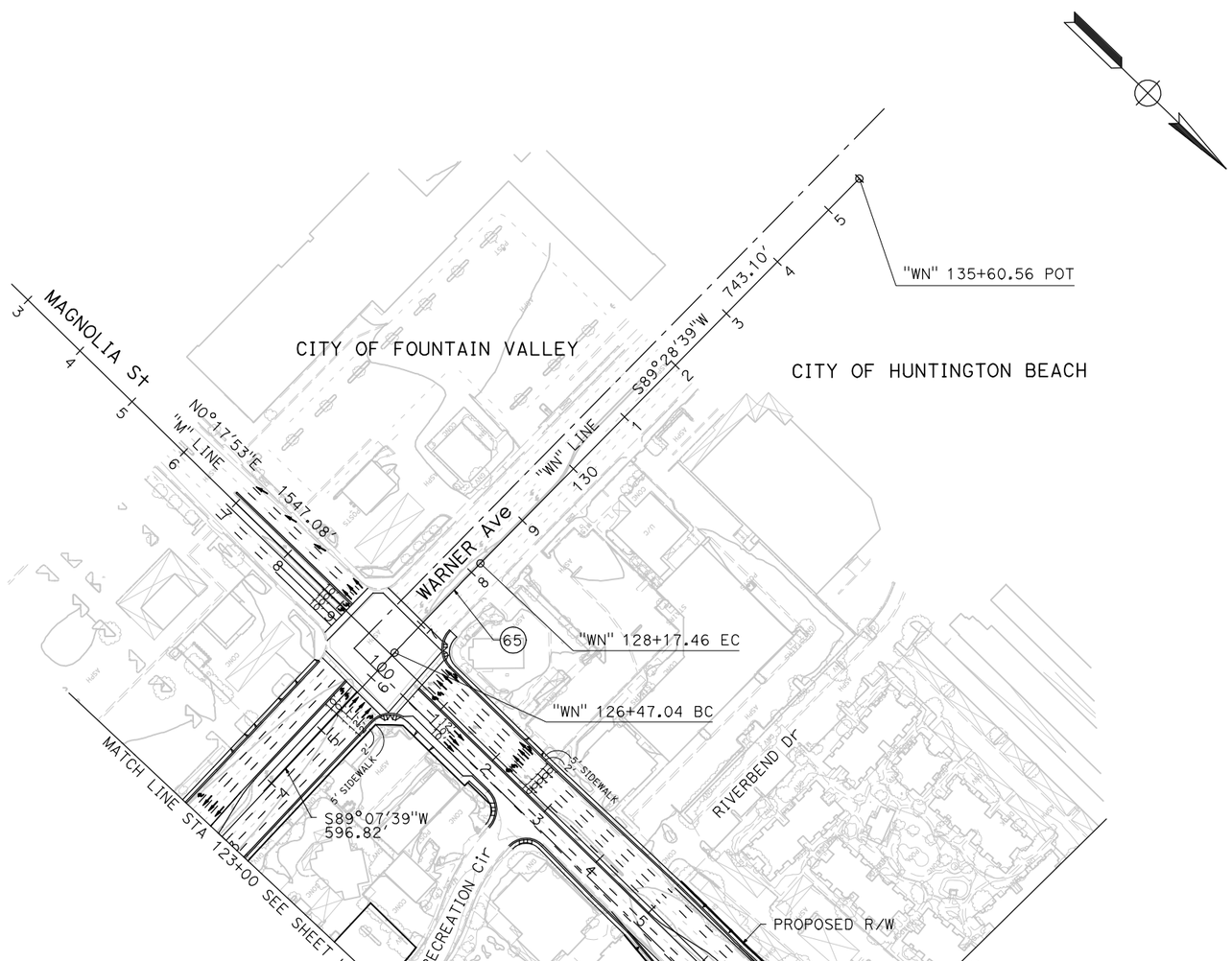

CURVE DATA

No.	R	Δ	T	L
(65)	7000.00′	1°23′42"	85.21′	170.42′
(79)	7000.00′	2°09′57"	132.31′	264.59′

ALTERNATIVE 1
LAYOUT

SCALE 1"=100′ **L-9**

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CURVE DATA

No.	R	Δ	T	L
(10)	12000.00′	5°14′45"	549.73′	1098.69′
(77)	3963.81′	4°21′08"	150.61′	301.08′
(78)	3000.00′	3°12′23"	83.96′	167.88′
(79)	7000.00′	2°09′57"	132.31′	264.59′
(80)	7000.00′	2°09′57"	132.31′	264.59′
(81)	7000.00′	2°09′57"	132.31′	264.59′
(82)	7000.00′	2°09′57"	132.31′	264.59′
(87)	170.00′	229°44′17"	-	681.65′
(88)	250.00′	90°04′27"	250.32′	393.02′
(89)	500.00′	40°28′22"	184.32′	353.19′
(91)	500.00′	37°28′32"	169.61′	327.03′

CURVE DATA

No.	R	Δ	T	L
(92)	250.00′	83°08′42"	221.75′	362.79′
(93)	172.00′	224°33′27"	-	674.11′
(94)	10000.00′	2°03′39"	179.86′	359.67′
(95)	20000.00′	0°55′53"	162.54′	325.08′
(96)	2200.00′	6°08′53"	118.15′	236.06′
(97)	20000.00′	1°10′23"	204.74′	409.47′
(98)	12087.00′	1°26′03"	151.27′	302.53′
(99)	120.00′	49°21′15"	55.14′	103.37′
(100)	450.00′	32°37′13"	131.68′	256.20′
(101)	250.00′	40°22′28"	91.92′	176.17′
(102)	3000.00′	3°11′32"	83.59′	167.15′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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550 SOUTH MAIN STREET
ORANGE, CA 92863

MATCH LINE STA 108+50 SEE SHEET L-9
"M" 109+26.85 PRC
"ML-2" 798+69.99 POT
N88°45'54"W 147.74'
"ML-2" 800+17.73 BC
R/W
"ML-2" 804+10.76 EC
ACCESS GATE
"ML-1" 809+97.12 EC
S89°01'07"E 184.40'
"ML-1" 811+81.52 POT
"M" 111+91.44 EC
N0°17'53"E 615.53'
"ML-1" 803+15.47 BC
"ML-2" 806+05.46 BC
SW No. 807/811
"ML-2" 809+58.65 EC
PROPOSED R/W
N39°16'50"W 568.86'
"ML-1" LINE
N39°09'49"W 641.43'
"WNL-2" 801+36.04 POT
MAGNOLIA St OC (REPLACE)
N39°09'49"W 420.00'
HEIL Ave POC (REPLACE)
"ML-2" 813+78.65 POT
"A" 815+66.44 BC
DE VILLE Cir
SAVOY Cir
LANDAU Ln
ROSS Cir
CITY OF HUNTINGTON BEACH
CITY OF WESTMINSTER
SW No. 819
R/W
SB ROUTE 405
NB ROUTE 405
"A" LINE
N44°01'57"W 8326.00'
"WNR-2" 804+36.08 POT
N45°10'42"W 300.00'
"MR-2" 804+37.14 EC
"MR-2" 810+90.91 PRC
N44°00'55"W 300.00'
"WNR-2" 801+36.02 EC
"WNR-2" 799+68.14 PRC
"MR-2" 807+31.24 BC
N45°08'41"W 294.10'
"M" 118+06.97 BC
"MR-2" 796+11.65 POT
"MR-2" 797+63.02 BC
S89°42'07"E 151.37'
"MR-2" LINE
"MR-3" LINE
ACCESS GATE
SW No. 828A
"MR-2" 819+52.06 PRC
"MR-2" 823+61.53 PRC
N45°09'39"W 300.06'
"MR-2" 817+15.99 BC
"MR-3" 817+07.09 POT
VENUS Dr
"MR-2" 814+15.99 EC
PROPOSED R/W
"MR-3" 814+07.03 EC
"MR-3" 812+39.88 PCC
"MR-3" 810+63.71 PCC
"MR-3" 808+07.51 PCC
"MR-3" 807+04.15 BC
S9°17'53"W 54.60'
"MR-3" 806+49.55 POT
HEIL Ave
GALAXY Dr
MERCURY Dr
MATCH LINE STA 798+50 SEE SHEET L-8
N6°33'25"W 319.90'
"MR-1" LINE
"MR-1" 800+19.99 EC
"MR-1" 803+39.90 BC
"MR-1" 807+02.68 EC
S89°42'07"W 140.28'
"MR-1" 808+42.96 POT
DAISY Ave
"M" 120+71.56 PRC
"M" 123+36.15 EC
N0°17'53"E 1292.14'
"M" LINE
MAGNOLIA St
CITY OF WESTMINSTER
CITY OF FOUNTAIN VALLEY
MATCH LINE STA 826+50 SEE SHEET L-11

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-10**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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PLANS APPROVAL DATE

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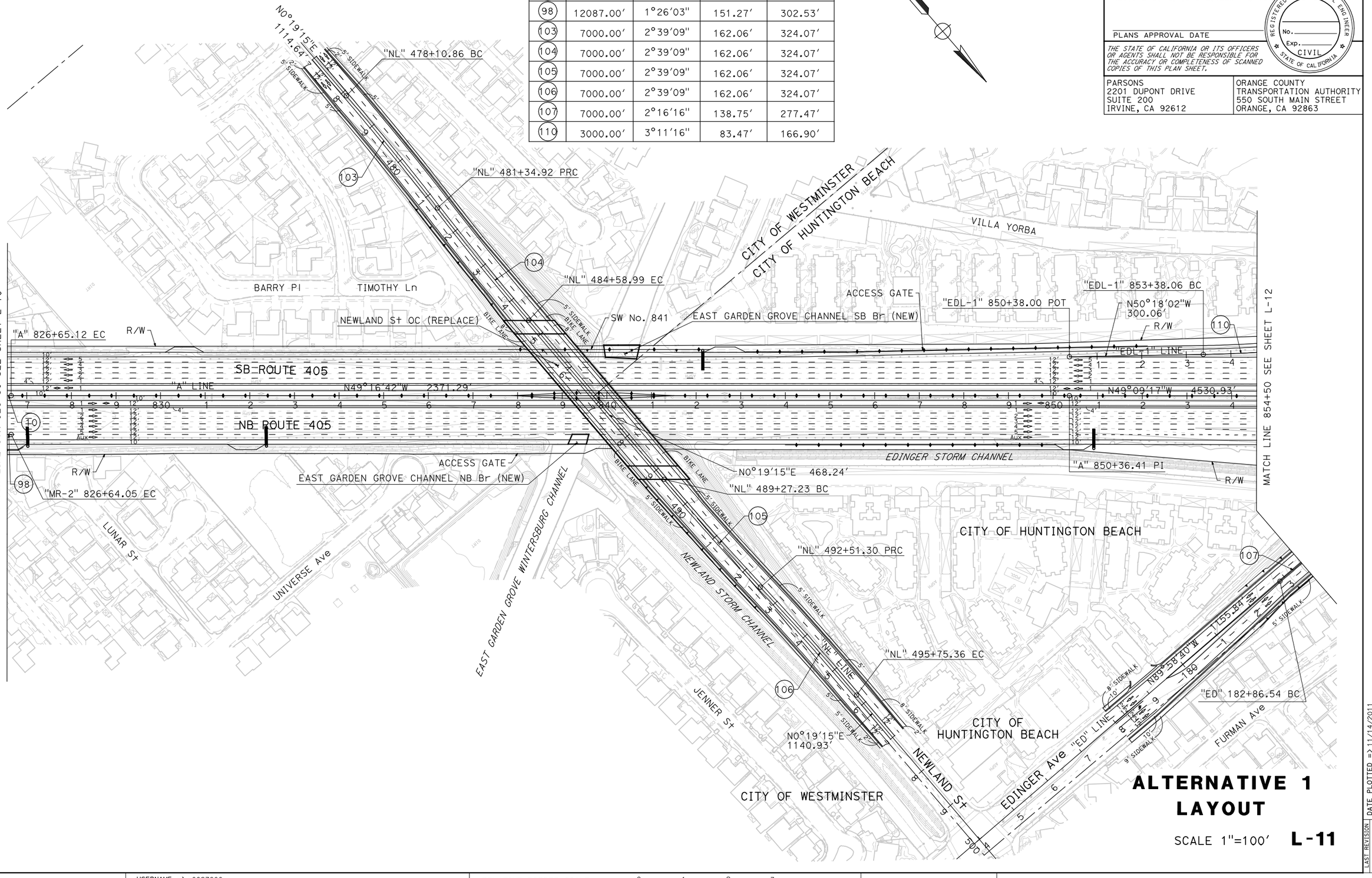
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
10	12000.00′	5°14′45"	549.73′	1098.69′
98	12087.00′	1°26′03"	151.27′	302.53′
103	7000.00′	2°39′09"	162.06′	324.07′
104	7000.00′	2°39′09"	162.06′	324.07′
105	7000.00′	2°39′09"	162.06′	324.07′
106	7000.00′	2°39′09"	162.06′	324.07′
107	7000.00′	2°16′16"	138.75′	277.47′
110	3000.00′	3°11′16"	83.47′	166.90′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-11**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
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BORDER LAST REVISED 7/2/2010 | USERNAME => p0027660 | DGN FILE => ALT 1 Layout Sheets.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

CURVE DATA

No.	R	Δ	T	L
(107)	7000.00′	2°16′16"	138.75′	277.47′
(108)	7000.00′	0°28′51"	29.38′	58.75′
(109)	7000.00′	1°24′36"	86.13′	172.26′
(110)	3000.00′	3°11′16"	83.47′	166.90′
(111)	600.00′	29°08′32"	155.97′	305.18′
(112)	3000.00′	3°11′29"	83.57′	167.10′
(113)	3500.00′	4°20′49"	132.83′	265.54′
(114)	180.00′	75°32′44"	139.49′	237.33′
(115)	216.00′	89°06′49"	212.68′	335.95′
(117)	500.00′	36°25′34"	164.52′	317.88′
(118)	376.00′	66°54′04"	248.40′	439.03′
(119)	180.00′	205°42′30"	-	646.25′
(120)	2200.00′	4°26′21"	85.27′	170.45′
(121)	3000.00′	3°11′29"	83.57′	167.10′
(122)	1000.00′	21°16′20"	187.80′	371.27′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

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ORANGE, CA 92863

BEACH Blvd (ROUTE 39)
PROPOSED R/W
"ED" LINE
EDINGER Ave
1693.35′ N89°35′51"W
TYPE 1 BARRICADE
"EDL-1" 866+57.79 POT
CITY OF HUNTINGTON BEACH
R/W
N0°14′21"E 1400.68′
PROPOSED R/W
"BL-1" 878+58.00 POT
"BL-2" 875+86.63 POT
N40°18′40"E 35.11′
"BL-2" 876+21.74 BC
CENTER Ave
R/W
S55°18′35"W 140.12′
"BL-1" 877+17.88 EC
S39/S405 Conn Sep (NEW)
"BL-1" 874+80.55 BC
N49°08′41"W 573.77′
"BL-2" 879+57.69 EC
N48°48′09"W 372.55′
N82°37′49"W 518.06′
"EDL-1" 861+39.73 EC
"ED" 194+23.41 EC
"BL-1" 866+41.24 BC
CITY OF WESTMINSTER
"EDL-1" 858+34.55 BC
"EDL-1" 855+04.96 EC
SW No. 857
"EDL-1" LINE
N53°29′17"W 329.59′
"ED" 192+51.15 BC
"BL-1" 864+60.87 EC
"BL-1" 869+06.78 EC
6 TIE BACK WALL No. 2300
"BL-2" LINE
"BL-1" 859+93.72 POT
"BL-1" 862+93.78 BC
N50°18′02"W 300.06′
N53°29′30"W 180.37′
"A" LINE
SB ROUTE 405
N49°09′17"W 4530.93′
NB ROUTE 405
"BR-2" 879+74.33 BC
N53°29′30"W 222.24′
"BR-2" LINE
"BR-2" 875+81.64 BC
"BR-2" 877+52.09 EC
N49°03′09"W 263.99′
"BR-2" 864+45.39 POT
"BR-3" LINE
"BR-3" 880+77.66 BC
N74°45′39"W 297.30′
"BR-3" 877+80.36 POT
TIE BACK WALL No. 2200
"BR-2" 873+17.64 EC
N39/N405 Conn Sep (NEW)
S74°45′39"E 226.00′
"BR-2" 866+71.39 BC
N88°11′15"W 628.39′
EDINGER Ave OC (REPLACE)
N44°17′09"W 428.78′
"BR-1" 862+47.55 POT
"BR-1" 866+76.34 BC
"ED" 186+22.76 EC
"ED" 185+64.01 PRC
"BR-1" 869+94.22 EC
"BR-1" LINE
N7°51′35"W 263.42′
"BR-1" 872+57.64 BC
"BR-1" 876+96.67 EC
N74°45′39"W 199.14′
"BR-1" 878+95.81 POT
ROCKVIEW Cir
MONROE St
MATCH LINE STA 854+50 SEE SHEET L-11
MATCH LINE STA 882+50 SEE SHEET L-14
MATCH LINE SEE SHEET L-13
8' SIDEWALK
6' SIDEWALK
5' SIDEWALK
BIKE LANE
AUX

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-12**

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DATE PLOTTED => 11/14/2011
TIME PLOTTED => 10:56:42 AM

BORDER LAST REVISED 7/2/2010
USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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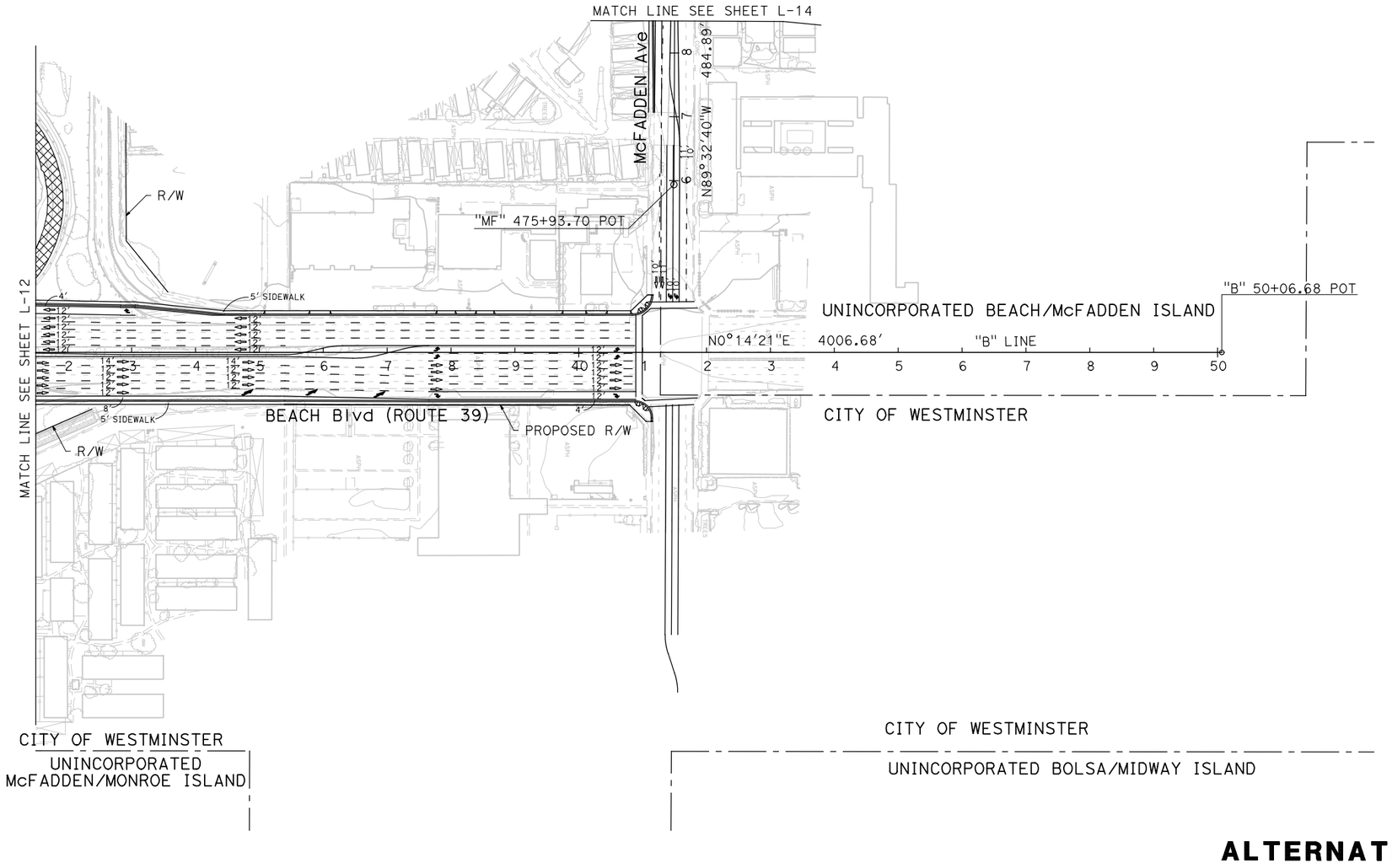

ALTERNATIVE 1 LAYOUT

SCALE 1"=100' **L-13**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR | CALCULATED-DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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TRANSPORTATION AUTHORITY
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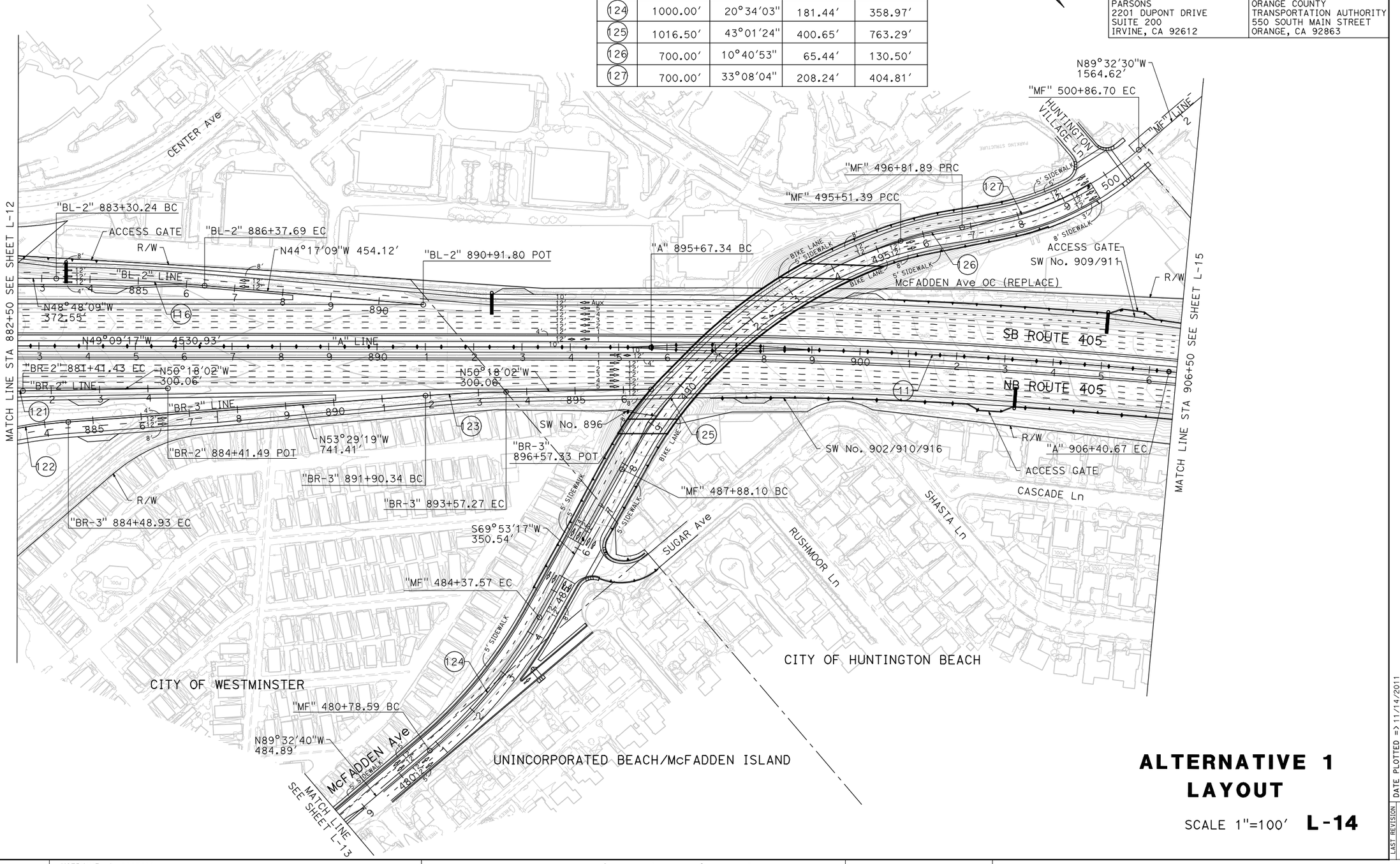
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
11	12000.00′	5°07′29"	537.02′	1073.33′
116	3900.00′	4°31′00"	153.80′	307.44′
121	3000.00′	3°11′29"	83.57′	167.10′
122	1000.00′	21°16′20"	187.80′	371.27′
123	3000.00′	3°11′17"	83.49′	166.93′
124	1000.00′	20°34′03"	181.44′	358.97′
125	1016.50′	43°01′24"	400.65′	763.29′
126	700.00′	10°40′53"	65.44′	130.50′
127	700.00′	33°08′04"	208.24′	404.81′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-14**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
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LAST REVISION 00-00-00
DATE PLOTTED => 11/14/2011
TIME PLOTTED => 10:56:53 AM

BORDER LAST REVISED 7/2/2010
USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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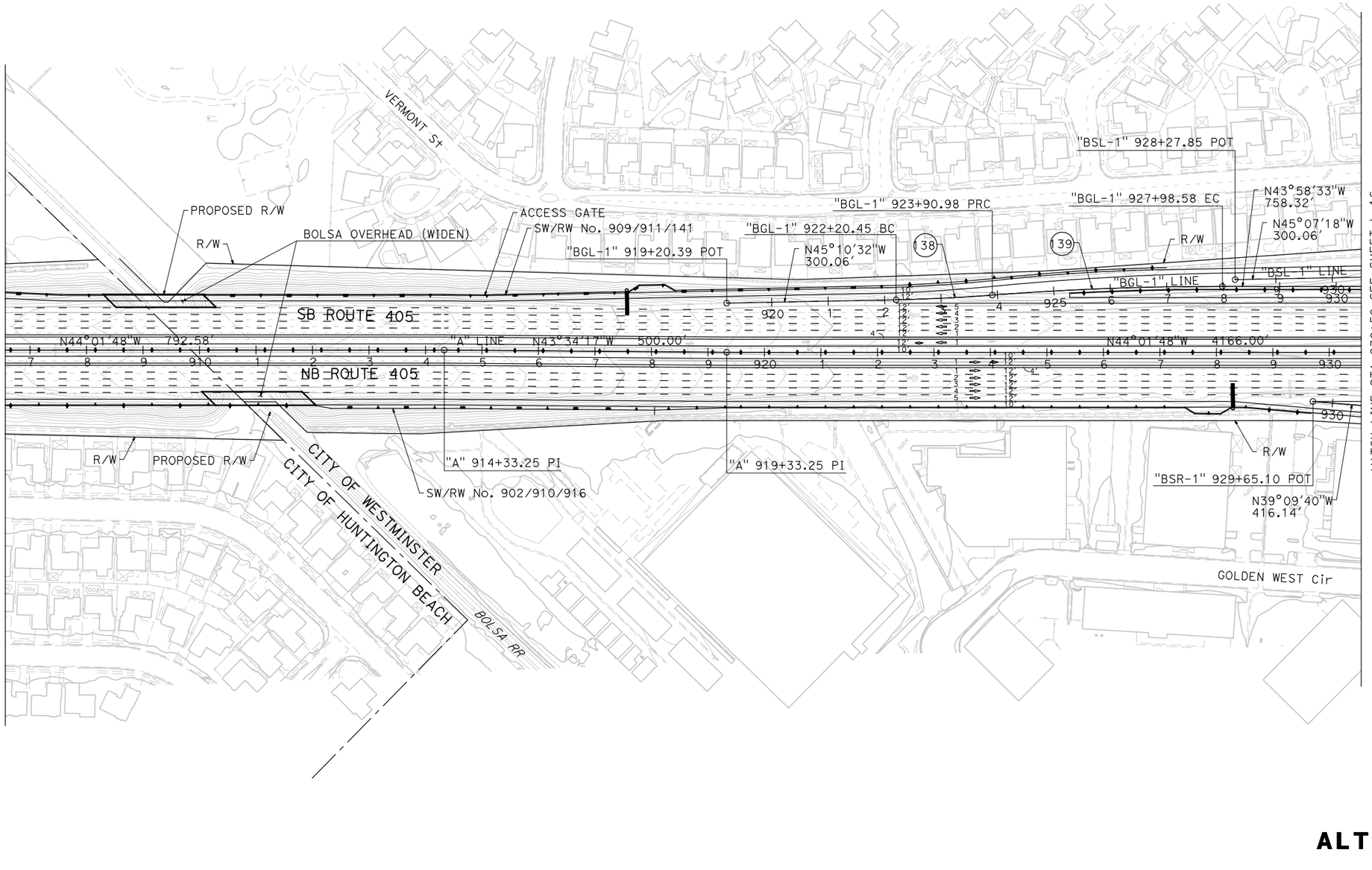
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
138	3000.00′	3°15′25"	85.29′	170.53′
139	5240.00′	4°27′25"	203.90′	407.60′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-15**

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BORDER LAST REVISED 7/2/2010

USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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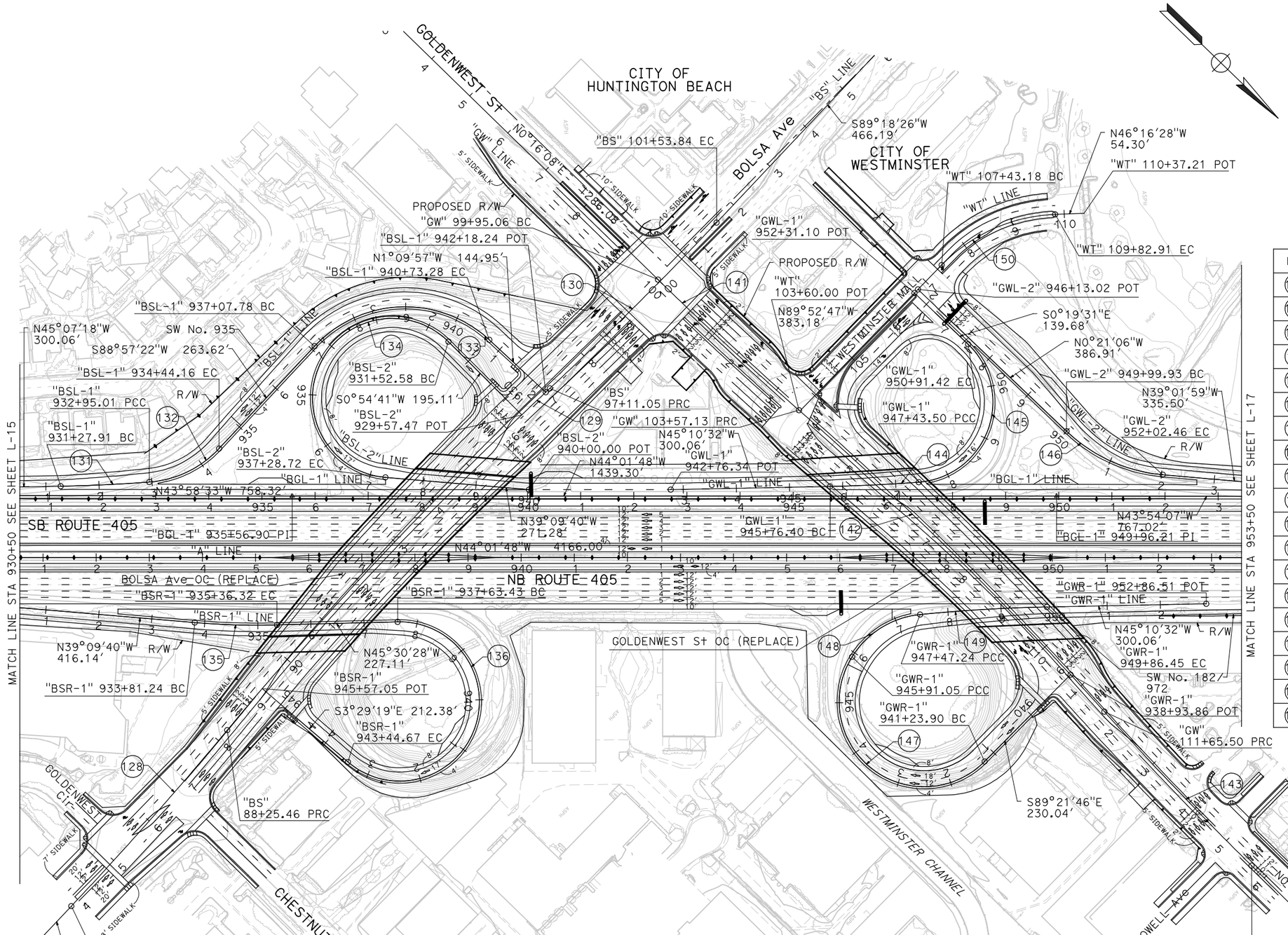

CURVE DATA

No.	R	Δ	T	L
128	7000.00′	3°37′28"	221.47′	442.79′
129	7000.00′	7°14′55"	443.38′	885.59′
130	7000.00′	3°37′28"	221.47′	442.79′
131	3000.00′	3°11′29"	83.57′	167.10′
132	200.00′	42°43′50"	78.24′	149.16′
133	233.00′	89°52′40"	232.50′	365.50′
134	150.00′	220°04′20"	-	576.15′
135	1400.00′	6°20′48"	77.62′	155.08′
136	150.00′	222°01′09"	-	581.24′
141	7000.00′	2°57′49"	181.07′	362.07′
142	7000.00′	6°37′00"	404.63′	808.37′
143	7000.00′	3°17′05"	200.71′	401.30′
144	3000.00′	3°11′29"	83.57′	167.10′
145	151.07′	131°57′29"	338.97′	347.93′
146	300.00′	38°40′53"	105.30′	202.53′
147	160.00′	167°17′09"	1436.16′	467.15′
148	171.00′	52°19′57"	84.02′	156.19′
149	3000.00′	4°34′07"	119.67′	239.21′
150	315.00′	43°36′18"	126.01′	239.73′

ALTERNATIVE 1
LAYOUT

SCALE 1"=100′ **L-16**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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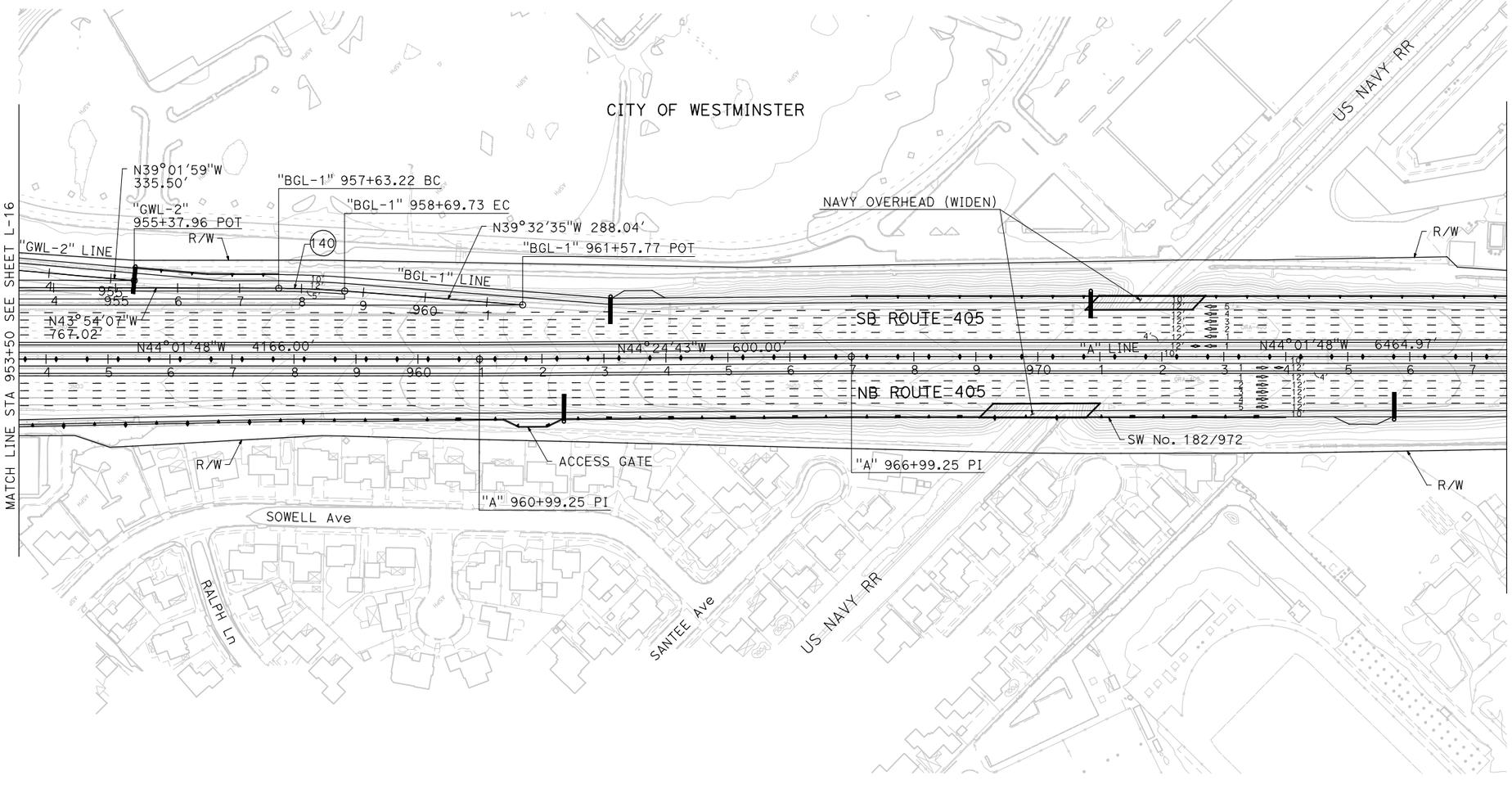
CURVE DATA

No.	R	Δ	T	L
140	1400.00′	4°21′32"	53.28′	106.50′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-17**

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BORDER LAST REVISED 7/2/2010 | USERNAME => p0027660 | DGN FILE => ALT 1 Layout Sheets.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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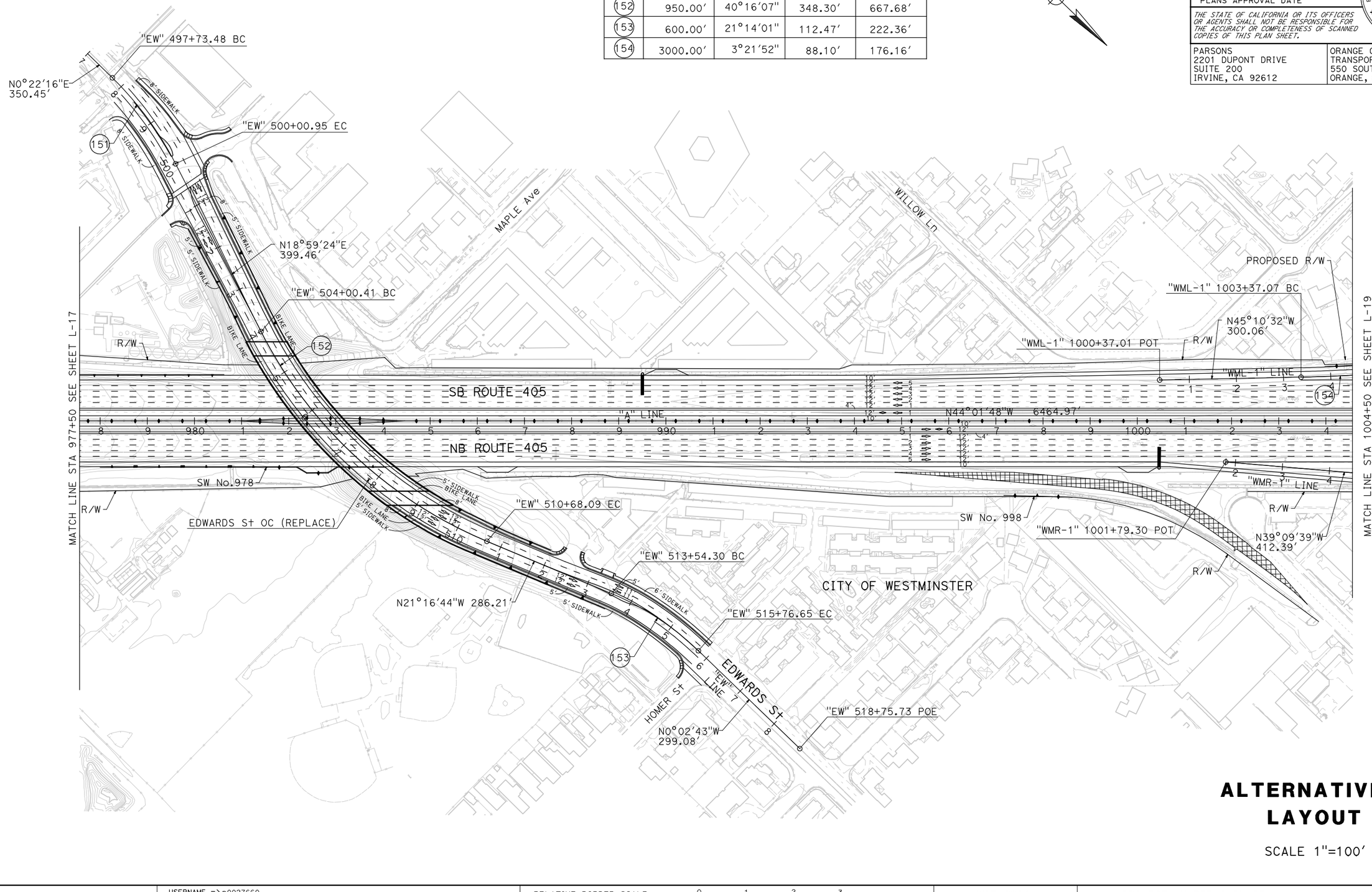
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
151	700.00′	18°37′07"	114.75′	227.47′
152	950.00′	40°16′07"	348.30′	667.68′
153	600.00′	21°14′01"	112.47′	222.36′
154	3000.00′	3°21′52"	88.10′	176.16′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-18**

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DGN FILE => ALT 1 Layout Sheets.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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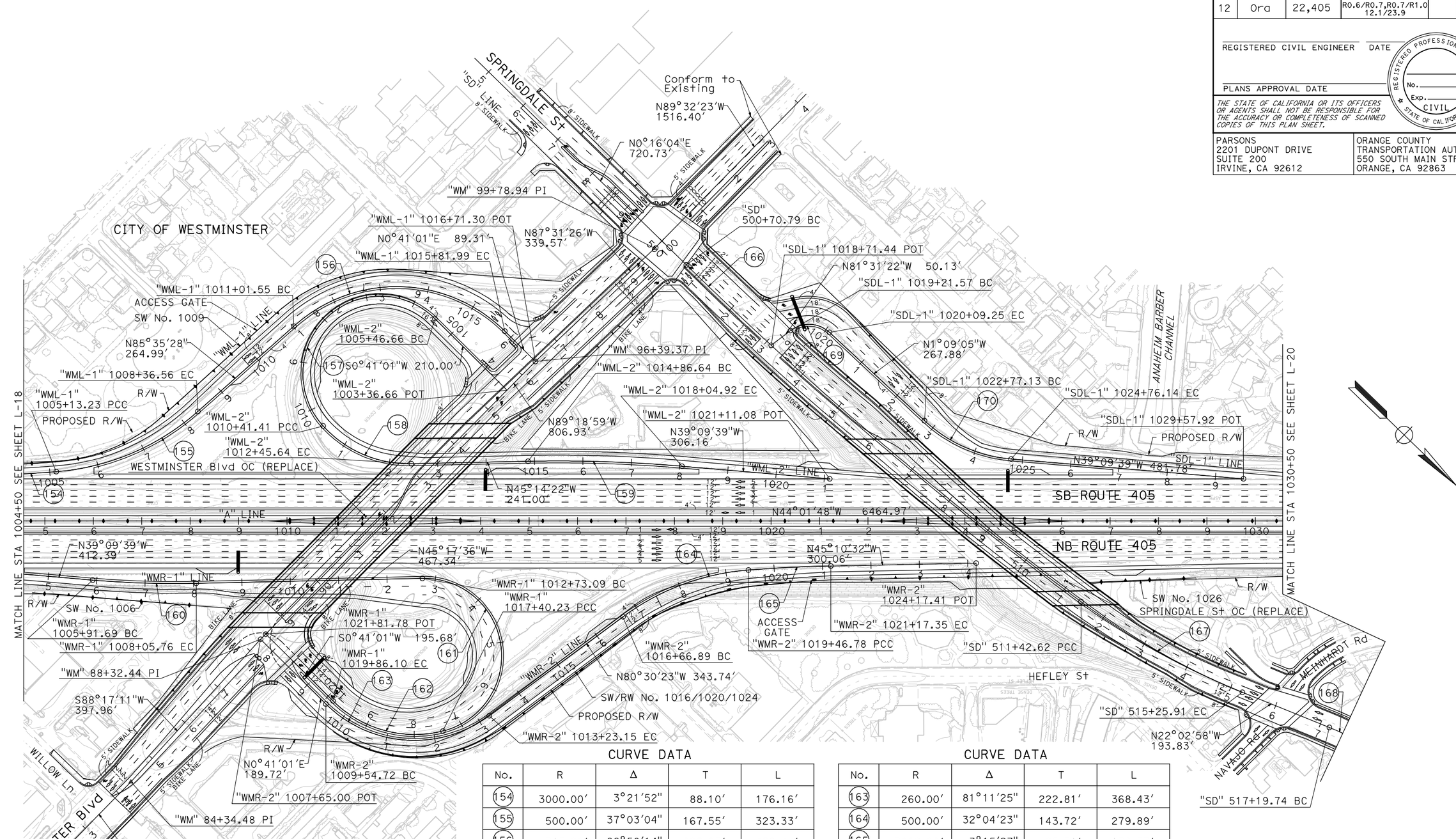

CURVE DATA

No.	R	Δ	T	L
154	3000.00′	3°21′52"	88.10′	176.16′
155	500.00′	37°03′04"	167.55′	323.33′
156	317.00′	86°50′14"	299.97′	480.44′
157	160.00′	177°10′04"	6472.14′	494.75′
158	240.00′	48°45′20"	108.76′	204.23′
159	3000.00′	6°04′43"	159.29′	318.28′
160	2000.00′	6°07′57"	107.13′	214.06′
161	160.00′	167°16′48"	1435.47′	467.13′
162	240.00′	58°41′50"	134.95′	245.87′

CURVE DATA

No.	R	Δ	T	L
163	260.00′	81°11′25"	222.81′	368.43′
164	500.00′	32°04′23"	143.72′	279.89′
165	3000.00′	3°15′27"	85.31′	170.57′
166	8000.00′	7°40′35"	536.72′	1071.83′
167	1500.00′	14°38′27"	192.70′	383.30′
168	600.00′	23°42′12"	125.91′	248.22′
169	62.50′	80°22′18"	52.79′	87.67′
170	300.00′	38°00′34"	103.33′	199.02′

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-19**

LAST REVISION DATE PLOTTED => 11/14/2011
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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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ORANGE COUNTY
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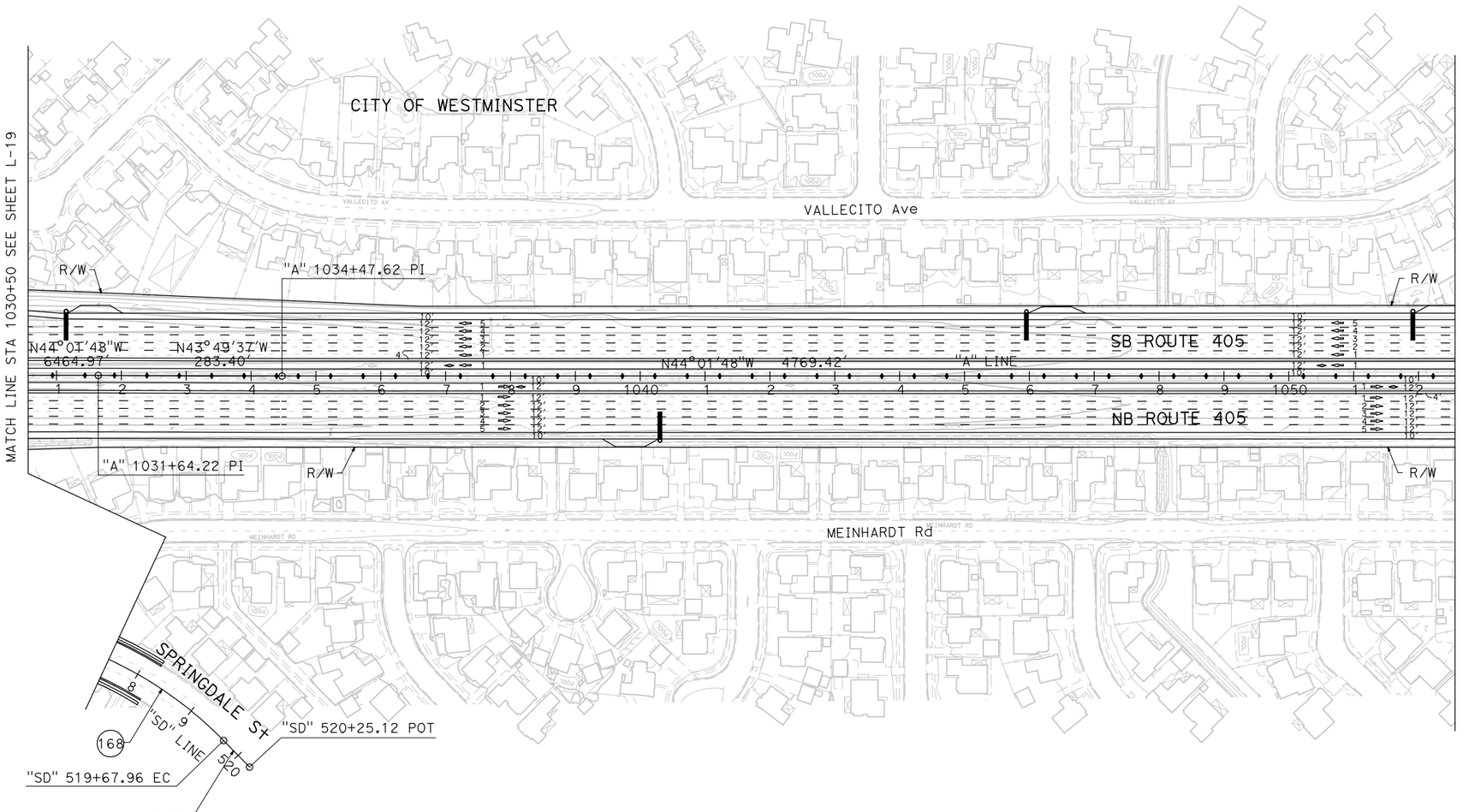
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
168	600.00′	23°42′12"	125.91′	248.22′



ALTERNATIVE 1
LAYOUT

SCALE 1"=100′ **L-20**

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CALCULATED-DESIGNED BY
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LAST REVISION 00-00-00
DATE PLOTTED => 11/14/2011
TIME PLOTTED => 10:57:26 AM

BORDER LAST REVISED 7/2/2010
USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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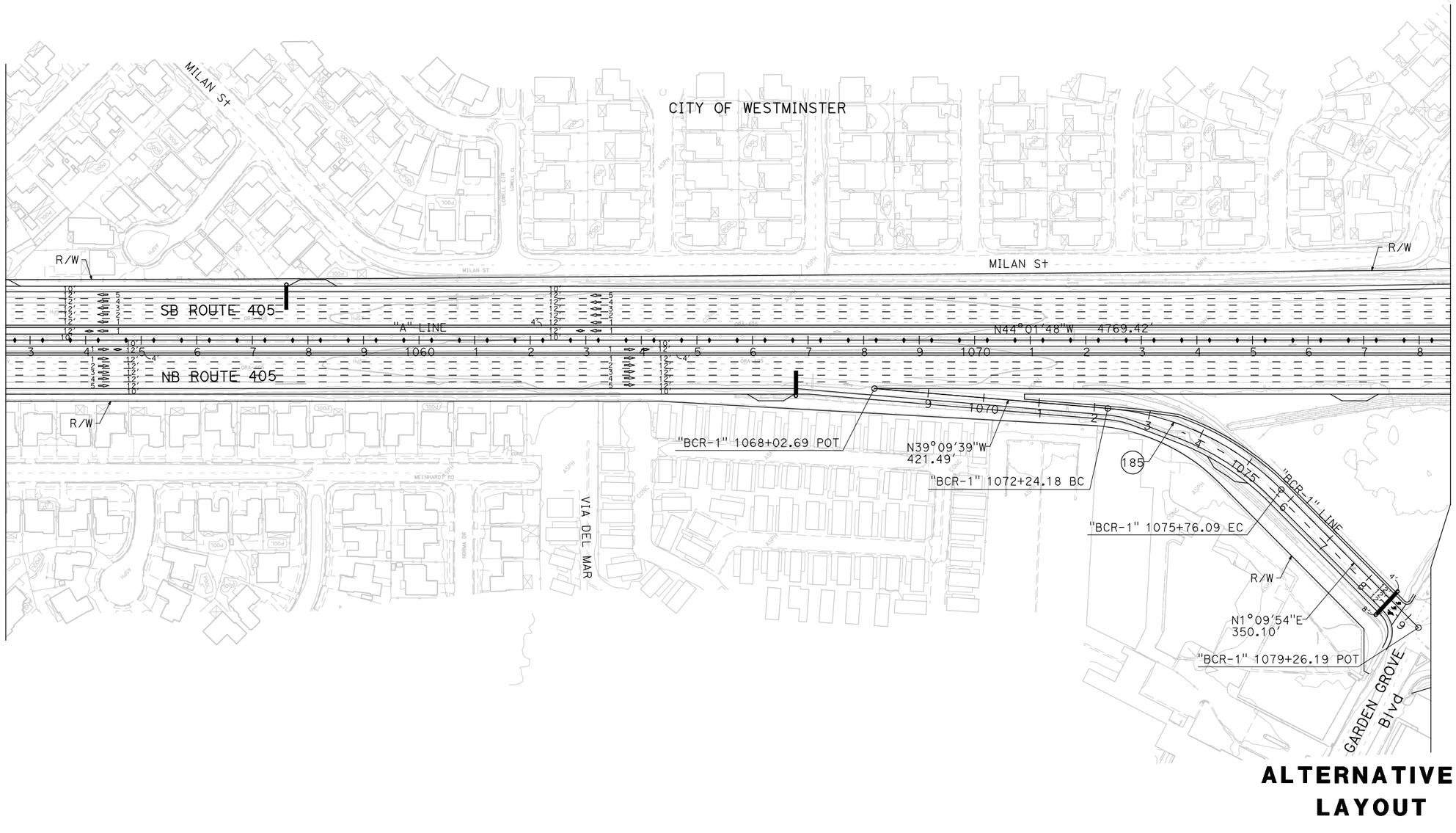
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
185	500.00′	40°19′33"	183.60′	351.91′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-21**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR

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USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

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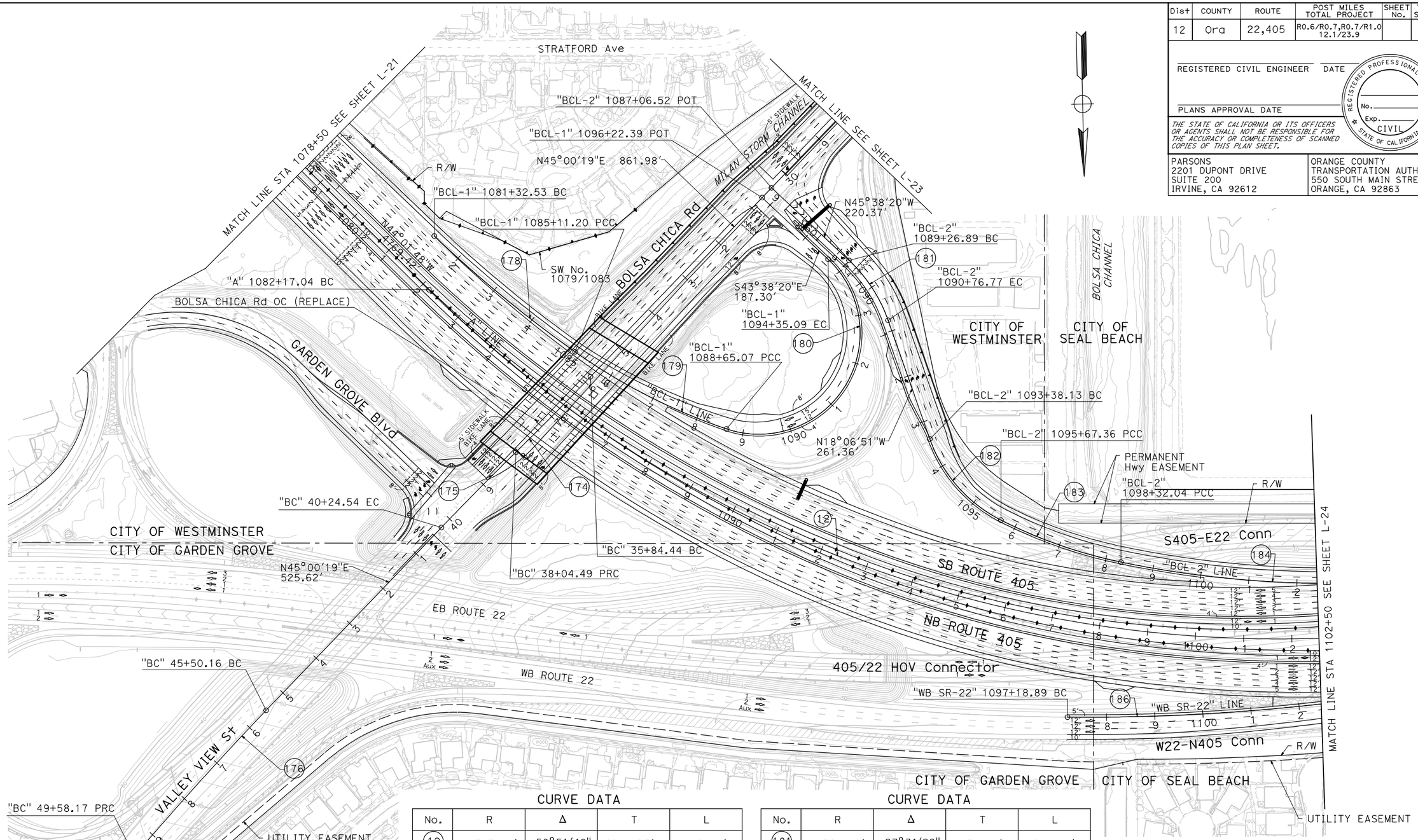
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans



CURVE DATA

No.	R	Δ	T	L
12	2503.00′	50°51′40"	1190.15′	2221.90′
174	7000.00′	1°48′04"	110.03′	220.05′
175	7000.00′	1°48′04"	110.03′	220.05′
176	7000.00′	3°20′23"	204.06′	408.01′
177	7000.00′	3°20′52"	204.56′	409.00′
178	2624.00′	8°16′06"	189.66′	378.67′
179	1216.00′	16°40′27"	178.20′	353.88′
180	210.00′	155°31′15"	968.05′	570.01′

CURVE DATA

No.	R	Δ	T	L
181	312.00′	27°31′29"	76.42′	149.88′
182	300.00′	43°46′49"	120.54′	229.23′
183	1000.00′	15°09′53"	133.12′	264.67′
184	2124.00′	12°01′17"	223.64′	445.64′
186	4350.68′	8°28′55"	322.62′	644.06′

ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-22**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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SUITE 200
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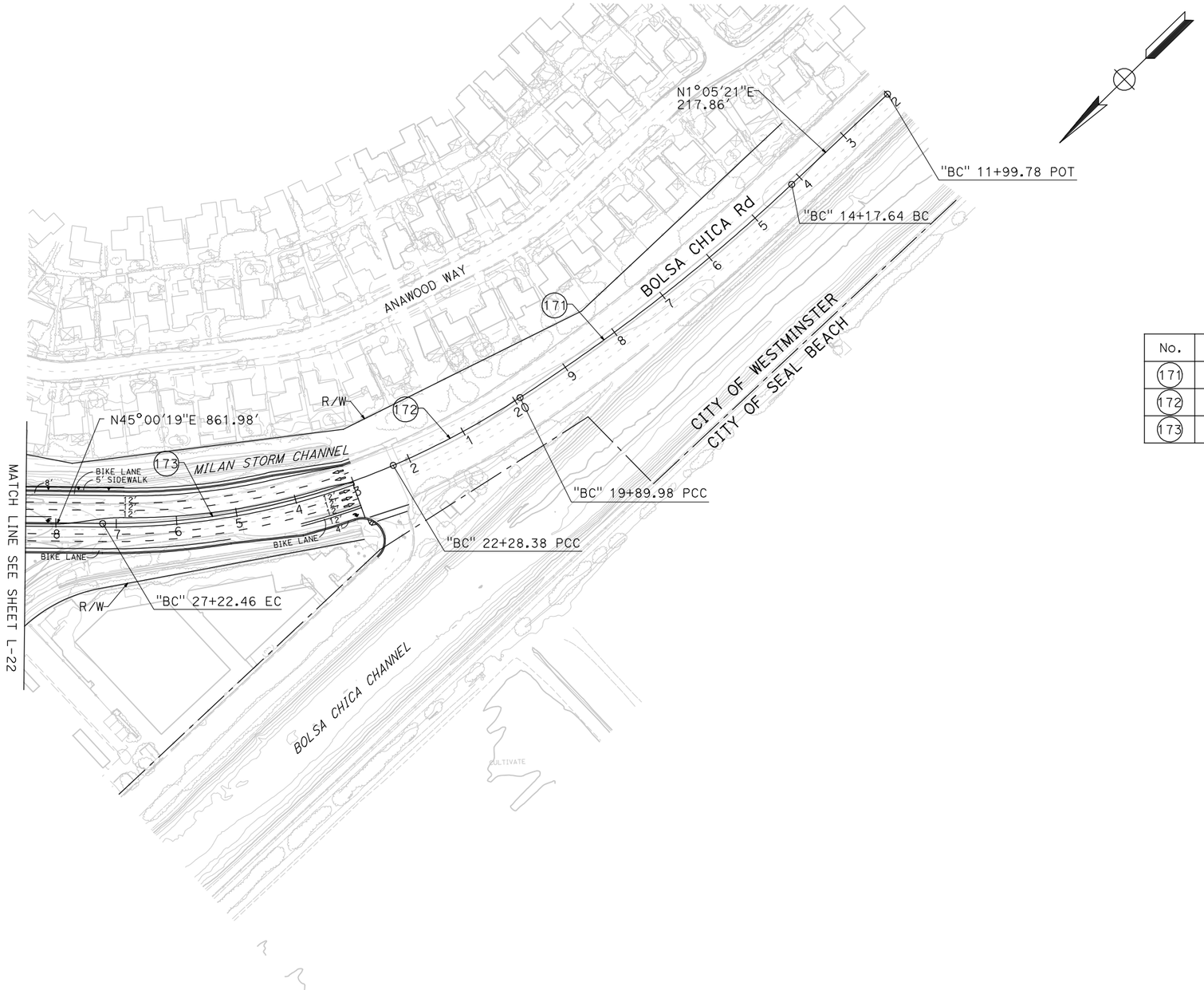
ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



CURVE DATA

No.	R	Δ	T	L
171	3178.45′	10°19′02"	286.94′	572.34′
172	1412.63′	9°40′09"	119.48′	238.40′
173	1183.00′	23°55′47"	250.70′	494.08′

ALTERNATIVE 1
LAYOUT

SCALE 1"=100′ **L-23**

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BORDER LAST REVISED 7/2/2010

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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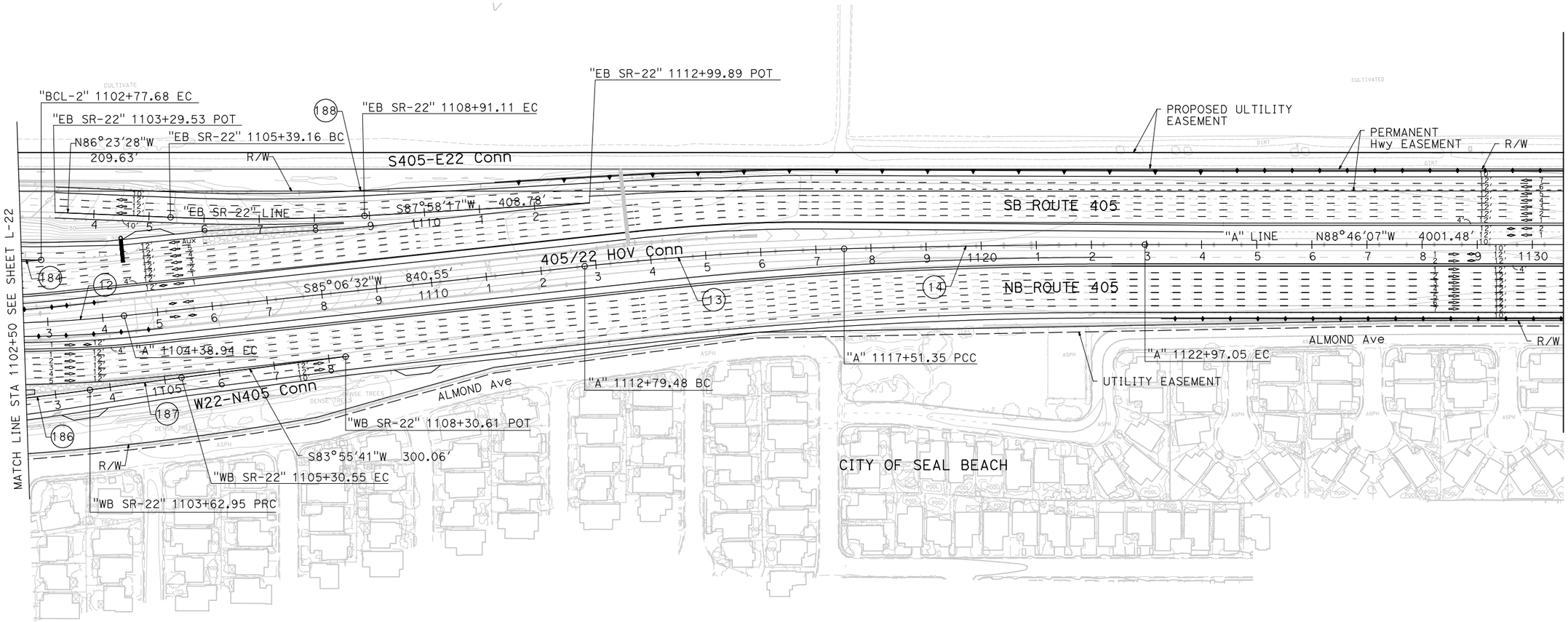
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
12	2503.00′	50°51′40"	1190.15′	2221.90′
13	5930.00′	4°33′33"	236.06′	471.87′
14	20000.00′	1°33′48"	272.86′	545.69′
184	2124.00′	12°01′17"	223.64′	445.64′
186	4350.68′	8°28′55"	322.62′	644.06′
187	14265.84′	0°40′23"	83.80′	167.60′
188	3577.00′	5°38′15"	176.12′	351.95′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-24**

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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BORDER LAST REVISED 7/2/2010 | USERNAME => p0027660 DGN FILE => ALT 1 Layout Sheets.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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PARSONS
2201 DUPONT DRIVE
SUITE 200
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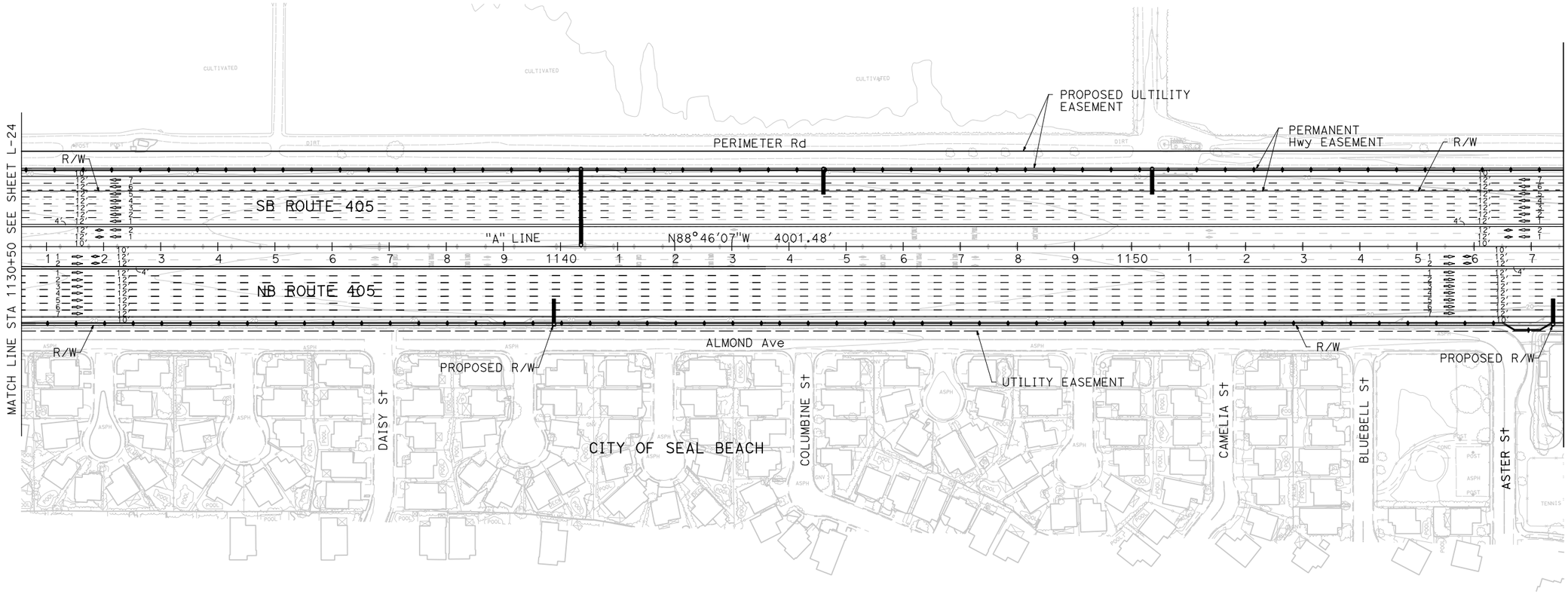
ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



ALTERNATIVE 1 LAYOUT

SCALE 1"=100' **L-25**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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DGN FILE => ALT 1 Layout Sheets.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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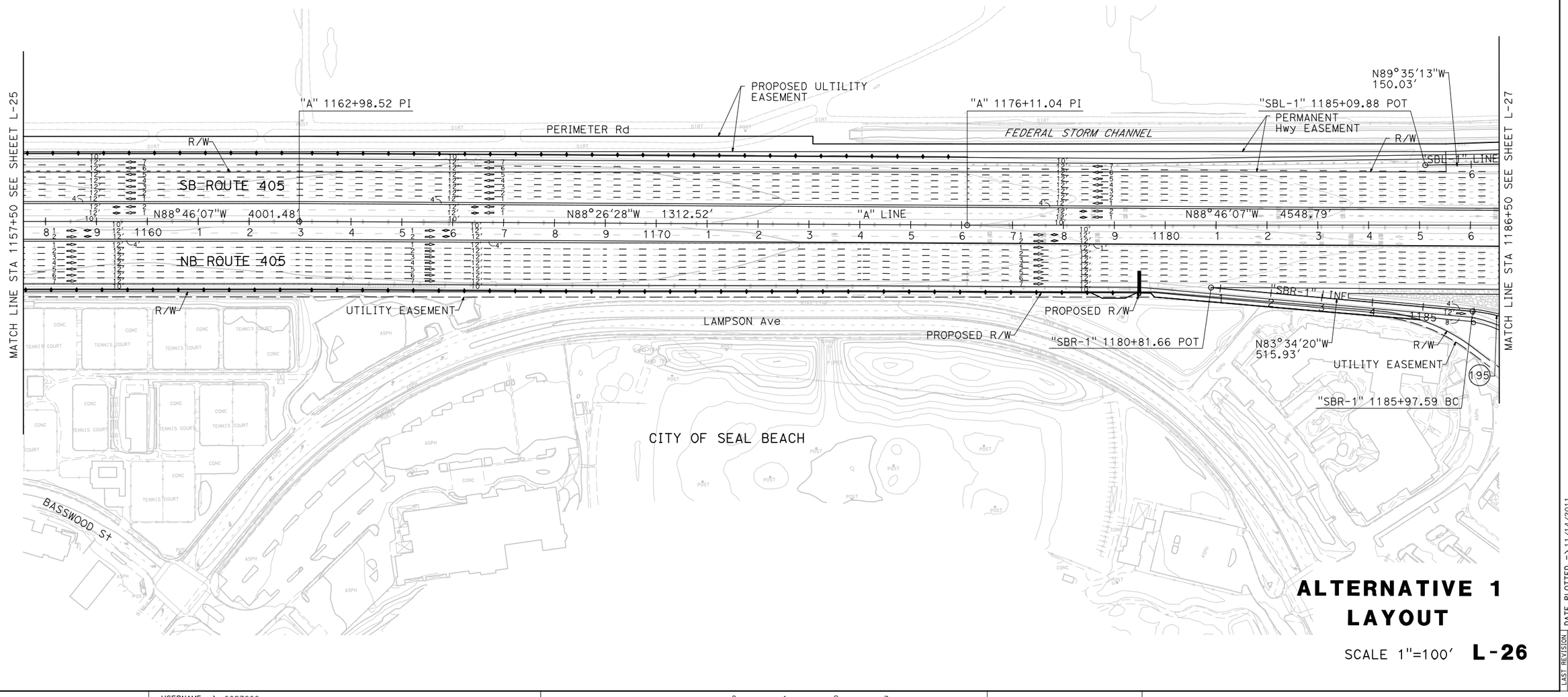
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
195	300.00′	35°18′36"	95.48′	184.88′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-26**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
CALCULATED-DESIGNED BY
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LAST REVISION 00-00-00
DATE PLOTTED => 11/14/2011
TIME PLOTTED => 3:13:50 PM

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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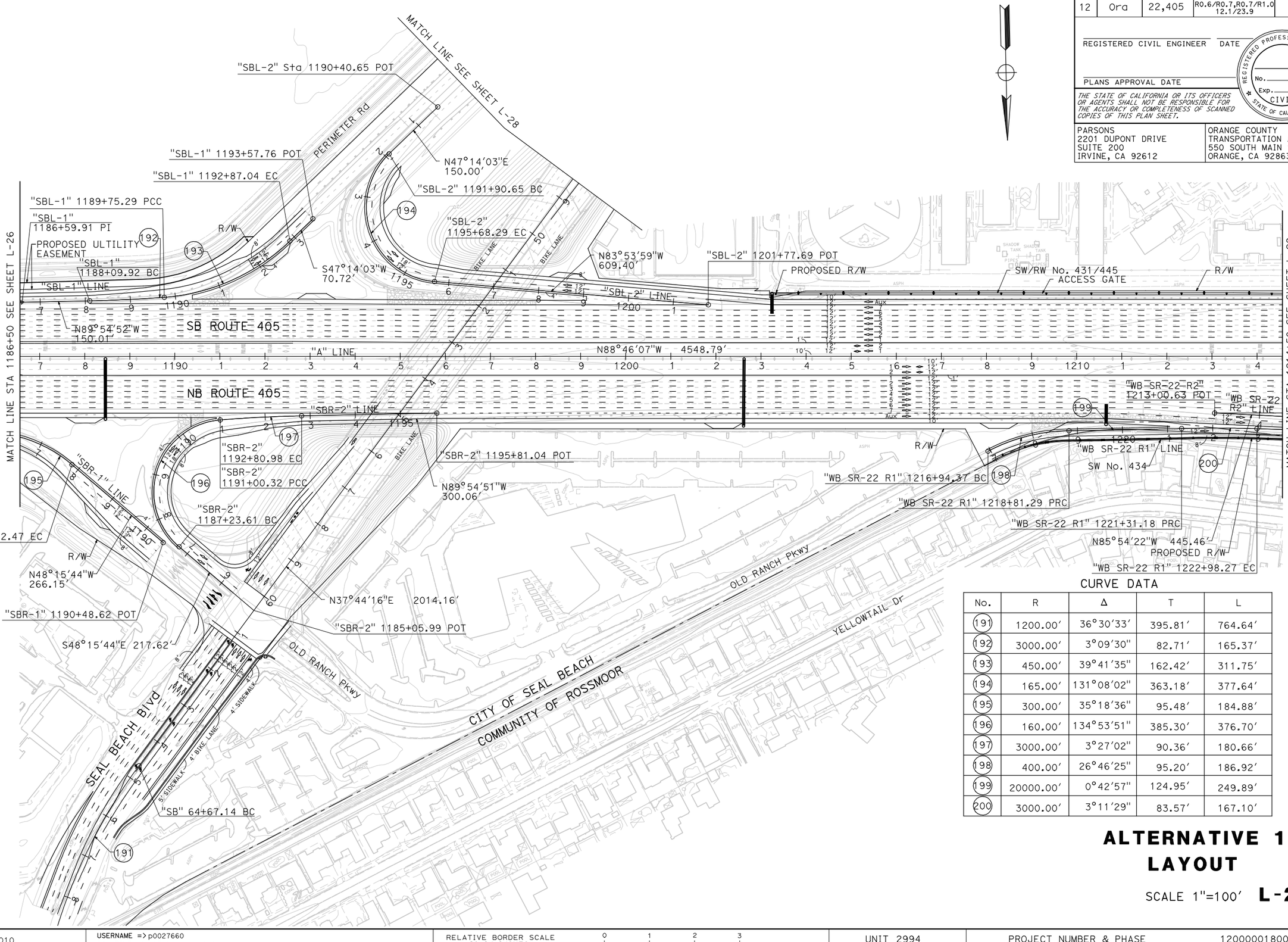
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



CURVE DATA

No.	R	Δ	T	L
191	1200.00′	36°30′33′	395.81′	764.64′
192	3000.00′	3°09′30"	82.71′	165.37′
193	450.00′	39°41′35"	162.42′	311.75′
194	165.00′	131°08′02"	363.18′	377.64′
195	300.00′	35°18′36"	95.48′	184.88′
196	160.00′	134°53′51"	385.30′	376.70′
197	3000.00′	3°27′02"	90.36′	180.66′
198	400.00′	26°46′25"	95.20′	186.92′
199	20000.00′	0°42′57"	124.95′	249.89′
200	3000.00′	3°11′29"	83.57′	167.10′

ALTERNATIVE 1
LAYOUT

SCALE 1"=100′ **L-27**

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TIME PLOTTED => 3:13:56 PM

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USERNAME => p0027660
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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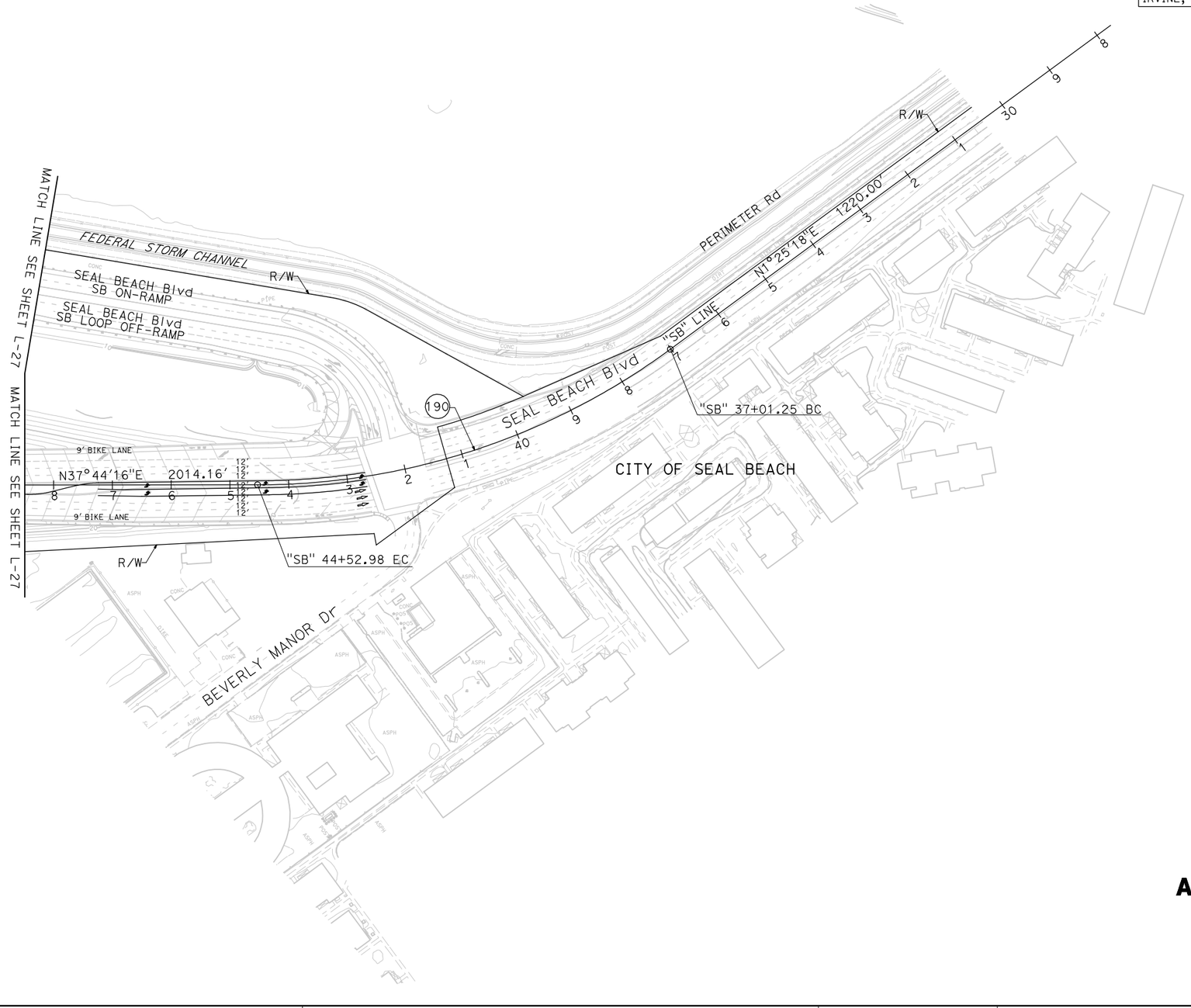
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
190	1186.00′	36°18′58"	388.98′	751.73′



ALTERNATIVE 1
LAYOUT

SCALE 1"=100′ **L-28**

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DATE PLOTTED => 11/14/2011
TIME PLOTTED => 10:58:09 AM

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Caltrans

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USERNAME => p0027660
DGN FILE => ALT 1 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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PARSONS
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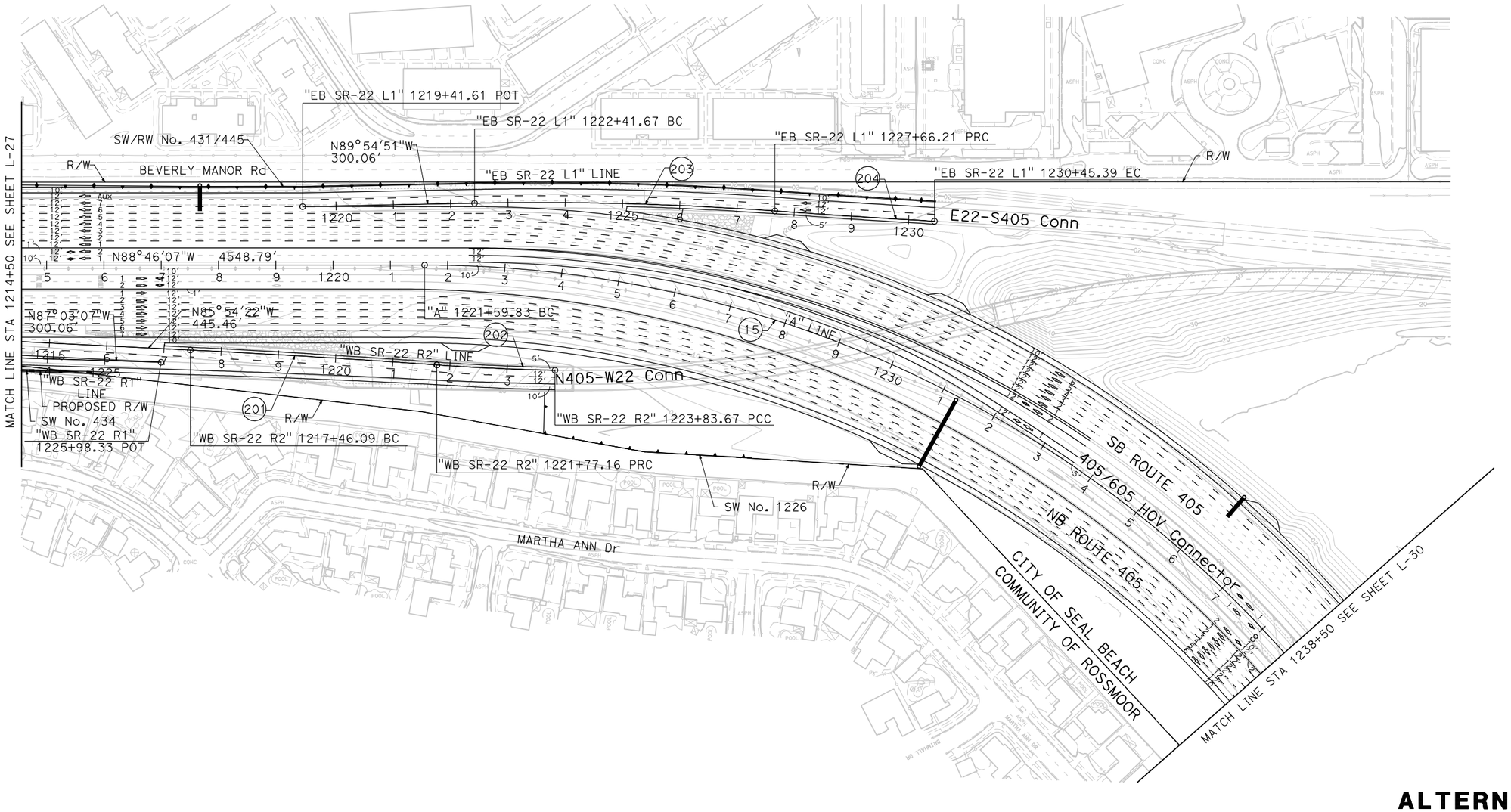
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
15	2000.00′	58°25′06"	1118.18′	2039.19′
201	20000.00′	1°14′06"	215.54′	431.07′
202	3967.24′	2°58′57"	103.28′	206.51′
203	5720.87′	5°15′12"	262.45′	524.54′
204	20000.00′	0°47′59"	139.60′	279.19′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-29**

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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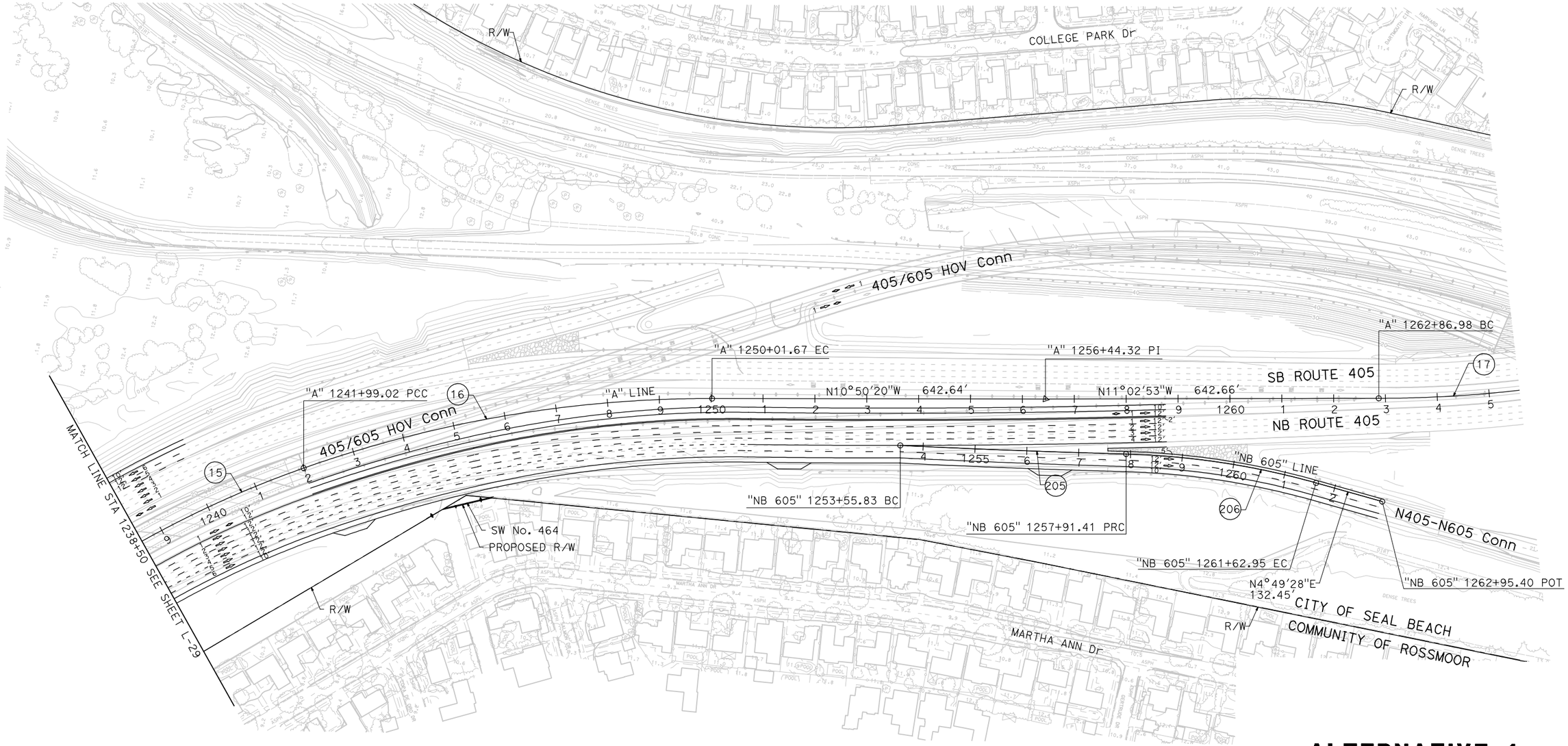
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
15	2000.00′	58°25′06"	1118.18′	2039.19′
16	2357.00′	19°30′42"	405.25′	802.65′
17	2400.00′	36°15′41"	785.86′	1518.91′
205	20062.00′	1°14′38"	217.80′	435.58′
206	1500.00′	14°11′30"	186.72′	371.54′



ALTERNATIVE 1 LAYOUT

SCALE 1"=100′ **L-30**

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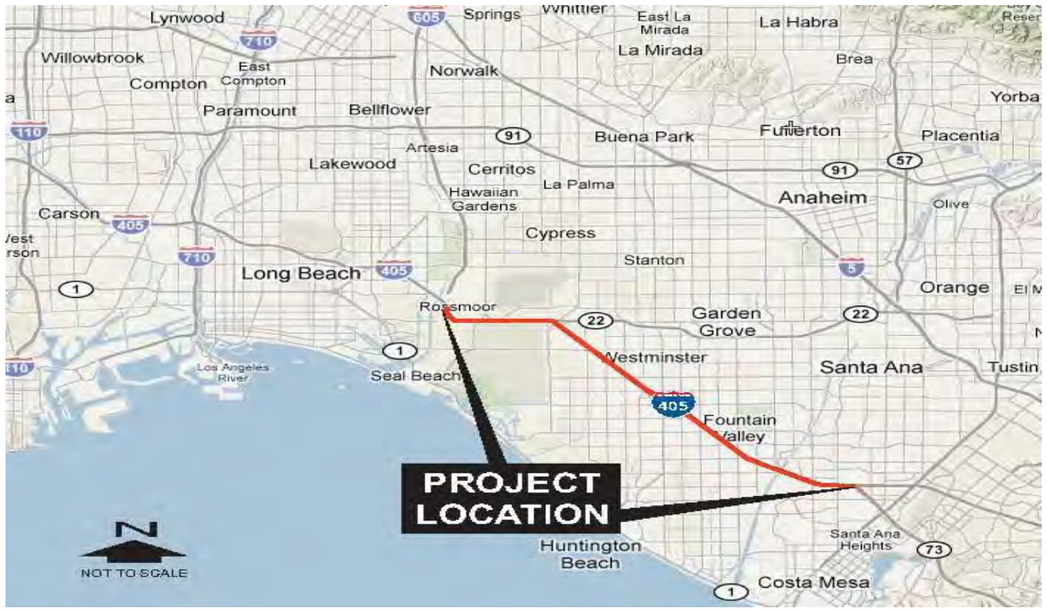
ALTERNATIVE 2
LAYOUT SHEETS

Draft Project Report

I-405 Improvement Project



ATTACHMENT E

Alternative 2 Drawings

INDEX OF PLANS

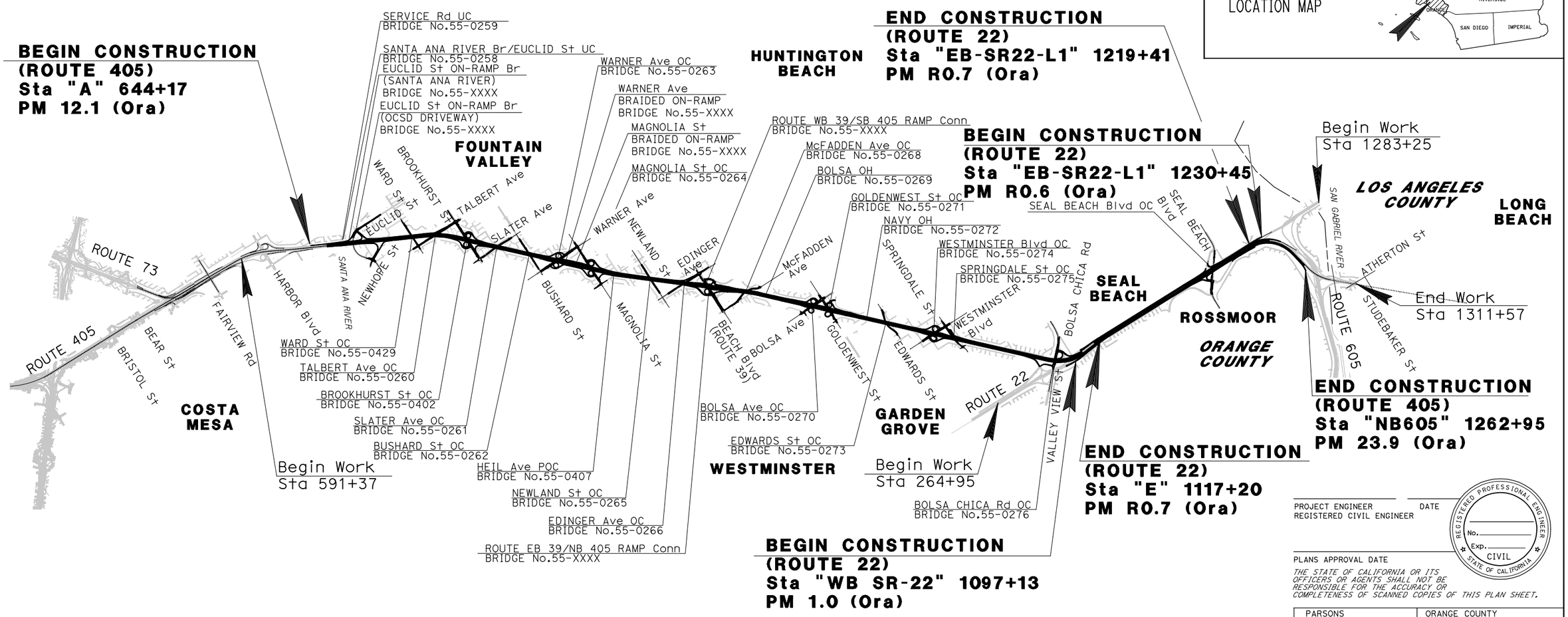
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN LOS ANGELES AND ORANGE COUNTIES
IN COSTA MESA, FOUNTAIN VALLEY, WESTMINSTER, HUNTINGTON BEACH, GARDEN GROVE, SEAL BEACH, ROSSMOOR, AND LONG BEACH
ON ROUTE 22 FROM ROUTE 405 TO 0.3 MILE WEST OF VALLEY VIEW STREET OVERCROSSING
ON ROUTE 22 FROM 0.3 MILE WEST OF ROUTE 605 TO ROUTE 405
ON ROUTE 405 FROM 0.5 MILE SOUTH OF EUCLID STREET UNDERCROSSING TO 0.2 MILE SOUTH OF 405/605 SEPERATION

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

LOCATION MAP



PROJECT ENGINEER DATE
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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PROJECT REPORT PLANS FOR ALTERNATIVE 2

NO SCALE

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PARSONS 2201 DUPONT DRIVE SUITE 200 IRVINE, CA 92612	ORANGE COUNTY TRANSPORTATION AUTHORITY 550 SOUTH MAIN STREET ORANGE, CA 92863
CONTRACT No.	12-0H1000
PROJECT ID	12000001800

APPROVED AS TO IMPACT ON STATE FACILITIES AND CONFORMANCE WITH APPLICABLE STATE STANDARDS AND PRACTICES AND THAT TECHNICAL OVERSIGHT WAS PERFORMED.

CONSULTANT DESIGN ENGINEER | REGISTRATION No. | LICENSE Exp DATE | CALTRANS DESIGN OVERSIGHT APPROVAL | DATE SIGNED

LAST REVISION 00-00-00 | DATE PLOTTED => 11/3/2011 TIME PLOTTED => 7:14:27 PM

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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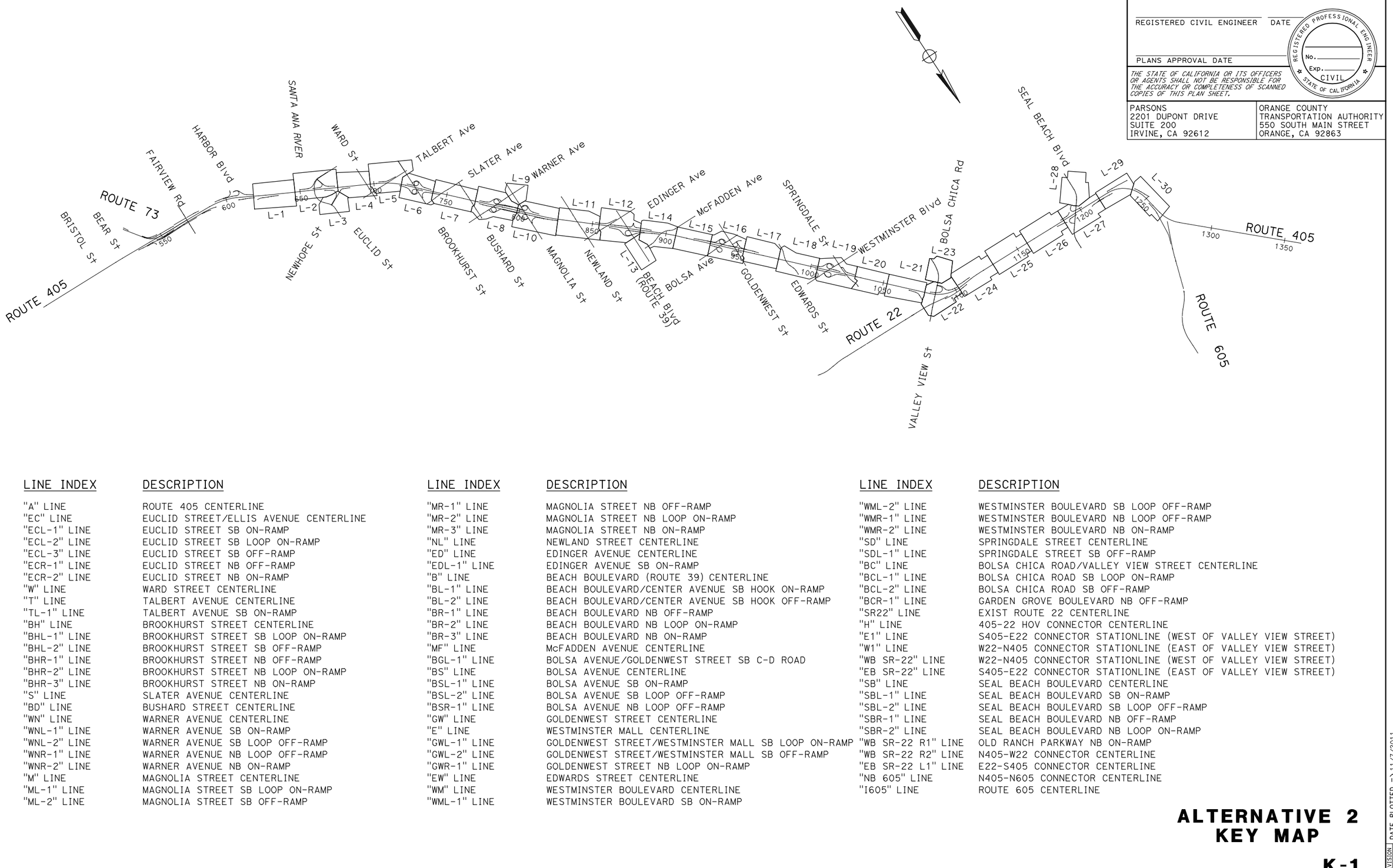
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



LINE INDEX	DESCRIPTION
"A" LINE	ROUTE 405 CENTERLINE
"EC" LINE	EUCLID STREET/ELLIS AVENUE CENTERLINE
"ECL-1" LINE	EUCLID STREET SB ON-RAMP
"ECL-2" LINE	EUCLID STREET SB LOOP ON-RAMP
"ECL-3" LINE	EUCLID STREET SB OFF-RAMP
"ECR-1" LINE	EUCLID STREET NB OFF-RAMP
"ECR-2" LINE	EUCLID STREET NB ON-RAMP
"W" LINE	WARD STREET CENTERLINE
"T" LINE	TALBERT AVENUE CENTERLINE
"TL-1" LINE	TALBERT AVENUE SB ON-RAMP
"BH" LINE	BROOKHURST STREET CENTERLINE
"BHL-1" LINE	BROOKHURST STREET SB LOOP ON-RAMP
"BHL-2" LINE	BROOKHURST STREET SB OFF-RAMP
"BHR-1" LINE	BROOKHURST STREET NB OFF-RAMP
"BHR-2" LINE	BROOKHURST STREET NB LOOP ON-RAMP
"BHR-3" LINE	BROOKHURST STREET NB ON-RAMP
"S" LINE	SLATER AVENUE CENTERLINE
"BD" LINE	BUSHARD STREET CENTERLINE
"WN" LINE	WARNER AVENUE CENTERLINE
"WNL-1" LINE	WARNER AVENUE SB ON-RAMP
"WNL-2" LINE	WARNER AVENUE SB LOOP OFF-RAMP
"WNR-1" LINE	WARNER AVENUE NB LOOP OFF-RAMP
"WNR-2" LINE	WARNER AVENUE NB ON-RAMP
"M" LINE	MAGNOLIA STREET CENTERLINE
"ML-1" LINE	MAGNOLIA STREET SB LOOP ON-RAMP
"ML-2" LINE	MAGNOLIA STREET SB OFF-RAMP

LINE INDEX	DESCRIPTION
"MR-1" LINE	MAGNOLIA STREET NB OFF-RAMP
"MR-2" LINE	MAGNOLIA STREET NB LOOP ON-RAMP
"MR-3" LINE	MAGNOLIA STREET NB ON-RAMP
"NL" LINE	NEWLAND STREET CENTERLINE
"ED" LINE	EDINGER AVENUE CENTERLINE
"EDL-1" LINE	EDINGER AVENUE SB ON-RAMP
"B" LINE	BEACH BOULEVARD (ROUTE 39) CENTERLINE
"BL-1" LINE	BEACH BOULEVARD/CENTER AVENUE SB HOOK ON-RAMP
"BL-2" LINE	BEACH BOULEVARD/CENTER AVENUE SB HOOK OFF-RAMP
"BR-1" LINE	BEACH BOULEVARD NB OFF-RAMP
"BR-2" LINE	BEACH BOULEVARD NB LOOP ON-RAMP
"BR-3" LINE	BEACH BOULEVARD NB ON-RAMP
"MF" LINE	McFADDEN AVENUE CENTERLINE
"BGL-1" LINE	BOLSA AVENUE/GOLDENWEST STREET SB C-D ROAD
"BS" LINE	BOLSA AVENUE CENTERLINE
"BSL-1" LINE	BOLSA AVENUE SB ON-RAMP
"BSL-2" LINE	BOLSA AVENUE SB LOOP OFF-RAMP
"BSR-1" LINE	BOLSA AVENUE NB LOOP OFF-RAMP
"GW" LINE	GOLDENWEST STREET CENTERLINE
"E" LINE	WESTMINSTER MALL CENTERLINE
"GWL-1" LINE	GOLDENWEST STREET/WESTMINSTER MALL SB LOOP ON-RAMP
"GWL-2" LINE	GOLDENWEST STREET/WESTMINSTER MALL SB OFF-RAMP
"GWR-1" LINE	GOLDENWEST STREET NB LOOP ON-RAMP
"EW" LINE	EDWARDS STREET CENTERLINE
"WM" LINE	WESTMINSTER BOULEVARD CENTERLINE
"WML-1" LINE	WESTMINSTER BOULEVARD SB ON-RAMP

LINE INDEX	DESCRIPTION
"WML-2" LINE	WESTMINSTER BOULEVARD SB LOOP OFF-RAMP
"WMR-1" LINE	WESTMINSTER BOULEVARD NB LOOP OFF-RAMP
"WMR-2" LINE	WESTMINSTER BOULEVARD NB ON-RAMP
"SD" LINE	SPRINGDALE STREET CENTERLINE
"SDL-1" LINE	SPRINGDALE STREET SB OFF-RAMP
"BC" LINE	BOLSA CHICA ROAD/VALLEY VIEW STREET CENTERLINE
"BCL-1" LINE	BOLSA CHICA ROAD SB LOOP ON-RAMP
"BCL-2" LINE	BOLSA CHICA ROAD SB OFF-RAMP
"BCR-1" LINE	GARDEN GROVE BOULEVARD NB OFF-RAMP
"SR22" LINE	EXIST ROUTE 22 CENTERLINE
"H" LINE	405-22 HOV CONNECTOR CENTERLINE
"E1" LINE	S405-E22 CONNECTOR STATIONLINE (WEST OF VALLEY VIEW STREET)
"W1" LINE	W22-N405 CONNECTOR STATIONLINE (EAST OF VALLEY VIEW STREET)
"WB SR-22" LINE	W22-N405 CONNECTOR STATIONLINE (WEST OF VALLEY VIEW STREET)
"EB SR-22" LINE	S405-E22 CONNECTOR STATIONLINE (EAST OF VALLEY VIEW STREET)
"SB" LINE	SEAL BEACH BOULEVARD CENTERLINE
"SBL-1" LINE	SEAL BEACH BOULEVARD SB ON-RAMP
"SBL-2" LINE	SEAL BEACH BOULEVARD SB LOOP OFF-RAMP
"SBR-1" LINE	SEAL BEACH BOULEVARD NB OFF-RAMP
"SBR-2" LINE	SEAL BEACH BOULEVARD NB LOOP ON-RAMP
"WB SR-22 R1" LINE	OLD RANCH PARKWAY NB ON-RAMP
"WB SR-22 R2" LINE	N405-W22 CONNECTOR CENTERLINE
"EB SR-22 L1" LINE	E22-S405 CONNECTOR CENTERLINE
"NB 605" LINE	N405-N605 CONNECTOR CENTERLINE
"I605" LINE	ROUTE 605 CENTERLINE

ALTERNATIVE 2
KEY MAP

NO SCALE

K-1

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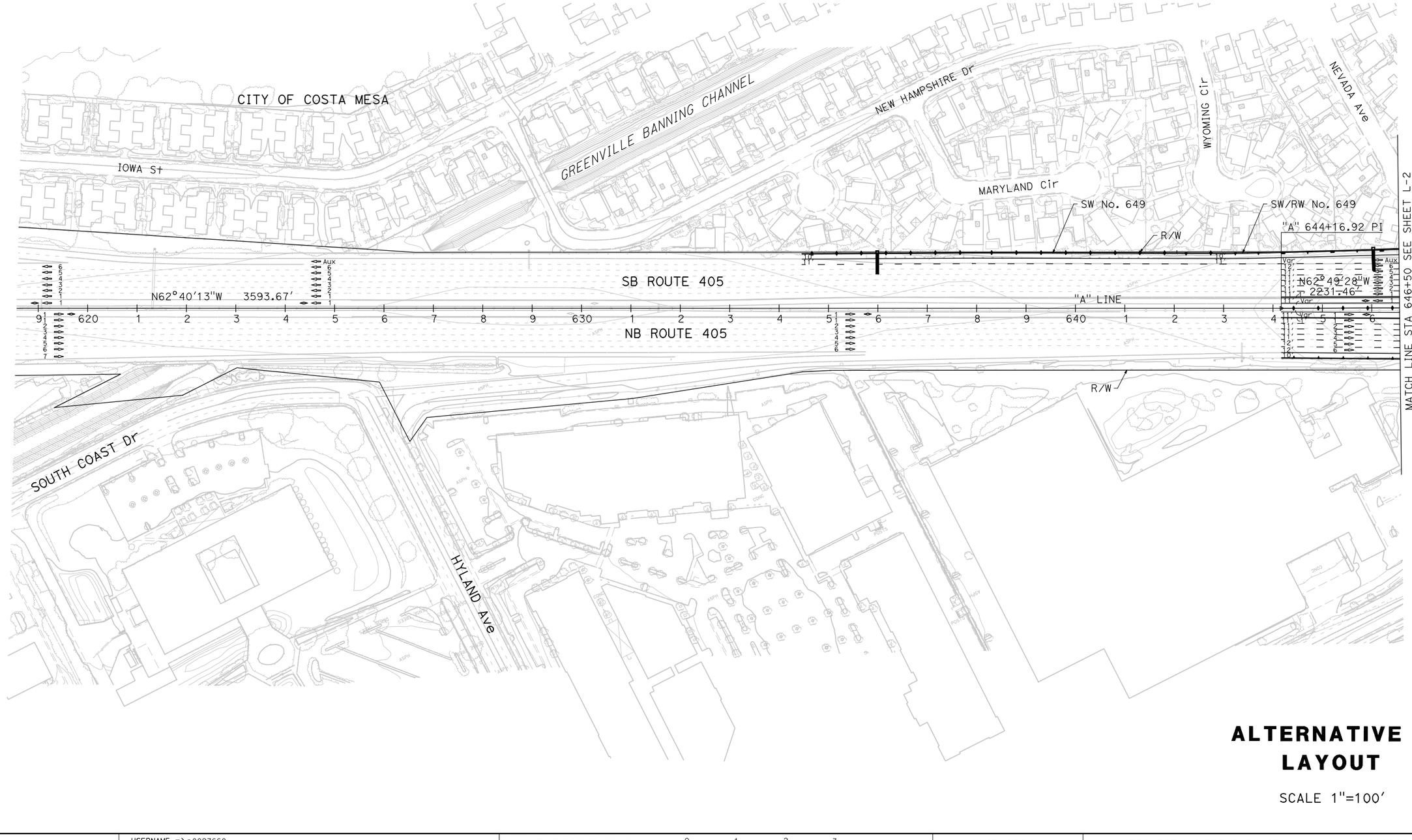

ALTERNATIVE 2 LAYOUT

SCALE 1"=100' **L-1**

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12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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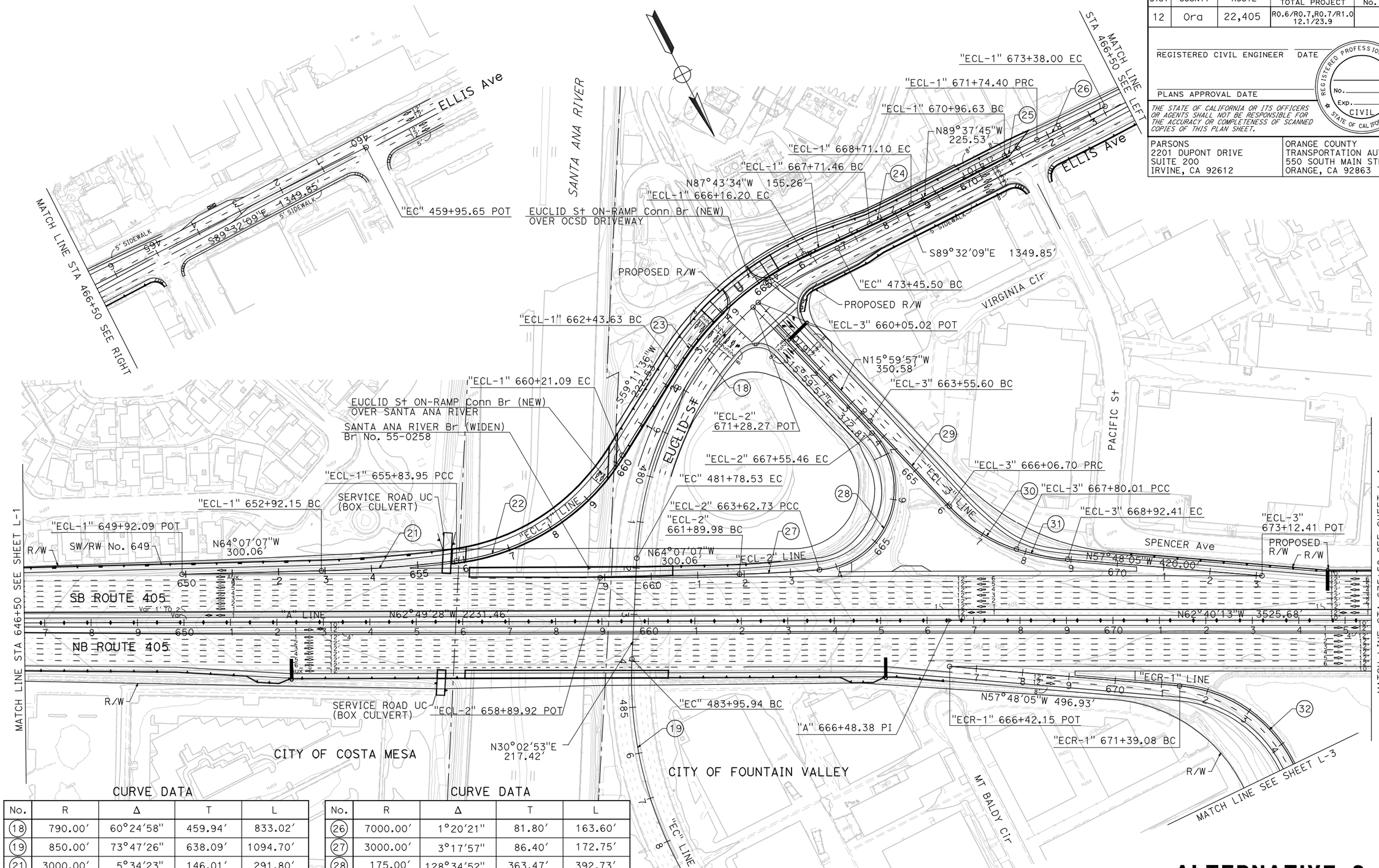

CURVE DATA

No.	R	Δ	T	L
(18)	790.00′	60°24′58"	459.94′	833.02′
(19)	850.00′	73°47′26"	638.09′	1094.70′
(21)	3000.00′	5°34′23"	146.01′	291.80′
(22)	490.00′	51°06′55"	234.32′	437.14′
(23)	645.30′	33°04′50"	191.64′	372.57′
(24)	3000.00′	1°54′11"	49.83′	99.64′
(25)	2791.17′	1°35′47"	38.89′	77.77′

CURVE DATA

No.	R	Δ	T	L
(26)	7000.00′	1°20′21"	81.80′	163.60′
(27)	3000.00′	3°17′57"	86.40′	172.75′
(28)	175.00′	128°34′52"	363.47′	392.73′
(29)	20000.00′	0°43′10"	125.55′	251.10′
(30)	335.00′	29°38′29"	88.64′	173.31′
(31)	500.00′	12°52′49"	56.44′	112.40′
(32)	300.00′	102°24′12"	373.15′	536.18′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-2**

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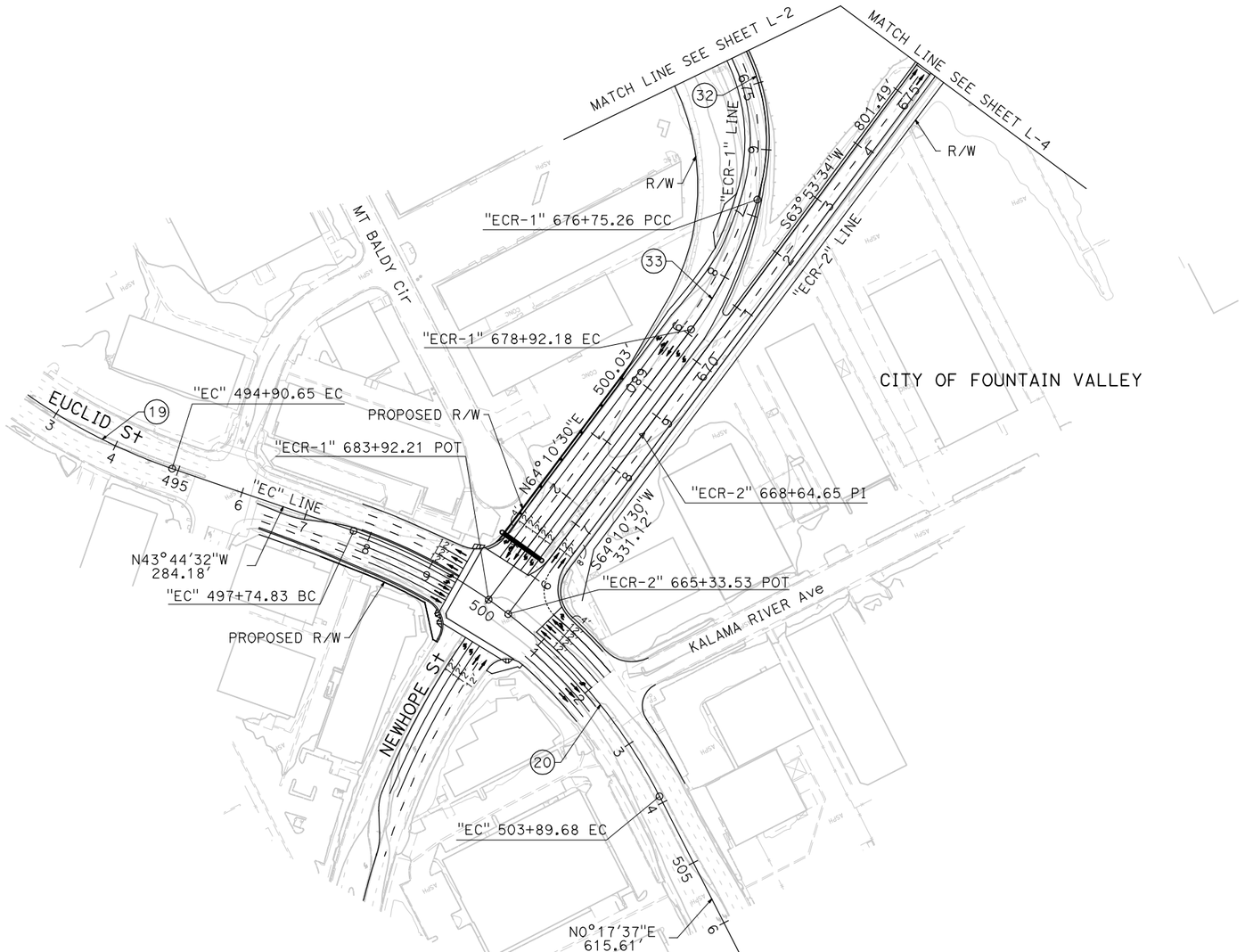

CURVE DATA

No.	R	Δ	T	L
19	850.00′	73°47′26"	638.09′	1094.70′
20	800.00′	44°02′09"	323.51′	614.86′
32	300.00′	102°24′12"	373.15′	536.18′
33	635.00′	19°34′23"	109.53′	216.92′

ALTERNATIVE 2
LAYOUT

SCALE 1"=100′ **L-3**

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PLANS APPROVAL DATE

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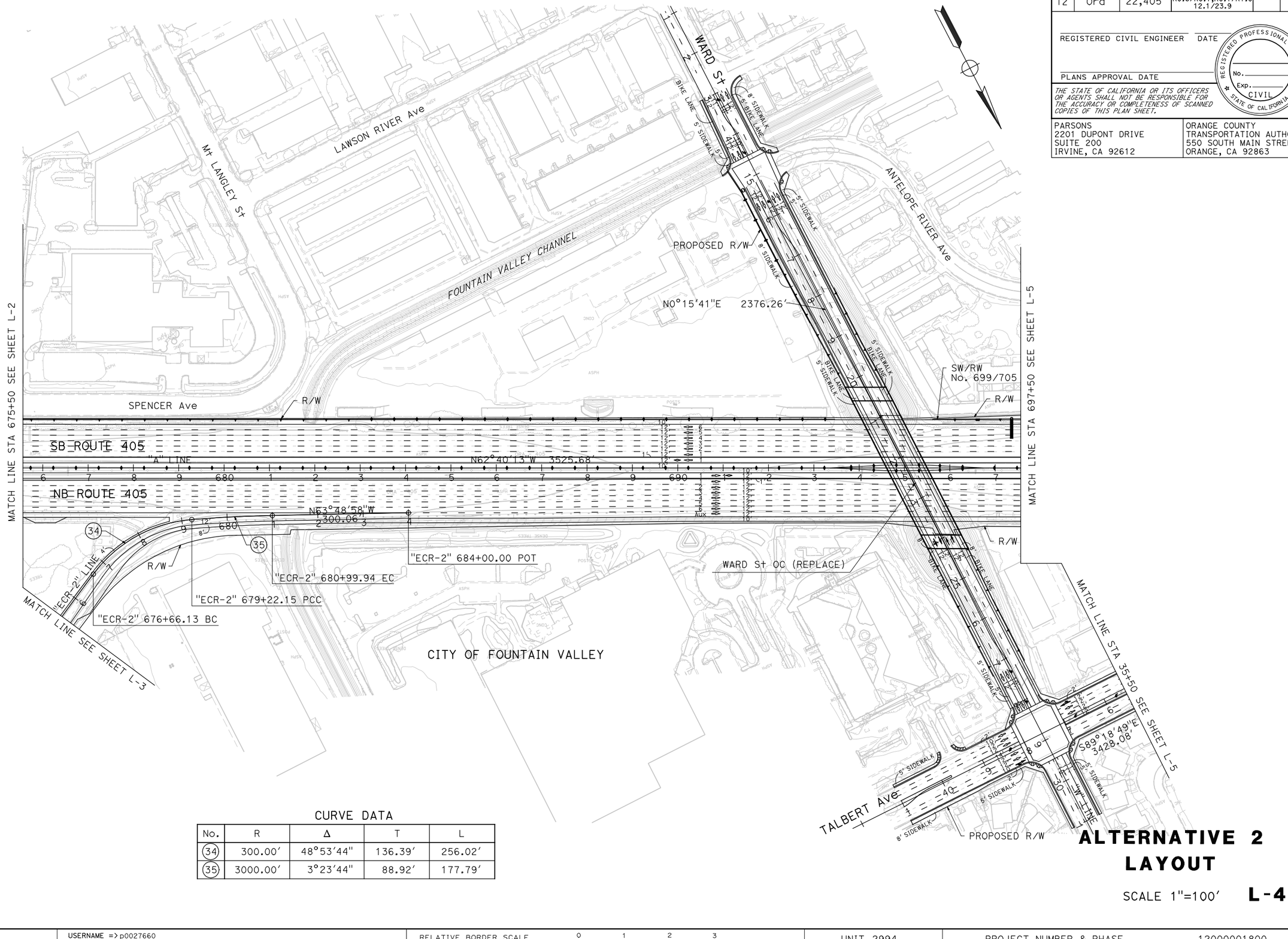

CURVE DATA

No.	R	Δ	T	L
(34)	300.00′	48°53′44"	136.39′	256.02′
(35)	3000.00′	3°23′44"	88.92′	177.79′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-4**

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UNIT 2994

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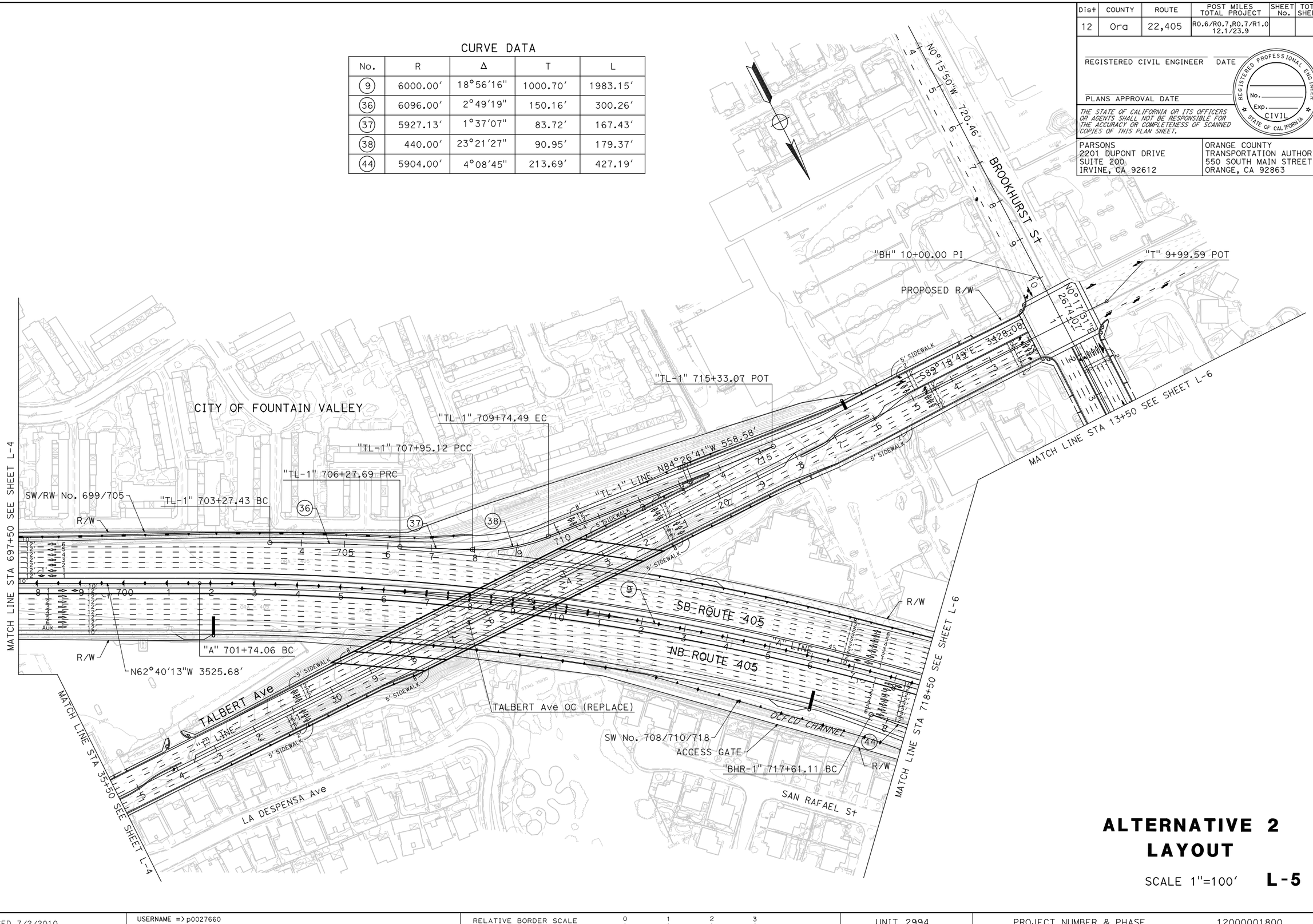
CURVE DATA

No.	R	Δ	T	L
(9)	6000.00′	18°56′16"	1000.70′	1983.15′
(36)	6096.00′	2°49′19"	150.16′	300.26′
(37)	5927.13′	1°37′07"	83.72′	167.43′
(38)	440.00′	23°21′27"	90.95′	179.37′
(44)	5904.00′	4°08′45"	213.69′	427.19′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-5**

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CURVE DATA

No.	R	Δ	T	L
(9)	6000.00′	18°56′16"	1000.70′	1983.15′
(39)	3000.00′	6°11′05"	162.07′	323.83′
(40)	152.00′	297°59′01"	-	790.52′
(42)	210.00′	85°45′17"	194.99′	314.31′
(43)	500.00′	35°12′37"	158.66′	307.27′
(44)	5904.00′	4°08′45"	213.69′	427.19′
(45)	500.00′	38°35′43"	175.07′	336.81′
(46)	230.00′	89°43′35"	228.90′	360.18′
(47)	162.00′	301°14′23"	-	851.74′
(48)	3000.00′	4°35′23"	120.23′	240.32′
(49)	225.00′	123°36′41"	419.72′	485.42′
(50)	3000.00′	3°11′29"	83.57′	167.10′
(51)	7000.00′	4°08′15"	252.86′	505.50′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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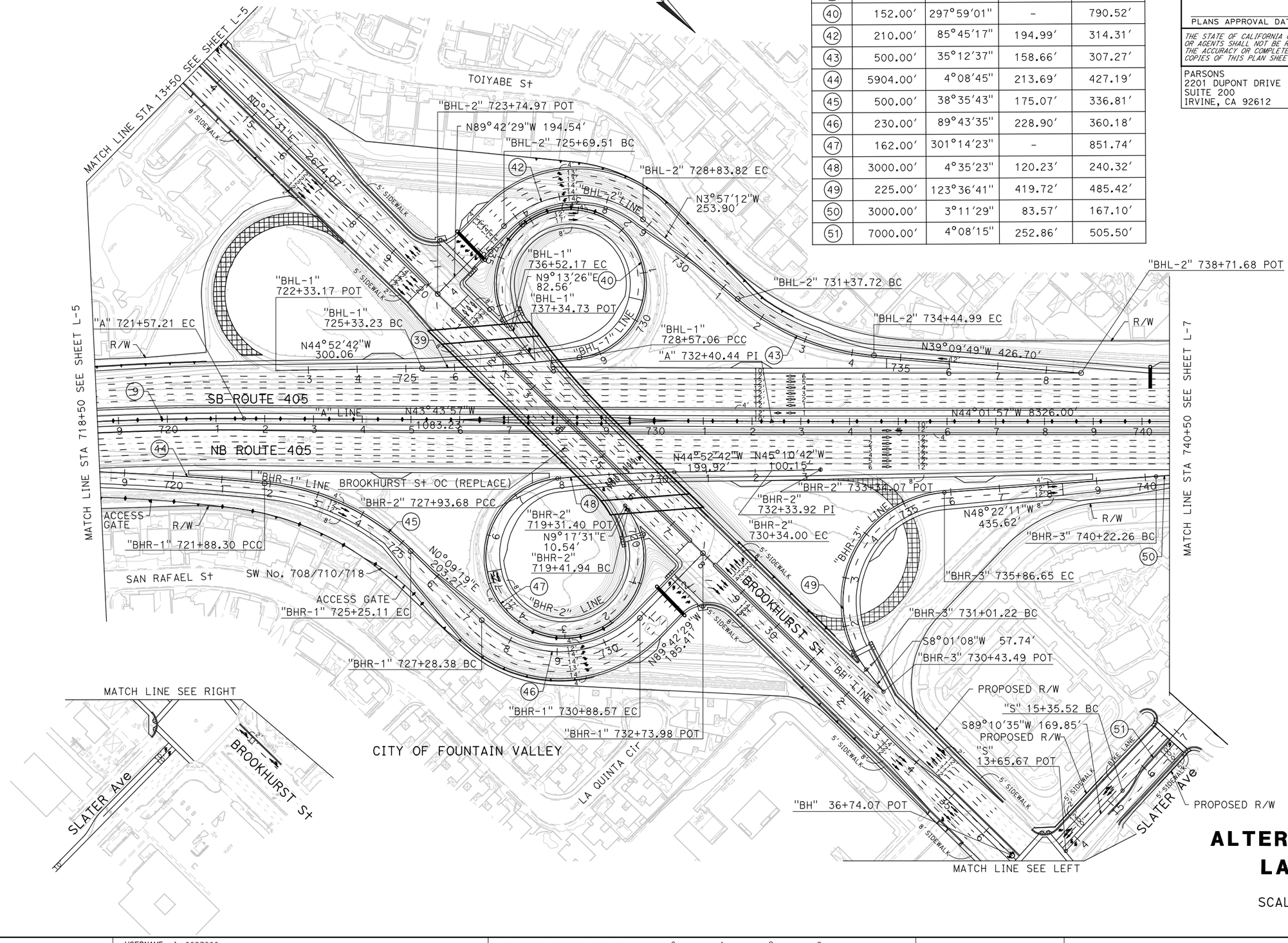

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-6**

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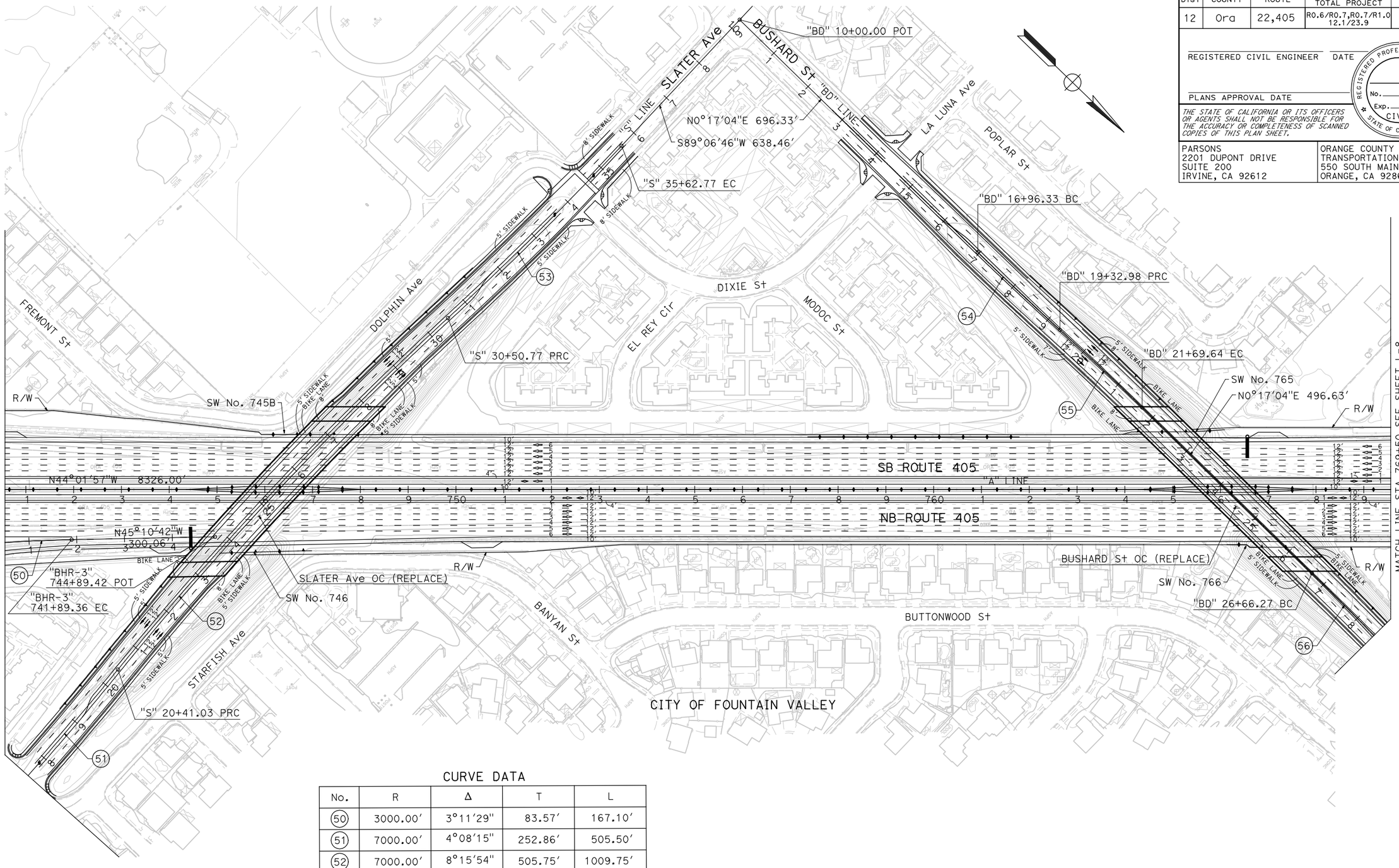

CURVE DATA

No.	R	Δ	T	L
(50)	3000.00′	3°11′29"	83.57′	167.10′
(51)	7000.00′	4°08′15"	252.86′	505.50′
(52)	7000.00′	8°15′54"	505.75′	1009.75′
(53)	7000.00′	4°11′27"	256.11′	511.99′
(54)	7000.00′	1°56′13"	118.34′	236.65′
(55)	7000.00′	1°56′13"	118.34′	236.65′
(56)	7000.00′	1°56′13"	118.34′	236.65′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-7**

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UNIT 2994

PROJECT NUMBER & PHASE 12000001800

CURVE DATA

No.	R	Δ	T	L
56	7000.00′	1°56′13"	118.34′	236.65′
57	7000.00′	1°56′13"	118.34′	236.65′
58	7000.00′	2°46′55"	169.98′	339.89′
59	7000.00′	2°46′55"	169.98′	339.89′
60	7000.00′	2°35′26"	158.28′	316.50′
61	7000.00′	2°13′02"	135.46′	270.88′
63	3000.00′	4°32′25"	118.93′	237.73′
64	388.29′	34°08′53"	119.26′	231.42′
65	350.00′	81°21′13"	300.80′	496.96′
66	158.00′	226°53′21"	-	625.67′
67	20000.00′	2°28′00"	430.60′	861.06′
68	3500.00′	5°15′29"	160.71′	321.20′
69	1400.00′	5°25′23"	66.30′	132.51′
70	1600.00′	7°27′30"	104.28′	208.27′
71	154.00′	217°37′30"	-	584.93′
72	300.00′	88°27′08"	292.00′	463.13′
73	400.00′	42°53′42"	157.14′	299.46′

CURVE DATA

No.	R	Δ	T	L
74	4500.00′	1°56′44"	76.41′	152.81′
75	20000.00′	0°50′01"	145.48′	290.95′
80	20000.00′	0°59′34"	173.27′	346.53′
81	2700.00′	2°24′31"	56.76′	113.50′
82	1900.00′	6°54′37"	114.72′	229.15′
83	850.00′	11°23′33"	84.79′	169.01′
87	1400.00′	4°37′51"	56.61′	113.15′
88	500.00′	37°28′32"	169.61′	327.03′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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ALTERNATIVE 2
LAYOUT

SCALE 1"=100′ **L-8**

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12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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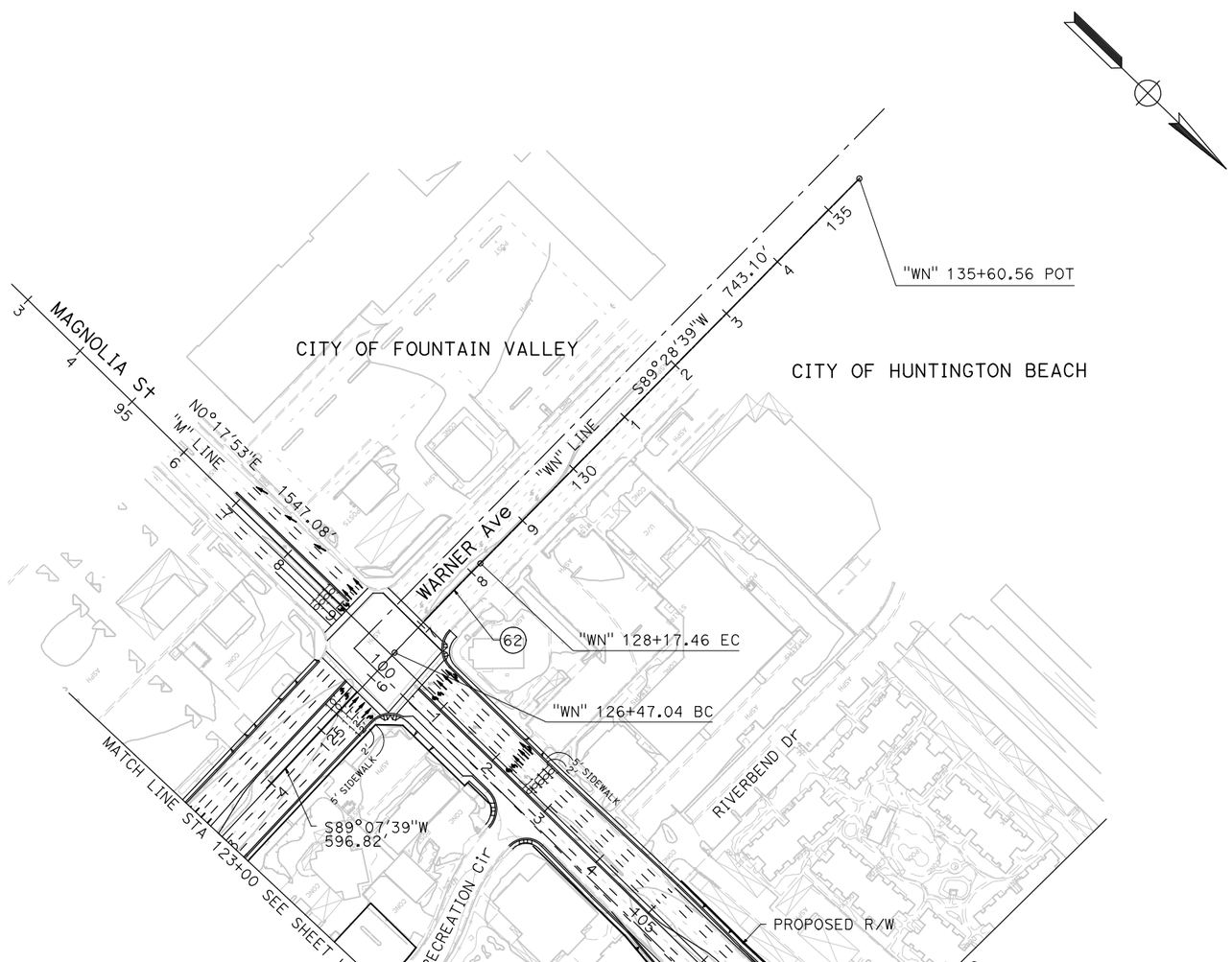

CURVE DATA

No.	R	Δ	T	L
(62)	7000.00′	1°23′42"	85.21′	170.42′
(76)	7000.00′	2°09′57"	132.31′	264.59′

ALTERNATIVE 2
LAYOUT

SCALE 1"=100′ **L-9**

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UNIT 2994

PROJECT NUMBER & PHASE 12000001800

CURVE DATA

No.	R	Δ	T	L
(10)	12000.00′	5°14′45"	549.73′	1098.69′
(75)	20000.00′	0°50′01"	145.48′	290.95′
(76)	7000.00′	2°09′57"	132.31′	264.59′
(77)	7000.00′	2°09′57"	132.31′	264.59′
(78)	7000.00′	2°09′57"	132.31′	264.59′
(79)	7000.00′	2°09′57"	132.31′	264.59′
(84)	170.00′	229°44′17"	-	681.65′
(85)	250.00′	84°49′31"	228.38′	370.12′
(86)	500.00′	35°15′41"	158.90′	307.71′
(88)	500.00′	37°28′32"	169.61′	327.03′

CURVE DATA

No.	R	Δ	T	L
(89)	250.00′	83°08′42"	221.75′	362.79′
(90)	172.00′	224°33′27"	-	674.11′
(91)	10000.00′	2°03′39"	179.86′	359.67′
(92)	20000.00′	0°55′53"	162.54′	325.08′
(93)	3000.00′	4°42′12"	123′.20′	246.26′
(94)	12097.00′	1°25′18"	150.07′	300.13′
(95)	120.00′	49°21′15"	55.14′	103.37′
(96)	450.00′	32°37′13"	131.68′	256.20′
(97)	250.00′	40°22′28"	91.92′	176.17′
(98)	3000.00′	3°11′32"	83.59′	167.15′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

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ORANGE, CA 92863

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

MATCH LINE STA 108+50 SEE SHEET L-9
"M" 109+26.85 PRC
"ML-2" 798+69.99 POT
N88°45'54"W 147.74'
"ML-2" 800+17.73 BC
"ML-2" 803+87.85 EC
ACCESS GATE
"ML-2" LINE
"ML-1" 809+97.12 EC
S89°01'07"E 184.40'
"ML-1" 811+81.52 POT
"M" 111+91.44 EC
N0°17'53"E 615.53'
N33°56'24"W 212.17'
"ML-2" 806+60.02 BC
SW/RW No. 807
"ML-2" 809+67.73 EC
PROPOSED R/W
DE VILLE Cir
SAVOY Cir
LANDAU Ln
HEIL Ave POC (REPLACE)
PROPOSED R/W
CITY OF HUNTINGTON BEACH
CITY OF WESTMINSTER
ROSS Cir
SW/RW No. 811/827/841
R/W
MATCH LINE STA 798+50 SEE SHEET L-8
N39°16'50"W 568.56'
"ML-1" LINE
"ML-1" 803+15.47 BC
MAGNOLIA St OC (REPLACE)
N39°12'04"W 421.93'
"ML-2" 813+89.66 POT
"A" 815+66.44 BC
N39°09'49"W 535.39'
"WNL-2" 800+30.00 POT
N44°01'57"W 8326.00'
SB ROUTE 405
"A" LINE
NB ROUTE 405
N48°43'06"W 348.88'
"WNR-2" 803+52.61 POE
N45°08'41"W 300.06'
"MR-2" 804+37.14 EC
"MR-2" 810+90.91 PRC
N44°00'55"W 292.86'
"WNR-2" 800+52.55 EC
"MR-2" LINE
"MR-2" 807+31.24 BC
N45°08'41"W 294.10'
"M" 118+06.97 BC
"MR-2" 796+11.65 POT
N0°17'53"E 615.53'
S89°42'07"E 151.37'
"MR-2" 797+63.02 BC
ACCESS GATE
"MR-2" 819+55.11 EC
"MR-3" 817+07.09 POT
"MR-2" 817+08.85 BC
VENUS Dr
"MR-2" 826+04.12 EC
ACCESS GATE
"MR-2" 823+03.99 BC
MATCH LINE STA 826+50 SEE SHEET L-11
"MR-3" LINE
"MR-3" 814+07.03 EC
"MR-2" 814+15.99 EC
PROPOSED R/W
"MR-3" 812+39.88 PCC
"MR-3" 810+63.71 PCC
"MR-3" 808+07.51 PCC
"MR-3" 807+04.15 BC
S9°17'53"W 54.60'
"MR-3" 806+49.55 POT
GALAXY Dr
MERCURY Dr
HEIL Ave
"MR-1" LINE N6°33'25"W 319.90'
"MR-1" 800+19.99 EC
"MR-1" 803+39.90 BC
"MR-1" 807+02.68 EC
S89°42'07"W 140.28'
"MR-1" 808+42.96 POT
DAISY Ave
"M" 120+71.56 PRC
"M" 123+36.15 EC
N0°17'53"E 1292.14'
"M" LINE
MAGNOLIA St
CITY OF WESTMINSTER
CITY OF FOUNTAIN VALLEY

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-10**

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BORDER LAST REVISED 7/2/2010 | USERNAME => p0027660 DGN FILE => ALT 2 Layout Sheets.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

CURVE DATA

No.	R	Δ	T	L
10	12000.00′	5°14′45"	549.73′	1098.69′
99	7000.00′	2°39′09"	162.06′	324.07′
100	7000.00′	2°39′09"	162.06′	324.07′
101	7000.00′	2°39′09"	162.06′	324.07′
102	7000.00′	2°39′09"	162.06′	324.07′
103	7000.00′	2°16′16"	138.75′	277.47′

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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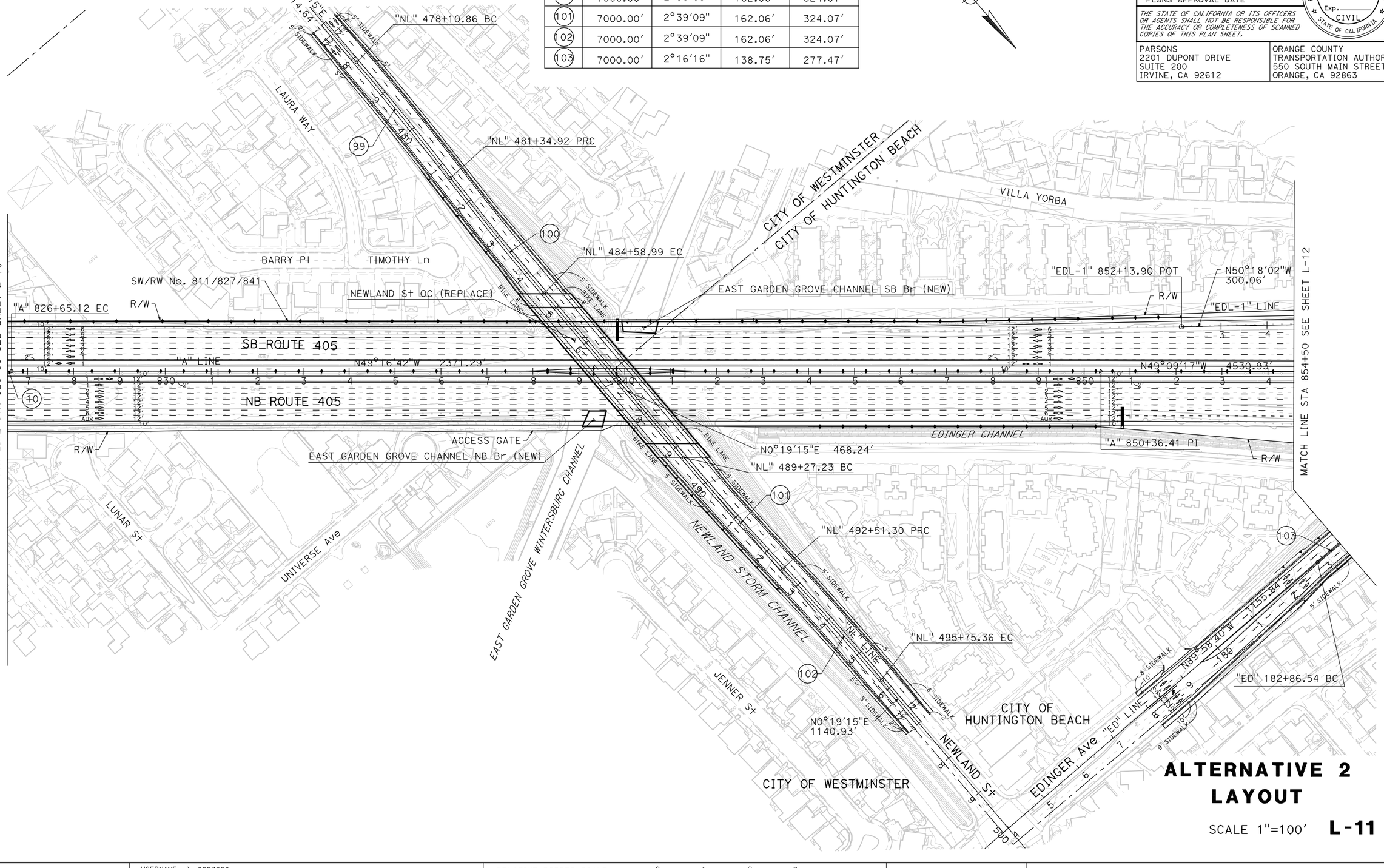

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-11**

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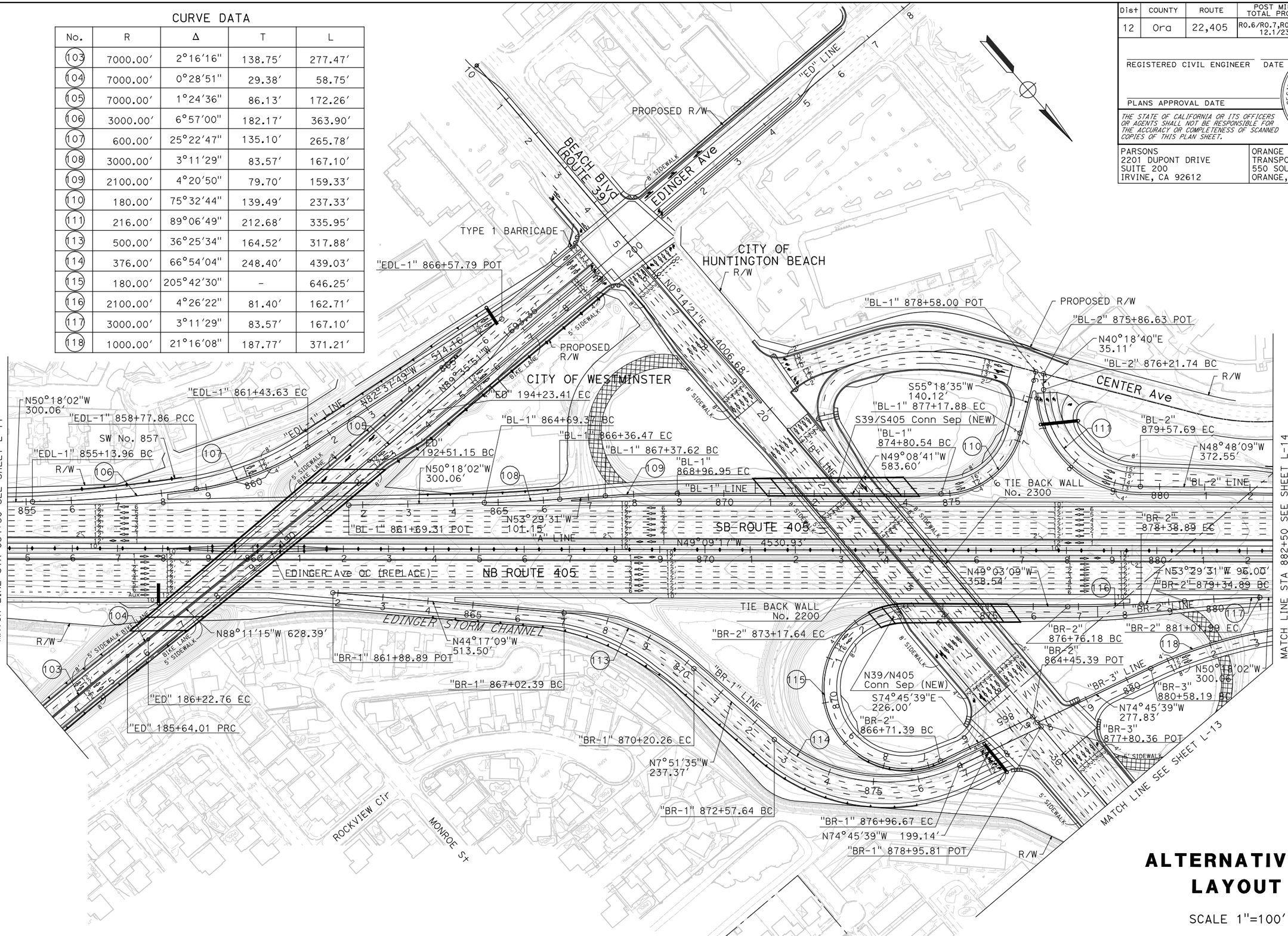
CURVE DATA

No.	R	Δ	T	L
103	7000.00′	2°16′16"	138.75′	277.47′
104	7000.00′	0°28′51"	29.38′	58.75′
105	7000.00′	1°24′36"	86.13′	172.26′
106	3000.00′	6°57′00"	182.17′	363.90′
107	600.00′	25°22′47"	135.10′	265.78′
108	3000.00′	3°11′29"	83.57′	167.10′
109	2100.00′	4°20′50"	79.70′	159.33′
110	180.00′	75°32′44"	139.49′	237.33′
111	216.00′	89°06′49"	212.68′	335.95′
113	500.00′	36°25′34"	164.52′	317.88′
114	376.00′	66°54′04"	248.40′	439.03′
115	180.00′	205°42′30"	-	646.25′
116	2100.00′	4°26′22"	81.40′	162.71′
117	3000.00′	3°11′29"	83.57′	167.10′
118	1000.00′	21°16′08"	187.77′	371.21′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-12**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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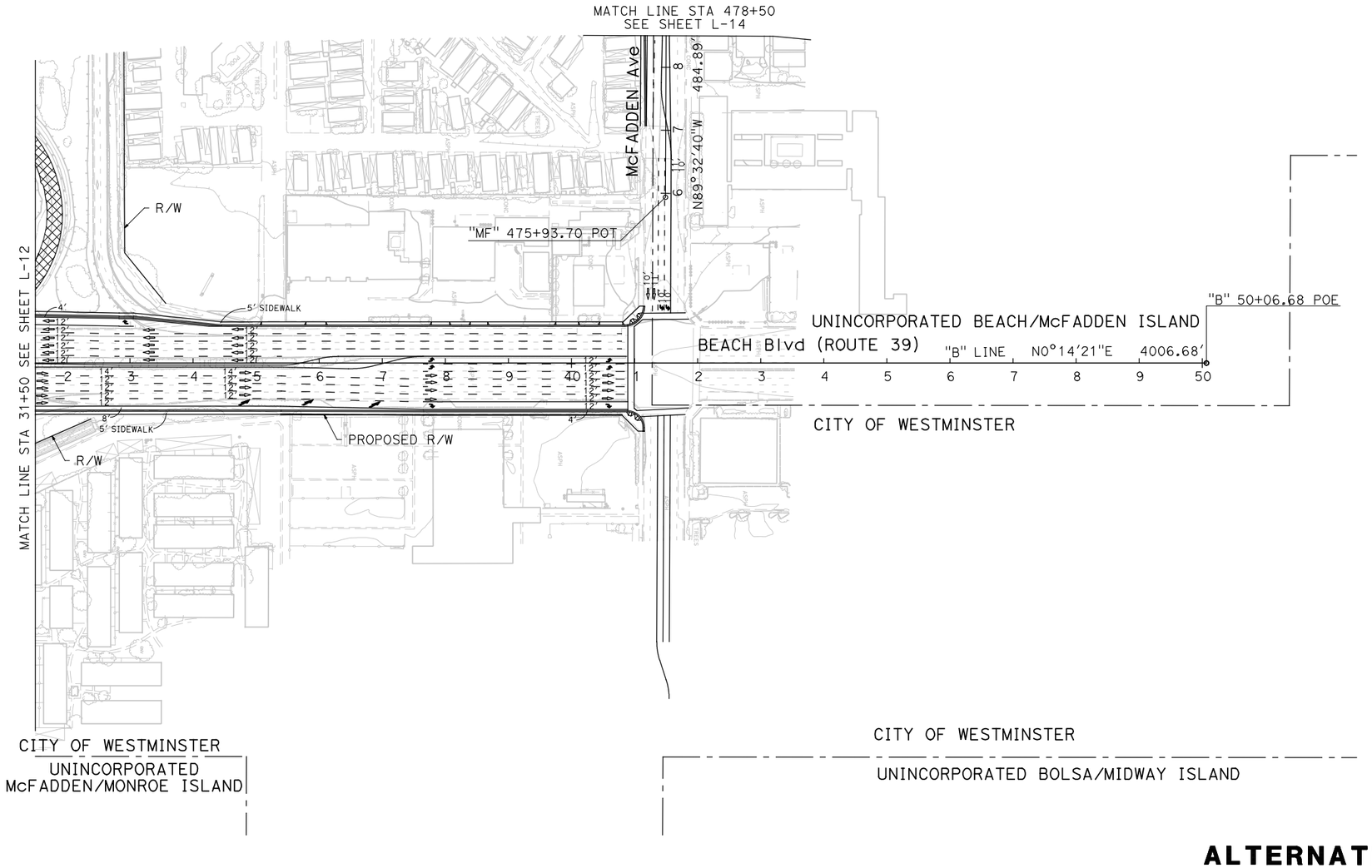

ALTERNATIVE 2
LAYOUT

SCALE 1"=100' **L-13**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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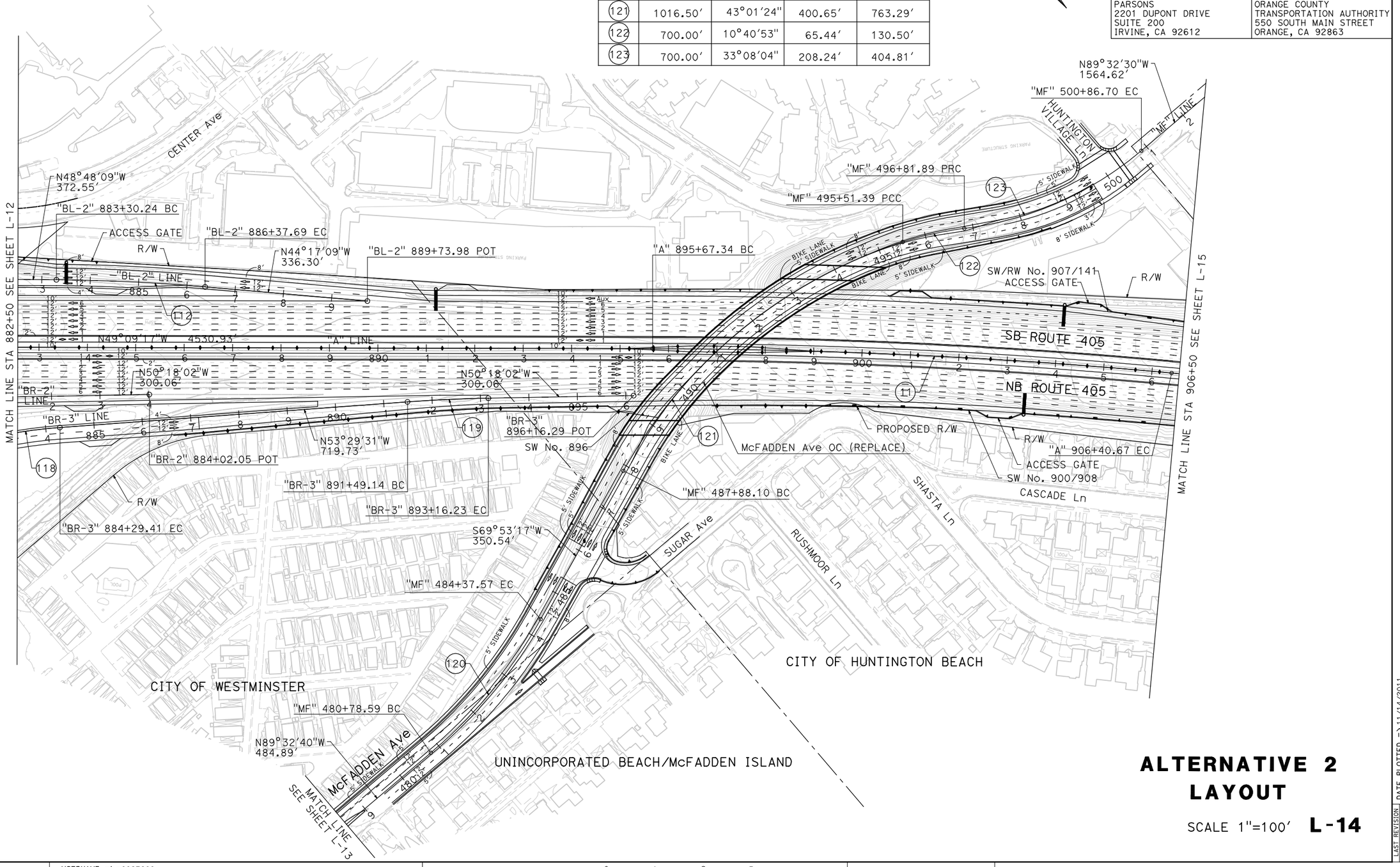
CURVE DATA

No.	R	Δ	T	L
11	12000.00′	5°07′29"	537.02′	1073.33′
112	3900.00′	4°31′00"	153.80′	307.44′
118	1000.00′	21°16′08"	187.77′	371.21′
119	3000.00′	3°11′29"	83.57′	167.10′
120	1000.00′	20°34′03"	181.44′	358.97′
121	1016.50′	43°01′24"	400.65′	763.29′
122	700.00′	10°40′53"	65.44′	130.50′
123	700.00′	33°08′04"	208.24′	404.81′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-14**

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DATE PLOTTED => 11/14/2011
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DGN FILE => ALT 2 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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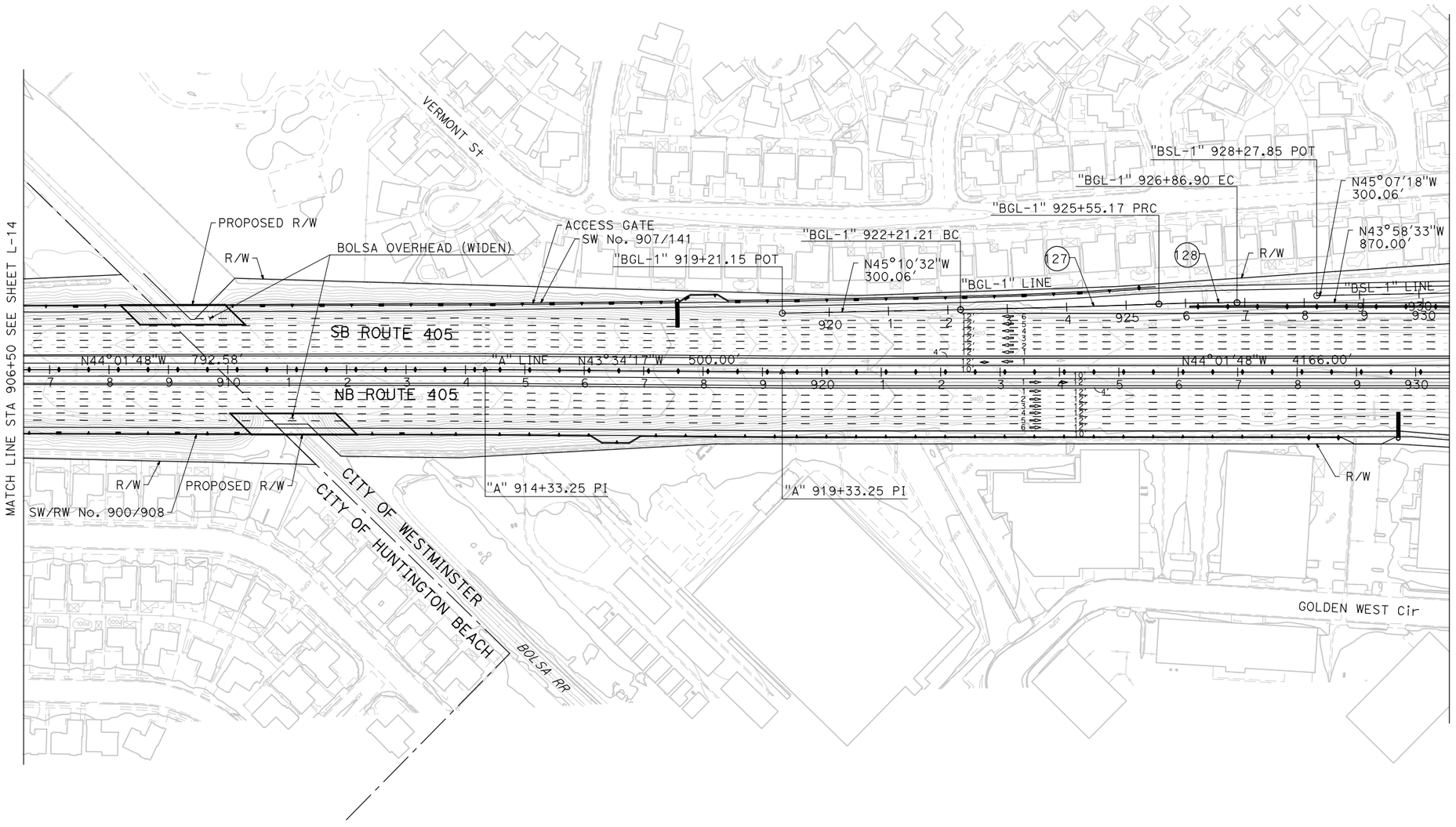
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
127	20000.00′	0°57′24"	166.98′	333.96′
128	3500.00′	2°09′23"	65.87′	131.73′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-15**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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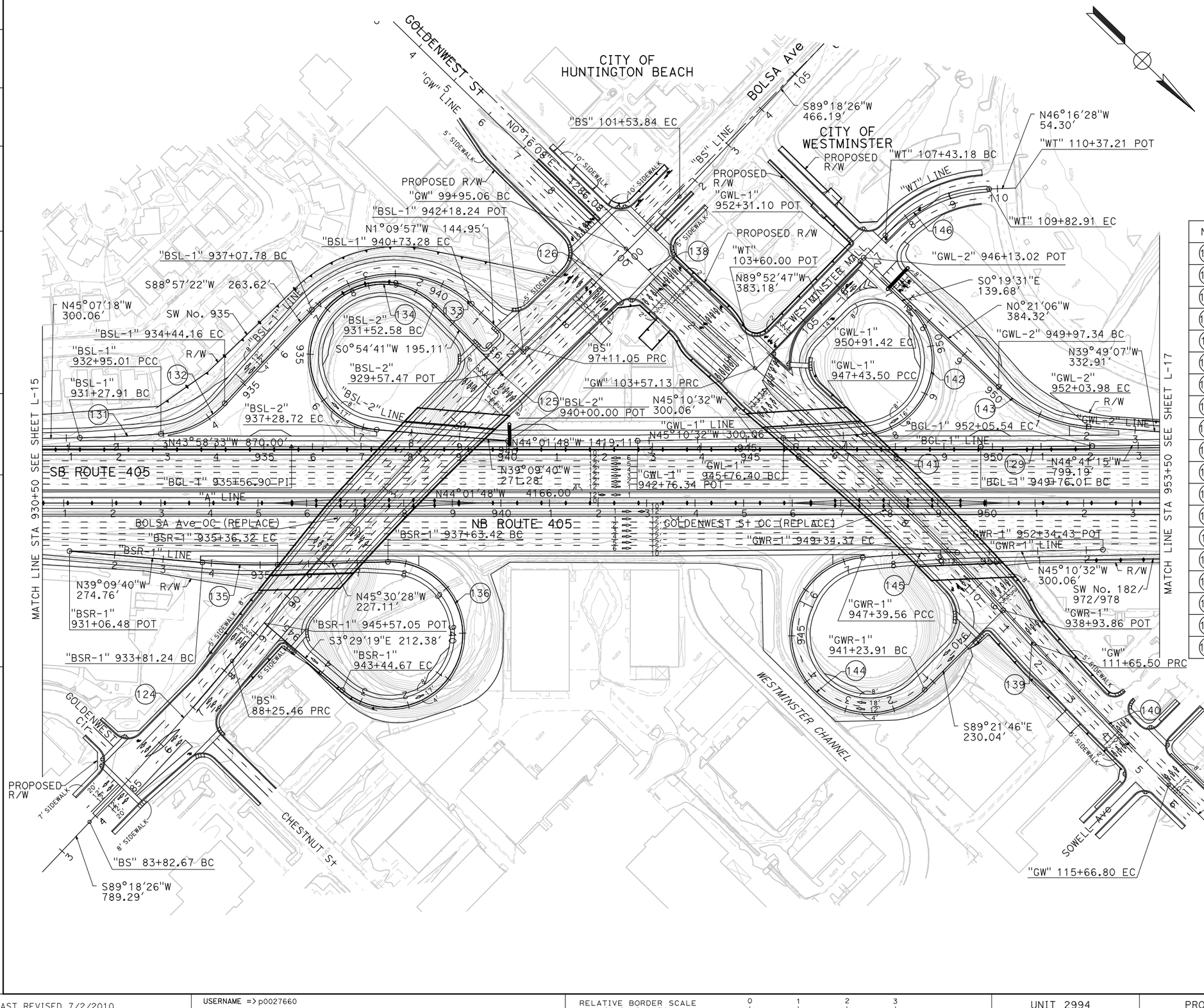

CURVE DATA

No.	R	Δ	T	L
124	7000.00′	3°37′28"	221.47′	442.79′
125	7000.00′	7°14′55"	443.38′	885.59′
126	7000.00′	3°37′28"	221.47′	442.79′
129	20000.00′	0°39′27"	114.77′	229.53′
131	3000.00′	3°11′29"	83.57′	167.10′
132	200.00′	42°43′50"	78.24′	149.16′
133	233.00′	89°52′40"	232.50′	365.50′
134	150.00′	220°04′20"	-	576.15′
135	1400.00′	6°20′48"	77.62′	155.08′
136	150.00′	222°01′09"	-	581.24′
138	7000.00′	2°57′49"	181.07′	362.07′
139	7000.00′	6°37′00"	404.63′	808.37′
140	7000.00′	3°17′05"	200.71′	401.30′
141	3000.00′	3°11′29"	83.57′	167.10′
142	151.07′	131°57′29"	338.97′	347.93′
143	300.00′	39°28′01"	107.61′	206.65′
144	160.00′	220°27′59"	-	615.66′
145	3000.00′	3°43′14"	97.44′	194.81′
146	315.00′	43°36′18"	126.01′	239.73′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-16**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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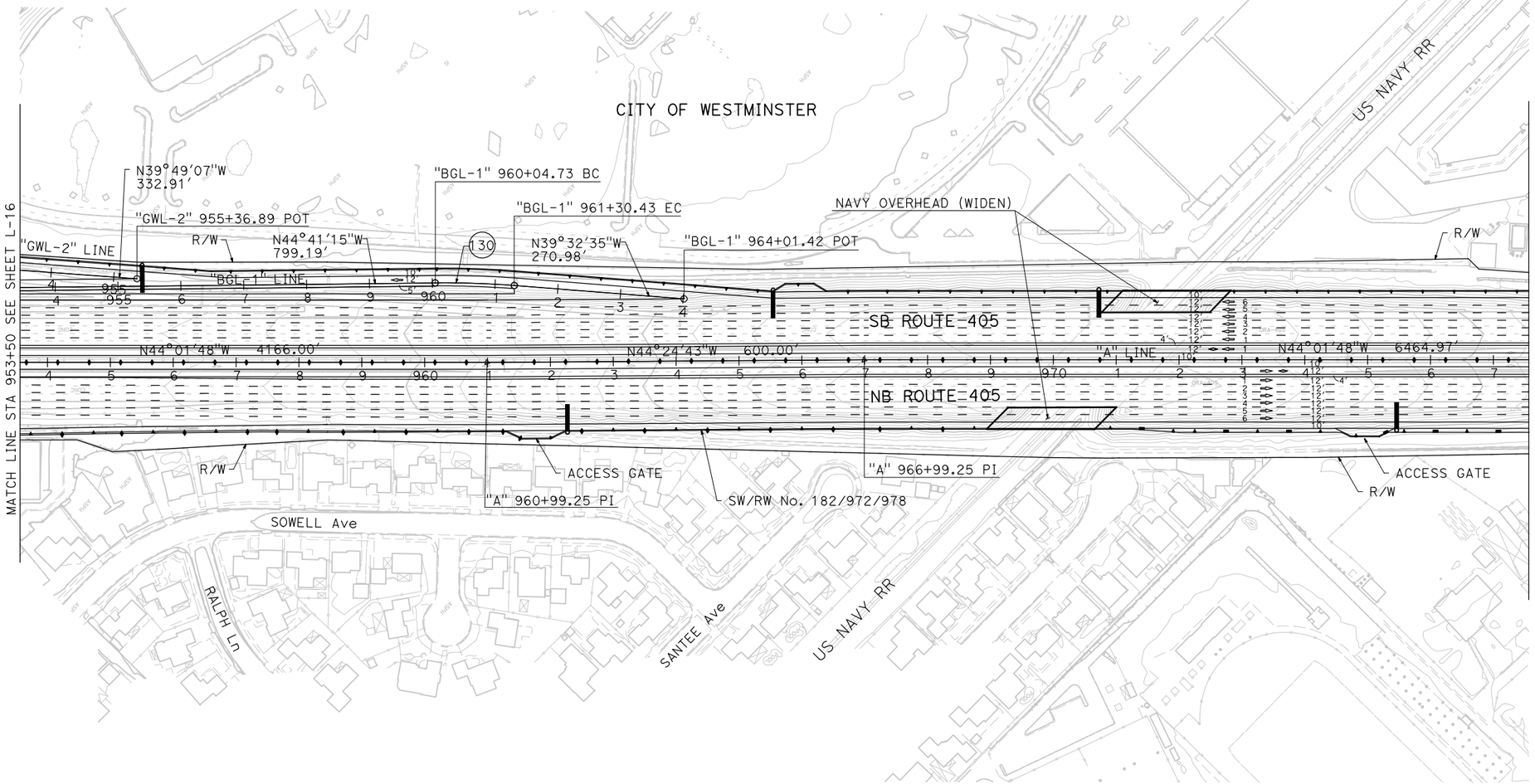
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
130	1400.00′	5°08′39"	62.89′	125.70′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-17**

LAST REVISION 00-00-00
DATE PLOTTED => 11/14/2011
TIME PLOTTED => 11:02:18 AM

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USERNAME => p0027660
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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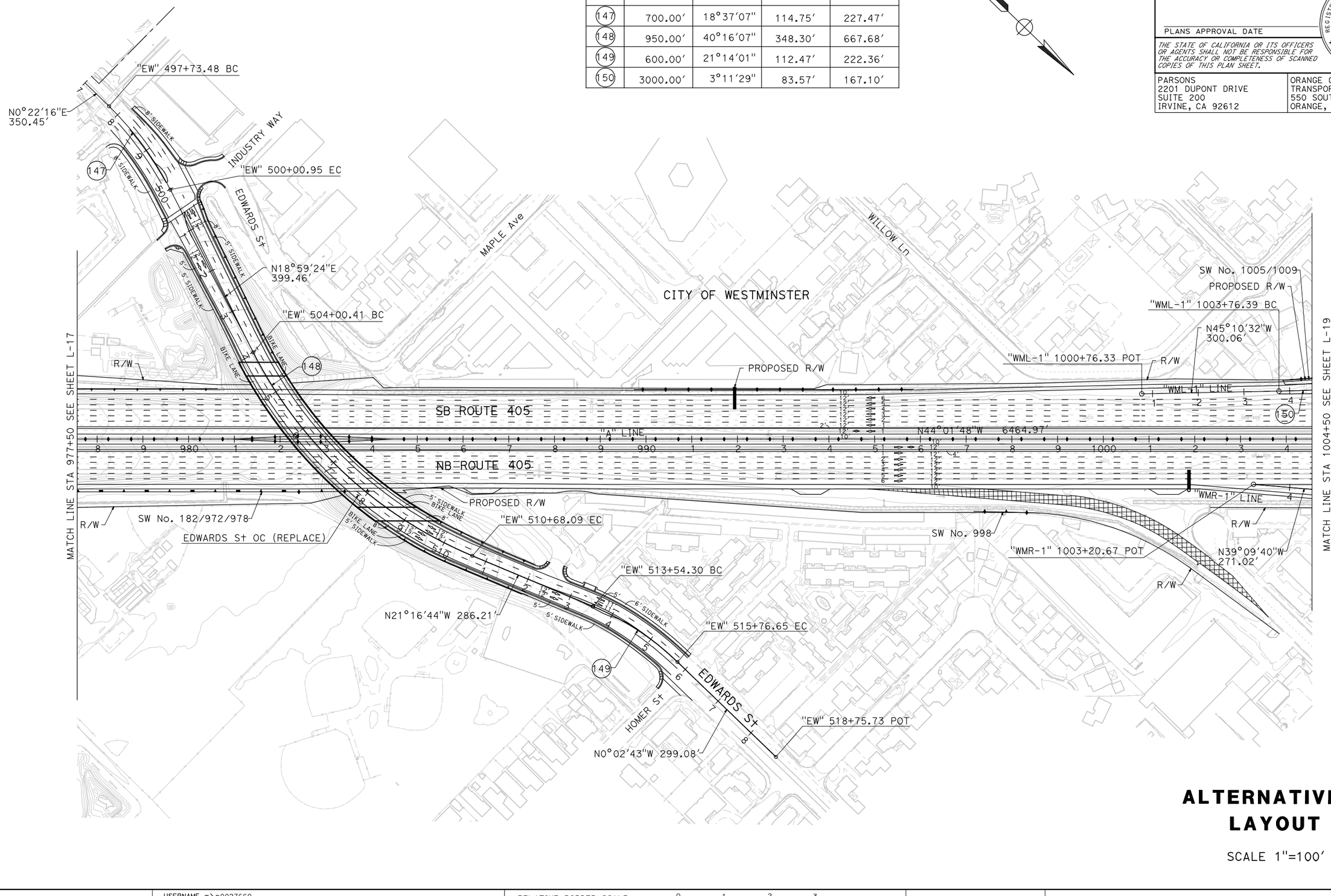
550 SOUTH MAIN STREET
ORANGE, CA 92863

CURVE DATA

No.	R	Δ	T	L
147	700.00′	18°37′07"	114.75′	227.47′
148	950.00′	40°16′07"	348.30′	667.68′
149	600.00′	21°14′01"	112.47′	222.36′
150	3000.00′	3°11′29"	83.57′	167.10′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-18**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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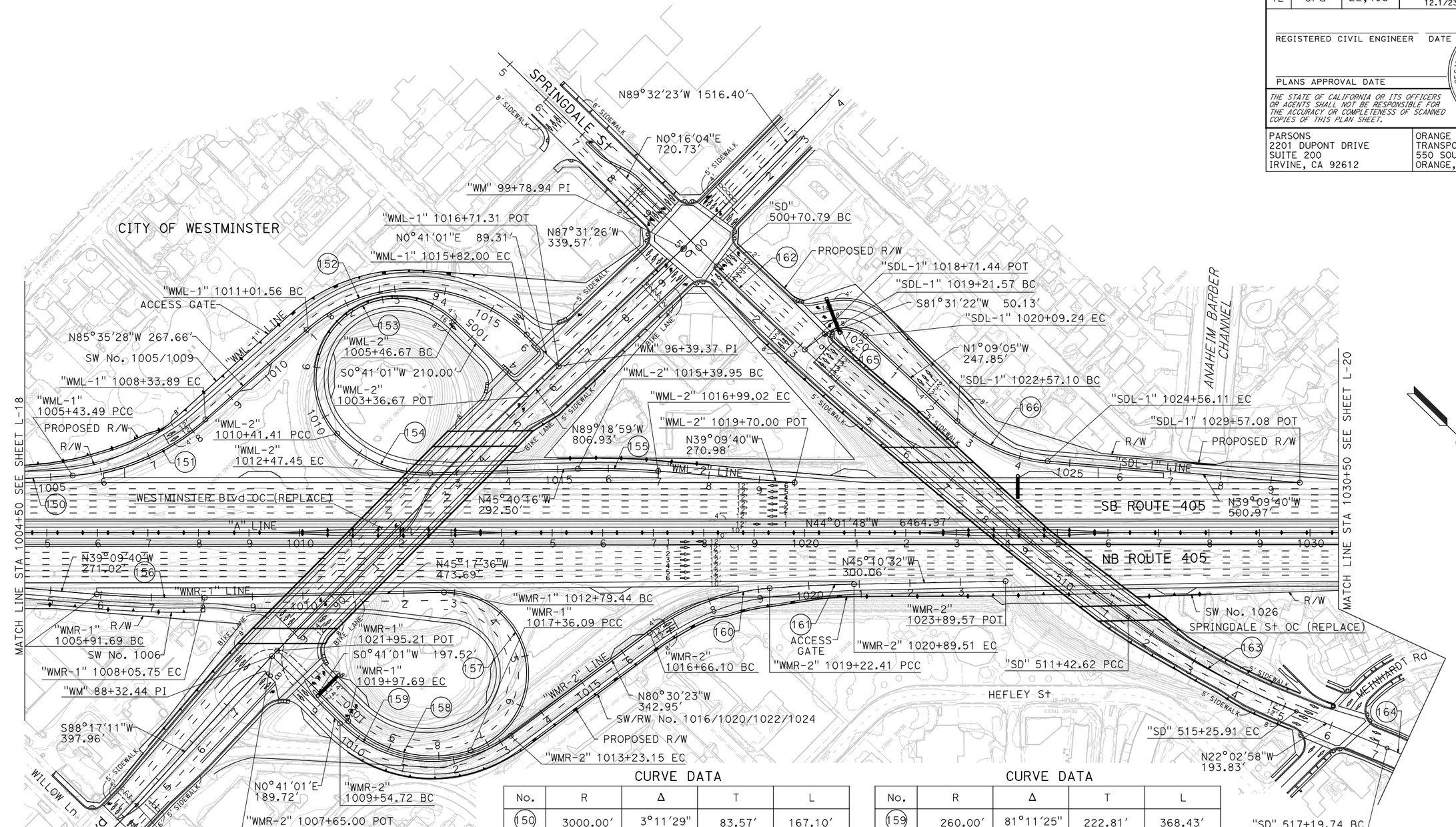

CURVE DATA

No.	R	Δ	T	L
150	3000.00′	3°11′29"	83.57′	167.10′
151	447.00′	37°13′26"	150.54′	290.41′
152	317.00′	86°50′14"	299.97′	480.44′
153	160.00′	177°10′04"	6472.14′	494.75′
154	240.00′	49°11′13"	109.85′	206.03′
155	1400.00′	6°30′36"	79.62′	159.07′
156	2000.00′	6°07′56"	107.13′	214.06′
157	160.00′	163°31′27"	1105.15′	456.65′
158	240.00′	67°27′10"	145.50′	261.60′

CURVE DATA

No.	R	Δ	T	L
159	260.00′	81°11′25"	222.81′	368.43′
160	456.93′	32°08′21"	131.62′	256.31′
161	3000.00′	3°11′29"	83.57′	167.10′
162	8000.00′	7°40′35"	536.72′	1071.83′
163	1500.00′	14°38′27"	192.70′	383.30′
164	600.00′	23°42′12"	125.91′	248.22′
165	62.50′	80°22′18"	52.79′	87.67′
166	300.00′	38°00′35"	103.33′	199.02′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-19**

LAST REVISION | DATE PLOTTED => 11/14/2011
00-00-00 | TIME PLOTTED => 11:02:27 AM

BORDER LAST REVISED 7/2/2010 | USERNAME => p0027660 | DGN FILE => ALT 2 Layout Sheets.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2994 | PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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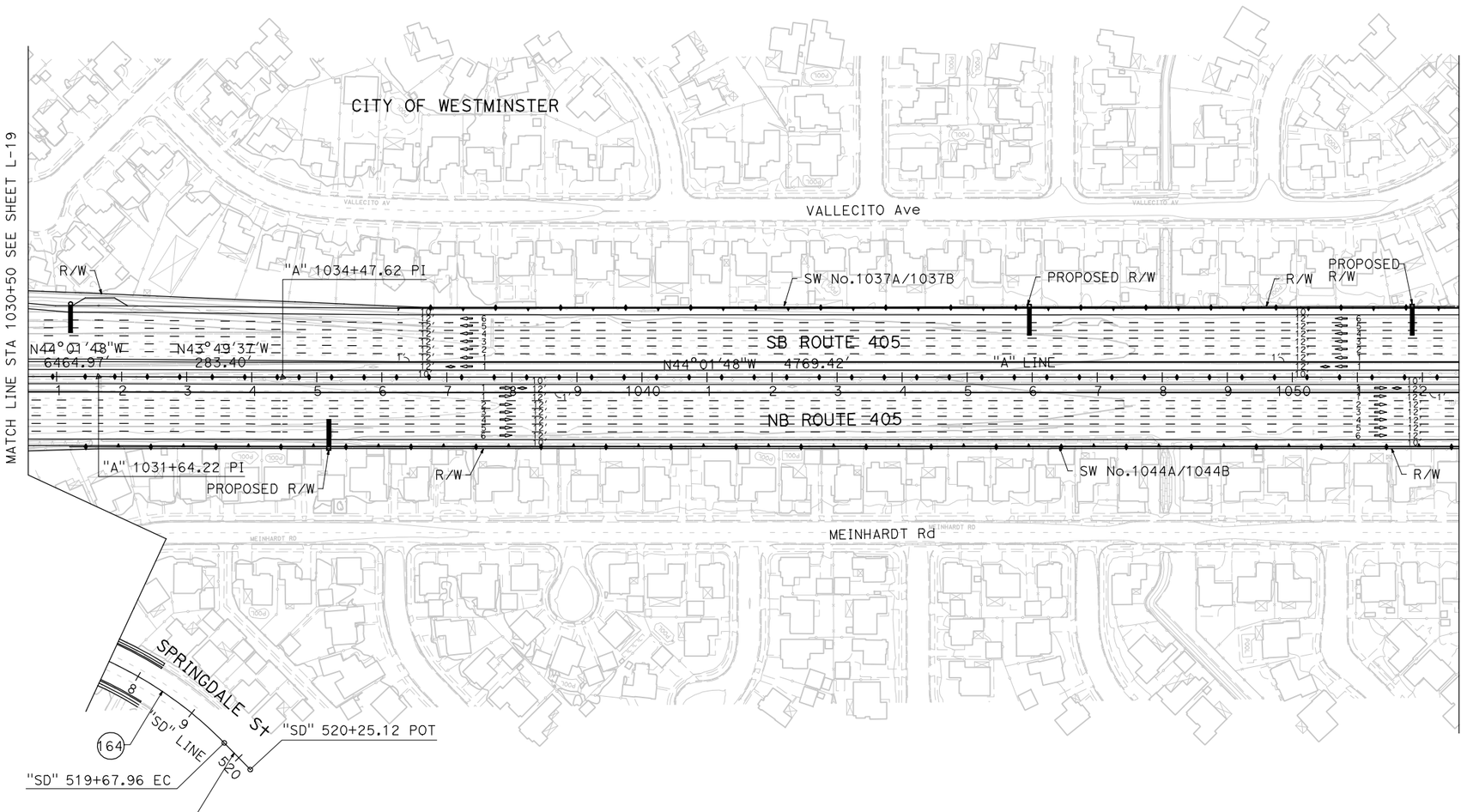
CURVE DATA

No.	R	Δ	T	L
164	600.00′	23°42′12"	125.91′	248.22′



ALTERNATIVE 2
LAYOUT

SCALE 1"=100′ **L-20**

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DATE PLOTTED => 11/14/2011
TIME PLOTTED => 11:02:34 AM

BORDER LAST REVISED 7/2/2010
USERNAME => p0027660
DGN FILE => ALT 2 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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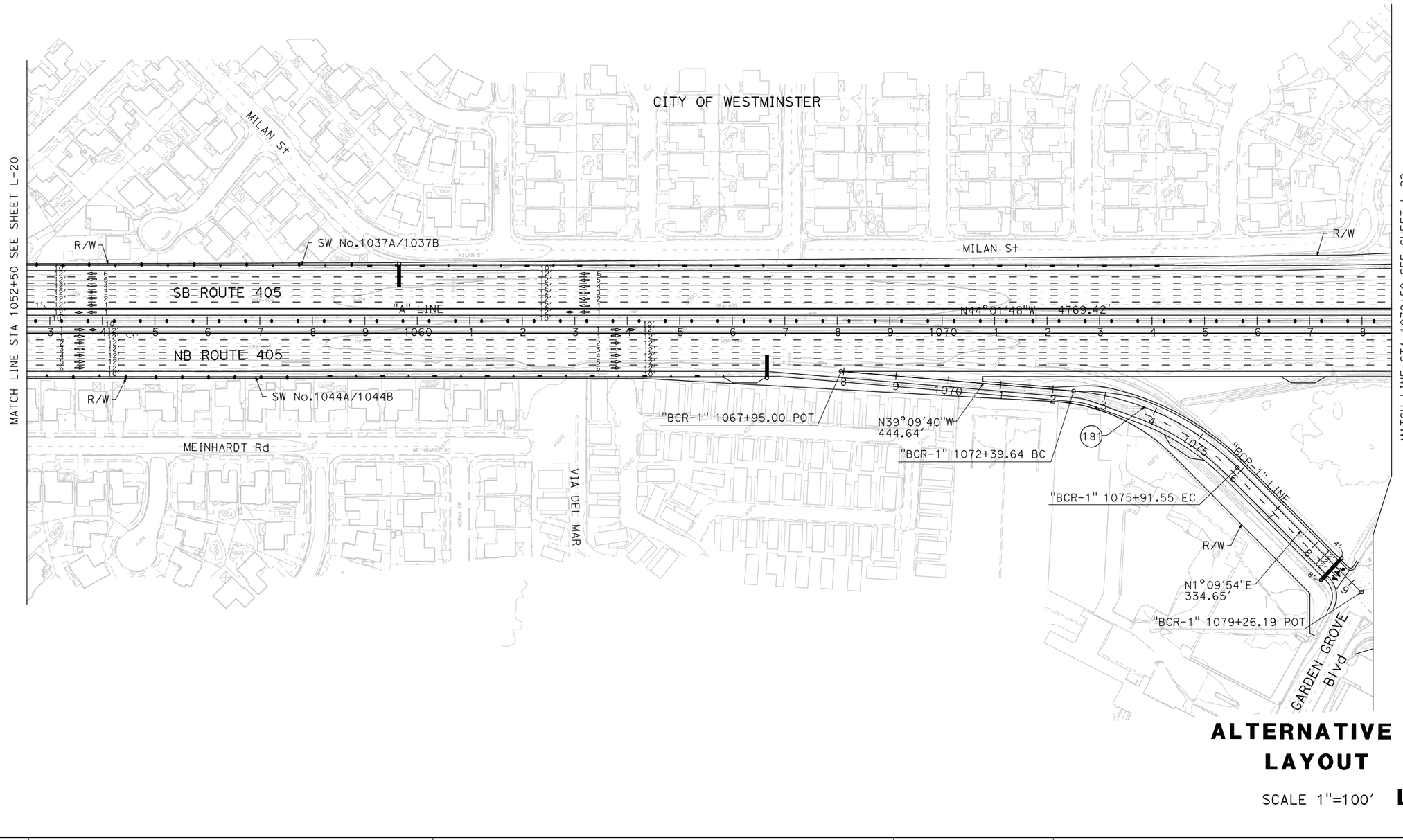
CURVE DATA

No.	R	Δ	T	L
(181)	500.00′	40°19′33"	183.60′	351.91′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-21**

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LAST REVISION 00-00-00
DATE PLOTTED => 11/14/2011
TIME PLOTTED => 11:02:38 AM

BORDER LAST REVISED 7/2/2010
USERNAME => p0027660
DGN FILE => ALT 2 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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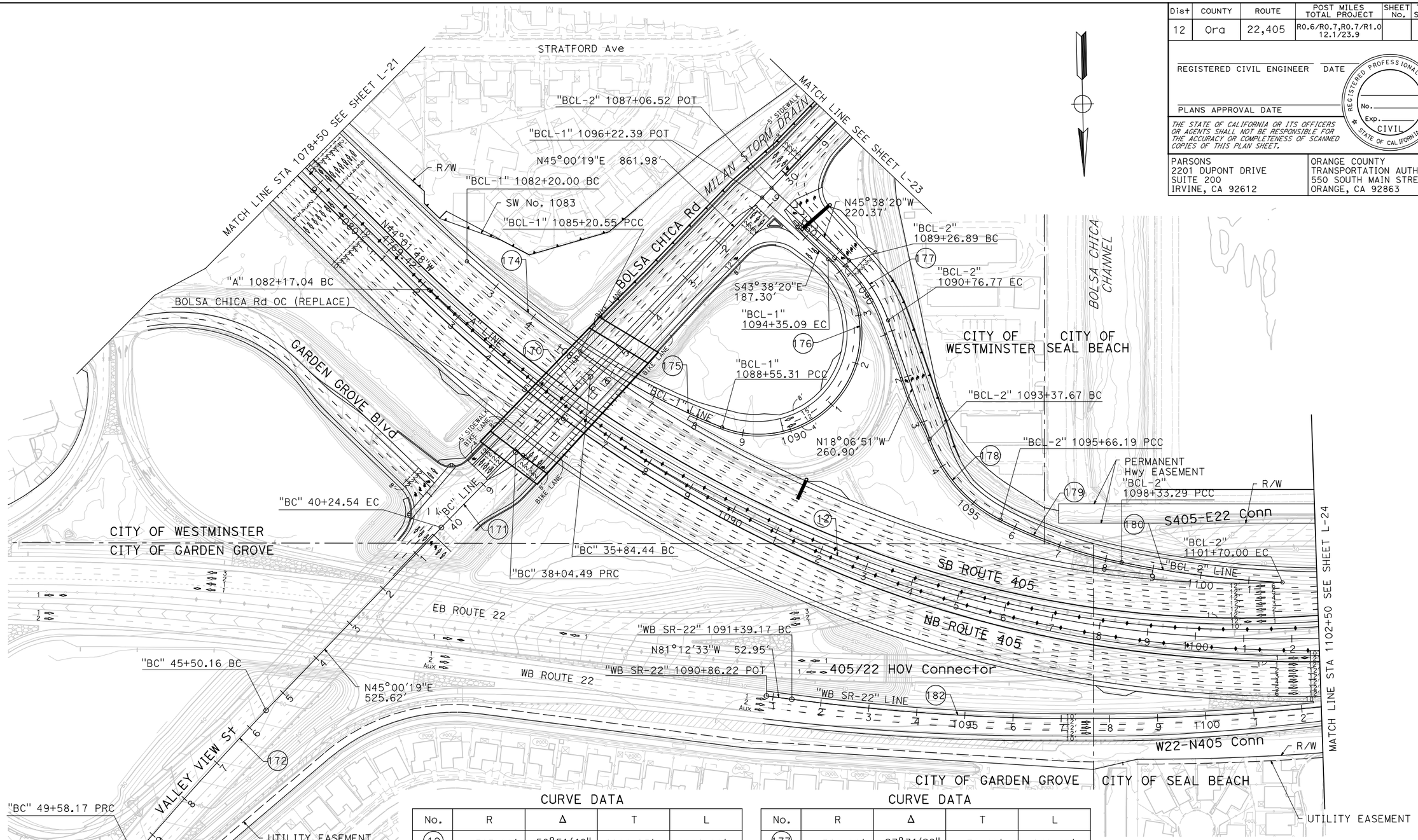

CURVE DATA

No.	R	Δ	T	L
12	2503.00′	50°51′40"	1190.15′	2221.90′
170	7000.00′	1°48′04"	110.03′	220.05′
171	7000.00′	1°48′04"	110.03′	220.05′
172	7000.00′	3°20′23"	204.06′	408.01′
173	7000.00′	3°20′52"	204.56′	409.00′
174	2615.00′	6°35′07"	150.44′	300.55′
175	1386.70′	13°49′54"	168.20′	334.76′
176	210.00′	158°11′04"	1089.72′	579.78′

CURVE DATA

No.	R	Δ	T	L
177	312.00′	27°31′29"	76.42′	149.88′
178	300.00′	43°38′39"	120.13′	228.52′
179	1000.00′	15°18′15"	134.35′	267.11′
180	2115.00′	9°07′17"	168.71′	336.71′
182	4686.90′	14°35′16"	599.90′	1193.32′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-22**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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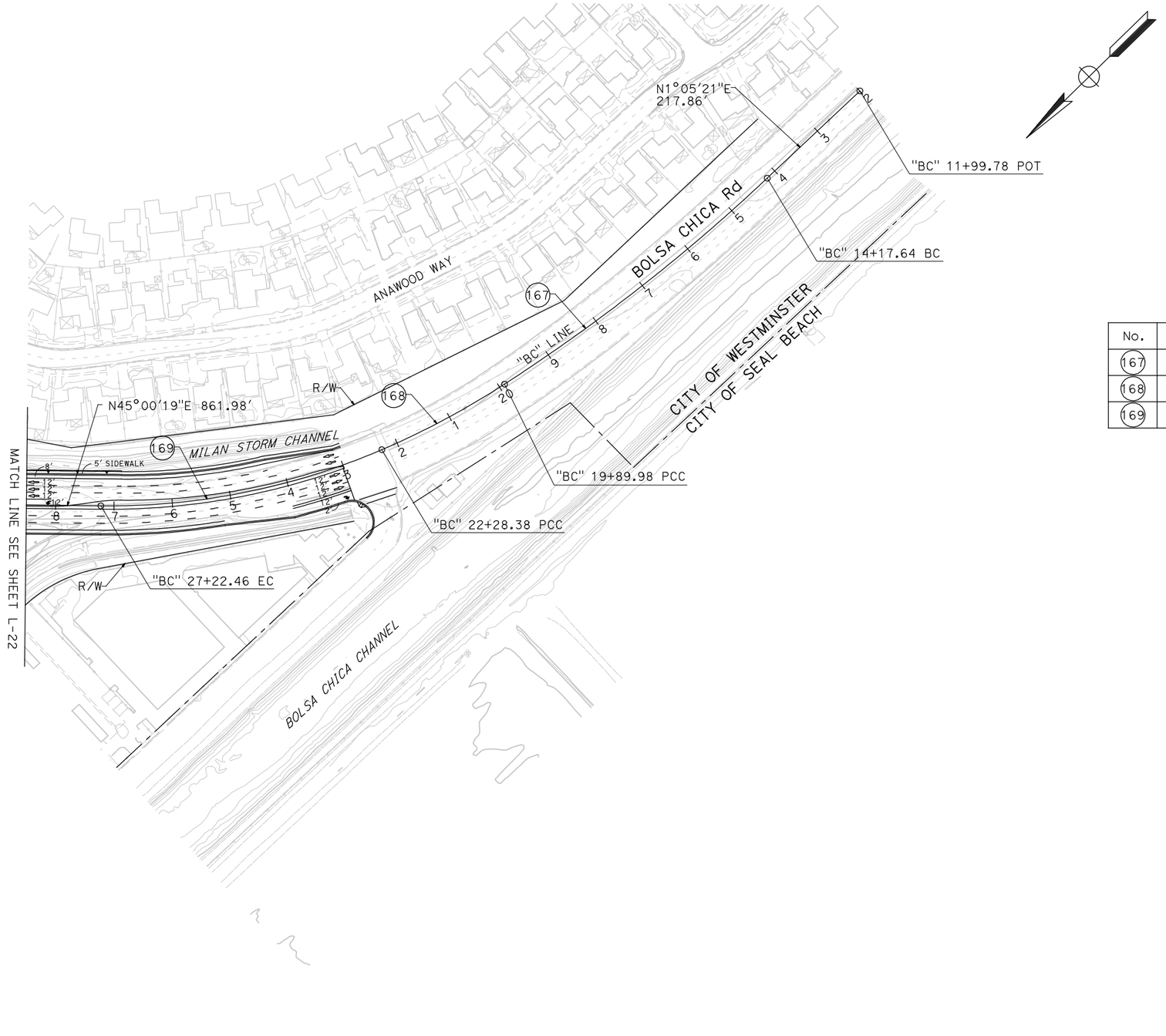

CURVE DATA

No.	R	Δ	T	L
167	3178.45′	10°19′02"	286.94′	572.34′
168	1412.63′	9°40′09"	119.48′	238.40′
169	1183.00′	23°55′47"	250.70′	494.08′

ALTERNATIVE 2
LAYOUT

SCALE 1"=100′ **L-23**

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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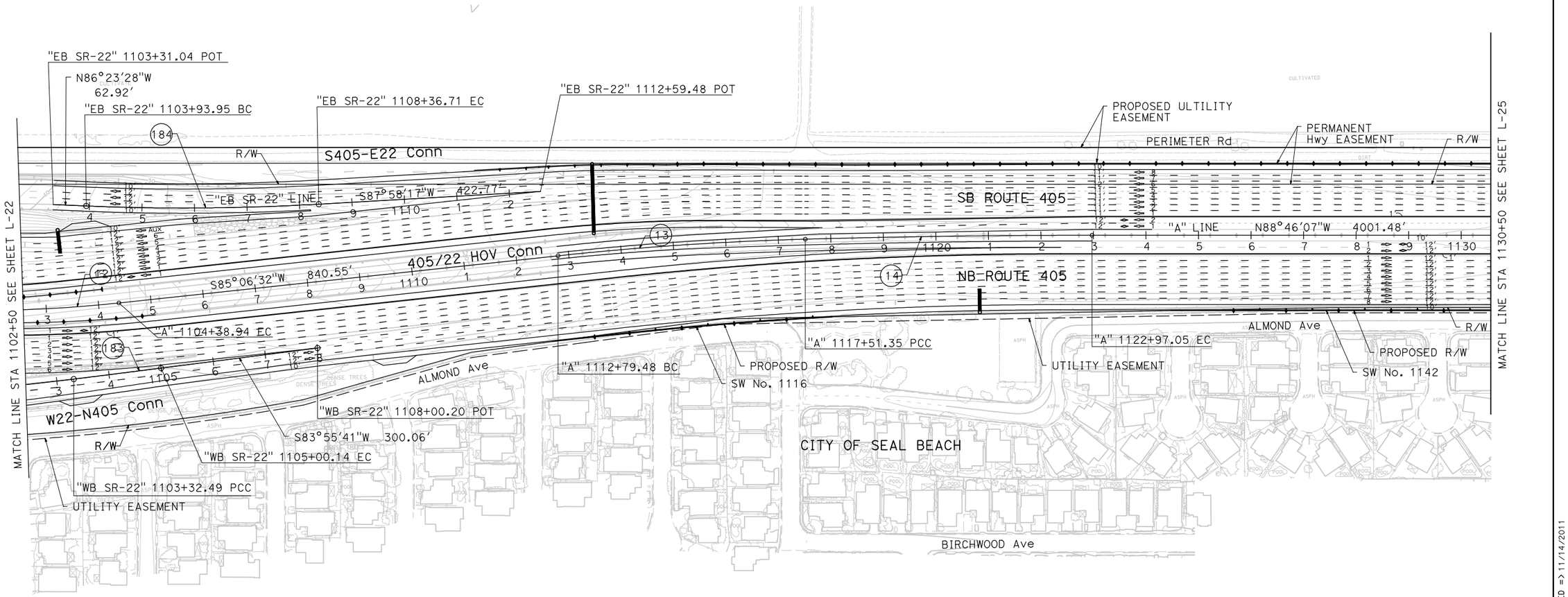
CURVE DATA

No.	R	Δ	T	L
12	2503.00′	50°51′40"	1190.15′	2221.90′
13	5930.00′	4°33′33"	236.06′	471.87′
14	20000.00′	1°33′48"	272.86′	545.69′
183	34963.56′	0°16′29"	83.83′	167.65′
184	4500.00′	5°38′15"	221.56′	422.76′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-24**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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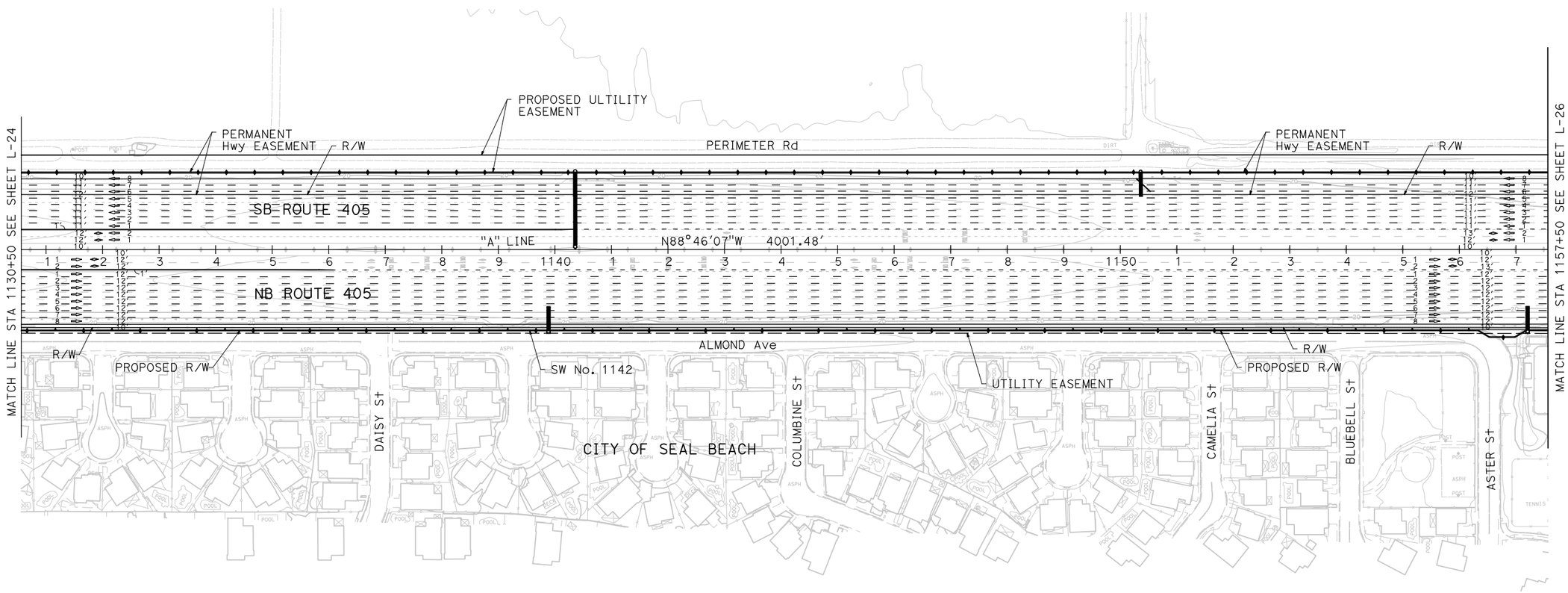

ALTERNATIVE 2
LAYOUT

SCALE 1"=100' **L-25**

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DATE PLOTTED => 11/14/2011
TIME PLOTTED => 3:12:49 PM

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DGN FILE => ALT 2 Layout Sheets.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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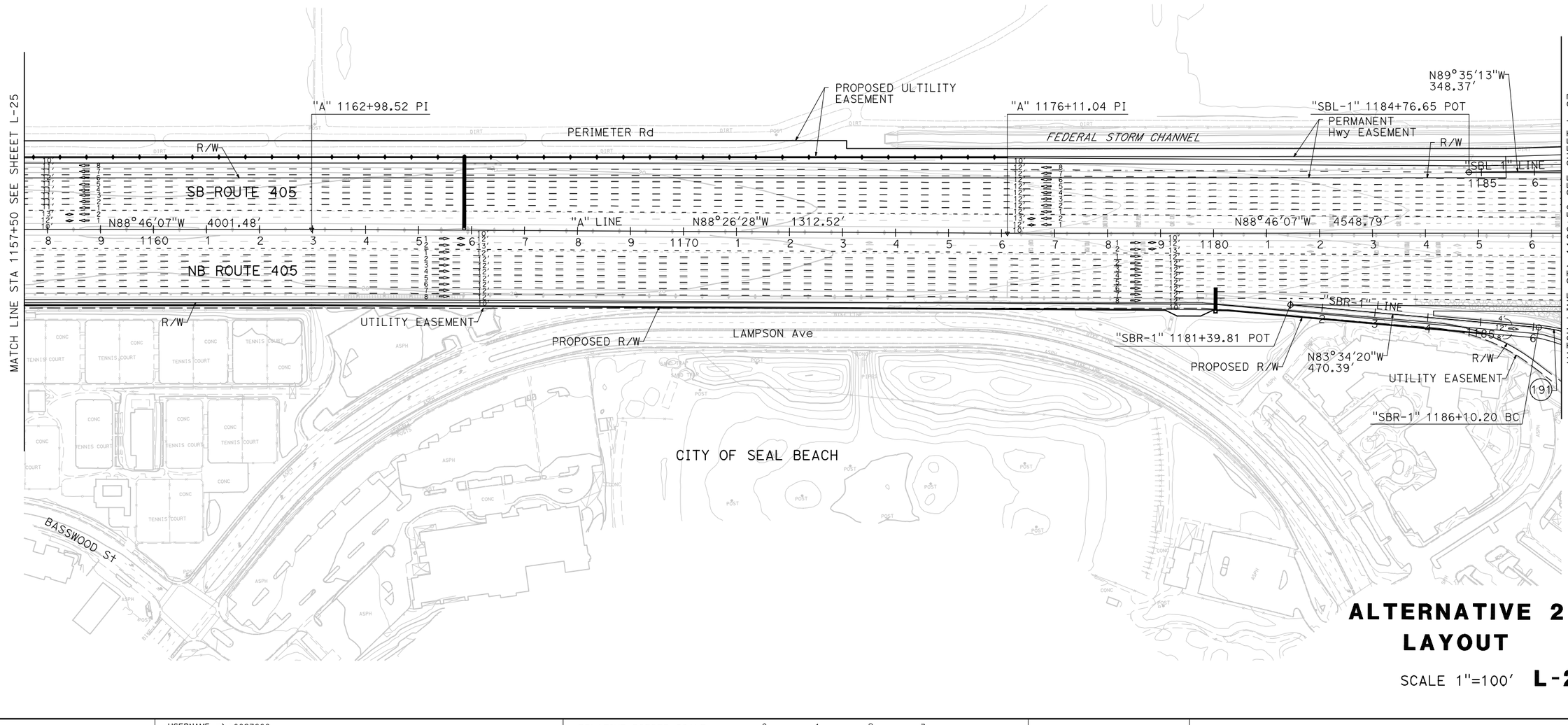
CURVE DATA

No.	R	Δ	T	L
(191)	300.00′	35°18′36"	95.48′	184.88′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-26**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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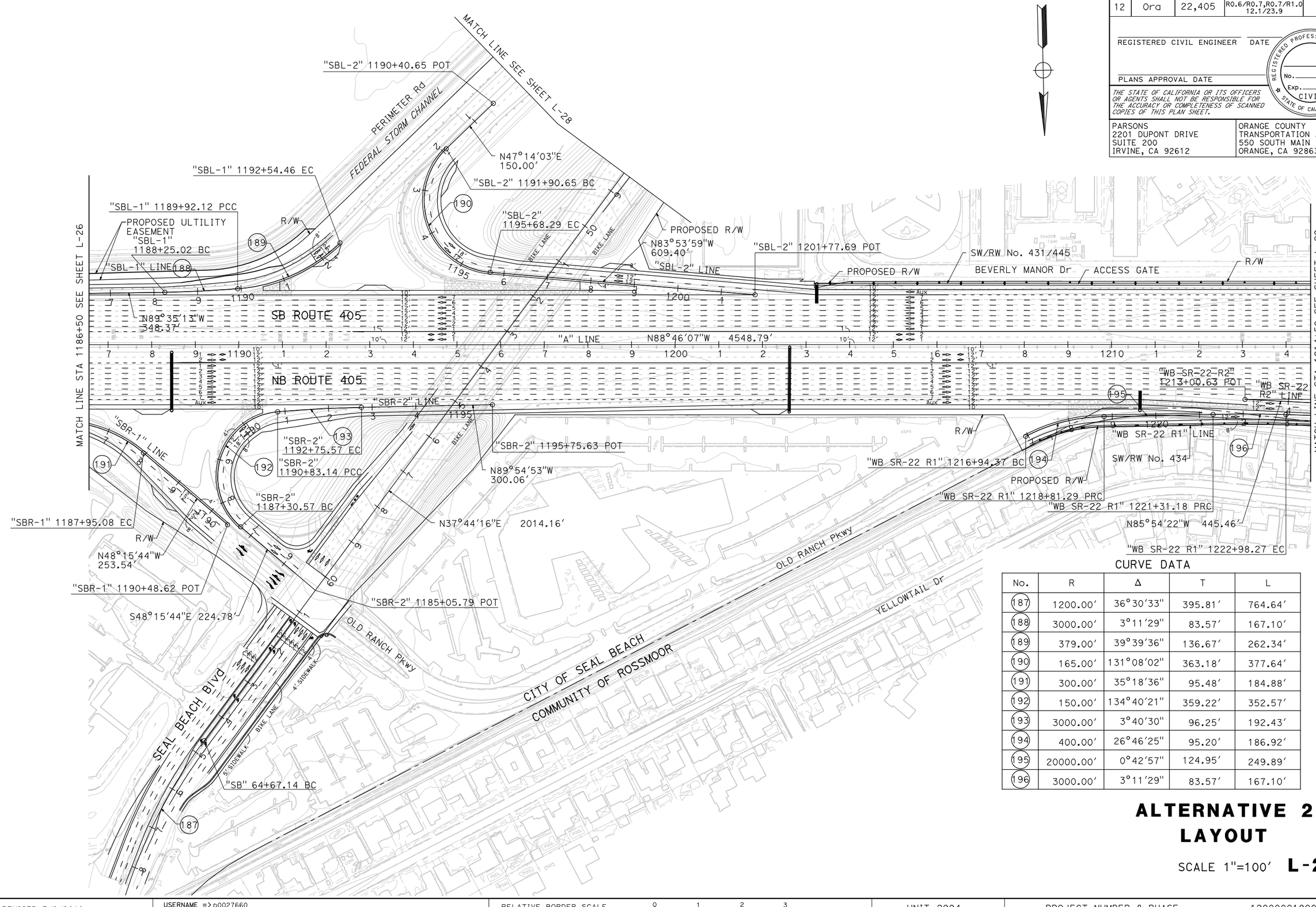

CURVE DATA

No.	R	Δ	T	L
187	1200.00′	36°30′33"	395.81′	764.64′
188	3000.00′	3°11′29"	83.57′	167.10′
189	379.00′	39°39′36"	136.67′	262.34′
190	165.00′	131°08′02"	363.18′	377.64′
191	300.00′	35°18′36"	95.48′	184.88′
192	150.00′	134°40′21"	359.22′	352.57′
193	3000.00′	3°40′30"	96.25′	192.43′
194	400.00′	26°46′25"	95.20′	186.92′
195	20000.00′	0°42′57"	124.95′	249.89′
196	3000.00′	3°11′29"	83.57′	167.10′

ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-27**

LAST REVISION DATE PLOTTED => 11/14/2011
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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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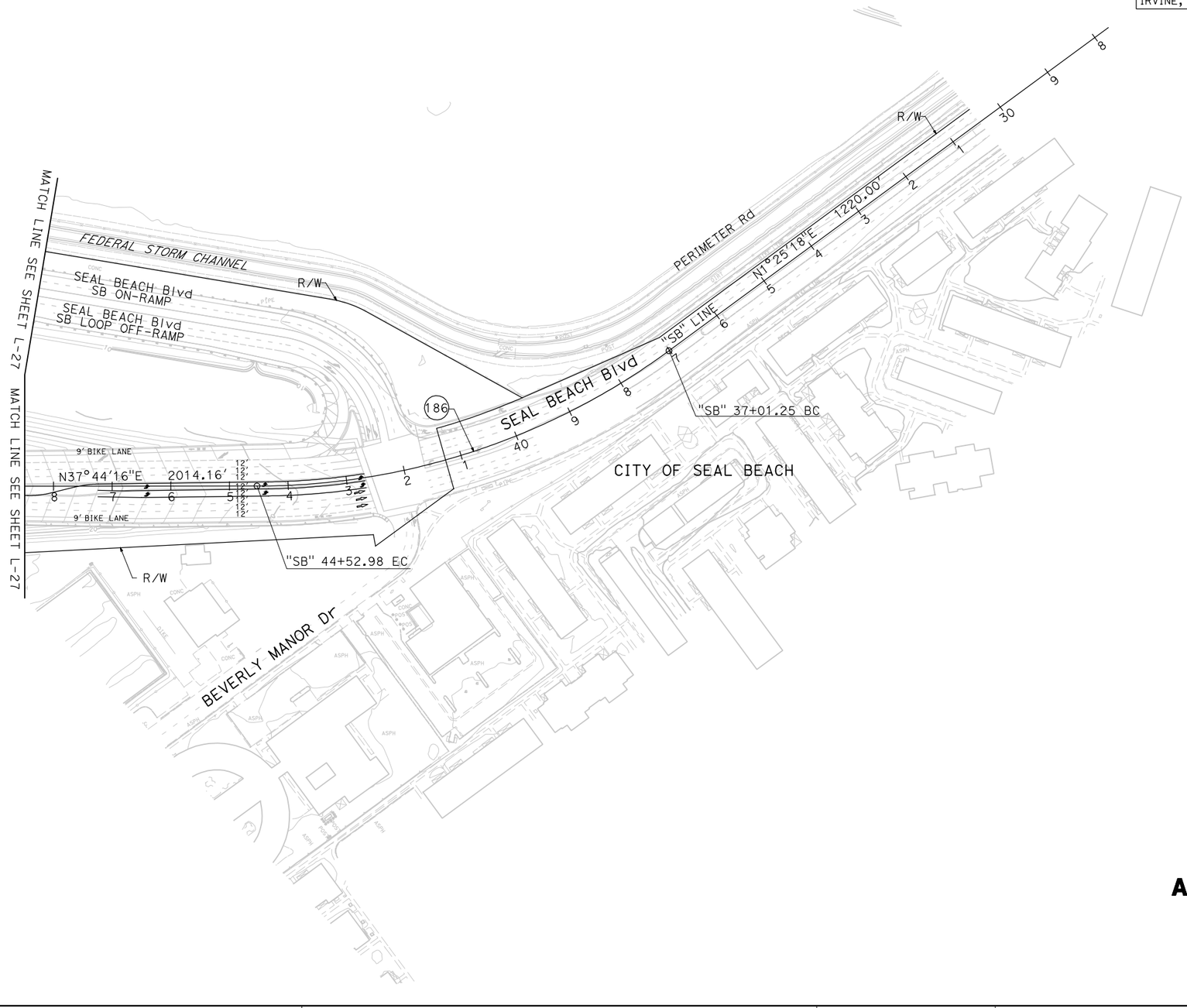
CURVE DATA

No.	R	Δ	T	L
186	1186.00′	36°18′58"	388.98′	751.73′



ALTERNATIVE 2
LAYOUT

SCALE 1"=100′ **L-28**

LAST REVISION	DATE PLOTTED => 11/14/2011
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UNIT 2994

PROJECT NUMBER & PHASE 12000001800

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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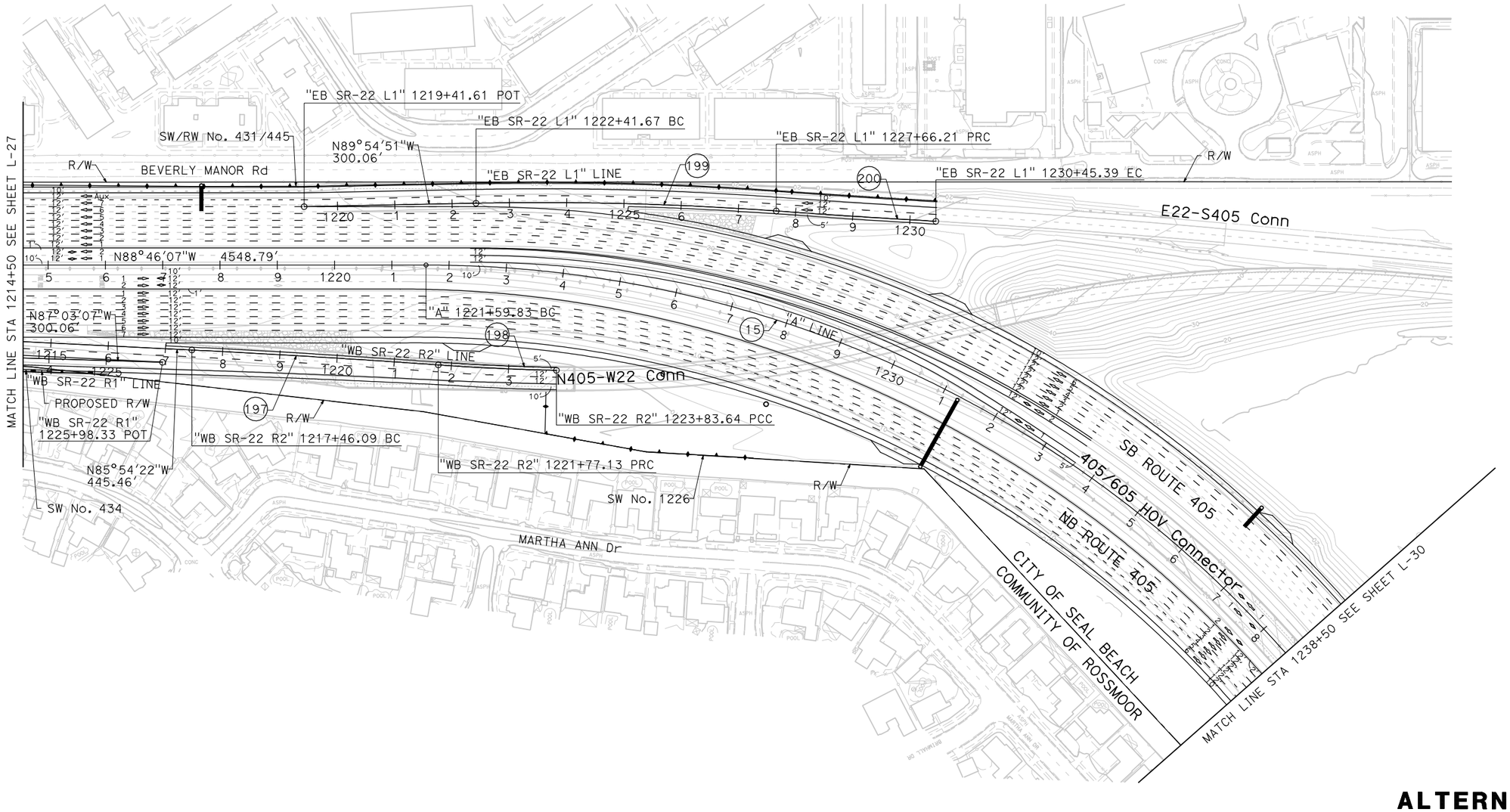
CURVE DATA

No.	R	Δ	T	L
15	2000.00′	58°25′06"	1118.18′	2039.19′
197	20000.00′	1°14′05"	215.53′	431.04′
198	3967.24′	2°58′57"	103.28′	206.51′
199	5720.87′	5°15′12"	262.45′	524.54′
200	20000.00′	0°47′59"	139.60′	279.19′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-29**

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	22,405	R0.6/R0.7,R0.7/R1.0 12.1/23.9		

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PLANS APPROVAL DATE

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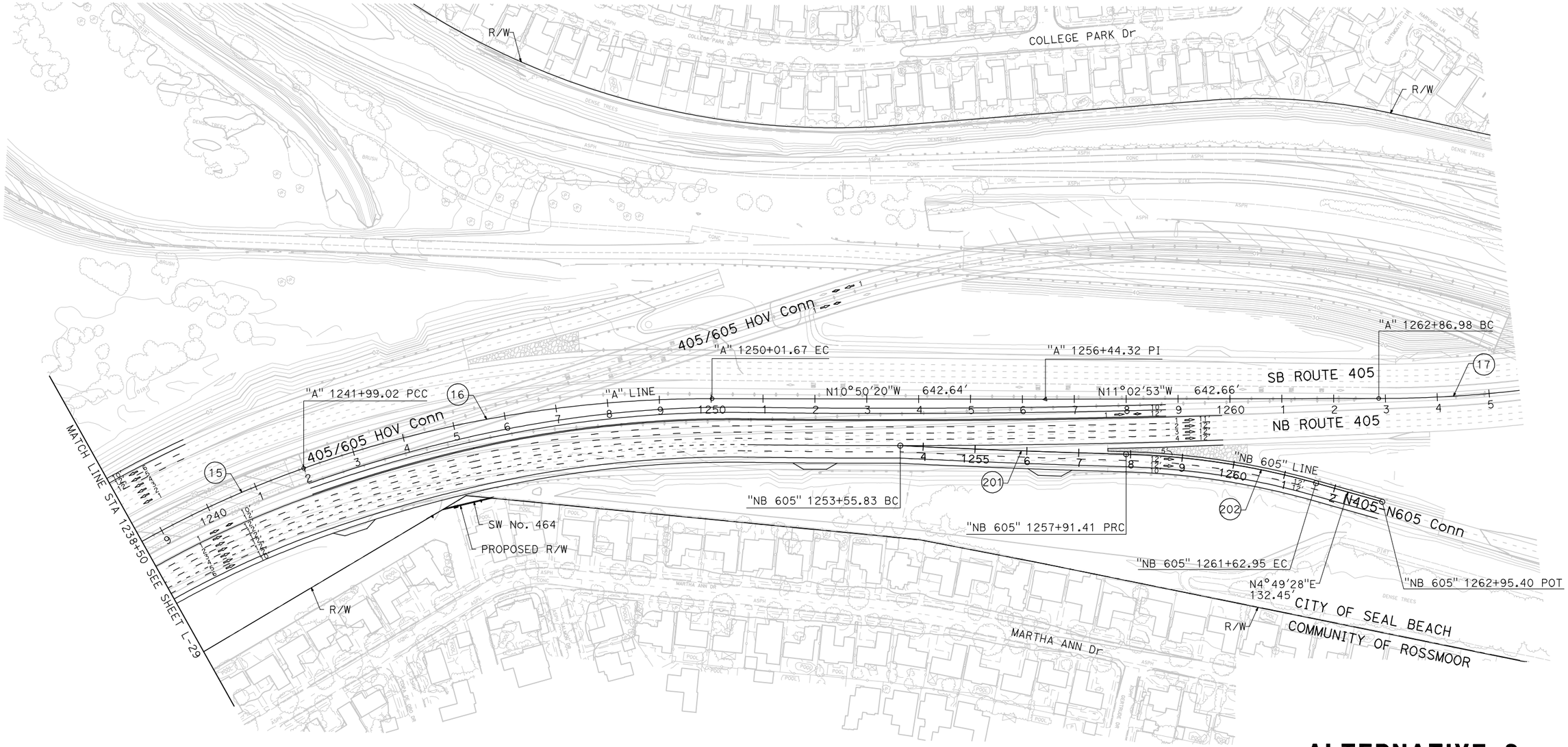
CURVE DATA

No.	R	Δ	T	L
15	2000.00′	58°25′06"	1118.18′	2039.19′
16	2357.00′	19°30′42"	405.25′	802.65′
17	2400.00′	36°15′41"	785.86′	1518.91′
201	20062.00′	1°14′38"	217.80′	435.58′
202	1500.00′	14°11′30"	186.72′	371.54′



ALTERNATIVE 2 LAYOUT

SCALE 1"=100′ **L-30**

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TIME PLOTTED => 11:03:23 AM

BORDER LAST REVISED 7/2/2010
USERNAME => p0027660
DGN FILE => ALT 2 Layout Sheets.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2994
PROJECT NUMBER & PHASE 12000001800