TECHNICAL REPORT

DISPOSAL OF TUNNEL AND STATION EXCAVATION MATERIAL

LOS ANGELES RAIL RAPID TRANSIT PROJECT
"METRO RAIL"

Draft Environmental Impact Statement and
Environmental Impact Report

Prepared by

SEDWAY/COOKE
Urban and Environmental
Planners and Designers

in association with

WESTEC SERVICES, INC.
URS/JOHB A. BLUME & ASSOCIATES

Prepared for

U.S. Department of Transportation
Urban Mass Transportation Administration

and

Southern California Rapid Transit District

April 1983

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DISPOSAL OF TUNNEL AND STATION EXCAVATION MATERIAL

In fulfillment of
Task #18H: Muck Disposal Study

Prepared by

SEDWAY/COOKE
Urban and Environmental
Planners and designers

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WESTEC Services, Inc.
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Prepared for:

The Southern California Rapid Transit District
Metro Rail Project
Second Tier Environmental Impact Statement/Report

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Funding for the project is provided by grants to the Southern California Rapid Transit District from the United States Department of Transportation, the State of California and the Los Angeles County Transportation Commission.

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I. SUMMARY

INTRODUCTION AND CONCLUSIONS

The purpose of this report is to provide SCRTD with information necessary to facilitate the disposal of excavated materials, or muck, from the Metro Rail Project's tunnel, station, and yard construction. The scope of this report encompasses the legal, institutional, and technical parameters of waste disposal in the Los Angeles region.

Major conclusions resulting from this study are identified below.

- There is adequate capacity at existing landfills to accommodate waste from the project.
- Alternate disposal methods exist and may complement the primary means of disposal, however, by themselves they are not practical for this project due to the proposed construction schedule and environmental concerns.
- The other waste disposal options reviewed in this study include new landfill development, use of exhausted gravel pits, ocean disposal, and waste disposal from beach replenishment.
- The large number of truck trips needed to transport and dispose of the excavated materials constitute an environmental concern that can be partially mitigated by carefully planning the haul routes between loading and disposal points.

METRO RAIL CONSTRUCTION

The subway tunnel construction would be accomplished by tunnel boring machines along much of the 18.6 mile alignment. Excavated tunnel material will be transported from the tunnel faces in rail cars and hauled to shaft or pit bottoms and then raised to the surface by a crane or hoist. From any one staging site this material will be produced at a maximum rate of 100 cubic yards per hour from two tunneling machines operating simultaneously. The tunnel waste will be loaded onto trucks for removal to disposal sites. The loading and hauling of tunnel waste will be restricted to the hours of 7:00 a.m. to 6:00 p.m. along specified routes to minimize disturbance to residences and other noise-sensitive areas.

Cut and cover construction will be used for Metro Rail stations and certain line segments. Each cut and cover station will be designed somewhat differently, but all stations have similar dimensions: approximately 650 feet long, 60 feet wide, and 55 feet below street level. Approximately 112,800 cubic yards of material will be excavated from each station site. The material from the cut and cover station excavation will be removed at an average rate of 860 cubic yards of material per day per station and brought to the surface and loaded on trucks for disposal. This rate requires approximately eight truckloads per hour.

Construction of the tunnels and stations will also require the transport of construction materials and backfill. The number of truck trips for these activities represents a small proportion of those trips required to haul away excavated materials.

DISPOSAL REQUIREMENTS AND OPTIONS

For the Locally Preferred Alternative the total volume of material excavated from tunnels and stations will be approximately 6.55 million cubic yards. The Aerial Option would generate approximately 20 percent less tunnel material for disposal and the Minimum Operable Segment about 64 percent less. Construction of the tunnels will take approximately 3 to 3-1/2 years for the Locally Preferred Alternative and about 2-1/2 years for the Minimum Operable Segment. The Locally Preferred Alternative construction schedule translates to an excavation rates of 21,000 tons/day. This will require 1,047 daily one-way truck trips to landfills.

In order to determine whether this volume could be accommodated, landfills, the most likely candidate for disposal of excavated materials, in the Los Angeles region were identified. These landfills were then screened for their suitability and availability during the Metro Rail construction period. Key criteria used to identify acceptable landfills included:

- maximum reasonable distance
- available capacity during construction period
- ability of site to accept waste types generated by the project

Although this process eliminated most of the landfills in the Los Angeles region, the remaining ones have adequate capacity to accommodate the solid waste requirements of Metro Rail. A conservative estimate based upon 1981 fill rates in the Los Angeles region indicates that roughly 41,000 tons of material were disposed daily. But the actual amount landfills can accommodate is higher and depends upon the conditions specified in the use permits issued to each landfill operation.

Of the other disposal options reviewed, the development of new landfills and/or the use of gravel pits is not considered feasible due to the long development time and permit review processes. Optimistically, a three year period is required for a new landfill development. A conservative and more realistic estimate indicates a waiting time of 6 or more years, which would be too late to accommodate excavated materials from Metro Rail's construction. Ocean disposal and beach replenishment are potential options, however their feasibility is questionable from both an environmental and cost standpoint.

II. INTRODUCTION

PURPOSE AND SCOPE

The Metro Rail construction will produce substantial amounts of excavation material which will require disposal in an environmentally acceptable manner. This report identifies and responds to the impacts and concerns that result from the subway excavation and provides information required for the EIS/EIR. The purpose of this document is to describe applicable waste disposal regulations, identify disposal options, and identify the disposal and transportation requirements for the environmental analysis. The information contained in this report is also intended for use by SCRTD and its construction contractors as a guide to securing landfill sites to accommodate excavation during the subway construction.

This report is based upon the Draft Interim Report on Muck Disposal prepared by DMJM/PBQD, and the Construction Scenario prepared by Westec Services. These reports described construction techniques which will be used for the subway construction and detailed the amounts, duration, and points of origin for the excavated tunnel and station material.

REPORT ORGANIZATION

This report is organized into six chapters. Chapter I provides a report summary, and Chapter II describes the purpose and scope of this report. Chapter III identifies the regulatory framework for solid waste disposal and discusses the roles and responsibilities of federal, state, and local regulators. Chapter IV details the available waste disposal options. Chapter V presents a list of likely landfill sites to accommodate excavated material and describes the criteria for their selection. Chapter VI presents recommended haul routes for waste transportation to landfills, and Chapter VII concludes the report with the bibliography and persons and agencies contacted for the report preparation.

Appendix A has been prepared to evaluate the disposal implications of the alternative Hollywood and North Hollywood alignments.

III. REGULATORY FRAMEWORK FOR SOLID WASTE DISPOSAL

Solid waste disposal is an increasingly complex and controversial issue. Land disposal sites typically serve the regional needs for waste management but the impacts associated with their operation are localized. The trucks which haul waste to landfills often traverse local streets, affecting adjacent commercial and residential land uses. Because of potential water quality, visual, noise, and odor problems, disposal facilities are frequently viewed by communities as undesirable uses. In response to the regional nature of waste management and to protect the welfare of local communities, government agencies at the local, county and state levels assume responsibility for the planning and design of disposal sites.

This section reviews the regulatory framework for solid waste disposal. Considerable detail is presented in the section for two reasons: (1) to demonstrate that existing landfills have undergone considerable engineering and environmental analyses before becoming operational, and (2) to describe the regulatory procedures involved in the safe transport and disposal of solid waste.

OVERVIEW

The regulatory framework for the disposal of solid waste in California involves several agencies at the state, county, and local levels. The discussion which follows describes the authorities of particular relevance to the Metro Rail Project.

At the state level, three agencies play major roles in solid waste management. These are the State Solid Waste Management Board which is responsible for nonhazardous solid wastes, the Department of Health Services responsible for hazardous wastes, and the State Water Resources Control Board responsible for the effect of disposal on water quality. To meet the mandate of the Federal Resources Conservation and Recovery Act of 1976, the State Solid Waste Management Board and the Department of Health Services jointly produce a state plan for solid waste management.

The state legislature has delegated responsibility for solid waste management to counties. Each county is responsible for the preparation and implementation of a solid waste management plan (Government Code Sections 66700 et seq.). Counties, with the concurrence of a majority of the cities containing a majority of the incorporated population of the counties, had to adopt these plans and submit them to the State Solid Waste Management Board for review and approval by January 1, 1976 (Government Code Section 66700). Amendments to the plans are subject to city and state approval. Under the Act, counties must review and update their plans at least every three years (Government Code 66780.5). Los Angeles County is currently revising its 1975 County Solid Waste Management plan and completion is expected by spring of 1983 (Dave Yamahara, personal commun.).

Once the plan has been adopted by the County and approved by the State Solid Waste Management Board, it governs the approval of solid waste management facilities and their federal and state funding. The Board may only approve those requests for state or federal funds for solid waste management projects that con-

form to the County Plan (Government Code Section 66782). No individual, jurisdiction or agency can establish or operate a site for solid waste disposal, transfer, waste processing, or resource recovery that does not conform to a State-approved Solid Waste Management Plan (Government Code Section 66784).

WASTE TYPES

The regulation of solid waste disposal depends on the waste types. Wastes of a hazardous nature must be disposed of at specially designed landfills which insure the protection of groundwater resources. Landfills are classified according to their geology and continuity with groundwater and surface water resources. These characteristics, in turn, determine their ability to accept different wastes. Class I landfills accept non-radioactive hazardous waste, Class II landfills accept a large array of waste groups, incuding non-hazardous liquid waste, and Class III landfills can accept only inert materials.

Non-hazardous Waste

The major portion of materials excavated during the Metro Rail Project construction is composed of new and old alluvium. This material includes combinations of clean sands, silty sands, gravelly sands, sandy gravels, silts and clayey sands (Converse Ward Davis Dixon, Earth Sciences Associates, Geo/Resource Consultants, 1981). This material type closely approximates Group 3 waste materials, which include nonwater soluble, nondecomposible inert solids such as earth, rock, concrete, and asphalt paving fragments. Group 3 materials may be accepted at all landfills.

Hazardous Waste

The State Department of Health Services requires that hazardous waste producers, transporters, and hazardous waste disposal site operators complete a manifest to monitor the generation, transportation, and disposal of hazardous waste materials (Government Health and Safety Code Sections 66475, 66480, and 66485). This procedure requires that a waste generator describe the type of waste, chemical composition, and special handling instructions and identify whether the waste is hazardous or extremely hazardous (Government Health and Safety Code Section 25160). The producer must also list the proper Department of Transportation shipping name for each load of hazardous waste before the waste is transported on a public road. The producer must submit a copy of the manifest for each load of hazardous waste to the waste hauler to whom he transfers custody of the waste. In the case of large waste volumes a single daily manifest may be submitted. At the end of each month the waste producer must submit a copy of each manifest to the California Department of Health Services.

Section 66420 of the California Administrative Code requires that all hazardous waste haulers be registered with the California Department of Health Services' Hazardous Materials Management Section. Vehicle inspection and proof of insurance are required for registration.

The Draft Interim Report for Muck Disposal (DMJM/PBQD 1982b) indicates that approximately 560,000 cubic yards of soil will be oil or tar contaminated. Oil is identified as a toxic hazardous waste by the California Department of Health

Services (Government Health and Safety Code Section 66680). State Department of Health officials indicate that testing of soil samples during tunneling through contaminated soil horizons will be necessary to determine whether special disposal sites are needed (Williams, personal commun.) For the purpose of this study a conservative approach for the safe disposal of contaminated waste is assumed; therefore, requiring this quantity of waste be transported to either a Class I or II-I landfill.

WASTE TRANSPORT

The transport of excavated materials is regulated by the City of Los Angeles, the Department of California Highway Patrol, the California Department of Transportation, the County of Los Angeles, and other incorporated cities affected by haul activities. Issues of concern for the transport of waste include public safety, street and highway maintenance, noise and air quality control. Regulations and guidelines for waste transport are intended to mitigate or reduce these and other impacts on adjacent residential and commercial areas. Routes are selected to avoid noise sensitive land uses such as schools, hospitals, senior care facilities, and residential areas. Typically, haul routes utilize major streets and highways which can support the heavy loads and large trucks required for large scale construction projects.

Initial identification of haul routes are made by contractors retained to transport waste. These routes are subsequently reviewed by the City of Los Angels and are subject to revision as necessary to insure conformance with weight restrictions and loading regulations outlined in the California Vehicle Code (CVC). The discussion which follows details the procedure necessary to secure haul routes within the City of Los Angeles and other incorporated areas, and describes State regulations for the transport of non-hazardous materials.

The City of Los Angeles regulates all projects involving the transport of all earth material in excess of 1,000 cubic yards. The intent of these regulations is to monitor the contractor's selection of haul routes from their points of origin to disposal sites, to review the import and export of earth, and to establish guidelines for "grading projects" in the hillside areas of the City. The Metro Rail Project may not constitute a grading project since most excavation will occur below ground, however the project will likely require the establishment of haul routes subject to the City's review to assure that impacts to residential areas and the environment are addressed (Lumpkin, personal commun.).

To secure haul routes SCRTD must submit the proposed haul routes of both loaded and empty trucks, the projected maximum gross truck weight, the vehicle type (dump truck, semi-trailer, truck and trailer, etc.), the hours and days of hauling, the total trips per day, and the duration of the project. As part of the application package, the applicant must submit additional information forms and a filing fee of $150.00. Information which must be submitted by the applicant includes the following: three copies of a vicinity map showing all lots within 300 feet of the project boundary; two sets of property owners lists for all parcels shown on the vicinity map; twelve sets of the haul route maps which indicate the location of the project site in relation to nearby major and local access streets; significant physical features which might have a bearing on the proposed hauling; public facilities such as schools, hospitals, libraries, police and fire stations; twelve sets of the Haul Route

Questionnaire which includes the location of borrow and/or dispersal sites within the hillside area and extending to or from a major or secondary highway; and, the maximum gross weight of haul vehicles when loaded.

This information is then reviewed by the Departments of Building and Safety, Public Works, and Traffic. Recommendations of these Departments are made to the Board of Building and Safety Commissioners and are reviewed at a public hearing. Prior to the hearing, the Department of Public Works may, within 14 days after receipt of the haul proposal application, recommend conditions to be imposed on the hauling operation in order to protect the public health, safety, and welfare. The recommendations, incorporating suggestions from the Bureau of Engineering and Street Maintenance, are transmitted to the Department of Building and Safety for consideration at the Safety Commission's public hearing.

Incorporated cities have signs posted indicating designated haul routes or haul-restricted streets. In such instances contractors are limited to the designated posted haul routes. The transport of excavated materials will likely occur along haul routes which utilize the extensive freeway system serving the Los Angeles Region. The California Highway Patrol is responsible for ensuring that the CVC size and weight laws are enforced. These laws regulate the weight, height, length, and width of vehicles on State maintained roads and highways. The CVC establishes gross weight limits by vehicle type. Weight limits are determined on the basis of the weight exerted by any group of two or more consecutive axles upon the highway. The total allowable gross weight permitted on State Highways is 40 tons. These maximum allowable weight estimates are consistent with the City of Los Angeles' guidelines which also utilize the CVC weight standards. Enforcement of vehicle code size and weight laws occurs via State operated weight inspection stations, platform scales, and portable scale pits (Harwood, personal commun.).

The California Department of Transportation (Caltrans) is authorized to issue special permits allowing extralegal loads on State maintained roads (Section 35780, CVC), and to review requests to haul oversize vehicles and loads. It is not anticipated that tunnel spoil truck loads will necessitate Caltrans transportation permits to exceed legal load limits. Caltrans also assumes responsibility for determining the structural integrity of State maintained roads and highways. In the Los Angeles region one weight restricted freeway has been identified which will affect haul route selection. The Pasadena Freeway from the Hollywood Freeway north to Pasadena is restricted to maximum weight limits of 6,000 pounds, or about the weight of a automobile (Brennler, personal commun.). In this instance, truck routes will be required to take alternate freeways.

Los Angeles County is responsible for the issuance of waste haul permits for loads in excess of 10,000 cubic yards. The County's jurisdiction includes unincorporated portions of Los Angeles and extends to more than 30 cities and communities which contract for traffic control services (Harwood, personal commun.). To obtain a permit the County reviews all haul routes and requires that the contractor file a Certificate of Workman's Compensation, a County Liability Insurance form, submit the appropriate permit fee and a $5,000 bond to cover potential damage to roadways (Ames, personal commun.).

Landfills are categorized according to their geology and their relationship to nearby water resources. These characteristics dictate the kinds of wastes the landfill can accept. The following classification system is used to distinguish different landfills:

Class I: There must be no possibilty of discharge of pollutant substances to usable waters. Artificial barriers may be used for the control of lateral waste movement only. Usable groundwater may underlie the site, but only under extreme cases and where natural geological conditions prevent movement of the wastes to the water and provide protection for the active life of the site. Inundation and washout must not occur. All waste groups may be received.

Class II: The geolocial requirements for Class II sites are similar to those for Class I. The principal differences are that the barriers may be artificial rather than natural, and surface waters are protected against 100 year flood.

Class II-1: These sites may overlie or may be adjacent to usable groundwater. Artifical barriers may be used for both vertical and lateral waste confinement in the absence of natural conditions. Protection from a 100-year frequency flood must be provided. Group 2 and 3 wastes can be accepted and under special conditions, certain Group 1 materials may be accepted. (Class II with limited liquid disposal.)

Class III: These are sites where Group 3 wastes could under certain conditions be dumped directly into ground or surface water or where there is inadequate protection to water quality. Only Group 3 wastes may be accepted. Construction practices and facilities that could cause a discharge of soil or accelerate downstream transport of soil are also considered Class III disposal sites.

Aside from the above permanent facilities, the construction scenario indicates that several temporary storage areas will be needed to accommodate soil extracted during the no-haul period between the hours of 6:00 p.m. and 7:00 a.m. (Los Angeles City Building Regulations, Section 91.3002(e)). Storage areas would be within close proximity to the soil extraction site exit points identified in the Draft Interim Muck Disposal Report of August 1982. General requirements for the storage areas would include adequate fencing to afford public protection and to exclude access of pedestrians and vehicles. The temporary storage areas will be empty at the beginning of the no-haul period and then slowly
filled between the hours of 6:00 p.m. and 7:00 a.m.

IV. DISPOSAL OPTIONS

Five options were reviewed for the disposal of excavation materials. These include new landfill development, ocean and beach replenishment, construction fill demand, excavated sand and gravel pits, and existing landfills. The use of existing landfills appears to be the most promising option in terms of the ease of implementation. The remaining options, while not mutually exclusive, are, when viewed separately, considered unlikely candidates by virtue of their environmental impacts, long development schedule, community disruption and excessive costs. Construction fill demand and excavated sand and gravel pits alone cannot meet the demand expected from the project, but together these options may be used to accommodate some portion of the excavation. New landfill development can be completed in 3 to 6 years which means it is a possible candidate for disposal. But even if this assumed time frame is correct, unanswered questions remain concerning community opposition and uncertainty over new landfill site approval. In this regard the new landfill development option is considered plausible but unlikely.

The following discussion reviews four of the options and describes their ease of implementation. The fifth option, use of existing landfills, is treated separately in Section V.

NEW LANDFILL DEVELOPMENT

Additional disposal capacity to accommodate waste may be provided in two ways: development of new waste disposal sites and expansion of existing sites. Both procedures involve the coordination and close cooperation of all agencies within the regulatory framework for waste disposal.

Site acquisition and development of new landfills is time consuming. The time frame for the development of a landfill that can accept "clean" waste such as waste groups generated by this project would take at least three years (Smith, personal commun.). In Los Angeles County the procedure includes obtaining a conditional use permits (CUP) from the Los Angeles Department of Regional Planning or from the applicable city planning agency. An environmental impact report (EIR) would also be required pursuant to the California Environmental Quality Act (CEQA) since a landfill represents a project which would probably have a significant effect on the environment.

In addition to obtaining a CUP and EIR, any site secured for a potential landfill would require engineering and design work to assure proper site preparation to accommodate waste. During the design and engineering stage sufficient information must be provided by the discharger to enable evaluation of the disposal operation in relation to conditions in the disposal area. Information about local geohydrology and surface water hydrology is required. Generally, the larger the disposal operation, the greater the possibility that water quality problems will be created thereby requiring greater detail in technical reports.

Prior to the disposal of waste at a new site the operator is required by the California Water Code to file a report of waste discharge with the appropriate Regional Water Quality Control Board in order to receive site classification. Any site approved to receive or store hazardous waste must also be granted a permit to oper-

ate by the California Department of Health Services. All sites must be in conformance with the goals and policies of the State approved Los Angeles County Solid Waste Management Plan and must obtain an operating permit from the Solid Waste Management Board.

Expansion of existing landfills represents another means to increase disposal capacity. Several existing landfills have adjacent land suitable for filling. Some site operators have options to purchase adjacent or nearby lands. In all cases, site operators are required to obtain permits which place conditions on the use of the landfill expansion. Application for operating permits for landfill expansion may require an environmental analysis to determine the impacts of extending the life of the landfill. The time frame to plan, design, and develop new landfills ranges from 3 to 6 years

OCEAN DISPOSAL AND BEACH REPLENISHMENT

The Army Corps of Engineers (Los Angeles District) is responsible for issuing permits for disposal of material into ocean waters. This authority is derived from the Marine Protection, Research and Sanctuaries Act of 1972, the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act. Permission to conduct an ocean disposal or a beach replenishment is requested from the District Engineer of the Corps of Engineers. Material required in the application includes a justification for ocean disposal, a mechanical analysis of the waste to determine its physical composition, and a preliminary chemical analysis.

The restrictions on ocean disposal are generally directed toward minimizing toxic responses and the potential for bioaccumulation of various contaminants in marine ecosystems. Contaminated material is subjected to analysis by bioassay to determine short term toxicity and the long term bioaccumulation potential of disposal material.

One criterion used to determine the suitability of material for ocean disposal is the physical characterization of the grain size. The major concern with the use of this material is the amount of fine grained silts in the sand and gravel beds. This silt could have a negative impact on nearshore marine organisms and would require some study prior to their use for beach replenishment. Also, if the material is contaminated with oil or gas, it would not be suitable for ocean dumping. If the material is chemically uncontaminated and is non-silty, it is potentially useful as beach replenishment material.

If the material is deemed suitable, various beach areas will be considered and local agencies involved. Trucks could transport the spoils to the site. The local agency would then take charge of spreading the material.

Offshore disposal normally would take place in an EPA approved site but discharge closer to shore is possible with non-contaminated sediments. This would save significantly in barging costs. The normal process would be to transport the spoils to a shoreline terminal (probably Long Beach) by truck or train. At the terminal the spoils would be loaded onto barges and towed to sea by tugs. The material would be discharged at a set location and the barges would return to port.

Because of the transportation costs, permit requirements, and chemical analyses of the waste materials, ocean disposal is not recommended to SCRTD as the primary means for waste disposal.

EXCAVATED GRAVEL PITS

Exhausted gravel pits represent excellent sites for future waste disposal. Sand and gravel operations today are governed by local and state laws which require preparation and approval of reclamation plans. Reclamation plans for most pits call for their conversion to landfills to restore original topography or to provide an improved site that is convertible to some other land use. Excavated sand and gravel pits in the Sun Valley area have good potential for accepting a portion of the waste generated from construction of the Metro Rail Project. The Bradley and Penrose Pits have already been converted to landfills and capacity information for these is included in Table V-1. The Bradley Pit is actually three separate landfill operations, consisting of a Class 1 fill that is nearly completely filled, a new Class 2 fill which represents an expansion of the former, and an excavation into which only Class 3 materials are deposited. The Penrose Pit has operated as a Class 2 fill.

Three other major pits are presently active sand and gravel extraction sites. Of the three pits, the Wicks Pit is in the process of obtaining a Class 3 landfill permit and represents the most likely prospect as a waste disposal site. This site is to be called the Cal Mat landfill. Two other pits operate in the area. One of these pits, located north of the intersection of Glenoaks Boulevard and Sheldon is approximately two-thirds excavated. The other pit, located west of San Fernando Road between the Tujunga Wash and Branford Street appears about one quarter excavated. Both of these sites are potential future disposal sites but it is not known whether they will be ready to accept wastes during the 1984 to 1990 Metro Rail construction period.

The Cal Mat landfill is located adjacent to the Bradley Avenue West Class 2 landfill and is roughly bounded by Peoria Street on the southeast, Glenoaks Boulevard on the southwest, Wick Street on the northwest and Dronefield Avenue on the northeast. It has a design capacity of between 4 and 6 million cubic yards. It was projected that the landfill would accept between 140 and 310 tons of material per day. It is proposed that the facility operate Monday through Friday between the hours of 7:00 a.m. and 5:00 p.m. The site will continue as a sand and gravel operation for the next 15 years, however, the landfill will be started within the next year and operate simultaneously with extraction for a period of time.

Since the Cal Mat landfill is owned and operated by Valley Reclamation Company, a subsidiary of CONROCK Company, it is likely that a fee will be charge if this site is used for disposal. A fee has not yet been established for the landfill. There would be no other institutional constraints to the use of this landfill as long as the Metro Rail waste material meets the criteria for group 3 wastes.

The following environmental issues affecting the feasibility of using quarries for disposal sites are drawn from an EIR on the Cal Mat Landfill (Westec Services, 1980).

- Fill Duration - Impacts of noise and dust (and other nuisances such as truck traffic) would occur over extended periods of time (50 to 75 years). Class 3 landfills normally do not fill as fast as Class 2 (garbage) landfills.

- Groundwater - The Cal Mat landfill as well as the Sheldon Pit to the north have been excavated 15 to 20 feet below the high groundwater level established during the winter or 1969. During the rainy season, the bottom of these pits fill with water. Since groundwater augments the domestic supply in the San Fernando Valley, there was concern for groundwater contamination where the groundwater table intersects the fill.

- Health Effects - With many Class 1 and 2 fills closing there may be increased incidents of illegal dumping of hazardous wastes at the site. Because of this, the operators were required to monitor wastes coming into the fill.

- Nuisances - Residents of numerous community groups mounted substantial opposition to the establishment of the landfill. They basically thought that sand and gravel extraction operations were a nuisance and felt there would be further aggravation from dust, noise, truck traffic, and public safety from the gradual filling of the excavation over time. Residents seemed to favor more rapid filling of the pit at the owner's expense. It is significant to note that many of these concerns resulted in permit conditions which restricted the landfill operation.

- Surrounding Land Use - Residential areas commonly border the pits. Extensive visual screening including earth berming were required. Operational limitations were imposed.

- Institutional Factors - For many years Los Angeles County has contemplated removing the buildup of silt behind Hansen Dam which is nearby to the north. The County has considered condemning one or more pits for this operation and such action has been strongly opposed by the private gravel operators. Using the site for Hansen Dam silt did not constitute an alternative to the establishment of a Class 3 fill. Similarly, utilizing other quarries as muck disposal sites may require zone variances and also require that the provisions of the Solid Waste Management Board, Regional Waste Quality Control Board, and CEQA be met.

To summarize, there are several sites in the Sun Valley area which may accommodate Metro Rail waste disposal. Most of these have already been established as either Class 2 or Class 3 landfills. The establishment of a Class 3 landfill may be required to dispose of a substantial quantity of inert tunnel waste in quarries not already formally established as landfills. Institutional arrangements which would allow SCRTD to jointly operate a landfill or to store waste material at a quarry for future sale have not been formally investigated. Informally, however, the private companies that operate sand and gravel extraction and landfill operations will be concerned that any joint venture be profitable to both parties.

CONSTRUCTION FILL DEMAND

The Metro Rail Project will produce 6,550,000 cubic yards of spoil. Of this quantity, approximately 5,520,000 cubic yards consists of alluvium and soft ground products (DMJM/PBQD, 1982b). Depending upon the quality of this material some portion may be used for construction fill in the Los Angeles region. It is difficult to determine the amount of material that could be used, however, fill demand will likely arise from several large construction projects currently being planned, chief of which is the I-105 Century Freeway Transitway.

Preliminary discussions with Caltrans indicate that two or three million cubic yards of fill will be required for the Century Freeway project (Shu, personal commun.). Fill would be required at interchange points for embankments and roadway construction along the proposed alignment between the Harbor Freeway and the Long Beach Freeway. All fill would be subject to inspection by Caltrans and must be of a non-corrosive nature. Supply contractors would be responsible for both placing and compacting fill material and would be bonded for all aspect of the work. Areas receiving fill would require fencing and erosion control.

The Century Freeway construction is tentatively scheduled to begin in 1984 with major fill requirements between 1986 and 1989. This schedule provides an opportunity for SCRTD to dispose of some of its clean fill without having to deplete the capacity of existing landfills. If an arrangement could be made with Caltrans, it would mutually benefit both agencies.

V. LANDFILL SITES

Because this option is immediately available and the regulatory procedures regarding its implementation are in place, use of existing landfill sites represents the preferred candidate for disposal of Metro Rail excavation materials.

SITE SELECTION CRITERIA

To identify potential landfill sites to accommodate spoil, selection criteria were employed to screen existing landfill sites in Southern California. The criteria were maximum reasonable distance from spoil excavation points to landfills, the available capacity at the landfill site during the construction period, and the ability of the landfill site to accept different types of waste. The following discussion defines the site selection process.

Landfills within a Maximum Reasonable Distance. A twenty mile radius around the Regional Core is determined to be the maximum reasonable distance to haul waste. This generalized boundary is shown in Figure V-1. Exceptions to this criterion were made where major landfills are located just outside the twenty-mile boundary. The twenty mile radius reflects the following considerations: travel speed, estimated total one-way trip time, and dry-out time for waste. A distance of twenty miles can be covered by haulers in approximately 1 hour. A one hour maximum one-way travel time is desirable from the perspective of dry-out time. (Excavated materials need to be wet down to avoid blowing away or spilling. It is estimated the materials would dry out in about one hour. Implicit also are economic considerations such as the number of haul trucks needed for the maximum reasonable distance. This study assumes that while a greater distance could feasibly be traveled, it would require more trucks to maintain acceptable headways for waste disposal. Such a distance may not be considered economically feasible.

Available Site Capacity during Metro Rail Construction Period. On the basis of the initial screening process landfills within the maximum reasonable distance were reviewed to determine their permitted capacity and additional available capacity by expansion. Remaining capacity under permit and potential expansion capacity (tons) were obtained from the California State Solid Waste Management Board's Solid Waste Information System (SWIS) data base. This data was then sent by Sedway/ Cooke for review by the Los Angeles County Regional Planning Department, the Los Angeles County Sanitation Districts, the Facilities Sanitation Division of the County Department of Engineering, and the Los Angeles County Department of Health.

Using rate-of-fill information from the State Solid Waste Management Board, the estimated closure data for each disposal site was determined. Assuming a construction period from 1984 to 1990, all landfills with estimated closure dates of 1984 or beyond are included as potential fill sites. Landfills whose closure dates may be extended, because new operating permits will permit additional capacity, are also noted.

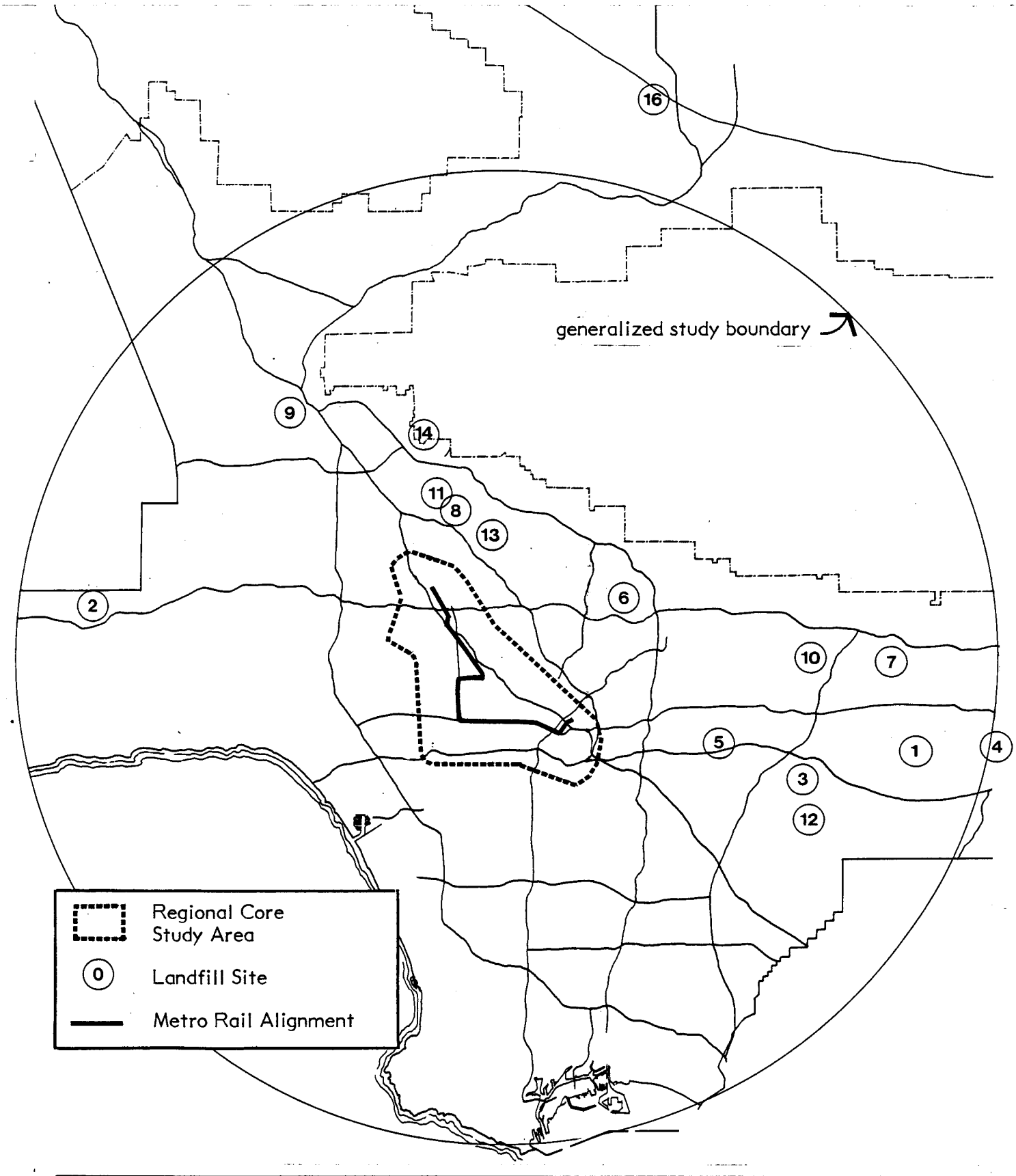
Ability of the Landfill Site to Accept Waste Types. Landfills having available capacity during the construction timeframe were next reviewed to determine each site's ability to accept the wastes expected to be excavated during Metro Rail construction.

POTENTIAL DISPOSAL SITES

Thirty-two candidate landfills were identified. Table V-1 lists these landfills by name and sector (public/private); identifies their location and classification; describes any special consideration for waste disposal; and details the rate of fill (in tons per year and tons per day for 1981), remaining capacity, and estimated closure date(s). Major eligible landfills having substantial capacity and daily fill rates, thereby representing logical sites for disposal of Metro Rail excavation materials, are shown in boldface type.

A review of Table V-1 indicates 1981 land disposal fill rate within the study area was roughly 41,000 tons daily. However, the actual ability of landfills to accommodate more is higher and depends upon the conditions specified in landfill operation permits. This cumulative disposal rate does not include the fill rates for numerous smaller sites that will demand a portion of the Metro Rail construction waste to meet their need for clean fill cover. Table V-1 includes the names and available information for these smaller sites for the use of SCRTD and waste haul contractors. Figure V-1 shows the general location of the largest landfills. They are identified by their number as listed in Table V-1.

The major landfills identified in Table V-1 (boldface type) have an existing capacity of 177.3 million tons. Even assuming that the 1981 fill rate increases by two percent per year between 1981 and 1990, the remaining 1990 capacity (50 million tons) of these most eligible sites will be many times greater than the disposal requirements resulting from Metro Rail construction. Excavated materials from the project would use 15 percent of the remaining capacity.



Southern California Rapid Transit District

Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 2 4 6 8 10 miles

V-3

Figure V-1
Major Landfills In The Los Angeles Region

SEDWAY/COOKE
Urban and Environmental Planners and Designers

TABLE V-1 STATUS OF LANDFILLS IN LOS ANGELES REGION

NAME/SECTOR	DISPOSAL SITE LOCATION	LANDFILL[1] CLASS	SPECIAL CONSIDERATIONS	TONS PER[2] YEAR/DAY	REMAINING[3] CAPACITY (TONS)	ESTIMATED[4] CLOSURE DATE
1. BKK West Covina Disposal Site (Private)	2210 South Azusa Avenue, West Covina	I	Accepts nonradio-active hazardous liquids only.	2,710,000/ 8,700	63,000,000	2005
2. Calabasas Landfill (LA County Sanitation District)	26919 West Ventura Freeway, Agoura, 1 mile west of Las Virgenes Road.	II	Arrangements must be made 24 hours in advance.	660,000/2,110	3,000,000/ 17,000,000[x]	1987/2008[x]/ (1991)
3. Puente Hills Landfill No. 6 (LA County Sanitation District)	2800 South Workman Mill Road, Whittier	II (II-1)	Accepts sludge/septage; latex waste; tank bottom sediment; paint sludge; drilling mud — non-hazardous only.	2,830,000/ 9,000	4,000,000/ 120,000,000[x]	1984/2024[x]
4. *Spadra Landfill (LA County Sanitation District)	4125 West Valley Boulevard, Pomona	II (II-1)	Will accept liquid, including non-hazardous oil and tar.	340,000/1,100	4,000,000/ 6,000,000[x] (2,000,000)/ (3,100,000)	1993/2001[x]/ (1988)
5. Operating Industries, Inc. Landfill (Private)	900 Potrero Grande Drive, Monterey Park	II (II-1)	Accepts drilling muds; paint sludge; tank bottom sediment; mud and water; latex waste.	310,000/1,000	2,000,000	1988
6. Scholl Canyon Sanitary Landfill (LA County Sanitation District)	7721 North Figueroa, Los Angeles	II		870,000/2,800	8,000,000/ 23,000,000[xl]	1991/2008[xl]/ (2002)
7. Azusa Land Reclamation Co., Inc. (Private)	1201 West Gladstone, Azusa	II		530,000/1,700	3,000,000 (12,000,000)	1988 (2005)
8. Penrose Pit (Private)	8251 Tujunga Avenue, Sun Valley, Los Angeles	II		620,000/2,000	1,000,000	1985
9. Sunshine Canyon North Valley Landfill (Private)	14747 San Fernando Road, Sylmar	II		680,000/2,200	40,000,000/ 167,000,000[x]	2000 (2041)

x = additional capacity may be available but requires permit to utilize full capacity.
xl = assumes land lease agreement is extended. Also closure date provided additional available permit.

Table V-1 (Continued)

NAME	DISPOSAL SITE LOCATION	LANDFILL[1] CLASS	SPECIAL CONSIDERATIONS	TONS PER[2] YEAR/DAY	REMAINING[3] CAPACITY (TONS)	ESTIMATED[3] CLOSURE DATE
10. Nu-Way Industries (Private)	400 East Live Oak Avenue, Irwindale	III		1,248,000/ 4,000	28,704,000	2004
11. Bradley Avenue Sanitary Landfill-West (Private)	9227 Tujunga Avenue, Sun Valley	II		470,000/1,500	10,000,000	2003 (1997)
12. Savage Canyon Disposal Site (City of Whittier)	13919 East Penn Street, Whittier	II	Receives waste generated within City of Whittier.	100,000/370	4,900,000	2027
13. Burbank Landfill (City of Burbank)	1600 Lockheed View Drive, Burbank	II	Receives waste generated within City of Burbank.	70,000/220	600,000	1988 (1991)
14. Lopez Canyon Sanitary Landfill (City of Los Angeles)	1950 Lopez Canyon Road Lakview Terrace, Los Angeles	II		780,000/2,500	7,020,000	1991
15. Livingston-Graham (Private)	Duarte	III	Open to company's customers only, facility operational but received no waste 7/79-6/80.	48,000/153	288,000	1988 (1987)
16. *Antelope Valley Public Dump (Private)	1200 West City Ranch Road, Palmdale	II		93,600/300	2,714,400	2010
17. Universal Refuse Removal (Private)	600 East Avenue F, Lancaster			257,400/825	3,598,000	1995
18. Manning Bros. Rock and Sand Company (Private)	16158 East Central Street, Irwindale	III	Open to company's customers only.	30,000/96	N/A	N/A
19. Chandler Landfill (Private)		III		77,000	N/A	N/A

Table V-1 (Continued)

NAME	DISPOSAL SITE LOCATION	LANDFILL[1] CLASS	SPECIAL CONSIDERATIONS	TONS PER[2] YEAR/DAY	REMAINING[3] CAPACITY (TONS)	ESTIMATED[4] CLOSURE DATE
20. Chiquito Canyon Landfill (Private)	29201 Henry Mayo Drive, Saugus	N/A		137,280/440	7,000,000[x]	2032
21. Stone Canyon Reservoir Fill (Los Angeles Dept. of Water and Power)	NE 1/4, Sec. 33, T1N, R 15 W, near Stone Canyon Reservoir	III	Landfill operated by and used by Los Angeles Dept. of Water and Power only.	21,000	N/A	N/A
22. Livingston Pit (Private)		III	Open to company's customers only.	100,000	N/A	N/A
23. Consolidated Rock Products (Private)	Central Avenue and Tenth Street, Claremont	III	Open to company's customers only.	40,000	N/A	N/A
24. Vail Avenue Refuse Pit (Private)	861 South Vail Avenue, Montebello	III	Used by Bethlehem Steel and City of Montebello only.	38,500	N/A	N/A
25. Alpha Investment Association (Private)	2559 Bateman Avenue, Irwindale	N/A		N/A	N/A	N/A
26. *Lancaster Valley (Private)		N/A		N/A	N/A	N/A
27. Asbury Contractors (Private)		N/A		N/A	N/A	N/A
28. Landfill Associates (Private)		N/A		N/A	N/A	N/A
29. Blue Diamond (Private)		N/A		N/A	N/A	N/A
30. Browns Debris Disposal Area (LA County Flood Control District)	13000 Browns I (LA County Flood Control Dist.)			N/A	N/A	(1989)

Table V-1 (Continued)

NAME	DISPOSAL SITE LOCATION	LANDFILL[1] CLASS	SPECIAL CONSIDERATIONS	TONS PER[2] YEAR/DAY	REMAINING[3] CAPACITY (TONS)	ESTIMATED[4] CLOSURE DATE
31. Wayside Honor Rancho Landfill (Private)	29300 The Old Road, Saugus	II		1,200/4	N/A	(1999)
32. Savage Canyon Disposal Site	13919 East Penn Street, Whittier			N/A	N/A	(2030)

Source: Solid Waste Information System (SWIS) — "Selected Detailed Information on Landfills in Los Angeles County," September 10, 1982. State Solid Waste Management Board.

Puente Hills Draft Environmental Impact Report, p. II-10, 1982.

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Allen Freihofer, Waste Management Specialist, Waste Management Division, State Solid Waste Management Board, Sacramento, California.

Kim Wilhelm, Associate Engineer, Hazardous Waste Management Branch, California Department of Health Services, Berkeley, California.

Ted Palmer, Senior SMT, Department of County Engineer Facilities, Los Angeles, Califonria.

Notes:

[1] Class I — There must be no possibility of discharge of pollutant substances to usable waters. Artificial barriers may be used for the control of lateral waste movement only. Usable groundwater may underlie the site, but only under extreme cases and where natural geological conditions prevent movement of the wastes to the water and provide protection for the active life of the site. Inundation and washout must not occur. All waste groups may be received.

Class II — The geological requirements for Class II sites are similar to those for Class I. The principal differences are that the barriers may be artificial rather than natural, and surface waters are protected against 100 year flood.

Class II-I — These sites may overlie or may be adjacent to usable groundwater. Artifical barriers may be used for both vertical and lateral waste confinement in the absence of natural conditions. Protection from a 100-year frequency flood must be provided. Group 2 and 3 wastes can be accepted and under special conditions, certain Group 1 materials may be accepted. (Class II with limited liquid disposal.)

Class III — These are sites where Group 3 wastes could under certain conditions be dumped directly into ground or surface water or where there is inadequate protection to water quality. Only Group 3 wastes may be accepted. Construction practices and facilities that could cause a discharge of soil or accelerate downstream transport of soil are also considered Class III disposal sites.

[2] Assumes sites operate 6 days per week, 312 days per year.

[3] Represents capacity under permit. x = additional capacity may be available but requires permit to utilize full capacity. xl = assumes land lease agreement is extended. Also closure date provided additional available via permit.

[4] "Estimated closure date" calculated by dividing remaining landfill cpacity by "tons per year". Assumes that tons per year remain constant. Year in parentheses indicates an alternative best estimate from State Solid Waste Management Board.

* Outside 20-mile study area.

VI. RECOMMENDED HAUL ROUTES

Haul routes for the transport of Metro Rail spoil have as their origins the site exit points identified in the DMJM/PBQD Draft Interim Muck Disposal Report. Site exit points are the source points where excavated material is brought to the surface for transport to landfills. For each site exit point identified by the Interim Muck Disposal Report a haul route is recommended which provides the shortest travel distance to a freeway access point and which mitigates potential impacts to sensitive land uses such as residential and noise sensitive areas. Table VI-1 provides summary information for daily truck trips and quantities of materials. The discussion which follows details these haul routes.

Center Street/Ducommun Street Area. East, north, and southbound to landfills: north on Center Street to Commercial Street, then left turn onto Commercial Street. West on Commercial Street to Vignes Street on-ramp to the Santa Ana Freeway, then right turn to on-ramp. East on the Santa Ana Freeway (remain in right lane) and exit Mission Street. Cross Mission Street for access to either the Santa Ana or San Bernardino Freeways. Westbound to landfills: from Center Street/Ducommun Street, north on Center Street to Ramirez Street, then Ramirez Street to Vignes Street. South on Vignes Street to U.S. Highway 101. Eastbound from landfills: exit U.S. Highway 101 at Hewitt off-ramp then left turn onto Commercial Street. East on Commercial Street to Center Street, then right turn onto Center Street to complete the trip. West, south, and northbound from landfills: exit First Street from the Santa Ana Freeway, then west on First Street to Mission Street. Right turn onto Mission Street, then north on Mission to Santa Ana Freeway access ramp westbound. Access Santa Ana Freeway (remain in right lane) and continue west to Vignes Street exit. Exit Vignes Street, then proceed to Ramirez Street. Right turn onto Ramirez Street, then south on Ramirez Street to Center Street to complete the trip (see Figure VI-1).

Macy Street/Union Passenger Terminal Area. Eastbound to landfills: Macy Street east to Mission Street, then south on Mission Street to U.S. Highway 101 on-ramp. This route affords access to the Santa Ana and San Bernardino Freeways. Westbound to landfills: East on Macy Street to Vignes Street, then south on Vignes Street to U.S. Highway 101 Freeway entrance. Eastbound from landfills: exit Hewitt Street from U.S. Highway 101, then west on Commercial Street to Alameda Street. Right onto Alameda, then north on Alameda Street to Macy Street to complete the trip. Westbound from landfills: exit Alameda Street from U.S. Highway 101, then north on Alameda to Macy Street to complete the trip (see Figure VI-1).

First Street/Hill Street. Eastbound to landfills: west on First Street to Hope Street, then north on Hope Street for access to U.S. Highway 101. Westbound to landfills: west on First Street to Grand Avenue, then north on Grand for access to U.S. Highway 101 westbound. Westbound from landfills: exit Grand Avenue from freeway, then south on Grand to First Street. Left turn onto First Street, then east on first to complete the trip. Eastbound from landfills: exit Temple Street or Hope Street from the freeway, then south on Hope Street to First Street. Left turn onto First Street, then east on First to complete the trip (see Figure VI-2).

TABLE VI-1
DAILY TRUCK TRIPS AND AVERAGE TONNAGE FOR TUNNEL CONSTRUCTION SITE EXIT POINTS

CONTRACT PACKAGING	SITE EXIT	EXCAVATED MATERIAL[2] TYPE[1]	IN-PLACE VOLUME (yd^3)	IN-PLACE TONS	EXCAVATION[3] DURATION (days)	PRODUCTION RATE[4] (tons per day)	ONE-WAY TRUCK TRIPS/DAY[5]
Contract B							
B(1) - Downtown yards and cut and cover line section to Union Station.	Center Street	A_1	217,800	383,328	399	961	48
B(2) - Union Station and crossover tunnels to Civic Center Station.	Macy Street	A_1 C	146,969 46,411	258,665 81,683	326	1,044	52
B(3) - Civic Center Station, tunnels to 5th Street Station.	Hill Street/ 1st Street	A_4 C	35,640 142,560	62,726 250,906	389	806	40
B(4) - 5th Street Station, tunnels to Flower Street Station.	Hill Street/5th Street	A_1	174,240	306,662	389	788	39
B(5) - Flower Street Station and crossover.	7th Street/Flower	A_1 C	129,129 12,771	227,267 22,477	336	743	37
Contract C							
C(1) - Alvarado Station, tunnels to Flower Street Station.	Wilshire/Alvarado	A_4 C	35,363 150,757	62,239 265,332	378	867	44
C(2) - Vermont Station, tunnels to Alvarado Station.	Vermont	A_4 C	52,272 121,968	91,999 214,664	368	833	42
C(3) - Normandie Station and crossover tunnels to Vermont Station.	Normandie/Wilshire	A_4 C	72,838 162,122	128,195 285,335	420	985	49

Table VI-1 (Continued)

CONTRACT PACKAGING	SITE EXIT	EXCAVATED MATERIAL[2] TYPE[1]	IN-PLACE VOLUME (yd^3)	IN-PLACE TONS	EXCAVATION[3] DURATION (days)	PRODUCTION RATE[4] (tons per day)	ONE-WAY TRUCK TRIPS/DAY[5]
Contract D							
D(1) - Western Station, tunnels to Normandie Station.	Western/Wilshire	A_4	126,060	221,866	305	727	36
D(2) - Western/La Brea mid line fan shaft tunnels to Western Station.	Windsor Boulevard	A_4	96,360	169,594	158	1,073	54
D(3) - La Brea Station and pocket track tunnels to mid line fan shaft.	La Brea/Wilshire	A_4	277,200	487,872	336	1,452	73
Contract E							
E(1) - Fairfax Station and crossover tunnels to La Brea Station.	Fairfax/Wilshire	A_4	346,711	610,211	567	1,170	59
	oil and tar ——— contaminated	A_4	30,149	53,062			
E(2) - Beverly Boulevard Station tunnels to Fairfax Station.	Beverly/Fairfax	A_2-A_4	21,331	37,543	389	1,206	60
	oil and tar ——— contaminated	A_4	245,309	431,744			
Contract F							
F(1) - Santa Monica Station and crossover tunnels to mid line fan shaft.	Santa Monica/ Fairfax Avenue	A_2	266,640	469,286	452	1,038	52
F(2) - Santa Monica Boulevard/Hollywood Boulevard mid line fan shaft, tunnels to Hollywood Boulevard Station.	Sunset Boulevard/ La Brea	A_2	125,400	220,704	242	912	46
F(3) - Hollywood Boulevard Station.	Hollywood/ Cahuenga	A_2	86,460	152,170	252	604	30

Table VI-1 (Continued)

Table VI-1 (Continued)

CONTRACT PACKAGING	SITE EXIT	EXCAVATED MATERIAL[2] TYPE[1]	IN-PLACE VOLUME (yd^3)	IN-PLACE TONS	EXCAVATION[3] DURATION (days)	PRODUCTION RATE[4] (tons per day)	ONE-WAY TRUCK TRIPS/DAY[5]
Contract G							
G(1) - Tunnels from Franklin Avenue to Regal Place	Franklin Avenue/ Cahuenga	A_2	33,033	58,138	357	1,832	92
		Rock	267,267	596,005			
G(2) - Universal City Station tunnels to Regal Place.	Bluffside Drive/ Studio City Area	A_1-A_2	132,000	232,320	273	851	43
Contract H							
H(1) - North Hollywood Station and crossover tunnels to Universal City Station.	Lankershim/ Chandler	A_1	301,620	530,851	494	1,075	54
H(2) - Hollywood yards.	Tujunga Avenue	A_1	417,780	735,293	378	1,945	97
		Totals:	4,274,160	7,648,137		20,914	1,047

Source: Sedway/Cooke; Jim Keith, URS/John A. Blume and Associates, DMJM/PBQD, Draft Interim Report on Muck Disposal, August 1982; Geotechnical Investigation Report, dated November, 1981.

NOTES:

1 A_1 YOUNG ALLUVIUM (Granular): Includes clean sands, silty sands, gravelly sands, sandy gravels, and locally contains cobbles and boulders. Primarily dense, but ranges from loose to very dense.

A_2 YOUNG ALLUVIUM (Fine-grained): Includes clays, clayey silts, sandy silts, sandy clays, clayey sands. Primarily stiff, but ranges from firm to hard.

A_3 OLD ALLUVIUM (Granular): Includes clean sands, silty sands, gravelly sands, and sandy gravels. Primarily dense, but ranges from medium dense to very dense, containing more cohesive material than A_1.

A_4 OLD ALLUVIUM (Fine-grained): includes clays, clayey silts, sandy silts, sandy clays, and clayey sands. Primarily stiff, but ranges from firm to hard; contains more cohesive material than A_2.

C FERNANDO AND PUENTE FORMATIONS: Claystone, siltstone, and sandstone: thinly to thickly bedded. Primarily low hardness, weak to moderately strong, but locally contains hard, thin sandstone beds.

2 In-place volumes calculated from bulked volumes identified in the DMJM/PBQD Interim Report on Muck Disposal, August, 1982. In-place volume-to-ton conversion factors: 1.76 tons/yd^3 for soft ground classifications, and 2.23 tons/yd^3 for rock classifications.

3 Assumes a 253 day construction year = 5 day/week construction and excludes seven legal holidays per year. Excavation duration (months) identified in the DMJM/PBQD Interim Report on Muck Disposal, August 1982.

4 Production rate calculated by dividing in-place tons by excavation duration.

5 Assumes 20 ton load limit per trip to conform to City and State road and highway weight limits.

Hill Street/Fifth Street. To landfills: direct access to State Highway 11 is afforded by Fifth Street which runs one-way west to the Harbor Freeway. From landfills: Fourth Street exit from State Highway 11, then east on Fourth Street to Hill Street. Right on Hill Street to complete the trip (see Figure VI-3).

Seventh Street/Flower Street. To landfills: north on Flower Street to Fifth Street, then same trip as indicated for the Hill Street/Fifth Street exit point. Southbound from landfills: Beaudry Avenue exit from Highway 11. South on Beaudry to Wilshire, then left turn onto Wilshire. East on Wilshire to Flower Street to complete the trip. Northbound from landfills: Sixth Street exit from State Highway 11, then east on Sixth Street to Flower Street. Right turn onto Flower, then continue south to complete the trip (see Figure VI-4).

Wilshire/Alvarado. Note: This haul route assumes that the construction site exit point will be large enough to afford direct access to Westlake Avenue. Southbound to landfills: from the site exit point proceed east to Westlake Avenue, then south on Westlake to Seventh Street. Left turn onto Seventh Street, then east on Seventh Street to Bixel Street. Right turn onto Bixel Street, then continue south on Bixel Street to State Highway 11 entrance southbound. Northbound to landfills: from the site exit point take the same route as identified for "southbound to landfills" to Seventh Street and Bixel Street. continue east on Seventh Street to Francisco Street, then right turn on Francisco Street. South on Francisco to Eighth Street, then right turn onto Eighth Street. West on eighth for northbound on-ramp to the Harbor Freeway. Northbound from landfills: exit Ninth Street to Figueroa Street. Right turn onto Figueroa Street, then south on Figueroa street to Olympic Boulevard. Right turn onto Olympic, then west on Olympic to Alvarado Street. Right turn onto Alvarado, then north on Alvarado to Wilshire to complete the trip. Southbound from landfills: exit Eighth Street from State Highway 11, then west on Eighth to Alvarado Street. Right turn onto Alvarado Street, then proceed north to Seventh Street to complete the trip (see Figure VI-5).

Vermont. Vermont Avenue north to U.S. Highway 101. Alternate route would take Vermont Avenue south to Interstate Highway 10. From landfills: Vermont Avenue exit from either Interstate Highway 10 or U.S. Highway 101, then Vermont Avenue to Wilshire Boulevard to complete the trip (see Figure VI-6).

Normandie/Wilshire. To landfills: east on Wilshire Boulevard, then left on Vermont Avenue. Vermont Avenue north to U.S. Highway 101. Alternate route would take Vermont Avenue south to Interstate Highway 10. From landfills: Vermont Avenue exit from either Interstate Highway 10 or U.S. Highway 101, then Vermont Avenue to Wilshire Boulevard to complete the trip (see Figure VI-6).

Western/Wilshire. To landfills: south on Western Avenue to Interstate 10. From land fills: exit Western Avenue from Interstate 10, then north on Western Avenue to complete the trip (see Figure VI-7).

Windsor Boulevard. To landfills: east on Wilshire Boulevard to Western Avenue, then south on Western Avenue to Interstate 10. From landfills: exit Western Avenue from Interstate 10, then north on Western Avenue to Wilshire Boulevard. Left on Wilshire to Windsor to complete the trip (see Figure VI-7).

La Brea/Wilshire. To landfills: south on La Brea to Interstate 10. From landfills: La Brea Avenue exit from Interstate 10, then north on La Brea to complete the trip (see Figure VI-8).

Fairfax/Wilshire. To landfills: East to La Brea Avenue, then same route as La Brea/Wilshire site exit point. From landfills: same route as La Brea/Wilshire with trip completed at Fairfax/Wilshire (see Figure VI-9).

Beverly/Fairfax. To landfills: east on Beverly Boulevard to La Brea Avenue, then right onto La Brea. South on La Brea Avenue to Wilshire Boulevard, then take the same route as the La Brea/Wilshire site exit. From landfills: La Brea Avenue exit from Interstate 10, then north on La Brea to Beverly Boulevard. Left turn onto Beverly, then west on Beverly to complete the trip (see Figure VI-10).

Santa Monica/Fairfax Avenue. To landfills: east on Santa Monica Boulevard to U.S. Highway 101 for southbound access. For northbound access to Highway 101, east on Santa Monica then left turn onto Western Avenue and proceed north to freeway on-ramp. From landfills: southbound Highway 101 exit Lexington Avenue, then left on Lexington to Western Avenue. Right turn onto Western Avenue, then south to Santa Monica Boulevard. Right turn onto Santa Monica, then continue west to Fairfax Avenue to complete trip. For hauls northbound on Highway 101, exit Santa Monica Boulevard and continue west on Santa Monica Boulevard to Fairfax Avenue (see Figure VI-11).

Sunset Boulevard/La Brea. To landfills: east on Sunset Boulevard to Highland Avenue, then right turn onto Highland. South on Highland Avenue to Santa Monica, then left onto Santa Monica. The remainder of the haul route is the same identified for Santa Monica/Fairfax. Southbound and northbound from landfills: exit Sunset Boulevard from Highway 101, then west on Sunset to La Brea to complete the trip (see Figure VI-12).

Hollywood/Cahuenga. To landfills: Cahuenga Boulevard north to U.S. Highway 101. From landfills: Cahuenga Boulevard exit from U.S. Highway 101, then south on Cahuenga to complete the trip (see Figure VI-13).

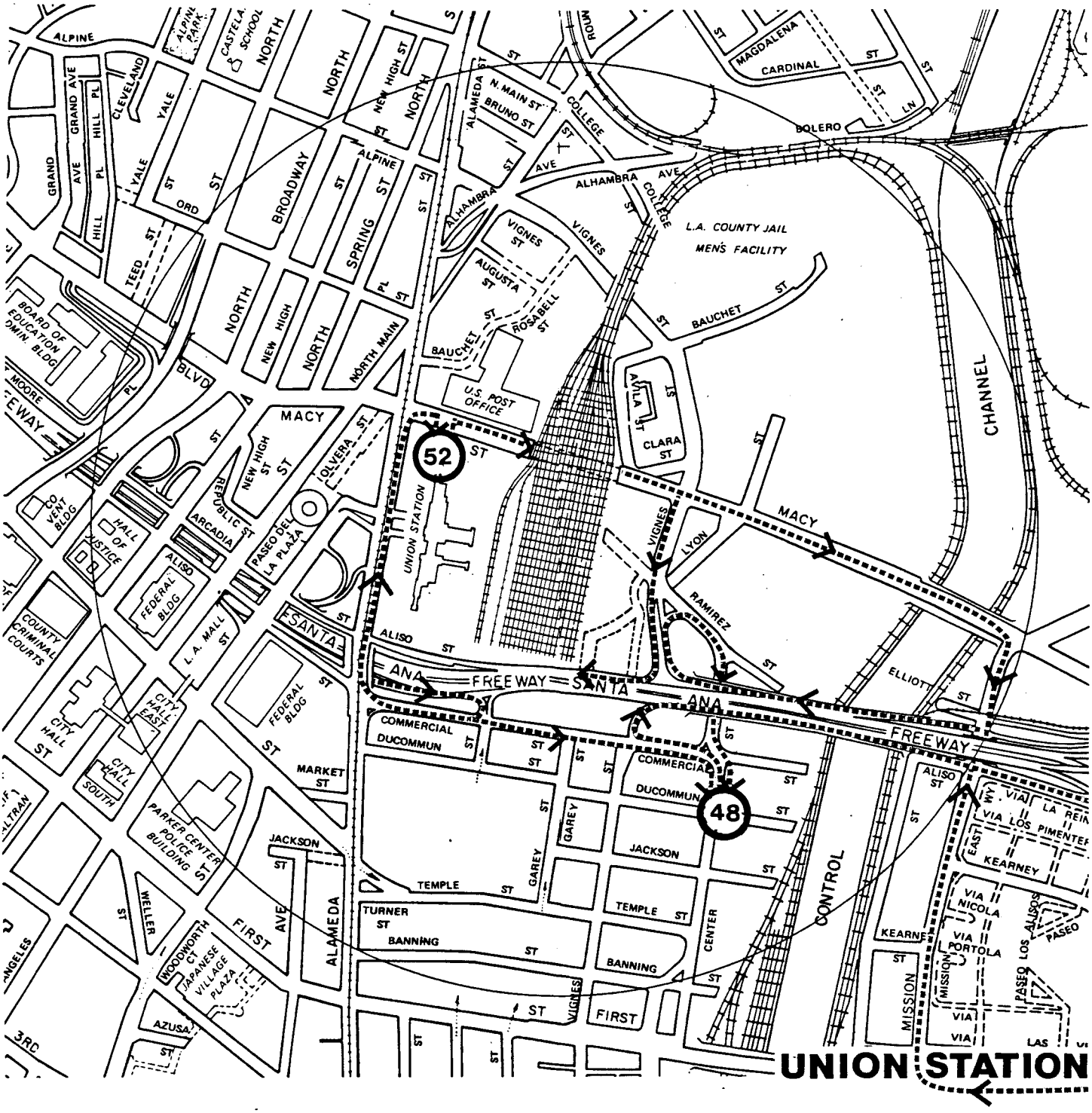
Franklin Avenue/Cahuenga. Same haul route as identified for Hollywood/Cahuenga site exit point.

Bluffside Drive/Studio City Area. Southbound to landfills: Bluffside drive to Vineland, then right turn onto Vineland. North on Vineland to U.S. Highway 101. North, east and west to landfills: Bluffside Drive to Vineland, then north on Vineland to Landale Street. Right turn on Landale, then east to Lankershim. Left turn on Lankershim, then north to Riverside Drive. Left turn on Riverside Drive, then west on Riverside to eastbound State Highway 134 access point. Westbound access ramp is located directly north of the freeway overpass. From landfills: Vineland exit from U.S. Highway 101, then south on Vineland to Bluffside Drive. Left turn to Bluffside Drive to complete the trip (see Figure VI-14).

Lankershim/Chandler. Lankershim Boulevard south to Magnolia Boulevard,then right turn onto Magnolia. Magnolia Boulevard west to State Highway 170. From landfills: exit Magnolia Boulevard from State Highway 170, then east on Magnolia to Lankershim. Left turn onto Lankershim and continue north to complete the trip (see Figure VI-15).

Tujunga Avenue. Tujunga Avenue to Chandler (eastbound), then Chandler Boulevard to Lankershim. Left turn onto Lankershim, then north to Burbank Boulevard. Left turn onto Burbank, then west on Burbank to State Highway 170. From landfills:

Burbank Boulevard exit from Highway 170, then east on Burbank to Tujunga Avenue. Right turn onto Tujunga and continue south to complete the trip (see Figure VI-15).



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

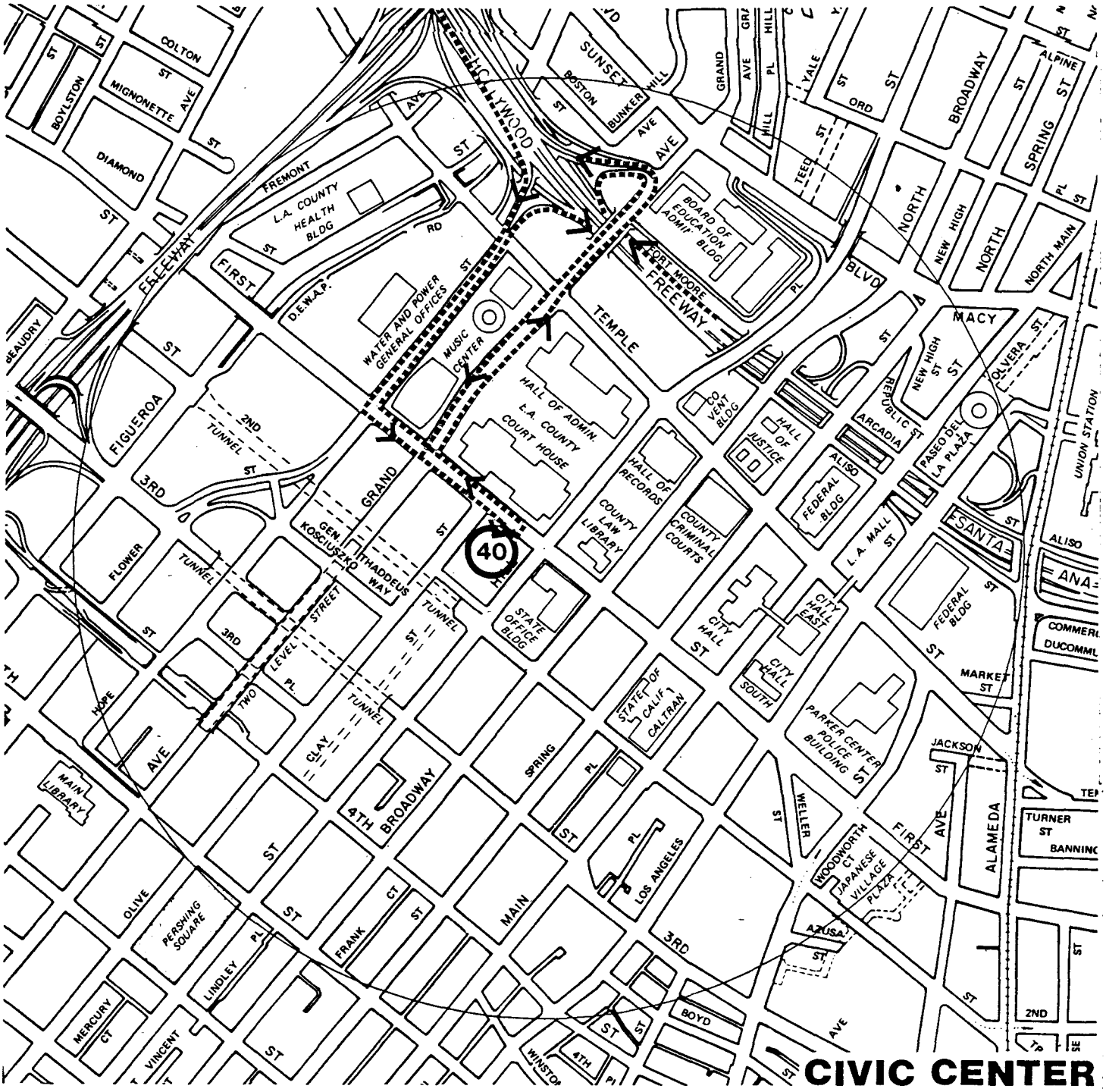
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-1 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



..... **RECOMMENDED HAUL ROUTE**

(15) **SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS**

Southern California Rapid Transit District

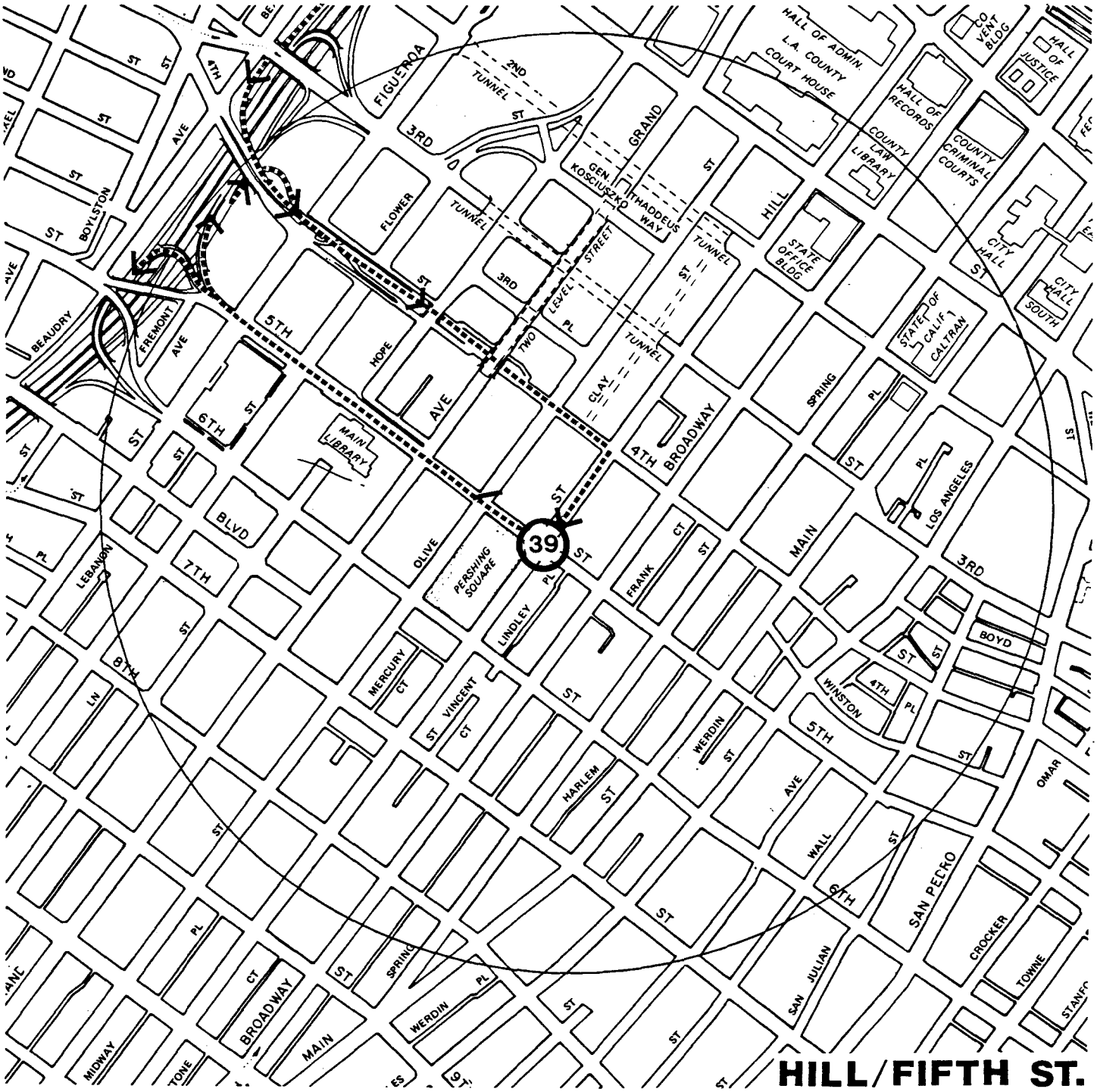
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

Figure VI-2 Recommended Haul Route

0 400 800 1600 feet

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

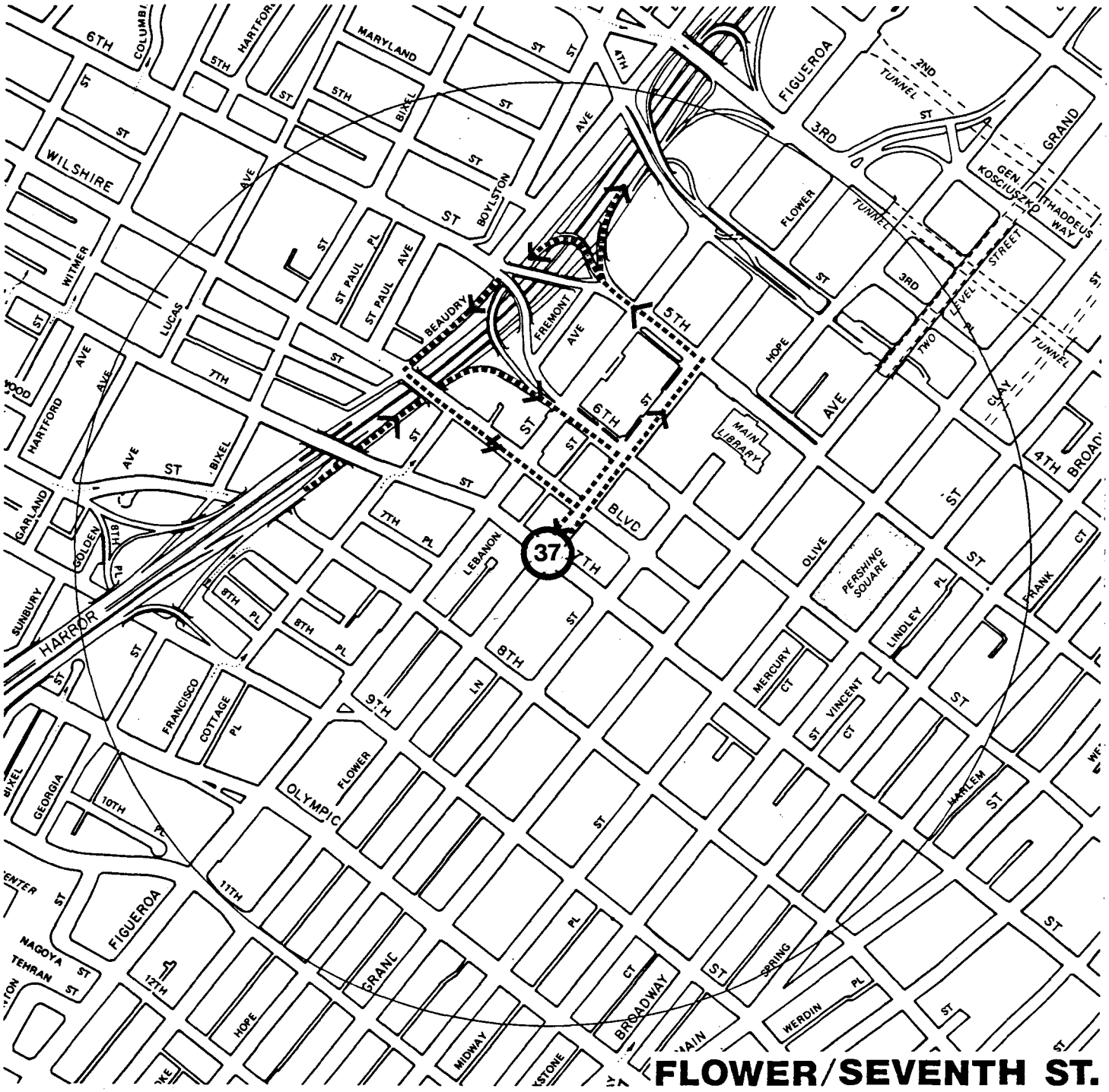
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-3 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



..... **RECOMMENDED HAUL ROUTE**

(15) **SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS**

Southern California Rapid Transit District

Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-4 Recommended Haul Route

SEDWAY/COOKE

Urban and Environmental Planners and Designers

..... **RECOMMENDED HAUL ROUTE**

(15) **SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS**

Southern California Rapid Transit District

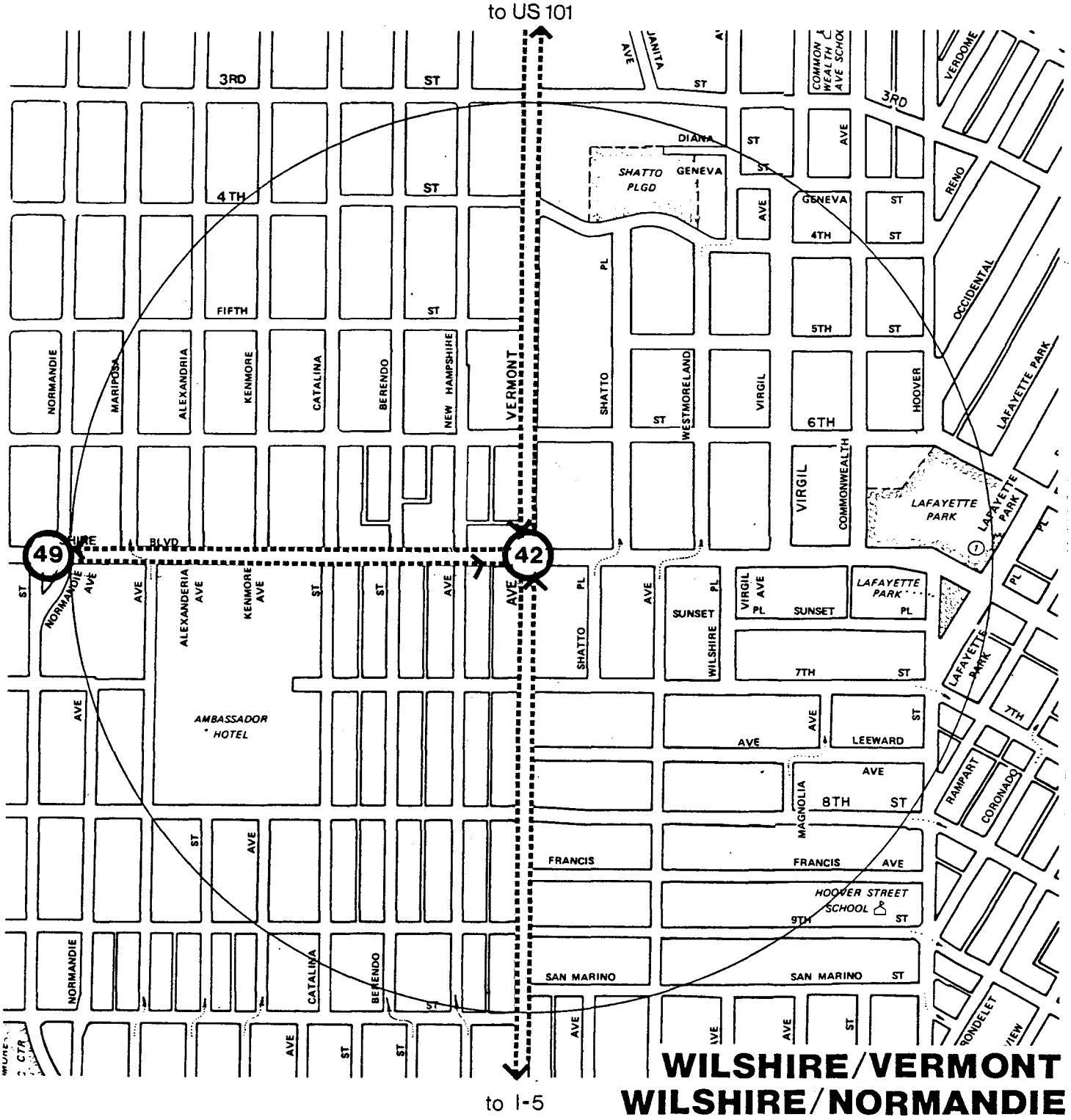
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

Figure VI-5 Recommended Haul Route

SEDWAY/COOKE

Urban and Environmental Planners and Designers



WILSHIRE/VERMONT
WILSHIRE/NORMANDIE

RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

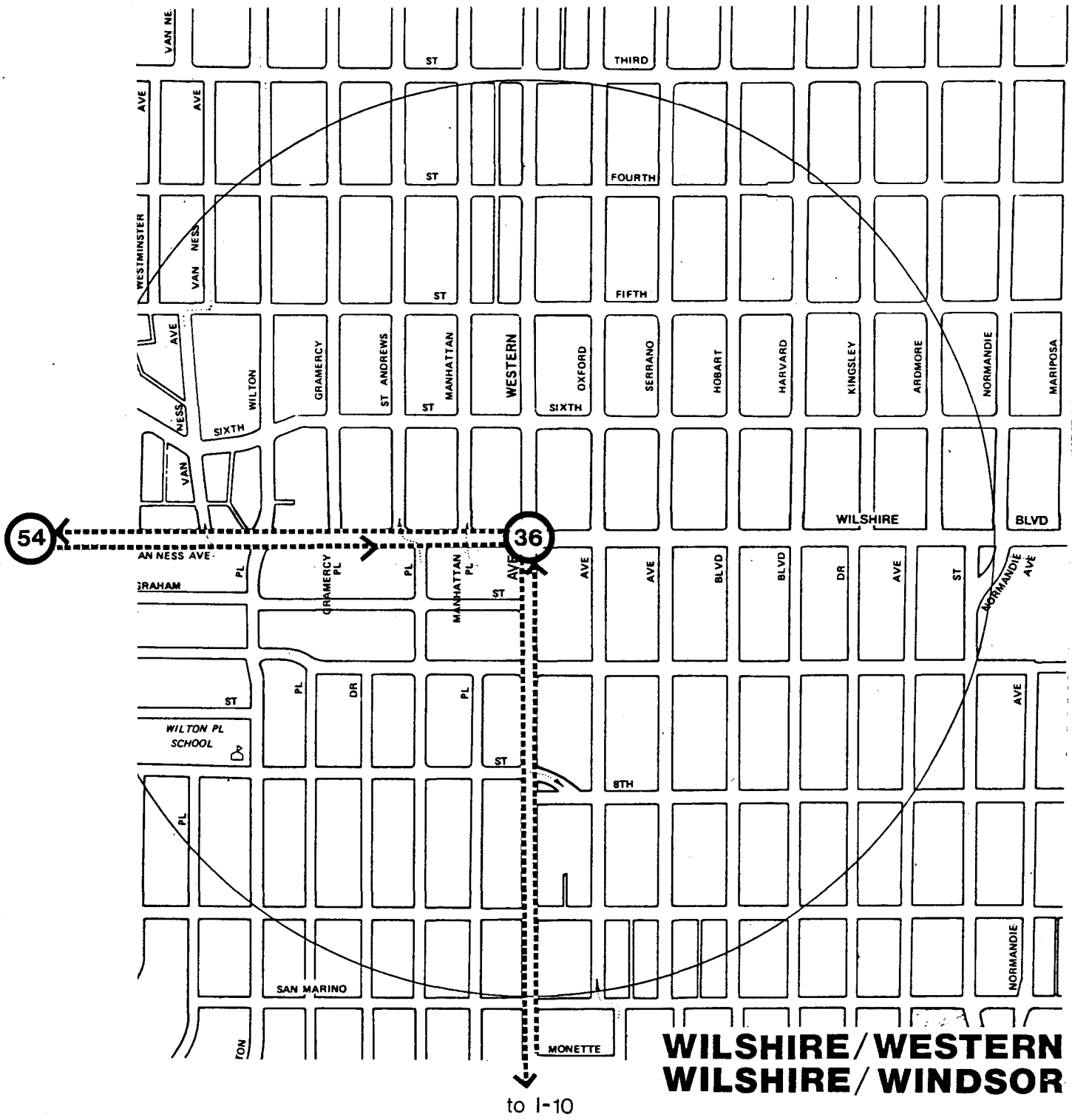
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-6 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



..... RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

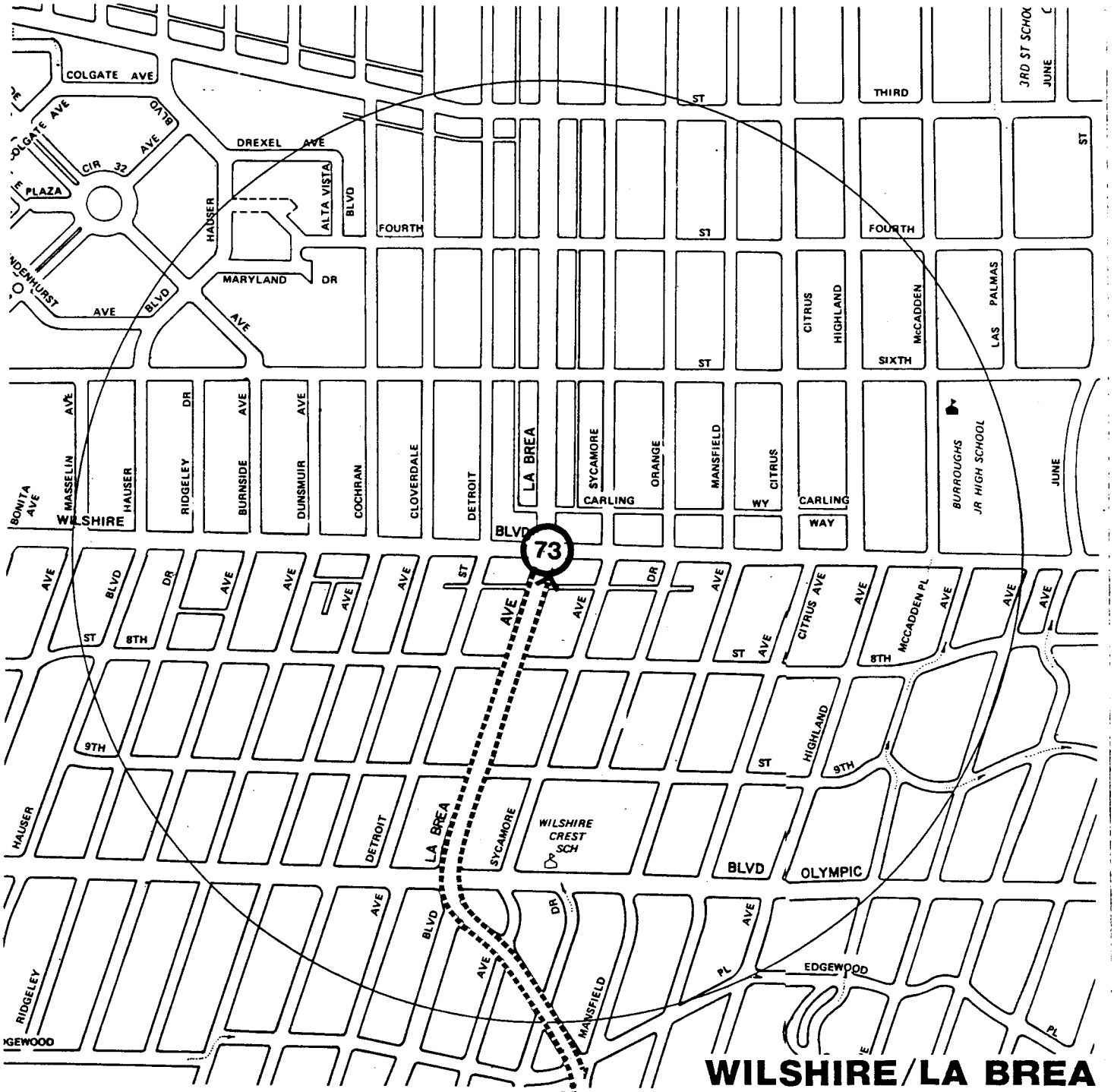
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-7 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

15 SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

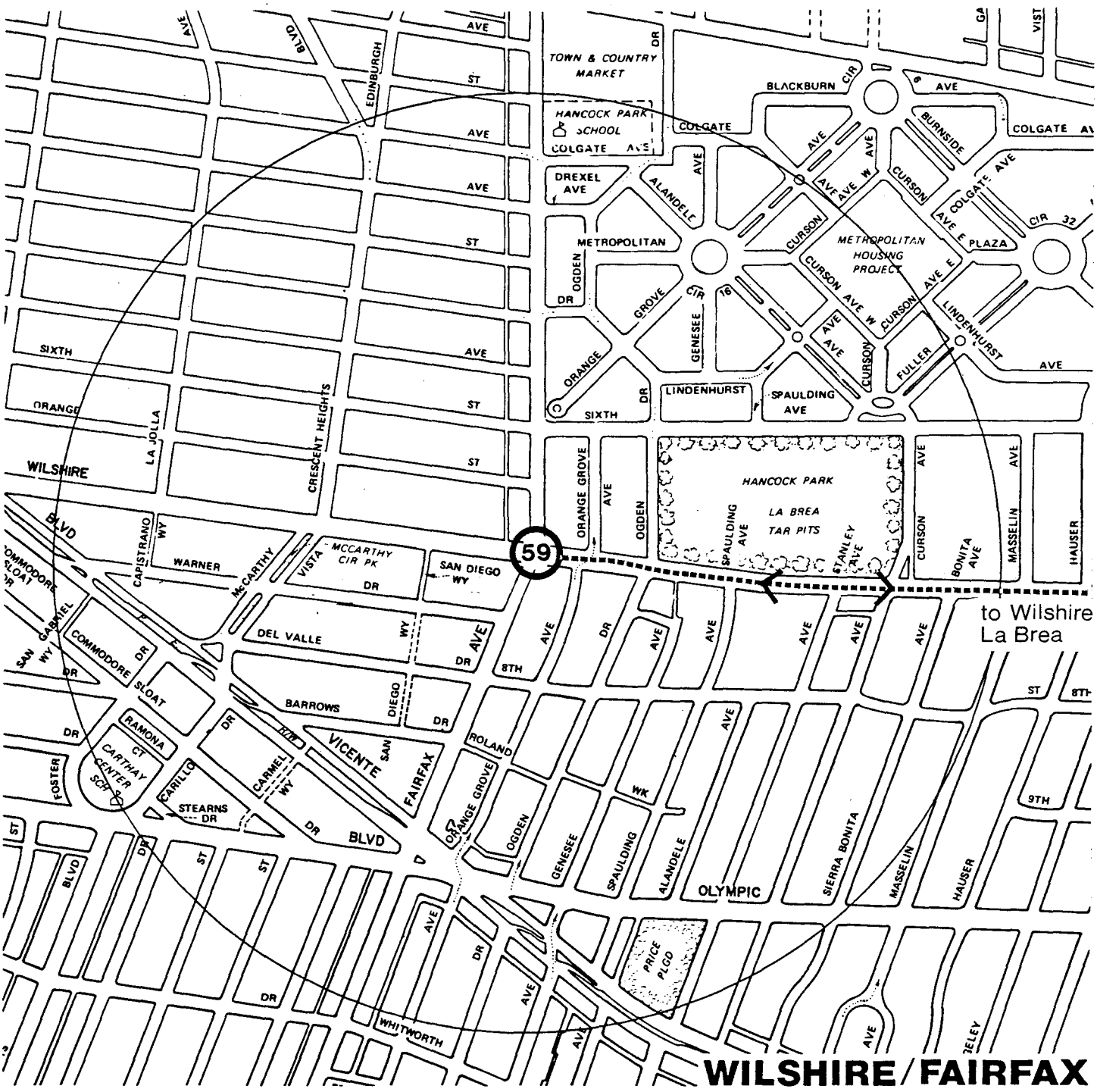
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-8 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

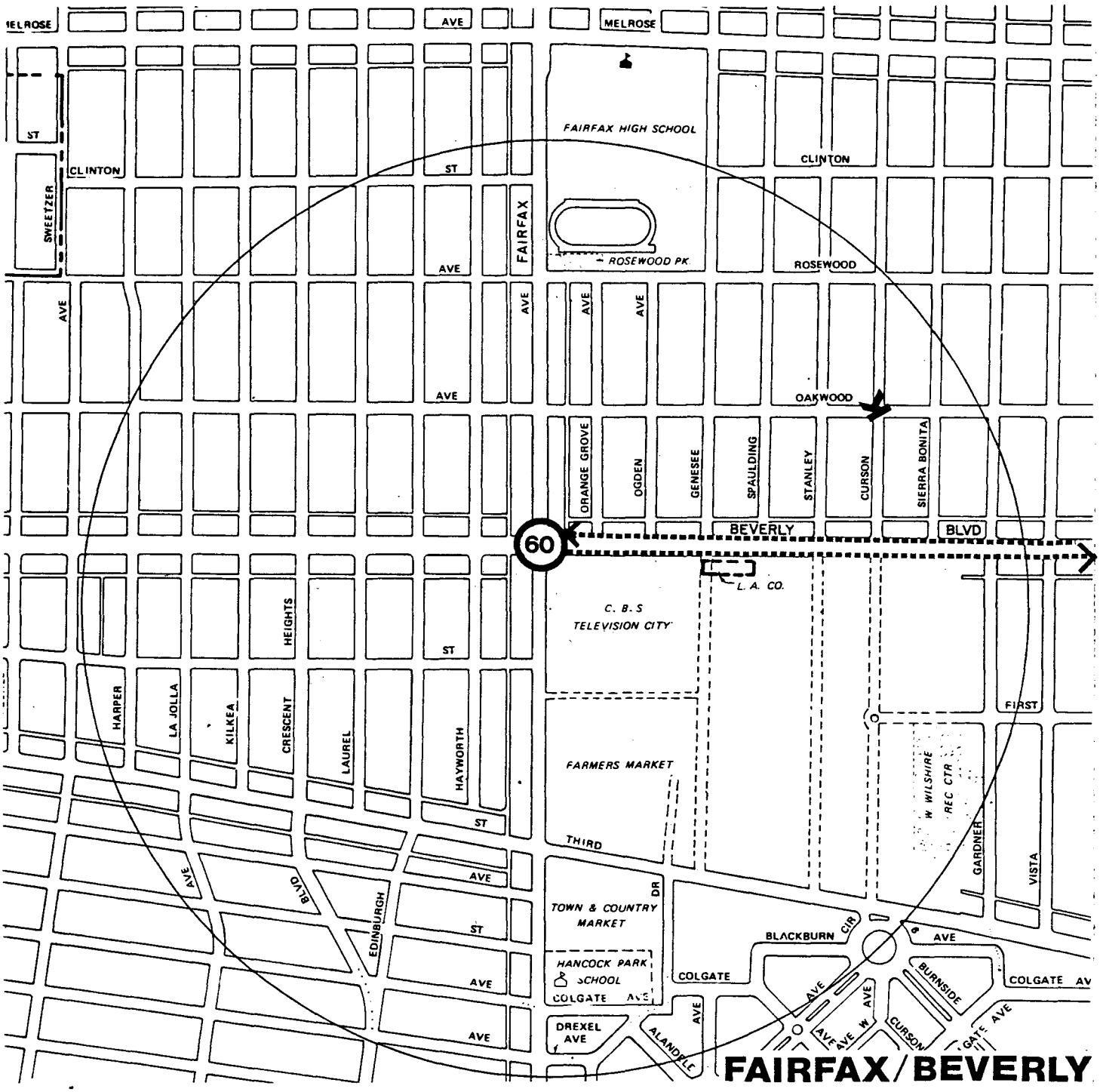
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 | 400 | 800 | 1600 feet

Figure VI-9 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

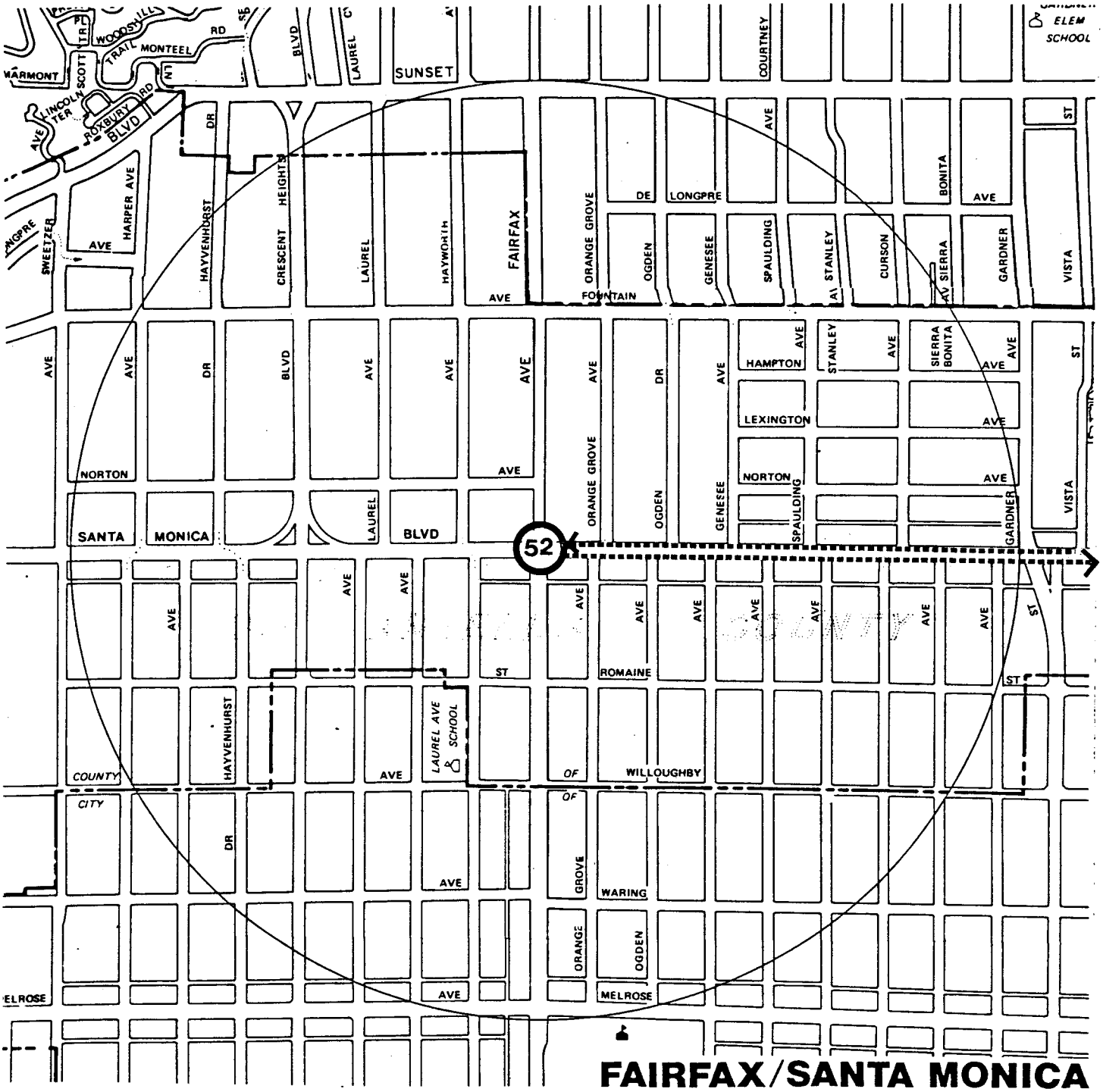
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-10 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



FAIRFAX/SANTA MONICA

RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

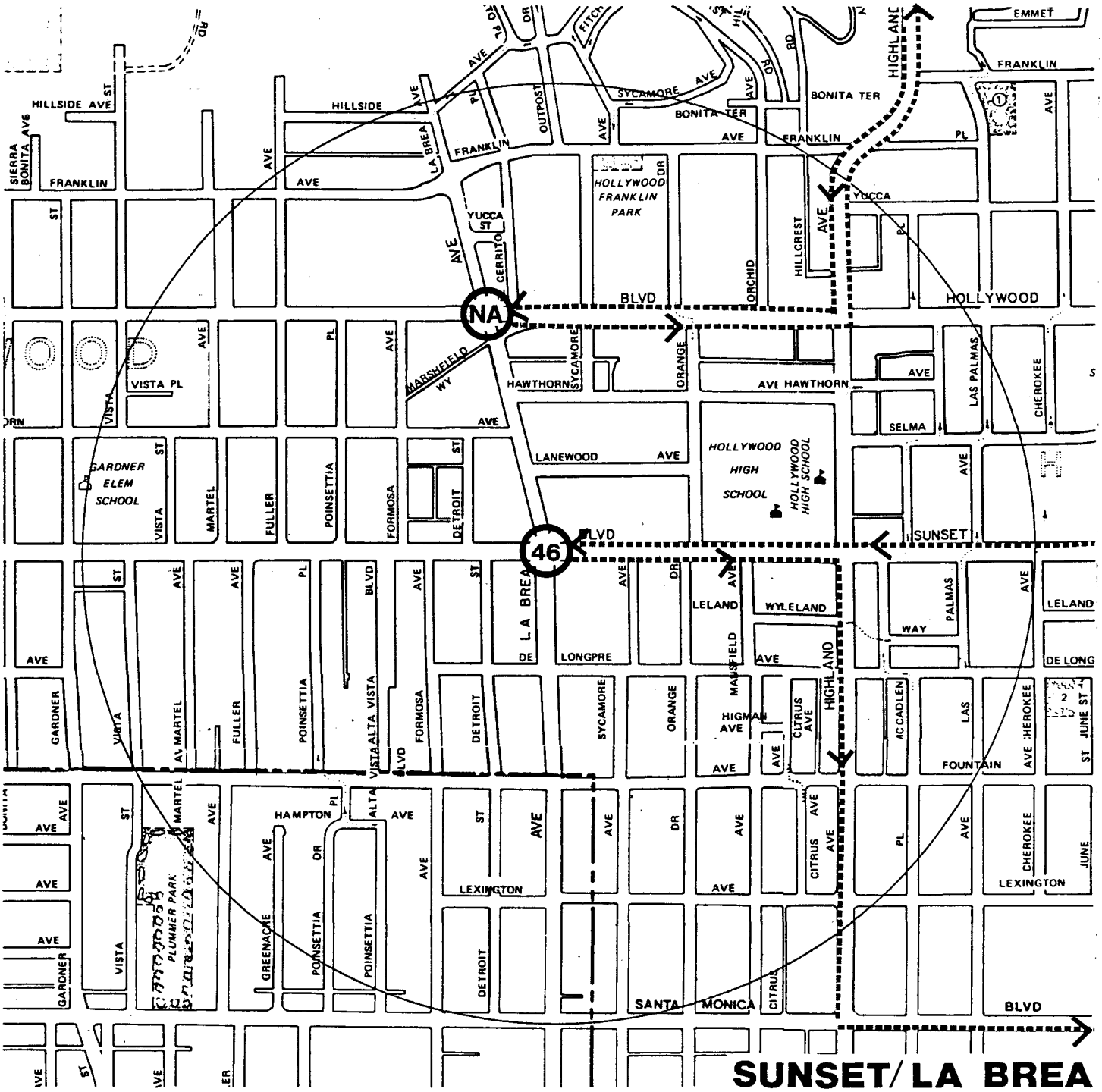
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-11 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



SUNSET/ LA BREA

RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

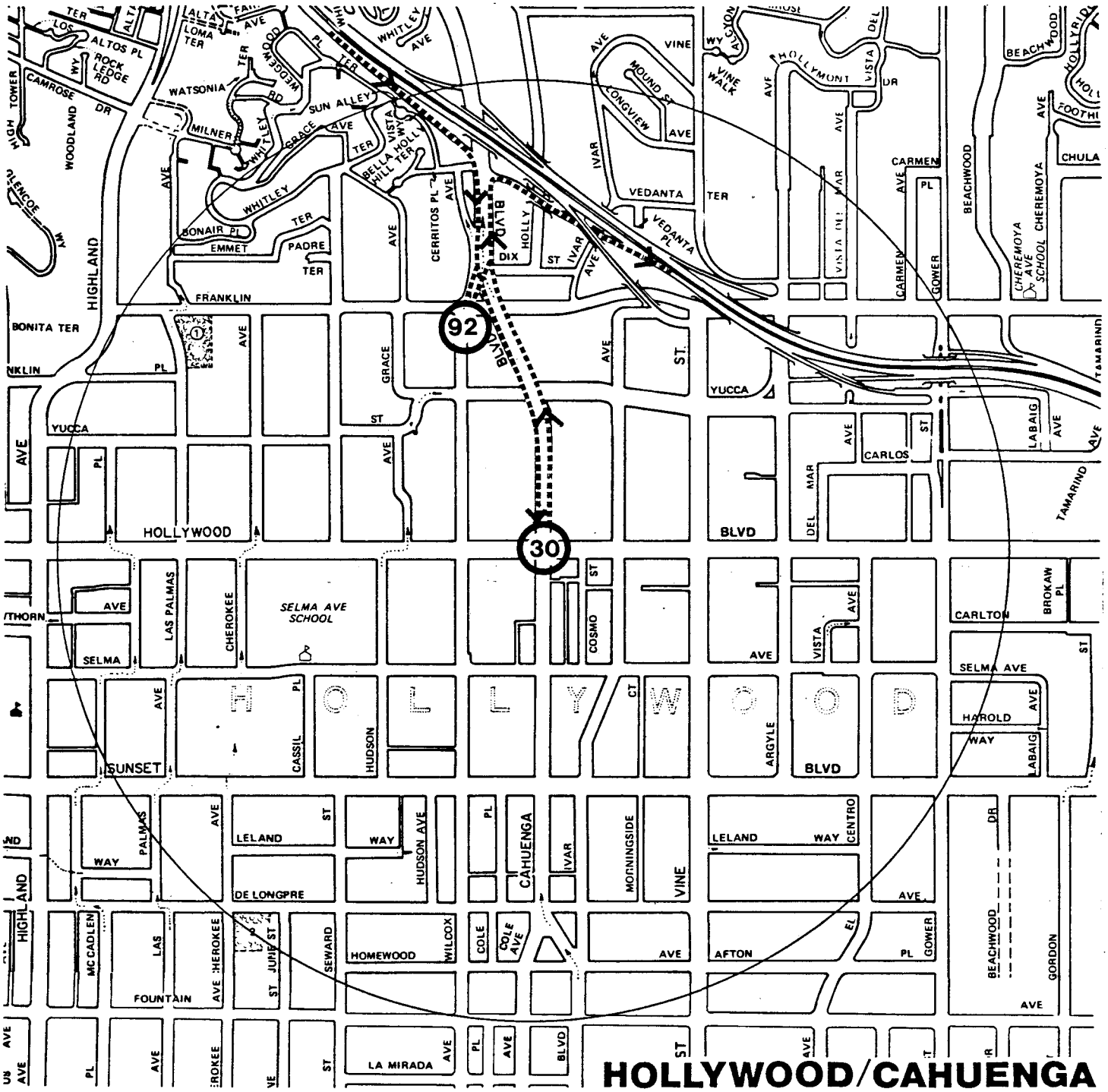
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-12 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

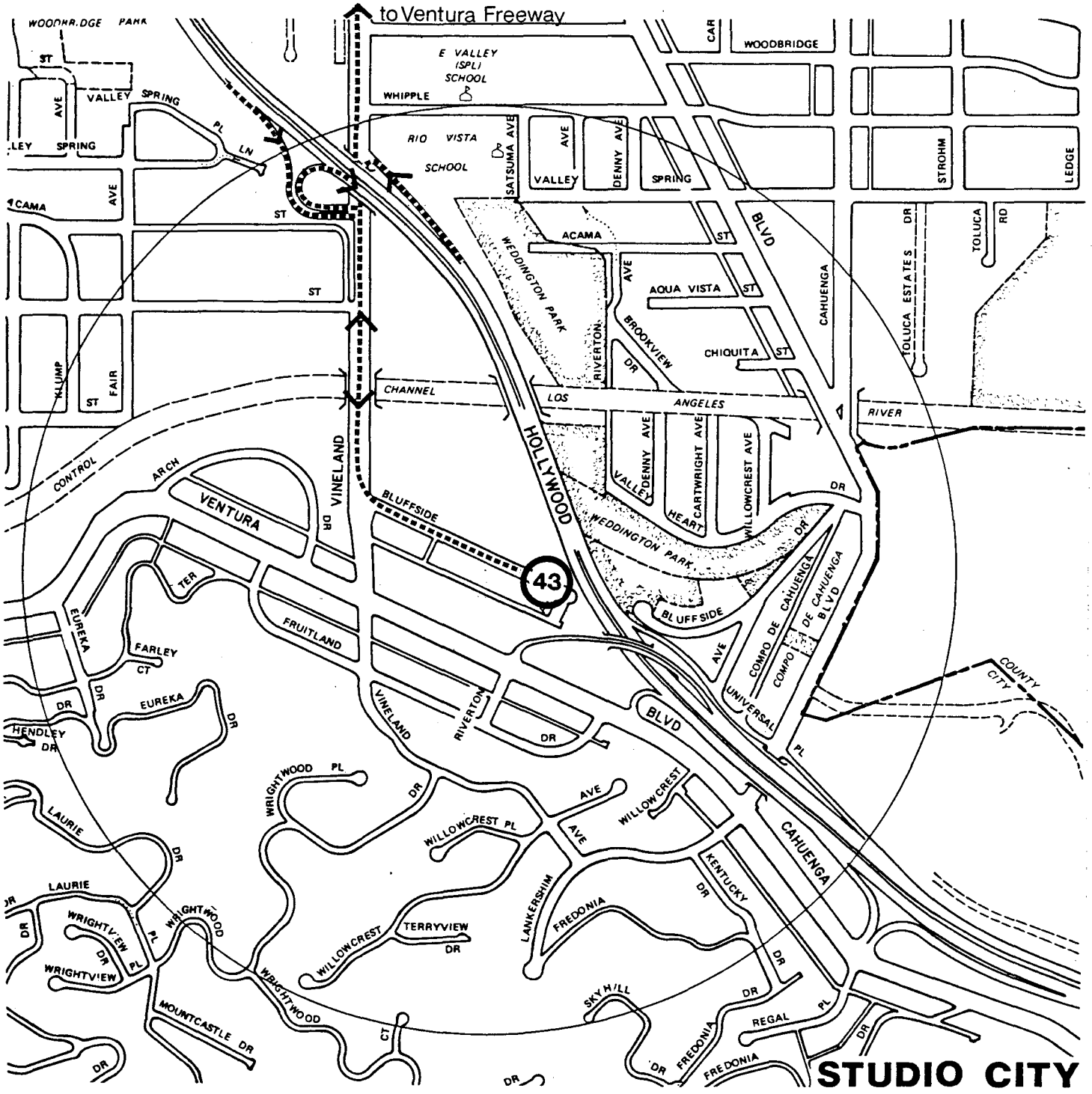
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-13
Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-14
Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers

RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure VI-15
Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers

APPENDIX A
EXCAVATION QUANTITIES, DAILY TRUCK TRIPS AND HAUL ROUTES FOR ALTERNATIVE METRO RAIL ALIGNMENTS

DESCRIPTION OF ALTERNATIVE ALIGNMENTS

The alignment from the Central Business District along Wilshire Boulevard and to the Fairfax/Santa Monica Station is common to all alternatives developed during the identification and evaluation of alternative alignments. From this station, there are three alternative alignments through Hollywood:

- A, Cahuenga Bend: this alignment continues north on Fairfax to Sunset Boulevard, then goes east on Sunset Boulevard to Cahuenga Boulevard. From Cahuenga Boulevard the alignment turns north to pass through the Santa Monica Mountains via the Cahuenga Pass.

- B, Fairfax Extended: this alignment goes straight north along Fairfax Avenue and continues northward under the Santa Monica Mountains. An auxiliary transit system, at grade (LRT) or aerial (ICTS), is proposed to provide east-west distribution service in Hollywood.

- C, La Brea Bend: this alignment goes east on Fountain Avenue and turns north on La Brea Avenue to pass under the Santa Monica Mountains. An auxiliary transit system, at grade (LRT) or aerial (ICTS), is proposed to provide east-west distribution service in Hollywood.

The alignment continues north of the mountains in the San Fernando Valley. It emerges from the mountains and proceeds to either Studio City or Universal City. The alignment will be either subway or aerial. From Studio City, the alignment proceeds northward along Vineland Avenue to Camarillo Street. From Universal City, the alignment proceeds northwesterly along Lankershim Boulevard to Camarillo Street. At Camarillo Street, the alignment, still in subway or elevated can approach the terminus station in North Hollywood from either Vineland Avenue or Lankershim Boulevard.

WASTE QUANTITIES AND DAILY TRUCK TRIPS

On the basis of data derived from the construction scenarios (DMJM/PBQD 1982a) for the alternative alignments, the number of daily one-way truck trips required to haul excavated materials has been calculated and is presented in Table A-1.

The quantity of waste and number of truck trips naturally vary with the horizontal and vertical alternatives. Quantities of waste and daily truck trips for aerial alternatives are roughly twenty percent less than for the subway alternatives. Also, because Alternative B - Fairfax Extended, is shorter, it generates less waste and fewer daily truck trips than either Alternative A - Cahuenga Bend or Alternative C - La Brea Bend.

TABLE A-1 CONSTRUCTION WASTE AND DAILY ONE-WAY TRUCK TRIPS FOR ALTERNATIVE METRO RAIL ALIGNMENTS

ALTERNATIVE ALIGNMENTS	IN-PLACE MATERIAL Volume (yd^3)	Tons	DAILY ONE-WAY TRUCK TRIPS
Hollywood/North Hollywood			
1. Cahuenga Blvd./Vineland Subway to North Hollywood Yard	1,291,450	2,394,349	466
2. Cahuenga Blvd./Vineland Aerial to North Hollywood Yard	1,070,600	1,984,893	386
3. Cahuenga Blvd./Lankershim Subway to North Hollywood Yard	1,298,150	2,406,769	468
4. Cahuenga Blvd./Lankershim Aerial to North Hollywood Yard	1,074,400	1,991,937	388
5. Fairfax Extended/Vineland Subway to North Hollywood Yard	790,150	1,464,938	285
6. Fairfax Extended/Vineland Aerial to North Hollywood Yard	616,300	1,142,620	222
7. Fairfax Extended/Lankershim Subway to North Hollywood Yard	781,300	1,448,530	282
8. Fairfax Extended/Lankershim Aerial to North Hollywood Yard	608,500	1,128,159	219
9. La Brea Bend/Vineland Subway to North Hollywood Yard	1,004,650	1,862,621	302
10. La Brea Bend/Vineland Aerial to North Hollywood Yard	814,550	1,510,175	294
11. La Brea Bend/Lankershim Subway to North Hollywood Yard	1,107,300	2,052,934	399
12. La Brea Bend/Lankershim Aerial to North Hollywood Yard	785,150	1,455,668	283

Source: Sedway/Cooke, 1982 and DMJM/PBQD, Construction Scenarios: North Hollywood Alternatives, September 29, 1982.

Assumptions:

- In-place volume-to-ton conversion factors are 1.76 tons per cubic yard for soft ground, and 2.23 tons per cubic yard for rock excavation.
- Material composition is twenty percent rock and eighty percent soft-ground.
- Seventeen month construction period, 253 day construction year = 5 day/week construction and excludes seven legal holidays per year.
- Assumes 20 ton load limit per trip to conform to City and State road highway limits.

HAUL ROUTES FOR ALTERNATIVE ALIGNMENTS

For each site exit point identified for waste generation, a truck haul route has been identified that minimizes impacts to residential areas and noise sensitive land uses.

Alternative A - Cahuenga Bend Portal

Portal at Cahuenga/Franklin. The designated haul route would be the same as the route designated in Figure VI-13 for the Cahuenga/Franklin site exit point.

Alternative B - Fairfax Extended

Portal at Fairfax/Hollywood. Southbound to landfills: east on Hollywood Boulevard to Highland Avenue, then left turn onto Highland Avenue. North on Highland Avenue to freeway on-ramp. Northbound to landfills: north on Highland Avenue to Odin Street. Right turn onto Odin Street, then east to Cahuenga Boulevard East. Left turn onto Cahuenga Boulevard East for northbound access to the Hollywood Freeway. Northbound and southbound from landfills: exit Highland Avenue from the Hollywood Freeway, then south on Highland Avenue to Hollywood Boulevard. Right turn on Hollywood Boulevard, then continue west to complete the trip.

Alternative C - La Brea Bend

Portal at La Brea/Hollywood. To landfills: from La Brea/Hollywood, same route as designated for Fairfax/Hollywood site exit point. From landfills: same haul route as designated for Fairfax/Hollywood site exit point to the La Brea/Hollywood (see Figure VI-12).

Lankershim Alignment

Portal at Kentucky/Lankershim. Northbound to landfills: east on Lankershim Boulevard to Cahuenga Boulevard, then left turn onto Cahuenga Boulevard. North on Cahuenga Boulevard to Ventura Boulevard, continue north on Ventura Boulevard to Vineland Avenue. Right turn onto Vineland Avenue, then same route as identified for the Bluffside Drive site exit point. Southbound to landfills: east on Lankershim to Cahuenga, then right turn on Cahuenga. South on Cahuenga to Regal Place for southbound access ramp to Highway 101. Northbound from landfills: exit Lankershim Boulevard from Highway 101, then left turn onto Lankershim. West on Lankershim to Kentucky Drive to complete the trip. Southbound from landfills: Exit Regal Place from Highway 101, then right turn onto Cahuenga. North on Cahuenga to Lankershim Boulevard, then left onto Kentucky Drive to complete the trip (see Figure A-1).

Lankershim/Magnolia Station. To landfills: Magnolia Boulevard west to State Highway 170. From landfills: Exit Magnolia Boulevard from Highway 170, then east on Magnolia Boulevard to complete the trip (see Figure VI-15).

Portal at West Kentucky/Lankershim. Haul routes would be substantially the same as those identified for Kentucky/Lankershim site exit point (see Figure A-1).

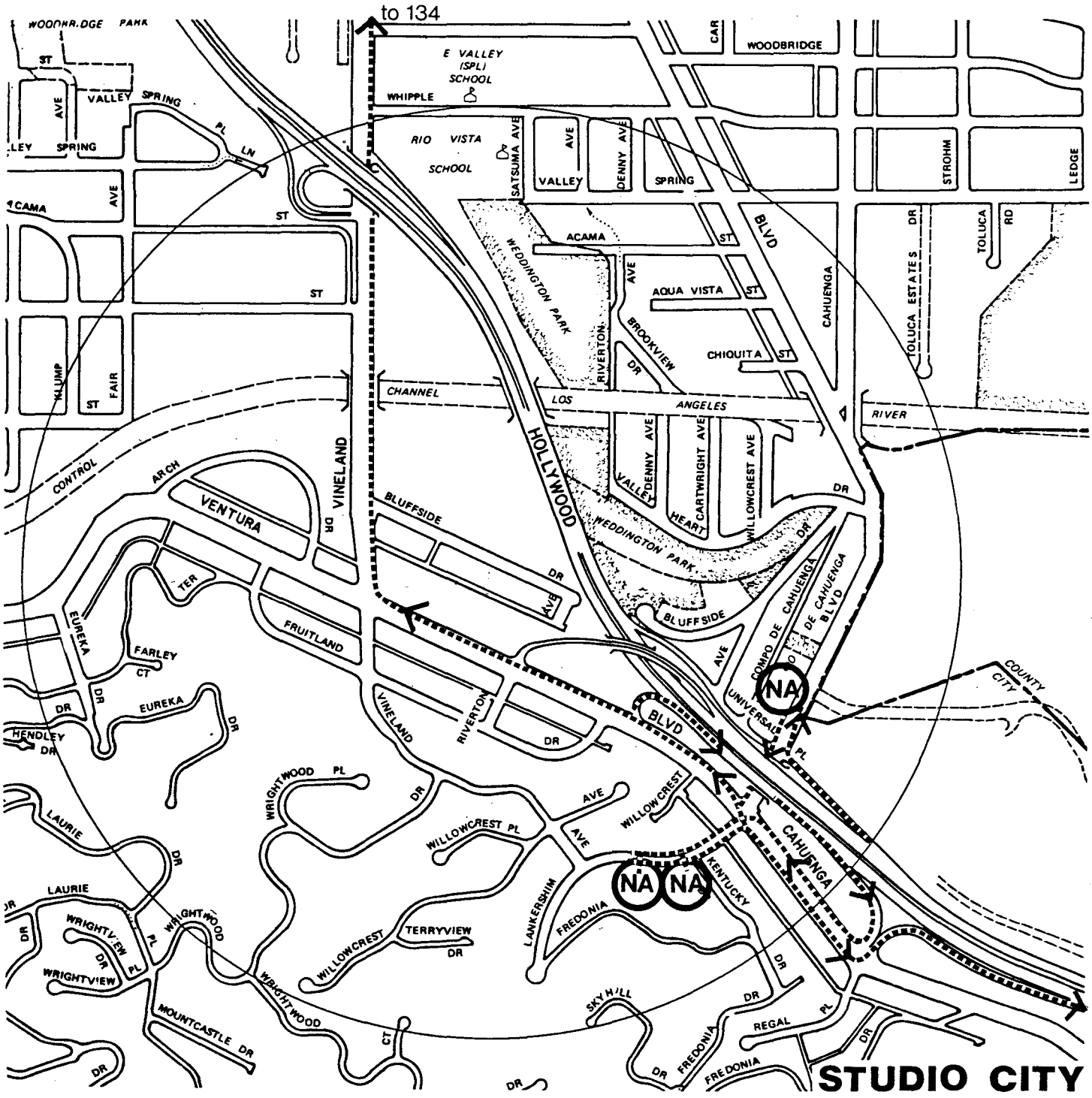
Universal City Station. Northbound to landfills: same haul route as identified for Kentucky/Lankershim site exit point. Southbound to landfills: south on Lankershim Boulevard to Cahuenga, then left turn on Cahuenga Boulevard. South on Cahuenga Boulevard to Regal Place freeway on-ramp. Southbound from landfills: exit Regal Place from the Hollywood Freeway, then make a right turn onto Cahuenga Boulevard. North on Cahuenga Boulevard to Lankershim Boulevard, then right turn on Lankershim Boulevard. North on Lankershim Boulevard to complete the trip. Northbound from landfills: exit Universal Place, then make right turn onto Lankershim Boulevard. North on Lankershim Boulevard to complete the trip (see Figure A-1).

Vineland Alignment

Portal at Regal Place/Fredonia Drive Area. Southbound to landfills: from Fredonia Drive and Regal Place portal area east on Regal Place to Cahuenga Boulevard, then cross Cahuenga Boulevard for southbound access to the Hollywood Freeway. Northbound to landfills: east on Regal Place to Cahuenga Boulevard, then left turn onto Cahuenga Boulevard. North on Cahuenga Boulevard to Ventura Boulevard, then continue north on Ventura to Vineland Avenue. The remaining haul route would be the same as that identified for Kentucky/ Lankershim site exit point. Southbound from landfills: exit Regal Place from Hollywood Freeway, then cross Cahuenga Boulevard and proceed west on Regal Place to complete the trip. Northbound from landfills: exit Lankershim Boulevard to Cahuenga Boulevard, then left turn onto Cahuenga Boulevard. South on Cahuenga Boulevard to Regal Place, right turn onto Regal to complete the trip (see Figure A-2).

Vineland/Magnolia Station. To landfills: Magnolia Boulevard west to State Highway 170. From landfills: exit Magnolia Boulevard from Highway 170, then east on Magnolia Boulevard to complete the trip (see Figure VI-15).

Portal at South of the Fruitland/Ventura Intersection. Northbound to landfills: same haul route as identified for Kentucky/Lankershim site exit point. Southbound to landfills: north to Ventura Boulevard, then right turn. South on Ventura Boulevard to Regal Place, then left turn on Regal Place for access ramp to the Hollywood Freeway. Northbound from landfills: exit Ventura Boulevard then proceed south on Ventura Boulevard to complete the trip. Southbound from landfills: exit Regal Place, then right turn on Cahuenga Boulevard. North on Cahuenga Boulevard to Ventura Boulevard, then left turn at Fruitland to complete the trip (see Figure A-2).



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

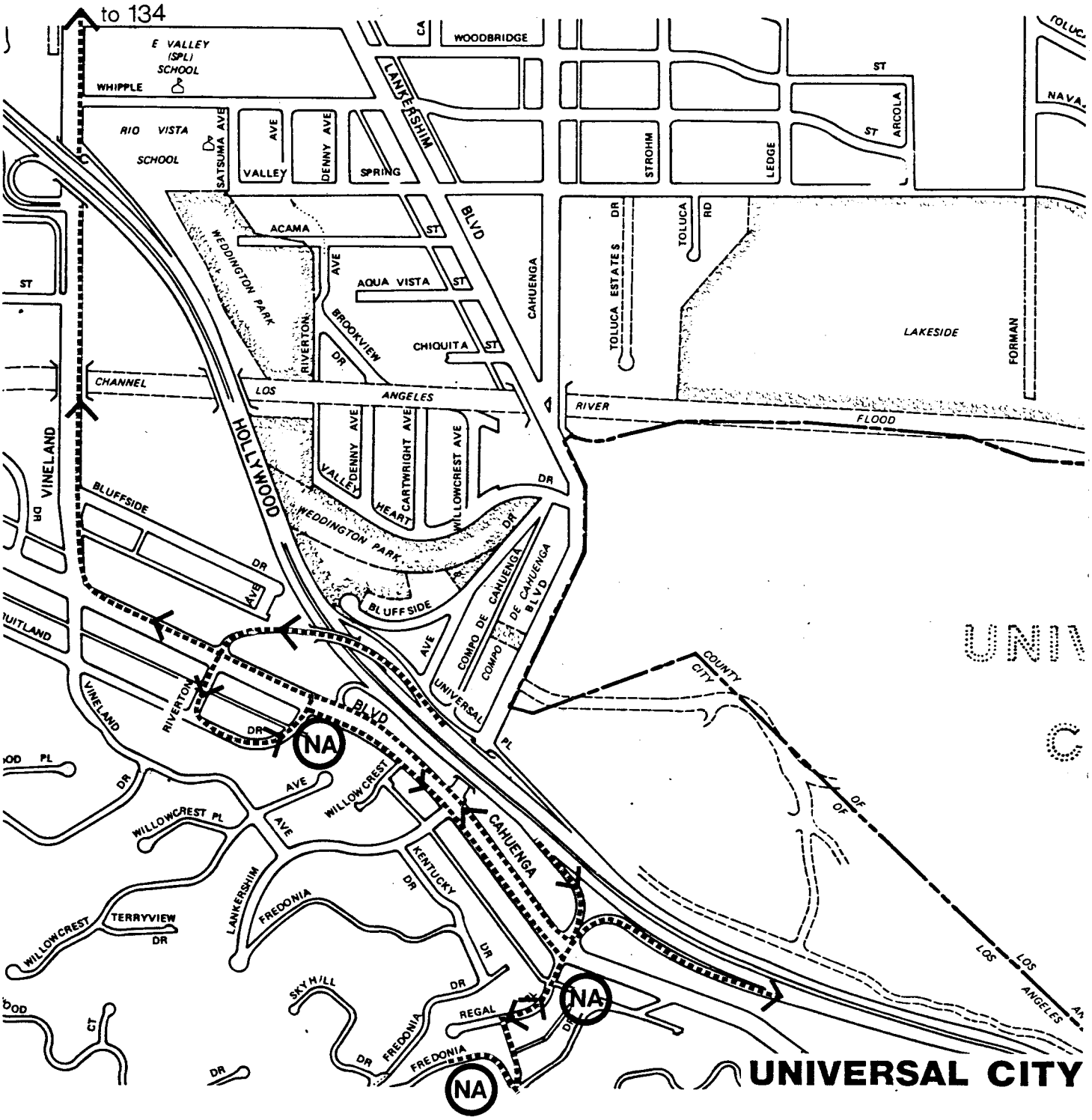
Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure A-1 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers



RECOMMENDED HAUL ROUTE

(15) SITE EXIT POINT AND ESTIMATED DAILY TRUCK TRIPS

Southern California Rapid Transit District

Metro Rail Project

PRELIMINARY ENGINEERING PROGRAM

0 400 800 1600 feet

Figure A-2 Recommended Haul Route

SEDWAY/COOKE
Urban and Environmental Planners and Designers

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Jean Carr, Public Participation Coordinator, Southern California Hazardous Waste Management Project, SCAG, November 15, 1982.

Peggy Clark, Public Relations Officer, Los Angeles County Sanitation District, September 3, 1982.

Chuck Coffee, County Health Officer, Los Angeles County Department of Health, September 7, 1982.

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John Lewis, Associate Water Resource Control Engineer, Resources Agency, California Regional Water Quality Control Board, Los Angeles Region, September 2, 1982.

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