ROUTE REFINEMENT STUDY

COASTAL CORRIDOR RAIL TRANSIT PROJECT

SOUTH SEGMENT

MAY 1990

LOS ANGELES COUNTY TRANSPORTATION COMMISSION
403 WEST EIGHTH STREET, SUITE 500
LOS ANGELES, CALIFORNIA 90014

LACTC

IN COOPERATION WITH THE CITIES OF
LAWNDALE, REDONDO BEACH AND TORRANCE

29869342 (cdy)

ROUTE REFINEMENT STUDY

COASTAL CORRIDOR RAIL TRANSIT PROJECT
SOUTH SEGMENT

Prepared for:

The Los Angeles County Transportation Commission
in Cooperation with the Cities of Lawndale,
Redondo Beach, and Torrance

Prepared by:

Bechtel Civil, Inc. (Project Team Leader)
Acoustical Analysis Associates
Barrio Planners, Inc.
DKS Associates, Inc.
Manuel Padron Associates
Michael Brandman Associates
Ralph Stone and Company, Inc.
PGH Wong Engineering, Inc.
W.J. Okitsu Engineering

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The following organizations and individuals participated in the preparation of this study:

Los Angeles County Transportation Commission

Executive Director	Neil Peterson
Director of Rail Development	Richard Stanger
Rail Development Manager	Susan Rosales
Senior Rail Development Planner	Sharad Mistry
Rail Development Planner	Nelia Custodio
Community Relations Manager	Steve Lantz
Community Relations Specialist	Paula Willins
Public Affairs Officer	Mary Lou Echternach

City of Lawndale

City Planner	Kendra Morries

City of Redondo Beach

Housing, Economic Development and Transit	Sue Heller
	Cara Rice
Department of Public Works	John Mate
	Ken Montgomery
Planning and Community Development	Randy Berler

City of Torrance

Transportation Planning Manager	Richard Etherington
Department of Transportation	Ray Schmit
	Robert Hildebrand
	James Chen
Department of Engineering	Dick Perkins
Office of the City Manager	Gary Flod
Department of Planning	Elnora Lee

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SECTION 1

PROJECT BACKGROUND

In November 1980, residents of the Los Angeles County voted to increase the general sales tax by one-half cent to finance development of the countywide transportation system. The measure, commonly referred to as Proposition A, gave the Los Angeles County Transportation Commission (LACTC) the mandate to improve and expand existing public transportation countywide, reduce fares, and design and construct a rail transit system serving approximately 13 corridors. In 1983, the LACTC designated the Coastal Corridor as one of the high priority rail corridors. (Please refer to Exhibit 1. Los Angeles County Rail Transit Plan.)

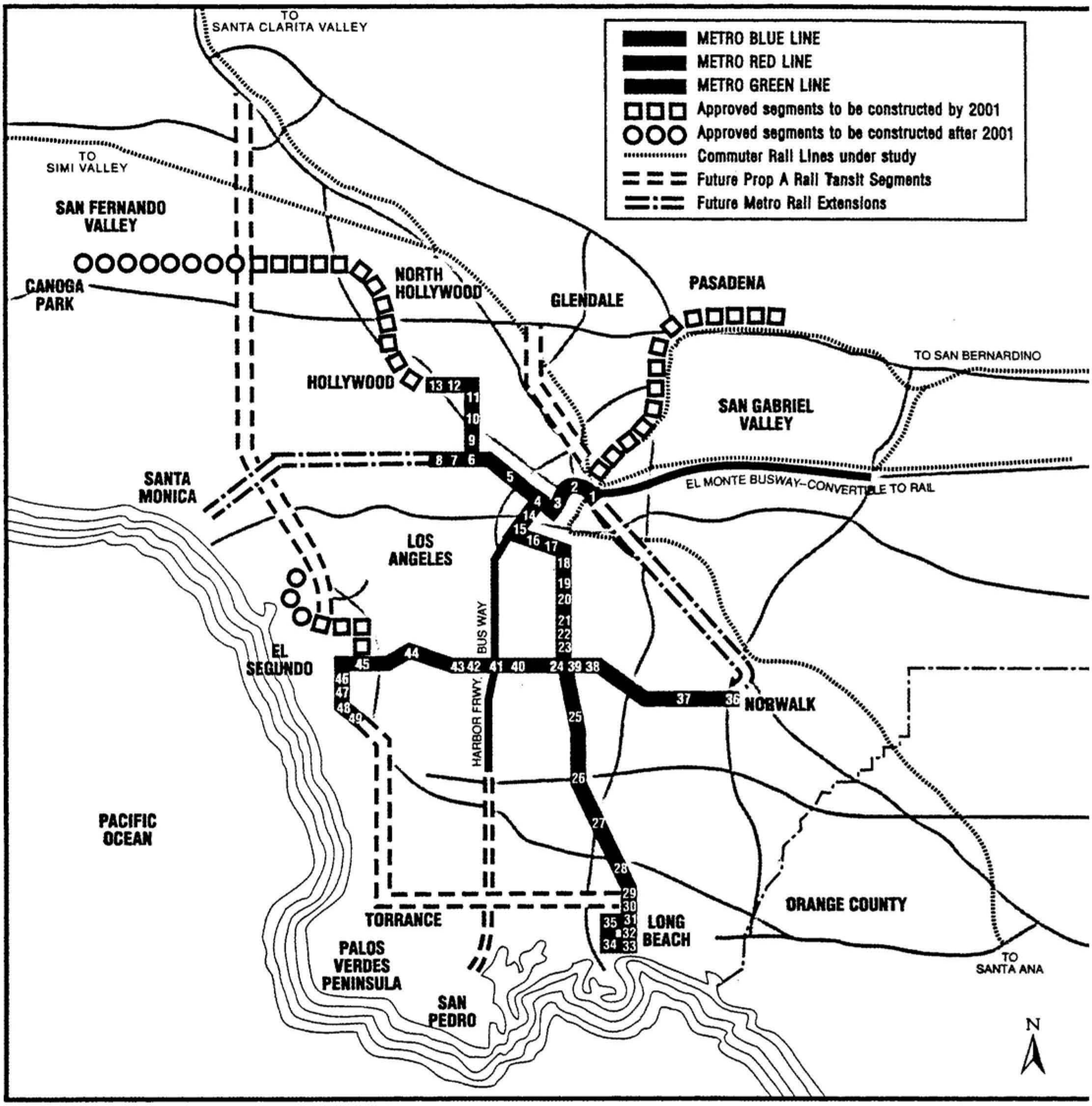
As planned, the Coastal Corridor will be an extension of the Green Line (Norwalk-El Segundo). The North Segment begins at Aviation Boulevard and continues northerly through Century and Lincoln Boulevards to a proposed terminus at Culver Boulevard. The South Segment begins at Space Park and turns south through the Atchison, Topeka, and Santa Fe (AT&SF) right-of-way to Hawthorne Boulevard.

Approximately 8.3 miles, the South Segment follows a median alignment along Hawthorne Boulevard to several alternative terminal sites. The decision to focus on an alignment along Hawthorne Boulevard was the result of a selection process that included alternative alignments and participation from public officials and interested parties. In a jointly signed letter to LACTC in October 1983, officials from 13 cities comprising the South Bay Steering Committee endorsed the Hawthorne Boulevard alignment. Section 2 of this report briefly explores variations of the alignment and reaffirms the overall viability of the route along Hawthorne Boulevard. Favorable land use and Hawthorne Boulevard's ability to accommodate transit provide strong support for this alignment.

This study explores the basic feasibility of the preferred route. It develops a preliminary track alignment based upon engineering and traffic conditions and requirements, and identifies alternative station locations. It examines land use, environmental, and community concerns associated with the development of the rail line. It provides the baseline information which allows the initial determination of the line's engineering feasibility, service area, and impacts on the environment. The route refinement process provides sufficient information to determine if a full environmental assessment is appropriate, in which specific impacts are examined in greater depth and detail. (Please refer to Exhibit 2. Phases of Project Development, Los Angeles County Rail Transit System.)

Exhibit 1

LOS ANGELES METRO



STATION LOCATIONS

Red Line*-Union Station to Hollywood/Vine*

1. Union Station
2. 1st St./Hill St. (Civic Center)
3. 5th St./Hill St.
4. 7th St./Flower St.
5. Wilshire Blvd./Alvarado St.
6. Wilshire Blvd./Vermont Ave.
7. Wilshire Blvd./Normandie Ave.
8. Wilshire Blvd./Western Ave.
9. Vermont Ave./Beverly Blvd.
10. Vermont Ave./Santa Monica Blvd.
11. Vermont Ave./Sunset Blvd.
12. Hollywood Blvd./Western Ave.
13. Hollywood Blvd./Vine St.

Blue Line*-Long Beach to Los Angeles*

14. 7th St./Flower St.
15. Pico Blvd./Flower St.
16. Grand Ave./Washington Blvd.
17. San Pedro St./Washington Blvd.
18. Washington Blvd./Long Beach Ave.
19. Vernon Ave./Long Beach Ave.
20. Slauson Ave./Long Beach Ave.
21. Florence Ave./Graham Ave.
22. Firestone Blvd./Graham Ave.
23. 103rd St./Graham Ave.
24. Imperial Hwy./Wilmington Ave.
25. Compton Blvd./Willowbrook Ave.
26. Artesia Blvd./Acacia Ave.
27. Del Amo Blvd./Santa Fe Ave.
28. Wardlow Rd./Pacific Ave.
29. Willow St./Long Beach Blvd.
30. Pacific Coast Hwy./Long Beach Blvd.
31. Anaheim St./Long Beach Blvd.
32. 5th St./Long Beach Blvd.
33. 1st St./Long Beach Blvd.
34. 1st St./Pine Ave.
35. 5th St./Pacific Ave.

Green Line*-Norwalk to El Segundo*

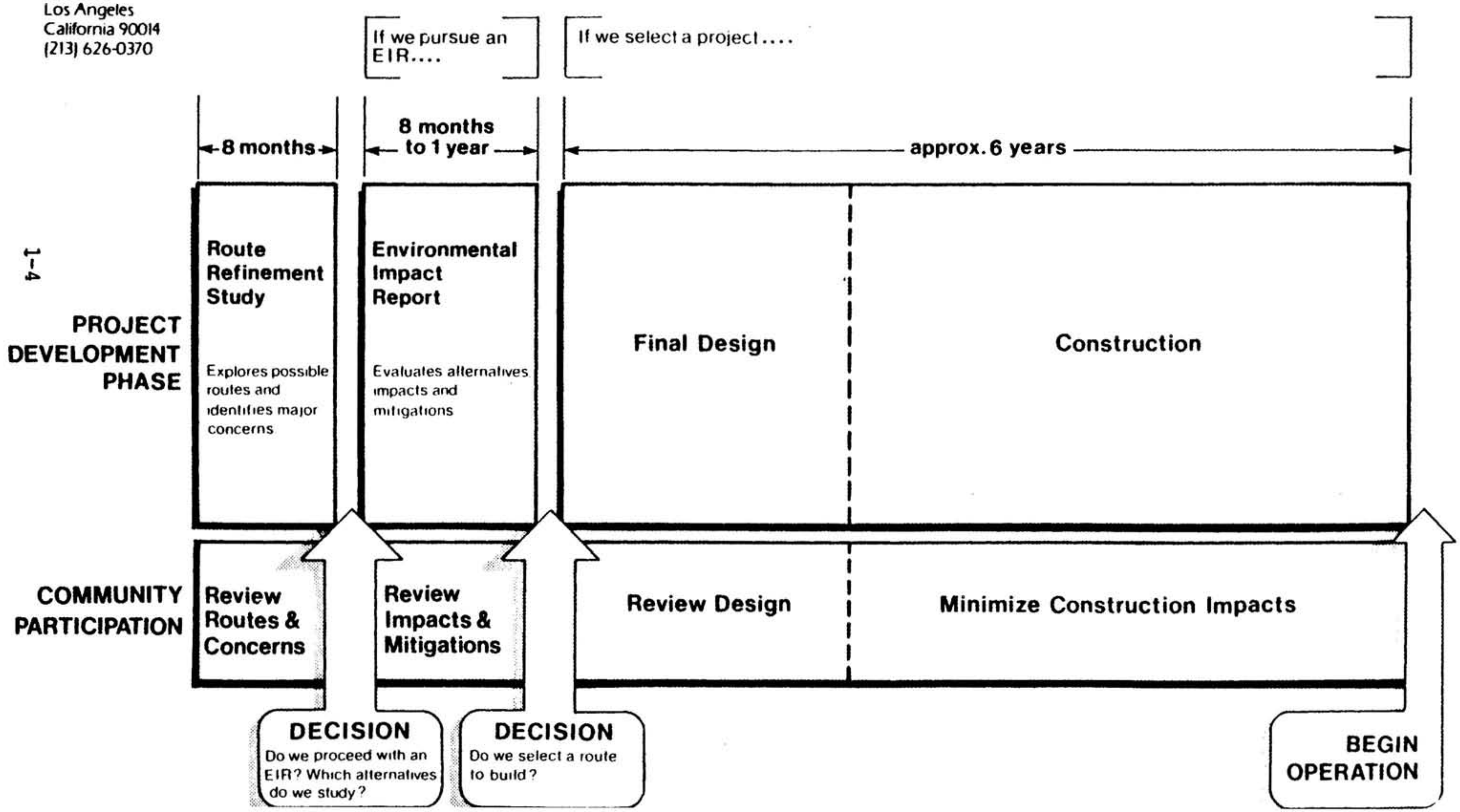
36. Studebaker Rd./605 Fwy.
37. Lakewood Blvd./Imperial Hwy.
38. Long Beach Blvd./Imperial Hwy.
39. Imperial Hwy./Wilmington Ave.
40. Avalon Blvd./117th St.
41. 110 Fwy./117th St.
42. Vermont Blvd./117th St.
43. Crenshaw Blvd./119th St.
44. Hawthorne Blvd./111th St.
45. Aviation Blvd./Imperial Hwy.
46. Mariposa Ave./Nash St.
47. El Segundo Ave./Nash St.
48. Douglas St.
49. Freeman Ave.

Exhibit 2

Phases Of Project Development

For Los Angeles County Rail Transit System

Los Angeles County Transportation Commission
403 West Eighth Street
Suite 500
Los Angeles
California 90014
(213) 626-0370



SECTION 2

ENGINEERING FEASIBILITY ANALYSIS

2.1 GENERAL

For each of the alignment segments and alternatives, this report provides a description, and discusses physical constraints, right-of-way requirements, utility conflicts, and engineering feasibility. Station site planning and traffic and environmental impacts are discussed in separate reports. This report is supplemented by the engineering drawings. Right-of-way requirements, where obvious, are depicted on the drawings as cross-hatched. Right-of-way for possible street widenings at intersections due to column placement is not shown due to lack of certainty at this point in the study. These detailed assessments cannot be made accurately until sufficient engineering studies of the alignment are completed.

Modifications that may be required on Hawthorne Boulevard will be to CALTRANS' design standards and subject to the approval of CALTRANS. If jurisdiction of Hawthorne Boulevard is relinquished to the cities by 1991, as planned, then the redesign of Hawthorne Boulevard would be subject to the standards and approval of the cities involved.

The structural and seismic design of the aerial guideway and stations depicted on the conceptual drawings and described in this report will be subject to the design criteria established by the Los Angeles County Transportation Commission's Design and Performance Criteria, in conformance with design codes effective at the time of design, and be based on site-specific recommendations from geotechnical consultants.

2.2 ALIGNMENTS

For ease of understanding this report, the alignments were segmented and grouped as follows:

- From Compton Boulevard (the southern terminus of the Norwalk-El Segundo Line or Green Line) along the AT&SF Railroad southeasterly to Manhattan Beach Boulevard, then east in the median of Manhattan Beach Boulevard and along the southwest embankment of the San Diego Freeway and finally entering the median of Hawthorne Boulevard at the freeway interchange.

- Aerial guideway in median of Hawthorne Boulevard from the San Diego Freeway interchange to Lomita Boulevard.

- Alternative alignments that depart from and return to the Hawthorne Boulevard median at the Galleria of South Bay, Old Towne Mall, and Del Amo Fashion Center. These options are also aerial.

- Terminal site alignments as follows:

  Departing from Hawthorne Boulevard at Lomita Boulevard and continuing on aerial guideway in the center of Lomita to a terminal station site near Crenshaw Boulevard.

  Continuing on aerial guideway in the Hawthorne Boulevard median south of Lomita and turning into the south side and then center of Skypark Drive to a terminal site located near Madison Street or near Garnier Street.

  Continuing in the Hawthorne Boulevard median south of Lomita Boulevard or Skypark Drive on single track aerial guideway to a station site in Rolling Hills Estates near Ernie J. Howlett Park. This option is viewed as a branch line to the main dual track guideway.

- A cursory examination was made of an alignment alternative that would follow the AT&SF right-of-way southward through Lawndale, remain in the AT&SF right-of-way as it crosses Hawthorne Boulevard, and continue southeasterly to Madrona Avenue, where the alignment would turn southerly into Madrona Avenue. This alternative alignment could link with the alignment in Hawthorne Boulevard to form other options. In addition to being extendable to the east, it could function to anchor the Coastal Corridor to a significant parking terminus in the event parking could not be developed along Hawthorne to the south.

2.3 METHODOLOGY FOR ALIGNMENTS

The criteria for alignment engineering were established by the Long Beach-Los Angeles Rail Transit Project, Design and Performance Criteria. The criteria were modified by discussions with LACTC staff and other LACTC consultants as appropriate for a fully grade-separated and automated transit system, powered by an overhead contact system. Plan and profile sheets were prepared on mylar from mapping made from aerial photo mosaics flown in 1988. Additional mapping and topo data for studies of various terminal segments were acquired from the City of Torrance. Plans of existing utility facilities were obtained from the various cities, agencies, and utility companies.

The alignment drawings and sections included in Appendix A should be reviewed in concert with this report for a full understanding of the engineering feasibility.

2.4 ALIGNMENT DISCUSSION

COMPTON BOULEVARD TO HAWTHORNE BOULEVARD

Description

The alignment begins as aerial guideway at the southern terminus of the El Segundo Rail Transit Project (the Green Line) near Compton Boulevard. In the AT&SF right-of-way on the westerly side of the existing tracks, the alignment continues southerly as aerial guideway in the railroad right-of-way to Manhattan Beach Boulevard. In the center of Manhattan Beach Boulevard, the alignment continues as aerial guideway in an easterly direction to the San Diego Freeway (I-405) right-of-way, and proceeds southerly along the westerly embankment of the freeway until Hawthorne Boulevard is reached. There are no stations located in this segment.

Physical Constraints

A fifteen foot horizontal distance is required between the centerline of nearest transit track and the AT&SF mainline and/or siding track. The relocation and consolidation of siding and spur tracks will be required.

Some reconstruction of the median of Manhattan Beach Boulevard will be required for the accommodation of guideway support columns. Special guideway support bents and deep girders may be required for long spans crossing the traffic lanes.

Right-Of-Way Requirements

A strip of right-of-way outside the AT&SF right-of-way will be required on the westerly side of the AT&SF railroad between Inglewood Avenue and Manhattan Beach Boulevard. Two private property takes will also be required on the inside of the curve first as the guideway curves into Manhattan Beach Boulevard (corner clip) and then as it curves onto the San Diego Freeway embankment (corner clip and removal of two buildings).

Utility Interferences

A petroleum pipeline that parallels the AT&SF right-of-way on the westerly side may require relocation for an undetermined length. Two aerial power transmission lines in the area between Compton Boulevard and Inglewood Avenue (a 66KV tower line paralleling the railroad tracks on the west side and a 66KV power line crossing the tracks) will need to be raised and possibly rearranged. The aerial power transmission lines on the west side will likely be rearranged by the Green Line construction. However, the other line, which crosses under the line on the west side, will need to be rearranged as a part of this contract as it will probably be unaffected by the previous Green Line construction. Another aerial power transmission line crosses the alignment on Manhattan Beach Boulevard (at Firmona) and continues on along the west side of the San Diego Freeway between Manhattan Beach Boulevard and 161st Street. This 220KV pole line will probably also need to be raised and/or relocated. At street crossings and along Manhattan Beach Boulevard, overhead power lines, street lighting, and routine subsurface utilities will be encountered. A gas line may require rearrangement as the guideway enters Manhattan Beach Boulevard.

HAWTHORNE BOULEVARD MEDIAN ALIGNMENT

Description

The alignment closely follows the centerline of Hawthorne Boulevard on aerial structure from where Hawthorne is entered at the San Diego Freeway interchange to Lomita Boulevard, at which point terminal alignment options develop. (The alternative alignments that depart from the street center and traverse the parking areas of the three major shopping centers along Hawthorne are discussed in Section 2.4.3.)

The stations along the median alignment are elevated and are located in Lawndale at 166th Street, opposite the Galleria at South Bay in Redondo Beach, near the northern end of Old Towne Mall in Torrance, and at the northern end of Del Amo Fashion Center, also in Torrance.

Physical Constraints

Aerial guideway will be supported by columns resting on pilings or caissons. Care will need to be taken to avoid conflict with underground utility lines when setting pier locations and constructing the foundations.

Maintenance of vehicular traffic during construction will require careful consideration of construction traffic plans that are workable for the businesses and acceptable to the jurisdictions involved.

As Hawthorne Boulevard south of Artesia Boulevard exists today, aerial guideway cannot be easily accommodated in the median while maintaining existing traffic capacity primarily due to the narrow islands in the turn lane areas. Hawthorne Boulevard north of Artesia Boulevard, however, has a median wide enough to accommodate guideway supports with less modification than the segment south of Artesia. The narrow islands will have to be widened to accommodate approximately seven feet diameter columns at 80 feet to 100 feet spacing along the guideway, and possibly bent structures in the station areas. Where existing island widths are insufficient, widening of the median would be required, especially at major intersections. Additional right-of-way may be required in some areas. In order to avoid street widening, in some instances straddle bent structures may be utilized, but even these may require some right-of-way from private property.

Because Hawthorne Boulevard is fully utilized for traffic lanes, there is little opportunity to gain space in the median for column supports by removing curb parking. Additional space may be gained by eliminating left turn lanes and/or by closing median openings at minor intersections. This will be particularly effective south of Artesia Boulevard.

In reconfiguring the median of the street, curbs and traffic lanes must be redesigned to accommodate a revised traffic pattern with transit in the center. Guideway column supports, nominally spaced at 80 feet centers, will present sight distance problems for turning vehicles. This conflict can be mitigated in redesigning the street and by requiring that all remaining median openings be signalized.

At major intersections, deep girder sections will be required to span long reaches across the intersections. The structures, as with straddle bent structures, are more expensive to construct.

Right-of-Way Requirements

Additional right-of-way will be required at station sites to accommodate vehicular and pedestrian access facilities and may be required in major intersection areas where the median must be widened to accommodate guideway support columns.

Utility Interferences

In addition to the usual relocation of the smaller trunk and service lines to accommodate transit columns and station parking and access facilities, the following major impacts are expected to be encountered in Hawthorne Boulevard:

An aerial power transmission line crosses the alignment just north of Redondo Beach Boulevard. This 220KV pole line will need to be raised. Two aerial power transmission lines cross the alignment just south of 177th Street. These two lines, a 220KV tower line and a 66KV tower line, will need to be raised. A 66KV pole line, crossing the alignment near 186th Street and again just north of 190th Street, will probably also need to be raised. And finally, three tower lines crossing the alignment south of 190th Street (a 66KV and two 220KV tower lines) will need to be raised.

A major underground telephone cable could be encountered between 160th Street and Artesia Boulevard, although it may be possible to avoid this conflict. At most major cross streets, there may be some conflict with underground telephone cables. In addition to telephone cables, other aerial and underground cables, such as TV cables, cross Hawthorne Boulevard at several cross streets. Where cables are encountered, they may require splicing, extending, and relocating.

Some water main crossings are encountered and may require rearrangement. Most water mains are not in the street median and major impacts may be avoided. Some rearrangements may be required due to street widening around intersections.

Some large sanitary sewer lines are crossed at different locations and may require manhole relocations, but the sewers along Hawthorne are not severely impacted as they are in the side of the street. Redesign of the street to accommodate rail transit may reveal further impacts.

Storm drains are encountered at different locations. In addition to crossings at intersections that may require rearrangements, a large line varying in diameter from 72 inches to 48 inches is encountered in the median between the San Diego Freeway and 172nd Street. Another major line is encountered between Redondo Beach Boulevard and Artesia Boulevard. Other major storm drains are at times in the median of Hawthorne but primarily along the sides of the street and are not directly impacted by aerial guideway in the median. There are also cross-connections that may be impacted. It may be possible to avoid these major lines in most cases.

Major gas lines are largely avoided except for possible conflicts with street widening where required. Potential conflicts with a 6-inch line between Redondo Beach Boulevard and 190th Street, and south of Lomita Boulevard, is noted.

Petroleum lines exist in Hawthorne Boulevard north of 190th Street. Generally, they are in an easement outside the median area, but do cross the median, and therefore may be in conflict with the column foundation supports. Petroleum lines are within the street confines in several areas and, while transit in the median may largely avoid them, the major modifications that would be required to Hawthorne may impact these lines.

It must be emphasized that, in addition to the major conflicts noted above, distribution lines, both aerial and subterranean, and aerial power, street lighting, and traffic signalling lines will require rearranging. The extent of this work will largely depend on the configuration of the redesigned Hawthorne Boulevard.

ALTERNATIVE ALIGNMENTS AT SHOPPING CENTERS

Description

Galleria at South Bay

The alignment departs from Hawthorne Boulevard near Artesia Boulevard and, following reverse curves, allows for sufficient tangent track to place an aerial station in the shopping center parking area. This alignment option reenters Hawthorne Boulevard just north of 179th Street.

Old Towne Mall

This alignment option departs the median of Hawthorne Boulevard just north of the AT&SF Railroad crossing and flies over the railroad, following a gently curving alignment into the parking area where an aerial station is proposed between the existing shopping center structures and the proposed new buildings. This option reenters Hawthorne Boulevard north of Del Amo Boulevard.

Del Amo Fashion Center

This alignment departs the Hawthorne median just north of Del Amo Circle and, utilizing reverse horizontal curves, allows for an aerial station to be positioned over Carson Street. This option reenters Hawthorne on a gently curving alignment south of Sepulveda Boulevard.

Physical Constraints

Galleria at South Bay

Reverse horizontal curves are proposed in order to minimize the length of span as the guideway crosses the vehicular lanes of Hawthorne Boulevard. Even so, straddle bent structures and possibly eccentrically loaded support columns placed in modified median island and sidewalk areas will be required to support the guideway. Maintenance of traffic during construction in the parking area and along Hawthorne will be a requirement, as will business access.

Old Towne Mall

A very high (50 feet) aerial structure is required in crossing the AT&SF traffic. This requirement is the same for both the shopping center and median alignments. Support of the guideway will be difficult due to long spans across the northbound lanes of Hawthorne Boulevard and the crossing of 190th Street. Special support structures and reconfiguration of sidewalk areas will be required. Traffic along Hawthorne Boulevard and in the shopping center parking area, as well as business access, will require attention during construction.

Del Amo Fashion Center

As with the other shopping center alignment options, reverse horizontal curves are specified in order to reduce the spans across the Hawthorne Boulevard traffic lanes. Straddle bent structures, eccentrically loaded columns, and rearrangement of sidewalks and, possibly, median islands will be required. Maintenance of traffic both along Hawthorne Boulevard and in the shopping center parking areas will be required. Business access could also be affected.

Right-of-Way Requirements

Once outside public street rights-of-way, aerial easements and touchdown point acquisitions for the aerial guideway and stations will be necessary. Purchase of private property and/or agreement for joint-use will be required for parking/station access facilities.

Utility Interferences

For the shopping center alignment options, moderate conflicts with major utility lines, both buried and aerial, are anticipated. Water lines, storm drains, sanitary sewers, gas lines, and petroleum lines are often located near the curbs of Hawthorne Boulevard. In addition to guideway foundations, major street widening or modification may cause direct impacts. Aerial high voltage electrical lines at the Galleria and Old Towne Mall will require relocation, but this is also the case for the median alignment. A 66KV aerial power transmission line is located on the east side of Hawthorne Boulevard adjacent to the Old Towne Mall. This line will need to be modified in the areas where it crosses the proposed guideway as it turns into and out of the Mall area to leave/return to the median.

Relocations of buried and aerial minor distribution lines and service lines will be required.

The placement of guideway into the shopping center areas should not create utility impacts that are substantially more significant than the median guideway, as parking and access facilities will be required in either cases and these facilities will cause some relocations.

__Terminal Station Site Alignments__

Various alternative terminal station sites and connecting alignments were studied. Please refer to the Station Siting Report, Appendix B.

__Description__

Terminal Station at Lomita/Crenshaw

This terminal alignment option departs Hawthorne Boulevard and proceeds aerially in the center of Lomita Boulevard with an elevated station located at Hospital Drive (Lomita-Hospital Station), and continues as aerial guideway in the center of Lomita to an aerial terminal station site along the south side of Lomita at the southwest quadrant of the Lomita/Crenshaw intersection.

Terminal Station at Skypark/Madison or Skypark/Garnier

This alignment departs Hawthorne as aerial guideway and offers the possibility of a terminal station site on the south side of Skypark at Madison or continues aerial in the center of Skypark with the terminal station located north of Skypark and east of Garnier.

A variation of this alignment may be to consider a northeasterly alignment continuation that traverses private property with a station located in the southwest quadrant of Lomita/Crenshaw. In this case, the station near Madison would be an intermediate stop rather than a terminal candidate. This alignment possibility was not carried through this study and assessed; therefore drawings that depict this option are not included.

Terminal Site in Rolling Hills Estates

The guideway would remain in the center of Hawthorne as elevated guideway but would become a single track operation a short distance south of either Lomita or Skypark, depending on the terminal siting solution. The link to the at-grade station opposite Ernie J. Howlett Park (Rolling Hills Station) is not considered a terminal alignment/station solution due to the steep grades involved in accessing the station site, the lack of opportunity to further extend the line due to terrain, and the concern for placing a large terminal parking lot on a methane gas producing landfill. This alignment would be a branching option and not a line haul operation.

A single track is sufficient to meet the operational requirements for the branch option. As future extension is not considered feasible, future double track is not envisioned.

<u>**Physical Constraints**</u>

Terminal Station at Lomita/Crenshaw

Lomita is a street without a median island and such an arrangement would have to be created for placement of guideway columns in the center.

Some street widening may be required, especially at major intersections and at the Lomita-Hospital Station. In other areas, street parking may be removed to allow a transit-occupied median. Horizontal geometry is restrictive at the curve entering Lomita and, again, at the reverse curves approaching the Lomita/Crenshaw Station. Special structures, such as bents or straddle bents, will be required as Lomita is entered from Hawthorne, at the Lomita-Hospital Station, and as the guideway crosses to the south of Lomita at the terminal.

Terminal Station at Skypark/Madison or Skypark/Garnier

Skypark is a relatively narrow street for aerial guideway. Guideway is to the south side for a considerable reach for the purposes of the station siting at Madison and because of the street width. Some other constraints associated with this alignment option are the moderately restrictive horizontal curves entering Skypark and again at the Garnier Street Station site, and the requirement for special guideway support structures as Skypark is entered and departed. Another constraint is the difficulty of extending the alignment eastward without inordinate horizontal geometry offsets. A possibility may be to traverse the oil company property to the northeast and gain entry to Lomita near Crenshaw. A possible constraint that will require further investigation is the FAA clearance requirements for Torrance Municipal Airport near the Madison Street station. Also, because of aviation clearance problems, the private helipad operated by the hospital will probably need to be relocated.

Terminal Site and Rolling Hills Estates

While the horizontal alignment is acceptable, the unrelenting climb on first a four percent and then a five percent grade is not very acceptable to transit operations. Other problems are the continuing difficulty of establishing column placements in Hawthorne Boulevard and the lack of a desirable terminal parking area in the methane gas producing landfill that is available for parking.

Right-of-Way Requirements

Right-of-way acquisition would be required where Lomita may be widened at major intersections and at the Lomita-Hospital Station site. Right-of-way will also be required for the corner clip at the northeast quadrant of the Hawthorne Boulevard/Lomita Boulevard intersection and for the terminal station and station parking/access facilities at Crenshaw.

For the Skypark alignment, an acquisition will be required at the northeast corner of Hawthorne/Skypark. Other right-of-way acquisition will be required for the station facilities at the Madison and/or Garnier Station sites, and potentially for the relocated helipad.

For the link to the south, property needs outside the Hawthorne right-of-way are required where the street may be widened to accommodate guideway columns at intersections, and possibly at the Rolling Hills Station site.

Utility Interferences

Lomita Boulevard contains a 21-inch and a 34-inch trunk sewer and a 16-inch water line that will need to be avoided to the extent possible during design. The usual relocation of minor subsurface and aerial lines is anticipated, with more significant impacts in street widening and station siting areas.

Skypark Drive contains a 30-inch storm drain near the center of the street that may be impacted in some areas. Two water mains are also located in the street and some impacts will occur. Routine rearrangements are anticipated, especially where street modifications occur and at station sites.

Hawthorne Boulevard utility rearrangement requirements are much the same between Lomita and Pacific Coast Highway as they are north of Lomita, that is, substantial impacts may occur where major modifications to Hawthorne Boulevard are required. South of Pacific Coast Highway, the intensity of existing utilities diminish somewhat but rearrangements will occur, especially where street modifications are required. An aerial power transmission line (66KV) crosses the alignment just north of Pacific Coast Highway and a second one (also 66KV) crosses the alignment near Newton Street. Both of these lines will probably need to be raised. In addition, a 66KV pole line crosses the alignment just south of Newton Street and continues along the west side of Hawthorne Boulevard. This line will have to be raised where it crosses the alignment. In addition, it may need to be modified to some degree where the guy wires to the poles (which currently stretch across the street) need to be eliminated due to conflict with the elevated guideway. At present, an unknown in this area is the extent of gas pipelines originating in the landfill area and the nature of these impacts. Should this segment be studied further, more investigation needs to be carried out on methane gas impacts.

AT&SF/MADRONA AVENUE ALIGNMENT

Description

This alignment would remain at AT&SF right-of-way south of Manhattan Beach Boulevard and would be mostly elevated with some at-grade guideway. Hawthorne Boulevard would be crossed in the AT&SF right-of-way just north of 190th Street. From this point eastward, the guideway would remain in the railroad right-of-way until it reaches Madrona, where it would turn south in the center of Madrona to Sepulveda Boulevard, and then continue east.

Presumably, this option would be elevated guideway. A modification to this alignment option would be to originate it at Hawthorne Boulevard rather than Manhattan Beach Boulevard. Station sites and alignment drawings were not produced for this alternative.

Physical Constraints

Tight horizontal curves would be required entering and departing Madrona Avenue. Column placement and long span girder problems would be encountered at major street crossings along both the railroad and streets and where streets are entered and departed.

Right-of-Way Requirements

Studies of this alignment were not advanced sufficiently to determine right-of-way impacts.

Utility Interferences

Studies were not advanced sufficiently to assess major impacts, but a determination of existing utility conditions would include a concern for major electrical transmission line clearance problems, the possibility of oil and fiber optics easements in the railroad right-of-way and the impacts that would be created by modifications to Madrona Avenue and Sepulveda Boulevard.

2.5 SUMMARY OF FINDINGS

The construction of aerial transitway in the median of Hawthorne Boulevard will have a major impact on the present vehicular traffic circulation patterns and capacity of the streets as the median is not sufficiently wide in many places to accommodate guideway support columns. There is little to almost no excess space between the curbs and the placement of columns has the potential to obscure sight distances for left turn motorists. While this subject is more appropriately addressed as a traffic problem and discussion is contained in the traffic analysis report, the subject is stressed in this report due to the obvious need to redesign large segments of Hawthorne by widening at intersections, closing minor cross street median openings, eliminating many left turns and left turn lanes from Hawthorne, and rearranging the lane configuration of major stretches. During later planning phases, close coordination with the jurisdictions will be required, and a major traffic circulation study will be needed. Such an undertaking has utility impacts, both minor and major, aerial and buried, that in addition to major street work, tend to further increase the cost of guideway. Due to the traffic congestion in Hawthorne, and the modifications required to the street to accommodate both transit and vehicular traffic, the aerial guideway would be more expensive than more conventional aerial guideway.

The relatively high cost is also attributable to deep long span girder construction that will be necessary in spanning major cross streets and straddle bent structures required to place transit stations in the shopping center parking areas. While transit stations in the parking lots have features attractive to good station site planning, such guideway geometry introduces reverse horizontal curves and deep girder construction with straddle bent supports, which increases capital costs. In addition, the length of the line is increased, thereby increasing capital cost. However, some economy may be realized in more efficient station access from the parking lot areas. Another benefit may be that some major intersection conflicts can be avoided by removing the guideway from the Hawthorne median in the shopping center areas. It is assumed that real estate and construction costs associated with parking areas would be about the same for both median and side alternatives.

In selecting a terminal site, there are --in addition to other considerations-- four basic criteria that must be met. (Please refer to the terminal siting criteria contained in the Station Siting Report.) The four are as follows:

1. Parking lot for 1,000+ autos, plus Kiss & Ride and bus drop-off area.
2. Station and storage track - Straight and level section to provide 600 to 1,000 feet of track for station and storage.
3. Future Extension - Site must not preclude future extension to Long Beach Line.
4. Accessibility by Rail - Must be accessible to mainline without violating alignment design criteria.

The link to Rolling Hills Estates is ruled out as a valid terminal alternative since it does not meet these four basic criteria. Both Lomita and Skypark alternatives meet the criteria. The Skypark alignment could be extended northeasterly through private property so that an eastward extension would be achieved along Lomita. The Lomita alignment provides an easier, more direct potential extension to the Blue Line (Long Beach-Los Angeles). The Lomita option thus appears to best meet the criteria, even though it may present more problems due to the busier nature of the street.

No attempt is made in this study to explore the attractiveness of the AT&SF/Madrona/Sepulveda alignment as a terminal alignment. This is due to the cursory nature of the engineering assessment and the fact that this option is seen as an alternative to Hawthorne Boulevard as a transit corridor rather than as a terminal alternative.

SECTION 3

STATION SITING ANALYSIS

3.1 DESCRIPTION OF STATIONS

LAWNDALE STATION

The Lawndale Station would be located at Hawthorne Boulevard and 166th Street. The station would be a neighborhood station serving Lawndale and nearby communities. Surrounding land uses are primarily commercial along Hawthorne Boulevard, and residential to the east and west. Walking would be the primary mode of access, with bus and kiss-ride being secondary modes.

The aerial station would be located in the median of Hawthorne Boulevard. At the north end of the center platform there would be vertical circulation units rising to a pedestrian overpass, which would cross to both the northeast and northwest corners of the intersection.

On the northeast corner there would be vertical circulation between the overpass and sidewalk level, with a recessed bus bay for northbound buses on Hawthorne Boulevard. The northwest corner would also have vertical circulation and a southbound bus bay. In addition, there would be an area for kiss-ride and short-term parking, with space for about 30 cars. This would require acquisition of a gas station/convenience store on that corner. (If there are major problems with property acquisition, the kiss-ride facility could be moved to another corner of the intersection, with appropriate changes in the overpass location.)

GALLERIA STATION

This station would be located along Hawthorne Boulevard, a short distance south of Artesia Boulevard, on the east side of The Galleria shopping center. There are two possible configurations for the station, one on the west side of Hawthorne, and the other in the median of Hawthorne. Both locations would be aerial stations with center platforms. Both configurations would have similar access facilities, the main difference being the need for a pedestrian overpass and two additional sets of vertical circulation units with the median location.

The station would be within walking distance of the Galleria, as well as other commercial development along Hawthorne, and residential areas east of Hawthorne.

Buses would be an important mode of access to the station. There is an existing transit center located on the northwest side of the Galleria. The center is used by buses of SCRTD, Torrance, Gardena, and Lawndale, with a current total of eight bus routes. The transit center should be relocated to the rail station on the east side of the Galleria. This will facilitate bus-rail transferring as well as bus-bus transferring. There may also be other existing or new bus routes that should feed into this station.

The station would have space for kiss-ride access. Parking facilities should also be provided. There is a good opportunity for a shared parking facility with the Galleria, assuming that new decked parking can be constructed. The peak demand for transit parking would be during weekdays, while peak shopping center demand is normally on weekends.

The west-side location of the station would be more convenient than the median location for the majority of patrons, since it would be closer, both horizontally and vertically, for all patrons arriving by bus or car, and for most walk-in patrons.

OLD TOWNE STATION

There are also two possible locations for this station. The median alternative would be located in the median of Hawthorne Boulevard at the northwest corner of the Old Towne Mall, about two blocks south of 190th Street. The east-side location would be located in the parking lot of the Old Towne Mall, at the southwest corner of the mall, about two blocks north of Del Amo Boulevard. Since the two locations are some distance apart, the access facilities would be different.

The median alternative would be an aerial station with center platform. Vertical circulation from the north end of the platform would rise to a pedestrian overpass that would cross to both the east and west sides of Hawthorne Boulevard. On the east side there would be bus drop-off facilities in the northwest corner of the mall parking lot. There could possibly be shared parking with the mall.

On the west side the vertical circulation would require the acquisition of one house on Cadison Street. There would be a southbound bus bay along Hawthorne Boulevard. Parking and kiss-ride facilities would be provided along a power right-of-way that runs east-west across Hawthorne. The land is currently used by a nursery. There is space for about 500 cars if the right-of-way is used as far west as Firmona Avenue, about 1,000 feet west of Hawthorne. Firmona connects to 190th Street, thus providing access from the west, although it is basically a neighborhood street. (Parking could also be provided along the power right-of-way east of Hawthorne, but auto access in and out of that site would be difficult.)

The east-side alternative would also be an aerial station with center platform. Bus loading would be located along the shopping center entrance that connects to Hawthorne across from Halison Street. Kiss-ride and parking facilities would be located in what is now surface parking for Old Towne Mall. As with the Galleria Station, there is opportunity for shared use of existing or new decked parking at this station.

Either station location would serve the surrounding communities fairly well if adequate parking can be provided.

DEL AMO STATION

The Del Amo Station would be located at Del Amo Fashion Center, one of the largest shopping centers in the region, and a growing center of commercial and office development. As with the Galleria and Old Towne Stations, there are two alternatives for the Del Amo Station, a median and an east-side alternative. Both would be located on the west side of the shopping center, in the vicinity of Carson Street and Del Amo Circle. This location serves both the shopping center on the east side of Hawthorne and the growing office development on the west side. Both would be aerial stations with center platforms.

The median alternative station would be located just south of Del Amo Circle. A pedestrian overpass would connect the north end of the platform to both the southeast and southwest corners of the Hawthorne Boulevard/Del Amo Circle intersection. The southwest corner is the location of Del Amo Financial Center, a large office complex. On the southeast corner the overpass would touch down in a portion of the shopping center parking lot. A bus loop and kiss-ride area would be provided. Parking should also be provided, either by shared use of existing parking or new construction.

The east-side alternative would be located east of Hawthorne Boulevard, on the west side of Del Amo Fashion Center just north of Carson Street. A bus loop and kiss-ride area would be located in an area currently used for surface parking. Patron parking should be provided by construction of new parking decks.

3.2 STATION ALTERNATIVES FOR ALIGNMENTS SOUTH OF SEPULVEDA BOULEVARD

There are two alternative alignments for the main line south of Sepulveda, and a possible branch line. The main line would turn southeast off Hawthorne Boulevard at either Lomita Boulevard or Skypark Drive. There would be a station a short distance east of Hawthorne on either alignment. The main line would then continue southeast of a terminal station. With the Lomita alignment the terminal would be at Lomita and Crenshaw. With the Skypark alignment the terminal could be either at Garnier Street or at Crenshaw and Lomita. The possible branch line would continue south along Hawthorne Boulevard to a terminal station in Rolling Hills Estates.

TORRANCE HOSPITAL STATION

The first station on the Lomita alignment would be located at Lomita Boulevard and Hospital Drive. The Torrance Memorial Hospital is located on the southeast corner of this intersection. Office buildings are the predominant land use along both sides of Lomita towards Hawthorne Boulevard, and light industrial uses are located to the southeast along Lomita.

The station would be an aerial station located in the median of Lomita Boulevard. A pedestrian overpass would connect to the south side of Lomita for walk-in patrons. The overpass would also connect to the north side, where vehicular access facilities would be located in what is currently employee parking for a Garrett facility. Replacement parking could be provided with decked parking to the rear. The access facilities would include bus and kiss-ride spaces. Parking should also be provided. The amount of parking would depend partially on the amount of parking provided at nearby stations (Del Amo and rolling Hills), and partially on the availability of property at the station site. If acquisition of the Garrett property is not feasible, then alternative locations could be considered to the northwest along Lomita. They would require acquisition of office or industrial buildings.

CRENSHAW STATION

The terminal station for the Lomita alternative would be located on the southwest quadrant of Lomita Boulevard and Crenshaw Boulevard. A large vacant parcel owned by Union Oil Company extends south to Skypark Drive. The northern portion of the property would be used for the station and a large parking facility of approximately 1,000 spaces. The surrounding land uses are generally industrial, although there is commercial and residential development east of Crenshaw in the City of Lomita.

The station itself would be an aerial station with center platform, located along the south side of Lomita just west of Crenshaw. (Future extension of the line towards Long Beach would continue southeast along Lomita Boulevard.) Bus loading spaces would be located underneath the aerial station. Kiss-ride spaces would be just south of the station, and then the parking lot. Entrances would be located off both Lomita and Crenshaw.

MADISON STREET STATION

The Madison Street Station would be the first station on the Skypark alternative. It would be located on the southeast quadrant of Skypark Drive and Madison Street, at the northwest corner of Torrance Municipal Airport. It would serve the office development to the west and north, the Torrance Hospital to the northeast, and would have vehicular access facilities.

The station would be aerial with a center platform. Bus loading and kiss-ride facilities would be located close to the station. Parking would be provided by acquiring the existing parking lot (480 spaces) at the west end of the airport. Additional parking could be provided in the adjacent vacant land along the south side of Skypark Drive in the airport clear zone. The feasibility of this station location depends on favorable negotiations with the City of Torrance and clearance from the Torrance Municipal Airport.

GARNIER STREET STATION

The terminal station for the Skypark alternative would be located just east of Garnier Street in currently vacant land along the north side of Skypark Drive. The surrounding land use is generally industrial: oil company and airport facilities. (An option would be to continue the line eastward and turn northeast to the Union Oil site at Crenshaw Boulevard.)

The station would be an aerial station with center platform. Bus loading would be located under the aerial structure. Kiss-ride facilities would be located between the station and Skypark Drive. Approximately 1,000 parking spaces would be located north of the station. There would be two major entrances off Skypark Drive.

ROLLING HILLS STATION

The Rolling Hills Station would be located along Hawthorne Boulevard across from Ernie Howlett Park, about one-half mile north of Palos Verdes Drive. The City of Torrance plans to develop a bus park-ride lot at this location, which is a reclaimed landfill site. The bus park-ride lot would have approximately 300 parking spaces.

The rail station would be located in the median of Hawthorne Boulevard. The center platform would be at about the same grade as the street. A pedestrian overpass would link the station to Ernie Howlett Park on the northwest side of Hawthorne and to the park-ride lot on the southeast side. Bus and kiss-ride facilities would also be located in the park-ride lot. The parking demand for a rail station should exceed the 300 spaces to be provided in the bus park-ride lot. Additional parking could be provided if it is possible to use more of the landfill site.

SECTION 4
PATRONAGE

4.1 INTRODUCTION

Estimated ridership in the Year 2010 was developed by the Southern California Association of Governments (SCAG) in coordination with the LACTC rail planning staff. SCAG employs a regional transportation model that consists of four stages: (1) trip generation, (2) trip distribution, (3) mode choice, and (4) trip assignment. Trip generation produces trips within a zone (e.g., home-work, home-shopping, etc.). Trip distribution assigns destinations to the trips generated from each zone to all other zones. Mode choice splits person trips among the modes available (transit or private vehicle). Trip assignment chooses particular routes for the trips by mode (e.g., transit or highway networks). The models in each of these stages are developed and calibrated with origin-destination travel survey data collected in the planning area.

The patronage estimates summarized in Tables 4-1, 4-2 and 4-3 assume the operation of the Red (Metro Rail), Blue (Long Beach-Los Angeles), Pasadena, San Fernando Valley, and Green (Norwalk-El Segundo, North and South Coast) lines as well as the operation of the Harbor Freeway Transitway. Two Green lines were simulated for patronage estimation. Both lines were assumed to operate over a common trunk from Norwalk to Aviation Boulevard, then continue with one line following the North Segment route and the other South Segment route. Ridership was obtained in separate model runs for each variation of a line terminus or park-ride availability. (For further information, please refer to "Ridership Forecasts for the Pasadena and Coastal Corridor Light Rail Projects," Southern California Association of Governments, February 1990.)

4.2 PATRONAGE SUMMARY

Tables 4-1 and 4-2 compare estimated patronage for the South Segment with varying in park-ride assumptions at the shopping center stations (0 and 200 spaces, respectively) and the southern terminus at Lomita/Crenshaw. Table 2 shows the ridership for the South Segment with 200 parking spaces assumed for the shopping center stations, but with the southern terminus at Madison/Skypark. Because the study uses a work mode choice model, ridership is expressed in terms of home-work trips, or daily boardings. Tables 4-1, 4-2 and 4-3 show daily boardings at each

TABLE 4-1

AVERAGE WEEKDAY HOME-WORK TRIPS
Lomita/Crenshaw Terminus

Station	Park and Ride	Daily Boardings Home-Work Only
Space Park	*	1,269
166th/Hawthorne	30	457
Artesia/Hawthorne	0	701
190th/Hawthorne	0	706
Del Amo Fashion Center	0	1,440
Lomita/Hospital	200	968
Crenshaw/Lomita	1,000	761
Daily Boardings, Home-Work		6,302
TOTAL DAILY BOARDINGS, INCLUDING NONWORK TRIPS		**11,670****
Daily boardings, Home-work, Norwalk to Crenshaw/Lomita		28,220
TOTAL DAILY TRIPS (Home-work, Nonwork), Norwalk to Crenshaw/Lomita		52,259

* Assumes no additional Park & Ride requirements at this station for the South Segment.

** This was estimated by applying a regional factor used by SCAG (.54) to daily work trips for the segment. As noted in an earlier discussion, this cannot be done by station because non-work trips do not have the same destination as work trips.

TABLE 4-2

AVERAGE WEEKDAY HOME-WORK TRIPS WITH PARK AND RIDE AT ARTESIA, 190TH, AND DEL AMO FASHION CENTER
Lomita/Crenshaw Terminus

Station	Park and Ride	Daily Boardings Home-Work Only
Space Park	*	1,278
166th/Hawthorne	30	450
Artesia/Hawthorne	200	845
190th/Hawthorne	200	1,033
Del Amo Fashion Center	200	1,752
Lomita/Hospital	200	956
Crenshaw/Lomita	1,000	767
Daily Boardings, Home-Work		7,081
TOTAL DAILY BOARDINGS, INCLUDING NONWORK TRIPS		13,113**
Daily boardings, Home-work, Norwalk to Crenshaw/Lomita		29,454
TOTAL DAILY TRIPS (Home-work, Nonwork), Norwalk to Crenshaw/Lomita		52,259

* Assumes no additional Park & Ride requirements at this station for the South Segment.

** This was estimated by applying a regional factor used by SCAG (.54) to daily work trips for the segment. As noted in an earlier discussion, this cannot be done by station because non-work trips do not have the same destination as work trips.

TABLE 4-3

AVERAGE WEEKDAY HOME-WORK TRIPS
Madison/Skypark Terminus

Station	P&R	Daily Boardings Home-Work Only
Space Park	*	1,293
166th/Hawthorne	30	456
Artesia/Hawthorne	200	869
190th/Hawthorne	200	1,024
Del Amo Fashion Center	200	1,697
Madison/Skypark	500	1,172
Daily Boardings, Home-Work		6,511
TOTAL DAILY BOARDINGS, INCLUDING NONWORK TRIPS		**12,057****
Daily boardings, Home-work, Norwalk to Madison/Skypark		29,008
TOTAL DAILY TRIPS (Home-work, Nonwork), Norwalk to Madison/Skypark		53,719

* Assumes no additional Park & Ride requirements at this station for the South Segment.

** This was estimated by applying a regional factor used by SCAG (.54) to daily work trips for the segment. As noted in an earlier discussion, this cannot be done by station because non-work trips do not have the same destination as work trips.

station along the South Segment and include total boardings for the line from Norwalk to a South Segment terminus as well as total daily trips for the entire Green Line. Total daily (weekday) trips, which include nonwork trips, were estimated by applying a regional factor (.54) to daily work trips for the line as a whole. This cannot be done by station because nonwork trips do not have the same destinations as work trips.

As shown in Table 4-2 patronage of the South Segment increased from 6,302 to 7,081, or by 12.4 percent, when park-ride capacity was added at Artesia, 190th and Del Amo Fashion Center. Home-work trips to Space Park, represented by alightings at that station, also increase as a result of increased park-ride capacity at the shopping center stations.

4.3 MODE OF ARRIVAL

Overall, walking and use of the automobile are the most prevalent modes of access. On the average, 48 percent walk, 44 percent drive, and eight percent ride the bus to the various rail stations.

SECTION 5
GENERAL ENVIRONMENTAL ANALYSIS

5.1 INTRODUCTION

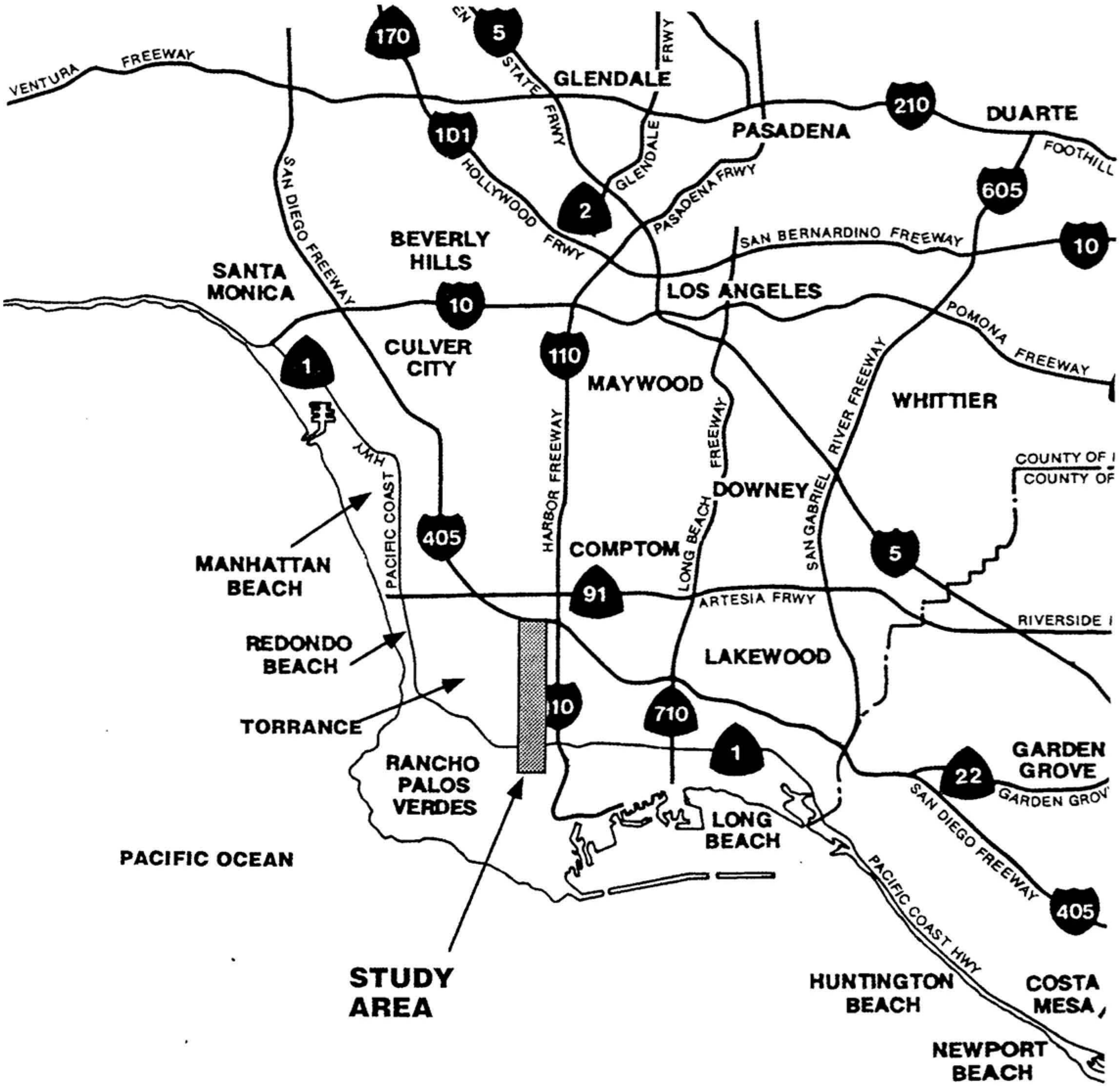
The general environmental analysis includes discussions on existing and planned land uses, potential displacement, sensitive land uses, disruption, and a number of key environmental issues that should be considered in future planning. If a specific project were to be proposed by LACTC, an environmental impact report would be required.

This report considers one primary alignment with two terminal station alternatives. The primary alignment begins in the northern city limits of Redondo Beach as an extension of the Green Line. The alignment follows an existing AT&SF Railroad right-of-way to Manhattan Beach Boulevard, where it turns eastward and then parallels the San Diego Freeway to Hawthorne Boulevard where it turns southward. Both alternative alignments continue southward on Hawthorne Boulevard and terminate in the City of Torrance. The two terminal station alternatives considered result in the following alignment designations for the portion of the alignment south of Lomita Boulevard.

- Lomita Alignment
- Sky Park Alignment

A single track branch operation along Hawthorne Boulevard to a terminus in the City of Rolling Hills Estates was also studied.

The regional context of the alignment under consideration is indicated in Exhibit 5-1. The alignment is illustrated in Exhibit 5-2. There are nine stations proposed along the alignment. All of the stations are planned adjacent to bus stops and would be Kiss-and-Ride locations. The Madison Street, Crenshaw-Lomita, and Garnier Street stations are located adjacent to roadways. The Lawndale Avenue, Lomita Hospital, and Rolling Hills stations are within the street medians. Two locations are under consideration for each of the Galleria, Old Towne, and Del Amo stations. One alternative for each is within the Hawthorne Boulevard median. The second alternative for each proposes to extend the rail into the existing mall parking lots and locate stations adjacent to the mall structures.



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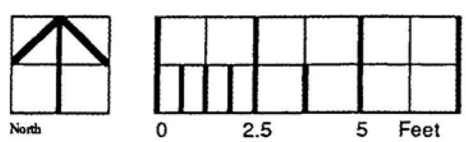
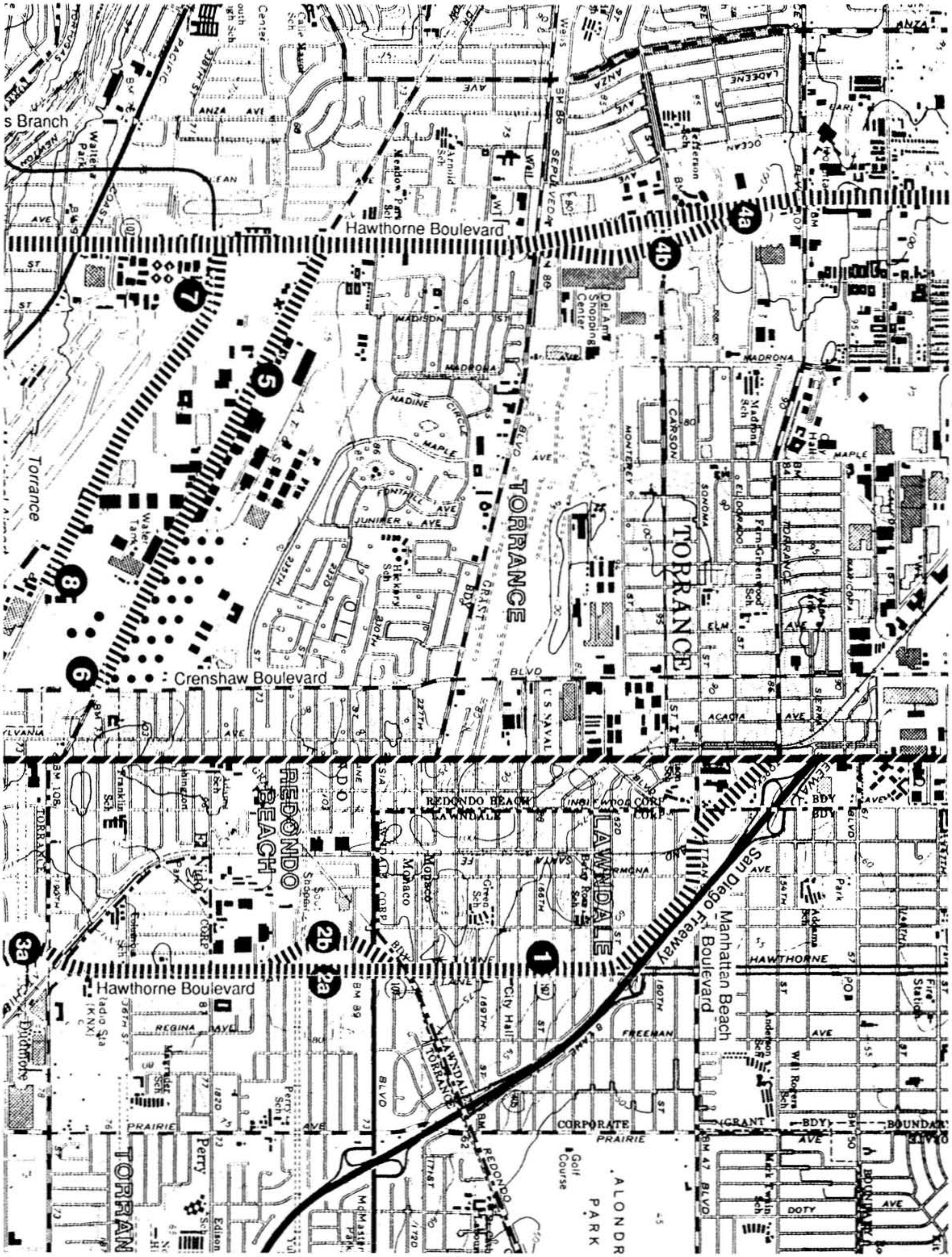
Michael Brandman Associates



Regional Location Map

Coastal Corridor Rail Transit Study - South Segment

Exhibit 5-1


Hawthorne Boulevard
Crenshaw Boulevard
Hawthorne Boulevard
San Diego Freeway
Manhattan Beach Boulevard
Torrance
TORRANCE
TORRANCE
REDONDO BEACH
LAWNDALE
Del Amo Shopping Center
1
2a
2b
3a
4a
4b
5
6
7
8

5.2 STUDY METHODOLOGY

The general environmental analysis consisted of a review of the preliminary 1"=100' scale centerline alignment plans and profiles of the LRT routes prepared by Bechtel Civil, Inc. In addition, the project team reviewed available local records and conducted a field survey to determine potential environmental and community impacts. Current land use plans and recent environmental studies were consulted to identify land use issues. A field survey of the alignment was conducted to assess displacement, as well as potential impacts on residential and business uses located near the alignments. A review of the hazardous waste sites listed by the federal and state government was conducted to assess the likelihood of the presence of toxic or hazardous materials contamination. The project team also consulted with city staff as appropriate to identify additional environmental issues. These and other factors investigated are explained in greater detail below.

LAND USE CHARACTERISTICS

A generalized land use survey was completed to identify the distribution of land use along the potential alignment for this analysis. Land uses were placed into one of six categories: residential, commercial, industrial, parklands, public, and undeveloped land. Retailing and service activities and professional office uses were classified as commercial. Manufacturing and warehousing activities were placed into the industrial category. Public uses included Torrance Municipal Airport.

LAND USE IMPACTS

The engineering team has completed a series of engineering drawings that indicate the location and extent of proposed LRT facilities. This assessment of land use impacts focuses on identifying existing and planned land uses and development, potential land use conflicts, potential for businesses to be disrupted, and anticipated displacement impacts. Residential uses abutting the alternative alignments are identified. This measure helps indicate the potential for noise, visual, and land use compatibility impacts that may affect sensitive residential uses.

PARKING DISPLACEMENT

The potential displacement of parking is identified by the approximate number of spaces affected. All of the parking spaces eliminated are off-street parking.

BUSINESS DISRUPTION IMPACTS

Commercial business areas that may be disrupted by the LRT alignments are identified. Construction disruption is not evaluated as part of this factor because it will affect the entire corridor. Rather, permanent effects are assessed, such as loss of parking in commercial areas, impacts related to commercial visibility, or changes in automobile access. Potential beneficial impacts of the LRT facilities were not considered in this initial assessment though these benefits should be considered along with any adverse effects in future evaluations.

TOXIC AND HAZARDOUS MATERIAL CONTAMINATION

The U.S. Environmental Protection Agency (EPA) National Priorities List (NPL), updated June 1988; the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list produced by the EPA May 1988; and the California Expenditure Plan for the Hazardous Substances Cleanup Bond Act of 1984 (revised January 1988) were reviewed for sites of potential hazardous materials contamination within one mile of the alignment under consideration. In April 1989, the California Water Resources Control Board (RWQCB) of the Los Angeles Region compiled an Underground Storage Tank (UST) Case List of leaks. This UST Case List was also consulted for sites of soil and/or groundwater contamination caused by underground tank spills or leaks along the alignment under consideration.

OTHER ENVIRONMENTAL ISSUES

Potential environmental issues are highlighted as outlined by the California Environmental Quality Act (CEQA). These issues are intended to begin documentation of potential environmental issues and help direct future environmental analysis of alignments by the LACTC.

5.3 GENERAL ENVIRONMENTAL ANALYSIS OF THE ALIGNMENTS AND STATION ALTERNATIVES

This section of the Route Refinement Study describes, in general, the potential impacts that may result from the construction and subsequent operation of the proposed alignment and various station alternatives. The individual factors considered in this analysis are summarized below.

LAND USE CHARACTERISTICS

The land uses along the alignment are depicted in Exhibit 5-3. For further characterization of these land uses, the alignment was divided into three separate segments.

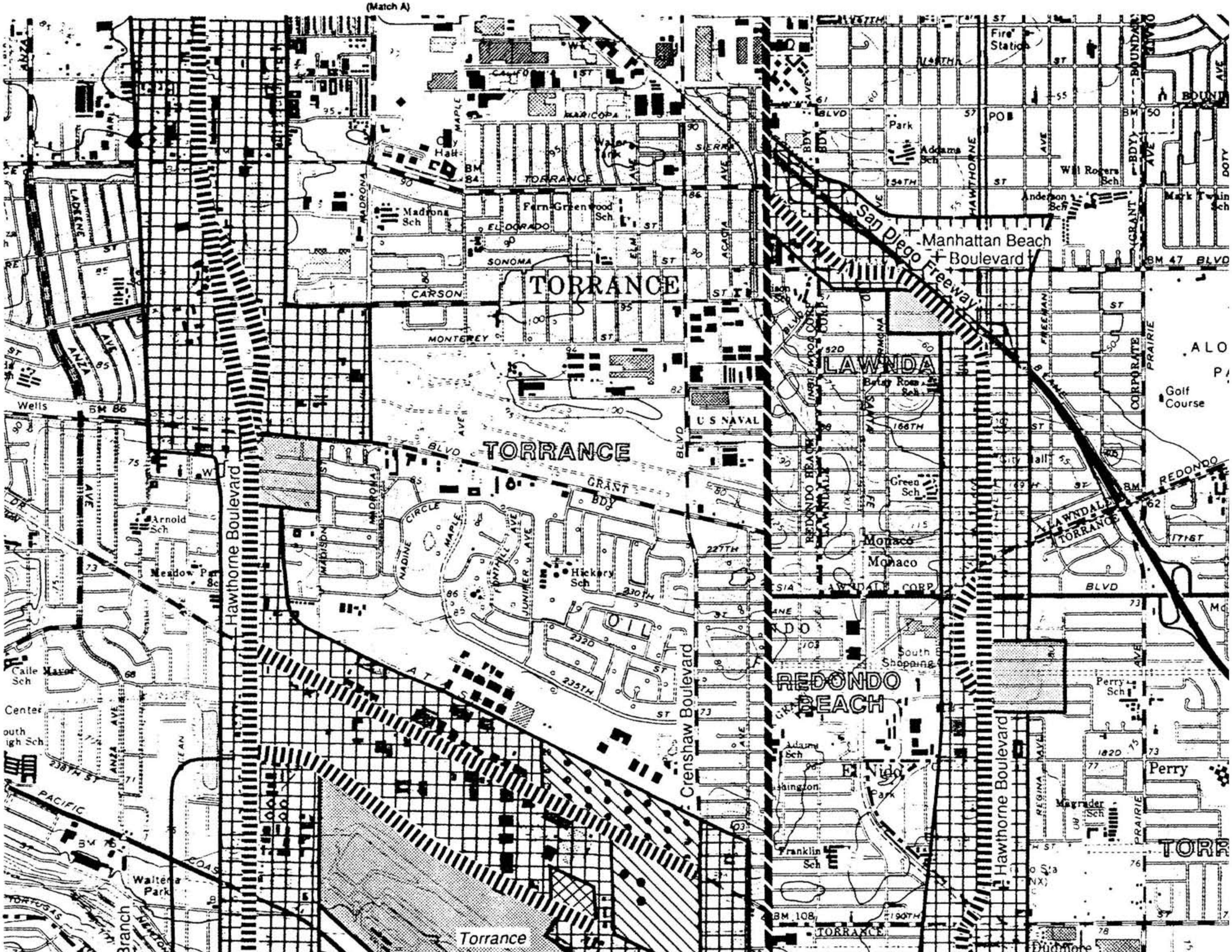
Segment 1 - (Railroad R-O-W to Hawthorne Boulevard)

This portion of the alignment occupies the Santa Fe railroad right-of-way northwest of Manhattan Beach Boulevard in the cities of Redondo Beach and Lawndale, along the Manhattan Beach Boulevard median from railroad right-of-way to San Diego Freeway in the City of Lawndale, and along the southwestern side of the San Diego Freeway to Hawthorne Boulevard in the City of Lawndale. Small to medium industrial and commercial uses are located along the railroad right-of-way and Manhattan Beach Boulevard. Along the San Diego Freeway portion, there are residential single-family housing and undeveloped areas.

Segment 2 - Hawthorne Boulevard (San Diego Freeway To Lomita Boulevard)

This portion of the alignment runs along Hawthorne Boulevard from the San Diego Freeway to Lomita Boulevard and through the cities of Lawndale, Redondo Beach, and Torrance. This segment includes the Lawndale, Galleria, Old Towne, and Del Amo stations. Primarily, commercial uses line Hawthorne Boulevard with single-family residential at three locations as depicted in Exhibit 5-3.

(Match A)



TORRANCE
TORRANCE
LAWNDA
REDONDO BEACH
San Diego Freeway
Manhattan Beach Boulevard
Hawthorne Boulevard
Crenshaw Boulevard
Hawthorne Boulevard
Torrance
U S NAVAL
Fire Station
Park
Addams Sch
Will Rogers Sch
Anderson Sch
Mark Twain Sch
City Hall
Madrona Sch
Fern-Greenwood Sch
Arnold Sch
Meadow Park Sch
Hickory Sch
OIL
Green Sch
Monaco
South Bay Shopping
Perry Sch
Perry
Magruder Sch
Adams Sch
El Nido Park
Franklin Sch
Walteria Park
Calle Mayor Sch
Center
Golf Course
Wells
Branch
Dudmore
CARSON
MONTEREY
SONOMA
EL DORADO
TORRANCE
MARICOPA
SIERRA
GRANT BDY
BLVD
PACIFIC
COAST
238TH ST
235TH
230TH
227TH
232D
190TH

Segment 3 - South of Lomita Boulevard

Two terminal station alternatives are being considered for this segment. They include the Lomita and Skypark terminal stations in the City of Torrance.

- Lomita Alignment. The Lomita Alignment continues eastward on Lomita Boulevard from Hawthorne Boulevard and terminates at the Lomita Station immediately west of Crenshaw Boulevard. A second station (Lomita-Hospital Station) is located at Torrance Memorial Hospital. Land uses along this alignment include commercial use such as Torrance Memorial Hospital and industrial uses on the northwest and southwest corner of Lomita and Crenshaw Boulevards (the Union Oil Company maintains oil tank yards in this area).

- Skypark Alignment. The Skypark Alignment continues south on Hawthorne Boulevard to Skypark Drive where it shifts eastward approximately two-thirds of the distance to Crenshaw Boulevard. Commercial and public uses border this alignment. Torrance Municipal Airport is located to the south of Skypark Drive. Two stations are located along this alignment, Madison Street Station and Garnier Station. A baseball diamond (not public) is located to the northeast of the Garnier Street Station.

In addition to the Lomita and Skypark Alignments, a branch into the City of Rolling Hills was considered.

- Rolling Hills Branch. The Rolling Hills Alignment continues south on Hawthorne Boulevard to the northern boundary of the City of Rolling Hills Estates. The only station is located at the end of this branch. Adjacent land uses include commercial developments and park and undeveloped land in steep terrain at the terminus.

LAND USE CONFLICTS

Potential land use conflicts may arise from adverse impacts associated with the LRT operation due to potential displacement or the disruption of normal present-day activities. In general, displacement impacts relate to the use of parking lot area by the alternative station locations adjacent the malls. Some displacement of structures and trees will occur at these locations. Displacements will also occur at the southwest corner of the San Diego Freeway and Manhattan Beach Boulevard, a corner at 166th and Hawthorne Boulevard, and northeast corners of Hawthorne Boulevard and Lomita Boulevard and Skypark Drive.

Sensitive land uses considered for this study included single-family homes existing along the alignment, a medical/dental building, the Torrance Memorial Hospital, and Ernie Howlett Park. Business disruption will result primarily from the loss of parking space visibility. The impacts related to displacement, sensitive land use, and business disruption are summarized in Table 5-1, and the locations are indicated on Exhibit 5-4.

TOXIC AND HAZARDOUS WASTE CONTAMINATION

There were no National Priorities List sites located along the alignments. However, there were two sites listed on the California Bond Expenditure Plan and six CERCLIS sites within one mile of all the alignments. In addition, three sites along the alignment were listed on the UST Case List. The City of Torrance also provided information on a non-listed contamination site (UNOCAL Tank Yard) at Lomita and Crenshaw boulevards. The sites of potential contamination are located on Exhibit 5-5 and summarized in Table 5-2.

PLANNED DEVELOPMENT

As shown in Exhibit 5-3, there are only three areas of undeveloped land along the proposed alignments. The site for the Crenshaw-Lomita Station is currently undeveloped. Commercial uses surround the site with the UNOCAL Tank Yard to the north and west. For the Skypark Alignment, undeveloped property is located northeast of the Garnier Street Station. However, the property has commercial uses on all sides including Torrance Municipal Airport to the south and is designated in the General Plan for commercial uses. The Rolling Hills Branch has undeveloped land on both sides near the terminus. However, the terrain is steep making development extremely difficult.

OTHER ENVIRONMENTAL ISSUES

A number of additional environmental issues were identified in the analysis with discussions following. The potential impacts of each are described in qualitative terms and are described in the following sections for each alignment alternative.

TABLE 5-1

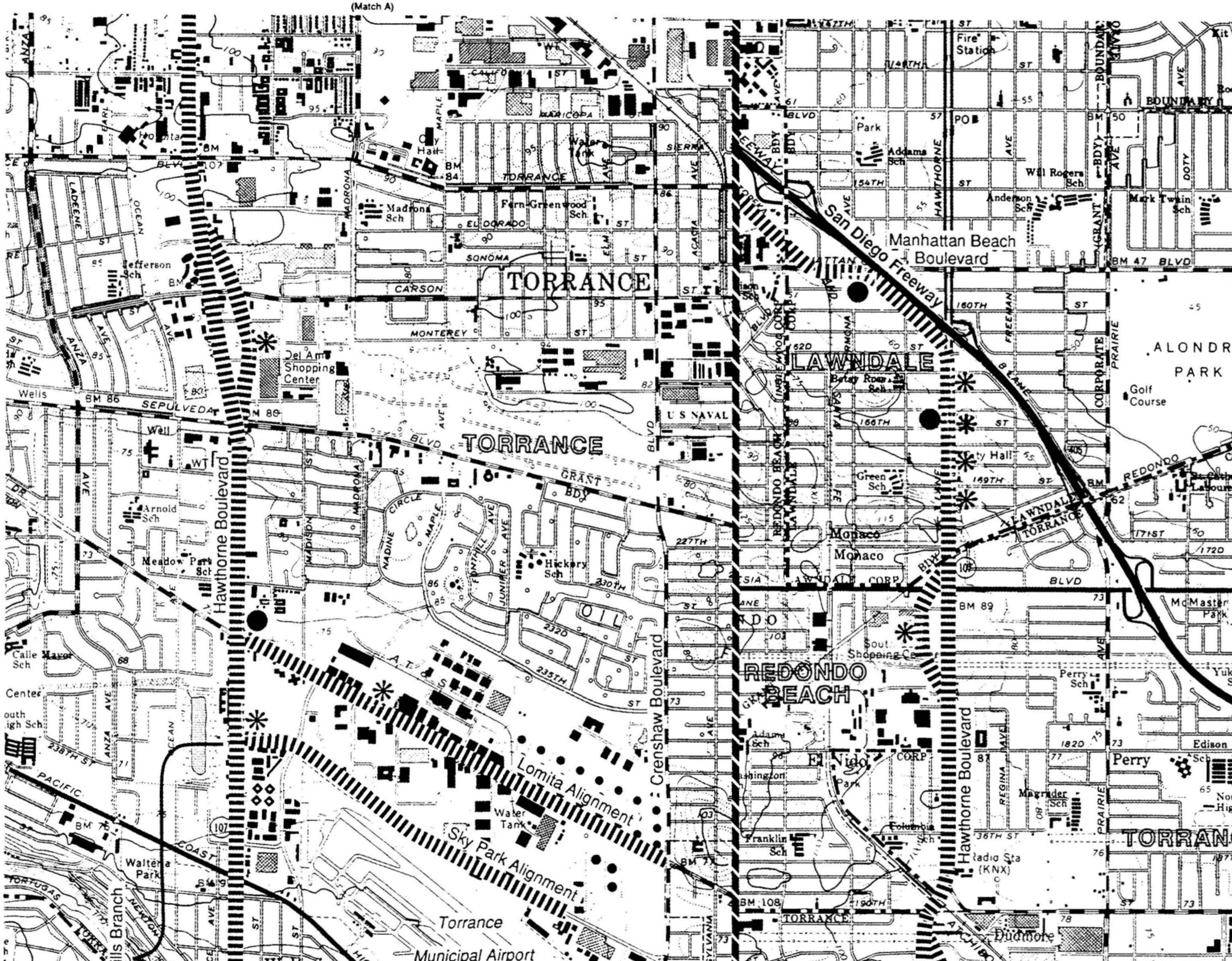
LAND USE IMPACTS

	Location	Nature of Impact
Segments 1 and 2 - All Alignments		
1.	Santa Fe Railroad right-of-way	Encroachment into railroad right-of-way.
2.	Northeast corner of Manhattan Beach Boulevard and railroad line	Right-of-way required.
3.	Southwest corner of Manhattan Beach Boulevard and San Diego Freeway	Displacement of two businesses.
4.	Grevillea Avenue adjacent to the San Diego Freeway	Increased noise and loss of aesthetic landscaping and visibility to single-family residences.
5.	Southwest corner of San Diego Freeway and Hawthorne Boulevard	Right-of-way required.
6.	Hawthorne Boulevard at 166th Street - Lawndale Station/kiss and ride/parking	Loss of one business, approximately 25 off-street parking spaces, aesthetic landscaping, and visibility to businesses.
7.	Hawthorne Boulevard at 176th Street - Galleria Station westside alternative	Loss of approximately 15 off-street parking spaces and aesthetic landscaping, and visibility to businesses.
8.	East side of Hawthorne Boulevard between 174th and 177th Street - median alternative	Increased noise and loss of aesthetic visibility to single-family residences.
9.	Hawthorne Boulevard at 176 Street - Galleria Station median alternative	Loss of approximately eight off-street parking spaces and visibility of businesses.
10.	Southeast corner of 190th Street and Hawthorne Boulevard	Increased noise and vibration to medical and dental businesses.
11.	Hawthorne Boulevard at Old Towne Mall - Old Towne Station east-side alternative	Loss of approximately 15 off-street parking spaces and aesthetic landscaping and visibility to businesses.
12.	West side of Hawthorne Boulevard between Cadison Avenue to Del Amo Boulevard - median alternative	Increased noise and loss of aesthetic landscaping and visibility to single-family residences.

TABLE 5-1 (continued)

Location	Nature of Impact
13. Hawthorne Boulevard between 225th and 227th Street - Del Amo Station eastside alternative	Loss of approximately 17 off-street parking spaces and aesthetic landscaping and visibility.
14. East side of Hawthorne Boulevard between 225th and 227th Street	Increase noise and loss of aesthetic landscaping and visibility to single-family residences.
<u>Segment 3 - Lomita Alignment</u>	
15. Northeast corner of Hawthorne Boulevard and Lomita Drive	One business displaced and right-of-way required.
16. Lomita Avenue - Torrance Memorial Hospital	Loss of approximately eight off-street parking spaces, right-of-way required, increased noise and vibration, and loss of visibility.
17. Southwest corner of Crenshaw Blvd. and Lomita at station site	Major vacant land acquisition.
<u>Segment 3 - Sky Park Alignment</u>	
18. Northeast corner of Hawthorne Boulevard and Skypark Drive	Right-of-way required and loss of 10 off-street parking spaces.
19. South side of Skypark Drive at Madison Street Station	Land acquisition and right-of-way required.
20. North side of Skypark Drive for Garnier Street Station	Major vacant land acquisition for station facilities and parking.
<u>Segment 3 - Rolling Hills Branch</u>	
21. Ernie Howlett Park	Minor increase in noise levels.

(Match A)



TORRANCE
TORRANCE
LAWNDALE
REDONDO BEACH
ALONDRA PARK
Manhattan Beach Boulevard
San Diego Freeway
Hawthorne Boulevard
Hawthorne Boulevard
Crenshaw Boulevard
Lomita Alignment
Sky Park Alignment
Torrance
Municipal Airport
Del Amo Shopping Center
U S NAVAL
SEPULVEDA
BLVD
Fern-Greenwood Sch
Madrona Sch
Jefferson Sch
Arnold Sch
Meadow Park Sch
Hickory Sch
Calle Mayor Sch
Walteria Park
City Hall
Water Tank
Fire Station
Park
Addams Sch
Will Rogers Sch
Anderson Sch
Mark Twain Sch
Betsy Ross Sch
Green Sch
Monaco
El Nido
Park
Franklin Sch
Columbia Sch
Perry Sch
Magruder Sch
Radio Sta (KNX)
Edison Sch
Perry
McMaster Park
Golf Course
Dudmore

(Match A)

Sperry Remington
Lawndale Annex FAAFB
Elco Corporation
TORRANCE
San Diego Freeway
Manhattan Beach Boulevard
LAWNDALE
ALONDRA PARK
Golf Course
Del Amo Shopping Center
U S NAVAL
TORRANCE
Hawthorne Boulevard
Crenshaw Boulevard
Hughes Aircraft Company
Unocal Tank Yard
Torrance
REDONDO BEACH
Unocal Station
UCC/Linde Division
Hawthorne Boulevard
Mobil Oil Corporation
Perry
TORRANCE
City Hall
Madrona Sch
Fern-Greenwood Sch
Jefferson Sch
Arnold Sch
Meadow Park Sch
Hickory Sch
Addams Sch
Will Rogers Sch
Anderson Sch
Mark Twain Sch
Green Sch
Monaco
Perry Sch
Edison Sch
Magruder Sch
Franklin Sch
Columbia Sch
Radio Sta (KNX)
McMaster Park
Calle Mayor Sch
Walteria Park
Dudmore
SEPULVEDA BLVD
CARSON
MONTEREY
SONOMA
EL DORADO
MARICOPA
GRANT BDY
PACIFIC COAST

TABLE 5-2

POTENTIAL HAZARDOUS MATERIAL CONTAMINATION SITES

Site	Listed On	Distance From Alignment	Status
Segments 1 and 2 - Alignments			
Lawndale Annex FAAVFB 14724 S. Aviation Blvd. Hawthorne	CERCLIS	approximately 1/2 mile to the northeast	No information available.
ELCO Corporation 2250 Park Place El Segundo	California Bond Act	approximately 3/4 mile to the north	Soil contaminated with cadmium and/or nickel to depth of 50 feet. Remedial action completed.
UNOCAL Station 4373 122nd Street Torrance	RWQCB UST	within 1/4 mile of site	Soil contamination of site. No action taken.
UCC/Linde Division 19200 Hawthorne Torrance	RWQCB UST	on alignment	Acetone contamination extent undetermined. No action taken.
Mobil Oil Corporation 3700 W. 190th Street Torrance	CERCLIS	3/4 mile to the east	No information available.
Union Carbide Corporation Torrance DLT 3651 Del Amo Blvd. Torrance	CERCLIS	within 1/4 mile of site	No information available.

TABLE 5-2 (Continued)

Site	Listed On	Distance From Alignment	Status
Torrance Landfill Madrona and Del Amo Torrance	CERCLIS	approximately 1/2 mile to the east	No information available.
Sperry Remington 610 S. Maple Avenue Torrance	CERCLIS	3/4 mile to the east	No information available.
<u>Segment 3 - Lomita Alignment</u>			
Hughes Aircraft Company 3100 Lomita Blvd. Torrance	RWQCB UST	on alignment	Soil contamination with motor vehicle fuel. Investigation in progress.
UNOCAL Tank Farm West of the intersection of Lomita and Crenshaw Boulevards	Unlisted (City provided)	on alignment	Soil contamination of site. Remedial action proposed.
<u>Segment 3 - Skypark Alignment</u>			
None	None	None	None
<u>Segment 3 - Rolling Hills Branch</u>			
Palos Verdes Landfill 36301 Crenshaw Blvd. Rolling Hills Estate	California Bond Act, CERCLIS	Approximately 3/4 mile to the south	291-acre site with 25,573,729 tons of solid waste including Class I hazardous waste. Remedial action in progress.

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Noise

The operation of the LRT will generate noise which may affect noise sensitive land uses located in the immediate vicinity of the proposed LRT. However, high ambient noise levels presently exist due to traffic on the San Diego Freeway, Hawthorne and Lomita Boulevards, and Skypark Drive.

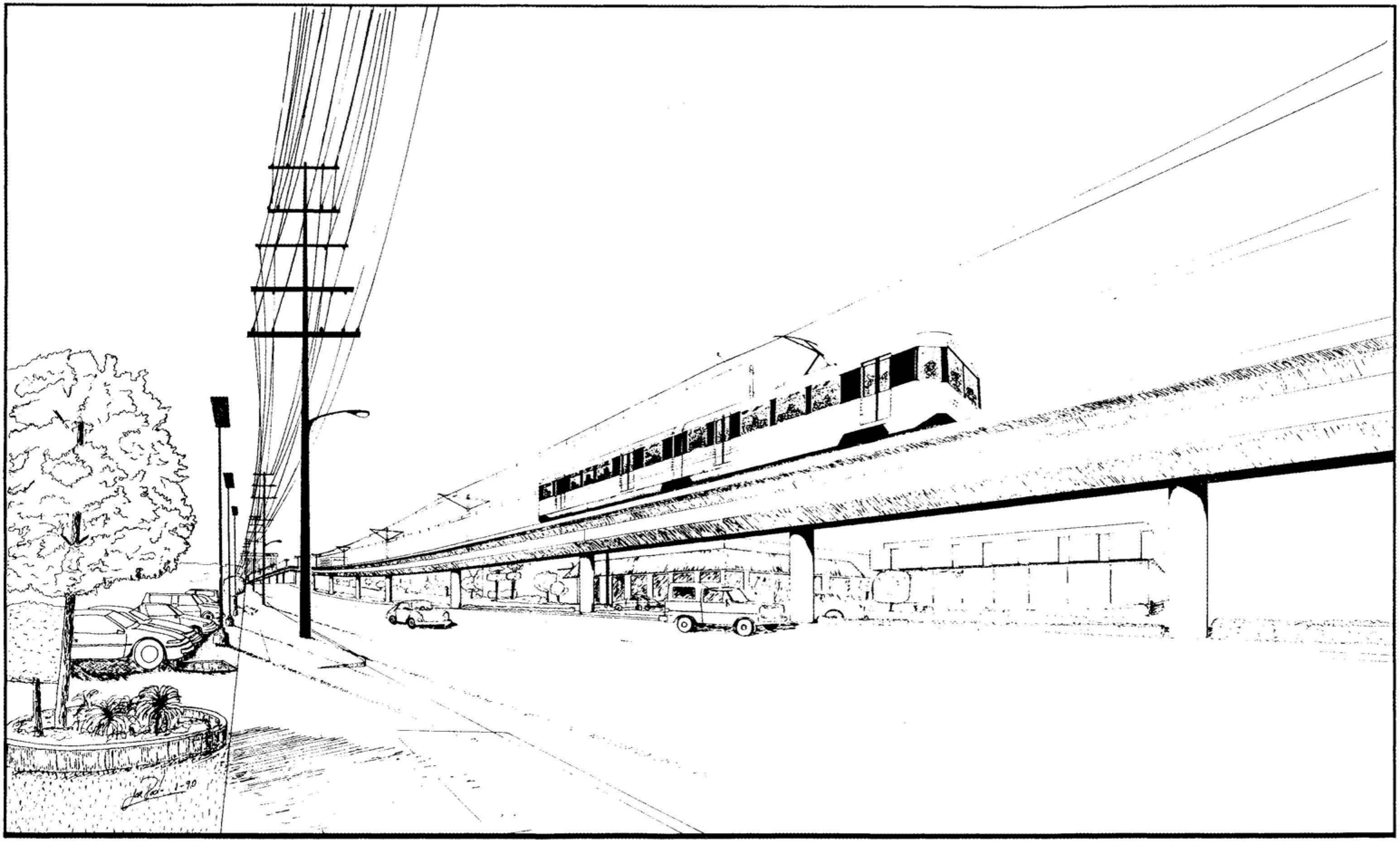
The Noise and Vibration Technical Report for the Coastal Corridor (South) Rail Transit Project Route Refinement Study provides a detailed discussion of potential noise and vibration impacts. The conclusions of the report are summarized below.

- Noise. Three small areas were identified as having noise impacts on a CNEL basis. These are the Medical Building at Hawthorne Blvd. and 190th Street, and commercial buildings located adjacent to the turns from Hawthorne Blvd. to Lomita Blvd. or Skypark Drive for those alternative termini. Noise mitigation could take the form of sound barrier walls along the edge of the rail guideway structure nearest the given building. In most cases, a relatively short barrier could be used (perhaps 3 feet high) to block line-of-sight between the wheel/rail noise source and the receiver.

- **Vibration**. The report identified several areas where vibration mitigation measures should be considered. All of these involve buildings in adjacent (under 50 feet) to the proposed LRT aerial structure. To minimize impacts, the support structure should never be in direct contact with a building structure or foundation. Ideally, there should be at least 2 feet of intervening soil between the support structure and any building foundations or structures. In cases where this is not possible, an elastomer element should be placed between the subway box and the building foundation to prevent direct transmission of ground-borne noise and vibration into the building.

Aesthetics

Aesthetic impacts would result from construction of stations and support facilities. For example, all of the alignments will involve the construction of columns needed to support the LRT, which will result in aesthetic impacts. The stations may also result in aesthetic and visual impacts. However, substantial aesthetic impacts are not expected for two reasons. First, the alignments are entirely long existing rail lines or roadways. Secondly, the shape of the concrete structures will be designed in form and appearance to blend into the streetscape as much as possible. Exhibit 5-6 depicts a typical segment along Hawthorne Boulevard.



LOS ANGELES COUNTY TRANSPORTATION COMMISSION

COASTAL RAIL TRANSIT PROJECT - SOUTH SEGMENT
ROUTE REFINEMENT STUDY

Aerial Perspective of Typical Segment
Coastal Corridor Rail Transit Study - South Segment

4580003 - 6/90

Exhibit 5-6

Street Trees/Open Space Resources

The areas where the proposed alignments are being considered have virtually no areas that have not been disturbed by past urbanization. It will be necessary to remove street trees to accommodate the LRT.

While the exact number of affected trees has not been determined, the number of street trees likely to be affected by the proposed LRT alignment in each segment is identified in Table 5-3.

TABLE 5-3

STREET TREE IMPACTS

Segment	Impact
1. Railroad R-O-W to Hawthorne Blvd.	Loss of landscaping along freeway
2. Hawthorne Blvd. (San Diego Freeway to Lomita Boulevard)	
- with median alternatives only	Loss of approximately 50 street trees
- with alternatives adjacent to the malls only	Loss of approximately 75 street and wall trees
3. South of Lomita Boulevard	Loss of approximately 75 street and mall trees
- Lomita Alignment	No trees lost
- Skypark Alignment	No trees lost
- Rolling Hills Branch	Loss of approximately 40 street trees

PUBLIC SAFETY

No significant public safety concerns have been identified for any of the three terminal station alignments.

Earth

The area in which the alignments are being considered is fully urbanized and little grading and soil displacement are likely. Some localized excavation may be required, though the precise nature and extent of grading and/or excavation will need to be defined in subsequent phases of engineering and design.

The alignments under consideration are located in a seismically active region and could experience the effects (primarily ground motion and possible surface rupture) from a major earthquake during the operational lifetime of the project. The Palos Verdes Fault crosses the southern end of the alignment. In addition, the Newport-Inglewood Fault is approximately 5 miles to the north of the northern end of the alignment. If the project were implemented, seismic standards appropriate to the area will be incorporated in project design.

Air

The construction and operation of the proposed LRT will result in localized air quality impacts. A primary objective of this proposed project, as well as other transit projects in the region, is to reduce usage of private vehicles which are a major contributor to emissions in the South Coast Air Basin (SCAB). Localized increases in vehicular emissions may occur around stations and park and ride facilities. Carbon monoxide levels may increase in the vicinity of stations (and along Hawthorne Boulevard, Lomita Boulevard, and Skypark Drive).

Water

The alignments under consideration will not involve any significant alterations in surface water runoff or in the direction or rate of flow of groundwater.

Light and Glare

The operation of the proposed LRT will introduce additional light and glare into an area that is urbanized at the present time. However, most of the area where the LRT is being considered is adjacent to activities that would not be overly sensitive to increased lighting. Potential adverse impacts related to light and glare are not expected.

Energy/Utilities

The LRT system will use electrical power to provide power to the vehicles. This power will be generated by plants located within the SCAB and will include power purchased from purveyors outside the region.

The construction and operation of the proposed LRT will require some modification to existing utilities facilities and substructures and may result in additional systems.

Natural Resources

Some nonrenewable resources will be consumed during the construction of the proposed project. In addition, facilities providing power to the proposed project will consume nonrenewable fossil fuels.

Risk of Upset

Risk of upset is defined as the risk of explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals, or radiation) in the event of an accident or upset condition. In addition, risk of upset also applies to any interference with an emergency response plan or emergency evacuation plan. This issue was addressed in the discussion on Land Use Impacts.

Population/Housing

The implementation of the proposed LRT will not result in any displacement of housing units. The operation of the proposed LRT may result in some growth-inducing impacts which will affect both housing and population in the city.

Public Services

The LRT system will maintain its own security staff which will limit the impacts on cities for patrol and law enforcement services. No schools are located in the immediate vicinity of the alignment, though Ernie Howlett Park is located adjacent to the Rolling Hills Alignment.

5.4 CONCLUSIONS

None of the terminal station alternatives and the branch line results in a significant environmental impact that could not be mitigated. The major environmental concerns are highlighted below and compared in Table 5-4.

Segments 1 and 2 (Railroad R-O-W to intersection of Hawthorne and Lomita Boulevards for both terminal station alternatives):

- Minor rights-of-way and land acquisitions
- Two businesses displaced at southwest corner of Manhattan Beach Boulevard and San Diego Freeway
- Displacement of one business at northwest corner of Hawthorne Boulevard and 166th Street
- Possible contaminated soils at UCC Linde Division and Union Carbide Corporation locations (see Exhibit 5-5)
- Noise impact at medical building at Hawthorne Boulevard and 190th Street
- Removal of approximately 50 to 75 street trees in median of Hawthorne Boulevard and at stations
- Loss of off-street parking at station locations and in median of Hawthorne Boulevard north of Redondo Beach Boulevard

Segment 3 - South of Lomita Boulevard:

- Lomita Alignment
  - One business displaced at northeast corner of Hawthorne Boulevard and Lomita Drive
  - Major land acquisition Crenshaw - Lomita Station
  - Possible contaminated site at Hughes Aircraft Co. and UNOCAL Tank Yard
  - Noise impact to commercial buildings at northeast corner of Hawthorne and Lomita Boulevards

- Skypark Alignment

  - Major vacant land acquisition at Garnier Street Station
  - Noise impact to commercial buildings at northeast corner of Hawthorne Boulevard and Skypark Drive

- Rolling Hills Branch

  - Land acquisition at Rolling Hills Station
  - Removal of approximately 40 street trees

TABLE 5-4

OVERVIEW OF ENVIRONMENTAL IMPACTS

Issue Area	Segment 1 (Railroad R-O-W to Hawthorne Blvd.)	Segment 2 (Hawthorne Blvd. to San Diego Freeway to Lomita Blvd.	Segment 3: Lomita Alignment	Segment 3: Skypark Alignment	Segment 3: Rolling Hills Branch
Land Use	Land acquisition of railroad and freeway right-of-way, and southwest corner of Manhattan Beach Blvd/San Diego Freeway and southwest corner of Hawthorne Blvd/San Diego Freeway	Land acquisition near 190th Street and at stations	Land acquisition at stations and corner of Hawthorne Blvd.	Land acquisition at stations and corner of Hawthorne Blvd.	Land acquisition at stations
Hazardous Materials (contamination)	No substantial impact	Possible contamination at UCC Linde Division and Union Carbide Corp.	Possible contamination at Hughes Aircraft Co. and UNOCAL Tank Farm	No substantial impact	No substantial impact
Noise	No substantial impacts	Medical Bldg. impacted at Hawthorne Blvd. and 190th Street	Impact to commercial buildings at northeast corner of Hawthorne and Lomita Blvds.	Impact to commercial buildings at northeast corner of Hawthorne Blvd. and Sky Park Drive	No substantial impacts
Aesthetics	No substantial impact	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts

TABLE 5-4 (Continued)

Issue Area	Segment 1 (Railroad R-O-W to Hawthorne Blvd.)	Segment 2 (Hawthorne Blvd. to San Diego Freeway to Lomita Blvd.	Segment 3 Lomita Alignment	Segment 3 Skypark Alignment	Segment 3 Rolling Hills Branch
Street Trees/ Open Space	Removal of open space and land-scaping adjacent to San Diego Freeway	Removal of approximately 50 trees if all median alternatives are constructed, approximately 20 less if Galleria westside alternative is chosen; 24 more for Old Towne or Del Amo east-side alternatives	Removal of approxi-mately 8 street trees	No impact	Removal of approxi-mately 40 street trees. Minor impact to Ernie Howlett Park
Public Safety	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts
Earth	No major grading or excavation	No major grading or excavation	No major grading or excavation	No major grading or excavation	No major grading or excavation
Air	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts
Light and Glare	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts	No substantial impacts

TABLE 5-4 (Continued)

Issue Area	Segment 1 (Railroad R-O-W to Hawthorne Blvd.)	Segment 2 (Hawthorne Blvd. to San Diego Freeway to Lomita Blvd.	Segment 3 Lomita Alignment	Segment 3 Skypark Alignment	Segment 3 Rolling Hills Branch
Natural Resources	Consumption of nonrenewable resources for construction and power generation	Consumption of nonrenewable resources for construction and power generation	Consumption of nonrenewable resources for construction and power generation	Consumption of nonrenewable resources for construction and power generation	Consumption of nonrenewable resources for construction and power generation
Risk of Upset	No significant risk of upset anticipated	No significant risk of upset anticipated	No significant risk of upset anticipated	No significant risk of upset anticipated	No significant risk of upset anticipated
Population/ Housing	No displacement of housing. Growth-inducing impacts on housing and population	No displacement of housing. Growth-inducing impacts on housing and population	No displacement of housing. Growth-inducing impacts on housing and population	No displacement of housing. Growth-inducing impacts on housing and population	No displacement of housing. Growth-inducing impacts on housing and population
Public Services	No significant adverse impacts on public services anticipated	No significant adverse impacts on public services anticipated	No significant adverse impacts on public services anticipated	No significant adverse impacts on public services anticipated	No significant adverse impacts on public services anticipated
Energy Consumption	LRT will consume electricity for power generation	LRT will consume electricity for power generation	LRT will consume electricity for power generation	LRT will consume electricity for power generation	LRT will consume electricity for power generation

SECTION 6
TRAFFIC ANALYSIS

6.1 ENVIRONMENTAL SETTING AND EXISTING CONDITIONS

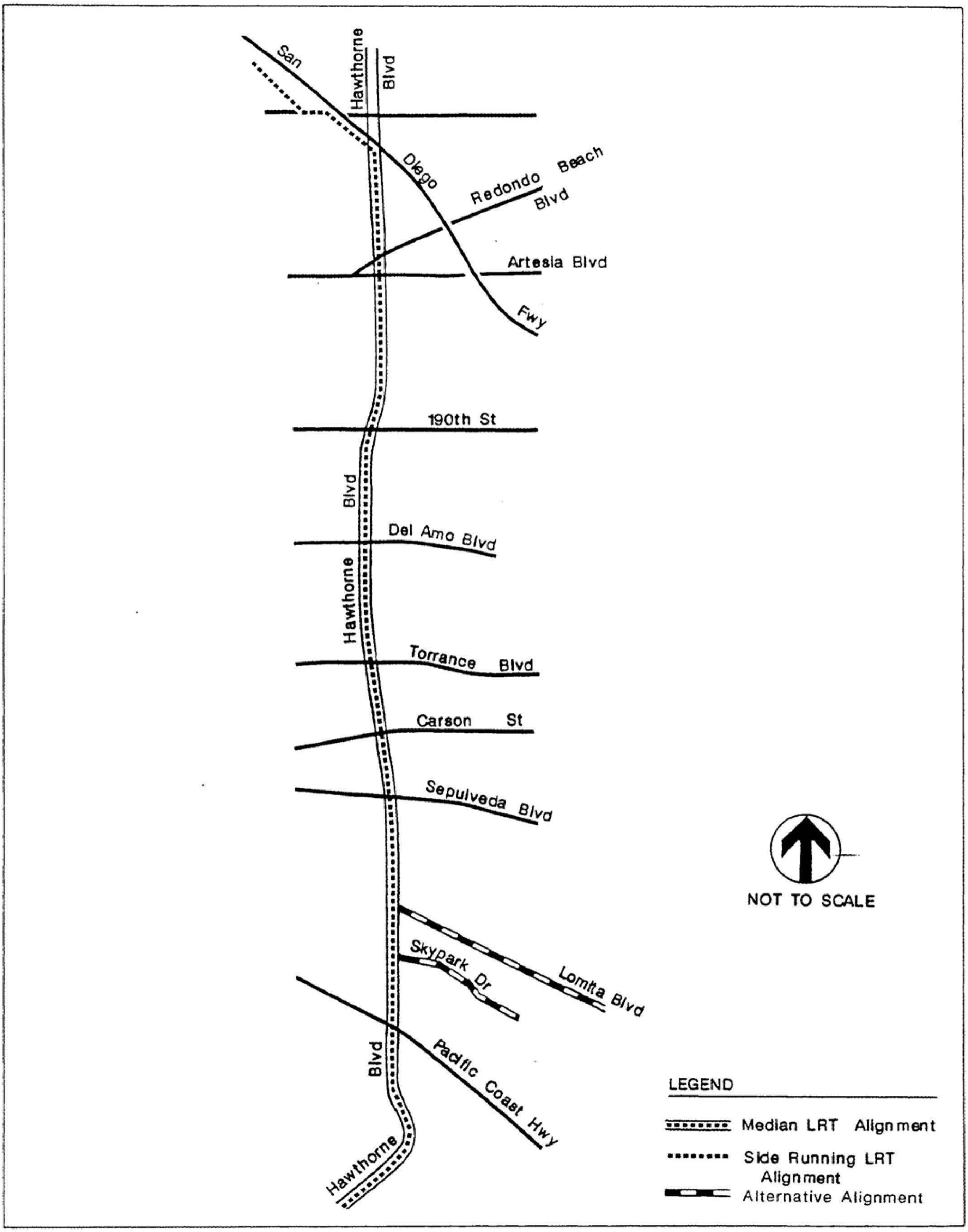
REGIONAL SETTING AND PROPOSED ALIGNMENT

The Coastal Corridor Light Rail Transit Project South Segment begins at the end of the El Segundo Extension of the Century Freeway rail project. The alignment proceeds south along the Santa Fe Railroad right-of-way and rises to an elevated structure to flyover Compton Boulevard. It proceeds along the railroad right-of-way to Manhattan Beach Boulevard where the aerial structure turns into the median and proceeds to the west side of the San Diego Freeway (I-405). It runs along the west side of the freeway to Hawthorne Boulevard. The proposed alignment continues on aerial structure in the median of Hawthorne Boulevard for nearly six miles to Rolling Hills Road. This traffic analysis addresses that portion of the alignment which is outside of existing railroad right-of-way.

Alternatives to the median alignment are proposed at the following station locations: the Galleria Station, the Old Towne Station, and the Del Amo Station. The alternative alignments at these locations would bring the aerial structure out of the median of Hawthorne Boulevard and into the existing parking areas of the South Bay Galleria, the Old Towne Mall, and the Del Amo Fashion Center. Two additional alignment alternatives would bring the line onto Skypark Drive or Lomita Boulevard from Hawthorne Boulevard. Both of those alternatives would serve the general area of the Torrance Airport and the Torrance Memorial Hospital Medical Center. Exhibit 6-1 displays the location of the proposed rail line and alternatives.

STREET AND HIGHWAY SYSTEM

The following summarizes existing conditions for each principal roadway in the corridor. Number of traffic lanes, presence of parking or restrictions and average daily traffic (ADT) volumes are provided where the information was available from the cities along the corridor and Caltrans.



PROPOSED COASTAL CORRIDOR SOUTH LRT ALIGNMENT

Exhibit 6-1

Freeways

Currently, the only freeway near the light rail corridor under study is the San Diego Freeway (I-405). The proposed rail line runs parallel to the freeway between Manhattan Beach Boulevard and Hawthorne Boulevard. The Century Freeway (I-105) is scheduled for completion in 1993. The Century Freeway light rail line will connect directly to the coastal route at the "wye" to be located near the intersection of Imperial Highway and Aviation Boulevard.

San Diego Freeway (I-405)

The San Diego Freeway is a major north/south route which connects the Coastal LRT Corridor to West Los Angeles and the San Fernando Valley to the north and Long Beach and Orange County to the south. Near Manhattan Beach Boulevard, it has four lanes in each direction. The average daily traffic volume on I-405 near the project is approximately 270,000.

Major Highways

The proposed rail project runs primarily along Hawthorne Boulevard, Lomita Avenue and Skypark Drive, with a small segment along Manhattan Beach Boulevard. The traffic impact analysis therefore focuses upon those key roadways. Several major and secondary highways may be impacted where they cross Hawthorne Boulevard. Potential impacts on those streets are analyzed in terms of intersection operating conditions.

Manhattan Beach Boulevard

Near the project Manhattan Beach Boulevard consists of two through lanes in each direction plus parking on each side of the street and a raised median. The existing volume east of Inglewood Avenue is approximately 33,200 vehicles per day. Manhattan Beach Boulevard is 84 feet wide curb-to-curb where the proposed rail alignment would run.

Hawthorne Boulevard

Hawthorne Boulevard, also known as State Route 107, varies from three to four through lanes in each direction over most of the corridor from the San Diego Freeway to Pacific Coast Highway (PCH). No parking is allowed anywhere along Hawthorne Boulevard north of PCH. South of PCH parking is allowed to Newton Street. Exclusive left-turn lanes are provided at the intersection of Hawthorne Boulevard with most major and secondary highways. There is a raised median over the entire segment which ranges from several feet to over 50 feet wide. The width of the median is key to the potential for traffic impacts and thus the median configuration is discussed in more detail in Section 2, which outlines potential project-related impacts.

Lomita Boulevard

Lomita Boulevard functions as an arterial facility between Hawthorne Boulevard and Crenshaw Boulevard. West of Hawthorne Boulevard, it becomes a residential collector street. It has two lanes plus a bike lane in each direction where the rail line is proposed. The curb-to-curb width of Lomita Boulevard west of Hawthorne Boulevard is 40 feet. East of Hawthorne Boulevard it widens to a full 80-foot width curb-to-curb. The ADT on Lomita Boulevard is approximately 33,500.

Skypark Drive

Skypark Drive is a collector street which runs from Hawthorne Boulevard to Crenshaw Boulevard. It serves as the northern boundary of the Torrance Municipal Airport property. Skypark Drive intersects Hospital Drive and therefore acts as a major access route to the Torrance Memorial Hospital Medical Center. It has two lanes in each direction near the project at Madison Street.

Existing Transit Service

Transit service for the proposed rail corridor is provided by SCRTD and Torrance Transit. Several SCRTD and Torrance Transit lines run along some portion of Hawthorne Boulevard within the proposed rail corridor and on the east/west routes which cross perpendicular to the corridor. The following summarizes the routes that currently serve the area.

Routes Along Hawthorne Boulevard

SCRTD 40

Within the corridor, this line runs from the South Bay Galleria Transit Center north along Hawthorne Boulevard to La Brea Avenue. It continues through Inglewood and south central Los Angeles into downtown Los Angeles.

SCRTD 210

This line runs north from the South Bay Galleria to Artesia Boulevard via Hawthorne Boulevard. It continues east on Artesia Boulevard to Crenshaw Boulevard. It follows Crenshaw Boulevard to Wilshire Boulevard. North of Wilshire Boulevard, the line continues into Hollywood via Rossmore Avenue and Vine Street.

SCRTD 211

This line runs north from the South Bay Galleria to Artesia Boulevard via Hawthorne Boulevard. It follows Artesia Boulevard east to Prairie Avenue where it continues north into Inglewood.

SCRTD 442

This express line operates along Hawthorne Boulevard from the South Bay Galleria to La Brea Avenue. It follows Manchester Boulevard and the Harbor Freeway into downtown Los Angeles.

SCRTD 444

Line 444 operates on Hawthorne Boulevard over most of the proposed rail corridor. It runs on Hawthorne from the Palos Verdes Peninsula to Artesia Boulevard. From Artesia Boulevard it takes the San Diego Freeway to the Harbor Freeway into downtown Los Angeles.

Torrance Transit Routes 2, 3, 4, 7, 8 and 9 all operate along some portion of the rail corridor. Route 8 covers the largest section of the corridor, running from south of Pacific Coast Highway to north of Artesia Boulevard. The various routes provide service to all parts of Torrance, the Harbor City area (Route 2), Long Beach (Route 3), and downtown Los Angeles (Route 2).

Routes Crossing Hawthorne Boulevard

The following SCRTD routes cross Hawthorne Boulevard within the proposed rail corridor: 130 (on Artesia Boulevard), 448 (on Pacific Coast Highway), and 232 (on Pacific Coast Highway).

Lomita Boulevard Transit

Torrance Transit Route 9 runs along Lomita Boulevard from Hawthorne Boulevard to Western Avenue. It runs entirely within the City of Torrance and connects the Lomita Boulevard corridor to downtown Torrance and the Del Amo Fashion Square.

EXISTING TRAFFIC CONDITIONS

Existing traffic operating conditions have been analyzed at key intersections along Manhattan Beach Boulevard and Hawthorne Boulevard in the Cities of Lawndale, Redondo Beach, and Torrance. Because the alignment will be aerial and will most likely be located in the median of Hawthorne Boulevard, the impact analysis focuses upon those locations where column supports may impact traffic operations. Intersections which may be impacted by station-related pedestrian or vehicular traffic are also included in the analysis.

At-grade rail crossings are not feasible due to the operation of a driverless automated vehicle, which is an element of the Green Line. The issue of at-grade versus aerial traffic impacts is therefore not investigated as part of this analysis. Preliminary analysis has generally eliminated the side-running alignment along Hawthorne Boulevard. Traffic impacts therefore focus on the median alignment except at three station locations where alternative alignments are proposed outside of the median.

The following intersections are included in the traffic impact analysis:

- Redondo Beach Boulevard/Hawthorne Boulevard
- Artesia Boulevard/Hawthorne Boulevard

- 190th Street/Hawthorne Boulevard
- Del Amo Boulevard/Hawthorne Boulevard
- Torrance Boulevard/Hawthorne Boulevard
- Carson Street/Hawthorne Boulevard
- Sepulveda Boulevard/Hawthorne Boulevard
- Lomita Boulevard/Hawthorne Boulevard

Exhibit 6-2 displays the locations of these study intersections.

Morning and evening peak hour traffic counts have been obtained from existing studies, from City records, and taken in the field during March and June, 1989.

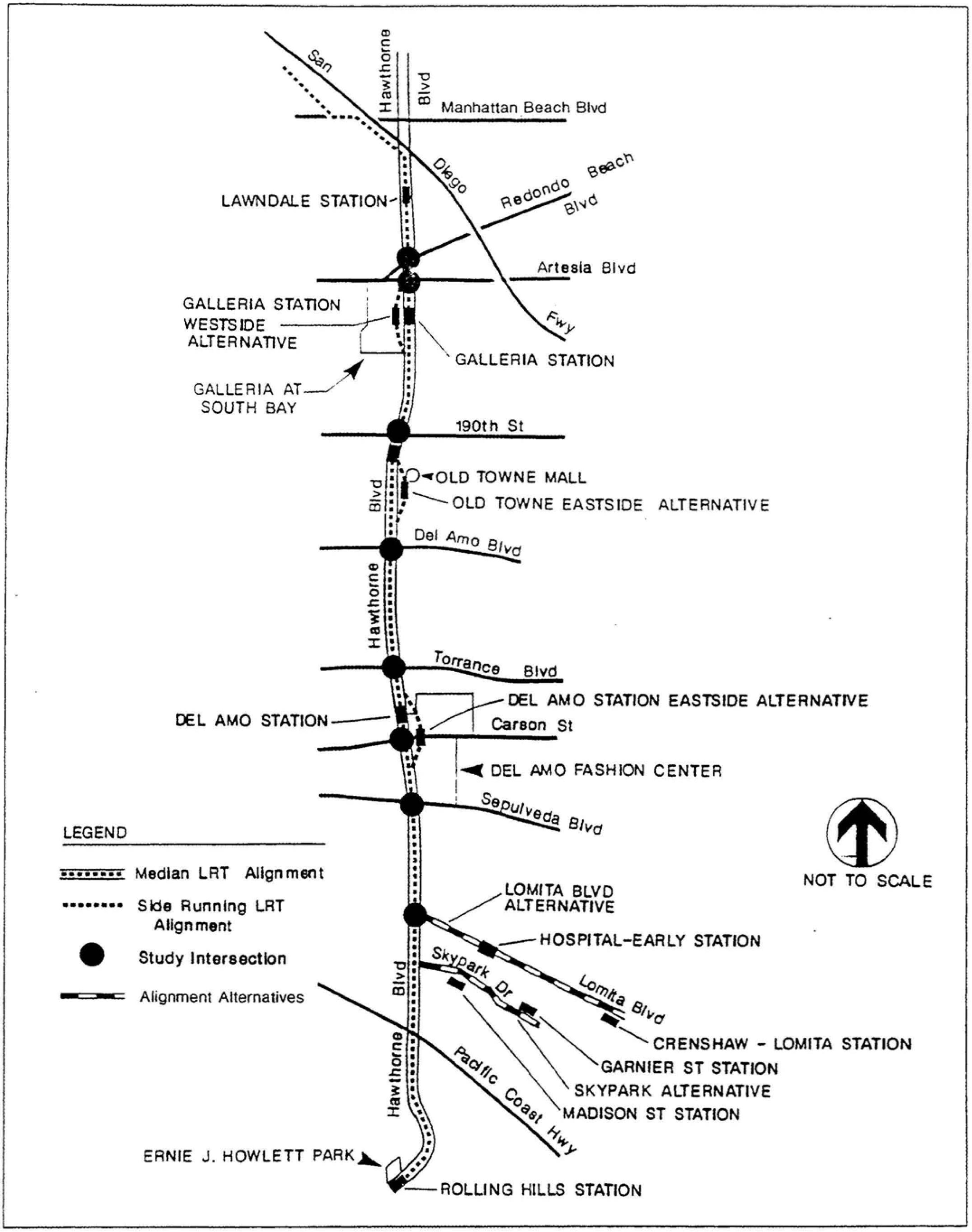
Existing intersection operating conditions have been analyzed utilizing the critical movement analysis (CMA) method. The CMA method measures the critical traffic volume at an intersection, compares that volume to an assumed capacity and results in a volume-to-capacity (V/C) ratio. The assumed capacity per lane is 1,700 vehicles per hour of green signal indication, adjusted downward as necessary to account for lost time due to multiple signal phases. These assumptions are consistent with those used in the environmental analysis prepared for the Coastal Corridor North Segment, although they are adjusted slightly to reflect conditions specific to the Torrance area.

After calculation of the volume/capacity ratio at each intersection, a level of service (LOS) is determined at each location. Level of service is a qualitative measure of intersection operating conditions which ranges from A (very good operating conditions) to F (extremely congested conditions). Table 6-1 describes typical intersection operating conditions and volume/capacity ratios under each level of service.

The existing V/C ratios and level of service at key intersections are listed in Table 6-2. The table shows the estimated LOS during both the morning (7 to 9 AM) and evening (4 to 6 PM) peak periods.

The minimum acceptable level of service on urban arterial streets is generally regarded as LOS D. Intersections operating at LOS E or F are considered to be severely congested with traffic demand approaching or at capacity. Of the eight study intersections, six are at LOS E or F during the AM peak hour, and seven are currently at LOS E or F during the PM peak hour. This indicates that considerable traffic congestion exists throughout the corridor. The provision of double left-turn

DKS Associates



STUDY INTERSECTIONS
Exhibit 6-2

Table 1
Level of Service Interpretation

Level of Service	Description	Delay Range (Sec. per Vehicle)	Volume to Capacity Ratio
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	—5	0-.59
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	5.1-15.0	.60-.69
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	15.1-25.0	.70-.79
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues. <u>This level is typically associated with design practice for peak periods</u>.	25.1-40.0	.80-.89
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	40.1-60.0	.90-1.00
F	Forced flow. Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	>60	Over 1.00

Source: Based on National Academy of Sciences, <u>Highway Capacity Manual</u>, 1965 and 1986.

Table 2
Existing Volume/Capacity Ratio and Level of Service at Key Intersections

	AM Peak Hour		PM Peak Hour	
Intersection	V/C	LOS	V/C	LOS
Hawthorne Boulevard/Redondo Beach Boulevard	–1.00	F	0.88	D
Hawthorne Boulevard/Artesia Boulevard	0.97	E	0.90	E
Hawthorne Boulevard/190th Street	0.98	E	–1.00	F
Hawthorne Boulevard/Del Amo Boulevard	0.95	E	–1.00	F
Hawthorne Boulevard/Torrance Boulevard	0.80	D	–1.00	F
Hawthorne Boulevard/Carson Street	0.80	D	1.00	F
Hawthorne Boulevard/Sepulveda Boulevard	0.96	E	–1.00	F
Hawthorne Boulevard/Lomita Boulevard	1.00	F	–1.00	F

lanes at several major intersections also indicates a history of high peak hour traffic volumes along the Hawthorne Boulevard corridor.

6.2 ENVIRONMENTAL IMPACTS

TRAFFIC PROJECTIONS - AMBIENT TRAFFIC GROWTH

For purposes of this study, year 2010 was chosen as the design year in which future traffic conditions with and without the project are assessed. A methodology of projecting future traffic volumes was developed for the Coastal Corridor Rail Transit Project North Segment and the Pasadena Rail Transit Project. The same methodology is utilized for this analysis to remain consistent with previous light rail transit studies. The calculation of background traffic growth rates is described below.

A background traffic growth rate was developed for each intersection based upon regional traffic model projections from the Southern California Association of Governments (SCAG). Average daily traffic volumes from the 1984 SCAG regional model were compared to those from the 2010 model run, and an annual rate of background traffic growth was determined for all key facilities.

The annual growth rates based upon the SCAG projections for different segments of the corridor range over the rail corridor. The average growth rate is calculated as 0.6 percent per year. To assure a conservative (worst case) analysis, the annual growth rate is rounded to one percent per year for purposes of this analysis. The one percent growth rate represents ambient (background) traffic growth due to development not related to the rail transit project. Based upon a one percent compounded annual growth rate, the total ambient traffic growth is expected to be 22 percent over the 20-year period. Although this rate is low relative to recent trends in Southern California, it is considered a realistic rate for the Hawthorne Boulevard corridor due to characteristics of the area. Many parcels adjacent to the proposed rail corridor are essentially built out and Hawthorne Boulevard has been modified to achieve maximum capacity within existing right-of-way. Even if development patterns cause significant additional traffic demand, new traffic will be forced to seek alternate routes due to capacity constraints already imposed by roadway geometrics along Hawthorne Boulevard.

A significant level of medical office development has been proposed in the area around Lomita Boulevard between Hawthorne Boulevard and Crenshaw Boulevard. No specific information on the size, location, or timing of that development was available when this analysis was prepared. Traffic resulting from expansion of the medical office district is therefore not included in the forecast of future traffic growth. Future development of a specific plan for the medical office district should be closely coordinated with the rail transit project planning.

TRAFFIC PROJECTIONS - PROJECT RELATED TRAFFIC

The next step is to estimate the traffic volumes generated by the project. SCAG's modeling results indicate that this project has no significant impact on the regional traffic projections. Future traffic volumes projected by SCAG for the "Base Case" and With LRT" differ only slightly. Therefore, traffic generation by LRT will only be localized at roadways and intersections near stations during the peak periods.

There is no established trip generation rate for light rail stations. Two approaches could be used to estimate the number of trips generated at LRT stations. As in previous LRT traffic studies, SCAG's "Mode of Access" table could be reviewed to identify the amount of auto trips generated/attracted at each station. The SCAG "mode of access" information, however, was developed before the specific station locations were identified. Therefore, the SCAG patronage information as of the date of this report does not match proposed station locations and does not provide a meaningful estimate of future project-related traffic flows. Station related traffic generation is therefore based upon the number of proposed parking spaces at each station location. The number of kiss-and-ride (drop off) trips may also be included in the calculation, although those numbers were not available when this study was prepared.

Table 6-3 shows estimated AM and PM peak hour station related tripmaking based up on the number of proposed parking spaces and the Institute of Transportation Engineers trip rate for park-and-ride lots. Those stations for which no parking or patronage information is available are not included.

Table 3
Estimated Station-Related Traffic Generation

Station	Number of Parking Spaces	AM Peak Trips[1]		PM Peak Trips[1]	
		In	Out	In	Out
Lawndale	30	20	5	5	20
Galleria	(Shared Parking Proposed)[2]				
Old Towne	500	300	75	60	280
Del Amo	(Shared Parking Proposed)[2]				
Rolling Hills	300	180	45	40	170
Lomita Alternative					
Lomita-Hospital	200	120	30	25	110
Crenshaw-Lomita	1,000	600	150	125	560
Sky Park Alternative					
Madison St.	485	295	75	60	270
Garnier St.	1,000	600	150	125	560

[1]Based on ITE trip rate # 090

[2]Parking proposed to be shared with shopping centers. SCAG model runs completed following preparation of this report indicate 200 to 300 peak hour vehicle trips at each location. Subsequent detailed analysis should include SCAG projections. These changes may result in additional local roadway improvements, but will not change the general conclusions of this study.

TRAFFIC IMPACTS

Future Without the Project

As stated in the previous section, an overall ambient traffic growth rate of 22 percent is assumed for the future before project implementation. Intersection V/C ratios and LOS have been recalculated with the assumed 22 percent traffic growth. Table 3 displays forecast intersection operating conditions for 2010 with and without the project. Based upon this analysis, a 22 percent traffic growth rate would result in significant congestion (LOS E or F) at every study intersection.

Future with Proposed Light Rail Project

Intersection operations for 2010 have been recalculated with the addition of project-related trips shown in Table 6-4. The ultimate V/C ratio and level of service at each location with the rail line are shown in the table. This scenario assumes that the LRT could be built without impacting the intersection geometry, a topic which is addressed in the next chapter. The data in the table illustrate that the station-related traffic impacts are forecast to be insignificant at most intersections. Three intersections are expected to experience a 0.01 increase in V/C and one is expected to experience 0.04 V/C increase.

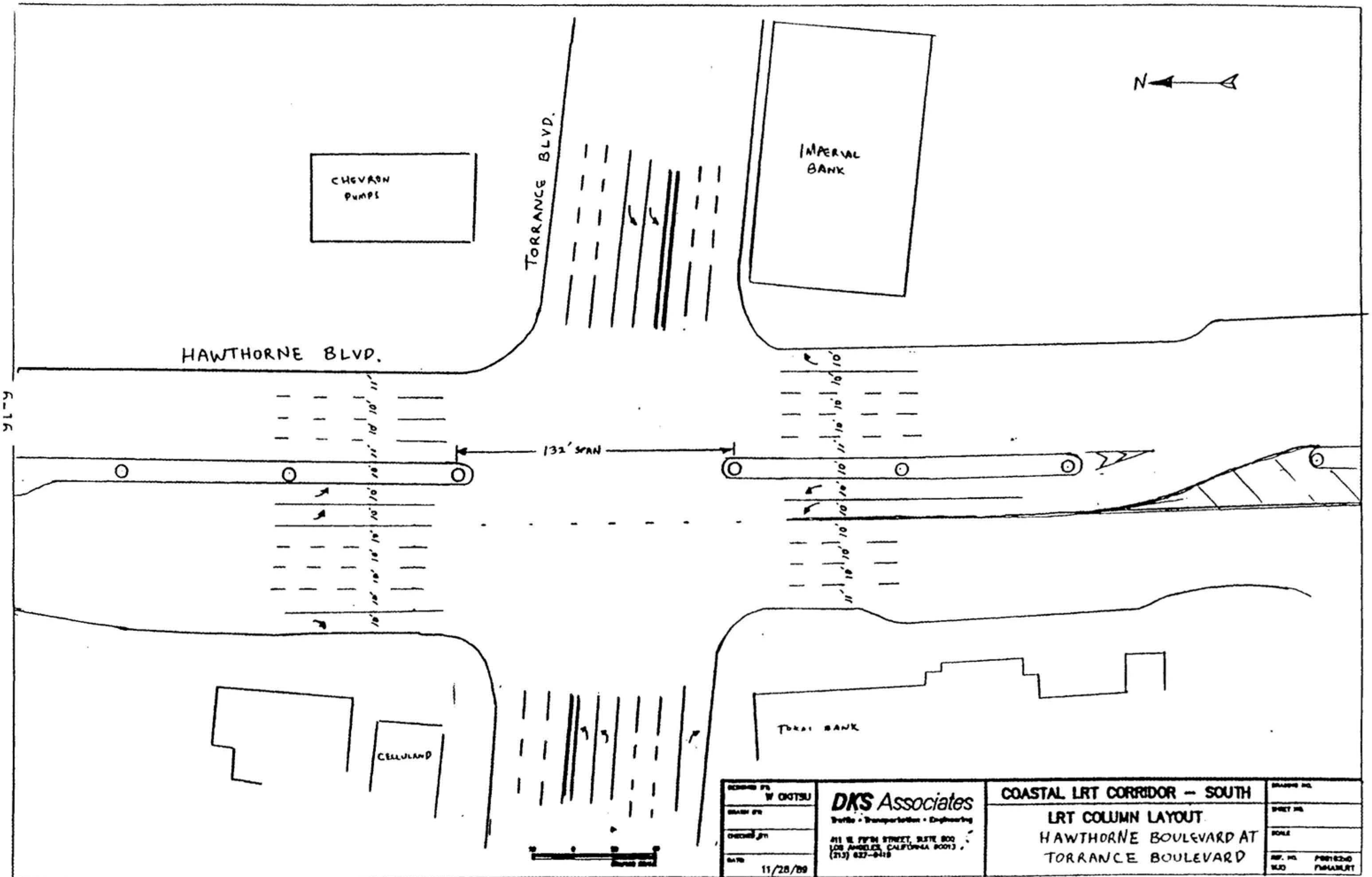
6.3 ROADWAY GEOMETRIC IMPACTS DUE TO AERIAL STRUCTURE

Because the proposed rail line will be aerial, no traffic lanes will be permanently removed to install right-of-way for the tracks. However, some temporary loss of roadway width and lanes for moving traffic will occur during construction. Furthermore, some roadway space will be permanently lost due to the placement of column supports.

Exhibits 6-3 and 6-4 show sketches of the proposed traffic lane configuration of Hawthorne Boulevard at Torrance Boulevard and at 230th Street, respectively. The aerial structure is shown in the median of Hawthorne Boulevard. The columns are assumed to be six feet wide. Approximately two feet of additional space on each side of the columns is necessary as a buffer between moving traffic and the columns. Although the median has been widened in both exhibits to accommodate the columns, the existing number of lanes have been maintained without

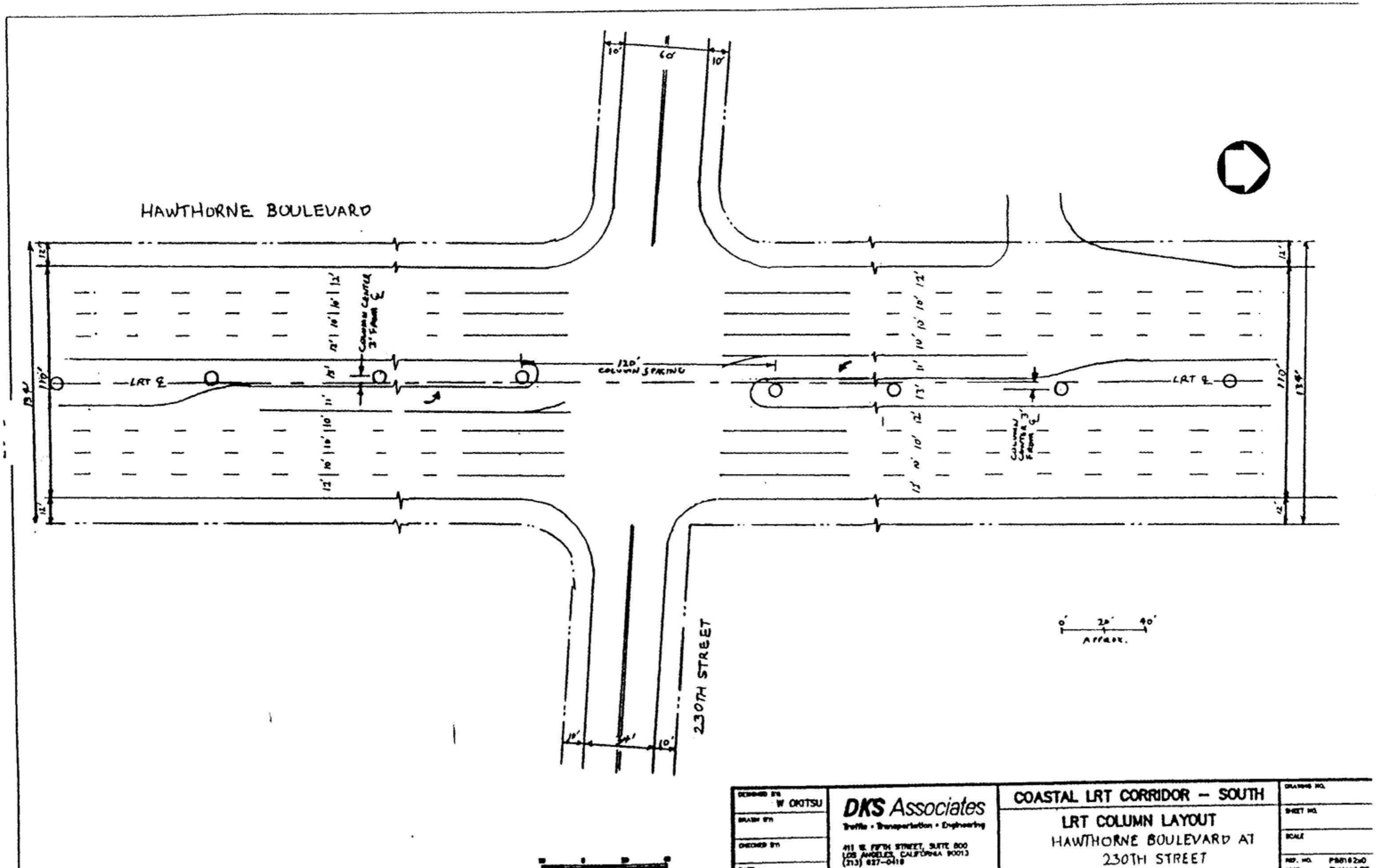
Table 4
Existing and Year 2010 Volume/Capacity Ratio and Level of Service

Intersection	AM Peak Hour						PM Peak Hour					
	Existing		Base Case		With LRT		Existing		Base Case		With LRT	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Hawthorne Blvd. at:												
Redondo Beach Blvd.	-1.00	F	1.25	F	1.25	F	0.88	D	1.08	F	1.08	F
Artesia Blvd.	0.97	E	1.19	F	1.19	F	0.90	E	1.09	F	1.09	F
190th St.	0.98	E	1.20	F	1.21	F	-1.00	F	1.28	F	1.29	F
Del Amo Blvd.	0.95	E	1.16	F	1.16	F	-1.00	F	1.27	F	1.27	F
Torrance Blvd.	0.80	D	0.97	E	0.97	E	-1.00	F	1.36	F	1.36	F
Carson St.	0.80	D	0.98	E	0.98	E	1.00	F	1.22	F	1.22	F
Sepulveda Blvd.	0.96	E	1.17	F	1.17	F	-1.00	F	1.47	F	1.47	F
Lomita Blvd.	1.00	F	1.23	F	1.26	F	-1.00	F	1.45	F	1.49	F



N
TORRANCE BLVD.
CHEVRON PUMPS
IMPERIAL BANK
HAWTHORNE BLVD.
132' SPAN
TOKAI BANK
CELLULAND
W OKITSU
11/28/89
DKS Associates
COASTAL LRT CORRIDOR — SOUTH
LRT COLUMN LAYOUT
HAWTHORNE BOULEVARD AT
TORRANCE BOULEVARD

Exhibit 6-3



HAWTHORNE BOULEVARD
230TH STREET
LRT ℄
120' COLUMN SPACING
COLUMN CENTER 3' FROM ℄
0' 20' 40' APPROX.
DESIGNED BY W OKITSU
DATE 11/28/89
DKS Associates
Traffic • Transportation • Engineering
COASTAL LRT CORRIDOR – SOUTH
LRT COLUMN LAYOUT
HAWTHORNE BOULEVARD AT 230TH STREET

Exhibit 6-4

widening Hawthorne Boulevard, by using narrower lanes. Exhibits 6-3 and 6-4 are intended to illustrate the striping concept for this route refinement study. A more detailed investigation of the traffic striping and right-of-way requirements is appropriate during the preparation of the EIR.

Due to the significant traffic volumes already experienced along Hawthorne Boulevard and the projected LOS E and F conditions, the removal of any existing roadway capacity would create a significant impact. The aerial structure must therefore be designed without the loss of any through traffic lanes or left or right turn lanes at critical intersections.

As discussed earlier, the aerial structure is proposed to run down the median of Manhattan Beach Boulevard and Hawthorne Boulevard except where alternative station sites are proposed at the South Bay Galleria, Old Towne Mall, and Del Amo Fashion Center. The Lomita Boulevard alternative includes the aerial structure in the median of Lomita Boulevard until the Crenshaw-Lomita station location where it moves to the south side of the street. The Skypark Drive alternative runs in the median of Skypark Drive from Hawthorne Boulevard to Madison Street. East of Madison Street it moves to the south side of the street for approximately 200 feet after which it returns to a median alignment until the Garnier Street station to be located north of Skypark Drive.

The aerial structure can be easily accommodated over a portion of the proposed alignment where the existing median is sufficiently wide. In some portions of the alignment, however, the existing median is too narrow to accommodate the columns. Complete reconstruction of the median will be required at those locations in conjunction with other measures such as narrowing of sidewalks, removal of left-turn lanes at minor intersections, purchase of right-of-way, and signalization.

Detailed discussion of every potentially impacted roadway segment is beyond the scope of this analysis. A conceptual discussion of the required mitigation by segment is, however, included below.

Manhattan Beach Boulevard

The existing median width of 16 feet is sufficient to accommodate aerial structure columns without removing through traffic lanes. A straddle bent will be required where the structure turns onto

Manhattan Beach Boulevard (see Plan and Profile drawing C102). At Firmona Avenue the eastbound left-turn bay (to a driveway) must be eliminated to accommodate a column. The westbound left-turn bay (to southbound Firmona Avenue) must be redesigned and the median adjacent to the left-turn pocket widened. This can likely be accommodated within the existing curb-to-curb width through parking removal.

Adjacent to San Diego Freeway

No roadway related impacts are anticipated as the aerial structure is outside of all surface street right-of-way.

Hawthorne Boulevard (San Diego Freeway to Lawndale Station)

The wide median in this segment will accommodate the structure without significant reconstruction. Straddle bent support structures may be required where left-turn pockets cut through the median. The median island at 166th Street must be redesigned to accommodate structural columns for the Lawndale Station which would span the intersection.

Hawthorne Boulevard (Lawndale Station to Galleria Station)

The median along most of this segment is wide enough to accommodate the structure without significant reconstruction. Where left-turn pockets cut through the median, straddle bents will be required or the median islands will require redesign. More detailed traffic engineering analysis of all proposed straddle bent and column locations will be necessary during later design phases of the project. This review will be required to prevent potential sight distance problems (i.e., columns interfering with the driver's view of oncoming vehicles). Detailed review of potential column sight distance problems should be conducted not only for this segment but over the entire alignment.

Preliminary review of the line reveals that sight distance problems may occur for left-turning vehicles at minor cross streets. Installation of traffic signals to control left-turn movements may be required at those locations unless the left-turn pockets are removed and left turns are prohibited. Signal timing at any new traffic signals along Hawthorne Boulevard would need to be carefully coordinated with adjacent existing signals to minimize disruption to traffic flow. Even with coordination, however, congestion on Hawthorne Boulevard could worsen with the installation of new signals at intersections which are currently controlled only by stop signs.

The median alternative for the Galleria Station may require widening of the existing 10-foot median. To prevent loss of roadway capacity, the east curb line must be moved. The west side will also require widening for a bus turnout. The existing traffic signal poles will also need to be relocated as the median and curbs are redesigned.

The westside alternative would not require any median island or signal redesign as the structure would be located in the existing Galleria parking area.

Hawthorne Boulevard (Galleria Station to 190th Street)

Due to the narrow median island size and location of multiple left-turn pockets, significant roadway redesign is required for this segment. The median must be widened throughout, and the lost roadway area must be taken from the sidewalks on either side. The sidewalks on the east side vary from 14 to 22 feet, thus, removal of a few feet will not create a significant impact. Westside sidewalks are generally narrower, but appear to have sufficient width (10 to 15 feet) to allow minor roadway widening. Left-turn pockets at minor streets such as 186th Street may need to be removed to accommodate the aerial structures.

A straddle bent will be required where the structure crosses Hawthorne Boulevard north of the AT&SF bridge north of 190th Street. The median island on the east side of 190th Street must be widened and extended to the west approximately 10 feet for placement of a column support. The southeast corner of the intersection will require reconstruction, and purchase of additional right-of-way may be necessary.

Hawthorne Boulevard (190th Street to Del Amo Station)

Median reconstruction and roadway widening will be necessary along this entire segment. Sidewalks will need to be narrowed at various locations and closure of some minor street left-turn pockets may be necessary.

Skypark Drive Alternative

The LRT columns could be accommodated with two lanes in each direction or one lane plus parking on each side of the street. East of Madison Street, Skypark Drive narrows to under 40 feet, but no impacts are anticipated because the alignment is proposed to be located south of the street.

6.4 MITIGATION MEASURES

Two types of mitigation measures will be necessary to reduce anticipated LRT related impacts to levels of insignificance. First, all roadway space lost due to placement of LRT columns must be replaced through restriping (if feasible), widening via reduction in sidewalk width, or widening via purchase of right-of-way. These specific mitigation measures should be developed throughout the proposed LRT corridor during later design phases of the project. A preliminary review of the improvements that will be needed were outlined in Section 3.

The second general type of improvement will be needed to mitigate circulation impacts due to the placement of park-and-ride and kiss-and-ride lots near proposed stations. Although it can be argued that the rail line may ultimately reduce the number of automobile trips on the roadway system, it may also increase local tripmaking around stations. One mitigation strategy will be the provision of local feeder bus service which will bring LRT users to the rail line from surrounding residential and commercial areas. Efficient east/west oriented feeder bus service will eliminate many single occupant automobile trips to the stations.

The traffic impact analysis results indicate that nearly all anticipated future impacts will be due to ambient traffic growth rates. The LRT will have some local traffic impacts near stations, but these impacts will be minor compared to congestion already on the street system. All driveway access locations, however, must be carefully designed to prevent further impact to traffic flow on Hawthorne Boulevard. If it is feasible all access should be limited to side street rather than Hawthorne Boulevard itself.

From a traffic impact perspective, the east and westside station alternatives are preferred. These alternatives eliminate all column related impacts in the vicinity of the station due to the placement of the aerial structure outside of the roadway median. Also, the circulation systems in those areas

The Del Amo Station median alignment would require roadway reconstruction but the eastside alternative could be accommodated without impacting Hawthorne Boulevard or other streets.

Hawthorne Boulevard (Del Amo Station to 230th Street)

Median island reconstruction will be necessary primarily at intersections where the island narrows to eight feet. Spot widening will be required and some loss of sidewalk width will occur. Between intersections the median widens to 20 feet and will accommodate columns.

Hawthorne Boulevard (230th Street to Pacific Coast Highway)

Similar to the previous segment, median island widening and reconstruction will be required at intersections, but midblock segments will accommodate the LRT columns without widening. A new raised median will be required from Pacific Coast Highway northward to the existing island located approximately 750 feet north of PCH. Left turns into and out of three driveways on the west side of Hawthorne between PCH and 229th Street must be restricted to right-turn-in/right-turn-out.

Hawthorne Boulevard (PCH to Rolling Hills Station)

Median reconstruction and widening of the roadway will be necessary at intersection locations. The single track alignment along this section will result in narrower columns and therefore median widening will be less than segments to the north. South of PCH the extra roadway width needed for moving traffic lanes may be taken from existing parking lanes with resulting impact to the street's parking capacity.

Lomita Boulevard Alternative

Although there is currently no raised median on Lomita Boulevard, there is sufficient width (80 feet curb-to-curb) to accommodate the LRT columns without loss of roadway capacity. No direct roadway impacts are expected due to the Crenshaw station as it will be located south of Lomita Boulevard and west of Crenshaw Boulevard, outside of the roadway right-of-way.

are already designed to handle significant traffic flow into and out of the shopping center parking areas where the stations would be located. Finally, much of the rail patronage at these locations will likely be oriented to the shopping areas. The east and westside alternatives, unlike the median alignment, would not require rail passengers destined for the shops to cross into the middle of the street (and thereby impact capacity) to access the rail line.

SECTION 7
NOISE ANALYSIS

7.1 INTRODUCTION

This report examines the potential noise and vibration impacts associated with the proposed Coastal Corridor (South) Rail Transit Project and provides the technical documentation for the noise and vibration sections of the project route refinement study.

As a basis for the analysis of potential impact, noise and vibration measures and impact criteria are described in Section 7.2. Section 7.3 presents the results of the noise and vibration impact analysis conducted along the proposed route, concentrating on the change in exposure in sensitive areas for the proposed operation of the system. Section 7.4 identifies those areas where potential impacts exist, and suggests possible mitigation measures for further study and evaluation.

7.2 NOISE AND VIBRATION METRICS AND IMPACT CRITERIA

NOISE OF OPERATIONS

When high noise levels are experienced inside or outside people's homes, as may occur from the passage of motor vehicles (cars, buses, trucks) or rail rapid transit vehicles, feelings of annoyance may result. These noise levels may also interfere with the performance of various activities such as conversation, TV watching, sleeping, etc. The degree to which there is annoyance and/or activity interference depends upon the magnitude of the intruding noise level, the frequency with which it occurs, and the time of day of occurrence. At present, there is a consensus among a variety of government agencies charged with establishing noise standards and criteria that the day-night average sound level is the preferred unit of noise exposure for use in assessing the potential impact of an intruding noise source.[1] The day-night sound level (L_{dn}) represents an average of the A-weighted noise levels occurring during a complete 24-hour period; however, it includes a weighing applied to those noises occurring during nighttime (10 p.m. to 7 a.m.) hours.

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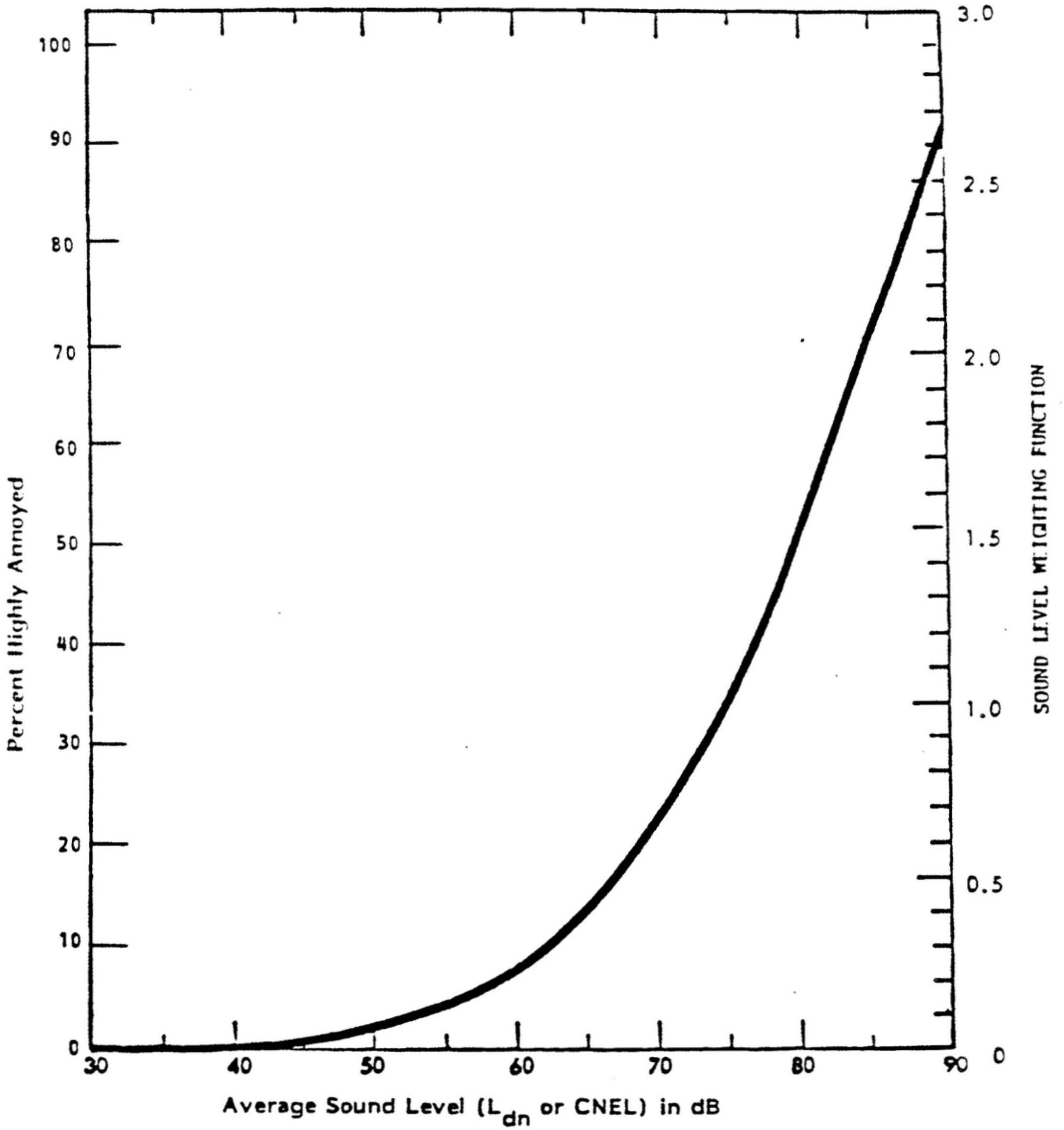
[1] References are listed at the end of Sec. 7.

Several social surveys have been conducted in which people's reaction to their noise environment has been determined as a function of the day-night sound level occurring outside their homes. Figure 7-1 shows the results of many of these surveys.[2] The measure of community annoyance is expressed in terms of the percentage of the population sampled who indicated that they were "highly annoyed" with their noise environment. This curve has been found to be appropriate for a variety of noise sources, ranging from aircraft to surface transportation to railroad noise.

Specific criteria can be developed for individual land uses based upon the information described in Figure 7-1 as well as information concerning activity interference. For residential land use, a day-night sound level of 65 dB has been selected by a number of federal agencies (HUD, DOD, etc.) as a general dividing line between an unacceptable and an acceptable noise environment[1], based upon several considerations including the potential for disturbance of various activities that normally are conducted at home. (Note that an L_{dn} of 65 dB would result from Figure 7-1 in 15 percent of the population being highly annoyed. It should be recognized that in any noise environment some people will always indicate annoyance and some people will never indicate annoyance regardless of noise level).

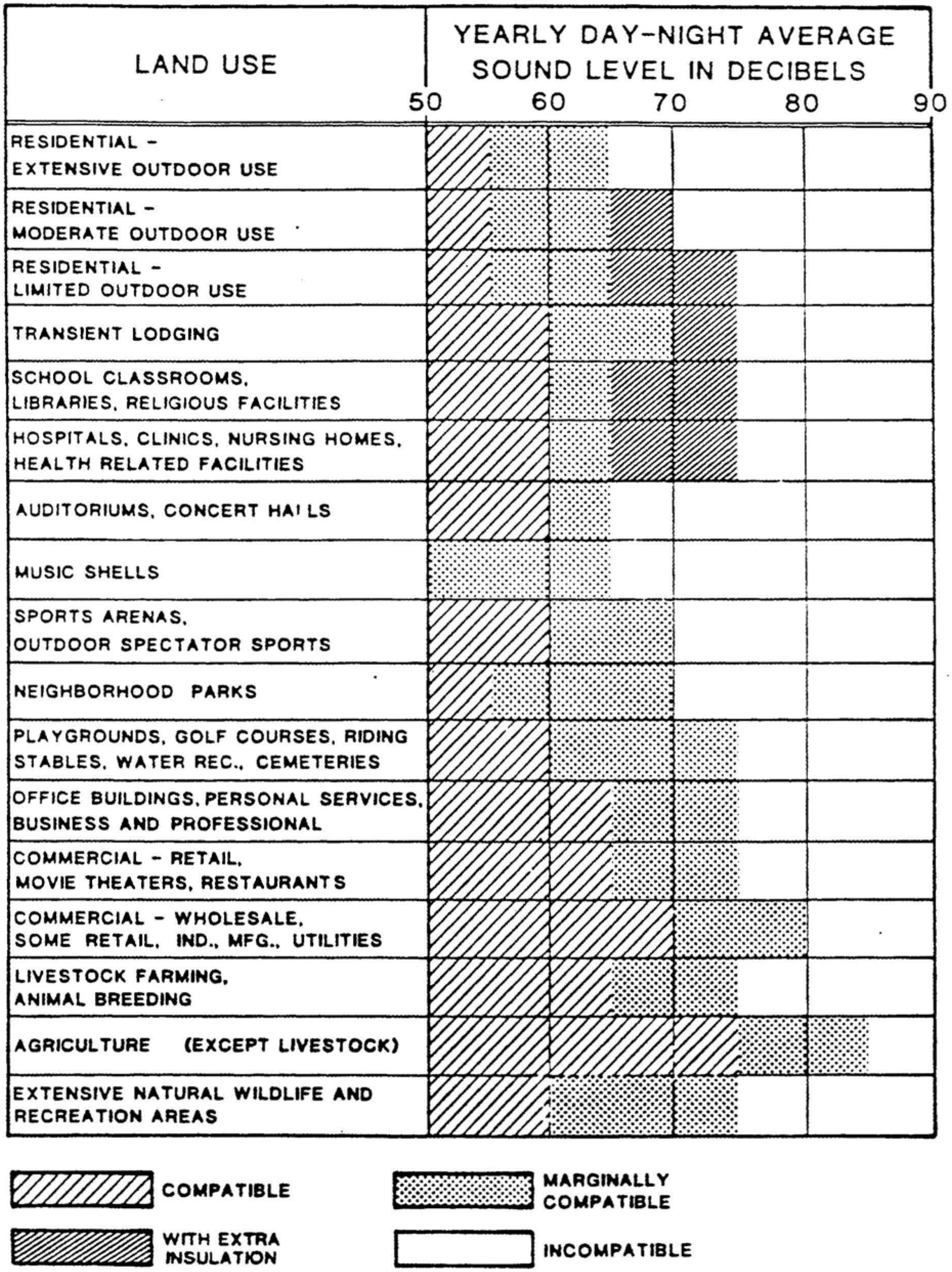
For other land uses, the level of acceptability of the noise environment is dependent upon the activity that is conducted and the type of building construction (for indoor activities). Figure 7-2 provides noise exposure compatibility guidelines for a variety of land uses.[3] The figure shows that for many "noise sensitive" land uses such as schools, churches, hospitals, etc., an L_{dn} value of 65 dB is also selected as the dividing line between an unacceptable and an acceptable noise environment.

In California, several agencies use an alternate measure of noise exposure known as the community noise equivalent level, or CNEL. The CNEL is identical to the L_{dn} with one exception: in the CNEL measure there is a weighing of 5 dB applied to those noises occurring during evening hours (7 p.m. to 10 p.m.). Thus, both measures represent a 24-hour average of the A-weighted noise levels at a particular location; the L_{dn} includes a nighttime weighing, and the CNEL includes both an evening and a nighttime weighing. For most transportation and community noise sources, the CNEL and L_{dn} are equal to within 1 dB (typically CNEL = L_{dn} + 0.5 dB). In the remainder of this document, the CNEL measure will be utilized.



COMMUNITY RESPONSE TO NOISE

Exhibit 7-1



LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVEL AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED (AFTER ANSI STD S 3.23 - 1980)

Exhibit 7-2

In addition to being concerned about the absolute noise level that might occur when a new noise source is introduced into an area, it is also important to consider the level of the existing noise environment. If the existing noise environment is quite low and the new noise source greatly increases the noise exposure (even though a criterion level might not be exceeded), some impact may occur. Conversely, if the existing noise environment is quite high and the new noise source is of comparable level, there may be no new noise impact even though existing levels and levels in combination with the new source may exceed a criterion level.

The discussion above has concentrated on the concept that noise impact is best assessed by evaluating the long-term noise exposure from a proposed transportation source. Many people are often concerned about the maximum noise level produced during the passby of a transit vehicle in addition to the long-term noise exposure implications of the operation of such vehicles. At present, there are no state or federal standards limiting the noise of such vehicles, nor do individual cities and counties address such sources in their noise ordinances. Guidelines on the maximum allowable single-event noise level from light rail vehicles are available, however, as proposed to LACTC. These guidelines (presented in Table 7-1) vary as a function of receiving land use and community area category, which relates to the background noise level in the community. The most restrictive maximum noise level appropriate for residential areas along the proposed alignments would be 75 dB, applicable for LRT operations. Based on the expected operating speeds and distances from the tracks to sensitive nearby structures, the proposed light rail system should not exceed this guideline level at most locations along the proposed coastal route. Further, the guideline has been chosen to minimize "possible large differences between maximum passby levels and average community ambient noise."[4] Maximum noise levels in most areas along the proposed route are currently in excess of 75 dB due to existing noise sources such as heavy surface traffic on the major arterial streets.

VIBRATION

In measuring the noise of transportation systems, it is customary to utilize the A-weighted noise level, which is a single number that takes into account the frequency characteristics of the sound signal. Similarly, the potential vibration impacts of the light rail system can be described in terms of a single number, the maximum vertical velocity experienced during a vehicle passby in dB relative to 10-6 inches/second.

TABLE 7-1
MAXIMUM NOISE LEVEL GOALS FOR LIGHT RAIL TRANSIT AND RAIL FREIGHT OPERATIONS

(Noise Sensitive Receivers)

	LMAX Design Criteria, dBA	
	LRT	Railroad
Residential Buildings		
Land Use Category 1 - Low Density Residential	75	88
Land Use Category 2 - Medium Density	78	88
Land Use Category 3 - High Density (Multi-Family)	80	90
Land Use Category 4 - Commercial	80	93
Land Use Category 5 - Industrial	80	93
Schools, Churches, Hospitals, Museums, Theatres, Libraries		
Land Use Categories 1-3	78	88
Land Use Category 4	80	88
Land Use Category 5	80	88

To assess the impact of vibration levels in this report, criteria for maximum vertical velocity level as a function of receiver land uses during an LRT passby are used. These criteria are shown in Table 7-2.

7.3 NOISE AND VIBRATION IMPACTS OF OPERATIONS

NOISE IMPACTS

Assessment of the noise impacts of proposed LRT operations will be conducted in two different ways:

- General information will be presented that compares projected LRT maximum passby noise levels with corresponding levels from existing and future noise sources.
- For residential areas along the proposed alignments, a detailed noise exposure (CNEL) analysis will be performed to provide the numbers of residences exposed to accepted criteria levels for existing and future alternative conditions.

In evaluating the potential noise impact of a new transportation noise source, there are generally two factors which should be considered. First, the expected noise of the new system should be compared to applicable criteria to insure compliance with local, state or federal regulations and guidelines to minimize interference with specific activities as a function of land use. Second, expected system levels should be compared with existing levels in areas along the alignment to ensure that the noise environment is not degraded.

As a starting point, Table 7-3 presents the maximum A-weighted sound levels expected from various transportation modes at typical distances from the noise source. Since most of the aerial alignment is located in the median of Hawthorne Blvd., the maximum levels due to typical auto, truck, and bus passbys are of interest. As can be seen from the table, the existing maximum level from such sources is comparable to that expected from a single light rail vehicle passby at curbside.

A screening-level assessment of noise impact from LRT operations can be made by comparing expected maximum noise levels from such activity with the noise level goals (presented in Table 7-1) for different receiving land uses, and with existing levels in the various areas. The

TABLE 7-2
MAXIMUM GROUND-BORNE VIBRATION CRITERIA, LIGHT RAIL TRANSIT AND FREIGHT RAIL OPERATIONS

	Ground-borne Vibration LRT[1]	Ground-borne Vibration Railroad[1]
Residential Buildings		
Land Use Category 1	70 dB	75 dB
Land Use Category 2	70	75
Land Use Category 3	73	78
Land Use Category 4	75	80
Land Use Category 5	78	83
Schools, Churches, Hospitals, Museums, Theaters, Libraries		
Land Use Categories 1-3	78	78
Land Use Category 4	75	80
Land Use Category 5	78	83
Concert Halls, TV Studios, Recording Studios	65	70

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[1] Vertical vibration velocity in cB relative to 10^{-6} in/sec

TABLE 7-3
MAXIMUM A-WEIGHTED SOUND LEVELS FOR VARIOUS TRANSPORTATION MODES

	Distance from Vehicle Path Centerline, ft.	
Mode	50	100
	For speeds of 35 mph/55 mph	
Auto	64/70	58/64
Bus	74/80	68/74
LRT At Grade	74/80	68/74
LRT Aerial	77/83	71/77

results of this evaluation are summarized in Table 7-4, and are used to identify areas where further study is indicated.

As shown in Table 7-4, the numbers of noise-sensitive structures along each the route for which the recommended maximum A-weighted sound level limits (see Table 7-1) would be exceeded during each LRT passby are few. Further, in these cases, existing maximum noise levels from roadway traffic are comparable (80 to 85 dBA) to those expected from LRT passbys.

In the Manhattan Beach Blvd. section, there are 3 commercial buildings (converted residences) where the maximum noise level criterion will be exceeded. Just beyond this portion, where the alignment is adjacent to the San Diego Freeway, there are 3 multi-family residences where the maximum passby noise criterion will be exceeded, and one single family residence. At 190th St., a Medical Building will experience maximum noise levels exceeding the criteria during rail passbys. Along Hawthorne Blvd. there are a total of 7 single family residences where the maximum passby noise level criterion will just be reached. Six are just south of Sepulveda Blvd., and the last is near the end of the alignment just south of Rolling Hills Rd, giving the totals shown in Table 7-4.

The Galleria Station and Old Towne Station alternatives will not change the number of structures where the maximum noise level criterion is exceeded. However, the Del Amo Station East Side Alternative will result in close approaches (20 to 40 feet) to three commercial buildings, resulting in maximum passby noise levels over the suggested criteria.

On the other hand, selection of the Lomita or Skypark alternatives would result in significantly fewer commercial buildings impacted, and one less residence. This is accomplished by avoiding the area of Hawthorne Blvd. south of Pacific Coast Highway, where the right-of-way and distances to the nearest structures are less than they are farther north.

The impact of the light rail vehicle noise source, although seemingly significant in the areas noted above on a maximum noise level basis, may be less significant due to the high noise levels generated by other transportation and community noise sources. A measure of long-term noise exposure, such as CNEL, may be more appropriate in assessing impact from light rail operations and comparing these to other significant noise sources. The operating schedule used to compute LRT CNEL was provided by Manuel Padron Associates. Existing and future roadway traffic levels are based on data provided by DKS Associates, the project traffic consultants.

TABLE 7-4
RESULTS OF SINGLE EVENT NOISE IMPACT ANALYSIS FOR PROPOSED COASTAL CORRIDOR (SOUTH) LIGHT RAIL TRANSIT ALTERNATIVES

No. of Buildings exceeding criteria:

Route Segment	Land Use Category	LRT Lmax, dB	Residential Sgl Fam	Residential Multi	Commercial	Medical
Hawthorne Alternative:						
142-149	3,4	87	0	3	3	0
149-157	2	79	1	0	0	0
258+00	4	81	0	0	0	0
380-390	2	78	6	0	0	0
426-466	4	81	0	0	12	0
466-479	4	81	0	0	12	0
479-487	2	79	1	0	0	0
Totals:			8	3	27	1
Galleria Station West Side Alternative:						
No change in impacts.						
Old Towne Station East Side Alternative:						
No change in impacts.						
Del Amo Station East Side Alternative:						
142-149	3,4	87	0	3	3	0
149-157	2	79	1	0	0	0
258+00	4	81	0	0	0	1
341-356	4	80	0	0	1	0
356-380	4	86	0	0	2	0
380-390	2	78	6	0	0	0
426-466	4	81	0	0	12	0
466-479	4	81	0	0	12	0
479-487	2	79	1	0	0	0
Totals:			8	3	30	1

TABLE 7-4 (CONT')
RESULTS OF SINGLE EVENT NOISE IMPACT ANALYSIS FOR PROPOSED COASTAL CORRIDOR (SOUTH) LIGHT RAIL TRANSIT ALTERNATIVES

No. of Buildings exceeding criteria:

Route Segment	Land Use Category	LRT Lmax, dB	Residential Sgl Fam	Residential Multi	Commercial	Medical
Lomita Alternative:						
142-149	3,4	87	0	3	3	0
149-157	2	79	1	0	0	0
258+00	4	81	0	0	0	1
380-390	2	78	6	0	0	0
410-425	4	87	0	0	1	0
Totals:			7	3	4	1
Skypark Alternative:						
142-149	3,4	87	0	3	3	0
149-157	2	79	1	0	0	0
258+00	4	81	0	0	0	1
380-390	2	78	6	0	0	0
426-445	4	87	0	0	1	0
Totals:			7	3	4	1

Table 7-5 provides a comparison of the light-rail system with other transportation systems on a noise exposure (CNEL) basis. The table shows that the CNEL 50 feet from the centerline of a major thoroughfare such as Hawthorne Blvd. with high traffic flow would be approximately 74 dB. In comparison, the CNEL from the currently proposed operating schedule would be 70 dB for the aerial guideway configuration at maximum speed (55 mph) and 65 dB at a reduced speed (35 mph).

The results of the system-wide noise exposure analysis are given in Table 7-6. The noise exposure impact is given by the change in future CNEL resulting from project implementation (with project vs. no project). In cases where the increase is less than 3 dB, the impact is insignificant, since a 3 dB increase in level is the point at which the average listener can detect the change.

Where the increase is 3 to 5 dB, the noise impact is significant. An increase in CNEL of more than 5 dB is generally considered to be adverse.

Due to the contributions of other noise sources, the (CNEL) 24-hour average noise impact is far less significant than the impact on a single event basis. As shown in Table 7-6, the only areas where further study is indicated are at the Medical Building at 190th St. and Hawthorne Blvd., and at the commercial buildings located nearest the proposed turns to Lomita Blvd. and Skypark Drive for the respective alternatives. The change due to the project indicated for the industrial area toward the east end of the Skypark alternative is probably not as great as 3 to 4 dB, because of our estimate of existing traffic on Skypark Drive (10,000 ADT). 24-hour traffic counts are not currently available for Skypark Drive.

VIBRATION IMPACTS

Groundborne vibration is generated during light rail vehicle operations as the steel wheels of the rail vehicle impact the rail. In the vicinity of existing roadway transportation facilities, in which there are only rubber-tired vehicles, groundborne vibration is generally low.

The impact of vibration levels induced by the LRT vehicle passbys were evaluated in terms of the maximum vertical vibration velocity in decibels relative to 10-6 in/sec. Table 7-7 presents the vibration velocity levels expected for various transportation modes at 50 ft and 100 ft

TABLE 7-5
COMPARISON OF NOISE EXPOSURE FOR VARIOUS TRANSPORTATION MODES

Transportation Source	CNEL at 50 feet, dB
Major Thoroughfare Traffic (50,000 ADT)	74
Major Freeway Traffic (120,000 ADT)	84
LRT Using Proposed Operating Schedule	
35 mph at-grade	62
35 mph on aerial guideway	65
55 mph at-grade	67
55 mph on aerial guideway	70

TABLE 7-6
LRT COASTAL CORRIDOR (SOUTH) CNEL IMPACT RESULTS

ALIGNMENT STATION NUMBERS	BUILDING	DIST TO BLDG FT	LRT CNEL	EXISTING CNEL	TOTAL FUTURE NOISE LEVELS NO PROJ CNEL	W/PROJ CNEL	CNEL CHANGE (IMPACT)
142-149	TYPICAL	50	68.2	74.6	74.7	75.6	0.9
MF RES	NEAREST	20	72.2	77.8	77.9	79.0	1.0
149-157	TYPICAL	80	66.2	73.8	73.9	74.6	0.7
SGL RES	NEAREST	50	68.2	75.5	75.7	76.4	0.7
165-205	TYPICAL	85	66.8	71.1	71.9	73.1	1.2
COMMERCIAL	NEAREST	80	67.1	71.1	71.9	73.2	1.2
205-216	TYPICAL	100	61.7	70.8	71.6	72.0	0.4
SGL RES	NEAREST	85	62.4	71.6	72.5	72.9	0.4
216-223	TYPICAL	100	65.2	71.3	72.1	72.9	0.8
SGL RES	NEAREST	70	66.8	71.6	72.5	73.5	1.0
246-251	TYPICAL	100	67.0	71.4	72.3	73.4	1.1
SGL RES	NEAREST	90	67.4	71.6	72.5	73.7	1.2
258+00	TYPICAL	45	65.2	70.8	71.6	72.5	0.9
MED BLDG	NEAREST	20	68.7	70.8	71.6	73.4	1.8
258-271	TYPICAL	110	61.3	70.5	71.4	71.8	0.4
SGL RES	NEAREST	60	63.9	70.7	71.5	72.2	0.7
271-290	TYPICAL	120	66.2	70.5	71.4	72.5	1.1
SGL RES	NEAREST	110	66.6	70.7	71.5	72.7	1.2
290-341	TYPICAL	90	67.4	72.6	73.5	74.4	1.0
COMMERCIAL	NEAREST	60	69.2	73.0	73.8	75.1	1.3
341-356	TYPICAL	100	61.7	72.3	73.2	73.5	0.3
COMMERCIAL	NEAREST	70	63.2	72.9	73.8	74.1	0.4
356-380	TYPICAL	85	67.7	72.6	73.4	74.4	1.0
COMMERCIAL	NEAREST	70	68.5	72.9	73.8	74.9	1.1
380-390	TYPICAL	80	67.9	73.1	74.0	75.0	1.0
SGL RES	NEAREST	70	68.5	73.4	74.2	75.3	1.0
390-410	TYPICAL	80	62.7	73.6	74.4	74.7	0.3
COMMERCIAL	NEAREST	60	63.9	74.0	74.9	75.2	0.3
410-426	TYPICAL	85	67.7	73.0	73.9	74.8	0.9
COMMERCIAL	NEAREST	70	68.5	73.4	74.2	75.3	1.0
426-466	TYPICAL	75	68.2	74.2	75.0	75.9	0.8
COMMERCIAL	NEAREST	50	70.0	74.8	75.7	76.7	1.0
466-479	TYPICAL	60	69.2	73.8	74.6	75.7	1.1
MF RES ?	NEAREST	50	70.0	74.1	75.0	76.2	1.2
479-487	TYPICAL	75	68.2	72.7	73.6	74.7	1.1
SGL RES	NEAREST	65	68.8	73.0	73.8	75.0	1.2
487-505	TYPICAL	300	62.2	66.8	67.6	68.7	1.1
PARK	NEAREST	250	63.0	67.1	68.0	69.2	1.2

TABLE 7-6 (Cont.)
LRT COASTAL CORRIDOR (SOUTH) CNEL IMPACT RESULTS

GALLERIA STATION WEST SIDE ALTERNATIVE

205-216	TYPICAL	230	58.1	70.8	71.6	71.8	0.2
SGL RES	NEAREST	210	58.5	71.6	72.5	72.7	0.2
216-223	TYPICAL	120	64.4	71.3	72.1	72.8	0.7
SGL RES	NEAREST	100	65.2	71.6	72.5	73.2	0.7

OLD TOWNE STATION EAST SIDE ALTERNATIVE

258+00	TYPICAL	45	69.6	70.7	71.5	73.7	2.2
MED BLDG	NEAREST	30	71.4	70.7	71.5	74.5	2.9
258-271	TYPICAL	380	61.2	70.5	71.4	71.8	0.4
SGL RES	NEAREST	140	65.5	70.7	71.5	72.5	1.0
271-290	TYPICAL	380	55.9	70.5	71.4	71.5	0.1
SGL RES	NEAREST	140	60.2	70.7	71.5	71.8	0.3

DEL AMO STATION EAST SIDE ALTERNATIVE

341-356	TYPICAL	100	61.7	72.3	73.2	73.5	0.3
COMMERCIAL	NEAREST	25	67.7	72.9	73.8	74.7	1.0
356-380	TYPICAL	120	66.2	72.6	73.4	74.2	0.7
COMMERCIAL	NEAREST	30	72.2	72.9	73.8	76.1	2.3

LOMITA ALTERNATIVE

410-425	TYPICAL	75	68.2	70.4	71.3	73.0	1.7
COMMERCIAL	NEAREST	20	74.0	71.2	72.0	76.1	4.1
425-440	TYPICAL	100	61.7	68.9	69.7	70.4	0.6
IND/MED	NEAREST	75	62.9	69.4	70.3	71.0	0.7
440-485	TYPICAL	100	65.2	68.9	69.7	71.1	1.3
INDUSTRIAL	NEAREST	75	66.5	69.4	70.3	71.8	1.5

SKYPARK ALTERNATIVE

426-445	TYPICAL	100	63.0	65.4	66.2	67.9	1.7
COMMERCIAL	NEAREST	20	70.0	65.9	66.8	71.7	4.9
470-486	TYPICAL	90	65.7	65.4	66.2	69.0	2.7
INDUSTRIAL	NEAREST	50	68.2	65.9	66.8	70.6	3.8

TABLE 7-7
VERTICAL VIBRATION VELOCITY LEVELS FOR VARIOUS TRANSPORTATION MODES

		Distance from Vehicle Path Centerline, ft.	
Mode	Condition	50	100
Bus	smooth road	51	46
	rough road	63	58
LRT	vehicle 35 mph	65-69	60-63
LRT	vehicle 55 mph	69-73	64-67

distances. The values given for the light rail vehicle passbys are stated in terms of a range of levels in the ground representing the average-to-maximum values expected for an at-grade construction. For the aerial configuration, levels of vibration in the ground will be somewhat lower, and concentrated in the areas of the concrete and steel supports. These levels, therefore, represent a worst-case condition.

Table 7-8 shows the numbers of structures at which the LRT maximum vibration velocity levels will exceed the suggested criterion level. The results differ somewhat from the single event noise level results in that fewer areas are impacted by vibration levels. As shown, vibration impacts may result at the same three commercial and multi-family buildings and at the Medical Building. However, LRT vibration impacts will not exist at any other location along the Hawthorne alternative. The Del Amo East Side Alternative will result in vibration impacts at the same three commercial locations which were identified as impacted by noise. Similarly, the Lomita Blvd. and Skypark Drive alternatives give rise to vibration impacts at the same locations identified as having noise impacts.

7.4 MITIGATION MEASURES

NOISE MITIGATION OF LRT OPERATIONS

Three small areas were identified as having noise impacts on a CNEL basis. These are the Medical Building at Hawthorne Blvd. and 190th St., and commercial buildings located adjacent to the turns from Hawthorne Blvd. to Lomita Blvd. or Skypark Drive for those alternatives. Noise mitigation could take the form of sound barrier wells along the edge of the rail guideway structure nearest the given building. In most cases, a relatively short barrier could be used (perhaps 3 ft high) to block line-of-sight between the wheel/rail noise source and the receiver.

VIBRATION MITIGATION OF LRT OPERATIONS

Section 7.3 of this report identified several areas where vibration mitigation measures should be considered. All of these involve buildings in close proximity (under 50 feet) to the proposed LRT aerial structure. To minimize impacts, the support structure should never be in direct contact with a building structure or foundation. Ideally, there should be at least 2 feet of intervening soil between the support structure and any building foundations or structures. In cases where this

TABLE 7-8
RESULTS OF SINGLE EVENT VIBRATION IMPACT ANALYSIS
FOR PROPOSED COASTAL CORRIDOR (SOUTH)
LIGHT RAIL TRANSIT ALTERNATIVES

No. of Buildings exceeding criteria:

Route Segment	Land Use Category	LRT Velocity level, dB	Residential Sgl Fam	Residential Multi	Commercial	Medical
Hawthorne Alternative:						
142-149	3,4	80	0	3	3	0
149-157	2	72	1	0	0	0
258+00	4	77	0	0	0	1
Totals:			1	3	3	1
Galleria Station West Side Alternative:						
No change in impacts.						
Old Towne Station East Side Alternative:						
No change in impacts.						
Del Amo Station East Side Alternative:						
142-149	3,4	80	0	3	3	0
149-157	2	72	1	0	0	0
258+00	4	77	0	0	0	1
351-356	4	73	0	0	1	0
356-380	4	78	0	0	2	0
Totals:			1	3	6	1
Lomita Alternative:						
142-149	3,4	80	0	3	3	0
149-157	2	72	1	0	0	0
258+00	4	77	0	0	0	1
410-425	4	79	0	0	1	0
Totals:			1	3	4	1

TABLE 7-8 (Cont')
RESULTS OF SINGLE EVENT VIBRATION IMPACT ANALYSIS
FOR PROPOSED COASTAL CORRIDOR (SOUTH)
LIGHT RAIL TRANSIT ALTERNATIVES

No. of Buildings exceeding criteria:

Route Segment	Land Use Category	LRT Velocity level, dB	Residential Sgl Fam	Multi	Commercial	Medical
Skypark Alternative:						
142-149	3,4	80	0	3	3	0
149-157	2	72	1	0	0	0
258+00	4	77	0	0	0	1
426-445	4	79	0	0	1	0
Totals:			1	3	4	1

is not possible, an elastomer element should be placed between the subway box and the building foundation to prevent direct transmission of ground-borne noise and vibration into the building.

7.5 REFERENCES

1. "Guidelines for Considering Noise in Land Use Planning and Control," Federal Interagency Committee on Urban Noise, June 1980.

2. T. J. Schultz, "Synthesis of Social Surveys on Noise Annoyance," JASA, Vol. 64, No. 2, August 1978.

3. American National Standards Institute (ANSI) Standard s3.23-1980.

4. American Public Transit Association (APTA), "1981 Guidelines for Design of Rail Transit Facilities."

5. "Guidelines for Preparing Environmental Impact Statements on Noise," Working Group 69 of the Committee on Hearing Bioacoustics and Biomechanics, National Academy of Sciences, 1977.

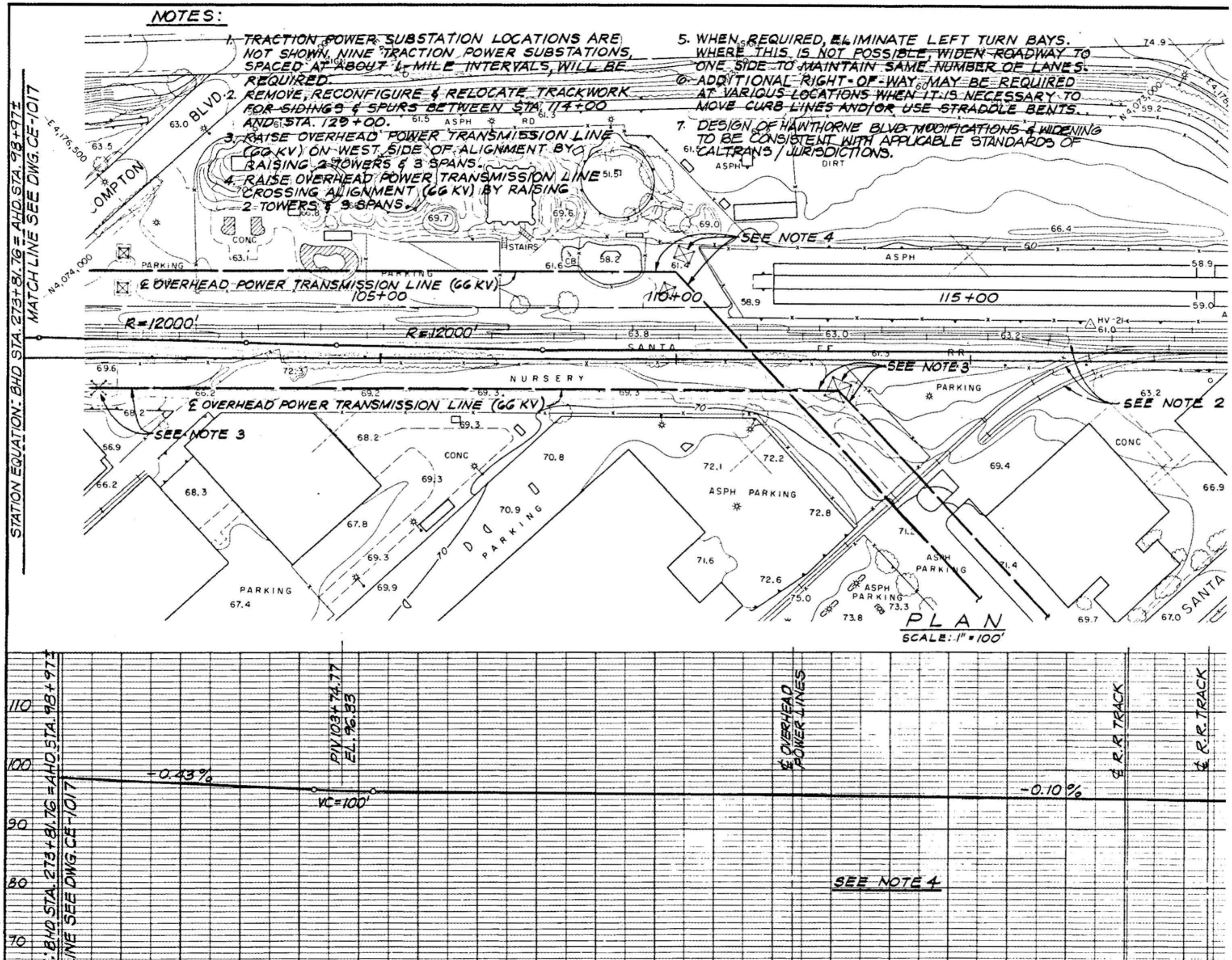
APPENDICES

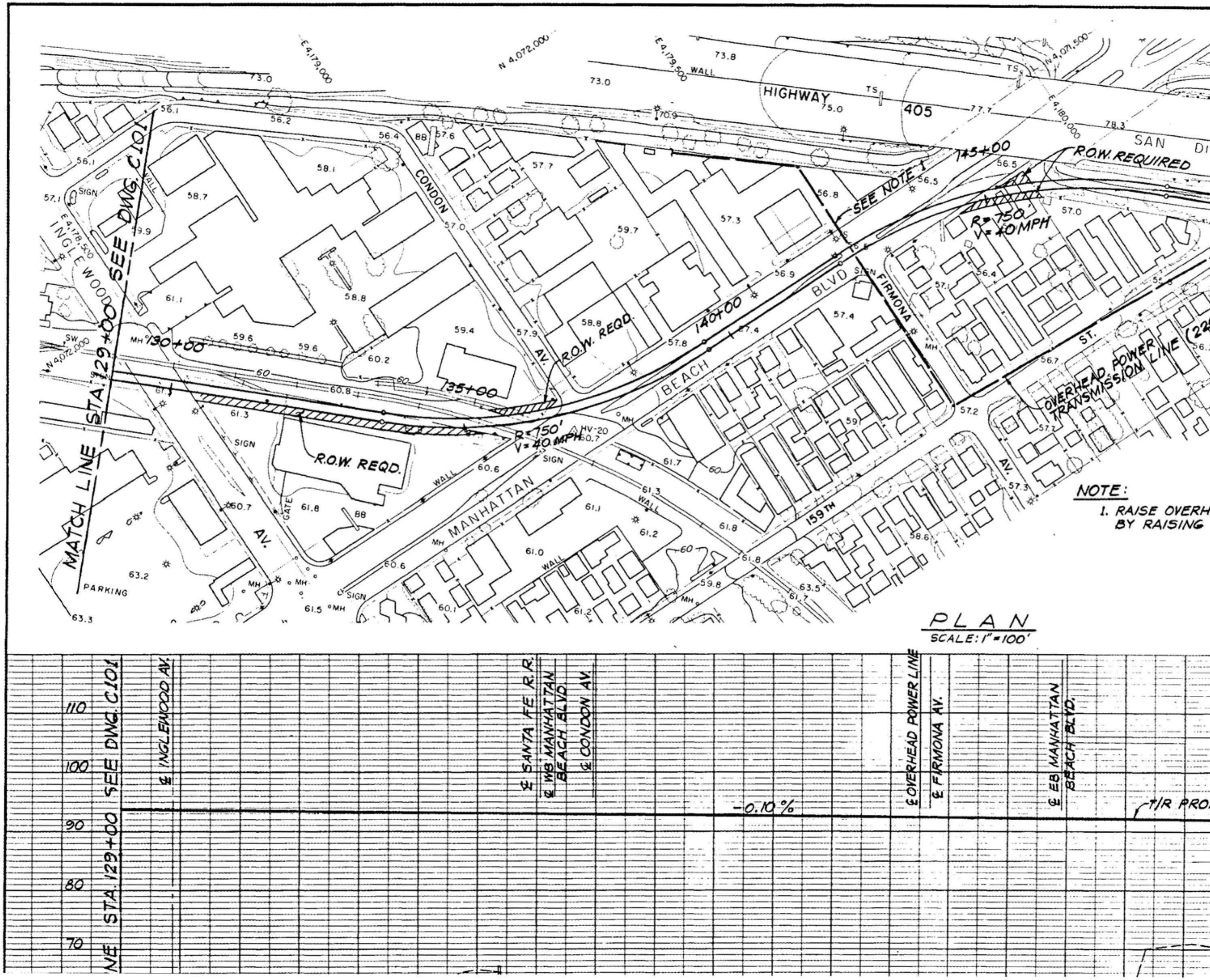
APPENDIX A
ENGINEERING DRAWINGS

LOS ANGELES COUNTY TRANSPORTAT

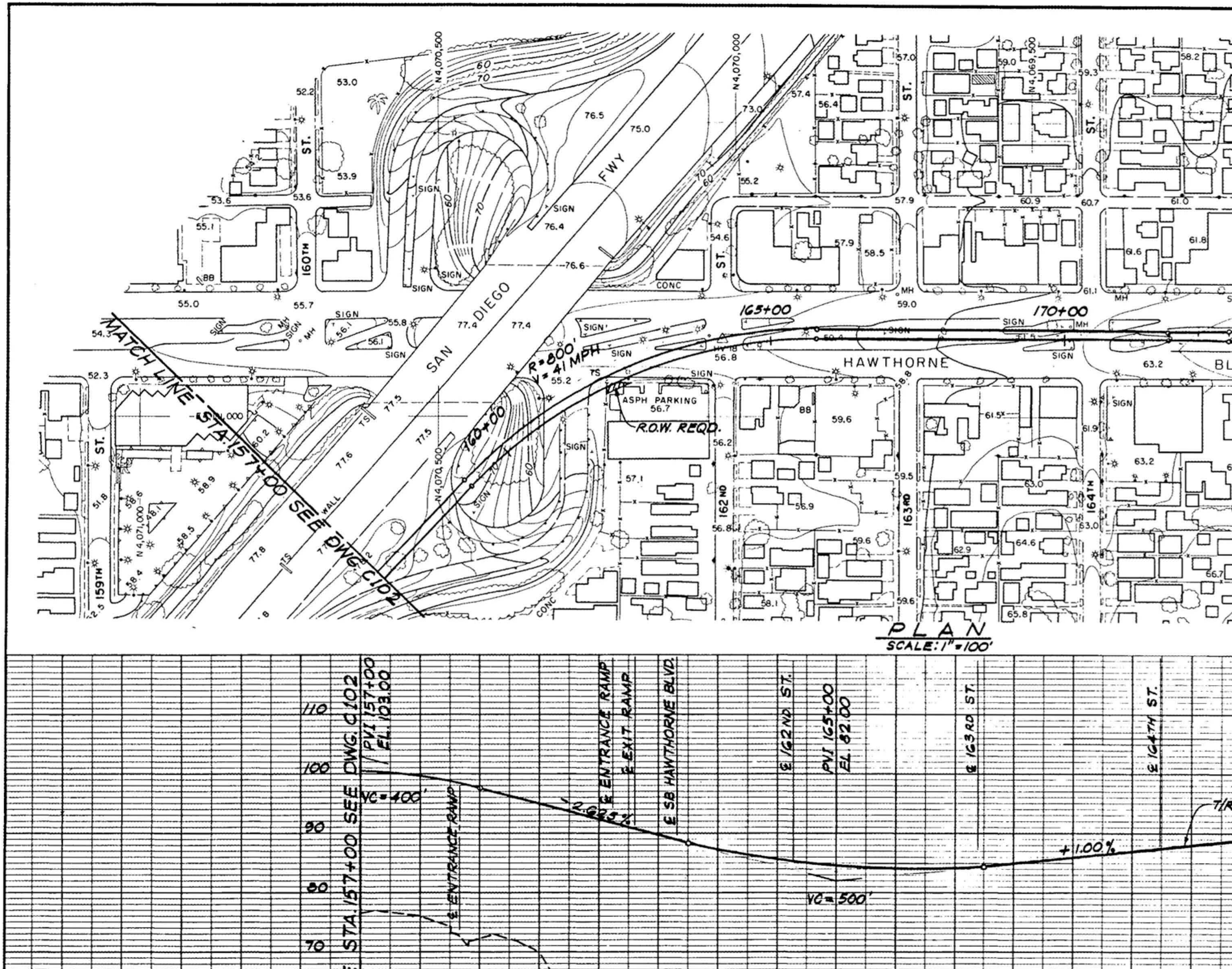
COASTAL CORRIDOR RAIL TRA

(SOUTH SEGMENT)

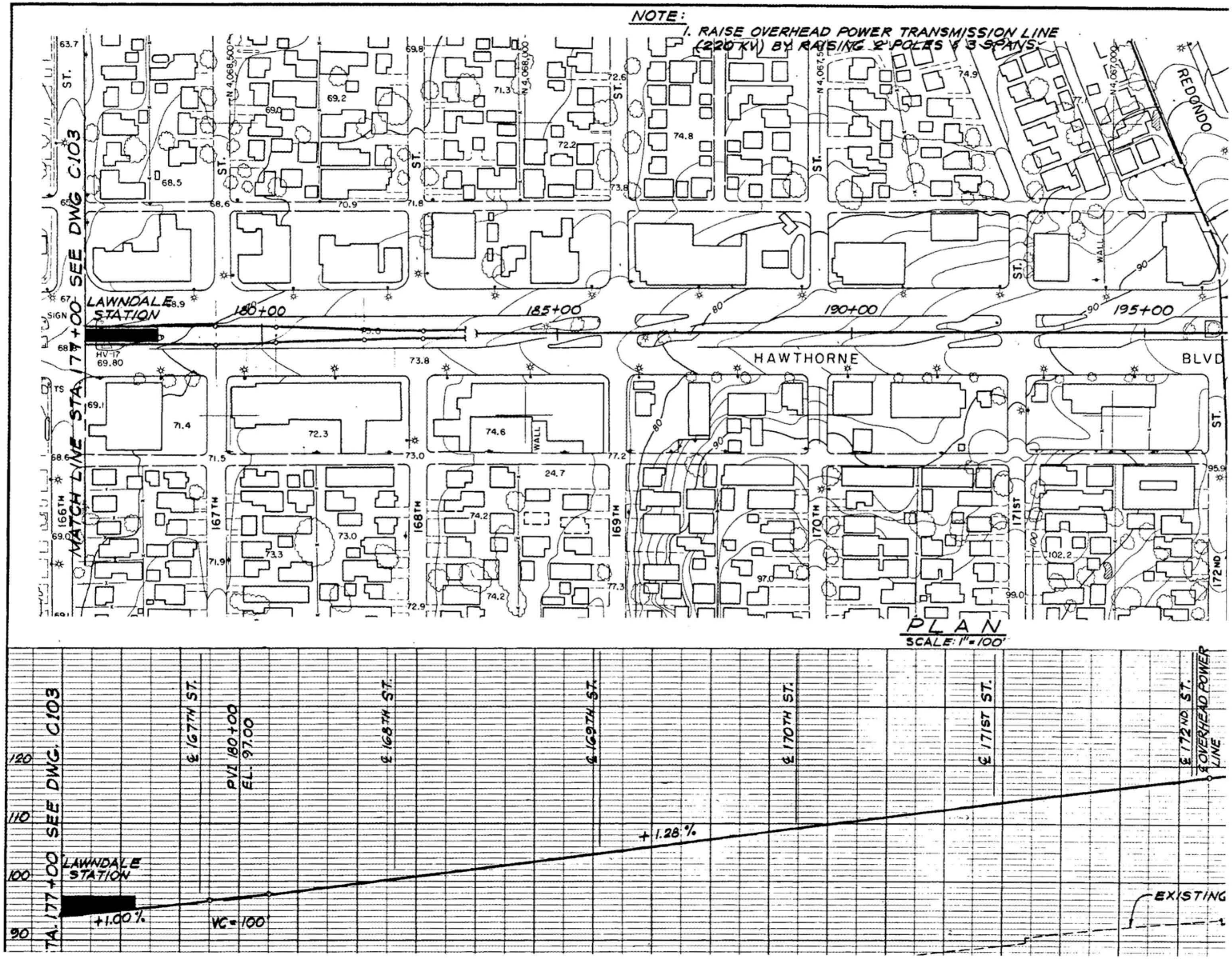

NOTES:
1. TRACTION POWER SUBSTATION LOCATIONS ARE NOT SHOWN. NINE TRACTION POWER SUBSTATIONS, SPACED AT ABOUT 1-MILE INTERVALS, WILL BE REQUIRED.
2. REMOVE, RECONFIGURE & RELOCATE TRACKWORK FOR SIDINGS & SPURS BETWEEN STA. 114+00 AND STA. 129+00.
3. RAISE OVERHEAD POWER TRANSMISSION LINE (66 KV) ON WEST SIDE OF ALIGNMENT BY RAISING 2 TOWERS & 3 SPANS.
4. RAISE OVERHEAD POWER TRANSMISSION LINE CROSSING ALIGNMENT (66 KV) BY RAISING 2 TOWERS & 3 SPANS.
5. WHEN REQUIRED, ELIMINATE LEFT TURN BAYS. WHERE THIS IS NOT POSSIBLE, WIDEN ROADWAY TO ONE SIDE TO MAINTAIN SAME NUMBER OF LANES.
6. ADDITIONAL RIGHT-OF-WAY MAY BE REQUIRED AT VARIOUS LOCATIONS WHEN IT IS NECESSARY TO MOVE CURB LINES AND/OR USE STRADDLE BENTS.
7. DESIGN OF HAWTHORNE BLVD. MODIFICATIONS & WIDENING TO BE CONSISTENT WITH APPLICABLE STANDARDS OF CALTRANS / JURISDICTIONS.
STATION EQUATION: BHD STA. 273+81.76 = AHD STA. 98+97±
MATCH LINE SEE DWG. CE-1017
COMPTON BLVD.
ASPH RD
SEE NOTE 4
℄ OVERHEAD POWER TRANSMISSION LINE (66 KV)
105+00
110+00
115+00
R=12000'
SANTA FE RR
NURSERY
SEE NOTE 3
SEE NOTE 2
PARKING
ASPH PARKING
CONC
STAIRS
DIRT
PLAN
SCALE: 1" = 100'
BHD STA. 273+81.76 = AHD STA. 98+97±
LINE SEE DWG. CE-1017
PIV 103+74.77
EL. 96.33
-0.43%
VC=100'
℄ OVERHEAD POWER LINES
℄ R.R. TRACK
-0.10%
SEE NOTE 4
110
100
90
80
70

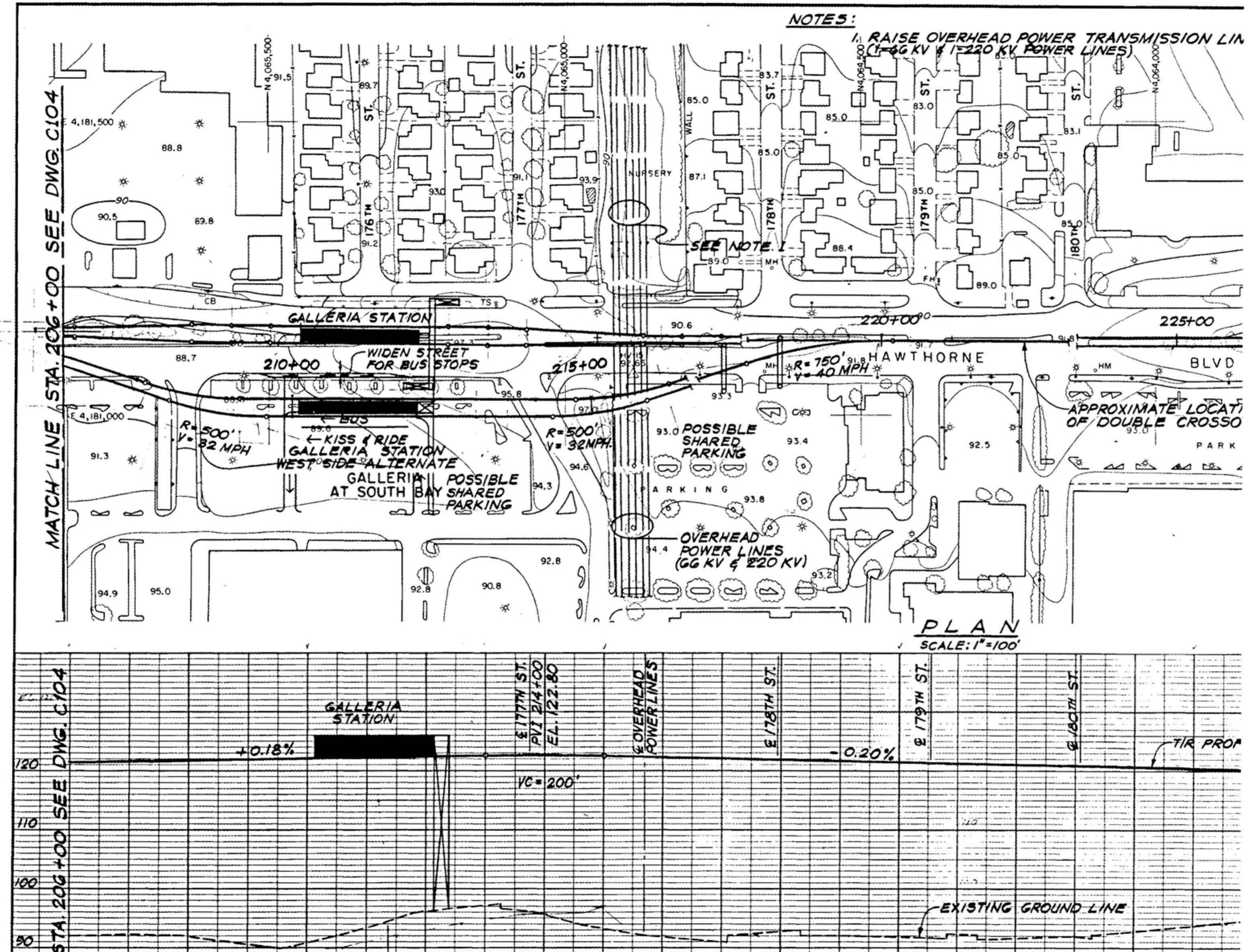


MATCH LINE STA 129+00 SEE DWG. C101
HIGHWAY 405
SAN DIEG
N 4,072,000
E 4,179,000
E 4,179,500
E 4,180,000
N 4,071,500
E 4,178,500
WALL
INGLEWOOD
CONDON
AV.
R.O.W. REQUIRED
SEE NOTE 1
R=750'
V=40 MPH
R.O.W. REQD.
130+00
135+00
140+00
145+00
BEACH
BLVD
FIRMONA
ST.
OVERHEAD POWER TRANSMISSION LINE (220 K
MANHATTAN
159TH
PARKING
SIGN
GATE
MH
NOTE:
1. RAISE OVERHEA
BY RAISING 4
PLAN
SCALE: 1"=100'
STA 129+00 SEE DWG. C101
℄ INGLEWOOD AV.
℄ SANTA FE R.R.
℄ WB MANHATTAN BEACH BLVD.
℄ CONDON AV.
℄ OVERHEAD POWER LINE
℄ FIRMONA AV.
℄ EB MANHATTAN BEACH BLVD.
-0.10 %
T/R PROFIL
110
100
90
80
70



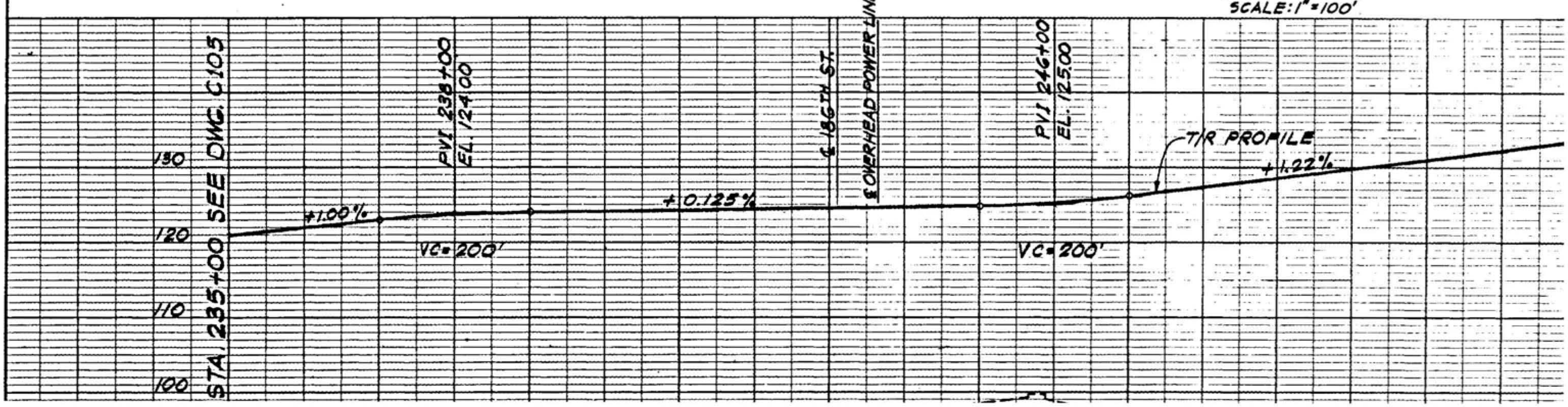
MATCH LINE - STA. 157+00 SEE DWG. C102
SAN DIEGO FWY
HAWTHORNE BLVD
160TH ST.
159TH ST.
162ND ST.
163RD ST.
164TH ST.
160+00
165+00
170+00
R=800'
V=41 MPH
ASPH PARKING
R.O.W. REQD.
N4,070,500
N4,070,000
N4,069,500
N4,071,000
SIGN
CONC
WALL
PLAN
SCALE: 1"=100'
STA. 157+00 SEE DWG. C102
PVI 157+00
EL. 103.00
VC=400'
-2.625%
℄ ENTRANCE RAMP
℄ EXIT RAMP
℄ SB HAWTHORNE BLVD.
℄ 162ND ST.
PVI 165+00
EL. 82.00
VC=500'
℄ 163RD ST.
℄ 164TH ST.
+1.00%
EXISTING GROUND PROFILE
110
100
90
80
70

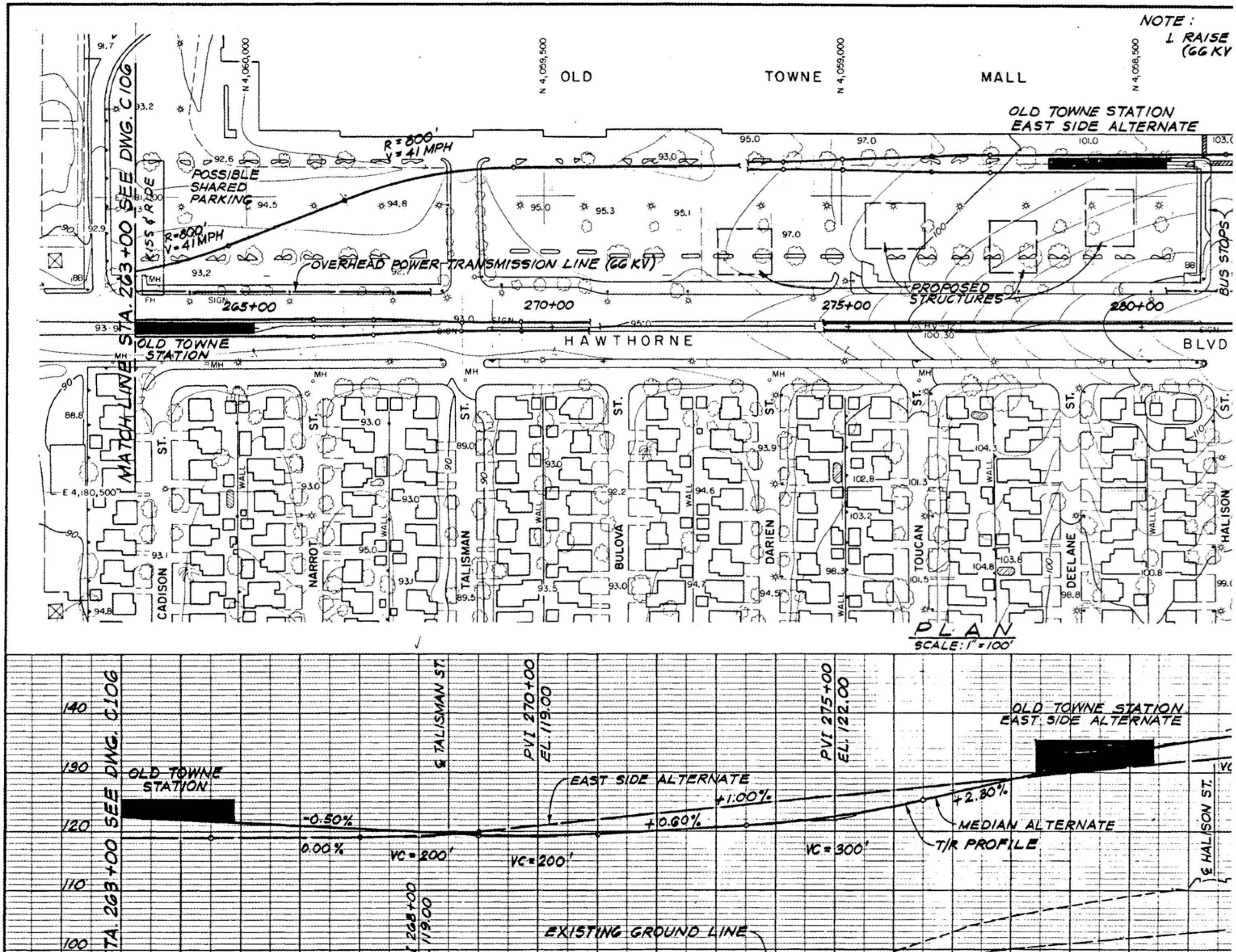

NOTE:
1. RAISE OVERHEAD POWER TRANSMISSION LINE (220 KV) BY RAISING 2 POLES & 3 SPANS.
MATCH LINE STA. 177+00 SEE DWG. C103
LAWNDALE STATION
180+00
185+00
190+00
195+00
HAWTHORNE BLVD
REDONDO
166TH
167TH
168TH
169TH
170TH
171ST
172ND
PLAN
SCALE: 1"=100'
TA. 177+00 SEE DWG. C103
LAWNDALE STATION
℄ 167TH ST.
PVI 180+00
EL. 97.00
℄ 168TH ST.
℄ 169TH ST.
℄ 170TH ST.
℄ 171ST ST.
℄ 172ND ST.
℄ OVERHEAD POWER LINE
+1.00%
VC=100'
+1.28%
EXISTING
120
110
100
90


NOTES:
1. RAISE OVERHEAD POWER TRANSMISSION LIN
(1-66 KV & 1-220 KV POWER LINES)
MATCH LINE STA. 206+00 SEE DWG. C104
GALLERIA STATION
WIDEN STREET FOR BUS STOPS
210+00
215+00
220+00
225+00
HAWTHORNE BLVD
R=500' V=32 MPH
R=500' V=32MPH
R=750' V=40 MPH
KISS & RIDE
GALLERIA STATION WEST SIDE ALTERNATE
GALLERIA AT SOUTH BAY
POSSIBLE SHARED PARKING
SEE NOTE 1
NURSERY
176TH ST.
177TH ST.
178TH ST.
179TH ST.
180TH ST.
OVERHEAD POWER LINES (66 KV & 220 KV)
APPROXIMATE LOCATI OF DOUBLE CROSSO
PARKING
PLAN
SCALE: 1"=100'
STA. 206+00 SEE DWG. C104
GALLERIA STATION
+0.18%
-0.20%
℄ 177TH ST.
PVI 214+00
EL. 122.80
VC = 200'
℄ OVERHEAD POWER LINES
℄ 178TH ST.
℄ 179TH ST.
℄ 180TH ST.
T/R PROF
EXISTING GROUND LINE
120
110
100
90

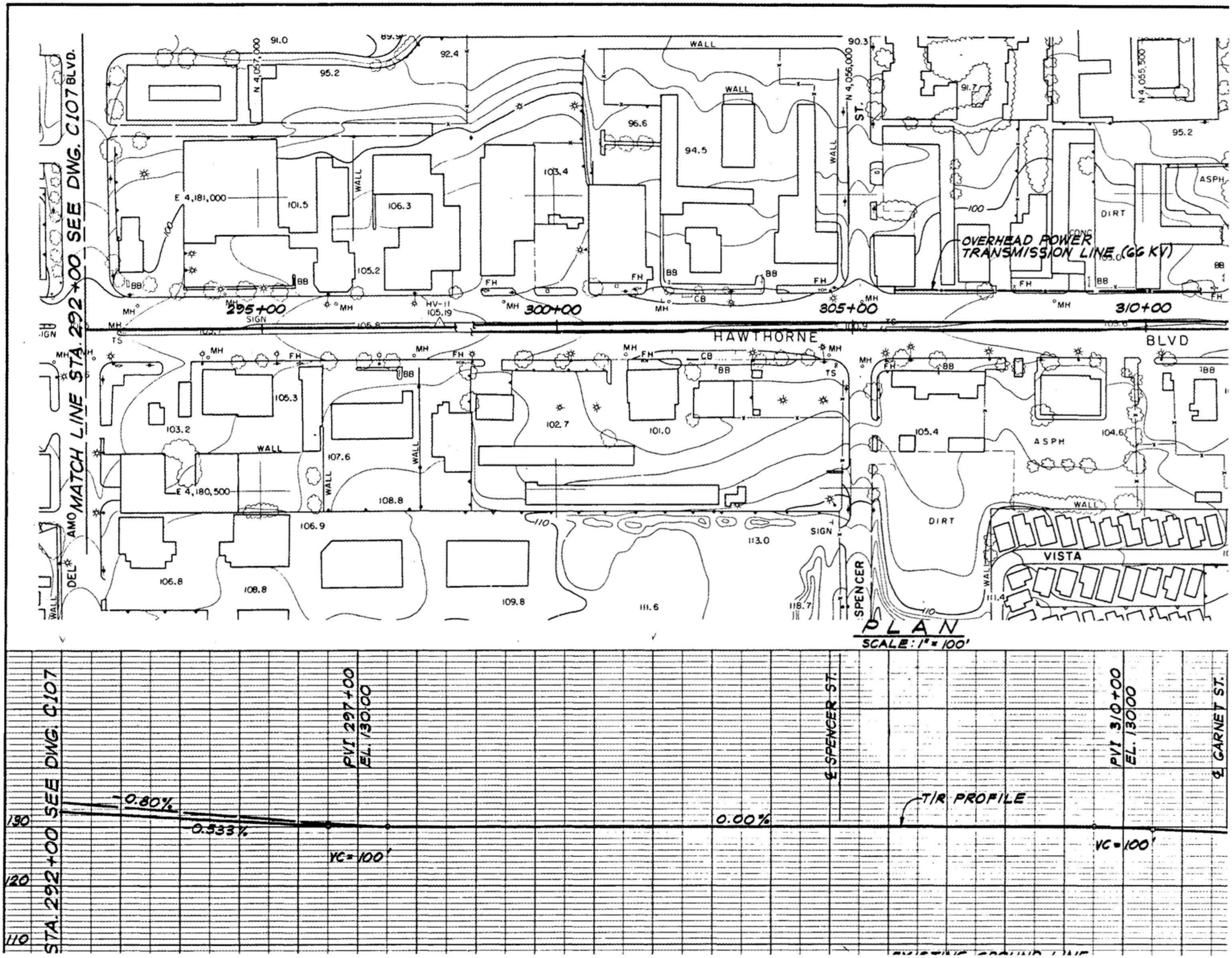
NOTES:
1. RAISE AND/OR RELOCATE OVERHEAD POWER TRANSMISSION LINE (66 KV POLE LINE).
2. RAISE OVERHEAD POWER TRANSMISSION LINE (1-66 KV & 2-220 KV TOWER LINES)

PLAN
SCALE: 1"=100'

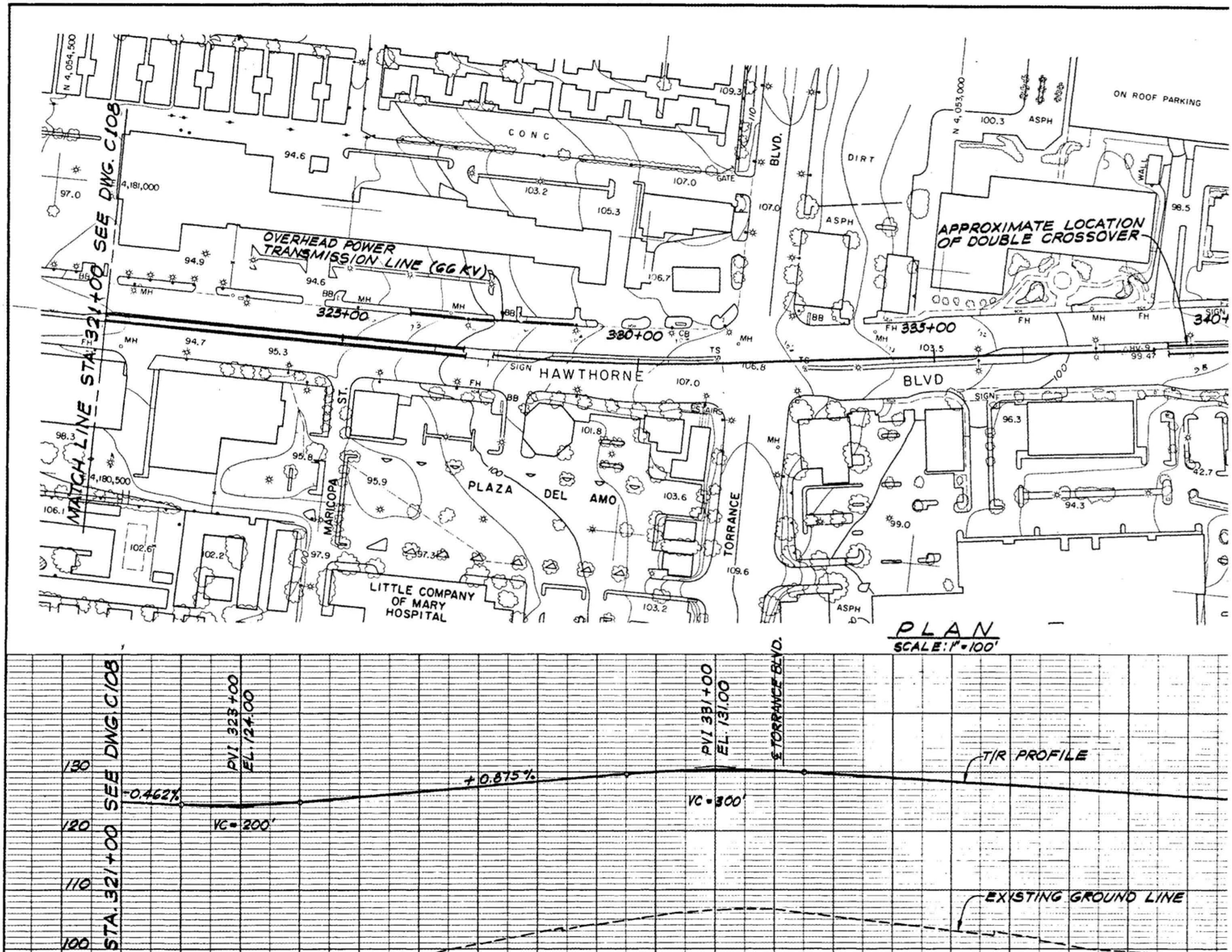




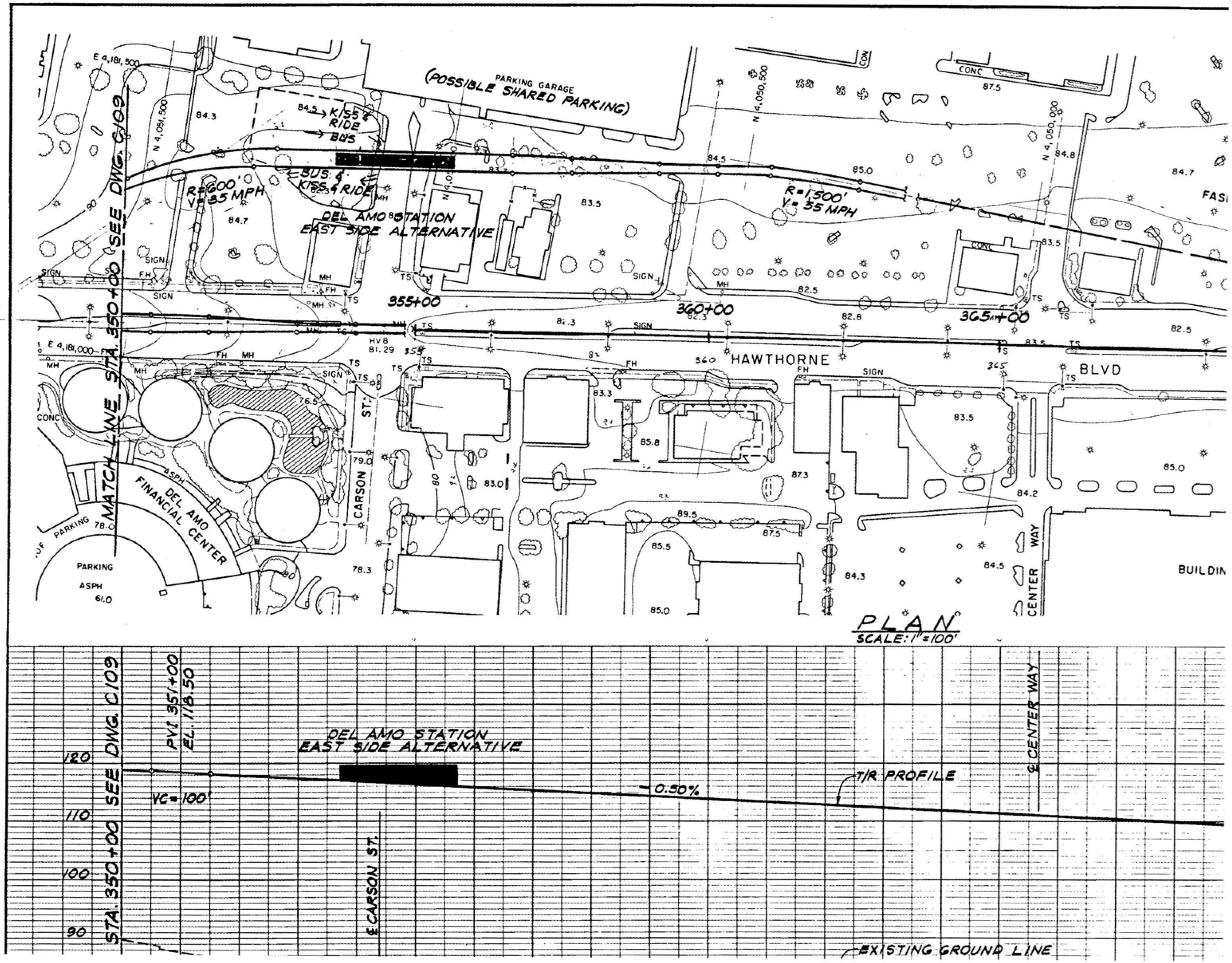
NOTE :
1. RAISE (66 KV
OLD
TOWNE
MALL
N 4,060,000
N 4,059,500
N 4,059,000
N 4,058,500
OLD TOWNE STATION EAST SIDE ALTERNATE
R=800' V=41 MPH
POSSIBLE SHARED PARKING
KISS & RIDE
R=800' V=41MPH
OVERHEAD POWER TRANSMISSION LINE (66 KV)
PROPOSED STRUCTURES
BUS STOPS
265+00
270+00
275+00
280+00
HAWTHORNE
BLVD
OLD TOWNE STATION
MATCH LINE STA. 263+00 SEE DWG. C106
CADISON ST.
NARROT ST.
TALISMAN ST.
BULOVA ST.
DARIEN ST.
TOUCAN ST.
DEELANE ST.
HALISON ST.
WALL
E 4,180,500
PLAN
SCALE: 1" = 100'
STA. 263+00 SEE DWG. C106
140
130
120
110
100
OLD TOWNE STATION
℄ TALISMAN ST.
PVI 270+00 EL. 119.00
PVI 275+00 EL. 122.00
PVI 268+00 EL. 119.00
OLD TOWNE STATION EAST SIDE ALTERNATE
EAST SIDE ALTERNATE
-0.50%
0.00%
+1.00%
+0.60%
+2.30%
VC = 200'
VC = 200'
VC = 300'
MEDIAN ALTERNATE
T/R PROFILE
℄ HALISON ST.
EXISTING GROUND LINE



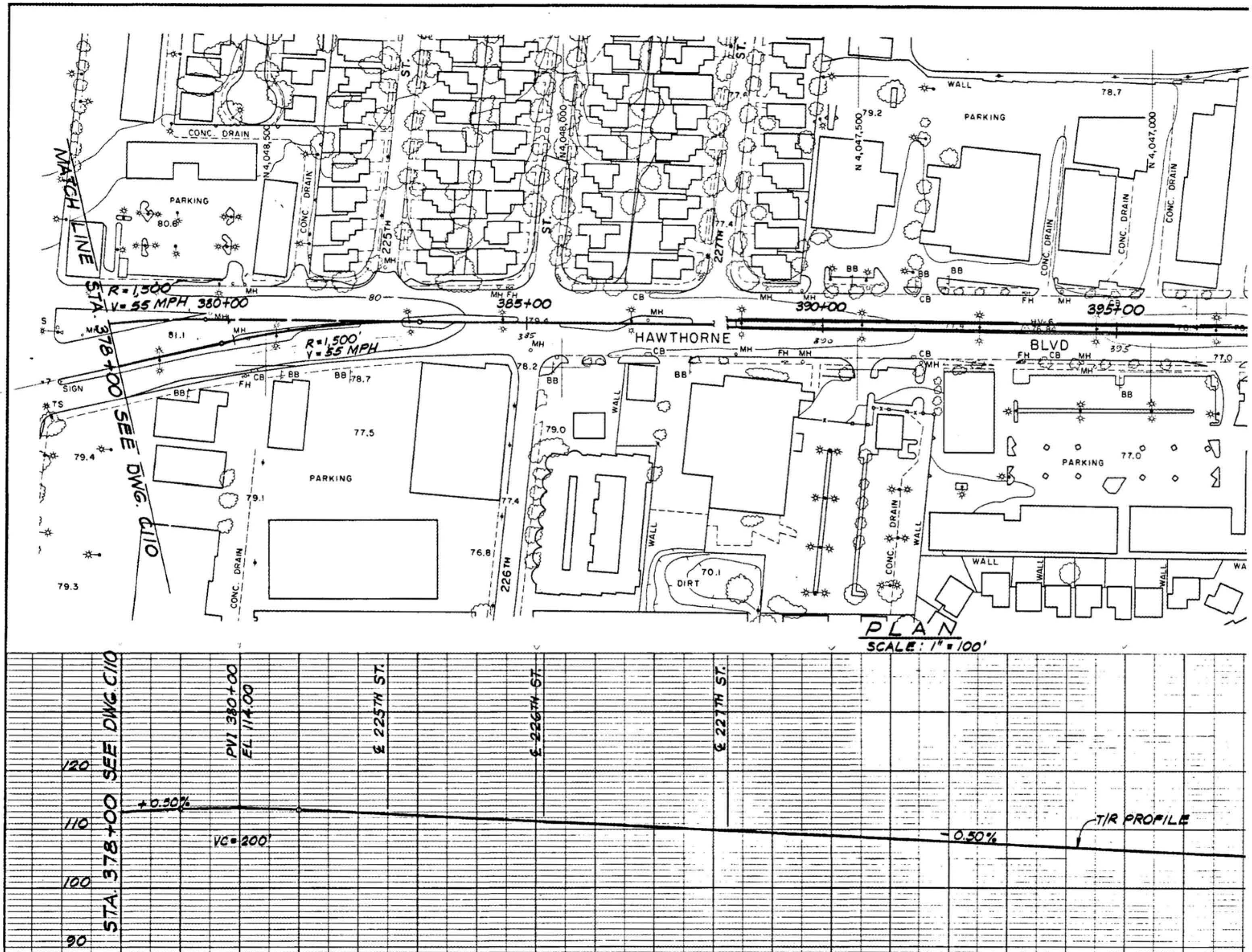
MATCH LINE STA. 292+00 SEE DWG. C107
HAWTHORNE BLVD
295+00
300+00
305+00
310+00
OVERHEAD POWER TRANSMISSION LINE (66 KV)
SPENCER
VISTA
PLAN
SCALE: 1" = 100'
STA. 292+00 SEE DWG. C107
PVI 297+00
EL. 130.00
℄ SPENCER ST.
PVI 310+00
EL. 130.00
℄ GARNET ST.
-0.80%
-0.533%
0.00%
T/R PROFILE
VC = 100'
VC = 100'
130
120
110

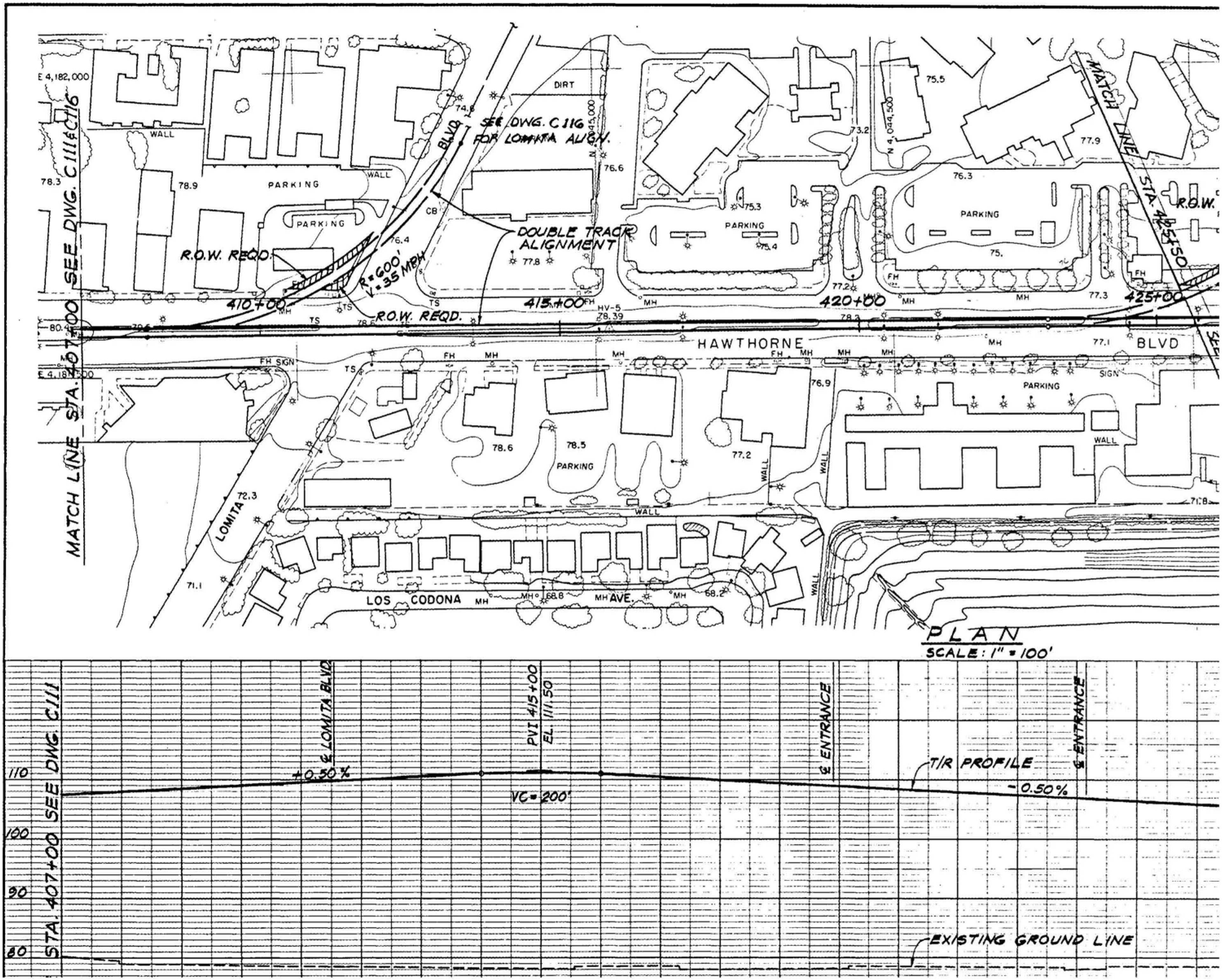


MATCH LINE STA. 321+00 SEE DWG. C108
OVERHEAD POWER TRANSMISSION LINE (66 KV)
323+00
330+00
335+00
HAWTHORNE BLVD
TORRANCE BLVD.
MARICOPA ST.
PLAZA DEL AMO
LITTLE COMPANY OF MARY HOSPITAL
APPROXIMATE LOCATION OF DOUBLE CROSSOVER
ON ROOF PARKING
CONC
DIRT
ASPH
N 4,054,500
N 4,053,000
E 4,181,000
E 4,180,500
PLAN
SCALE: 1" = 100'
STA. 321+00 SEE DWG C108
PVI 323+00
EL. 124.00
PVI 331+00
EL. 131.00
℄ TORRANCE BLVD.
-0.462%
+0.875%
VC = 200'
VC = 300'
T/R PROFILE
EXISTING GROUND LINE
130
120
110
100

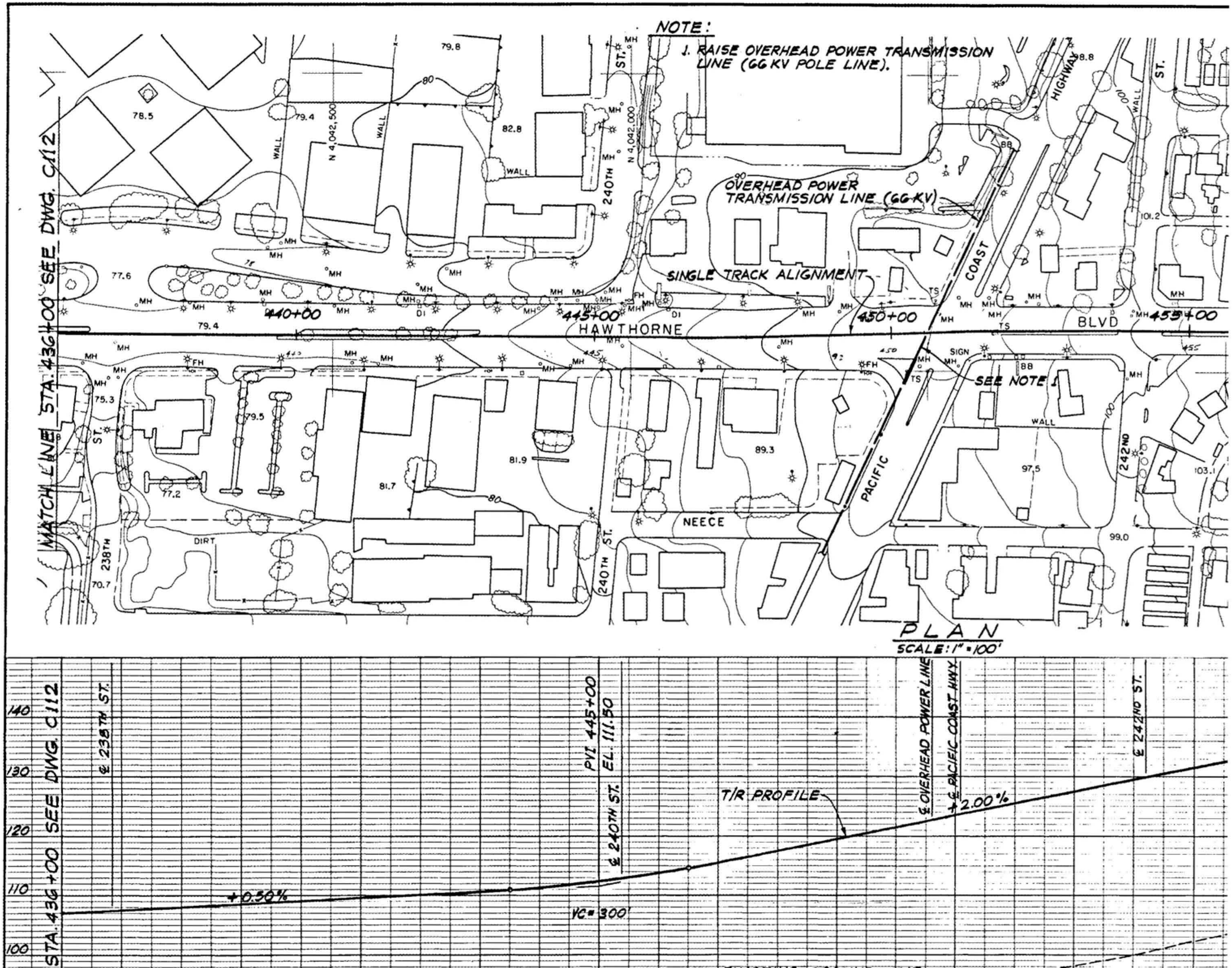


(POSSIBLE SHARED PARKING)
PARKING GARAGE
KISS & RIDE
BUS
BUS & KISS & RIDE
R=600'
V=35 MPH
R=1,500'
V=35 MPH
DEL AMO STATION
EAST SIDE ALTERNATIVE
355+00
360+00
365+00
HAWTHORNE BLVD
CARSON ST.
CENTER WAY
DEL AMO FINANCIAL CENTER
PARKING
ASPH
BUILDIN
MATCH LINE STA. 350+00 SEE DWG. C109
E 4,181,500
E 4,181,000
N 4,051,500
N 4,050,500
N 4,050,000
PLAN
SCALE: 1"=100'
STA. 350+00 SEE DWG. C109
PVI 351+00
EL. 118.50
VC=100'
DEL AMO STATION
EAST SIDE ALTERNATIVE
-0.50%
T/R PROFILE
℄ CARSON ST.
℄ CENTER WAY
EXISTING GROUND LINE
120
110
100
90


MATCH LINE
STA. 378+00 SEE DWG. C110
R=1,500'
V=55 MPH
380+00
385+00
390+00
395+00
HAWTHORNE
BLVD
R=1,500'
V=55 MPH
PARKING
CONC. DRAIN
225TH ST.
226TH
227TH
N 4,048,500
N 4,048,000
N 4,047,500
N 4,047,000
WALL
DIRT
PLAN
SCALE: 1" = 100'
PVI 380+00
EL 114.00
℄ 225TH ST.
℄ 226TH ST.
℄ 227TH ST.
+0.50%
VC=200'
-0.50%
T/R PROFILE
120
110
100
90
STA. 378+00 SEE DWG. C110

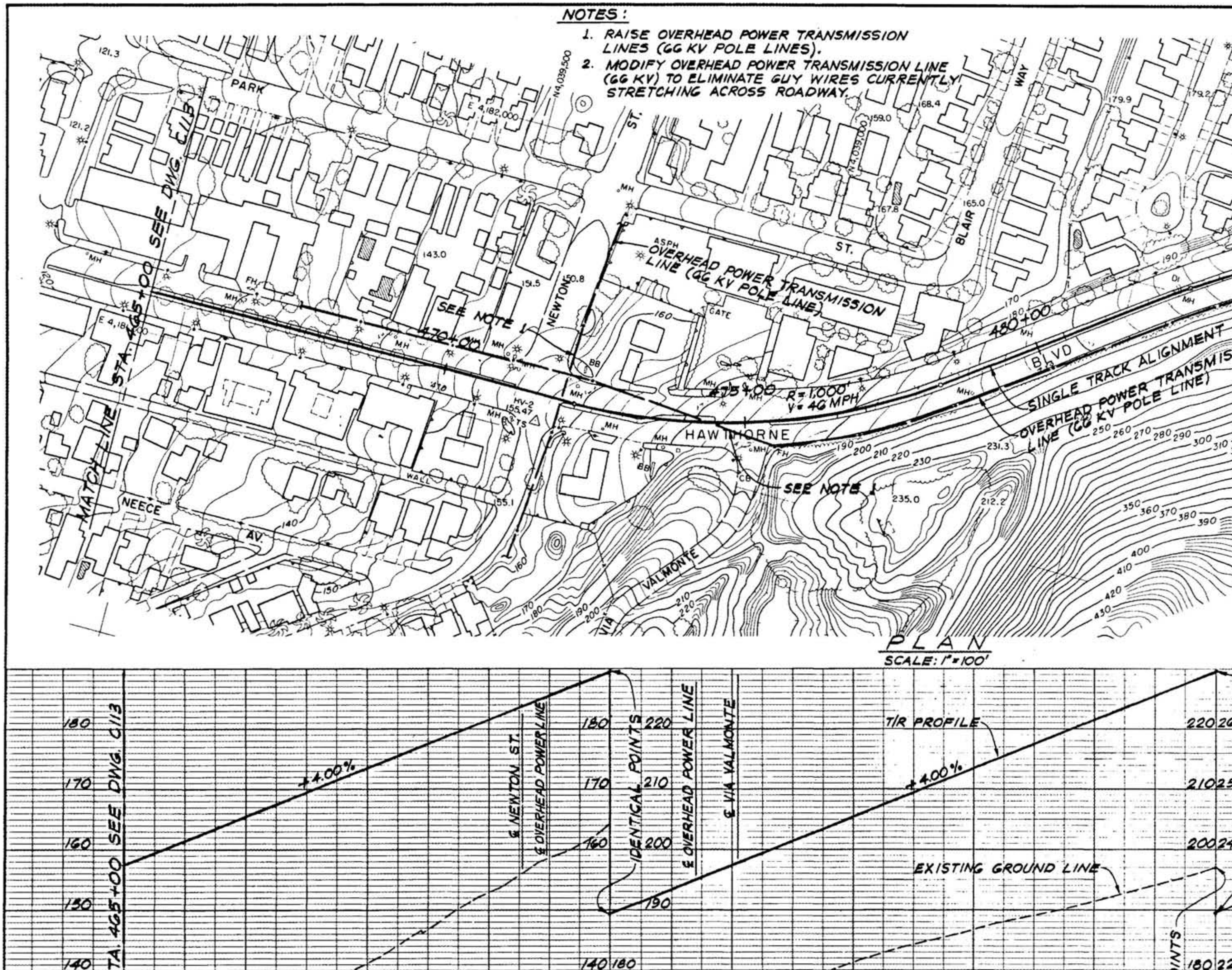


MATCH LINE STA. 407+00 SEE DWG. C111 & C116
SEE DWG. C116 FOR LOMITA ALIGN.
DOUBLE TRACK ALIGNMENT
R.O.W. REQD.
R=600'
V=35 MPH
410+00
415+00
420+00
425+00
HAWTHORNE BLVD
LOMITA BLVD
LOS CODONA AVE.
PARKING
WALL
DIRT
MATCH LINE STA. 425+50
R.O.W.
PLAN
SCALE: 1" = 100'
STA. 407+00 SEE DWG. C111
℄ LOMITA BLVD
PVI 415+00
EL. 111.50
℄ ENTRANCE
+0.50%
VC= 200'
T/R PROFILE
-0.50%
EXISTING GROUND LINE
110
100
90
80


NOTE:
1. RAISE OVERHEAD POWER TRANSMISSION LINE (66 KV POLE LINE).
MATCH LINE STA. 436+00 SEE DWG. C112
OVERHEAD POWER TRANSMISSION LINE (66 KV)
SINGLE TRACK ALIGNMENT
440+00
445+00
450+00
455+00
HAWTHORNE BLVD
PACIFIC COAST HIGHWAY
240TH ST.
238TH ST.
242ND ST.
NEECE
SEE NOTE 1
WALL
DIRT
PLAN
SCALE: 1" = 100'
STA. 436+00 SEE DWG. C112
℄ 238TH ST.
PVI 445+00
EL. 111.50
℄ 240TH ST.
℄ OVERHEAD POWER LINE
℄ PACIFIC COAST HWY.
℄ 242ND ST.
T/R PROFILE
+0.50%
+2.00%
VC = 300'
EXISTING GROUND LINE
140
130
120
110
100

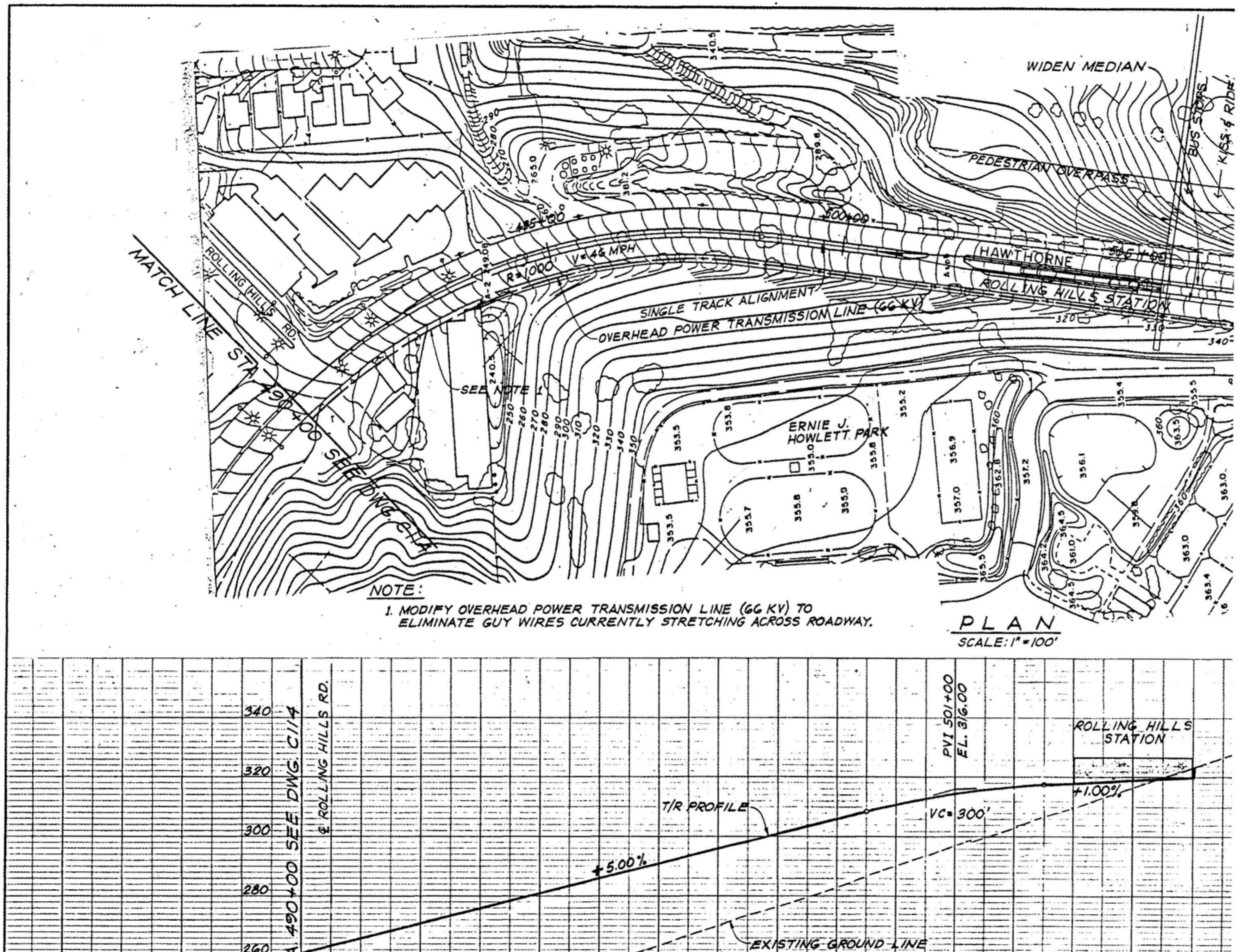
NOTES:

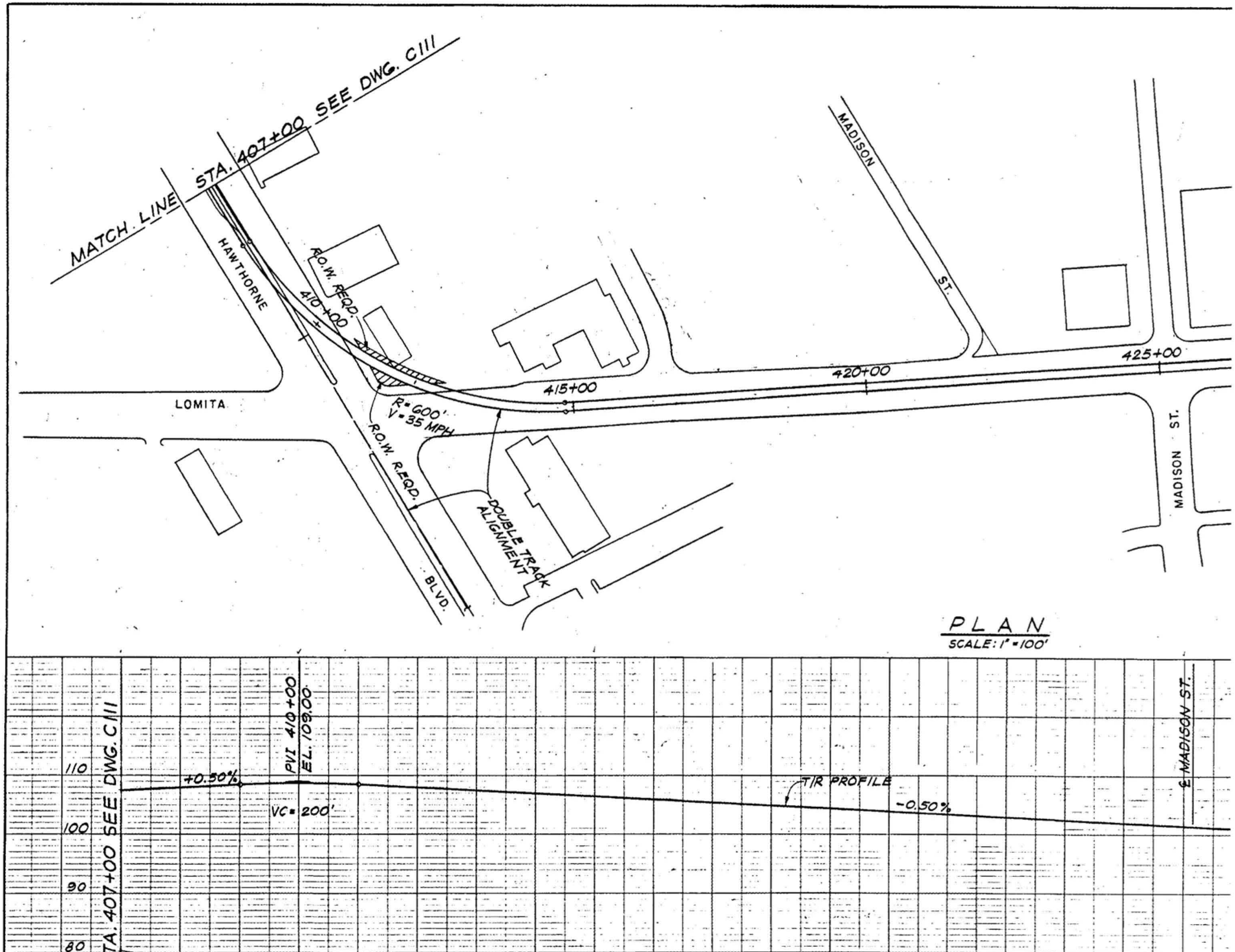
1. RAISE OVERHEAD POWER TRANSMISSION LINES (66 KV POLE LINES).
2. MODIFY OVERHEAD POWER TRANSMISSION LINE (66 KV) TO ELIMINATE GUY WIRES CURRENTLY STRETCHING ACROSS ROADWAY.



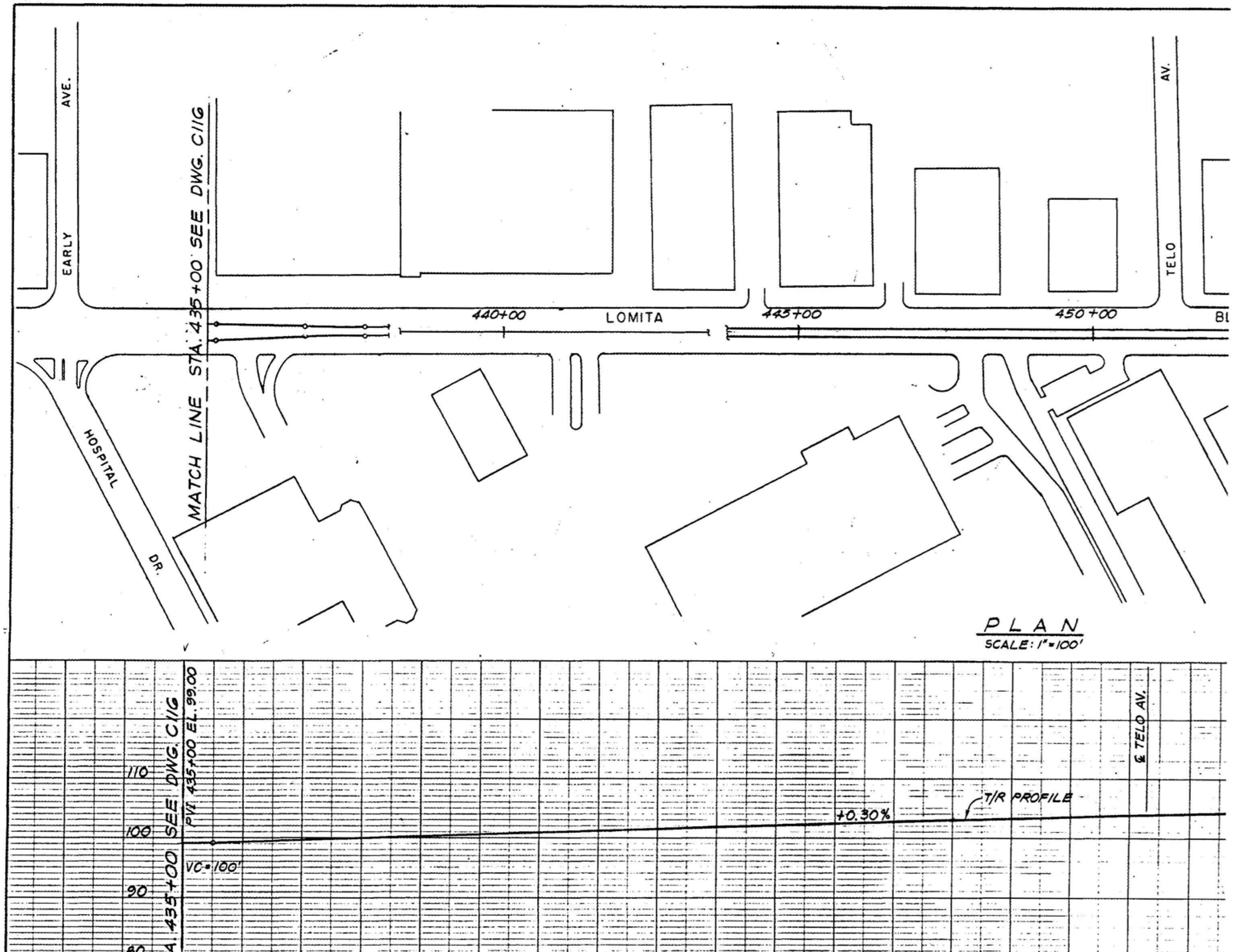
PLAN

SCALE: 1"=100'

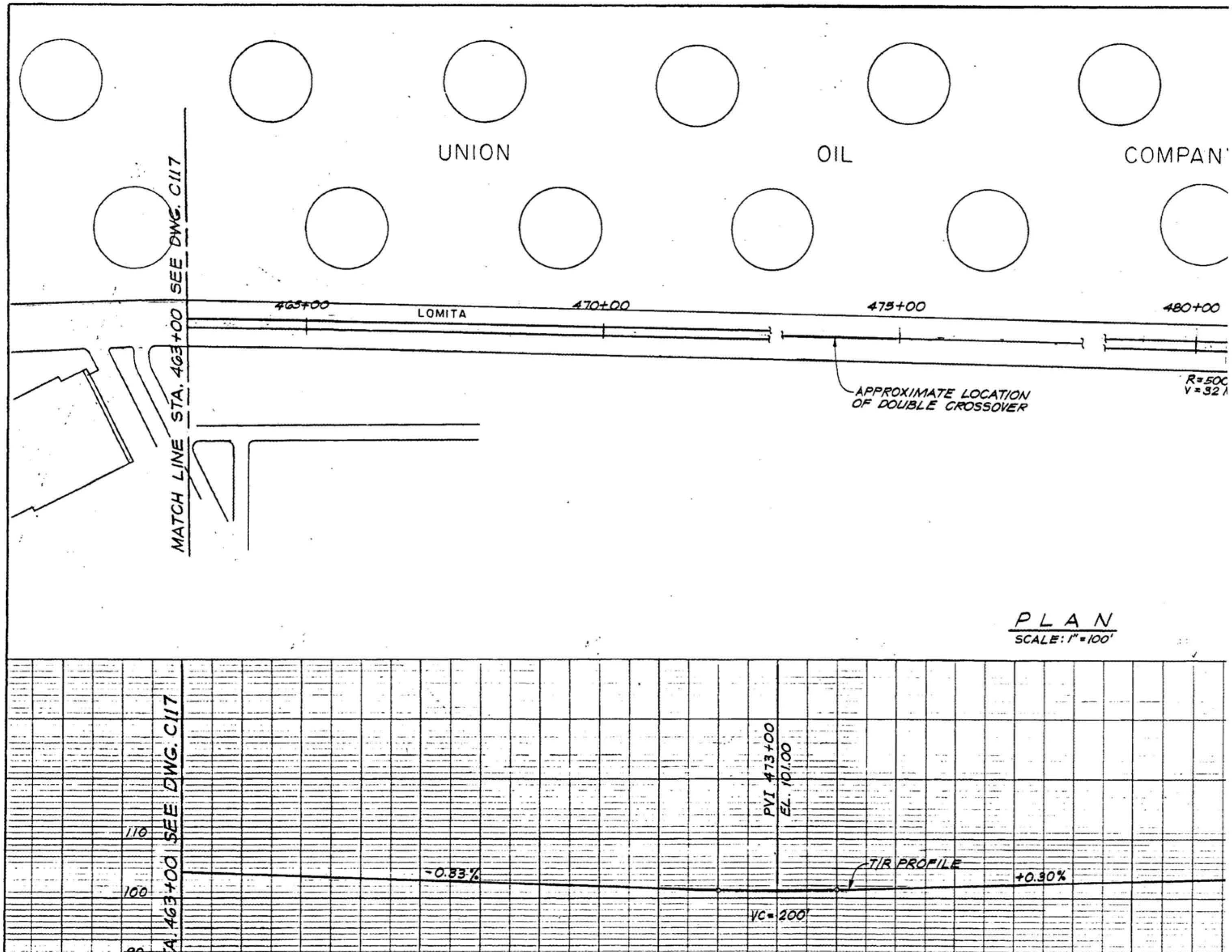

WIDEN MEDIAN
BUS STOPS
KISS & RIDE
PEDESTRIAN OVERPASS
485+00
500+00
505+00
HAWTHORNE
ROLLING HILLS STATION
R=1000' V=46 MPH
SINGLE TRACK ALIGNMENT
OVERHEAD POWER TRANSMISSION LINE (66 KV)
MATCH LINE STA. 490+00 SEE DWG. C114
ROLLING HILLS RD.
SEE NOTE 1
ERNIE J. HOWLETT PARK
NOTE:
1. MODIFY OVERHEAD POWER TRANSMISSION LINE (66 KV) TO ELIMINATE GUY WIRES CURRENTLY STRETCHING ACROSS ROADWAY.
PLAN
SCALE: 1" = 100'
STA. 490+00 SEE DWG. C114
℄ ROLLING HILLS RD.
PVI 501+00
EL. 316.00
ROLLING HILLS STATION
+1.00%
VC= 300'
T/R PROFILE
+5.00%
EXISTING GROUND LINE
340
320
300
280
260

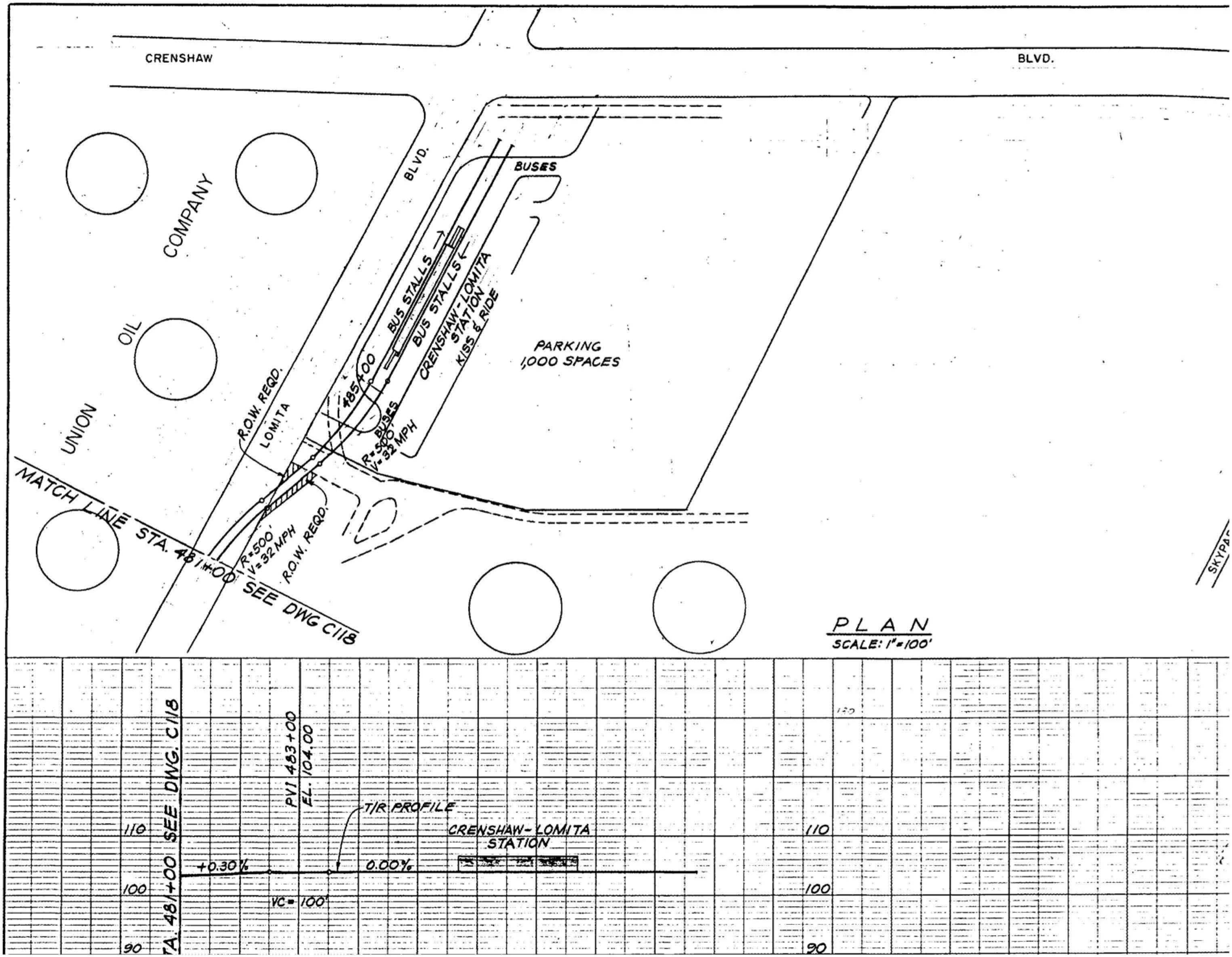


MATCH LINE STA. 407+00 SEE DWG. C111
MADISON ST.
HAWTHORNE BLVD.
R.O.W. REQD.
410+00
415+00
420+00
425+00
LOMITA
R=600'
V=35 MPH
R.O.W. REQD.
DOUBLE TRACK ALIGNMENT
MADISON ST.
PLAN
SCALE: 1"=100'
STA. 407+00 SEE DWG. C111
110
100
90
80
+0.50%
PVI 410+00
EL. 109.00
VC=200'
T/R PROFILE
-0.50%
℄ MADISON ST.
EXISTING GROUND LINE

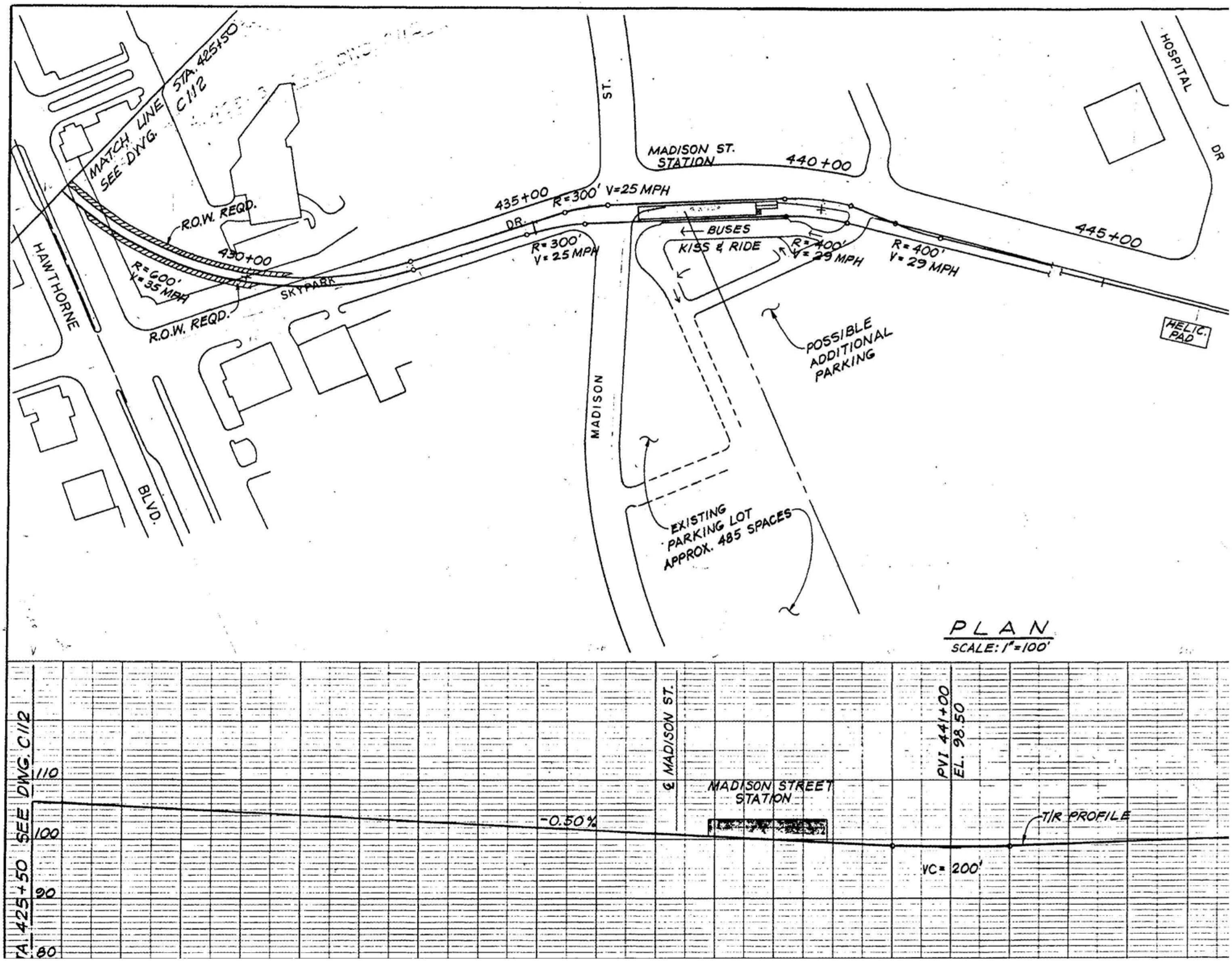


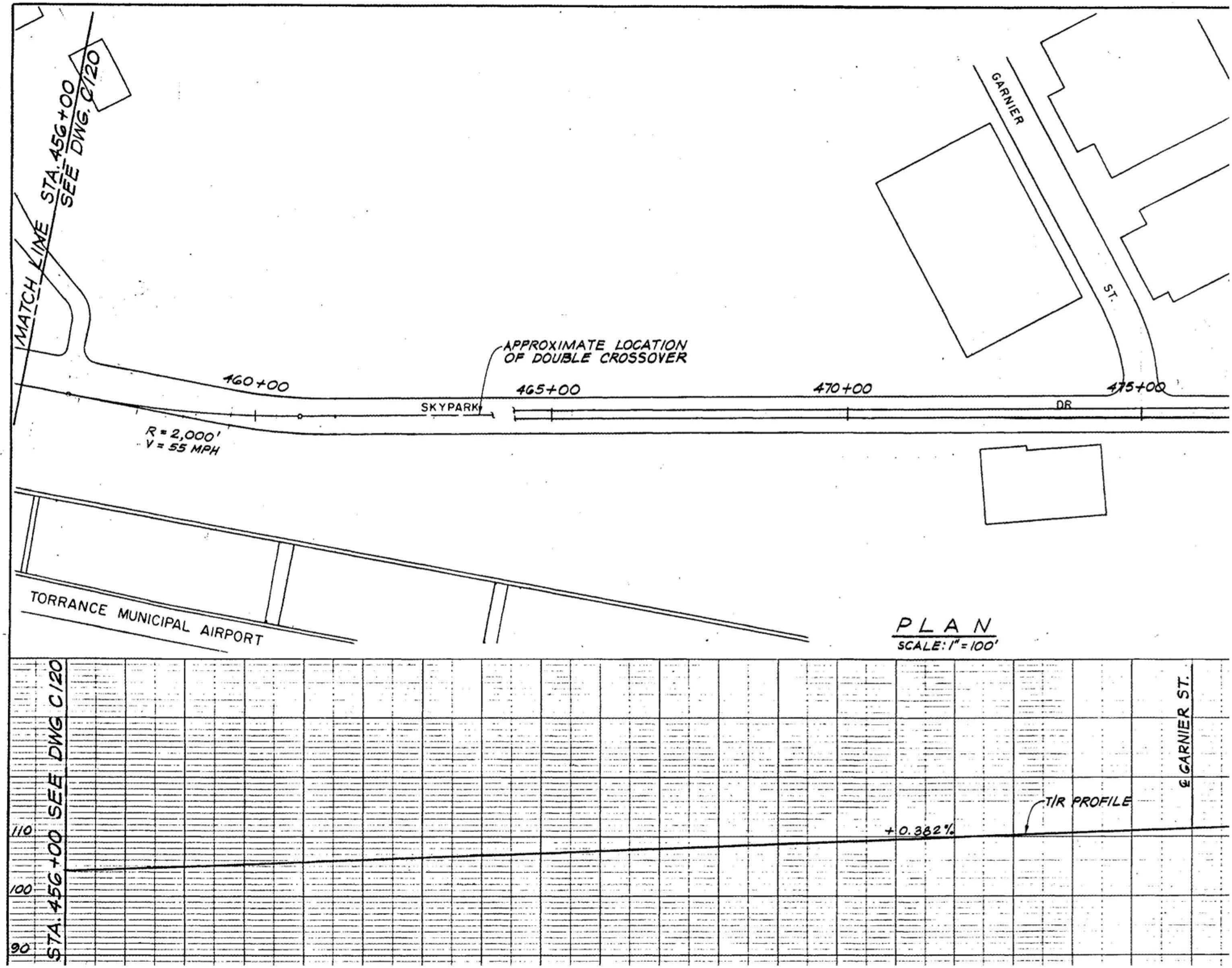
AVE.
EARLY
MATCH LINE STA. 435+00 SEE DWG. C11G
AV.
TELO
440+00
LOMITA
445+00
450+00
HOSPITAL
DR.
PLAN
SCALE: 1"=100'
435+00 SEE DWG. C11G
PVI 435+00 EL. 99.00
VC=100'
110
100
90
80
+0.30%
T/R PROFILE
℄ TELO AV.

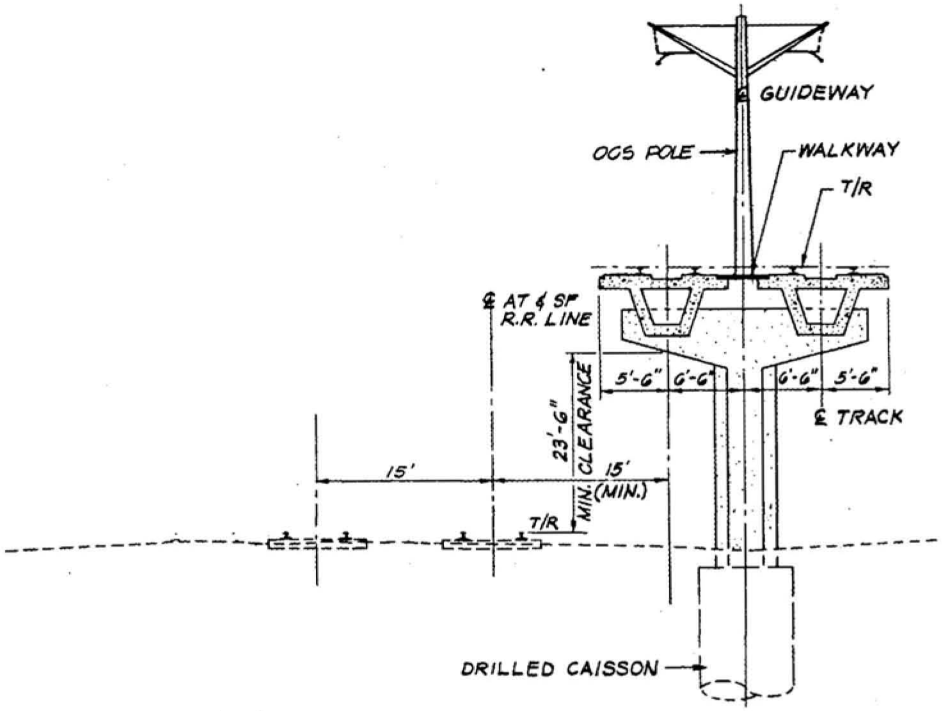

UNION
OIL
COMPAN
MATCH LINE STA. 463+00 SEE DWG. C117
463+00
LOMITA
470+00
475+00
480+00
APPROXIMATE LOCATION OF DOUBLE CROSSOVER
PLAN
SCALE: 1" = 100'
TA. 463+00 SEE DWG. C117
110
100
90
PVI 473+00
EL. 101.00
-0.33%
T/R PROFILE
+0.30%
VC = 200'



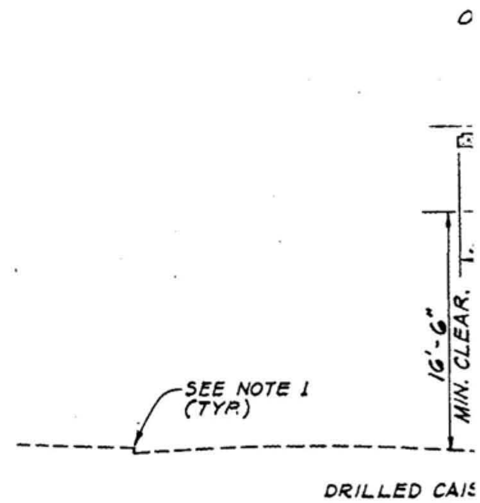
CRENSHAW
BLVD.
BLVD.
BUSES
UNION
OIL
COMPANY
BUS STALLS
BUS STALLS
CRENSHAW - LOMITA
STATION
KISS & RIDE
PARKING
1,000 SPACES
485+00
R.O.W. REQD.
LOMITA
BUSES
R=500'
V=32 MPH
MATCH LINE STA. 481+00 SEE DWG C118
R=500'
V=32 MPH
R.O.W. REQD.
SKYPA
PLAN
SCALE: 1"=100'
STA. 481+00 SEE DWG. C118
PVI 483+00
EL. 104.00
T/R PROFILE
CRENSHAW - LOMITA
STATION
+0.30%
0.00%
VC= 100'
110
100
90
110
100
90


MATCH LINE STA. 425+50
SEE DWG. C112
HAWTHORNE
BLVD.
R.O.W. REQD.
R.O.W. REQD.
R=600'
V=35 MPH
430+00
SKYPARK
DR.
435+00
R=300' V=25 MPH
R=300'
V=25 MPH
ST.
MADISON
MADISON ST.
STATION
440+00
BUSES
KISS & RIDE
R=400'
V=29 MPH
R=400'
V=29 MPH
445+00
HOSPITAL
DR
HELIC.
PAD
POSSIBLE
ADDITIONAL
PARKING
EXISTING
PARKING LOT
APPROX. 485 SPACES
PLAN
SCALE: 1"=100'
STA. 425+50 SEE DWG. C112
110
100
90
80
℄ MADISON ST.
MADISON STREET
STATION
-0.50%
PVI 441+00
EL. 98.50
VC= 200'
T/R PROFILE

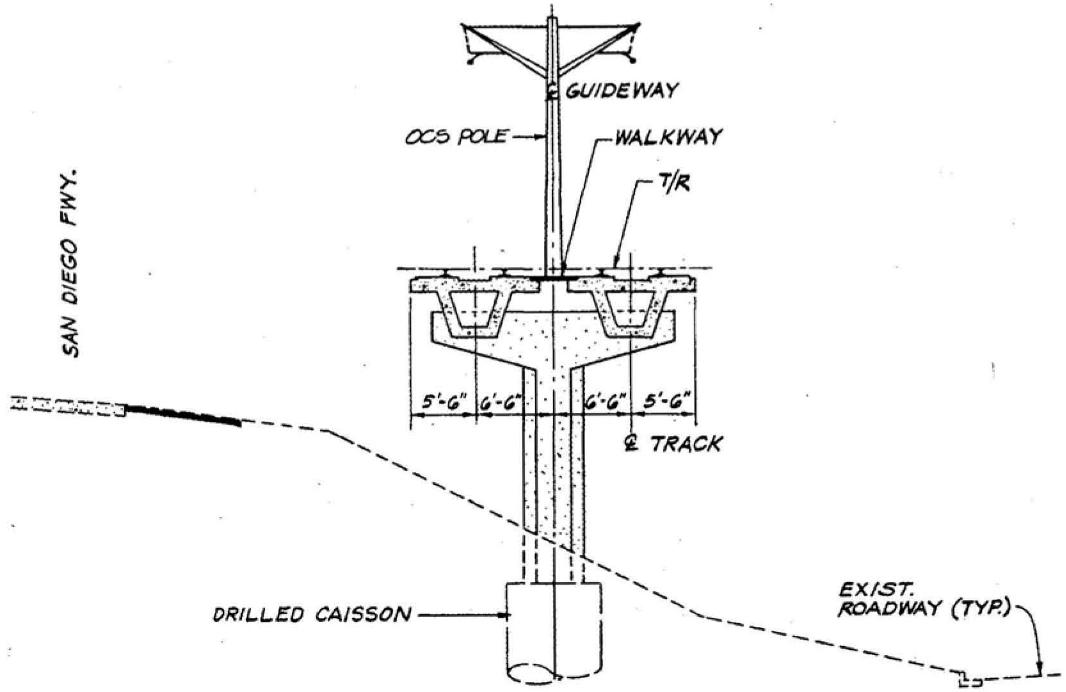

MATCH LINE STA. 456+00
SEE DWG. C/120
GARNIER ST.
APPROXIMATE LOCATION OF DOUBLE CROSSOVER
460+00
465+00
470+00
475+00
SKYPARK DR
R = 2,000'
V = 55 MPH
TORRANCE MUNICIPAL AIRPORT
PLAN
SCALE: 1" = 100'
STA. 456+00 SEE DWG C/120
℄ GARNIER ST.
T/R PROFILE
+0.382%
110
100
90

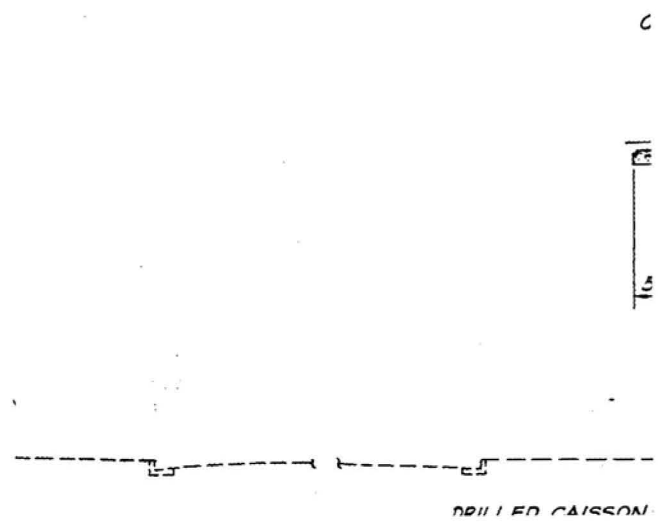


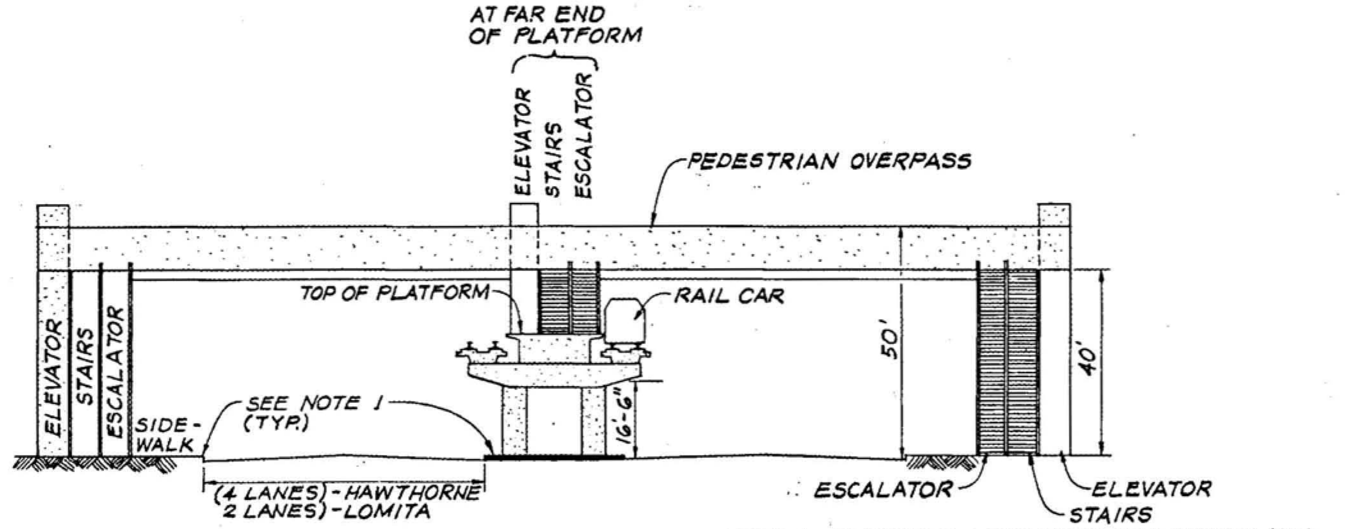
CROSS SECTION ALONG R.R. TRACK



CROSS SECTION AL
HAWTHORNE BLV
LOMITA BLVD. A

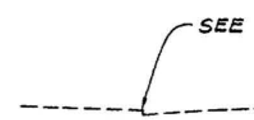






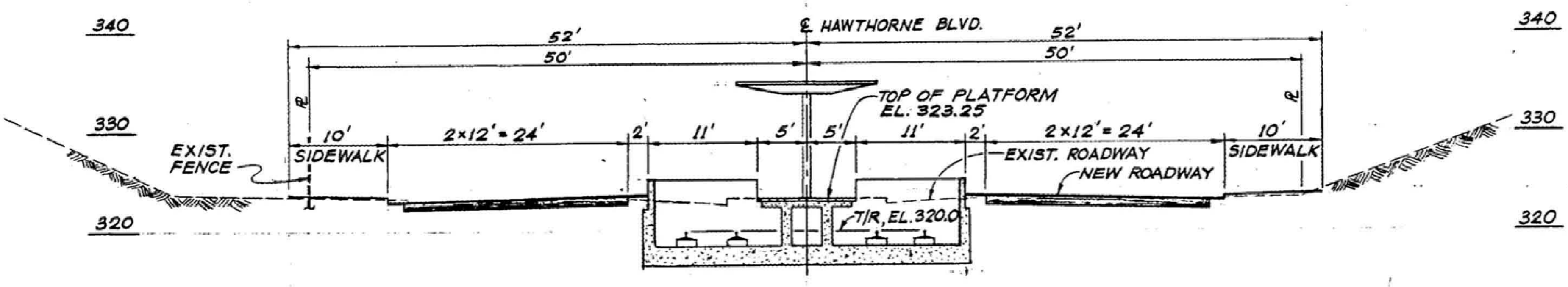
NOTE 1: ELIMINATE LEFT TURN BAY. WHERE NOT POSSIBLE OR WHERE NARROW MEDIAN IS EXIST., WIDEN MEDIAN & ROADWAY TO ONE SIDE TO MAINTAIN SAME NUMBER OF LANES.

NOTE 2: STATION CANOPY NOT SHOWN.



TYPICAL CROSS SECTION OF STATION
IN MEDIAN OF ARTERIAL
(HAWTHORNE BLVD, LOMITA BLVD.)
SCALE: 1" = 20'

C



APPENDIX B

TERMINAL SITE SELECTION REPORT

TERMINAL STATION SITE SELECTION

1.0 Criteria

1.1 Parking lot. An area to accommodate 1000+ autos plus a kiss and ride and bus drop-off area is required.

1.2 Station and storage track. A straight and level section to provide 600 to 1000 feet of tangent level alignment for the station proper and storage track is necessary. For anchorage of the track and safe terminal operations the storage track should be placed on embankment.

1.3 Future extension. The site should not preclude future extension to the Long Beach Line.

1.4 Accessibility by rail. The site must be accessible to the main line without violation of the general alignment criteria, e.g. within the minimum curve and maximum grade restrictions.

1.5 Accessibility by vehicular traffic including the bus system. The site should be in the proximity of a major arterial.

1.6 Cost. Construction, real estate, and operational costs shall all be considered in the selection of the site.

1.7 Other considerations that apply:

- o Proximity to trip generators/attractors
- o Population density in the immediate services area
- o Pedestrian access and movement
- o Capacity to accommodate future increases in parking and pedestrian traffic

- o Joint development potential
- o Station spacing
- o Constructibility

2.0 Sites under consideration (Hawthorne alignment)

2.1 S.W. corner of Lomita and Crenshaw. A large level area, even larger than necessary, is available, and stations, storage tracks, and parking lot can easily be provided. Future extension appears possible and bus and auto accessibility would be from Crenshaw Blvd.

2.1.1 Possible problems. The land is for sale and may be purchased and developed in the near future. The site is almost 8000 feet from Hawthorne.

2.2 Skypark and Garnier. The available land appears just adequate. Future extension would be Skypark to Crenshaw Blvd. to Pacific Coast Highway. Bus and auto accessibility would be from Hawthorne and Crenshaw Blvd.

2.2.1 Possible problems. The land may be purchased and developed in the near future. Developing rail transit on Pacific Coast Highway will be difficult. The site is 4800 feet from Hawthorne Blvd. and over 3000 feet from Crenshaw Blvd. making auto and bus accessibility difficult.

2.3 Skypark and Madison. Sufficient land is available along Skypark adjacent to the airport for the station and the storage track; space for parking and drop-off areas would have to be arranged for from the existing parking lot with perhaps some airport land. Future extension would be Skypark Dr. to Crenshaw Blvd. to Pacific Coast Highway. Bus and auto accessibility would be from Hawthorne Blvd.

2.3.1 Possible problems. Parking may be costly to arrange and may entail purchasing buildings to which the current parking is assigned. Rail transit will be difficult to develop on Pacific Coast Highway.

3.0 Sites no longer under consideration.

3.1 Hawthorne Blvd. south of Rolling Hills Road (opposite Ernie J. Howlett Park). No future extension is possible and rising land presents a grade problem. The area is still under consideration as single track spur line.

3.2 N.E. corner of Hawthorne Blvd. and Pacific Coast Highway. The area is already under consideration for development by others and the real estate cost will be high.

3.3 Skypark Dr. west of Hawthorne Blvd. Expensive construction would be necessary in unstable ground over an active county flood control sump area.

3.4 Narbonne south of Pacific Coast Highway (backfilled quarry site). Rail and auto access along a narrow road with steep grades would be very difficult and future extensions impossible.

3.5 Consolidated Edison property east of Crenshaw Blvd. and south of 235th Street. Rail access and future extension would be impossible without extensive additional private property acquisition.

APPENDIX C

INTERSECTION ANALYSIS WORKSHEETS

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & TORRANCE BLVD
Calculation Form 1, page 16 — AM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	245	Left	2	245	245	135	0
			Thr-Lft	0				
	Through	2307	Through	4	2476	2307	577	
			Thr-Rt	0				577
	Right	169	Right	1		169	169	
			CODE	2				
Westbound	Left	292	Left	2	292	292	161	161
			Thr-Lft	0				
	Through	627	Through	3	746	746	249	
			Thr-Rt	0				0
	Right	119	Right	0		0	119	
			CODE	2				
Southbound	Left	237	Left	2	237	237	130	130
			Thr-Lft	0				
	Through	1604	Through	3	1735	1604	535	
			Thr-Rt	0				0
	Right	131	Right	1		131	131	
			CODE	2				
Eastbound	Left	259	Left	2	259	259	142	0
			Thr-Lft	0				
	Through	842	Through	3	1215	842	281	
			Thr-Rt	0				373
	Right	373	Right	1		373	373	
			CODE	2				
							TOTAL	1241
			4 PHASES				CAPACITY	1560
							V/C	0.80

APPROACH VOLUMES

Northbound	In	2721	Southbound	In	1972
	Out	2269		Out	2685
Westbound	In	1038	Eastbound	In	1474
	Out	1248		Out	1003

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	707
SB Thr + NB Lft	669
WB Thr + EB Lft	391
EB Thr + WB Lft	534

APPROACH CALCULATIONS

Approach V/C	37%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	577
Shared Right	0
Approach Phasing	0
Approach V/C	10%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	249
Shared Right	1
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	535
Shared Right	0
Approach Phasing	0
Approach V/C	24%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	373
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & TORRANCE BLVD
Calculation Form 1, page 16 — PM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	434	Left	2	434	434	239	239
			Thr-Lft	0				
	Through	2315	Through	4	2456	2315	579	
			Thr-Rt	0				0
	Right	141	Right	1		141	141	
			CODE	2				
Westbound	Left	455	Left	2	455	455	250	0
			Thr-Lft	0				
	Through	1291	Through	3	1453	1453	484	
			Thr-Rt	0				484
	Right	162	Right	0		0	162	
			CODE	2				
Southbound	Left	332	Left	2	332	332	183	0
			Thr-Lft	0				
	Through	2480	Through	3	2727	2480	827	
			Thr-Rt	0				827
	Right	247	Right	1		247	247	
			CODE	2				
Eastbound	Left	341	Left	2	341	341	188	188
			Thr-Lft	0				
	Through	863	Through	3	1186	863	288	
			Thr-Rt	0				0
	Right	323	Right	1		323	323	
			CODE	2				
							TOTAL	1737
			4 PHASES				CAPACITY	1560
							V/C	1.11

APPROACH VOLUMES

Northbound	In	2890	Southbound	In	3059
	Out	3258		Out	2818
Westbound	In	1908	Eastbound	In	1527
	Out	1336		Out	1972

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	761
SB Thr + NB Lft	1065
WB Thr + EB Lft	672
EB Thr + WB Lft	573

APPROACH CALCULATIONS

Approach V/C	15%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	579
Shared Right	0
Approach Phasing	0
Approach V/C	31%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	484
Shared Right	1
Approach Phasing	0
Approach V/C	53%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	827
Shared Right	0
Approach Phasing	0
Approach V/C	12%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	323
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & TORRANCE BLVD
Calculation Form 1, page 16 — AM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	299	Left	2	299	299	164	0
			Thr-Lft	0				
	Through	2815	Through	4	3020.72	2815	704	
			Thr-Rt	0				704
	Right	206	Right	1		206	206	
			CODE	2				
Westbound	Left	356	Left	2	356	356	196	196
			Thr-Lft	0				
	Through	765	Through	3	910.12	910	303	
			Thr-Rt	0				0
	Right	145	Right	0		0	145	
			CODE	2				
Southbound	Left	289	Left	2	289	289	159	159
			Thr-Lft	0				
	Through	1957	Through	3	2116.7	1957	652	
			Thr-Rt	0				0
	Right	160	Right	1		160	160	
			CODE	2				
Eastbound	Left	316	Left	2	316	316	174	0
			Thr-Lft	0				
	Through	1027	Through	3	1482.3	1027	342	
			Thr-Rt	0				455
	Right	455	Right	1		455	455	
			CODE	2				
							TOTAL	1514
			4 PHASES				CAPACITY	1560
							V/C	0.97

APPROACH VOLUMES

Northbound	In	3319.	Southbound	In	2405.84
	Out	2768.		Out	3275.7
Westbound	In	1266.	Eastbound	In	1798.28
	Out	1522.		Out	1223.66

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	863
SB Thr + NB Lft	817
WB Thr + EB Lft	477
EB Thr + WB Lft	651

APPROACH CALCULATIONS

Approach V/C	45%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	704
Shared Right	0
Approach Phasing	0
Approach V/C	13%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	303
Shared Right	1
Approach Phasing	0
Approach V/C	10%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	652
Shared Right	0
Approach Phasing	0
Approach V/C	29%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	455
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & TORRANCE BLVD
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	529	Left	2	529	529	291	291
			Thr-Lft	0				
	Through	2824	Through	4	2996.32	2824	706	
			Thr-Rt	0				0
	Right	172	Right	1		172	172	
			CODE	2				
Westbound	Left	555	Left	2	555	555	305	0
			Thr-Lft	0				
	Through	1575	Through	3	1772.66	1773	591	
			Thr-Rt	0				591
	Right	198	Right	0		0	198	
			CODE	2				
Southbound	Left	405	Left	2	405	405	223	0
			Thr-Lft	0				
	Through	3026	Through	3	3326.94	3026	1009	
			Thr-Rt	0				1009
	Right	301	Right	1		301	301	
			CODE	2				
Eastbound	Left	416	Left	2	416	416	229	229
			Thr-Lft	0				
	Through	1053	Through	3	1446.92	1053	351	
			Thr-Rt	0				0
	Right	394	Right	1		394	394	
			CODE	2				
							TOTAL	2119
			4 PHASES				CAPACITY	1560
							V/C	1.36

APPROACH VOLUMES

Northbound	In	3525.	Southbound	In	3731.98
	Out	3974.		Out	3437.96
Westbound	In	2327.	Eastbound	In	1862.94
	Out	1629.		Out	2405.84

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	929
SB Thr + NB Lft	1300
WB Thr + EB Lft	820
EB Thr + WB Lft	699

APPROACH CALCULATIONS

Approach V/C	19%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	706
Shared Right	0
Approach Phasing	0
Approach V/C	38%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	591
Shared Right	1
Approach Phasing	0
Approach V/C	65%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1009
Shared Right	0
Approach Phasing	0
Approach V/C	15%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	394
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — Hawthorne Ave & Del Amo
Calculation Form 1, page 16 — AM Peak - Existing Base Volumes

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	97	Left	1	97	97	97	0
			Thr-Lft	0				
	Through	2704	Through	4	2829	2829	707	
			Thr-Rt	0				707
	Right	125	Right	0		0	125	
			CODE	2				
Westbound	Left	108	Left	1	108	108	108	0
			Thr-Lft	0				
	Through	419	Through	2	560	560	280	
			Thr-Rt	0				280
	Right	141	Right	0		0	141	
			CODE	2				
Southbound	Left	188	Left	2	188	188	103	103
			Thr-Lft	0				
	Through	1560	Through	4	1694	1694	424	
			Thr-Rt	0				0
	Right	134	Right	0		0	134	
			CODE	2				
Eastbound	Left	391	Left	1	391	391	391	391
			Thr-Lft	0				
	Through	877	Through	2	937	937	469	
			Thr-Rt	0				0
	Right	60	Right	0		0	60	
			CODE	2				
							TOTAL	1482
			4 PHASES				CAPACITY	1560
							V/C	0.95

APPROACH VOLUMES

Northbound	In	2926	Southbound	In	1882
	Out	1728		Out	3236
Westbound	In	668	Eastbound	In	1328
	Out	1190		Out	650

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	811
SB Thr + NB Lft	521
WB Thr + EB Lft	671
EB Thr + WB Lft	577

APPROACH CALCULATIONS

Approach V/C	45%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	707
Shared Right	1
Approach Phasing	0
Approach V/C	18%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	280
Shared Right	1
Approach Phasing	0
Approach V/C	7%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	424
Shared Right	1
Approach Phasing	0
Approach V/C	25%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	469
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — Hawthorne Ave & Del Amo
Calculation Form 1, page 16 — PM Peak - Existing Base Volumes

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	218	Left	1	218	218	218	218
			Thr-Lft	0				
	Through	2509	Through	4	2676	2676	669	
			Thr-Rt	0				0
	Right	167	Right	0		0	167	
			CODE	2				
Westbound	Left	288	Left	1	288	288	288	0
			Thr-Lft	0				
	Through	754	Through	2	1018	1018	509	
			Thr-Rt	0				509
	Right	264	Right	0		0	264	
			CODE	2				
Southbound	Left	182	Left	2	182	182	100	0
			Thr-Lft	0				
	Through	2599	Through	4	2810	2810	703	
			Thr-Rt	0				703
	Right	211	Right	0		0	211	
			CODE	2				
Eastbound	Left	197	Left	1	197	197	197	197
			Thr-Lft	0				
	Through	447	Through	2	569	569	285	
			Thr-Rt	0				0
	Right	122	Right	0		0	122	
			CODE	2				
							TOTAL	1627
			4 PHASES				CAPACITY	1560
							V/C	1.04

APPROACH VOLUMES

Northbound	In	2894	Southbound	In	2992
	Out	3009		Out	2970
Westbound	In	1306	Eastbound	In	766
	Out	796		Out	1183

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	769
SB Thr + NB Lft	921
WB Thr + EB Lft	706
EB Thr + WB Lft	573

APPROACH CALCULATIONS

Approach V/C	14%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	669
Shared Right	1
Approach Phasing	0
Approach V/C	33%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	509
Shared Right	1
Approach Phasing	0
Approach V/C	45%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	703
Shared Right	1
Approach Phasing	0
Approach V/C	13%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	285
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — Hawthorne Ave & Del Amo
Calculation Form 1, page 16 — AM Peak - with 2010 Volumes

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	118	Left	1	118	118	118	0
			Thr-Lft	0				
	Through	3299	Through	4	3451.38	3451	863	
			Thr-Rt	0				863
	Right	153	Right	0		0	153	
			CODE	2				
Westbound	Left	132	Left	1	132	132	132	0
			Thr-Lft	0				
	Through	511	Through	2	683.2	683	342	
			Thr-Rt	0				342
	Right	172	Right	0		0	172	
			CODE	2				
Southbound	Left	229	Left	2	229	229	126	126
			Thr-Lft	0				
	Through	1903	Through	4	2066.68	2067	517	
			Thr-Rt	0				0
	Right	163	Right	0		0	163	
			CODE	2				
Eastbound	Left	477	Left	1	477	477	477	477
			Thr-Lft	0				
	Through	1070	Through	2	1143.14	1143	572	
			Thr-Rt	0				0
	Right	73	Right	0		0	73	
			CODE	2				
							TOTAL	1808
			4 PHASES				CAPACITY	1560
							V/C	1.16

APPROACH VOLUMES

Northbound	In	3569.	Southbound	In	2296.04
	Out	2108.		Out	3947.92
Westbound	In	814.9	Eastbound	In	1620.16
	Out	1451.		Out	793

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	989
SB Thr + NB Lft	635
WB Thr + EB Lft	819
EB Thr + WB Lft	703

APPROACH CALCULATIONS

Approach V/C	55%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	863
Shared Right	1
Approach Phasing	0
Approach V/C	22%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	342
Shared Right	1
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	517
Shared Right	1
Approach Phasing	0
Approach V/C	31%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	572
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — Hawthorne Ave & Del Amo
Calculation Form 1, page 16 — PM Peak - with 2010 Volumes

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	266	Left	1	266	266	266	266
			Thr-Lft	0				
	Through	3061	Through	4	3264.72	3265	816	
			Thr-Rt	0				0
	Right	204	Right	0		0	204	
			CODE	2				
Westbound	Left	351	Left	1	351	351	351	0
			Thr-Lft	0				
	Through	920	Through	2	1241.96	1242	621	
			Thr-Rt	0				621
	Right	322	Right	0		0	322	
			CODE	2				
Southbound	Left	222	Left	2	222	222	122	0
			Thr-Lft	0				
	Through	3171	Through	4	3428.2	3428	857	
			Thr-Rt	0				857
	Right	257	Right	0		0	257	
			CODE	2				
Eastbound	Left	240	Left	1	240	240	240	240
			Thr-Lft	0				
	Through	545	Through	2	694.18	694	347	
			Thr-Rt	0				0
	Right	149	Right	0		0	149	
			CODE	2				
							TOTAL	1984
			4 PHASES				CAPACITY	1560
							V/C	1.27

APPROACH VOLUMES

Northbound	In	3530.	Southbound	In	3650.24
	Out	3670.		Out	3623.4
Westbound	In	1593.	Eastbound	In	934.52
	Out	971.1		Out	1443.26

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	938
SB Thr + NB Lft	1123
WB Thr + EB Lft	861
EB Thr + WB Lft	698

APPROACH CALCULATIONS

Approach V/C	17%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	816
Shared Right	1
Approach Phasing	0
Approach V/C	40%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	621
Shared Right	1
Approach Phasing	0
Approach V/C	55%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	857
Shared Right	1
Approach Phasing	0
Approach V/C	15%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	347
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & CARSON BLVD
Calculation Form 1, page 16 — AM PEAK HOUR EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	88	Left	1	88	88	88	0
			Thr-Lft	0				
	Through	2327	Through	3	2457	2327	776	
			Thr-Rt	0				776
	Right	130	Right	1		130	130	
			CODE	2				
Westbound	Left	144	Left	2	144	144	79	79
			Thr-Lft	0				
	Through	340	Through	3	502	502	167	
			Thr-Rt	0				0
	Right	162	Right	0		0	162	
			CODE	2				
Southbound	Left	179	Left	2	179	179	98	98
			Thr-Lft	0				
	Through	1624	Through	4	1673	1673	418	
			Thr-Rt	0				0
	Right	49	Right	0		0	49	
			CODE	2				
Eastbound	Left	87	Left	1	87	87	87	0
			Thr-Lft	0				
	Through	503	Through	2	590	590	295	
			Thr-Rt	0				295
	Right	87	Right	0		0	87	
			CODE	2				
							TOTAL	1248
			4 PHASES				CAPACITY	1560
							V/C	0.80

APPROACH VOLUMES

Northbound	In	2545	Southbound	In	1852
	Out	1855		Out	2576
Westbound	In	646	Eastbound	In	677
	Out	812		Out	477

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	874
SB Thr + NB Lft	506
WB Thr + EB Lft	254
EB Thr + WB Lft	374

APPROACH CALCULATIONS

Approach V/C	50%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	776
Shared Right	0
Approach Phasing	0
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	167
Shared Right	1
Approach Phasing	0
Approach V/C	6%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	418
Shared Right	1
Approach Phasing	0
Approach V/C	19%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	295
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & CARSON BLVD
Calculation Form 1, page 16 — PM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	140	Left	1	140	140	140	140
			Thr-Lft	0				
	Through	2165	Through	3	2417	2165	722	
			Thr-Rt	0				0
	Right	252	Right	1		252	252	
			CODE	2				
Westbound	Left	359	Left	2	359	359	197	197
			Thr-Lft	0				
	Through	492	Through	3	566	566	189	
			Thr-Rt	0				0
	Right	74	Right	0		0	74	
			CODE	2				
Southbound	Left	54	Left	2	54	54	30	0
			Thr-Lft	0				
	Through	2452	Through	4	2947	2947	737	
			Thr-Rt	0				737
	Right	495	Right	0		0	495	
			CODE	2				
Eastbound	Left	322	Left	1	322	322	322	0
			Thr-Lft	0				
	Through	598	Through	2	974	974	487	
			Thr-Rt	0				487
	Right	376	Right	0		0	376	
			CODE	2				
							TOTAL	1561
			4 PHASES				CAPACITY	1560
							V/C	1.00

APPROACH VOLUMES

Northbound	In	2557	Southbound	In	3001
	Out	3187		Out	2561
Westbound	In	925	Eastbound	In	1296
	Out	904		Out	1127

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	751
SB Thr + NB Lft	877
WB Thr + EB Lft	511
EB Thr + WB Lft	684

APPROACH CALCULATIONS

Approach V/C	9%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	722
Shared Right	0
Approach Phasing	0
Approach V/C	13%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	189
Shared Right	1
Approach Phasing	0
Approach V/C	47%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	737
Shared Right	1
Approach Phasing	0
Approach V/C	31%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	487
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0

Circular 212 Planning Method — HAWTHORNE AVE & CARSON BLVD

Calculation Form 1, page 16 — AM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	107	Left	1	107	107	107	0
			Thr-Lft	0				
	Through	2839	Through	3	2997.54	2839	946	
			Thr-Rt	0				946
	Right	159	Right	1		159	159	
			CODE	2				
Westbound	Left	176	Left	2	176	176	97	97
			Thr-Lft	0				
	Through	415	Through	3	612.44	612	204	
			Thr-Rt	0				0
	Right	198	Right	0		0	198	
			CODE	2				
Southbound	Left	218	Left	2	218	218	120	120
			Thr-Lft	0				
	Through	1981	Through	4	2041.06	2041	510	
			Thr-Rt	0				0
	Right	60	Right	0		0	60	
			CODE	2				
Eastbound	Left	106	Left	1	106	106	106	0
			Thr-Lft	0				
	Through	614	Through	2	719.8	720	360	
			Thr-Rt	0				360
	Right	106	Right	0		0	106	
			CODE	2				
							TOTAL	1523
			4 PHASES				CAPACITY	1560
							V/C	0.98

APPROACH VOLUMES

Northbound	In	3104.	Southbound	In	2259.44
	Out	2263.		Out	3142.72
Westbound	In	788.1	Eastbound	In	825.94
	Out	990.6		Out	581.94

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1066
SB Thr + NB Lft	618
WB Thr + EB Lft	310
EB Thr + WB Lft	457

APPROACH CALCULATIONS

Approach V/C	61%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	946
Shared Right	0
Approach Phasing	0
Approach V/C	6%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	204
Shared Right	1
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	510
Shared Right	1
Approach Phasing	0
Approach V/C	23%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	360
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & CARSON BLVD
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	171	Left	1	171	171	171	171
			Thr-Lft	0				
	Through	2641	Through	3	2948.74	2641	880	
			Thr-Rt	0				0
	Right	307	Right	1		307	307	
			CODE	2				
Westbound	Left	438	Left	2	438	438	241	241
			Thr-Lft	0				
	Through	600	Through	3	690.52	691	230	
			Thr-Rt	0				0
	Right	90	Right	0		0	90	
			CODE	2				
Southbound	Left	66	Left	2	66	66	36	0
			Thr-Lft	0				
	Through	2991	Through	4	3595.34	3595	899	
			Thr-Rt	0				899
	Right	604	Right	0		0	604	
			CODE	2				
Eastbound	Left	393	Left	1	393	393	393	0
			Thr-Lft	0				
	Through	730	Through	2	1188.28	1188	594	
			Thr-Rt	0				594
	Right	459	Right	0		0	459	
			CODE	2				
							TOTAL	1905
			4 PHASES				CAPACITY	1560
							V/C	1.22

APPROACH VOLUMES

Northbound	In	3119.	Southbound	In	3661.22
	Out	3888.		Out	3124.42
Westbound	In	1128.	Eastbound	In	1581.12
	Out	1102.		Out	1374.94

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	917
SB Thr + NB Lft	1070
WB Thr + EB Lft	623
EB Thr + WB Lft	835

APPROACH CALCULATIONS

Approach V/C	11%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	880
Shared Right	0
Approach Phasing	0
Approach V/C	15%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	230
Shared Right	1
Approach Phasing	0
Approach V/C	58%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	899
Shared Right	1
Approach Phasing	0
Approach V/C	38%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	594
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & 190TH ST
Calculation Form 1, page 16 — AM PEAK HOUR EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	172	Left	2	172	172	95	0
			Thr-Lft	0				
	Through	3316	Through	4	3534	3316	829	
			Thr-Rt	0				829
	Right	218	Right	1		218	218	
			CODE	2				
Westbound	Left	150	Left	2	150	150	83	83
			Thr-Lft	0				
	Through	661	Through	2	831	661	331	
			Thr-Rt	0				0
	Right	170	Right	1		170	170	
			CODE	2				
Southbound	Left	106	Left	2	106	106	58	58
			Thr-Lft	0				
	Through	1455	Through	4	1599	1455	364	
			Thr-Rt	0				0
	Right	144	Right	1		144	144	
			CODE	2				
Eastbound	Left	256	Left	2	256	256	141	0
			Thr-Lft	0				
	Through	1125	Through	2	1417	1125	563	
			Thr-Rt	0				563
	Right	292	Right	1		292	292	
			CODE	2				
							TOTAL	1532
			4 PHASES				CAPACITY	1560
							V/C	0.98

APPROACH VOLUMES

Northbound	In	3706	Southbound	In	1705
	Out	1897		Out	3742
Westbound	In	981	Eastbound	In	1673
	Out	1449		Out	977

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	887
SB Thr + NB Lft	458
WB Thr + EB Lft	471
EB Thr + WB Lft	645

APPROACH CALCULATIONS

Approach V/C	53%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	829
Shared Right	0
Approach Phasing	0
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	331
Shared Right	0
Approach Phasing	0
Approach V/C	4%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	364
Shared Right	0
Approach Phasing	0
Approach V/C	36%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	563
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & 190TH ST
Calculation Form 1, page 16 — PM PEAK HOUR EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	425	Left	2	425	425	234	234
			Thr-Lft	0				
	Through	2911	Through	4	3205	2911	728	
			Thr-Rt	0				0
	Right	294	Right	1		294	294	
			CODE	2				
Westbound	Left	340	Left	2	340	340	187	0
			Thr-Lft	0				
	Through	1351	Through	2	1506	1351	676	
			Thr-Rt	0				676
	Right	155	Right	1		155	155	
			CODE	2				
Southbound	Left	172	Left	2	172	172	95	0
			Thr-Lft	0				
	Through	2444	Through	4	2769	2444	611	
			Thr-Rt	0				611
	Right	325	Right	1		325	325	
			CODE	2				
Eastbound	Left	221	Left	2	221	221	122	122
			Thr-Lft	0				
	Through	656	Through	2	1056	656	328	
			Thr-Rt	0				0
	Right	400	Right	1		400	400	
			CODE	2				
							TOTAL	1642
			4 PHASES				CAPACITY	1560
							V/C	1.05

APPROACH VOLUMES

Northbound	In	3630	Southbound	In	2941
	Out	3184		Out	3287
Westbound	In	1846	Eastbound	In	1277
	Out	1122		Out	2101

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	822
SB Thr + NB Lft	845
WB Thr + EB Lft	797
EB Thr + WB Lft	587

APPROACH CALCULATIONS

Approach V/C	15%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	728
Shared Right	0
Approach Phasing	0
Approach V/C	43%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	676
Shared Right	0
Approach Phasing	0
Approach V/C	39%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	611
Shared Right	0
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	400
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & 190TH ST
Calculation Form 1, page 16 — AM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	210	Left	2	210	210	115	0
			Thr-Lft	0				
	Through	4046	Through	4	4311.48	4046	1011	
			Thr-Rt	0				1011
	Right	266	Right	1		266	266	
			CODE	2				
Westbound	Left	183	Left	2	183	183	101	101
			Thr-Lft	0				
	Through	806	Through	2	1013.82	806	403	
			Thr-Rt	0				0
	Right	207	Right	1		207	207	
			CODE	2				
Southbound	Left	129	Left	2	129	129	71	71
			Thr-Lft	0				
	Through	1775	Through	4	1950.78	1775	444	
			Thr-Rt	0				0
	Right	176	Right	1		176	176	
			CODE	2				
Eastbound	Left	312	Left	2	312	312	172	0
			Thr-Lft	0				
	Through	1373	Through	2	1728.74	1373	686	
			Thr-Rt	0				686
	Right	356	Right	1		356	356	
			CODE	2				
							TOTAL	1869
			4 PHASES				CAPACITY	1560
							V/C	1.20

APPROACH VOLUMES

Northbound	In	4521.	Southbound	In	2080.1
	Out	2314.		Out	4565.24
Westbound	In	1196.	Eastbound	In	2041.06
	Out	1767.		Out	1191.94

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1083
SB Thr + NB Lft	559
WB Thr + EB Lft	575
EB Thr + WB Lft	787

APPROACH CALCULATIONS

Approach V/C	65%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1011
Shared Right	0
Approach Phasing	0
Approach V/C	6%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	403
Shared Right	0
Approach Phasing	0
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	444
Shared Right	0
Approach Phasing	0
Approach V/C	44%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	686
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & 190TH ST
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	519	Left	2	519	519	285	285
			Thr-Lft	0				
	Through	3551	Through	4	3910.1	3551	888	
			Thr-Rt	0				0
	Right	359	Right	1		359	359	
			CODE	2				
Westbound	Left	415	Left	2	415	415	228	0
			Thr-Lft	0				
	Through	1648	Through	2	1837.32	1648	824	
			Thr-Rt	0				824
	Right	189	Right	1		189	189	
			CODE	2				
Southbound	Left	210	Left	2	210	210	115	0
			Thr-Lft	0				
	Through	2982	Through	4	3378.18	2982	745	
			Thr-Rt	0				745
	Right	397	Right	1		397	397	
			CODE	2				
Eastbound	Left	270	Left	2	270	270	148	148
			Thr-Lft	0				
	Through	800	Through	2	1288.32	800	400	
			Thr-Rt	0				0
	Right	488	Right	1		488	488	
			CODE	2				
							TOTAL	2003
			4 PHASES				CAPACITY	1560
							V/C	1.28

APPROACH VOLUMES

Northbound	In	4428.	Southbound	In	3588.02
	Out	3884.		Out	4010.14
Westbound	In	2252.	Eastbound	In	1557.94
	Out	1368.		Out	2563.22

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1003
SB Thr + NB Lft	1031
WB Thr + EB Lft	972
EB Thr + WB Lft	716

APPROACH CALCULATIONS

Approach V/C	18%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	888
Shared Right	0
Approach Phasing	0
Approach V/C	53%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	824
Shared Right	0
Approach Phasing	0
Approach V/C	48%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	745
Shared Right	0
Approach Phasing	0
Approach V/C	10%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	488
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & ARTESIA BLVD
Calculation Form 1, page 16 — AM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	172	Left	2	172	172	95	0
			Thr-Lft	0				
	Through	3423	Through	4	3574	3574	894	
			Thr-Rt	0				894
	Right	151	Right	0		0	151	
			CODE	2				
Westbound	Left	178	Left	2	178	178	98	98
			Thr-Lft	0				
	Through	863	Through	2	1028	1028	514	
			Thr-Rt	0				0
	Right	165	Right	0		0	165	
			CODE	2				
Southbound	Left	108	Left	2	108	108	59	59
			Thr-Lft	0				
	Through	1088	Through	4	1106	1106	277	
			Thr-Rt	0				0
	Right	18	Right	0		0	18	
			CODE	2				
Eastbound	Left	0	Left	0	0	0	0	0
			Thr-Lft	0				
	Through	1183	Through	3	1396	1396	465	
			Thr-Rt	0				465
	Right	213	Right	0		0	213	
			CODE	2				
							TOTAL	1516
			4 PHASES				CAPACITY	1560
							V/C	0.97

APPROACH VOLUMES

Northbound	In	3746	Southbound	In	1214
	Out	1479		Out	3588
Westbound	In	1206	Eastbound	In	1396
	Out	1442		Out	1053

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	953
SB Thr + NB Lft	371
WB Thr + EB Lft	514
EB Thr + WB Lft	563

APPROACH CALCULATIONS

Approach V/C	57%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	894
Shared Right	1
Approach Phasing	0
Approach V/C	6%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	514
Shared Right	1
Approach Phasing	0
Approach V/C	4%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	277
Shared Right	1
Approach Phasing	0
Approach V/C	30%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	465
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & ARTESIA BLVD
Calculation Form 1, page 16 — PM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	303	Left	2	303	303	167	167
			Thr-Lft	0				
	Through	2144	Through	4	2370	2370	593	
			Thr-Rt	0				0
	Right	226	Right	0		0	226	
			CODE	2				
Westbound	Left	393	Left	2	393	393	216	216
			Thr-Lft	0				
	Through	874	Through	2	957	957	479	
			Thr-Rt	0				0
	Right	83	Right	0		0	83	
			CODE	2				
Southbound	Left	160	Left	2	160	160	88	0
			Thr-Lft	0				
	Through	2520	Through	4	2555	2555	639	
			Thr-Rt	0				639
	Right	35	Right	0		0	35	
			CODE	2				
Eastbound	Left	0	Left	0	0	0	0	0
			Thr-Lft	0				
	Through	812	Through	3	1126	1126	375	
			Thr-Rt	0				375
	Right	314	Right	0		0	314	
			CODE	2				
							TOTAL	1397
			4 PHASES				CAPACITY	1560
							V/C	0.90

APPROACH VOLUMES

Northbound	In	2673	Southbound	In	2715
	Out	3227		Out	2227
Westbound	In	1350	Eastbound	In	1126
	Out	1198		Out	1212

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	681
SB Thr + NB Lft	805
WB Thr + EB Lft	479
EB Thr + WB Lft	591

APPROACH CALCULATIONS

Approach V/C	11%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	593
Shared Right	1
Approach Phasing	0
Approach V/C	14%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	479
Shared Right	1
Approach Phasing	0
Approach V/C	41%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	639
Shared Right	1
Approach Phasing	0
Approach V/C	24%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	375
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & ARTESIA BLVD
Calculation Form 1, page 16 — AM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	210	Left	2	210	210	115	0
			Thr-Lft	0				
	Through	4176	Through	4	4360.28	4360	1090	
			Thr-Rt	0				1090
	Right	184	Right	0		0	184	
			CODE	2				
Westbound	Left	217	Left	2	217	217	119	119
			Thr-Lft	0				
	Through	1053	Through	2	1254.16	1254	627	
			Thr-Rt	0				0
	Right	201	Right	0		0	201	
			CODE	2				
Southbound	Left	132	Left	2	132	132	72	72
			Thr-Lft	0				
	Through	1327	Through	4	1349.32	1349	337	
			Thr-Rt	0				0
	Right	22	Right	0		0	22	
			CODE	2				
Eastbound	Left	0	Left	0	0	0	0	0
			Thr-Lft	0				
	Through	1443	Through	3	1703.12	1703	568	
			Thr-Rt	0				568
	Right	260	Right	0		0	260	
			CODE	2				
							TOTAL	1850
			4 PHASES				CAPACITY	1560
							V/C	1.19

APPROACH VOLUMES

Northbound	In	4570.	Southbound	In	1481.08
	Out	1804.		Out	4377.36
Westbound	In	1471.	Eastbound	In	1703.12
	Out	1759.		Out	1284.66

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1163
SB Thr + NB Lft	453
WB Thr + EB Lft	627
EB Thr + WB Lft	687

APPROACH CALCULATIONS

Approach V/C	70%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1090
Shared Right	1
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	627
Shared Right	1
Approach Phasing	0
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	337
Shared Right	1
Approach Phasing	0
Approach V/C	36%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	568
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & ARTESIA BLVD
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	370	Left	2	370	370	203	203
			Thr-Lft	0				
	Through	2616	Through	4	2891.4	2891	723	
			Thr-Rt	0				0
	Right	276	Right	0		0	276	
			CODE	2				
Westbound	Left	479	Left	2	479	479	264	264
			Thr-Lft	0				
	Through	1066	Through	2	1167.54	1168	584	
			Thr-Rt	0				0
	Right	101	Right	0		0	101	
			CODE	2				
Southbound	Left	195	Left	2	195	195	107	0
			Thr-Lft	0				
	Through	3074	Through	4	3117.1	3117	779	
			Thr-Rt	0				779
	Right	43	Right	0		0	43	
			CODE	2				
Eastbound	Left	0	Left	0	0	0	0	0
			Thr-Lft	0				
	Through	991	Through	3	1373.72	1374	458	
			Thr-Rt	0				458
	Right	383	Right	0		0	383	
			CODE	2				
							TOTAL	1704
			4 PHASES				CAPACITY	1560
							V/C	1.09

APPROACH VOLUMES

Northbound	In	3261.	Southbound	In	3312.3
	Out	3936.		Out	2716.94
Westbound	In	1647	Eastbound	In	1373.72
	Out	1461.		Out	1478.64

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	830
SB Thr + NB Lft	983
WB Thr + EB Lft	584
EB Thr + WB Lft	722

APPROACH CALCULATIONS

Approach V/C	13%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	723
Shared Right	1
Approach Phasing	0
Approach V/C	17%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	584
Shared Right	1
Approach Phasing	0
Approach V/C	50%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	779
Shared Right	1
Approach Phasing	0
Approach V/C	29%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	458
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & REDONDO BEACH BLVD
Calculation Form 1, page 16 — AM PEAK 2010 VOLUMES + STATION GENERATED TRAFFIC

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	10	Left	1	10	10	10	0
			Thr-Lft	0				
	Through	3737	Through	3	4284.78	4285	1428	
			Thr-Rt	0				1428
	Right	548	Right	0		0	548	
			CODE	2				
Westbound	Left	150	Left	1	150	0	75	0
			Thr-Lft	1				
	Through	294	Through	1	476.02	444	148	
			Thr-Rt	0				182
	Right	182	Right	1		182	182	
			CODE	3				
Southbound	Left	80	Left	1	80	80	80	80
			Thr-Lft	0				
	Through	1273	Through	4	1321.8	1322	330	
			Thr-Rt	0				0
	Right	49	Right	0		0	49	
			CODE	2				
Eastbound	Left	89	Left	1	89	0	45	0
			Thr-Lft	1				
	Through	689	Through	1	699.06	788	263	
			Thr-Rt	0				263
	Right	10	Right	0		0	10	
			CODE	3				
							TOTAL	1953
			4 PHASES				CAPACITY	1560
							V/C	1.25

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1508
SB Thr + NB Lft	340
WB Thr + EB Lft	227
EB Thr + WB Lft	338

APPROACH CALCULATIONS

Approach V/C	92%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1428
Shared Right	1
Approach Phasing	0
Approach V/C	12%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	182
Shared Right	0
Approach Phasing	1
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	330
Shared Right	1
Approach Phasing	0
Approach V/C	17%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	263
Shared Right	1
Approach Phasing	1
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

APPROACH VOLUMES

Northbound	In	4294.	Southbound	In	1401.8
	Out	1432.		Out	4008.06
Westbound	In	626.0	Eastbound	In	788.12
	Out	1317.		Out	352.58

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & REDONDO BEACH BLVD
Calculation Form 1, page 16 — PM PEAK 2010 VOLUMES + STATION GENERATED TRAFFIC

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	100	Left	1	100	100	100	0
			Thr-Lft	0				
	Through	2177	Through	3	2544.22	2544	848	
			Thr-Rt	0				848
	Right	367	Right	0		0	367	
			CODE	2				
Westbound	Left	611	Left	1	611	0	306	0
			Thr-Lft	1				
	Through	610	Through	1	815	1221	407	
			Thr-Rt	0				407
	Right	205	Right	1		205	205	
			CODE	3				
Southbound	Left	182	Left	1	182	182	182	182
			Thr-Lft	0				
	Through	2765	Through	4	3016	3016	754	
			Thr-Rt	0				0
	Right	251	Right	0		0	251	
			CODE	2				
Eastbound	Left	162	Left	1	162	0	81	0
			Thr-Lft	1				
	Through	540	Through	1	569.74	732	244	
			Thr-Rt	0				244
	Right	29	Right	0		0	29	
			CODE	3				
							TOTAL	1681
			4 PHASES				CAPACITY	1560
							V/C	1.08

APPROACH VOLUMES

Northbound	In	2644.	Southbound	In	3197.78
	Out	3405.		Out	2544.26
Westbound	In	1426.	Eastbound	In	732
	Out	1089.		Out	961.04

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1030
SB Thr + NB Lft	854
WB Thr + EB Lft	488
EB Thr + WB Lft	550

APPROACH CALCULATIONS

Approach V/C	54%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	848
Shared Right	1
Approach Phasing	0
Approach V/C	26%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	407
Shared Right	0
Approach Phasing	1
Approach V/C	12%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	754
Shared Right	1
Approach Phasing	0
Approach V/C	16%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	244
Shared Right	1
Approach Phasing	1
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & 190TH ST
Calculation Form 1, page 16 — AM PEAK 2010 VOLUMES + STATION GENERATED TRAFFIC

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	212	Left	2	212	212	117	0
			Thr-Lft	0				
	Through	4080	Through	4	4348	4080	1020	
			Thr-Rt	0				1020
	Right	268	Right	1		268	268	
			CODE	2				
Westbound	Left	195	Left	2	195	195	107	107
			Thr-Lft	0				
	Through	806	Through	2	1013.82	806	403	
			Thr-Rt	0				0
	Right	207	Right	1		207	207	
			CODE	2				
Southbound	Left	129	Left	2	129	129	71	71
			Thr-Lft	0				
	Through	1891	Through	4	2066.68	1891	473	
			Thr-Rt	0				0
	Right	176	Right	1		176	176	
			CODE	2				
Eastbound	Left	312	Left	2	312	312	172	0
			Thr-Lft	0				
	Through	1373	Through	2	1751.5	1373	686	
			Thr-Rt	0				686
	Right	379	Right	1		379	379	
			CODE	2				
							TOTAL	1885
			4 PHASES				CAPACITY	1560
							V/C	1.21

APPROACH VOLUMES

Northbound	In	4560	Southbound	In	2196
	Out	2465		Out	4599.72
Westbound	In	1208.	Eastbound	In	2063.82
	Out	1769.		Out	1194.1

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1091
SB Thr + NB Lft	589
WB Thr + EB Lft	575
EB Thr + WB Lft	794

APPROACH CALCULATIONS

Approach V/C	65%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1020
Shared Right	0
Approach Phasing	0
Approach V/C	7%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	403
Shared Right	0
Approach Phasing	0
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	473
Shared Right	0
Approach Phasing	0
Approach V/C	44%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	686
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & 190TH ST
Calculation Form 1, page 16 — PM PEAK 2010 VOLUMES + STATION GENERATED TRAFFIC

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	536	Left	2	536	536	295	295
			Thr-Lft	0				
	Through	3663	Through	4	4033	3663	916	
			Thr-Rt	0				0
	Right	370	Right	1		370	370	
			CODE	2				
Westbound	Left	418	Left	2	418	418	230	0
			Thr-Lft	0				
	Through	1648	Through	2	1837.32	1648	824	
			Thr-Rt	0				824
	Right	189	Right	1		189	189	
			CODE	2				
Southbound	Left	210	Left	2	210	210	115	0
			Thr-Lft	0				
	Through	3005	Through	4	3401.5	3005	751	
			Thr-Rt	0				751
	Right	397	Right	1		397	397	
			CODE	2				
Eastbound	Left	270	Left	2	270	270	148	148
			Thr-Lft	0				
	Through	800	Through	2	1292.32	800	400	
			Thr-Rt	0				0
	Right	492	Right	1		492	492	
			CODE	2				
							TOTAL	2018
			4 PHASES				CAPACITY	1560
							V/C	1.29

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1031
SB Thr + NB Lft	1046
WB Thr + EB Lft	972
EB Thr + WB Lft	722

APPROACH CALCULATIONS

Approach V/C	19%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	916
Shared Right	0
Approach Phasing	0
Approach V/C	53%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	824
Shared Right	0
Approach Phasing	0
Approach V/C	48%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	751
Shared Right	0
Approach Phasing	0
Approach V/C	10%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	492
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

APPROACH VOLUMES

Northbound	In	4569	Southbound	In	3611.34
	Out	3915		Out	4121.72
Westbound	In	2255.	Eastbound	In	1561.94
	Out	1380.		Out	2580.72

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & REDONDO BEACH BLVD
Calculation Form 1, page 16 — AM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	8	Left	1	8	8	8	0
			Thr-Lft	0				
	Through	3055	Through	3	3504	3504	1168	
			Thr-Rt	0				1168
	Right	449	Right	0		0	449	
			CODE	2				
Westbound	Left	123	Left	1	123	0	62	0
			Thr-Lft	1				
	Through	241	Through	1	389	364	121	
			Thr-Rt	0				148
	Right	148	Right	1		148	148	
			CODE	3				
Southbound	Left	65	Left	1	65	65	65	65
			Thr-Lft	0				
	Through	1042	Through	4	1082	1082	271	
			Thr-Rt	0				0
	Right	40	Right	0		0	40	
			CODE	2				
Eastbound	Left	73	Left	1	73	0	37	0
			Thr-Lft	1				
	Through	565	Through	1	573	646	215	
			Thr-Rt	0				215
	Right	8	Right	0		0	8	
			CODE	3				
							TOTAL	1596
			4 PHASES				CAPACITY	1560
							V/C	1.02

APPROACH VOLUMES

Northbound	In	3512	Southbound	In	1147
	Out	1173		Out	3276
Westbound	In	512	Eastbound	In	646
	Out	1079		Out	289

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1233
SB Thr + NB Lft	279
WB Thr + EB Lft	185
EB Thr + WB Lft	277

APPROACH CALCULATIONS

Approach V/C	75%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1168
Shared Right	1
Approach Phasing	0
Approach V/C	9%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	148
Shared Right	0
Approach Phasing	1
Approach V/C	4%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	271
Shared Right	1
Approach Phasing	0
Approach V/C	14%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	215
Shared Right	1
Approach Phasing	1
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & REDONDO BEACH BLVD
Calculation Form 1, page 16 — PM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	82	Left	1	82	82	82	0
			Thr-Lft	0				
	Through	1783	Through	3	2084	2084	695	
			Thr-Rt	0				695
	Right	301	Right	0		0	301	
			CODE	2				
Westbound	Left	501	Left	1	501	0	251	0
			Thr-Lft	1				
	Through	500	Through	1	667	1001	334	
			Thr-Rt	0				334
	Right	167	Right	1		167	167	
			CODE	3				
Southbound	Left	149	Left	1	149	149	149	149
			Thr-Lft	0				
	Through	2259	Through	4	2464	2464	616	
			Thr-Rt	0				0
	Right	205	Right	0		0	205	
			CODE	2				
Eastbound	Left	133	Left	1	133	0	67	0
			Thr-Lft	1				
	Through	443	Through	1	467	600	200	
			Thr-Rt	0				200
	Right	24	Right	0		0	24	
			CODE	3				
							TOTAL	1377
			4 PHASES				CAPACITY	1560
							V/C	0.88

APPROACH VOLUMES

Northbound	In	2166	Southbound	In	2613
	Out	2784		Out	2083
Westbound	In	1168	Eastbound	In	600
	Out	893		Out	787

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	844
SB Thr + NB Lft	698
WB Thr + EB Lft	400
EB Thr + WB Lft	451

APPROACH CALCULATIONS

Approach V/C	45%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	695
Shared Right	1
Approach Phasing	0
Approach V/C	21%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	334
Shared Right	0
Approach Phasing	1
Approach V/C	10%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	616
Shared Right	1
Approach Phasing	0
Approach V/C	13%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	200
Shared Right	1
Approach Phasing	1
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & REDONDO BEACH BLVD
Calculation Form 1, page 16 — AM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	10	Left	1	10	10	10	0
			Thr-Lft	0				
	Through	3727	Through	3	4274.88	4275	1425	
			Thr-Rt	0				1425
	Right	548	Right	0		0	548	
			CODE	2				
Westbound	Left	150	Left	1	150	0	75	0
			Thr-Lft	1				
	Through	294	Through	1	474.58	444	148	
			Thr-Rt	0				181
	Right	181	Right	1		181	181	
			CODE	3				
Southbound	Left	79	Left	1	79	79	79	79
			Thr-Lft	0				
	Through	1271	Through	4	1320.04	1320	330	
			Thr-Rt	0				0
	Right	49	Right	0		0	49	
			CODE	2				
Eastbound	Left	89	Left	1	89	0	45	0
			Thr-Lft	1				
	Through	689	Through	1	699.06	788	263	
			Thr-Rt	0				263
	Right	10	Right	0		0	10	
			CODE	3				
							TOTAL	1948
			4 PHASES				CAPACITY	1560
							V/C	1.25

APPROACH VOLUMES

Northbound	In	4284.	Southbound	In	1399.34
	Out	1431.		Out	3996.72
Westbound	In	624.6	Eastbound	In	788.12
	Out	1316.		Out	352.58

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1504
SB Thr + NB Lft	340
WB Thr + EB Lft	225
EB Thr + WB Lft	338

APPROACH CALCULATIONS

Approach V/C	91%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1425
Shared Right	1
Approach Phasing	0
Approach V/C	12%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	181
Shared Right	0
Approach Phasing	1
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	330
Shared Right	1
Approach Phasing	0
Approach V/C	17%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	263
Shared Right	1
Approach Phasing	1
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & REDONDO BEACH BLVD
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	100	Left	1	100	100	100	0
			Thr-Lft	0				
	Through	2175	Through	3	2542.48	2542	847	
			Thr-Rt	0				847
	Right	367	Right	0		0	367	
			CODE	2				
Westbound	Left	611	Left	1	611	0	306	0
			Thr-Lft	1				
	Through	610	Through	1	813.74	1221	407	
			Thr-Rt	0				407
	Right	204	Right	1		204	204	
			CODE	3				
Southbound	Left	182	Left	1	182	182	182	182
			Thr-Lft	0				
	Through	2756	Through	4	3006.08	3006	752	
			Thr-Rt	0				0
	Right	250	Right	0		0	250	
			CODE	2				
Eastbound	Left	162	Left	1	162	0	81	0
			Thr-Lft	1				
	Through	540	Through	1	569.74	732	244	
			Thr-Rt	0				244
	Right	29	Right	0		0	29	
			CODE	3				
							TOTAL	1680
			4 PHASES				CAPACITY	1560
							V/C	1.08

APPROACH VOLUMES

Northbound	In	2642.	Southbound	In	3187.86
	Out	3396.		Out	2541.26
Westbound	In	1424.	Eastbound	In	732
	Out	1089.		Out	960.14

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1029
SB Thr + NB Lft	852
WB Thr + EB Lft	488
EB Thr + WB Lft	550

APPROACH CALCULATIONS

Approach V/C	54%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	847
Shared Right	1
Approach Phasing	0
Approach V/C	26%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	407
Shared Right	0
Approach Phasing	1
Approach V/C	12%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	752
Shared Right	1
Approach Phasing	0
Approach V/C	16%
Shared Left	1
PCE Value	1.0
Thr-Rt Max	244
Shared Right	1
Approach Phasing	1
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & SEPULVADA BLVD
Calculation Form 1, page 16 — AM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	115	Left	2	115	115	63	0
			Thr-Lft	0				
	Through	2130	Through	3	2563	2563	854	
			Thr-Rt	0				854
	Right	433	Right	0		0	433	
			CODE	2				
Westbound	Left	409	Left	2	409	409	225	225
			Thr-Lft	0				
	Through	741	Through	4	1063	741	185	
			Thr-Rt	0				0
	Right	322	Right	1		322	322	
			CODE	2				
Southbound	Left	113	Left	2	113	113	62	62
			Thr-Lft	0				
	Through	1442	Through	3	1527	1442	481	
			Thr-Rt	0				0
	Right	85	Right	1		85	85	
			CODE	2				
Eastbound	Left	323	Left	2	323	323	178	0
			Thr-Lft	0				
	Through	1063	Through	3	1154	1063	354	
			Thr-Rt	0				354
	Right	91	Right	1		91	91	
			CODE	2				
							TOTAL	1496
			4 PHASES				CAPACITY	1560
							V/C	0.96

CRITICAL VOL. COMPARISON	
NB Thr + SB Lft	916
SB Thr + NB Lft	544
WB Thr + EB Lft	500
EB Thr + WB Lft	579

APPROACH CALCULATIONS	
Approach V/C	55%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	854
Shared Right	1
Approach Phasing	0
Approach V/C	14%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	322
Shared Right	0
Approach Phasing	0
Approach V/C	4%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	481
Shared Right	0
Approach Phasing	0
Approach V/C	23%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	354
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

APPROACH VOLUMES

Northbound	In	2678	Southbound	In	1640
	Out	1942		Out	2775
Westbound	In	1472	Eastbound	In	1477
	Out	1609		Out	941

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & SEPULVADA BLVD
Calculation Form 1, page 16 — PM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	325	Left	2	325	325	179	0
			Thr-Lft	0				
	Through	1982	Through	3	2764	2764	921	
			Thr-Rt	0				921
	Right	782	Right	0		0	782	
			CODE	2				
Westbound	Left	815	Left	2	815	815	448	448
			Thr-Lft	0				
	Through	1321	Through	4	1558	1321	330	
			Thr-Rt	0				0
	Right	237	Right	1		237	237	
			CODE	2				
Southbound	Left	367	Left	2	367	367	202	202
			Thr-Lft	0				
	Through	2318	Through	3	2655	2318	773	
			Thr-Rt	0				0
	Right	337	Right	1		337	337	
			CODE	2				
Eastbound	Left	300	Left	2	300	300	165	0
			Thr-Lft	0				
	Through	914	Through	3	1040	914	305	
			Thr-Rt	0				305
	Right	126	Right	1		126	126	
			CODE	2				
							TOTAL	1876
			4 PHASES				CAPACITY	1560
							V/C	1.20

APPROACH VOLUMES

Northbound	In	3089	Southbound	In	3022
	Out	3259		Out	2519
Westbound	In	2373	Eastbound	In	1340
	Out	2063		Out	1983

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1123
SB Thr + NB Lft	951
WB Thr + EB Lft	495
EB Thr + WB Lft	753

APPROACH CALCULATIONS

Approach V/C	59%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	921
Shared Right	1
Approach Phasing	0
Approach V/C	29%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	330
Shared Right	0
Approach Phasing	0
Approach V/C	13%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	773
Shared Right	0
Approach Phasing	0
Approach V/C	20%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	305
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & SEPULVADA BLVD
Calculation Form 1, page 16 — AM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	140	Left	2	140	140	77	0
			Thr-Lft	0				
	Through	2599	Through	3	3126.86	3127	1042	
			Thr-Rt	0				1042
	Right	528	Right	0		0	528	
			CODE	2				
Westbound	Left	499	Left	2	499	499	274	274
			Thr-Lft	0				
	Through	904	Through	4	1296.86	904	226	
			Thr-Rt	0				0
	Right	393	Right	1		393	393	
			CODE	2				
Southbound	Left	138	Left	2	138	138	76	76
			Thr-Lft	0				
	Through	1759	Through	3	1862.94	1759	586	
			Thr-Rt	0				0
	Right	104	Right	1		104	104	
			CODE	2				
Eastbound	Left	394	Left	2	394	394	217	0
			Thr-Lft	0				
	Through	1297	Through	3	1407.88	1297	432	
			Thr-Rt	0				432
	Right	111	Right	1		111	111	
			CODE	2				
							TOTAL	1825
			4 PHASES				CAPACITY	1560
							V/C	1.17

APPROACH VOLUMES

Northbound	In	3267.	Southbound	In	2000.8
	Out	2369.		Out	3385.5
Westbound	In	1795.	Eastbound	In	1801.94
	Out	1962.		Out	1148.02

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1118
SB Thr + NB Lft	664
WB Thr + EB Lft	610
EB Thr + WB Lft	707

APPROACH CALCULATIONS

Approach V/C	67%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1042
Shared Right	1
Approach Phasing	0
Approach V/C	18%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	393
Shared Right	0
Approach Phasing	0
Approach V/C	5%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	586
Shared Right	0
Approach Phasing	0
Approach V/C	28%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	432
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — AM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	80	Left	1	80	80	80	0
			Thr-Lft	0				
	Through	2064	Through	4	2217	2217	554	
			Thr-Rt	0				554
	Right	153	Right	0		0	153	
			CODE	2				
Westbound	Left	91	Left	1	91	91	91	91
			Thr-Lft	0				
	Through	381	Through	2	725	381	191	
			Thr-Rt	0				0
	Right	344	Right	1		344	344	
			CODE	2				
Southbound	Left	619	Left	2	619	619	340	340
			Thr-Lft	0				
	Through	1093	Through	3	1161	1093	364	
			Thr-Rt	0				0
	Right	68	Right	1		68	68	
			CODE	2				
Eastbound	Left	132	Left	1	132	132	132	0
			Thr-Lft	0				
	Through	997	Through	2	1164	1164	582	
			Thr-Rt	0				582
	Right	167	Right	0		0	167	
			CODE	2				
							TOTAL	1568
			4 PHASES				CAPACITY	1560
							V/C	1.00

APPROACH VOLUMES

Northbound	In	2297	Southbound	In	1780
	Out	1351		Out	2540
Westbound	In	816	Eastbound	In	1296
	Out	1769		Out	529

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	895
SB Thr + NB Lft	444
WB Thr + EB Lft	476
EB Thr + WB Lft	673

APPROACH CALCULATIONS

Approach V/C	36%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	554
Shared Right	1
Approach Phasing	0
Approach V/C	6%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	344
Shared Right	0
Approach Phasing	0
Approach V/C	22%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	364
Shared Right	0
Approach Phasing	0
Approach V/C	37%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	582
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & SEPULVADA BLVD
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	397	Left	2	397	397	218	0
			Thr-Lft	0				
	Through	2418	Through	3	3372.08	3372	1124	
			Thr-Rt	0				1124
	Right	954	Right	0		0	954	
			CODE	2				
Westbound	Left	994	Left	2	994	994	547	547
			Thr-Lft	0				
	Through	1612	Through	4	1900.76	1612	403	
			Thr-Rt	0				0
	Right	289	Right	1		289	289	
			CODE	2				
Southbound	Left	448	Left	2	448	448	246	246
			Thr-Lft	0				
	Through	2828	Through	3	3239.1	2828	943	
			Thr-Rt	0				0
	Right	411	Right	1		411	411	
			CODE	2				
Eastbound	Left	366	Left	2	366	366	201	0
			Thr-Lft	0				
	Through	1115	Through	3	1268.8	1115	372	
			Thr-Rt	0				372
	Right	154	Right	1		154	154	
			CODE	2				
							TOTAL	2289
			4 PHASES				CAPACITY	1560
							V/C	1.47

APPROACH VOLUMES

Northbound	In	3768.	Southbound	In	3686.84
	Out	3975.		Out	3073.18
Westbound	In	2895.	Eastbound	In	1634.8
	Out	2516.		Out	2419.26

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1370
SB Thr + NB Lft	1161
WB Thr + EB Lft	604
EB Thr + WB Lft	919

APPROACH CALCULATIONS

Approach V/C	72%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1124
Shared Right	1
Approach Phasing	0
Approach V/C	35%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	403
Shared Right	0
Approach Phasing	0
Approach V/C	16%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	943
Shared Right	0
Approach Phasing	0
Approach V/C	24%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	372
Shared Right	0
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — PM PEAK HOUR-EXISTING BASE VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	243	Left	1	243	243	243	243
			Thr-Lft	0				
	Through	1842	Through	4	1942	1942	486	
			Thr-Rt	0				0
	Right	100	Right	0		0	100	
			CODE	2				
Westbound	Left	259	Left	1	259	259	259	0
			Thr-Lft	0				
	Through	931	Through	2	1738	931	466	
			Thr-Rt	0				807
	Right	807	Right	1		807	807	
			CODE	2				
Southbound	Left	429	Left	2	429	429	236	0
			Thr-Lft	0				
	Through	2080	Through	3	2270	2080	693	
			Thr-Rt	0				693
	Right	190	Right	1		190	190	
			CODE	2				
Eastbound	Left	117	Left	1	117	117	117	117
			Thr-Lft	0				
	Through	433	Through	2	573	573	287	
			Thr-Rt	0				0
	Right	140	Right	0		0	140	
			CODE	2				
							TOTAL	1860
			4	PHASES			CAPACITY	1560
							V/C	1.19

APPROACH VOLUMES

Northbound	In	2185	Southbound	In	2699
	Out	2479		Out	2766
Westbound	In	1997	Eastbound	In	690
	Out	962		Out	1364

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	721
SB Thr + NB Lft	936
WB Thr + EB Lft	924
EB Thr + WB Lft	546

APPROACH CALCULATIONS

Approach V/C	16%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	486
Shared Right	1
Approach Phasing	0
Approach V/C	52%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	807
Shared Right	0
Approach Phasing	0
Approach V/C	44%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	693
Shared Right	0
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	287
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — AM PEAK HOUR-WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	98	Left	1	98	98	98	0
			Thr-Lft	0				
	Through	2518	Through	4	2704.74	2705	676	
			Thr-Rt	0				676
	Right	187	Right	0		0	187	
			CODE	2				
Westbound	Left	111	Left	1	111	111	111	111
			Thr-Lft	0				
	Through	465	Through	2	884.5	465	232	
			Thr-Rt	0				0
	Right	420	Right	1		420	420	
			CODE	2				
Southbound	Left	755	Left	2	755	755	415	415
			Thr-Lft	0				
	Through	1333	Through	3	1416.42	1333	444	
			Thr-Rt	0				0
	Right	83	Right	1		83	83	
			CODE	2				
Eastbound	Left	161	Left	1	161	161	161	0
			Thr-Lft	0				
	Through	1216	Through	2	1420.08	1420	710	
			Thr-Rt	0				710
	Right	204	Right	0		0	204	
			CODE	2				
							TOTAL	1913
			4 PHASES				CAPACITY	1560
							V/C	1.23

APPROACH VOLUMES

Northbound	In	2802.	Southbound	In	2171.6
	Out	1648.		Out	3098.8
Westbound	In	995.5	Eastbound	In	1581.12
	Out	2158.		Out	645.38

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1092
SB Thr + NB Lft	542
WB Thr + EB Lft	581
EB Thr + WB Lft	821

APPROACH CALCULATIONS

Approach V/C	43%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	676
Shared Right	1
Approach Phasing	0
Approach V/C	7%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	420
Shared Right	0
Approach Phasing	0
Approach V/C	27%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	444
Shared Right	0
Approach Phasing	0
Approach V/C	46%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	710
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — PM PEAK HOUR WITH 2010 VOLUMES

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	296	Left	1	296	296	296	296
			Thr-Lft	0				
	Through	2247	Through	4	2369.24	2369	592	
			Thr-Rt	0				0
	Right	122	Right	0		0	122	
			CODE	2				
Westbound	Left	316	Left	1	316	316	316	0
			Thr-Lft	0				
	Through	1136	Through	2	2120.36	1136	568	
			Thr-Rt	0				985
	Right	985	Right	1		985	985	
			CODE	2				
Southbound	Left	523	Left	2	523	523	288	0
			Thr-Lft	0				
	Through	2538	Through	3	2769.4	2538	846	
			Thr-Rt	0				846
	Right	232	Right	1		232	232	
			CODE	2				
Eastbound	Left	143	Left	1	143	143	143	143
			Thr-Lft	0				
	Through	528	Through	2	699.06	699	350	
			Thr-Rt	0				0
	Right	171	Right	0		0	171	
			CODE	2				
							TOTAL	2270
			4 PHASES				CAPACITY	1560
							V/C	1.45

APPROACH VOLUMES

Northbound	In	2665.	Southbound	In	3292.78
	Out	3024.		Out	3374.52
Westbound	In	2436.	Eastbound	In	841.8
	Out	1173.		Out	1664.08

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	880
SB Thr + NB Lft	1142
WB Thr + EB Lft	1127
EB Thr + WB Lft	666

APPROACH CALCULATIONS

Approach V/C	19%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	592
Shared Right	1
Approach Phasing	0
Approach V/C	63%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	985
Shared Right	0
Approach Phasing	0
Approach V/C	54%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	846
Shared Right	0
Approach Phasing	0
Approach V/C	9%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	350
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — PM PEAK 2010 VOLUMES + LOMITA ALTERNATIVE

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	296	Left	1	296	296	296	296
			Thr-Lft	0				
	Through	2247	Through	4	2370.24	2370	593	
			Thr-Rt	0				0
	Right	123	Right	0		0	123	
			CODE	2				
Westbound	Left	323	Left	1	323	323	323	0
			Thr-Lft	0				
	Through	1162	Through	2	2169	1162	581	
			Thr-Rt	0				1007
	Right	1007	Right	1		1007	1007	
			CODE	2				
Southbound	Left	529	Left	2	529	529	291	0
			Thr-Lft	0				
	Through	2538	Through	3	2769.4	2538	846	
			Thr-Rt	0				846
	Right	232	Right	1		232	232	
			CODE	2				
Eastbound	Left	143	Left	1	143	143	143	143
			Thr-Lft	0				
	Through	534	Through	2	704.8	705	352	
			Thr-Rt	0				0
	Right	171	Right	0		0	171	
			CODE	2				
							TOTAL	2292
			4 PHASES				CAPACITY	1560
							V/C	1.47

APPROACH VOLUMES

Northbound	In	2666.	Southbound	In	3298.4
	Out	3031.		Out	3396.98
Westbound	In	2492	Eastbound	In	847.54
	Out	1186		Out	1690.26

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	884
SB Thr + NB Lft	1142
WB Thr + EB Lft	1150
EB Thr + WB Lft	675

APPROACH CALCULATIONS

Approach V/C	19%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	593
Shared Right	1
Approach Phasing	0
Approach V/C	65%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	1007
Shared Right	0
Approach Phasing	0
Approach V/C	54%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	846
Shared Right	0
Approach Phasing	0
Approach V/C	9%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	352
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — AM PEAK 2010 VOLUMES + LOMITA ALTERNATIVE

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	98	Left	1	98	98	98	0
			Thr-Lft	0				
	Through	2518	Through	4	2710.08	2710	678	
			Thr-Rt	0				678
	Right	192	Right	0		0	192	
			CODE	2				
Westbound	Left	113	Left	1	113	113	113	113
			Thr-Lft	0				
	Through	472	Through	2	898	472	236	
			Thr-Rt	0				0
	Right	426	Right	1		426	426	
			CODE	2				
Southbound	Left	776	Left	2	776	776	427	427
			Thr-Lft	0				
	Through	1333	Through	3	1416.42	1333	444	
			Thr-Rt	0				0
	Right	83	Right	1		83	83	
			CODE	2				
Eastbound	Left	161	Left	1	161	161	161	0
			Thr-Lft	0				
	Through	1250	Through	2	1453.74	1454	727	
			Thr-Rt	0				727
	Right	204	Right	0		0	204	
			CODE	2				
							TOTAL	1944
			4 PHASES				CAPACITY	1560
							V/C	1.25

APPROACH VOLUMES

Northbound	In	2807.	Southbound	In	2192.42
	Out	1650.		Out	3105.12
Westbound	In	1011	Eastbound	In	1614.78
	Out	2218		Out	652.56

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1104
SB Thr + NB Lft	542
WB Thr + EB Lft	587
EB Thr + WB Lft	840

APPROACH CALCULATIONS

Approach V/C	43%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	678
Shared Right	1
Approach Phasing	0
Approach V/C	7%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	426
Shared Right	0
Approach Phasing	0
Approach V/C	27%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	444
Shared Right	0
Approach Phasing	0
Approach V/C	47%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	727
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — AM PEAK 2010 VOLUMES + SKYPARK ALTERNATIVE

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	100	Left	1	100	100	100	0
			Thr-Lft	0				
	Through	2586	Through	4	2778	2778	695	
			Thr-Rt	0				695
	Right	192	Right	0		0	192	
			CODE	2				
Westbound	Left	132	Left	1	132	132	132	132
			Thr-Lft	0				
	Through	465	Through	2	884.5	465	232	
			Thr-Rt	0				0
	Right	420	Right	1		420	420	
			CODE	2				
Southbound	Left	755	Left	2	755	755	415	415
			Thr-Lft	0				
	Through	1574	Through	3	1656.96	1574	525	
			Thr-Rt	0				0
	Right	83	Right	1		83	83	
			CODE	2				
Eastbound	Left	161	Left	1	161	161	161	0
			Thr-Lft	0				
	Through	1216	Through	2	1456.34	1456	728	
			Thr-Rt	0				728
	Right	240	Right	0		0	240	
			CODE	2				
							TOTAL	1970
			4 PHASES				CAPACITY	1560
							V/C	1.26

APPROACH VOLUMES

Northbound	In	2878	Southbound	In	2412.14
	Out	1946		Out	3166.72
Westbound	In	1016.	Eastbound	In	1617.38
	Out	2163.		Out	647.78

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	1110
SB Thr + NB Lft	625
WB Thr + EB Lft	581
EB Thr + WB Lft	860

APPROACH CALCULATIONS

Approach V/C	45%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	695
Shared Right	1
Approach Phasing	0
Approach V/C	8%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	420
Shared Right	0
Approach Phasing	0
Approach V/C	27%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	525
Shared Right	0
Approach Phasing	0
Approach V/C	47%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	728
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0

DKS ASSOCIATES CAPACITY CALCULATION

INTCAP 3.0
Circular 212 Planning Method — HAWTHORNE AVE & LOMITA BLVD
Calculation Form 1, page 16 — PM PEAK 2010 VOLUMES + SKYPARK ALTERNATIVE

DIRECTION	VOLUMES		LANES		OPPOSING AND PCE	TOTAL VOLUME	LANE VOLUME	CRITICAL VOLUMES
Northbound	Left	326	Left	1	326	326	326	326
			Thr-Lft	0				
	Through	2478	Through	4	2614.24	2614	654	
			Thr-Rt	0				0
	Right	136	Right	0		0	136	
			CODE	2				
Westbound	Left	322	Left	1	322	322	322	0
			Thr-Lft	0				
	Through	1136	Through	2	2120.36	1136	568	
			Thr-Rt	0				985
	Right	985	Right	1		985	985	
			CODE	2				
Southbound	Left	523	Left	2	523	523	288	0
			Thr-Lft	0				
	Through	2589	Through	3	2820.4	2589	863	
			Thr-Rt	0				863
	Right	232	Right	1		232	232	
			CODE	2				
Eastbound	Left	143	Left	1	143	143	143	143
			Thr-Lft	0				
	Through	528	Through	2	703.06	703	352	
			Thr-Rt	0				0
	Right	175	Right	0		0	175	
			CODE	2				
							TOTAL	2317
			4 PHASES				CAPACITY	1560
							V/C	1.49

APPROACH VOLUMES

Northbound	In	2940.	Southbound	In	3343.78
	Out	3085.		Out	3605.52
Westbound	In	2442.	Eastbound	In	845.8
	Out	1187.		Out	1694.08

CRITICAL VOL. COMPARISON

NB Thr + SB Lft	941
SB Thr + NB Lft	1189
WB Thr + EB Lft	1127
EB Thr + WB Lft	674

APPROACH CALCULATIONS

Approach V/C	21%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	654
Shared Right	1
Approach Phasing	0
Approach V/C	63%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	985
Shared Right	0
Approach Phasing	0
Approach V/C	55%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	863
Shared Right	0
Approach Phasing	0
Approach V/C	9%
Shared Left	0
PCE Value	1.2
Thr-Rt Max	352
Shared Right	1
Approach Phasing	0
N-S Phase	2
E-W Phase	2
Adjusted Capacity	0