10

PROJECT MILESTONE

RTD

Metro Rail Project

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

PRELIMINARY DRAFT REPORT

For The Development Of Milestone 10:

FIXED FACILITIES

FEBRUARY 1983

PRELIMINARY

DRAFT REPORT

FOR

MILESTONE TEN

FIXED FACILITIES

Southern California Rapid Transit District
425 South Main Street
Los Angeles California 90013

The preparation of this report has been financed in part by grants from the U.S. Department of Transportation, Urban Mass Transportation Administration and the State of California.

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FOREWARD

Since June 1980, the Southern California Rapid District (SCRTD) has been engaged in the preliminary engneering phase of the Metro Rail Project. This project encompasses the preliminary design of an 18-mile subway, which will be the initial segment of Southern California's ultimate rapid transit network. As part of the 1976 Regional Transportation Development Program, Metro Rail is designed to help solve the increasing transportation problems of Los Angeles' high-density urban center -the Regional Core.

Before Metro Rail goes into operation, it will have passed through the five conventional stages of rapid transit development: (1) planning and alternative analysis, (2) preliminary engineering/environmental impact analysis, (3) final design, (4) construction, and (5) operational testing. The SCRTD successfully guided the project through the first phase from 1977 to 1980 and has since been engaged in the preliminary engineering phase. This is an intensive 2-1/2 year program during which the key elements of the subway project are to be defined and designed. This phase encompasses the selection of the precise route alignment (where the trains will go), the station location (where the trains will stop), the preliminary station designs (how the stations will look), the vehicle designers (what size the cars will be and how they will look) and construction methods.

Simultaneous with the design work will be an extensive, detailed analysis of the possible environmental impacts of this project on the affected communities along Metro Rail's Downtown to North Hollywood route.

Pending the acquisition of necessary capital funding, the final design phase will commence, followed by a four - to six-year construction period, and culminating with a system inspection and testing period.

The preliminary engineering work is on schedule with its mid-1983 planned completion. This intensive effort is under the policy direction of the District Board of Directors; Mike Lewis, President; Ruth E. Richter, Vice President; Jan Hall; Marvin L. Holen; Carl Meseck; Thomas G. Newsom; Nick Patsaouras; Jay Price; Charles H. Storing; Gordana Swanson; and George Takei.

The preliminary engineering program is proceeding under the general direction of the SCRTD General Manager, and under the administrative and technical management of the Metro Rail Project Manager/Chief Engineer. The District has also engaged the professional services of the following consulting firms for specialized consulting work: Daniel, Mann, Johnson, & Mendenhall/Parsons Brinckerhoff Quade and Douglas (ways and structures); Kaiser Engineers, Inc. (subsystems); Harry Weese & Associates (station design); Booz-Allen & Hamilton, Inc. (systems analysis); Sedway/Cooke (environmental analysis); The Converse Consultants (general geotechnical and seismic exploration); Lindvall-Richter & Associates (special geotechnical and seismic evaluation); Wilson-Ihrig Associates (noise and vibration); PSG/Waters (corrosion control); Gage-Babcock (fire protection); and Barton-Aschman (patronage estimates).

The Metro Rail Project Staff is responsible for direction and control of the consultants' work. Together, the Project Staff and the consultants form the Project Team.

During the next few months, decisions will be made on 12 vital interrelated points of project development - called "milestones' - that will lead to the ultimate system definition. These milestones represent successive incremental steps in establishing a final system plan that will be the basis for detailed design and construction. Each milestone is a major decision point for the Metro Rail Project. This report, the tenth of the 12 milestone reports, addresses the design of Fixed Facilities.

EXECUTIVE SUMMARY

The Metro Rail Project, undertaken by the Southern California Rapid Transit District, will have a significant role in the future development of the Los Angeles region. Its impact will reach beyond giving the community an additional choice in how to get to work each day--such development initiates potential for a wider variety of lifestype, new housing options, greater employment opportunities and commercial expansion.

The project is currently in the preliminary engineering phase of an 18-mile initial segment of the ultimate rapid transit network. This phase of the project is scheduled for completion in mid-1983. Development of the project during preliminary engineering is being charted in 12 milestone reports, each corresponding to a vital, interrelated decision point of project development. To serve as a means of obtaining public input, extensive community participation programs have been established for each of the 12 milestones.

Milestone 3, Route Alignment Alternatives and Milestone 4, Station Location Alternatives provided the basis for making decisions on the locational aspects of the Project. The SCRTD Board, in adopting these two previous Milestones, has fixed the route alignment and the location of stations.

This report, Milestone 10 - Fixed Facilities, documents the design resulting from the "Preliminary Engineering" phase of the project. For stations, this means that the number, size and location, of all basic elements is determined including surface provisions for park-and-ride, kiss-and-ride, bus facilities, and pedestrian access. The same level of determinations is made for the other fixed facilities in the system. For the alignment, the exact horizontal and vertical location of the tracks is plotted and related track structures such as crossovers and pocket tracks are determined. The design of yard and maintenance facilities is defined and the general construction methods to be used have been selected.

The conclusions reached in Milestone 10 will define all the essential design requirements and limitations which will provide the framework for the next stage of design, "Continuing Preliminary Engineering." During the Continuing Preliminary Engineering phase all systems, materials, quantities, qualities, sizes, and finishes are defined. Then during Final Design contract drawings and documents for issuance to construction contractors for bidding are prepared.

Milestone 10, Fixed Facilities is presented in five chapters. The background of the project and the Community Participation Program are presented in Chapter I. Chapter II introduces the reader to the various elements of station definitive design and then discusses each station individually presenting the recommended definitive design conclusions. For the Preliminary Draft Report, "footprint" plans are utilized indicating basic surface and station features. The later Draft Report will show a site plan, floor plan, and sections of each station. Each plan is accompanied by text describing the parameters leading to the station design. Chapter III describes Line, Yard and Maintenance Facilities, Miscellaneous Structures, and the Central Control Facility. Chapter IV presents the general construction methods to be used. The final chapter, Chapter V - Implementation, describes the next steps in the design of the system and outlines the recommended design and construction packages.

Recommendations and conclusions will be provided in the Milestone 10 Draft Report, subsequent to public meetings presenting the Preliminary Draft Report.

I. INTRODUCTION

I. INTRODUCTION

A. BACKGROUND

The California State Legislature created the Southern California Rapid Transit District (SCRTD) in 1964 with a legislative mandate to design, construct, and operate a rail rapid transit system within the Los Angeles County area. The success of such a program is dependent upon the availability of funds. On three occasions, SCRTD attempted to obtain countywide voter approval of rapid transit funding through increases in local sales taxes. Finally, in June 1974, Proposition 5 was passed by a solid majority, allowing for the use of a portion of state gasoline taxes for rapid transit development. This measure provided a local source of funds for SCRTD to begin its rail rapid transit development program in Los Angeles.

SCRTD also received federal funding in 1974 to evaluate 16 transit corridors in the Los Angeles metropolitan area. A Rapid Transit Advisory Committee (RTAC), composed of representatives of local and state agencies, guided this effort. The result of the evaluations was the identification of a rapid transit corridor that justified further development and evaluation.

Based on the results of the RTAC study, a Regional Transit Development Program was adopted by state and local jurisdictions. In September 1976, representatives of the City of Los Angeles, Caltrans, Southern California Association of Governments, the County of Los Angeles, and SCRTD applied to the Urban Mass Transportation Administration (UMTA) for assistance in financing the Regional Transportation Development Program. Designed to focus on transportation problems in the Los Angeles area, this four-part program included improvements to the existing street system, freeway transit projects, a proposed Downtown People Mover System, and an evaluation of alternative transit solutions for the Regional Core, the approximately 55-square-mile portion of the metropolitan center of Los Angeles. The program was immediately endorsed by the newly established Los Angeles County Transportation Commission in 1977.

Having received UMTA and Proposition 5 funds to evaluate transit corridors, SCRTD began in 1977 an in-depth analysis for 11 alternatives: a "status quo", five rail-bus, and five all-bus alternatives. The critical issues considered during the evaluation included:

- Which alternative could serve the largest number of people?
- Which corridor was experiencing the greatest surface traffic congestion without any plans for relief?
- Which alternative would reduce the greatest number of auto trips per day?
- Which corridor would best accommodate city and county land use plans?
- Which corridor might have the greatest impact on local air quality and energy savings?
- Which alternative would offer the best opportunity for efficient operations?
- Which alternative might provide the greatest economic benefits to the Los Angeles metropolitan area?

Concurrently, a comprehensive environmental impact analysis was conducted to examine the effects of each of the alternatives on the affected communities. In September 1979, the District Board of Directors selected its "preferred alternative" - an 18-mile rapid transit line extending from the Central Business District through the Wilshire Boulevard area to Fairfax Avenue, and northerly through Hollywood to North Hollywood.

The results of this analytical work were published in the final Alternatives Analysis/Environmental Impact Statement/Report (AA/EIS/EIR) and were submitted to UMTA for evaluation in April 1980. Two months later, SCRTD was allocated $12 million from UMTA and $3 million from local sources to begin the first phase of the 10-year project - preliminary engineering. This phase includes additional environmental analysis and the basic work leading to the final design and construction. UMTA noted that the Metro Rail Project is one of the most carefully studied and thoroughly justified projects of its kind in the country. It is the only new rail start for which the current federal and state administrations and congress have been willing to grant funds for preliminary engineering.

To date, combined government funding totals approximately $39 million which will allow completion of preliminary engineering. In addition, approximately $19 million has been received for Continuing Preliminary Engineering which will further advance designs.

B. COMMUNITY PARTICIPATION PROGRAM

An important factor in the development of the Metro Rail Project has been regionwide public support. This broad-based support has been demonstrated on numerous occasions. Particularly impressive were the public hearings conducted in 1979 when businessmen, officials, organizations, and citizens from all areas of Los Angeles testified that this project was the one with which to begin rail rapid transit system development in the Los Angeles community.

As part of the process of designing and developing the rail system, the SCRTD Metro Rail Project Team is now involved with land use planning, service criteria, social issues, energy concerns, and environmental impact and aesthetic considerations. The Project Team recognizes that designers and decision makers must be responsive to the public's needs and desires.

Given the history of experiences in other cities, it is most essential that the Team maintain sensitivity to public concerns by means of a public participation process before definitive plans are made. An extensive Community Participation Program has been established to meet that need. The purpose of the Program, as adopted by the SCRTD Board of Directors, is to provide interested, concerned, and affected citizens of the Los Angeles area a means to interact with and provide input to the Project Team, city and county officials, and the Board in regard to Metro Rail preliminary engineering issues as well as on related areas of planning and development.

The key element of this Program is the policy decision-making process, or Milestone Process. Community participants will help the Project Team make decisions on 12 basic, interrelated points of development - called milestones - that must be made during the preliminary engineering phase of the subway project. (These are the 12 most critical decision points of the project such as route selection, station location, vehicle design, and cost estimates.) It is through this mechanism that community participants will be informed of and able to provide input to the most significant aspects of the Metro Rail Project.

This does not mean, however, that the District Board of Directors and involved local elected officials will relinquish their respective responsibilities where decisions are concerned. But it does mean that important decisions will be made with the overall values, needs, and priorities of the community in mind. Since the greatest amount of public interest is expected from those who live and work in the areas most directly affected by the Metro Rail Project, the Community Participation Program has been structured to encourage and accommodate participation by means of three levels of organization:

- The Sector Level. This base organization level has been divided into six key geographical areas along the subway alignment, called "sectors". Representatives from each of these sectors will participate in the appropriate groups of the next level of organization. Special organized groups will be encouraged to participate at this level.

- The Segment Level. Sector representatives will form this second level of community organization. The sector representatives will be grouped into three geographic segments along the alignment (i.e., the Central Business District segment, the Wilshire segment, and the Fairfax/Hollywood/North Hollywood segment). They will discuss issues that affect these three broad segments of the alignment. Representatives from each segment group will participate in the next level of organization.

- The System Level. Segment participants will join other interested citizens, established organizations, and special interest groups in forming this final level of community organization. The system level will convene meetings on more general issues that concern all segment and sector level groups. This level will function as the primary group for conflict resolution of Community and Project Team concerns and recommendations.

The above structure has been developed for citizens to review, comment on, and have input to the 12 project milestone reports that relate directly to the design, engineering, and environmental impact of the Metro Rail Project. These milestones will be presented to the public in a series of community meetings throughout preliminary engineering. Through the community participation process, the public will have three opportunities to review and comment on the milestone ten proposal:

- Preliminary Draft Report. At the community meetings the Project Team will present its initial recommendations and discuss the issues. Copies of the preliminary draft report will be distributed to each participant for review and comment. Subsequent meetings may be necessary to answer participants' questions.

- Draft Report Meeting. A second public review will occur upon publication of a draft milestone report, which will include comments relative to the particular initial milestone data along with the Project Team's responses to that input.

- Board Hearing. Prior to adopting each milestone report, the SCRTD Board of Directors will convene a hearing, thus giving the participants a final opportunity to comment on that specific milestone.

These three key input points will occur in the overall community participation process, which will take approximately 45 to 60 days to implement for each milestone. This process will be conducted for each of the 12 milestones, thus meeting the mid-1983 preliminary engineering completion deadline. (See Table I-1 for a list of the project milestones and the general timetables for public reviews.)

The SCRTD believes that through the Community Participation Program, the Metro Rail Project design alternatives adopted at the conclusion of preliminary engineering will best represent the needs and desires of the community.

Table I-1

TIMETABLE FOR MILESTONE REVIEWS

Community Review Schedule		Milestone	Approximate SCRTD Board Hearing Date
March-April 1982	1.	Preliminary System/ Operational Plan	May 13, 1982
	2.	System Design Criteria	
May-June 1982	3.	Route Alignment	July 29, 1982
	4.	Station Location	
June-July 1982	5.	Relocation Policy	August 12, 1982
August-September 1982	6.	Development/Land Use	November 17, 1982
September-October 1982	7.	Safety, Security, System Assurance	November 10, 1982
November-December 1982	8.	Systems and Subsystems	January 13, 1983
January-February 1983	9.	Supporting Service	March 9, 1983
February-March 1983	10.	Fixed Facilities	April 14, 1983
March-April 1983	11.	Cost Estimate	May 11, 1983
May-June 1983	12.	System Plan	June 27, 1983

II. STATION DESIGN

II. STATION DESIGN

A. DEFINITIVE DESIGN DESCRIPTION

During the Milestone 4 process, a number of station location alternatives were studied and numerous public meetings were held. Subsequently a specific location for each station was fixed by the RTD Board, forming the basis for the next step: definitive design. It is during definitive design that the major decisions regarding station design are reached. Among these decisions are the number and location of entries in accordance with the anticipated patronage demand; the fare collection configuration--in an above-grade concourse or in a below-grade mezzanine; platform type and size; and the number/locations of required stairs, escalators, and elevators. In addition, and no less importantly, the substantial mechanical and electrical ancillary spaces must be accommodated as efficiently as possible in order to minimize capital, operating and maintenance expenses. A decision made regarding any of these elements affects other decisions. For example, the need to place an entrance at a specific location can require a particular mezzanine configuration; conversely, the selection of a particular mezzanine layout will affect where entries can be placed.

The first part of the chapter will describe in general terms the station design philosophy and its application to particular station elements such as entrances and other components. The remainder of the Chapter will present station specific information in support of station plans which illustrate the basic station and site layout.

1. Architectural Design

The overall design of each station will provide a site-specific approach to the basic disposition of all functional elements such as, mezzanines, platforms, and ancillary rooms. The basic architectural framework will be established by providing for a clear span structural shell (without columns) and a ceiling-mounted low velocity air distribution duct running down the length of the trainroom. In addition, all stairs, escalators, and elevators will be standardized with regard to finishes, spatial relations between vertical access devices, fare collection areas, mezzanines, and platforms. Lighting will be provided by a standard type of fixture although their placement may vary depending on the differing configurations provided in each station.

Materials and finishes will be determined in the next stage of design following Preliminary Engineering, from a limited palette of choices to assure high durability, and straightforward maintenance within a pre-established budget. Signing will be unified throughout the stations with regard to placement and types of messages. All ancillary and equipment rooms will be standardized with regard to functional layouts, materials, lighting, and other utility requirements to permit a unified program for maintenance and to minimize capital costs.

CLEARSPAN END MEZZANINE

SCRTD Metro Rail
HWA
January 1983

FIGURE II-1

2. Station Entrances

Plaza - type entrances and entrances within existing or planned developments are preferred; these "off-street" entrances have been planned to relate to business and urban activities in addition to serving their transit function. "On-street" entrances with stairs, escalators and elevators leading directly from the sidewalk to the fare collection areas have been avoided.

A number of factors have been considered in determining the number and location of entrances. Patronage projections and expected mode of arrival at each station are basic determinants. And, particular attention was given to rail--bus interface and pedestrian flows. Future development plans in each station area have been noted and the potential for joint development considered. Among the findings was the determination that expected patronage levels high enough to support the cost of constructing entrances at each end of a station (which requires two fare collection areas) occur only at the downtown stations and at the Wilshire/Fairfax Station. Particular site considerations also lead to a double-ended station at North Hollywood.

The next determination - to have one, or more than one, entrance into each mezzanine - is based on both the projected patronage levels and site specific considerations. The heavy bus transfers, for example, that will occur on each side of Vermont lead to planning for an entrance on each side. On the other hand, the lack of a suitable, economical location for a second entrance at the Wilshire/Normandie Station dictated only a single entrance.

Determination of the entrance orientation, e.g. whether the entry parallels, runs perpendicular or at some other angle to the major street, is usually the result of weighing several considerations. The existence of below surface utility lines, anticipated pedestrian flows, and the location of bus stops help determine the best orientation. When the entry is to be located on a developable parcel, consideration is given to maximizing the development potential of the parcel. This is usually accomplished by orienting the entry perpendicular to the major street thus leaving the maximum frontage along the major street available for development. A final consideration which relates to decisions concerning both entry locations and mezzanine configurations is the desire to maximize the potential for the construction of additional entrances either by SCRTD or by others, either during initial construction or in the future.

3. STATION COMPONENTS

In addition to the entrances that will be at or near the surface as discussed above, all stations will have the following components:

- Mezzanine/Concourse. This component functions as a transition area between the entrance to the station and the train platform. It may be at a point between the surface and the platforms(s) where it is called a mezzanine, or at street level where it is called a concourse. Wilshire/Alvarado is the only concourse type station currently being designed.

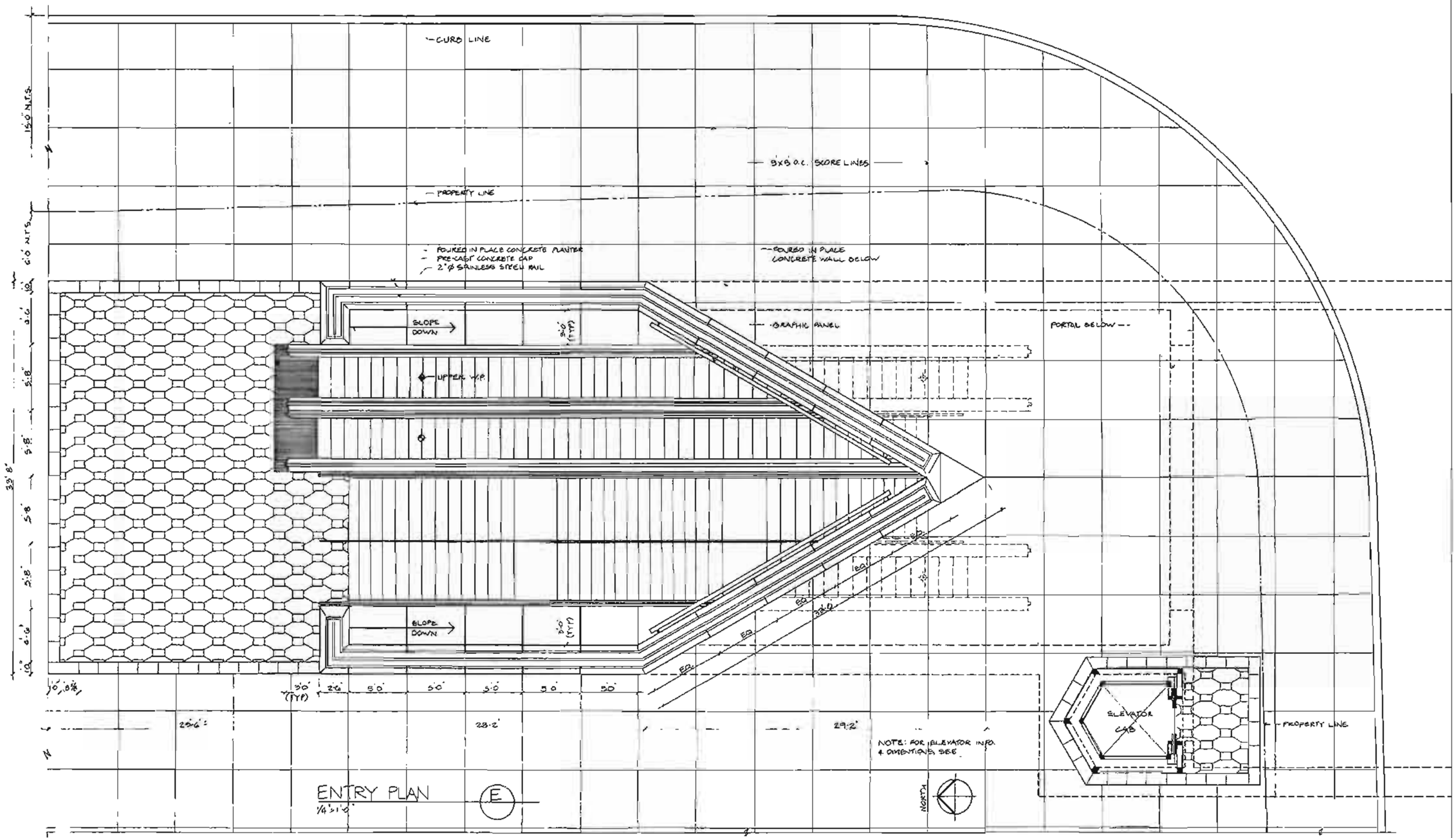
  The mezzanine/concourse provides space for various functions and typically includes fare collection, directional and information signage, and amenities for the patron's needs such as telephones and maps. The space that a patron enters prior to ticketing is designated a "free" area, with a corresponding space after ticketing designated "paid" area.

  The mezzanine may extend for the full length of the station (none of the Metro Rail starter line stations have this configuration), be at any point along the platform, or at one or both ends of the station. As mentioned above, the mezzanine configuration is determined by the expected patronage levels and the desired number and location of entrances.

- Platforms. Metro Rail station platforms will be approximately 450 feet long to accommodate trains consisting of six 75-foot-long cars. The platform configuration proposed for all stations is a "center" type, where a single platform is flanked by the two tracks. Patron orientation is much easier with a center platform since a directional decision can be made at the platform. Also the cost of a station with a center platform is typically lower compared to a side platform station.

- Equipment Spaces. Electrified rail transit stations require substantial amounts of space to house such elements as traction power substations, electrical distribution rooms, and fan rooms. These areas are typically located at track level beyond the platforms and at mezzanine level beyond the public spaces.

  Where a pocket track (a train storage track usually located between through tracks) or crossover track (a location where a train can switch from one track to another) is located at the end of a station, the station "box" - the area to be constructed by the cut-and-cover method - is extended. A traction power substation can often be located in this box over the crossover or pocket track. More than thirty different service and equipment rooms are needed to support the operation of the station. Certain spatial relationships must be maintained in the locating or placing of these rooms while at the same time keeping unusable space to a minimum.



REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY HWA Date ____
DRAWN BY M. HOMER Date 12-2-83
CHECKED BY Date ____

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ENVIRONMENTAL COLLABORATIVE, INC.
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General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD
APPROVAL RECOMMENDED ____ Reg. No ____
APPROVED ____ Date ____
MANAGER / CHIEF ENGINEER Reg. No. ____

ENTRY AT GRADE

CONTRACT NO.
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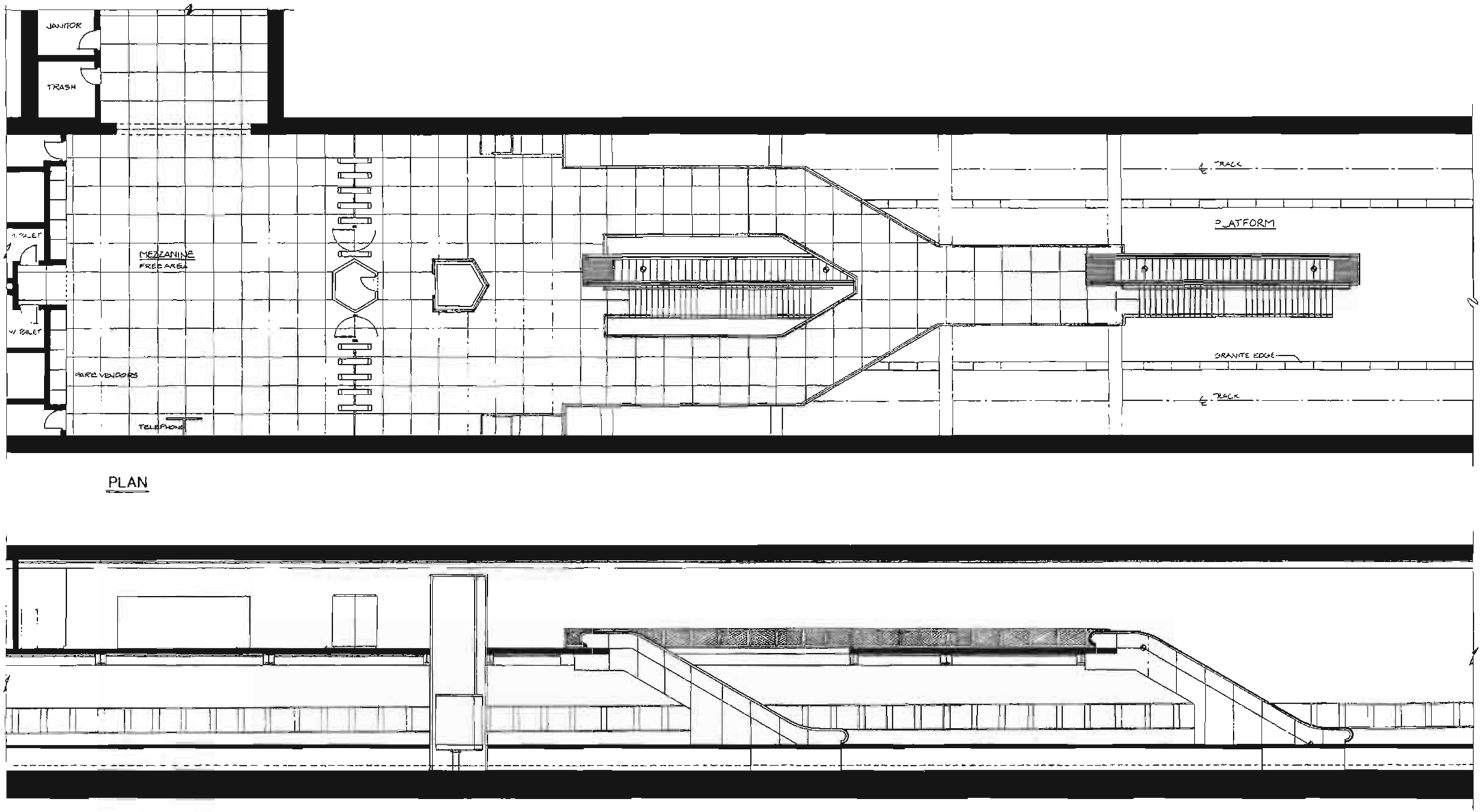
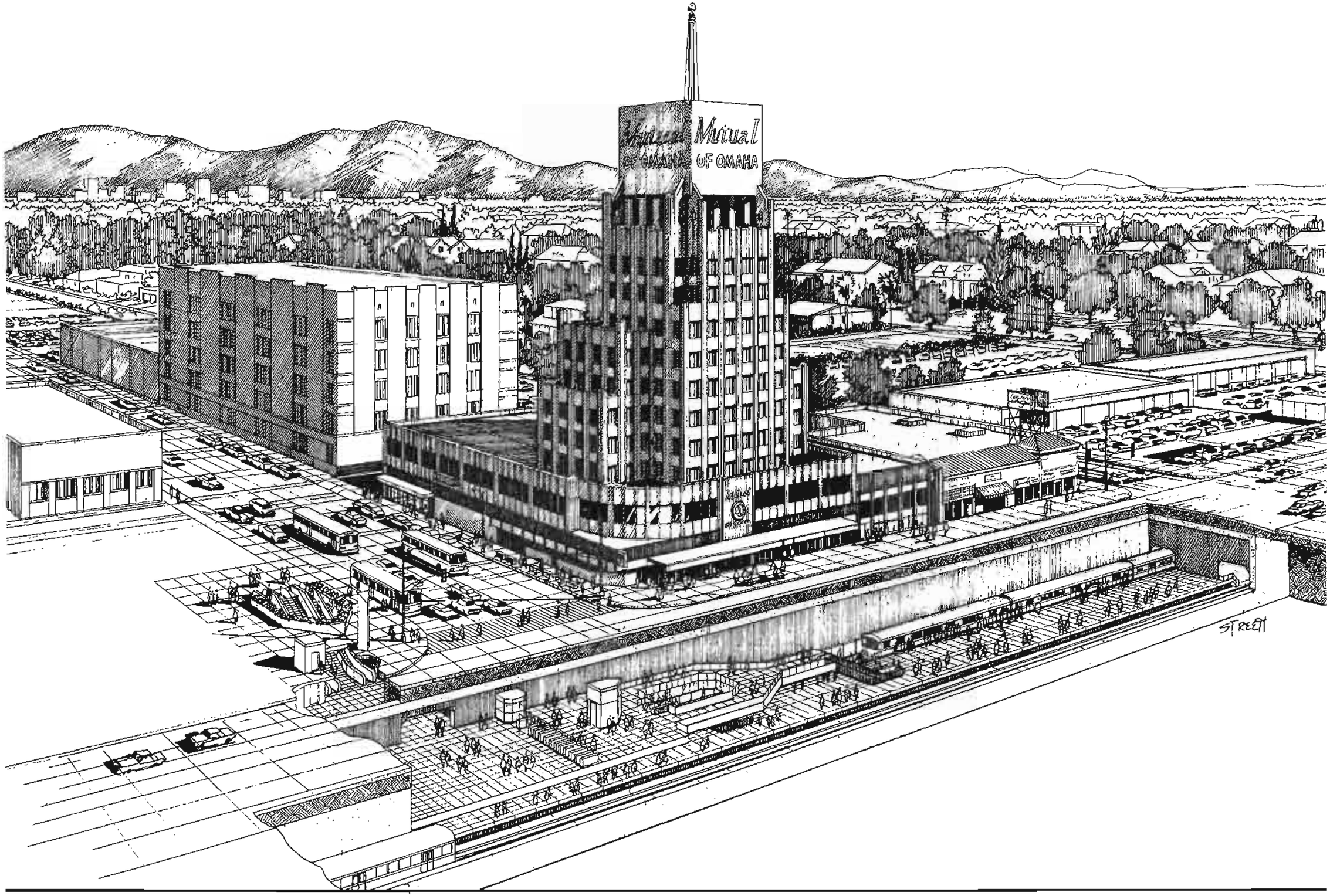
SCALE 1/4"=1'0"
SHEET NO.

FIGURE II-2



Typical End Mezzanine Plan

FIGURE II-3



WILSHIRE / LA BREA STATION

CUTAWAY VIEW LOOKING NORTH

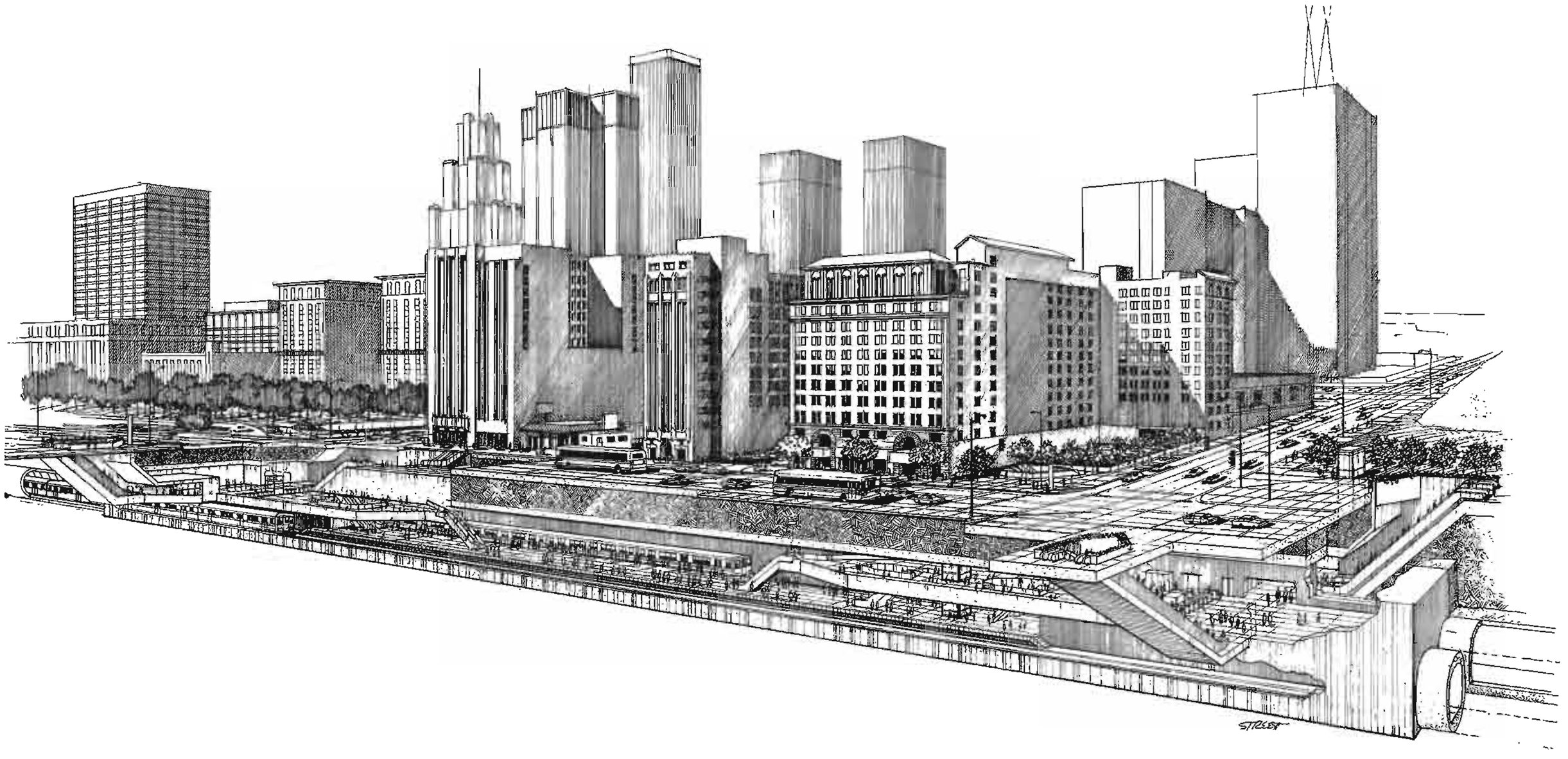
SCRTD Metrc Rail
HWA

FIGURE II-4

4. Patron Movement Within Stations

Of prime importance in station design is the movement of patrons, both horizontally and vertically, between the station entrance and the trains. Minimizing both travel times and capital/operating costs, as well as providing for ease of movement, is an essential design goal.

For horizontal movements, the distances between travel points located at the same level have been held to the least practical amount, considering all functional factors. Vertical movements, i.e., connecting the various levels within the station, utilize stairs principally for down-travel plus a limited amount of up-travel, and escalators as the principal means of up-travel. For those stations with extremely long vertical movements, escalators have been proposed for down-travel as well. An elevator from street level to the free area of a mezzanine has been planned to make the system accessible to the handicapped at the primary entrance to each mezzanine type station. A second elevator will provide access from the paid area on the mezzanine to the platform level. The numbers of stairs and escalators provided at each station are determined by patronage forecasts and the directional split of patrons (boarding or deboarding) during the morning and evening hours. Additional stairs will be provided at each end of the platform to permit evacuation of the stations during any emergency conditions.



STATION AT 5TH / HILL

FIGURE II-5

5. Parking

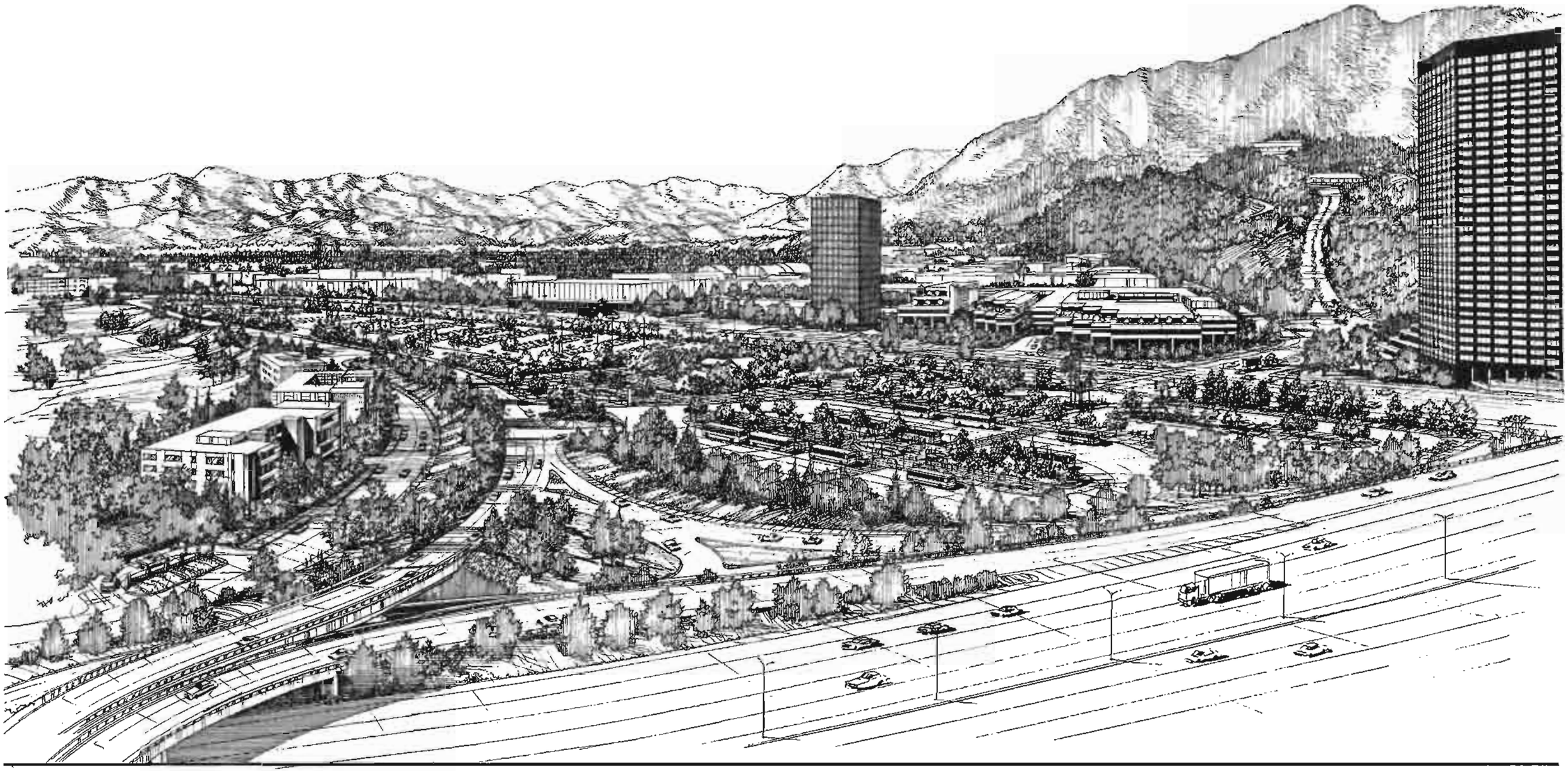
Patronage projections have been analyzed in terms of expected mode of access to each station. Based on this analysis, park-and-ride facilities have been programmed for Union Station, Wilshire/Fairfax Station, Fairfax/Beverly Station, Universal City Station, and North Hollywood Station. In each case a footprint for a parking structure sized to meet the expected demand has been developed to determine the appropriate site requirements. However, as a cost-saving measure, it is proposed that the initial construction provide for surface parking only. The construction of parking structures will be deferred.

6. Bus - Rail Interface Planning

Depending on site - specific considerations, such as existing street widths and the availability of undeveloped land in a station area, certain provisions are proposed for facilitating bus-rail connections. These provisions, which are discussed below, range from providing bus turnout lanes on existing streets to complete bus terminals with bus bays and layover space.

7. Construction

Stations will be constructed by a cut-and-cover method. With this method the work progresses from the street level down, and involves some surface disruption in the immediate vicinity of the station itself. Chapter IV - Construction Methods, describes the construction process in some detail.



PROPOSED UNIVERSAL CITY METRO RAIL STATION

HOLLYWOOD FREEWAY, LANKERSHIM BLVD.
& PROPOSED NEW ACCESS ROAD

SCRTD Metro Rail
HWA
February,1983

FIGURE II-6

B. STATION SITE AND DESIGN REPORTS

UNION STATION

Background

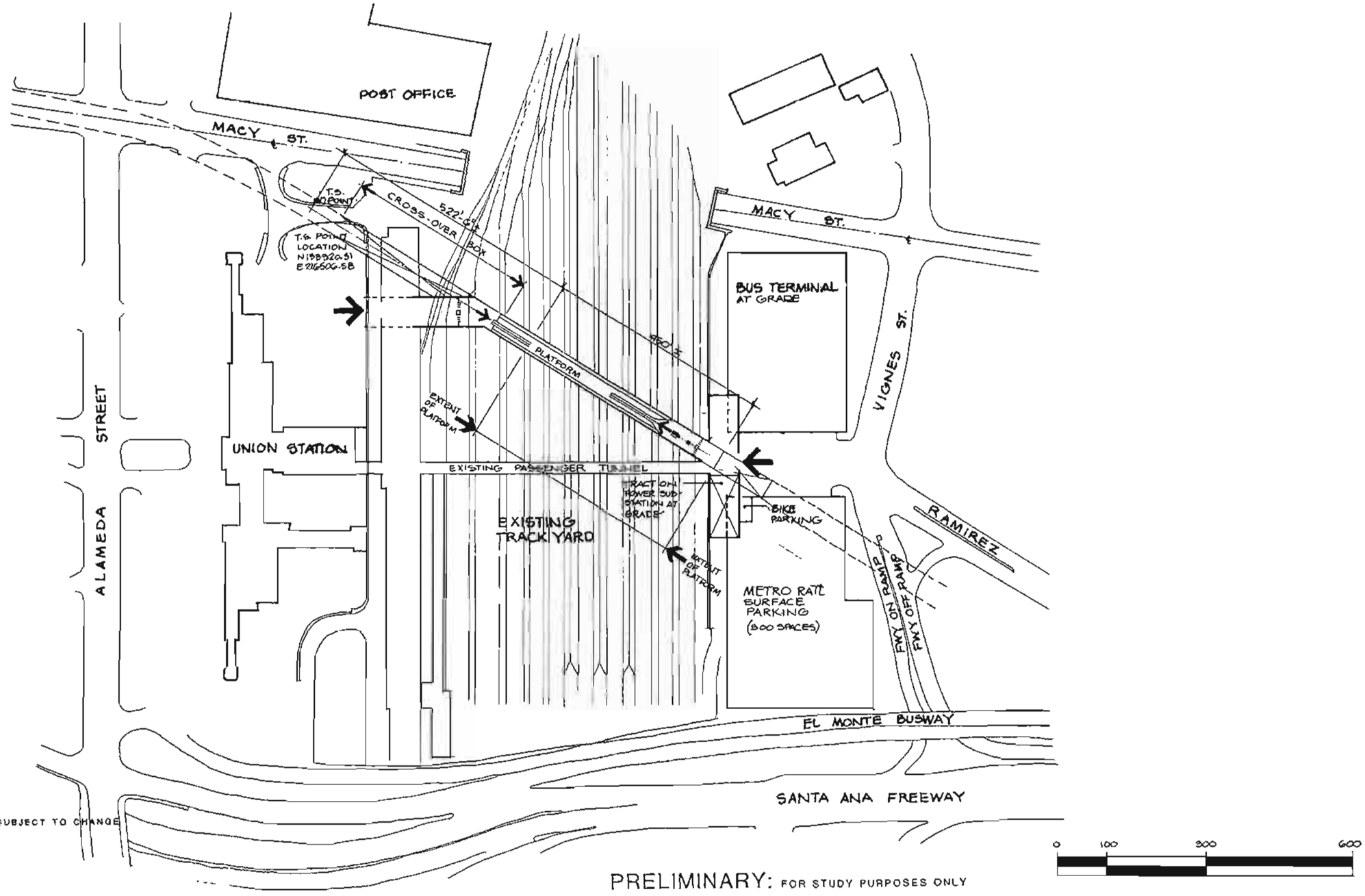
The Metro Rail Station at old Union Station will be located below the railroad yards behind (to the east of) the Union Station Terminal Building. This area is at the edge of the downtown core, adjacent to El Pueblo de Los Angeles State Historic Park (a major tourist attraction) and close to the Civic Center and little Tokyo.

The station site is bounded by Alameda Street to the west, Macy Street to the north, Vignes Street to the east and Highway 101 to the south. Located within this area is the Union Station Terminal Building, freight buildings, surface parking, tracks, and a vacant, unimproved area east of the tracks.

Immediately to the north of the site is the Post Office Terminal Annex. The area to the east of the site is being developed primarily with governmental facilities. The County Jail and the City of Los Angeles Piper Technical Center are located there.

Intercity bus and railroad services operate from Union Station and local RTD buses use the turnaround at the north end of the terminal as a bus stop. Also, the State Department of Transportation (CALTRANS) has planned an extension of the El Monte Busway which will provide a bus stop for express buses serving the San Gabriel Valley on the southwest corner of the Union Station site (Alameda Street and Highway 101). There is pending litigation under a joint powers agreement between CALTRANS and the City of Los Angeles to acquire Union Station. In a separate action CALTRANS is pursuing acquisition of the southerly portion of Union Station to accommodate the extension to the El Monte Busway from Mission Street to Alameda Street.

Union Station is on the National Register of Historic Places.



PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY Date 1-18-88 — HWA/GW, TAMS/TEC
DRAWN BY Date 1-18-88 — M. POINDEXTER
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General Architectural Consultants; Stations

SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED — Reg. No.
APPROVED — Date
MANAGER / CHIEF ENGINEER — Reg. No.

UNION STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

Station Site Design Parameters

Several bus routes will terminate at Union Station creating the need for a number of off-street bus bays for loading and unloading plus some additional space to provide for bus layovers. This off-street bus facility is proposed for a site just north of the east station entrance and will consist of paved roadways and a raised, paved passenger platform area. The bus bays will be designed to accommodate articulated as well as standard sized buses.

Based on an analysis of the mode of access for the projected station patronage, the need (program) for park-and-ride facilities was determined to be 1500 parking spaces initially and an additional 1000 parking spaces to be provided in a second later phase. However, as a cost reduction measure, the parking structures will be deferred until a later date. In the interim, surface parking will be provided in the area reserved for parking structures.

The small demand for kiss-and-ride parking at this station can be met on the streets in the morning and in a portion of the surface parking area during the afternoon and evening hours.

An alternative station site design is being studied in which a bus terminal deck is constructed on the present site of the Railway Express Agency building (see Figure II-8). Ramps would be constructed to permit buses using the El Monte Freeway to use the deck, either terminating or continuing through. Other bus service, allocated to the east end of the station in the original scheme would also use the bus terminal deck. Pedestrian access would be provided from the deck to both the Metro Rail Station and the train station.

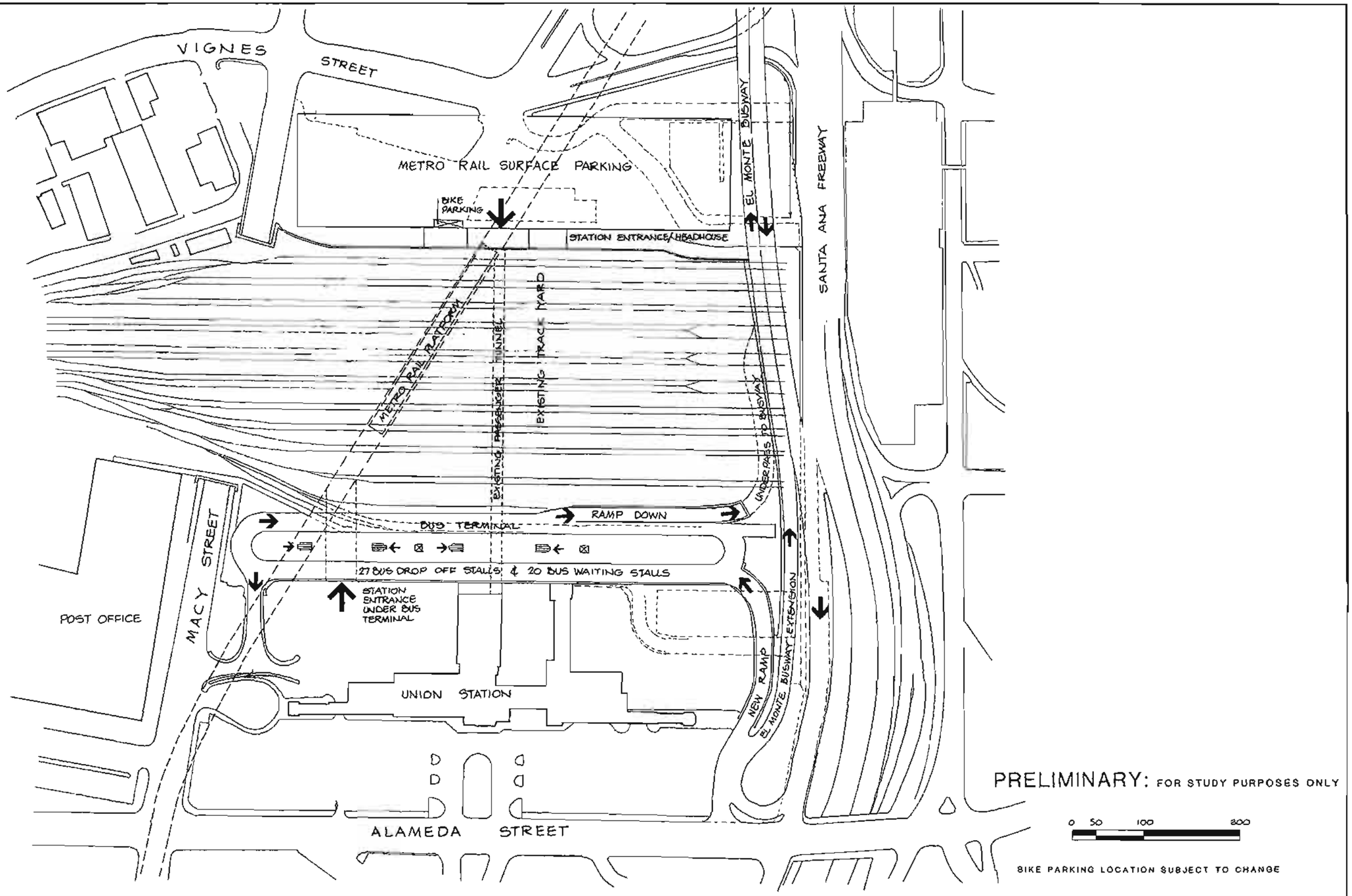
In the alternative design the number of bus-rail transfers at Union Station would greatly increase and many buses would terminate at the station rather than continuing on surface streets. The alternative is being studied by appropriate City and State agencies and findings regarding its feasibility are expected in the near future.

Station Design Parameters

Union Station will be the first station on the alignment. Passengers arriving at the station on foot will be coming primarily from the west (downtown). However, passengers arriving by auto and bus will arrive predominantly from the east. These passenger arrival characteristics combined with high projected patronage levels led to the station being designed with an entry at each end of the platform. Since the railroad tracks are at a higher elevation than each point of entry, the mezzanines at each end of the station will be at the existing entry grade level and extend under the tracks. Having the east mezzanine at grade permits the development of a headhouse (above-grade entry) structure which can house many of the ancillary space requirements.

The Metro Rail Station east entrance will be located and designed to permit access from the existing Union Station railroad platform access tunnel (passageway). This will permit intercity train travelers to easily access the Metro Rail system.

Escalators and stairs will provide access from each mezzanine to a center platform. And, while the future need is unlikely, the mezzanine design will permit the retrofitting of additional devices.



PRELIMINARY: FOR STUDY PURPOSES ONLY

0 50 100 200

BIKE PARKING LOCATION SUBJECT TO CHANGE

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY HWA/GW/TAMS/TEC
DRAWN BY M. POINDEXTER Date 2-19-93
CHECKED BY J. Wiley Date 2-19-93

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stallone

SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED — Reg. No.
APPROVED — Date
MANAGER / CHIEF ENGINEER — Reg. No.

UNION STATION WITH INTERMODAL BUS DEVELOPMENT

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

CIVIC CENTER STATION

Background

The Civic Center Station will be located under Hill Street between Temple and 1st Streets. Various Federal, State, County, and City office buildings are located in the station vicinity including the County Courthouse, Hall of Records, County Law Library, City Hall, Hall of Administration, State Office Building, Criminal Courts, and the Hall of Justice. Immediately to the west of Hill is the Civic Center Mall and to the east is the Court of Flags creating a major axis running from the Water and Power Building and the Music Center to the City Hall.

The southwest corner of 1st and Hill is part of several undeveloped parcels, two of which are owned by Los Angeles County. The Music Center's Performing Arts Council in conjunction with the Community Redevelopment Agency have announced plans for a large mixed-use development project with three theatres and office, residential, and commercial buildings for this site.

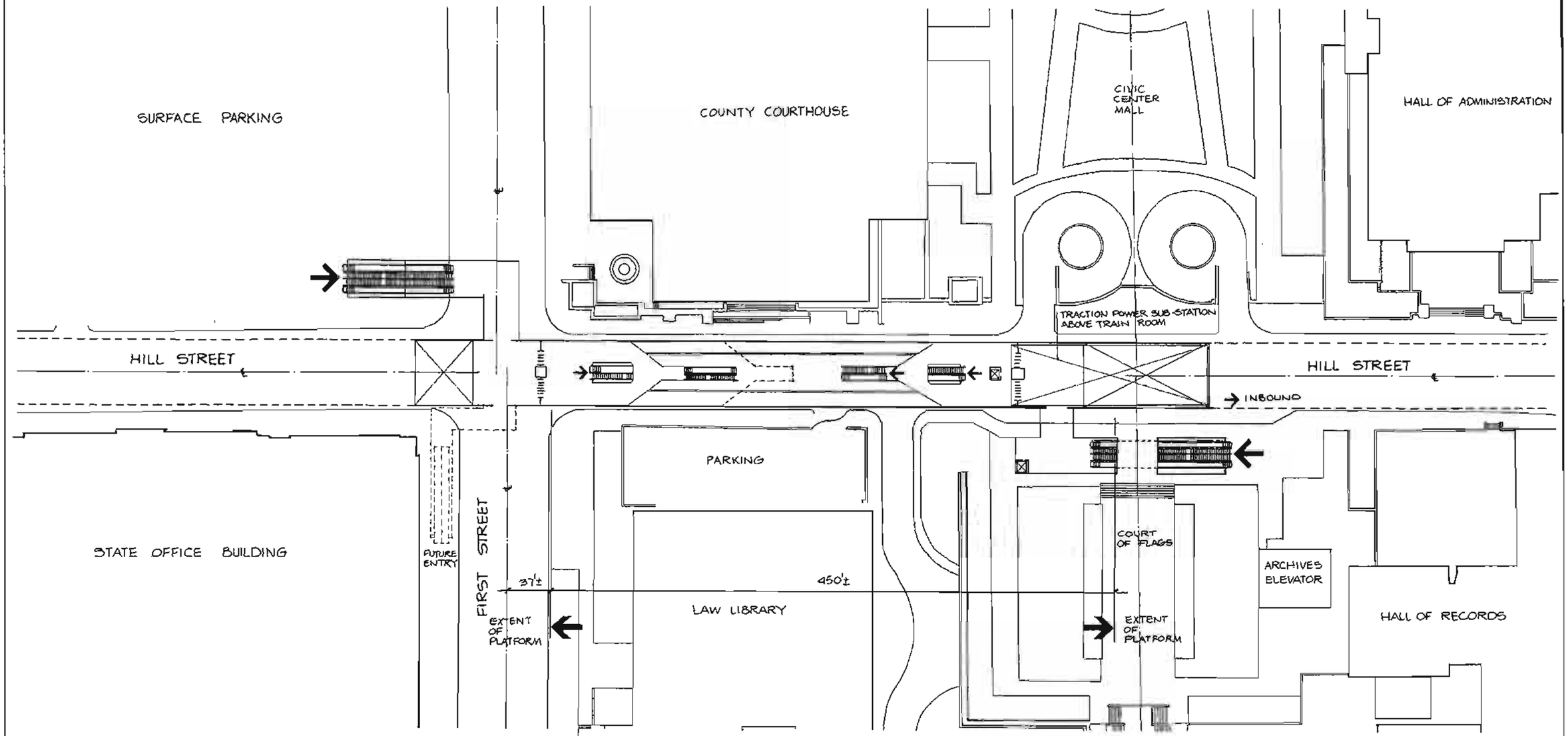
Station Site Design Parameters

A significant number of transfers are expected between the bus and rail systems at this station. However, since the buses will be continuing in service and not terminating at this location, two bus pull-out lanes are proposed - one on the west side of Hill, just to the south of 1st Street, the other on the east side of Hill adjacent to the Court of Flags. The program for this station site does not call for Park-Ride, Kiss-Ride or any other facilities. Therefore, prime consideration rests with pedestrian traffic, except for patrons transfering from buses. Pedestrian traffic at the intersection of 1st and Hill moves along both sides of each street in approximately equal flows. However, at the north end of the station the pedestrian flow is heaviest along the east-west axis running to the south of the Court of Flags. Entry locations which are discussed in the next section have been located to serve these movements while having a minimum impact on public parkland.

Station Design Paramenters

In response to the relatively high patronage levels projected and the expected pedestrian flow patterns, this station has been planned with entries and mezzanines at each end of the platform. The entries at the south end of the station are proposed for the southwest and southeast corners of 1st and Hill. The entry on the southwest corner will be designed to accommodate future development of the site. The southeast entry is designated for future construction. The north entry to the station will be located adjacent to the Court of Flags and will be designed to minimize any adverse impacts on this public park space.

A traction power substation will be located over the train room and ancillary space will be provided at the mezzanine and platform levels at each end of the station.



PRELIMINARY: FOR STUDY PURPOSES ONLY

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date HWB GIN ASSOCIATES
DRAWN BY Date 2-11-83 M. POINDEXTER
CHECKED BY Date

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED Date
Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

CIVIC CENTER STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

5TH/HILL STATION

Background

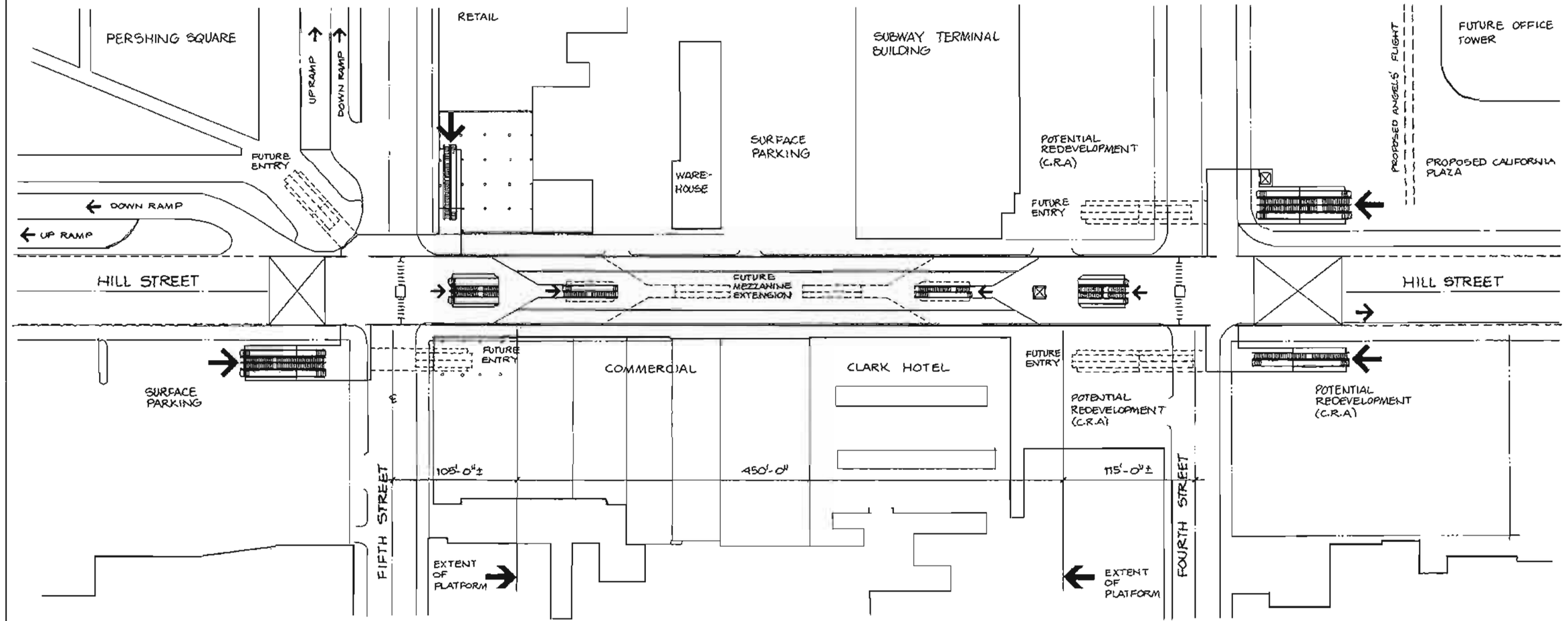
The 5th/Hill Station is to be located under Hill Street between 4th and 5th Streets. The surrounding area contains the Jewelry Mart, Grand Central Market, Biltmore Hotel, and many retail, commercial and office buildings. Pershing Square Park is at the south end of the station and is the focus for the surrounding area. Several major new developments are proposed for this area including the California Plaza $1.2 billion mixed-use development on the northwest corner of 4th and Hill; and the proposed expansion of the Jewelry Mart on the southeast corner of 5th and Hill.

Station Site Design Parameters

The primary site design concern at this station is to orient the entrances to pedestrian flows and to design the entrances so as to minimize adverse impacts on the future development of the entry sites. The major bus transfer point for the station will be at the 5th and Hill intersection. Three corners of the intersection are fully developed which increases the complexity of locating entrances. The 4th and Hill end of the station will be the primary access point for pedestrians from east of Hill Street and from the proposed California Plaza Development. There is a strong desire by the Community Redevelopment Agency to see a pedestrian link (possibly a mechanized device) between Hill Street and a new pedestrian plaza to be developed above Hope and Grand as part of this development project which, if constructed, would be a major pedestrian path to the north station entries.

Station Design Parameters

This station has one of the highest patronage projections for the system and is planned with mezzanines at each end of the platform. The mezzanines have been located so as to not preclude the locating of entries on any or all four corners of the 4th and Hill and 5th and Hill intersections. At the 4th and Hill intersection two initial entries are proposed, one on the northwest corner serving the proposed California Plaza project and other pedestrian traffic from the west, and the other located on the northeast corner oriented to serve pedestrian movements from the east. Both sites are undeveloped but have projects proposed for them. The entries will be designed to permit their integration into future development. Two initial entries are also proposed for the 5th and Hill intersection. One entry is proposed to be built into the existing 401 Hill Street Building and will require careful design to protect and enhance the commercial viability of the ground floor of the building. The other entry is proposed for the corner adjacent to the International Jewelry Center, and has a site presently undeveloped but expected to house an expansion of the Jewelry Center. This entry is oriented parallel to 5th Street to intercept pedestrians coming from the commercial area along Broadway and Spring Streets.



PRELIMINARY: FOR STUDY PURPOSES ONLY

40 0 80 200

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY — Date 2-10-83
ENGINEERING TEC
DRAWN BY — Date 2-10-83
M. POINDEXTER
CHECKED BY — Date 2-14-83
J.W.L.

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants; Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED — Reg. No.
APPROVED — Date
MANAGER / CHIEF ENGINEER — Reg. No.

FIFTH / HILL STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-10

7TH/FLOWER STATION

Background

The 7th/Flower Station will be located under 7th Street between Hope and Figueroa Streets. Land uses in the station area are high-rise office towers, street level retail and commercial space, department stores and restaurants. First Interstate Tower, Robinson's Department Store, Arco Plaza, Hilton Hotel, Barker Brothers, and the Broadway Plaza are major activity centers in the immediate vicinity. 7th Street is a major auto, bus and pedestrian artery through the CBD. The immediate area contains very little undeveloped land with the notable exception of the southwest corner of Figueroa and Seventh Streets. This site is the location for the proposed Pacific Plaza Project, which is planned to provide over 3 million square feet of office and commercial/retail space. Three historic landmark buildings are located in the vicinity of 7th and Figueroa - the Barker Bros. Building, Global Marine House, and Engine Company No. 28.

Station Site Design Parameters

Due to the geometry of the alignment and the station configuration it appears most economical to locate the traction power substation needed at this station in an off-street location. Since the entry proposed for the northeast corner of 7th and Figueroa will require the acquisition of the existing structure on this site, the substation and its ancillary space are to be located below-grade on the cleared site. The entry at that location will be the primary entry to the station and will include an elevator to provide handicapped accessibility from the surface to the station mezzanine.

The entry and substation will be located on the site in a manner to facilitate future development. The second entry to the station will be constructed into the corner of the Central Bank Building at 7th and Hope. This entry will be designed to minimize its impact on the commercial space located in this corner of the building. No special provisions for buses, and autos, are planned at this station.

Station Design Parameters

In response to the moderately high patronage projected for this station it has been planned with a mezzanine at each end providing access to a center platform. The west mezzanine has been configured to permit the construction of another entry from the proposed Pacific Plaza Project to the station. The east mezzanine has been similarly configured with a single entry. The addition of an entry from the garden level of the Broadway Plaza is possible. Station ancillary space will be located at each end of the platform.

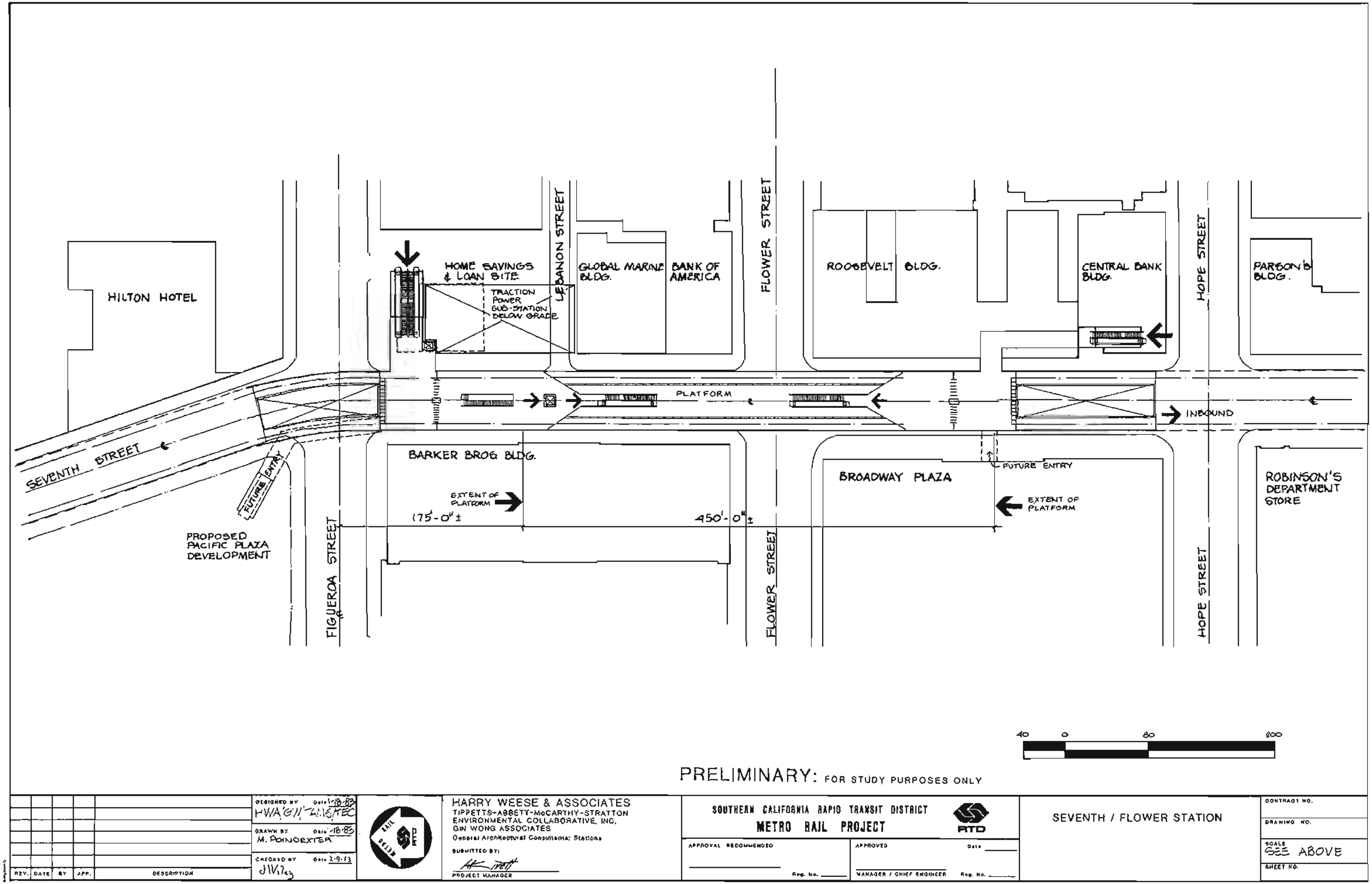

HILTON HOTEL
HOME SAVINGS & LOAN SITE
TRACTION POWER SUB-STATION BELOW GRADE
LEBANON STREET
GLOBAL MARINE BLDG.
BANK OF AMERICA
FLOWER STREET
ROOSEVELT BLDG.
CENTRAL BANK BLDG.
HOPE STREET
PARSON'S BLDG.
PLATFORM
INBOUND
SEVENTH STREET
FUTURE ENTRY
BARKER BROS BLDG.
BROADWAY PLAZA
FUTURE ENTRY
ROBINSON'S DEPARTMENT STORE
EXTENT OF PLATFORM
EXTENT OF PLATFORM
175'-0"±
450'-0"±
PROPOSED PACIFIC PLAZA DEVELOPMENT
FIGUEROA STREET
FLOWER STREET
HOPE STREET
40 0 80 200
PRELIMINARY: FOR STUDY PURPOSES ONLY
REV. DATE BY APP. DESCRIPTION
DESIGNED BY HWA/GW/TAMS/EC
DRAWN BY M. POINDEXTER
CHECKED BY Date 2-9-83
HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD
APPROVAL RECOMMENDED
APPROVED
MANAGER / CHIEF ENGINEER
SEVENTH / FLOWER STATION
CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-11

WILSHIRE/ALVARADO STATION

Background

The Wilshire/Alvarado Station will be located off-street at mid-block between 7th Street and Wilshire running from Bonnie Brae to Alvarado. The station vicinity is known as the Westlake Area. Across Alvarado from the station is MacArthur Park, which is a heavily used public space during daytime hours. The block facing along Alvarado and 7th Street contains low-rise retail buildings with several mid-rise office buildings located along Wilshire. The center of the block is primarily devoted to parking.

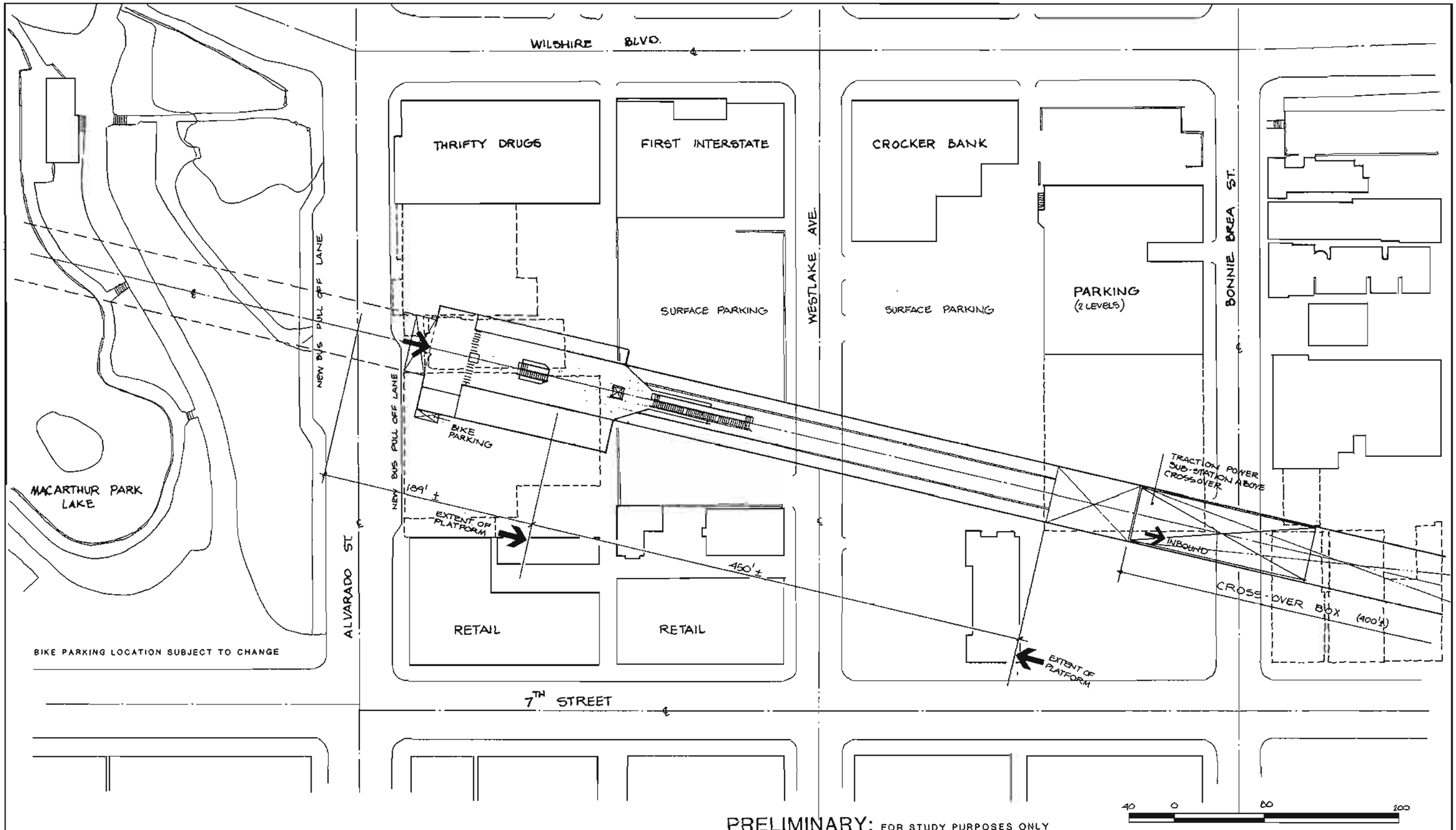
Station Site Design Parameters

The station will be constructed by the cut-and-cover method. As a result, the mid-block area will be cleared and could possibly be available for new development upon completion of station construction. The alignment of the station is on a skew to Alvarado, which impacts the siting of the above-grade concourse and the site plan. Consideration may be given to the creation of a mid-block mall or pedestrian pathway from Alvarado to Westlake.

The station will also receive a significant number of passengers transferring from buses running on Alvarado. To facilitate this transfer movement a bus turnout lane is planned for each side of Alvarado in front of the station. No special provisions are planned for parking or pick-up and drop-off by auto.

Station Design Parameters

Patronage is projected to be moderate at this station. In response to the station's off-street location and relatively shallow depth, it has been planned as a concourse station, rather than the more typical mezzanine. Patrons will enter a concourse structure at-grade, pass through fare-collection devices and then move by escalator, stair or elevator directly to the center platform. The entry concourse will be adjacent to Alvarado at the west end of the station. While not planned as part of the initial station construction package, it will be possible to add a second concourse entry at the east end of the station at a later date. Ancillary space will be provided at each end of the station and a double crossover track will be located at the east end of the station. A traction power substation will be located below-grade over the crossover track.



PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY HWA/GW/TAMS/TEC Date 1-18-83
DRAWN BY M. POINDEXTER Date 1-18-83
CHECKED BY J. Wiley Date 1-20-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

WILSHIRE / ALVARADO STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-12

WILSHIRE/VERMONT STATION

Background

The Wilshire/Vermont Station will be located off-street at mid-block between Wilshire and 6th Street straddling Vermont Avenue. The block facings in the immediate area of the station have primarily office and retail development. The development along Wilshire is high-rise structures with low-rise development predominating along the north-south streets. The surrounding area is primarily residential. A Bank of America branch bank is located adjacent to the station on the northeast corner of Wilshire and Vermont and a service station is located on the other adjacent corner. Bullock's Wilshire, a historic landmark, is located nearby on Wilshire. The mid-block area which will be the most impacted by station construction is primarily used for parking. The Vermont bus lines which serve the station location have one of the highest patronage levels in the city.

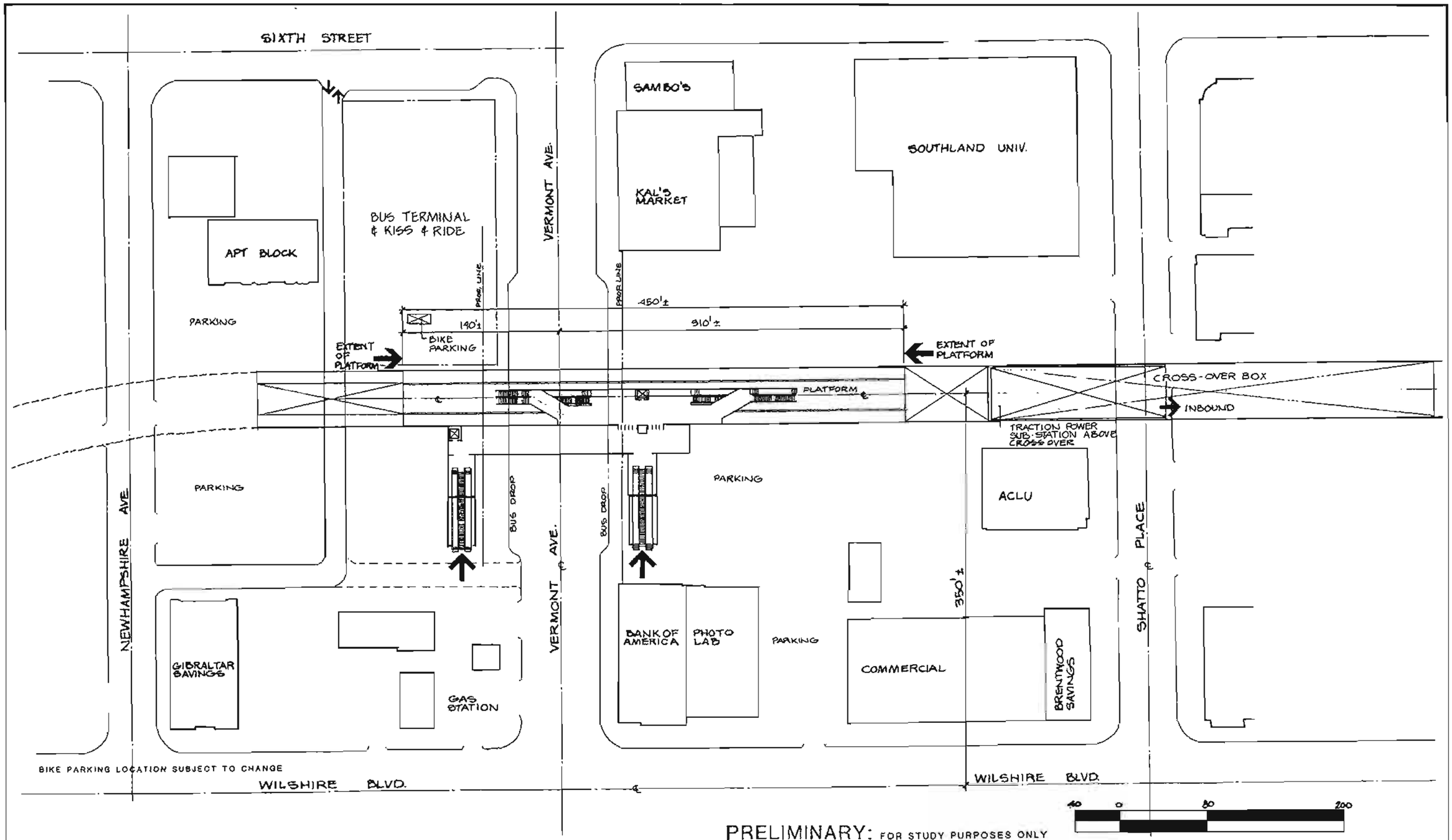
Station Site Design Parameters

A major factor considered in the site design for this station is the transit interface between bus and Metro Rail. Some buses will be terminating at this location while others will be picking up and dropping off passengers and continuing on. It is planned for all Vermont bus boarding to occur in bus turn-out lanes located on each side of Vermont, each adjacent to a station entry. Deboarding points for terminating buses will be located off-street just north of the west station entry. The site used for the unloading of buses will also be designed to provide bus layover spaces (e.g. spaces where a bus can be parked until it is time to start its next run). In addition, a bus turnout lane is planned for the south side of 6th Street just to the west of Vermont to serve buses running on 6th Street.

A small number of kiss-and-ride parking spaces are also planned for the site. The station entries will be oriented towards Wilshire, the direction of the major pedestrian flow. The location of the station entries will offer strong potential for future adjacent and air-rights development.

Station Design Parameters

The station is planned with a single mezzanine located near the center of the station. To facilitate the bus-rail transfer, two entries into the mezzanine are planned, one on each side of Vermont. The mezzanine will have stairs and escalators at each end connecting to a center platform. The entrance on the west side of Vermont (adjacent to the off-street bus area) is the primary station entrance and will have an elevator from the surface to the mezzanine level to provide handicapped access. A second elevator will run from the paid zone of the mezzanine down to the center platform. Ancillary space will be provided at each end of the station. A double crossover track will be located on the east end of the station and a traction power substation will be located below grade over the crossover track.



PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY HWA G./T.A.M.S. Date 1-8-83
DRAWN BY M. PONDEXTER Date 1-8-83
CHECKED BY J. Wiley Date 1-8-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations

SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED — Reg. No.
APPROVED — Date — MANAGER / CHIEF ENGINEER — Reg. No.

WILSHIRE / VERMONT STATION

CONTRACT NO.
DRAWING NO.
SCALE 5E3 ABOVE
SHEET NO.

FIGURE II-13

WILSHIRE/NORMANDIE STATION

Background

The Wilshire/Normandie Station will be located under Wilshire Boulevard between Ardmore and Normandie Streets. A number of high-rise office buildings are located along Wilshire near the station location. In addition two major hotels are close by. The Wilshire Hyatt Hotel is immediately adjacent to the station and the Ambassador Hotel is one block away. Areas to the north and south of Wilshire are residential in character. The Ambassador Hotel, the Wilshire Christian Church (on the northeast corner of Wilshire and Normandie) and the Brown Derby are historic landmarks.

Several sites fronting on Wilshire are being considered for new development. A six story office building is planned for the site adjacent to the Glendale Federal Bank and the owners of the Ambassador Hotel are considering the development of the area in front of the hotel. There have also been plans for developing the Brown Derby site.

Irolo Street next to the Glendale Federal Bank is little used and is under consideration for vacation by the City of Los Angeles.

Station Site Design Parameters

Major utilities passing through the intersection of Normandie and Wilshire have limited the opportunity to locate an entrance east of Normandie. West of Normandie the right-of-way of Irolo Street offers the opportunity to locate the required entry on public land not needed for other transportation purposes. The entry will, to the extent possible, be designed and located to complement the proposed development on the adjacent site. Because of the bend in Normandie, southbound buses will need a turn-out lane near the intersection of Normandie and Irolo. This will improve the flow of traffic on Normandie and will be convenient for transferring passengers.

The feasibility of locating a station entrance on the northwest corner of Normandie and Wilshire (presently occupied by the Hyatt Conference Center) was investigated and found to be difficult to design and expensive to construct but remains an option that could be carried out in the future.

Station Design Parameters

Major utility conflicts have been avoided by locating the station platform west of Normandie. The strong desire to locate the station entrance close to Normandie to facilitate bus transfer and pedestrian access determined that the station would have an end mezzanine with the entry located in Irolo Street. As indicated above, a second entry onto this mezzanine is possible but the moderate patronage projected for this station suggests that it will not be necessary. Ancillary space will be provided at each end of the station. A traction power substation is not required at this location.

KEMPER INSURANCE

EXTENT OF PLATFORM

SURFACE PARKING

ARDMORE AVE.

WILSHIRE- HYATT HOTEL

450'±

CONFERENCE BLDG.

100'±

EXTENT OF PLATFORM

NORMANDIE AVE.

WILSHIRE CHRISTIAN CHURCH

ATLANTIC RICHFIELD CO.

MARIPOSA

EQUITABLE BLDG.

PLATFORM

WILSHIRE BLVD.

INBOUND

PARAMOUNT PLAZA

ARDMORE AVE.

TITLE INSURANCE

PROPOSED OFFICE COMPLEX SITE

GLENDALE FEDERAL SAVINGS

VACATED IROLO STREET

56'±

NORMANDIE AVE.

BUS DROP OFF

CENTRAL PLAZA TISHMAN COMPLEX

MARIPOSA

40 0 80 200

PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY Date 1-18-85 JAVAGHI/TANG/TEC

DRAWN BY Date 1-18-85 M.P.DINDEXTER

CHECKED BY Date 1-21-85 J.Wiley

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

WILSHIRE / NORMANDIE STATION

CONTRACT NO.

DRAWING NO.

SCALE SEE ABOVE

SHEET NO.

FIGURE II-14

WILSHIRE/WESTERN STATION

Background

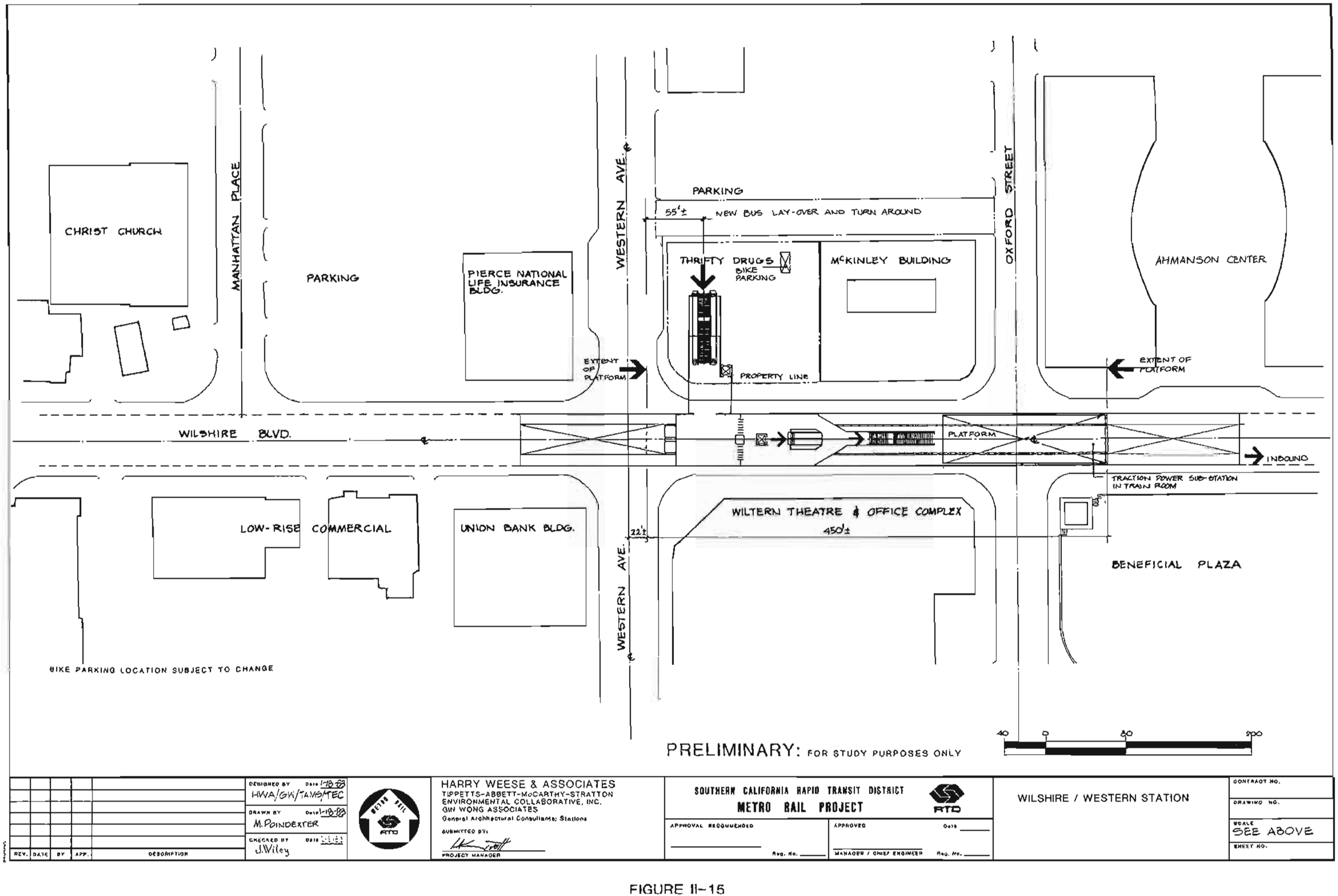
The Wilshire/Western Station will be located under Wilshire Boulevard between Western and Oxford Streets. This area is on the western edge of a high-rise segment of the Wilshire Corridor office core. The other major streets have low to medium rise mixed-use buildings. The remainder of the surrounding area is in residential use. All four corners of the intersection of Wilshire and Western are developed. The historic landmark Wiltern Theater is located on the southeast corner and is undergoing renovation. A Union Bank building is on the southwest corner; the Pierce National Life Insurance Building is on the northwest corner and a one story Thrifty Drug Store is on the northeast corner adjacent to the historic landmark McKinley Building.

Station Site Design Parameters

All corners of the intersection of Western and Wilshire were investigated as potential entry locations. It was determined that it would be difficult and costly to construct a station entry at all but one corner location. The northeast corner is occupied by the smallest existing structure and is therefore proposed for the single entry planned for this station. This station is expected to have a relatively high volume of bus-rail transfer and, therefore, bus turnout lanes on each side of Western north of Wilshire are planned. Certain bus lines will terminate at this station and will need to turnaround and, at times, layover. To facilitate the bus operation a bus only right-of-way connecting Western Avenue to Oxford Street is proposed. The right-of-way would be sufficiently wide to have one parking lane and one passing or through lane. The station entry will be oriented parallel to Western to facilitate future site development.

Station Design Parameters

This station has been planned with a single mezzanine on the west end of the station. This configuration will permit an additional entry to be constructed into the Union Bank Building if needed to meet patronage requirements, or if constructed by others. Ancillary space will be located at each end of the station, and, because a crossover or pocket track is not located at either end of this station, the required traction power substation will be located over the platform in the trainroom.



REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY HWA/GW/TAW/MEC Date 1-18-83
DRAWN BY M. POINDEXTER Date 1-18-83
CHECKED BY J. Wiley Date 1-18-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
APPROVAL RECOMMENDED — Date — Reg. No.
APPROVED — Date — MANAGER / CHIEF ENGINEER — Reg. No.

WILSHIRE / WESTERN STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-15

WILSHIRE/LA BREA STATION

Background

The Wilshire/La Brea Station will be located under Wilshire Boulevard between Detroit Street and Sycamore Avenue. The surrounding area along Wilshire is mostly low-rise commercial and retail development with the exception of the medium-rise historic landmark Mutual of Omaha Building, which is located on the northeast corner of the intersection of Wilshire and La Brea. The areas north and south of Wilshire are residential in character. Presently, there are no major destinations or public spaces and attractions at this location. The many under-utilized parcels of land which exist in the station vicinity will have increased development potential as a result of the construction of the Metro Rail station.

Station Site Design Parameters

The moderate patronage level projected for this station requires only a single entrance. The northwest corner of the Wilshire/La Brea intersection is the least developed and is therefore proposed for the entry. The site is occupied by low-rise commercial structures and surface parking. To facilitate bus-rail transfer a bus turnout lane is proposed on the west side of La Brea adjacent to the station entry. The entry is oriented parallel to the La Brea axis to preserve the maximum frontage along Wilshire for future development and to increase the convenience of the bus-rail transfer.

Station Design Parameters

Based on the moderate patronage projection, this station has been planned with a single mezzanine at the west end. It will have a center platform with ancillary space provided at each end of the station. A pocket track will be constructed at the east end of the station and a traction power substation will be constructed over the pocket track.

PARKING

DETROIT ST.

PARKING

PROPERTY LINE

140'±

67'±

BIKE PARKING

LA BREA AVE.

CENTER-LINE STREET

PARKING

MUTUAL OF OMAHA

SYCAMORE AVE.

LOU EHLER CADILLAC

TRACTION POWER SUB-STATION ABOVE POCKET TRACK

WILSHIRE BLVD.

PLATFORM

POCKET TRACK

INBOUND

COMMERCIAL

BANK OF AMERICA

EXTENT OF PLATFORM

450'±

SOUTHWEST SAVING

PARKING

EXTENT OF PLATFORM

SERVICE STATION

PARKING

DETROIT ST.

PARKING

LA BREA AVE.

PARKING

SYCAMORE AVE

BIKE PARKING LOCATION SUBJECT TO CHANGE

40 0 80 200

PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY FWAGW/ZAVSTEC Date 1-18-83

DRAWN BY M. POINDEXTER Date 1-18-83

CHECKED BY J Wiley Date 1-18-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants/ Stations

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

WILSHIRE / LA BREA STATION

CONTRACT NO.

DRAWING NO.

SCALE SEE ABOVE

SHEET NO.

FIGURE II-16

WILSHIRE/FAIRFAX STATION

Background

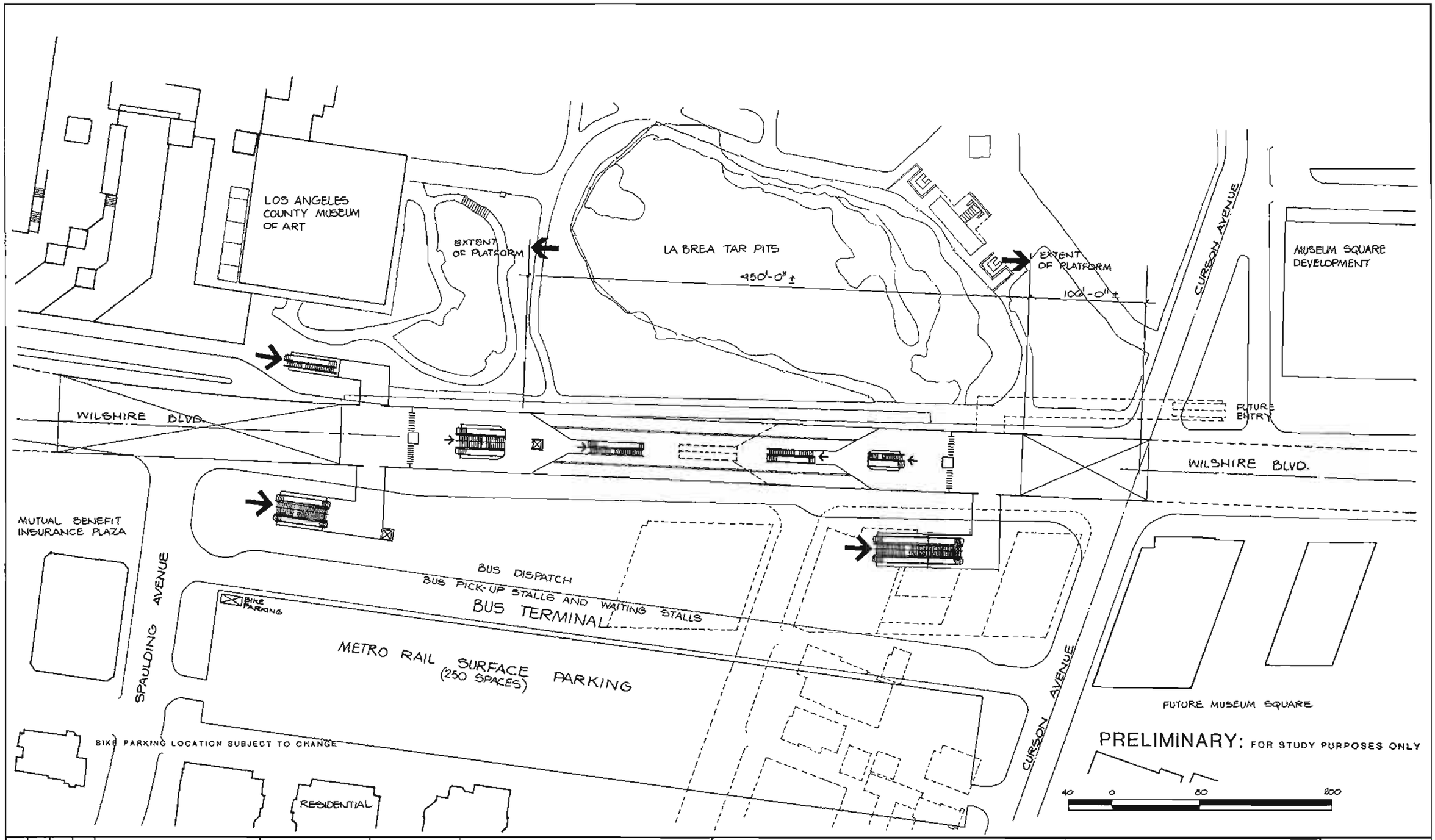
The Wilshire/Fairfax Station is located under Wilshire Boulevard between Curson and Spaulding Avenues. The surrounding area is heavily residential but also contains major public attractions. The Los Angeles County Museum of Art, the Rancho La Brea Tar Pits and the Page Museum of Natural History are all located on the north side of Wilshire adjacent to the station. Two blocks west of the station, at the intersection of Fairfax and Wilshire, is a major retail shopping area containing both The May Company and Orbachs Department Stores. The May Company is considering plans to redevelop its properties by building a major multi-use complex. Adjacent to the station on the south side of Wilshire is a large undeveloped parcel of land. The surrounding residential areas contain high-rise, multi-family and single-family housing units.

Station Site Design Parameters

This is the last outbound station before the alignment turns north along Fairfax Avenue. Thus, the station will be a major receptor for patrons arriving by auto and bus from the south and west. A future parking structure is proposed for this station accommodating 1000 parking spaces, but only surface parking will be provided initially. In addition, a major off street bus facility is planned. A bus turnout lane will be provided on the south side of Wilshire just west of Curson Avenue. Wilshire and Fairfax buses terminating at the station will unload in this turnout and passengers transferring to Metro Rail will use a station entrance adjacent to the turnout to access the station. The buses will then use the terminal to turnaround and/or layover. Patrons boarding buses will use either of the south station entrances to access the bus platform. To minimize traffic conflicts and congestion the future parking facility is proposed with entry only from Spaulding Avenue and exit only onto Curson. The bus terminal will conversely have entry only from Curson and exit only onto Spaulding. The two facilities have been sited to permit the concurrent or future development of the Wilshire frontage. The bus terminal is entirely on-grade and can accommodate development in the air space over it. The proposed station site development will require acquisition of several existing structures along Wilshire, west of Curson.

Station Design Parameters

To accommodate the moderately high patronage projected for this station and in response to the station location and site development potential it has been planned with a mezzanine at each end of the platform. This configuration will permit a large number of entrances to be developed. Initial plans call for two entries at the west end of the station and one entry on the east end. The northwest entry will be sited and oriented to serve the County Museum of Art and pedestrians from the west. The southwest entry will serve the bus terminal and pedestrian from the west. The east entry will serve deboarding bus patrons and pedestrians from the Page Museum and from the east. Ancillary space will be provided at each end of the station and turnouts for a future line extension will be located at the west end of the station. A traction power substation will be located over the turnout tracks. Special construction procedures will be implemented to locate and protect potential paleontological finds.



REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date
DRAWN BY M. POINDEXTER Date 2-11-83
CHECKED BY Date

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations

SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

WILSHIRE / FAIRFAX STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-17

FAIRFAX/BEVERLY STATION

Background

The Fairfax/Beverly Station will be located off-street on a north-south axis about 100 feet east of and parallel to Fairfax. The north end of the station will be just south of Beverly Boulevard. The proposed station site is currently used as surface parking for CBS Television City. Immediately to the south of the station is the historic landmark, Farmer's Market--a major tourist and retail attraction. Other land use in the area is characterized by retail, commercial, and mixed uses along Fairfax and Beverly, with an immediate shift to residential housing on other streets. The land use west of the station is primarily low-density, single-family housing; to the east are medium and high-density apartments. Pedestrian activity is high throughout the area, particularly during the daytime hours.

Station Site Design Parameters

Based on moderate patronage projections for this station it is planned with a single entrance at the southeast corner of the intersection of Fairfax and Beverly. A bus turnout lane is proposed adjacent to the station entry to serve bus lines running on Beverly and for a possible neighborhood shuttle bus service. A future parking structure accommodating 1000 parking spaces will be developed for this location, but only surface parking will be provided initially.

Station Design Parameters

The single entry planned for this station will provide access to a mezzanine at the north end of the station and then to a center platform. The addition of a second entry and mezzanine at the south end of the platform can be accomplished in the future, if patronage and future development justify another entry. Ancillary space will be provided at each end of the station and a double crossover track will be located at the south end of the station. A traction power substation will be located over the crossover track.

CBS TELEVISION CITY

FARMER'S MARKET

METRO RAIL SURFACE PARKING (290 SPACES)

SURFACE PARKING

SURFACE PARKING

BUS DROP LANE

75'±

BIKE PARKING

GREAT WESTERN SAVING

PLATFORM

FUTURE ENTRANCE

TRACTION POWER SUB-STATION ABOVE CROSS OVER

CROSS OVER BOX

CENTER LINE STATION

INBOUND

(NOT TO SCALE)

228'±

450'±

FAIRFAX AVE.

CENTER LINE STREET

FAIRFAX AVE.

EXTENT OF PLATFORM

EXTENT OF PLATFORM

MOVIE HOUSE

BEVERLY BLVD.

GAS STATION

CROCKER BANK

PARKING

AMERICAN SAVINGS

GAS STATION

FARMER'S DAUGHTER MOTEL

BIKE PARKING LOCATION SUBJECT TO CHANGE

40 0 80 200

PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY HWA/GW/TA/TSO Date 1-18-85

DRAWN BY M. POINDEXTER Date 1-18-85

CHECKED BY J. Wiley Date

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

FAIRFAX / BEVERLY STATION

CONTRACT NO.

DRAWING NO.

SCALE SEE ABOVE

SHEET NO.

FAIRFAX/SANTA MONICA STATION

Background

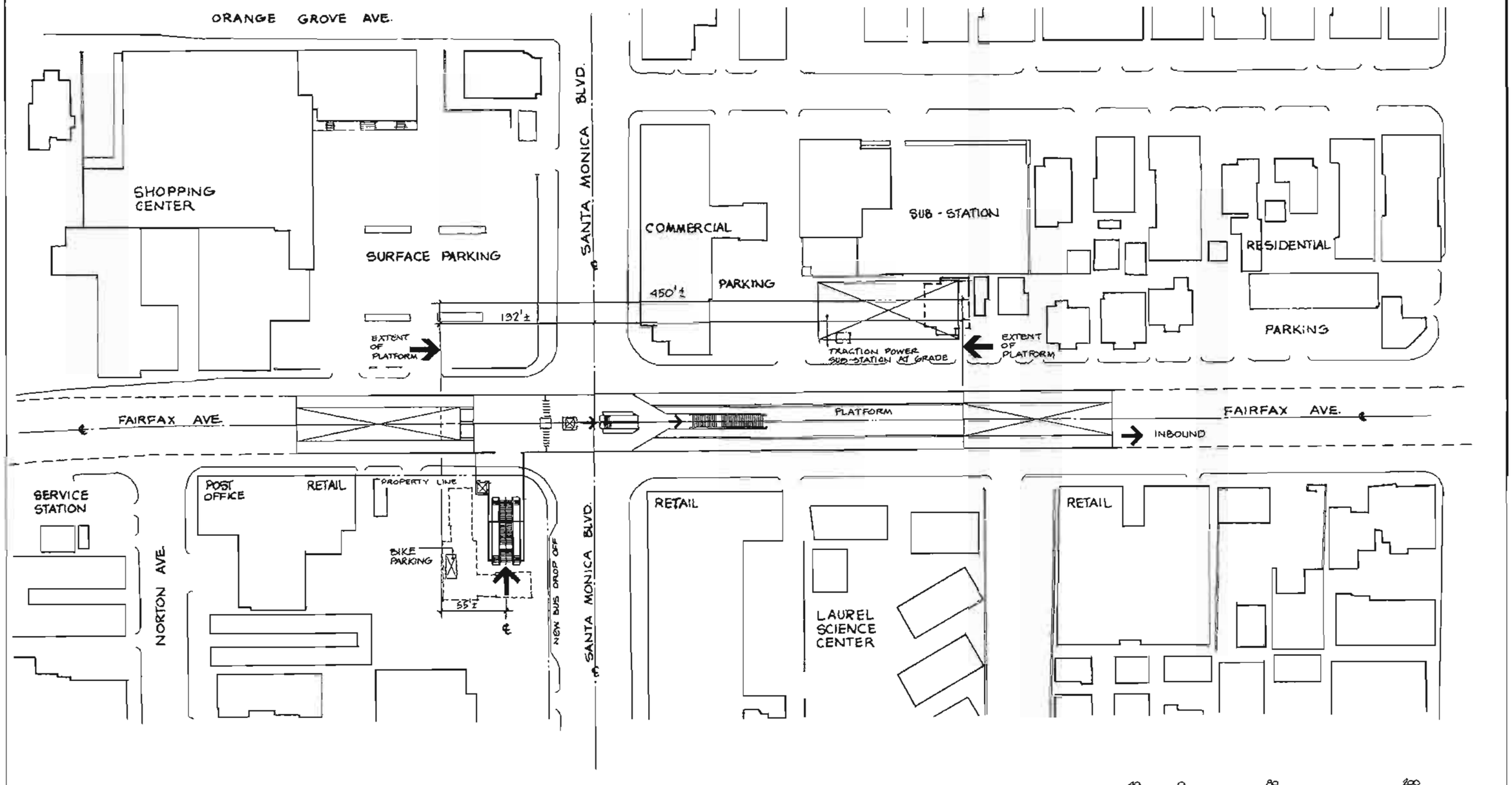
The Fairfax/Santa Monica Station will be located under Fairfax Avenue between Romaine and Norton Streets. Land use along the major streets in this station area is primarily low-rise, storefront retail and small neighborhood shopping centers. There are many vacant lots and parking lots interspersed with a gererally low level of development. The areas off the major streets are primarily residential land uses with a variety of housing types.

Station Site Design Paramenters

In addition to patrons arriving on foot to the station, the major mode of access will be via bus. The buses will be primarily arriving from and departing to the west and some buses may terminate at the station. Therefore, to facilitate the rail-bus transfer movement, the single entry to this station is planned for the northwest corner of the intersection of Fairfax and Santa Monica. A bus turnout lane is proposed for the north side of Santa Monica adjacent to the station entry. Although locating the entry on this corner will require the demolition of an existing service station, the corner will offer great development potential after the entry is in place.

Station Design Parameters

A single mezzanine located on the north end of the station will provide sufficient space to meet the projected moderate patronage demand but still permit the later construction of a station entry on the northeast corner of Fairfax and Santa Monica if future development or patronage warrants the addition. The station is planned with a center platform and with ancillary space provided at each end of the station. Since neither a crossover or pocket track is proposed for this station, the required traction power substation will not be located in the station structure. The facility is proposed to be at-grade in an off-street location east of Fairfax and south of Santa Monica.



BIKE PARKING LOCATION SUBJECT TO CHANGE

PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY H'NA'GIN'AYSTEC Date 1-18-83
DRAWN BY M. POINDEXTER Date 1-18-83
CHECKED BY J Wiley Date 2-3-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
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SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED — Reg. No.
APPROVED — Date — MANAGER / CHIEF ENGINEER — Reg. No.

FAIRFAX / SANTA MONICA STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-19

LA BREA/SUNSET STATION

Background

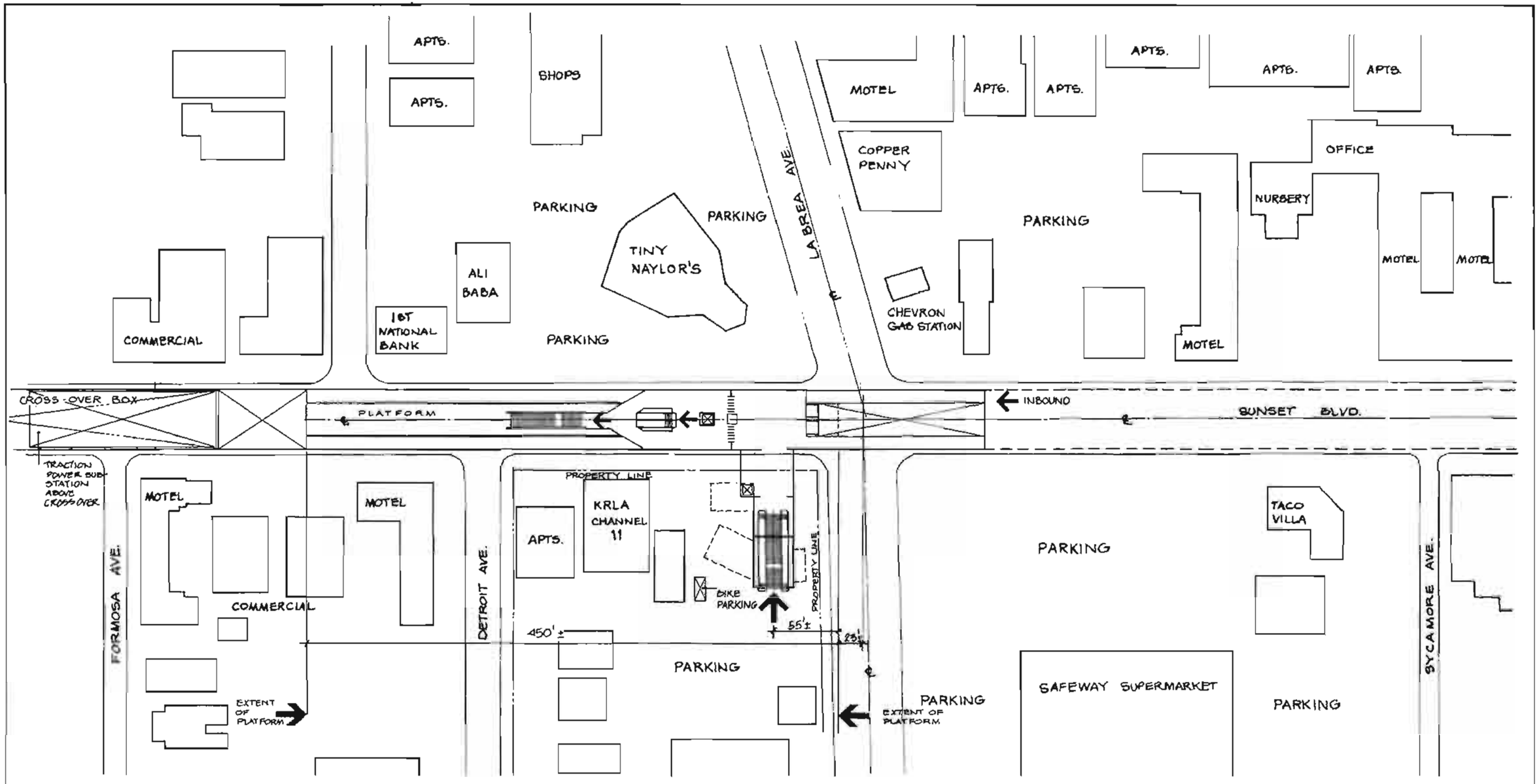
The La Brea/Sunset Station will be located under Sunset Boulevard between Formosa and La Brea Avenues. The station area is characterized by mixed-use development. The major streets, Sunset and La Brea, have low-rise commercial facilities. The areas behind the major streets are primarily single-family residential. Hollywood High School is located nearby. A Safeway Supermarket is located on the southeast corner of La Brea and Sunset, service stations are on the northeast and southwest corners, and a Tiny Naylor's Restaurant is on the northwest corner.

Station Site Design Parameters

The expected patronage for this station is among the lowest on the system. It is planned with a single entry to be located on the southwest corner of the intersection of Sunset and La Brea. The construction of the entry will require the removal of an existing service station, but the site will have future development potential.

Station Design Parameters

In response to the low patronage projection the station is planned with a single mezzanine at the east end of the station. The station will have a center platform with ancillary space provided at each end of the station. A double crossover track will be located at the west end of the station and the required traction power substation will be located over the cross-over track.



BIKE PARKING LOCATION SUBJECT TO CHANGE

PRELIMINARY: FOR STUDY PURPOSES ONLY

40 0 80 200

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY HWA/GW/IMS/TEC Date 1-18-83
DRAWN BY M. POINDEXTER Date 1-18-83
CHECKED BY JW Tey Date 2-9-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
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GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
APPROVAL RECOMMENDED Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

LA BREA / SUNSET STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-20

HOLLYWOOD/CAHUENGA STATION

Background

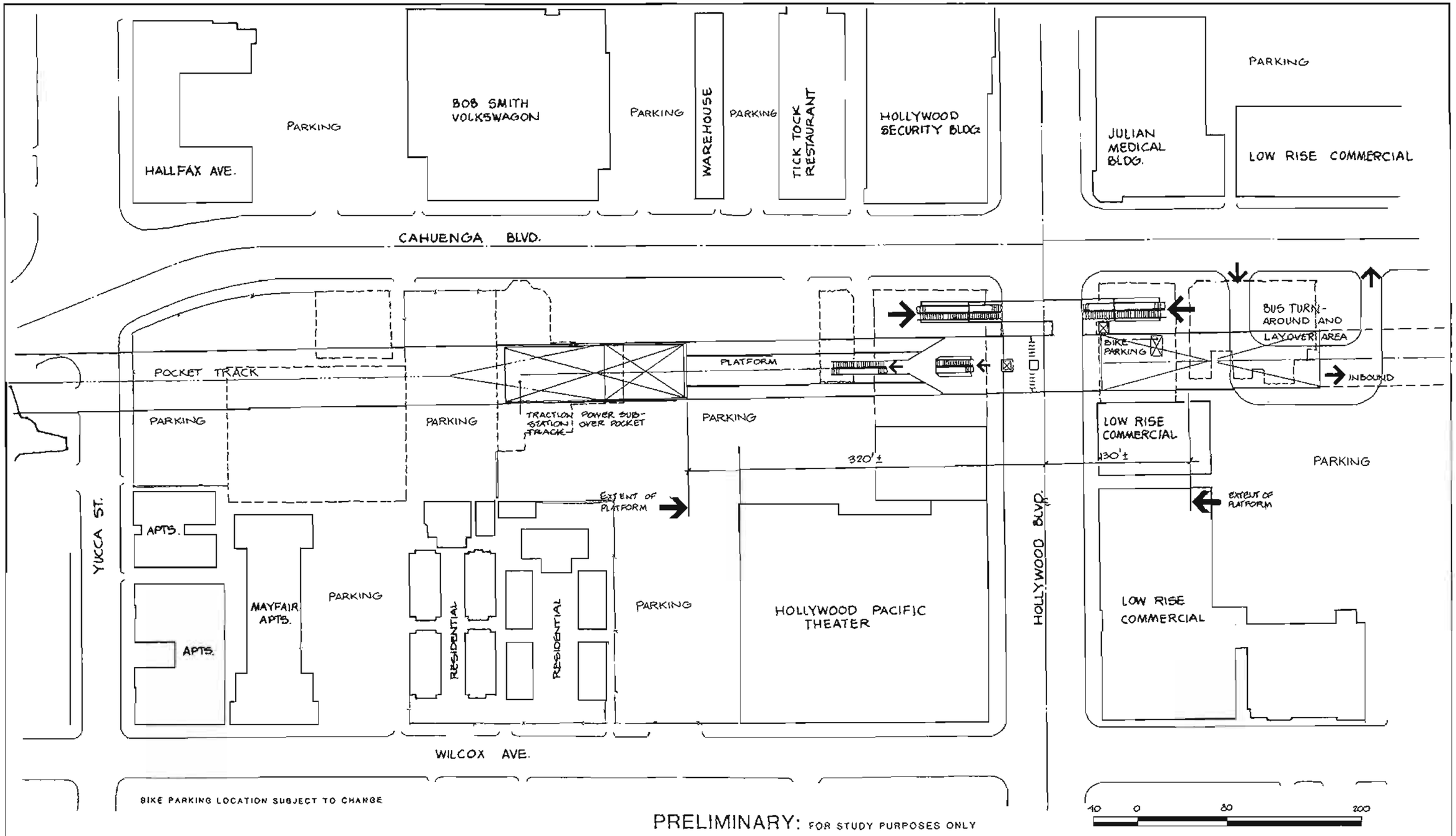
The Hollywood/Cahuenga Station will be located off-street running north-south along the west side of Cahuenga Boulevard from a point just south of Hollywood Bouelvard up to Yucca Street. The station area is in the commercial center of Hollywood. The development along Hollywood Boulevard is low and medium rise commercial with a number of theaters and other entertainment users. A mixture of commercial and industrial buildings are located on Cahuenga Boulevard. North of Hollywood Boulevard and west of Cahuenga are high density residential areas.

Station Site Design Parameters

In addition to serving passengers whose destination is the station area, many station users will be transferring to buses running in both directions on Hollywood Boulevard. Some bus lines will terminate at the station and others will continue on. In response to expected pedestrian activity and the bus movements, the station has been planned with two entries, one on the northwest and one on the southwest corner of Hollywood and Cahuenga. An area immediately to the south of the station is planned for use as a bus turnaround and layover area. This area is also used as a staging area for buses serving the Hollywood Bowl. A pocket track will be located at the north end of the station. Both the station and the pocket track will be constructed by the cut-and-cover method which will result in the removing of most of the existing structures facing on Cahuenga Boulevard between Hollywood Boulevard and Yucca Street. This area, which will be adjacent to a station entry, will upon completion of station construction, be available for new development. The off-street station location will reduce traffic impacts normally caused by construction activities.

Station Design Parameters

The station, which has moderately high patronage projections, is planned with a single mezzanine located at the south end of the station connecting to two station entries. Ancillary space will be provided at each end of the station and a traction power substation will be located over the pocket track described above.



PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY HWA GW TMS TEC Date 1-18-83
DRAWN BY M. POINDEXTER Date 1-18-83
CHECKED BY J Wiley Date 1-21-83

HARRY WEESE & ASSOCIATES
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GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO BAIL PROJECT
RTD

APPROVAL RECOMMENDED — Date — Reg. No.
APPROVED — Date — MANAGER / CHIEF ENGINEER — Reg. No.

HOLLYWOOD / CAHUENGA STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-21

UNIVERSAL CITY STATION

Background

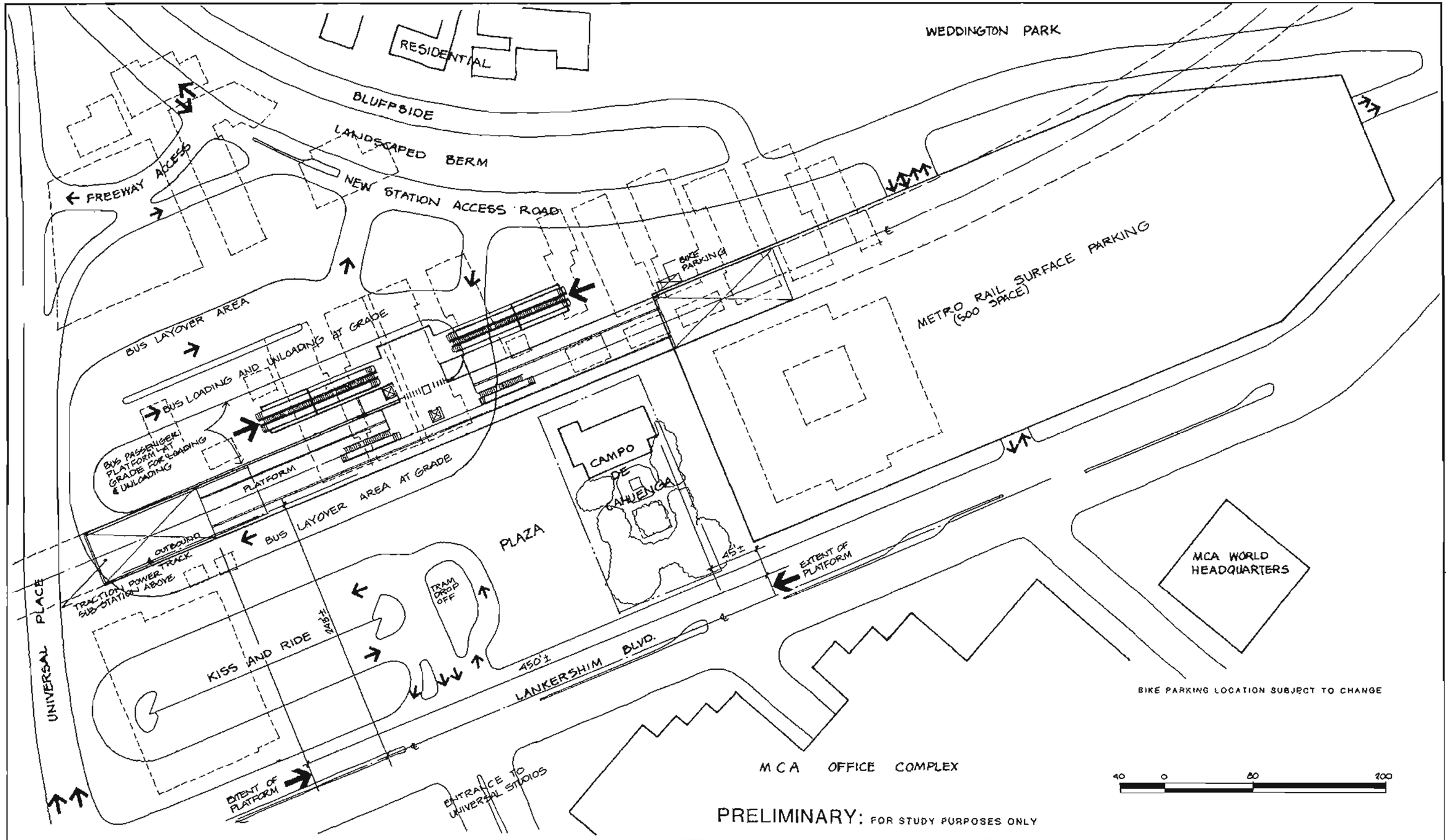
The Universal City Station will be located off-street in an area bounded by Lankershim Boulevard on the east, Universal Place on the south, and Bluffside Drive on the west and north. MCA Headquarters and Universal Studios are located immediately to the east. Areas to the west are either residential or parkland. Within the station site boundaries is located the Campo de Cahuenga--a historic landmark park. The Hewlett Packard Company which currently occupies a facility in the station area is relocating to new facilities in the near future. A 36 story, 700,000 sq. ft. office building, which will be the headquarters for the Getty Oil Corporation, is under construction on the east side of Lankershim adjacent to the Hollywood Freeway.

Station Site Design Parameters

The program for the station site includes a future parking structure, but surface parking only in the first phase; 40 space Kiss-Ride area; and a bus terminal with boarding locations for 8 bus lines and layover capacity for 10 buses. Vehicular access problems to the site will be mitigated by the construction of a separate roadway, parallel to but separate from Bluffside Drive, over the Hollywood Freeway to Ventura Boulevard. Also, Universal Place will be changed to a one-way westbound street. Extensive landscaped berms will be provided to further mitigate adverse impacts from the new roadway and overpasses. The station site entry from Lankershim will be configured to permit Universal Studio Trams to cross Lankershim and load/unload passengers convenient to a station entry. The existing RTD Park-Ride lot and the tennis courts west of the Hollywood Freeway will be used for additional surface parking. Landscaping and setbacks will be used to mitigate any adverse impacts on the Campo de Cahuenga. All other structures in the station area will be removed. The station entries and vehicular access areas are being designed to provide a parklike setting and enhance the neighborhood.

Station Design Parameters

Two entrances are planned for this station, one serving the bus terminal and the other oriented towards the parking areas and serving pedestrians. The entrances will lead to a single mezzanine located in the center of the station. Ancillary space will be provided at each end of the station with a traction power substation located below-grade over the ancillary space at the south end of the station.



REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date 1-18-83 HWA. GN/TAMS/EC
DRAWN BY Date 1-19-83 M POINDEXTER
CHECKED BY Date 2-9-83 J. Wiley

HARRY WEESE & ASSOCIATES
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GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

UNIVERSAL CITY STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-22

NORTH HOLLYWOOD STATION

Background

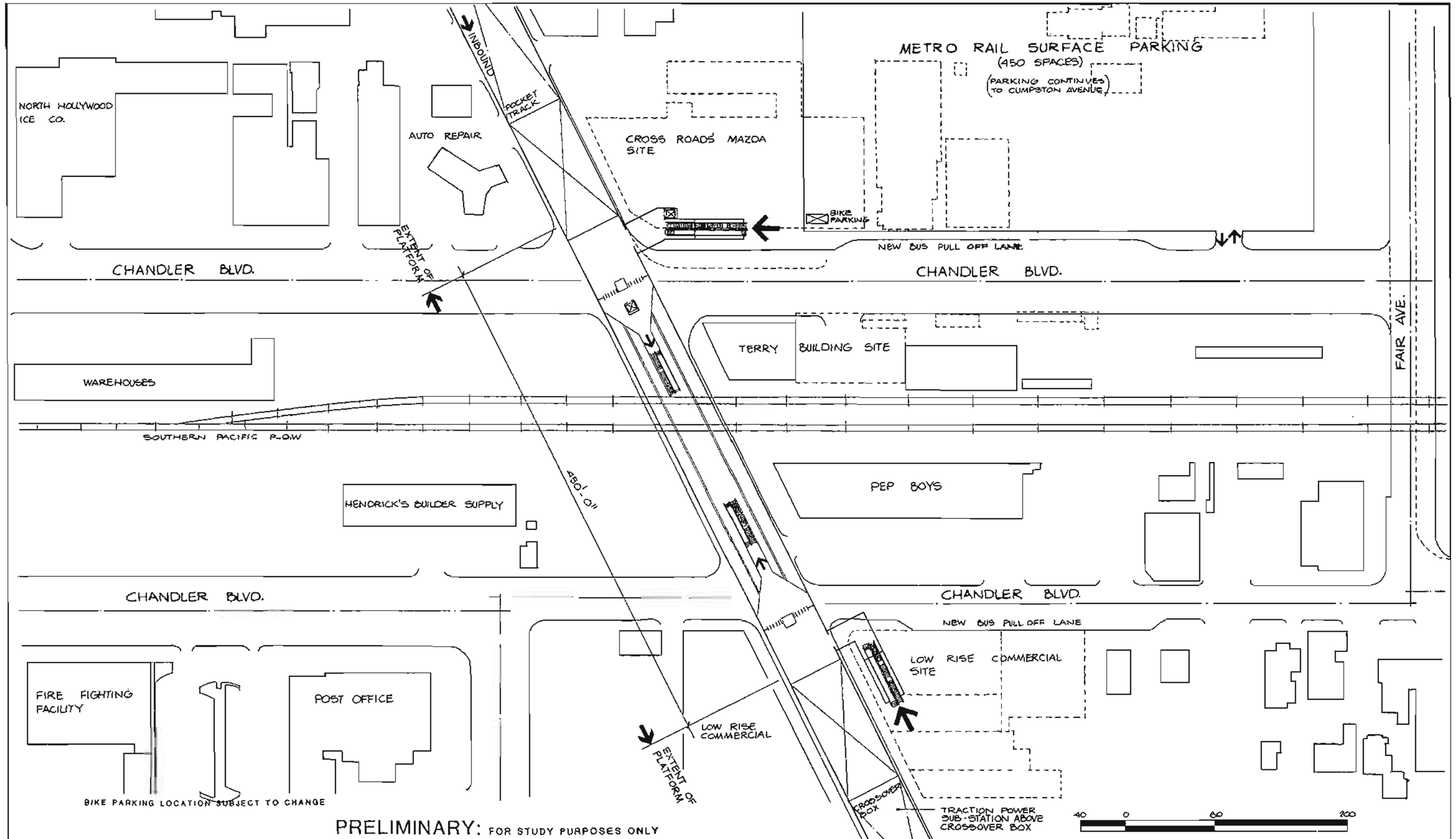
The North Hollywood Station will be located under Lankershim Boulevard straddling Chandler Boulevard. The area around the station has many different land uses. Auto dealerships are located along Lankershim to the north. Low-rise commercial--retail space predominates along Lankershim to the south. The area along Chandler is used for industrial and warehousing purposes. An office/warehouse facility extending from Tujunga westward along Chandler was recently completed. The station lies within the boundaries of the North Hollywood Redevelopment Area. The first phase of redevelopment is planned for the area south of Chandler and east of Lankershim. Residential land use exists to the north and east of the station.

Station Site Design Parameters

The program for the station site includes a future 2300 space parking structure, but initially only surface parking will be provided. A bus turnaround and layover area are also planned. In response to the need to serve both the redevelopment area and the surface parking area, the station has been planned with an entry at each end. Parking has been sited just north of the Chandler Boulevard on the east side of Lankershim. The face of the future parking structure will be held back to permit commercial/retail development to occur along Lankershim. A bus turnout lane is planned on the south side of Chandler just east of Lankershim. Buses unload at this location and proceed left onto Fair Avenue and then into the turnout lane proposed for the north side of Chandler, adjacent to the south face of the parking site. Buses will also board passengers from this turnout lane on Chandler. It is proposed to widen the section of Chandler between Lankershim and Fair to permit the striping of a left-hand turn pocket lane for buses and also for cars using Fair Avenue. The south station entry is located on the southeast corner of Lankershim and Chandler and can be oriented to the south or east depending on future development plans for the corner.

Station Design Parameters

To accommodate the two widely spaced entrances the station has been planned with a mezzanine at each end of the platform. A double crossover track will be located at the south end of the station and a pocket track at the north end. The station, pocket track, and crossover track areas will all be constructed by the cut-and-cover method and a traction power substation will be located over the crossover track.



PRELIMINARY: FOR STUDY PURPOSES ONLY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY GIN WONG ASSOCIATES — Date
DRAWN BY M. POINDEXTER — Date 2-16-83
CHECKED BY J. Vilay — Date 2-14-83

HARRY WEESE & ASSOCIATES
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENVIRONMENTAL COLLABORATIVE, INC.
GIN WONG ASSOCIATES
General Architectural Consultants: Stations
SUBMITTED BY:
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED — Reg. No.
APPROVED — Date
MANAGER / CHIEF ENGINEER — Reg. No.

NORTH HOLLYWOOD STATION

CONTRACT NO.
DRAWING NO.
SCALE SEE ABOVE
SHEET NO.

FIGURE II-23

III. WAYS AND STRUCTURES DESIGN

III. WAYS AND STRUCTURES DESIGN

A. ALIGNMENT DESCRIPTION, PLANS AND PROFILES

In the following description the alignment is divided into four segments. These four segments correspond to the phased construction of Metro Rail. Each of the segments could be built and put into operation sequentially should that be necessary. Each segment description is related to the attached detailed Plan and Profile drawings.

Los Angeles CBD - Union Station to Wilshire/Vermont Station

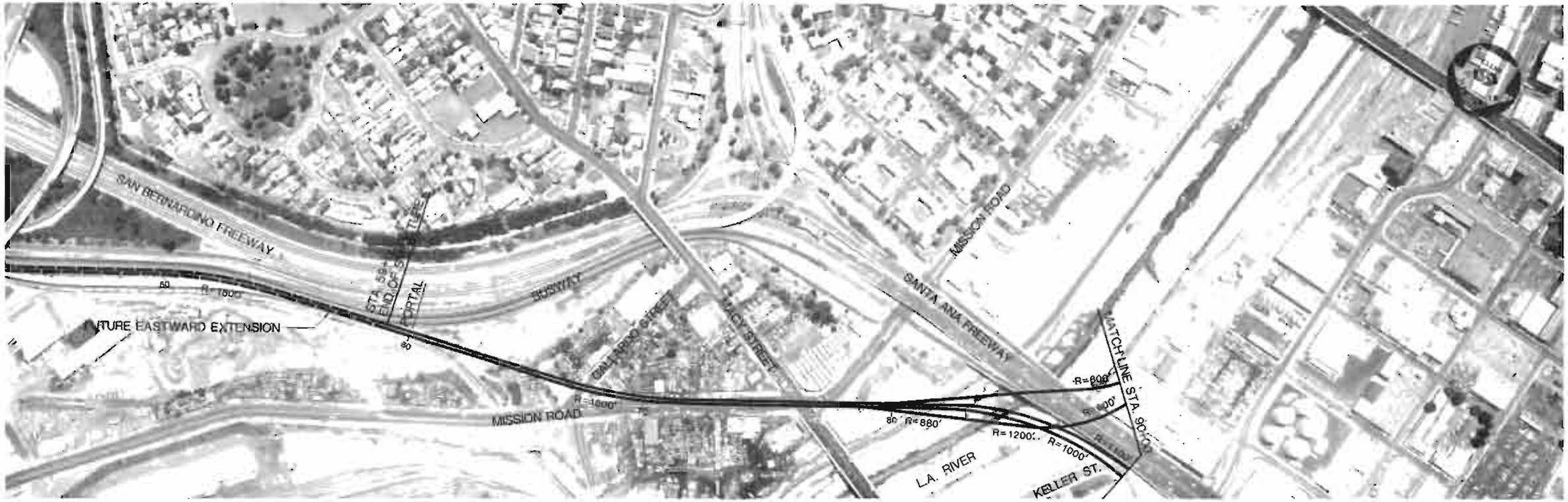
This route segment is shown in Figures III - 1, 2, 3, 4, 5, and 6 of the Plan and Profile drawings. Beginning at the storage and maintenance yard adjacent to the Los Angeles River, the line runs to Union Station. This portion of the line will be constructed by cut-and-cover methods and includes the yard leads and the wye branch which is used for turning trains. From the Metro Rail Union Station, which is located under the railroad boarding platforms, the alignment runs generally northwesterly to enter Macy Street at Alameda Street. Union Station and the adjacent crossover structure will be constructed by cut-and-cover methods. The line segments through this section will be constructed by tunnel methods. All stations and adjacent crossover structures in this segment are proposed for cut-and-cover construction procedures.

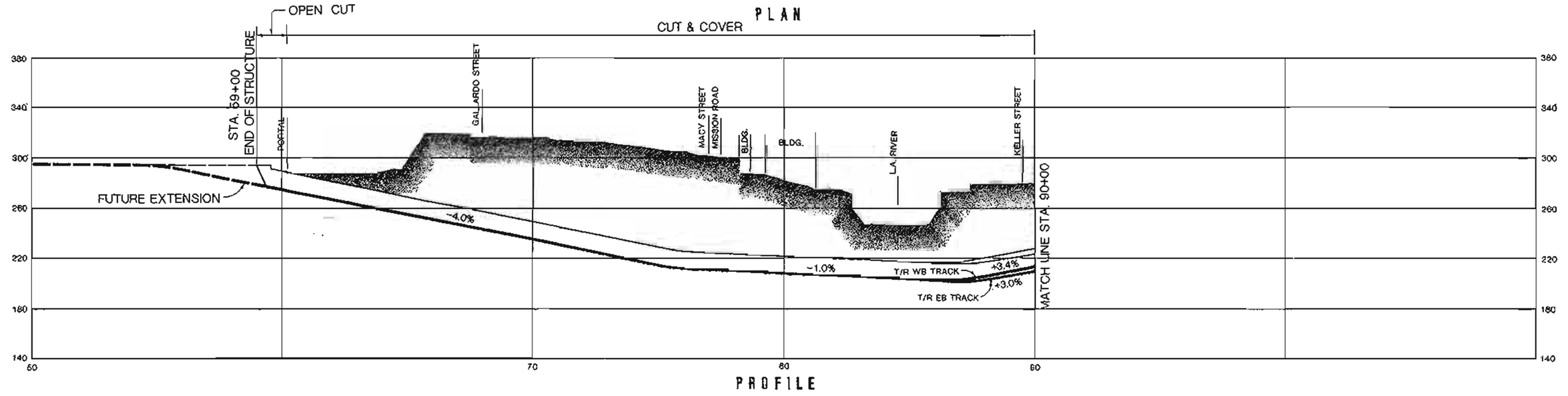
After entering Macy Street right-of-way, the alignment curves to the west, then on a short tangent enters another curve to the southwest under the Santa Ana Freeway and thence into the Hill Street right-of-way at Temple Street. The alignment continues along Hill Street to the Civic Center Station northeasterly of 1st Street.

Leaving the Civic Center Station, the alignment continues southwesterly along Hill Street to the 5th/Hill Station located between 4th and 5th Streets. After leaving the 5th/Hill Station, the alignment continues in Hill Street to about 6th Street where it begins a 1000-foot-radius curve westerly to enter 7th Street at about Grand Avenue. From there it proceeds to the 7th/Flower Station, which is centered on Flower Street.

Leaving the 7th/Flower Station, the alignment remains under 7th, to avoid the Hilton Hotel and continues under 7th Street crossing under the Harbor Freeway. The alignment remains under 7th Street to about Burlington Avenue where it enters an off-street alignment between 7th and Wilshire to reach the Wilshire/Alvarado Station located on the diagonal between Wilshire and 7th Street and just east of Alvarado Street as shown on Sheet 5 of the Plan and Profile drawings. A double crossover is to be constructed just east of the Alvarado station.

Upon leaving the Wilshire/Alvarado Station, the alignment proceeds on the diagonal westerly crossing under the lake in MacArthur Park to enter the Wilshire Boulevard right-of-way at Parkview Street as shown on Sheet 5 of the Plan and Profile drawings. The alignment then runs under Wilshire Boulevard to Hoover Street where Wilshire turns due west while the Metro Rail alignment will continue northwesterly entering an off-street alignment midway between Wilshire Boulevard and 6th Street to reach the off-street Wilshire/Vermont Station. This station would be located mid-block between Wilshire and 6th, straddling Vermont Avenue. A double crossover structure is to be constructed just east of the station.





REV.	DATE	BY	APP.	DESCRIPTION

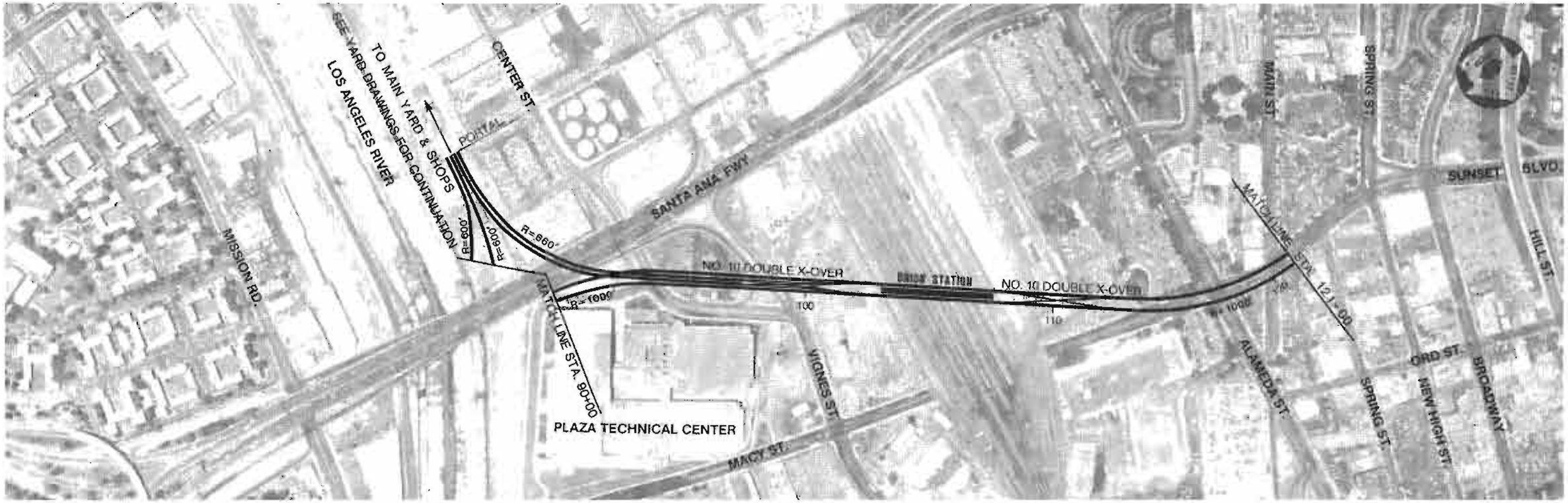
DESIGNED BY CZYZEWSKI GARCIA / DHINSA / KARAT Date 2/2/83
DRAWN BY IONESCU MANUEL / CASTILLO / MACIS Date 2/9/83
CHECKED BY LOGAN Date 2/9/83

DMJM/PBQD
A Joint Venture
General Engineering Consultant - Ways and Structures
SUBMITTED BY:
PROJECT MANAGER Reg. No.

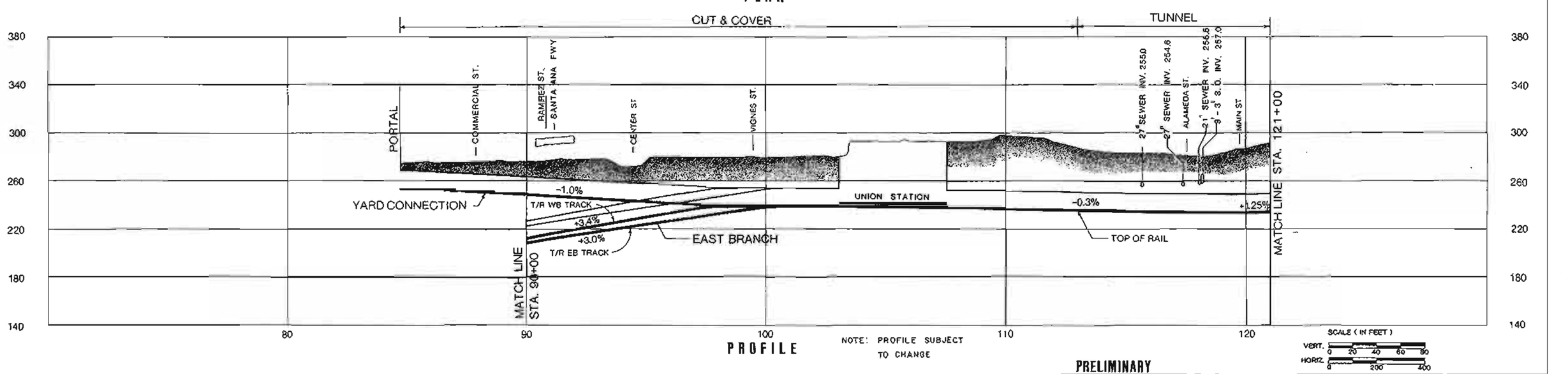
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD
APPROVAL RECOMMENDED
DEPUTY CHIEF ENGINEER Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS
ALIGNMENT PLAN AND PROFILE
STATION 59+00 TO STATION 90+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-001
SCALE AS SHOWN
SHEET NO. 1 OF 21



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

PRELIMINARY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date 2/2/83
CZYZEWSKI
GARCIA / DHINSA / KARAT

DRAWN BY Date 2/9/83
IONESCU
MANUEL/CASTILLO/MACIS

CHECKED BY Date 2/9/83
LOGAN

DMJM/PBQD
A Joint Venture
General Engineering Consultant - Ways and Structures

SUBMITTED BY:

PROJECT MANAGER Reg No.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED Reg. No.

APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 90+00 TO STATION 121+00

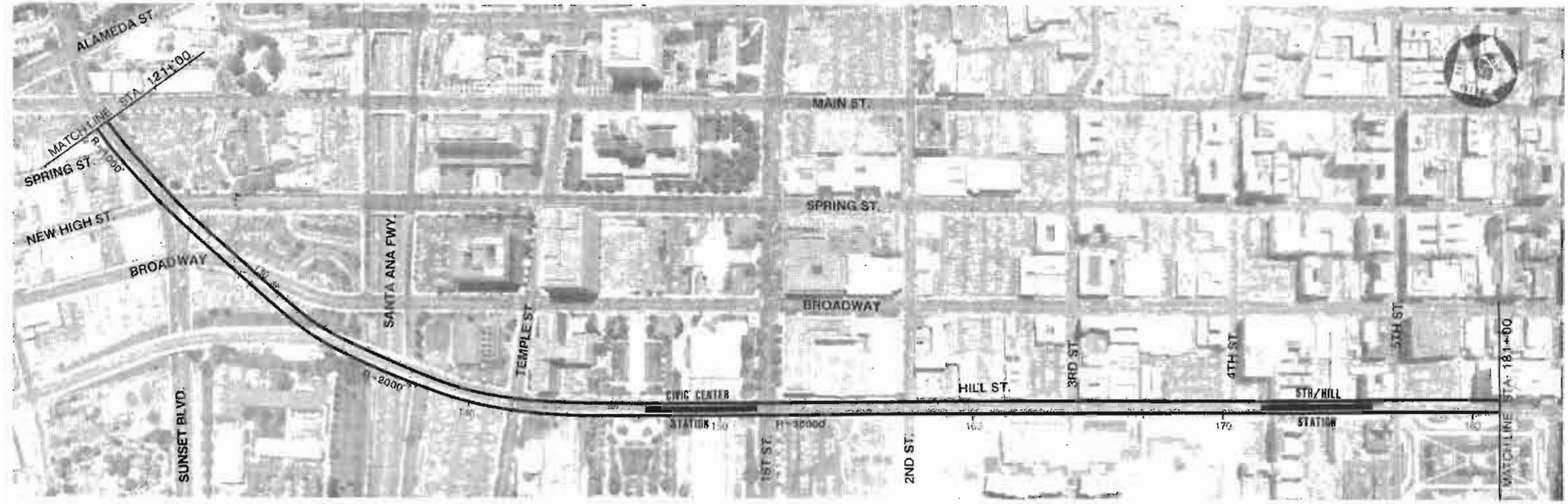
CONTRACT NO.

DRAWING NO. AP-16 AAA-C-002

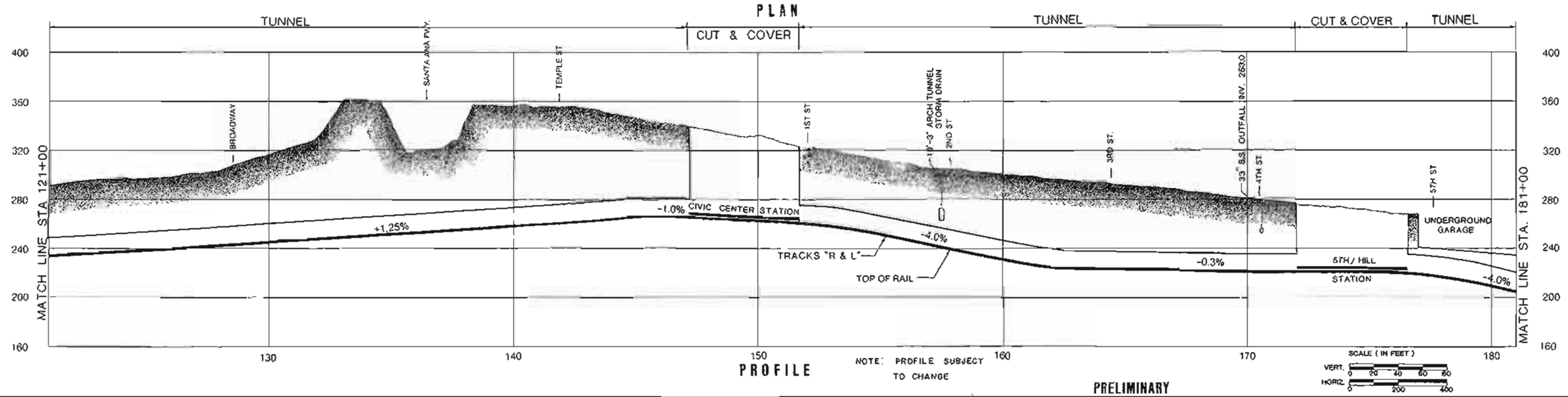
SCALE AS SHOWN

SHEET NO. 2 OF 21

FIGURE III-2



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

PRELIMINARY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date 2/2/83
CZYZEWSKI
GARCIA / DHINSA / KARAT

DRAWN BY Date 2/9/83
IONESCU
MANUEL/CASTILLO/MACIS

CHECKED BY Date 2/9/83
LOGAN

DMJM/PBQD
A Joint Venture
General Engineering Consultant-Ways and Structures

SUBMITTED BY:

PROJECT MANAGER Reg No.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED

DEPUTY CHIEF ENGINEER Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 121+00 TO STATION 181+00

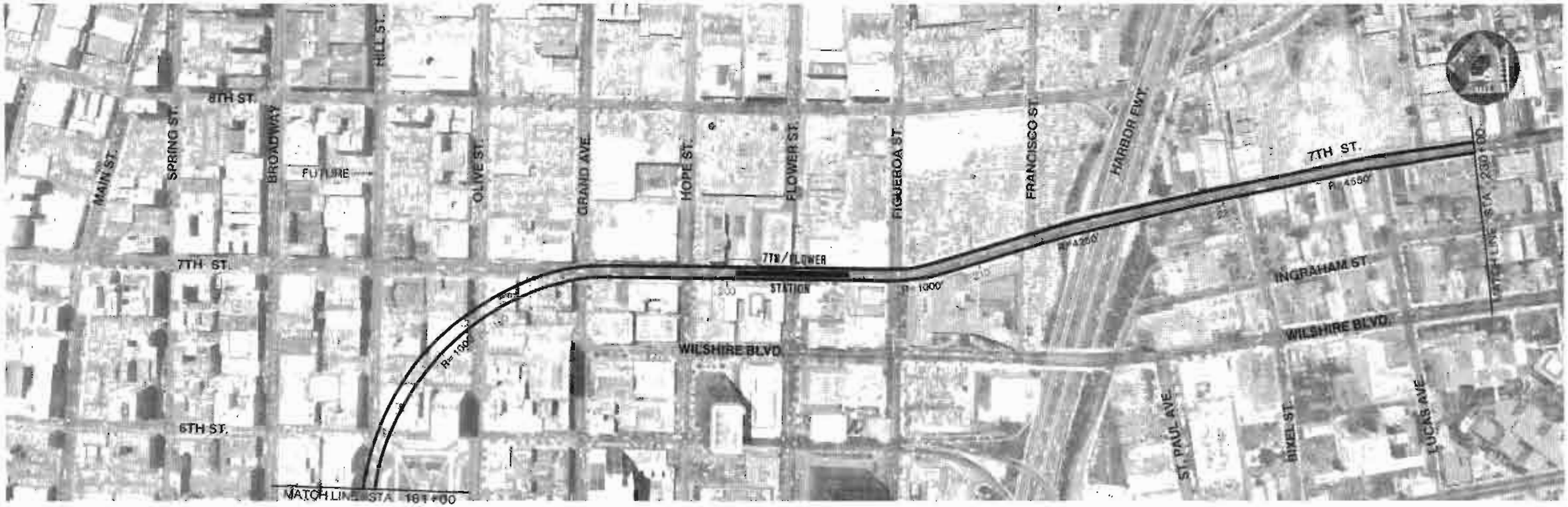
CONTRACT NO.

DRAWING NO. AP-16 AAA-C-003

SCALE AS SHOWN

SHEET NO. 3 OF 21

FIGURE III-3



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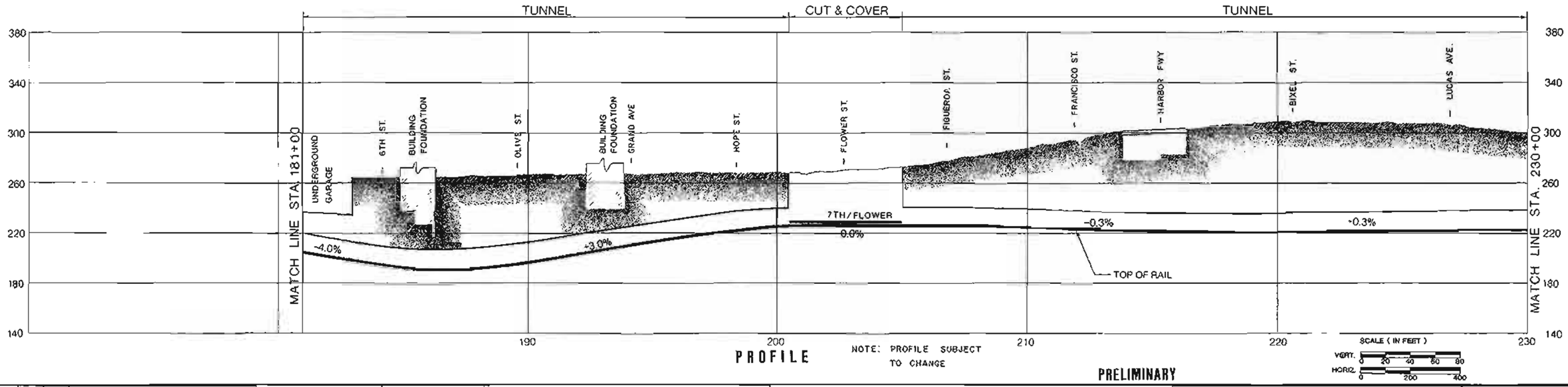

PROFILE

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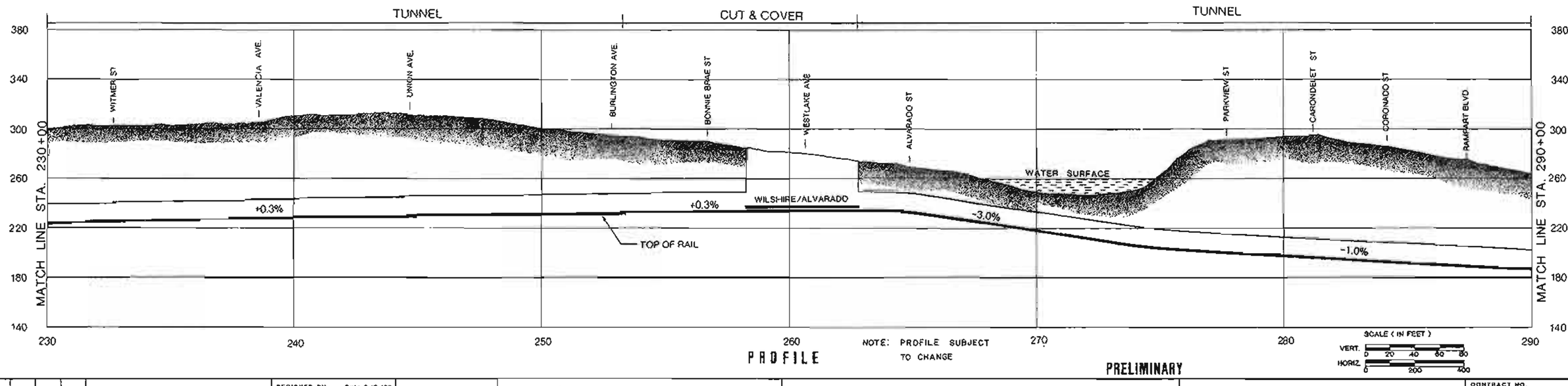
MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE
STATION 181+00 TO STATION 230+00

CONTRACT NO.
DRAWING NO AP-16 AAA-C-004
SCALE AS SHOWN
SHEET NO. 4 OF 21

FIGURE III-4

PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

PRELIMINARY

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METRO RAIL PROJECT

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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 230+00 TO STATION 290+00

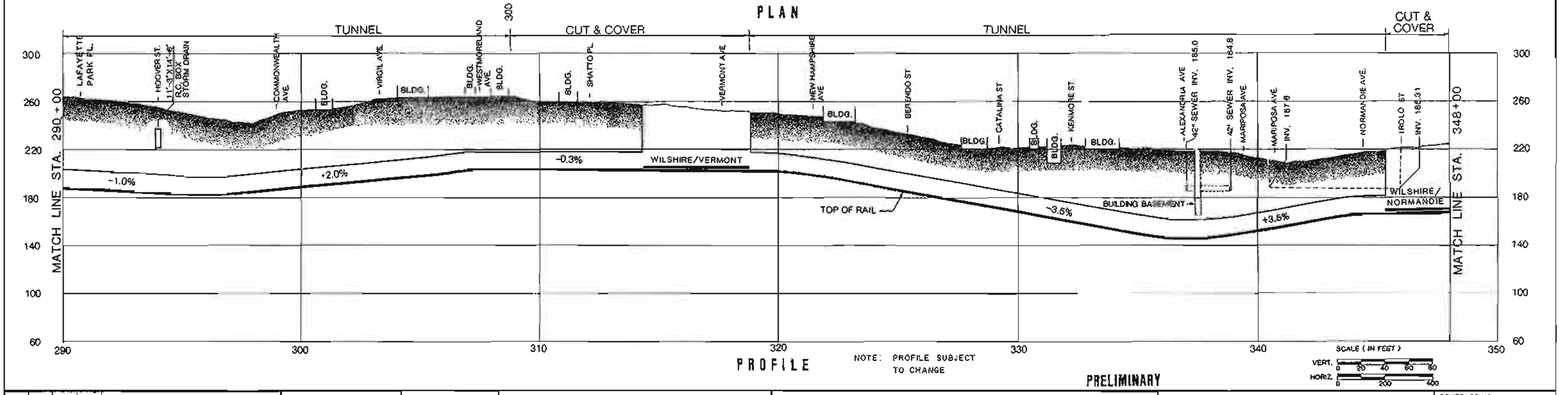
CONTRACT NO.

DRAWING NO. AP-16 AAA-C-005

SCALE AS SHOWN

SHEET NO. 5 OF 21

FIGURE III-5



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METRO RAIL PROJECT

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APPROVED Date
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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 290+00 TO STATION 348+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-006
SCALE AS SHOWN
SHEET NO. 6 OF 21

FIGURE III-6

Vermont Street to Fairfax/Beverly Station
Figures III - 6, 7, 8, 9 and 10)

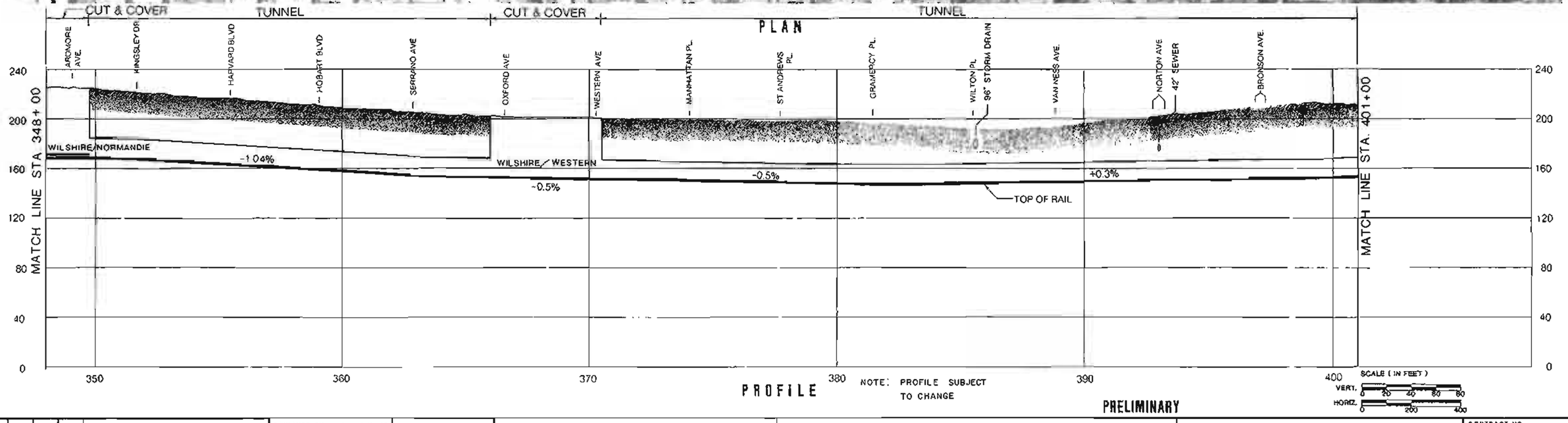
Through this section, all line segments are proposed for construction by tunneling methods and all stations, crossovers, or pocket track structures by cut-and-cover methods.

Leaving the Wilshire/Vermont Station, the alignment enters a set of reversing curves to reach the Wilshire Boulevard right-of-way at Alexandria Avenue. From that point, the alignment continues west under Wilshire Boulevard, through the Wilshire/Normandie Station located just east of Normandie, to the Wilshire/Western Station located just east of Western Avenue.

Leaving the Wilshire/Western Station, the alignment continues under Wilshire Boulevard to the Wilshire/La Brea Station that straddles La Brea Avenue. A pocket track is to be constructed just east of the Wilshire/La Brea Station. After leaving the Wilshire/La Brea Station, the alignment continues west under Wilshire Boulevard to the Wilshire/Fairfax Station.

After leaving the Wilshire/Fairfax Station, the line to North Hollywood turns north off a number 15 turnout from the Wilshire line. The inbound line passes under the future outbound line to Santa Monica, and a side-by-side configuration with the North Hollywood outbound line enters the Fairfax right-of-way.

After entering Fairfax Avenue near 6th Street, the alignment continues north under Fairfax to a point north of 4th Street, then the alignment passes through a set of short reverse curves to enter an off-street alignment under the western edge of the Farmers' Market and the CBS parking lot before reaching the Fairfax/Beverly Station just south of Beverly Boulevard, as shown on sheet 10 of the Plan and Profile drawings. A double crossover is to be constructed just south of the station.



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RTD
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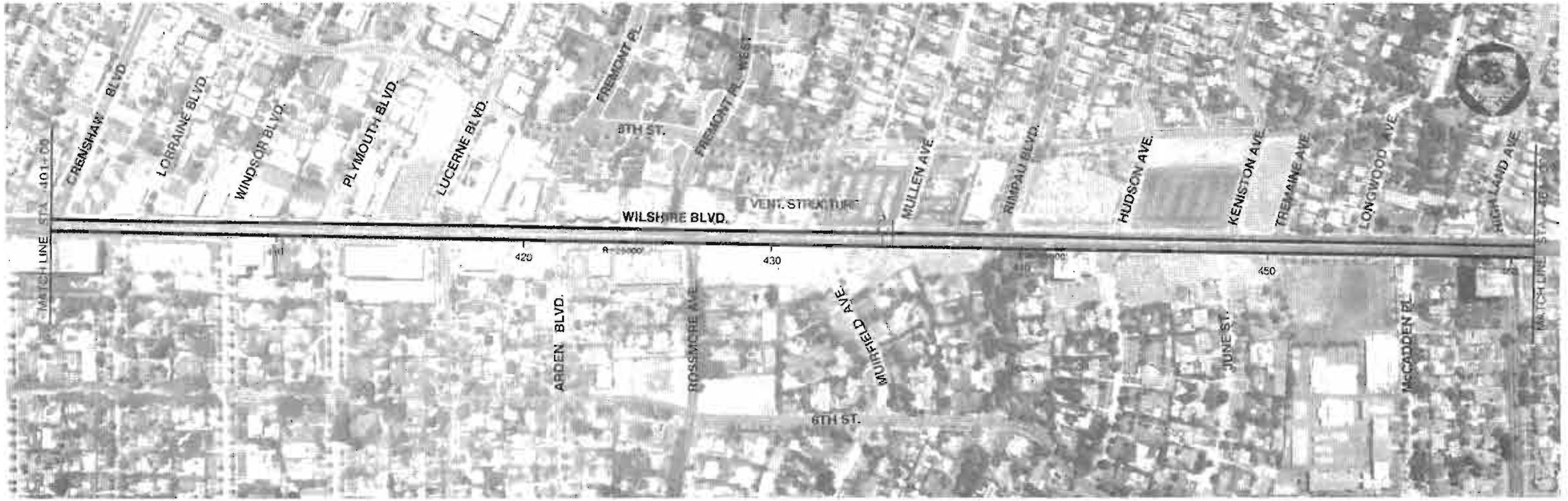
DEPUTY CHIEF ENGINEER Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

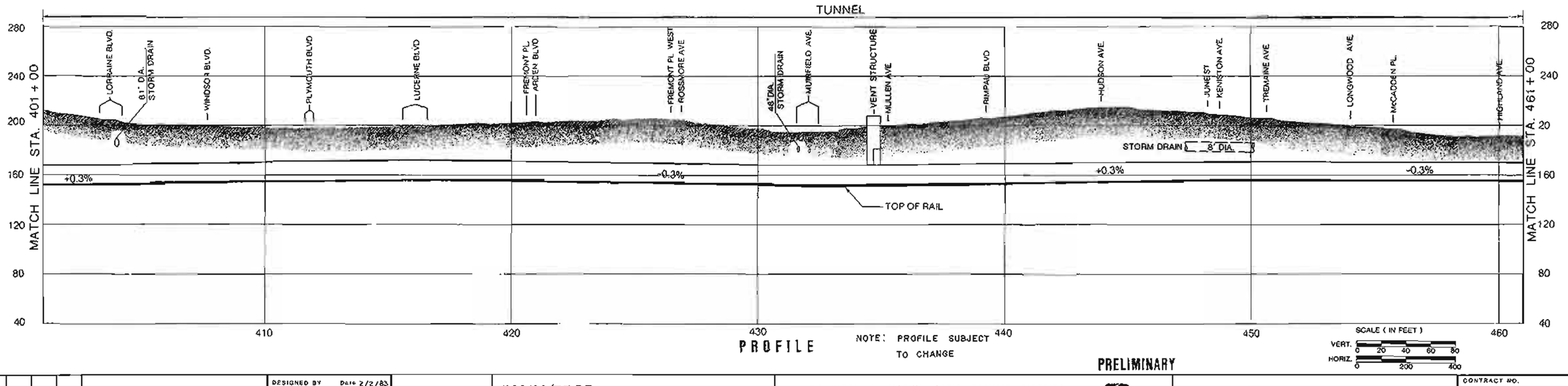
MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS
ALIGNMENT PLAN AND PROFILE
STATION 348+00 TO STATION 401+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-007
SCALE AS SHOWN
SHEET NO. 7 OF 21

FIGURE III-7



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

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MANUEL/CASTILLO/MACIS

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METRO RAIL PROJECT
RTD

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DEPUTY CHIEF ENGINEER Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

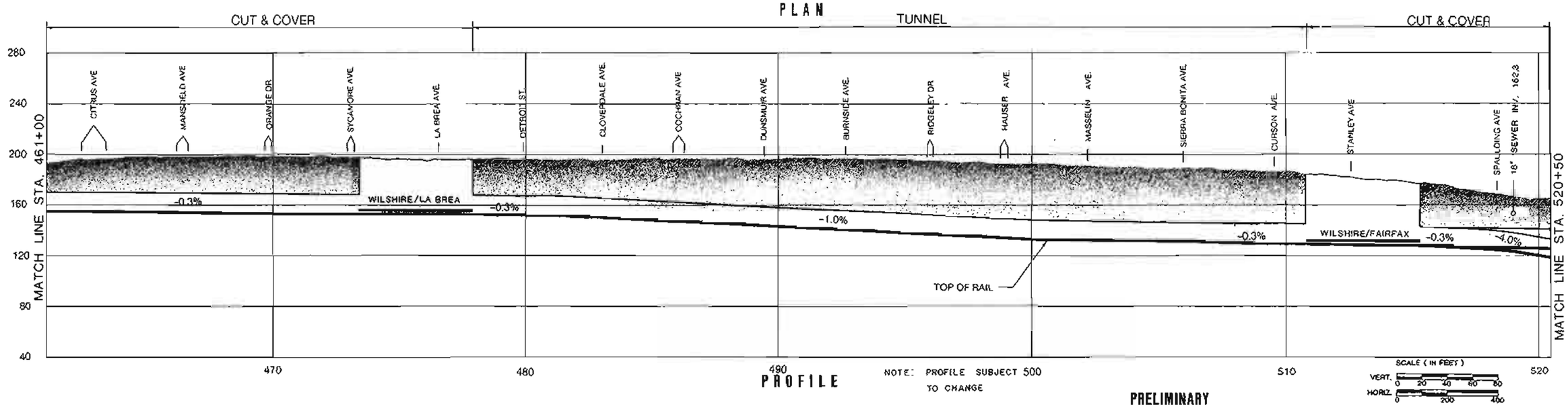
MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE
STATION 401+00 TO STATION 461+00

CONTRACT NO.
DRAWING NO AP-16 AAA-C-008
SCALE AS SHOWN
SHEET NO. 8 OF 21

FIGURE III-8

PLAN



PROFILE

NOTE: PROFILE SUBJECT 500 TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

PRELIMINARY

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METRO RAIL PROJECT
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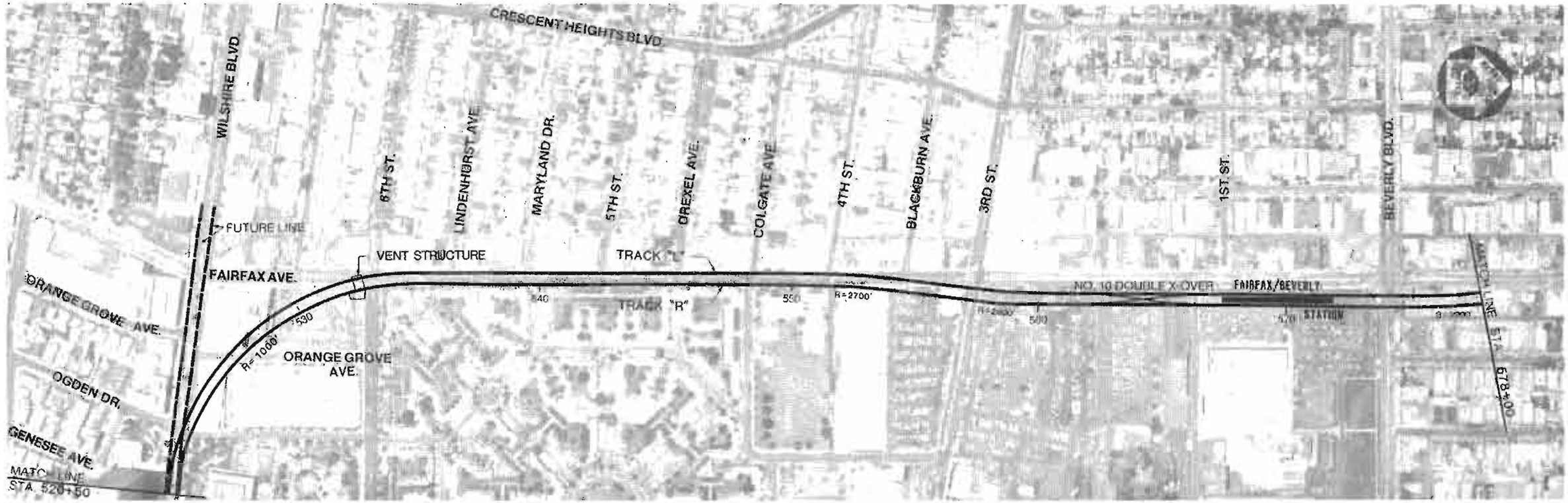
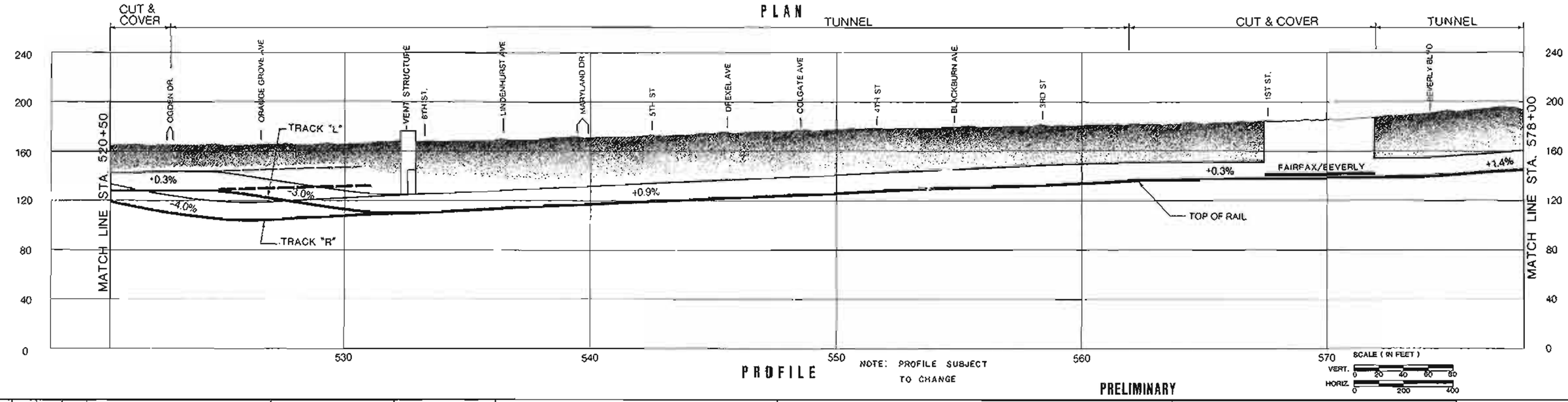
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS
ALIGNMENT PLAN AND PROFILE
STATION 461+00 TO STATION 520+50

CONTRACT NO.
DRAWING NO. AP-18 AAA-C-009
SCALE AS SHOWN
SHEET NO. 9 OF 21

FIGURE III-9





PRELIMINARY

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SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

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DEPUTY CHIEF ENGINEER Reg. No.

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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE
STATION 520+50 TO STATION 578+00

CONTRACT NO
DRAWING NO. AP-16 AAA-C-010
SCALE AS SHOWN
SHEET NO. 10 OF 27

FIGURE III-10

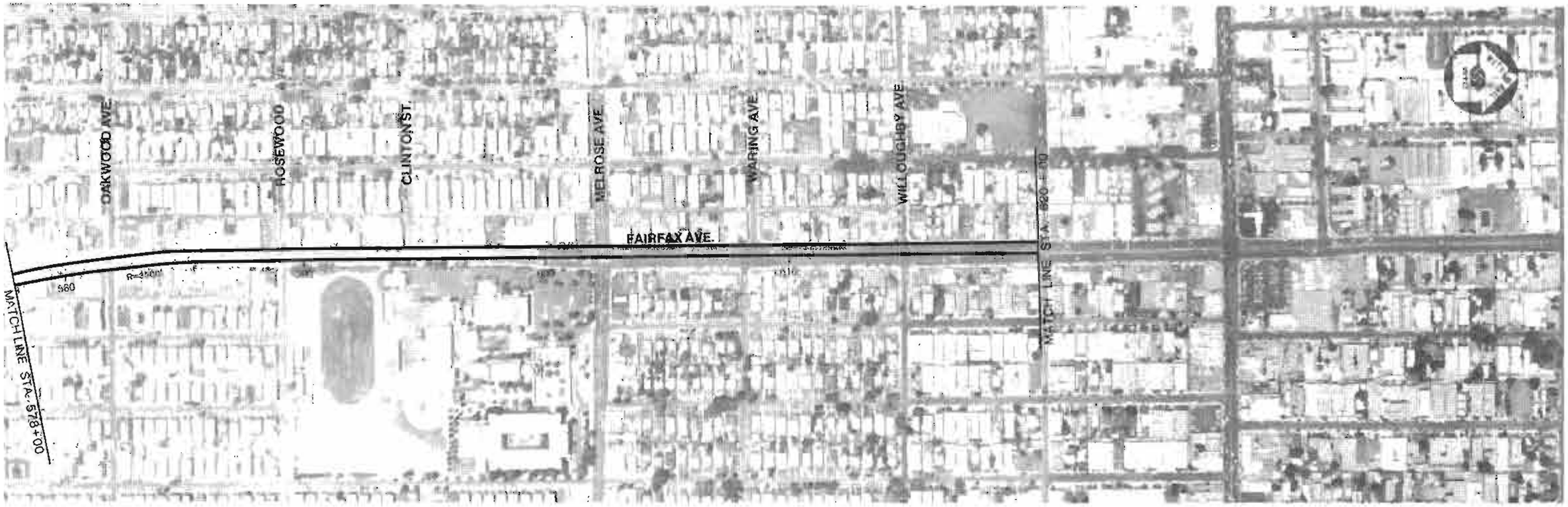
Fairfax/Beverly to Hollywood/Cahuenga Station
Figures III - 10, 11, 12, 13, 14 and 15)

Through this segment, all line segments are proposed for construction by tunneling methods and all stations, crossovers, or pocket track structures by cut-and-cover methods.

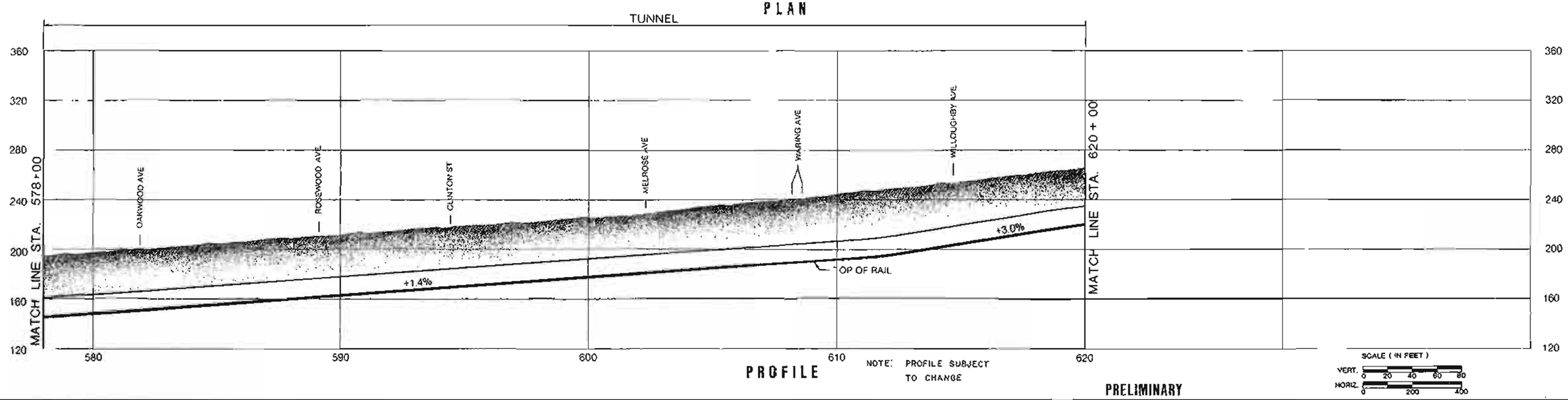
After leaving the Fairfax/Beverly Station, the alignment passes through a set of short reverse curves and returns to the Fairfax Avenue right-of-way north of Oakwood Avenue and then proceeds north under Fairfax to the Fairfax/Santa Monica Station that straddles Santa Monica Boulevard.

The Metro Rail alignment through this segment remains under Fairfax Avenue extending north to a point north of Fountain Avenue where it curves eastward under the Sunset Boulevard right-of-way at Stanley Avenue. The alignment continues east to the La Brea/Sunset Station just west of La Brea Avenue. A double crossover is to be constructed just west of the station.

After leaving the La Brea/Sunset Station the alignment continues easterly under the Sunset Boulevard right-of-way to Hudson Avenue where it curves northerly to an off-street alignment west of Cahuenga Boulevard to the Hollywood/Cahuenga Station that straddles Hollywood Boulevard. Just north of the station a pocket track for storage of a six-car train is to be constructed.



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

PRELIMINARY

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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 578+00 TO STATION 620+00

CONTRACT NO.

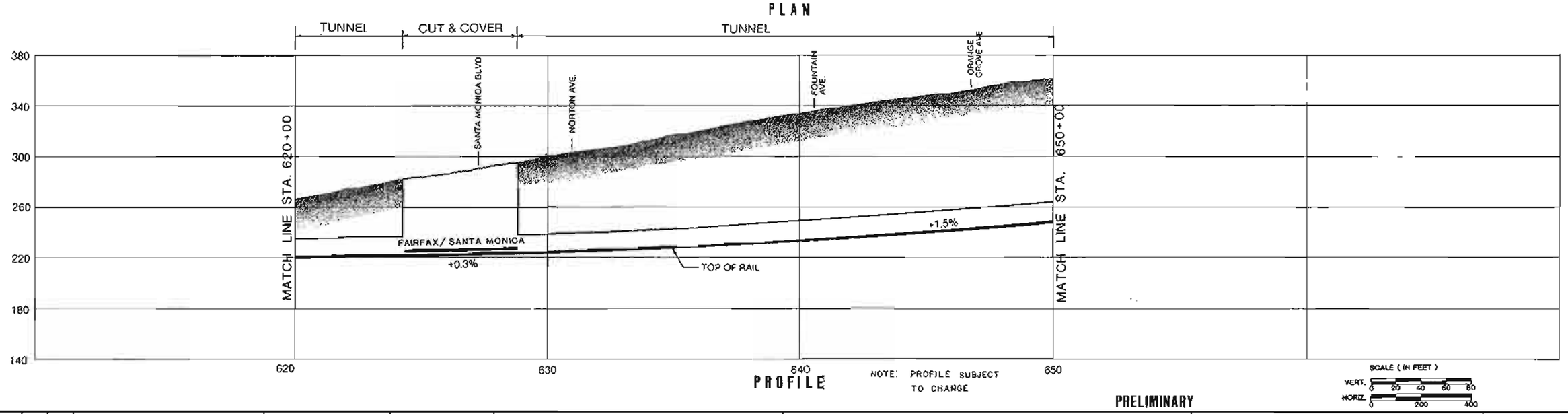
DRAWING NO AP-16 AAA-C-011

SCALE AS SHOWN

SHEET NO 11 OF 21

FIGURE III-11

PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 620 00 TO STATION 650+00

CONTRACT NO.

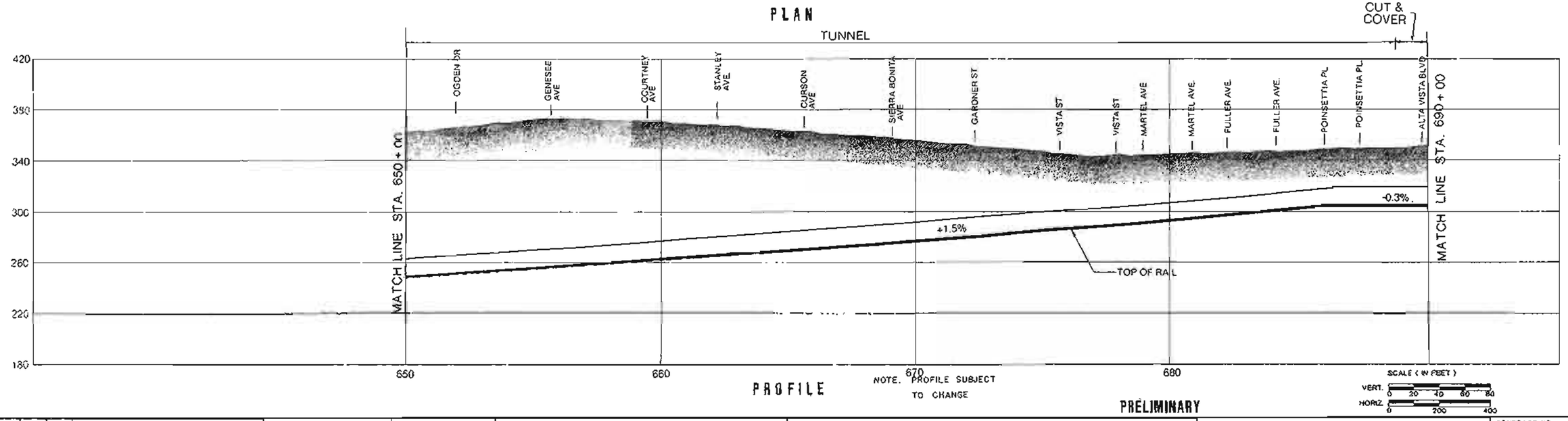
DRAWING NO. AP-16 AAA-C-012

SCALE AS SHOWN

SHEET NO. 12 OF 21

FIGURE III-12

PLAN



PROFILE

NOTE. PROFILE SUBJECT TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 650+00 TO STATION 690+00

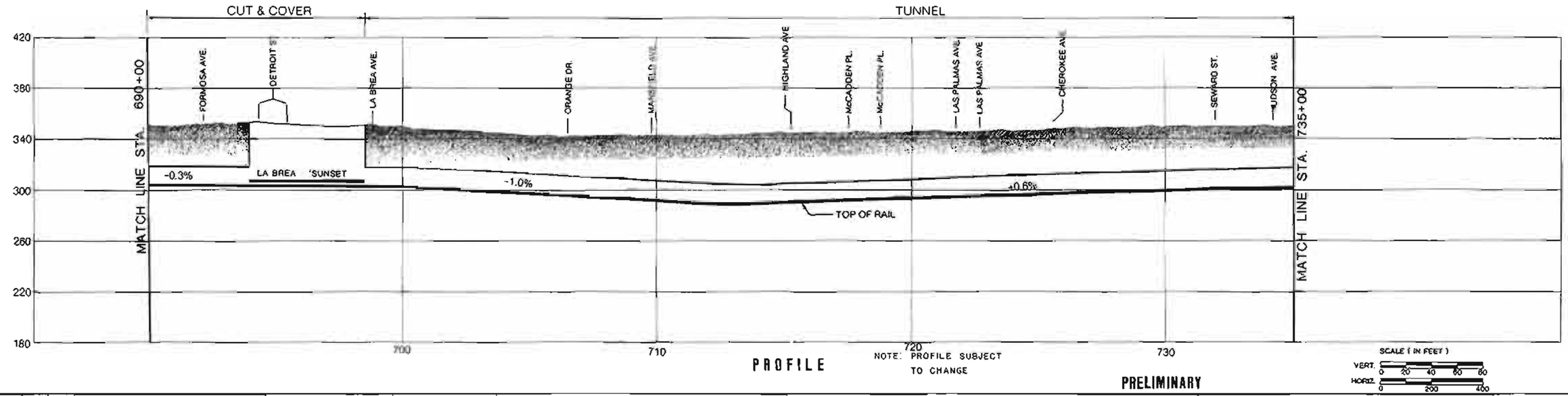
CONTRACT NO.

DRAWING NO AP-16 AAA-C-013

SCALE AS SHOWN

SHEET NO. 13 OF 21

PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 80 80
HORIZ. 0 200 400

PRELIMINARY

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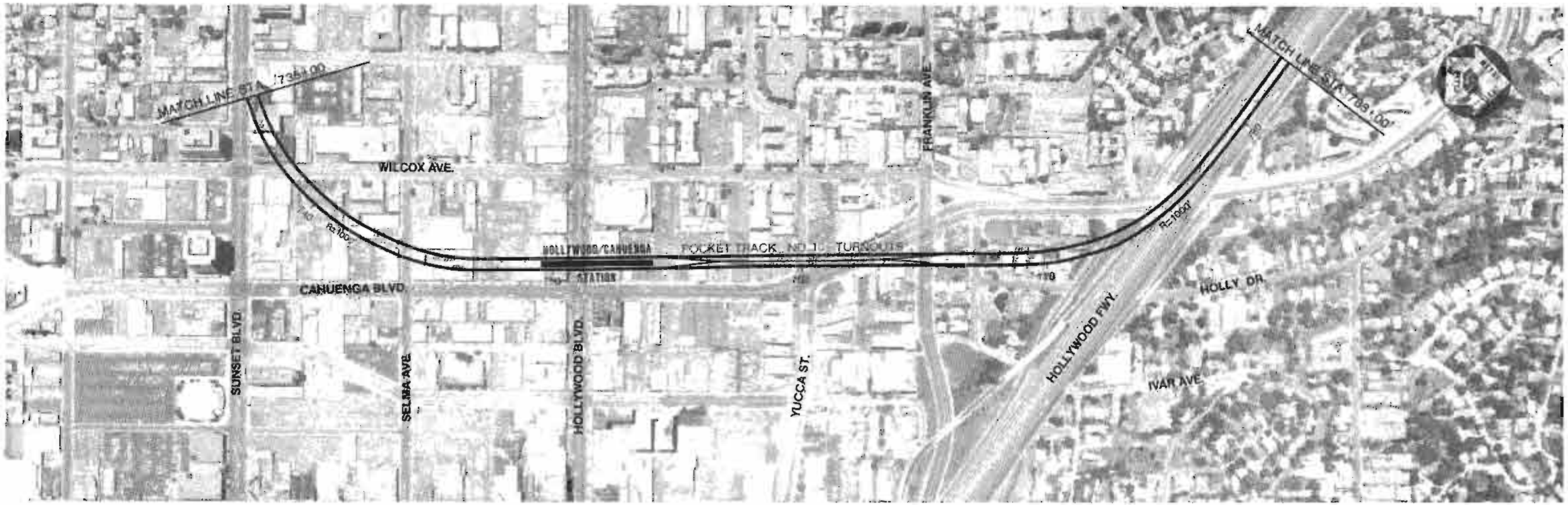
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

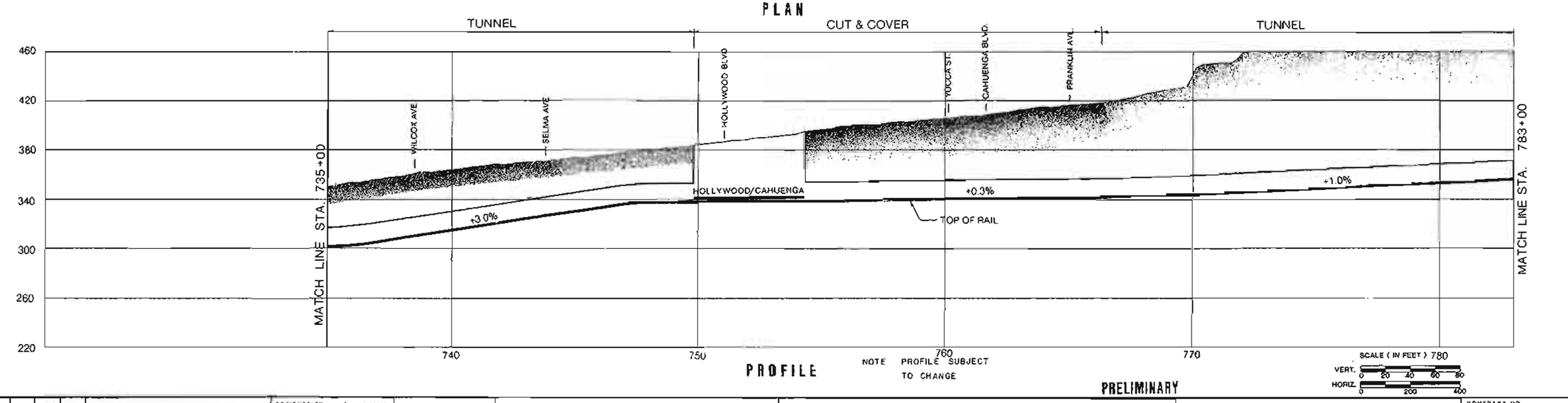
MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS
ALIGNMENT PLAN AND PROFILE
STATION 690+00 TO STATION 735+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-014
SCALE AS SHOWN
SHEET NO. 14 OF 21

FIGURE III-14



PLAN



PROFILE

NOTE PROFILE SUBJECT TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

PRELIMINARY

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MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 735+00 TO STATION 783+00

CONTRACT NO.

DRAWING NO. AP-16 AAA-C-015

SCALE AS SHOWN

SHEET NO. 15 OF 21

Hollywood/Cahuenga Station to North Hollywood Station
Figures III - 15, 16, 17, 18, 19, 20 and 21)

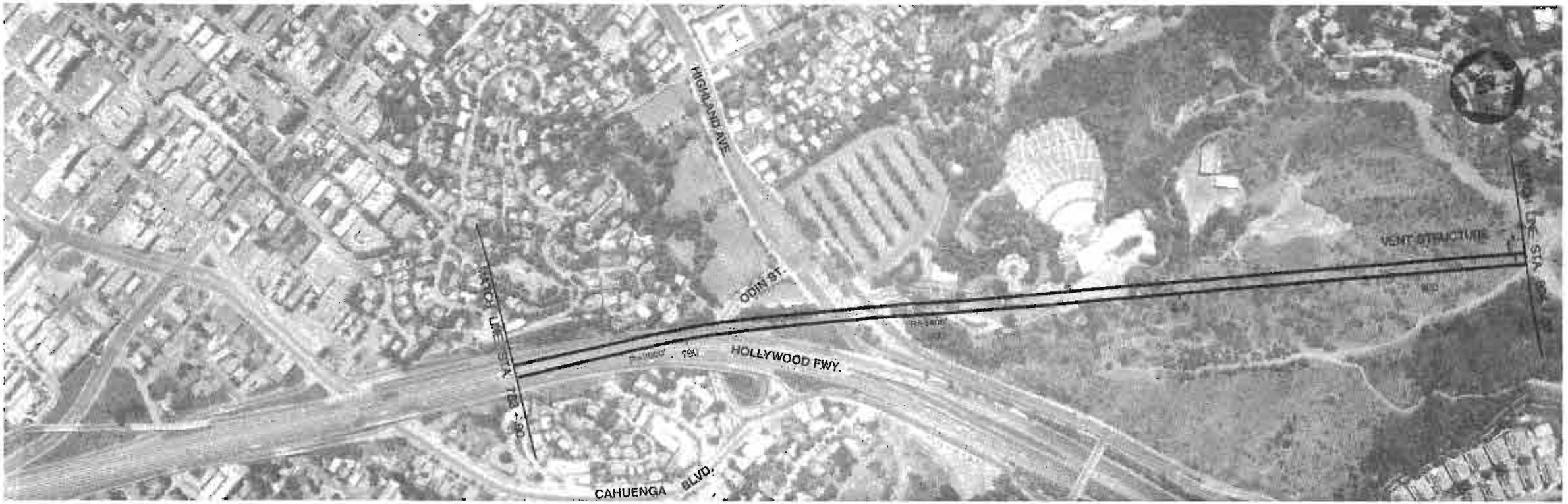
As in other sections, all line segments are proposed for construction by tunneling methods and all stations, crossovers, or pocket track structures by cut-and-cover methods.

After leaving the Hollywood/Cahuenga Station, the alignment continues to the Hollywood Freeway then curves westerly under the Hollywood freeway. Near Highland Avenue, the alignment leaves the freeway right-of-way and proceeds past the Hollywood Bowl in a deep tunnel under the Santa Monica mountains to the Universal City Station.

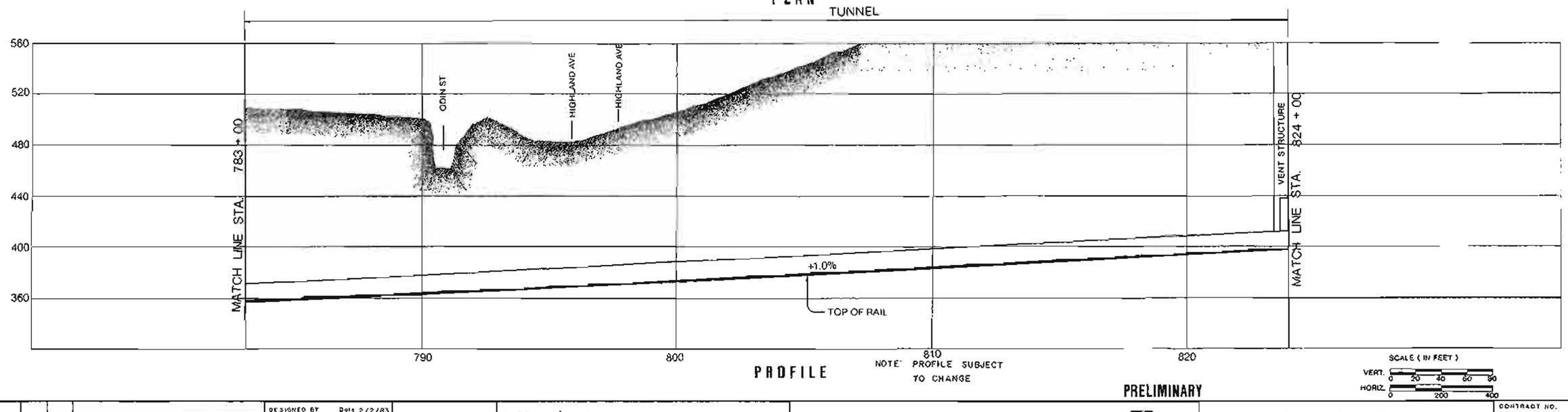
The Universal City Station is off the street west of and parallel to Lankershim Boulevard just north of the Hollywood Freeway.

After leaving the Universal City Station, the alignment will begin a 1500-foot radius curve to enter the Lankershim Boulevard right-of-way at about the Los Angeles River. After entering Lankershim the alignment will continue north to the North Hollywood Station, which is centered on the Chandler Boulevard right-of-way. This will be the terminal station for the initial phase Metro Rail Project.

A double crossover is to be constructed ahead of the station. Beyond the station a three-cell box structure, similar to a pocket track, will be provided for overnight storage of trains that will be needed for start-up in the morning.



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

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RTD

APPROVAL RECOMMENDED

DEPUTY CHIEF ENGINEER Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE

STATION 783+00 TO STATION 824+00

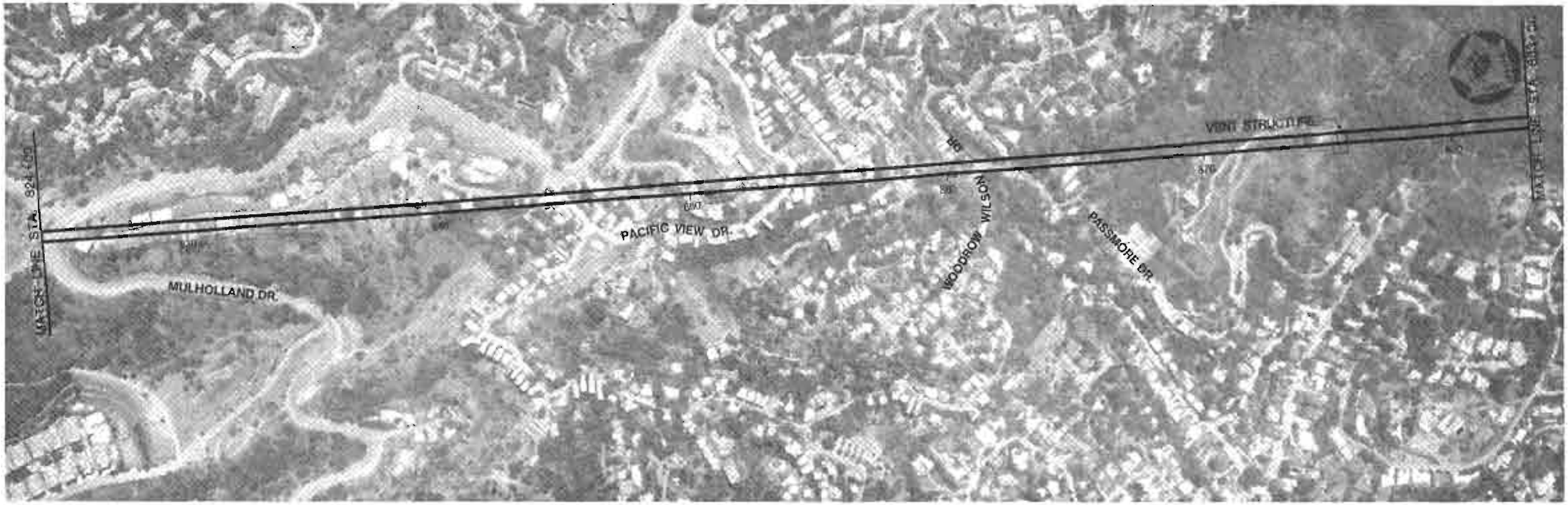
CONTRACT NO.

DRAWING NO. AP-16 AAA-C-016

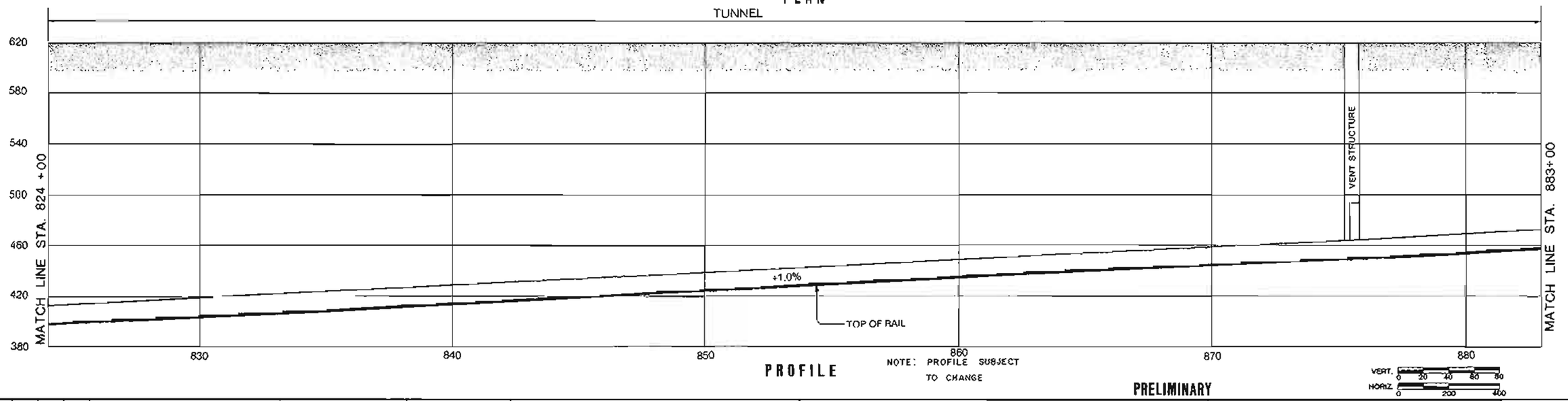
SCALE AS SHOWN

SHEET NO 16 OF 21

FIGURE III-16



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

PRELIMINARY

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY CZYZEWSKI GARCIA/OHINSA/KARAT Date 2/2/83
DRAWN BY IONESCU MANUEL/CASTILLO/MACIS Date 3/3/83
CHECKED BY LOGAN Date 3/3/83

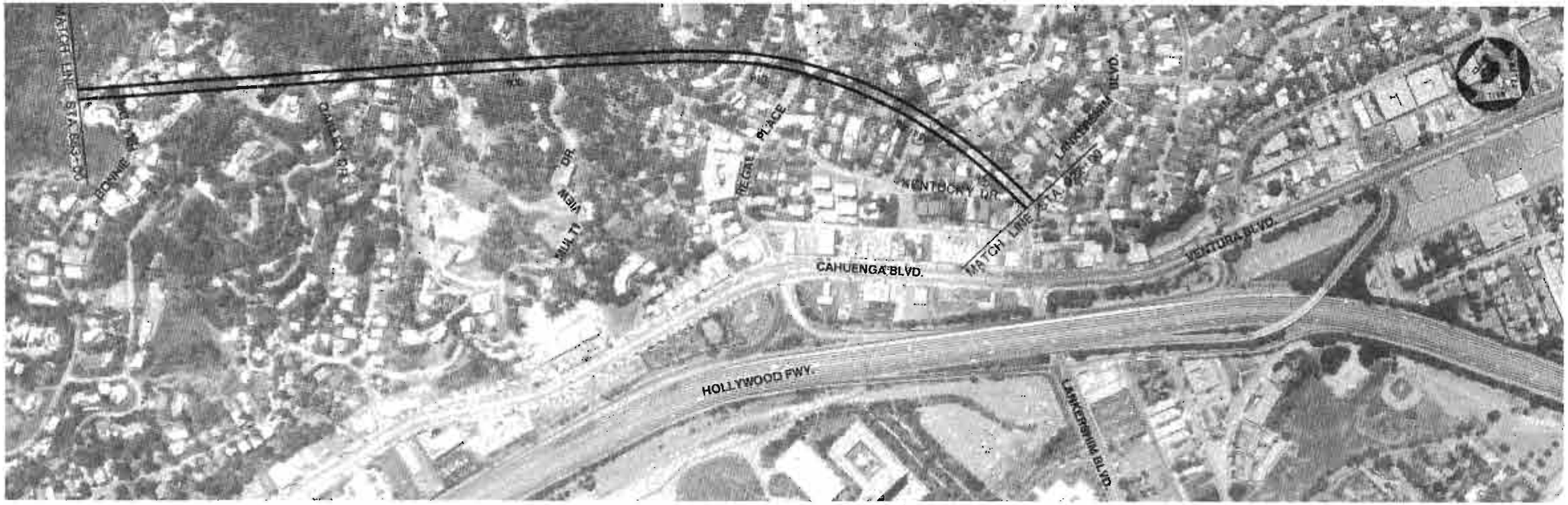
DMJM/PBQD
A Joint Venture
General Engineering Consultant - Ways and Structures
SUBMITTED BY:
PROJECT MANAGER Reg. No.

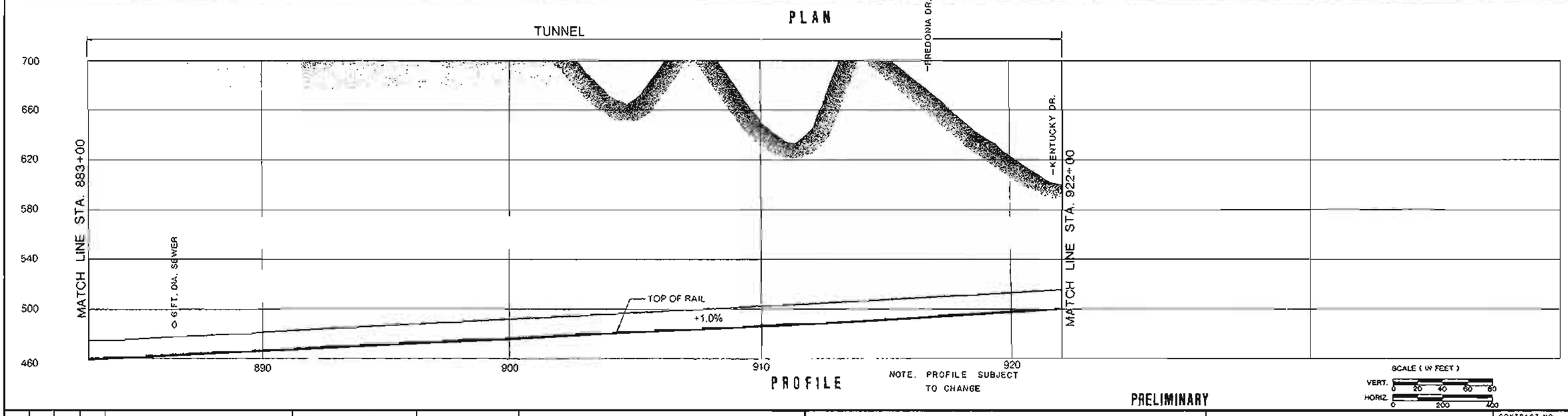
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD
APPROVAL RECOMMENDED
DEPUTY CHIEF ENGINEER Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS
ALIGNMENT PLAN AND PROFILE
STATION 824+00 TO STATION 883+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-017
SCALE AS SHOWN
SHEET NO. 17 OF 21

FIGURE III-17





PRELIMINARY

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date 2/22/83
CZYZEWSKI
GARCIA / DHINSA / KARAT

DRAWN BY Date 2/9/83
IONESCU
MANUEL / CASTILLO / MACIS

CHECKED BY Date 2/9/83
LOGAN

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SUBMITTED BY:

PROJECT MANAGER Reg. No.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
DEPUTY CHIEF ENGINEER Reg. No.

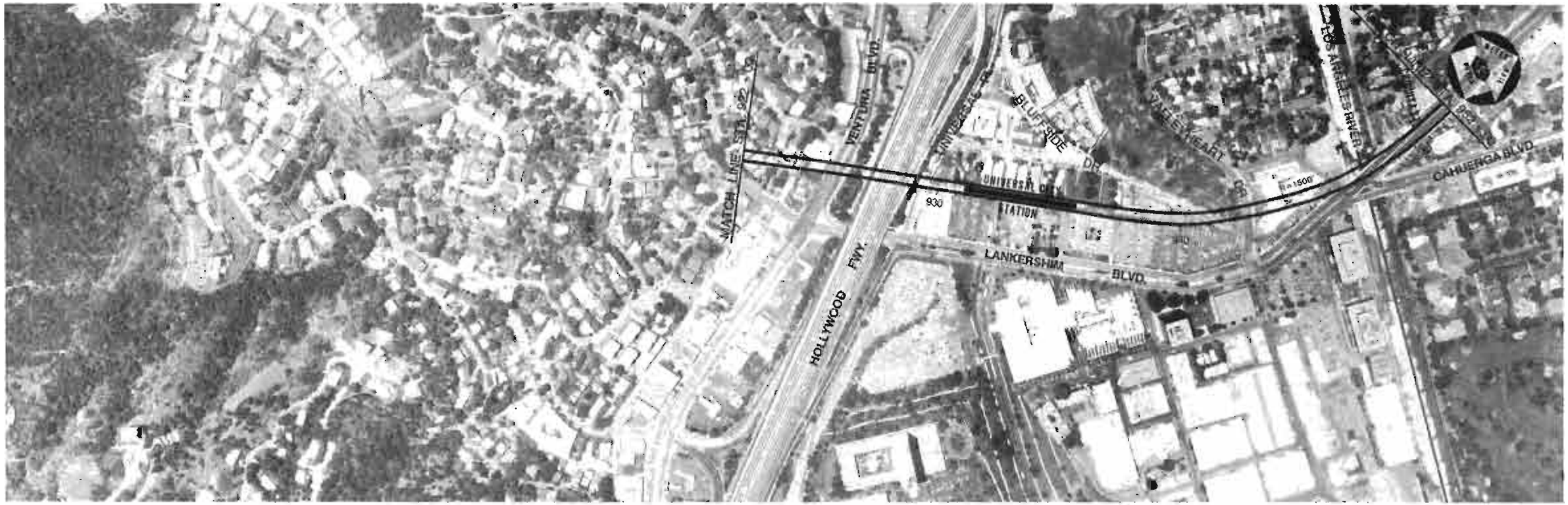
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE
STATION 883+00 TO STATION 922+00

CONTRACT NO.
DRAWING NO AP-16 AAA-C-018
SCALE AS SHOWN
SHEET NO 18 OF 21

FIGURE III-18



PRELIMINARY

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date 2/2/83
CZYZEWSKI/GARCIA/KARAT
DRAWN BY Date 2/9/83
IONESCU
MANUEL/CASTILLO/MACIS
CHECKED BY Date 2/9/83
LOGAN

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PROJECT MANAGER Reg. No.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
DEPUTY CHIEF ENGINEER Reg. No.

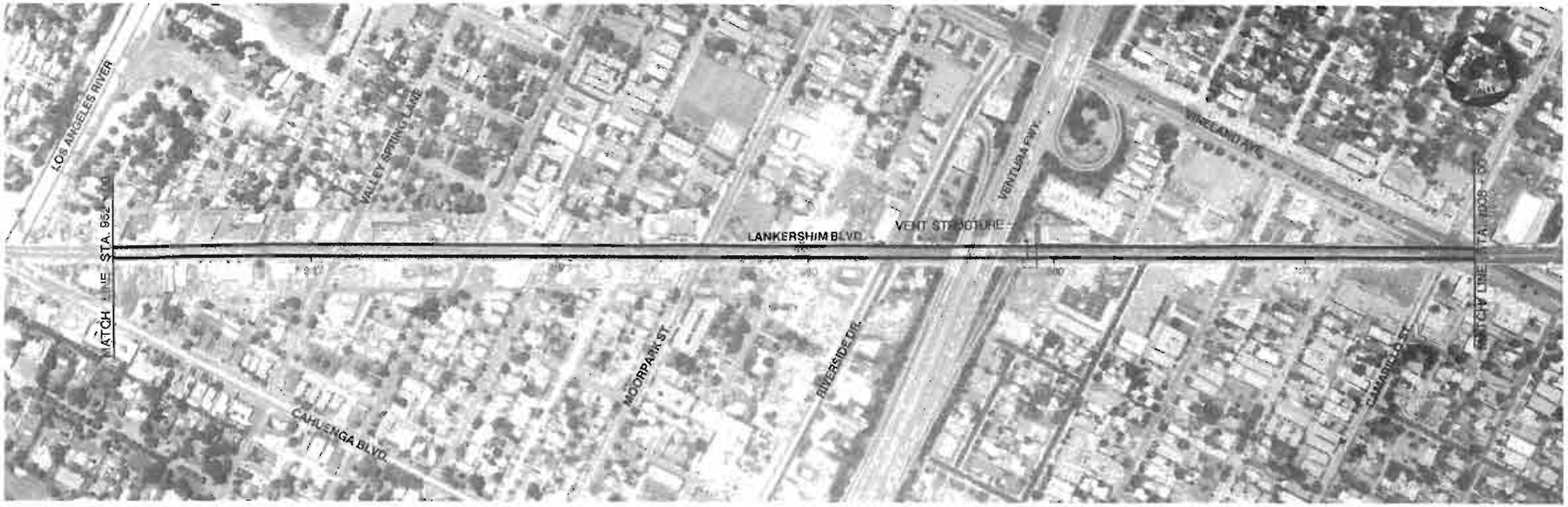
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

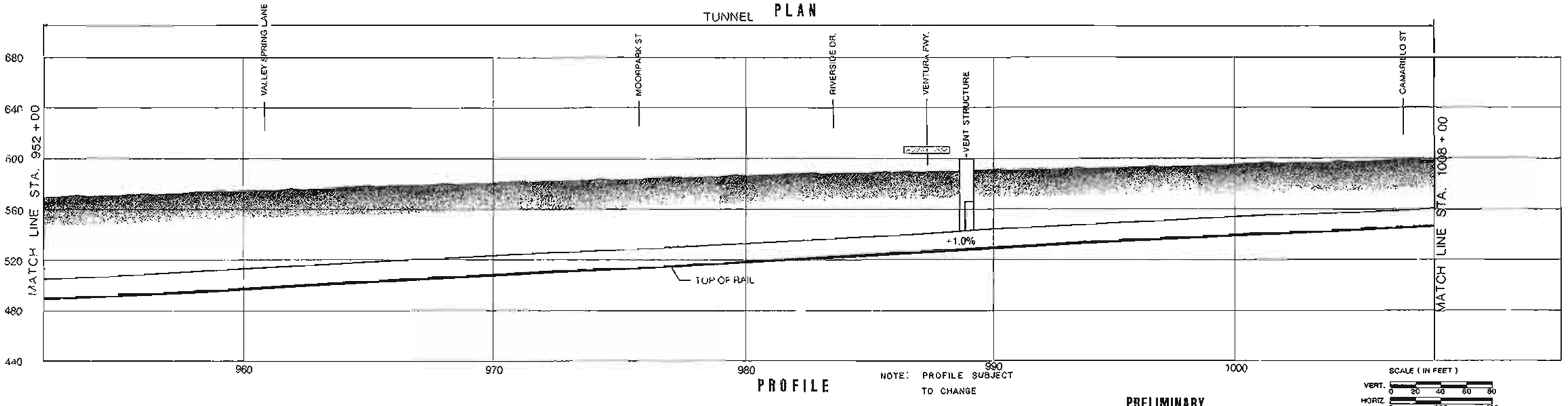
MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE
STATION 922+00 TO STATION 962+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-019
SCALE AS SHOWN
SHEET NO. 19 OF 21

FIGURE III-19





PRELIMINARY

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY — Date 2/2/83
CZYZEWSKI/GARCIA/KARAT
DRAWN BY — Date 2/9/83
IONESCU
MANUEL/CASTILLO/MACIS
CHECKED BY — Date 2/9/83
LOGAN

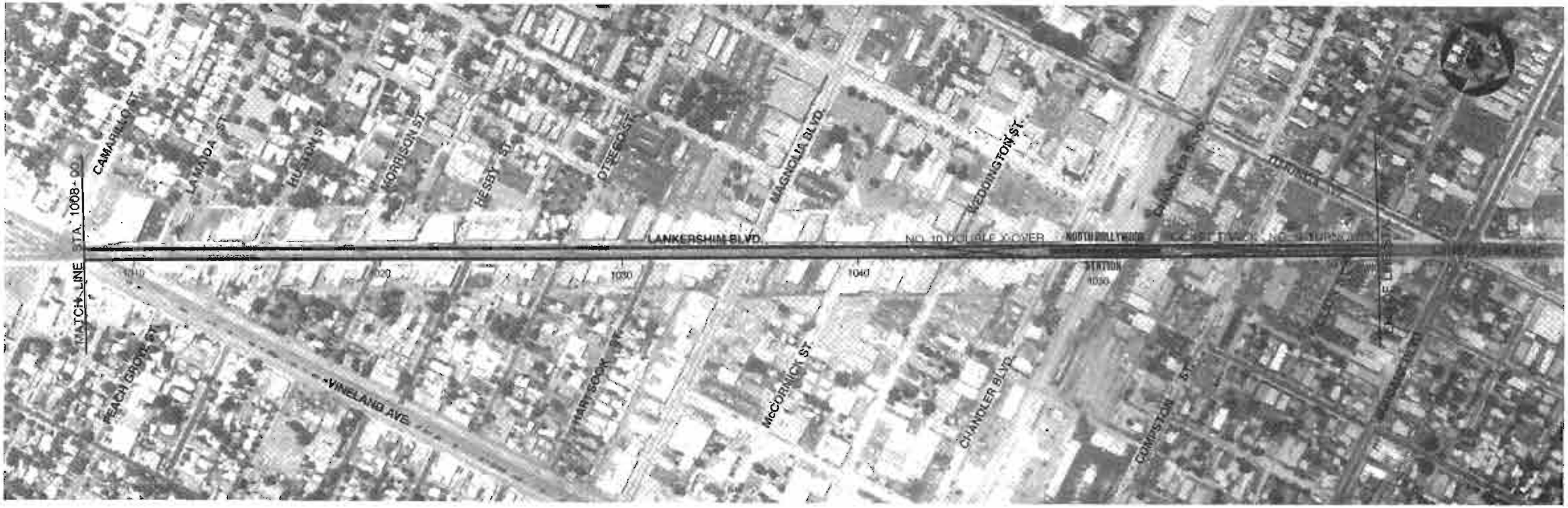
DMJM/PBQD
General Engineering Consultant Ways and Structures
SUBMITTED BY
PROJECT MANAGER — Reg. No.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
APPROVAL RECOMMENDED
DEPUTY CHIEF ENGINEER — Reg. No.
APPROVED — Date
MANAGER / CHIEF ENGINEER — Reg. No.

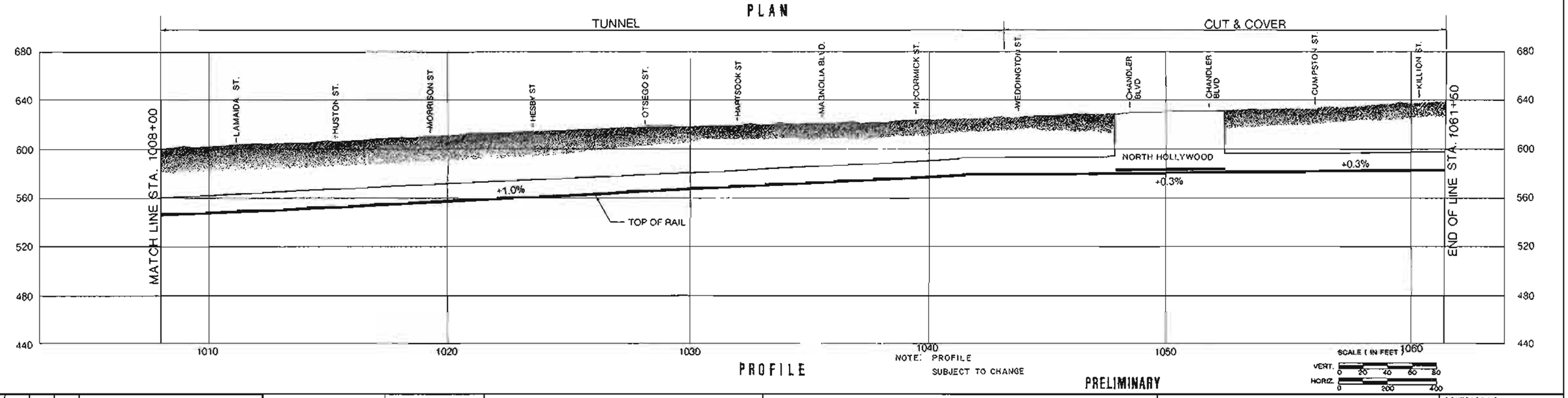
MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS
ALIGNMENT PLAN AND PROFILE
STATION 952+00 TO STATION 1008+00

CONTRACT NO.
DRAWING NO. AP-16 AAA-C-020
SCALE AS SHOWN
SHEET NO. 20 OF 21

FIGURE III-20



PLAN



PROFILE

NOTE: PROFILE SUBJECT TO CHANGE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

PRELIMINARY

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY Date 2/2/83
CZYZEWSKI/GARCIA/KARAT
DRAWN BY Date 2/9/83
IONESCU
MANUEL/CASTILLO/MACIS
CHECKED BY Date 2/9/83
LOGAN

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SUBMITTED BY:
PROJECT MANAGER Reg.No.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
DEPUTY CHIEF ENGINEER Reg. No.

APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MILESTONE 10
DEFINITIVE FIXED FACILITIES PLANS

ALIGNMENT PLAN AND PROFILE
STATION 1008+00 TO STATION 1061+50

CONTRACT NO.
DRAWING NO AP-10 AAA-C-021
SCALE AS SHOWN
SHEET NO. 21 OF 21

FIGURE III-21

B. YARD AND MAINTENANCE FACILITY DESIGN REPORT

The Southern California Rapid Transit District Metro Rail Project will require a comprehensive support system of yards and shops to provide for the storage of transit vehicles and for the proper and cost effective maintenance of the systems equipment and plant. This system of yards and shops will allow for the expeditious movement of trains between the yards and the revenue tracks without congestion or delay, and the safe and economical movement of trains and cars within the yard.

The yards and shops facilities reflect the complex and demanding requirement of function, as pertains not only to these facilities, but their relationship to the rest of the system. The yards are comprised of a number of related elements, each having unique operational requirements as well as those imposed by the relationships of the elements to each other. The shops are comprised of a number of functionally focal areas supported by a number of unique and in many cases, complex equipment repair and service shops.

For the 18-mile starter line, the design of the yards and shops has been based upon an ultimate operating capacity of six car trains operating at two minute headways. At this capacity the transit car fleet will consist of 214 cars (107 married pairs), with 180 cars for revenue service, 12 for standby consists and 22 for a maintenance margin. For the maintenance and storage of these transit cars one main yard with shops will be provided. Operating storage will be provided by three underground stub ended tail tracks, 500 feet long, beyond the North Hollywood Station.

1. Yard Site

The main yard will be located on a site east of the Central Business District of Los Angeles. It will be located between the Santa Fe Railway to the east, which is immediately west of the Los Angeles River, and Santa Fe Avenue on the west. This yard site extends south from the Santa Ana Freeway to a point about 1100 feet south of the Sixth Street Bridge. The site provides for a yard area of approximately 45 acres.

This yard site has a number of constraints. These are: existing highway bridges for the Santa Ana Freeway, First Street, Fourth Street, and Sixth Street crossing the yard site; an Amtrak Coach Yard south of the Seventh Street Bridge; and the Santa Fe Railway Facilities in this area. The yard layout must provide for maintaining the main track of the Santa Fe Railway, a principal lead, five storage tracks and track connections between the Santa Fe Railway and the freight spurs located west of the yard site. A yard at this site will require the removal, construction and relocation of railroad tracks and facilities.

2. Yard Layout

The main yard will extend about 5900 feet from a point between the Santa Ana Freeway and the First Street Bridge southward to a point below the Sixth Street Bridge. The east-west dimension varies, with the widest point being just north of the Fourth Street Bridge. At this point the yard will be 800 feet wide. North of the First Street Bridge and south of the Fourth Street Bridge, the yard narrows appreciably. The width of the site allows placement of the storage yard next to the main shops. The length of the site plus the narrowness of the available land at each end of the site rules out placing the storage yard and main shops end to end.

3. Yard Facilities

Entrance to the main yard will be provided from Union Station. Leaving Union Station, the future main tracks will descend so that they can pass under the Los Angeles River. The yard leads will ascend from Union Station, pass over the eastbound main track (future) and under the Santa Ana Freeway and a relocated freight spur to a portal at the north end of the yard. This portal will provide for four tracks. Two will be the yard leads from Union Station. The remaining two tracks will be the yard leads to the Metro Rail future eastward extension.

Immediately south of the portal is the transfer zone of the main yard. From the portal, the four yard leads proceed through an interlocking that allows each lead to have access to any one of the four transfer tracks. The most westerly track at the south end of the interlocking provides the lead into the maintenance-of-way shop and its storage tracks. The transfer tracks connect to the main shop tracks, the wash track and the blow down pit track. The layout described above allows access of any of the four leads from the mainline into any portion of the yard.

The main body of the yard south of the transfer zone, consists of the storage yard located on the east side of the yard. The storage yard is arranged to include as many as 12 tracks, each having a capacity of 18 cars, or three six-car trains, for a maximum total capacity of 216 cars. The tracks are alternately spaced at 14 feet and 19 feet centers. The storage yard is double ended, with access at each end between all other yard elements. Between the storage yard and the main repair shop will be the wash tracks, the blow-down pit, and the runaround track.

Adjacent to the storage yard will be the interior car cleaner's building, a small, single-level industrial type building containing an office, storage, equipment room and employee facilities. This building will support the interior car cleaning activities in the storage yard.

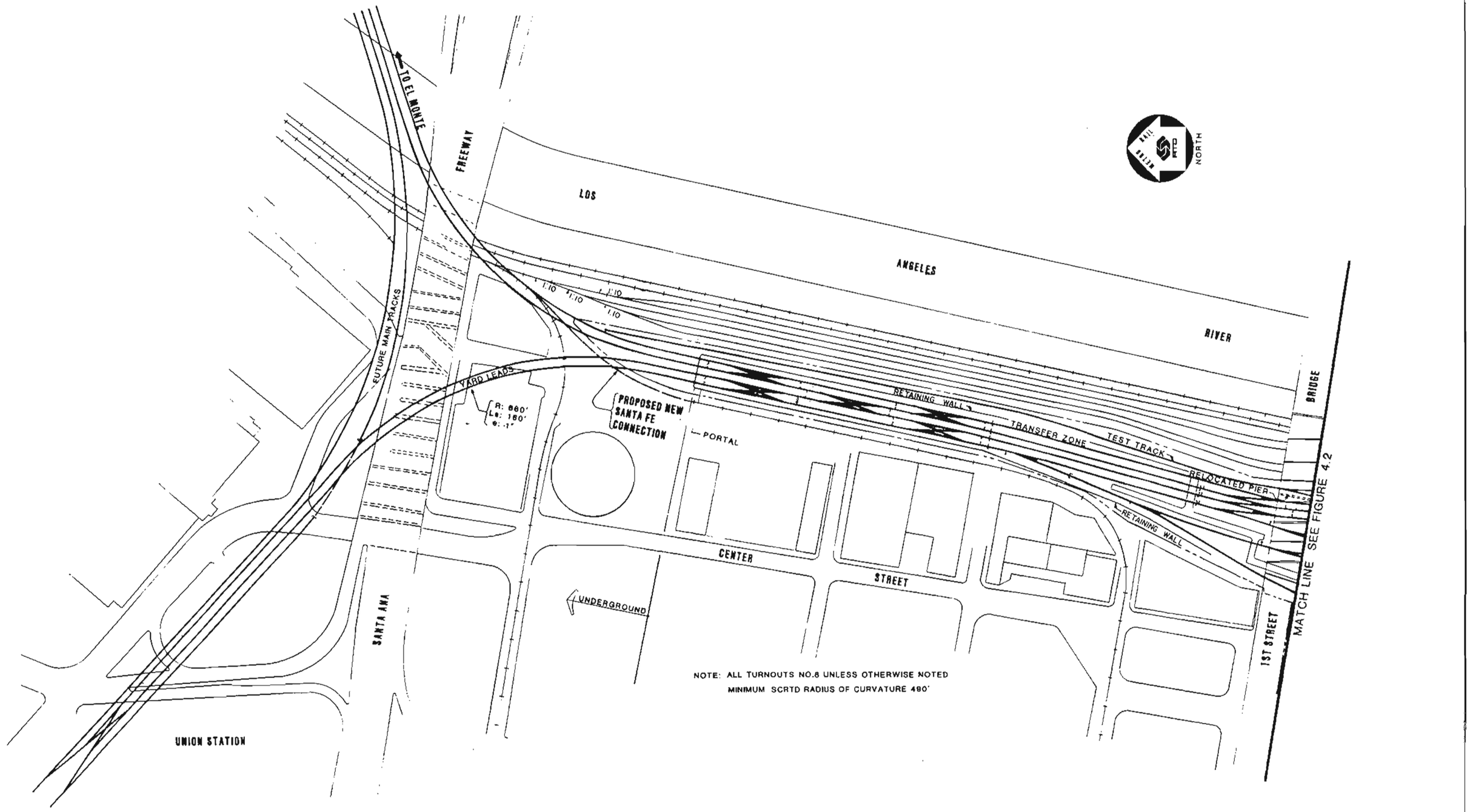
The main shop is located west of the storage yard just north of the Fourth Street Bridge. It is an industrial-type building, containing high bays for the heavy repairs and service and inspection areas. There are two-level areas on the west side of the building and in the center, separating the two high bays. These areas contain various component repair shops, support shops, employee facilities, offices, administrative areas, the stores, and equipment rooms. There is a loading dock adjacent to the stores, as well as access to the heavy repair bay where equipment may be unloaded from rail or highway vehicles. Rail access to the shop is at both ends. There are three tracks, each containing three married-pair positions throught the service and inspection area; two tracks, each containing two married-pair positions; and a single track for the wheel-truing equipment in the heavy repair area. An additional track is through the blow-down facility, which is located along the east side of the building. The yard control tower is placed in a centralized position over the blow-down pit adjacent to the main shop building.

To support the maintenance-of-way activities, support shops and administrative facilities will be provided in the maintenance-of-way shop. The maintenance-of-way shop is a single story industrial type building, comprised of a high bay containing general repair and automotive repair areas and an adjacent, single level area containing various smaller shops, stores, shop equipment rooms, employee facilities, and office and administrative areas. There is a loading dock adjacent to the stores, and road and rail access to the north end of the general repair area.

At the south end of the yard, all tracks within the main body of the yard connect into one of two tail tracks (800 feet and 1,050 feet in length). These tail tracks (with a test track) are between two operating railroad tracks. The easterly tail track provides a crossover to connect into the test track. Operations of the yard at the south end will be based on reverse moves. As an example, a train leaving the wash track would enter either of the tail tracks in a southward movement. It would then reverse direction and proceed northward into the storage yard.

4. Test Track

The test track is provided along the east side of the site between the main yard and the Santa Fe Railway. The test track will be about 5900 feet long extending from the south end of the tail tracks to a point just short of the Santa Ana Freeway. The northern end is determined by the location of railroad freight spur which crosses from the west over to the Santa Ana Railway main track. The south end is north of the Amtrak facilities in the vicinity of the Seventh Street Bridge. A service road is provided adjacent to the test track for most of its length. A test building with a run-through spur track is located south of the First Street Bridge. This test building is a small, single story, industrial type building containing a single track, connecting at both ends to the test track. This track is located in a general work area, one married-pair in length. The building also contains an office, storage, rest room, as well as an equipment room and train control room. Figures III - 22 through III - 32 illustrate the layout of the yard and maintenance facility.



REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date
DRAWN BY Date
DEL CASTILLO
CHECKED BY Date

DMJM/PBQD
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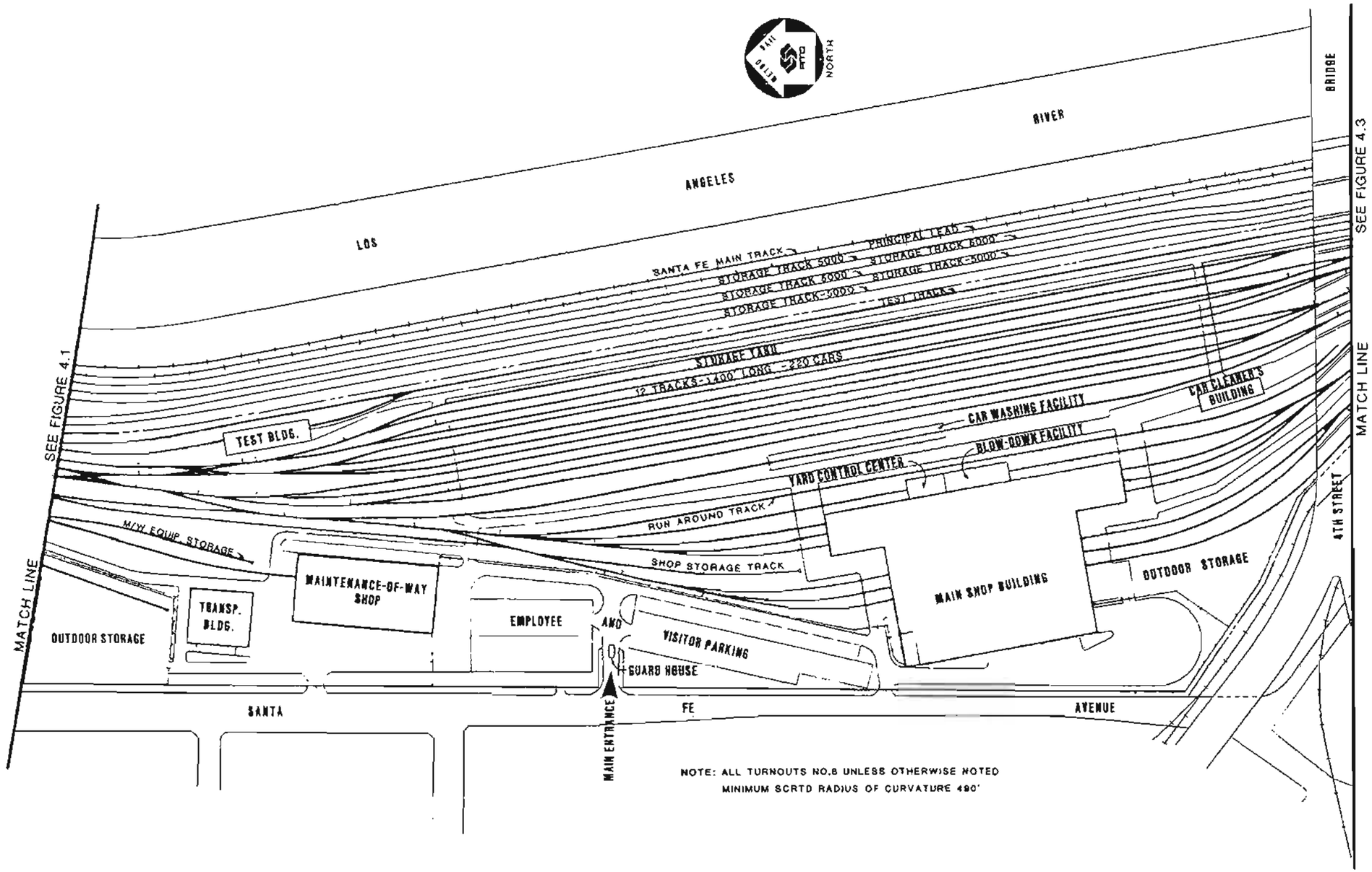
General Engineering Consultant - Ways and Structures
SUBMITTED BY
PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD
APPROVAL RECOMMENDED Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
YARD LAYOUT
TRANSFER ZONE AREA

CONTRACT NO.
DRAWING NO AC-14AAG-C-013(0)
SCALE 1":100'-0"
SHEET NO.

FIGURE III-22



NOTE: ALL TURNOUTS NO.8 UNLESS OTHERWISE NOTED
MINIMUM SCRTD RADIUS OF CURVATURE 490'

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date
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DMJM/PBQD
General Engineering Consultant - Ways and Structures
SUBMITTED BY:
PROJECT MANAGER

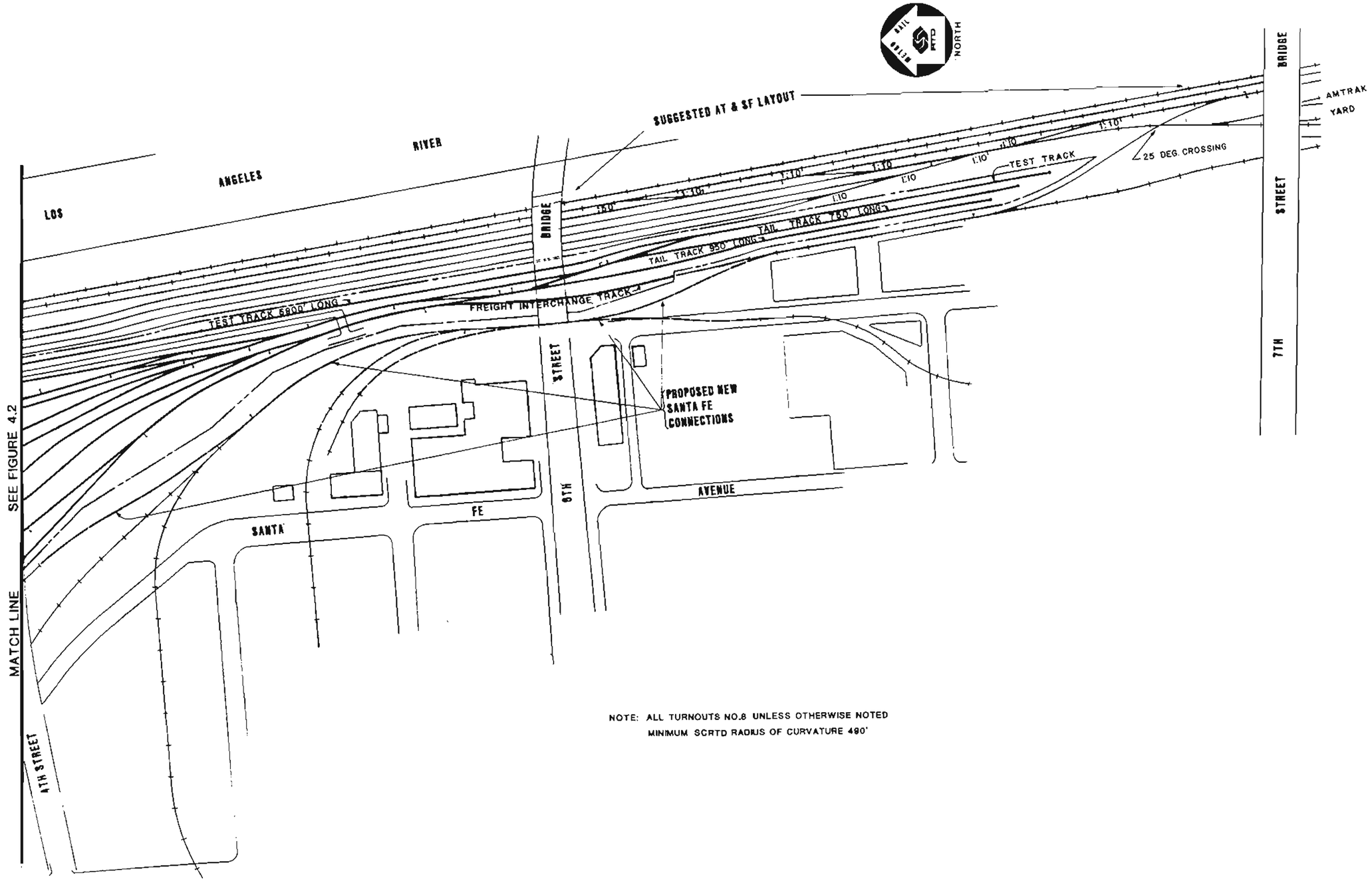
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
YARD LAYOUT
CENTRAL AREA

CONTRACT NO
DRAWING NO AC-14AAG-C-014(0)
SCALE 1":100'-0"
SHEET NO.

FIGURE III-23



NOTE: ALL TURNOUTS NO.8 UNLESS OTHERWISE NOTED
MINIMUM SCRTD RADIUS OF CURVATURE 490'

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY Date
DRAWN BY Date
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A Joint Venture
General Engineering Consultant - Ways and Structures
SUBMITTED BY:
PROJECT MANAGER

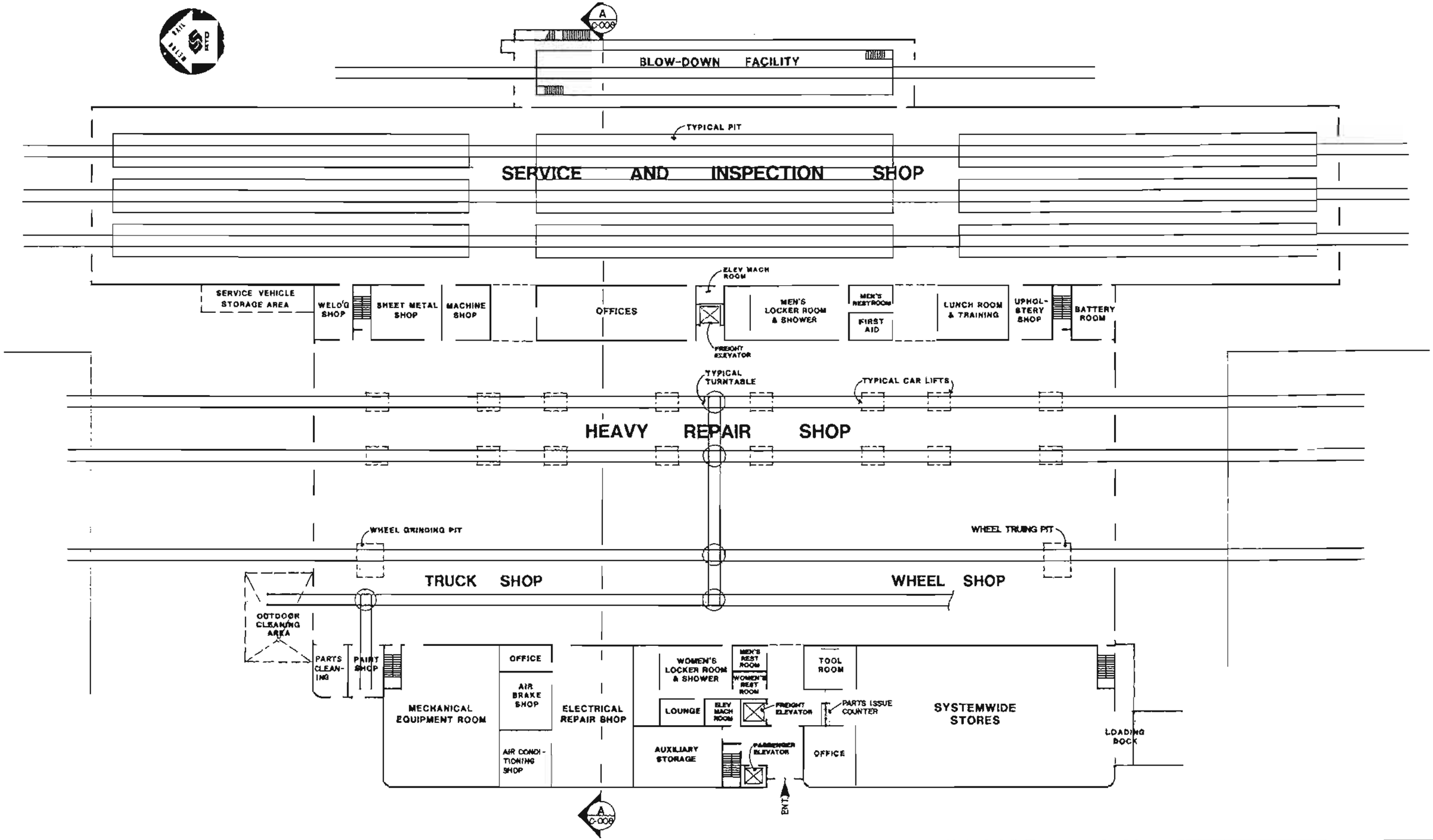
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
YARD LAYOUT
TAIL TRACK AREA

CONTRACT NO.
DRAWING NO AC-14AAG-C-015(0)
SCALE 1":100'-0"
SHEET NO.

FIGURE III-24



REV.	DATE	BY	APP	DESCRIPTION

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DRAWN BY Date

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General Engineering Consultant - Ways and Structures

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED

Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
MAIN SHOP BUILDING
LAYOUT OF GROUND FLOOR

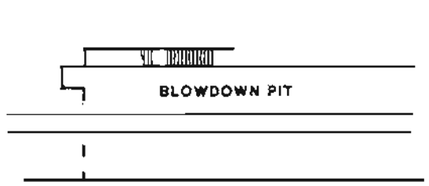
CONTRACT NO

DRAWING NO. AC-14AAG-C-006(D)

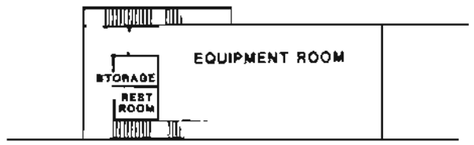
SCALE 1": 20'-0"

SHEET NO.

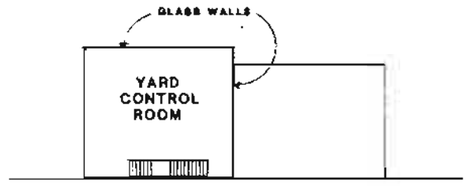
FIGURE III-25



GROUND LEVEL

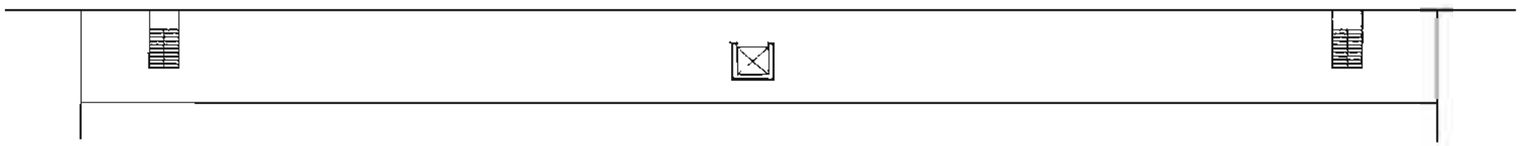


SECOND LEVEL

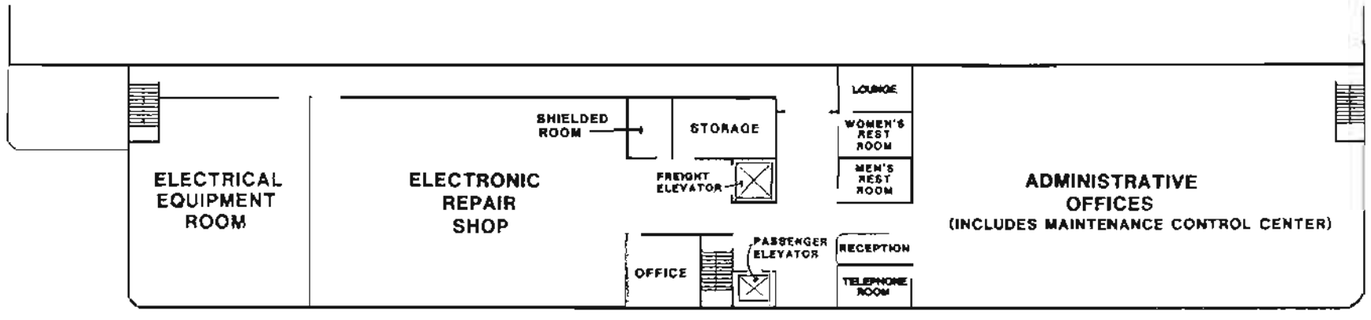


THIRD LEVEL

YARD CONTROL CENTER



OPTIONAL SECOND LEVEL for FUTURE EXPANSION



SECOND LEVEL

REV	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date
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PROJECT MANAGER

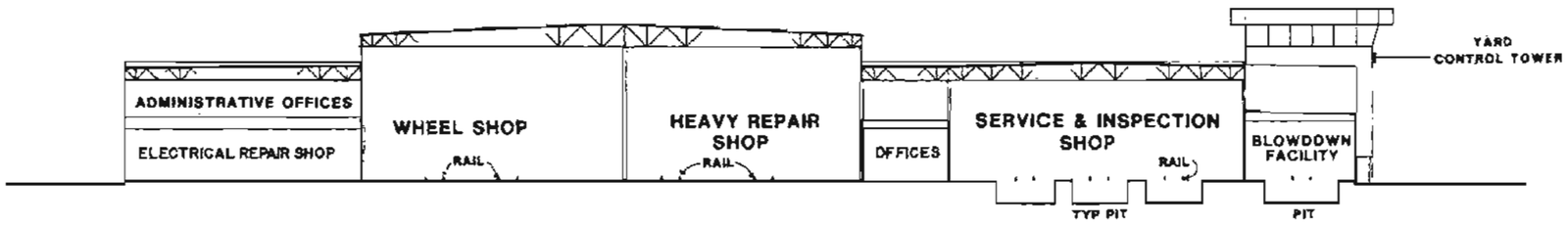
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
Reg. No
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
MAIN SHOP BUILDING
LAYOUT OF UPPER LEVELS

CONTRACT NO
DRAWING NO AC-14AAG-C-007(0)
SCALE 1": 20'-0"
SHEET NO

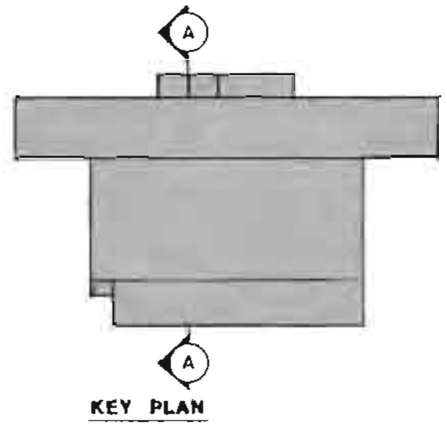
FIGURE III-26



A

SECTION

1":20'-0"



KEY PLAN

REV.	DATE	BY	APP	DESCRIPTION

DESIGNED BY Date

DRAWN BY Date

CHECKED BY Date

DMJM/PBQD
A Joint Venture
General Engineering Consultant - Ways and Structures

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED

Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
MAIN SHOP BUILDING
BUILDING SECTION

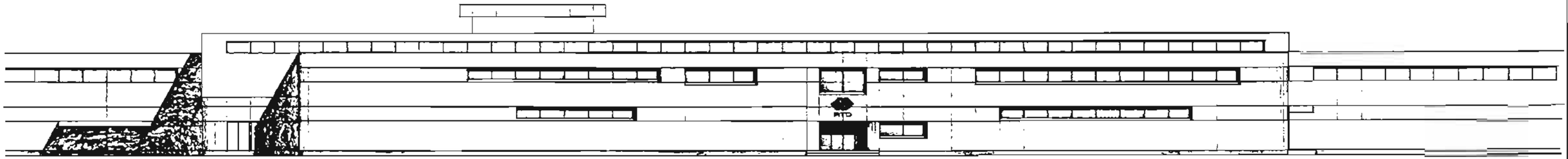
CONTRACT NO.

DRAWING NO AC-14AAG-C-008(0)

SCALE 1": 20'-0"

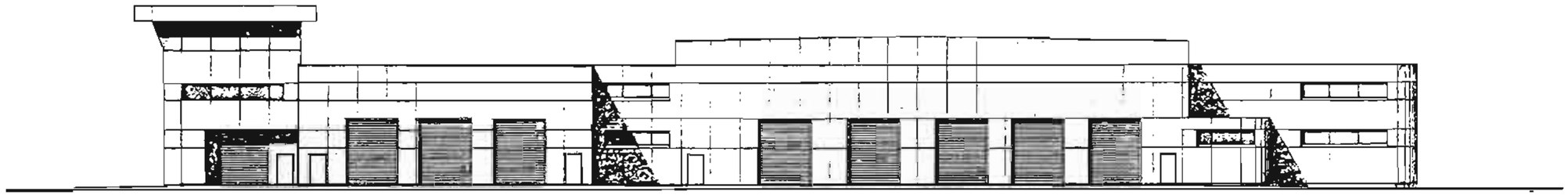
SHEET NO

FIGURE III-27



FRONT (WEST) ELEVATION

SCALE : 1/16" = 1'-0"



SIDE (NORTH) ELEVATION

SCALE : 1/16" = 1'-0"

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date

DRAWN BY Date

CHECKED BY Date

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A joint venture
General Engineering Consultant - Ways and Structures

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

METRO RAIL PROJECT

RTD

APPROVAL RECOMMENDED Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS

MAIN SHOP BUILDING

EXTERIOR ELEVATIONS

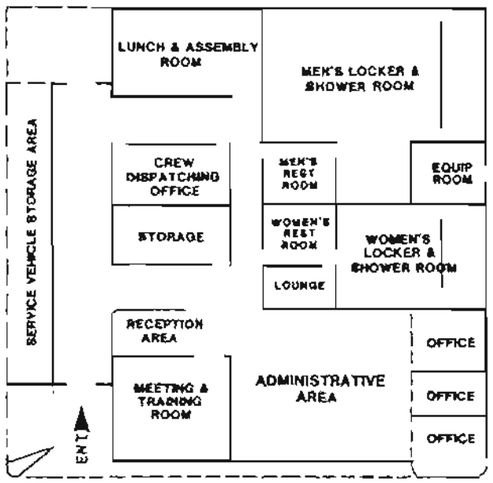
CONTRACT NO.

DRAWING NO AC-14AAG-C-009(0)

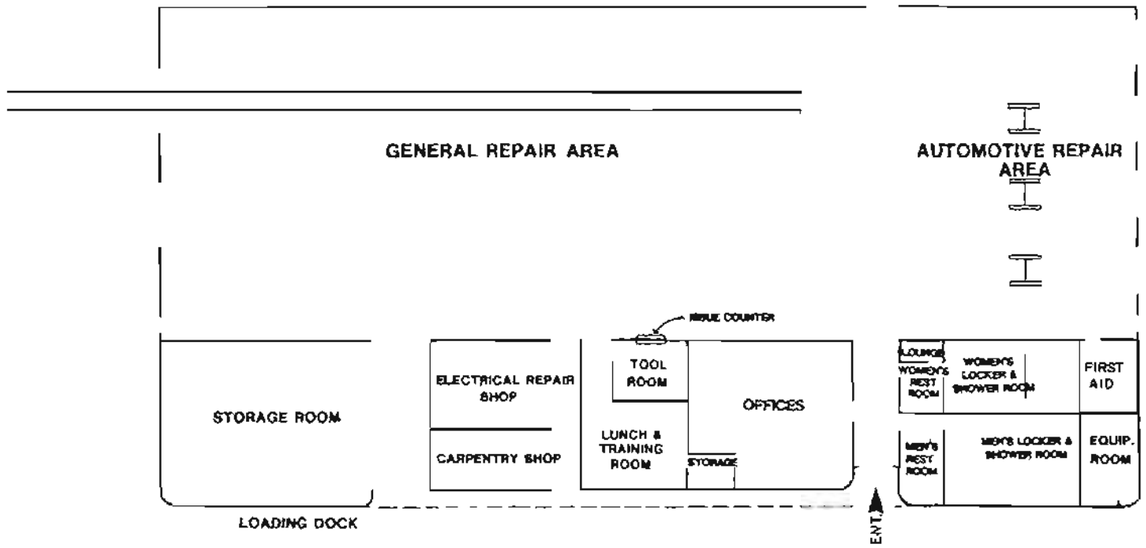
SCALE 1/16" = 1'-0"

SHEET NO.

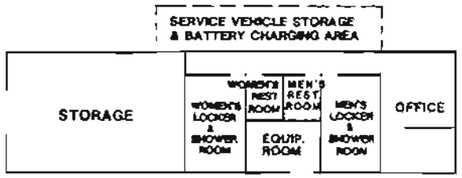
FIGURE III-28



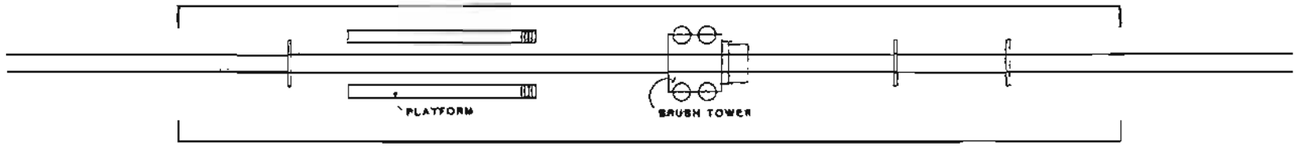
TRANSPORTATION BUILDING



MAINTENANCE-OF-WAY SHOP



INTERIOR CAR CLEANER'S BUILDING



EXTERIOR CAR WASH FACILITY
(TENTATIVE)

TEST BUILDING

REV	DATE	BY	APP	DESCRIPTION

DESIGNED BY Date
DRAWN BY Date
CHECKED BY Date

DMJM/PBQD
A joint venture
General Engineering Consultant - Ways and Structures
SUBMITTED BY:
PROJECT MANAGER

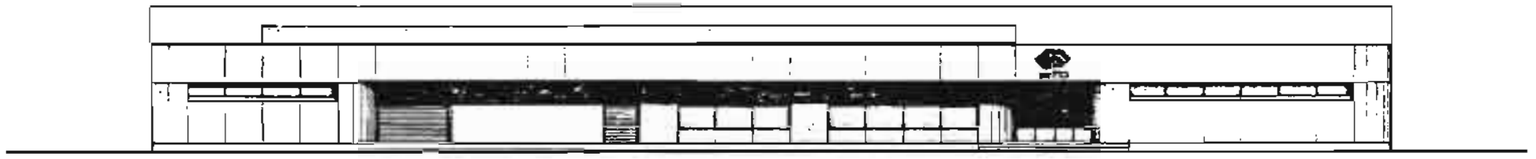
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED
Reg. No.
APPROVED Date
MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
MAINTENANCE-OF-WAY SHOP
TRANSPORTATION AND TEST BUILDINGS
CAR CLEANER'S BLDG. AND WASH FACILITY

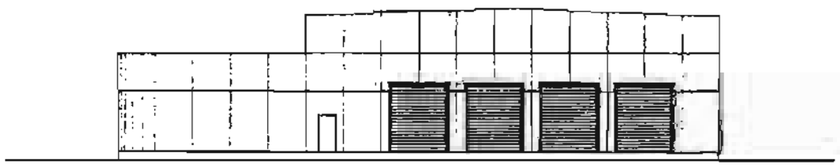
CONTRACT NO.
DRAWING NO. AC-14AAG-C-010(0)
SCALE 1": 20'-0"
SHEET NO.

FIGURE III-29



FRONT (WEST) ELEVATION

SCALE : 1/16" = 1'-0"



SIDE (SOUTH) ELEVATION

SCALE : 1/16" = 1'-0"

SIDE (NORTH) ELEVATION

SCALE : 1/16" = 1'-0"

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date

DRAWN BY Date

CHECKED BY Date

DMJM/PBQD
A Joint Venture
General Engineering Consultant - Ways and Structures

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED

Reg. No.

APPROVED Date

MANAGER / CHIEF ENGINEER Reg. No.

MAIN YARD AND SHOPS
MAINTENANCE-OF-WAY SHOP
EXTERIOR ELEVATIONS

CONTRACT NO.

DRAWING NO. AC-14AAG-C-011(0)

SCALE 1/16" = 1'-0"

SHEET NO.

FIGURE III-30

SIDE (SOUTH) ELEVATION

SCALE : 1/16" = 1'-0"

FRONT (WEST) ELEVATION

SCALE : 1/16" = 1'-0"

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY Date ____

DRAWN BY Date ____

CHECKED BY Date ____

DMJM/PBQD
General Engineering Consultant - Ways and Structures

SUBMITTED BY:

PROJECT MANAGER

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

APPROVAL RECOMMENDED

Reg. No. ____

APPROVED Date ____

MANAGER / CHIEF ENGINEER Reg. No. ____

MAIN YARD AND SHOPS
TRANSPORTATION BUILDING
EXTERIOR ELEVATIONS

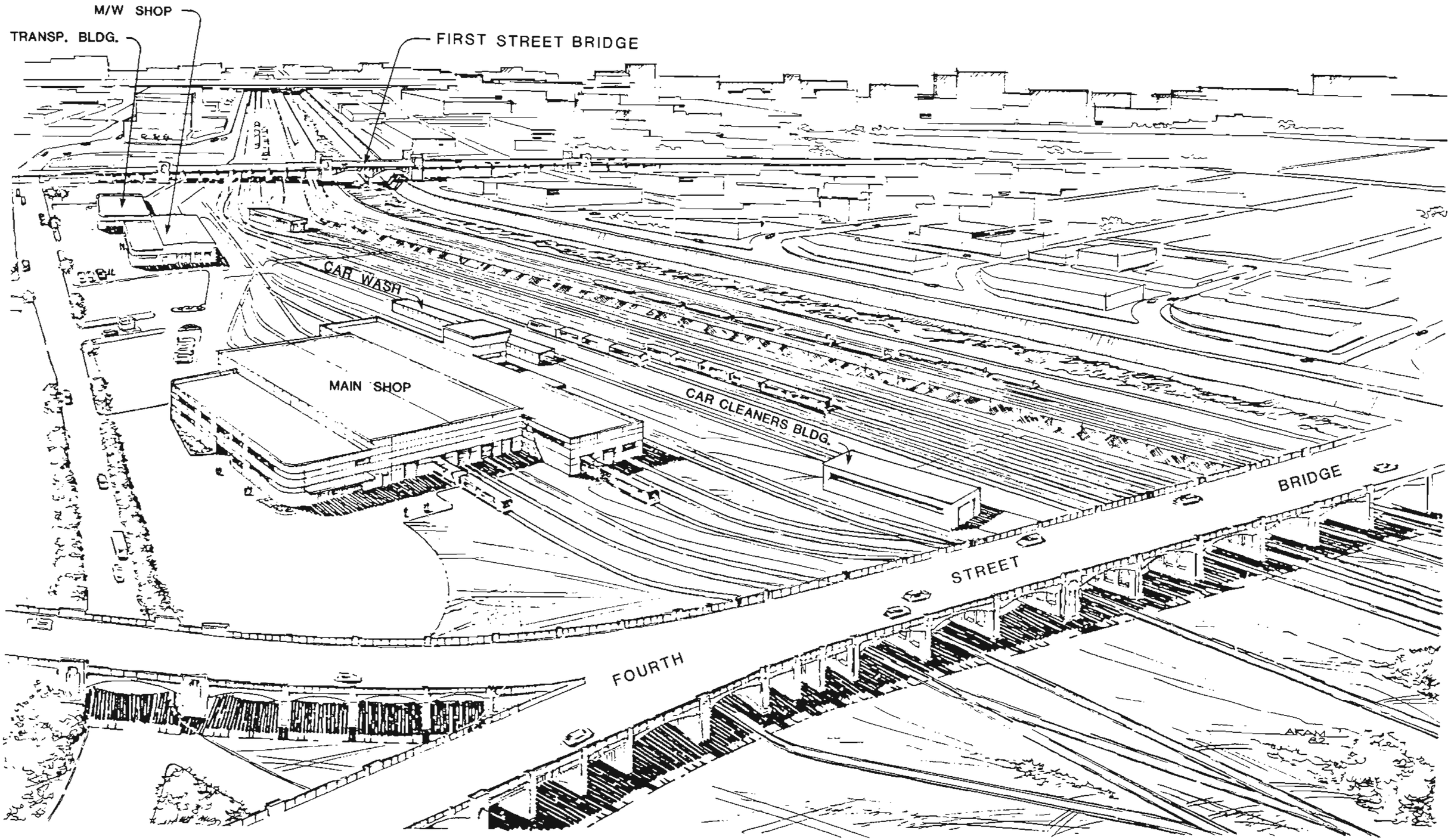
CONTRACT NO.

DRAWING NO. AC-14AAG-C-012(0)

SCALE 1/16" = 1'-0"

SHEET NO

FIGURE III-31



CONCEPTUAL VIEW OF MAIN YARD AND SHOPS

FIGURE III-32

DATA PROCESSING ROOM

EQUIPMENT ROOM

SURVEILLANCE AND SECURITY CENTER

COMPUTER STORAGE

TRAIN CONTROL COMPUTERS

HARDCOPY PRINTER

COMPUTER STORAGE

COMPUTER STORAGE

SUBSYSTEMS SUPERVISORY COMPUTERS

MASTER CLOCK

OPERATOR'S CONSOLE

TCCE TELEPHONE CABINET

TO/FROM PACIFIC TELEPHONE

PA POWER AMPLIFIER

TO/FROM WAYSIDE

DTS CABINET

FIRE & SECURITY EQUIPMENT

DTS CABINET

CTS CABINET

VOICE RECORDER

RADIO BASE STATIONS

TO ANTENNA

MONITOR (TYP.) (36)

RADIO REMOTE CONTROLLER

RADIO CHANNELS
1. TRAIN OPERATIONS
2. MAINTENANCE
3. SECURITY
4. EMERGENCY

TELEPHONE
1. ATEL
2. CCIC

SECURITY CONSOLE

VIDEO RECORDER

SURVEILLANCE CONSOLE (6 MONITORS)

RADIO CHANNELS
1. SECURITY

TELEPHONE
1. ATEL
2. CCIC

OPERATIONS CENTER

FACILITIES ALARMS & INDICATIONS

FIRE/SECURITY DISPLAYS & CONTROL

HARDCOPY PRINTER

VOICE RECORDER

EMERGENCY TELEPHONE IDENTIFICATION

RADIO REMOTE CONTROLLER

RADIO CHANNELS
1. TRAIN OPERATIONS
2. MAINTENANCE
3. SECURITY
4. EMERGENCY

TELEPHONE
1. ATEL
2. ETEL
3. DIRECT LINE PHONE
4. CCIC
5. STATION INTERCOM
6. ETEL

COMMUNICATIONS CONSOLE

PUBLIC ADDRESS
1. STATION

COMMUNICATIONS CENTER

DISPLAY COMPUTER INTERFACE

TRACTION POWER STATUS DISPLAY

DISPLAY COMPUTER INTERFACE

TRAIN CONTROL STATUS DISPLAY

CRT INTERFACE

TRACTION POWER CONSOLE

HARDCOPY PRINTER

RADIO CHANNELS
1. TRAIN OPERATIONS
2. EMERGENCY
3. MAINTENANCE

TELEPHONE
1. ATEL

TRAIN CONTROL CONSOLE

CRT INTERFACE

RADIO CHANNELS
1. TRAIN OPERATIONS
2. EMERGENCY
3. MAINTENANCE

TELEPHONE
1. ATEL
2. CCIC

TRAIN CONTROL CENTER

TRACTION POWER CONTROL CENTER 2 DIRECT LINE 3 CCIC

RADIO SPEAKER (TYP.)

CRT INTERFACE

OPERATIONS SUPERVISOR CONSOLE

RADIO REMOTE CONTROLLER

RADIO CHANNELS
1. TRAIN OPERATIONS
2. EMERGENCY
3. MAINTENANCE
4. SECURITY

TELEPHONE
1. ATEL
2. CCIC
3. MTEL

CRT WITH KEYBOARD (TYP. OF 4)

RADIO CHANNELS
1. TRAIN OPERATIONS
2. EMERGENCY
3. MAINTENANCE

TELEPHONE
1. ATEL
2. CCIC

TRAIN CONTROL CONSOLE

TELETYPE TO YARD CONTROL (UNION STATION & NORTH HOLLYWOOD)

REV.	DATE	BY	APP.	DESCRIPTION

DESIGNED BY A.P. ADELA Date 2/17/82

DRAWN BY Y.S. CH Date 2/17/82

CHECKED BY D.E. WELLINGTON Date 2/23/82

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

APPROVAL RECOMMENDED _____ Dept. No. _____

APPROVED _____ Date _____
MANAGER / CHIEF ENGINEER Dept. No. _____

FUNCTIONAL CENTER
CENTRAL CONTROL

CONTRACT NO.

DRAWING NO. 16CAC-C-002

SCALE NONE

SHEET NO. 2

FIGURE III-33

C. CENTRAL CONTROL FACILITY

Central Control will be the nerve center of the System and, as such, the focus of system operation. To enable efficient and safe system operations it will contain displays, controls, consoles, communications equipment, and operating personnel. It will be staffed continously during revenue service and as required during other hours. Upon detection of a failure or emergency condition affecting System operation, the Control Center personnel will implement corrective action to restore or maintain Metro Rail System operation.

Central Control will be divided into the following areas: operations center, surveillance and security center, data processing room, communications and electrical equipment room(s). Figure III - 33 illustrates the relationships between the various control components.

1. Operations Center

The Operations Center will contain status displays and controls for the automatic train control system and traction power system. The operating personnel will coordinate all activities within the operations room which affect revenue service operation from control consoles. Each display and control console will be equipped with radio, telephone and intercom communications. Central Control personnel will have provision for public address announcements to a selected train or all trains in revenue service. Data communications will be provided from field locations to Central Control for supervision of automatic train control and traction power systems.

a. Automatic Train Control. All train locations and movements will be monitored throughout the revenue line to enable the Central Control personnel to determine whether trains are operating on schedule within an acceptable limit. Train movements between stations, at interlockings, and to and from the yards, will be displayed on a train status board. The illuminated train status board will also indicate the position and status of each track switch throughout the mainline and yard lead tracks.

All movement of trains between the yard and the revenue line will be coordinated between Yard Control personnel and Central Control personnel through a high speed printer with backup provided by telephone communications.

b. Traction Power. All traction power circuits throughout the revenue line will be monitored and controlled to enable Central Control personnel to manage the traction power system for proper train operation. Circuit breaker and power rail status will be displayed on a traction power status board.

2. Communications Center

The communications center will contain status displays for facilities alarms and indications, fire/security displays and controls, a supervisory computer hard copy printer, and a communications console. The communications console will be equipped with radio, administrative emergency telephones, station public address, and intercoms. The console will be capable of making public address announcements in individual or all passenger stations. Direct line communications to local fire and police will be provided to coordinate their activities. A voice recorder will record all emergency telephone and radio communications with Central Control. The intercoms will be able to communicate directly with the patron assistance intercoms in each of the stations when the stations are unattended or if the station attendant is unable to answer a call. The intercoms will also allow communications among all of the consoles and desks located within Central Control.

B. SURVEILLANCE AND SECURITY CENTER

1. T.V. Monitor Center

A T.V. monitor room will contain video monitors (three monitors per passenger station) and a control console. Each video monitor normally will show sequenced image from the passenger stations. The console will have the capability to stop the sequencing and display the scene from only one camera. A video recorder will be provided to record selected video information. The console will be equipped with a telephone set and an intercom unit.

2. Security Center

The security room will contain a security console. The security console will be equipped with radio, a telephone set and an intercom unit. From this center all Metro Rail security forces will be directed.

C. DATA PROCESSING ROOM

The data processing room will contain the dual redendant automatic train control computers, the dual redundant supervisory computers, the Management Information System Computer and data processing support equipment.

D. COMMUNICATIONS EQUIPMENT ROOM

The communications equipment room will contain the cable transmission subsystem cabinet, the data transmission subsystem cabinet, telephone exchange(s), radio base stations(s), voice recorders and and other communications auxiliary equipment.

D. MISCELLANEOUS STRUCTURES

1. Intermediate Traction Power Substation

Preliminary analysis indicates that 19 traction power substations will be required for the SCRTD 18.6 mile starter line. Fourteen of the 19 traction power substations will be located in or near the passenger stations. One traction power substation will be located in the train yard and the remaining 4 traction power substations will be located between the stations with long runs as follows:

- o One traction power substation will be located approximately midway between the the Wilshire/Western Station and the Wilshire/La Brea Station.

- o Two traction power substation will be located equal - spaced between the Hollywood/Cahuenga Station and the Universal City Station.

- o One traction power substation will be located approximately midway between the Universal City Station and the North Hollywood Station.

The structure for these 4 substations will be built underground or, if suitable sites are available, above ground. At each of the intermediate substations, Train Control rooms and space for mechanical ventilation equipment will also be provided.

The facilities will be approximately 50' by 160' in size with normal access to the street.

2. Intermediate Ventilation Shafts

Ventilation shafts, in addition to those associated with stations, may be required at intermediate locations between widely spaced stations, such as, between the Wilshire/Western and Wilshire/La Brea Stations. The purpose of these ventilation shafts is to relieve the piston effect caused by trains moving in a tunnel. These shafts also serve as emergency fan shafts by which air can be drawn into the tunnels and air or smoke can be exhausted. Fans would only be used in emergency situations to augment the natural functioning of the shaft. The shaft must penetrate the surface, preferably in an off-street, off-sidewalk location. However, in some cases the penetration may be through sidewalk grates. In an off-street, off-sidewalk configuration the vent may be through a chimney like structure rising 10' to 12' above surrounding or adjacent surfaces.

IV. CONSTRUCTION METHODS

IV. CONSTRUCTION METHODS

A. STATION CONSTRUCTION METHODS

The underground stations of the Metro Rail Project will be constructed by cut-and-cover methods. Depths of trench excavations will be as shallow as possible consistent with a minimum earth cover allowance for utilities, the structural thicknesses required for the several levels of slabs and the interior vertical heights dictated by clearance requirements. Width of the trench excavations will depend on the platform and trackways widths and the calculated thickness of the structural walls. The widths of construction are further augmented by the thickness of the support of excavation sheeting systems installed. Figures IV - I through IV - 6 illustrate various aspects of station construction.

Since the underground stations are located in built-up urban areas, their construction must take into consideration the influence on adjacent structures, the impact on vehicular and pedestrian traffic, the effect on buried utilities and the necessity of final restoration of the street surfaces.

Various types of construction equipment will be operating at street level and below ground creating some visual impacts and perhaps even visual attractions. Noise emanating from this equipment will have to be maintained within acceptable levels. Transport of excavated muck and delivery of construction materials will be phased to minimize additional traffic flow in and around the project area.

1. Vehicular and Pedestrian Traffic

The construction of a cut-and-cover station in the roadway portion of the street will temporarily interfere with the normal flow of traffic causing some lanes to be closed to vehicles for short durations. Some lanes could be closed to non-construction vehicles, except emergency vehicles, for the entire period of construction.

The roadway widths in the Central Business District (CBD) are such that the widths of the Hill Street and the 7th/Flower Street station's cut-and-cover construction will overlap the sidewalks by varying amounts. In such cases a program to direct pedestrian traffic movement will be instituted.

2. Building Data

Consideration of adjacent buildings, with respect to the excavation for underground stations, is necessary to determine whether or not to underpin their foundations, or whether a protection type sheeting system is more suitable in lieu of underpinning. Building data will help determine whether tie-backs might be used or if only internal bracing of the sheeting is feasible. The concern for the integrity of the adjacent structures will also influence excavation and bracing procedures. Where subsidewalk vaults occur within the outline of the station construction, these vaults must be removed.

3. Geotechnical Conditions

Substrata conditions will determine whether a pervious type sheeting system such as soldier pile and timber lagging can be used, or whether a closed type, such as, interlocking sheet piling or concrete diaphragm wall, should be employed. The geology will also determine whether sheeting elements such as soldier piles or interlocking sheet piles can be driven to depths below subgrade, or whether predrilling or trench excavation prior to sheeting installation is necesary to accomplish the depth requirements.

Soil types can also affect the type of bracing selected. Tar sands and soft clays, for instance, will preclude the use of tie-backs. Excavation in soft clays will often limit successive depths of excavation below installed braces resulting in more tiers of bracing than would be employed in more competent material such as dense sand.

4. Underground Utilities

Subject to other constraints, underground stations will be located to avoid conflicts with the space occupied by utilities, but in certain instances the positioning of the station proper or locations of entrances and vent shafts dictate that conflicting utilities be relocated to clear the way for the station structures. This relocation to a new permanent location which would not be affected by the station construction work, is generally performed prior to the construction of the subway station.

Utilities, such as high pressure water mains and gas lines, which represent a hazard during cut-and-cover station construction and are not to be permanently relocated away from the work site, are removed from the cut-and-cover area temporarily to prevent any accidental damage to them and thus to the work and personnel. They are relocated temporarily by the station contractor at the early stages of his cut-and-cover operations and reset in essentially their original locations during the final backfilling above the constructed station. Utilities which need not be relocated, either permanently or temporarily, are uncovered during the early stages of excavation. These buried utilities, with the possible exception of sewers, are generally found within several feet of the street surface. They can be reinforced, if necessary, and supported by hanging from deck beams.

5. Sheeting Systems

A sheeting system of soldier piles and timber lagging has inherent characteristics that permits loss of ground such that important adjacent structures, whose foundations are within the zone of influence, would need to be underpinned to safeguard their integrity. In lieu of underpinning, the safety of adjacent structures can be accomplished by use of sheeting system types, which in conjunction with proper excavation and bracing procedures, can serve as protection to the adjacent structures. These sheeting systems have a degree of inherent stiffness which, together with controlled bracing supports, can acquire a serviceable amount of rigidity. The sheeting systems include interlocking sheet piling and reinforced concrete cylinders. Interlocking sheet piling would serve in relatively shallow cuts, such as those for entrances, while the others would be used for deep cuts.

6. Selection of Sheeting and Underpinning/Protection

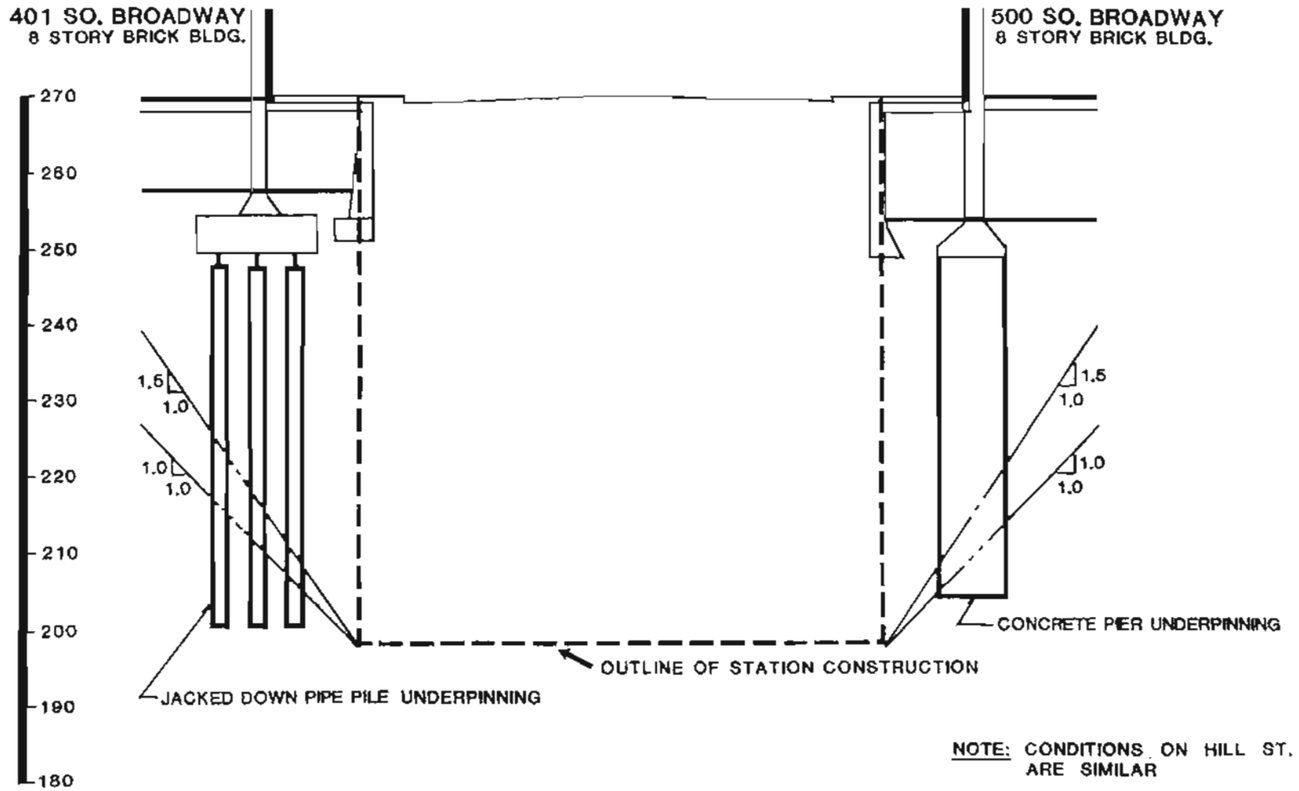
Present indications are that a soldier pile and timber lagging sheeting system would most likely be selected for virtually all of the cut-and-cover station constructions. This is because of the feasibility of its installation in the soil conditions known to exist along the route, the economy of the system, the minimum amount of underpinning that would be required in conjunction therewith, and the avoidance of a large amount of slurry use in the built-up urban environment. Soldier piles can also be installed between existing utility line house connections, thereby avoiding the need to shift or relocate them.

The tabulation that follows shows the present assessment of sheeting systems proposed for the support of excavation for each of the Metro stations. This tabulation is based on present limited knowledge of foundation characteristics of buildings adjacent to the stations. Also, since underpinning could cause some disruptions to the use of basement areas in some buildings, the economic value of such disruptions might rule in favor of utilizing a protection wall system of sheeting with total elimination of underpinning. Further studies of costs and public impacts will be made as more data becomes available.

Table IV-1

PROPOSED SHEETING SYSTEMS

Station	Soldier Pile & Timber Lagging	Underpinning Required with SPTL	Optional Use of Protection Wall
Union	Yes	None	No
Civic Center	"	Minimal	Maybe
5th & B'way or Hill	"	Moderate	Yes
7th & Flower	"	Moderate	Yes
Alvarado Street	"	Possible, Minimal	No
Vermont Avenue	"	None	No
Normandie Avenue	"	None	No
Western Avenue	"	Possible, Minimal	No
La Brea Avenue	"	Possible, Minimal	No
Fairfax Avenue	"	Moderate	Yes
Beverly Boulevard	"	Possible, Minimal	Maybe
Santa Monica Boulevard	"	Possible, Minimal	No
Hollywood Boulevard	"	Possible, Minimal	No
Hollywood Bowl	"	None	No
Universal City	"	Possible, Minimal	Yes
North Hollywood	"	Possible, Minimal	No



METHODS OF UNDERPINNING

FIGURE IV-1

7. Demolition of Subsidewalk Vaults

When the station arrangements make the removal of subsidewalk vaults unavoidable, knowledge of the vault structural details will assist the contractor in determining the demolition work he will have to perform. Initially, the portions of the subsidewalk vaults which are demolished are those which have to be cleared to enable the installation of the support of excavation sheeting systems. The demolition will involve at least portions of the sidewlak slab, the base slab and intermediate level slabs if more than one level of vault spaces are involved, and any cross-walls that might interfere with the sheeting arrangement. The outside retaining wall may or may not have to be demolished initially, depending upon whether the sheeting line falls inside the vault space or coincides with the retaining wall line. If not demolished initially, then the retaining wall is demolished during general excavation for the station structure. After removal of the subsidewalk vault, a structural closure wall is installed along the building line to seal the basement.

8. Maintenance of Traffic

The most economical and least time consuming condition for cut-and-cover station construction is one which permits the contractor to use equipment operating at street level. Auger drills, pile drivers and bucket excavators are employed for the installation of sheeting systems. Clam shell buckets are used for excavation, and high capacity trucks carry the muck away for disposal. Flat bed carriers transport reinforcing steel to the work site for cranes to lower the rebars down into the open trench. Ready-mix trucks bring concrete to the job, and dump either by chutes to the pour area, or into buckets for cranes to lower to the concreting locations. Cranes are required for the lowering and lifting of structural steel used for cross-lot bracing.

Equipment employed for cut-and-cover station construction is heavy duty and for large volumes. Such equipment requires certain amounts of space when standing still, more for swinging and additional for maneuvering. Review of expected equipment use shows that the contractor will be occupying a minimum 35 feet width of street surface with 40 feet or more desirable allowance for each of the various work operations.

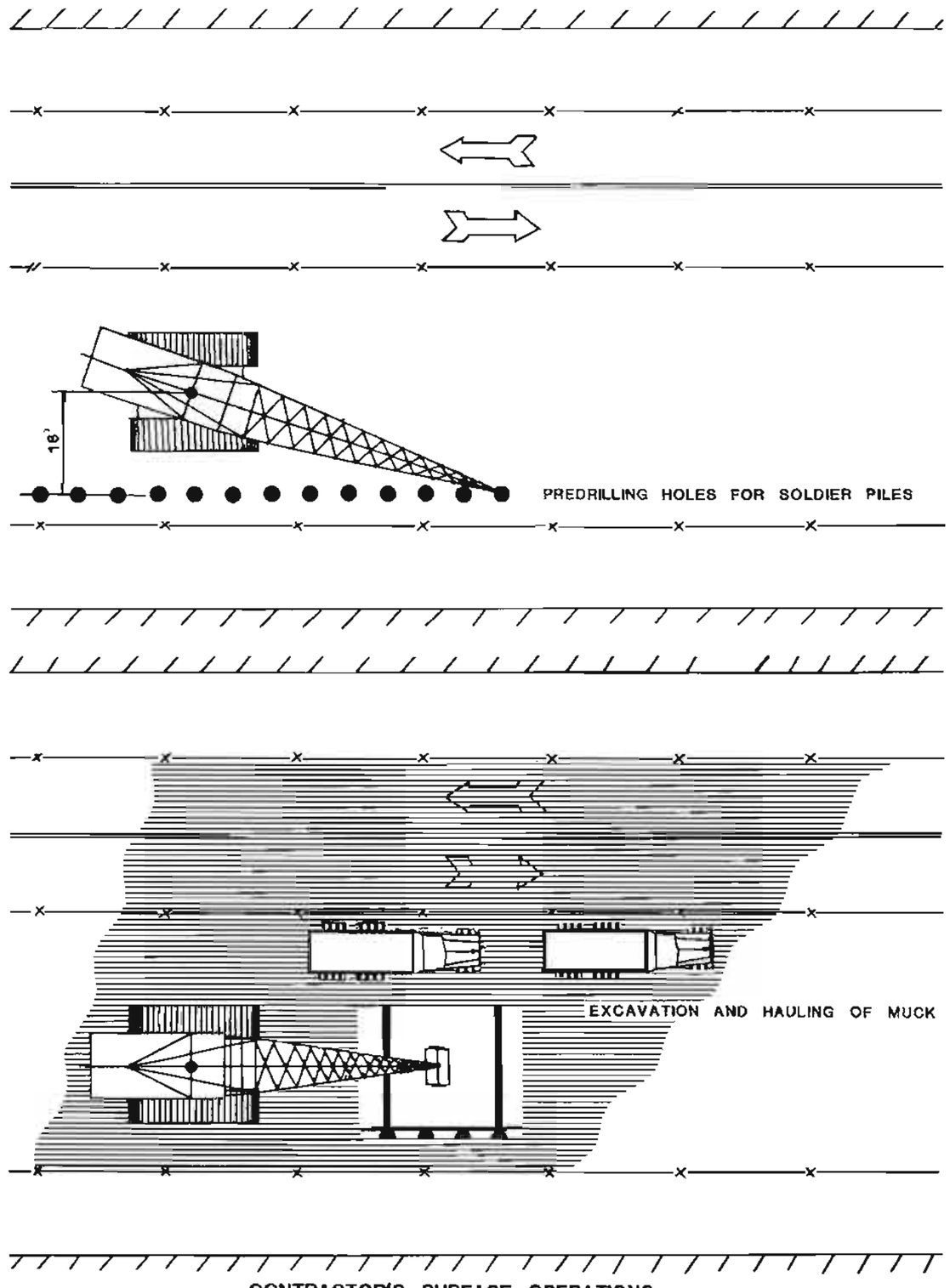


FIGURE IV-2

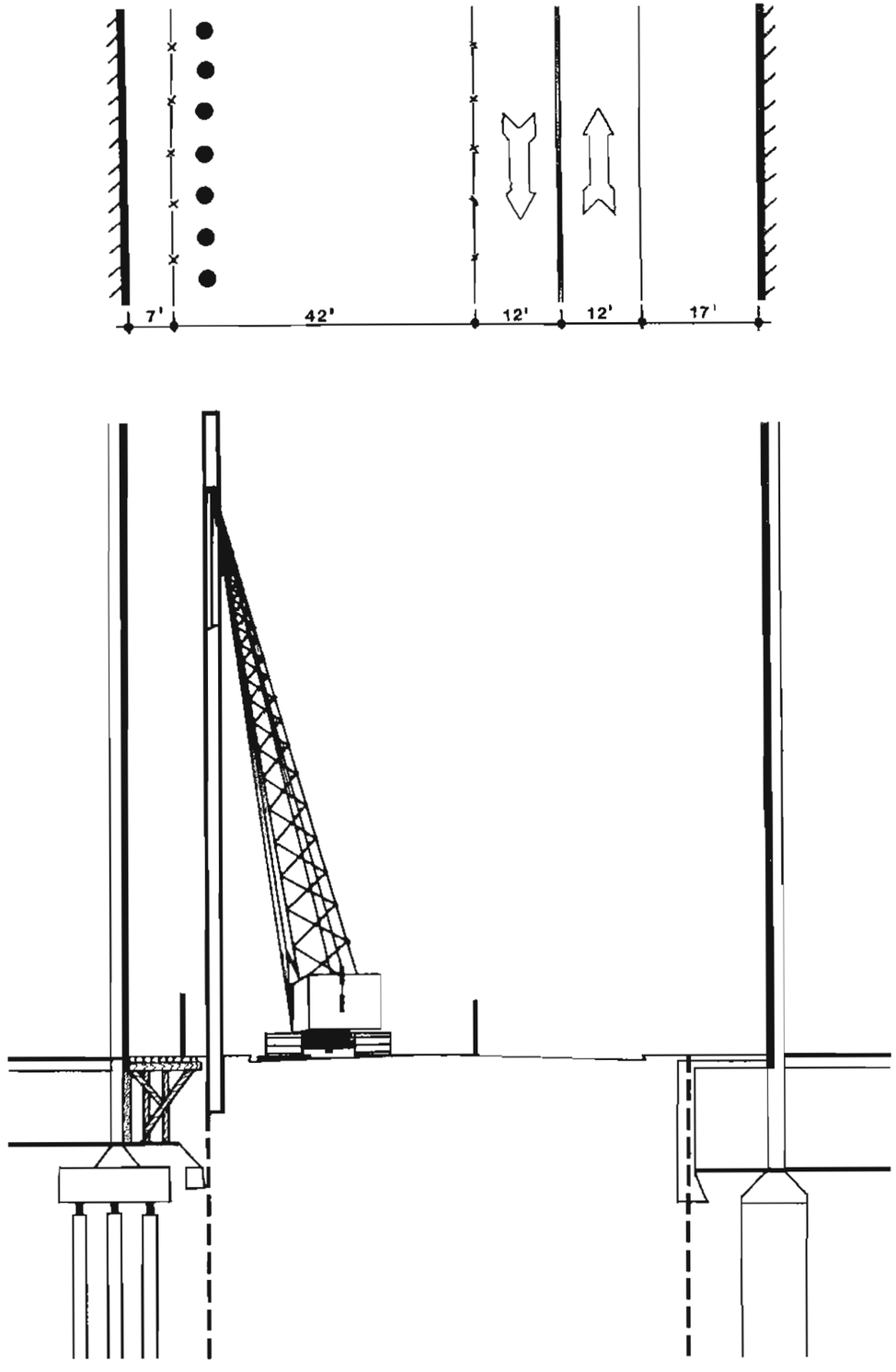
Because of the width of street surface that the contractor will occupy to perform the cut-and-cover construction operations, the flow of vehicular traffic will be limited in the direction parallel to the longitudinal axis of the station and will also be shifted from one side of the street to the other for the various states of construction. It has been determined that during the entire duration of cut-and-cover work on either Hill Street or 7th that a maximum of only two lanes of vehicular traffic can be accommodated at any time. On wider sections of Wilshire Boulevard it should be possible to maintain three lanes of vehicular traffic at all times during the construction of the stations.

Intersecting street traffic such as 4th Street, 5th Street, Flower Street, etc. will have intermittent reductions in traffic lanes to no more than half the present number while decking is installed and later when decking is removed and the street restored. During the period when all the decking is in place at the intersections, full cross-street lanes of traffic can be maintained.

9. Installation of Soldier Piles and Bearing Piles

In order to install the soldier piles for the support of excavation sheeting system, it is necessary to auger out holes for the placement of the piles. The predrilling of holes is necessary because of the types of soils encountered along the project route and because the depths of penetrations required for the station excavations make it impossible to drive the lengths of steel piles involved.

The contractor will first occupy one side of the street to install one line of soldier piles and the intermediate line of bearing piles. The amount of street width that his equipment requires will reduce the lanes of traffic on streets such as Hill and 7th to two lanes, and on the western portion of Wilshire Boulevard to three lanes; at this stage the traffic is still utilizing the existing pavement. After the contractor has decked the first side of the street, traffic is shifted onto the decked portion and the contractor moves his equipment to the other side of the street to install the second line of soldier piles.



SHEETING INSTALLATION REDUCES WIDTH OF PEDESTRIAN WALKWAY

FIGURE IV-3

10. Installation of Decking

It is assumed that none of the streets will be closed to either vehicular or pedestrian traffic where construction will take place in a street location. It is expected that the maximum amount of traffic flow will be taking place consistent with the practical surface needs of the contractor, as discussed previously. To satisfy the traffic flow and the contractor's operations, the site of the cut-and-cover work for the station core will be completely decked and where subside-walk vaults have been demolished, decking will be provided to replace the sidewalks destroyed.

The decking will be installed in stages. After the line of sheeting on one side of the station and the bearing piles near the centerline of the station have been installed, the deck beams and decking are placed on the one side of the street. After shifting of traffic to the decked portion of street and completion of sheeting installation on the other side of station, the deck beams and decking are placed for the remaining half of the street. Openings or removable panels are provided for raising and lowering of material. Decking at cross-streets is installed in stages to allow at least half of existing lanes for traffic at any time, then full cross street traffic is possible when all decking is in place.

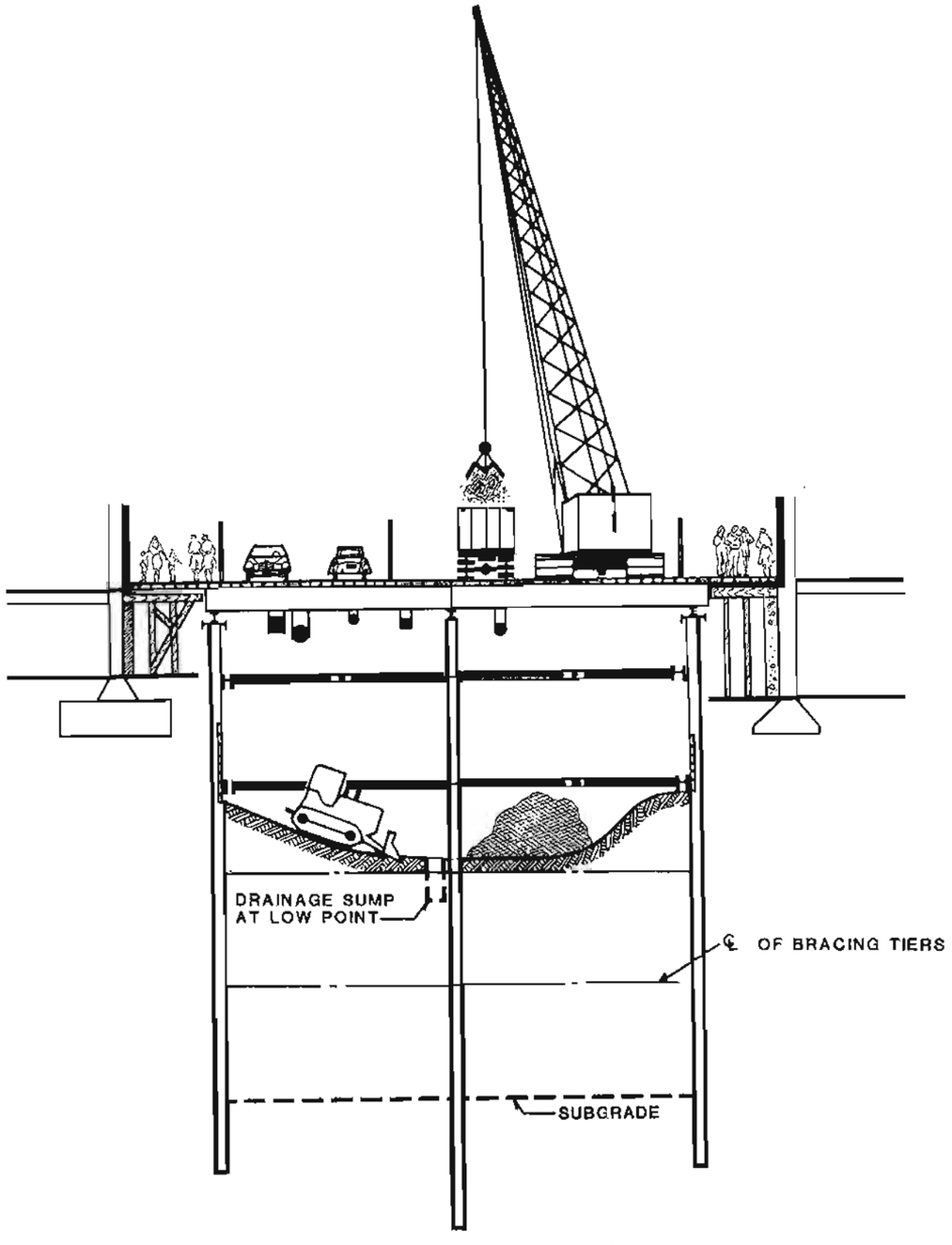
11. Excavation and Bracing

After the sheeting system and required interior bearing piles have been installed and prior to the placement of the deck beams, general excava-tion is made for a shallow depth, say to eight (8) feet below street surface. This shallow excavation is for the purpose of uncovering the buried utilities as well as to provide room for continuing the excavation below the erected decking.

Water mains and gas mains are relocated out of the excavation area since these utilities are deemed hazardous and are restored to their original positions, more or less, during the final backfilling operations.

As the deck beams are installed, the utilities that can remain in the trench area - such as telephone, traffic, electric, etc. - are cradled and picked up and hung from the deck beams. Sewer lines may show up at this shallow depth and will likewise be hung from the deck beams during the initial excavation stage or they may be deeper and uncovered fully after additional depth of excavation has been accomplished. Sometimes heavy utilities such as large sewer pipes are supported by an auxiliary set of beams spanning between sheeting systems rather than hanging them from the deck beams.

With the decking installed, the utilities supported, and the contractor's equipment occupying a prescribed area of the street surface, the major excavation work can proceed. The method of removing the muck for hauling away from the job site is entirely a choice to be made by the contractor. A typical operation would be for bulldozers and/or overhead loaders to move the dirt to a central pickup point or several such points, where a clam shell bucket, from a crane sitting on the decking, can hoist the material and place it into trucks waiting at the street surface.



EXCAVATION AND BRACING

FIGURE IV-4

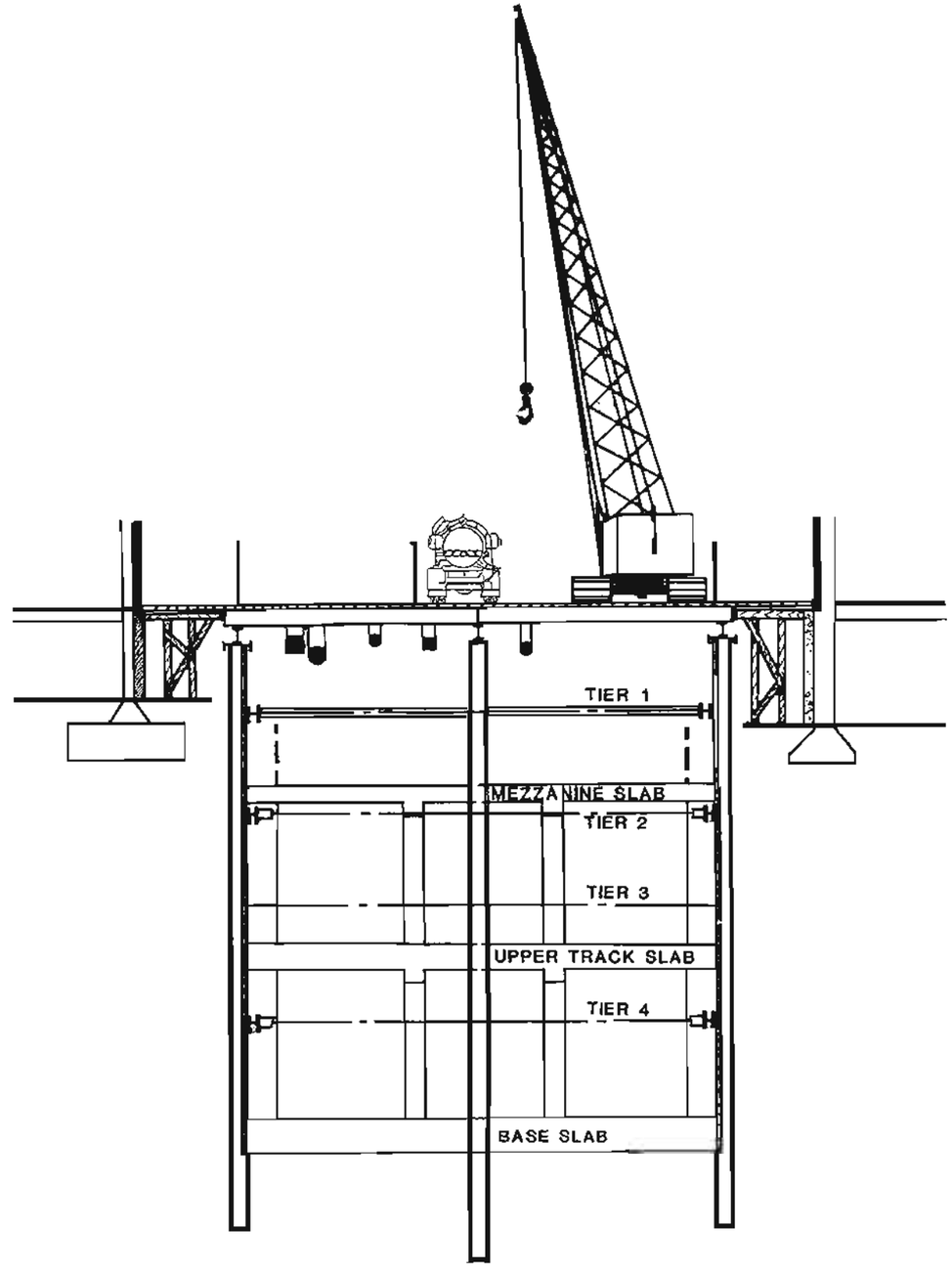
Bracing will be required at all of cut-and-cover stations. An internal bracing system rather than tie-backs will be used because, for the relatively narrow trenches involved, they will prove to be more economical. Also in certain station locations, such as Civic Center, 5th/Hill and 7th/Flower, the presence of adjacent building structures would preclude the use of tie-backs. Therefore, a planned sequence of excavation and installation of internal bracing will proceed downward until subgrade is reached.

12. Structure Installation and Bracing Removal

The station floor also known as invert or base slab, will be installed first. The slab is poured in longitudinal lengths of 30 to 50 feet and for the full transverse width. Invert slabs are generally poured in alternate sections so that the placement of reinforcing steel and the pouring of concrete do not interfere with each other.

After a reasonable length of continuous base slab has been completed, the installation of exterior walls and any interior column elements can proceed up to the underside of slab level that is to be supported by the walls and/or columns. Thus, the wall and column pour lifts might be to an upper track level, a mezzanine level, or a roof level. Then the suspended slabs are poured.

The exterior entrances are constructed after the station core has been completed.



STRUCTURE INSTALLATION AND BRACING AND REMOVAL

FIGURE IV-5

13. Backfilling and Surface Restoration

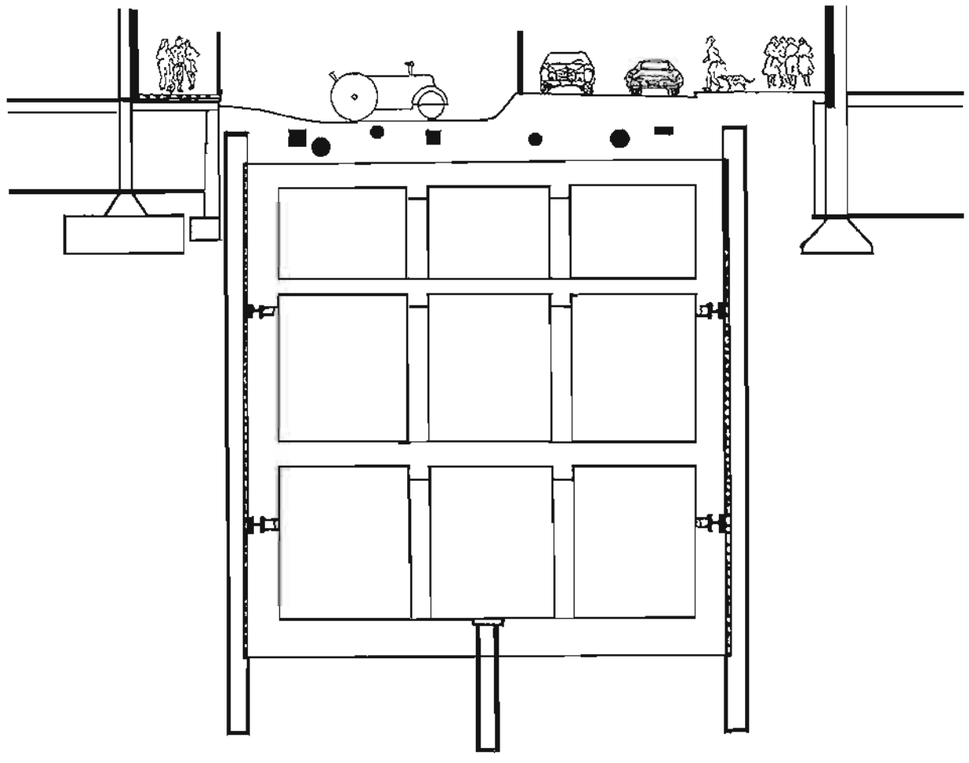
After the station structure has been completed and the roof slab allowed to cure for a specified period, the backfilling operation can begin. Where the subsidewalk vaults have been demolished, and a structural concrete closure wall, of necessity, has already been provided, the vault space is filled with compacted backfill. Prior to the backfilling operation the continuous sidewalk decking is removed, but access to building entrances is maintained by special bridgings.

During the backfilling operations, the utilities are restored to their permanent locations. The gas mains and water mains are brought back from their temporary locations. New sewer manholes and cable/duct vaults are usually built to replace the old ones either because the old ones are in poor condition or the locations of these structures within the station area have been changed for the restoration layout of the utilities.

Where the sidewalks have been demolished because of the cut-and-cover construction, they must be restored. This is done after the backfilling of vault spaces has beem completed or the reclaiming by the owner of the remaining vault area has been accomplished.

After the backfill has been completed on one side of the street, the permanent street pavement is installed to accommodate the lanes of traffic, two or three, that have been programmed for maintenance at all times along the particular street. Vehicular traffic shifts to the paved side and the contractor then shifts his operations to the other side of the street where he completes the remaining backfilling and utilities restoration work and can restore the sidewalk and the remainder of the street pavement.

With the restoration of roadway pavement and restoration of full vehicular traffic, the work of cut-and-cover subway structure is completed insofar as the station structure is concerned and continuing activity involving station finishes and equipment installations can continue beneath the surface with little, if any, disruption to street use by vehicles and pedestrians.



BACKFILLING AND SURFACE RESTORATION

FIGURE IV-6

B. LINE CONSTRUCTION

The line sections of the SCRTD Metro Rail Project will be constructed principally by bored tunneling methods, the twin tunnels varying in depth from 25 ft. to approximately 125 ft. beneath city streets and up to 700 ft. in depth beneath the Santa Monica Mountains.

In general the twin tunnels will be in the conventional side by side configuration. At frequent intervals along the line cross-passages will be mined between the tunnels to provide passenger access to the adjacent tunnel in the event of a safety-related incident requiring passenger evacuation.

Certain special structures will be constructed by cut-and-cover methods. These include crossovers, which allow the trains to switch tracks along the line; pocket tracks, which allow storage of defective trains between the running tracks; and ventilation shafts which house ventilation fans used for extracting excess heat from the line tunnels.

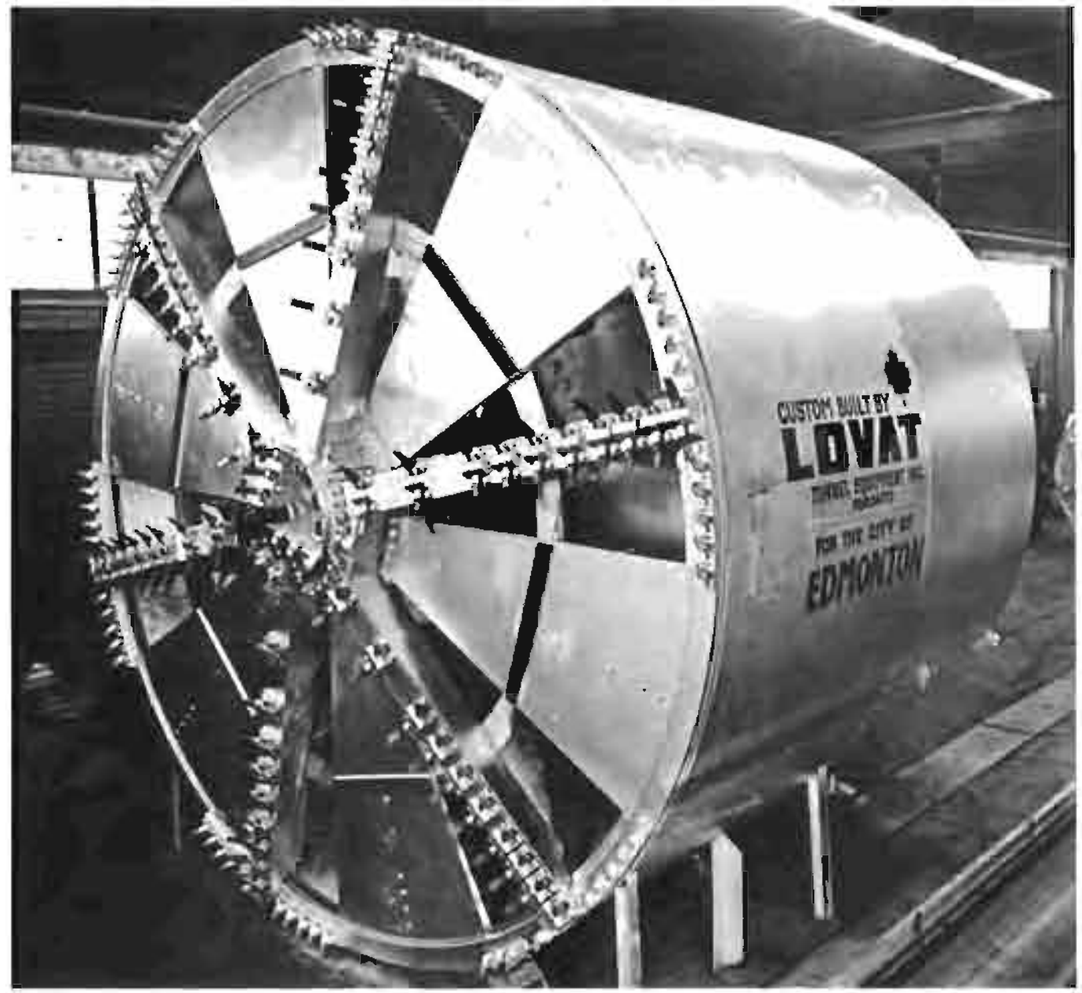
Finally, certain sections of non-revenue line beyond the terminal stations will be constructed by cut-and-cover construction. These include the underground lead tracks to the train storage yards and maintenance facilities east to Union Station and the three stub-ended tail tracks north of North Hollywood Station.

1. The Bored Tunnels

The twin bored tunnels connecting each station along the line will be contructed using mechanized tunnel boring machines (TBM's) which continuously support the ground during the tunneling operation. A typical TBM is shown in Figure IV-7. At the rear of these machines are tunnel liner erection devices that erect the precast segments that make up the permanent lining to the tunnels in the form of rings of precast concrete between 3 ft. and 4 ft. wide and approximately 18'-6" internal diameter. These rings serve to carry the earth and rock loads and to prevent groundwater from entering the tunnels and causing corrosion damage to the trains and fixed electrical/mechanical systems within the tunnels.

The tunnel boring machines (TBMs) will be placed in the ground generally at station or crossover structure excavations and driven to the next station or crossover using the previously placed tunnel liner rings to thrust off. When the TBM reaches the next station or crossover the machines will be skidded through the station excavation to recommence their construction of the next section of tunnel. Alternatively, the construction contractor may elect to lift the machines out using heavy mobile cranes and replace them at the other end of the station excavation, in order to avoid interfering with the construction of the station.

A tunnel staging site will be required at the starting point of each tunnel drive for tunnel liner storage; spoil removal, storage and loading facilities; and construction personnel facilities and offices. These sites may be combined with the station staging sites but will



CLOSED FACE TUNNEL BORER FLOOD DOORS IN THE FULLY OPEN POSITION

FIGURE IV-7

necessitate 2,500 to 5,000 square yards in area. They may be located in the excavations for the crossovers or on adjacent land leased temporarily for the purpose.

Upon completion of tunnel excavation and lining the cross-passages between the twin tunnels will be constructed by hand mining methods from openings formed in the tunnel liners. In addition, tunnel openings to ventilation shafts and low-point drainage sumps will be constructed.

Following these activities, first stage track bed construction will be carried out, together with the construction of an emergency evacuation walkway along the side of each tunnel to provide a safe evacuation route for passengers clear of the trainways.

2. Crossovers and Pocket Tracks

The crossover and pocket track structures are generally located immediately adjacent to stations and will be constructed, by cut-and-cover methods like the stations. Accordingly, all the design and construction requirements that are applicable to the station will be applicable to the crossovers and pocket tracks.

Crossover structures are approximately 450 ft. long, pocket tracks are approximately 1,100 ft. long, both consist of a concrete box approximately 60 ft. wide. At several locations traction power substations will be located on top of these structures since a considerable amount of underground space is available between the top of the crossover boxes and the ground surface.

3. Line Ventilation Shafts

Between certain stations on the line cut-and-cover ventilation shafts will be constructed to house ventilation fans used for extracting hot air from the tunnels. These shafts are generally required on sections of the line more than a mile between stations such as, between the North Hollywood and Universal City Stations.

Two types of shaft will be constructed; the first for tunnels less than 50 feet of cover; and the second for tunnels with more than 50 feet of cover.

The first type of shaft consists of a 50 feet wide three-cell horizontal concrete box 20 feet high joining openings in the top of the tunnels to a vertical shaft penetrating the ground in a convenient off-street location. Three ventilation fans and their control equipment are housed in this horizontal concrete box.

The second type of shaft is used when the tunnels exceed 50 feet in depth such as beneath the Santa Monica Mountains. Here a 20 feet diameter shaft will be sunk from the ground surface down to openings in the side of the tunnels. This type of shaft could be excavated from the bottom up using a raise bore drill so that all the excavated material is removed from the tunnels below, rather than from the shaft top. This would significantly reduce the impact of construction around the shaft top. The fans are then housed in a fan house at the top of the shaft just below ground level.

V. IMPLEMENTATION

V. IMPLEMENTATION

A. DESIGN COMPLETION

Upon completion of Preliminary Engineering, it is expected that the design of all fixed facilities will be approximately 30 percent complete. During the next phase of the project, "Continuing Preliminary Engineering," design work will be completed to the 50% level for most facilities and to 85% for some. Upon completion of the Environmental Impact Statement and approval by the funding authorities, a "Final Design" phase will complete the designs, ready for construction bidding. The goal of Preliminary Engineering is to define all elements of the Project and develop realistic cost estimates. Cost estimates will be presented in Milestone 11. The station and alignment plans that will be represented and referenced in the Final Draft of this report constitute the "General Plans" for fixed facilities and will guide the architects and engineers who will be further developing these designs during the next phase of the project.

SCRTD is in the process of selecting qualified architectural and engineering firms for each of the Continuing Preliminary Engineering design units. These design units have been determined based on the analysis of a number of factors such as:

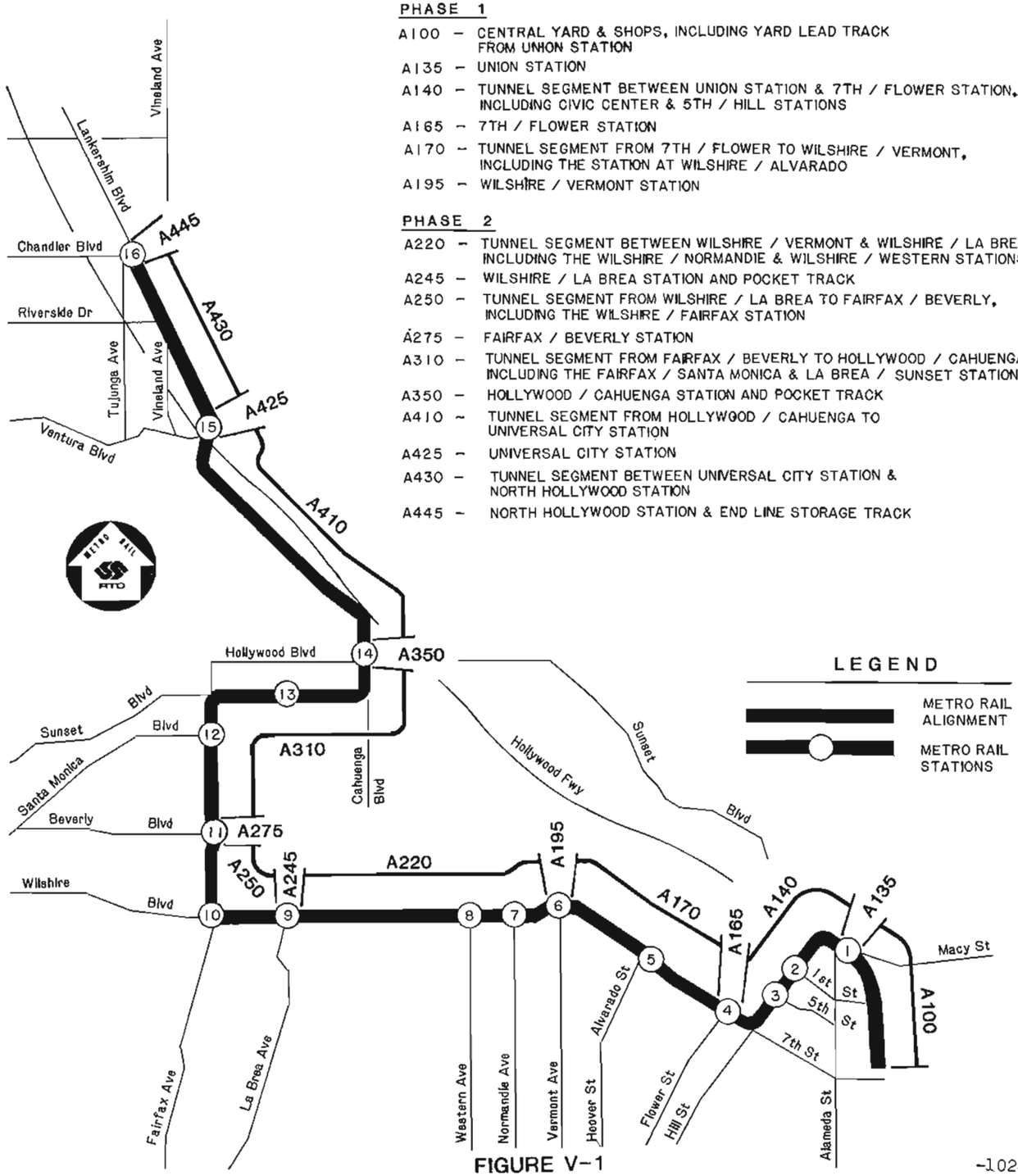
- o Maximizing use of required expensive construction equipment such as Tunnel Boring Machines.
- o Planning design units to coincide with construction units.
- o Arranging scheduling and phasing to reduce total design time.
- o Encouraging wider competition by qualified firms for design work.
- o Providing manageable scopes of work.

In some cases design units may consist of a station only or a line segment only; in other cases a design unit will have both station and line elements. The objective of the Continuing Preliminary Engineering work will be to bring the design work on 6 stations and 2 tunnel segments from 30% complete to 85% complete. And, for the remaining 10 stations and 5 tunnel segments, to bring the design work from 30% complete to 50% complete. Figure V-1 lists and illustrates the design units.

RTD

Southern California Rapid Transit District
Metro Rail Project

DESIGN UNITS



PHASE 1

- A100 – CENTRAL YARD & SHOPS, INCLUDING YARD LEAD TRACK FROM UNION STATION
- A135 – UNION STATION
- A140 – TUNNEL SEGMENT BETWEEN UNION STATION & 7TH / FLOWER STATION, INCLUDING CIVIC CENTER & 5TH / HILL STATIONS
- A165 – 7TH / FLOWER STATION
- A170 – TUNNEL SEGMENT FROM 7TH / FLOWER TO WILSHIRE / VERMONT, INCLUDING THE STATION AT WILSHIRE / ALVARADO
- A195 – WILSHIRE / VERMONT STATION

PHASE 2

- A220 – TUNNEL SEGMENT BETWEEN WILSHIRE / VERMONT & WILSHIRE / LA BREA, INCLUDING THE WILSHIRE / NORMANDIE & WILSHIRE / WESTERN STATIONS
- A245 – WILSHIRE / LA BREA STATION AND POCKET TRACK
- A250 – TUNNEL SEGMENT FROM WILSHIRE / LA BREA TO FAIRFAX / BEVERLY, INCLUDING THE WILSHIRE / FAIRFAX STATION
- A275 – FAIRFAX / BEVERLY STATION
- A310 – TUNNEL SEGMENT FROM FAIRFAX / BEVERLY TO HOLLYWOOD / CAHUENGA, INCLUDING THE FAIRFAX / SANTA MONICA & LA BREA / SUNSET STATIONS
- A350 – HOLLYWOOD / CAHUENGA STATION AND POCKET TRACK
- A410 – TUNNEL SEGMENT FROM HOLLYWOOD / CAHUENGA TO UNIVERSAL CITY STATION
- A425 – UNIVERSAL CITY STATION
- A430 – TUNNEL SEGMENT BETWEEN UNIVERSAL CITY STATION & NORTH HOLLYWOOD STATION
- A445 – NORTH HOLLYWOOD STATION & END LINE STORAGE TRACK

FIGURE V-1

B. CONSTRUCTION

When the design of a particular phase has been completed and all the contract drawings, specifications and quantities produced, the individual contracts will be offered to qualified and experienced contractors to bid on. The lowest bids fulfilling all the technical, financial, and other requirements of the SCRTD will be accepted and at the earliest possible time the successful contractors will be given permission to proceed with the construction.

The entire Metro Rail Project is devided into sixteen separate construction contracts. Eight contracts consist of the construction of single stations; two contracts consist of the construction of single lengths of twin-bore tunnel and five contracts consist of one or two stations together with connecting lengths of twin-bore tunnel. The remaining contract consists of the main storage yards and the connecting tunnels to Union Station.

The duration of each of these contracts conforms to the overall project schedule which provides for four phase openings along the line covering an eighteen month period.

C. SCHEDULE

The schedule for completion of the design and construction of the project is shown in Figure V-2.

METRO RAIL PROJECT– IMPLEMENTATION SCHEDULE (NORMAL)

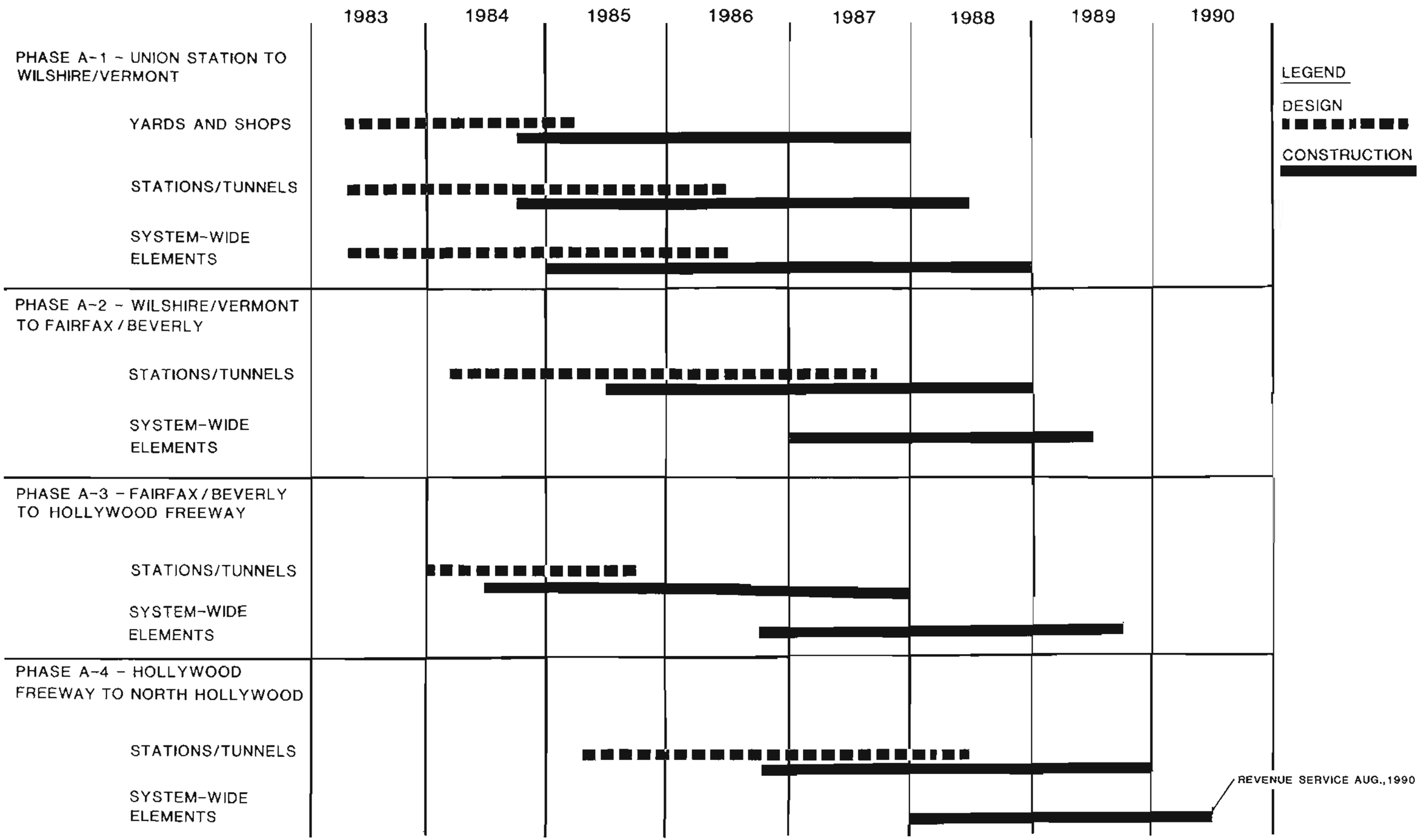


FIGURE V-2