FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
LAKE VIEW TERRACE, CALIFORNIA

VOLUME I OF IV
PARTIAL CLOSURE PLAN

Prepared for

Bureau of Sanitation
Department of Public Works
City of Los Angeles
419 South Spring Street, Suite 800
Los Angeles, California 90013

Prepared by

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1360 Valley Vista Drive
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1 February 1994

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FIGURES

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FIGURES (continued)

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FIGURES (continued)

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FIGURES (continued)

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME I OF IV - PARTIAL CLOSURE PLAN

FIGURES (continued)

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME II OF IV - PARTIAL CLOSURE PLAN (APPENDICES)

APPENDICES

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME III OF IV - PARTIAL CLOSURE PLAN (DRAWINGS)

DRAWINGS

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME III OF IV - PARTIAL CLOSURE PLAN (DRAWINGS)

DRAWINGS (continued)

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS
VOLUME IV OF IV - AMENDMENT TO PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME IV OF IV - AMENDMENT TO PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME IV OF IV - AMENDMENT TO PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME IV OF IV - AMENDMENT TO PARTIAL CLOSURE PLAN

FINAL CLOSURE PLAN
LOPEZ CANYON SANITARY LANDFILL
TABLE OF CONTENTS (continued)
VOLUME IV OF IV - AMENDMENT TO PARTIAL CLOSURE PLAN

DRAWINGS

APPENDICES

SECTION 1.0

INTRODUCTION

1.0 INTRODUCTION

1.1 INTRODUCTION

This Partial Closure Plan for the Lopez Canyon Landfill was prepared by **Bryan A. Stirrat & Associates, Inc. (BAS)** for the City of Los Angeles, Department of Public Works, Bureau of Sanitation (BOS) who is the owner and operator of the landfill. Volume I of this Plan includes discussions and appendices regarding closure and Volume II includes the full-size drawings referenced in Volume I.

The Lopez Canyon, Class III Landfill is divided into four areas known as Disposal Areas A, B, AB+ and C. The existing Solid Waste Facilities Permit (SWFP) issued in 1978 and a Notice and Order issued by the Local Enforcement Agency (LEA) on July 21, 1989, allows filling operations to be conducted in Disposal Areas A, B, and AB+. The BOS is currently seeking approval from the California Integrated Waste Management Board (CIWMB) and all other regulatory agencies having jurisdiction over the landfill to expand operations into Disposal Area C. However, until the revised SWFP has been approved, the BOS continues to comply with the existing SWFP conditions and the Notice and Order for the landfill.

In 1990, BOS estimated that the remaining permitted capacity would allow disposal operations to be conducted in Disposal Areas A, B and AB+ until March 31, 1993 (see Section 1.4.1 for discussion regarding the current closure date estimate). Therefore, in accordance with CCR Title 14, Section 18255, the BOS prepared and submitted a Final Closure and Post-Closure Maintenance Plan for Disposal Area A, B and AB+ on March 31, 1991 (two years prior to the anticipated closure date).

The BOS complied with this requirement, but to-date has been unable to obtain approval of the original Final Closure Plan because of the City's inability to meet closure financial responsibility requirements (i.e., an approved financial mechanism and adequate funding). The current status of the BOS compliance with financial responsibility requirements is discussed in Section 13.0.

As discussed above, the BOS is currently in the process of obtaining a revised SWFP. As part of that process a preliminary closure plan for any new or expansion area is required as an element of the permit application package. Therefore, at the recommendation of the CIWMB Closure Branch a Preliminary Closure and Post-Closure Maintenance Plan for Disposal Area C was prepared and submitted on December, 1991. The CIWMB deemed this plan incomplete because of non-compliance with closure financial responsibility requirements in Title 14. The CIWMB, indicated that the preliminary closure plan would not be approved and therefore any application for revision of the existing SWFP would be recommended for non-concurrence.

Subsequent to the preliminary closure plan's submittal, the City's consultant, **BAS** was able to develop a plan of action satisfactory to the CIWMB to bring the site into compliance with all financial responsibility requirements. As part of this action the CIWMB Closure Branch requested that both the Final and Preliminary Closure Plans be withdrawn and reformatted into one closure plan covering the entire landfill (Disposal Areas A, B, AB+ and C). The CIWMB indicated that this Closure Plan will also be adequate to meet the requirements of the application package for a revised SWFP for Disposal Area C.

In order to accommodate closure of the slopes of Disposal Areas A and B, in advance of the remaining disposal areas, the plan has been prepared as a Partial Closure Plan (Plan). The plan proposes that the closure of the landfill be accomplished in two phases. Phase I closure includes the slopes of Disposal Areas A and B and will be implemented upon approval of the Plan and when the closure account is fully funded. Phase II closure includes the top decks of Disposal Areas A, B and AB+ and all of Disposal Area C to be implemented in early 1996. The current Conditional Use Permit (CUP No. 90-0271CU) only allows disposal operations to be conducted at the landfill through February 4, 1996.

This Partial Closure Plan will be amended, as necessary, in accordance with Title 14, CCR, Section 18272. In addition, the Phase II portions of this Plan will be amended by February 1994 to include all elements of a final closure plan two years prior to the anticipated date of closure (February, 1996).

1.1.1 MAXIMUM EXTENT OF CLOSURE

Title 14, CCR, Section 18261.3 (a) (3) requires an operator to determine the maximum extent of the landfill that will ever require closure at any given time during the life of the landfill. The Lopez Canyon Landfill encompasses approximately 399 acres (including a seven acre parcel leased from the U.S. Forest Service), of which approximately 166 acres will have been used for refuse disposal during the life of the landfill and will require closure.

Therefore, the maximum extent of the landfill that will ever require closure under this closure plan will be 166 acres corresponding to the proposed limits of refuse shown on Figure 4-1, Proposed Final Grading Plan.

1.2 REGULATORY REQUIREMENTS FOR CLOSURE

1.2.1 REGULATIONS

This Partial Closure Plan has been prepared in accordance with the following California Code of Regulations:

- Title 23, Chapter 15, Articles 8 and 9, (Referred to herein as Chapter 15).

- Title 14, Chapter 3, Article 7.8 and Chapter 5, Articles 3.4 and 3.5, Closure/Post-Closure Regulations adopted by the California Integrated Waste Management Board in June, 1990 (Referred to herein as Title 14).

The requirements in these regulations were utilized as the minimum standards for this plan. In almost all cases, features of the Partial Closure Plan for the Lopez Canyon Landfill have been designed to upgraded standards.

1.2.1.1 CALIFORNIA CODE OF REGULATIONS, TITLE 23, CHAPTER 15

Chapter 15, Article 9, Section 2597 requires that the following information be included in closure and post-closure maintenance plans:

- o A projected schedule for partial and final closure.

- o A topographic map at appropriate scale, contour interval and detail showing the boundaries of the facility to be closed with projected final contours and any changes in natural surface drainage patterns.

- o A description of the precipitation and drainage control systems.

- o A description of the leachate control features and treatment or disposal procedures, if applicable.

- o A map and discussion of groundwater and unsaturated zone monitoring programs for the post-closure maintenance period, including location, construction details and rationale of all monitoring facilities.

- o An evaluation of anticipated settlement due to decomposition, compaction of wastes, and subsidence of underlying geologic materials.

- o A description of the nature of the final cover, including its physical characteristics, permeability, thickness, slopes, elasticity (shrink and swell), and erodibility, including design details of all landscaping, drainage and irrigation facilities and other features to be placed over the final cover.

- o The post-closure land use of the disposal site and the surrounding area.

- o Estimates of costs for closure and post-closure maintenance for the anticipated post-closure maintenance period.

1.2.1.2 CALIFORNIA CODE OF REGULATIONS, TITLE 14, CHAPTERS 3 AND 5

Under Assembly Bill (AB) 2448, the State Legislature required the California Integrated Waste Management Board (CIWMB) to adopt emergency regulations on or before July 1989, specifying procedures for closure and post-closure maintenance plans and uniform standards for closure and post-closure of solid waste landfills.

As a result, the CIWMB focused adoption procedures on the following primary areas which were incorporated into Title 14:

- Engineering plans for closure and post-closure maintenance of the solid waste landfill.
- Written cost estimates covering the estimated cost of each item contained in the closure plan and the estimated cost of maintaining the landfill in accordance with the post-closure maintenance plan.
- Evidence of the operator's financial ability in the form of a trust fund or an equivalent financial arrangement acceptable to the CIWMB to provide for the cost of closure plus 15 years of post-closure maintenance.

The regulations imposed by Title 14 include:

- A construction quality assurance program shall be developed to provide evidence that materials and procedures utilized in the placement of the final cover are tested, constructed, and monitored in accordance with the design specifications proposed in the approved closure plan.
- A test pad shall be constructed to evaluate the performance of the materials to be utilized for the low-permeability layer of the final cover.
- The operator shall make volumetric measurements of the final site configuration so that anticipated differential settlement of the site during the post-closure maintenance period can be determined. An aerial photographic survey of the entire permitted site will be made upon completion of closure activities and every five years thereafter.
- The operator shall ensure that landfill gases generated at the site are controlled during the periods of closure and post-closure maintenance, to provide for the protection of public health and safety, and the environment.
- The operator shall implement site security policies, including signage, and restricted access.

- The operator shall prepare and maintain a written post-closure emergency response plan. The plan shall be submitted as part of the post-closure maintenance plan.

- The operator shall ensure the integrity of the final slopes under both static and dynamic conditions. A stability analysis shall be performed and must indicate a factor of safety of at least 1.5 under dynamic conditions. In lieu of achieving a factor of safety of 1.5 under dynamic conditions, a more rigorous analytical method that provides a quantified estimate of the magnitude of movement may be employed.

In addition, the application and approval process and the record keeping and reporting requirements necessary to ensure compliance with the statutes are stipulated in the regulations.

1.2.2 REGULATORY AGENCIES TO REVIEW AND EVALUATE THE CLOSURE AND POST-CLOSURE MAINTENANCE PLANS

The following agencies are responsible for evaluation and approval of the Lopez Canyon Landfill Closure Plan:

- California Integrated Waste Management Board (CIWMB) - The CIWMB is responsible for ensuring that the plan elements conform with all regulations found in Title 14.

- Regional Water Quality Control Board (RWQCB) - The RWQCB, Los Angeles Region, shall review the plans for consistency with regulations found in Chapter 15 pertaining to the protection of water quality. The RWQCB shall also review the cost estimate for closure and post-closure maintenance as it pertains to the protection of water quality.

- Los Angeles County Department of Health Services Solid Waste Management Program and/or the City of Los Angeles Department of Environmental Affairs - These agencies are designated as the local enforcement agency (LEA). In addition to ensuring that the closure and post-closure maintenance plans comply with the pertinent regulations

found in Title 14, the LEA shall also review the plans for compliance with any additional applicable conditions that might be included in the Solid Waste Facilities Permit (SWFP). The LEA shall also ensure that the plans conform to existing local conditions and ordinances and that the elements have been reviewed for consistency with local planning and zoning requirements.

- South Coast Air Quality Management District (SCAQMD) - The SCAQMD shall review gas system control plans pertaining to the design, construction and operation of landfill gas control systems for the protection of air quality in the Los Angeles Basin. Other technical operating permits may also be required for material processing plants as part of special construction or landfill operation.

- United States Forest Service - In accordance with the CUP, a Special Use Permit (SUP) was issued under this agency by the United States Department of Agriculture which requires review of operational conditions. The existing SUP was issued on March 26, 1991, and is on file for public review at the previously mentioned locations.

- Subtitle D requirements, 40 CFR§ 258.60 and § 258.61 - Subtitle D Implementation by the CIWMB and RWQCB has not yet been determined nor have any specific requirements. **BAS** has been advised by the CIWMB that any design or plan currently under preparation or under review or advisement by the LEA or State should be prepared according to the previously outlined Title 23 and 14 of the CCR. If Subtitle D requirements become applicable to this Plan, the BOS will update the plan by use of addendums.

1.2.3 APPROVAL OF CLOSURE AND POST-CLOSURE MAINTENANCE PLANS

Within 120 days following submittal of the preliminary closure and post-closure maintenance plans by the operator, the LEA and the RWQCB shall submit to the CIWMB a written record of approval or denial of the plans. If the record indicates that approval has been denied, the LEA and RWQCB shall include in that written record the specific detailed circumstances for denial.

Within 60 days from the date of written approval, or denial, of the preliminary closure and post-closure maintenance plans by the LEA and the RWQCB, the CIWMB shall transmit to the operator a formal letter of approval or denial.

1.3 SETTING

1.3.1 GEOGRAPHIC SETTING

The Lopez Canyon Landfill is located in the northeastern part of the San Fernando Valley in Los Angeles County on the southern side of the San Gabriel Mountains on land wholly within the City of Los Angeles (see Figure 1-1). The landfill property covers an area of approximately 399 acres (including a seven acre parcel currently leased from the U.S. Forestry Service) and is situated adjacent to the east flank of Lopez Canyon, a broad canyon draining north to south as shown on Figure 1-2.

The site is immediately bounded on the north by undeveloped land belonging to the United States Department of Agriculture, Forestry Service. Other features in the vicinity of the landfill are the Hansen Dam Flood Control Basin, located approximately two miles to the southeast of the site; Kagel Canyon and Lake View Terrace communities, located to the east and south/southeast, respectively; and the Shalom Memorial Park, to the northeast.

1.3.2 EXISTING FACILITIES

The principal landfill operation facilities are the weigh station located off Lopez Canyon Road and Paxton Street (consisting of two scales and a scale house), and the field offices. Existing on-site environmental control facilities associated with the landfill operations are the gas collection system, flare station, and liquid management systems (see Figure 1-3). Any potential decommissioning of these environmental control facilities or structures will be performed in accordance with Title 14, Section 17771 and 17772 as discussed in Section 6.5.2.1.

There are no landfill structures to be removed per this Partial Closure Plan, other than the condensate holding tanks, which will be removed and reconstructed on top of the final cover during closure construction.

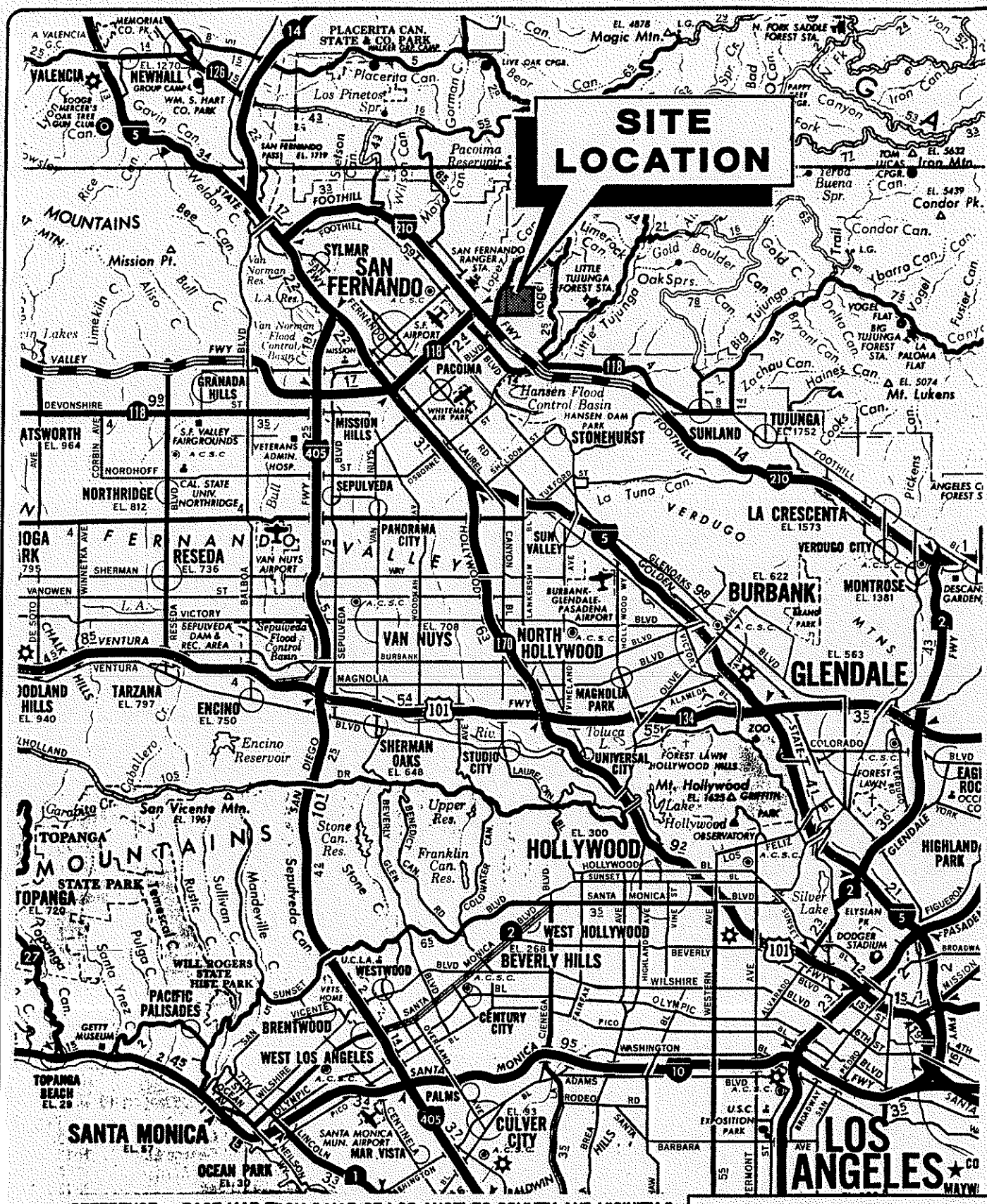
Water is supplied to the landfill by the City of Los Angeles, Department of Water and Power from a main line located at the base of the site near the scalehouse. The water feed line on-site is maintained by the operator. Water is pumped up to a one million gallon tank located on the ridge between Disposal Areas A and C next to the flare station.

The landfill has telephone and electric services. Personnel working on the landfill away from the site office communicate via two-way radio. Electric power for the site office, the scalehouse and the flare station is provided by the City of Los Angeles, Department of Water and Power. Restroom facilities located at the site entrance and in the scalehouse are connected to the city sewer system. Restroom facilities located at the site office are connected to two sewage holding tanks with a capacity of 6,000 gallons. Wash basins, showers and drinking water are also supplied on-site.

A comprehensive gas control system has been installed in Disposal Areas A, B and AB+. Primary elements consist of deep and shallow vertical gas wells, horizontal collection wells, a gas collection and conveyance network, and a flare station which includes nine flares. Section 6.0 describes the existing and proposed gas control systems. This system is operated by the Bureau of Sanitation. The flare station is located on the south side of the site on the ridge between Disposal Areas A and C next to the one million gallon (mg) water tank. The flare station was built to accommodate the expansion into Disposal Area C. A gas migration monitoring system consisting of 41 perimeter probes spaced an average of 1000 feet apart has been installed around the entire boundary of the landfill.

The existing leachate collection system consists of a system of sumps and a leachate barrier cut-off wall which was constructed at the location of the existing 1,500 foot elevation contour at the bottom of Disposal Area AB+. This system will be integrated with the proposed leachate collection and removal system (LCRS) to be installed in Disposal Area C. Section 7.0 presents additional details regarding the proposed LCRS for Disposal Area C.

The existing groundwater monitoring system consists of two pressure vacuum lysimeters, seven groundwater monitoring wells and four surface water sampling locations. A groundwater subdrain collection system is proposed for Disposal



REFERENCE : BASE MAP FROM " MAP OF LOS ANGELES COUNTY AND VICINITY " ISSUED BY "AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA "

FIGURE 1 - 1

BAS

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(714) 860-7777

LOPEZ CANYON LANDFILL

VICINITY MAP

JOB NO.	9303
DATE	JAN. 1993
DRAWN BY	PTN
CHECKED BY	VB

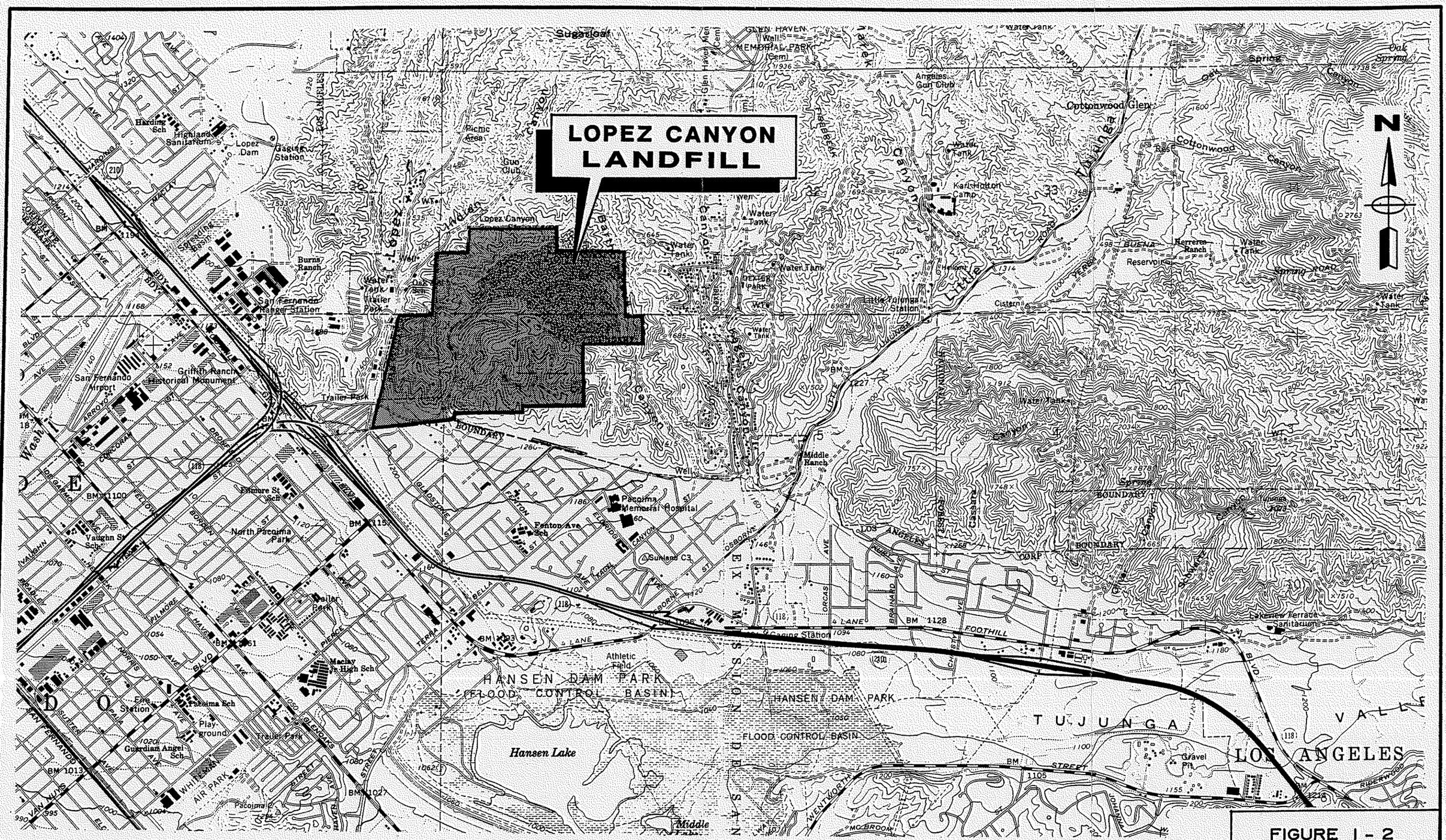

FIGURE 1 - 2

REFERENCE : BASE MAPS ARE FROM " U.S.G.S. MAPS OF SUNLAND, CALIFORNIA AND MAP OF SAN FERNANDO, CALIFORNIA " PHOTOREVISED 1988 "
SCALE : 1 INCH = 2000 FEET

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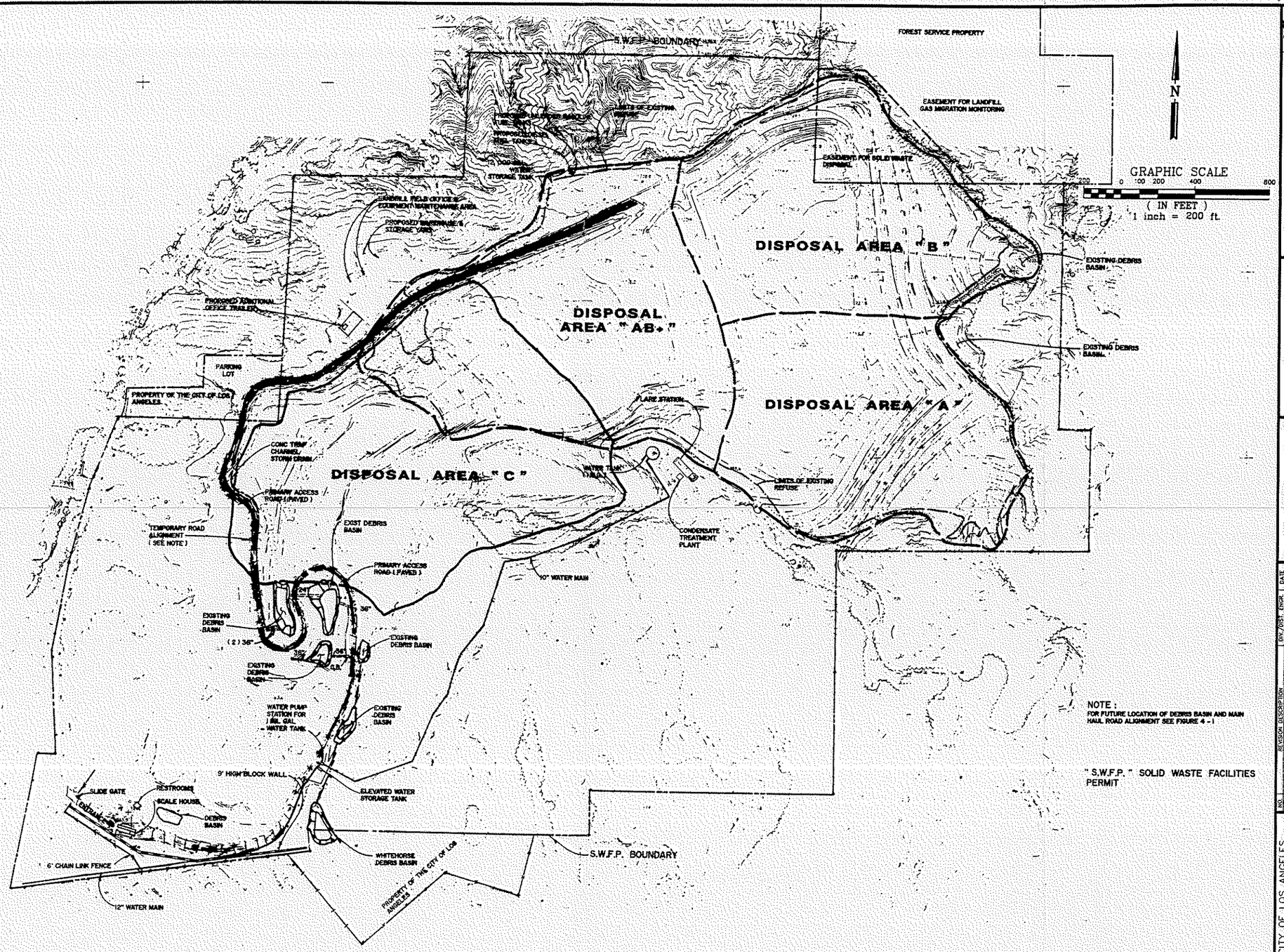
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL

SITE LOCATION MAP

JOB NO.	9035-1008
DATE	OCT. 1991
DRAWN BY:	PTN
CHECKED BY:	JB



NOTE :
FOR FUTURE LOCATION OF DEBRIS BASIN AND MAIN HAUL ROAD ALIGNMENT SEE FIGURE 4 - 1

" S.W.F.P. " SOLID WASTE FACILITIES PERMIT

FIGURE 1 - 3

CLOSURE PLAN
EXISTING SITE FACILITIES PLAN

DESIGNED	E.L.S.	12/91
DRAWN	H.M.G.	12/91
CHECKED	E.L.S.	12/91
SUPERVISED	E.L.S.	12/91
PROJECT ENGR.		R.E. NO.
ASST. DIV./DIST. ENGR.		R.E. NO.

BAS
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LOPEZ CANYON LANDFILL

CITY OF LOS ANGELES
BUREAU OF SANITATION — DELMAR A. BASS, DIRECTOR
DATE _____ 19____
DIV/DIST. ENGR. _____ R.E. NO.

NO	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
1	GENERAL REVISIONS	BPD / RB	JAN '95

SCALE
SHEET NO.
DWG. NO.
JOB NO.

SCALES HORIZ. 1"= VERT. 1"= | SHEET OF | INDEX NUMBER

Area C. Section 7.0 presents additional details regarding the site's groundwater monitoring collection system.

1.3.3 LOCAL LAND USE

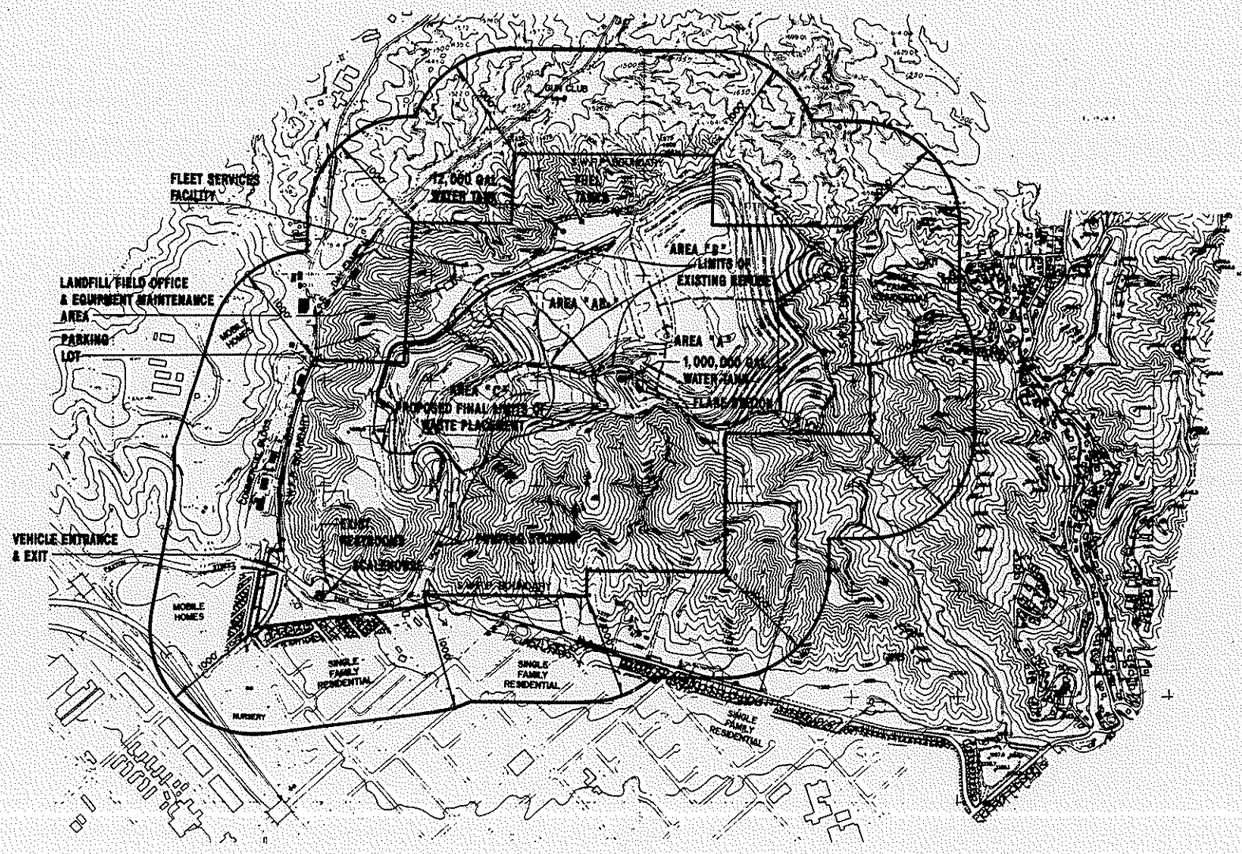
The Lopez Canyon Landfill is located within an area zoned as agricultural A2-1 (open space) near the communities of Lake View Terrace, Pacoima, and Kagel Canyon.

The undeveloped land, immediately to the north of the landfill, is owned by the United States Department of Agriculture, Forest Service (USFS).

Immediately south of the landfill is the community of Lake View Terrace. This community includes rural, suburban, and urban residential areas. The areas to the south and southwest of the landfill, including Lake View Terrace, are presently zoned for residential and light manufacturing. Further to the southeast is the Hansen Dam Flood Control Basin. A variety of recreational activities such as fishing, hiking and picnicking are available at this location. Figure 1-4 shows off-site structures within 1,000 feet of the property boundary.

The unincorporated area east of the landfill is a rural community known as Kagel Canyon. The unincorporated area to the west is zoned for multi-residential and light manufacturing. A current (1991) land use map for the area is shown on Figure 1-5.

The current end use for the site is to provide open space and the ultimate end use of the landfill has not been determined. The surfaces of the landfill will be vegetated at the completion of closure for erosion control and aesthetics. Irrigation will be provided to establish plant growth.



N

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)

1 inch = 500 ft.

TOTAL ACREAGE UNDER SOLID WASTE FACILITY PERMIT (S.W.F.P.) (INCLUDES SEVEN ACRE PARCEL LEASED FROM THE U.S. FOREST SERVICE) = 399 ACRES

FIGURE 1 - 4

CLOSURE PLAN 1000' RADIUS MAP

LOPEZ CANYON LANDFILL

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DRAWN
CHECKED
SUPERVISED
PROJECT ENGR.
ASSIST. DIR. PUBLIC WKS.

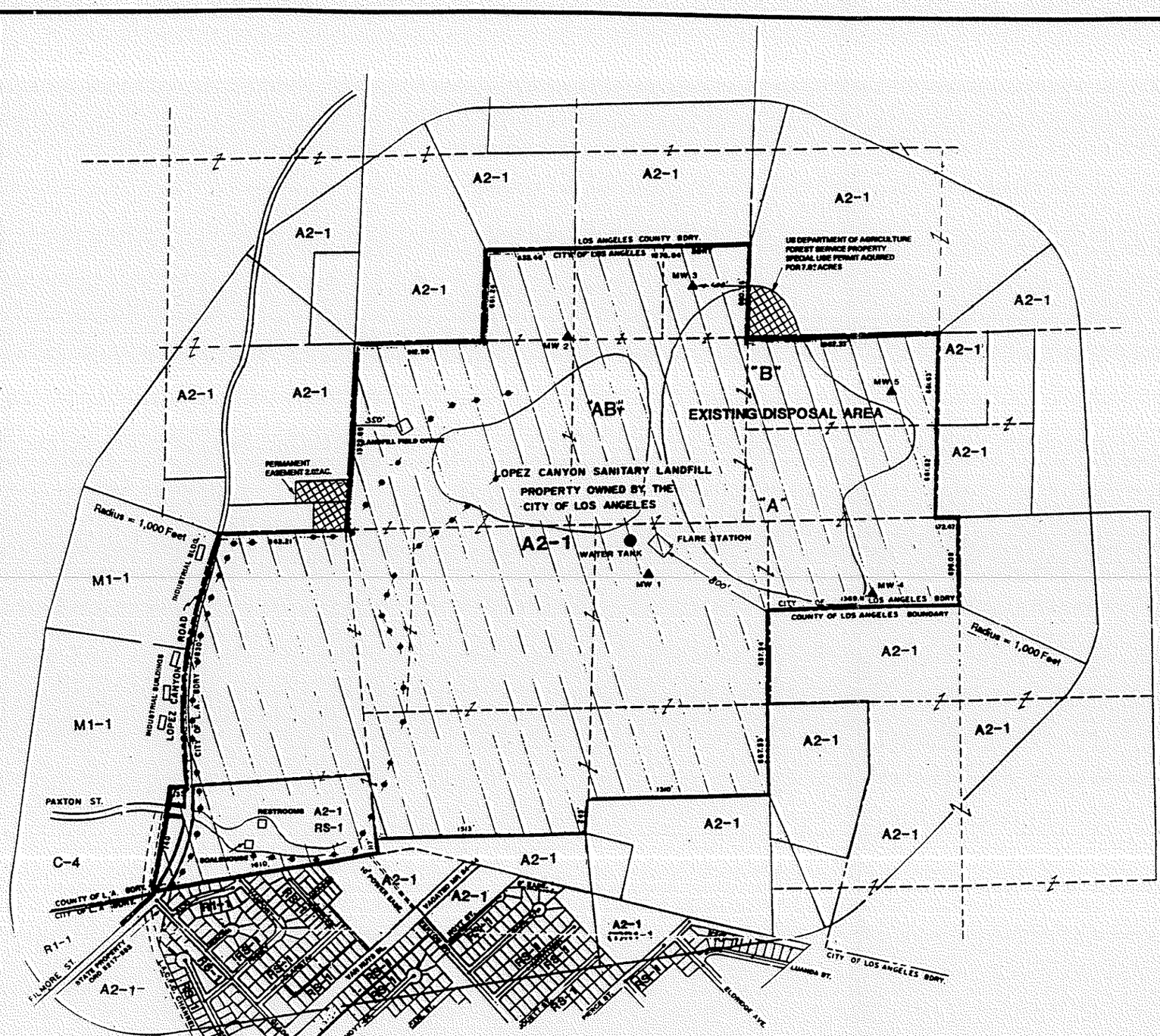
R.E. NO.
R.E. NO.

REVISION DESCRIPTION

GENERAL REVISIONS

APPROVED
DIRECTOR OF SANITATION
DEPUTY DIRECTOR

SCALES HORIZ. 1" = VERT. 1" SHEET OF INDEX NUMBER



Legend:

- Sanitary Sewer
- Power Poles
- MW Monitoring Well

Zoning Atlas

Book	1, Pg. 358
Grid	43/CA
T. B. Pg.	3
Grid	D 5

EXHIBIT 14

Explanation:

M Manufacturing
A Agriculture
R Residential
C Commercial

FIGURE 1 - 5

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LOPEZ CANYON LANDFILL

LAND USE MAP

JOB NO.	9035-1008
DATE	DEC. 1991
DRAWN BY:	H.M.G.
CHECKED BY:	J.R.B.

1.4 FACILITY HISTORY

1.4.1 BACKGROUND

The Lopez Canyon Landfill has been operated by the City of Los Angeles, Department of Public Works, Bureau of Sanitation (BOS) since 1975. The pre-landfill topography for the landfill is shown on Figure 1-6. An Environmental Impact Report (EIR), State Clearing House Number 76031520 assessing the impacts of operating the Lopez Canyon Landfill was originally certified by the City Council on July 13, 1976, when the site was annexed to the City of Los Angeles. In 1987, the BOS initiated a set of project activities at the landfill to bring the facility into compliance with the California Code of Regulations (CCR) for landfill facilities, local requirements of the South Coast Air Quality Management District (SCAQMD) and to undertake a series of other projects. A proposed Mitigated Negative Declaration for these activities was circulated in September, 1987. The public response to that document and subsequent decisions to consider the impacts of increased inflow, capacity, site life, and the disposal of wastewater sludge led to a decision to prepare a Subsequent Environmental Impact Report (SEIR) in 1988.

The 1988 SEIR was prepared in accordance with State regulations under the California Environmental Quality Act (CEQA) to support the activities (with the exception of the disposal of wastewater sludges) mentioned above, the expansion of the landfill into Disposal Area C, and the closure of the slopes of Disposal Areas A and B. A Conditional Use Permit (CUP) No. 90-0271CU, incorporating the mitigation measures resulting from the CEQA process was approved on February 4, 1991. The CUP grants local land use authority to continue landfill operations into Disposal Area C for a period of five years until February 4, 1996.

Until approval of a revised Solid Waste Facility Permit (SWFP) by the Local Enforcement Agency (LEA) and the California Integrated Waste Management Board (CIWMB) for Disposal Area C is received, the BOS continues to comply with the existing 1978 SWFP and Notice and Order issues by the LEA on July 21, 1989. Disposal Areas A, B and AB+ will reach their estimated fill capacity by late September, 1993. This change from the original estimated closure date of March 31, 1993, was due primarily to waste diversion activities implemented

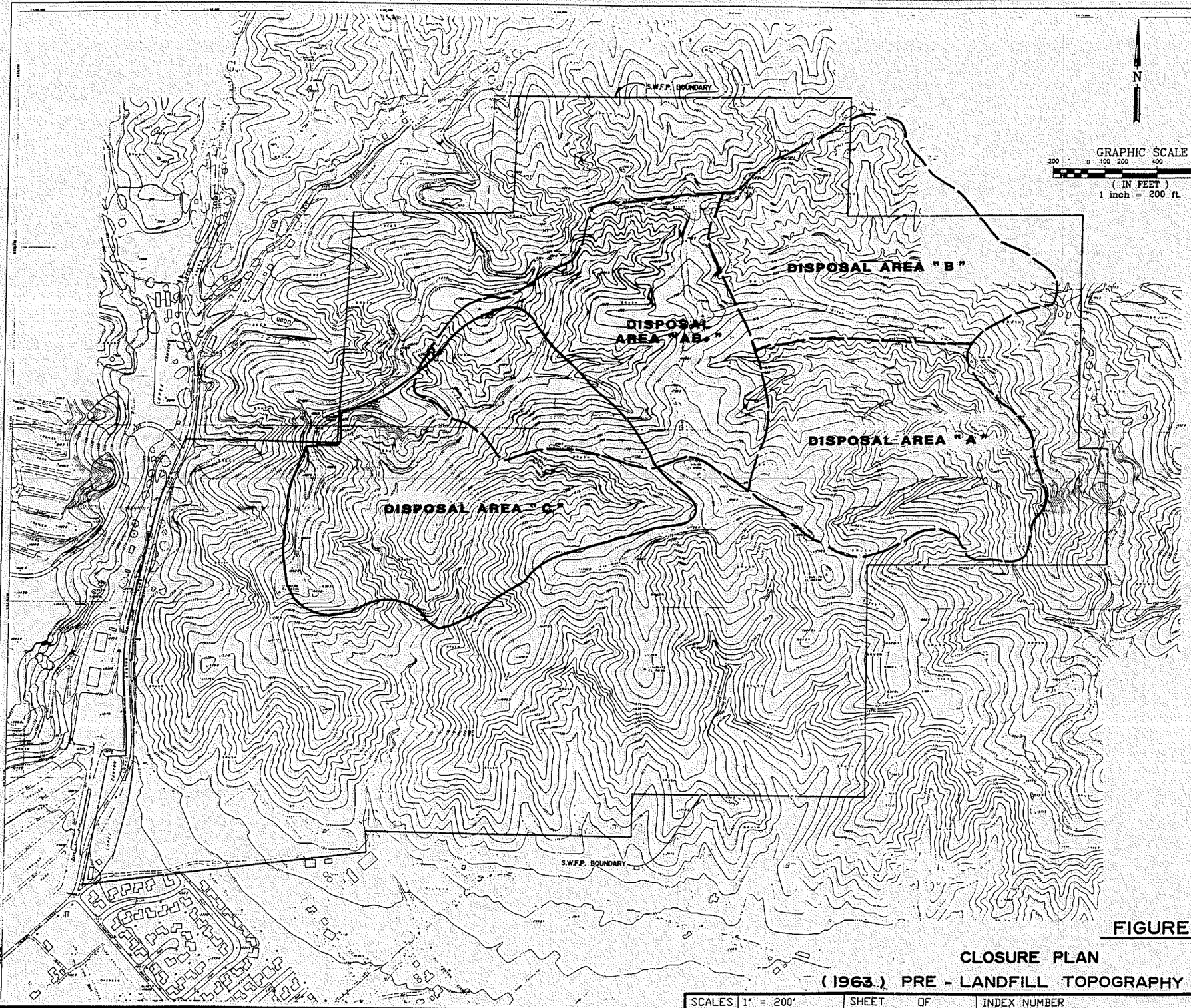


FIGURE 1 - 6

CLOSURE PLAN

(1963) PRE - LANDFILL TOPOGRAPHY MAP

SCALES	1" = 200'	SHEET	OF	INDEX NUMBER

	DATE
DESIGNED E.L.S.	12/91
DRAWN H.M.G.	12/91
CHECKED E.L.S.	12/91
SUPERVISED E.L.S.	12/91
PROJECT ENGR.	R.E. NO.
ASSIT. DIV./DIST. ENGR.	R.E. NO.

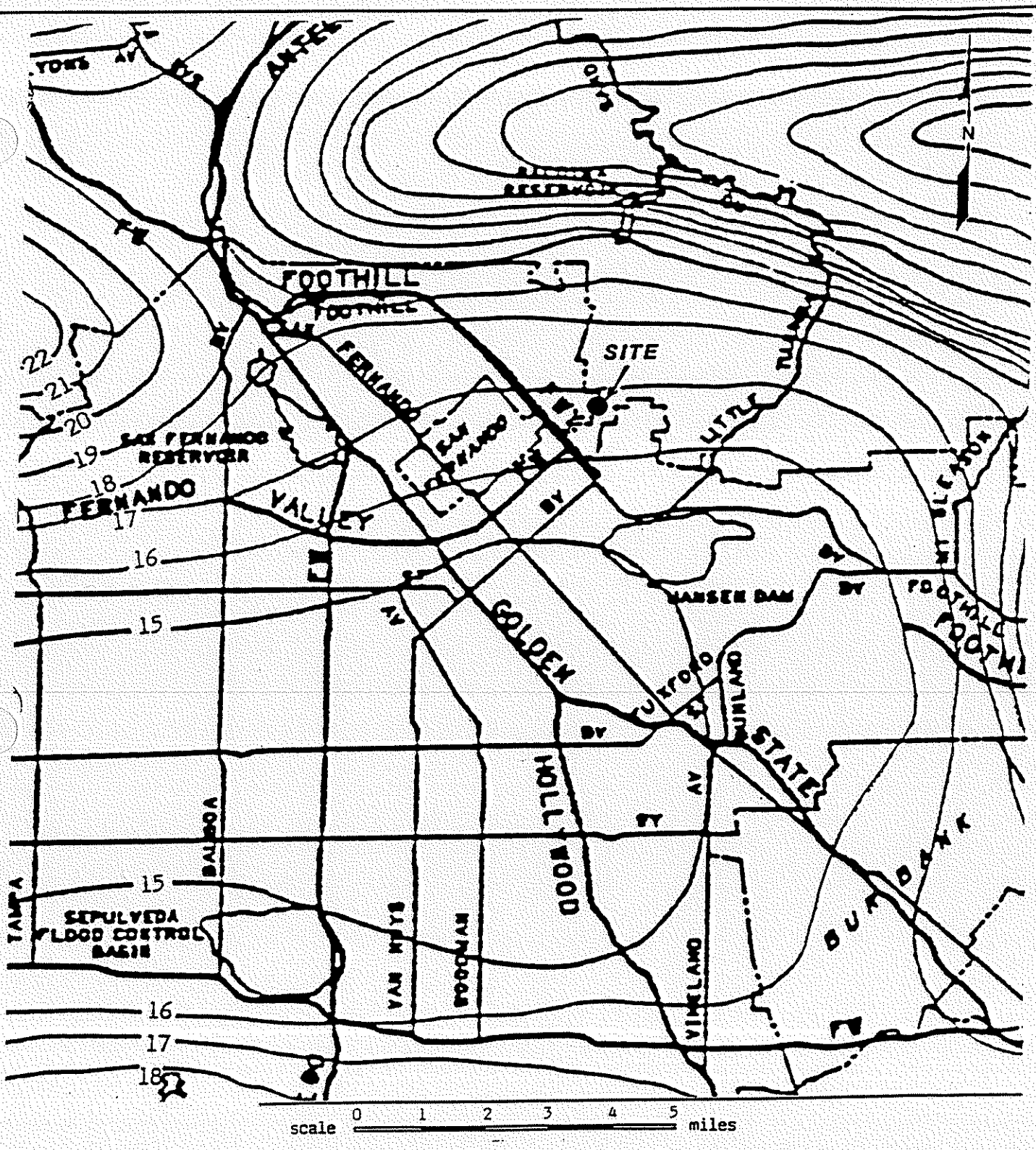
BYRAM A. STRIGAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1500 DIAMOND STREET, SUITE
DIAMOND BAR, CA. 91765

LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	BY	DATE
AA	GENERAL REVISIONS	BWT	12/91
AB			

CITY OF LOS ANGELES
BUREAU OF SANITATION DELBERT A. BLAU, DIRECTOR
DATE _____ 19__
DIVISION ENGR. R.E. NO.

SCALE 1" = 200'
SHEET NO.
DWG. NO.
JOB NO. 9035-1008



BASEMAP FROM L.A.C.F.C.D. ISO-HYETAL MAP DATED 1978

17 LINES OF EQUAL RAINFALL IN INCHES

FIGURE 1 - 7

(714) 860-7777
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LOPEZ CANYON LANDFILL

100 - YEAR MEAN RAINFALL

ISOHYETAL MAP

JOB NO.	
DATE	
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CHECKED BY:	

at the landfill. For the past several months, the BOS has been voluntarily diverting waste from the site, thus reducing their daily inflow of waste by as much as half. Thus extending the capacity of the landfill.

The landfill operation has functioned as a key element of the City of Los Angeles' solid waste management system. It serves the waste disposal needs of the highly urbanized central, south-central, northwestern, and San Fernando Valley areas of the City.

The site is operated according to the State Minimum Standards for a Class III disposal facility as established by the State Water Resources Control Board and the California Integrated Waste Management Board.

Currently, refuse is being accepted into Disposal Area AB+, which lies directly to the north and east of Disposal Area C. Disposal operations for the landfill site are limited to Monday through Friday 7:00 a.m. to 6:00 p.m. The site receives refuse from City of Los Angeles Collection vehicles and City contracted vehicles Monday through Friday from 7:00 a.m. to 4:30 p.m. Operations and maintenance staff are usually on-site from 6:00 a.m. to 6:00 p.m.

All excavation and dirt moving operations such as excavation of Disposal Area C, stockpiling of cover material, road development, facility improvements and winter deck preparation will be confined to the hours of 7:00 a.m. to 5:30 p.m. Monday through Saturday. The grading of the ridge tops will be confined to the hours of 9:00 a.m. and 3:00 p.m., to reduce early morning and late afternoon noise. Some landfill equipment requires daily servicing, that is, lubrication and oil change, which is permitted to be serviced by landfill personnel during disposal operations and between the hours of 6:00 p.m. and 8:00 p.m.

This disposal facility has received approximately 13.37 million tons of non-hazardous waste, household refuse, street sweepings, and inert waste as of November 30, 1992. Residue and grit from sewer cleanings and sewage treatment processes were received in the past, however this type of waste is no longer accepted at the site. Asbestos wastes may have been disposed of on-site prior to the designation of asbestos as a hazardous waste. No liquids or hazardous wastes were knowingly accepted at the site.

1.4.2 DISPOSAL METHODS AND ACCESS

Solid waste disposal activities are conducted in accordance with State and Local performance standards. The typical landfilling operation is that of a cut-and-cover canyon fill. Refuse is unloaded at the toe of the daily working face and spread in layers up 3:1 (horizontal to vertical) slopes by Caterpillar D-8 and D-9 bulldozers. The layers are no more than two feet thick and are compacted with three to five passes up and down the slope of the working face. The top of the refuse cell is simultaneously compacted along with the active face. This process is continued throughout the day until a section of the compacted waste reaches its designated lift height. The lifts may range from 5 to 20 vertical feet, depending on elevations needed to maintain proper drainage. The length along the toe of the working face varies from 50 to 250 feet. A minimum six-inch layer of suitable cover material is placed over all waste at the end of each working day.

Paxton Street is currently utilized for access to the landfill. Current traffic volumes at the site do not exceed 400 refuse collection vehicles per day.

1.4.3 SITE ASSESSMENTS

An Air Solid Waste Assessment Test (Air SWAT) was conducted at the Lopez Canyon Sanitary Landfill and submitted to the South Coast Air Quality Management District (SCAQMD) in April, 1987. This testing was performed in accordance with Section 41805.5 of the California Health and Safety Code (CHSC) which mandates one-time testing of solid waste disposal sites to characterize the landfill gas and to determine whether toxic chemicals are being released, either as air emissions or by subsurface gas migration. The BOS has also been conducting surface, subsurface, ambient air, and gas system monitoring in accordance with the SCAQMD's requirement.

A Water Solid Waste Assessment Test (Water SWAT) was conducted at the site in compliance with Section 41805.5 of the CHSC which mandates testing of solid waste disposal sites to characterize the hydrogeology and groundwater quality and to determine whether the site is leaking hazardous constituents. This investigation was conducted by the consulting firm, Law Environmental, Inc. The report was submitted to the Regional Water Quality Control Board

(RWQCB) on July 1, 1988 and is currently under review. The BOS conducts an ongoing groundwater monitoring program in accordance with its current Waste Discharge Requirements (WDR's) issued by the RWQCB.

1.5 OPERATING PERMITS

1.5.1 WASTE DISCHARGE REQUIREMENTS

The State Water Resources Control Board requires Class III solid waste facilities to obtain Waste Discharge Requirements (WDR). The Los Angeles Regional Water Quality Control Board (RWQCB) originally issued WDRs for this facility in 1970. The operator was issued updated WDR's (Order No. 91-122, File No. 69-68) on December 4, 1991 and modified on October 26, 1992. Monitoring is conducted in accordance with the Monitoring and Reporting Program No. 5636 as part of the current WDR.

1.5.2 SOLID WASTE FACILITIES PERMIT

The Lopez Canyon Landfill also operates under provisions of the CIWMB under Title 14, Division 3, "Minimum Standards for Solid Waste Handling and Disposal" which requires a Solid Waste Facilities Permit (SWFP). The facility is currently operating under SWFP No. 19-AA-0820 issued in 1978 in accordance with Title 14 CCR, Section 18210 and Notice and Order issued on July 21, 1989. The BOS will be applying for a revised SWFP in early 1993 to allow filling operations to be conducted in Disposal Area C.

Requirements contained in the SWFP are administered by the Local Enforcement Agency (LEA) and deal primarily with daily operations relating to cover, litter, vectors, refuse volumes, and load checking. The SWFP was issued to the BOS for the operation of the Lopez Canyon Sanitary Landfill as a Class III Solid Waste Sanitary Landfill. The permit lists all conditions of operation the facility is subject to comply with through the entire life of the operation.

1.5.3 PERMITS TO CONSTRUCT LANDFILL GAS FACILITIES

The SCAQMD is responsible for the regulation of fugitive and volatile emissions from the landfill and related ancillary gas control systems. Rule 1150.1, established by the SCAQMD, regulates surface emissions and the subsurface migration of landfill gas. The rule also stipulates the monitoring requirements necessary to ensure compliance with these regulations. The SCAQMD is responsible for issuing permits to construct any landfill gas control or recovery systems, long-term permits to operate these facilities as well as permits to excavate previously filled refuse, if necessary. Permits to Construct have been issued to the City of Los Angeles for the Gas Collection System (Permit No. R-255005, dated January 13, 1992) the Landfill Gas Flaring System (Permit No. 245157, dated August 28, 1991), an excavation permit No. A/N 189533 dated May 19, 1992, and a Landfill Gas Condensate Collection and Treating System (Permit No. D66964 A/N 274653, dated December 15, 1992).

1.5.4 FOREST SERVICE SPECIAL USE PERMIT

The Lopez Canyon Landfill is located on City-owned property, with the exception of a seven-acre portion in the northeastern corner of the site, which is leased from the U.S. Forest Service (Forest Service Special Use Permit No. R5-2700-46).

1.5.5 CONDITIONAL USE PERMIT

As previously mentioned, the site operates under a Conditional Use Permit No. 90-0271CU which includes landfill operations in Disposal Area C. This permit was approved by the Los Angeles City Council on February 4, 1991 and is effective for a period of approximately five years or until February 4, 1996.

1.6 CLIMATIC CONDITIONS

1.6.1 RAINFALL

The 100-year mean rainfall in the vicinity of the site is shown on Figure 1-7 Isohyetal Map. The mean rainfall is approximately 16 inches per year. The estimated 100-year maximum daily precipitation at Hansen Dam Station 3751 is

6.11 inches, and Pacoima Dam Station 6602 is 8.4 inches. Data is included from Figure 1-7.

Hansen Dam even though it is about two miles south of the site because its orographic setting is similar to that of the landfill. Minimum and maximum 24-hour rainfall data for the site would be expected to fall somewhere between the levels estimated for these two stations.

1.6.2 WIND

A wind monitoring station is located about seven miles southeast of the site. This station documents wind flow patterns around the landfill. A total of fourteen years of data was taken from this location. Additional wind monitoring data from an on-site monitoring station was collected for 1988, 1989 through 1990, and 1991. Dominant wind patterns in the Los Angeles Basin are shown on Figure 1-8.

Winds, at night and in the early morning, blow from the northeast at four to five mph. During the morning, winds remain light and rotate clockwise blowing from the southwest. The winds pick up speed in the late morning and early afternoon until they reach a speed of seven to nine mph from the southwest by mid-afternoon. The late evening hours are represented by periods of very light winds and inconsistent wind directions until the pattern begins again around midnight.

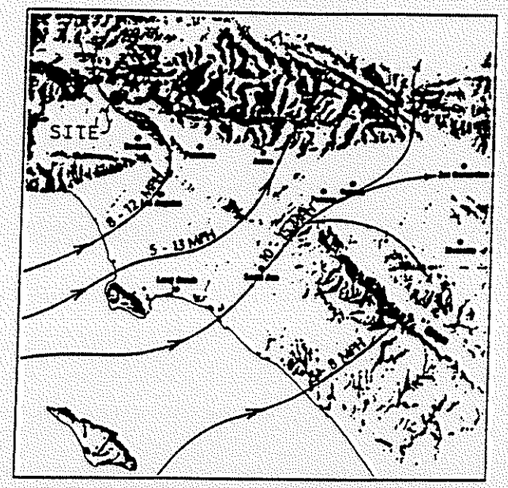
1.6.3 EVAPORATION

The nearest evaporation measurements are made at the Pacoima Dam, Los Angeles County Flood Control District (LACFCD) Station 293BE. The mean annual evaporation rate at this station is 89.59 inches. The maximum and minimum annual evaporations were 95.58 and 73.60 inches, respectively.

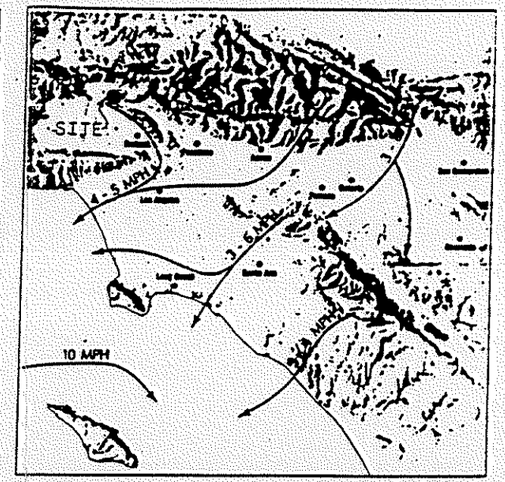
NOTES :

These maps show dominant summer and winter wind patterns in the South Coast Air Basin. For the period of the day shown, the net transport of air onshore usually is greater in the summer, while the net offshore transport as a rule is greater during the winter. Whether there is air movement or air stagnation during the morning and evening hours, before these dominant air flow patterns take effect, is one of the critical factors in determining the smog situation on any given day.

DOMINANT WIND PATTERNS IN THE BASIN



TYPICAL SUMMER DAYTIME OCEAN WINDS
(Noon to 7:00 PM)



TYPICAL SUMMER NIGHT DRAINAGE WINDS
(Midnight to 5:00 AM)

TYPICAL WINTER DAYTIME OCEAN WINDS
(Noon to 6:00 PM)

TYPICAL WINTER NIGHT DRAINAGE WINDS
(Midnight to 7:00 AM)

REFERENCE : LeROY CRANDALL AND ASSOCIATES

FIGURE 1 - 8

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LOPEZ CANYON LANDFILL

DOMINANT WIND PATTERNS IN THE BASIN

JOB NO.	9035-1021
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

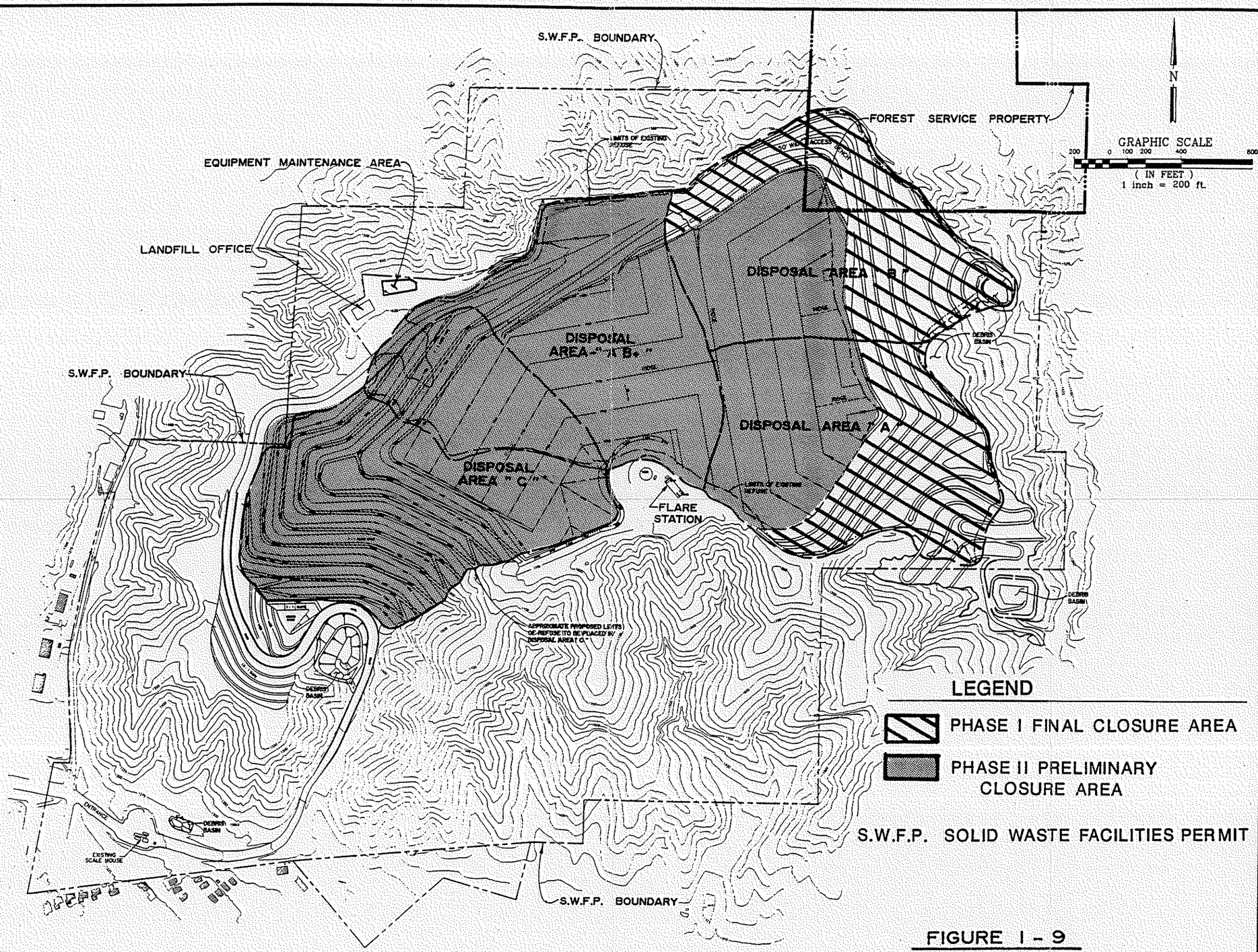
1.7 PRELIMINARY AND FINAL CLOSURE PLAN DISTINCTION

The Lopez Canyon Landfill will be closed in two phases. The Phase I Closure Area includes the slopes of Disposal Areas A and B which will be closed upon approval of this Partial Closure Plan (Plan). The Phase II Closure Area encompasses the remainder of the landfill, including the decks of Disposal Areas A, B and AB+ and all of Disposal Area C, which will be closed when the landfill ceases operations. It should be noted that a Final Closure Plan for Disposal Areas A, B and AB+ was prepared and submitted to the CIWMB on March 31, 1991, in accordance with the closure requirements for the existing landfill permit. This Partial Closure Plan (whose format was recommended by the CIWMB) has been prepared in support of a revision to the existing permit to include Disposal Area C. The Plan details closure procedures for all of the disposal areas (A, B, AB+ and C) and contains all of the elements of a Final Closure Plan required under 14 CCR 18262.3 with the exception of a slope stability analysis performed for Disposal Area C.

The Bureau of Sanitation (BOS) elected to submit this document as a Partial Closure Plan rather than a Final Closure Plan due to the requirement under 14 CCR 18270.

If this document would have been submitted as a Final Closure Plan, the BOS would have been required to prepare an environmental document addressing the entire landfill, both the Phase I and Phase II Areas. The BOS had only planned to implement the Phase I closure in advance of the remaining portions of the site because of requirements in the Conditional Use Permit (CUP No. 90-0271CU). The BOS has prepared an environmental document which addresses the Phase I Area (final closure). For additional information regarding the environmental document prepared to facilitate closure of the Phase I Area, see Section 14.0.

For purposes of reviewing this Partial Closure Plan, the Phase I Area should be considered the final closure area and includes all of the elements of a final closure plan in accordance with 14 CCR 18262.3 as well as the CEQA requirements under 14 CCR 18270. The Phase II Area should be considered the preliminary closure area and includes all of the elements of a preliminary closure plan in accordance with 14 CCR 18261.3. Figure 1-9 shows the location



LEGEND

- PHASE I FINAL CLOSURE AREA
- PHASE II PRELIMINARY CLOSURE AREA

S.W.F.P. SOLID WASTE FACILITIES PERMIT

FIGURE 1 - 9

CLOSURE PLAN
PHASE I AND II AREA LOCATION MAP

SCALES | 1" = 200' | SHEET OF | INDEX NUMBER

DESIGNED
DRAWN H.M.G.
CHECKED
SUPERVISED
PROJECT ENGR. R.E. NO.
ASST. DIV./DIST. ENGR. R.E. NO.
DATE DEC./1992

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LOPEZ CANYON LANDFILL

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BAIO, DIRECTOR
DATE 19
DIV/DIST. ENGR. R.E. NO.

SCALE 1" = 200'
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DWG. NO.
JOB NO. 9258
11-24-92

and extent of the Phase I (final closure) and Phase II Areas (preliminary closure).

The following discussions provide clarifications for each section of the Plan, as necessary, to allow the reviewer to distinguish which portions of the Plan pertain to the Phase I (final closure) Area and which portions pertain to the Phase II (preliminary closure) Area of the landfill.

Section 2.0 Geologic/Hydrogeologic Setting

This section describes the geologic and hydrogeologic characteristics within the entire landfill site and the immediate region. The location of varying geologic conditions are described in detail in this section and have no ramifications on the site for consideration as either a preliminary or final closure area.

Section 3.0 Final Cover

The final cover design configuration for both the final (Phase I Area) and the preliminary (Phase II Area) closure areas is the same and meets the current final cover requirements in 14 CCR 17773. Alternative final cover design considerations as they relate to that portion of the final cover to be placed over Disposal Area C (part of the Phase II or preliminary closure area) are discussed in Section 3.2.1.

Figure 1-9 shows the limits of the final cover system for Disposal Area C as projected on the overall site final grading plan. Any changes to the proposed final cover design as a result of new regulations (i.e., Subtitle D) will be submitted to the CIWMB as an amendment to this Partial Closure Plan. The amendment will discuss the transition between Disposal Areas C (lined disposal area) and AB+ (unlined disposal area), if any.

Section 4.0 Final Grading

This section discusses the final grading design and evaluation of existing cover as related to the Phase I (final closure) Area and the Phase II (preliminary closure) Areas. The final grading design (i.e., placement of the foundation, low-permeability and vegetative layers) discussed in Section 4.5 are general procedures that apply to the entire landfill. The soil loss and settlement analyses were also performed for the site as a whole utilizing the overall final grading design as the basis for these evaluations. The slope stability analyses discussed in Section 4.6 applies to Phase I as required for final closure.

Section 5.0 Final Drainage

This section describes the existing and proposed drainage control features for the entire landfill. Sections 5.4.1 and 5.4.2 specifically describe those modifications to the drainage control system in the Phase I (final closure) Area. All other drainage control system modifications described in Section 5.0 will be made in the Phase II (preliminary closure) Area.

Section 6.0 Landfill Gas Control System

This section describes the existing gas control system installed in Disposal Areas A, B and AB+ and the proposed system for Disposal Area C. The existing gas control system installed on the slopes of Disposal Areas A and B as shown on Figure 6-1, will be modified as discussed in Section 6.3.4. These modifications will be implemented as part of Phase I (final closure) activities to allow for the construction of the final cover. Similar modifications to the remaining portion of the gas control system will be made as part of the Phase II (preliminary closure). Details of the Phase II modifications will be included in the Final Closure Plan to be prepared for Phase II.

Section 7.0 Liquid Management Plan

This section describes the existing and proposed liquid management systems at the site. These systems will require no modifications as part of the Phase I or Phase II closures with the exception of the landfill gas condensate system. For

both Phases I and II, the condensate lines will be removed along with the horizontal collection lines during construction of the final cover. Additionally, the sumps used to collect the effluent will be disconnected in phases as the final cover construction progresses. That portion of the system to be modified within the Phase I (final closure) Area is shown on Figure 7-3. Similar modifications to the remaining portion of the gas condensate system will be made as part of Phase II (preliminary closure) and will be detailed in the Final Closure Plan to be prepared for Phase II.

Section 8.0 Landscaping and Irrigation

This section describes the proposed irrigation systems and landscape plans for all areas of the landfill. Section 8.3 describes the landscape materials to be utilized on the deck and slope areas for the entire landfill. Section 8.4.2 describes the general slope treatment procedures to be utilized prior to hydroseeding the slopes. Figure 8-1 and Figures 8-4 through 8-8 show the landscape planting areas and the irrigation system for the Phase I (final closure) Area. Figures 8-2, 8-3 and 8-9 through 8-12 show the landscape planting areas and the irrigation system for the Phase II (preliminary closure) Area.

Section 9.0 Closed Site Security

Construction associated with the installation of fencing around the Phase I Area will be implemented once this Plan has been approved. Signs will be posted as required under 14 CCR 17767. Similar site security measures described in this section will be implemented upon completion of the landfill during Phase II closure construction.

Section 10.0 Closure Plan Implementation

This section clearly delineates both the closure implementation schedules and accompanying closure construction activities related to the Phase I (final closure) Area and Phase II (preliminary closure) Area.

Section 11.0 Cost Estimate

The section describes the closure cost categories (i.e., final cover, landfill gas control system modifications, drainage control system modifications/installations) for the entire landfill and the overall cost estimate for each of the closure categories. Section 11.4 discusses apportionment of these costs to the Phase I (final closure) and Phase II (preliminary closure) Areas and disbursement of these funds during closure implementation.

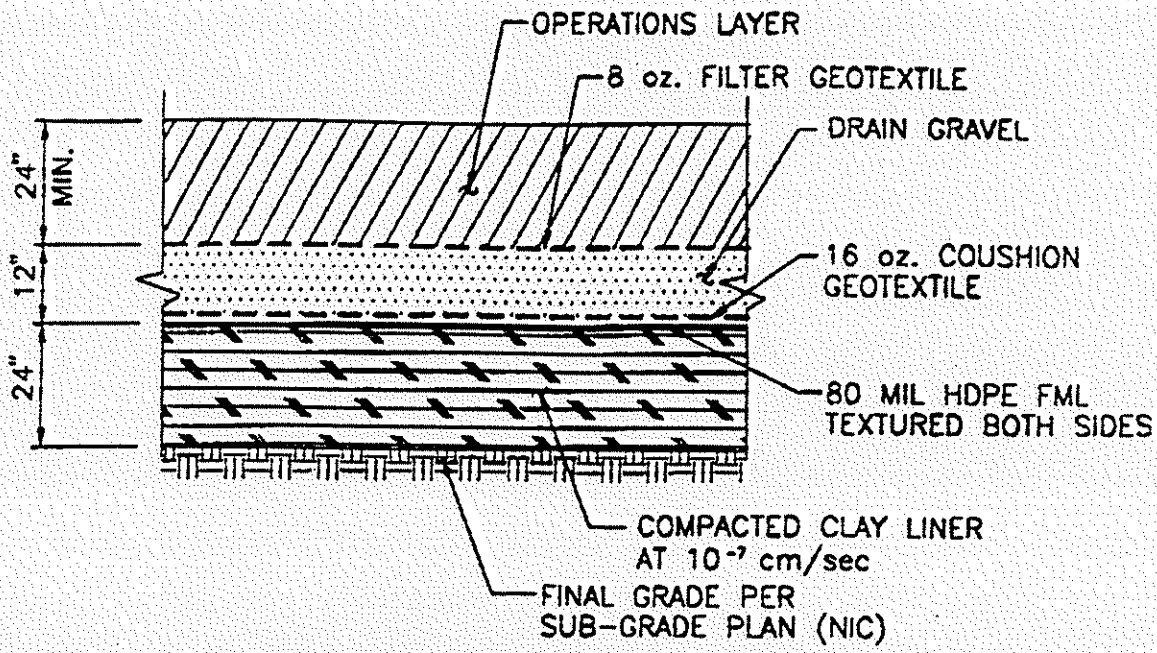
1.8 ENGINEERING DESIGN TRANSITION FROM DISPOSAL AREA AB+ TO DISPOSAL AREA C

As discussed in Section 1.4, refuse disposal operations are currently being conducted in Disposal Area AB+. Once this area is filled and a revised SWFP has been issued, refuse filling operations will move into Disposal Area C.

The following section will summarize the engineering design transition from Disposal Area AB+ to Disposal Area C as related to both the liner and final cover systems and the conceptual engineering design plans for final grading, drainage and environmental control systems. It is should be noted that each of these design elements for Disposal Area C are discussed, where appropriate, throughout this Partial Closure Plan.

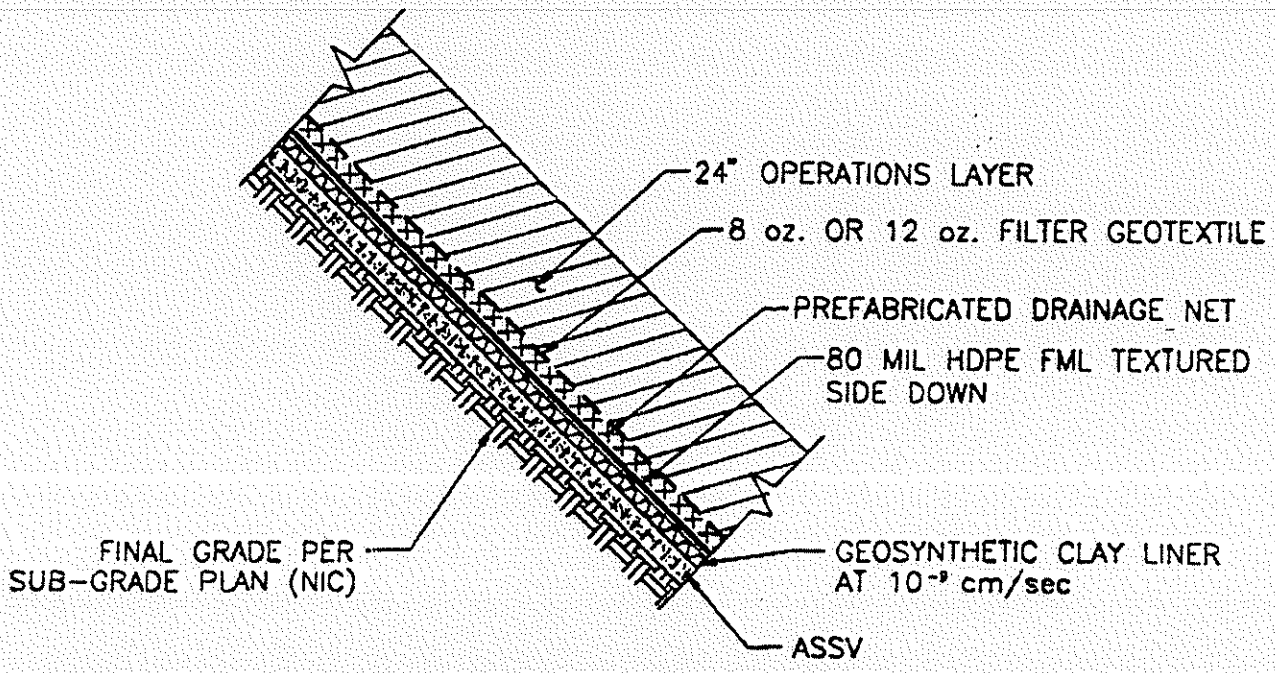
Disposal Area C is being constructed utilizing a composite liner system designed in accordance with state and federal regulations. Figure 1-10 presents a cross section of the bottom and side slope liner system. Figure 2-2 shows the location and extent of the liner system to be installed in Disposal Area C. Figures 4-1, 5-2 and 6-5 show the proposed final grading contours, final drainage control system and the final gas control system for Disposal Area C, respectively. Figures 7-2 and 7-6 show the leachate collection and removal and subdrain collection systems for Disposal Area C, respectively.

The liner system will be constructed in three phases over several months. Once the mass excavation of the disposal area has been completed, installation of the subdrain collection system will proceed. The next step is the construction of the low-permeability soil and synthetic liners. Finally, the leachate collection and



TYPICAL BASE AREA LINER SYSTEM SECTION

N.T.S



TYPICAL SIDE SLOPE LINER SYSTEM SECTION

N.T.S

FIGURE 1 - 10

Ref. GeoSyntec Consultants, 1993

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Lopez Canyon Landfill

Typical Base Area and Side Slope Liner System Section

JOB NO.	9303-134
DATE	4/4/93
DRAWN BY:	
CHECKED BY:	J.BOUCHER

removal system is constructed and an operational layer of random soils is placed over the entire composite liner system for protection. For a schematic presentation of the liner system, see Figure 1-10. For more detailed information, please refer to the above mentioned conceptual engineering design plans which are included in this Plan.

Initial filling operations in Disposal Area C will be conducted in the northeast portion of the disposal area with the refuse being placed against the slope of Disposal Area AB+. The slopes of Disposal Area AB+ (which will abut Disposal Area C) will have intermediate cover and will not be lined. Figures 1-11 and 1-12 show the transition area, cross-section location and the cross-section of the interface between Disposal Areas AB+ and C based on the conceptual engineering design. Figure 1-11 shows the location and extent of the liner system in Disposal Area C. The leachate collection and removal systems for Disposal Areas AB+ and C will be interconnected as described in Section 7.3.1. As stated above, the slopes of Disposal Area AB+ will not be lined however, all other interior slopes within Disposal Area C will have a composite liner.

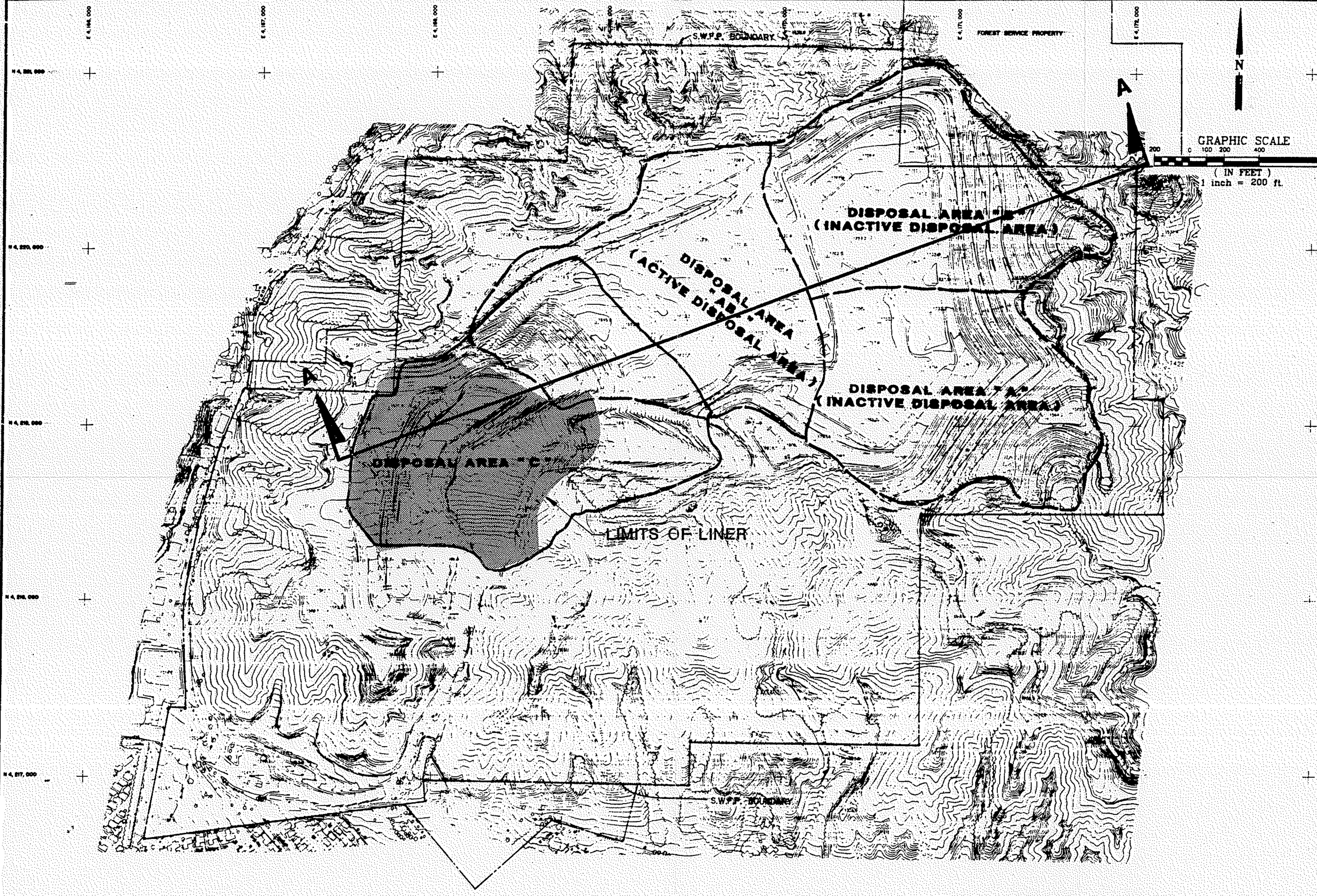

FIGURE 1 - 11

CLOSURE PLAN
CROSS-SECTION LOCATION PLAN

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SUPERVISED	
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LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE

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BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ________ 19__
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DWG. NO.
JOB NO.

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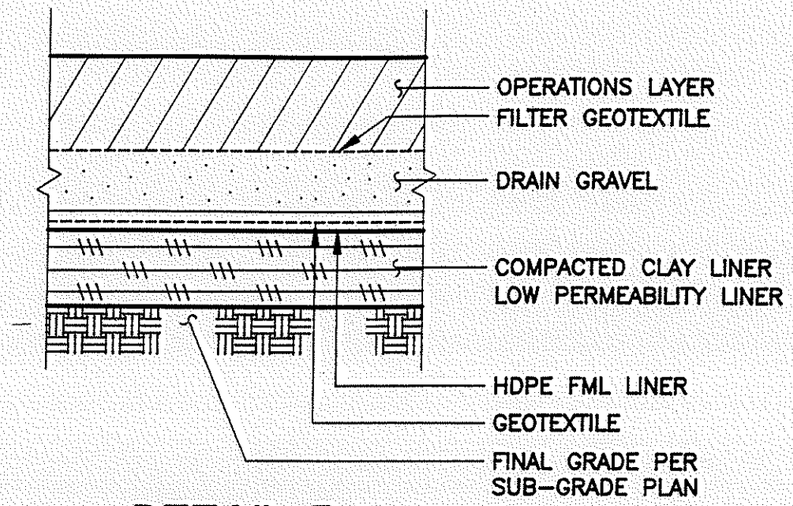

DETAIL B
TYPICAL BASE LINER SECTION

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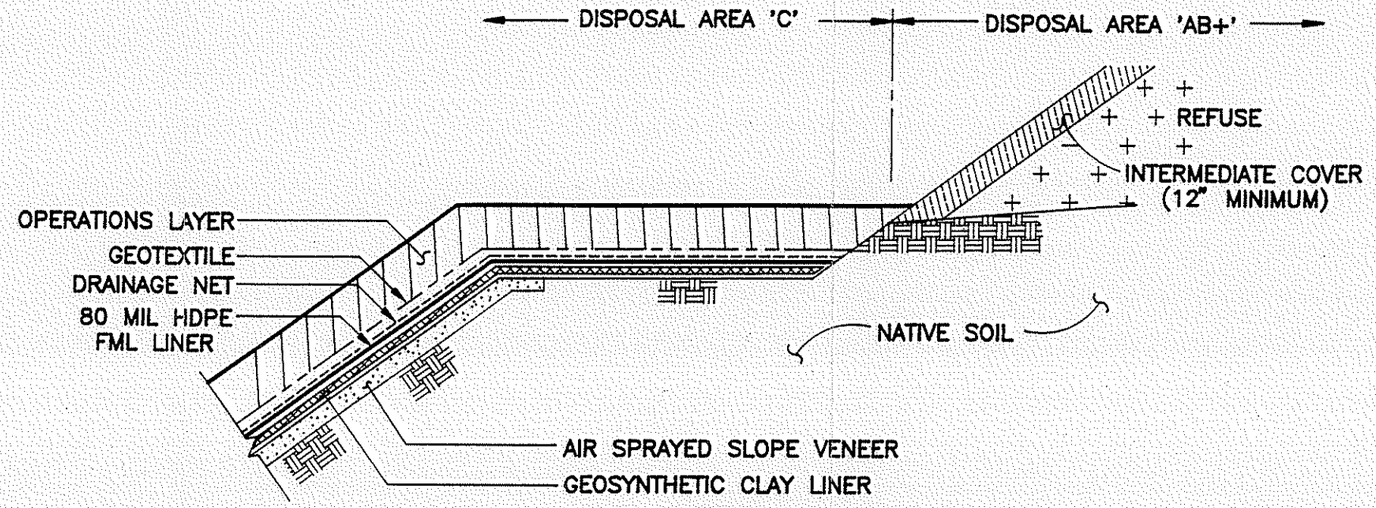

DETAIL C
TRANSITION SECTION

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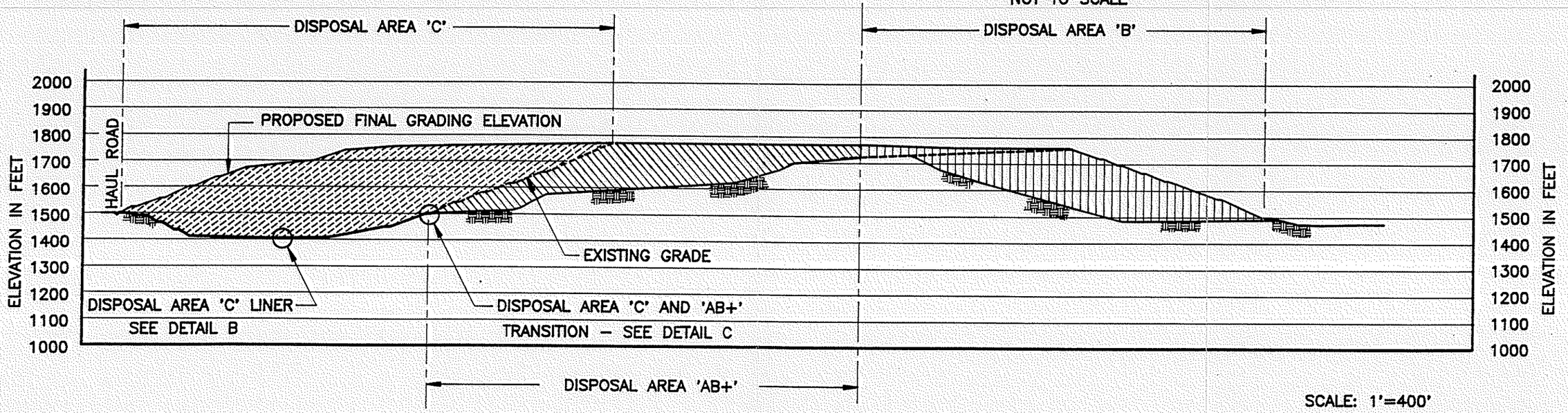

SCALE: 1'=400'

FIGURE 1 - 12

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LOPEZ CANYON LANDFILL

CROSS-SECTION A-A

DRAWING NO.	9303-0134-B-38-009-DB
DATE	3/31/93
DRAWN BY	S. ANGUS
CHECKED BY	J. BOUCHER

Drawing Name: G:\DWG\LOPEZ\38009DB

SECTION 2.0

GEOLOGIC/HYDROGEOLOGIC SETTING

2.0 GEOLOGIC/HYDROGEOLOGIC SETTING

2.1 INTRODUCTION

The geological and hydrogeologic settings of the Lopez Canyon Landfill are described in this section. Conclusions applicable to site seismicity are also presented.

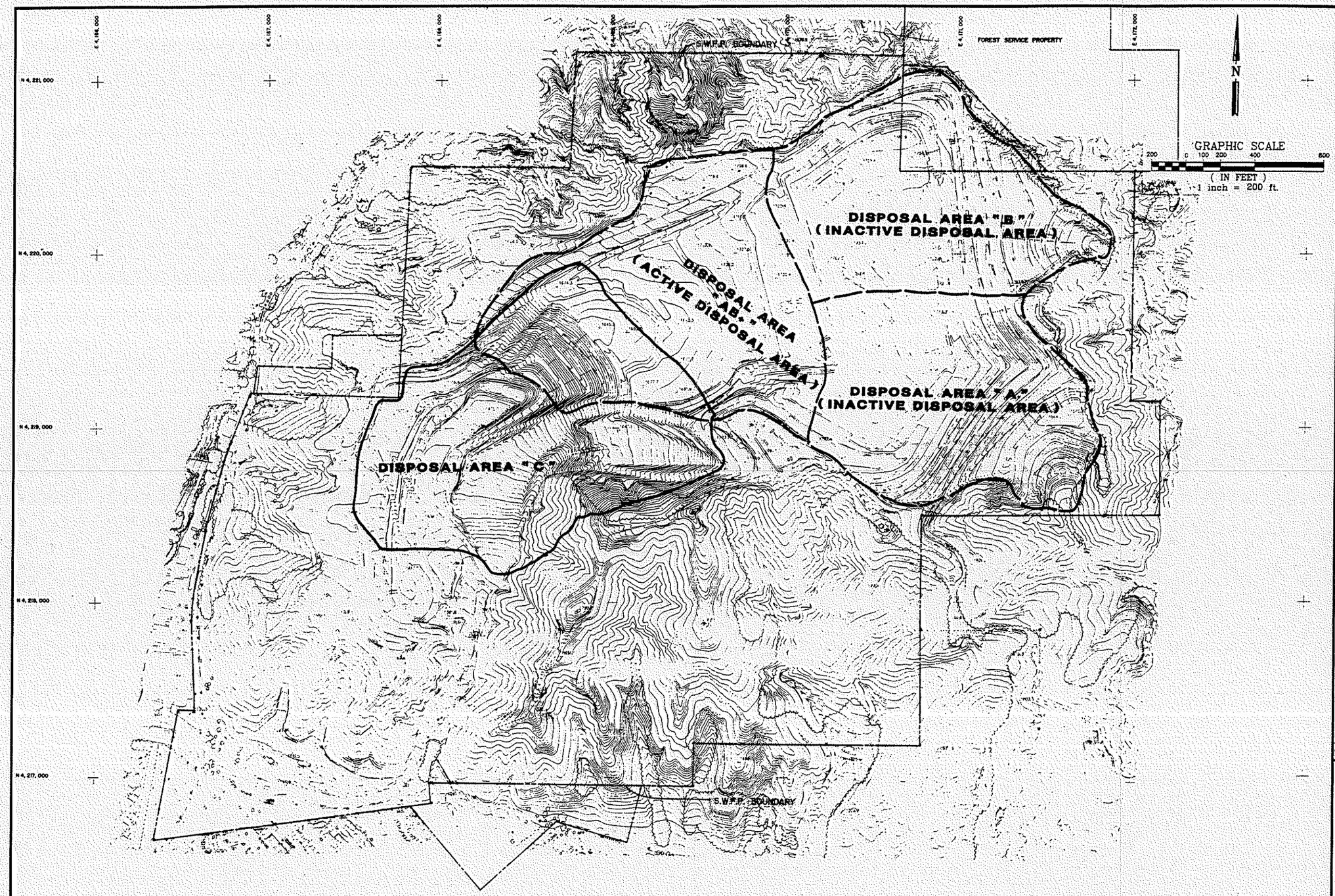
2.2 TOPOGRAPHY

The Lopez Canyon Landfill is approximately one and one-quarter miles southeast of Lopez Dam and one-half mile northeast of the Foothill Freeway. The property is bounded on the west by Lopez Canyon Road, on the north by Indian Canyon, and on the east by Bartholomaus Canyon. Elevations onsite range from 1,200 feet to 1,810 feet above sea level. The location of the site is shown in Figure 1-2, Site Location Map. Figure 1-6, 1963 Pre-Landfill Topography, shows the area of the site prior to development. The site itself consists of gently rolling hills incised by moderately steep canyons which trend generally north to northwest. The current topography of the site (March, 1992) is shown on Figure 2-1 and the proposed subgrade excavation of Disposal Area C is shown on Figure 2-2.

2.3 GEOLOGY

2.3.1 SETTING

The site is located in the foothill region of the San Gabriel Mountains, bordering the northeast rim of the San Fernando Valley. The San Gabriel Mountains and the San Fernando Valley are, in turn, located within the Transverse Range Province of Southern California. The site is depicted in the east-central portion of the 7.5-minute San Fernando, California Quadrangle. It lies within a triangular section of the foothills north of Hansen Dam and south of Indian Canyon, between Lopez Canyon and Kagel Canyon. The relationship of the site to nearby areas is shown on the Site Location Map, Figure 1-2.



NOTE : AERIAL TOPO FLOWN MARCH 1992

FIGURE 2 - 1

CLOSURE PLAN
EXISTING TOPOGRAPHY MAP

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SUPERVISED
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ASST. DIV./DIST. ENGR.
DATE
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R.E. NO.

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BRIAN A. STIRRAT & ASSOCIATES
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DIAMOND BAR, CA 91765
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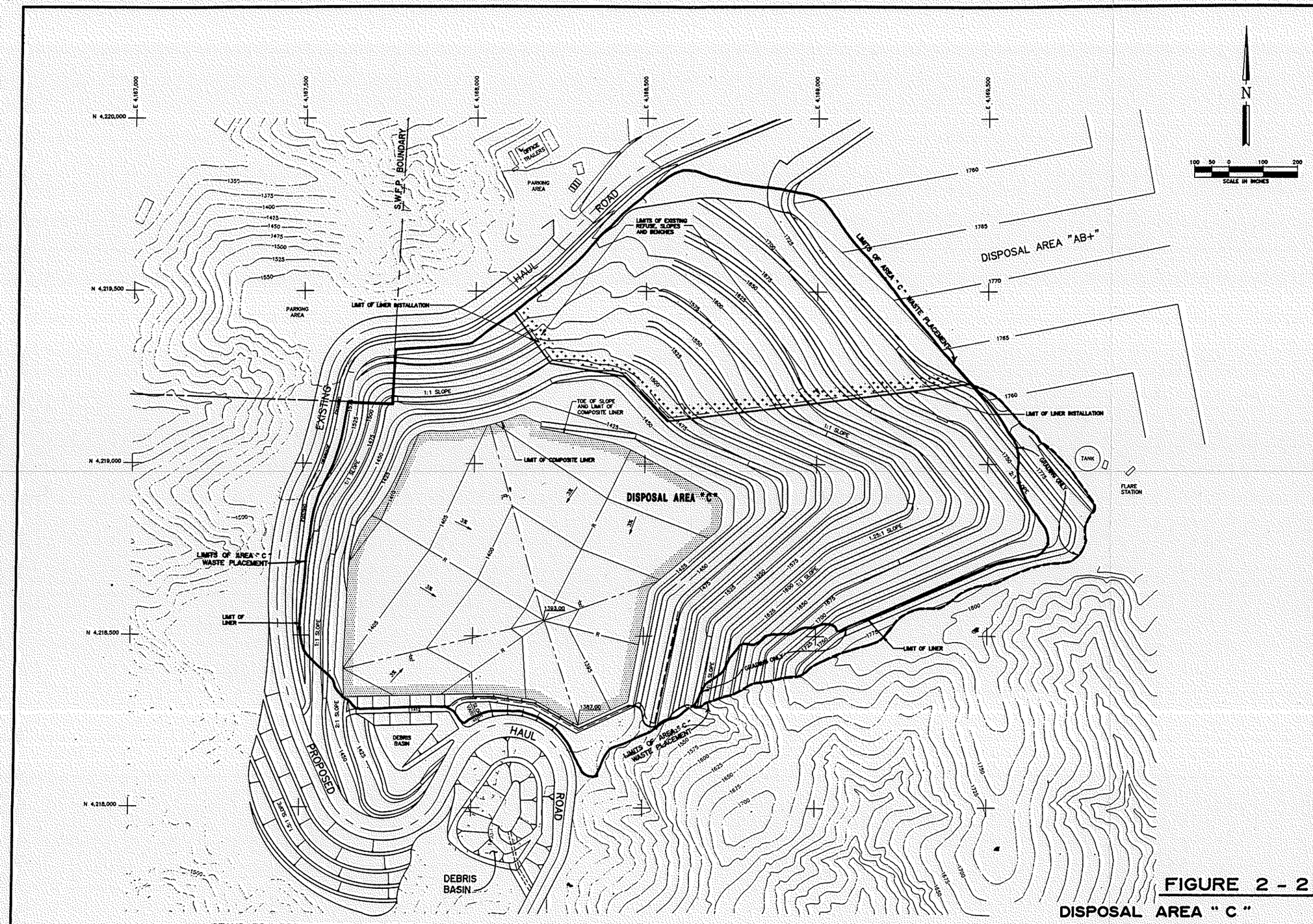
LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
1	GENERAL REVISIONS PER CITY COMMENTS	S.D.	JUNE 1993
2	GENERAL REVISIONS	S.P.D./K.G.	JAN. 94

CITY OF LOS ANGELES
BUREAU OF SANITATION - GILBERT A. BASIL, DIRECTOR
DATE _____ 19__
DIV/DIST. ENGR. R.E. NO.

SCALE
SHEET NO.
DWG. NO.
JOB NO.

SCALES HORIZ. 1"= VERT. 1"= | SHEET OF | INDEX NUMBER



STANDARD ABBREVIATIONS AND LEGEND

R RIDGE — R —
℄ FLOW LINE — — — —
EXISTING CONTOUR —1400—
PROPOSED SUB-GRADE OF LINER CONTOUR —1450—
DIR. OF FLOW AND RATE OF SLOPE 3%
LIMIT OF COMPOSITE LINER
LIMIT OF EXISTING REFUSE

FIGURE 2 - 2

DISPOSAL AREA " C "

CLOSURE PLAN

PROPOSED SUBGRADE OF LINER GRADING PLAN

SCALE	1" = 100'	SHEET	OF	INDEX NUMBER

	DESIGNED	DRAWN	CHECKED	SUPERVISED	PROJECT ENGR.	ASST. DIV./DIST. ENGR.
	M J B	D L L & C J G	J A I	E.L.S.	R.E. NO.	R.E. NO.
DATE	10-91	10-91	10-91	10-91		

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LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
A	MINERAL RIGHTS		SEP 7 '95

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWYN A. BAGL DIRECTOR
DATE ____ 19__
DIVISION ENGR. R.E. NO.

SCALE AS SHOWN
SHEET NO.
DWG. NO.
JOB NO. 9035-1026

G:\DWG\LOPEZ\9035LC1 10-22-91 CJG

Figure 2-3, Regional Geology, shows major structural and geologic features near the site. The Geologic Maps, consisting of Figures 2-4 through 2-8, show detailed geology and topography of the site. Figures 2-9 through 2-12, Geologic Sections, show lithology and structural features for the sections taken through the site.

2.3.2 STRATIGRAPHY

2.3.2.1 SUMMARY

The site is underlaid by bedrock of the Tertiary Modelo Formation (Tm, Tmsh, Tmss), Tertiary Towsley and/or Pico Formation (Ttp, Ttpss, Ttpsl, Ttpc), and the Tertiary-Quaternary Saugus Formation (TQs). Quaternary Terrace Deposits (Qt) are present locally near the southeastern boundary of the property. Quaternary and Holocene (Recent) alluvium (Qoa and Qal) locally line drainage channels and canyons bottoms. Artificial fill consisting of soil fill and stockpiles (af) and trash fill (aft) are present. The Geologic Maps and Geologic Sections use the symbols indicated above.

2.3.2.2 SOIL AND FILL (af AND aft) DEPOSITS

Surficial soil and slopewash are present in patches on hilltops or flanks of flatter slopes. These deposits, because of their discontinuous exposure, have not been differentiated on the geologic maps or sections. Talus deposits have accumulated in places along the toes of steep rock outcrops. Fill materials consist of loose soil or bedrock dislodged and/or deposited by earthmoving (af) and trash (aft).

2.3.2.3 TERRACE DEPOSITS

Terrace deposits (Qt), consist of orange and brown, poorly sorted, moderately consolidated pebbly sand and gravel. Cobbles and boulders are also scattered throughout the deposits.

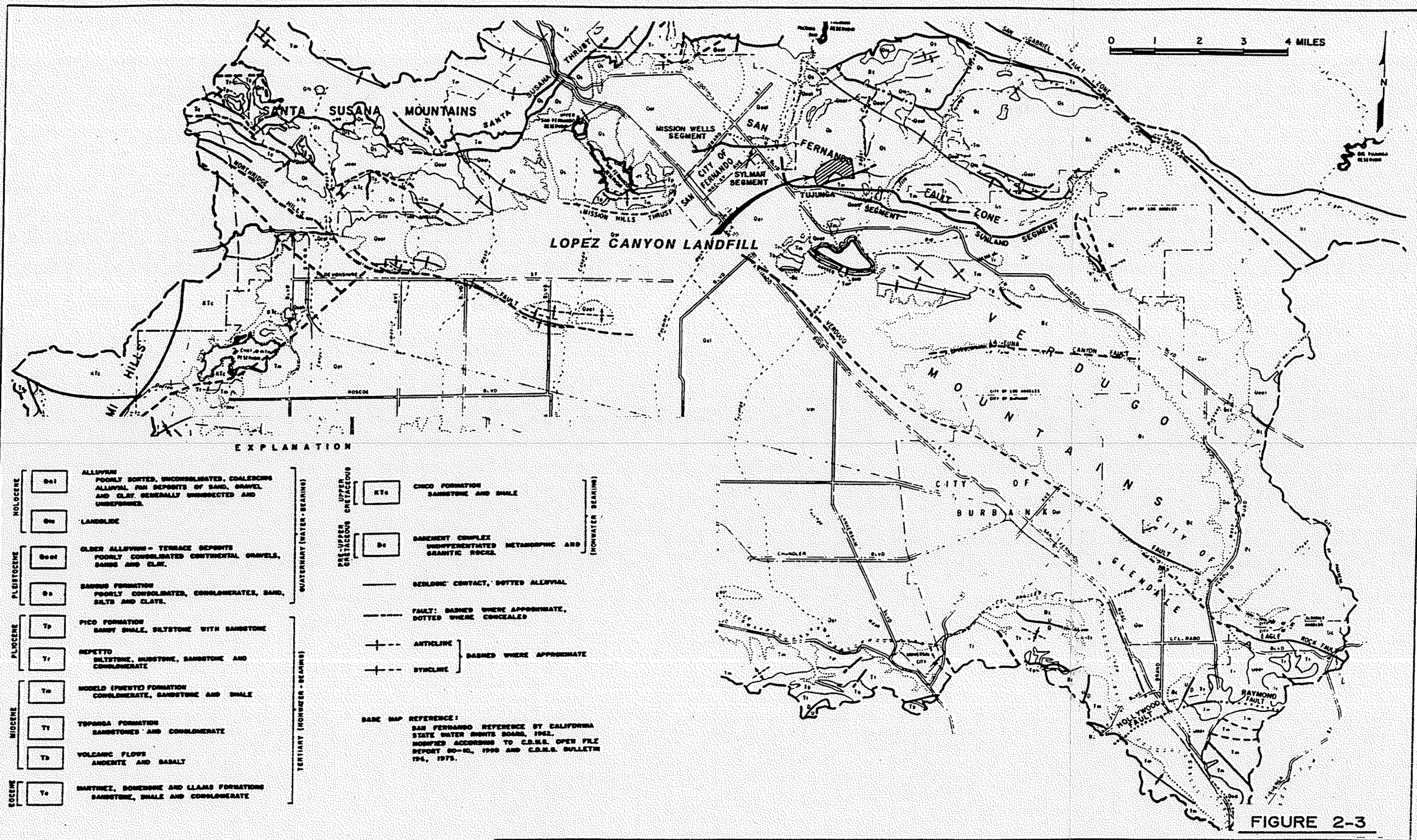

FIGURE 2-3

REFERENCE : LeROY CRANDALL AND ASSOCIATES

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LOPEZ CANYON LANDFILL

REGIONAL GEOLOGY

JOB NO.	9035-1008
DATE	FEB. 1991
DRAWN BY:	H.M.G.
CHECKED BY:	J.R.B.

LOPEZ CANYON LANDFILL

EXPLANATION

af - ARTIFICIAL FILL

aft - TRASH FILL

Qls - QUATERNARY LANDSLIDE

Qal - YOUNGER ALLUVIUM

Qoa - OLDER ALLUVIUM

Qt - TERRACE DEPOSITS

TQs - SAUGUS FORMATION

TOWSLEY AND/OR PICO FORMATION

Ttp - UNDIFFERENTIATED

Ttpsl - SILTSTONE AND SHALE

Ttpss - SANDSTONE /CONGLOMERATE

Ttpc - CONGLOMERATE

MODELO FORMATION

Tm - UNDIFFERENTIATED

Tmsl - SILTSTONE/SHALE

Tmss - SANDSTONE

APPROXIMATE CONTACT

CONTACT, PROJECTED BENEATH MAPPED UNITS

MAPPABLE BED CONTACT

LIMITS OF FILL

FAULT - DASHED WHERE APPROXIMATE

FAULT - PROJECTED BENEATH MAPPED UNITS

STRIKE AND DIP OF BEDDING

STRIKE AND DIP OF BEDDING, UNCERTAIN

GENERALIZED STRIKE AND DIP

STRIKE AND DIP OF JOINT

STRIKE AND DIP OF VERTICAL JOINT

STRIKE AND DIP OF FAULT

ZONE OF SHEARING

SCARP OF LANDSLIDE

EROSIONAL - GULLY FEATURES

WELL LOCATION

OLD OIL WELL

A A' LINE OF CROSS SECTION

CONGLOMERATE UNIT OR BED

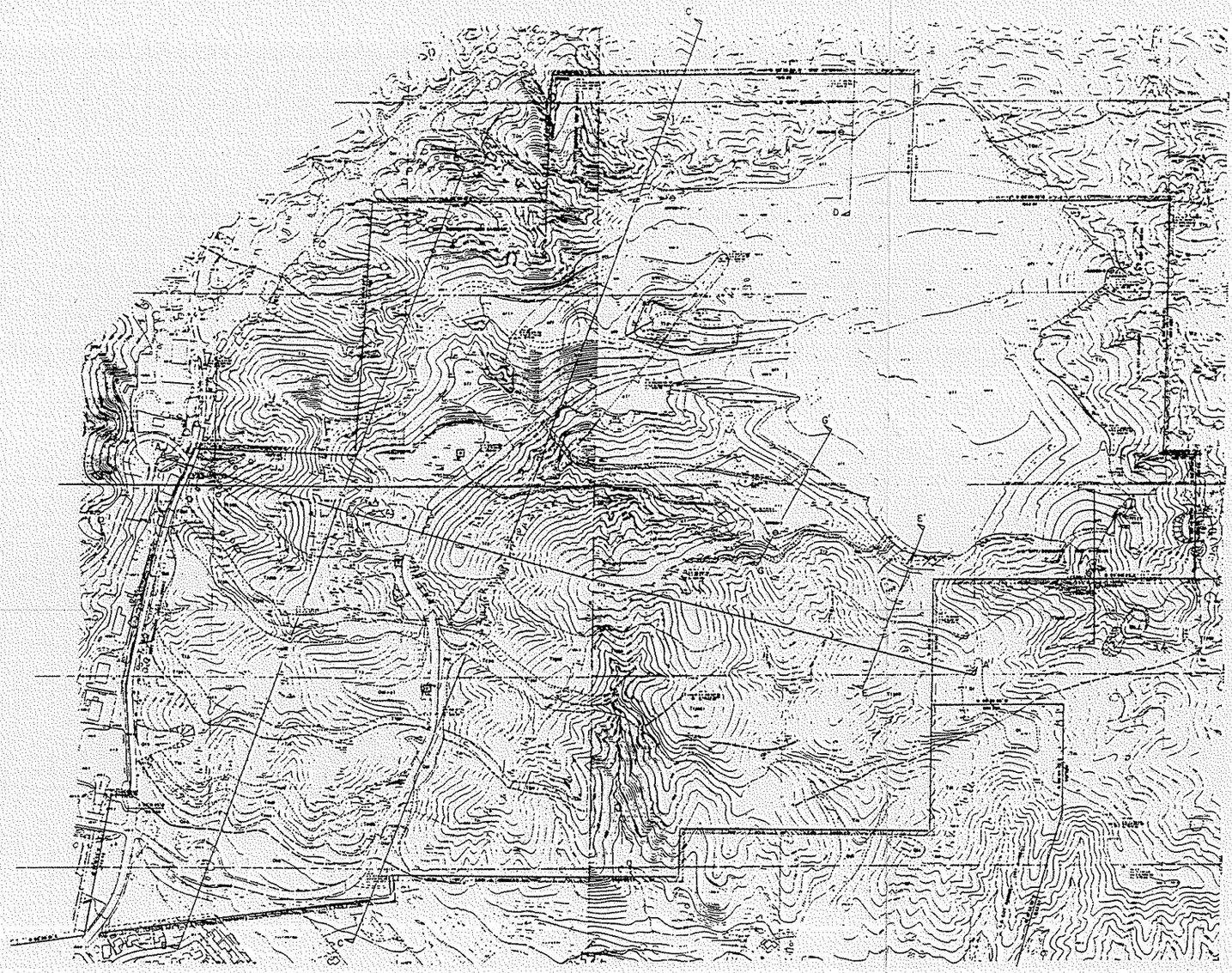
SANDSTONE UNIT OR BED

SILTSTONE/SHALE UNIT OR BED

CALCAREOUS BED

MW88-1 MONITORING WELL

6 BORING LOCATION



KEY MAP

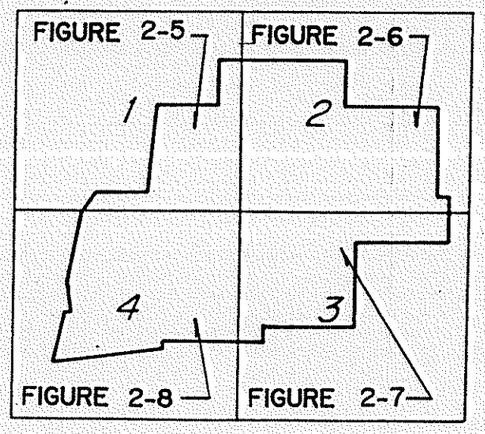


FIGURE 2-4

REFERENCE : LAW ENVIRONMENTAL (MAY 1988)

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LOPEZ CANYON LANDFILL

GEOLOGIC MAP

JOB NO.	9035-1008
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

LOPEZ CANYON LANDFILL

EXPLANATION

af – ARTIFICIAL FILL
aff – TRASH FILL
Qls – QUATERNARY LANDSLIDE
Qal – YOUNGER ALLUVIUM
Qoa – OLDER ALLUVIUM
Qt – TERRACE DEPOSITS
TQs – SAUGUS FORMATION

TOWSLEY AND/OR PICO FORMATION

Ttp – UNDIFFERENTIATED
Ttpsl – SILTSTONE AND SHALE
Ttpss – SANDSTONE /CONGLOMERATE
Ttpc – CONGLOMERATE

MODELO FORMATION

Tm – UNDIFFERENTIATED
Tmsl – SILTSTONE/SHALE
Tmss – SANDSTONE
APPROXIMATE CONTACT
CONTACT, PROJECTED BENEATH MAPPED UNITS
MAPPABLE BED CONTACT
LIMITS OF FILL

FAULT - DASHED WHERE APPROXIMATE
FAULT - PROJECTED BENEATH MAPPED UNITS
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF BEDDING, UNCERTAIN
GENERALIZED STRIKE AND DIP
STRIKE AND DIP OF JOINT
STRIKE AND DIP OF VERTICAL JOINT
STRIKE AND DIP OF FAULT
ZONE OF SHEARING
SCARP OF LANDSLIDE
EROSIONAL - GULLY FEATURES
WELL LOCATION
OLD OIL WELL
LINE OF CROSS SECTION
CONGLOMERATE UNIT OR BED
SANDSTONE UNIT OR BED
SILTSTONE/SHALE UNIT OR BED
CALCAREOUS BED
MW88-1 MONITORING WELL
6 BORING LOCATION

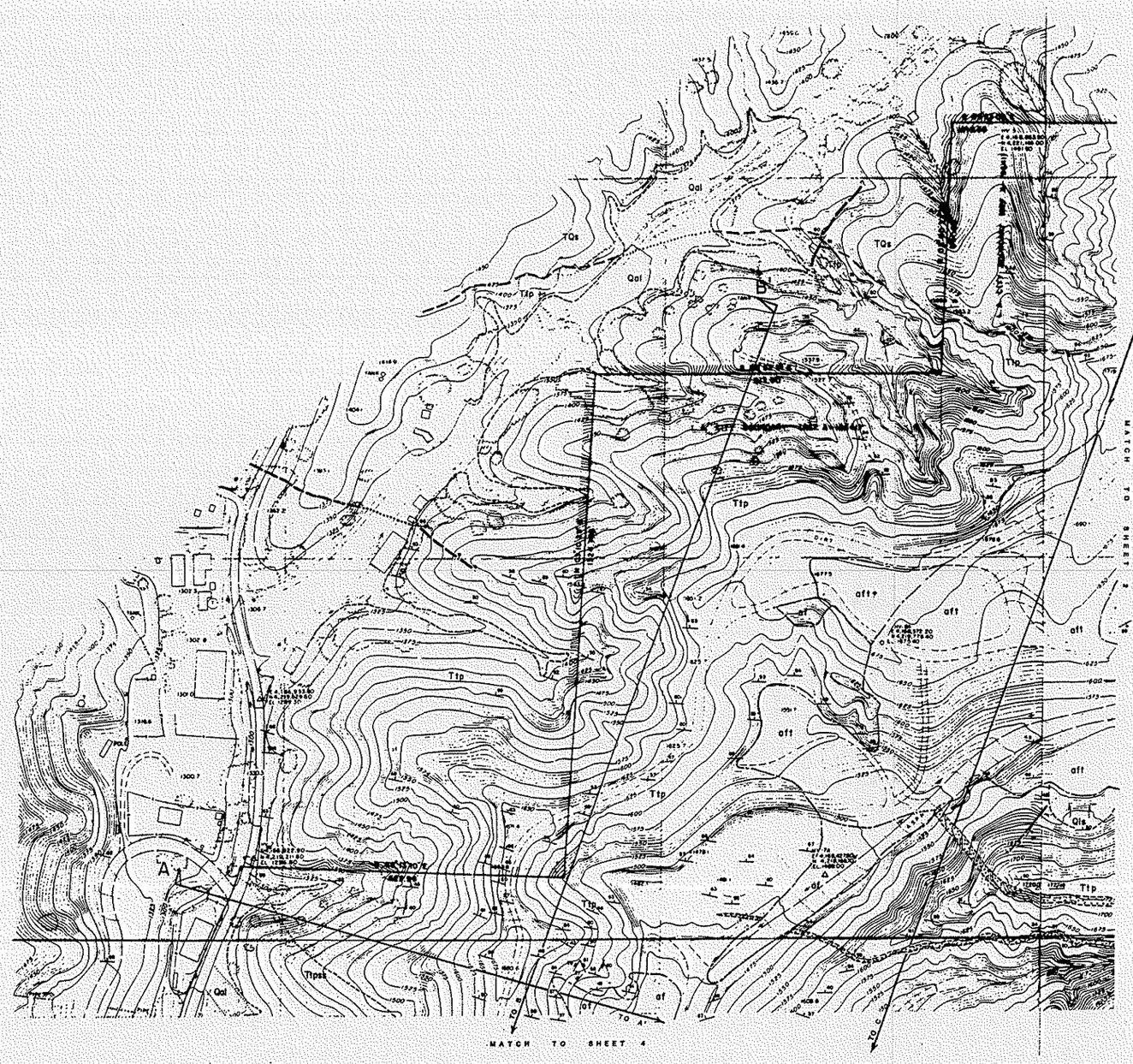

FIGURE 2-5

REFERENCE : LAW ENVIRONMENTAL (1988).

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LOPEZ CANYON LANDFILL

GEOLOGIC MAP

JOB NO.	9035-1008
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

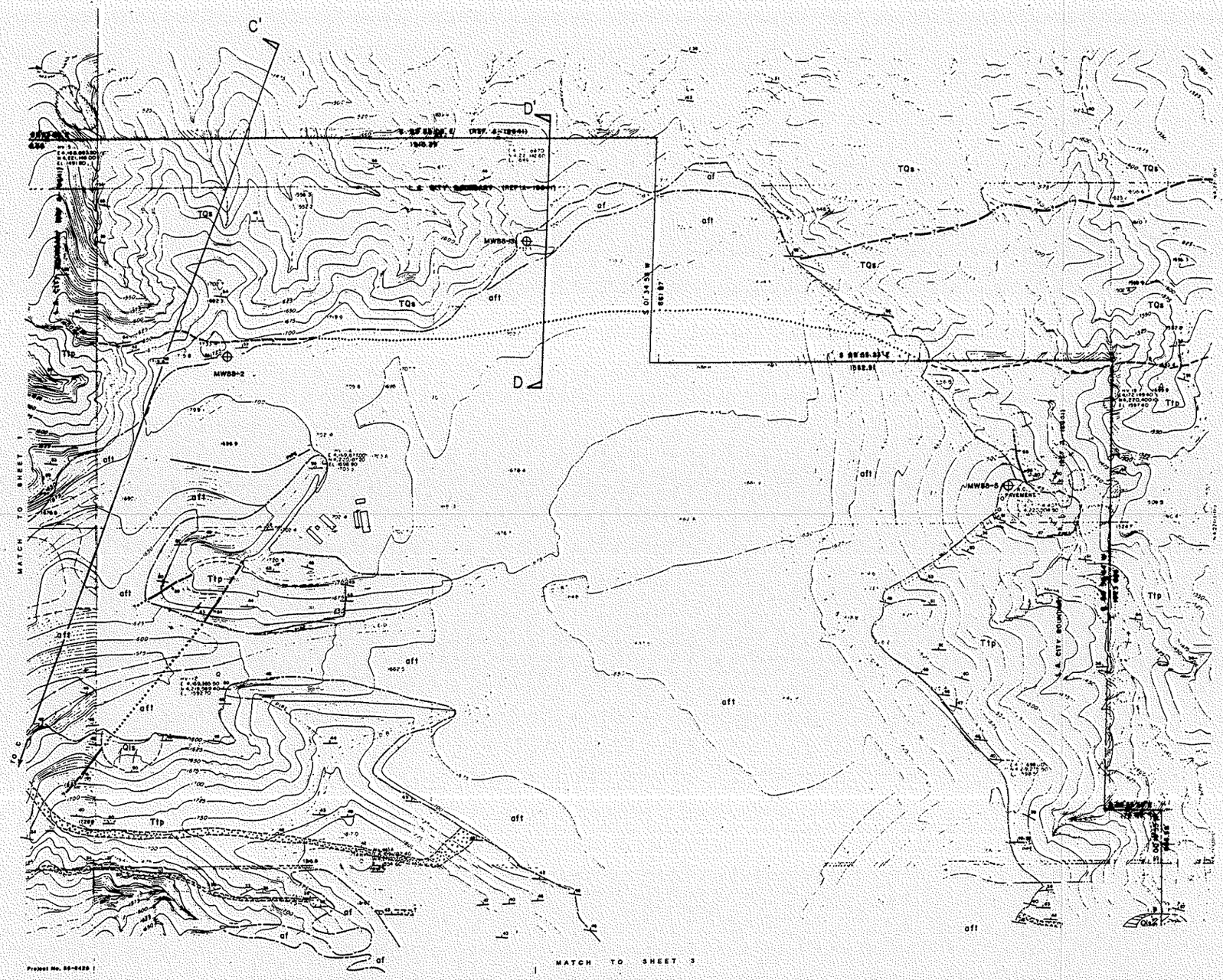

FIGURE 2-6

REFERENCE : LAW ENVIRONMENTAL (1988)

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LOPEZ CANYON LANDFILL

GEOLOGIC MAP

JOB NO.	9035-1008
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

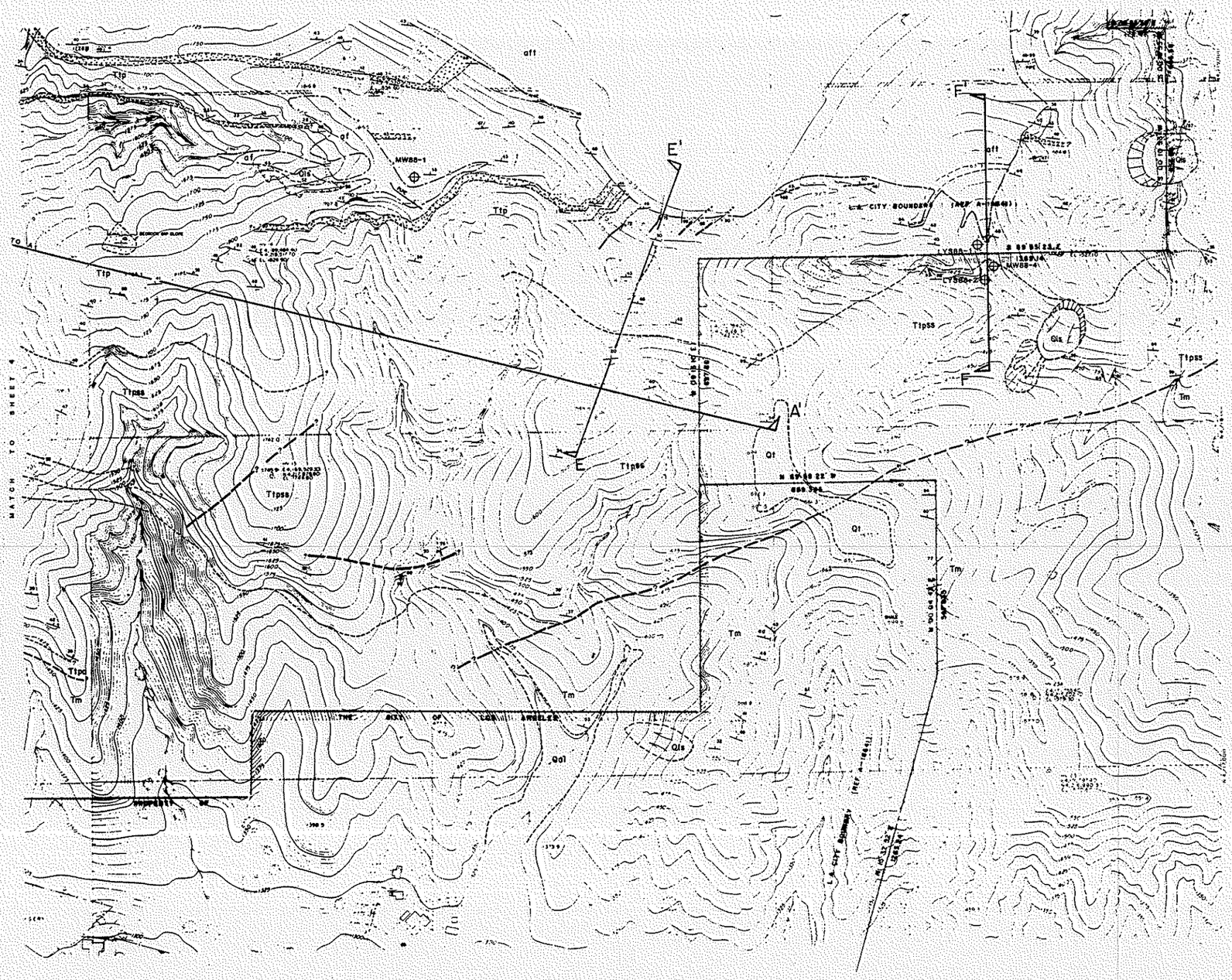

FIGURE 2-7

REFERENCE : LAW ENVIRONMENTAL (1988)

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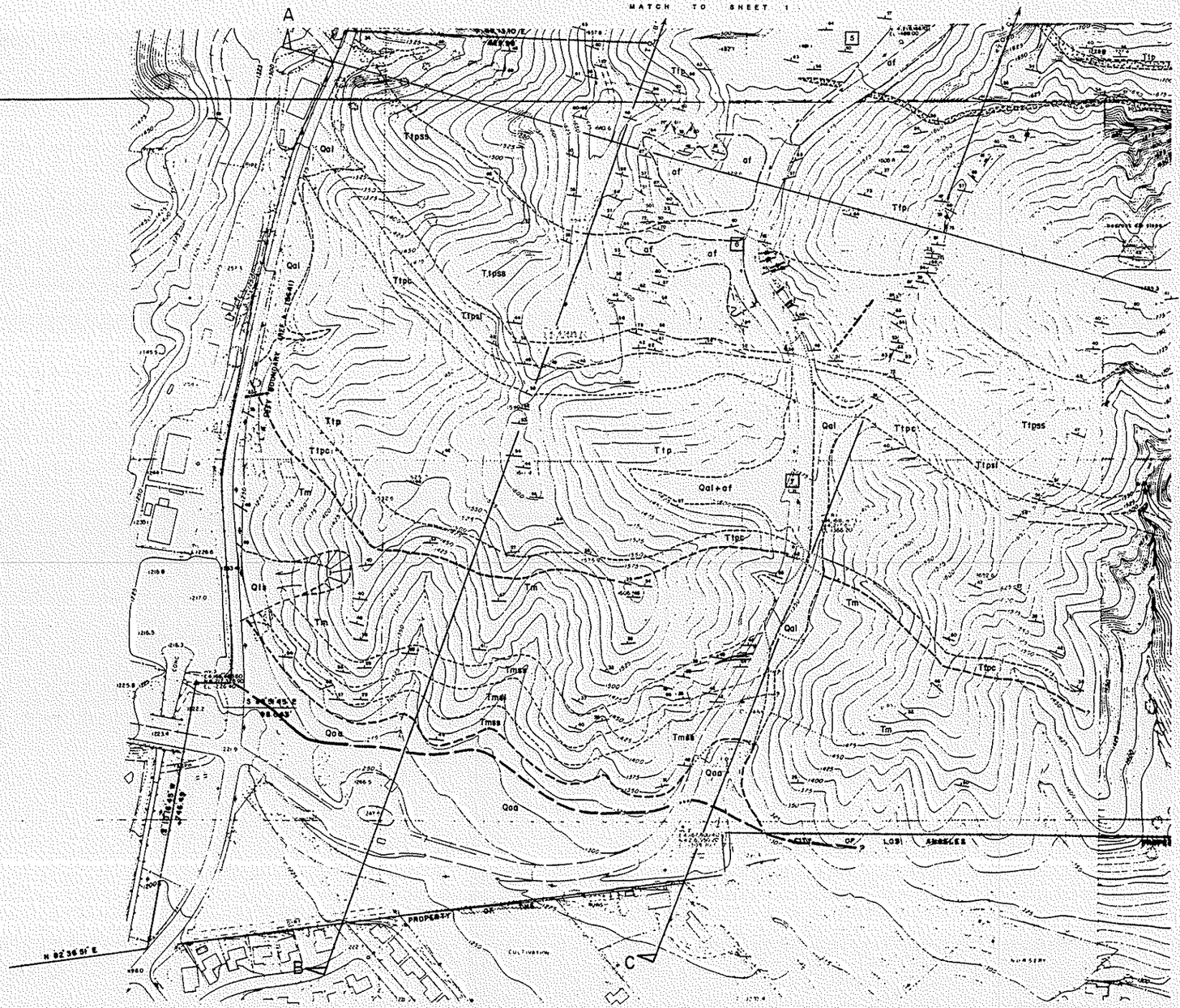
LOPEZ CANYON LANDFILL

GEOLOGIC MAP

JOB NO.	9035-1008
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB



REFERENCE : LAW ENVIRONMENTAL (1988)

FIGURE 2-8

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LOPEZ CANYON LANDFILL

GEOLOGIC MAP

JOB NO.	9035-1008
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

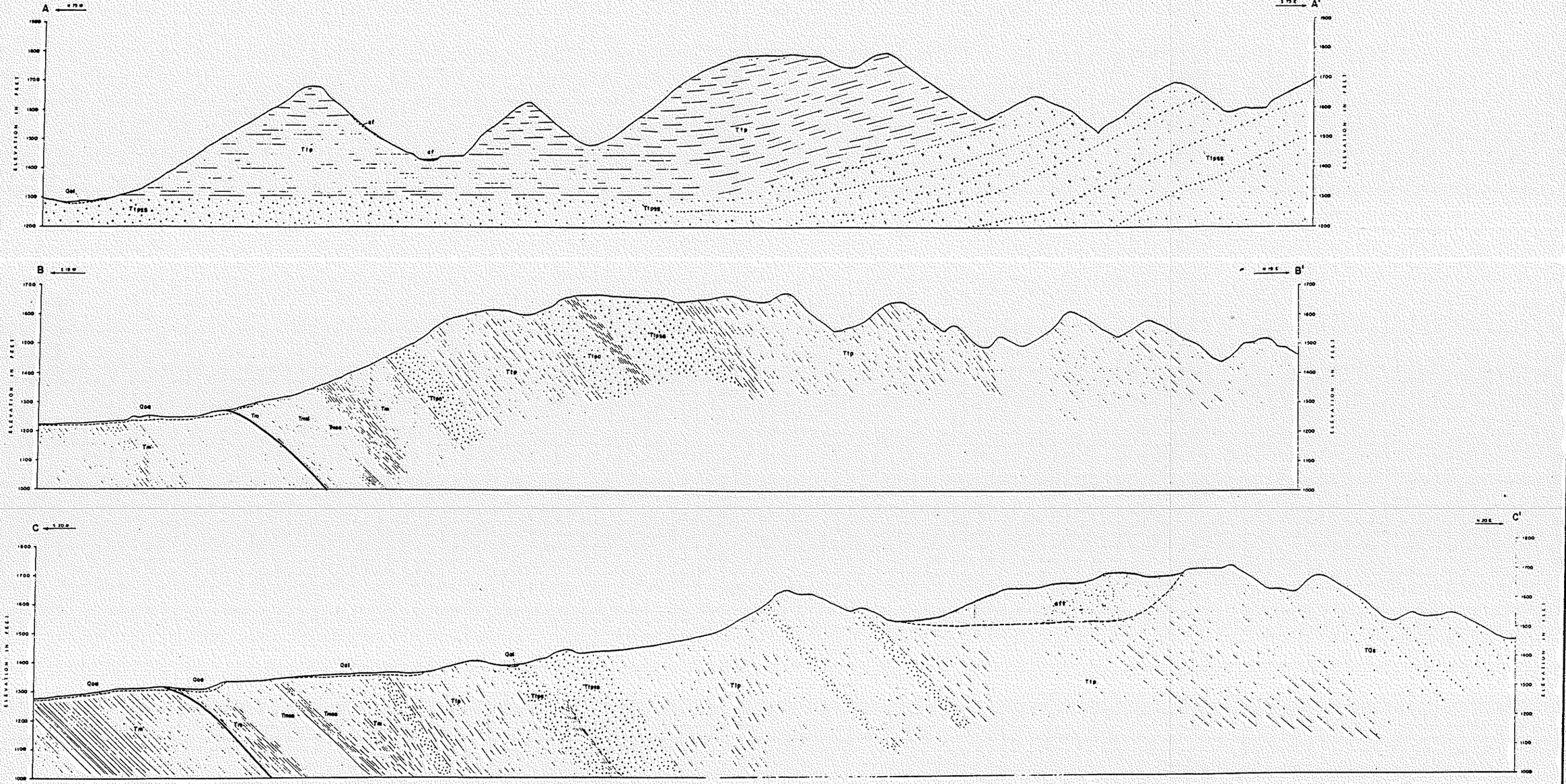

FIGURE 2 - 9

REFERENCE : LAW ENVIRONMENTAL (1988)

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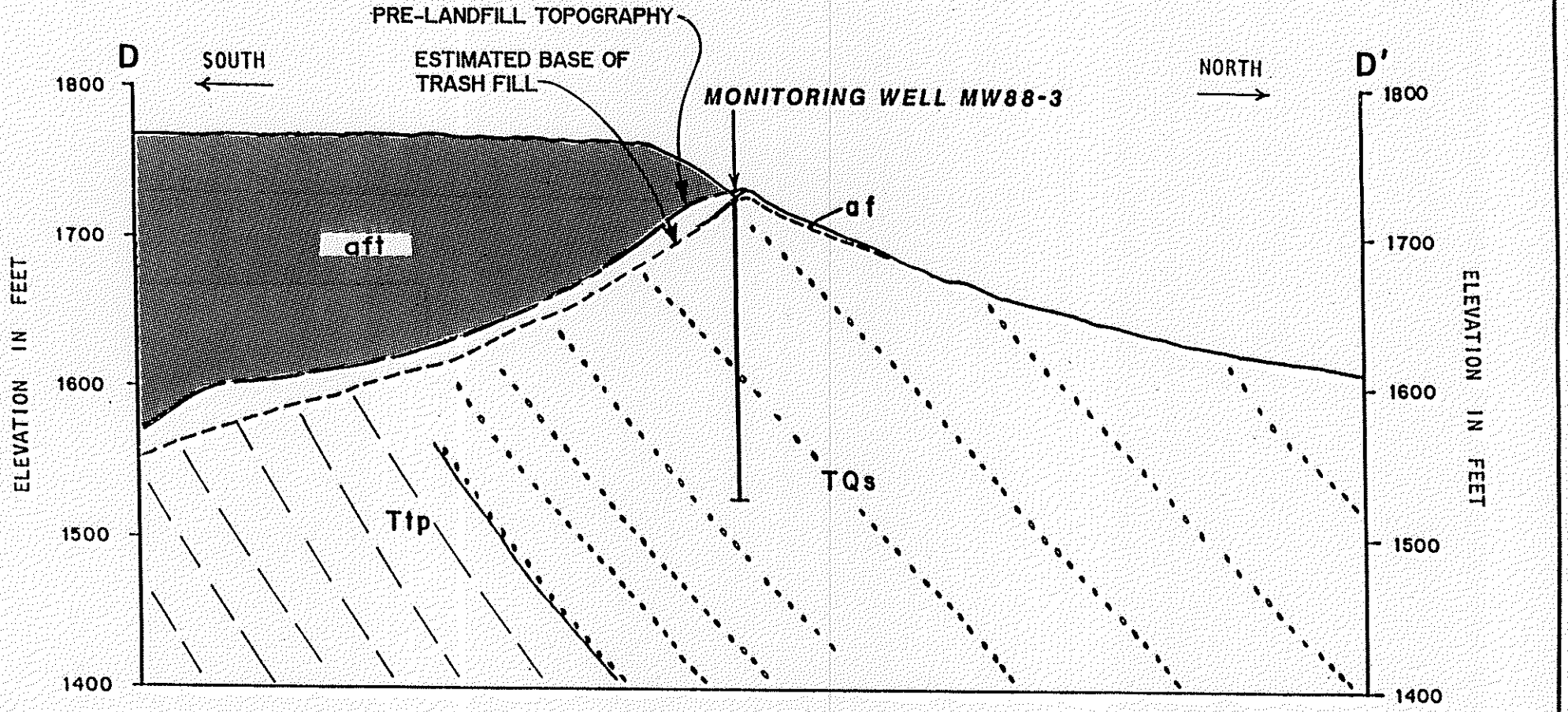
LOPEZ CANYON LANDFILL

GEOLOGIC SECTIONS
A - A', B - B', C - C'

JOB NO.	9035-1021
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB



REFERENCE : LeROY CRANDALL AND ASSOCIATES (1988)

FIGURE 2-10

BAS
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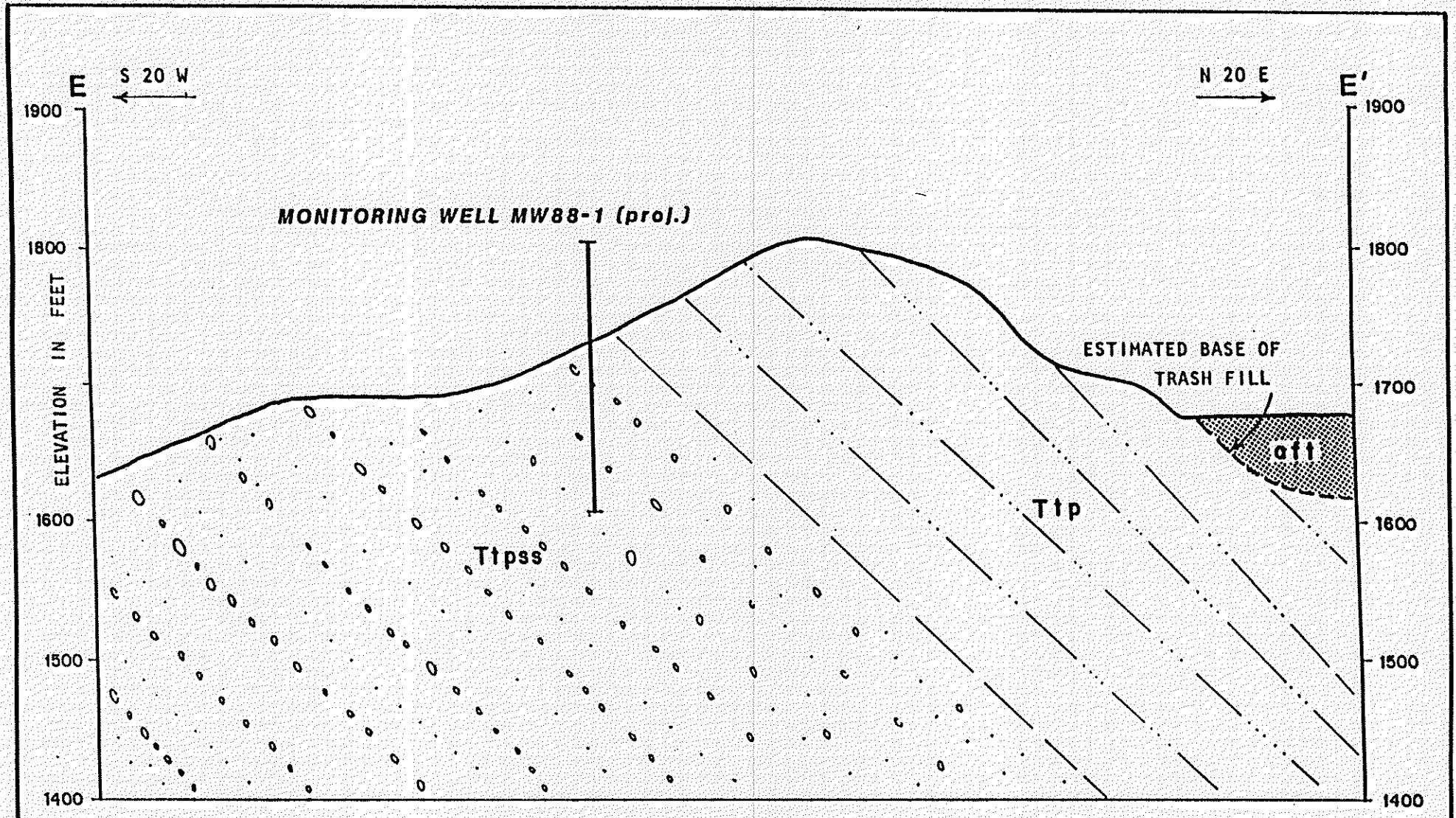
LOPEZ CANYON LANDFILL

GEOLOGIC SECTION D - D'

JOB NO.	9035-1021
DATE	DEC. 1991
DRAWN BY:	PTN
CHECKED BY:	VB



REFERENCE : LeROY CRANDALL AND ASSOCIATES (1988)

FIGURE 2 - 11

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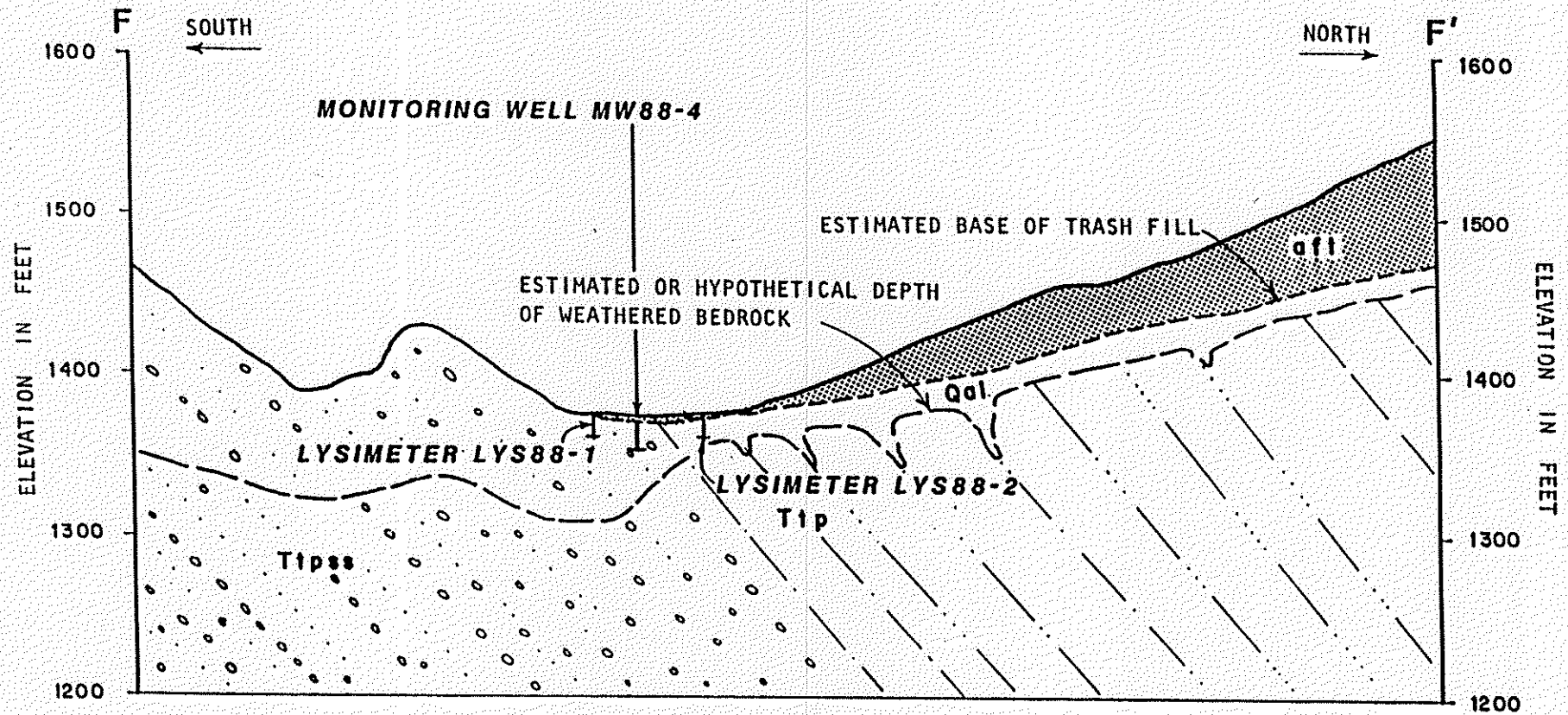
LOPEZ CANYON LANDFILL

GEOLOGIC SECTION E - E'

SCALE : 1" = 100'

JOB NO.	9035-1021
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB



REFERENCE : LeROY CRANDALL AND ASSOCIATES (1988)

FIGURE 2 - 12

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LOPEZ CANYON LANDFILL

GEOLOGIC SECTION F - F'

SCALE : 1" = 100'

JOB NO.	9035-1021
DATE	AUG. 1991
DRAWN BY:	HMG
CHECKED BY:	IRR

2.3.2.4 ALLUVIUM - (QOA, QAL)

Younger alluvium (Qal) consists of gray to brown silt and sand, with abundant gravel, cobbles, and boulders. The alluvium is dry and moderately loose. Older alluvium is present as redbrown sandy silt in a dry, fairly dense condition. Crude joint surfaces, coated with caliche, are apparent within the older alluvium.

2.3.2.5 SAUGUS FORMATION - (TOs)

The Saugus Formation was deposited as fluvial and alluvial-fan sediments at the western end of the San Gabriel Mountains. The formation consists of light-colored, poorly sorted, loosely consolidated, commonly crossbedded, conglomerate and coarse sandstone. The Saugus Formation underlies a small portion of the property along the northern edges and is extensively exposed in areas to the north. The Saugus Formation on-site consists of a light tan to gray, loosely consolidated, poorly sorted pebble conglomerate and sandstone. Bedding is poor or absent in most exposures and, where observed, is typically oriented east-west, dipping 50 to 65 degrees to the north. Where jointing is encountered in the Saugus Formation, it represents a plane of weakness similar to bedding. When bedding and jointing occur together, they may exhibit a tendency for block failure.

2.3.2.6 TOWSLEY AND PICO FORMATIONS - (Ttp, Ttpss, Ttpc, Ttpsl)

Exposed throughout most of the study area are the Towsley and Pico Formations, consisting of marine sedimentary rock units. The Towsley Formation and Pico Formation, respectively, have been grouped together in this area because their mutual formational contact interfingers. Some investigators call these same units the Repetto Formation. The Towsley/Pico Formation has been subdivided into three lithographic units: the sandstone/conglomerate unit (Ttpss), the shale/siltstone unit (Ttpsl), and the conglomerate unit (Ttpc).

The sandstone/conglomerate unit consists of a moderately bedded light yellow to orange sandstone, pebbly sandstone, and conglomeratic sandstone. This unit outcrops on-site as near vertical slopes and resistant ridges.

The shale/siltstone unit is composed of moderately bedded to well-bedded brown-gray shale and siltstone, while the conglomerate consists of a massive yellow to orange cobble conglomerate.

Typically, the Towsley/Pico Formation trends 75 to 85 degrees west of north and dips 40 to 70 degrees north. The conglomerate units are mapped predominantly in the southern portion of the property, while the sandstone content of the formations increase northward.

In the Towsley/Pico Formation, bedding exposed in north facing slopes may be subject to failure along dips in the sandstone and conglomerate beds where erosional or grading undercutting have occurred, or where slope angles exceed dip angles.

Previous workers (Oakeshott, 1958 and Barrows et al., 1975) have mapped the contact between the Towsley/Pico Formation and the Modelo Formation approximately 250 feet north of the contact indicated on our maps. Previous workers used conventional geologic techniques, presumably including pebble counts, mapping, and microfossil identification, as a basis for the contact location. The contact as mapped is based on the lithologic similarity of the units and local disparity in the trend and dip of the strata separated by the contact.

2.3.2.7 MODELO FORMATION - (Tm, Tmss, Tmsh)

Tertiary marine siltstone, shale, siliceous siltstone, and fine-grained sandstone typical of the Modelo Formation is present on-site. The Modelo Formation has been subdivided into two informal members designated as the sandstone member (Tmss) and the shale member (Tmsh). The sandstone member is predominantly a massive fine-grained sandstone with minor interbedded shale and siltstone. The shale member varies from a thin bedded yellow-brown silty shale to light brown massive siltstone. As observed, the Modelo Formation typically trends 60 to 85 degrees west of the north and dips about 45 degrees north.

2.3.3 GEOLOGIC STRUCTURE

2.3.3.1 SUMMARY

The main structural feature of the site lithology is moderate to steeply dipping strata (20° to 70°) inclined toward the north. The structure here depicts compressionaly upturned sediments along the south flank of the Merrick Syncline (also known as the Little Tujunga Syncline). In this portion of the San Gabriel Mountains frontal area, regional tectonics has tilted the strata of several bedrock formations into alignment with low angle reverse or thrust faulting of the San Fernando Fault Zone, thereby creating a convenient avenue for faulting along strata of some of the weaker bedrock materials.

2.3.3.2 BEDDING ORIENTATION

Bedding orientation is well exposed as a result of the graded ridge tops and the cuts present in the main canyon. Consequently, our ability to predict bedding as portrayed in sections is excellent. A minor discordance exists across the conglomeratic zone of the Towsley/Pico Formation. The northerly dip of the strata generally increases from 35° to 50° at the contact between Towsley/Pico and Modelo formations to 60° to 75° at the top of the Ttpss unit.

2.3.3.3 JOINT ORIENTATION

Jointing, where encountered, is typically oriented at a high angle (nearly perpendicular) to the stratification of the sediments.

2.3.3.4 LOCAL FAULTING

Structure is locally dominated by the active San Fernando Fault Zone, which includes the Tujunga Fault, the Oak Hill Fault, and the Kagel Fault. An Alquist-Priolo Special Studies Zone has been established along the San Fernando Fault Zone, which encompasses the entire study area. The Tujunga Fault crosses the southwest corner of the property just north of the landfill entrance. The Oak Hill Fault is 140 feet northwest of the property. The Kagel Fault transects the southeast corner of the site. These three faults are considered branches or segments of the active fault zone.

The latest major activity of the fault was during the magnitude 6.4 earthquake of February 9, 1971. Surface breaks resulting from the earthquake were observed along all three faults in the vicinity of the site. Along the Tujunga Fault, near the landfill entrance, the northerly block was thrust up 2½ feet relative to the south. Along the Oak Hill Fault, a similar 2½-foot scarp resulted from the earthquake. Discontinuous surface breaks along the Kagel Fault due to the earthquake created scarps up to two feet high.

Damage resulting from the earthquake in the study area included shattering of soil on the ridge tops on either side of the main canyon. This represents the concentration and dispersal of energy along sharp topographic highs. Seismically triggered landslides and rockfalls were noted in and around the study area after the earthquake, affecting mostly over-steepened slopes and north facing unsupported dip slopes. Final grading for the landfill closure typically results in the flattening or removal of high ridge tops, thereby minimizing ridgetop shattering that may take place during future earthquakes.

2.3.3.5 REGIONAL FAULTING

The numerous faults in Southern California include active, potentially active, and inactive faults. The criteria for these major groups, as established by Slemmons (1979), are presented in Table 2-1. Table 2-2 presents a listing of active faults in Southern California with the distance in miles between the site and the nearest point on the fault. Table 2-3 provides a similar listing for potentially active faults.

2.4 SEISMICITY

The following results are prepared in general accordance with California Division of Mines and Geology (CDMG) Guidelines, Notes 37, 43, 48 and 49. A general description of the regional and local geologic setting, as it relates to pertinent seismic parameters was included in Section 2.3.

TABLE 2-1

CRITERIA FOR CLASSIFICATION OF FAULTS WITH REGARD TO SEISMIC ACTIVITY
(After D. B. Slemmons, 1979)

Activity Classification and Definition	Criteria		
	Historic	Geologic	Seismologic
Active - a tectonic fault with a history of strong earthquakes or surface faulting, or a fault with a short recurrence interval relative to the life of the planned project. The recurrence interval used to define activity rate may vary according to the consequence of activity.	(1) Surface faulting and associated strong earthquakes. (2) Tectonic fault creep or geodetic evidence of fault displacement or deformation.	(1) Geologically young deposits cut by fault. (2) Youthful geomorphological features that are characteristic of geologically young displacements along the fault trace. (3) Ground water barriers in geologically young or unconsolidated deposits.	Earthquake epicenter can be assigned with confidence to the fault.
Potentially Active - a tectonic fault without historic surface offset, but with a recurrence interval that could be sufficiently short to be significant to the particular project.	No reliable report of historic surface faulting.	(1) Geomorphic features that are characteristic of active faults, but with subdued, eroded, and discontinuous form. (2) Faults not known to cut or displace youngest alluvial deposits, but offset older quaternary deposits. (3) Water barriers in older deposits. (4) Geological setting in which the geometry in relation to active or potentially active faults suggest similar degree of activity.	Alignment of some earthquake epicenters along or near fault, but assigned locations have low degree of confidence in location.
Activity Uncertain - a fault with insufficient evidence to define past activity or recurrence interval. The following classifications can be used until the results of additional studies provide definitive evidence.	Available information is insufficient to provide criteria that are sufficiently definitive to establish fault activity. This lack of information may be due to the inactivity of the fault or to lack of investigations needed to provide definitive criteria.		
Tentatively Active - predominant evidence suggest that the fault may be active even though its recurrence interval is very long or poorly defined.	Available information suggests evidence of fault activity, but evidence is not definitive.		
Tentatively Inactive - predominant evidence suggests that fault is not active.	Available information suggests evidence of fault inactivity, but evidence is not definitive.		
Inactive - a fault along which it can be demonstrated that surface faulting has not occurred in the recent past, and that the requirement interval is long enough not to be of significance to the particular project.	No historic activity.	Geomorphic features characteristic of active fault zones are not present and geological evidence is available to indicate that the fault has not moved in the recent past and recurrence is not likely during a time period considered significant to the site. Should indicate age of last movement: Holocene, Pleistocene, Quaternary, Tertiary, etc.	Not recognized as source of earthquakes.

TABLE 2-2

MAJOR NAMED FAULTS CONSIDERED TO BE ACTIVE (a) IN SOUTHERN CALIFORNIA

FAULT (in alphabetical order)	Maximum Credible Earthquake			Distance From Site (Miles)	Direction From Site
Big Pine	7.5	(b)		50	NW
Coyote Creek	7.2	(a)	SS	120	ESE
Elsinore	7.5	(b)		60	SE
Garlock	7.75	(b)		45	NNW
Malibu Coast	7.0	(a)	RO	18.5	SSW
Manix	6.25	(b)		114	ENE
More Ranch	7.5	(b)		77.5	W
Newport-Inglewood	7.0	(b)		15.5	S
Raymond	6.9	(a)	RO	14	SE
San Andreas	8.25	(b)		23.5	NNE
San Cayetano	7.0	(a)	RO	27.5	WNW
San Fernando Zone	6.5	(b)		--	--
San Gabriel	7.5	(a)	SS	4.5	NNE
San Jacinto Zone	7.5	(b)		43.5	E
White Wolf	7.75	(b)		61	NNW
Whittier	7.0	(a)	SS	29.5	SE

(Lopez Partial Closure Plan:FAULTSB:12-4-92)

(a) Slemmons, 1979
(b) Greensfelder,C.D.M.G. Map Sheet 23, 1974
SS Strike Slip
RO Reverse Oblique

TABLE 2-3

MAJOR NAMED FAULTS CONSIDERED TO BE POTENTIALLY ACTIVE (a) IN SOUTHERN CALIFORNIA

FAULT (in alphabetical order)	Maximum Credible Earthquake			Distance From Site (Miles)	Direction From Site
Calico-Newberry	7.25	(b)		96.5	ENE
Charnoc	6;5	(a)	SS	16.5	S
Chino	7.1	(a)	NO	39.5	EST
Cucamonga	6.5	(b)		41	ESE
Duarte	6.7	(a)	RO	24.5	ESE
Helendale	7.5	(b)		69	ENE
Northridge Hills	6.5	(b)		5.5	WSW
Norwalk	6.7	(a)	RO	30	SE
Oakridge	7.5	(b)		27.5	WNW
Overland	6.0	(a)	SS	15	S
Palos Verdes	7.0	(b)		26	SSW
Pinto Mountain	7.5	(b)		27.5	WNW
San Jose	6.9	(a)	RO	33	ESE
Santa Cruz Island	7.1	(a)	RO	60.5	WSW
Santa Monica-Hollywood	6.9	(a)	RO	12.5	S
Santa Susana	6.5	(b)		6	NW
Santa Ynez	7.5	(b)		35	NW
Sierra Madre	7.5	(b)		6.5	E
Sierra Nevada	8.25	(b)		72.5	NNE
Verdugo	7.4	(a)	RO	1.5	WSW

(Lopez Partial Closure Plan:FAULTSA:12-4-92)

(a) Slemmons, 1979
(b) Greensfelder, C.D.M.G. Map Sheet 23, 1974
SS Strike Slip
NO Normal Oblique
RO Reverse Oblique

2.4.1 CLOSURE REGULATIONS AND GUIDELINES

As required by Title 14, California Waste Management Board, Chapter 3, Minimum Standards for Solid Waste Handling and Disposal, Article 7.8, Disposal Site Closure and Post-Closure Section 17777, Final Site Face, the following information has been prepared in general accordance with the California Division of Mines and Geology (CDMG) Guidelines, Notes 37, 42, 43, 48, and 49. A general description of the regional and local geologic setting as it relates to pertinent seismic parameters was included in Section 2.3.

2.4.2 REGIONAL SEISMICITY

The seismicity of the region surrounding the site was calculated from a computer search of a magnetic tape catalog of earthquakes. The catalog of earthquakes included those compiled by the California Institute of Technology for the period from 1932 to 1981, and those earthquakes for the period of 1812 to 1931, compiled by Richter and the U. S. National Oceanic and Atmospheric Administration (NOAA). The search indicates that 395 earthquakes of Richter magnitude 4.0 and greater have occurred within 100 kilometers (62 miles) of the site during the period from 1932 to 1981 (see Figure 2-13). The earthquake search utilized for this Partial Closure Plan was completed by Law/Crandall Inc., between the years 1986 and 1987. Since that time, additional events have occurred. The differences resulting from the earlier data bases oversees the more recent data bases are not significant and do not require modification to the search or the evaluation of seismicity of the region.

The information listed for each earthquake found in Appendix E includes data and time in Greenwich Civil Time (GCT), location of the epicenter in latitude and longitude, quality of epicentral determination (Q), depth in kilometers, and magnitude. Where a depth of 0.0 is given, the solution was based on an assumed 16-kilometer focal depth. The letter code for the quality factor is presented on the first page of the table.

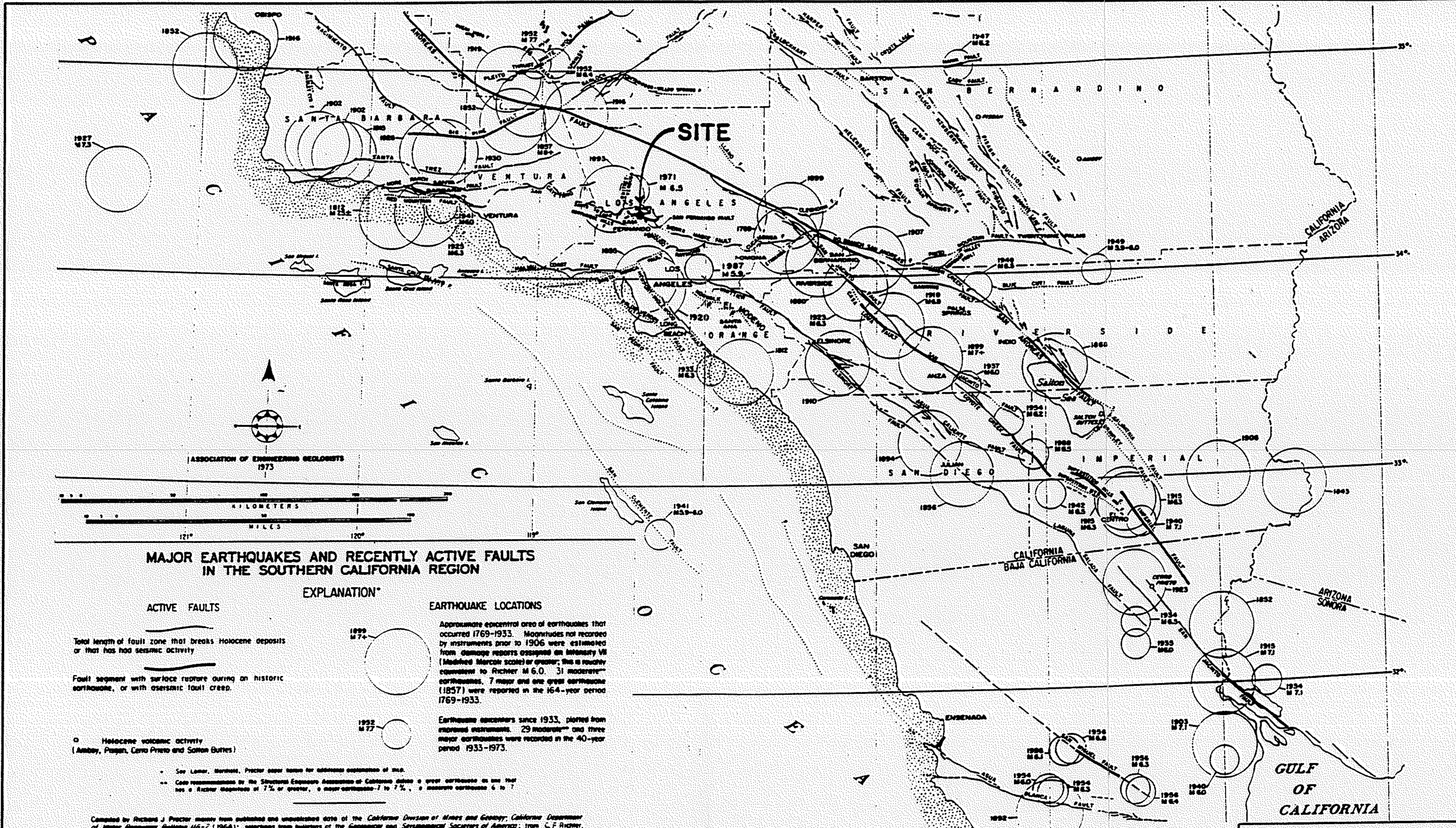
2.4.3 PRIMARY EARTHQUAKE HAZARDS

2.4.3.1 GROUND RUPTURE

Ground rupture occurred at the site during the February 9, 1971 San Fernando earthquake. The Aerial Geology and Fault Location Map, Figure 2-14 is adapted from the Geologic Map of the San Fernando Earthquake Area, Bulletin 196, Barrows, 1974. It shows areas where ground rupture was observed (faults that apparently moved (shown as darker areas) following the earthquake. The most prominent movement occurred near the south edge of the landfill on the Tujunga Fault segment and on the Oak Hill Fault northwest of the landfill. Localized breaks were mapped elsewhere within the landfill property. Three of these localized offsets were mapped in areas in close proximity to Disposal Areas A, B, AB+, and C. The easterly break nearest Bartholomaus Canyon was apparently covered by landfilling after 1971. Some of these localized ruptures may be attributed to lurching or incipient failure of a locally unsupported block of bedrock rather than to primary fault offset.

2.4.3.2 MAXIMUM CREDIBLE AND MAXIMUM PROBABLE EARTHQUAKE

The Maximum Probable Earthquake (MPE) was estimated using a deterministic seismic hazard analysis. The computer analyses (statistical data), as described in Section 2.4.2, were used to develop an earthquake recurrence curve, which is presented on Figure 2-15, Recurrence Curve. The recurrence curve was then used to predict the MPE (functional basis) that is likely to occur within 100 kilometers during a 100-year interval. Since the local faults are not considered capable of the larger magnitudes (greater than 6.75), it may appear in Figure 2-15 as if larger earthquakes have been ignored; however, the computer analyses included all earthquake magnitudes, 395 events (higher and lower) which have occurred within 100 kilometers of the site. The MPE that is statistically likely to occur within the area during a 100-year interval is magnitude 6.75. The nearest active fault capable of generating a 6.75 earthquake is the San Gabriel Fault (M.C.E.7.5), 4.2 miles northeast of the site. The Verdugo Fault (M.C.E. 7.4) about 1.5 miles away is a potentially active fault and thus is considered less likely to generate a 6.75 earthquake event. However, for purposes of site design, a magnitude 6.5 such as the San Fernando earthquake occurring on the San



MAJOR EARTHQUAKES AND RECENTLY ACTIVE FAULTS IN THE SOUTHERN CALIFORNIA REGION

EXPLANATION*

ACTIVE FAULTS

Total length of fault zone that breaks Holocene deposits or that has had seismic activity

Fault segment with surface rupture during an historic earthquake, or with aseismic fault creep.

o Holocene volcanic activity (Amboy, Pisgah, Cerro Prieto and Salton Buttes)

EARTHQUAKE LOCATIONS

1899 M 7+ — Approximate epicentral area of earthquakes that occurred 1769-1933. Magnitudes not recorded by instruments prior to 1906 were estimated from damage reports assigned an intensity VII (Modified Mercalli scale) or greater; this is roughly equivalent to Richter M 6.0. 31 moderate** earthquakes, 7 major and one great earthquake (1857) were reported in the 164-year period 1769-1933.

1952 M 7.7 — Earthquake epicenters since 1933, plotted from improved instruments. 29 moderate** and three major earthquakes were recorded in the 40-year period 1933-1973.

* See Lamar, Merifield, Proctor paper ... for additional explanation of map.

** Code recommendations by the Structural Engineers Association of California define a great earthquake as one that has a Richter magnitude of 7¾ or greater, a major earthquake 7 to 7¾, a moderate earthquake 6 to 7

Compiled by Richard J. Proctor mainly from published and unpublished data of the *California Division of Mines and Geology*; *California Department of Water Resources Bulletin 116-2* (1964); selections from bulletins of the *Geological* and *Seismological Societies of America*; from C.F. Richter, *Elementary Seismology* (1958); and the *National Atlas*, p.66.

FIGURE 2-13

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LOPEZ CANYON LANDFILL

REGIONAL SEISMICITY

JOB NO.	9035-1008
DATE	FEB. 1991
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CHECKED BY	VB

Fernando Fault might be more significant than a 6.75 earthquake occurring on a fault that is remote from the site. A larger earthquake on a more distant fault is not likely to have as great an affect on the site as a 6.5 or 6.75 earthquake on a local fault. Distant earthquakes may have greater magnitudes and durations of shaking; however, because the earthquakes ground motions attenuate with distance from the source, local earthquakes of smaller magnitude and duration of shaking are frequently more significant. Therefore, it has been determined that a 6.5 earthquake event located on the San Fernando Fault would be considered the MPE.

The Maximum Credible Earthquake (MCE) is defined as the most damaging earthquake that appears capable of occurring on a fault under the presently known tectonic framework (CDMG Note 43, 1975). The MCE for the San Fernando Fault is 6.5 (Greensfelder, 1974) which is the same intensity as the MPE.

The peak ground acceleration (PGA) for either the MCE or the MPE is 0.69g, using the rock attenuation relation for peak ground acceleration which was developed by Seed and Idriss (1982).

2.4.4 SECONDARY EARTHQUAKE HAZARDS

2.4.4.1 LIQUEFACTION

Liquefaction potential for the site design was based on an evaluation of factors including the groundwater level, soil types, gradation, relative density, intensity of ground shaking and duration of shaking. Liquefaction potential has been found to be the greatest where the groundwater level is shallow and loose, fine sands are present within a depth of about 50 feet or less. Liquefaction potential decreases with increasing grain size, clay and gravel content, but increases as ground acceleration and duration of shaking increase.

The intensity and duration of ground shaking during the MPE may be enough to produce liquefaction under conditions described above. However, the liquefaction potential for the natural materials beneath the site is considered very low because groundwater is deep and the firm bedrock is not susceptible to liquefaction.

2.4.4.2 SEISMIC SETTLEMENT DIFFERENTIAL COMPACTION AND SUBSIDENCE

Seismic settlement has been observed where loose to medium dense granular soils densify during ground shaking. Seismically induced settlement can occur in either dry, partially saturated, or saturated granular soils. Differential settlement may also be caused by ground failures such as liquefaction, flow slides, surface ruptures, and variable densification. The natural materials at the site are generally dense and firm and are not subject to significant seismically induced settlement. Differential settlements would generally be limited to locations where there are abrupt changes in adjacent material densities. For the landfill, these areas may include contact of the fills with the canyon walls.

Differential settlement should not be detrimental to the operation of the landfill unless it disrupts control of fluids on or under the landfill. Measures to minimize problems caused by differential settlement include:

1. Increasing the crown height of the landfill to allow for settlement.

2. Increasing drainage grades of the cover near the canyon edge and over areas of anticipated differential settlement to promote positive drainage.

The site is not located in an area of known ground subsidence due to the extraction of fluids. Accordingly, the potential for subsidence occurring beneath the site is considered remote.

2.5 HYDROGEOLOGY

2.5.1 INTRODUCTION

Most of the groundwater within a mile of the site is within the Pleistocene alluvium in the Sylmar and San Fernando basins. The Pre-Quaternary bedrock units beneath the site are not considered water bearing, and are not used for water supply because they do not contain economically exploitable volumes of water.

Groundwater is unconfined within the alluvial sediments on site. Groundwater near the site mainly comes from infiltration of precipitation. Rainfall and runoff from higher areas of the site drains toward the canyon bottoms and lower areas in and around the site. Groundwater moves mostly in the bedrock-alluvium interface, discharging into the canyon bottoms after transport. This groundwater is seasonal in nature and occurs as shallow groundwater during and after wet periods. During the dry summer season, no groundwater is present.

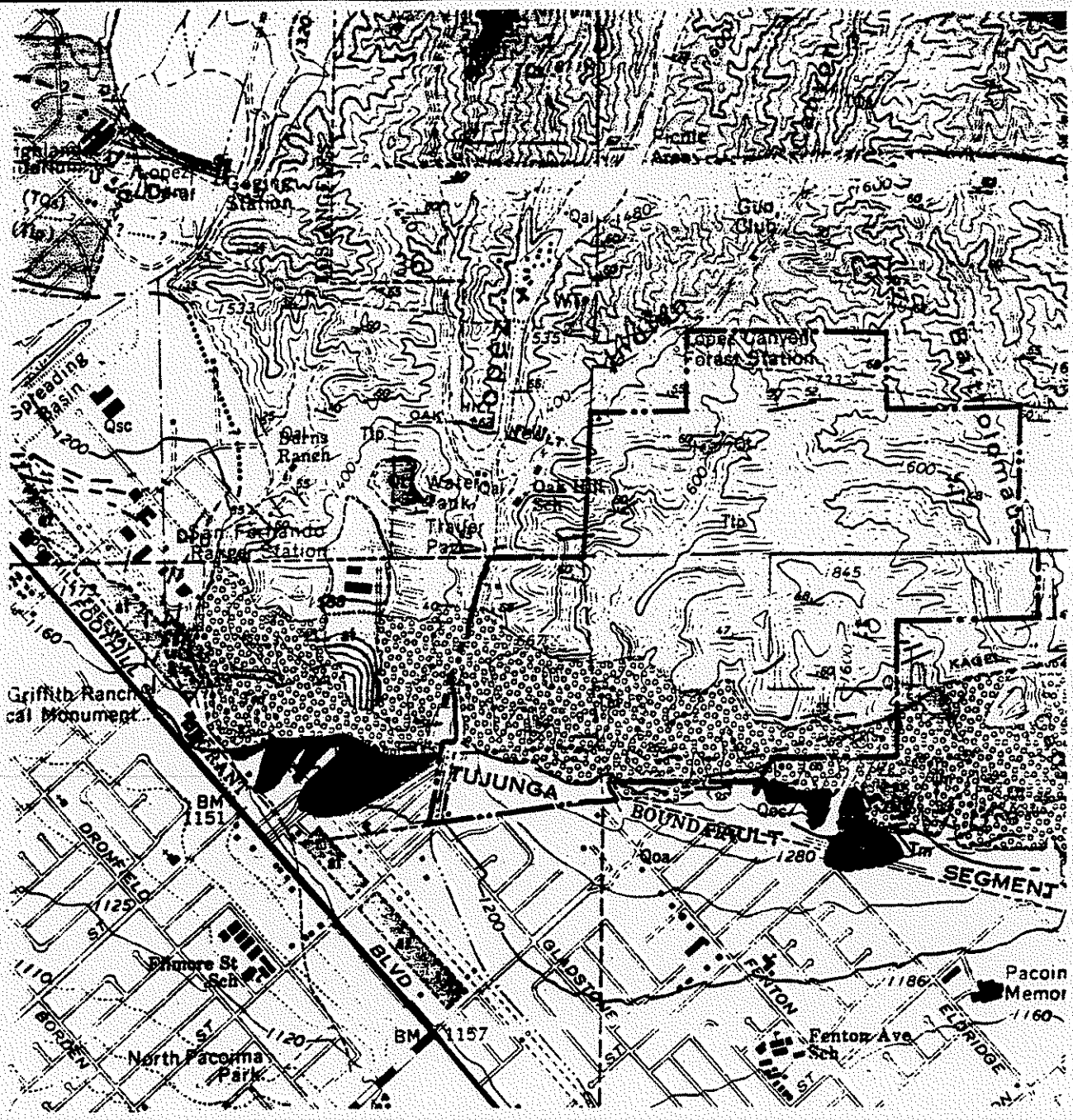
2.5.1.1 SAUGUS FORMATION

The water bearing formation in the vicinity of the site is the Pleistocene Age Saugus Formation. The Saugus Formation occurs along the northern edge of the site and is composed of strata that vary greatly in permeability. Based on existing information, several wells located north of the site in the Saugus Formation supply water is currently being utilized as domestic supply for the Los Angeles County Water Works District No. 21 (Kagel Canyon), fire protection and irrigation. Wells in the Saugus Formation near the site are typically 400 to 700 feet deep and reportedly decrease production during the summer months.

The Saugus Formation in and around the site is characteristic of good water bearing material, but the large relief of the area, combined with fast runoff, makes recharge of the bedrock difficult. Since the site is isolated in a hydrologic sense and because the Saugus dips away from the site, it is unlikely that any appreciable amount of groundwater would be able to accumulate beneath the site.

2.5.2 PERMEABILITY TESTING

Permeability of portions of the underlying materials was evaluated using a constant head permeameter laboratory analysis (ASTM D2434-68) on a selected undisturbed samples. Permeability test results are shown in Table 2-4. Boring locations from which samples were collected are shown on Figure 2-16, Boring and Sample Locations.



SCALE: 1"=1500'

N

REFERENCE:

Barrows, et al, GEOLOGIC MAP OF THE SAN FERNANDO EARTHQUAKE AREA, BULLETIN 196, 1974, CDMG.

FIGURE 2 - 14

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AREAL GEOLOGY AND FAULT

LOCATION MAP

JOB NO.	9035-1008
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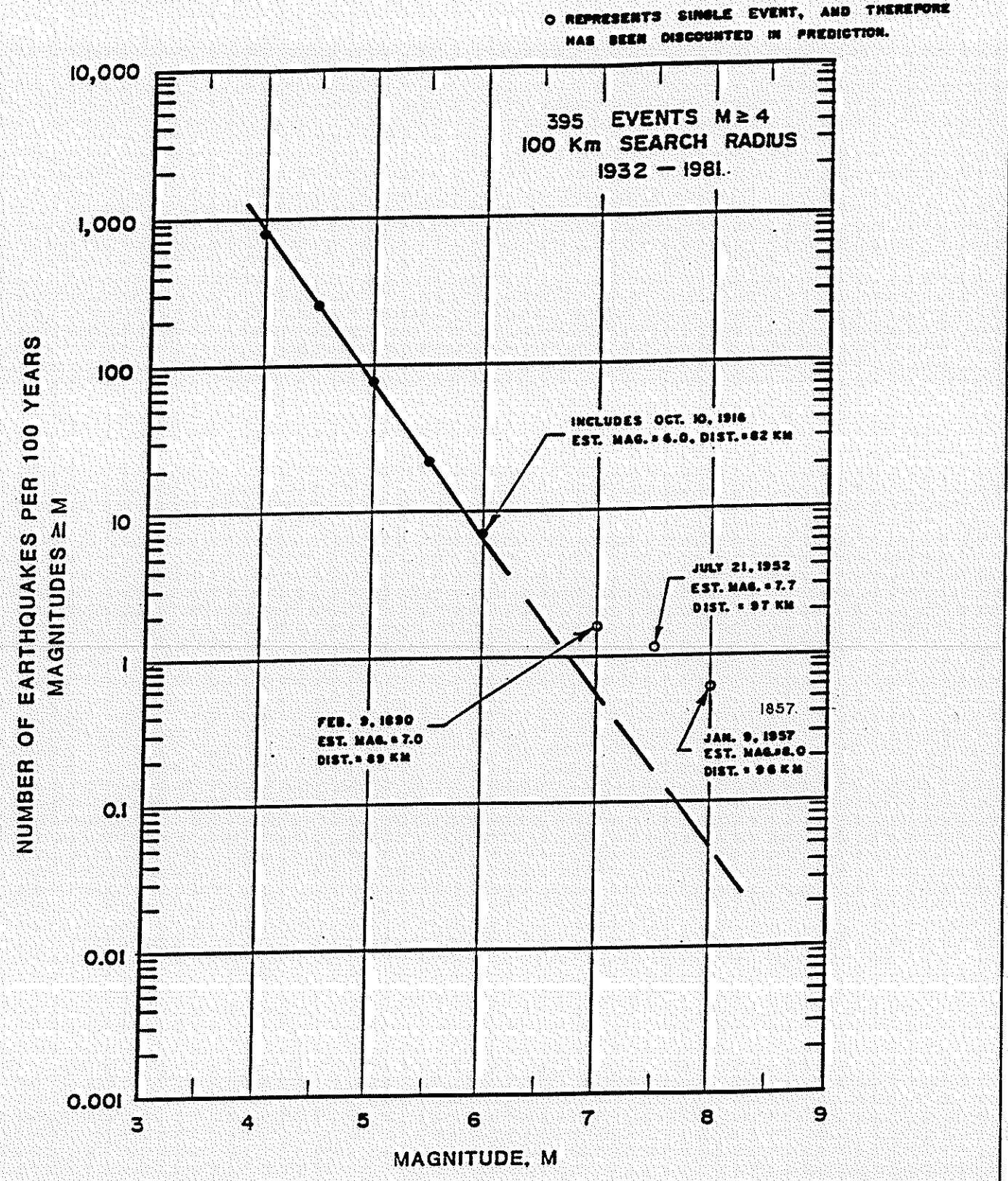

REF : LAW / CRANDALL, INC. (1988)

FIGURE 2 - 15

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RECURRENCE CURVE

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DATE	NOV. 1991
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CHECKED BY:	JRB

Soil and rock materials underlying the Lopez Canyon Landfill site exhibit a broad range of permeabilities, as can be readily demonstrated by classification alone. Since the natural materials vary from sand and gravel to silty clay, some permeability ranges can, if desired, be estimated solely by classification. Since many of the soils on site, by classification only, any prove to be suitable for specific uses such as liner or cover, the constant head laboratory permeability test was used as an indicator of permeability rate. When the permeabilities resulting from the tests fall in the granular range, the soils may not be acceptable (for low-permeability use), but when laboratory tests indicate very low-permeability, the soils may prove to be acceptable candidates for liner or cover uses.

The ranges of permeability shown are valid for specific materials underlying the site. However, fracture permeability or lack thereof may cause locally higher or lower natural infiltration rates.

The materials beneath the site are well consolidated and well bedded, which means that fractures and weak bedding planes are the most important potential zones for water storage and movement. These test results do not reflect the permeability of the site as a whole, because of the difficulty in securing a representative sample that is both bedded and fractured.

2.5.3 GROUNDWATER MOVEMENT

The movement of water in the materials beneath the site is controlled mainly by topography. The main source of groundwater near the site is from infiltration of precipitation. Rainfall and runoff from higher areas on the site drains toward canyon bottoms and lower areas in and around the site. Groundwater is unconfined and is believed to move chiefly in the bedrock-alluvium interface, discharging into the canyon bottoms after transport. This groundwater is considered ephemeral, being dependent on seasonal precipitation. Groundwater velocity and direction is not able to be calculated due to the lack of data from the sites existing groundwater monitoring wells.

The amount of precipitation and resulting runoff is a function of the soil found on the site. According to maps of the Los Angeles County Department of Public Works, the soil type is 050, Hanford Fine Sandy Loam (Mountain Soil), as shown

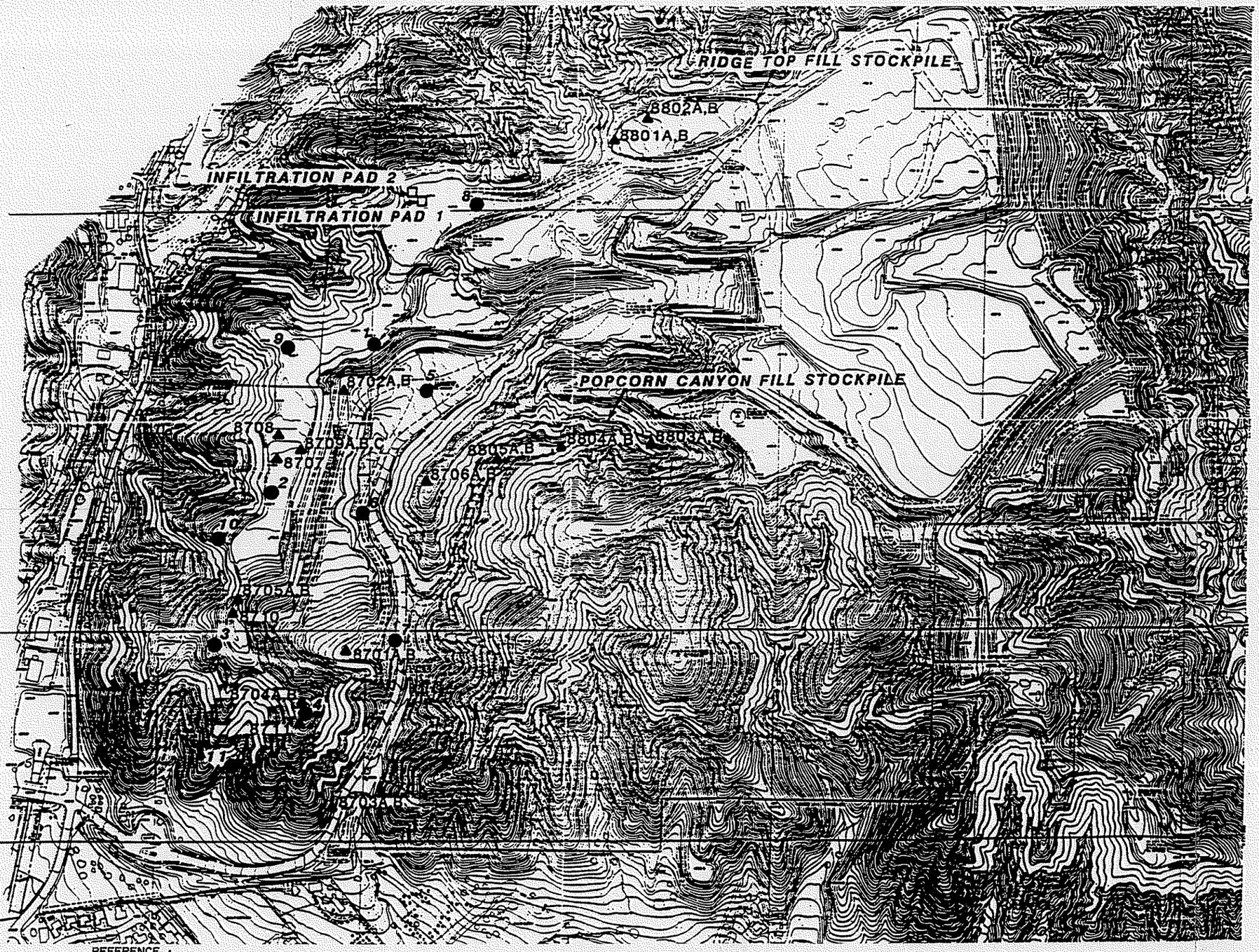
TABLE 2-4

PERMEABILITY TEST DATA

BORING NO.	SAMPLE DEPTH (feet)	SOIL TYPE	PERMEABILITY (cm/sec)
5	1	Sandstone	1.2×10^{-6}
5	3	Sandstone	7.4×10^{-7}
5	5	Sandstone	1.0×10^{-6}
6	2	Fill-Silty Sand	1.8×10^{-5}
6	8	Silty Sand	1.6×10^{-6}
6	12	Clayey Sand	2.0×10^{-5}
7	1	Fill-Silty Sand	2.8×10^{-5}
7	3	Fill-Silty Sand	1.3×10^{-7}
7	7	Fill-Silty Sand	6.7×10^{-8}

(Lopez Partial Closure:TESTDTA:1-21-93)

See Figure 2-16 for Sample Locations
Ref: Law/Crandall Inc., 1988



N

EXPLANATION

11 ● BORING LOCATION

8707 ▲ SAMPLE LOCATION

SCALE: 1" = 500'

BASEMAP FROM CITY OF LOS ANGELES BUREAU OF SANITATION, DATED 06-30-87.

REFERENCE :

LeROY CRANDALL AND ASSOCIATES.

FIGURE 2-16

BAS

[714] 860-7777

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BORING AND SAMPLE LOCATIONS

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CHECKED BY	VB

on Figure 2-17, Soil Type Map. Runoff characteristics of soil type 050 are shown on Figure 2-18, Infiltration Table.

2.5.3.1 WATER LEVELS

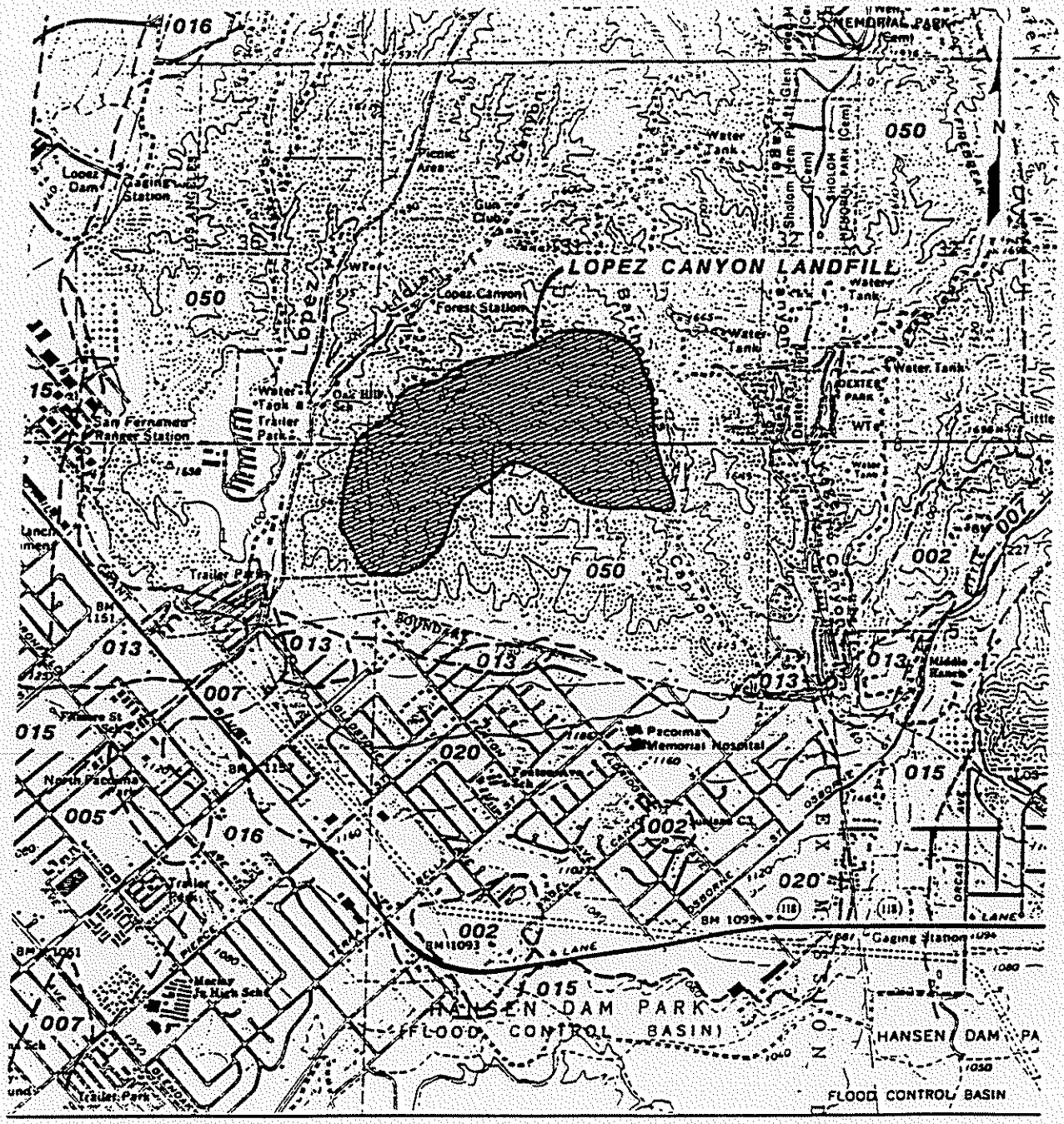
The Lopez Canyon site has two distinct groundwater regimes: A double-porosity joint and fracture system in the bedrock, and a seasonal system in the alluvium. Water levels in the bedrock have not been observed to be higher than the elevation of water in the stream alluvium. The stream alluvium has a maximum elevation at ground surface, and minimum elevations at the base of the alluvium. In the bedrock, water is observed in joints and fractures, or bellow the depths of the streams. Because the bedrock does not have a continuous water surface, no "water table" can be contoured. The following table presentes the groundwater depths and elevations.

TABLE 2-5
GROUNDWATER MONITORING WELL DEPTH AND ELEVATION MEASUREMENTS

MONITORING WELL	TOP OF PVC CASING ELEVATION	DEPTH ** TO GROUNDWATER (feet)	GROUNDWATER ELEVATION	DATE OF MEASUREMENT
MW88-1	1,815.4	Dry	Dry	12/21/92
MW88-2	1,721.2	Dry	Dry	12/21/92
MW88-4	1,380.8	Dry	Dry	12/21/92
MW88-5	1,454.2	25.87	1.428.33	12/21/92
MW92-1	1,367.59	24.22	1,343.37	12/21/92
MW92-2	1,368.56	27.40	1,341.16	12/21/92
MW92-3	1,517.62	14.25	1,503.37	12/23/92

* Elevations are reported in feet above mean sea level.

** Depths are reported from top of PVC well casing.



EXPLANATION

002	ALTAMONT CLAY LOAM
005	HANFORD FINE SANDY LOAM
007	HANFORD GRAVELLY SANDY LOAM
013	RAMONA LOAM
015	TUJUNGA FINE SANDY LOAM
016	YOLO LOAM
020	YOLO SANDY LOAM
050	UPPER LOS ANGELES RIVER SOIL (MOUNTAIN SOIL)

BASEMAP FROM U.S. GEOLOGICAL SURVEY 7½ MINUTE SAN FERNANDO (1972) AND SUNLAND (1972) QUADRANGLES.

SOIL TYPE MAP FROM LACFCD HYDROLOGY

FIGURE 2 - 17

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SOIL TYPE MAP

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DATE	AUG. 1991
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Infiltration Rates in Inches per Hour

Soil Number	Soil Designation	Rainfall Intensity in Inches per Hour 0	0.5	1.0	1.5	2.0	2.5	3.0
021	S.M.M.- 1	0	0.490	0.830	1.100	1.260	1.375	1.440
022	S.M.M.- 2	0	0.405	0.550	0.660	0.760	0.825	0.900
023	S.M.M.- 3	0	0.405	0.600	0.705	0.780	0.825	0.840
024	S.M.M.- 4	0	0.500	0.960	1.245	1.480	1.650	1.770
025	S.M.M.- 5	0	0.200	0.330	0.435	0.520	0.600	0.660
026	S.M.M.- 6	0	0.500	1.000	1.500	2.000	2.500	3.000
027	S.M.M.- 7	0	0.500	0.830	1.035	1.200	1.325	1.410
028	S.M.M.- 8	0	0.460	0.740	0.930	1.040	1.125	1.200
029	S.M.M.- 9	0	0.220	0.290	0.300	0.280	0.250	0.270
030	S.M.M.-10	0	0.500	0.800	0.975	1.140	1.275	1.410
031	S.M.M.-11	0	0.500	1.000	0.960	1.040	1.100	1.170
032	S.M.M.-12	0	0.350	0.480	0.555	0.580	0.625	0.630
033	S.M.M.-13	0	0.485	0.650	0.780	0.880	0.975	1.050
034	S.M.M.-14	0	0.285	0.350	0.405	0.470	0.450	0.480
035	S.M.M.-15	0	0.500	1.000	1.500	1.400	1.400	1.470
036	S.M.M.-16	0	0.260	0.350	0.390	0.420	0.425	0.420
037	S.M.M.-17	0	0.500	0.730	0.870	1.000	1.100	1.230
038	S.M.M.-18	0	0.485	0.600	0.690	0.780	0.825	0.870
039	S.M.M.-19	0	0.290	0.340	0.360	0.360	0.350	0.360
040	S.M.M.-20	0	0.285	0.350	0.325	0.400	0.425	0.450
041	S.M.M.-21	0	0.500	1.000	1.500	2.000	2.300	2.280
042	S.M.M.-22	0	0.325	0.470	0.555	0.620	0.650	0.690
043	S.M.M.-23	0	0.495	0.820	1.020	1.200	1.325	1.440
044	S.M.M.-24	0	0.215	0.240	0.225	0.200	0.200	0.180
045	S.M.M.-25	0	0.500	1.000	1.500	1.800	1.825	1.920
046	U.L.A.R.- 1	0	0.500	0.960	1.365	1.720	2.050	2.340
047	U.L.A.R.- 3	0	0.385	0.540	0.675	0.660	0.650	0.660
048	U.L.A.R.- 5	0	0.500	0.720	0.870	0.980	1.050	1.050
049	U.L.A.R.- 6AB	0	0.345	0.450	0.525	0.580	0.600	0.600
050	U.L.A.R.- 6CD	0	0.255	0.320	0.360	0.360	0.350	0.330
051	U.L.A.R.- 6EF	0	0.440	0.610	0.705	0.760	0.775	0.810
052	U.L.A.R.- 7A	0	0.500	1.000	1.500	2.000	2.500	3.000
053	U.L.A.R.- 7B	0	0.500	0.720	0.945	1.160	1.325	1.470
054	U.L.A.R.- 7CD	0	0.435	0.540	0.675	0.720	0.725	0.720
055	U.L.A.R.- 8	0	0.430	0.640	0.762	0.840	0.900	0.930
056	U.L.A.R.- 9A	0	0.345	0.420	0.450	0.480	0.500	0.510
057	U.L.A.R.- 9B	0	0.500	0.980	1.245	1.425	1.520	1.590
058	U.L.A.R.- 9C	0	0.460	0.610	0.750	0.860	0.950	1.020
059	U.L.A.R.- 9D	0	0.350	0.420	0.450	0.460	0.450	0.450
060	U.L.A.R.- 9E	0	0.500	0.910	1.125	1.320	1.500	1.680
061	U.L.A.R.-10A	0	0.500	1.000	1.500	2.000	2.500	3.000
062	U.L.A.R.-10B	0	0.500	0.730	0.855	0.960	1.025	0.050
063	U.L.A.R.-11	0	0.445	0.620	0.720	0.780	0.825	0.870
064	U.L.A.R.-12	0	0.320	0.420	0.495	0.540	0.575	0.600

FIGURE 2 - 18

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LOPEZ CANYON LANDFILL

INFILTRATION RATE TABLE MOUNTAIN - DESERT SOILS

JOB NO. 9035-1021
DATE AUG. 1991
DRAWN BY: HMG
CHECKED BY: JRB

2.5.3.2 CAPILLARY RISE

Capillary rise is the tendency of water to rise in "soil tubes" or connected voids to elevations above the water table. The following table presents a range of rise for several different soil types.

TABLE 2-6
CAPILLARY RISE RANGE

SOIL TYPE	CAPILLARY RISE
Sand	0.5 - 3 ft
Sandy silt	3 - 7 ft
Silt	3-30 ft
Silty clay	15 - 25 ft
Clay	>30 ft

From the foregoing table, it can be seen that capillary rise can only be considered a problem if the water table is within 30 feet from the bottom of the landfill. If capillary rise were to pose a problem for landfill design, a capillary break consisting of a coarse grained granular material can be installed in problematic areas.

A permanent water table beneath the site has not been established within the Towsley-Pico Formation which forms the bedrock at the site.

2.5.4 SPRINGS

There are no known springs within a mile of the site. Within the site itself, there is a gravel-lined pipe approximately six inches in diameter protruding from beneath the main haul road south of Disposal Area C. This drain pipe was installed in 1975 during initial road paving. It is believed that prior to paving, there was a seep in the area, which was to be covered by the road. At present, water is seen flowing from both the pipe and the gravel pack around the pipe after rainy periods. At other times the flow ceases altogether.

SECTION 3.0

FINAL COVER

3.0 FINAL COVER

3.1 INTRODUCTION

This section describes the proposed final cover design for the deck and slope areas of Disposal Areas A, B, AB+ and C. It also identifies potential borrow areas available both on-site and off-site where the quality and quantity of soils necessary for completion of closure can be obtained.

The purpose of a final cover is to provide long-term minimization of surface water intrusion, to accommodate settlement and subsidence, to isolate the wastes from the surface and to reduce the potential for odors and gas emissions. The cover also provides a base for vegetation which will reduce drainage velocities and thus minimize erosion and abrasion of the cover.

3.2 MINIMUM DESIGN STANDARDS

The minimum cover standards, as outlined in the closure and post-closure Requirements for Class III Landfills contained in Title 23, Chapter 15 and Title 14 of the California Code of Regulations, include:

A cover foundation of two feet (or less if approved by the RWQCB) of approved soil, contaminated soil, incinerator ash, or other waste materials that have appropriate engineering properties, so as to provide a relatively unyielding surface upon which to place and compact the low-permeability layer.

A low-permeability layer consisting of a minimum one-foot layer of clean soil placed over the foundation layer with a permeability which is the lesser of either:

a. 1×10^{-6} cm/sec, or

b. the permeability of any bottom liner system or underlying natural geologic materials.

Permeabilities are to be determined by field tests in accordance with accepted civil engineering practices.

A one-foot layer of soil containing no waste or leachate placed over the low-permeability layer. Vegetation root depths must not exceed the top soil layer thickness.

The cover should require minimum maintenance.

Grading is required to:

a. prevent ponding and provide for slopes of at least three percent (a lesser slope may be allowed if surface drainage is diverted) and

b. minimize surface erosion by water and wind in areas of greater than ten percent slope and in surface drainage courses.

3.2.1 ALTERNATIVE FINAL COVER DESIGN CONSIDERATIONS

Alternative final cover design considerations may be evaluated for Disposal Area C. This area will be constructed with a composite liner system. The CIWMB and the RWQCB contacted regarding the final cover requirements as they relate to facilities proposing to utilize a composite liner system. Specifically, discussions regarding with the design criteria established in CCR 23, Chapter 15, Section 2581 (a) were of concern. The State Water Resources Control Board (SWRCB) informed the CIWMB and RWQCB that this regulation is being rewritten to allow alternative designs for final cover. It is the SWRCB's intent to allow alternative covers, such as the monolithic final cover on slopes as is proposed for this site, as a performance standard alternative. This cover design as proposed is considered to comply with the technical equivalency guidelines under Section 2511, of the CCR, Chapter 15. However, it should be noted that future changes in Title 23, Chapter 15 and Title 14, or changes as a result of the implementation of 40 CFR Parts 258 (Subtitle-D), may necessitate that this plan be revised to reflect new regulations regarding final cover design criteria.

3.3 FINAL COVER DESIGN

3.3.1 INTRODUCTION

In order to ensure the containment of the waste materials, to minimize the infiltration of water from rain or future irrigation and to provide for a suitable end use, the final cover for the Lopez Canyon Landfill has been designed to meet or exceed the minimum design standards outlined in Section 3.2.

Many factors were taken into consideration to ensure adequate performance of the cover. These included the geometry of the existing landfill, climatic conditions, potential settlement, grading, available cover materials, erosion protection and end use.

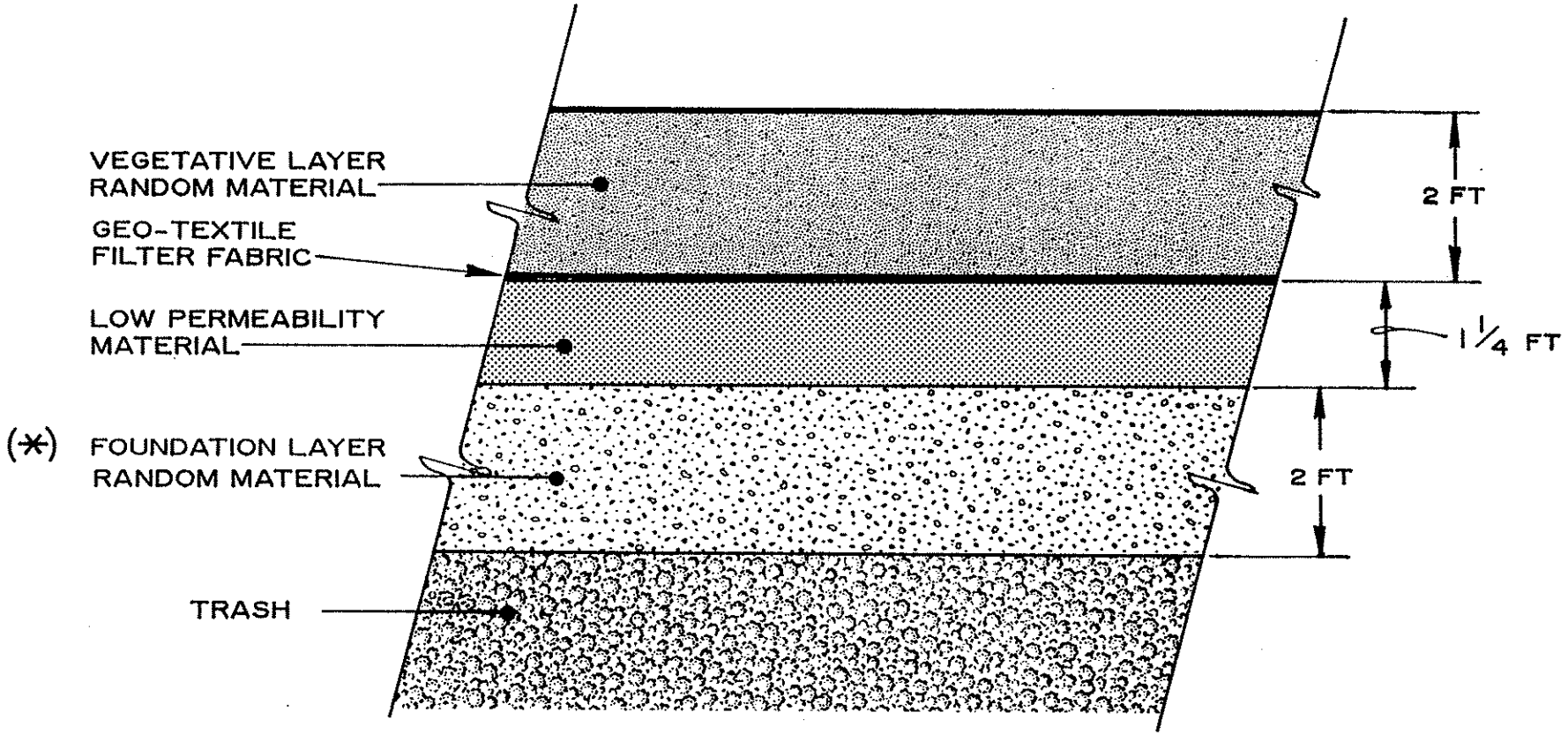
The cover has been designed to accommodate irrigation so as not to limit any future end use selected for the site. A permanent irrigation system is planned for the slopes and a temporary irrigation system is planned for the deck areas to provide for establishment of vegetation.

Due to construction and stability concerns of placing a layered cover on steep side slopes, two different cover designs have been selected: one for slopes with gradients exceeding 4:1 and one for the flatter deck areas. There are approximately 85 acres of deck area and 81 acres of slope area. These acreage totals reflect the actual footprint of the disposal areas.

3.3.2 DECK AREAS

The final cover design for the deck areas will consist of the following: a two foot foundation layer comprised of random soils; a low-permeability layer of selected materials approximately 15 inches thick which will yield a permeability of 1×10^{-6} cm/sec or less; a geotextile filter fabric; and a two foot vegetative layer of random soils (Figure 3-1). All cover soils, including low-permeability soils, will be generated from the potential borrow areas identified in Section 3.5.

The existing cover material will be utilized as part of the foundation layer. Evaluation of the depth of the existing cover for Disposal Areas A and B is discussed in Section 4.0. The geotextile filter fabric material will be placed



NOTE (*) AN AVERAGE 2 FT. TO 10 FT. OF FOUNDATION EXISTS AS LANDFILL INTERIM COVER.

FIGURE 3 - 1

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LOPEZ CANYON LANDFILL

DECK AREA
FINAL COVER CROSS-SECTION

JOB NO.	9258-134
DATE	NOV. 1991
DRAWN BY	PTN
CHECKED BY	VB

between the low-permeability layer and the vegetative layer to help maintain a relatively uniform moisture content in the fine grained materials and to prevent the piping of any coarse grained materials from the vegetative layer into cracks which may develop in the low-permeability layer.

The depth of the vegetative layer will enable adequate root depth for on-site vegetation and will provide protection of the low-permeability layer from root penetration and the drying effects of evapotranspiration.

3.3.3 SLOPE AREAS

The final cover design for the slope areas will consist of a three-foot thick low-permeability and vegetative layer placed over the existing foundation layer (Figure 3-2-A and 3-2-B). The low-permeability and vegetative layers will be placed in horizontal lifts to improve constructability and to reduce the potential for planar laminations parallel to the slope face. Adequate slope stabilization measures will be implemented during hydroseeding to ensure growth of the vegetation on the slopes (Section 8.0).

The three-foot thick low-permeability and vegetative layer for the slope areas is a "monolithic" layer that combines the two layers into one continuous layer. The monolithic layer is a proven design that has been successfully implemented and approved as a cover design at other landfill sites in Southern California. The monolithic layer greatly improves the construction of the cover since a monolithic layer can be constructed at one time using the same equipment and construction techniques. In addition, the monolithic layer reduces the potential for cracks that would penetrate the entire thickness of the layer, thereby compromising the integrity and desired permeability characteristics.

3.4 LIMITS OF REFUSE

The limits of refuse fill for the Lopez Canyon Landfill are presented on the Final Grading Plan (Figure 4-1 in Section 4.0). These limits were established from review of historical topographic drawings and photos, discussions with Bureau of Sanitation staff and geological field investigations.

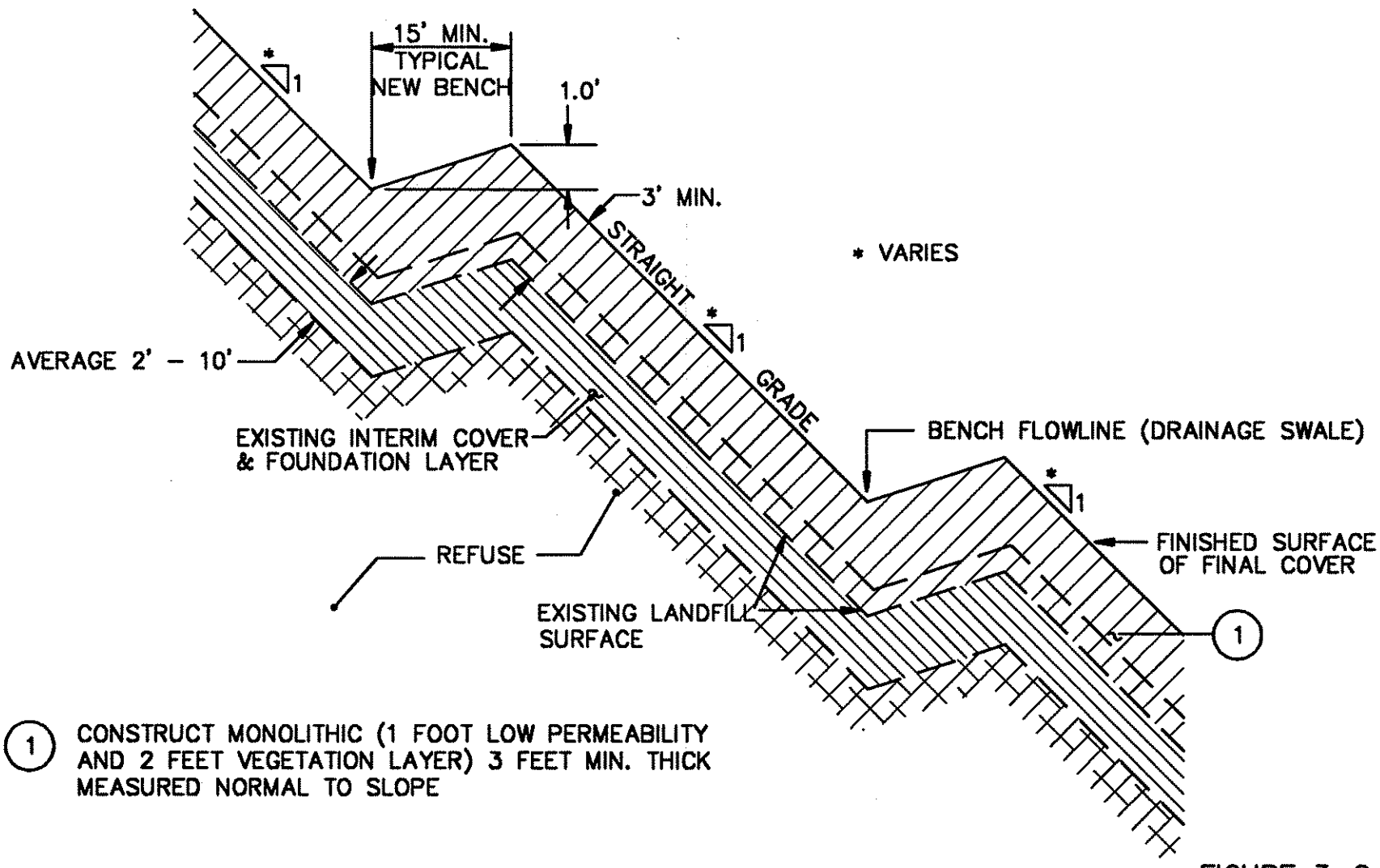

FIGURE 3-2-A

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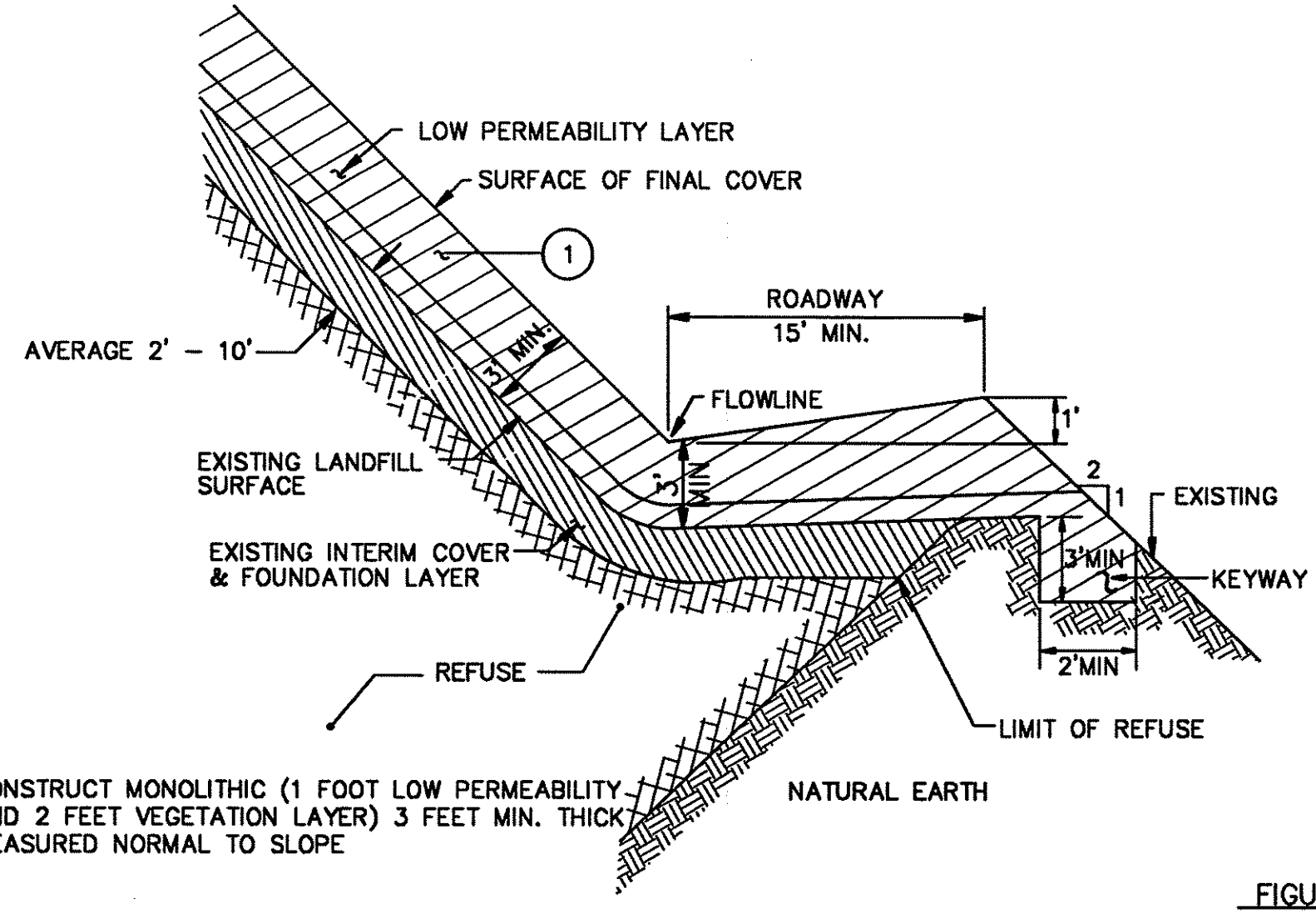
TYPICAL FINAL COVER SLOPE CROSS SECTION

NTS

JOB NO.	9303-134
DATE	JAN. 1993
DRAWN BY	KK
CHECKED BY	SPD



(1) CONSTRUCT MONOLITHIC (1 FOOT LOW PERMEABILITY AND 2 FEET VEGETATION LAYER) 3 FEET MIN. THICK MEASURED NORMAL TO SLOPE

FIGURE 3–2–B

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PERIPHERY ROADWAY FINAL COVER SECTION

NTS

JOB NO.	9303-134
DATE	JAN. 1993
DRAWN BY	KK
CHECKED BY	SPD

In most portions of the landfill, the limits of refuse coincide with the internal roads which border most of the refuse fill area.

The scale area and the main haul road leading into the site is underlain by native material and clean compacted fill. A section of the refuse fill located in the northeastern portion of Disposal Area B encroaches approximately seven acres of U. S. Forestry Service Property. The Bureau of Sanitation entered into a lease agreement with the USFS to utilize this area for refuse disposal and environmental monitoring.

3.5 SOURCES OF COVER MATERIAL

3.5.1 POTENTIAL BORROW SITES

Several potential on-site borrow areas were identified and evaluated as part of a prior investigation for the proposed Disposal Area C expansion. The complete results of the prior studies were presented in "Volume II, Report of Design, Lopez Canyon Landfill, 11950 Lopez Canyon Road, Lakeview Terrace, Los Angeles, California," dated July 23, 1991 (LCA AE-86425-L). That information is included as Appendix B of this Closure Plan for easy reference.

If sufficient quantity and/or quality of on-site material is not available, a potential off-site borrow source of montmorillonite clay with a permeability of less than 1 x 10^{-6} cm/sec has also been identified. It is located in an old lake bed in suburban Mojave approximately 85 miles from the landfill. If at the time of closure this source has been utilized, another borrow source will be identified. Further investigations will be conducted for potential off-site low-permeability material. A test pad will be constructed to evaluate the material prior to the placement of the final cover. The schedule for test pad construction, if needed, is presented in Section 11.0.

3.5.2 MATERIALS EVALUATION

Specific field and laboratory investigations were performed at the Lopez Canyon Landfill site to identify and evaluate the availability of suitable on-site materials for liner and cover construction in 1987, 1988, and 1992. The field investigations included geologic studies and borings to identify potential borrow areas at the

TABLE 3-1

SUMMARY OF LABORATORY TEST RESULTS FOR COVER STUDY

Location	Date Tested	Sample Depth	(1) Sample Description	(2) USCS	Plasticity Index	Percent #200 Sieve (%)	Permeability (cm/sec)
PHASE I - TESTS ON POTENTIAL LOW-PERMEABILITY ON-SITE MATERIALS							
8701	7/10/87	0'-1'	Siltstone to Silty Sandstone	SM	NP	26	1.6×10^{-6}
8702	7/14/87	0'-1'	Sandy Siltstone	ML	NP	58	14.1×10^{-6}
8703	7/14/87	0'-1'	Silty Sandstone and Shale	SM	10	21	5.4×10^{-6}
8704A	7/14/87	0'-1'	Siltstone to Silty Sandstone	SM	NP	21	12.0×10^{-6}
8704B	7/15/87	0'-1'	Siltstone to Silty Sandstone	SM	--	32	1.1×10^{-6}
8705	7/16/87	0'-1'	Siltstone to Silty Sandstone	SM	NP	25	9.3×10^{-6}
8706	7/20/87	0'-1'	Siltstone to Silty Sandstone	SM	11	28	4.1×10^{-6}
PHASE 2 - TESTS ON SELECTED POTENTIAL LOW-PERMEABILITY ON-SITE MATERIALS							
8707	7/29/87	0'-1'	Shale (Ttp)	ML	11	78	--
8708	7/29/87	0'-1'	Shale (Ttp)	--	Non-Plastic	57	--
8709A	7/29/87	0'-1.5'	Shale (Ttp) (Middle of Unit)	ML	13	75	--
8709B	7/29/87	0'-1'	Shale (Ttp) (Top of Unit)	ML	12	73	--
8709C	7/29/87	0'-1'	Shale (Ttp) (Bottom of Unit)	ML	11	85	--
8710	7/29/87	0'-1'	Siltstone/Sandstone	--	13	79	--
8711	7/29/87	0'-1'	Siltstone/Sandstone, and Shale	ML	12	72	--
PHASE 5 - TESTS ON MIXTURES OF AVERAGE ON-SITE MATERIALS							
--	3/10/88	--	Average Mixture "A"	ML	NP	32	--
--	3/10/88	--	Average Mixture "A" + 5% Bentonite	CL	12	--	--
--	3/10/88	--	Average Mixture "A" + 10% Bentonite	CL	28	--	--
--	3/10/88	--	Average Mixture "B"	ML	NP	31	--
--	3/10/88	--	Average Mixture "B" + 5% Bentonite	CL	13	--	--
--	3/10/88	--	Average Mixture "B" + 10% Bentonite	CL	28	--	--

(Lopez Partial Closure:RESULTS:12-4-92)

(1) Soil A: Selected low-permeability native material consisting of a dark grey to black siltstone. Mixtures A and B consist of overaged mixture of typical on-site siltstone, sandstone, and shale.

(2) USCS: Unified Soil Classification System group designation.

site for low-permeability materials. Representative samples of low-permeability materials were obtained from the site near the ground surface for laboratory testing. These studies were performed during the prior investigation and design of Disposal Area C.

3.5.2.1 LABORATORY TESTING

The descriptions of the laboratory tests performed as part of the prior cover studies are presented in the July 23, 1991, Volume II, Report of Design, Lopez Canyon Landfill. Laboratory tests were performed during previous studies at the site on representative samples of the subsurface soils and bedrock materials obtained from the borings, and on samples of possible cover materials available at the site to evaluate their engineering properties. An explanation of the laboratory testing for low-permeable material is presented below.

Phase 1 laboratory testing (Locations 8701 to 8706) followed major geologic mapping and, from subjective observations, was intended to identify the less permeable materials that might have potential use for liner or cover. It was a broad brush sampling of materials that by visual classification appeared to have potential low-permeability application.

Phase 2 laboratory testing was a somewhat more focused follow-up of the Phase 1 testing in a further attempt to identify materials with favorable clay content, since Phase 1 samples yielded fairly low (passing No. 200) sieve results, low or non-plasticity indexes, and marginal permeability results. The intent of Phase 2 was to identify such materials, if any, by Atterberg limits and percent passing No. 200 sieve tests. Results of the laboratory test for the cover study are summarized in Table 3-1.

3.5.2.2 TEST PADS

Materials identified in Samples 8709A, B, and C were used for borrow to construct infiltration test pads to evaluate the material for use as low-permeability cover. Two test pads were constructed in 1988, one using native material, field mixed, and compacted to about 90 percent of the laboratory maximum dry density as determined by ASTM Designation D1557-70, and one using native material plus five percent by weight of bentonite, field-mixed, and

compacted to about 90 percent. The native material pad was designated Test Pad 2, and the native material plus five percent bentonite was designated Test Pad 1.

The method described by ASTM Designation D-3385-75, Standard Test Method for Infiltration Rate of Soils in the Field Using Double-Ring Infiltrometers was chosen for use at Lopez Canyon to determine soil infiltration rates. The infiltration rate obtained with this method may be used to calculate the hydraulic conductivity (coefficient of permeability) of the soil. The double ring tests were performed on one-foot thick pads consisting of on-site materials and on-site materials enriched with bentonite.

The infiltrometer consists of two metal rings (12 and 24 inches in diameter) 20 inches in height, which are placed concentrically and embedded a few inches into the undisturbed soil. The rings were initially filled with water to a depth of approximately six inches. This initial water level was maintained throughout the duration of the tests by monitoring the levels periodically and recording the volume of water required to restore the initial water levels ($\pm$ 0.2 mm). Between readings, the rings were tightly covered and shaded in order to minimize evaporative loss. The tests were continued until a reasonable constant infiltration rate was achieved.

The final infiltration rate of water from the inner ring was used to calculate the hydraulic conductivity of the soil by the technique presented in Day and Daniel (1985). A value of one was assumed for the lateral spreading factor. The hydraulic gradient was calculated by the method in Smedema and Rycroft (1983).

The results of the (1988) double-ring infiltrometer tests are presented in Table 3-2, Summary of Test Pad Results for Cover Study.

Further tests of onsite material were also conducted in 1992 for evaluation of the material for use as liner material and also as final cover material. The final report for this testing is included in Appendix C.

TABLE 3-2

SUMMARY OF TEST PAD RESULTS FOR COVER STUDY

Location	Date Tested	Sample Depth	Sample Description (1)	(2) USCS	Moisture Content %	(3) Dry Density (pcf)	(4) Percent Compaction (%)	Plasticity Index	Percent Passing #200 Sieve (%)	Permeability (cm/sec)
PHASE 3 - TESTS ON SELECTED LOW PERMEABILITY ON-SITE MATERIALS										
Test Pad 2	1/13/88	0'	Soil A	CL	--	--	--	9	69	1.1×10^{-6}
--	1/19/88	0.5'	Soil A	CL	--	--	--	--	59	1.7×10^{-6}
--	2/1/88	0'	Soil A + 5% Bentonite (Lab Mixed/Remolded)	CL	--	--	--	18	67	1.9×10^{-6}
PHASE 4 - TEST ON SELECTED LOW-PERMEABILITY ON-SITE MATERIALS PLUS BENTONITE										
Test Pad 1	1/13/88	0'	Soil A + Bentonite (Field Mixed)	CL	16.7	109	89		69	0.4×10^{-6}
--	1/13/88	0'	Soil A + Bentonite (Field Mixed)	CL	11.7	111	90	12	67	1.1×10^{-6}
--	1/13/88	0.5'	Soil A + Bentonite (Field Mixed)	CL	12.5	111	90	13	67	0.5×10^{-6}
--	2/1/88	0.5'	Soil A + Bentonite (Field Mixed)	CL	12.2	109	88	9	--	1.5×1^{-6}

SUMMARY OF FIELD INFILTROMETER TEST RESULTS (1)

(2) Location	Date Tested	Sample Depth	Material Description (1)	(3) USCS	Moisture Content %	(4) Dry Density (pcf)	(5) Percent Compaction (%)	Plasticity Index	Percent Passing #200 Sieve (%)	Permeability (cm/sec)
Test Pad 2	2/23/88	--	Compacted Dark Grey to Black Siltstone	CL	17.1	116	94	9	69	2×10^{-7}
Test Pad 1	2/23/88	--	Compacted Dark Grey Black Siltstone + Bentonite	CL	16.8	119	97	12	64	4×10^{-7}

(Lopez Partial Closure Plan:RESULTS2:12-4-92)

NOTES:

(1) Tests consisted of double-ring infiltrometer tests.
(2) USCS: Unified Soil Classification System group symbols.
(3) Dry density from field sand cone tests.
(4) Percent of maximum dry density as determined by ASTM D1557-70

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3.5.2.3 RESULTS OF MATERIAL EVALUATION

The results of the initial field and laboratory investigations at the site indicate that a dark gray to black siltstone of the Towsley/Pico Formation would be most favorable among the native materials at the site for meeting the requirements of Chapter 15 and Title 14 for final cover material. Field infiltrometer tests on full-scale test pads constructed of this material with and without bentonite indicate permeabilities of 2×10^{-7} cm/sec to 4×10^{-7} cm/sec.

Since the initial cover material testing was conducted, additional material has been excavated from Disposal Area C. Excavated earth is stockpiled on the deck of Disposal Areas A and B. All potential on-site material will be quantified several months prior to implementation of closure construction activities at the landfill. At that time, a determination will be made as to the need for an off-site source of low-permeability material.

Based on field infiltrometer permeability tests, the dark gray to black siltations at the Towsley/Pico Formation may yield adequate permeability without enrichment with bentonite. For scheduling purposes, it is proposed to further evaluate the low-permeability borrow characteristics and complete the final borrow site selection approximately nine months before the initiation of closure construction. Upon selection of the final borrow site, a final test pad will be constructed and a Sealed Double-Ring Infiltrometer (SDRI) Test will be initiated at least six months before final construction. Results of the SDRI test will be submitted to the appropriate agencies for approval.

3.5.3 BORROW SITE GRADING AND EROSION PROTECTION

All borrow areas have been excavated to provide the maximum available cover material without creating drainage or erosion control problems as a result of the removals. Finished surfaces are graded and slopes and drainage benches will be designed to meet local grading ordinances. A vegetative cover will be provided by hydroseeding all excavated areas with a seed mixture common to the region. These areas will not be irrigated, other than that provided by the normal winter rains. The borrow material utilized for the final cover are stockpiled on the deck areas of Disposal Areas A and B.

3.5.4 HAULING DISTANCE

Most of the identified borrow areas are within the limits of the landfill. The bulk of this material has been generated during the excavation of Disposal Area C. The haul distance for the potential off-site borrow source in Mojave is approximately 170 miles round trip to the borrow source access road.

3.6 QA/QC FOR FINAL COVER PLACEMENT

The primary purpose of a Quality Assurance/Quality Control (QA/QC) program is to provide documentation that suitable materials and good practices are used to place the final cover in accordance with the design specifications.

A preliminary QA/QC Plan for final cover placement is included in Appendix D. Elements of this Plan include: definition of program objectives, listing of responsible parties, requirements for the final cover placement documentation, and earthwork specifications. The responsible parties selected by the BOS to conduct the QA/QC program shall be qualified in final cover placement and shall be responsible for appropriate modifications to the QA/QC Plan due to field conditions. The QA/QC Plan will be rewritten to reflect changes in the final cover design that will be determined when the final evaluation is completed on the material which will actually be used.

SECTION 4.0

FINAL GRADING

4.0 FINAL GRADING

4.1 INTRODUCTION

The Lopez Canyon Landfill is presently divided into four distinct disposal areas known as Disposal Areas A, B, AB+ and C. Disposal Area AB+ is the current active disposal area. Once the SWFP has been revised and Disposal Area AB+ has been filled to capacity, filling operations will move into Disposal Area C. Closure construction activities will be implemented in two phases; Phase I will include the slope of Disposal A and B; and Phase II will include the remainder of the Landfill.

Final contours for each area will be graded with respect to the adjacent terrain and the drainage control features incorporated into that portion of the site. The Lopez Canyon Landfill is a typical Southern California deep canyon refuse disposal site in that the canyon walls and adjacent ridges were excavated for cover dirt and the canyons were systematically filled in layers until the final elevation was achieved.

4.2 SURFACE DESIGN

Upon completion, the landfill will be comprised of approximately 85 acres of flatter deck areas. All of the deck areas will be closed during Phase II closure construction. The deck areas will be graded to a minimum slope of three percent to provide for run-off of precipitation.

The slopes of Disposal Areas A and B have an overall gradient of approximately 2:1 with the exception of the lower portion of Disposal Area A which is slightly steeper at a gradient of 1-3/4:1. This portion of the slope was placed during the early phases of site operations. Reconstruction of this area of the slope to a 2:1 gradient will be accomplished during Phase I closure construction. The finished slopes will extend from the base of the landfill to a vertical height of approximately 385 feet for Disposal Area A and 270 feet for Disposal Area B.

The outer slope areas of Disposal Area C will have an overall gradient of approximately 2.5:1 The finished exterior slopes will extend from the base of the landfill to a vertical height of approximately 375 feet. A slope stability analysis will be performed on the final slopes of Disposal Area C in accordance with Title 14, Section 17777.

4.3 BENCH DESIGN

The east and southeast faces of Disposal Areas A and B are sloped at an approximate 2 to 1 gradient with 15-foot wide benches located at a vertical spacing of approximately 40 feet. The southwest facing slopes of Disposal Area C will be sloped at an approximate 2:1 gradient with 15-foot wide benches located at a vertical spacing of approximately 40 feet. These benches serve to collect surface run-off before erosion occurs. They are graded and banked to create a drainage channel which directs run off from the slopes above to storm drain inlets which will ultimately traverse vertically down the landfill face and into debris basins (see Section 5.0). Benches, as a secondary benefit, also provide for increased slope stability and access for maintenance.

4.4 EVALUATION OF EXISTING COVER

The thickness of existing cover materials on Disposal Areas A and B was determined by evaluating boring logs for gas wells drilled through the cover during placement of the gas control system and by interviewing the operators responsible for placement of the intermediate cover. Results obtained from bore hole drilling indicate that a minimum of 24-inches of cover material was placed over the entire surface of the landfill upon completion of filling operations in Disposal Areas A and B. Consequently, the minimum requirement of a two foot thick foundation layer has already been achieved for Phase I closure. A minimum of 24-inches of cover material will be placed over Disposal Areas AB+ and C prior to Phase II closure construction. The active portion of the landfill, Disposal Area AB+ was not investigated.

The placement of additional random fill will be required to achieve a gradient of 2 to 1 in the lower portion of Disposal Area A and may be required for purposes of drainage control in those areas of the deck where adequate slope gradients have not been achieved.

4.5 FINAL GRADING DESIGN

4.5.1 INTRODUCTION

This section describes the final grading plan and outlines the grading procedures considered necessary to construct the layered final cover on the deck areas and the final cover on the steeper slope areas. Installation of additional access roads and benches is also described. The proposed final grading plan is shown on Figure 4-1.

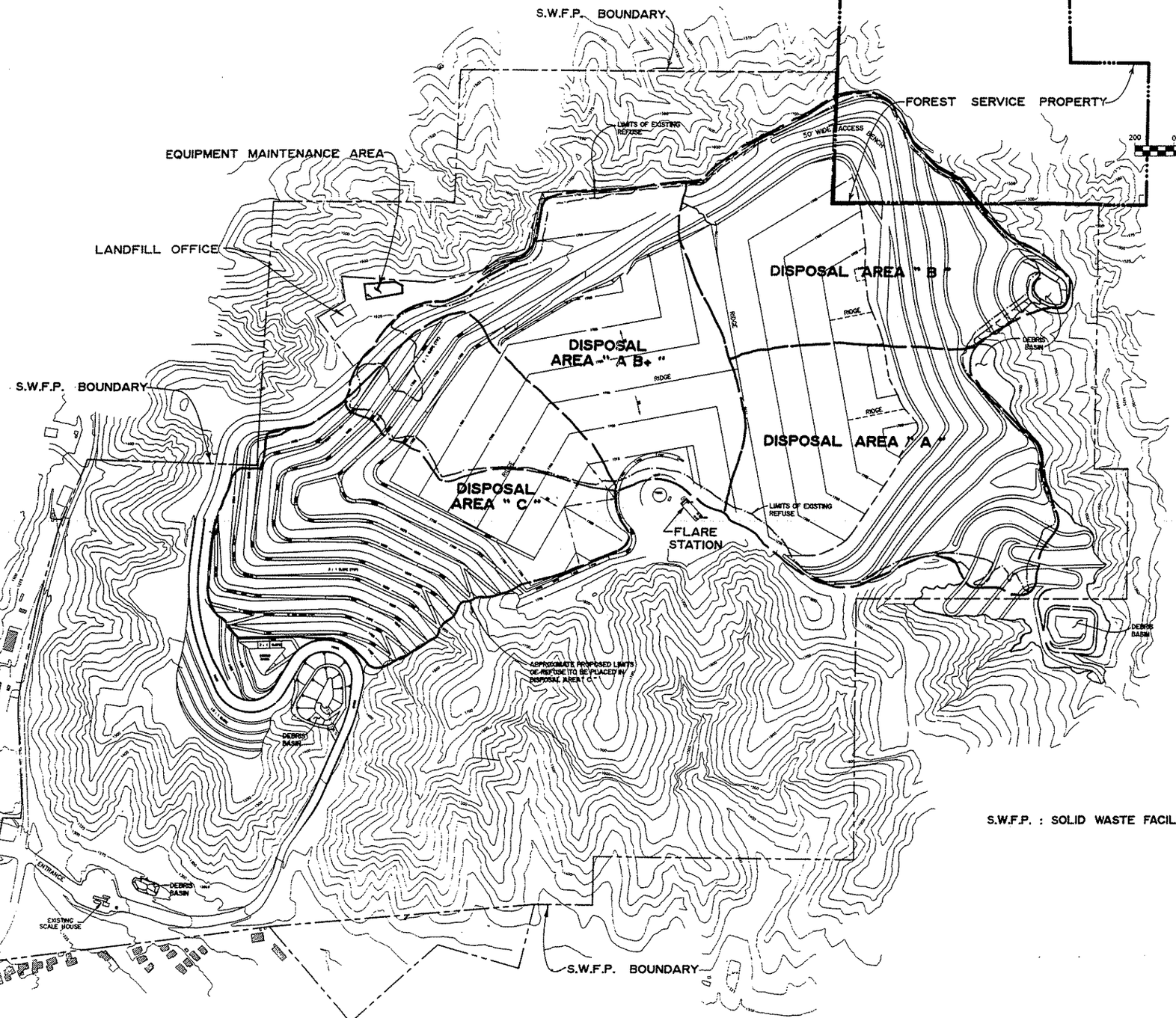
4.5.2 DECK AREA FINAL GRADING

Since the cover on the deck areas will be placed in layers, it will be necessary to develop separate grading procedures for the foundation layer, low-permeability layer and vegetative layer. All layers will be graded to a minimum slope of three percent to prevent ponding and promote lateral run-off of precipitation, thereby reducing infiltration.

In addition, to facilitate QA/QC of the cover construction as the filling progresses, proper surveying and construction techniques will be used throughout the landfill to provide control of placement and compaction of the individual layers.

4.5.2.1 FOUNDATION LAYER

The foundation layer will be graded to form an elongated ridge running through the center of the top deck. The foundation layer of Disposal Area C will be graded to blend with the already established grade from the adjoining Disposal Area AB+. The landfill will slope from this ridge line with a grade of at least three percent. Survey crews will stake the proposed foundation layer elevations so that the material can be graded and compacted as necessary to meet the final grade requirements. Only areas which require grading will be disturbed. Water trucks will be used at all times to eliminate any dust and aid in soil compaction.



S.W.F.P. : SOLID WASTE FACILITIES PERMIT.

FIGURE 4 - 1

CLOSURE PLAN
PROPOSED FINAL GRADING PLAN

SCALES	1" = 200'	SHEET OF	INDEX NUMBER	JOB NO. 9258

DESIGNED H.M.S. DATE DEC./1992
DRAWN
CHECKED
SUPERVISED
PROJECT ENGR. R.E. NO.
ASST. DIV./DIST. ENGR. R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL & STRUCTURAL ENGINEERS
1360 SOUTH VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765

LOPEZ CANYON LANDFILL

NO	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
1	GENERAL REVISIONS	SPD / KG	JAN 93

CITY OF LOS ANGELES
BUREAU OF SANITATION GILMAN A. BRAD, DIRECTOR
DATE _____ 19__
DIV/DIST. ENGR. R.E. NO.

SCALE 1" = 200'
SHEET NO.
DWG. NO.

11-24-92
C:\DWG\LOPEZ\9CJOB##

4.5.2.2 LOW-PERMEABILITY LAYER

The low-permeability cover material will be obtained from one of the sources identified in Section 3.0. It will be placed as outlined in the preliminary Quality Assurance/Quality Control (QA/QC) Plan presented in Appendix D. The low-permeability layer will be graded to the same configuration as described for the foundation layer. This low-permeability layer will be a minimum of 12-inches thick when completed.

However, the layer is designed for 15 inches to ensure that the minimum of 12-inches is achieved. The low-permeability material will be compacted and yield a saturated hydraulic conductivity of not more than $1x10^{-6}$ cm/sec or less.

4.5.2.3 VEGETATIVE LAYER

A minimum two-foot thick vegetative layer will be placed on top of the low-permeability layer. The vegetative layer will be placed as outlined in the preliminary Quality Assurance/Quality Control Plan presented in Appendix D. A geotextile filter fabric will be installed between the low-permeability and vegetative layers on all deck areas in order to eliminate piping of fine sands into cracks which may occur in the low-permeability layer over time.

4.5.3 SLOPE AREA FINAL GRADING

The final grades for the slope areas will be achieved by finish grading the foundation layer which consists of the existing intermediate cover material. The low-permeability and vegetative layers will be constructed as a monolithic layer placed in horizontal lifts approximately 12 feet wide. Excess material will then be trimmed back to the desired thickness. This allows for improved constructability while still meeting the performance standards alternative contained in Chapter 15. The constructed thickness of this monolithic layer will allow the upper two-foot thickness for use as a vegetative layer. The slopes will then be prepared for hydroseeding as discussed in Section 8.0.

4.5.4 ACCESS ROADS AND BENCHES

The main access to the closed landfill will be provided by the existing improved access road from Paxton Street. Access roads to the various gas collection and drainage facilities and to provide for post-closure maintenance of the final cover and landscaping will be provided. Vehicular access to the slope area will be facilitated by the bench roads. Bench road treatment consisting of crushed asphalt is proposed for those areas that will have low-permeability material as the final surface. Vehicular access to the steeper slope areas located along the lower portion of Disposal Area A is not possible at this time. However, this slope will be reconstructed to provide for additional service roads and benches. This will allow access to the bottom of this slope as shown on Figure 4-1. Traffic on the benches will be limited to maintenance vehicles and heavy equipment to minimize unnecessary rutting or damage.

4.6 SLOPE STABILITY

A slope stability analysis was performed in support of the Phase I closure to evaluate the slopes of Disposal Areas A and B. The analysis considered deep-seated stability under static and earthquake loads. Based on 1990 topography, the areas analyzed were about 300 to 400 feet in height with grades of approximately 2:1 (horizontal to vertical). The landfill slopes are typically constructed with 15-foot-wide terraces at 40-foot vertical intervals. A slope stability analysis for disposal Area C will also be performed in support of the Phase II closure. The analysis will evaluate the slopes of Disposal Area C for stability under static and dynamic conditions. The Plan will be amended to include the results of the slope stability analysis for Phase II, in accordance with Title 14 final closure plan requirements.

4.6.1 STATIC STABILITY ANALYSES

The static stability calculations were performed using the computer program "TSLOPE/TSTAB" developed by TAGA Engineering Software Services in Berkeley, California. The program uses Bishop's Simplified Method for circular failure surfaces and Spencer's Method for specified failure surfaces.

4.6.2 DYNAMIC ANALYSES

Dynamic stability calculations were performed using the Permanent Seismic Deformation Method presented by Makdisi and Seed (1978). This analysis assumes a slope has a "yield acceleration" that produces a horizontal inertial force on the slope and reduces the factor of safety to unity. Any acceleration beyond the yield acceleration will produce permanent deformations in the slope. The deformations were approximated using Figure 4-2 (Makdisi and Seed, 1978) and a ratio of yield acceleration to peak ground acceleration. The peak ground acceleration of 0.69g was determined using the deterministic method proposed by Seed and Idriss (1982) for Maximum Credible Earthquake (MCE) and Maximum Probable Earthquake (MPE) for the San Fernando Fault Zone.

4.6.3 RESULTS OF ANALYSIS

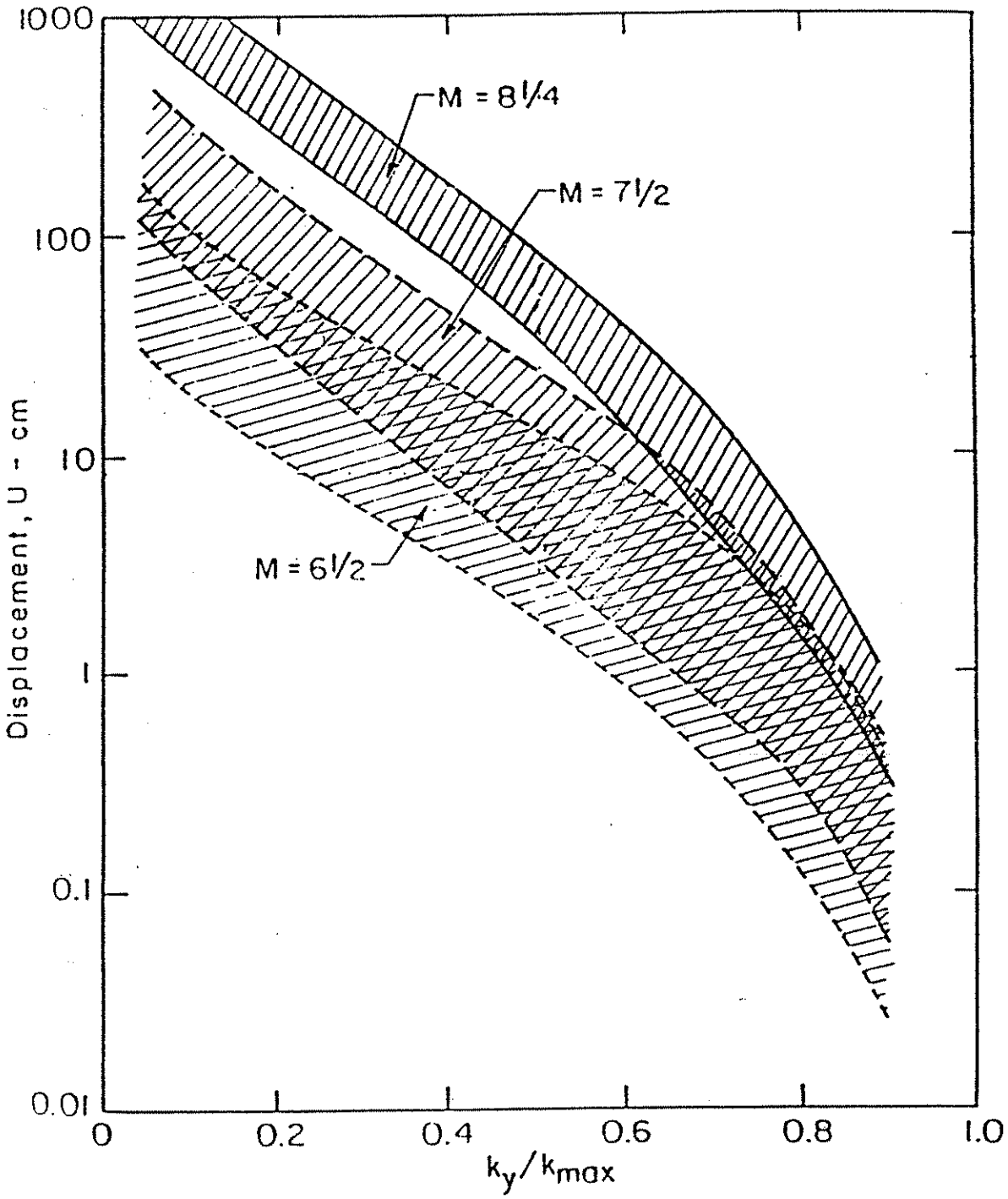
The strength parameters used in the stability analyses were determined as follows:

- Strength parameters of the refuse landfill material were based on available literature and information from previous studies conducted for the BKK Landfill in West Covina, California.

- Strength parameters of the bedrock materials were based on results of tests on undisturbed samples sheared and resheared across the natural bedding orientations at saturated conditions.

- Strength parameters for the clay cover materials were based on the results of laboratory tests.

More detailed descriptions of the test procedures and results of the direct shear tests are presented in Appendix A of Volume II, Report of Design, Lopez Canyon Landfill, Lakeview Terrace District, Los Angeles, California, dated May 5, 1988 (LCA AE-86425-L) (Appendix B).



REFERENCE : MAKDISI AND SEED (1978)

FIGURE 4 - 2

BAS
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CIVIL AND ENVIRONMENTAL ENGINEERS

LOPEZ CANYON LANDFILL

SEISMIC DEFORMATION CHART

JOB NO.	9035-1008
DATE	FEB. 1991
DRAWN BY:	H.M.G.
CHECKED BY:	

The strengths used in the stability analyses for the various materials are as follows:

Material	Cohesion (psf)	Friction Angle	Unit Weight (psf)
Refuse	600	25	55
Bedrock	200	34	115
Clay Cover	290	33	115

The stability calculations and results of the analyses are presented in Appendix E. A summary of the stability analyses follows with reference to the cross sections presented in Appendix E.

Cross Section	Static FS	Critical Seismic Coefficient (FS=1)	Seismic Deformation (ft.) MCE	MPE
A' - A"	1.85	0.25	1	½
B" - B'	1.78	0.23	1	½
B - A	1.80	0.24	1	½

Based on the stability analyses, the landfill slopes should perform satisfactorily under both static and seismic conditions. The estimated permanent deformation of the landfill slope of about 1 to 2 feet, should not adversely affect the overall stability of the slope and will not significantly impact the closure systems.

4.7 EROSION POTENTIAL AND SOIL LOSS ANALYSIS

Soil loss potential at landfill sites due to water erosion is evaluated using the U.S. Department of Agriculture Universal Soil Loss Equation (USLE). The USLE was intended for analysis of cropland soil loss, but can be applied to landfill sites with certain assumptions. This equation is:

$$A = RKLSCP$$

where	A	=	average annual soil loss, in tons/acre
	R	=	rainfall and runoff erosivity index
	K	=	soil erodibility factor, tons/acre
	L	=	slope-length factor
	S	=	slope-steepness factor
	C	=	cover-management factor
	P	=	support practice factor

The input data to this equation are described in Evaluating Cover Systems for Solid and Hazardous Waste (SW-867) September, 1982, U.S. EPA (revised edition), which is presented in Appendix A.

For the purpose of soil loss analysis, the landfill was divided into regions based upon the average slopes of the final cover and surface drainage characteristics. The landfill soil loss evaluation data is identified on Table 4-1 and soil loss evaluation areas are identified on Figure 4-3.

The USLE factors for the Lopez Canyon Landfill study were assigned as follows:

R = 50	Accepted value for Southern California inland and coastal valleys (Figure 20 in Appendix A).
K = 0.28	It is assumed that final cover material will be a "clay loam", and will be less than 0.5% organic.
$0.07 \leq LS \leq 33.0$	Dependent upon length and average gradient of study area (Table 6, Appendix A).
C = 0.013 Decks 0.011 Slopes	"C" is predominantly based on agricultural factors, including seasonal grass cover (Table 7, Appendix A).
$0.3 < P < 1.0$	Dependent upon existence of benches and on gradient of study area (Table 8, Appendix A).

The average depth of soil loss, assuming a soil density of 125 pounds per cubic foot, will be 0.006 inches per year for the deck and 0.0147 inches per year for the slope areas at the landfill. Over the 30-year post-closure maintenance period, the average

TABLE 4-1
SOIL LOSS ANALYSIS
(DECK AREAS)

STUDY AREA	AREA (ac)	TOTAL LENGTH (ft.)	AVERAGE GRADE %	R FACTOR	K FACTOR	LS FACTOR	C FACTOR	P FACTOR	TONS PER ACRE	ANNUAL SOIL LOSS (tons)
I	2	600	2	50	0.12	5.26	0.013	1.0	0.41	0.82
II	15.17	1000	3	50	0.28	0.57	0.013	1.0	0.10	1.57
III	15.04	900	3	50	0.28	0.56	0.013	1.0	0.1	1.53
XI	0.83	200	2	50	0.28	0.25	0.013	1.0	0.05	0.04
XIV	11.39	1000	3	50	0.28	0.57	0.013	1.0	0.10	1.18
XV	14.66	800	3	50	0.28	0.54	0.013	1.0	0.10	1.44
XVII	0.83	350	5	50	0.12	4.37	0.013	1.0	0.34	0.28
XVIII	0.72	50	5	50	0.28	13.00	0.013	1.0	2.37	1.70
XVIV	4.1	450	3	50	0.28	0.46	0.013	1.0	0.08	0.34
XXI	9.5	500	3	50	0.28	0.47	0.013	1.0	0.09	0.82
XXII	8.4	400	3	50	0.28	0.57	0.013	1.0	0.10	0.87
XXVI	4.1	300	3	50	0.28	0.50	0.013	1.0	0.09	0.37
TOTAL	86.74									10.96

(SLOPE AREAS)

STUDY AREA	AREA (ac)	TOTAL LENGTH (ft.)	AVERAGE GRADE %	R FACTOR	K FACTOR	LS FACTOR	C FACTOR	P FACTOR	TONS PER ACRE	ANNUAL SOIL LOSS (tons)
IV	1.25	530	27.5	50	0.28	15.95	0.011	1.0	2.46	3.07
V	2.63	600	27.5	50	0.28	17.00	0.011	1.0	2.62	6.89
VI	1.84	1300	23.75	50	0.28	21.63	0.011	1.0	3.33	6.13
VII	9.79	1000	27.25	50	0.28	22.00	0.011	1.0	3.39	33.17
VIII	0.55	300	27.25	50	0.28	12.00	0.011	1.0	1.85	1.02
IX	9.02	1100	27.25	50	0.28	24.50	0.011	1.0	3.77	34.03
X	9.92	1200	27.25	50	0.28	25.50	0.011	1.0	3.93	38.96
XII	7.29	800	30	50	0.28	23.00	0.011	1.0	3.54	25.82
XIII	5.91	1200	38	50	0.28	29.00	0.011	1.0	4.47	26.4
XVI	5.97	1500	26.25	50	0.28	26.75	0.011	1.0	4.12	24.6
XX	6.7	800	27.25	50	0.28	17.00	0.011	1.0	2.62	17.54
XXIII	8.0	800	27.25	50	0.28	17.00	0.011	1.0	2.62	20.94
XXIV	11.0	1100	27.25	50	0.28	19.00	0.011	1.0	2.93	32.19
XXV	11.5	1100	27.25	50	0.28	19.00	0.011	1.0	2.93	33.65
TOTAL	91.37									304.41

(Lopez Partial Closure Plan:SOILANAL:12-3-92)

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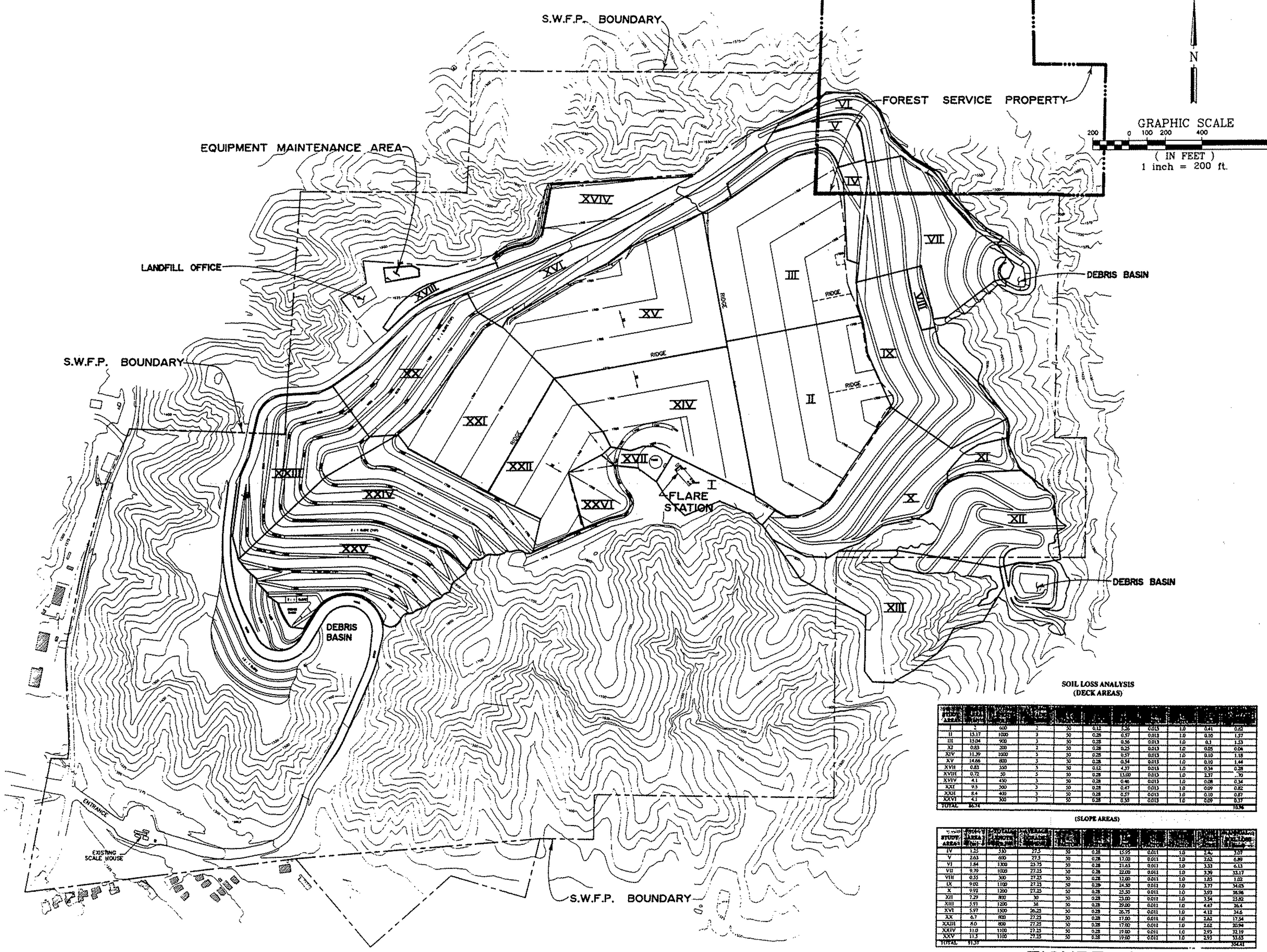

SOIL LOSS ANALYSIS
(DECK AREAS)

STUDY AREAS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I	2	600	2	50	0.12	5.25	0.013	1.0	0.41	0.22
II	15.17	1000	3	50	0.28	0.57	0.013	1.0	0.10	1.57
III	13.04	900	3	50	0.28	0.56	0.013	1.0	0.1	1.53
XI	0.83	200	2	50	0.28	0.25	0.013	1.0	0.05	0.04
XIV	11.39	1000	3	50	0.28	0.57	0.013	1.0	0.10	1.18
XV	14.66	800	3	50	0.28	0.54	0.013	1.0	0.10	1.44
XVII	0.83	350	5	50	0.12	4.37	0.013	1.0	0.34	0.28
XVIII	0.72	50	5	50	0.28	13.00	0.013	1.0	2.37	..70
XVIV	4.1	450	3	50	0.28	0.46	0.013	1.0	0.08	0.34
XXI	9.5	500	3	50	0.28	0.47	0.013	1.0	0.09	0.82
XXII	8.4	400	3	50	0.28	0.57	0.013	1.0	0.10	0.87
XXVI	4.1	300	3	50	0.28	0.50	0.013	1.0	0.09	0.37
TOTAL	86.74									10.96

(SLOPE AREAS)

STUDY AREAS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IV	1.25	550	27.5	50	0.28	15.95	0.011	1.0	2.4.	3.07
V	2.63	600	27.5	50	0.28	17.00	0.011	1.0	2.62	6.89
VI	1.84	1300	23.75	50	0.28	21.63	0.011	1.0	3.33	6.13
VII	9.79	1000	27.25	50	0.28	22.00	0.011	1.0	3.39	33.17
VIII	0.55	300	27.25	50	0.28	12.00	0.011	1.0	1.85	1.02
IX	9.02	1100	27.25	50	0.28	24.50	0.011	1.0	3.77	34.03
X	9.92	1200	27.25	50	0.28	25.50	0.011	1.0	3.93	38.96
XII	7.29	800	30	50	0.28	23.00	0.011	1.0	3.54	25.82
XIII	5.91	1200	38	50	0.28	29.00	0.011	1.0	4.47	26.4
XVI	5.97	1500	26.25	50	0.28	26.75	0.011	1.0	4.12	24.6
XX	6.7	800	27.25	50	0.28	17.00	0.011	1.0	2.62	17.54
XXIII	8.0	800	27.25	50	0.28	17.00	0.011	1.0	2.62	20.94
XXIV	11.0	1100	27.25	50	0.28	19.00	0.011	1.0	2.93	32.19
XXV	11.5	1100	27.25	50	0.28	19.00	0.011	1.0	2.93	33.83
TOTAL	91.37									304.41

NOTE :
S.W.F.P. : SOLID WASTE FACILITIES PERMIT.

FIGURE 4 - 3
CLOSURE PLAN
SOIL LOSS ANALYSIS PLAN

SCALES 1" = 200' | SHEET OF | INDEX NUMBER

LOPEZ CANYON LANDFILL

BAS
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CIVIL AND ENVIRONMENTAL ENGINEERS
1360 SOUTH VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765

DESIGNED		DATE
DRAWN	PTN	DEC. 92
CHECKED		
SUPERVISED		
PROJECT ENGR.		R.E. NO.
ASST. DIV./DIST. ENGR.		R.E. NO.

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
A	GENERAL REVISIONS	SPD / K9	JAN 1993

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ________ 19___
DIV/DIST. ENGR. R.E. NO.

SCALE 1" = 200'
SHEET NO.
DWG. NO.
JOB NO. 9258
11-24-92
C:\DWG\LOPEZ\BIGJOHN

soil loss for the deck area would be 0.017 inches and 0.441 inches for the slope areas. The 30-year soil loss for the deck and slope area is .07 percent and 1.8 percent, respectively, of the total vegetative layer depth of 24 inches, which is within the minimum required depth stipulated under Title 14 and Chapter 15 regulations.

4.8 SETTLEMENT ANALYSES

4.8.1 GENERAL

Settlement analyses were performed to verify that the final landfill cover design will maintain adequate surface grades for drainage after closure in Disposal Areas A, B, AB+ and C.

The settlement of sanitary landfills is basically the result of shrinkage due to compaction and decomposition of the landfill materials. The amount of settlement over time is dependent on many variables, which at present, are largely unknown and difficult to quantify.

However, some research has been made of sanitary landfill settlements. Observations and studies conducted by the County of Los Angeles Sanitation Districts (Huitric, 1981) for the Mission Canyon Landfill in the Santa Monica Mountains in Southern California indicate the overall, ultimate settlements of municipal sanitary landfills may be about 30 to 35 percent of the thickness of the refuse placed.

4.8.2 METHOD OF ANALYSES

Based on studies by the County of Los Angeles Sanitation Districts, an empirical relationship was derived for calculating sanitary landfill settlement. It is assumed that the refuse at Lopez Canyon Landfill is similar to that at landfills operated by the County Sanitation Districts. For this case, an ultimate settlement of 30 percent of the refuse thickness was assumed for preliminary design purposes.

For the Lopez Canyon Landfill settlement study of Disposal Areas A, B and AB+, a series of topographic plans (dated 1965, 1978, 1979, 1982, 1986, 1987, 1988, and 1990) were provided by the City of Los Angeles, Bureau of Sanitation in addition to

the proposed final grading plan for closure. The topographic plans were analyzed at selected points to determine the change in surface elevation over time during the period of landfill operation, and a chronological history of refuse placement was determined. According to City records, placement of refuse at the Lopez Canyon Landfill did not begin until 1976. Since no topographic plan was provided for 1976, the earlier 1963 topographic plan is assumed to correspond with the 1976 surface elevations.

For the Disposal Area C settlement study, projected 1992 prefilling contours and projected 1996 closure contours were simulated. By using the above referenced empirical trash settlement curves, total settlement at various points for the trash thickness between the 1992 and 1996 contours were estimated. Then having developed total settlement contours, projected 2046 post-settlement contours after 50 years were developed.

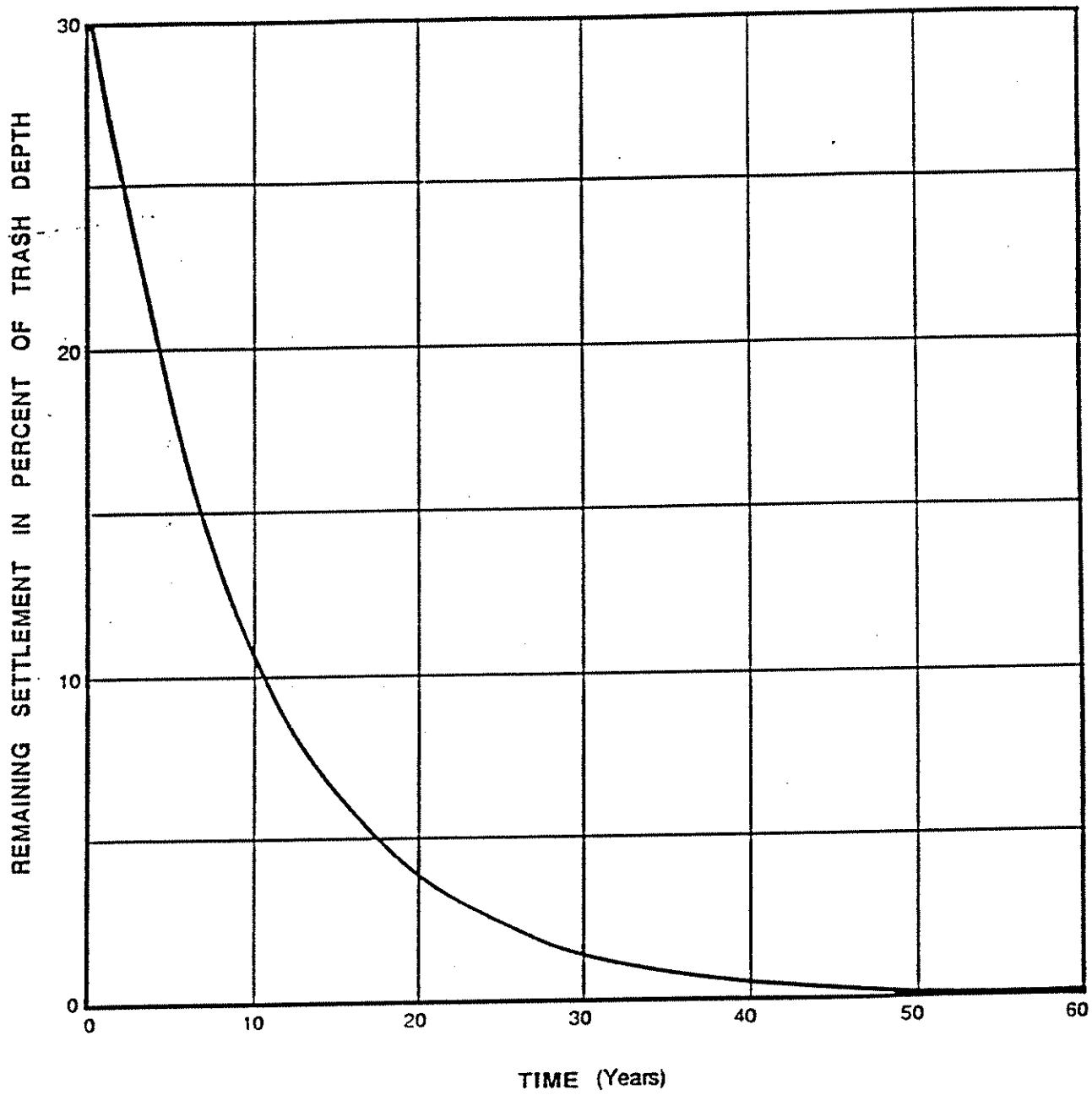
Assuming that ultimate settlement would be 30% of the refuse thickness, the amount of settlement for a given layer of refuse placed was computed using the following empirical relationship:

$$S = H - (0.7H - 0.3He^{-0.1t})$$

Where: S = Settlement (feet)
H = Height (or thickness) of refuse layer (feet)
t = Age of layer (years)
e = 2.718

4.8.3 RESULTS OF ANALYSES

From this equation, two sanitary landfill settlement curves were established (see Figures 4-4 and 4-5) which show the percent settlement that has occurred versus time and the percent of settlement remaining versus time respectively for each refuse layer. Based on these relationships, the ultimate settlement (assumed to be 30 percent of refuse thickness) is essentially complete 50 years after placement. These settlement curves are ideal and actual settlement will vary depending upon phasing and stockpiling plans.



(BASED ON 30% TOTAL SETTLEMENT)

REFERENCE :
LAW/CRANDALL 1988.

FIGURE 4 - 4

BAS
[714] 860-7777
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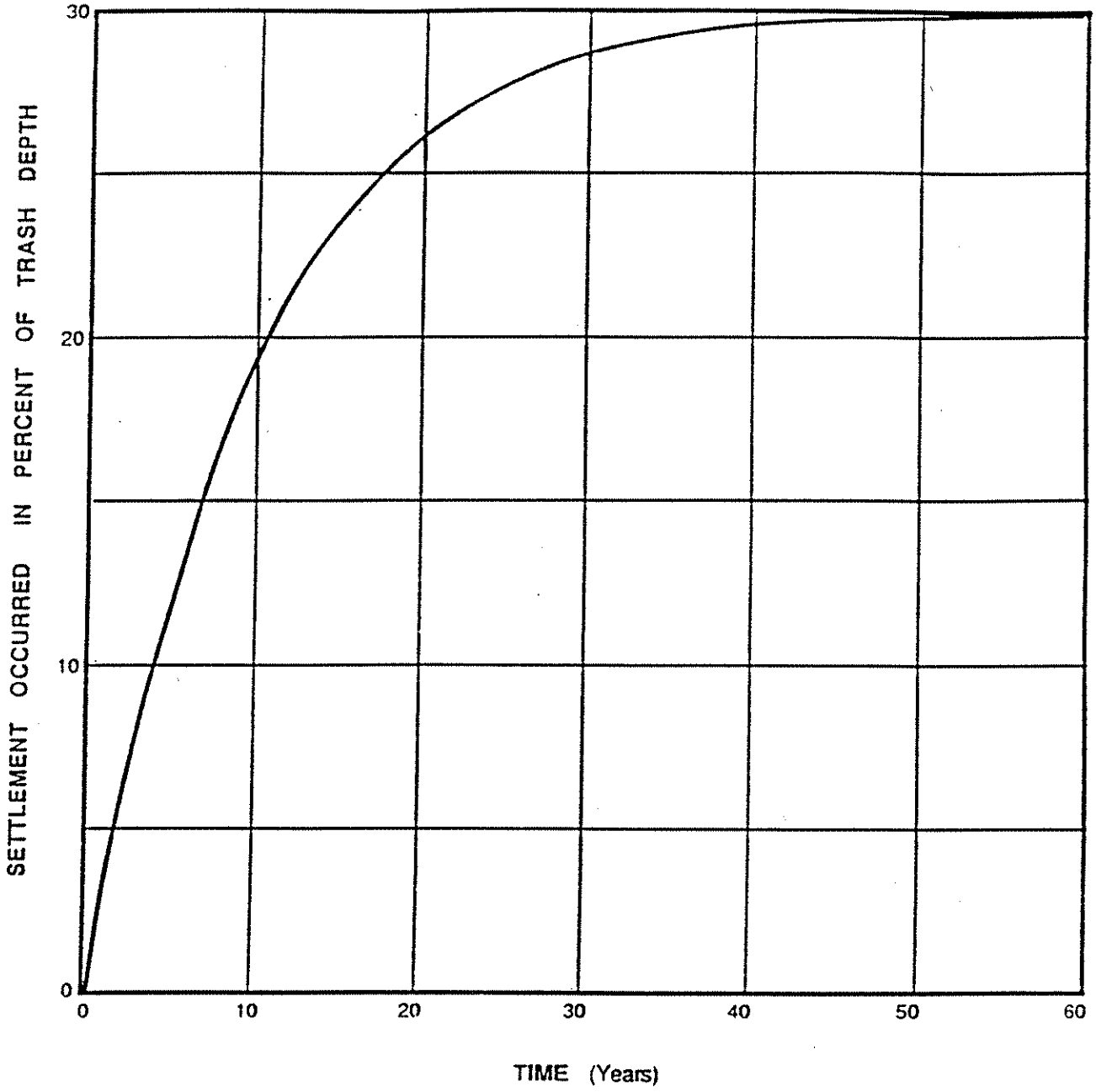
LOPEZ CANYON LANDFILL

LANDFILL SETTLEMENT CURVE

JOB NO.	9035 - 1008
DATE	FEB. 1991
DRAWN BY:	PTN
CHECKED BY:	



(NOTE : BASED ON 30% TOTAL SETTLEMENT)

REFERENCE :
LAW/CRANDALL 1988.

FIGURE 4 - 5

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LOPEZ CANYON LANDFILL

LANDFILL SETTLEMENT CURVE

JOB NO.	9035 - 1008
DATE	FEB, 1991
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CHECKED BY:	

Settlement was computed at numerous points throughout the landfill. The approximate locations are presented in Figures 4-6 and 4-7. The thickness and age of each refuse layer for Disposal Areas A, B and AB+ were based on the history of placement derived from the topographic maps, as previously discussed. The thickness and age of each refuse layer for Disposal Area C was estimated based on the fill sequencing plans. The estimated settlement for all of the Disposal Areas (both occurred and remaining) was computed at the time of closure, 10 years after closure, and 50 years after closure.

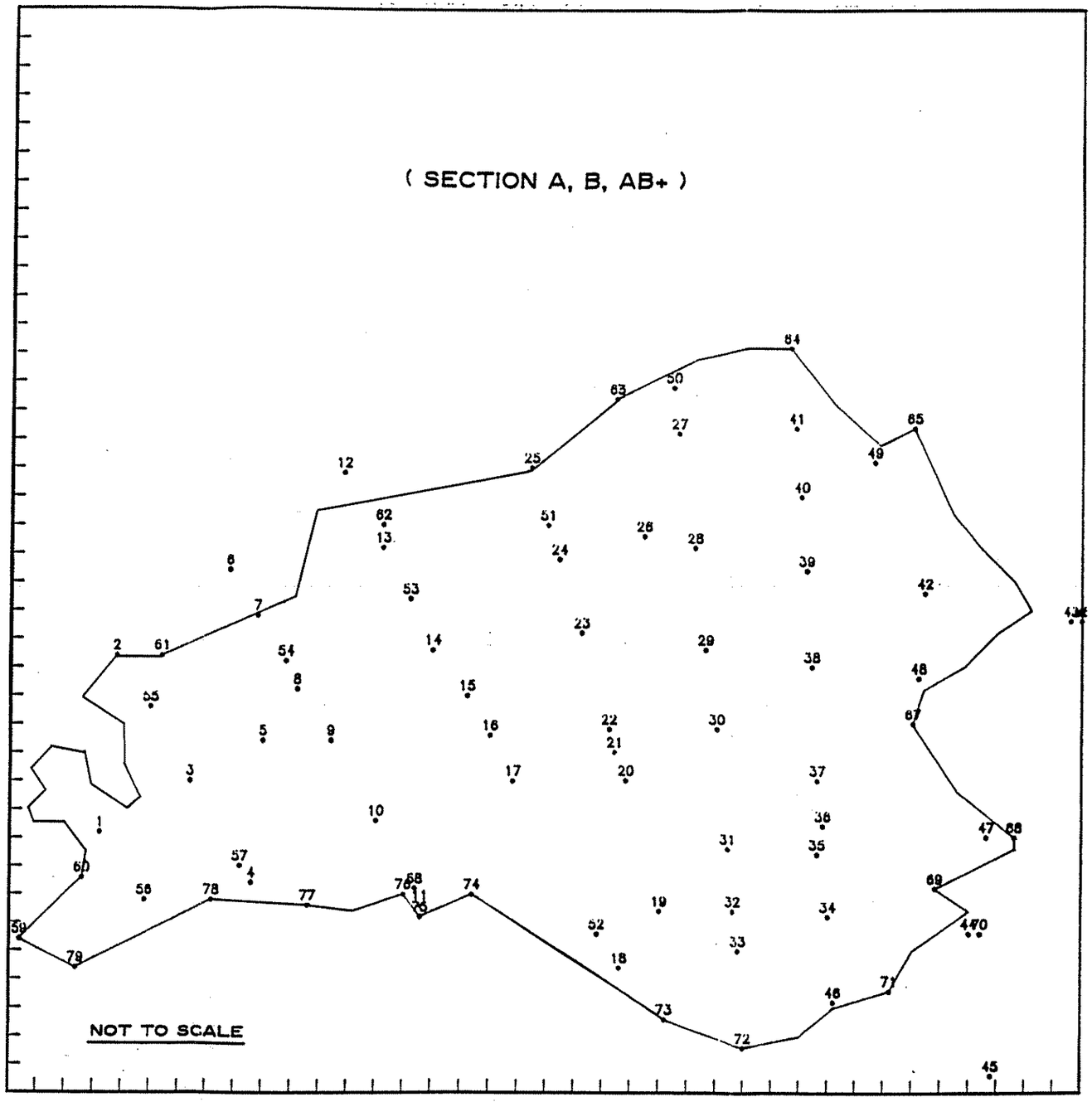
Settlement isopleths were drawn for maximum settlement occurring approximately 50 years after closure as shown on Figures 4-8 and 4-9. Based on the estimated settlement, a plot of the approximate surface elevation contours of the settled landfill was drawn and is presented in Figures 4-10 and 4-11.

4.8.4 SETTLEMENT MONUMENTATION

In order to monitor the future settlement of the landfill, survey monuments will be installed strategically throughout the site. These monuments will consist of galvanized pipes, two-inches in diameter and 18- inches long placed in blocks of concrete 12-inches in diameter by nine inches deep. A nail and tag will be placed in the center of the monument for identification.

A total of 10 monuments will be placed on the landfill area. Three monuments will also be placed as reference points in ground not subject to settlement. The locations proposed for these monuments are shown on Figures 4-12. All survey monuments will be routinely monitored as part of the post-closure maintenance and monitoring activities. Figure 4-13 shows the survey monument protection detail.

(SECTION A, B, AB+)



REF : LeROY CRANDALL AND ASSOCIATES 1988.

FIGURE 4 - 6

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LOPEZ CANYON LANDFILL

SETTLEMENT POINTS
DISPOSAL AREAS A, B AND AB+

JOB NO.	9035-1008
DATE	FEB. 1991
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CHECKED BY:	

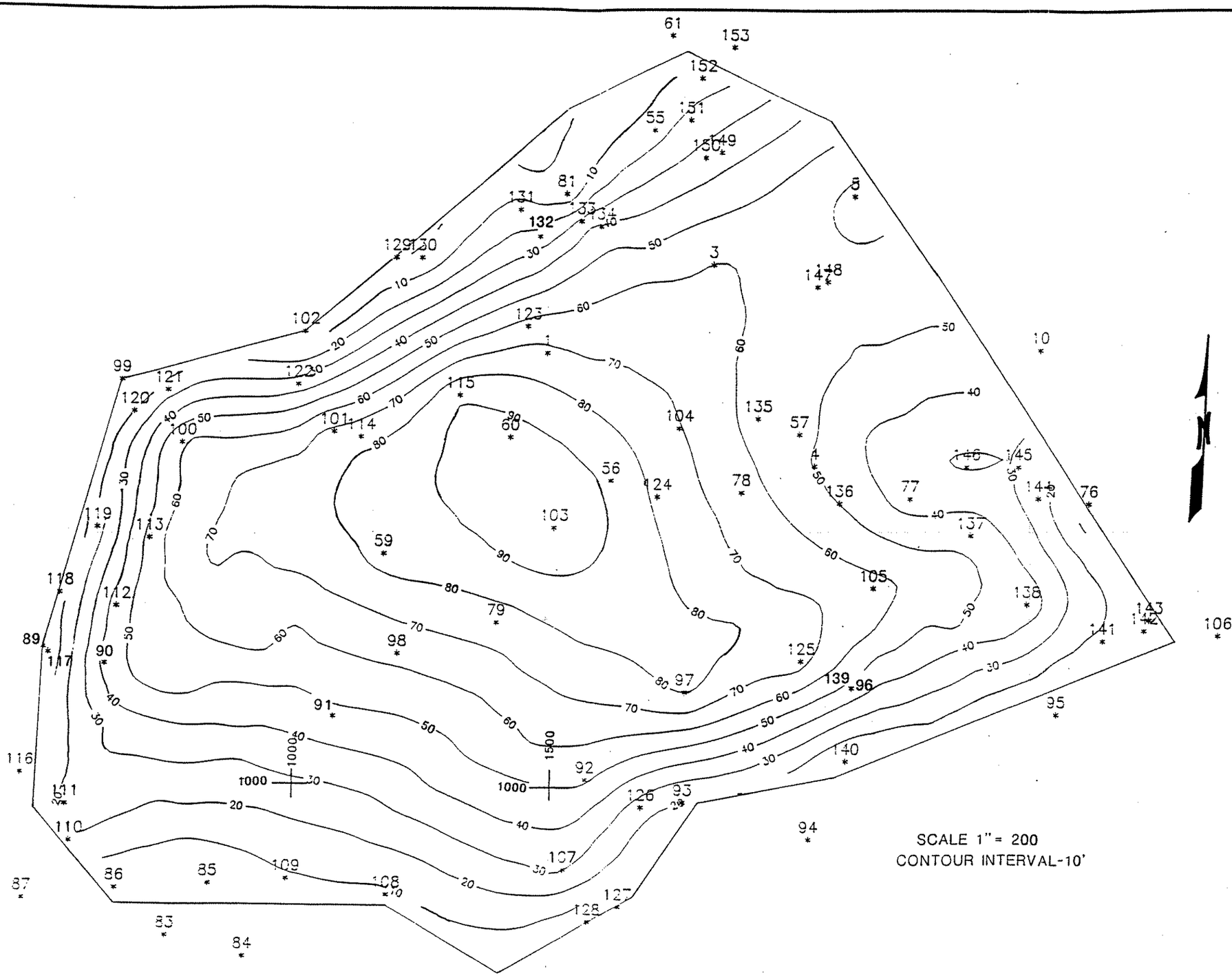

FIGURE 4 - 7

REF : LAW / CRANDALL, INC. 1990.

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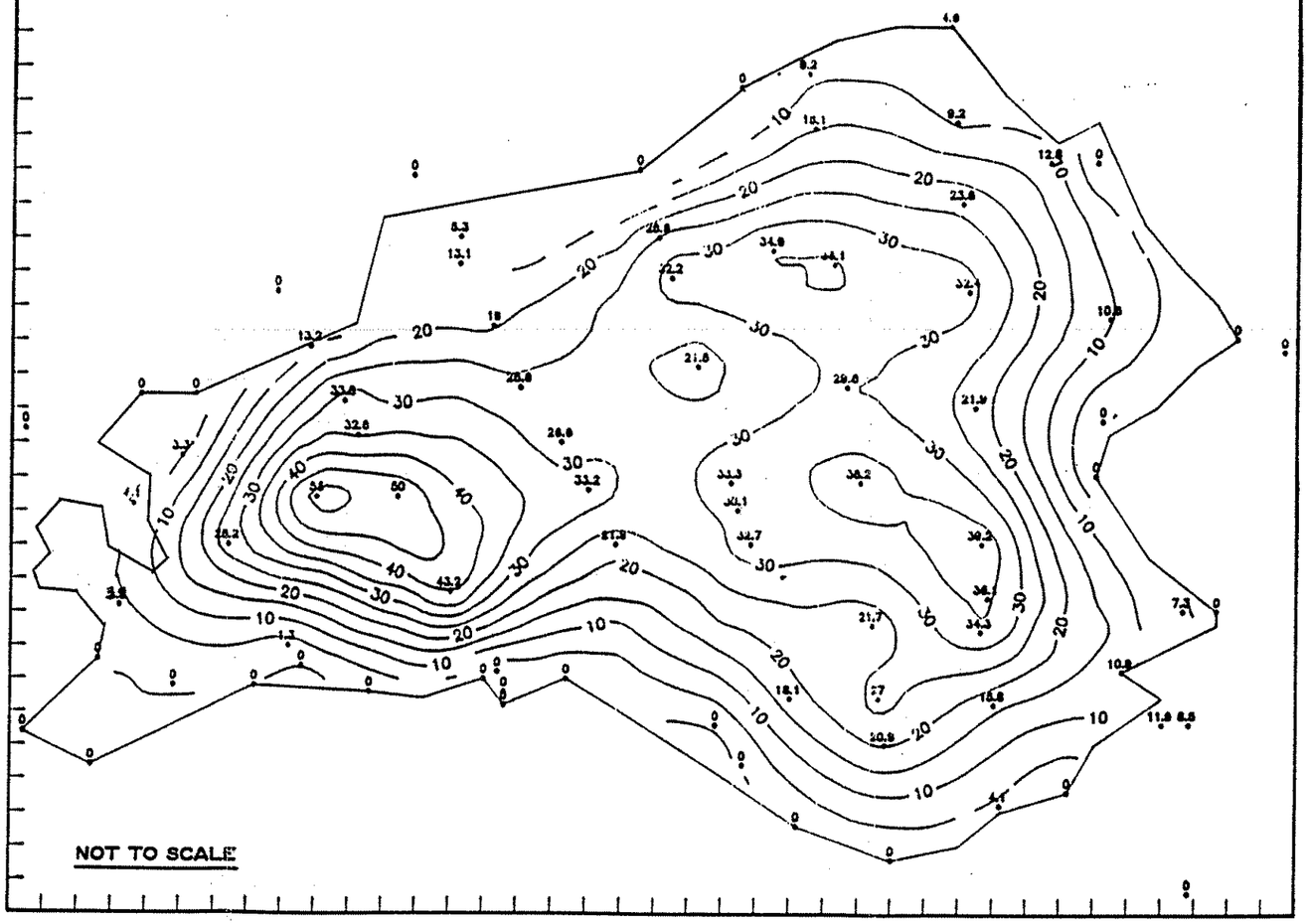
LOPEZ CANYON LANDFILL

SETTLEMENT POINTS
DISPOSAL AREA C

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

(SETTLEMENT IN FEET)

(SECTION A, B, & AB+)



REF : LeROY CRANDALL AND ASSOCIATES 1988.

FIGURE 4 - 8

[714] 860-7777
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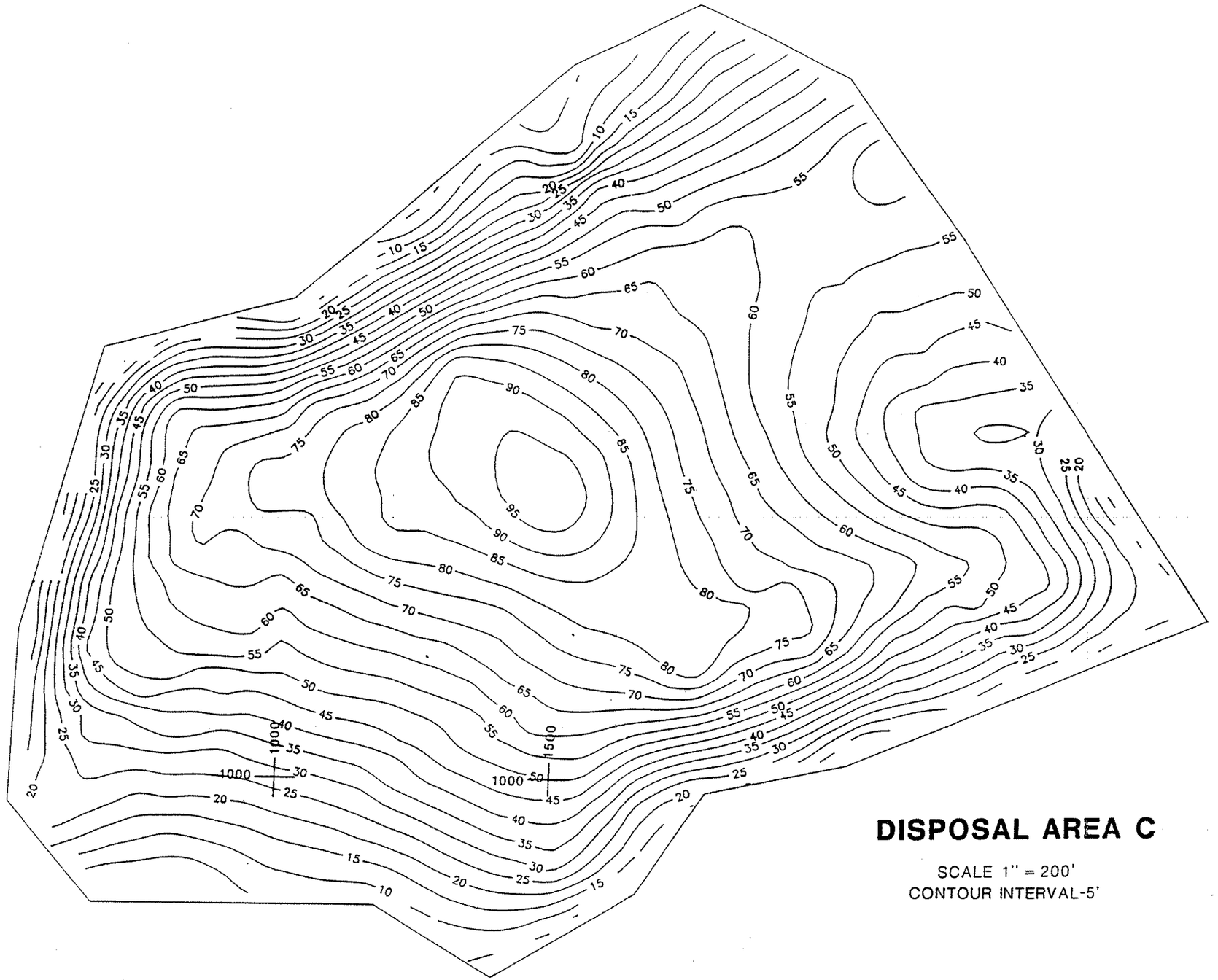
LOPEZ CANYON LANDFILL

50-YEAR SETTLEMENT CONTOURS
DISPOSAL AREAS A, B AND AB+

JOB NO.	9035-1008
DATE	FEB. 1991
DRAWN BY:	PTN
CHECKED BY:	



DISPOSAL AREA C

SCALE 1" = 200'
CONTOUR INTERVAL-5'

FIGURE 4 - 9

REF : LAW / CRANDALL, INC. 1990.

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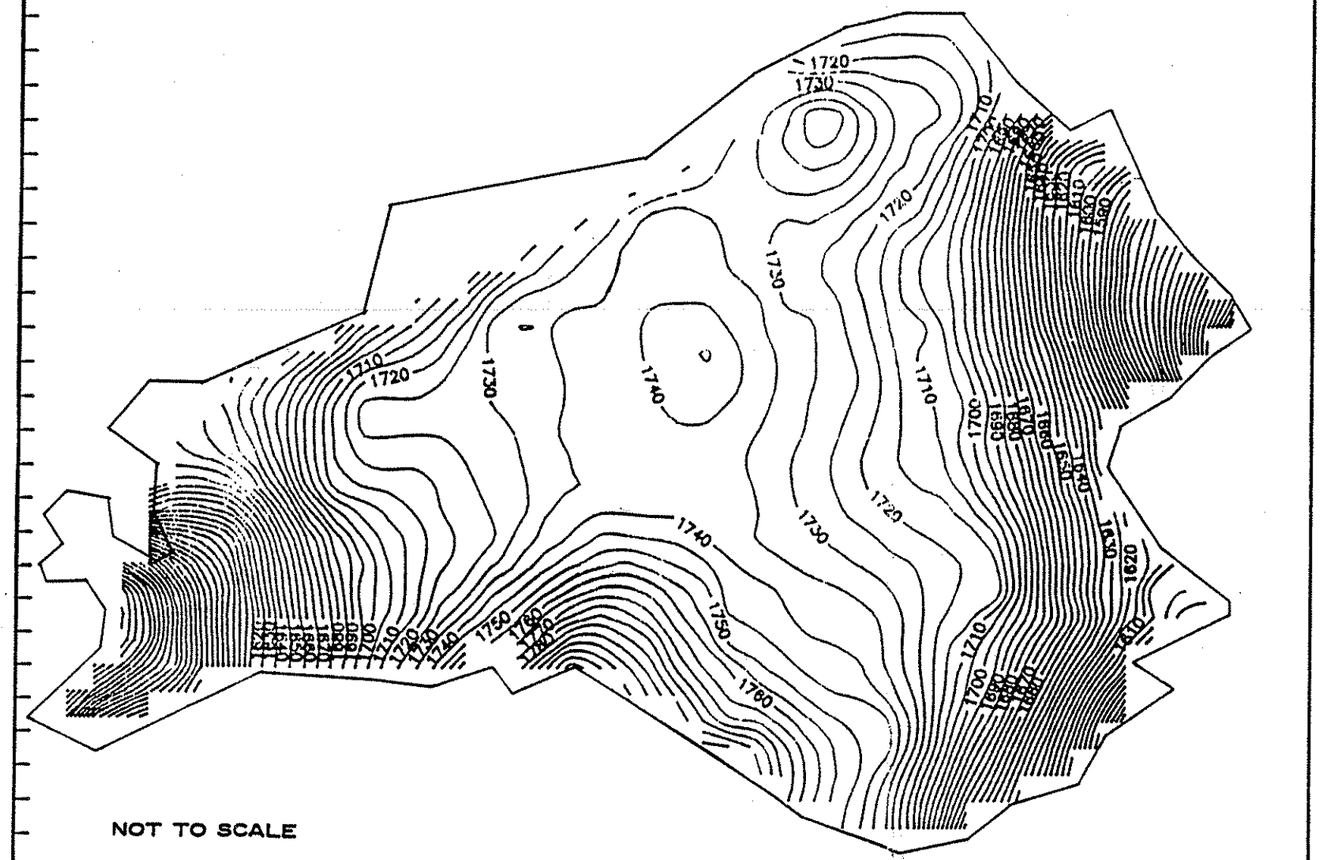
LOPEZ CANYON LANDFILL

50 - YEAR SETTLEMENT CONTOURS
DISPOSAL AREA C

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

(ELEVATION IN FEET M.S.L.)

(SECTION A, B, AB+)



NOT TO SCALE

REF : LeROY CRANDALL AND ASSOCIATES 1988.

FIGURE 4 - 10

BAS

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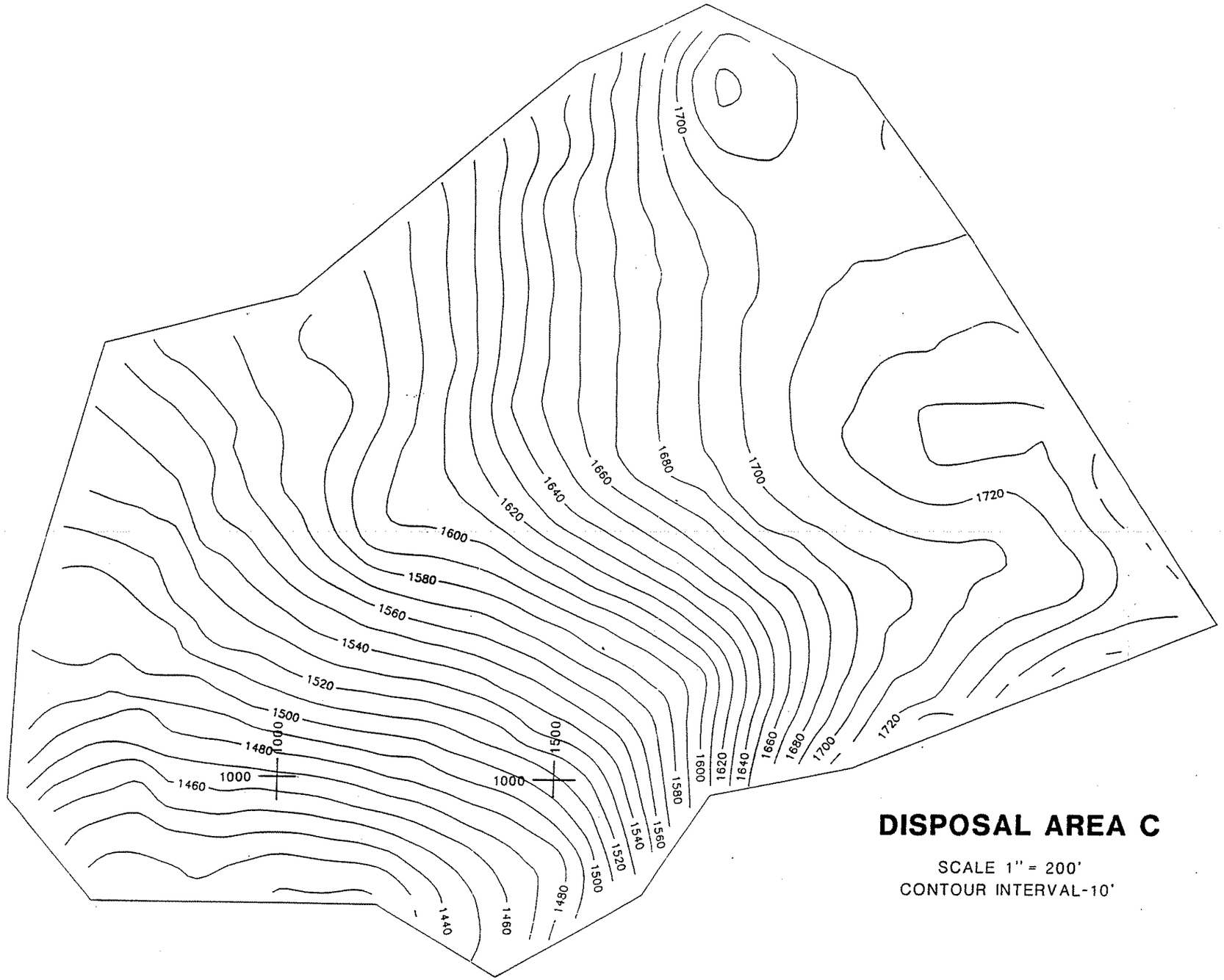
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL

50-YEAR ELEVATION CONTOURS
DISPOSAL AREAS A, B AND AB+

JOB NO.	9035-1008
DATE	FEB. 1991
DRAWN BY:	PTN
CHECKED BY:	CMA



DISPOSAL AREA C

SCALE 1" = 200'
CONTOUR INTERVAL-10'

FIGURE 4 - 11

REF : LAW / CRANDALL, INC. 1990.

BAS
[714] 860-7777
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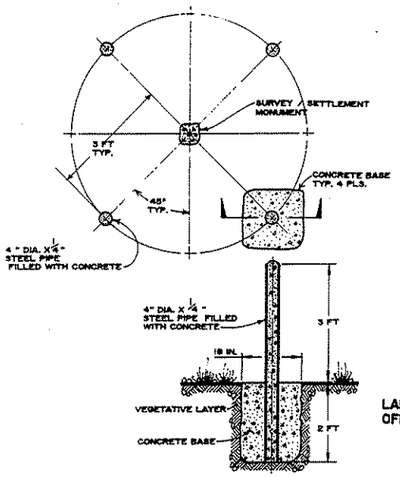
LOPEZ CANYON LANDFILL

50 - YEAR ELEVATION CONTOURS
DISPOSAL AREA C

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB



SETTLEMENT MONUMENT DETAIL

NOT TO SCALE

S.W.F.P. BOUNDARY

EQUIPMENT MAINTENANCE AREA

FOREST SERVICE PROPERTY

LANDFILL OFFICE

FLARE STATION

ENTRANCE

EXISTING SCALE HOUSE

S.W.F.P. BOUNDARY

N

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

LEGEND :

S.W.F.P. : SOLID WASTE FACILITIES PERMIT.

▲ SM-1 SETTLEMENT MONUMENT

△ SRM-1 SETTLEMENT REFERENCE MONUMENT

FIGURE 4 - 12

CLOSURE PLAN

SETTLEMENT MONUMENTATION PLAN

SCALES | 1" = 200' | SHEET OF | INDEX NUMBER

DESIGNED | DRAWN | CHECKED | SUPERVISED | PROJECT ENGR. | R.E. NO. | ASST. DIV./DIST. ENGR. | R.E. NO. | DATE

BAS BRYANT A. STIRRAT & ASSOCIATES CIVIL AND ENVIRONMENTAL ENGINEERS 1360 SOUTH VALLEY VISTA DRIVE DIAMOND BAR, CA 91765

CITY OF LOS ANGELES BUREAU OF SANITATION KELVIN A. BRAD, DIRECTOR

DATE _____ 19____

DIV/DIST. ENGR. R.E. NO.

LOPEZ CANYON LANDFILL

REVISION DESCRIPTION | DIV./DIST. ENGR. | DATE

NO. 1 GENERAL REVISIONS | EPD / 60 | JAN 93

SCALE 1" = 200'

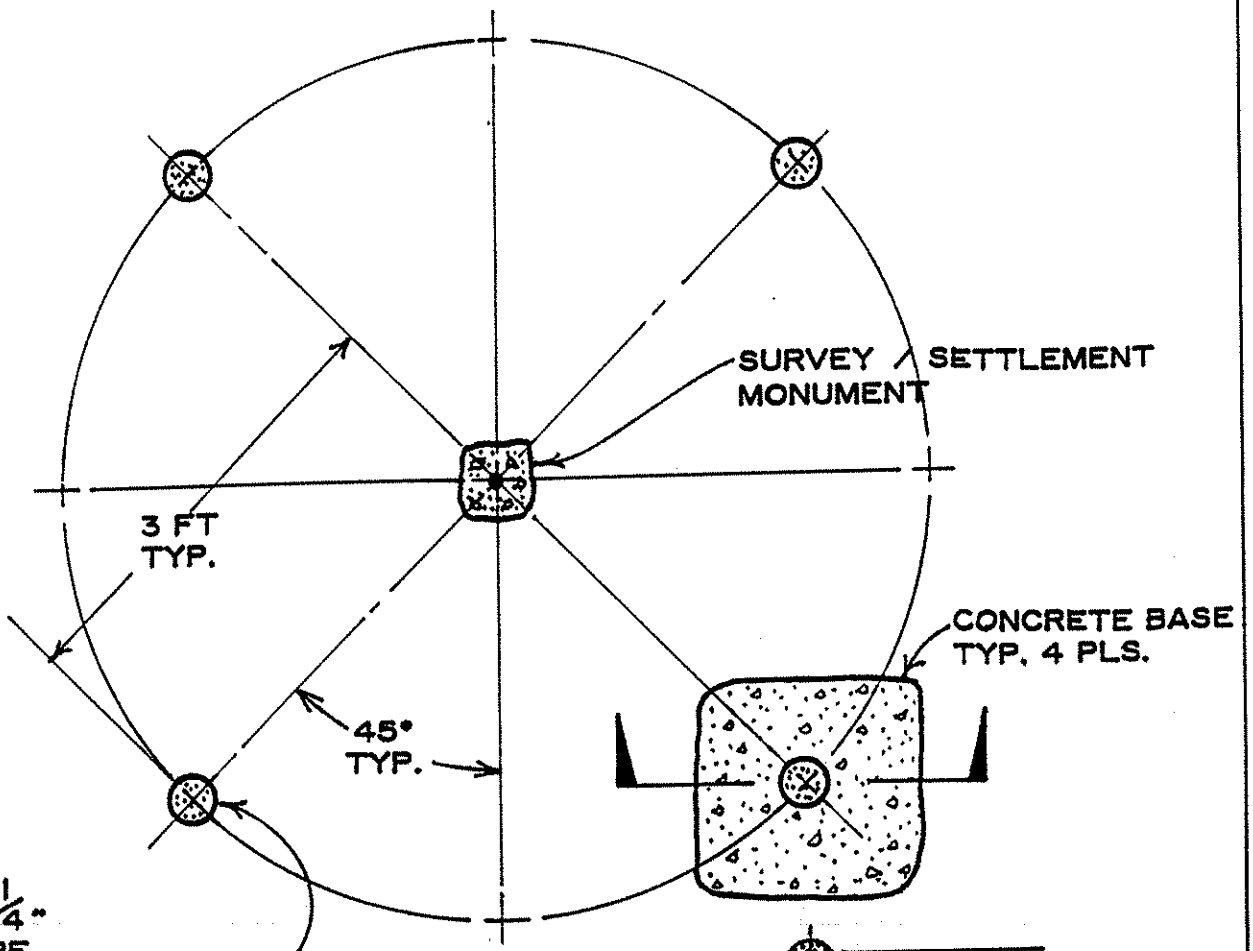
SHEET NO.

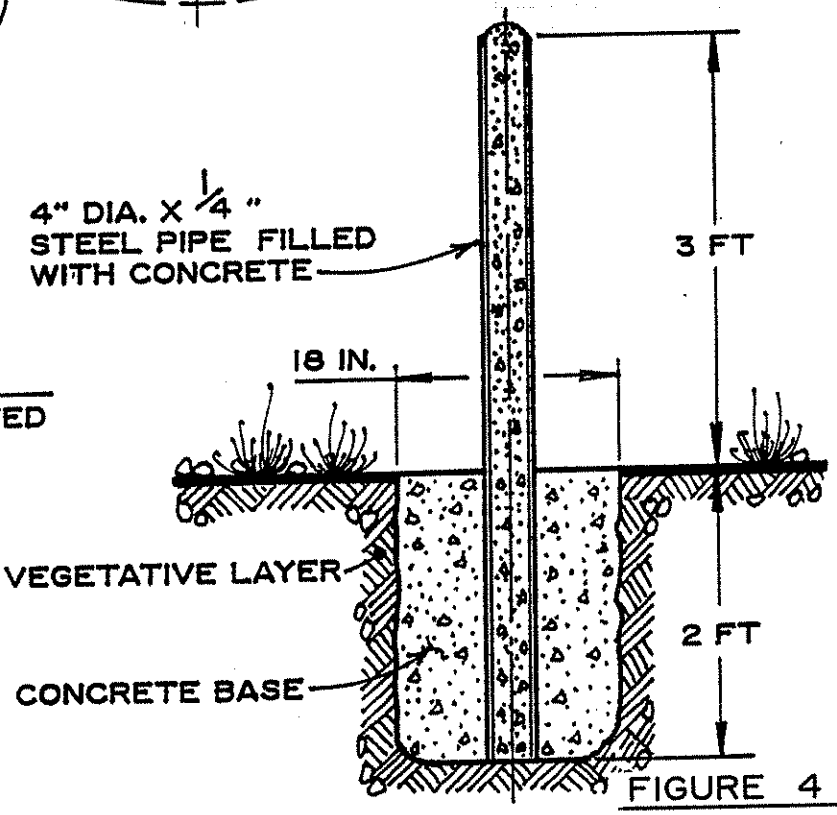
DWG. NO.

JOB NO. 9258

11-24-92

C:\DWG\LOPEZ\BRGJOHN





NOTE :

MONUMENTS WILL BE PAINTED SATETY YELLOW.

FIGURE 4 - 13

BAS
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BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL

SURVEY / SETTLEMENT MONUMENT PROTECTION

JOB NO.	9035-1021
DATE	MAR. 1991
DRAWN BY:	PTN
CHECKED BY:	MJB

SECTION 5.0

FINAL DRAINAGE

5.0 FINAL DRAINAGE

5.1 INTRODUCTION

The two major functions of the drainage system are to minimize cover erosion and infiltration by the rapid removal of rainfall and to divert off-site run-on away from the disposal areas.

The rapid removal of rainfall from the surface of the landfill will be facilitated by sloping the disposal areas so that water flows freely to storm drains installed to collect and transport the runoff to perimeter drainage courses. The drainage courses are located along the eastern and western perimeters of the main disposal areas.

The analyses and design of these systems are described in detail in the following sections.

5.2 HYDROLOGY

5.2.1 LOCAL HYDROLOGY

The Lopez Canyon Landfill lies in the northwest portion of the drainage area known as the Hansen Dam Flood Control Basin. This basin accommodates discharge from that portion of the San Gabriel Mountains surrounding the landfill.

The Lopez Canyon diversion channel system located along Lopez Canyon Road accepts flows from Lopez and Indian Canyons located directly west and north of the site, respectively (see Figure 1-2). Run-off from the east side of the landfill and surrounding hills drain naturally into Bartholomaus Canyon. Discharges from these waterways eventually outlet into the Hansen Dam Flood Control Basin.

5.2.2 HYDROLOGY STUDY

The objective of the hydrologic analysis was to provide preliminary sizing and locations of storm drain facilities within Disposal Areas A, B, AB+ and C.

The Lopez Canyon Landfill is within the hydrological jurisdiction of the County of Los Angeles, Department of Public Works, formally the Los Angeles County Flood Control District. Other reviewing agencies will include the Army Corp of Engineers and the City of Los Angeles, Department of Public Works, Bureau of Engineering. Hydrologic analysis for the landfill was performed by using the HEC-1 computer program published by Heastad Methods. This program was developed by the Hydrologic Engineering Center and is generally accepted by most regulatory agencies. The HEC-1 program utilizes the "Kinematic Wave Method" to model stormwater run-off (Appendix F). The hydrologic analysis was performed to determine the 100-year, 24-hour storm event which is used to design the final and interim drainage control systems.

The "Kinematic Wave" model determines the actual storm discharge (Q_{100}) based on a synthetic storm constructed from rainfall values and patterned after historic rainfall events occurring in the area. The rainfall mass curve data, which was obtained from the Los Angeles County, Department of Public Works, Hydrology Manual (1982 edition), is given in terms of the 50-year storm event. To convert to a 100-year storm event, the rainfall data was multiplied by a standard conversion factor of 1.13. The rainfall data used for this study utilizes the most intense 100-year, 24-hour rainfall period of a four-day storm cycle, as determined by the Los Angeles County, Department of Public Works (Flood Control). The 100-year frequency design conforms the criteria set fourth in CCR, Title 23 and Title 14. The hydrology study was conducted to include all tributary areas associated with the landfill that contributes to the main water courses. A summary of the peak discharge rates and drainage subareas are shown in Figure 5-1. The hydrology study conducted for Disposal Area C is based on the conceptual Final Grading Plan (see Figure 5-1).

LOPEZ CANYON
FINAL CLOSURE 100-YEAR HYDROLOGY STUDY
HEC-1 RUNOFF SUMMARY TABLE

Canyon Slope "A"

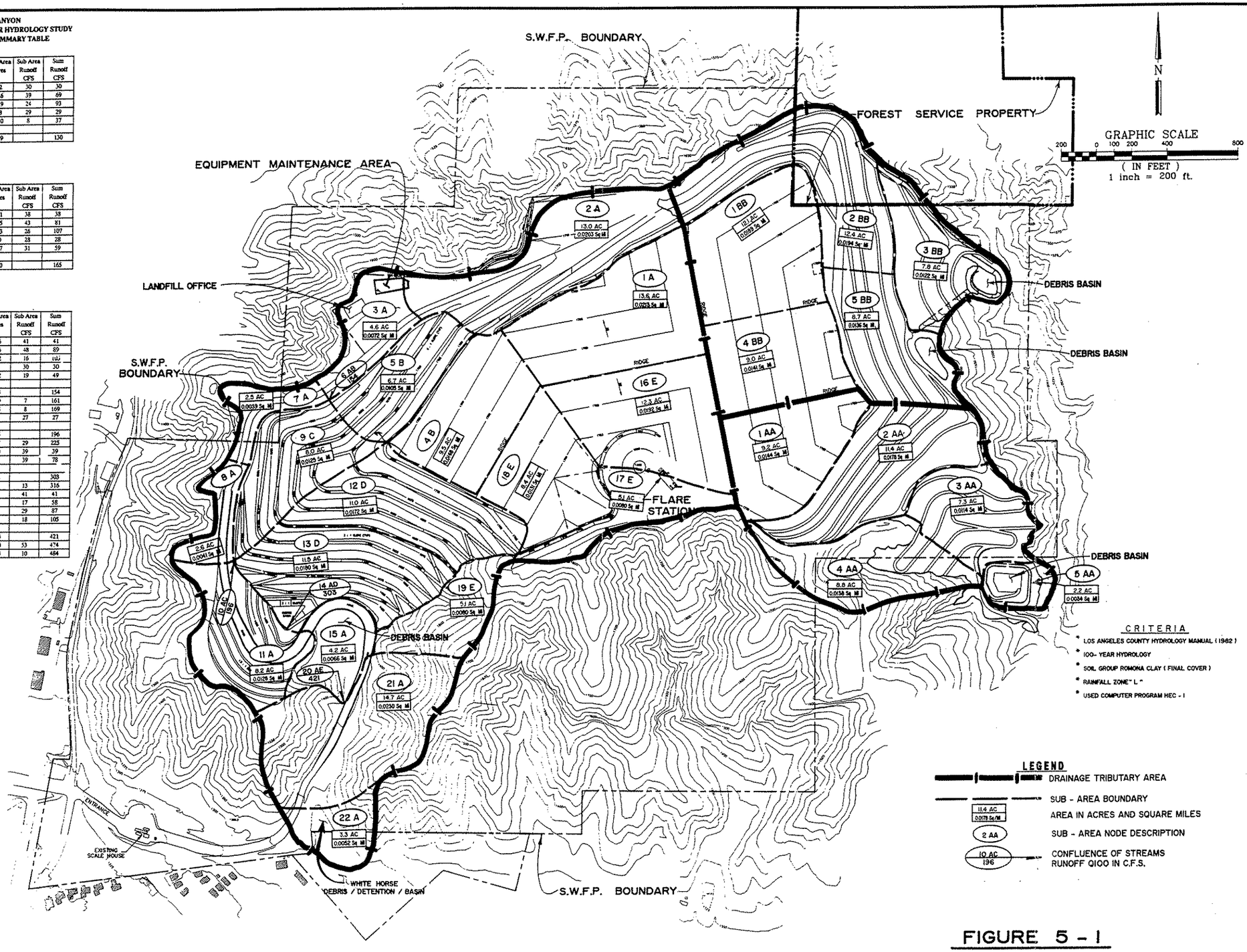
Sub Area Name	Sub Area Acres	Sum Area Acres	Sub Area Runoff CFS	Sum Runoff CFS
1AA	9.2	9.2	30	30
2AA	11.4	20.6	39	69
3AA	7.3	27.9	24	93
4AA	8.8	8.8	29	29
5AA	2.2	11.0	8	37
6AA		38.9		130

Canyon Slope "B"

Sub Area Name	Sub Area Acres	Sum Area Acres	Sub Area Runoff CFS	Sum Runoff CFS
1BB	12.0	12.1	38	38
2BB	12.4	24.5	43	81
3BB	7.8	32.3	26	107
4BB	9.0	9.0	28	28
5BB	8.7	17.7	31	59
6BB		50.0		165

Canyon Area "C"

Sub Area Name	Sub Area Acres	Sum Area Acres	Sub Area Runoff CFS	Sum Runoff CFS
1A	13.6	13.6	41	41
2A	13.0	26.6	48	89
3A	4.6	31.2	16	105
4B	9.5	9.5	30	30
5B	6.7	16.2	19	49
6AB		47.4		154
7A	2.5	49.9	7	161
8A	2.6	52.5	8	169
9C	8.0	8.0	27	27
10AC		60.5		196
11A	8.2	68.7	29	225
12D	11.0	11.0	39	39
13D	11.5	22.5	39	78
14AD		91.2		303
15A	4.2	95.4	13	316
16E	12.3	12.3	41	41
17E	5.1	17.4	17	58
18E	8.4	25.8	29	87
19E	5.1	30.9	18	105
20AE		126.3		421
21A	14.7	141.0	53	474
22A	3.3	144.3	10	484



CRITERIA

- LOS ANGELES COUNTY HYDROLOGY MANUAL (1982)
- 100- YEAR HYDROLOGY
- SOIL GROUP ROMONA CLAY (FINAL COVER)
- RAINFALL ZONE " L "
- USED COMPUTER PROGRAM HEC - 1

LEGEND

- DRAINAGE TRIBUTARY AREA
- SUB - AREA BOUNDARY
- 11.4 AC 0.0178 Sq Mi — AREA IN ACRES AND SQUARE MILES
- 2 AA — SUB - AREA NODE DESCRIPTION
- 10 AC 196 — CONFLUENCE OF STREAMS RUNOFF Q100 IN C.F.S.

FIGURE 5 - 1

CLOSURE PLAN

100 - YEAR FINAL CLOSURE HYDROLOGY MAP

SCALES	1" = 200'	SHEET OF	INDEX NUMBER

DATE
DESIGNED
DRAWN
CHECKED
SUPERVISED
PROJECT ENGR.
ASST. DIV./DIST. ENGR.
R.E. NO.
R.E. NO.

BAS
BROWN AND CALDWELL ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 SOUTH VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765

LOPEZ CANYON LANDFILL

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BRAD, DIRECTOR
DATE ____ 19____
DIV/DIST. ENGR. R.E. NO.

SCALE 1" = 200'
SHEET NO.
DWG. NO.
JOB NO. 9258
C:\DWG\LOPEZ\BG30HN

5.3 EXISTING DRAINAGE CONTROL SYSTEM

The existing drainage control system for the site consists of down drains on the slopes of Disposal Areas A, B and AB+ with inlet structures located at each of the intercepting benches. There are two debris basins located near Disposal Area B. The upper debris basin handles storm water flow from the higher benches. Discharge from the upper basin is channeled into the lower debris basin. In order to reduce flow velocity at the bottom of the outlet channel, an energy dissipater was installed. Water in the lower basin then discharges into Bartholomaus Canyon.

Eight debris basins are within the site's boundary. The debris basins are cut into the natural terrain and are asphalt lined. A trapezoidal concrete channel runs along the main haul road from the top of Disposal Area AB+ to an existing debris basin.

A drainage outlet has been constructed to convey stormwater flows from the Whitehorse Debris Basin into the existing storm draing system under the Van Nuys Boulevard, which outlets to the Lopez Canyon diversion channel. The storm drain outlet consists of an underground pipe joining the existing 42-inch diameter drain, located at Gladstone Avenue, and extending to the northerly end of Van Nuys Boulevard. The pipe is sized to carry the runoff from a storm of a ten year frequency. This frequency was used for the design criteria of the Whitehorse Debris Basin discharge flow.

There is also a concrete trapezoidal channel which runs from the water tank and flare station area southwest along the upper perimeter of Disposal Areas AB+ and C. This channel intercepts flow from down the southern excavated slopes of Disposal Area C and discharges into the future lower debris basin along the haul road.

5.4 PROPOSED DRAINAGE CONTROL SYSTEM

The hydraulic calculations and flow rates for a 100-year storm (Section 5.2) have been used to design the drainage improvements for disposal areas shown on Figure 5-2. These improvements, combined with the proposed surface grading, will facilitate the rapid removal of surface runoff from the site in accordance with Title 23, Chapter 15 regulations.

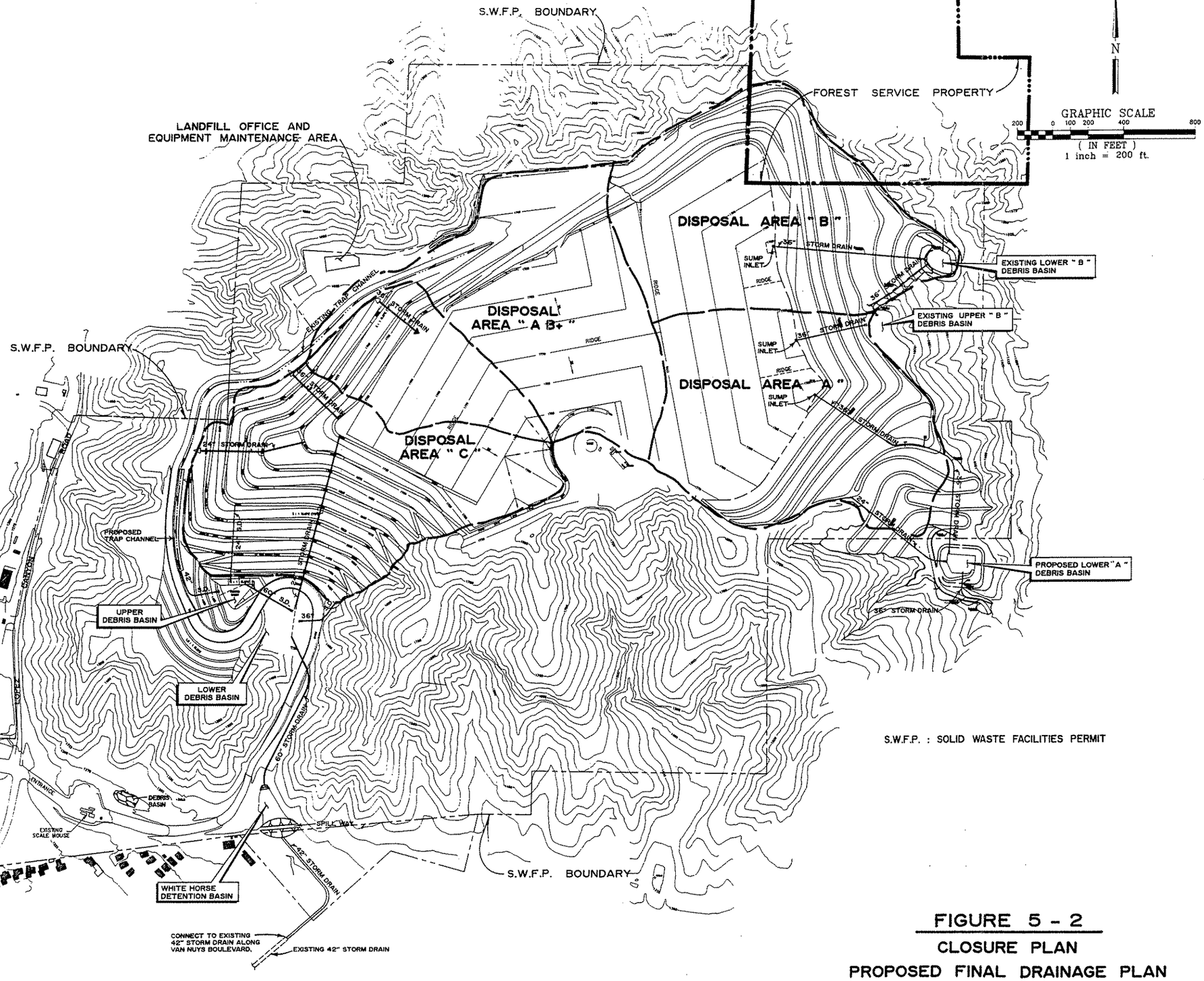


FIGURE 5 - 2

CLOSURE PLAN

PROPOSED FINAL DRAINAGE PLAN

SCALES	1" = 200'	SHEET	OF	INDEX NUMBER

DESIGNED
DRAWN PTN
CHECKED
SUPERVISED
PROJECT ENGR.
ASST. DIV./DIST. ENGR.
DATE DEC. 1992
R.E. NO.
R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL SOIL & WATER ENGINEERS
1360 SOUTH GRAND AVENUE
DIAMOND BAR, CA. 91765

NO. REVISION DESCRIPTION DATE
GENERAL RECORDING DIV./DIST. ENGR. DATE
APPD. / NO.

CITY OF LOS ANGELES
BUREAU OF SANITATION JOHN A. BIAGI, DIRECTOR
DATE _____ 19____
DIV/DIST. ENGR. R.E. NO.

SCALE 1" = 200'
SHEET NO.
DWG. NO.
JOB NO. 9258

11-24-92
G:\DWG\LOPEZ\BIGJOHN

Two drainage courses are located near the Lopez Canyon Landfill. These include Bartholomaus Canyon and the Lopez Canyon diversion channel. In order to properly utilize these drainage courses, modifications to the existing system will be incorporated. The drainage control system can be divided into four areas known as Disposal Area A, Disposal Area B, Disposal Area AB+ and Disposal Area C. It should be noted that all existing drains will be removed and reinstalled or replaced (if damaged) during final cover and closure activities.

5.4.1 DISPOSAL AREA A DRAINAGE CONTROL SYSTEM

Drainage control system modifications within Disposal Area A will consist of one large debris basin at the base of the canyon, two main drainage pipe traversing down each side of the slope and perimeter intercepting drains. This basin will also allow for the elimination of the existing collection point of runoff midway up the slope of Disposal Area A, known as "Twin Barrels". All storm water currently discharging from this point will be diverted to the new basin. All downdrains will outlet into the proposed basin at the base of the slope. The main basin will discharge into a concrete-lined drainage culvert (pipe). This culvert will utilize an outlet structure and rip-rap to minimize the erosional effects of flowing storm water from the Disposal Area A basin into the natural drainage course of Bartholomaus Canyon.

5.4.2 DISPOSAL AREA B DRAINAGE CONTROL SYSTEM

The two existing debris/detention basins for Disposal Area B will remain. These basins are currently lined with asphalt, gunite (air blown concrete), or combination of both. The basins will be maintained and repaired as outlined in the Post-Closure Maintenance Plan for the site.

The only additions to the existing drainage controls for Disposal Area B is the addition of a drain pipe and the elimination of the existing gunite channel by the construction of a buried drainage culvert. The drain pipe will be installed along the northern perimeter of the access road, which will provide all weather access to the basin at the bottom of this area.

5.4.3 DISPOSAL AREA AB+ DRAINAGE CONTROL SYSTEM

The proposed drainage control system for the completed Disposal Area AB+ consists of two 36-inch downdrains descending to the north facing slopes and an open concrete channel along the northern perimeter of the disposal area. Both downdrains feed into this channel. Disposal Area AB+ will be incorporated into the drainage control system of Disposal Area C as it is filled with refuse.

5.4.4 DISPOSAL AREA C DRAINAGE CONTROL SYSTEM

The proposed drainage control system for Disposal Area C (see Figure 5-2) will be similar in design and function to the existing drainage control system in Disposal Areas A, B and AB+. The proposed system will consist of one 24-inch drainage pipe traversing down the center of the slope. Three auxiliary drainage pipes located along the northern portion of the slope will feed into the open concrete channel running along the perimeter of the cell. Surface water will flow into two debris basins located along the haul road. The outlet from the lower basin will flow through a 60-inch drain pipe into the White Horse Debris basin just east of the scale house.

There is also a concrete trapezoidal channel which runs from the water tank and flare station area southwest along the upper perimeter of Disposal Area AB+ and C. This channel intercepts flows from down the southern excavated slopes of Disposal Area C and discharges into the future lower debris basin along the haul road.

As discussed in Section 5.2, hydraulic calculations and flow rates for a 100-year storm were used to design the handling capability of the proposed drainage control system. In addition, the proposed system will be designed to incorporate the existing drainage control system for Disposal Area AB+ (i.e., the open concrete drainage channel along the northern perimeter).

It should be noted that interim drainage facilities will be utilized during disposal operations to handle stormwater run-off. The downdrains utilized on the front or west facing slopes of Disposal Area AB+ will be modified as Disposal Area C is filled. Surface water from these downdrains will be channeled into the Disposal Area C drainage facilities.

5.5 DRAINAGE SYSTEM FEATURES

5.5.1 DECK AREAS

The deck areas will be graded to form a ridge, as shown on Figure 5-2, which will allow sheet flow away from the center of the deck area to the edges of the slope. Along the edges of the slope, a drainage swale and berm will be constructed to intercept the flow and direct the storm water into downdrains placed along the top of the slope. This prohibits run-off from breaching the top edge of the slopes thereby reducing potential erosional effects. These downdrains will carry the flow down the slope into the debris basins and eventually into perimeter drainage structures and waterways located along the east and west sides of the landfill.

5.5.2 SLOPE AREAS

Drainage from all finished slopes will be controlled by drainage benches approximately 15 feet wide constructed along the face of the slope at approximately 40-foot vertical intervals. The benches will be graded so that surface water runoff will drain to the heel of the bench and then to inlet structures of the downdrains.

5.5.3 DOWNDRAIN DETAILS

The downdrains for the site will be constructed of either metal and/or polyethylene. Downdrain details are shown on Figures 5-3 and 5-4. Each downdrain will be anchored to the slope as shown on Figures 5-3, 5-4 and 5-5. Each downdrain has been designed with "slip collars" to accommodate settlement and will be capable of withstanding movement between the benches.

5.5.4 TERRACE BENCH CROSSING INLET STRUCTURES

The terrace benches at the Lopez Canyon Landfill serve as points of access for maintenance and monitoring of the slopes and as points of drainage for storm water. The inside toe of the slope at the bench is a flow line for stormwater. Benches will be graded as shown in Figure 3-2-A and 3-2-B.

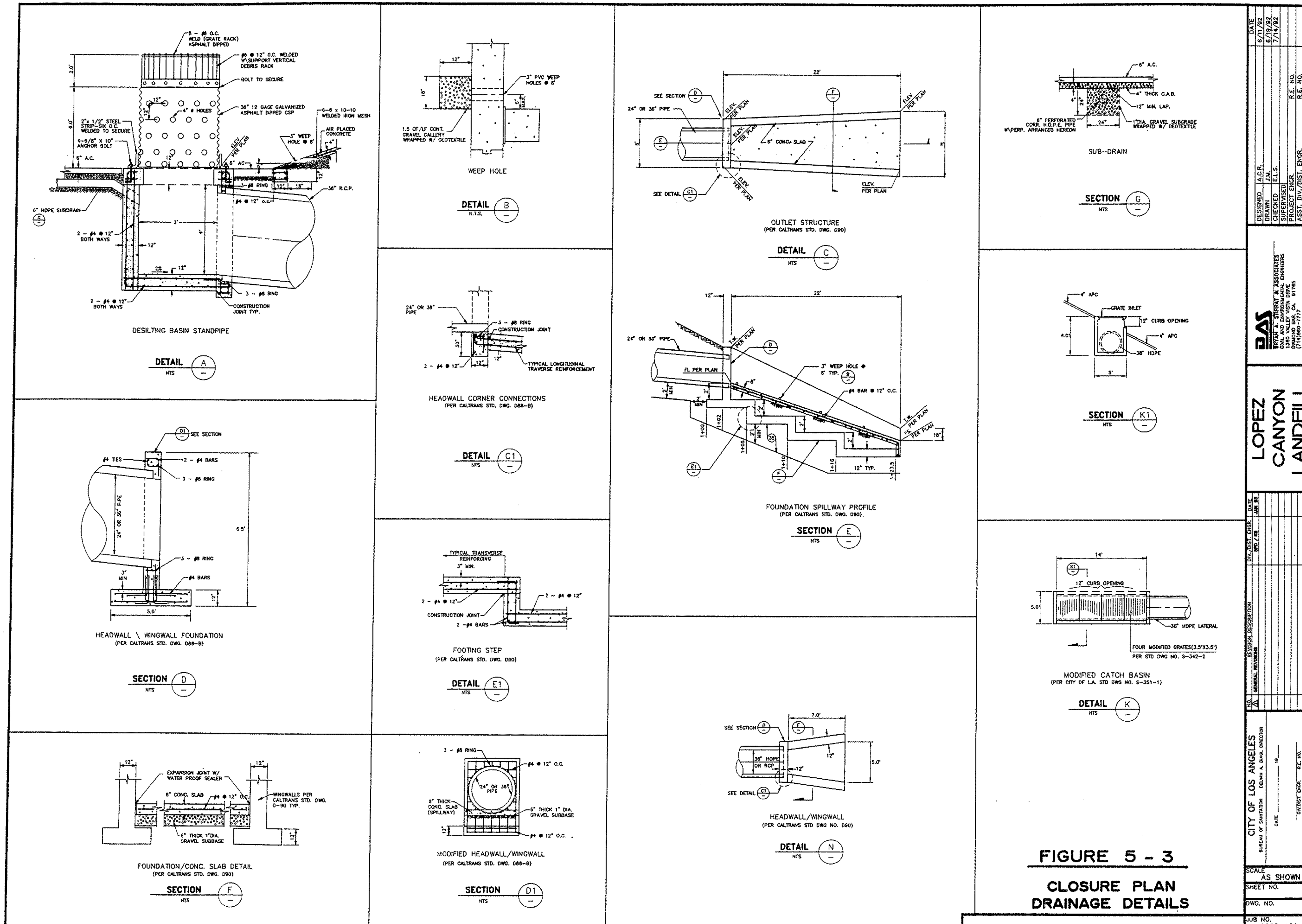
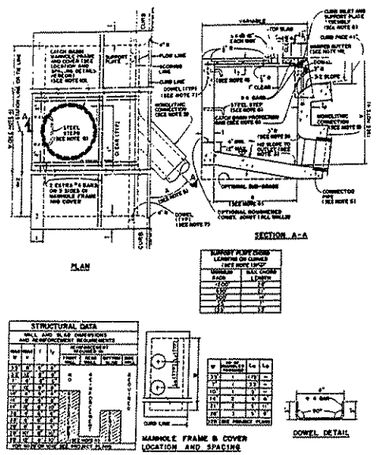


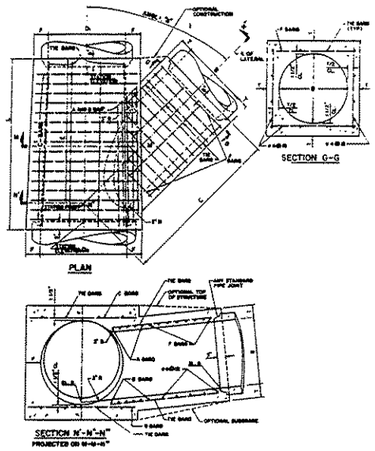
FIGURE 5 - 3

CLOSURE PLAN DRAINAGE DETAILS



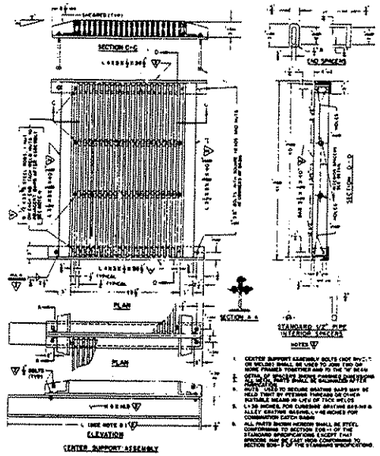
SIDE OPENING CATCH BASIN

(PER CITY OF L.A. STD PLAN S-351-1)



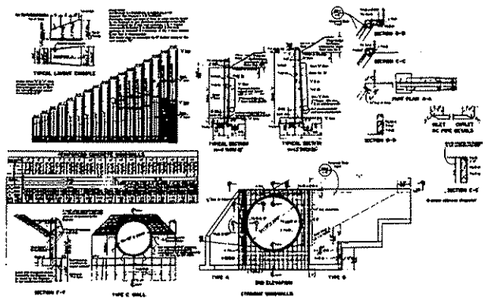
JUNCTION STRUCTURE " C "

(PER CITY OF L.A. STD PLAN S-303-0)



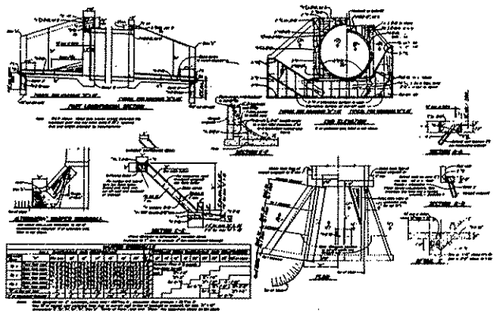
FRAME AND GRATING FOR CATCH-BASIN

(PER CITY OF L.A. STD PLAN S-342-2)



PIPE CULVERT HEADWALL, ENDWALL, & WINGWALL TYPES " A ", " B ", AND " C "

(PER CAL.-TRANS STD DWG D-90)



PIPE CULVERT HEADWALL, ENDWALL, & WARPED WINGWALL

(PER CAL.-TRANS STD DWG D86-B)

FIGURE 5 - 4

CLOSURE PLAN DRAINAGE DETAILS

DESIGNED	
DRAWN	PTN
CHECKED	SPD / KG
SUPERVISED	
PROJECT ENGR.	
ASST. DIV./DIST. ENGR.	

DATE: DEC. 92 / DEC. 92

R.E. NO.

R.E. NO.

BAS
BRYANT A. STIRRAT & ASSOCIATES
CIVIL AND MUNICIPAL ENGINEERS
1350 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765

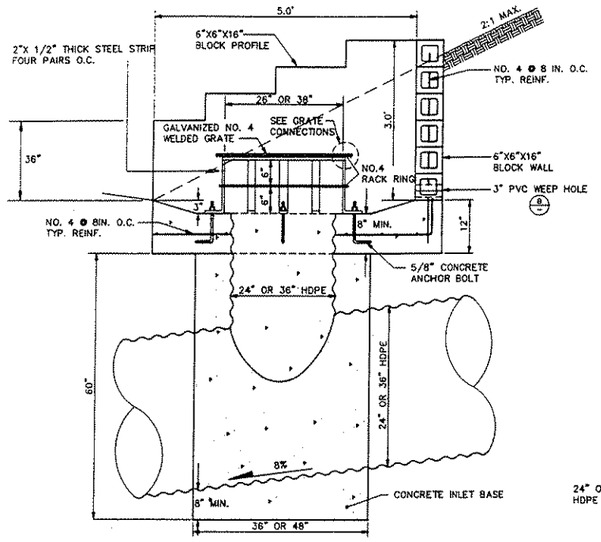
LOPEZ CANYON LANDFILL

REVISION DESCRIPTION | DIV./ASST. ENGR. | DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWYN A. BRAD, DIRECTOR
DATE ..... 19.....
DIVISION ENGR. R.E. NO.

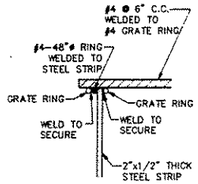
SCALE NOT TO SCALE
SHEET NO.
DWG. NO.
JOB NO. 9258-108

SCALES HORIZ. 1"= VERT. 1"= | SHEET OF | INDEX NUMBER



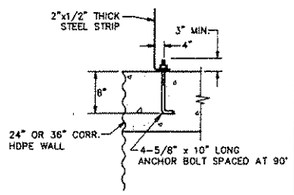
BIRD CAGE INLET STRUCTURE

SECTION (H) N.T.S.



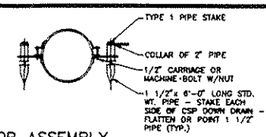
GRATE CONNECTION

NTS



ANCHOR BOLT

NTS

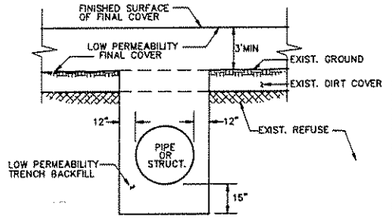


ANCHOR ASSEMBLY

ONE REQUIRED AT ANGLES AND 10'-0" MAXIMUM VERTICAL SPACING ON FINAL COVER SLOPES. (PER CALTRANS STD. DWG. NO. D87-A)

TYPICAL BENCH DOWNDRAIN

SECTION (L) N.T.S.



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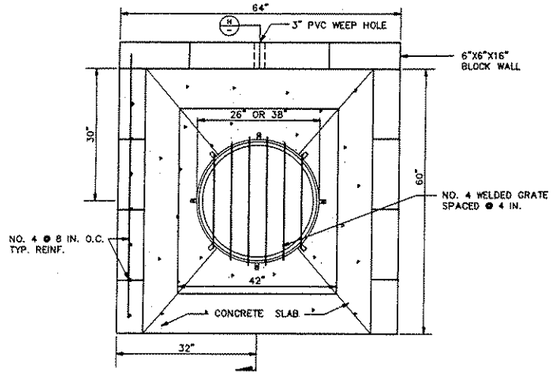
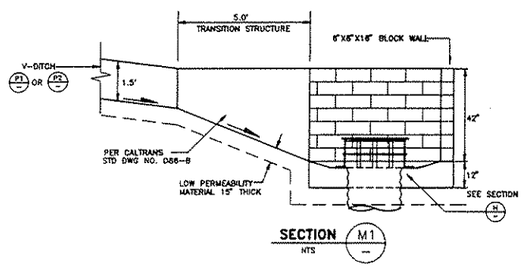
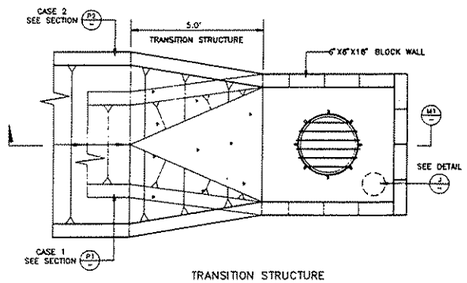


INLET/BLOCKWALL STRUCTURE

DETAIL (J) N.T.S.

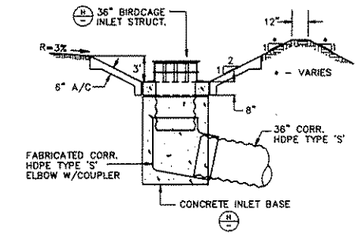


SECTION (M1) NTS

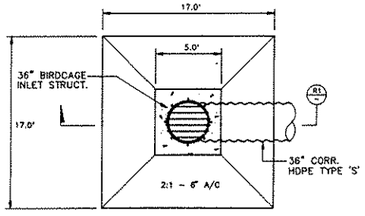


TRANSITION STRUCTURE
(PER CALTRANS STD DWG No. D86-B)

DETAIL (M) NTS

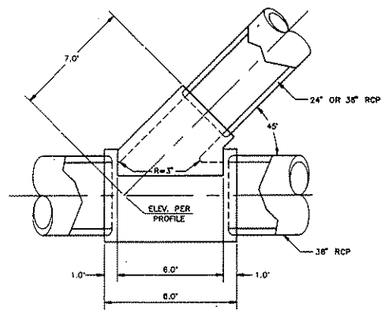


SECTION (R1) NTS



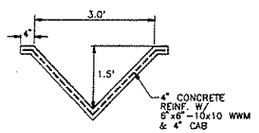
TOP DECK SUMP INLET STRUCTURE

DETAIL (R) NTS



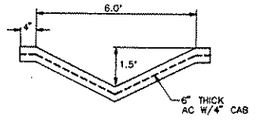
TRANSITION STRUCTURE "C"
(PER CITY OF L.A. STD. DWG. NO. S-305-0')

DETAIL (T) NTS



CONCRETE V-DITCH

SECTION (P1) NTS



A/C V-DITCH

SECTION (P2) NTS

FIGURE 5 - 5

CLOSURE PLAN DRAINAGE DETAILS

DATE		
06/12/92		
06/22/92		
07/15/92		
DESIGNED	J.A.C.R.	
DRAWN	J.A.M.	
CHECKED	E.L.S.	
SUPERVISED		R.E. NO.
PROJECT ENGR.		R.E. NO.
ASST. DIV./DIST. ENGR.		

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LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DATE	DES./DRFTG. ENGR.
1	GENERAL REVISIONS	MAY 93	SPD / KB

CITY OF LOS ANGELES
BUREAU OF SANITATION EDWIN A. BUAG, DIRECTOR
DATE ____ 19____
DIV./DIST. ENGR. R.E. NO.

SCALE AS SHOWN
SHEET NO.
DWG. NO. 9258-0108-E-47-002-08
JOB NO. 9258-108
11/19/92

C:\DWG\LOPEZ\CLOSE2

Stormwaters are designed to flow along the inside of the benches to downdrains. Entry of the stormwaters into the downdrains is controlled by inlet structures which divert the stormwaters down into the downdrain pipes.

Each inlet is constructed with an asphalt flow line and a winged retaining wall of reinforced concrete to reduce surface erosion around the inlet. A metal grate (bird cage) will be placed over each inlet to prevent the entry of debris. Inlet structures will be installed as necessary during construction of the downdrains. Details for the bench drainage inlet structures are shown on Figures 5-3 and 5-4.

5.5.5 DEBRIS BASINS

The two existing debris basins on the eastern side (Disposal Area B) of the landfill are gunite and/or asphalt lined and interconnected by a stormdrain. The Whitehorse Debris Basin located along the main haul road just east of the scale house has been modified to discharge into the storm drain system located under Van Nuys Boulevard to the south of the landfill and connected to the Lopez Canyon Channel. This modification has reduced surface street discharge rates allowing the Van Nuys Boulevard storm drain system to be utilized. The typical design configuration consists of reinforced concrete outlet structures or spillways, a low-flow drain pipe and concrete rip-rap placed at the inlet and outlet (if applicable) for erosion control.

5.6 SURROUNDING AREA DRAINAGE

Any potential stormwater runoff from the surrounding hillsides will be intercepted by the perimeter drain system or by the natural topography and water courses before it comes into contact with the landfill disposal areas.

SECTION 6.0

LANDFILL GAS CONTROL SYSTEM

6.0 LANDFILL GAS CONTROL SYSTEM

6.1 INTRODUCTION

The original landfill gas control and flaring system was installed at the Lopez Canyon Landfill in 1989 and has since been upgraded in 1992. Initial startup of the system was conducted in December 1989. The current flare station consists of nine flares. The system was expanded to a total of nine flares to accommodate increased production from Disposal Area C and to maintain ongoing compliance with South Coast Air Quality Management District rules and requirements and other regulatory requirements. The gas control system consists of wells, laterals, headers and monitoring probes in a large portion of the landfill. The collected gas is delivered to the flare station where it is processed by combustion.

6.2 EXISTING GAS CONTROL SYSTEM

6.2.1 GAS CONTROL SYSTEM

6.2.1.1 HORIZONTAL WELLS

The gas control system for Disposal Areas A, B and AB+ is shown in Figure 6-1, which shows the above ground gas control system as well as the vertical gas extraction wells and the underground horizontal gas wells. Two levels of horizontal gas collection wells were installed under the entire deck area of Disposal Areas A and B. Currently, two levels of horizontal gas collection wells (grids) have been installed in Disposal Area AB+. The third level of horizontal collection wells is currently being installed. The vertical distance between each system of horizontal wells is approximately 40 to 50 feet. The primary purpose of the horizontal well is to allow for collection of gas from the center of the landfill and to reduce the volume of gas which may permeate through the top deck. See Figure 6-6 for the typical horizontal well detail. The existing horizontal wells (grids) are connected to the main gas collection header lines at 46 locations. Each connection is controlled by a manually operated regulating valve.

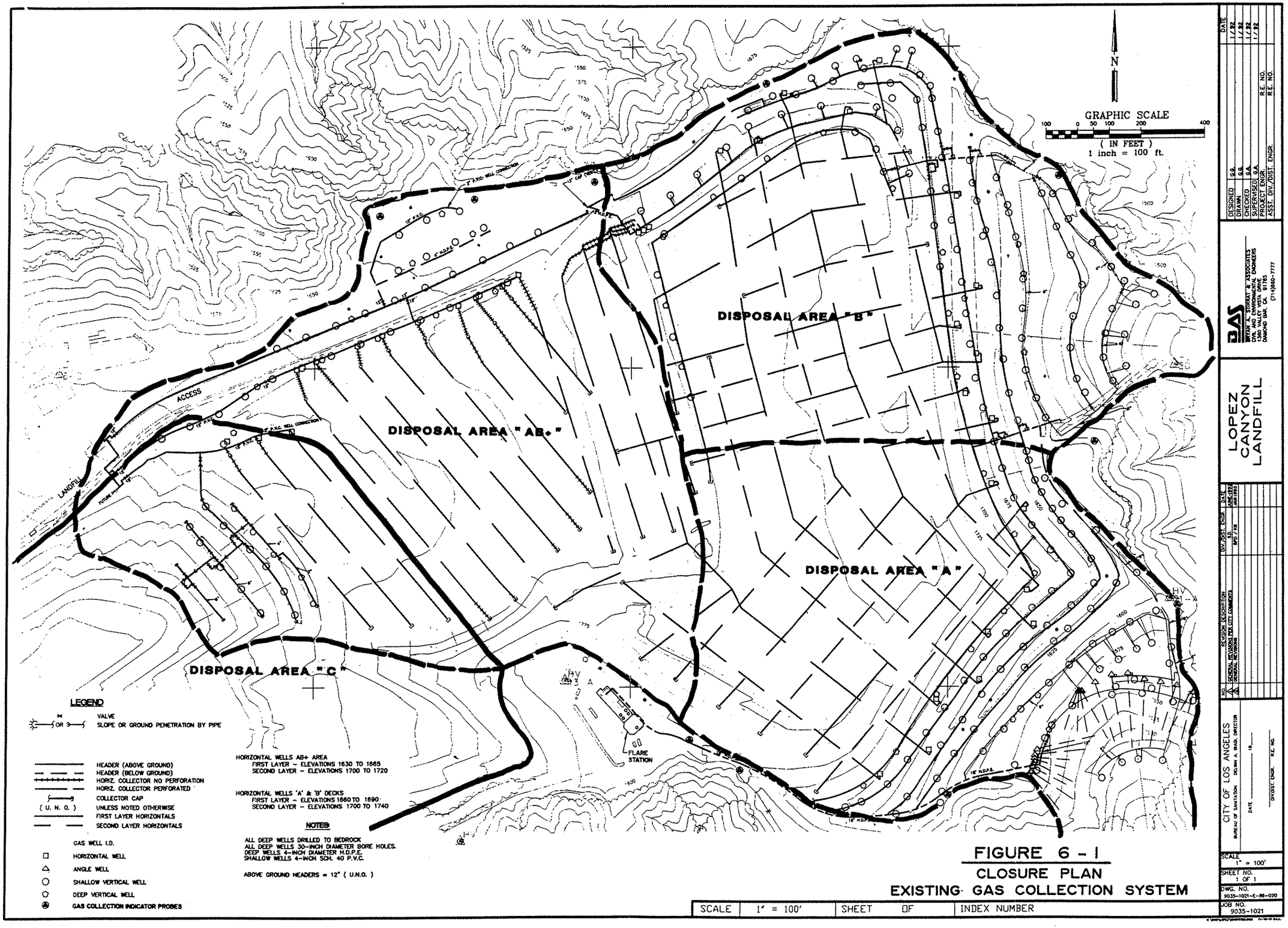

FIGURE 6 - 1

CLOSURE PLAN
EXISTING GAS COLLECTION SYSTEM

DESIGNED	G.A.	1/92
DRAWN	R.G.	1/92
CHECKED	G.A.	1/92
SUPERVISED	G.A.	1/92
PROJECT ENGR.		R.E. NO.
ASST. DIV./DIST. ENGR.		R.E. NO.

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LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DEV./DIST. ENGR.	DATE
1	GENERAL REVISIONS PER CITY COMMENTS	S.D.	JUNE 1992
2	GENERAL REVISIONS	BPD / KB	JULY 1993

CITY OF LOS ANGELES
BUREAU OF SANITATION DELMAR A. BIAD, DIRECTOR
DATE _____, 19__
DIV/DIST. ENGR. R.E. NO.

SCALE 1" = 100'
SHEET NO. 1 OF 1
DWG. NO. 9035-1021-E-86-020
JOB NO. 9035-1021

SCALE	1" = 100'	SHEET	OF	INDEX NUMBER

6.2.1.2 SHALLOW VERTICAL GAS COLLECTION WELLS

A total of 211 shallow vertical gas wells have been installed on the slopes of Disposal Areas A, B and AB+ where horizontal gas wells were not installed or where horizontal gas wells were not sufficient to control the gas. The placement of the shallow vertical gas wells was determined by the results of surface and subsurface gas monitoring. Past monitoring has shown that the interface areas, and benches where no horizontal gas wells were installed required shallow vertical gas wells. The main purpose of these shallow wells is to reduce point source gas emissions. The borehole of a shallow vertical gas well ranges from 4 to 12 inches in diameter. The depth of the initial 43 shallow vertical wells installed was typically 20 feet and the depth of the second installation of shallow wells is typically 50 feet into the refuse. Figure 6-2 presents a typical cross sections of these wells. The well head consists of a two to four inch diameter PVC pipe.

6.2.1.3 DEEP VERTICAL GAS COLLECTION WELLS

A total of 43 deep vertical gas wells were installed to collect landfill gas in the lower sections of the refuse and any refuse gas migrating to the upper portions of the refuse cell. These wells were installed along the upper portion of the slopes of Disposal Areas A and B. The borehole of a deep vertical gas well is 30 inches in diameter. The deep wells were installed to a depth equal to the bottom of the refuse. The wellheads consist of four inch diameter PVC pipe. Figure 6-3 illustrates a typical cross section of a deep vertical gas well.

For both the shallow and deep vertical wells, the portion of the wellhead emplaced in the refuse was perforated along its entire length. The annular area between the wellhead and the borehole was backfilled with crushed rock to the upper most level of refuse to increase the active collection area. The borehole area above the refuse was sealed with a layer of bentonite pellets to provide a seal, and subsequently backfilled with clean fill material.

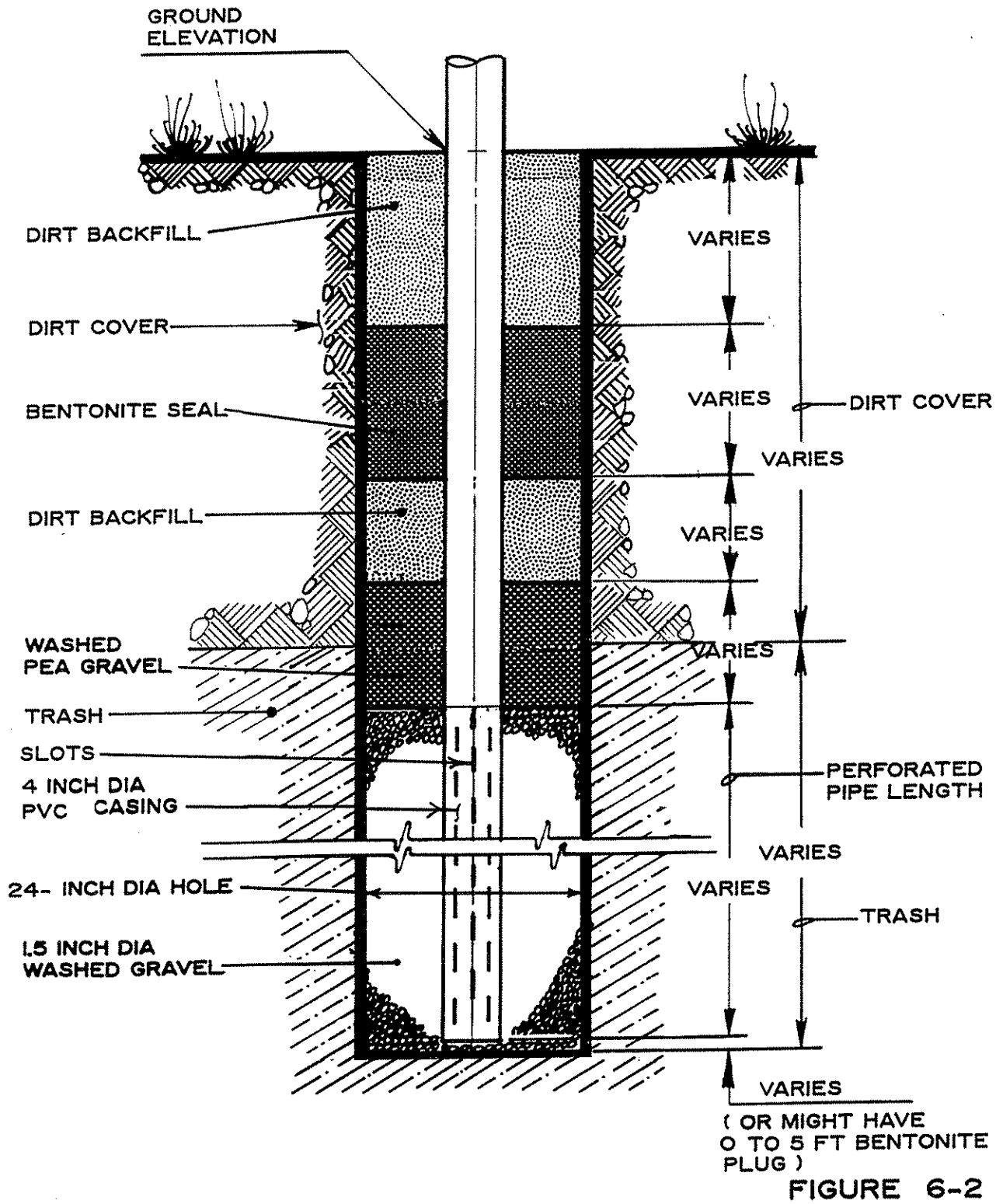

FIGURE 6-2

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LOPEZ CANYON LANDFILL

TYPICAL DETAIL

SHALLOW WELL CONSTRUCTION

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	PTN
CHECKED BY:	VS

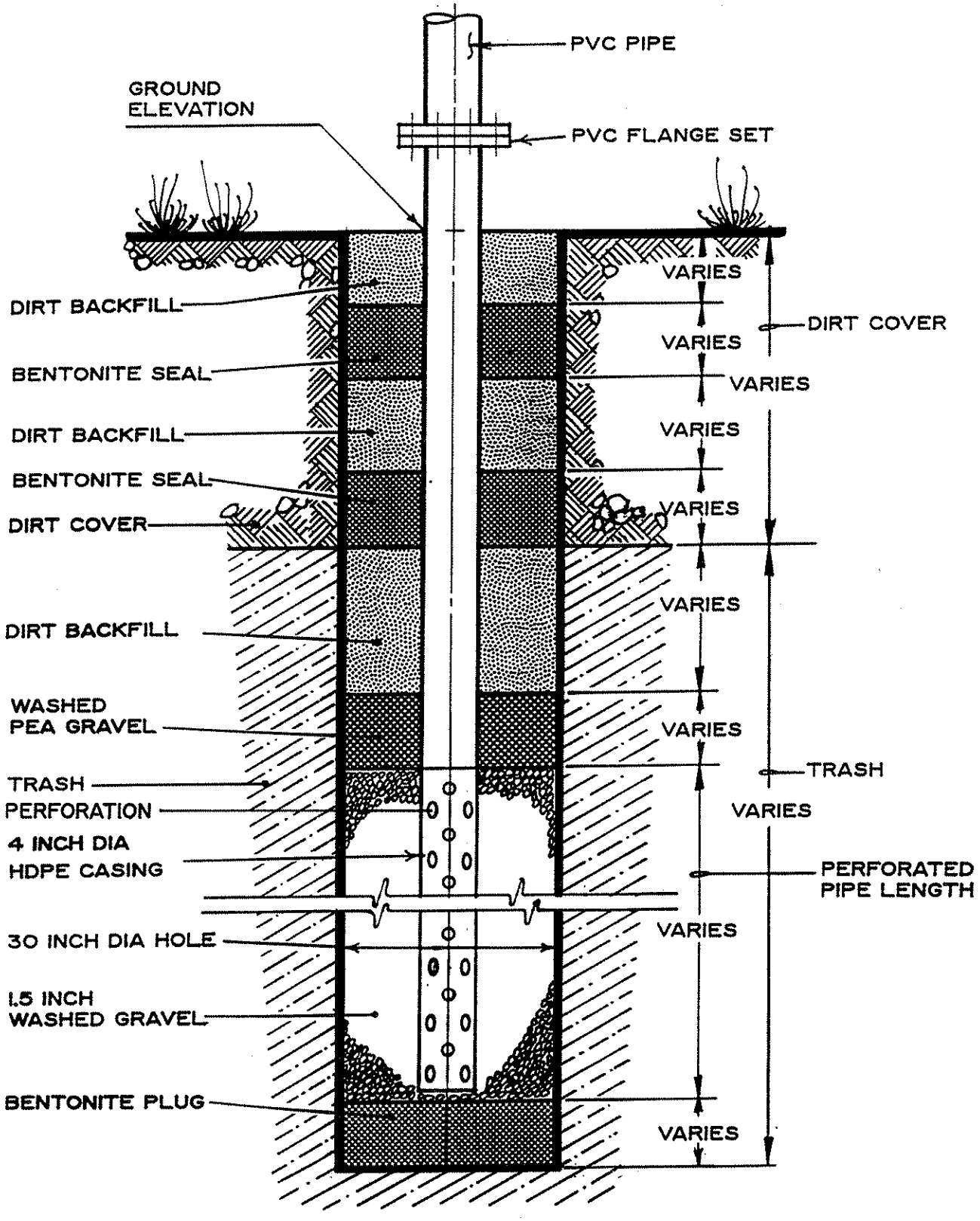

FIGURE 6-3

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LOPEZ CANYON LANDFILL

TYPICAL DETAIL
DEEP WELL CONSTRUCTION

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	PTN
CHECKED BY:	VS

6.2.1.4 ANGLE GAS COLLECTION WELLS

A total of 22 angle wells were installed to prevent surface emissions along one bench in Disposal Area A. These wells are installed 10 to 15 feet below the surface parallel to the slope (see Figure 6-4 for typical detail).

6.2.3 GAS CONDENSATE SYSTEM

Gas condensate which is generated in the gas control system drains by gravity through a series of drain lines connected to the bench headers. These drain lines are connected to the main headers which feed into double-walled sumps strategically located at low points around the site. The collected condensate is then pumped to a storage tank located on-site, treated in accordance with appropriate regulations, and discharged into the City's sewer system.

6.2.4 FLARE STATION

The flare station is located on the southern ridge between Disposal Area A and AB+ next to the one million gallon water tank, as shown on Figure 6-1. The SCAQMD permits to construct for the flare station is included in Appendix G.

The landfill gas flare system consists of nine flares fed by two of four gas blowers with a capacity of 8750 SCFM. This maximum inflow capacity will accommodate the expected peak landfill gas generation rate over the life of the landfill and through the post-closure period. Four flares and two blowers are kept on standby. The gas is drawn by the blowers under vacuum from the gas collection system through a filter/knockout drum to remove particulates and entrained liquids. It is then forced under pressure through a flame arrestor to the flare where it is processed (burned) at temperatures exceeding 1500°F.

The system is controlled by a Program Logic Controller (PLC) which automatically regulates the total flow rate and individual temperature of each flare. If either the temperature or flow control limits are not met, the system is automatically shut down and a telephone dialer alerts a 24-hour response center. If system shutdown is initiated, the blowers are automatically turned off and the

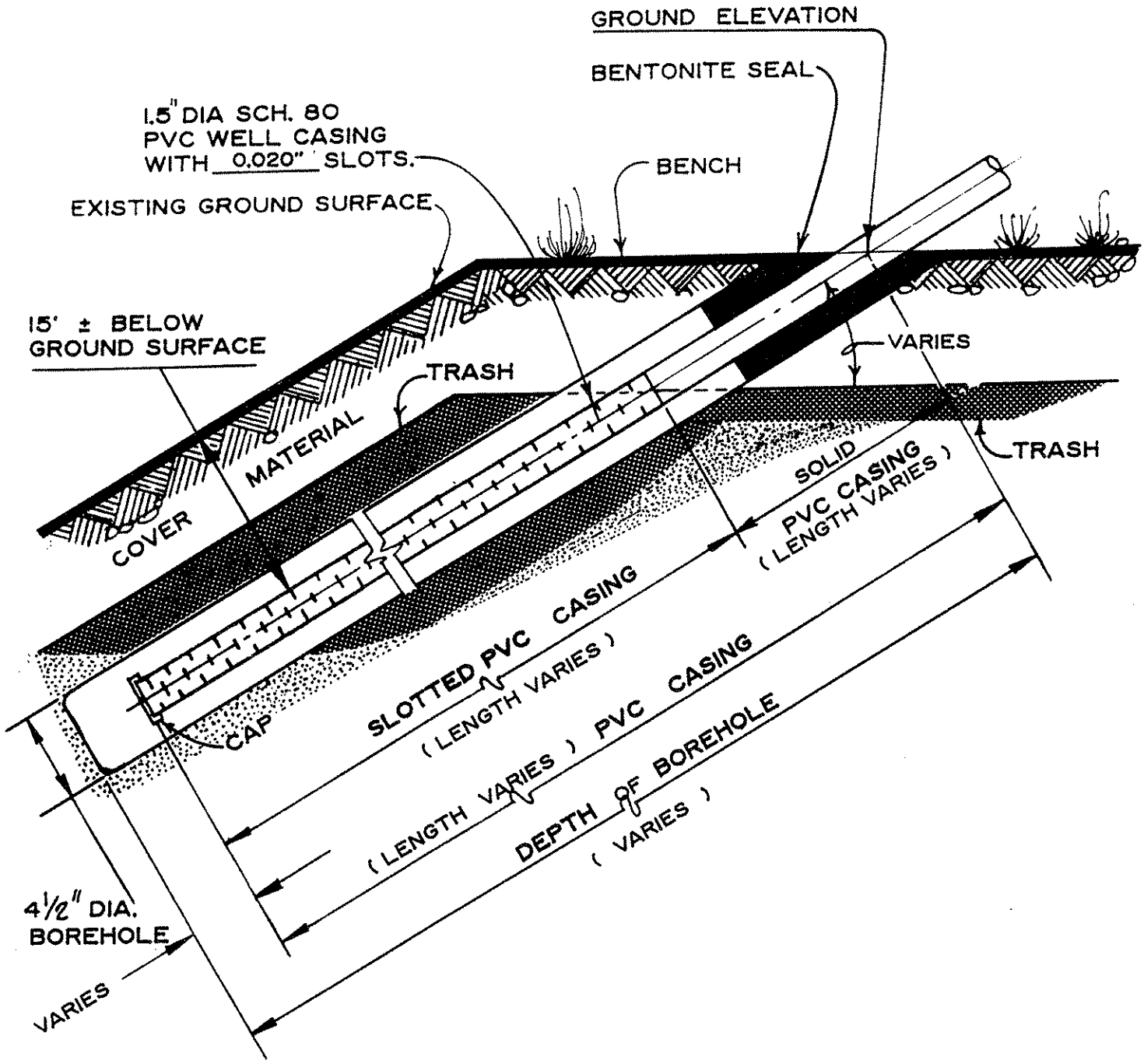

FIGURE 6-4

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LOPEZ CANYON LANDFILL

TYPICAL DETAIL
GAS ANGLE WELL

JOB NO.	9035-1018
DATE	OCT. 1991
DRAWN BY:	PTN
CHECKED BY:	VB

flow/shut off valves are closed. The flares are designed so that the flame is totally contained within the flare stack (seven feet from the top). The skin temperature of the flare is less than 250° F well below the ignition point of any materials that might come in contact with the flare shell. Flame arrestors are used on each flare to prevent any flame from being drawn back into the gas collection system.

The flares have been designed to meet the Best Available Control Technology (BACT) dictated by the SCAQMD Regulation XIII, which limits the emission of criteria pollutants. Initial and annual source testing of the flares have been conducted to assure compliance. An air modeling analysis and risk assessment was conducted and indicated that the flare emissions would have no significant health affect. Appendix G includes the current Permit to Construct from the SCAQMD and the latest annual source testing results for the flares.

6.3 PROPOSED GAS CONTROL SYSTEM MODIFICATIONS

The existing gas control system was installed prior to the placement of final cover and consists of vertical gas wells and horizontal collection wells buried in the intermediate cover which are designed to allow gas condensate to flow to the sumps located at low points around the site. The system modifications described in the following sections will enable construction of the final cover with minimal impact on the existing gas wells, will effectively incorporate Disposal Areas AB+ and C into the existing gas control system, and will handle any increased condensate volumes the system may experience when Disposal Areas AB+ and C have reached capacity. Any additional modifications made to the landfill gas monitoring, collection and control systems or to the sampling, testing, analysis and reporting protocols during the closure and post-closure maintenance period will be submitted to the LEA and the CIWMB for approval per CCR, Title 14, Section 17783(d).

6.3.1 DISPOSAL AREA AB+ GAS CONTROL SYSTEM

As Disposal Area AB+ is being filled, a system of horizontal gas wells is being installed. The horizontal spacing between adjacent well lines will be

approximately 100 feet. Lines are installed so that they will cross the fill area perpendicular to the main header lines installed along the northern portion of Disposal Area AB+. Each layer of horizontal wells is staggered above the previous system of horizontal wells. The vertical distance between each layer of horizontal wells is approximately 50 feet. The top level of horizontal wells will be approximately 20 feet below the final cover. Each outlet is individually valved and connected to a gas collection header. The main purpose of the horizontal gas wells is to allow for collection of gas from the center of the landfill without interfering with disposal operations. It is anticipated that Disposal Area AB+ will have a total of three levels of horizontal wells before the placement of final cover.

6.3.2 DISPOSAL AREA C GAS CONTROL SYSTEM

The design of the gas control system for Disposal Area C incorporates a series of horizontal and vertical gas collection wells and collection header lines (see Figure 6-5).

As the disposal area is filled, a system of horizontal gas wells (see Figure 6-6) will be installed. A total of nine levels of horizontal gas wells are proposed for Disposal Area C. The horizontal spacing between adjacent gas well lines will be approximately 100 feet. Lines will be installed so that each layer of horizontal wells will be installed perpendicular to the previous layer. In addition, each level of horizontal wells will be staggered above the previous set of wells. The vertical distance between each level of horizontal wells will be approximately 40 feet. The top grid of horizontal wells will be approximately 20 feet below the final cover.

Each outlet line will be individually valved and connected to a gas collection header. The main purpose of the horizontal gas wells is to allow for collection of gas from the center of the landfill. Their chief advantages are lower cost and compatibility with ongoing fill operations.

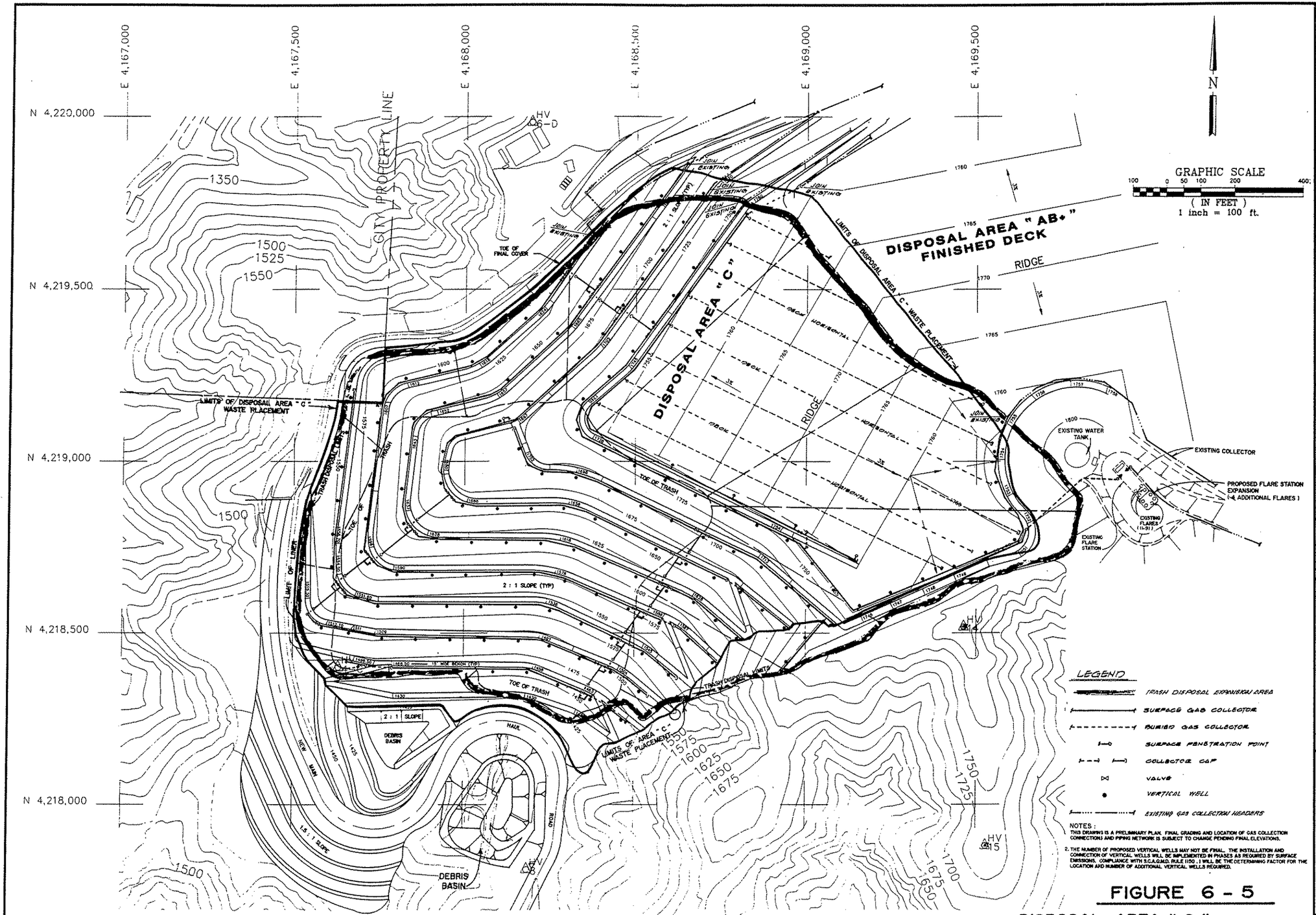

FIGURE 6 - 5

DISPOSAL AREA " C "
CLOSURE PLAN
PROPOSED GAS CONTROL SYSTEM

DESIGNED	D.S. 4/91
DRAWN	D.S. 4/91
CHECKED	G.G. 4/91
SUPERVISED	G.G. 4/91
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

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LOPEZ CANYON LANDFILL

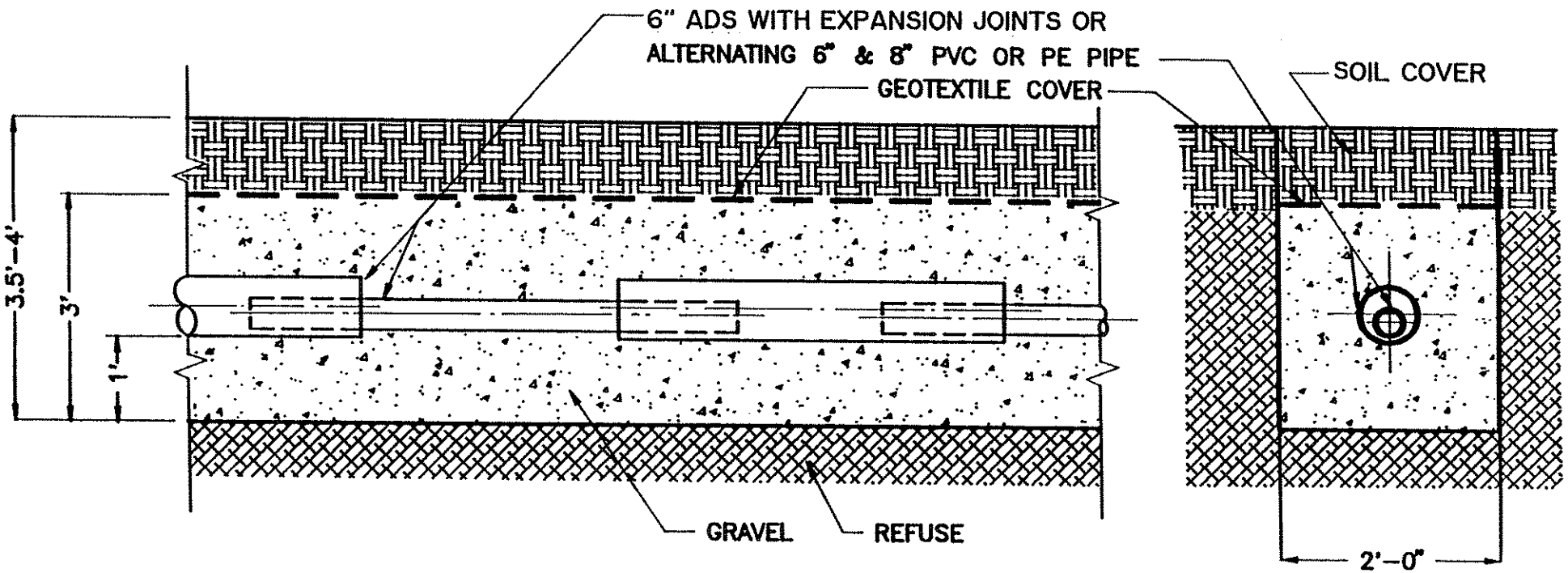
CITY OF LOS ANGELES
BUREAU OF SANITATION — DELWYN A. BAGG, DIRECTOR

NO. | REVISION DESCRIPTION | DATE | DIV./DIST. ENGR.
1 | GENERAL REVISIONS | 4/91 | SPD / AB

DATE _____ 19__ DIV./DIST. ENGR. R.E. NO.

SCALE
SHEET NO.
DWG. NO.
JOB NO.

SCALES HORIZ. 1"= VERT. 1"= | SHEET OF | INDEX NUMBER



TRENCH PROFILE
NTS

TRENCH SECTION
NTS

FIGURE 6 - 6

BAS
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LOPEZ CANYON LANDFILL

TYPICAL GAS COLLECTION TRENCH DETAIL

JOB NO.	9035-1008
DATE	DEC. 1991
DRAWN BY:	PTN
CHECKED BY:	VB

Several vertical gas collection wells of varying depths will also be installed in Disposal Area C as part of the proposed gas control system. The majority of vertical wells will be installed on the slopes of the site running parallel to each bench from the top deck to the toe of the landfill. Lateral spacing between the collection wells will be approximately 100 feet. The collection wells to be installed along the periphery of the disposal area and along the lower benches will be shallow in depth. Those collection wells to be installed along the upper benches and toward the center of the disposal area will be deeper. The number and location of vertical gas collection wells may vary depending on surface and subsurface monitoring conducted on the landfill site as the Disposal Area C is developed. Construction details for the shallow and deep vertical gas collection wells are shown on Figures 6-2 and 6-3.

6.3.3 PROPOSED GAS CONDENSATE COLLECTION SYSTEM

A gas condensate collection system will be installed in Disposal Area C. The system will be designed and constructed similar to the existing condensate system currently in operation. Gas condensate which is generated in the gas control system will drain by gravity through a series of drain lines connected to the bench headers. These drain lines will be connected to main lines which will feed into the double-walled sumps strategically located at low points in Disposal Area C. The collected condensate will then be pumped to a storage tank located on-site. The gas condensate will then be treated in accordance with appropriate regulations and discharged into the City's sewer system.

6.3.4 HEADER AND VERTICAL GAS COLLECTION WELL MODIFICATIONS

Prior to placement of final cover, the header system must be removed in phases in order to minimize interruption of the system. The headers will be reinstalled if the integrity of the pipeline remains intact, otherwise, the pipelines will be replaced.

The existing deep vertical gas collection wells will be protected during the placement of the final cover since control of landfill gas will be continued during closure. Protection of these wells will be provided by a six-foot long section of 48-or 36 inch diameter pipe, placed over the well head. The pipe will form a vault for the well head and will also support the cover material. The same procedure will be utilized for horizontal wells protruding from the side slopes.

The top of the vertical wells will be extended beyond the final cover and then reconnected to the lateral header line as before. The final cover material will be placed by hand around the 48 or 36-inch diameter cylinder to protect it from damage by earthmoving equipment.

6.3.4.1 DECOMMISSIONING OF VERTICAL GAS WELLS

Should the wells interfere with the constructability (i.e., obstruct access) of the final cover, the wells will be abandoned as deemed necessary to proceed with final cover construction. Abandonment of wells will be performed in accordance with Title 14, Section 17772 and replaced after the final cover has been installed.

Wells will be abandoned by removing the PVC well casing, backfilling the borehole with sand, and finally with bentonite to seal the borehole. The final cover will be placed in phases on the side slopes in order to accommodate the decommissioning and redrilling of the vertical wells as final cover placement progresses. This will provide for on-going gas control during the placement of final cover. All waste materials generated during well decommissioning will be disposed at an approved solid waste facility.

6.3.5 GAS CONDENSATE COLLECTION SYSTEM MODIFICATIONS

There are several low points in the existing gas recovery system which are connected to a main gas condensate collection line. Existing connections between low points and condensate collection lines will be disconnected and the condensate lines capped during the placement of final cover. Upon completion of final cover placement, the four-inch collection pipes will be extended as required to connect into the six-inch diameter main collection line. All collection lines will be fed into the main collection line which will be installed around the entire perimeter of the site and will terminate at the gas condensate treatment facility to be located near the flare station. As previously mentioned, the main collection line will intercept the secondary collection lines at low points. Sumps will be located at these low points and the gas condensate will be pumped up the slopes to ultimately discharge into the treatment facility, to be constructed prior to closure.

The gas condensate will be treated to allow for discharge into the City's sewer system. This will be accomplished via an above-ground discharge line installed across a portion of the ridge to the south of the site and into the sewer system near the scalehouse.

6.4 GAS MIGRATION MONITORING SYSTEM

6.4.1 MONITORING PROBE SYSTEMS

The Lopez Canyon Landfill has two types of subsurface landfill gas monitoring probe systems installed around the facility, Gas Collection Indicator Probes (GCIP) and Gas Migration Monitoring Probes. The GCIPs are monitored to evaluate the gas control systems efficiency and the gas migration monitoring probes are monitored to detect off-site migration of landfill gas. Both of these systems will be routinely monitored throughout closure and post-closure.

6.4.2 GAS COLLECTION INDICATOR PROBES

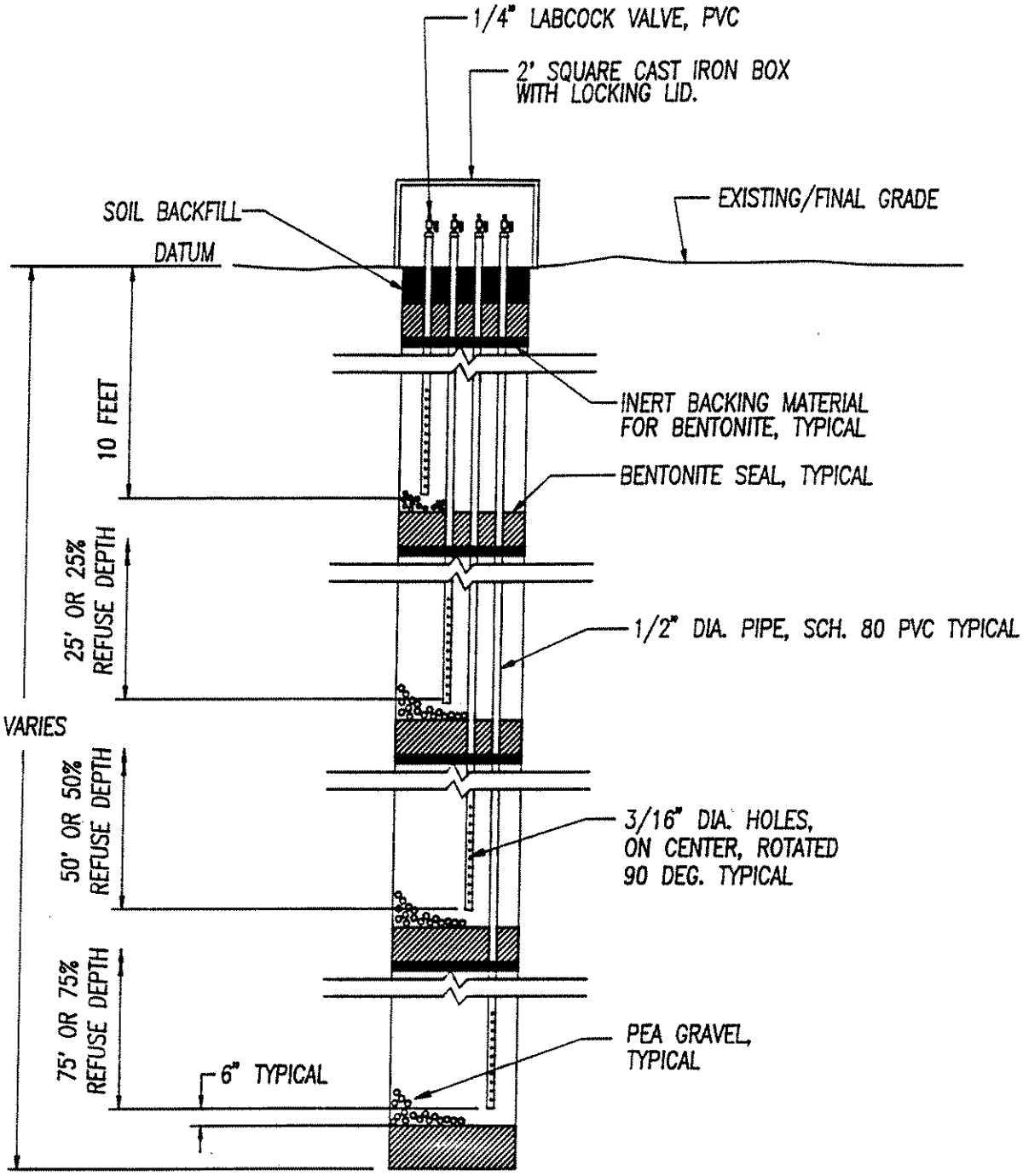
The main primary objective of the GCIP system is to assist the operator in the proper adjustment and limitation of the gas control system. The GCIPs are located outside of the refuse cell primarily adjacent to the side slopes. The depth of the GCIPs are based on the depth of refuse near the probes. Currently, ten GCIPs have been installed around Disposal Areas A, B and AB+. Additional probes will be installed as Disposal Area C is developed. See Figure 6-7 for typical construction details of the GCIP. The location of the current GCIPs is shown on Figure 6-8.

6.4.3 GAS MIGRATION MONITORING PROBE SYSTEM

The gas migration monitoring probes are regularly monitored to determine whether landfill gas is migrating offsite. Currently, 42 probes have been installed around the landfill boundary. The depth of these probes varies from six to ten feet and are approximately 500-feet apart. Future probes will be installed according to the depth of refuse adjacent to the proposed probe location. A typical construction detail for the gas migration monitoring probe is shown on Figure 6-9. Locations of the gas migration monitoring probes are shown on Figure 6-10.

6.4.4 SYSTEM EFFECTIVENESS

Title 14, Section 17783 of the CCR dictates that gas migration levels be no greater than five percent by volume in air at the property line. All gas migration probes, at or beyond the landfill boundary, show gas readings, below natural background levels (less than 100 ppm) and typically read at or below the ambient air level (1-5 ppm methane). All gas perimeter probes are currently monitored on a monthly basis. Appendix G contains results from monthly monitoring data which supports the effectiveness of the gas control system.



NOTE:
THE NUMBER OF PROBES INSTALLED CAN VARY FROM 3 TO 4 DEPENDING ON THE DEPTH OF REFUSE ADJACENT TO THE PROBE.

FIGURE 6 - 7

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LOPEZ CANYON LANDFILL

TYPICAL DETAIL GAS COLLECTION INDICATOR PROBE

JOB NO.	9035-1008
DATE	NOV, 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

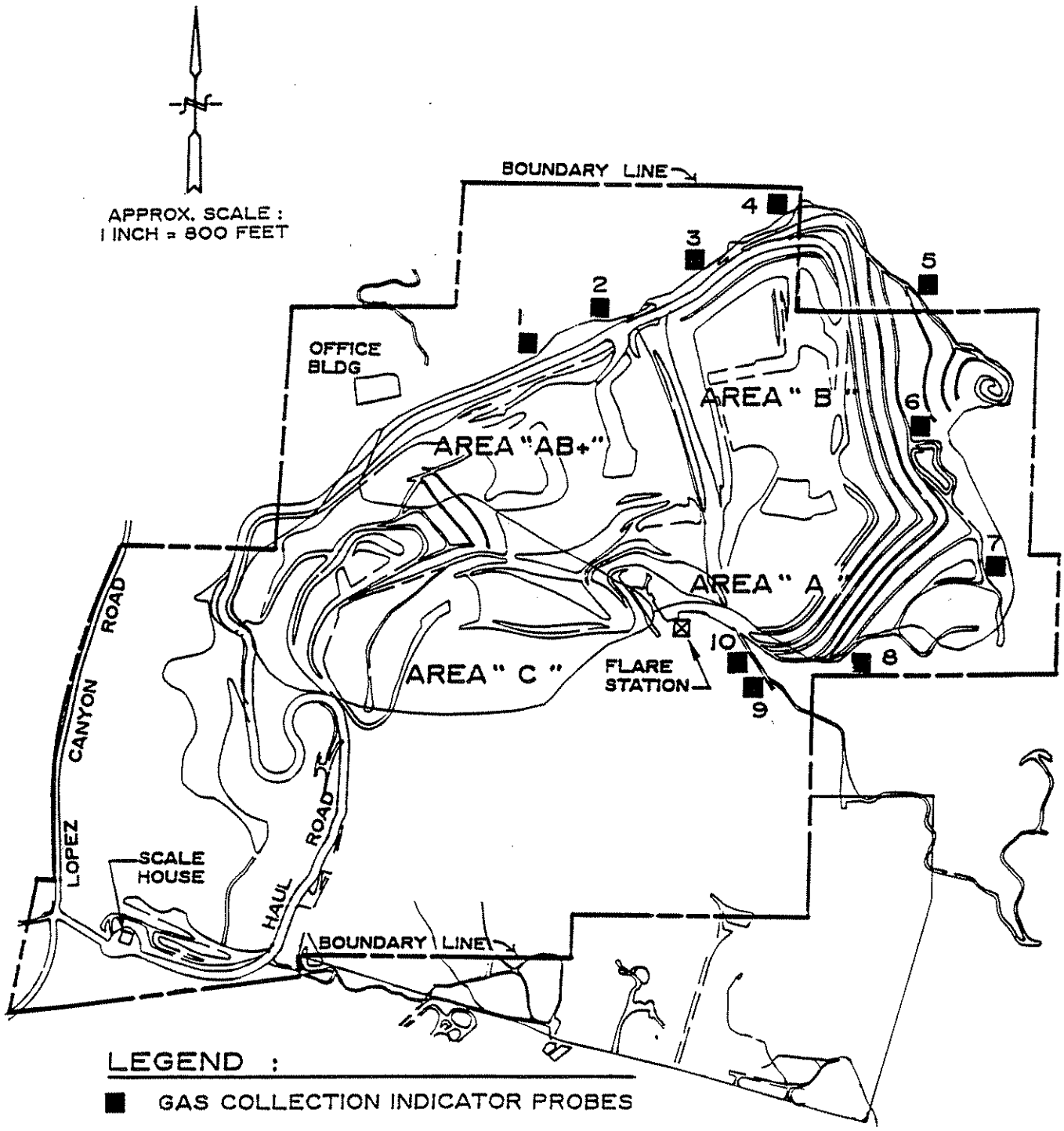

FIGURE 6 - 8

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LOPEZ CANYON LANDFILL

GAS COLLECTION INDICATOR PROBE LOCATION MAP

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

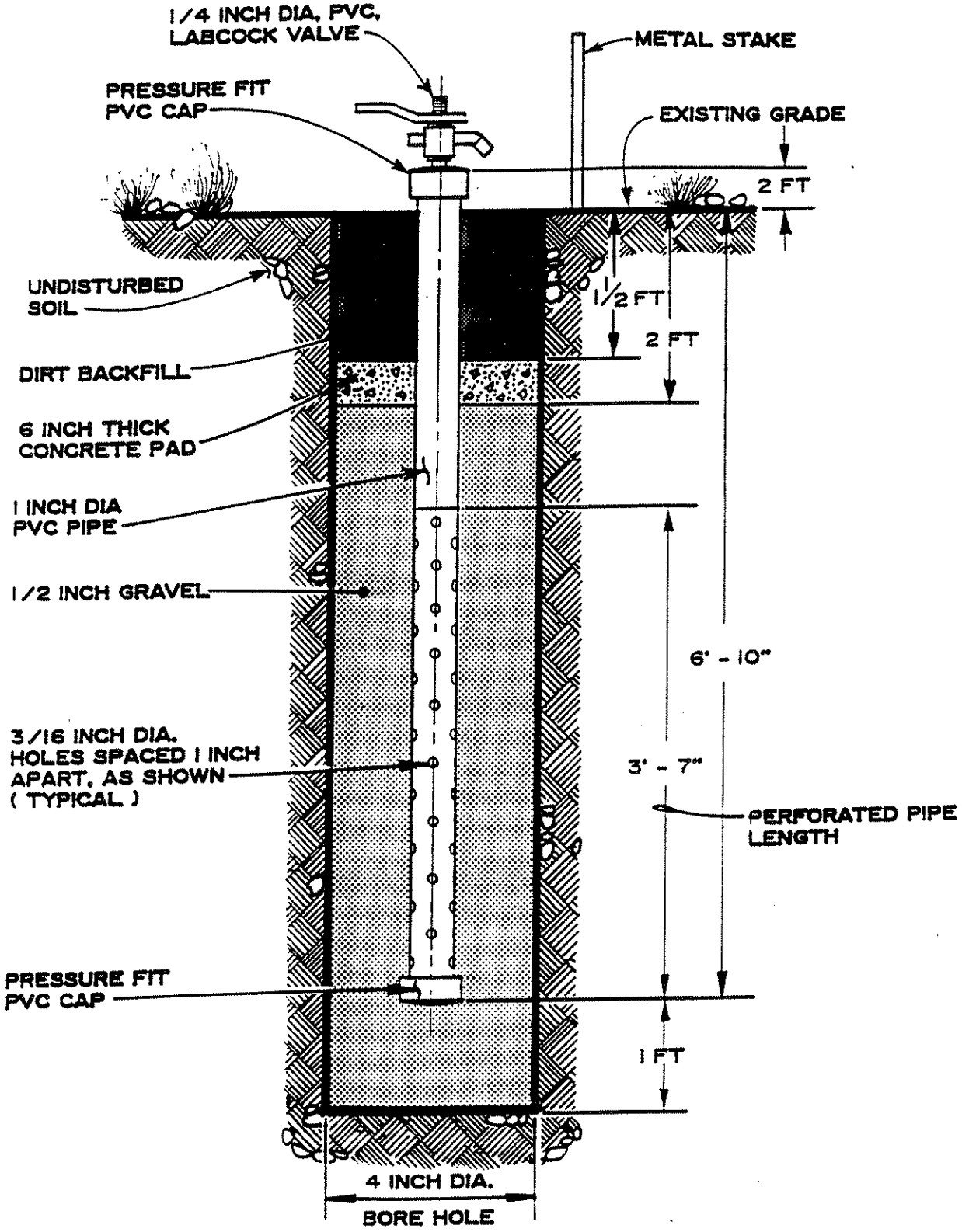

FIGURE 6 - 9

BAS

[714] 860-7777

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LOPEZ CANYON LANDFILL

GAS MIGRATION MONITORING PROBE
TYPICAL DETAIL

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	PTN
CHECKED BY:	VB

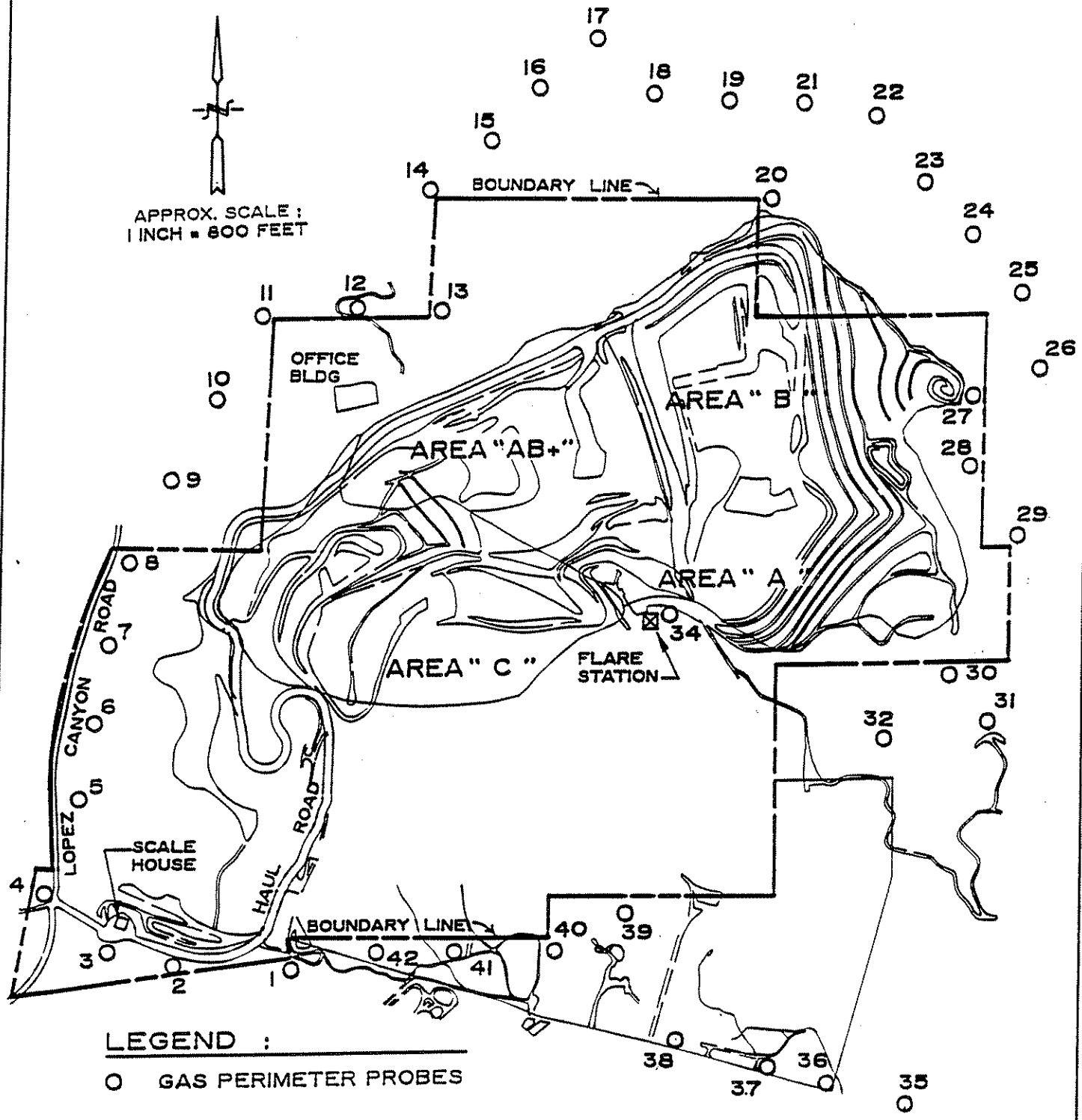

FIGURE 6 - 10

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1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL

GAS MIGRATION MONITORING PROBE LOCATION MAP

JOB NO.	9035-1008
DATE	NOV. 1991
DRAWN BY:	HMG
CHECKED BY:	JRB

There has been no evidence, to date, that gas generated at the landfill is reaching the site property line and/or migrating beyond. The geologic conditions, combined with the installation of a gas collection system and the distances from structures to the refuse cell boundary, should prevent gas migration offsite. This current system of gas migration monitoring probes will be adequate for future monitoring upon closure of Disposal Areas A, B, AB+ and C.

SECTION 7.0

LIQUID MANAGEMENT PLAN

7.0 LIQUID MANAGEMENT PLAN

7.1 INTRODUCTION

The liquid management plan covers the monitoring, collection, storage, handling, and ultimate disposal of liquids originating in the subsurface regions of the landfill. The liquid management plan specifically excludes the handling of surface run-off which is covered in Section 5.0.

Potential sources of subsurface liquids are landfill leachate, gas condensate and any seepage from natural springs. The only known source of subsurface liquid associated with the Lopez Canyon Landfill will be from condensate generated in the landfill gas collection system.

7.2 SOURCES OF LIQUID

Landfill leachate is generally formed when refuse comes in contact with migrating water infiltrating through the soil cover or the native bedrock. Secondary sources include liquids contained in the trash at the time of disposal.

Typically, at landfills similar to Lopez Canyon, liquids migrate downward through the trash prism and along the bottom of the landfill. In a lined waste cell such as Disposal Area C, the leachate will move along the bottom liner and be collected by a leachate collection and removal system (LCRS). In the unlined waste cells of Disposal Areas A and B, the leachate may either move along the native ground contact at the bottom of the landfill or it may enter the alluvium or bedrock. Disposal Areas AB+ has leachate barrier (cut-off-wall) at the toe of the fill area which intercepts leachate that may drain along the bottom or in the alluvium under the site. The existing and proposed leachate collection and removal systems are described in Section 7.3.1.

At the present time, there is no information to indicate that production of leachate within the landfill or in the unsaturated natural ground under the landfill has occurred. Groundwater wells around the landfill have produced samples which indicate no leachate production, or have not produced a sample, indicating a lack of produced leachate.

In addition, as landfill waste decomposes producing methane and carbon dioxide, these gases become saturated with moisture as they move through the warm moist decomposing trash. Condensate forms when the warm gas contacts the cooler collection pipes traversing along the landfill.

7.3 LIQUID COLLECTION AND REMOVAL SYSTEMS

7.3.1 LEACHATE COLLECTION AND REMOVAL SYSTEMS

Since the start of the Lopez Canyon Landfill operations (October, 1975) there has been no visible or detectable leachate generation. As part of the development of Disposal Area AB+, the Regional Water Quality Control Board required the operator to install a leachate seepage cut-off barrier wall (see Figure 7-1) at the downstream end of Disposal Area AB+ along the 1,500 foot elevation contour. In order to remove any leachate, a gravel collector was placed upstream of the barrier wall and a collector pipe was extended from the gravel collector through the barrier wall and downstream to a clarifier placed at the mouth of the canyon.

A leachate collection and removal system (LCRS) will be installed as part of the liner system in Disposal Area C (see Figure 7-2). Once the liner system has been installed in Disposal Area C, the collector pipe from the Disposal Area AB+ barrier wall will be connected through the bottom of the liner into the leachate collection and removal system located on top of the composite liner. The LCRS will consist of a drainage blanket on the liner with an integrated drainage system on the canyon bottom. The drainage blanket on the canyon bottom will consist of a minimum two-foot thick layer of processed conglomerate or approved imported drainage material over the high-density polyethylene (HDPE) liner. The slope gradient of the liner and drainage systems on the canyon bottom will be three percent descending toward the mouth of the canyon. Intercepting lateral drainage pipes will be spaced up to a maximum of 200 feet apart. The pipes will be placed in trenches and surrounded by permeable material. The lateral drainage pipes will discharge to a main collector along the canyon bottom.

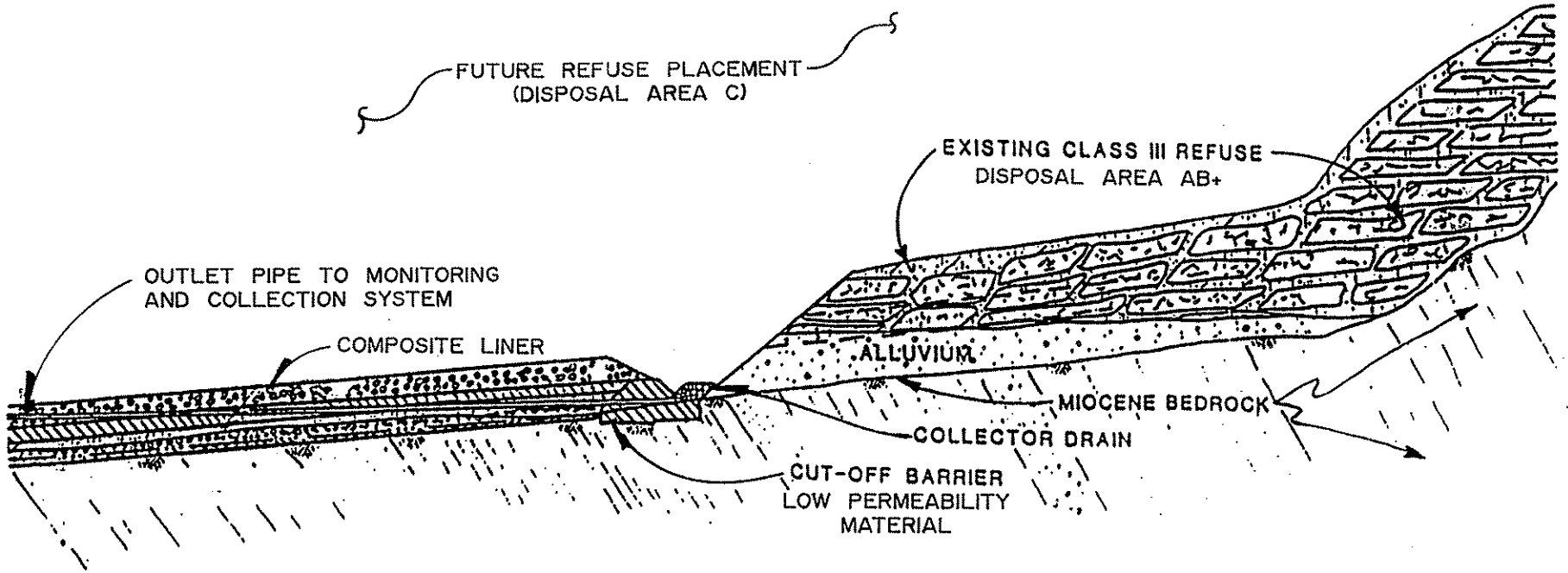


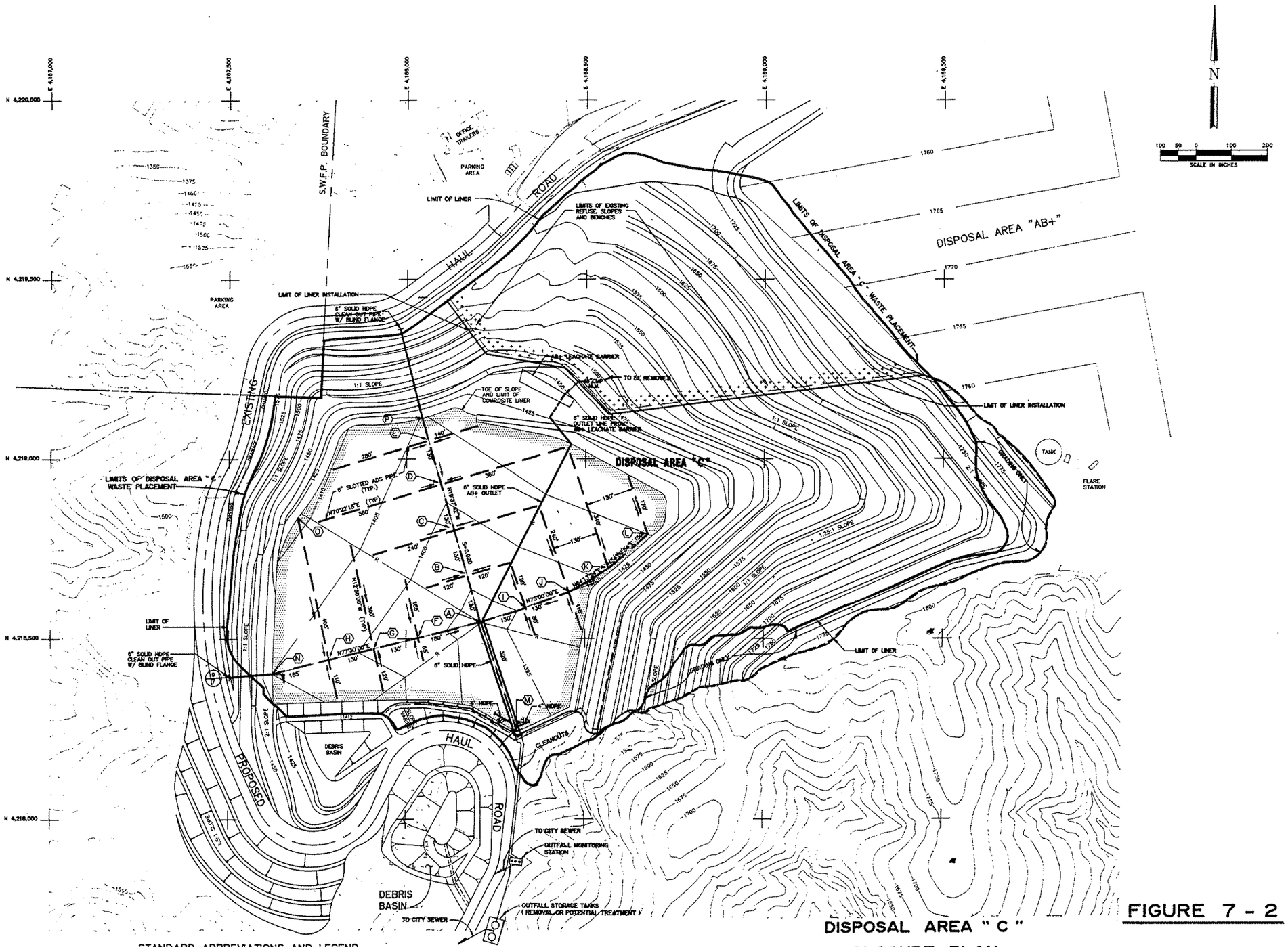
FIGURE 7 - 1

BAS
[714] 860-7777
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL

DISPOSAL AREA AB+
BARRIER / COLLECTOR CUT-OFF WALL

JOB NO.	9035-1008
DATE	FEB. 1992
DRAWN BY:	PTN
CHECKED BY:	JRB



STANDARD ABBREVIATIONS AND LEGEND

R RIDGE — R —
F FLOW LINE — — — —
EXISTING CONTOUR —1400— — — —
PROPOSED SUB-GRADE OF LINER CONTOUR —1450—
DIR. OF FLOW AND RATE OF SLOPE 3%
LIMIT OF COMPOSITE LINER
LIMIT OF EXISTING REFUSE

FIGURE 7 - 2

DISPOSAL AREA " C "
CLOSURE PLAN
PROPOSED LEACHATE COLLECTION AND REMOVAL SYSTEM

SCALE	1" = 100'	SHEET OF	INDEX NUMBER

		DATE
DESIGNED:	M J B	10-91
DRAWN:	D L L & C J G	10-91
CHECKED:		10-91
SUPERVISED:	E.L.S.	10-91
PROJECT ENGR.		R.E. NO.
ASST. DIV./DIST. ENGR.		R.E. NO.

BAS
BOYLE A. STUART & ASSOCIATES
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1350 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(714)860-7777

LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
	GENERAL REVISIONS	BPD / KB	JAN. 93

CITY OF LOS ANGELES
BUREAU OF SANITATION DELBERT A. BRAZIL DIRECTOR
DATE _____ 19____
DIV/DIST. ENGR. R.E. NO.

SCALE AS SHOWN
SHEET NO.
DWG. NO.
JOB NO. 9035-1026

The LCRS will continuously gravity drain any liquids from the bottom of the landfill. This system is anticipated to collect liquids squeezed out of the compacted refuse and rainwater percolating through the decks and running off the side slopes. Additionally, the LCRS includes a piping network to test and clean out the system as a part of routine maintenance. The proposed LCRS was designed in accordance with performance criteria recommended in EPA SW-869, April 1983, Revised Edition.

Both of these systems were designed to control the migration of leachate away from the disposal areas. Leachate that may be collected from the Disposal Area AB+ barrier wall is conveyed to a holding tank downstream where it can be contained, sampled and stored. Once the liner including the LCRS has been installed in Disposal Area C, any leachate collected will be conveyed via the outfall system to storage tanks. Manholes will be located on the outfall system to allow monitoring of collected leachate. If the effluent meets the City of Los Angeles sewer discharge requirements and the Industrial Waste Control Ordinance, it will be discharged into the sewer system connection located near the scalehouse. If the effluent does not meet minimum requirements, it will be trucked offsite and disposed of as required by the appropriate regulatory agencies.

7.3.2 GAS CONDENSATE COLLECTION SYSTEM

The condensate that is currently generated by the extraction of landfill gas is collected by drain lines connected to the gas collection system bench headers as shown on Figure 7-3. The condensate gravity flows to double-wall sumps located at low points around the facility. The landfill gas condensate collection system to be installed in Disposal Area C will be designed and constructed similar to the existing system described above.

The collected condensate is then pumped to a large double-walled storage tank located near the flare station. Currently, all condensate is manually treated with lime at the storage tank to increase the pH level. The liquid is then tested in accordance with City of Los Angeles sewer discharge and RWQCB requirements, if acceptable, the treated condensate is then conveyed to the sewer system.

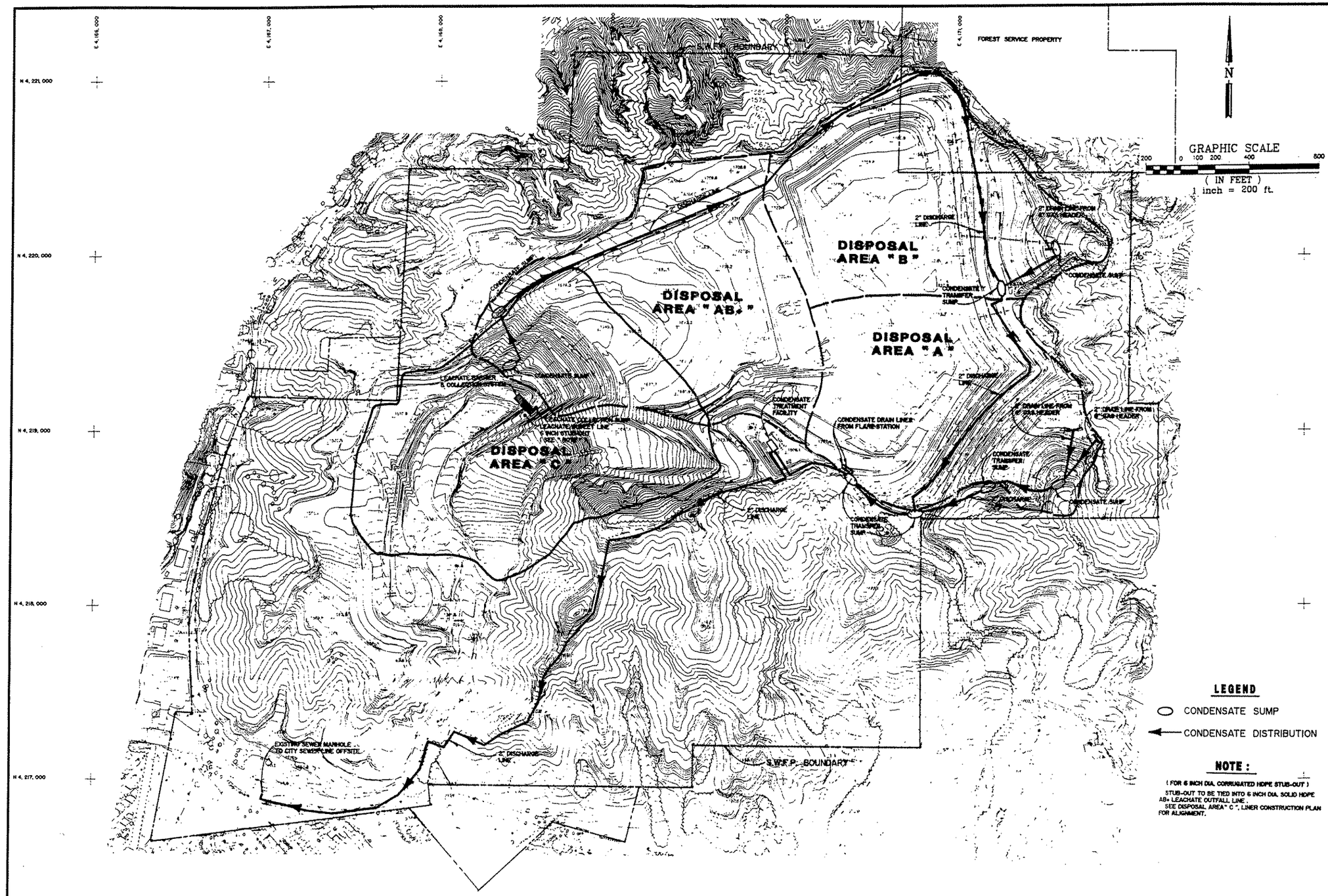

FIGURE 7 - 3

CLOSURE PLAN

EXISTING GAS CONDENSATE / LEACHATE MANAGEMENT SYSTEM

DESIGNED	D.S.	1/92
DRAWN	D.S.	1/92
CHECKED	G.G.	1/92
SUPERVISED	G.A.	1/92
PROJECT ENGR.		R.E. NO.
ASSIT. DIV./DIST. ENGR.		R.E. NO.

BAS
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1380 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765
(714)860-7777

LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
1	GENERAL REVISIONS	M.D.	APR 1993
2	REVISIONS PER CITY COMMENTS	M.D. / R.B.	JUN 1993

CITY OF LOS ANGELES
BUREAU OF SANITATION — DELMAR A. BIAGI, DIRECTOR
DATE _____, 19__
DIV./DIST. ENGR. _____ R.E. NO. _____

SCALE
SHEET NO.
DWG. NO.
JOB NO.

SCALES HORIZ. 1"= VERT. 1"= | SHEET OF | INDEX NUMBER

The operator is proposing to construct a new condensate treatment system. The system will include two-9,000 gallon tanks for collection and treatment of the condensate from the condensate sumps and a 1,500 gallon holding tank for the lime to be used to adjust the pH of the condensate. The lime will be added manually and the condensate will be tested for pH, upon reaching the required pH, the condensate will then be released to the sewer via an underground pipe. Any vapors resulting from the treatment system will be collected, passed through the gas collection system, and sent to the flare station for destruction. The operator plans to have this treatment system operational by early 1993.

7.3.3 GROUNDWATER MONITORING SYSTEM

The groundwater monitoring system consists of a network of four groundwater wells. The locations and typical construction details of the existing wells are shown on Figures 7-4 and 7-5, respectively. These wells are designated as follows:

TABLE 7-1
GROUNDWATER MONITORING WELL DEPTH
AND ELEVATION MEASUREMENTS

MONITORING WELL	TOP OF PVC CASING ELEVATION	DEPTH ** TO GROUNDWATER (feet)	GROUNDWATER ELEVATION	DATE OF MEASUREMENT
MW88-1	1,815.4	Dry	Dry	12/21/92
MW88-2	1,721.2	Dry	Dry	12/21/92
MW88-4	1,380.8	Dry	Dry	12/21/92
MW88-5	1,454.2	25.87	1.428.33	12/21/92
MW92-1	1,367.59	24.22	1,343.37	12/21/92
MW92-2	1,368.56	27.40	1,341.16	12/21/92
MW92-3	1,517.62	14.25	1,503.37	12/23/92

* Elevations are reported in feet above mean sea level.

** Depths are reported from top of PVC well casing.

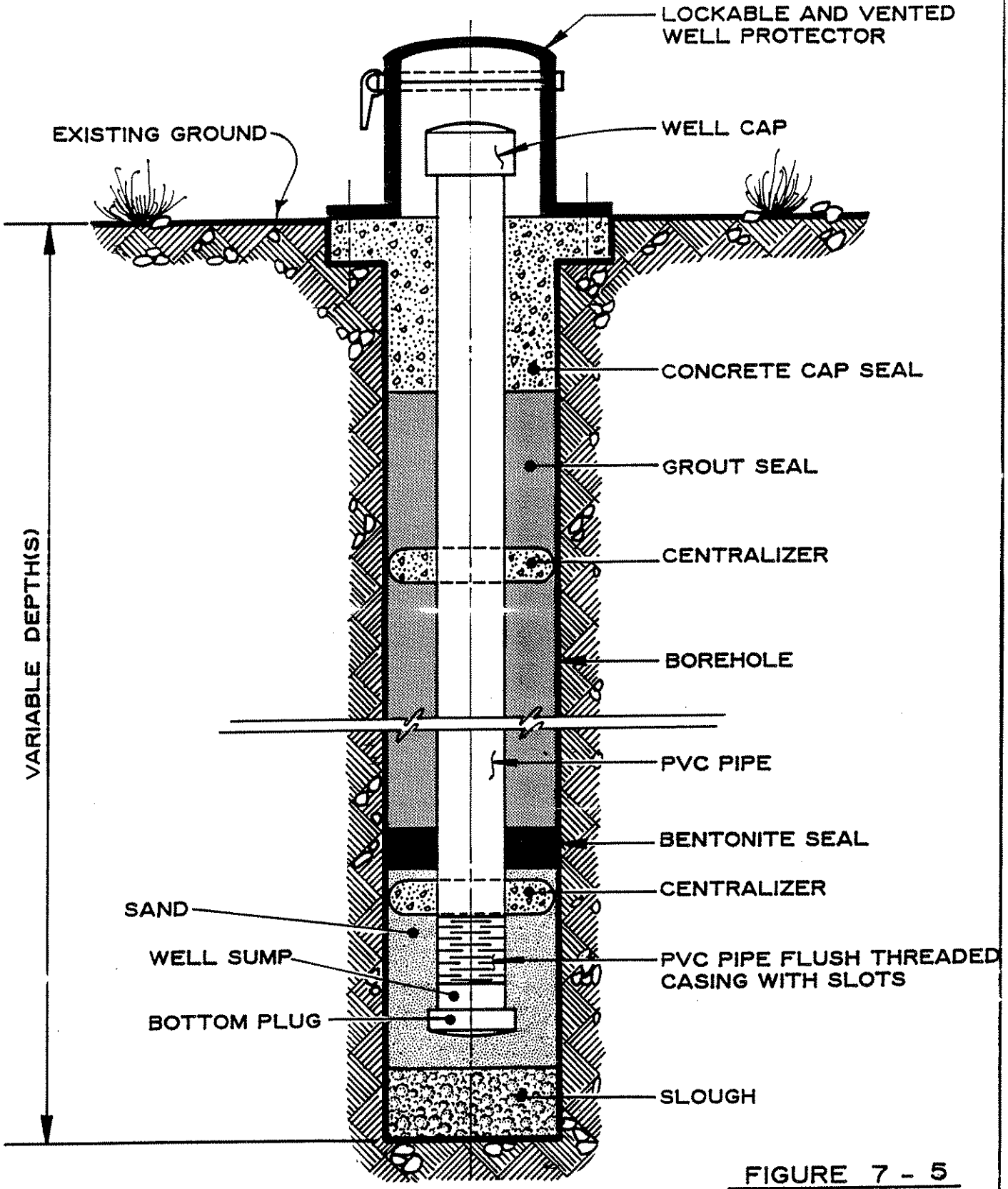

FIGURE 7 - 5

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LOPEZ CANYON LANDFILL

GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS

JOB NO.	9035-1021
DATE	DEC. 1991
DRAWN BY:	PTN
CHECKED BY:	VS

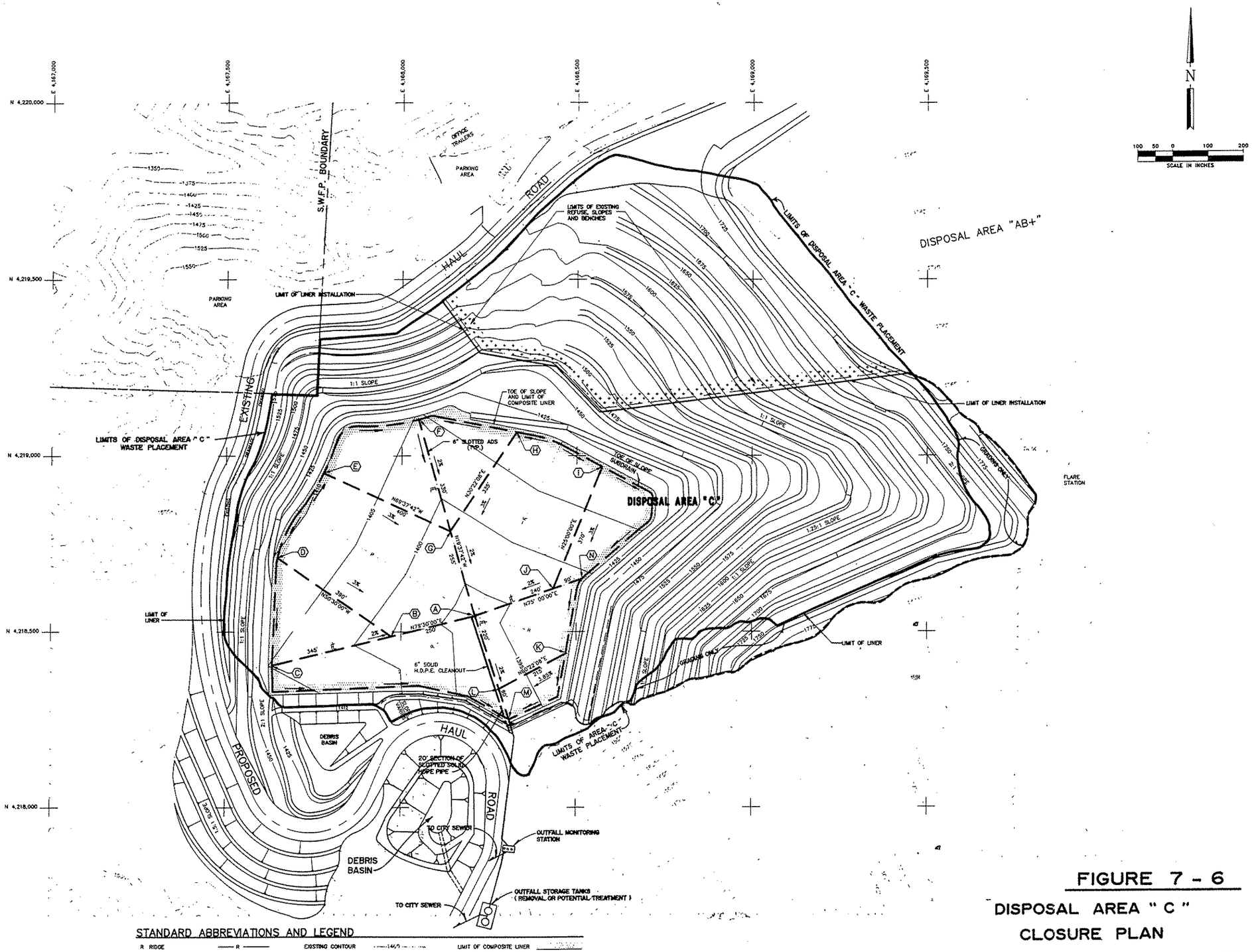
Groundwater monitoring is conducted in accordance with the CUP and Waste Discharge Requirements (WDRs) issued by the RWQCB (WDR Order No. 91-122) (Appendix I). Monitoring of these wells, to date, have not indicated the generation of leachate at the site.

In 1991, new regulations were promulgated by the State Water Resources Board that revised Article 5, Chapter 15, Title 23 which required the RWQCB to revise WDR's for Class III disposal facilities. The City submitted the Article 5 application on August 31, 1992 and is awaiting review by the RWQCB. The revisions to the WDR's will effect the monitoring parameters, water quality protection standards, other monitoring systems, and financial assurance.

Monitoring well MW92-3 was constructed as a replacement well for well MW-88-3 which was abandoned. This well is located in Bartholomaus Canyon and will serve as an upgradient well to well MW88-5. The locations of these wells are indicated on Figure 7-4. The existing wells will continue to be monitored and reported according to the WDR's and the CUP.

7.3.4 SUBDRAIN COLLECTION SYSTEM

A subdrain collection system will be installed as part of the liner system of Disposal Area C (see Figure 7-6). The system will be installed along the excavated canyon bottom underneath the liner to prevent any water seepage from coming into contact with the composite liner. The specific locations and depths of the planned subdrains, as well as possible additional local subdrains, will be established during the canyon excavation as the subsurface conditions are exposed. Adjustment of the subdrains and the installation of any supplemental subdrains in localized areas will be made in the field as directed by an engineering geologist or geotechnical engineer, based on observations of the exposed subsurface conditions.



STANDARD ABBREVIATIONS AND LEGEND

R RIDGE	—— R ——	EXISTING CONTOUR	LIMIT OF COMPOSITE LINER
℄ FLOW LINE	— — — —	PROPOSED SUB-GRADE OF LINER CONTOUR —1450—	LIMIT OF EXISTING REFUSE
		DIR. OF FLOW AND RATE OF SLOPE 3%	

FIGURE 7 - 6

DISPOSAL AREA " C "
CLOSURE PLAN
PROPOSED SUBDRAIN COLLECTION SYSTEM

SCALE	1" = 100'	SHEET	OF	INDEX NUMBER	

	DESIGNED	DRAWN	CHECKED	SUPERVISED	PROJECT ENGR.	ASST. DIV./DIST. ENGR.
DATE	M J B	D L L & C J G	J A I	E.L.S.	R.E. NO.	R.E. NO.
	10-91	10-91	10-91	10-91		

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DIAMOND BAR, CA. 91765
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LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE
1	GENERAL REVISIONS	SPD 7 AB	JAN 1993

CITY OF LOS ANGELES
BUREAU OF SANITATION — OSMAN A. BHAQ, DIRECTOR
DATE _____ 19__
DIV./DIST. ENGR. R.E. NO.

SCALE AS SHOWN
SHEET NO.
DWG. NO.
JOB NO. 9035-1026

G:\DWG\LOPEZ\9035LC1 10-22-91 CJG

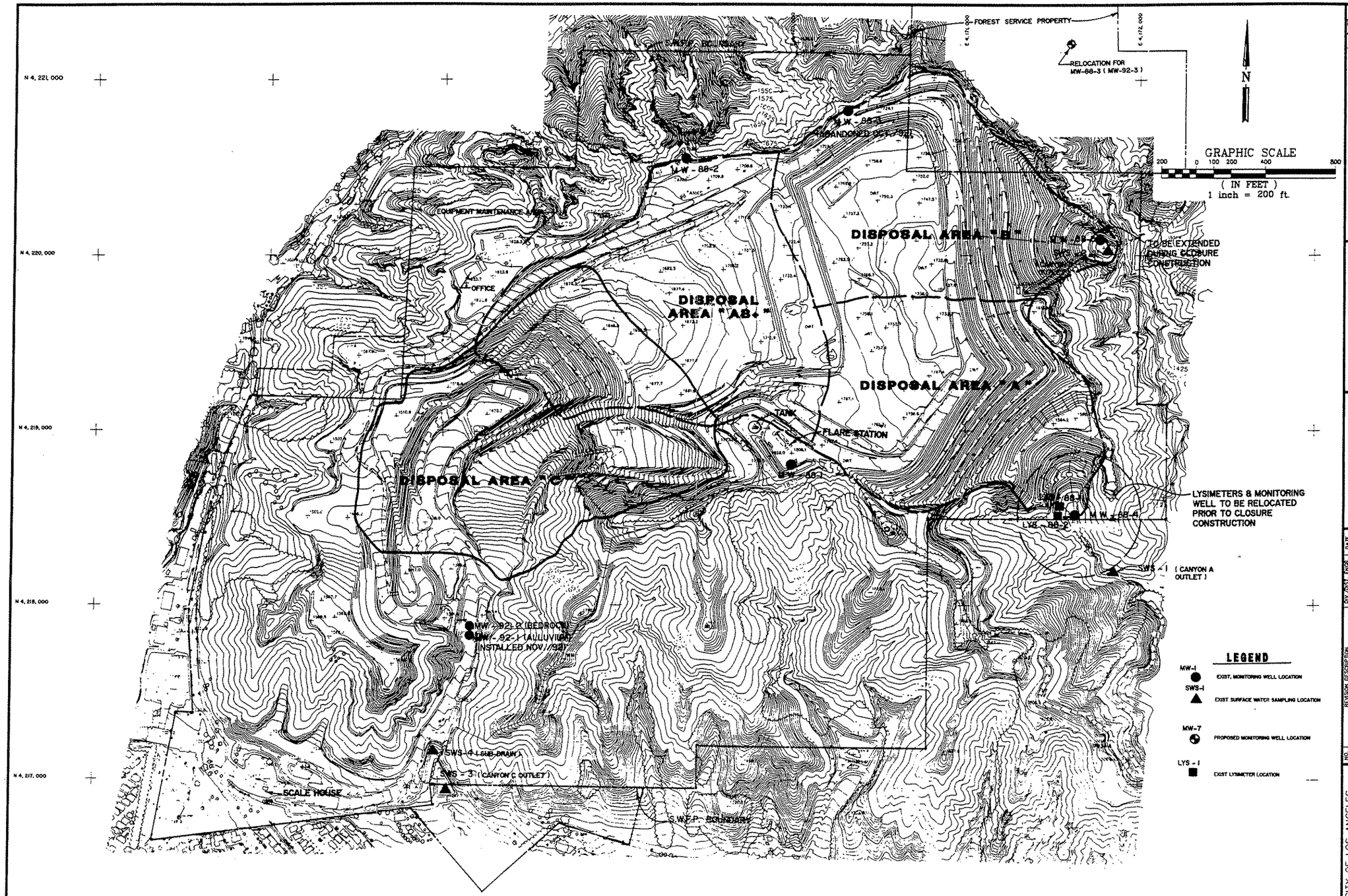

FIGURE 7 - 4

CLOSURE PLAN : SURFACE WATER SAMPLING & GROUNDWATER MONITORING WELL LOCATION MAP

SCALES	HORIZ. 1"=	SHEET	OF	INDEX NUMBER	
	VERT. 1"=				

	DATE
DESIGNED E.L.S.	12/91
DRAWN H.M.G.	12/91
CHECKED E.L.S.	12/91
SUPERVISED E.L.S.	12/91
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

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LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	SAN./ASST. ENGR.	DATE
1	GENERAL REVISIONS PER CITY COMMENTS	S.D.	MAR./1993
2	GENERAL REVISIONS	S.D.	MAY/1993
3		BWP / RB	JULY/1993

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWYN A. BIAGI, DIRECTOR
DATE _____, 19__
DIV/DIST. ENGR. R.E. NO.

SCALE
SHEET NO.
DWG. NO.
JOB NO.

7.4 MONITORING PROGRAMS

7.4.1 SURFACE WATER MONITORING PROGRAM

Currently, surface stormwater is monitored at the Lopez Canyon Landfill site in accordance with the WDR's and the CUP. The WDR requires a Monitoring and Reporting Program (M&RP 5636) (Appendix I) which specifies that surface and storm water be monitored at the following points.

Point	Location
1)	Disposal Area A Canyon Outlet
2)	Disposal Area B Canyon Outlet
3)	Disposal Area C Canyon Outlet
4)	Sub-drain C pipe outlet

Representative surface water samples are and will be obtained semi-annually during the rainy season (October through April). One sample is to be taken at each of the four sampling locations during the first half of the rainy season (Fall) and once during the second half (Winter).

7.4.2 VADOSE ZONE MONITORING PROGRAM

The vadose zone is the area below the landfill, above the groundwater, where water may be present that is suspended in the weathered bedrock or soil. At the Lopez Canyon Landfill, the presence or absence of this water is monitored through the use of lysimeters which are special wells designed to permit the measurement of water that may be in the pores of the soil or weathered bedrock above the groundwater zone.

The site's two lysimeters are monitored in accordance with the WDR's and the CUP at the Lopez Canyon Landfill. The locations of the lysimeters are shown on Figure 7-4.

7.4.3 LEACHATE MONITORING PROGRAM

Monitoring for the presence of leachate will be accomplished primarily by means of the existing AB+ Barrier, proposed Disposal Area C leachate collection and removal systems (LCRS) and the site's monitoring wells. Samples will be drawn from the monitoring station located on the outfall system. Representative samples will be tested in accordance with applicable Waste Discharge Requirements in effect at the time of closure.

Quarterly monitoring and reporting will be conducted to characterize and record the amount of leachate generated, treated and disposed. Quarterly reports will be submitted to the LEA, the CIWMB, and the RWQCB.

In addition, monitoring of the vadose zone to detect the escape of leachate from the refuse cell will be conducted in accordance with CCR, Title 23, Chapter 15, Section 2559.

SECTION 8.0

LANDSCAPING AND IRRIGATION

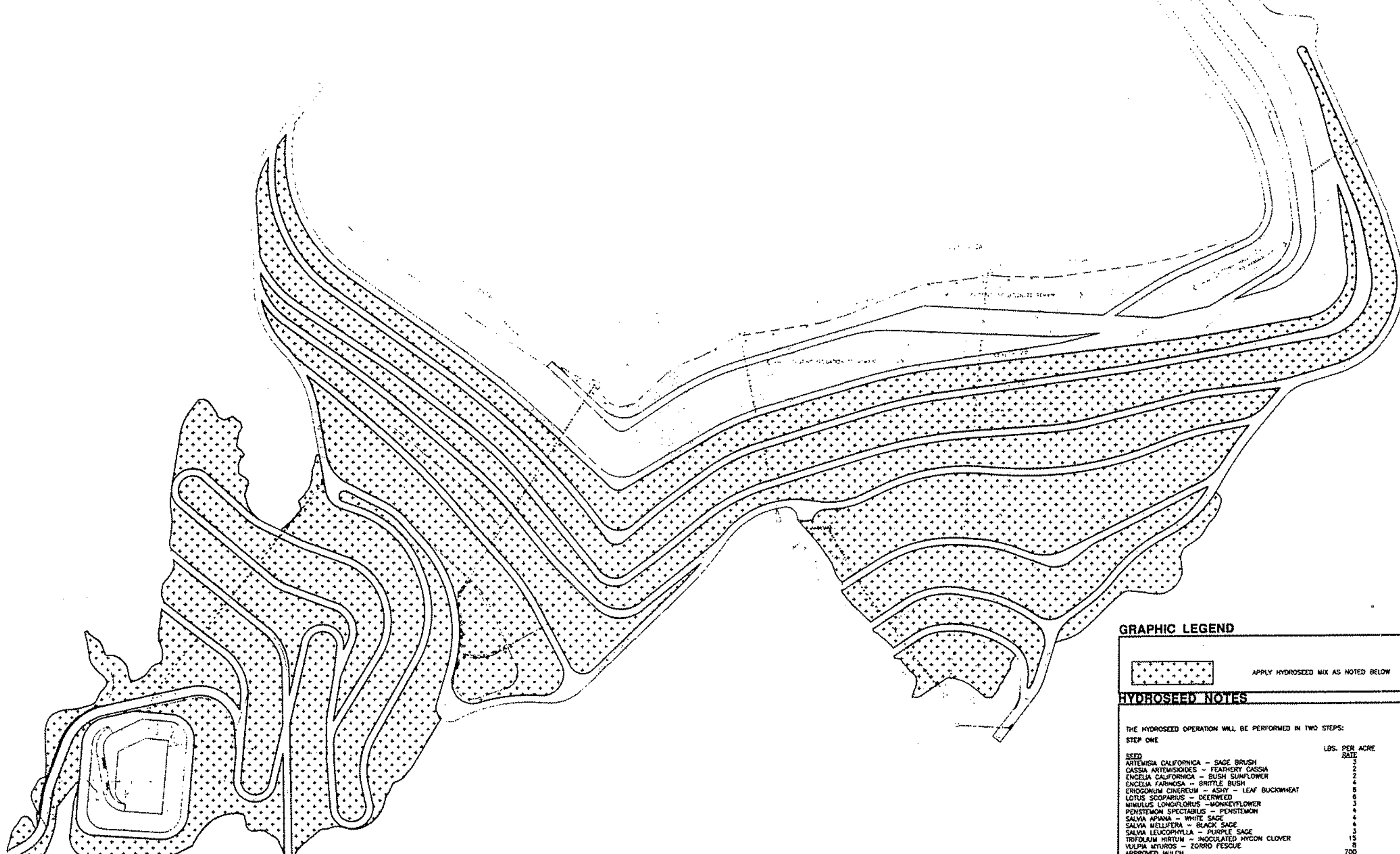
8.0 LANDSCAPING AND IRRIGATION

8.1 INTRODUCTION

The currently proposed landscape design for the closed Lopez Canyon Landfill is an interim open space landscape revegetated with California native plant materials suited for Southern California. The primary purpose of the vegetative cover will be the protection of surface soils against erosive elements such as water and wind. Secondary or indirect purposes of the cover include aesthetic enhancement and restoration and replacement of native grass and sage scrub species. The deck and slope areas of the landfill will receive vegetative types which respond to site factors such as solar orientation; degree of erosion potential, and water conservation. Figures 8-1, 8-2 and 8-3 shows the slope and deck planting areas.

All deck and south/southwest oriented areas of the landfill will be planted with native grassland species of Southern California with additional non-native; non-competitive grasses. Pioneer plant species will be included to rejuvenate the soil environment. All north/northeast oriented slopes will be revegetated with native shrubs and grasses typical of the local slope areas adjacent the site. Such plants will require little water, little maintenance, and will be shallow rooted to avoid penetration of the low-permeability final cover layer. A temporary overhead spray irrigation system will supplement rainfall for approximately 18 months, or two growing seasons, on the decks in order to establish plant growth. A permanent overhead spray irrigation system will supplement natural rainfall on all slope areas.

A water balance study was performed to determine if irrigation of the final cover would create excess infiltration of water into the trash prism. Based on the results of the water balance study, irrigation of the final cover to establish vegetation will not result in unacceptable percolation through the cover, even under the wettest conditions. A water balance study for the Lopez Canyon Landfill was prepared by Law Environmental dated March 27, 1992 and is included as Appendix J. In addition, periodic monitoring of watering by a landscape architect representative will be conducted until final cover vegetation is established.



GRAPHIC LEGEND

APPLY HYDROSEED MIX AS NOTED BELOW

HYDROSEED NOTES

THE HYDROSEED OPERATION WILL BE PERFORMED IN TWO STEPS:

STEP ONE

SEED	LBS. PER ACRE RATE	PURITY	GERMINATION
ARTEMISIA CALIFORNICA – SAGE BRUSH	3	15	60
CASSIA ARTEMISIOIDES – FEATHERY CASSIA	2	95	70
ENCELIA CALIFORNICA – BUSH SUNFLOWER	2	40	80
ENCELIA FARINOSA – BRITTLE BUSH	4	40	60
ERIOGONUM CINEREUM – ASHY – LEAF BUCKWHEAT	8	50	10
LOTUS SCOPARIUS – DEERWEED	6	40	60
MIMULUS LONGIFLORUS –MONKEYFLOWER	3	5	70
PENSTEMON SPECTABILIS – PENSTEMON	4	95	75
SALVIA APIANA – WHITE SAGE	4	70	50
SALVIA MELLIFERA – BLACK SAGE	4	85	50
SALVIA LEUCOPHYLLA – PURPLE SAGE	3	75	70
TRIFOLIUM HIRTUM – INOCULATED HYCON CLOVER	15	95	90
VULPIA MYUROS – ZORRO FESCUE	8	85	80
APPROVED MULCH	700	--	--
FERTILIZER, BEST, OR EQUAL 16-20-0	250	--	--

STEP TWO

MULCH	700
ACTIVATED HYDROBLEND, LANDTECH, OR EQUAL	3000
BINDER/TACKIFIER	60

CONTRACTOR SHALL AVOID SPRAYING HYDROSEED SLURRY ON EXISTING OR NEWLY PLANTED SHRUBS AND TREES AND ALL SITE EQUIPMENT. AVOID SPRAYING SLURRY IN TREE PLANTING BASINS.

0 100 200 300
SCALE IN FEET

LANDSCAPE ARCHITECTS
3221 HUTCHISON AVE
SUITE B – LA, CA 90034
310.838.0448
FAX 204.2644
RLA 2023

HYDROSEED PLANTING PLAN

DESIGNED	TB
DRAWN	JT
CHECKED	TB
SUPERVISED	
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
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DIAMOND BAR, CA 91765
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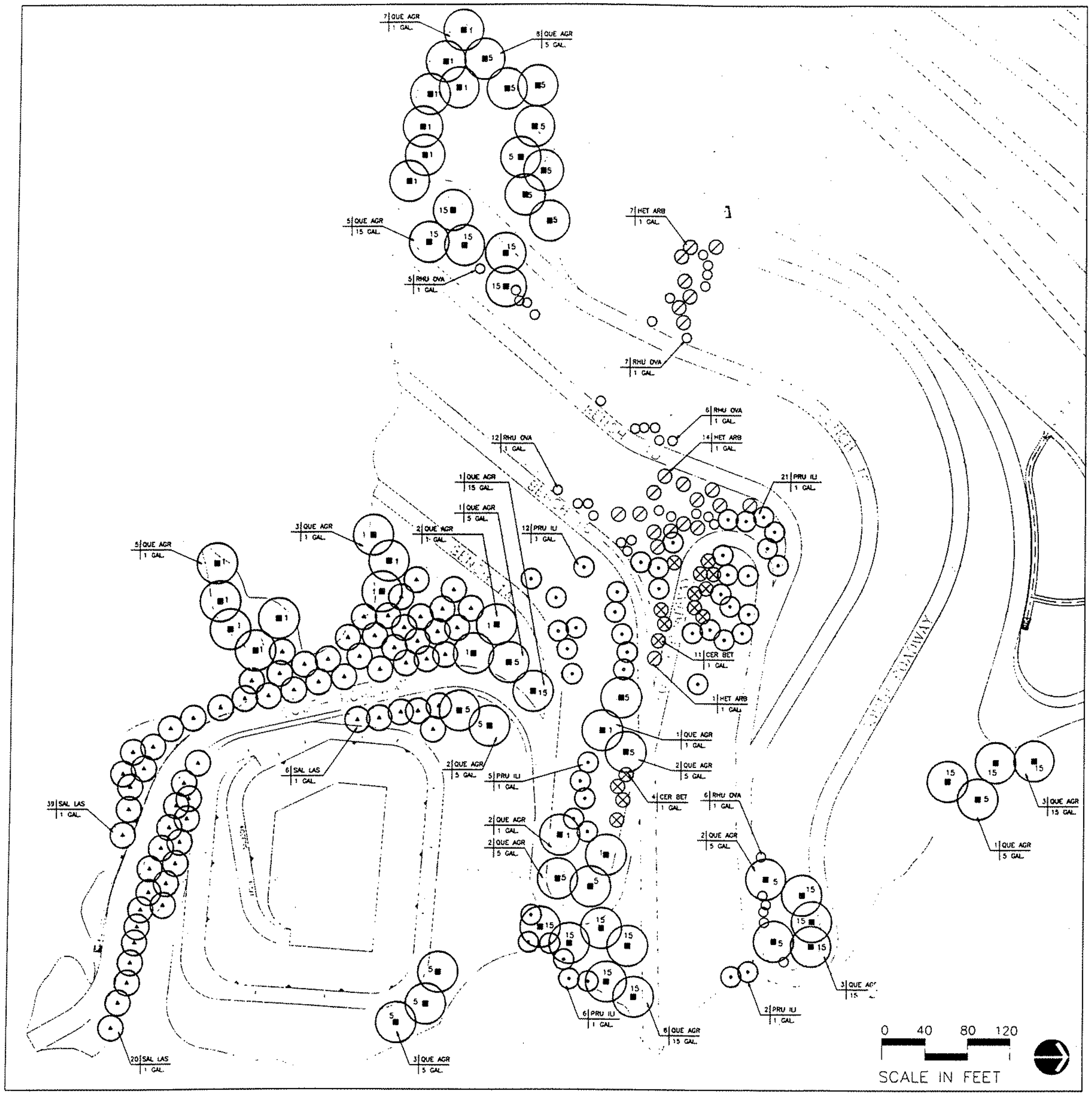
LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ______ 19____
DIV./DIST. ENGR. R.E. NO.

SCALE 1"=100'
SHEET NO. L-6
DWG. NO. 0258-OXT-E-55-00-CO
JOB NO.

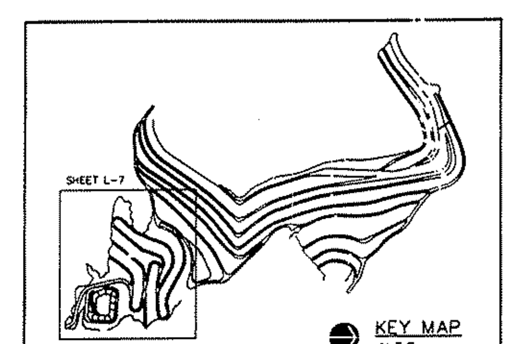
FIGURE 8 - 1



PLANT LEGEND

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL
TREES					
●	PRUNUS ILICIFOLIA	HOLLYLEAF CHERRY	1 GAL.	46	T,U
■1	QUERCUS AGRIFOLIA	COAST LIVE OAK	1 GAL.	20	U,V
■5	QUERCUS AGRIFOLIA	COAST LIVE OAK	5 GAL.	21	U,V
■15	QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GAL.	18	U,V
▲	SALIX LASIOLEPIS	ARROYO WILLOW	1 GAL.	66	T,U
SHRUBS					
⊗	CERCOCARPUS BETULOIDES	SWEET BRUSH	1 GAL.	15	T,U
⊘	HETEROMELOS ARBUTIFOLIA	TOYON	1 GAL.	22	T,U
○	RHUS OVATA	SUGAR BUSH	1 GAL.	38	T,U

PRELIMINARY



LANDSCAPE ARCHITECTS

CONTAINER PLANTING PLAN

DESIGNED	TB
DRAWN	JT
CHECKED	TB
SUPERVISED	
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
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DIAMOND BAR, CA. 91765
(714)860-7777

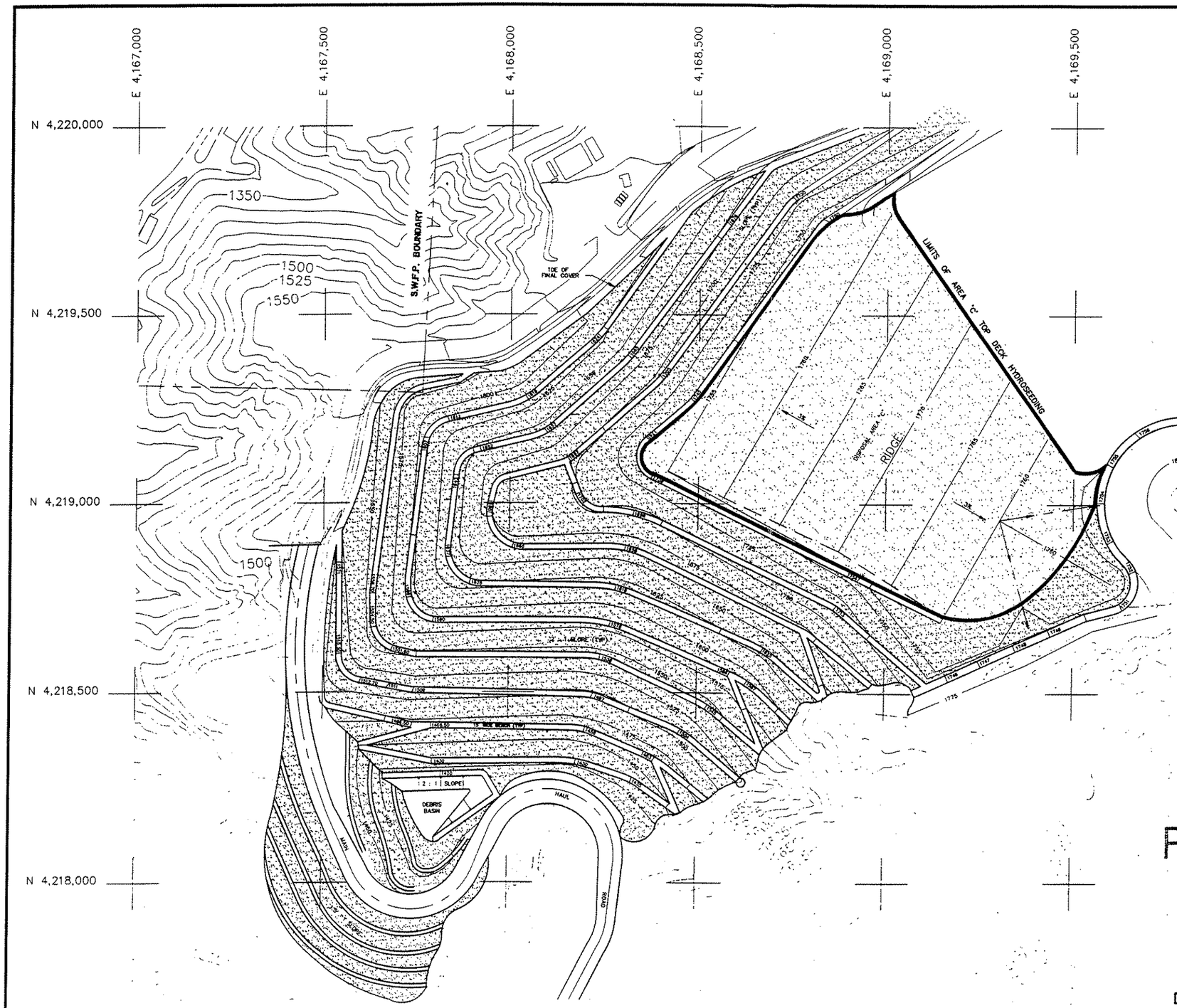
LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ______ 19__
DIV/DIST. ENGR. R.E. NO.

SCALE: 1"=40'-0"
SHEET NO. L-7
DWG. NO.
JOB NO.

FIGURE 8 - 2



DECK SEED MIX

SPECIE
Aristida sp.
Festuca megalura - Zorro Fescue
Stipa cernua - Nodding Stipa
Stipa pulchra - Purple Stipa
Melica californica - Melic
Poa scrabella - Pine Bluegrass

SLOPE SEED MIX

SPECIE
Aristida sp.
Festuca megalura - Zorro Fescue
Stipa cernua - Nodding Stipa
Stipa pulchra - Purple Stipa
Melica californica - Melic
Poa scrabella - Pine Bluegrass
Encelia Californica - Bush Sunflower

PRELIMINARY

DISPOSAL AREA " C "

LANDSCAPE PLAN

SCALE	1" = 100'	SHEET	OF	INDEX NUMBER

		DATE
DESIGNED	C T D	12/91
DRAWN	D A L	12/91
CHECKED	C T D	12/91
SUPERVISED	T E N	12/91
PROJECT ENGR.		R.E. NO.
ASST. DIV./DIST. ENGR.		R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
3 HUGHES IRVINE, CA 92718
(714)580-7777

LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DATE	DIV./DIST. CHIEF	DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELMA A. BRAZIL, DIRECTOR
DATE 19
DIV./DIST. ENGR. R.E. NO.

SCALE	
SHEET NO.	
DWG. NO.	
JOB NO.	

G:\DWG\LOPEZ\DISPFG 4-4-91 CJC

FIGURE 8-3

8.2 POST-CLOSURE END USE

The currently proposed interim end use for the site is open space and will be planted with foothill grass plant species and inland sage scrub plant species. The vegetation established on the slopes at the completion of closure should be compatible with most ultimate end uses. The cover has been designed to accommodate irrigation so as not to limit any future end use selected for the site.

8.3 LANDSCAPE MATERIALS

8.3.1 GENERAL DESCRIPTION

All plant species for the site have been selected because of their adaptability to a limiting set of site criteria. The more important criteria includes low water consumption, tolerance of high salt content in the soils, adaptability to clay soils, ease of maintenance, low fire fuel load, shallow root systems and wind tolerance.

8.3.2 DECK AND SLOPE AREA PLANT MATERIALS

All deck and south/southwest oriented areas will be vegetated with a select grass seed mix comprised of native annual and perennial bunch grass species. Individual species selected as the vegetative cover are identified in Table 8-1. The grasses will provide a green vegetative color during the wet season and a light green/light brown color during the dry season. Several grass species are warm season perennials providing green foliage during the summer months on limited water. Their warm season perennial characteristic should limit fire fuel load buildup. Establishment of the grass should occur in the first two, possibly three growing seasons.

All north/northeast oriented slopes will be revegetated with perennial shrubs common to the local slopes of the area. The shrubs will provide visual integration of these disposal areas to the adjacent open space areas. The ultimate height of the vegetative cover will be approximately four feet with most species reaching two feet in height. Establishment of the shrubs should occur in the fourth or fifth growing season. Individual species selected as the vegetative cover are identified in Table 8-1.

TABLE 8-1
REVEGETATION PLANT SPECIES

DECK AREA SEED MIX		REMARKS	
Aristida sp			
Festuca megalura	Zorro Fescue	CA Native	
Stipa cernua	Nodding Stipa	CA Native	
Stipa pulchra	Purple Stipa	CA Native	
Melica californica	Melic	CA Native	
Poa scrabella	Pine Bluegrass	CA Native	
SLOPE AREA SEED MIX - SOUTH/SOUTHWEST SLOPES			
Aristida sp.			
Festuca megalura	Zorro Fescue	CA Native	
Stipa cernua	Nodding Stipa	CA Native	
Stipa pulchra	Purple Stipa	CA Native	
Melica californica	Melic	CA Native	
Poa scrabella	Pine Bluegrass	CA Native	
Encelia californica	Bush Sunflower	CA Native	
Lotus scoparius	Deerweed	CA Native	
SLOPE AREA SEED MIX - NORTH/NORTHEAST SLOPES			
Artemisia californica	Sagebrush	CA Native	
Atriplex semibaccata	Saltbush		
Baccharis pilularis	Coyote Bush		
Encelia californica	Bush Sunflower	CA Native	
Eriogonum giganteum	St Catherines Lace	CA Native	
Eriogonum cinereum	Ashy Leaf Buckwheat	CA Native	
Eschscholzia californica	Poppy	CA Native	
Lotus scoparius	Deerweed	CA Native	
Lupinus succulentus	Lupine	CA Native	
Salvia apiana	White Sage	CA Native	
Salvia leucophylla	Purple Sage	CA Native	
Salvia mellifera	Black Sage	CA Native	
Stipa pulchra	Purple Stipa	CA Native	
Stipa cernua	Nodding Stipa	CA Native	
Melica californica	California Melic	CA Native	
Melica imperfecta	Coastrange Melic	CA Native	
Bromus carinatus	California Brome	CA Native	
Elymus glaucus	Blue Wildrye	CA Native	
DISPOSAL AREA A - TREES AND SHRUBS			SIZE
Heteromeles arbutifolia	Toyon	CA Native	1 to 15 gallon
Prunus illicofolia	Hollyleaf Cherry	CA Native	1 to 15 gallon
Quercus dumosa	Scrub Oak	CA Native	1 to 15 gallon
Rhamnus alternafolius	Coffeeberry	CA Native	1 to 15 gallon
Rhus integrifolia	Lemonade Berry	CA Native	1 to 15 gallon
Rhus ovata	Sugar Bush	CA Native	1 to 15 gallon

The lower slope area of Disposal Area A can be seeded and/or planted with deeper rooting shrubs. The shrubs will not threaten cover integrity since the final cover design in this area provides for a vegetative layer 10 to 40 feet thick. During cover construction, soil depths should be noted to ensure proper placement of deeper rooted plants.

Shrub and tree species common to the chaparral belt plant community can be installed on the Disposal Area "A" slopes where deeper vegetative soil layers will be placed. These shrubs and trees are not available in seed source and should be installed from field containers following the first stage of plant establishment. These shrub species are identified in Table 8-1.

8.3.3 SOIL AMENDMENT

Prior to seeding, a soil activator/conditioner will be applied to the decks and slopes. The soil activator will provide an available nutrient base for quick establishment and will provide a long-term fertile soil environment for full plant development. The soil activator is formulated to provide an appropriate soil environment for the native plant species proposed as a vegetative cover.

8.4 LANDSCAPE INSTALLATION

8.4.1 WEED ERADICATION

Upon completion of closure construction, an aggressive weed eradication program should be implemented to eliminate invasive weeds such as mustards and thistles. These weeds are natural to disturbed sites of the region and their control will be necessary to ensure establishment of the desired plant materials, reduce fire potential and eliminate possible penetration of the final cover by deep rooting weeds.

All areas will require a minimum two-stage weed eradication program with continued weed monitoring during post-closure operations. All weeds existing at the site should be eradicated and removed by herbicides and mechanical means prior to hydroseeding. During testing of the irrigation system and following the

first-stage of weed removal, existing weed seeds will germinate. Three weeks following the appearance of these weeds, a second herbicide application is required to kill the second generation weeds. Following eradication of the second generation of weeds, the slopes are ready for planting.

8.4.2 SLOPE PREPARATION

The slopes will be constructed to limit water infiltration and allow for proper establishment of the vegetative cover. The minimum cover thickness required for vegetation will be 24 inches and may be highly compacted. Slope scarification and texturing will eliminate high run-off velocities of water and will create pockets for seed dispersal and germination. The selected method for texturing will produce surface pockets to a minimum depth of two inches normal to the slope at not greater than eight inches apart. Prior to slope texturing, the surface will be dampened to a minimum depth of two inches.

8.4.3 HYDROSEEDING PROCEDURES

Seeding procedures for the deck area will be performed by mechanical drill seeding. This technique provides better contact between the seeds and the soil which will increase the germination percentages. Prior to drill seeding, and the addition of soil activators, all compacted soils should be watered to reduce soil compaction in the upper three inches of soil. This step increases the drill seeding equipment's efficiency at dropping seeds into the soil and will incorporate the soil activator with existing cover soils. Drill seeding can occur following the installation of the temporary irrigation system.

Installation of the slope vegetative cover will be performed by two-stage hydroseeding in the fall months after weed eradication. The two-stage hydroseed installation creates a better growth environment resulting in increased landscape coverage. The first stage of the process is an application of the seed mix in the form of a light mulch slurry on the textured slope. The second stage is an application of a soil activator and tackifier over the seed. This process provides soil contact between the seed and soil and provides a heavy mulch cover over the seed which will reduce exposure to the sun. The tackifier prevents loss of the mulch from rain or irrigation and wind.

8.5 IRRIGATION SYSTEM

The final cover irrigation system will consist of a pressured water supply line, the existing one million gallon (1 MG) water tank, a booster pump at the reservoir, distribution networks on the irrigated area, permanent sprinkler systems on the slopes and an irrigation controller capable of operating all zones of the landfill. The pump is designed to accommodate an estimated demand of 0.50 inches of water per week.

The existing landfill water supply system is designed to lift water from the Los Angeles Department of Water & Power main pipeline on Lopez Canyon Road to the 1 MG water tank. This system consists of two 400 gallon per minute (gpm) pumps and an above ground eight inch diameter cast iron pipeline to the 1 MG water tank at the top of the landfill.

A 485 gpm booster pump located at the reservoir will be used to pressurize the deck and slope distribution systems. This pump could be operated up to 24 hours per day to meet the demand.

Air and vacuum release valves will be located at all high points in the system. Blow-off valves will be placed at all low points, with a lateral connection to the storm drain for all discharges. Pressure regulating valves will be located at main supply lines that feed slopes to reduce the water pressure to acceptable levels. Pressure relief valves will also be installed in the supply line to eliminate pressure surges. Line valves will be installed at all tees at a maximum spacing of 1,000 feet to provide for flexibility during operation and maintenance of the system.

8.5.1 DECK AREA IRRIGATION

The deck area irrigation system for the Lopez Canyon Landfill is proposed to be a temporary manually operated system.

The major components of the system will be rented and consist of a mainline, lateral pipes, risers, manual valves, and sprinkler heads. The booster pump will be located at the point of connection adjacent to the 1 MG water tank.

Sprinkler laterals will be placed directly on the ground and spring check valves will be utilized at all risers to minimize gravity drainage from the laterals. This will eliminate the wasting of water and reduce the potential for erosion. The supply system will be designed to provide a minimum of 40 psi pressure to the sprinklers.

8.5.2 SLOPE AREA IRRIGATION SYSTEM

The slope area irrigation system is proposed to be a permanent, automatically operated system. The layout and installation details are shown on Figures 8-4 through 8-12. A supply line and a lateral line will run along the outside of each bench at the top of the slopes and could be placed on adjustable pipe support racks. A second set of laterals will run down the face to service sprinklers placed at mid-slope. These laterals will run perpendicular to the bench and enable equipment access to the slopes for maintenance of the cover as necessary.

All large on-grade and small diameter mainline and lateral lines will be PVC with U.V. inhibitors. Buried pipe will be steel, with the exception of PVC pipe at or near final cover areas and under bench crossings. Sleeves will be installed at bench crossing to protect the PVC pipe.

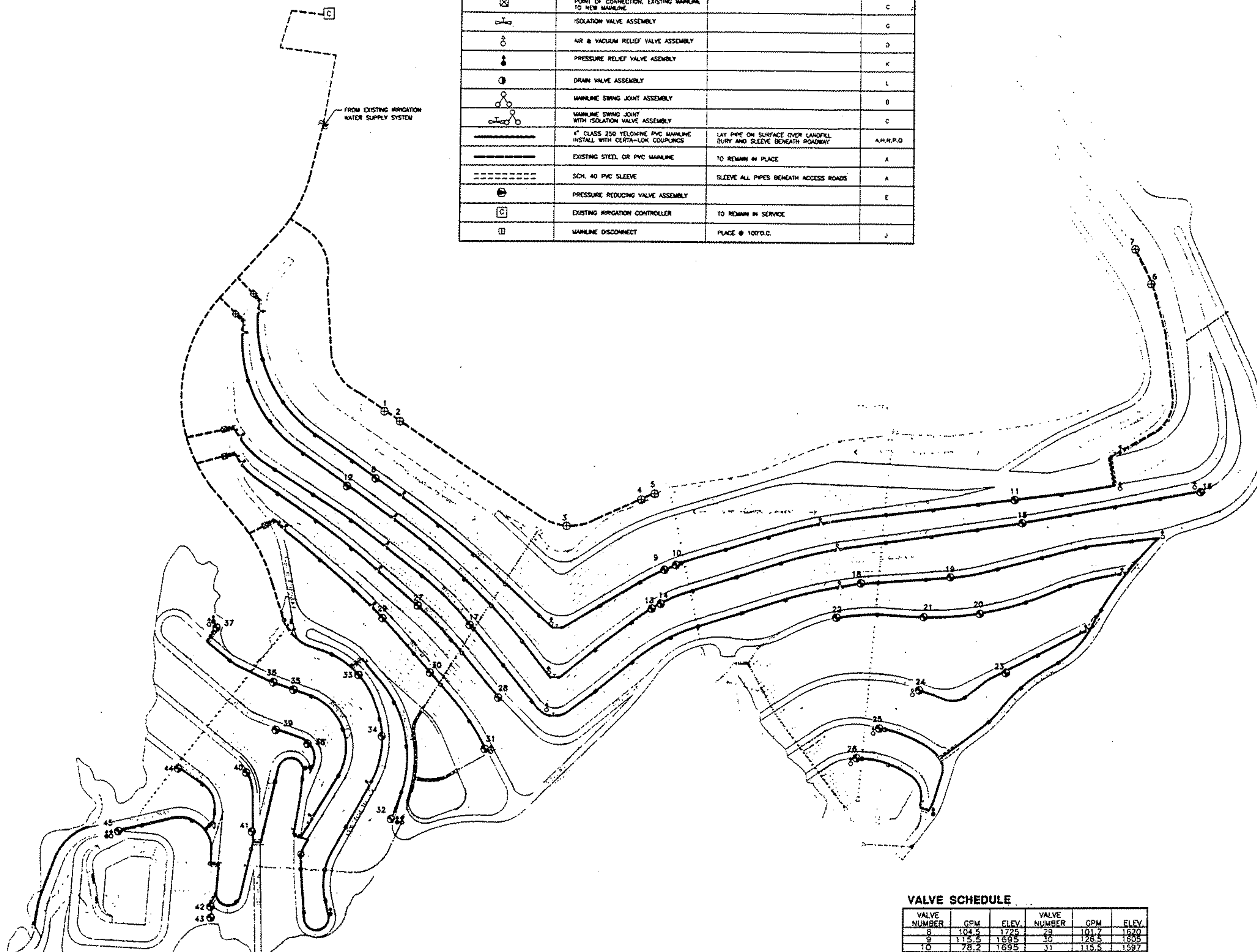
The sprinkler heads will have a gear driven rotary design with part circle coverage at the top of the slopes, and full circle heads at mid-slope. The supply system will be designed to provide a minimum of 40 psi pressure to the sprinklers.

The sprinkler nozzle sizes will vary depending on the water pressure and desired coverage at each head. Spring check valves will be used at each lateral to minimize drainage and reduce the potential for erosion and rutting. The tension of the springs will vary depending on the water pressure at each valve.

Figures 8-1, 8-2, 8-4 through 8-6 illustrate Disposal Areas A and B permanent irrigation system and landscaping plans. Figures 8-3, and 8-9 through 8-12 illustrate the Disposal Area C (includes a small portion of Disposal Area AB+ slope) conceptual irrigation system and hydroseeding plan.

EQUIPMENT LEGEND

SYMBOL	DESCRIPTION	REMARKS	DETAIL/REF
⊕	EXISTING REMOTE CONTROL VALVE	RECONSTRUCT PER RCV DETAIL. MAINTAIN LATERAL SYSTEM IN PLACE	F
	REMOTE CONTROL VALVE ASSEMBLY		F
⊠	POINT OF CONNECTION, EXISTING MAINLINE TO NEW MAINLINE		C
	ISOLATION VALVE ASSEMBLY		C
	AIR & VACUUM RELIEF VALVE ASSEMBLY		D
	PRESSURE RELIEF VALVE ASSEMBLY		K
	DRAIN VALVE ASSEMBLY		L
	MAINLINE SWING JOINT ASSEMBLY		B
	MAINLINE SWING JOINT WITH ISOLATION VALVE ASSEMBLY		C
	4" CLASS 250 YELOMINE PVC MAINLINE INSTALL WITH CERTA-LOK COUPLINGS	LAY PIPE ON SURFACE OVER LANDFILL BURY AND SLEEVE BENEATH ROADWAY	A,H,N,P,O
	EXISTING STEEL OR PVC MAINLINE	TO REMAIN IN PLACE	A
	SCH. 40 PVC SLEEVE	SLEEVE ALL PIPES BENEATH ACCESS ROADS	A
	PRESSURE REDUCING VALVE ASSEMBLY		E
C	EXISTING IRRIGATION CONTROLLER	TO REMAIN IN SERVICE	
	MAINLINE DISCONNECT	PLACE @ 100'O.C.	J



NOTICE TO CONTRACTORS

1. SPECIFICATIONS:

a. All work ... shall ... be constructed in accordance with "Standard Specifications for Public Works Construction", 1988 Edition, with current supplements, section 212 and 308 and any other pertinent sections, and Standard Plan S-610-15.

b. In addition, Specifications SECTION 02441 IRRIGATION, are hereby incorporated into and made a part of these specifications and their provisions shall be carried out by the Contractor.

2. WORK CALLED FOR:

This improvement consists of:
- DISASSEMBLY AND STORAGE OF EXISTING IRRIGATION EQUIPMENT.
- REASSEMBLY AND INSTALLATION OF REUSABLE IRRIGATION EQUIPMENT.
- INSTALLATION OF NEW IRRIGATION EQUIPMENT.
- TESTING, OPERATION AND MAINTENANCE PERIOD.

3. STANDARD PLANS FOR THIS PROJECT:

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION -1988 EDITION
S-610-15 Notice to contractors ... (Bureau of Engineering Standards)
308-0 Thrust Blocks for Plastic Pipe
S-251-1 Pipe Laying in Trenches (Case 1)

4. INSPECTIONS:

All work shown in these plans is subject to inspection during construction. Call (818) 376-6962 24 hours prior to beginning any work. The Contractor shall notify the Bureau of Sanitation by telephone (818) 376-6962 at least 48 hours prior to the inspections required below, so a representative can be present.

a. Testing of main and lateral irrigation lines per Section 308-5.6.
b. Irrigation coverage test per Section 308-5.6.
c. Plant material approval per Section 212-1.4.
d. Location and placement of plant material per Section 308-5.6.

5. APPROVALS:

a. The Contractor shall contact the Bureau of Contract Administration (phone 213-485-3011) and the Bureau of Sanitation (818) 376-6962 for a preconstruction meeting prior to the start of work. The meeting shall take place on site.

b. The Contractor shall furnish installation instruction sheets from the manufacturer for pipe installation and other irrigation devices to the Engineer. All guarantees, warranties, and instruction sheets for irrigation equipment shall be placed in a binder and given to the Engineer to be forwarded to the Bureau of Sanitation.

c. The Contractor shall submit, in triplicate, to the Site Engineer, for approval, a complete list, by brand name and product number, of irrigation equipment and landscape materials to be installed on the job. No material shall be purchased or moved on site until the product list has been approved.

6. IRRIGATION PIPE:

All pressurized lines, all risers, and all fittings shall be new P.V.C. Pipe, Schedule 80 as per Section 212-2.1 and/or as otherwise noted on the plans. Non-pressure lines shall be Schedule 40 P.V.C.

7. ELECTRICAL GENERAL:

All remote control valve wiring shall be color coded for easy identification. The common wire color shall be white.

8. ELECTRICAL CONDUIT:

All rigid metal conduit shall be threaded, bushed and packing shall be placed on the ends to protect the wiring. All P.V.C. conduit shall be reamed, bushed and have packing placed on the ends of the conduit.

9. AS-BUILT PLANS:

A set of As-Built plans shall be given to the Bureau of Sanitation (818) 376-6962 when the work is completed. The project will not be closed until these plans have been given to the Bureau. All rigid metal conduit shall be threaded, bushed and packing shall be placed on the ends to protect the wiring.

10. SERVICES:

Electrical and water services will be provided by the City.

11. DAMAGE RESPONSIBILITY:

The Contractor shall be responsible for the repair or replacement of all existing improvements which are not designated for removal which are damaged or removed as a result of the Contractor's operation.

INSTALLATION NOTES

DISASSEMBLY:

1. CAREFULLY DISASSEMBLE YELOMINE MAINLINE AND STORE PIPE AND FITTINGS FOR SUBSEQUENT USE. PREPARE INVENTORY OF EACH TYPE OF PIPE OR FITTING. USE CARE WHEN HANDLING PIPE, NOT TO DAMAGE GROOVED ENDS. SUBMIT COPY OF INVENTORY TO SITE ENGINEER.
2. CAREFULLY DISASSEMBLE EACH TYPE OF VALVE ASSEMBLY. INVENTORY, BOX, AND STORE EACH TYPE OF FITTING OR VALVE FOR SUBSEQUENT USE. SUBMIT COPY OF INVENTORY TO SITE ENGINEER. DISCARD DAMAGED OR UNUSED MATERIALS.
3. CAREFULLY DISASSEMBLE EACH SPRINKLER HEAD ASSEMBLY. INVENTORY, BOX, AND STORE EACH TYPE OF SPRINKLER HEAD AND FITTING FOR SUBSEQUENT USE. SUBMIT COPY OF INVENTORY TO SITE ENGINEER. DISCARD DAMAGED OR UNUSED MATERIALS.
4. SALVAGE AND STORE OTHER FITTINGS OR EQUIPMENT. SOLVENT WELDED PVC FITTINGS SHALL BE CUT OFF OF PIPELINES AND DISCARDED. SHORT PIECES OF LATERAL PIPELINE (LESS THAN 10' IN LENGTH) MAY BE DISCARDED.
5. EXISTING FENCE STAKE STABILIZERS SHALL BE LEFT IN PLACE.
6. RCV CONTROL WIRING AND CONDUIT SHALL BE REMOVED AND DISCARDED.

PRESSURE SYSTEMS:

1. REUSE SALVAGED YELOMINE MAINLINE AND CERTA-LOK FITTINGS. IF ADDITIONAL PIPE OR FITTINGS ARE REQUIRED, PROVIDE AND INSTALL AS SPECIFIED IN PLANS AND DETAILS.
2. USE CERTA-LOK RESTRAINED JOINT FITTINGS WHEREVER POSSIBLE ON ABOVE GRADE YELOMINE MAINLINE PIPE RUNS. WHERE CONDITIONS REQUIRE CUTTING YELOMINE PIPE, SOLVENT WELD SCH 80 PVC FITTINGS MAY BE USED.
3. SLEEVE ALL BURIED PVC PIPELINES.
4. PLACE THRUST BLOCKS WHERE INDICATED ON PLANS, AND AS CONDITIONS WARRANT.
5. REUSE SALVAGED VALVES, FITTINGS, AND ASSEMBLIES TO CONSTRUCT ASSEMBLIES ACCORDING TO PLANS AND DETAILS.
6. MAINTAIN EXISTING LATERAL SYSTEMS # 1 THROUGH #7 ABOVE BENCH 7 IN PLACE DURING CONSTRUCTION. RECONSTRUCT THESE VALVES ACCORDING TO RCV ASSEMBLY DETAIL.
7. PLACE ALL CONTROLLER WIRES IN PVC SCH 40 UVR CONDUIT AND ROUTE ALONGSIDE MAINLINES. EACH RCV STATION WIRE MUST BE COLOR CODED. WHERE MAINLINES ARE BURIED OR SLEEVED BENEATH ROADWAYS, ALSO BURY AND SLEEVE CONTROLLER WIRES.
8. UPON COMPLETION OF INSTALLATION, TURN OVER ANY UNUSED MATERIALS TO SITE ENGINEER.

LATERAL SYSTEMS:

1. REUSE SALVAGED ROTOR SPRINKLER HEADS. IF ADDITIONAL HEADS ARE NECESSARY, PROVIDE AND INSTALL HEAD TYPE SPECIFIED IN EQUIPMENT LEGEND.
2. REUSE SALVAGED LATERAL PIPE AND FITTINGS. IF ADDITIONAL EQUIPMENT IS NECESSARY, PROVIDE AND INSTALL AS SPECIFIED IN EQUIPMENT LEGEND.
3. UPON COMPLETION OF INSTALLATION, TURN OVER ANY UNUSED MATERIALS TO SITE ENGINEER.

TESTING AND OPERATION:

1. COMPLETE CONSTRUCTION OF SYSTEM AND MAKE ALL NECESSARY HYDRAULIC ADJUSTMENTS.
2. MAKE ALL NECESSARY CONNECTIONS BETWEEN RCV'S AND IRRIGATION CONTROLLER LOCATED AT FLARE STATION. ASSIST SITE ENGINEER IN PROGRAMMING CONTROLLER.
3. SCHEDULING NOTES: SLOPE AREAS SHALL BE WATERED WITH REPEATED LIGHT APPLICATIONS SO THAT RUNOFF OR SOIL EROSION DO NOT OCCUR. RCV'S MAY BE GROUPED BY AREA TYPE IN PROGRAMS TO CYCLE AND SOAK AT DIFFERENT TIMES FROM ADJACENT AREA TYPES.
4. IN ADDITION TO REQUIRED INSPECTIONS, PERFORM A COMPLETE OPERATION DEMONSTRATION OF ENTIRE SYSTEM FOR SITE ENGINEER.

GENERAL NOTES

1. EXISTING TEMPORARY IRRIGATION SYSTEMS SHALL BE CAREFULLY DISSASSEMBLED. REUSABLE MATERIALS SHALL BE INVENTORIED AND STORED AT A LOCATION TO BE PROVIDED BY THE CITY AT THE LANDFILL SITE.
2. UPON COMPLETION OF GRADING OPERATIONS, AS SCHEDULED BY THE CITY'S REPRESENTATIVE, INSTALLATION OF IRRIGATION SYSTEMS SHALL BEGIN. THE IRRIGATION CONTRACTOR SHALL USE THE INVENTORY OF REUSABLE EQUIPMENT AND NEW EQUIPMENT TO COMPLETE THE WORK.
3. BIDS FOR THIS WORK SHALL INCLUDE THE DISSASSEMBLY, TRANSPORT, INVENTORYING, AND REASSEMBLY OF USED EQUIPMENT FOR THIS WORK.

VALVE SCHEDULE

VALVE NUMBER	GPM	ELEV.	VALVE NUMBER	GPM	ELEV.
8	104.5	1725	29	101.7	1620
9	115.5	1695	30	126.5	1605
10	78.2	1695	31	115.5	1597
11	94.3	1725	32	114.0	1570
12	154.0	1707	33	89.2	1575
13	154.0	1675	34	121.0	1558
14	109.2	1675	35	105.8	1545
15	122.7	1705	36	54.9	1547
16	149.1	1726	37	77.0	1525
17	135.0	1660	38	134.7	1495
18	178.7	1655	39	109.8	1505
19	100.2	1660	40	65.9	1472
20	136.7	1638	41	134.7	1465
21	128.2	1634	42	74.2	1445
22	130.7	1620	43	112.7	1445
23	160.8	1590	44	111.7	1435
24	118.2	1575	45	119.5	1440
25	85.9	1530	46	0	0
26	77.0	1505	47	0	0
27	131.6	1645	48	0	0
28	119.5	1535			

PRELIMINARY

0 100 200 300

SCALE IN FEET

LANDSCAPE ARCHITECTS

IRRIGATION CONTROL & PRESSURE SYSTEMS PLAN

DESIGNED	TB
DRAWN	JT
CHECKED	TB
SUPERVISED	
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(714)860-7777

LOPEZ CANYON LANDFILL

NO. | REVISION DESCRIPTION | DIV./DIST. ENGR. | DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ____ 19__
DIV./DIST. ENGR. R.E. NO.

SCALE 1"=100'

SHEET NO. L-1

DWG. NO. 9258-047-E-56-008-CD

JOB NO.

FIGURE 8 - 4

INSTALLATION NOTES:

DISASSEMBLY:

1. CAREFULLY DISASSEMBLE YELOMINE MAINLINE AND STORE PIPE AND FITTINGS FOR SUBSEQUENT USE. PREPARE INVENTORY OF EACH TYPE OF PIPE OR FITTING. USE CARE WHEN HANDLING PIPE, NOT TO DAMAGE GROOVED ENDS. SUBMIT COPY OF INVENTORY TO SITE ENGINEER.
2. CAREFULLY DISASSEMBLE EACH TYPE OF VALVE ASSEMBLY. INVENTORY, BOX, AND STORE EACH TYPE OF FITTING OR VALVE FOR SUBSEQUENT USE. SUBMIT COPY OF INVENTORY TO SITE ENGINEER. DISCARD DAMAGED OR UNUSED MATERIALS.
3. CAREFULLY DISASSEMBLE EACH SPRINKLER HEAD ASSEMBLY. INVENTORY, BOX, AND STORE EACH TYPE OF SPRINKLER HEAD AND FITTING FOR SUBSEQUENT USE. SUBMIT COPY OF INVENTORY TO SITE ENGINEER. DISCARD DAMAGED OR UNUSED MATERIALS.
4. SALVAGE AND STORE OTHER FITTINGS OR EQUIPMENT. SOLVENT WELDED PVC FITTINGS SHALL BE CUT OFF OF PIPELINES AND DISCARDED. SHORT PIECES OF LATERAL PIPELINE (LESS THAN 10' IN LENGTH) MAY BE DISCARDED.
5. EXISTING FENCE STAKE STABILIZERS SHALL BE LEFT IN PLACE.
6. RCV CONTROL WIRING AND CONDUIT SHALL BE REMOVED AND DISCARDED.

PRESSURE SYSTEMS:

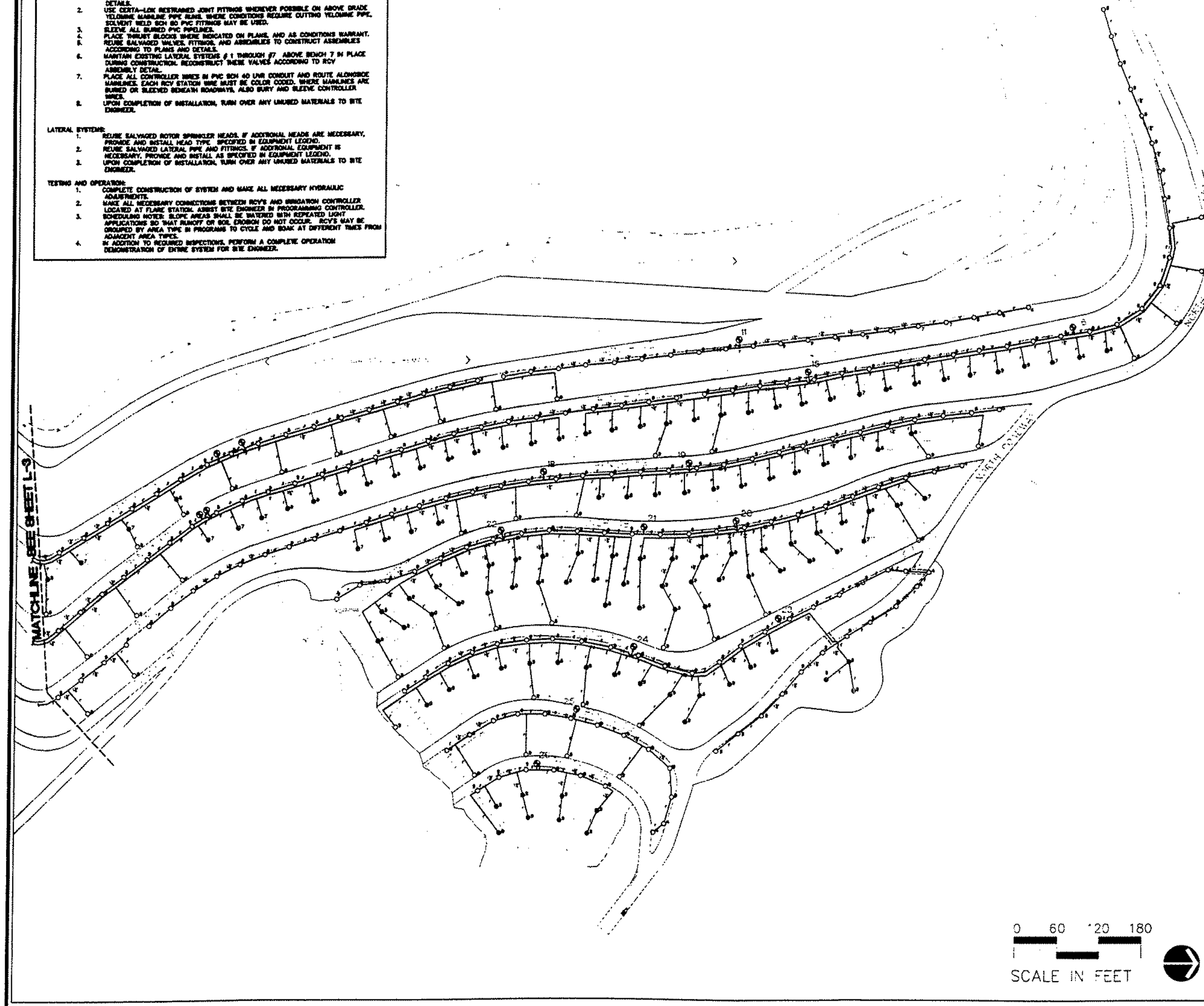
1. REUSE SALVAGED YELOMINE MAINLINE AND CERTA-LOK FITTINGS. IF ADDITIONAL PIPE OR FITTINGS ARE REQUIRED, PROVIDE AND INSTALL AS SPECIFIED IN PLANS AND DETAILS.
2. USE CERTA-LOK RESTRAINED JOINT FITTINGS WHENEVER POSSIBLE ON ABOVE GRADE YELOMINE MAINLINE PIPE RUNS. WHERE CONDITIONS REQUIRE CUTTING YELOMINE PIPE, SOLVENT WELD SCH 80 PVC FITTINGS MAY BE USED.
3. SLEEVE ALL BURIED PVC PIPELINES.
4. PLACE THRUST BLOCKS WHERE INDICATED ON PLANS, AND AS CONDITIONS WARRANT.
5. REUSE SALVAGED VALVES, FITTINGS, AND ASSEMBLIES TO CONSTRUCT ASSEMBLIES ACCORDING TO PLANS AND DETAILS.
6. MAINTAIN EXISTING LATERAL SYSTEMS # 1 THROUGH #7 ABOVE BENCH 7 IN PLACE DURING CONSTRUCTION. RECONSTRUCT THESE VALVES ACCORDING TO RCV ASSEMBLY DETAIL.
7. PLACE ALL CONTROLLER WIRES IN PVC SCH 40 UVR CONDUIT AND ROUTE ALONGSIDE MAINLINES. EACH RCV STATION WIRE MUST BE COLOR CODED. WHERE MAINLINES ARE BURIED OR SLEEVED BENEATH ROADWAYS, ALSO BURY AND SLEEVE CONTROLLER WIRES.
8. UPON COMPLETION OF INSTALLATION, TURN OVER ANY UNUSED MATERIALS TO SITE ENGINEER.

LATERAL SYSTEMS:

1. REUSE SALVAGED ROTOR SPRINKLER HEADS. IF ADDITIONAL HEADS ARE NECESSARY, PROVIDE AND INSTALL HEAD TYPE SPECIFIED IN EQUIPMENT LEGEND.
2. REUSE SALVAGED LATERAL PIPE AND FITTINGS. IF ADDITIONAL EQUIPMENT IS NECESSARY, PROVIDE AND INSTALL AS SPECIFIED IN EQUIPMENT LEGEND.
3. UPON COMPLETION OF INSTALLATION, TURN OVER ANY UNUSED MATERIALS TO SITE ENGINEER.

TESTING AND OPERATION:

1. COMPLETE CONSTRUCTION OF SYSTEM AND MAKE ALL NECESSARY HYDRAULIC ADJUSTMENTS.
2. MAKE ALL NECESSARY CONNECTIONS BETWEEN RCV'S AND IRRIGATION CONTROLLER LOCATED AT FLARE STATION. ASSIST SITE ENGINEER IN PROGRAMMING CONTROLLER.
3. SCHEDULING NOTES: SLOPE AREAS SHALL BE WATERED WITH REPEATED LIGHT APPLICATIONS SO THAT RUNOFF OR SOIL EROSION DO NOT OCCUR. RCV'S MAY BE GROUPED BY AREA TYPE IN PROGRAMS TO CYCLE AND SOAK AT DIFFERENT TIMES FROM ADJACENT AREA TYPES.
4. IN ADDITION TO REQUIRED INSPECTIONS, PERFORM A COMPLETE OPERATION DEMONSTRATION OF ENTIRE SYSTEM FOR SITE ENGINEER.



SPLINKLER HEAD LEGEND

SYMBOL	DESCRIPTION	MANUF. & PART#	NOZZLE	GPM	RADIUS	PSI	REMARKS	DET.
○4	ADJUSTABLE ARC ROTOR	HUNTER PGS-ADV-00	4	1.7	23-34	50	REUSE HEADS FROM INTERIM SYSTEMS	M,N,O
○6	"	"	6	2.7	25-36	50		M,N,O
○7	"	"	7	3.4	28-38	50		M,N,O
○8	"	"	8	4.2	30-39	50		M,N,O
○9	"	"	9	5.5	38-41	50		M,N,O
●4	FULL CIRCLE ROTOR	HUNTER PGS-36V-00	4	1.7	23-34	50		M,N,O
●6	"	"	6	2.7	25-36	50		M,N,O
●7	"	"	7	3.4	28-38	50		M,N,O
●8	"	"	8	4.2	30-39	50		M,N,O
●9	"	"	9	5.5	38-41	50		M,N,O
◄	SPRAY HEAD	TORO 10-HLA PCD.25	10-HLA	.25	3'	50	INSTALL ON RISERS PER DETAIL	R

EQUIPMENT LEGEND

SYMBOL	DESCRIPTION	MANUF. & PART#	REMARKS	DET.
——	UVR PVC LATERAL LINE		RUN ON SURFACE, SEE SPECS	M,N,O,Q
====	PIPELINE SLEEVING	SCH 40 PVC	SLEEVE PIPELINES UNDER ROADWAYS	A
—N—	IN-LINE SPRING LOADED CHECK VALVE, LINE SIZE	SEE CHART BELOW	USE WHERE FLOW OF WATER IS DOWNHILL	M
—B—	IN-LINE SWING CHECK VALVE, LINE SIZE	FLOW CONTROL INC. 1520 SERIES	USE WHERE FLOW OF WATER IS UPHILL	M
⊗	REMOTE CONTROL VALVE	EXISTING		F

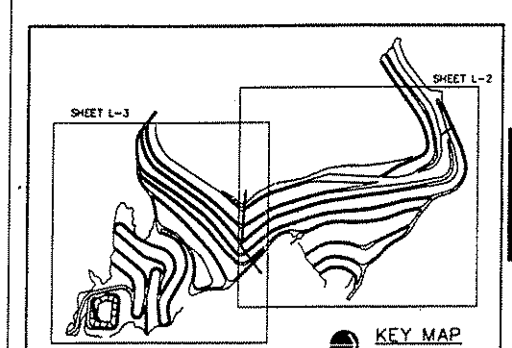
IN-LINE SPRING CHECK VALVES

DESCRIPTION	LINE SIZE	MANUFACTURER	PART NO.	PSI RANGE	REMARKS
ADJUSTABLE SPRING SPRING CHECK VALVE	1"	FLOW CONTROL INC.	1205-10	0-14	THREADED PVC SOLVENT WELD PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	1 1/4"	FLOW CONTROL INC.	1205-12	0-14	THREADED PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	1 1/2"	FLOW CONTROL INC.	1205-15	0-14	THREADED PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	2"	FLOW CONTROL INC.	1205-20	0-14	THREADED PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	2 1/2"	FLOW CONTROL INC.	1205-25	0-14	THREADED PVC
ADJUSTABLE HYDRAULIC CHECK VALVE	3"	RAIN FOR RENT (805)525-3306	3"-430Q,0-30	0-30	THREADED METAL

VALVE SCHEDULE

VALVE NUMBER	GPM	ELEV.
9	115.5	1695
10	78.2	1695
11	94.3	1725
13	154.0	1675
14	109.2	1675
15	122.7	1705
16	149.1	1726
18	178.7	1655
19	100.2	1660
20	136.7	1638
21	128.2	1634
22	130.7	1620
23	160.8	1590
24	118.2	1575
25	85.9	1530
26	77.0	1505

PRELIMINARY



LANDSCAPE ARCHITECTS

DESIGNED TB | DRAWN KH | CHECKED TB | SUPERVISED | PROJECT ENGR. R.E. NO. | ASST. DIV./DIST. ENGR. R.E. NO. | DATE

BAS — BRYAN A. STIRRAT & ASSOCIATES, CIVIL AND ENVIRONMENTAL ENGINEERS, 1360 VALLEY VISTA DRIVE, DIAMOND BAR, CA. 91765, (714)860-7777

LOPEZ CANYON LANDFILL

CITY OF LOS ANGELES — BUREAU OF SANITATION

SCALE 1"=60'-0"

SHEET NO. L-2

IRRIGATION HEAD & LATERAL LINE PLAN

FIGURE 8 - 5

INSTALLATION NOTES:

DISASSEMBLY:

1. CAREFULLY DISASSEMBLE YELOMINE MAINLINE AND STORE PIPE AND FITTINGS FOR SUBSEQUENT USE. PREPARE INVENTORY OF EACH TYPE OF PIPE OR FITTING. USE CARE WHEN HANDLING PIPE, NOT TO DAMAGE GRIDDED ENDS. SUBMIT COPY OF INVENTORY TO SITE ENGINEER.
2. CAREFULLY DISASSEMBLE EACH TYPE OF VALVE ASSEMBLY. INVENTORY, BOX, AND STORE EACH TYPE OF FITTING OR VALVE FOR SUBSEQUENT USE. SUBMIT COPY OF INVENTORY TO SITE ENGINEER. DISCARD DAMAGED OR UNUSED MATERIALS.
3. CAREFULLY DISASSEMBLE EACH SPRINKLER HEAD ASSEMBLY. INVENTORY, BOX, AND STORE EACH TYPE OF SPRINKLER HEAD AND FITTING FOR SUBSEQUENT USE. SUBMIT COPY OF INVENTORY TO SITE ENGINEER. DISCARD DAMAGED OR UNUSED MATERIALS.
4. SALVAGE AND STORE OTHER FITTINGS OR EQUIPMENT. SOLVENT WELDED PVC FITTINGS SHALL BE CUT OFF OF PIPELINES AND DISCARDED. SHORT PIECES OF LATERAL PIPELINE (LESS THAN 10' IN LENGTH) MAY BE DISCARDED.
5. EXISTING FENCE STAKE STABILIZERS SHALL BE LEFT IN PLACE.
6. RCV CONTROL WIRING AND CONDUIT SHALL BE REMOVED AND DISCARDED.

PRESSURE SYSTEMS:

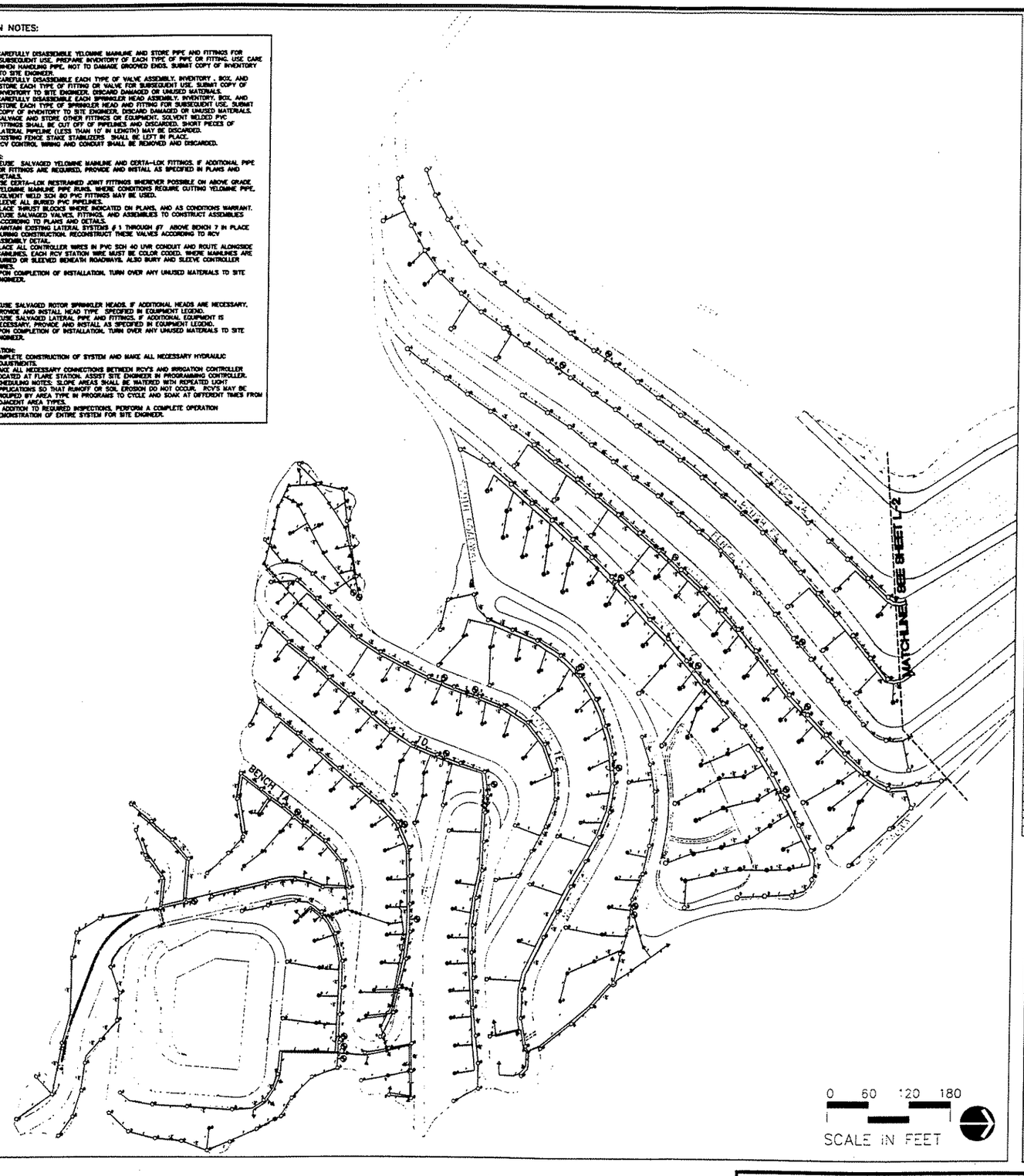
1. REUSE SALVAGED YELOMINE MAINLINE AND CERTA-LOK FITTINGS. IF ADDITIONAL PIPE OR FITTINGS ARE REQUIRED, PROVIDE AND INSTALL AS SPECIFIED IN PLANS AND DETAILS.
2. USE CERTA-LOK RESTRAINED JOINT FITTINGS WHEREVER POSSIBLE ON ABOVE GRADE YELOMINE MAINLINE PIPE RUNS. WHERE CONDITIONS REQUIRE CUTTING YELOMINE PIPE, SOLVENT WELD SCH 80 PVC FITTINGS MAY BE USED.
3. SLEEVE ALL BURIED PVC PIPELINES.
4. PLACE THRUST BLOCKS WHERE INDICATED ON PLANS, AND AS CONDITIONS WARRANT.
5. REUSE SALVAGED VALVES, FITTINGS, AND ASSEMBLIES TO CONSTRUCT ASSEMBLIES ACCORDING TO PLANS AND DETAILS.
6. MAINTAIN EXISTING LATERAL SYSTEMS # 1 THROUGH #7 ABOVE BENCH 7 IN PLACE DURING CONSTRUCTION. RECONSTRUCT THESE VALVES ACCORDING TO RCV ASSEMBLY DETAIL.
7. PLACE ALL CONTROLLER WIRES IN PVC SCH 40 UVR CONDUIT AND ROUTE ALONGSIDE MAINLINES. EACH RCV STATION WIRE MUST BE COLOR CODED. WHERE MAINLINES ARE BURIED OR SLEEVED BENEATH ROADWAYS, ALSO BURY AND SLEEVE CONTROLLER WIRES.
8. UPON COMPLETION OF INSTALLATION, TURN OVER ANY UNUSED MATERIALS TO SITE ENGINEER.

LATERAL SYSTEMS:

1. REUSE SALVAGED ROTOR SPRINKLER HEADS. IF ADDITIONAL HEADS ARE NECESSARY, PROVIDE AND INSTALL HEAD TYPE SPECIFIED IN EQUIPMENT LEGEND.
2. REUSE SALVAGED LATERAL PIPE AND FITTINGS. IF ADDITIONAL EQUIPMENT IS NECESSARY, PROVIDE AND INSTALL AS SPECIFIED IN EQUIPMENT LEGEND.
3. UPON COMPLETION OF INSTALLATION, TURN OVER ANY UNUSED MATERIALS TO SITE ENGINEER.

TESTING AND OPERATION:

1. COMPLETE CONSTRUCTION OF SYSTEM AND MAKE ALL NECESSARY HYDRAULIC ADJUSTMENTS.
2. MAKE ALL NECESSARY CONNECTIONS BETWEEN RCV'S AND IRRIGATION CONTROLLER LOCATED AT FLARE STATION. ASSIST SITE ENGINEER IN PROGRAMMING CONTROLLER.
3. SCHEDULING NOTES: SLOPE AREAS SHALL BE WATERED WITH REPEATED LIGHT APPLICATIONS SO THAT RUNOFF OR SOIL EROSION DO NOT OCCUR. RCV'S MAY BE GROUPED BY AREA TYPE IN PROGRAMS TO CYCLE AND SOAK AT DIFFERENT TIMES FROM ADJACENT AREA TYPES.
4. IN ADDITION TO REQUIRED INSPECTIONS, PERFORM A COMPLETE OPERATION DEMONSTRATION OF ENTIRE SYSTEM FOR SITE ENGINEER.



SPLINKLER HEAD LEGEND

SYMBOL	DESCRIPTION	MANUF. & PART#	NOZZLE	GPM	RADIUS	PSI	REMARKS	SET
○¹	ADJUSTABLE ARC ROTOR	HUNTER PGS-ADV-00	4	1.7	23-34	50	REUSE HEADS	M,N,O
○²	"	"	6	2.7	25-36	50	FROM INTERIM	M,N,O
○³	"	"	7	3.4	28-38	50	SYSTEMS	M,N,O
○⁴	"	"	8	4.2	30-39	50		M,N,O
○⁵	"	"	9	5.5	38-41	50		M,N,O
●¹	FULL CIRCLE ROTOR	HUNTER PGS-36V-00	4	1.7	23-34	50		M,N,O
●²	"	"	6	2.7	25-36	50		M,N,O
●³	"	"	7	3.4	28-38	50		M,N,O
●⁴	"	"	8	4.2	30-39	50		M,N,O
●⁵	"	"	9	5.5	38-41	50		M,N,O
◀	SPRAY HEAD	TORO 10-HLA PCD.25	10-HLA	25	3'	50	INSTALL ON RISERS PER DETAIL	R

EQUIPMENT LEGEND

SYMBOL	DESCRIPTION	MANUF. & PART#	REMARKS	SET
——	UVR PVC LATERAL LINE	BROWNLINE OR EQUAL	RUN ON SURFACE, SEE SPECS'	M,N,O,P
═══	PIPELINE SLEEVING	SCH 40 PVC	SLEEVE PIPELINES UNDER ROADWAYS	A
—▶—	IN-LINE SPRING LOADED CHECK VALVE, LINE SIZE	SEE CHART BELOW	USE WHERE FLOW OF WATER IS DOWNHILL	M
—⊟—	IN-LINE SWING CHECK VALVE, LINE SIZE	FLOW CONTROL INC. 1520 SERIES	USE WHERE FLOW OF WATER IS UPHILL	M
◉	REMOTE CONTROL VALVE	EXISTING		F

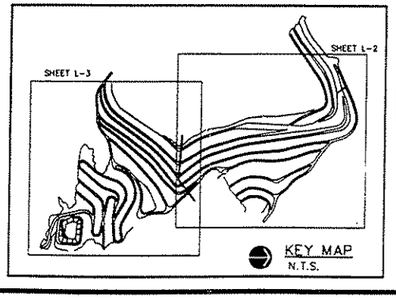
IN-LINE SPRING CHECK VALVES

DESCRIPTION	LINE SIZE	MANUFACTURER	PART NO.	PSI RANGE	REMARKS
ADJUSTABLE SPRING SPRING CHECK VALVE	1"	FLOW CONTROL INC.	1205-10	0-14	THREADED PVC SOLVENT WELD PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	1 1/4"	FLOW CONTROL INC.	1205-12	0-14	THREADED PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	1 1/2"	FLOW CONTROL INC.	1205-15	0-14	THREADED PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	2"	FLOW CONTROL INC.	1205-20	0-14	THREADED PVC
ADJUSTABLE SPRING SPRING CHECK VALVE	2 1/2"	FLOW CONTROL INC.	1205-25	0-14	THREADED PVC
ADJUSTABLE HYDRAULIC CHECK VALVE	3"	RAIN FOR RENT (805)525-3306	3"-4300,0-30	0-30	THREADED METAL

VALVE SCHEDULE

VALVE NUMBER	GPM	ELEV.
8	104.5	1725
12	154.0	1707
17	135.0	1660
27	131.5	1645
28	119.5	1535
29	101.7	1620
30	126.5	1605
31	115.5	1597
32	114.0	1570
33	89.2	1575
34	121.0	1558
35	105.8	1545
36	54.9	1547
37	77.0	1525
38	134.7	1495
39	109.8	1505
40	65.9	1472
41	134.7	1465
42	74.2	1445
43	112.7	1445
44	111.7	1435
45	119.5	1440
46	2.3	1470
47	5.0	1525
48	7.5	1445

PRELIMINARY



LANDSCAPE ARCHITECTS
3021 WILSHIRE BLVD
SUITE 6 - LA CANADA
310.838.0446
FAX 204.2664
BLA2023

IRRIGATION HEAD & LATERAL LINE PLAN

DESIGNED TB
DRAWN MH
CHECKED TB
SUPERVISED
PROJECT ENGR.
ASST. DIV./DIST. ENGR.
DATE
R.E. NO.
R.E. NO.

BAS
BRIAN A. STUART & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765
(714)860-7777

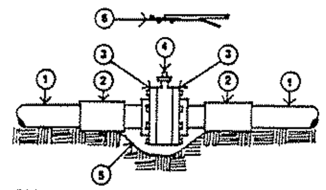
LOPEZ CANYON LANDFILL

REVISION DESCRIPTION — DATE — DIV./DIST. ENGR. — DATE — NO.

CITY OF LOS ANGELES
BUREAU OF SANITATION — DELMAR A. BEAD, DIRECTOR
DATE ——— 19 ———
DIV/DIST. ENGR. ——— R.E. NO.

SCALE 1"=60'-0"
SHEET NO. L-3
DWG. NO. 9258-0972-56-00-CD
JOB NO.

FIGURE 8 - 6

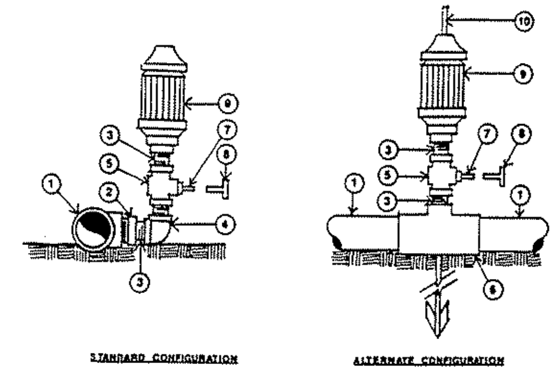


LEGEND:

1. 4" PVC MAINLINE, RESTS ON GRADE.
2. YELOMINE CERTA-LOK COUPLING
3. PVC YELOMINE TRANSITION FITTING, FLANGE BY MALE
4. NIBCO LD 2000 BUTTERFLY VALVE WITH 47078 LEVER LOCK
5. SCOOP OUT SOIL SO PIPE RESTS FLAT ON GRADE.
6. LEVER LOCK OPERATOR MAY BE PADLOCKED IN OPEN OR CLOSED POSITION

(G) ISOLATION VALVE

NOT TO SCALE

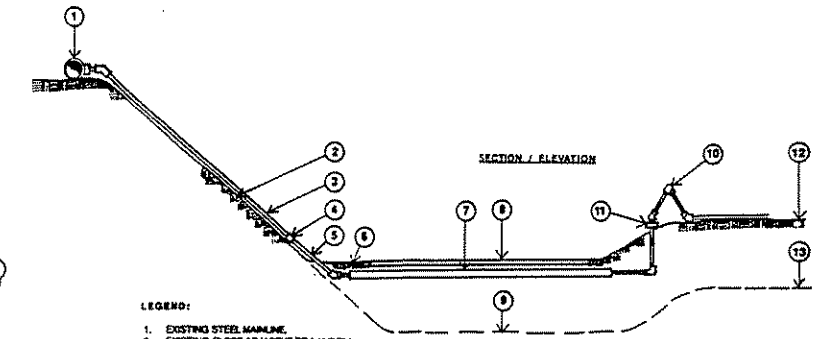


LEGEND:

1. 4" PVC MAINLINE
2. 4" X 2" SCH 80 PVC REDUCING BUSHING
3. 2" SCH 80 PVC NIPPLE
4. 2" SCH 80 PVC 90° ELL
5. NORMALLY OPEN, 2" GATE VALVE, NIBCO T-136L WITH LOCKSHIELD AND LOCKSHIELD KEY.
6. 4" X 4" X 2" SST SCH 80 PVC TEE, SOLVENT WELD ON MAINLINE.
7. LOCKSHIELD
8. LOCKSHIELD KEY
9. 2" COMBINATION AIR RELEASE VALVE MODEL # 4415 BY BERMAD (714) 888-1100
10. FENCE STAKE SUPPORT WITH ANCHOR FINS. USE WHEN AVAILABLE SPACE DOES NOT PERMIT STANDARD CONFIGURATION. ATTACH ASSEMBLY WITH NON-CORROSIVE PIPE SUPPORT STRAP.

(D) AIR & VACUUM RELEASE ASSEMBLY

NOT TO SCALE

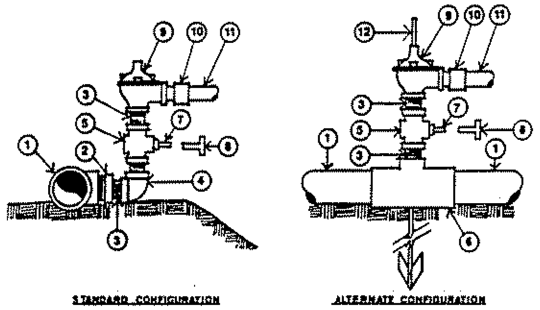


LEGEND:

1. EXISTING STEEL MAINLINE.
2. EXISTING SLOPE ADJACENT TO LANDFILL.
3. EXISTING PVC MAINLINE ON SLOPE.
4. POINT OF DISCONNECTION AND LATER RECONNECTION FOR MAINLINE.
5. REASSEMBLED MAINLINE.
6. NEW LANDFILL GRADE ELEVATION.
7. SLEEVE BENEATH ROADWAY.
8. BENCH / ROADWAY ON LANDFILL.
9. PREVIOUS LANDFILL GRADE ELEVATION.
10. MAINLINE SWING JOINT WITH ISOLATION VALVE ASSEMBLY - SEE DETAIL.
11. ISOLATION VALVE.
12. NEW LANDFILL BENCH ELEVATION.
13. PREVIOUS LANDFILL BENCH ELEVATION.

(A) MAINLINE POINT OF CONNECTION DETAIL

NOT TO SCALE

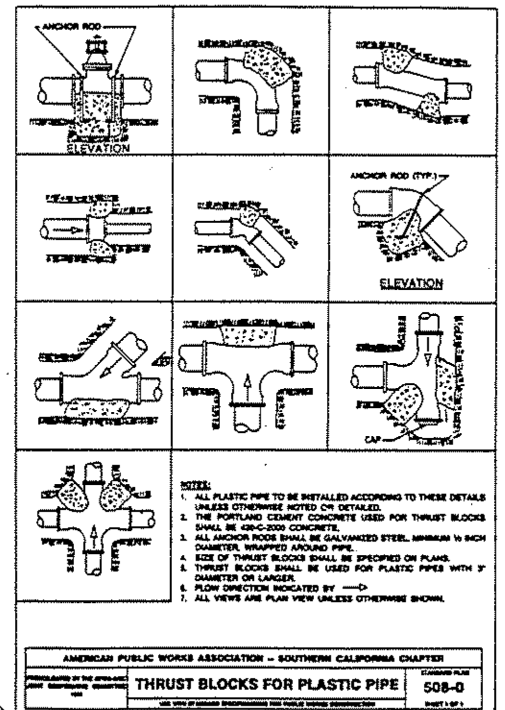


LEGEND:

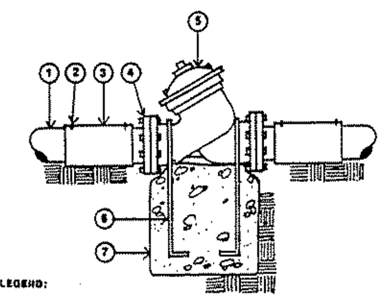
1. 4" PVC MAINLINE
2. 4" X 2" SCH 80 PVC REDUCING BUSHING
3. 2" SCH 80 PVC NIPPLE
4. 2" SCH 80 PVC 90° ELL
5. NORMALLY OPEN, 2" GATE VALVE, NIBCO T-136L WITH LOCKSHIELD AND LOCKSHIELD KEY.
6. 4" X 4" X 2" SST SCH 80 PVC TEE, SOLVENT WELD ON MAINLINE.
7. LOCKSHIELD
8. LOCKSHIELD KEY
9. 2" CLAYTON MODEL 50A-01 PRESSURE RELIEF VALVE WITH 20 TO 200 PSI RELIEF RANGE.
10. 2" UVR PVC MALE ADAPTOR
11. 2" UVR PVC SCH 40 PIPE. EXTEND PIPE 10' DOWN SLOPE AWAY FROM ASSEMBLY.
12. FENCE STAKE SUPPORT WITH ANCHOR FINS. USE WHEN AVAILABLE SPACE DOES NOT PERMIT STANDARD CONFIGURATION. ATTACH ASSEMBLY WITH NON-CORROSIVE PIPE SUPPORT STRAP.

(K) PRESSURE RELIEF ASSEMBLY

NOT TO SCALE



(H)

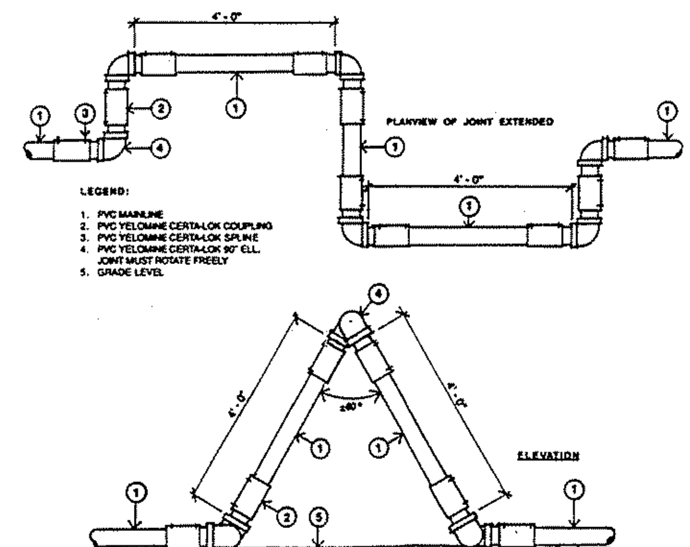


LEGEND:

1. 4" PVC MAINLINE, RESTS ON GRADE.
2. YELOMINE CERTA-LOK SPLINE
3. YELOMINE CERTA-LOK COUPLING
4. PVC YELOMINE TRANSITION FITTING, FLANGE BY MALE
5. 3" BERMAD 720 PRESSURE REDUCING VALVE ADJUST DOWNSTREAM PRESSURE AS NEEDED.
6. STEEL ANCHOR ROD.
7. THRUST BLOCK- SEE DETAIL.

(E) PRESSURE REDUCING VALVE ASSY.

NOT TO SCALE

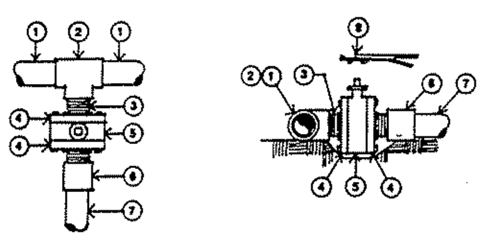


LEGEND:

1. PVC MAINLINE
2. PVC YELOMINE CERTA-LOK COUPLING
3. PVC YELOMINE CERTA-LOK SPLINE
4. PVC YELOMINE CERTA-LOK 90° ELL. JOINT MUST ROTATE FREELY
5. GRADE LEVEL

(B) MAINLINE SWING JOINT ASSEMBLY

PRELIMINARY

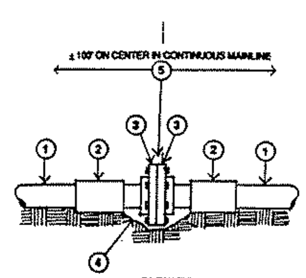


LEGEND:

1. 4" PVC MAINLINE, RESTS ON GRADE.
2. 4" X 4" X 4" SST SCH 80 PVC TEE.
3. 4" SCH 80 PVC NIPPLE
4. SCH 80 PVC FLANGE X 4" FIPT
5. NIBCO LD 2000 BUTTERFLY VALVE WITH 47078 LEVER LOCK LEVER LOCK OPERATOR MAY BE PADLOCKED IN CLOSED POSITION.
6. 4" UVR PVC MALE ADAPTOR
7. 4" UVR PVC PIPE: PIPE TO NEAREST DRAIN INLET.
8. LEVERLOCK OPERATOR

(L) DRAIN VALVE ASSEMBLY

NOT TO SCALE

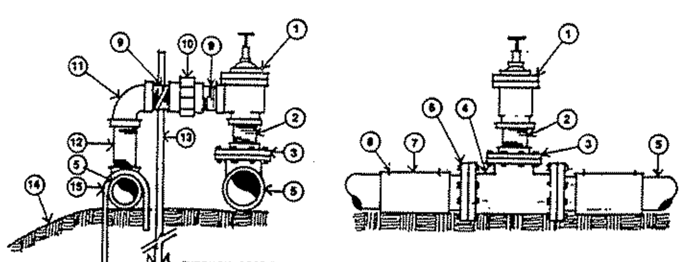


LEGEND:

1. 4" PVC MAINLINE, RESTS ON GRADE.
2. YELOMINE CERTA-LOK COUPLING
3. PVC YELOMINE TRANSITION FITTING, FLANGE BY MALE
4. SCOOP OUT SOIL SO PIPE RESTS FLAT ON GRADE.
5. PLACE DISCONNECTS AT 100' ON CENTER IN CONTINUOUS RUNS OF MAINLINE.

(J) MAINLINE DISCONNECT

NOT TO SCALE

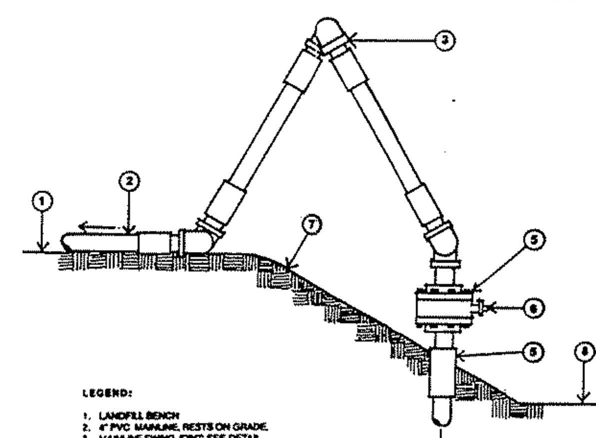


LEGEND:

1. 3" RAINBIRD EAV300-MFC REMOTE CONTROL VALVE.
2. 3" X 10" GALVANIZED STEEL NIPPLE
3. INSULATED STEEL COMPANION FLANGE X 3" FIPT
4. 4" FLANGED DUCTILE IRON TEE
5. PVC MAINLINE
6. PVC YELOMINE CERTA-LOK TRANSITION FITTING, FLANGE X MALE
7. PVC YELOMINE CERTA-LOK COUPLING
8. PVC YELOMINE CERTA-LOK SPLINE
9. 3" X 8" GALVANIZED STEEL NIPPLE
10. 3" GALVANIZED STEEL UNION
11. 3" GALVANIZED STEEL 90° ELL
12. 3" GALVANIZED STEEL NIPPLE, LENGTH AS REQUIRED
13. ANCHOR ROD - SEE DETAIL.
14. SLOPE FACE
15. OPTIONAL STABILIZER STAKE FOR ASSEMBLY, USE WITH APPROVAL OF SITE ENGINEER. STEEL FENCE STAKE WITH ANCHOR FINS, ATTACH TO ASSEMBLY WITH NON- -CORROSIVE PIPE SUPPORT STRAP.

(F) REMOTE CONTROL VALVE ASSEMBLY

NOT TO SCALE



LEGEND:

1. LANDFILL BENCH
2. 4" PVC MAINLINE, RESTS ON GRADE.
3. MAINLINE SWING JOINT; SEE DETAIL.
4. PVC YELOMINE COUPLING.
5. PVC YELOMINE TRANSITION FITTING, FLANGE BY MALE.
6. NIBCO LD 2000 BUTTERFLY VALVE WITH 47078 LEVER LOCK.
7. SLOPE CONDITION AT END OF BENCH WHERE MAINLINE IS STUBBED UP FROM CONNECTION UNDER ROADWAY
8. ROADWAY.

(C) MAINLINE SWING JOINT WI. ISOLATION VALVE

NOT TO SCALE

IRRIGATION DETAILS

DESIGNED	
DRAWN	
CHECKED	
SUPERVISED	
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.
DATE	

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765
(714)860-7777

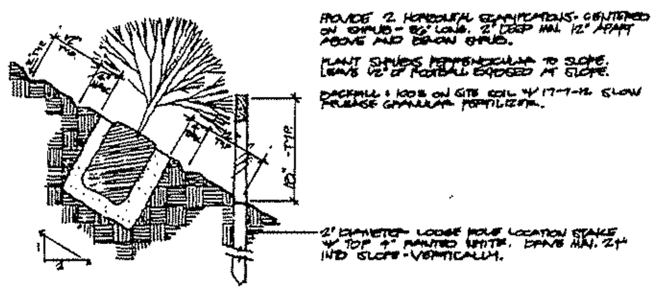
LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE

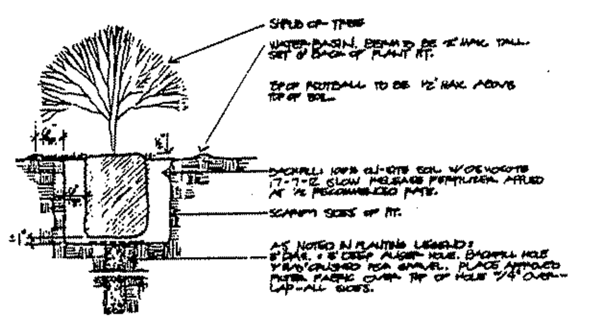
CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ______ 19__
DIV./DIST. ENGR. R.E. NO.

SCALE
SHEET NO. L-4
DWG. NO. 9296-0117-E-56-011-CO
JOB NO.

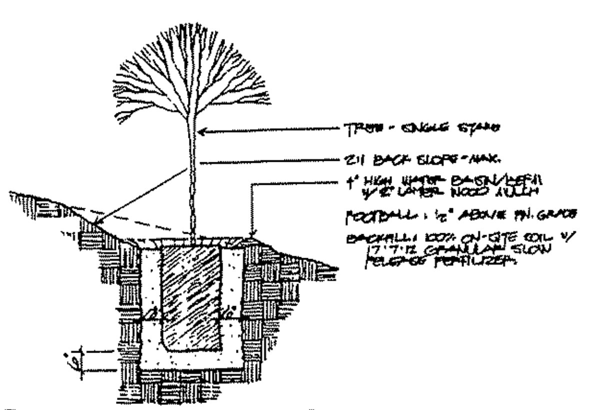
FIGURE 8 - 7



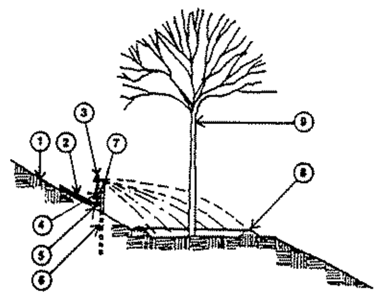
(T) NATIVE SHRUB PLANTING
For 2:1 Slopes N.T.S.



(U) NATIVE TREE/ SHRUB PLANTING
N.T.S.



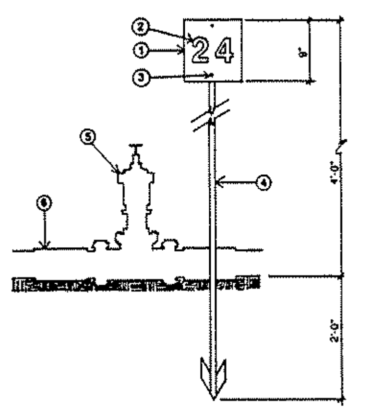
(V) NATIVE TREE PLANTING
For 4:1 Slope & Less N.T.S.



LEGEND:

1. SLOPE
2. UVR PVC LATERAL LINE ON SLOPE SURFACE
3. SPRAY HEAD
4. 1/2" X 12" SCH 80 RISER
5. SWING JOINT
6. 1/2" X 24" REBAR STAKE
7. RISER STABILIZER MODEL RS -150 BY BROWNLINE OR EQUAL
8. WATERING BASIN AROUND TREE: ADJUST SPRINKLER TO WET ENTIRE BASIN
9. TREE

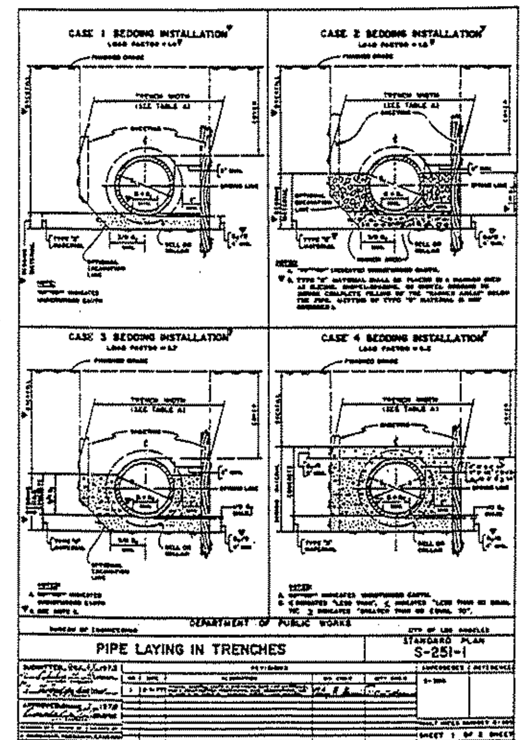
(R) SPRAY HEAD
NOT TO SCALE



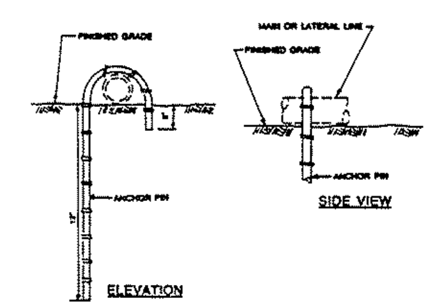
LEGEND:

1. 9" X 9" SQUARE METAL. PRIME AND PAINT BLACK.
2. 5" HEIGHT X 3" WIDTH WHITE STENCILED NUMERALS TO INDICATE VALVE NUMBER.
3. ATTACH SIGN TO STAKE WITH GALVANIZED BOLTS
4. STEEL FENCE STAKE WITH ANCHOR FINS. LOCATE 3' AWAY FROM R.C.V.
5. R.C.V. ASSEMBLY
6. PVC MAINLINE

(S) R.C.V IDENTIFICATION SIGN
NOT TO SCALE



(P)



NOTES:

1. ANCHOR SHALL BE PLACED NO GREATER THAN 15' APART FOR LATERAL LINE.
2. ANCHOR SHALL BE SPACED 10' ON CENTER FOR MAIN LINE.
3. ANCHOR SHALL BE #4 REINFORCING BAR.
4. THE 12" LEG OF THE ANCHOR PIN SHALL BE PLACED ON THE DOWN HILL SIDE FOR ALL SLOPE AREAS.

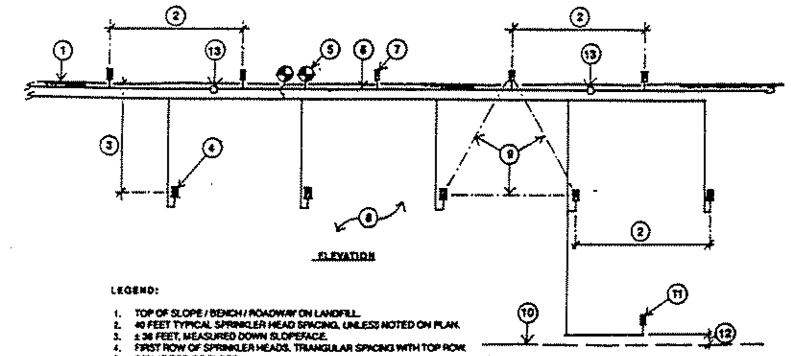
USE STABILIZER PS118/LA2 FOR 2" AND SMALLER PIPE.
USE STABILIZER PS118/LA4 FOR 2 1/2" AND LARGER PIPE.
BY V.I.T. PRODUCTS, INC. (619)673-1760 OR EQUAL

ANCHOR

AMERICAN PUBLIC WORKS ASSOCIATION – SOUTHERN CALIFORNIA CHAPTER

PIPE PINNING 515-0

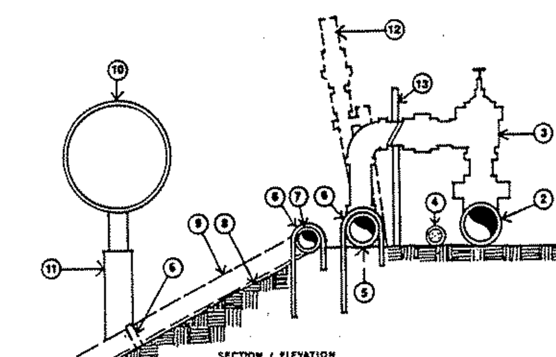
(Q)



LEGEND:

1. TOP OF SLOPE / BENCH / ROADWAY ON LANDFILL.
2. 40 FEET TYPICAL SPRINKLER HEAD SPACING, UNLESS NOTED ON PLAN.
3. ± 36 FEET, MEASURED DOWN SLOPEFACE.
4. FIRST ROW OF SPRINKLER HEADS. TRIANGULAR SPACING WITH TOP ROW.
5. RCV AT TOP OF SLOPE.
6. LATERAL LINE AT TOP OF SLOPE.
7. TOP ROW OF SPRINKLER HEADS AT TOP OF SLOPE.
8. SLOPE FACE
9. EQUILATERAL TRIANGLE (APPROXIMATE) MEASURED ON SLOPEFACE.
10. BOTTOM OF SLOPE.
11. SPRINKLER HEAD AT BOTTOM OF SLOPE, WHERE OCCURS.
12. PLACE BOTTOM HEADS 5 FEET UP SLOPE FACE FROM BOTTOM OF SLOPE.
13. SPRING OR SWING CHECK VALVE IN LATERAL LINE AT TOP OF SLOPE.

(M) SPRINKLER HEAD LAYOUT ON SLOPEFACE
NOT TO SCALE

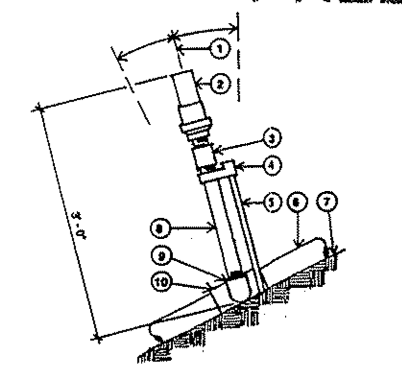


LEGEND:

1. BENCH / ROADWAY ON LANDFILL
2. PVC MAINLINE
3. REMOTE CONTROL VALVE (RCV) ASSEMBLY - SEE DETAIL
4. CONDUIT WITH RCV WIRING
5. UVR PVC TO LATERAL SYSTEM
6. ANCHOR ROD - SEE DETAIL
7. ADJACENT LATERAL LINE
8. SLOPE FACE
9. UVR PVC LATERAL PIPE ON SLOPEFACE
10. GAS COLLECTION SYSTEM HEADER; BY OTHERS.
11. SUPPORT STANCHION FOR GAS HEADER
12. PART CIRCLE SPRINKLER HEAD AT TOP OF SLOPE; SEE SPRINKLER HEAD DETAIL.
13. OPTIONAL STABILIZER STAKE FOR ASSEMBLY, USE WITH APPROVAL OF SITE ENGINEER. STEEL FENCE STAKE WITH ANCHOR FINS, ATTACH TO ASSEMBLY WITH NON- CORROSIVE PIPE SUPPORT STRAP.

(N) PIPELINE POSITIONING ON LANDFILL BENCH
NOT TO SCALE

PRELIMINARY



LEGEND:

1. ANGLE SPRINKLER ASSEMBLY MIDWAY BETWEEN VERTICAL AND RIGHT ANGLE TO SLOPEFACE FOR OPTIMUM PERFORMANCE.
2. ROTOR TYPE SPRINKLER HEAD.
3. ANTI-DRAIN CHECK VALVE MODEL CV-0750-FM BY KING BROS. OR EQUAL.
4. RISER STABILIZER MODEL RS -200 BY BROWNLINE OR EQUAL.
5. 1/2" X 36" STEEL REBAR DRIVE 12" INTO SLOPEFACE AT CORRECT ANGLE.
6. UVR PVC LATERAL LINE ON SLOPE SURFACE.
7. SLOPEFACE
8. 3/4" X 24" SCH 80 PVC NIPPLE.
9. 3/4" UVR PVC STREET ELL.
10. UVR PVC TEE IN LATERAL LINE

(O) ROTOR SPRINKLER ASSEMBLY
NOT TO SCALE

IRRIGATION & PLANTING DETAILS

DESIGNED	DRAWN	CHECKED	SUPERVISED	PROJECT ENGR.	ASST. DIV./DIST. ENGR.
				R.E. NO.	R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765
(714)860-7777

LOPEZ CANYON LANDFILL

NO. | REVISION DESCRIPTION | DIV./DIST. ENGR. | DATE

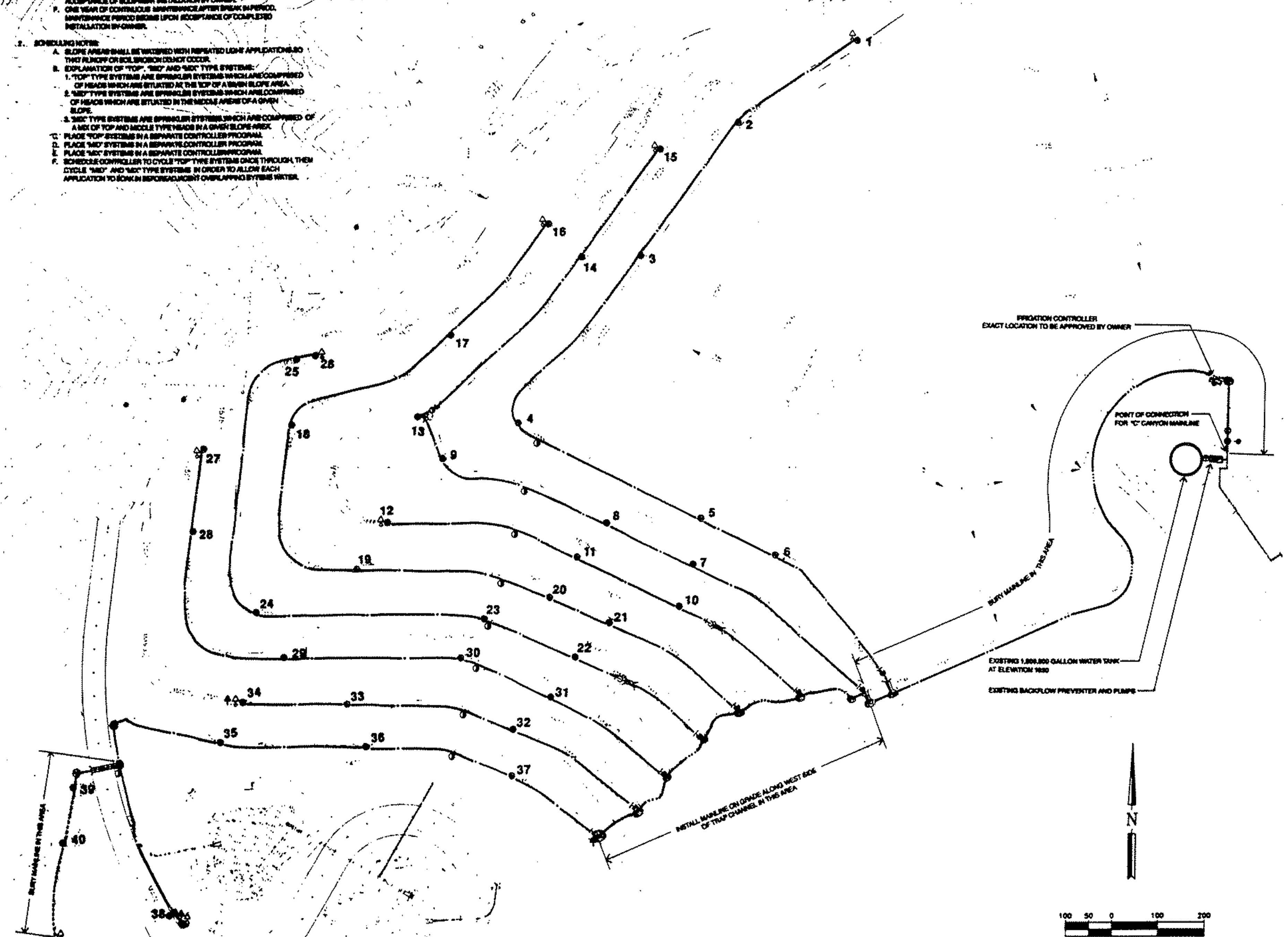
CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ____ 19__
DIV./DIST. ENGR. R.E. NO.

SCALE
SHEET NO. L-5
DWG. NO.
JOB NO.

FIGURE 8 - 8

CONTROL SYSTEM INSTALLATION NOTES:

1. CONTROLLER INSTALLATION SHALL INCLUDE:
   A. INSTALLATION OF RAINMASTER EVENS-PED ON CONCRETE BASE PER SPECIFICATIONS, PLANS AND DETAILS.
   B. CONNECTION OF CONTROLLER TO 120V POWER.
   C. INSTALLATION AND CONNECTION OF ALL CONTROLLER WIRES TO REMOTE CONTROL VALVES PER SPECIFICATIONS, PLANS AND DETAILS.
   C. CONNECTION AND CALIBRATION OF FLOW METER TO CONTROLLER.
   E. SUBMITTAL TO OWNER OF CONTROLLER INSTRUCTION MANUALS, WARRANTIES AND KEYS.
   E. PROGRAMMING, TESTING AND OPERATION OF CONTROLLER FOR [illegible] DAY BREAK IN PERIOD, INCLUDING [illegible] HOURS OF INSTRUCTION IN CONTROLLER OPERATIONS FOR OWNERS AUTHORIZED REPRESENTATIVE. BREAK IN PERIOD BEGINS UPON ACCEPTANCE OF EQUIPMENT INSTALLATION BY OWNER.
   F. ONE YEAR OF CONTINUOUS MAINTENANCE AFTER BREAK IN PERIOD. MAINTENANCE PERIOD BEGINS UPON ACCEPTANCE OF COMPLETED INSTALLATION BY OWNER.
2. SCHEDULING NOTES:
   A. SLOPE AREAS SHALL BE WATERED WITH REPEATED LIGHT APPLICATIONS SO THAT RUNOFF OR SOIL EROSION DO NOT OCCUR.
   B. EXPLANATION OF "TOP", "MID" AND "MIX" TYPE SYSTEMS:
      1. "TOP" TYPE SYSTEMS ARE SPRINKLER SYSTEMS WHICH ARE COMPRISED OF HEADS WHICH ARE SITUATED AT THE TOP OF A GIVEN SLOPE AREA.
      2. "MID" TYPE SYSTEMS ARE SPRINKLER SYSTEMS WHICH ARE COMPRISED OF HEADS WHICH ARE SITUATED IN THE MIDDLE AREAS OF A GIVEN SLOPE.
      3. "MIX" TYPE SYSTEMS ARE SPRINKLER SYSTEMS WHICH ARE COMPRISED OF A MIX OF TOP AND MIDDLE TYPE HEADS IN A GIVEN SLOPE AREA.
   C. PLACE "TOP" SYSTEMS IN A SEPARATE CONTROLLER PROGRAM.
   D. PLACE "MID" SYSTEMS IN A SEPARATE CONTROLLER PROGRAM.
   E. PLACE "MIX" SYSTEMS IN A SEPARATE CONTROLLER PROGRAM.
   F. SCHEDULE CONTROLLER TO CYCLE "TOP" TYPE SYSTEMS ONCE THROUGH, THEN CYCLE "MID" AND "MIX" TYPE SYSTEMS IN ORDER TO ALLOW EACH APPLICATION TO SOAK IN BEFORE ADJACENT OVERLAPPING SYSTEMS WATER.



EQUIPMENT LEGEND

SYMBOL	DESCRIPTION	MANUFACTURER & PART NUMBER	REMARKS
■	REDUCED PRESSURE TYPE BACKFLOW PREVENTION ASSEMBLY	FEBCO 825 - 6"	
	BOOSTER PUMP	CONSTANTFLO [illegible]	
●	MASTER VALVE	6" BERMAD 400-[illegible] WITH 24V AC SOLENOID	SEE DETAIL
	GATE VALVE	6" NIBCO F-619 FLANGED	
	REMOTE CONTROL SPRINKLER CONTROL VALVE	RAINBIRD EAV [illegible]	SEE DETAIL
	AIR & VACUUM RELIEF COMBINATION VALVE	APCO 145C	SEE DETAIL
	PRESSURE RELIEF VALVE	2" CLAYTON MODEL 50A-01 WITH 20-200 PSI RELIEF RANGE	SEE DETAIL
	BLOW OFF VALVE / DRAIN VALVE	2" NIBCO T136	SEE DETAIL
	MAINLINE SWING JOINT ASSEMBLY	PVC YELOMINE PRESSURE PIPE CERTA-LOK FITTINGS, NO VALVE	SEE DETAIL
	MAINLINE SWING JOINT ASSEMBLY WITH ISOLATION VALVE	WITH MANUAL ISOLATION VALVE TURBON SCH80, WITH FLANGE TO YELOMINE	SEE DETAIL
	FLOW SENSOR	DATA INDUSTRIAL 2000 INSTALL ON 2" FPT TEE ON MAINLINE	SEE DETAIL
	PERMANENT MAINLINE	6" GALVANIZED STEEL	SEE DETAIL
	EXISTING MAINLINE		
	YELOMINE PVC PRESSURE LINE	4" ; CLASS 200 CERTA-LOK FITTINGS	SEE DETAIL
	BURIED PVC PRESSURE LINE	4" YELOMINE PVC PRESSURE LINE SOLVENT WELD FITTINGS	SEE DETAIL
	IRRIGATION CONTROLLER	RAINMASTER EVENS-PED WITH EV-[illegible] CIRCUIT BOARD	SEE DETAIL SEE SPECS
	CONTROL WIRES IN CONDUIT	PLACE IN SCH. 40 SLEEVE BENEATH ACCESS ROADS	SEE SPECS
	SCHEDULE 40 SLEEVE	SLEEVE PRESSURE LINES BENEATH ACCESS ROADS	
	CONCRETE THRUST BLOCK		SEE DETAIL

VALVE LEGEND

VALVE NO.	SYSTEM TYPE	GPM	OUTLET TEE SIZE	HIGHEST HEAD ELEVATION	STATIC HEAD PSI	DISTANCE VALVE TO TANK	MAIN LOSS PSI	PRESS. LOSS PSI	MIN. PSI AT HEAD	PSI BOOST REQUIRED
1	MID/BOT	187.5	4"	1745	82.3	2,465 lin. ft.	34.6	30.0	60.0	69.3 psi
2	TOP	188.6	4"	1760	25.8	3,150 lin. ft.	31.6	30.0	60.0	66.0 psi
3	MID/BOT	187.0	4"	1745	32.3	2,795 lin. ft.	30.0	30.0	60.0	52.7 psi
4	MID/BOT	175.3	4"	1730	38.7	2,335 lin. ft.	23.4	30.0	60.0	72.7 psi
5	TOP	98.0	3"	1765	20.0	1,800 lin. ft.	19.0	30.0	60.0	70.9 psi
6	MID/BOT	179.3	4"	1730	30.1	1,715 lin. ft.	17.2	30.0	60.0	75.1 psi
7	MID/BOT	184.8	4"	1720	40.4	1,875 lin. ft.	18.8	30.0	60.0	66.2 psi
8	TOP	127.3	3"	1725	36.6	2,075 lin. ft.	29.8	30.0	60.0	72.2 psi
9	MID/BOT	190.7	4"	1696	53.6	2,475 lin. ft.	24.8	30.0	60.0	60.9 psi
10	MID/BOT	199.9	3"	1667	66.8	1,800 lin. ft.	10.1	30.0	60.0	41.3 psi
11	TOP	111.5	3"	1695	53.8	2,145 lin. ft.	21.5	30.0	60.0	64.7 psi
12	MID/BOT	186.6	4"	1642	67.9	2,846 lin. ft.	26.5	30.0	60.0	46.6 psi
13	MID/BOT	190.2	4"	1642	67.9	2,586 lin. ft.	26.0	30.0	60.0	48.9 psi
14	TOP	161.4	4"	1700	51.6	3,070 lin. ft.	30.6	30.0	60.0	47.2 psi
15	MID/BOT	172.5	4"	1700	51.6	3,066 lin. ft.	34.0	30.0	60.0	70.4 psi
16	MID/BOT	171.8	4"	1660	68.6	3,700 lin. ft.	37.8	30.0	60.0	57.0 psi
17	TOP	145.5	3"	1690	60.2	2,460 lin. ft.	34.5	30.0	60.0	62.3 psi
18	MID/BOT	174.1	4"	1643	78.1	3,060 lin. ft.	30.5	30.0	60.0	42.4 psi
19	MID/BOT	132.3	3"	1620	86.0	2,800 lin. ft.	28.2	30.0	60.0	28.2 psi
20	TOP	104.0	3"	1635	79.6	2,185 lin. ft.	21.7	30.0	60.0	30.1 psi
21	MID/BOT	133.4	3"	1625	83.6	2,846 lin. ft.	20.5	30.0	60.0	24.9 psi
22	MID/BOT	173.4	4"	1585	101.1	2,135 lin. ft.	21.4	30.0	60.0	8.3 psi
23	TOP	186.7	3"	1601	94.2	2,866 lin. ft.	23.7	30.0	60.0	17.5 psi
24	MID/BOT	188.4	4"	1580	103.2	2,686 lin. ft.	26.9	30.0	60.0	12.7 psi
25	MID/BOT	174.1	4"	1606	92.8	2,486 lin. ft.	24.9	30.0	60.0	30.4 psi
26	TOP	127.3	3"	1627	83.0	3,636 lin. ft.	36.4	30.0	60.0	40.4 psi
27	TOP	97.5	3"	1570	107.5	2,440 lin. ft.	24.4	30.0	60.0	14.8 psi
28	MID/BOT	127.5	3"	1550	116.1	3,260 lin. ft.	22.6	30.0	60.0	4.5 psi
29	MID/BOT	135.6	3"	1555	114.0	2,050 lin. ft.	26.5	30.0	60.0	2.5 psi
30	TOP	102.0	3"	1560	111.8	2,450 lin. ft.	24.5	30.0	60.0	0.7 psi
31	MID/BOT	133.8	3"	1545	118.3	2,210 lin. ft.	22.1	30.0	60.0	0.0 psi
32	MID/BOT	134.1	3"	1500	137.6	2,300 lin. ft.	23.0	30.0	60.0	0.0 psi
33	TOP	135.5	3"	1570	129.0	2,760 lin. ft.	27.6	30.0	60.0	0.0 psi
34	MID/BOT	136.8	3"	1500	137.6	2,970 lin. ft.	29.7	30.0	60.0	0.0 psi
35	MID/BOT	201.4	4"	1485	144.1	3,040 lin. ft.	30.4	30.0	60.0	0.0 psi
36	TOP	146.3	4"	1490	141.0	2,770 lin. ft.	27.7	30.0	60.0	0.0 psi
37	MID/BOT	190.8	4"	1460	154.8	2,370 lin. ft.	23.7	30.0	60.0	0.0 psi
38	MIX	188.1	4"	1475	148.4	2,720 lin. ft.	27.2	30.0	60.0	0.0 psi
39	MIX	136.2	3"	1490	141.8	2,400 lin. ft.	24.0	30.0	60.0	0.0 psi
40	MIX	142.3	3"	1525	126.9	2,600 lin. ft.	26.0	30.0	60.0	0.0 psi
41	MIX	102.4	3"	1545	118.3	2,700 lin. ft.	27.1	30.0	60.0	0.0 psi

GENERAL NOTES:

1. PLACE ALL CONTROLLER WIRES IN PVC CLASS 160 UVR CONDUIT AND ROUTE ALONGSIDE MAINLINES. WHERE MAINLINES ARE BURIED OR SLEEVED BENEATH ROADWAYS, ALSO BURY AND SLEEVE CONTROLLER WIRES.
2. USE CERTA-LOK RESTRAINED JOINT FITTINGS WHEREVER POSSIBLE ON ABOVE GRADE YELOMINE PIPE RUNS (FOR LATER DISASSEMBLY). WHERE CONDITIONS REQUIRE CUTTING YELOMINE PIPE, SOLVENT WELD UVR PVC FITTINGS MAY BE USED.
3. PLACE THRUST BLOCKS AS NECESSARY, AND WHERE INDICATED ON PLANS.
4. REFER TO "NOTICE TO CONTRACTORS" FOR ADDITIONAL SPECIFICATIONS.

PRELIMINARY

DISPOSAL AREA " C "

IRRIGATION CONTROL & PRESSURE SYSTEM PLAN

SCALES HORIZ. 1"= 100' VERT. 1"= | SHEET OF | INDEX NUMBER

DATE 11/7/91 | DESIGNED | DRAWN | CHECKED | SUPERVISED | PROJECT ENGR. R.E. NO. | ASST. DIV./DIST. ENGR. R.E. NO.

BAS BRYAN A. STIRRAT & ASSOCIATES CIVIL AND ENVIRONMENTAL ENGINEERS DIAMOND BAR, CA. 91765 (714)860-7777

LOPEZ CANYON LANDFILL

NO. | REVISION DESCRIPTION | DIV./DIST. ENGR. | DATE

CITY OF LOS ANGELES BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR

SCALE 1" = 100' | SHEET NO. | DWG. NO. | JOB NO.

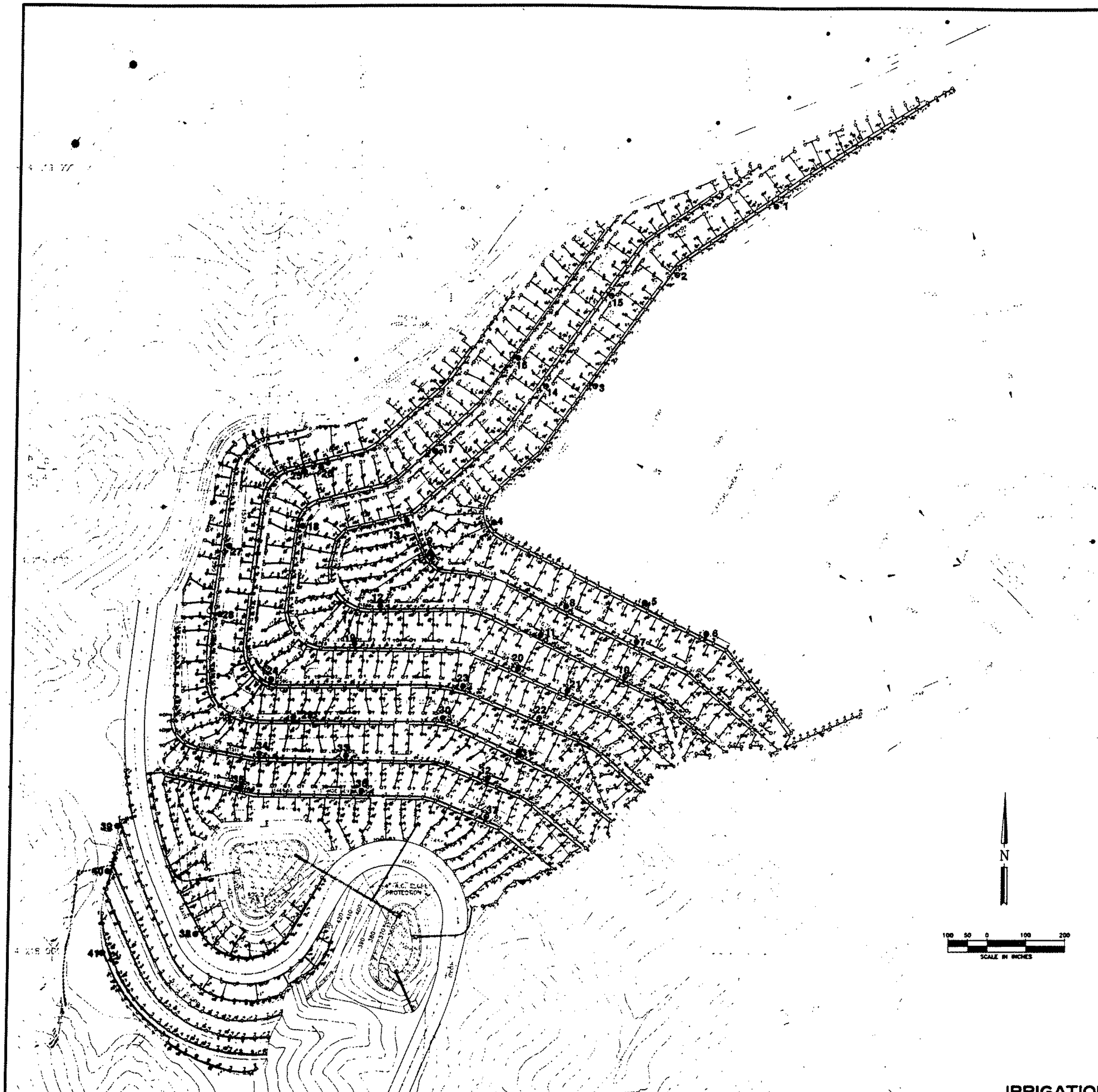
FIGURE 8 - 9

LATERAL LINE

SYMBOL	DESCRIPTION	MANUFACTURER / PART NUMBER	REMARKS
———	LATERAL PIPE ON	UVR PVC "BROWNLINE" OR EQUAL SCH 40 PVC	SEE DETAILS
	SLOPE SURFACE	1" MINIMUM / SIZE PER PLAN	AND SPECS.
—+—	IN-LINE SPRING LOADED		
	CHECK VALVE - LINE SIZE	K.B.I. KC-2020S WITH 5 LB. SPRING	SEE SPECS.
—●—	IN - LINE SWING CHECK VALVE		
	LINE SIZE	K.B.I. KSC - 2040S	SEE SPECS.
●	REMOTE CONTROL VALVE		SEE VALVE LEGEND

SPRINKLER HEAD LEGEND

SYMBOL	DESCRIPTION	MANUF. & PART #	NOZZLE	GPM	RAD.	PSI
○	ADJUSTABLE ARC ROTOR	HUNTER PGS-ADJ-C80-V	1	0.70	18-31	50
	"	"	2	1.00	20-31	50
	"	"	3	1.40	22-32	50
	"	"	4	1.70	23-34	50
	"	"	5	2.10	23-34	50
	"	"	6	2.70	25-38	50
	"	"	7	3.40	25-38	50
	"	"	8	4.20	30-38	50
	"	"	9	5.50	38-41	50
●	FULL CIRCLE ROTOR	HUNTER PGS-360-C80-V	1	0.70	18-31	50
	"	"	2	1.00	20-31	50
	"	"	3	1.40	22-32	50
	"	"	4	1.70	23-34	50
	"	"	5	2.10	23-34	50
	"	"	6	2.70	25-38	50
	"	"	7	3.40	25-38	50
	"	"	8	4.20	30-38	50
	"	"	9	5.50	38-41	50



PRELIMINARY

DISPOSAL AREA " C "

IRRIGATION HEAD & LATERAL LINE PLAN

DESIGNED	TB
DRAWN	MA/TB
CHECKED	CAJ
SUPERVISED	
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

DATE 11/7/94

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765
(714)860-7777

LOPEZ CANYON LANDFILL

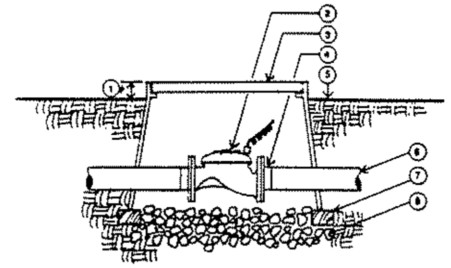
NO. | REVISION DESCRIPTION | DIV./DIST. ENGR. | DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ______ 19___
DIV./DIST. ENGR. R.E. NO.

SCALE 1" = 100'
SHEET NO.
DWG. NO.
JOB NO.

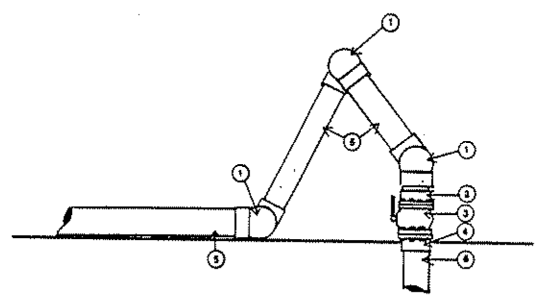
SCALES HORIZ. 1" = 100' VERT. 1" = | SHEET OF | INDEX NUMBER

FIGURE 8 - 10



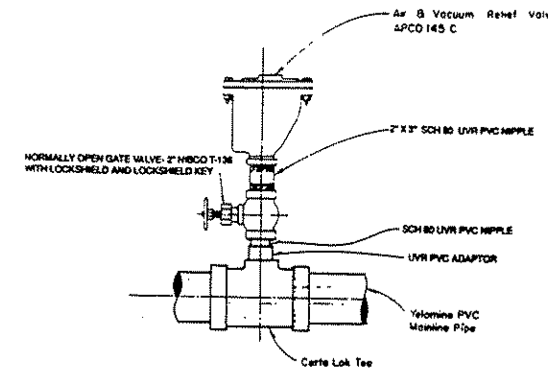
LEGEND:
1. 3" ABOVE GRADE
2. MASTER VALVE: SEE LEGEND
3. CONCRETE VALVE BOX AND LID
4. FLANGE FITTING
5. FINISH GRADE
6. MAINLINE
7. SUPPORT BLOCKING
8. 3 CUBIC FEET OF DRAIN GRAVEL

(F) MASTER VALVE DETAIL
N.T.S.

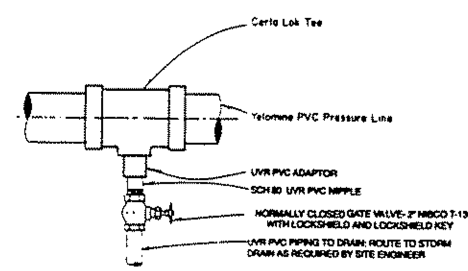


LEGEND:
1. 2 CERTA-LOK ELLS
2. CERTA-LOK FLANGE ADAPTOR
3. 4" TUFSION BO400L MANUAL ISOLATION VALVE
4. PVC FLANGE ADAPTOR
5. LAY PIPELINE ON GRADE - SEE PIPELINE AND SPRINKLER ASSEMBLY DETAIL
6. 4" PVC YELOMINE PIPE

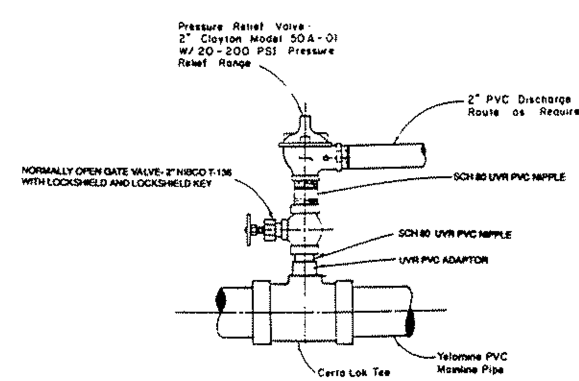
(E) MAINLINE SWING JOINT AND ISOLATION VALVE ASSEMBLY
N.T.S.



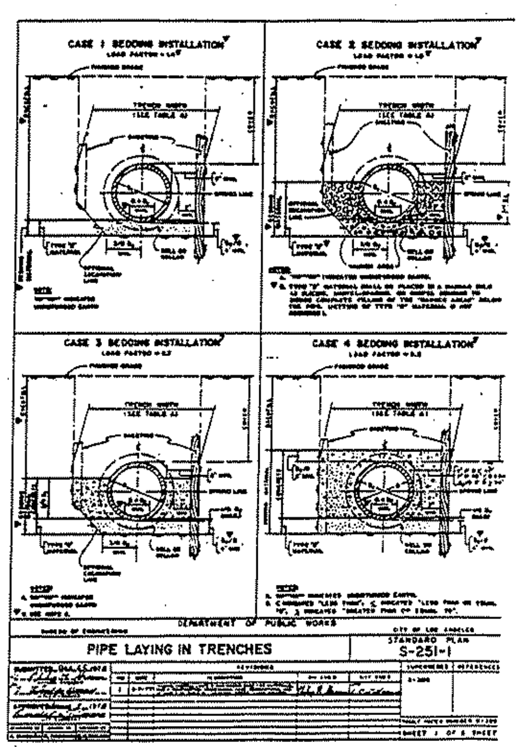
(C) AIR AND VACUUM RELIEF ASSEMBLY
N.T.S.



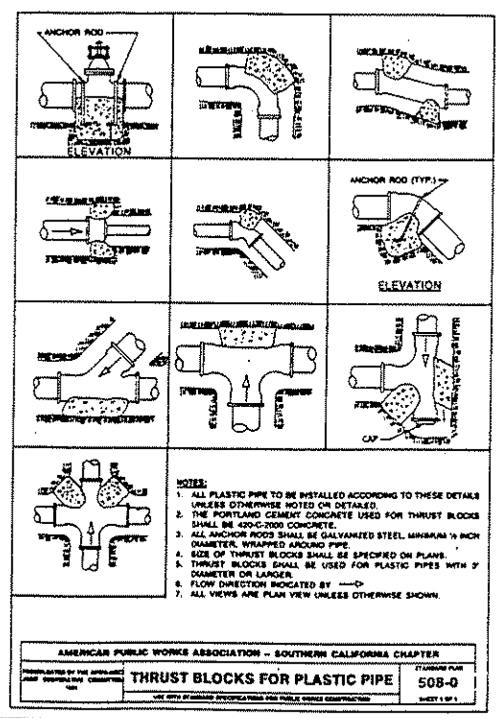
(B) BLOW-OFF ASSEMBLY
N.T.S.



(A) PRESSURE RELIEF VALVE ASSEMBLY
N.T.S.



(G)



(D)

NOTICE TO CONTRACTORS

1. **SPECIFICATIONS:**
   a. All work detailed on these plans to be performed under contract shall, except as otherwise stated or provided for herein, be constructed in accordance with "Standard Specifications for Public Works Construction", 1988 Edition, with current supplements, section 212 and 308 and any other pertinent sections, and Standard Plan S-610-15.
   b. In addition, Specifications SECTION 02441 IRRIGATION, are hereby incorporated into and made a part of these specifications and their provisions shall be carried out by the Contractor.

2. **WORK CALLED FOR:**

   This improvement consists of work called for only on these plans.

3. **STANDARD PLANS FOR THIS PROJECT:**

   STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION - 1988 EDITION

   S-610-15 Notice to contractors comprehensive (Bureau of Engineering Standards)
   508-0 Thrust Blocks for Plastic Pipe
   S-251-1 Pipe Laying in Trenches (Case 1)

4. **INSPECTIONS:**

   All work shown in these plans is subject to inspection during construction. Call (818) 376-6962 24 hours prior to commencing any work.

   The Contractor shall notify the Bureau of Sanitation, telephone (818) 376-6962 at least 48 hours prior to the inspections required below so a representative can be present.

   a. Plant material approval per Section 212-1.4.
   b. Location and placement of plant material per Section 308-5.6.
   c. Testing of main and lateral irrigation lines per Section 308-5.6.
   d. Irrigation coverage test per Section 308-5.6.

5. **APPROVALS:**
   a. The Contractor shall contact the Bureau of Contract Administration (phone 213-485-3011) and the Bureau of Sanitation (818) 376-6962 for a preconstruction meeting prior to the start of work. The meeting shall take place on site.
   b. The Contractor shall furnish installation instruction sheets from the manufacturer for pipe installation and other irrigation devices to the Engineer. All guarantees, warranties, and instruction sheets for irrigation equipment shall be placed in a binder and given to the Engineer to be forwarded to the Bureau of Sanitation. The Contractor shall provide a valve box key for each locking box installed.
   c. The Contractor shall submit, in triplicate, to the Site Engineer, for approval, a complete list, by brand name and product number, of irrigation equipment and landscape materials to be installed on this job. No material shall be purchased or moved on site until the product list has been approved.

6. **IRRIGATION PIPE:**

   All pressurized lines, all risers, and all couplings shall be new P.V.C. Pipe, Schedule 80 as per Section 212-2.1 and/or as otherwise noted on the plans. Non-pressure lines shall be Schedule 40 P.V.C.

7. **ELECTRICAL GENERAL:**

   All wiring shall be color coded for easy identification. The common wire color shall be white. All 120 volt wires shall be placed in a galvanized steel electric conduit and installed according to all codes and regulations applicable at the time of installation.

8. **ELECTRICAL CONDUIT:**

   All rigid metal conduit shall be threaded, bushed and packing shall be placed on the ends to protect the wiring. All P.V.C. conduit shall be reamed, bushed and have packing placed on the ends of the conduit.

9. **AS-BUILT PLANS:**

   A set of As-Built plans shall be given to the Bureau of Sanitation (818) 376-6962 when the work is terminated. The project will not be closed until these plans have been given to the Bureau.

10. **SERVICES:**

    Electrical and water services will be provided by the City.

11. **PIPELINE TRENCHING:**

    Pressurized mainlines shall be trenched to a depth of 18 inches with electrical conduit below the mainline. Non-pressure laterals shall be trenched to a depth of 12 inches. Backfill and compaction per standard specifications.

12. **DAMAGE RESPONSIBILITY:**

    The Contractor shall be responsible for the repair or replacement of all existing improvements which are not designated for removal which are damaged or removed as a result of the Contractor's operation.

PRELIMINARY

IRRIGATION DETAILS

SCALES HORIZ. 1" = VERT. 1" =	SHEET	OF	INDEX NUMBER

DATE	11/7/91
DESIGNED	TB
DRAWN	RW/TB
CHECKED	CAJ
SUPERVISED	
PROJECT ENGR.	R.E. NO.
ASST. DIV./DIST. ENGR.	R.E. NO.

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL

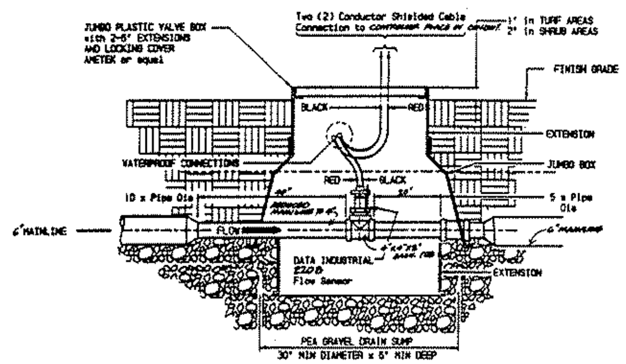
NO.	REVISION DESCRIPTION	DIV./DIST. ENGR.	DATE

CITY OF LOS ANGELES
BUREAU OF SANITATION DELWIN A. BIAGI, DIRECTOR
DATE ______ 19__
DIV./DIST. ENGR. R.E. NO.

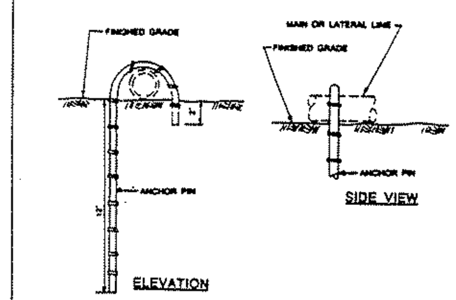
CALVIN R. ABE & ASSOCIATES, INC.
LANDSCAPE ARCHITECTS

SCALE
SHEET NO.
DWG. NO.
JOB NO.

FIGURE 8 - 11



(F) FLOW SENSOR INSTALLATION
N.T.S.

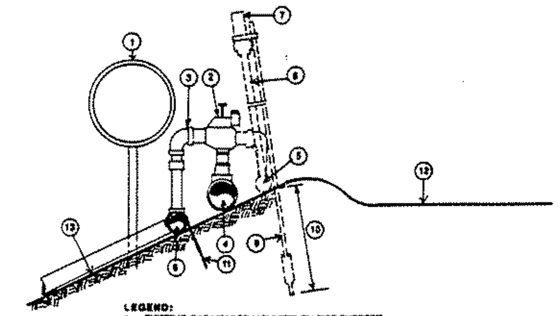


NOTES:
1. ANCHOR SHALL BE PLACED NO GREATER THAN 15' APART FOR LATERAL LINE.
2. ANCHOR SHALL BE SPACED 10' ON CENTER FOR MAIN LINE.
3. ANCHOR SHALL BE #4 REINFORCING BAR.
4. THE 12" LEG OF THE ANCHOR PIN SHALL BE PLACED ON THE DOWN HILL SIDE FOR ALL SLOPE AREAS.

ANCHOR

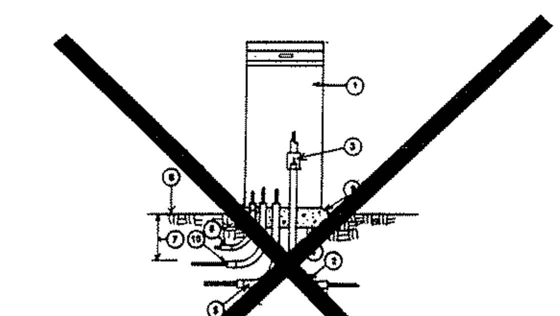
AMERICAN PUBLIC WORKS ASSOCIATION – SOUTHERN CALIFORNIA CHAPTER
PIPE PINNING
515-0

(D)



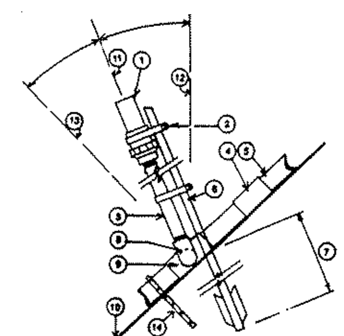
LEGEND:
1. EXISTING GAS HEADER MOUNTED ON PIPE SUPPORT
2. REMOTE CONTROL VALVE: ORIENT OUTLET TOWARDS TOP OF SLOPE FOR "TOP" TYPE SYSTEMS, ORIENT DOWNSLOPE FOR "MID" OR "MIX" TYPE SYTEMS.
3. GALVANIZED STEEL FITTINGS: SEE VALVE ASSEMBLY DETAIL
4. PVC YELOMINE MAINLINE ON GRADE. JOIN WITH CERTALOK FITTINGS WHEREVER POSSIBLE FOR LATER DISASSEMBLY. ALLOW PIPELINE TO REST AGAINST GAS HEADER SUPPORTS AND STAKE WITH ANCHOR FIN FENCE STAKES BETWEEN PIPE SUPPORTS AS NECESSARY TO PREVENT PIPELINE FROM SAGGING ON SLOPEFACE.
5. BROWNLINE LATERAL LINE ON GRADE; POSTION "TOP" TYPE SYSTEMS ABOVE MAINLINE. ALLOW PIPELINE TO REST AGAINST MAINLINE.
6. BROWNLINE LATERAL LINE ON GRADE: POSTION "MID" OR "MIX" TYPE SYSTEMS BELOW MAINLINE AND ABOVE GAS HEADER PIPE SUPPORTS. ALLOW PIPELINE TO REST AGAINST PIPE SUPPORTS.
7. PART CIRCLE SPRINKLER AT TOP OF SLOPE FOR "TOP" SYSTEMS
8. 2'-0" UVR PVC RISER
9. STEEL FENCE STAKE WITH ANCHOR FINS
10. MINIMUM DEPTH 2'-0"
11. STEEL PIPE ANCHOR; SEE DETAIL D
12. FLAT BENCH / ROADWAY
13. SLOPE

(B) PIPELINE & SPRINKLER ASSEMBLY



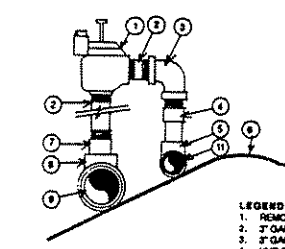
LEGEND:
1. LOCKING ... CONTROLLER CABINET ASSEMBLY
...
7. 18" DEPTH MINIMUM
8. FINISH GRADE
9. 6" THICKNESS REINFORCED CONCRETE PAD
10. 24V WIRES TO FLOW SENSOR IN ELECTRICAL CONDUIT

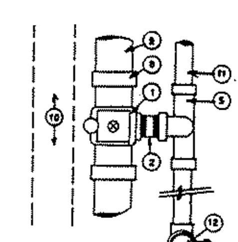
(E) CONTROLLER ENCLOSURE ASSEMBLY
N.T.S.



LEGEND:
1. GEAR DRIVEN ROTOR TYPE SPRINKLER
2. STAINLESS STEEL GEAR CLAMP(1 OF 2)
3. 24" X 3/4" UVR PVC SCH 80 NIPPLE
4. IN LINE CHECK VALVE; LOCATE PER PLAN
5. UVR PVC LATERAL PIPELINE; "BROWNLINE" OR EQUAL . SIZE PER PLAN
6. STEEL FENCE STAKE WITH ANCHOR FINS
7. MINIMUM 24" DEPTH
8. 3/4" UVR PVC STREET ELL
9. UVR PVC TEE WITH 3/4" THREADED OUTLET
10. SLOPEFACE
11. ANGLE SPRINKLER ASSEMBLY MIDWAY BETWEEN VERTICAL AND RIGHT ANGLE TO SLOPEFACE FOR OPTIMUM PERFORMANCE.
12. PLUMB VERTICAL
13. RIGHT ANGLE TO SLOPE
14. ANCHOR FINNING - SEE DETAIL "H"

(C) SPRINKLER HEAD ASSEMBLY ON SLOPE N.T.S.





LEGEND:
1. REMOTE CONTROL VALVE: ANGLE PATTERN
2. 3" GALVANIZED STEEL NIPPLE
3. 3" GALVANIZED STEEL ELL
4. UVR PVC MALE ADAPTOR: 3" MALE THREAD X OUTLET TEE SIZE SIZE FEMALE SLIP: SEE VALVE LEGEND FOR OUTLET TEE SIZE.
5. UVR PVC OUTLET TEE : SIZE PER VALVE LEGEND
6. TOP OF SLOPE; SEE PIPELINEAND SPRINKLER ASSEMBLY DETAIL
7. 3" X 4" GALVANIZED STEEL REDUCER BUSHING AS NECESSARY
8. THREADED OUTLET TEE IN MAINLINE: CERTA-LOK OR SOLVENT WELDED UVR PVC.
9. 4" PVC YELOMINE MAINLINE LAY ON GROUND
10. EXISTING GAS HEADER ON PIPE SUPPORTS; SEE PIPELINE AND SPRINKLER ASSEMBLY DETAIL
11. UVR PVC LATERAL PIPELINE: "BROWNLINE" OR EQUAL; SIZE PER PLAN
12. SPRINKLER HEAD ASSEMBLY - SEE PIPELINE AND SPRINKLER ASSEMBLY DETAIL

(A) REMOTE CONTROL VALVE ASSEMBLY
N.T.S.

PRELIMINARY

IRRIGATION DETAILS.

SCALES	HORIZ. 1"= VERT. 1"=
SHEET	OF
INDEX NUMBER	

LOPEZ CANYON LANDFILL

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765

CITY OF LOS ANGELES
BUREAU OF SANITATION

DESIGNED TB
DRAWN
CHECKED
SUPERVISED
PROJECT ENGR. R.E. NO.
ASST. DIV./DIST. ENGR. R.E. NO.
DATE 11/7/01

NO. | REVISION DESCRIPTION | DIV./DIST. ENGR. | DATE

SCALE
SHEET NO.
DWG. NO.
JOB NO.

FIGURE 8 - 12

SECTION 9.0

CLOSED SITE SECURITY

9.0 CLOSED SITE SECURITY

9.1 SIGNS

The operator is required to post signs within 10 days after receipt of the final shipment of waste. The signs must indicate where the closure and post-closure maintenance plans are kept and available for public inspection in accordance with CCR, Title 14, Section 17767. The signs shall also include a telephone number for emergency notification.

Signs will be posted in accordance with CCR, Title 14, Section 17767 (d) at the point of public access to this landfill at the intersection of Lopez Canyon Road and Paxton Street.

The operator is also required to post signs at the site entrance 60 days prior to the closure of the landfill to notify users of the location of alternate landfills where they may dispose of their refuse. However, the Lopez Canyon Landfill is not open for use by the general public and therefore is not required to comply and post these types of signs.

9.2 SITE SECURITY

Currently unauthorized vehicle entry is controlled by the gated entrance way, a 24-hour guard, fencing (near the entrance), steep terrain and posted no trespassing signs. Upon closure, the operator will install a six-foot high chain-link security fence in those areas where unauthorized entrance may be possible (see Figure 9-1).

Steep terrain along the western, northern, and portions of the southern boundary of the property will prevent unauthorized vehicle access and will therefore not be fenced. Fencing will be installed from below the northeast corner of the site to the bottom of Disposal Area B, and will continue along Bartholomaus Canyon to a point south of the landfill. A double gate will be located at this point to allow access to the bottom of both Disposal Areas A and B. Fencing will also be installed around the Paxton Street entrance and along the southeastern boundary terminating at a point near the mouth of Disposal Area C where the terrain steepens. A gate currently exists at the Paxton Street entrance. See Figures 9-2, 9-3, and 9-4 for fencing and gate details.

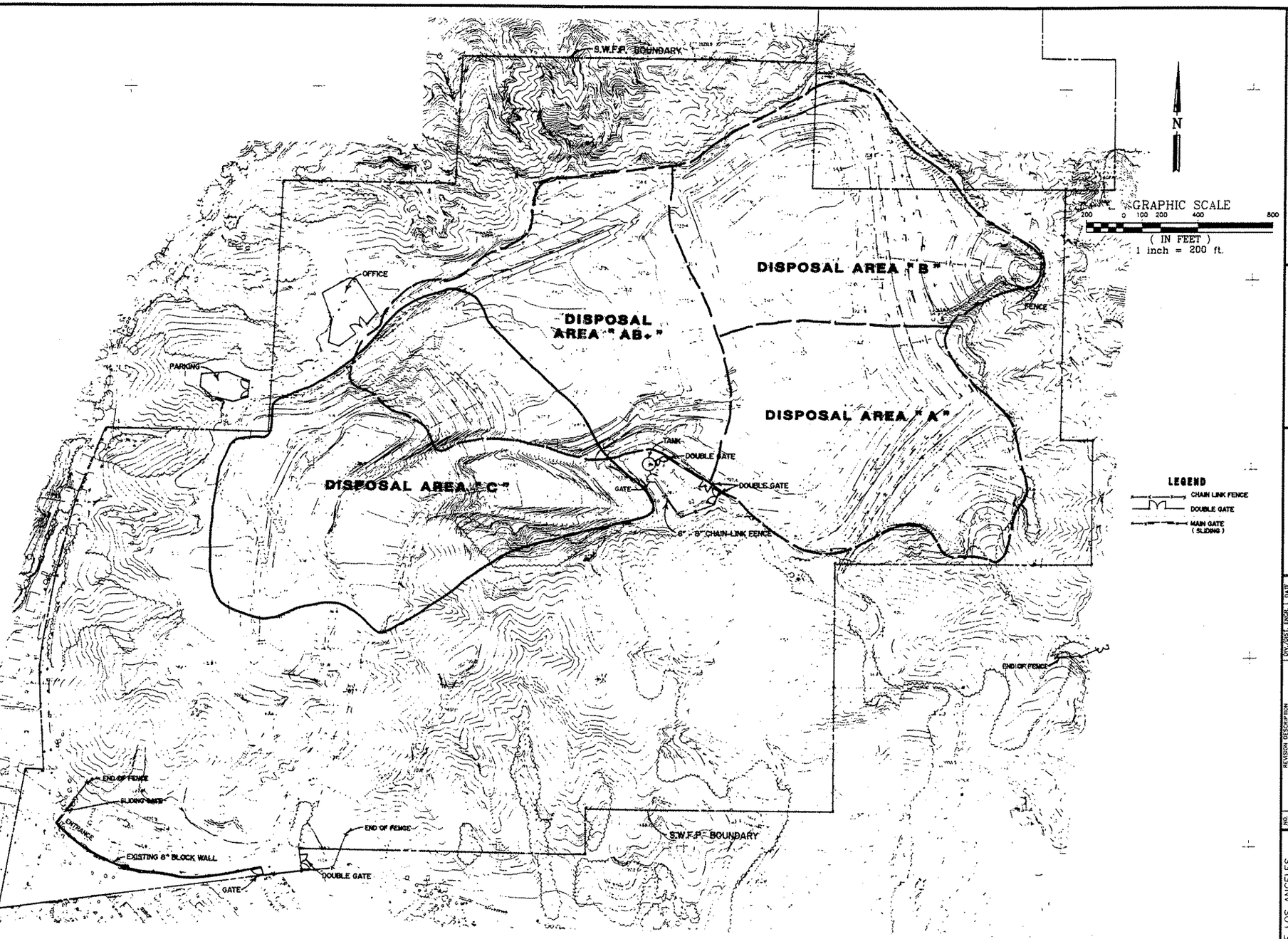


FIGURE 9 - 1

CLOSURE PLAN
PROPOSED SITE SECURITY PLAN

DESIGNED	E.L.S.	12/91			
DRAWN	H.M.G.	12/91			
CHECKED	E.L.S.	12/91			
SUPERVISED	E.L.S.	12/91			
PROJECT ENGR.			R.E. NO.		
ASST. DIV./DIST. ENGR.			R.E. NO.		

BAS
BRYAN A. STIRRAT & ASSOCIATES
ENVIRONMENTAL ENGINEERS
1390 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(714)860-9777

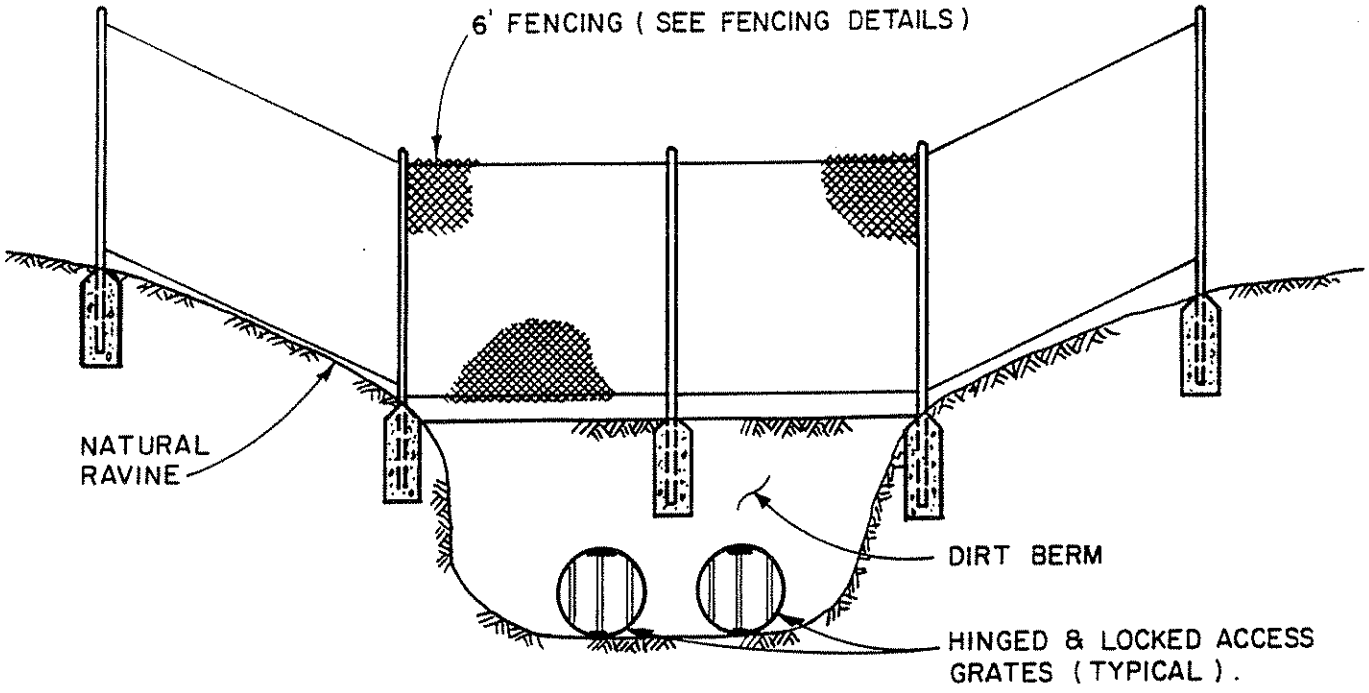
LOPEZ CANYON LANDFILL

NO.	REVISION DESCRIPTION	DWG./DIST. ENGR.	DATE
1	GENERAL REVISIONS	APP'D. R.E.	JAN 1993

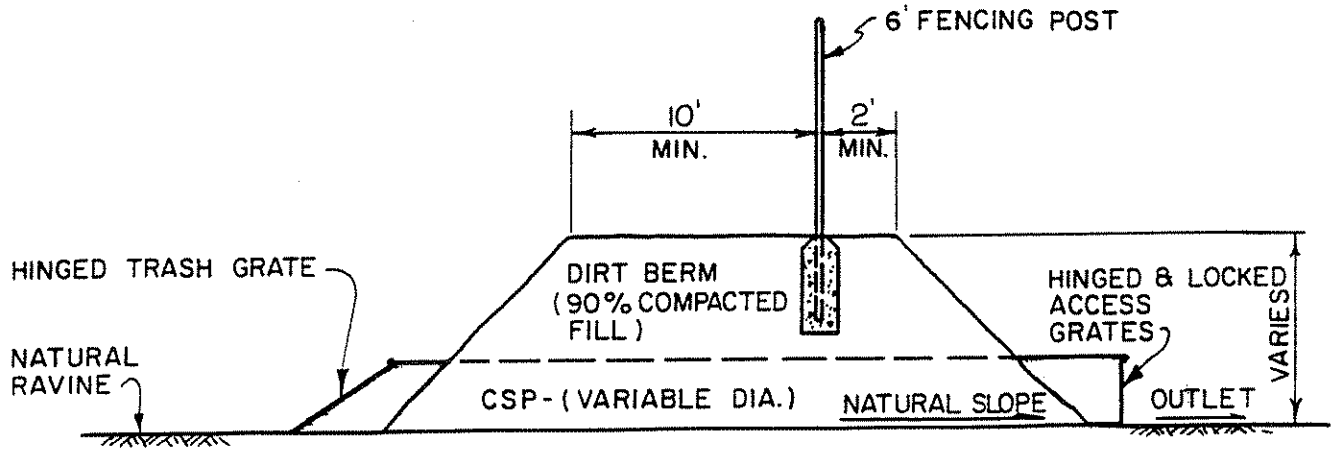
CITY OF LOS ANGELES
BUREAU OF SANITATION DELMAR A. BIAGI, DIRECTOR
DATE _____ 19__
DIV./DIST. ENGR. R.E. NO.

SCALE
SHEET NO.
DWG. NO.
JOB NO.

SCALES HORIZ. 1"= VERT. 1"= | SHEET OF | INDEX NUMBER



FRONT VIEW
TYPICAL



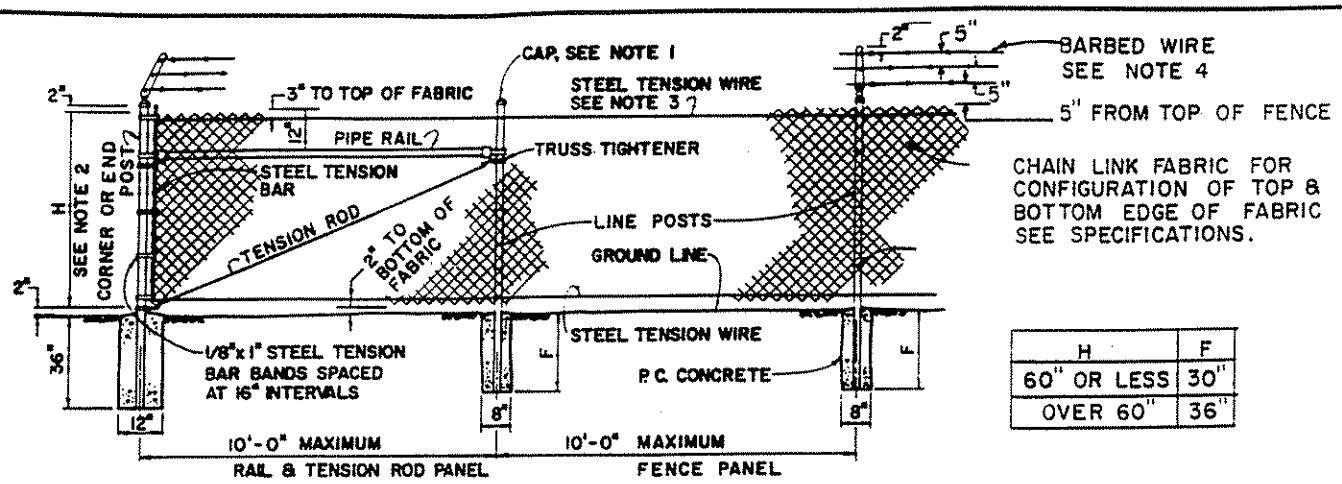
SIDE VIEW
TYPICAL

FIGURE 9 - 2

BAS
(714) 860-7777
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL
SITE SECURITY PLAN
CHAIN LINK FENCE DETAIL

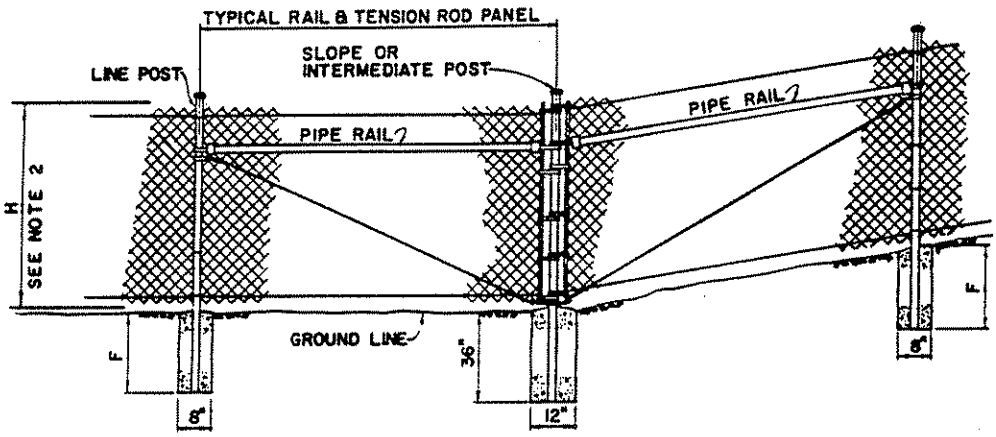
JOB NO.	9035 - 1008
DATE	2-15-91
DRAWN BY:	J.C.H.
CHECKED BY:	M.J.B.



CHAIN LINK FABRIC FOR CONFIGURATION OF TOP & BOTTOM EDGE OF FABRIC SEE SPECIFICATIONS.

H	F
60" OR LESS	30"
OVER 60"	36"

TYPICAL FENCE ELEVATION



INTERMEDIATE AND SLOPE POSTS SHALL BE INSTALLED AT 300' INTERVALS ALONG FENCE LINE AND AT GRADE CHANGES EXCEEDING 5% ALSO APPLICABLE TO CHANNEL FENCE

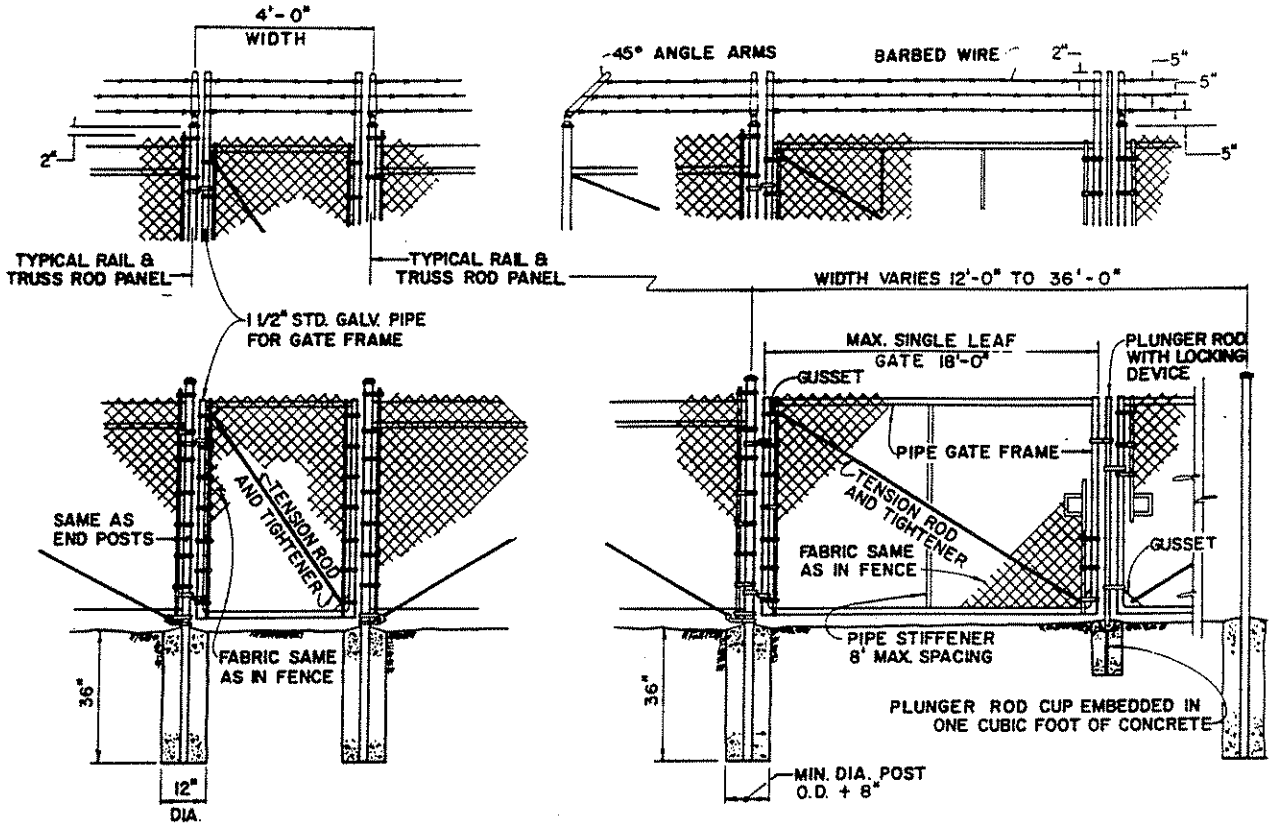
INTERMEDIATE POST DETAIL

FIGURE 9 - 3

BAS
(714) 860-7777
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL
SITE SECURITY PLAN
CHAIN LINK FENCE DETAIL

JOB NO.	9035-1008
DATE	2-15-91
DRAWN BY:	J.C.H.
CHECKED BY:	M.J.B.

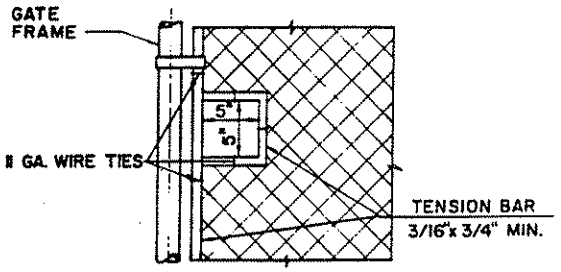


TYPICAL WALK GATE

TYPICAL DRIVE GATE

NOTES:

1. SECURE DRIVE FIT GALVANIZED CAP TO POST WITH 1/4" ROUND HEAD RIVET.
2. H DENOTES FABRIC WIDTH AND NOMINAL FENCE HEIGHT. H SHALL BE 5'-0" UNLESS OTHERWISE SPECIFIED.
3. IF CHAIN LINK FENCE WITH TOP RAIL IS SPECIFIED, DELETE STEEL TENSION WIRE AT THE TOP AND THE PIPE RAILS AT INTERMEDIATE, END AND CORNER POSTS. EXTEND TENSION ROD TO THE TOP RAIL.
4. BARBED WIRE SHALL BE USED ONLY WHEN SPECIFIED.
5. ALL DATA SHOWN ON TYPICAL DETAILS SHALL BE APPLICABLE TO OTHER PERTINENT DETAILS.



DETAIL OF CUT-OUT FOR CHAIN AND LOCK

FIGURE 9 - 4

BAS
(714) 860-7777
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE • DIAMOND BAR, CA 91765

LOPEZ CANYON LANDFILL
SITE SECURITY PLAN
CHAIN LINK FENCE DETAIL

JOB NO.	9035-1008
DATE	2-15-91
DRAWN BY:	J.C.H.
CHECKED BY:	M.J.B.

SECTION 10.0

CLOSURE PLAN IMPLEMENTATION

10.0 CLOSURE PLAN IMPLEMENTATION

10.1 INTRODUCTION

After approval of this Partial Closure Plan, construction plans and specifications will be prepared for Phase I (slopes of Disposal Areas A and B). The bidding packages will then be issued and contractor(s) selected. It should be noted that preparation of the construction plans and specifications for Phase II as discussed in Section 1.0 of the Partial Closure Plan will be prepared after the Plan has been amended and the final version for Phase II has been approved.

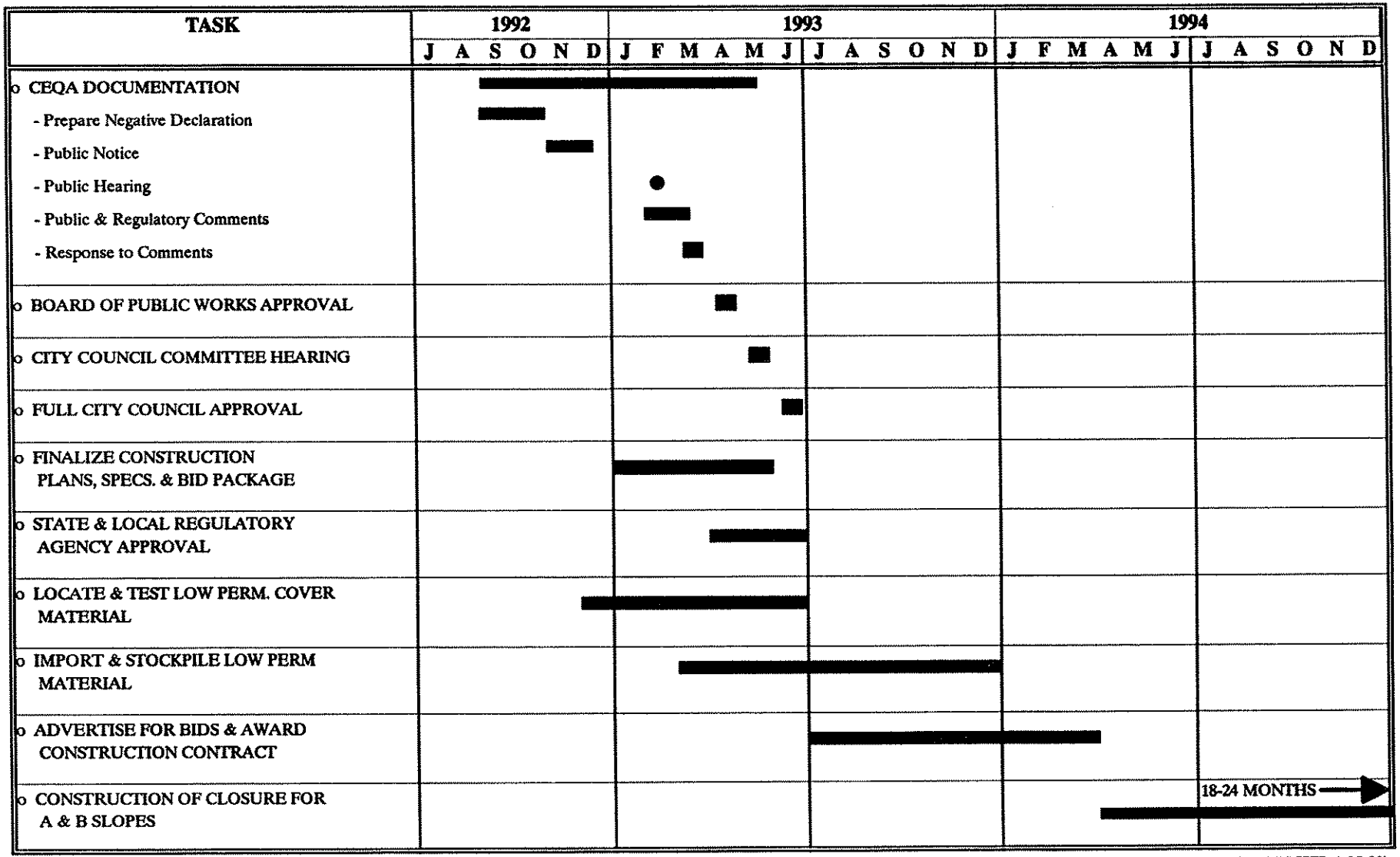
10.2 CLOSURE PROCESS

The closure construction process will be implemented in two phases; Phase I, will include the slopes of Disposal Areas A and B; and Phase II will include the remainder of the landfill. Construction activities will begin after approval of the Closure Plan and upon issuance of a Notice to Proceed by the City. The closure implementation schedules for Phase I and II are presented in Sections 10.2.1 and 10.2.2. The schedules will delineate the estimated timeframe to complete tasks relative to the closure activities associated with the slopes of Disposal Areas A and B (Phase I) and the decks of Disposal Areas A, B and AB+ and Disposal Area C (Phase II).

10.2.1 PHASE I CLOSURE

As shown on Figure 10-1, closure construction activities will begin for Phase I upon approval of the Final Closure Plan or when the closure account has been fully funded in accordance with Title 14, CCR, Article 3.5. Approximately six months prior to implementation of the closure construction activities, a final cover test pad will be constructed and testing will be completed to verify final cover suitability. The test pad laboratory results will be submitted to the California Integrated Waste Management Board prior to closure construction implementation.

FIGURE 10-1
PROPOSED CONSTRUCTION IMPLEMENTATION SCHEDULE
LOPEZ CANYON LANDFILL CLOSURE PLAN
PHASE I CLOSURE
DISPOSAL AREAS A AND B (SLOPES ONLY)



(Lopez Partial Closure Plan:PROPSCHD:1-25-93)

BRYAN A. STIRRAT & ASSOCIATES

The required personnel and type of equipment expected to be utilized during closure construction include:

PERSONNEL	TYPES OF EQUIPMENT
- Construction Manager	- Pettibone (hydraulic lift)
- Field Inspector(s)	- Motor Grader
- Field Engineer(s)	- Track Hoe
- Geotechnical Technician(s)	- Scrapers
- Drilling Crew	- Dozers
- Labor Crews	- Loaders
- Equipment Operators	- Compactors
- Surveyors	- Dump Truck
- Fabricators	- Water Truck
- Mechanics	- Drill Rig

Once enough equipment is onsite, initial abandonment of vertical gas wells, if necessary, can begin prior to rough grading of the slopes. Some clearing and grubbing of the hillside to the west of Disposal Area A slopes must be completed before rough grading of that area can be implemented. During preparation of the slopes for final cover placement, the final cover materials will be stockpiled on the deck of Disposal Areas A and B. Borrow material will continue to be transported and stockpiled onsite during construction of the final cover, as necessary.

Placement of the final cover materials will begin after rough grading of the slopes has been initiated. It is anticipated that construction and testing of the final cover will take approximately one year to complete. As placement of the final cover progresses, gas control system modifications and drainage facilities can be constructed. The construction of the drainage facilities will be completed approximately two months after completion of the final cover construction.

The integration of the landfill gas control system with placement of the final cover will include lateral extensions of the horizontal collectors through the final cover and connection to the main gas collection header. Existing vertical gas extraction wells at the time of closure will also be extended up through the final

cover or abandoned and redrilled as necessary. All waste materials generated through this process, including drill cuttings, will be disposed of either on-site in Disposal Area C or off-site at an approved solid waste disposal facility in accordance with CCR, Title 14, Section 17772.

Gas control system modifications can begin approximately one month after placement of final cover begins, and will be conducted one lift at a time to reduce as much as possible any down-time of the system. Landscaping and irrigation can begin approximately six months prior to completion of the placement of final cover. The estimated time for completion of the Phase I closure construction is 18 months.

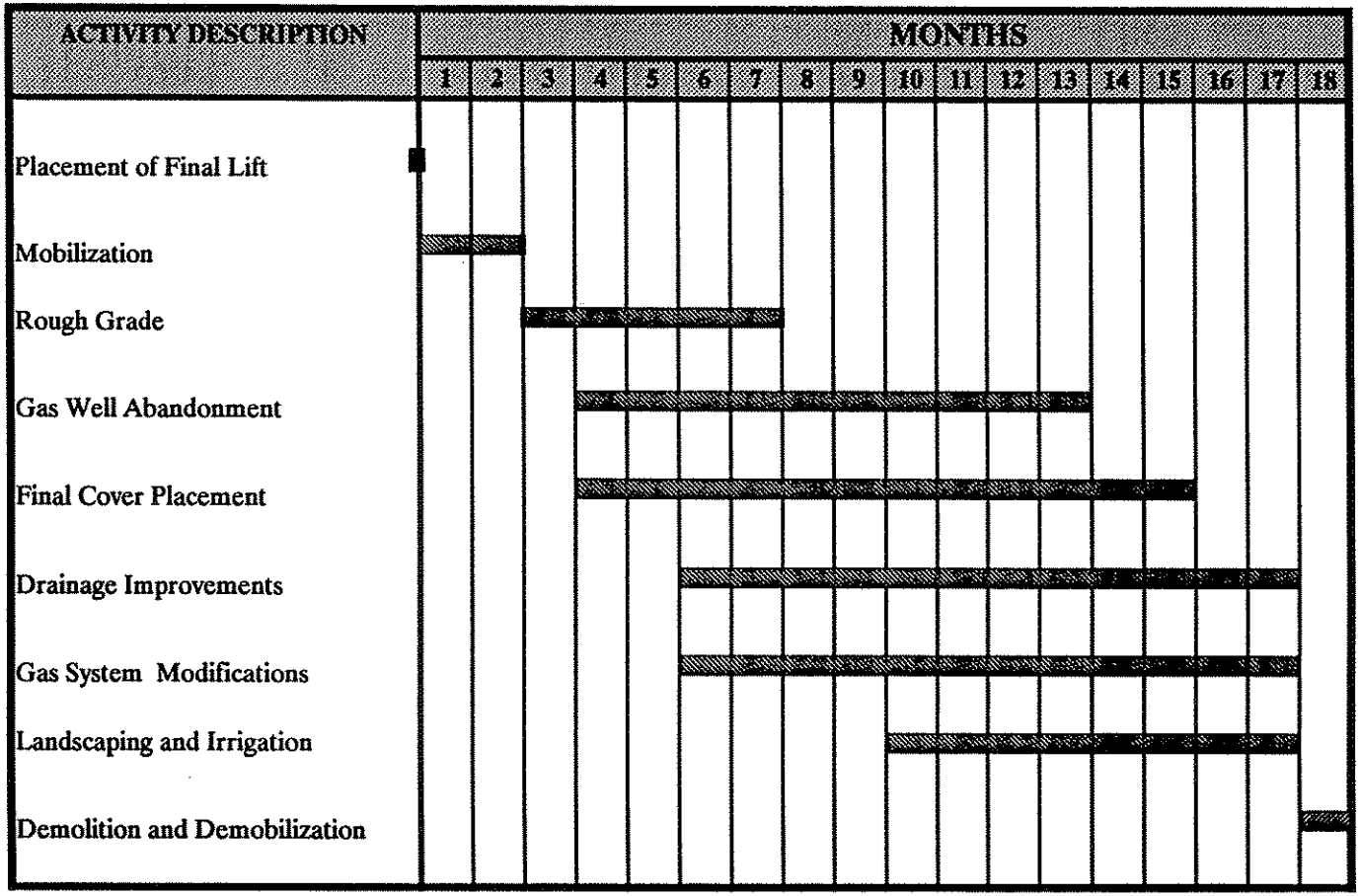
10.2.2 PHASE II CLOSURE

As shown on Figure 10-2, mobilization of equipment and materials will begin after placement of the final lift of refuse. It is anticipated that the final cover borrow source will be the same for both Phases I and II, thereby eliminating the need for a Phase II test pad. Equipment mobilized for Phase I will also be used for Phase II.

Rough grading of the site can begin after the final lift has been placed. Final cover placement will begin with the slopes of Disposal Area C, which will take approximately six months. During preparation of the site for final cover placement, the final cover materials will be stockpiled on the deck in such a manner so as not interfere with final cover placement, or it will be stockpiled in a nearby location. Borrow material will continue to be transported and stockpiled onsite during construction of the final cover, as necessary.

Placement of the final cover materials will begin after rough grading of the site. Well abandonment for the slopes, if necessary, will take place in conjunction with final cover placement. It is anticipated that construction and testing of the final cover will take approximately one year to complete. As placement of the final cover progresses, gas control system modifications and drainage facilities can be constructed. The construction of the drainage facilities will be completed approximately two months after completion of the final cover construction.

FIGURE 10-2
CONSTRUCTION SCHEDULE
LOPEZ CANYON LANDFILL CLOSURE PLAN
PHASE II CLOSURE
DISPOSAL AREAS A , B, AB+ (DECKS ONLY) AND AREA C



(Lopez Canyon Partial Closure:CONSDECK:12-3-92)

BRYAN A. STIRRAT & ASSOCIATES

The integration of the landfill gas control system with placement of the final cover will include lateral extensions of the horizontal collectors through the final cover to the main collection header. Existing vertical gas extraction wells at the time of closure will also be extended up through the final cover or abandoned and redrilled, if necessary. Landscaping and irrigation can begin approximately six months prior to completion of the placement of final cover.

Upon completion of the tasks described for closure, existing site structures will be utilized for post-closure maintenance activities and potential post-closure end uses. The estimated time for completion of all Phase II closure construction is 18 months.

10.3 CONSTRUCTION MANAGEMENT

10.3.1 CONSTRUCTION MANAGEMENT TEAM

A construction management (CM) team will be located on site during the entire closure construction period. The team will be under the direction of a construction manager, who will be responsible for the supervision of construction of the various features included in the Closure Plan. Other key full time staff will include a civil engineer, and a cost and scheduling engineer. Part time staff will include a health and safety engineer, a QA/QC engineer, and construction inspectors. A survey control crew and a geotechnical QA/QC crew will also be present, as required. The team will coordinate the activities of the on-site contractors and Bureau construction personnel will provide liaison among all parties associated with the closure construction.

10.3.2 HEALTH AND SAFETY

Before closure activities commence, a health and safety plan will be prepared by a qualified health and safety specialist. This plan will be written specifically for the Lopez Canyon Landfill and will take into account the special concerns of landfill gas, leachate, and gas condensate. The following is a main topic outline for a typical closure construction health and safety plan.

1. Introduction
2. Review of Existing Data and Toxicology
3. Hazard Assessment
4. Supervisory Responsibilities
5. Medical Monitoring
6. Levels of Protection and Personal Protective Equipment
7. Decontamination Procedures
8. Field Monitoring
9. General Safety Rules
10. Training
11. Industrial Hygiene Monitoring
12. Special Programs
13. Emergency Response Plan
14. Subcontractors, Policy and Training
15. OSHA Rules and Regulations

The construction manager will be responsible for implementation of the health and safety plan in coordination with a health and safety officer.

10.3.3 SURVEY CONTROL

The survey control crew, under the general direction of the construction manager, will be responsible for location of the closure plan facilities and for as-built information. The crew will be on-site full time during the placement of the cover. They will be responsible for day-to-day survey control to assure that the various components of the cover conform to grade and thickness requirements of the approved construction drawings and specifications.

10.3.4 QA/QC FOR COVER PLACEMENT

Construction specifications will include a QA/QC Plan for cover placement. A preliminary copy of this document is included in Appendix B. A geotechnical QA/QC crew, under the direction of the construction manager, will be on-site full time during the placement of the cover to monitor compliance with the designs included in the Closure Plan. The QA/QC crew will have day-to-day responsibility to oversee cover placement to ensure that it is constructed

according to specifications and that the material meets compaction, permeability, and soil moisture specifications.

10.3.5 CONSTRUCTION WATER SUPPLY

The ultimate end use for the closed landfill has not been determined. Until the specific end use, such as golf course, recreational park, or open space is identified, the known needs for water are for moisture control of the low-permeability cover material during closure construction and for irrigation water required for maintenance of the vegetative cover after closure.

As a result of the uncertainty associated with the specific end use, only one permanent water supply line is proposed. This supply line will connect the irrigation system to the permanent water source. The permanent water source, a 1 M.G. water tank, is located on the ridge between Disposal Area A and Disposal Area C. Water is supplied to the site by the City of Los Angeles Department of Water and Power through a water main located near the intersection of Lopez Canyon Road and Paxton Street. The water is fed to the water tank via a pump station located east of the scalehouse along the main haul road. A 400-gpm booster pump supplies the tank.

After closure, water used for construction purposes will be diverted to the irrigation system (Section 8.5).

10.3.6 PROTECTION OF EXISTING GAS COLLECTION SYSTEM

It is essential that the existing gas collection system remains in operation during the placement of the final cover; therefore, special care will be required during placement of cover materials around each gas well (Section 6.3.2). Header lines will be removed with great care prior to placement of the final cover. If any part of the header system is damaged, new lines will be installed after the cover has been placed. In addition, mandatory traffic lanes with specific crossing zones for equipment passage over headers and laterals will be established for movement of construction equipment. Crossings will be reinforced for equipment loadings as required. Procedures for protection of the wells and conveyances during construction will be specified in detail in the construction documents. Vertical gas

wells that may need to be abandoned prior to final cover placement will be redrilled upon completion of final cover construction.

SECTION 11.0

COST ESTIMATE

11.0 COST ESTIMATE

11.1 INTRODUCTION

A construction cost estimate was prepared for the closure plan features that are described in this report. This estimate was then combined with the estimate for post-closure maintenance monitoring to determine the total estimated cost of closure and post-closure. The cost estimates were prepared utilizing the CIWMB's cost estimate worksheet (revised 10/89) format included in Appendix K. (Vol II)

11.2 COST CATEGORIES

The plan features are grouped into categories for convenience in presenting the estimate. A brief description of the components included in each category is given below.

11.2.1 FINAL COVER

The Lopez Canyon Landfill Disposal Areas A, B, AB+ and C are comprised of 85 acres of decks and 81 acres of slopes. A minimum two-foot thick layer of random soil cover exists over the entire landfill area. This cover was placed during the normal landfill operations at the site. The planned cover for the deck area consists of a compacted low-permeability soil layer approximately 15 inches thick, a geotextile filter fabric, and a two-foot thick random soil vegetative layer (Figure 3-1 in Section 3.0). The planned additional cover for the slope area is a three-foot thick compacted low-permeability and vegetative layer (Figure 3-2 in Section 3.0).

The cost of the cover presented in Section 11.3 is based on the assumption that 542,000 cubic yards of suitable low-permeability material will be stockpiled onsite.

The cost of cover includes construction of a test pad, excavation of material from the designated borrow site and transporting, processing, and placing the materials on-site. The deck area costs also include the in-place cost for the geotextile and the slope area costs include slope preparation, slope trimming and bench grading.

11.2.2 REVEGETATION

This category covers the cost of soil preparation and planting of the vegetative cover; temporary and permanent irrigation systems on the deck and slope areas; the booster pump; and the construction of a water supply connection to supply the irrigation system.

11.2.3 LANDFILL GAS MONITORING AND CONTROL

This category includes costs for protection of 42 deep vertical gas wells decommissioning and redrilling of 211 vertical gas wells, and relocation of the header system and five (5) condensate sumps in the slope areas. It was assumed that the shallow wells will be decommissioned due to difficulties in protecting these wells during final cover placement. Costs for protecting the deep vertical wells have been included.

11.2.4 DRAINAGE INSTALLATION

Costs for the drainage system include on-site drainage facilities, and the perimeter drain improvements for the landfill (see Figure 5-2).

11.2.5 SECURITY INSTALLATION

This category includes installation of the signs and perimeter fence as discussed in Section 9.0.

11.2.6 CONTINGENCY

A 20 percent contingency factor has been added to the construction cost estimate in Section 11.3.

11.2.7 POST-CLOSURE MONITORING AND MAINTENANCE

This category includes all costs for post-closure monitoring and maintenance requirements at the Lopez Canyon Landfill as described in the Final Post-Closure Plan.

11.3 COST ESTIMATE

The following presents a summary of costs for the closure and post-closure maintenance features previously described by category. The back-up for the costs is included in the initial cost estimate worksheet included in Appendix K. The cost estimates are as follows:

Closure

Final Cover	$	3,301,918
Revegetation	$	2,382,350
Drainage Installation	$	2,394,898
Security Installation	$	33,000
Other (Monolithic Cover, Gas System Modifications, Geotextile Fabric, Groundwater Well & Lysimeter Modifications, Construction Management)	$	10,095,800
I. Subtotal	$	18,207,965
II. Contingency Costs	$	3,641,593
III. Total Closure Costs	$	21,849,558

Monitoring and Post-closure Maintenance

Leachate Management	$	63,223
Monitoring	$	32,200
Drainage	$	37,000
Security	$	7,000
Inspection	$	300,000
Other	$	662,150
IV. Annual Cost	$	1,101,573
V. Annual Cost x 30 years	$	33,047,190
VI. Revegetation	$	1,531,495
Total Costs (Item III + Item V + Item VI)	$	56,428,244

11.4 CLOSURE COST DISBURSEMENT SCHEDULES

11.4.1 INTRODUCTION

The California Code of Regulations, Title 14, Section 18262.3 (a) (7) requires an operator to prepare a detailed schedule for the disbursement of funds for closure construction costs.

The disbursement schedules prepared for the Lopez Canyon Landfill Closure Plan shall be administered to facilitate advance payment of construction activities to be performed by a contractor in accordance with the plan (Section 18262.3 (a) (7) (A)).

11.4.2 PHASE I AND II CLOSURE COST ESTIMATES

For purposes of preparing the disbursement schedules, an estimated total construction cost of approximately $9,200,000 was used for Phase I Closure and an estimated total construction cost of approximately $12,700,000 for Phase II Closure. The Total Closure Construction Costs for both Phase I and II are $21,900,000 which corresponds with the Total Closure Construction Cost for the entire landfill as presented in Section 11.3.

Phase I Closure includes the slopes of Disposal Areas A and B (59 acres). Phase II Closure includes the deck areas of Disposal Areas A, B and AB+ and all of Disposal Area C (107 acres).

11.4.3 DISBURSEMENT OF FUNDS

Capital disbursements from the closure fund will be distributed on a monthly basis throughout the closure construction period. The estimated time of completion for all construction activities of each phase is approximately 24 months for Phase I and 18 months for Phase II. The estimated individual construction activity costs for each phase were divided over the corresponding construction duration periods as shown on Figures 10-1 (Phase I) and 10-2 (Phase II) in Section 10.

The Construction Management/QA and Contingency costs estimated for each phase were divided over the entire construction period. The monthly disbursement amounts shown on the schedules are projections and may vary depending upon the duration and actual cost of a specific construction activities. Detailed disbursements schedules for both Phase I and II Closures are shown on Tables 11-1 and 11-2, respectively.

LOPEZ CANYON LANDFILL
TABLE 11-1
PHASE I CLOSURE CONSTRUCTION
DISBURSEMENT SCHEDULE
($)

Construction Period		Test Pad Construction	Final Cover	Final Drainage System	Gas Control System Modifications	Groundwater Monitoring System Modifications	Landscape and Irrigation	Construction Management and Contingency	Total Monthly Monthly Disbursements
Month	1	75,000						8,000	83,000
	2								0
	3								0
	4								0
	5								0
	6								0
	7							110,000	110,000
	8					6,560		110,000	116,560
	9		350,000		44,000			110,000	504,000
	10		350,000		44,000			110,000	504,000
	11		350,000		44,000			110,000	504,000
	12		350,000	118,000	44,000			110,000	622,000
	13		350,000	118,000	44,000			110,000	622,000
	14		350,000	118,000	44,000			110,000	622,000
	15		350,000	118,000	44,000		113,000	110,000	735,000
	16		350,000	118,000	44,000		113,000	110,000	735,000
	17		350,000	118,000	44,000		113,000	110,000	735,000
	18		350,000	118,000	44,000		113,000	110,000	735,000
	19		350,000	118,000	44,000		113,000	110,000	735,000
	20		350,086	118,000	44,000		113,000	110,000	735,086
	21			118,000	38,453	18,700	113,000	110,000	398,153
	22			120,980			113,000	110,000	343,980
	23						117,490	110,000	227,490
	24							100,547	100,547
Phase I Total Construction Costs		75,000	4,200,086	1,300,980	566,453	25,260	1,021,490	1,978,547	**9,167,816**

(Lopez Misc:Final Closure Plan:TAB11-1:9-13-91)

(Revised 3-27-92)

* The 20% Contingency and Construction Management/QA costs are evenly distributed over the entire construction period).

Note: See Table 11-2 for Total Construction Costs for both Phase I and II.

LOPEZ CANYON LANDFILL
TABLE 11-2
PHASE II CLOSURE CONSTRUCTION
DISBURSEMENT SCHEDULE

($)

Construction Period		Final Cover	Final Drainage System	Gas Control System Modifications	Landscape and Irrigation	Site Security	Construction Mgmt. and Contingency *	Final Closure Prep.	Total Monthly Disbursements
Month	1						184,000	50,000	234,000
	2						184,000		184,000
	3						184,000		184,000
	4	534,000		29,000			184,000		747,000
	5	534,000		29,000			184,000		747,000
	6	534,000	91,000	29,000			184,000		838,000
	7	534,000	91,000	29,000			184,000		838,000
	8	534,000	91,000	29,000			184,000		838,000
	9	534,000	91,000	29,000			184,000		838,000
	10	534,000	91,000	29,000	170,000		184,000		1,008,000
	11	534,000	91,000	29,000	170,000		184,000		1,008,000
	12	534,000	91,000	29,000	170,000		184,000		1,008,000
	13	534,000	91,000	29,000	170,000		184,000		1,008,000
	14	534,000	91,000	29,000	170,000		184,000		1,008,000
	15	538,912	91,000	29,000	170,000		184,000		1,012,912
	16		91,000	29,000	170,000		184,000		474,000
	17		92,918	35,737	170,860	16,000	184,000		499,515
	18					17,000	190,315		207,315
Phase II Total Construction Costs		6,412,912	1,093,918	412,737	1,360,860	33,000	3,318,315	50,000	**12,681,742**
Phase I Total Construction Costs (From Table 11-1)									**9,167,816**
Phase I and II Total Construction Costs									**21,849,558**

(Lopez Misc:TAB11-2:9-13-91)

Revised 3-27-92

* The 20% Contingency and Construction Management/QA costs are evenly distributed over the entire construction period.

Note: The Total Construction Costs for both Phase I and Phase II Closures ($15,298,000) correspond to the total cost presented in Section 11.3.

SECTION 12.0

CERTIFICATION OF CLOSURE

12.0 CERTIFICATION OF CLOSURE

12.1 INTRODUCTION

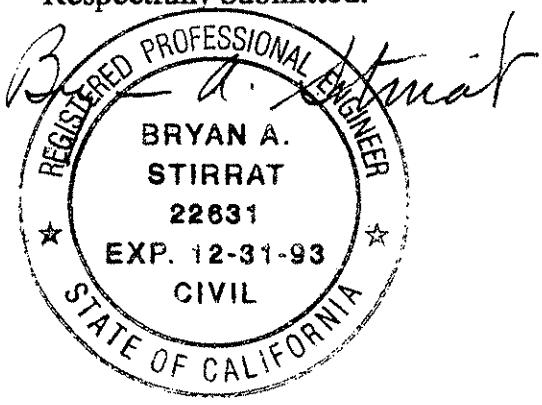
Current regulations under CCR Title 23, Chapter 15 and CCR Title 14, Chapter 5 require that a registered civil engineer or a certified engineering geologist prepare the closure plans for all Class III landfills.

In conformance with these regulations, the Lopez Canyon Landfill Partial Closure and Post-Closure Maintenance Plans have been prepared under the direct supervision of Bryan A. Stirrat, a California Registered Civil Engineer, Registration Number C 22631.

12.2 ENGINEERING CERTIFICATION

As evidenced by the signature and seal below, the Lopez Canyon Landfill Partial Closure and Post-Closure Maintenance Plans have been prepared in conformance with Title 14, CCR, Chapter 5 and Title 23, CCR, Chapter 15 as certified by Mr. Bryan A. Stirrat, a California Registered Civil Engineer, Registration Number C 22631.

Respectfully Submitted:



Bryan A. Stirrat, P.E.
R.C.E. No. C 22631

12.3 POST-CLOSURE CERTIFICATION

After the Closure Plan has been approved and construction has been completed, the following procedures will be followed to comply with the regulations pertaining to certification:

(a) The operator shall submit to the California Integrated Waste Management Board (CIWMD), the Los Angeles Regional Water Quality Control Board (RWQCB) and the Los Angeles County Solid Waste Management Program, the Local Enforcement Agency (LEA), certification that the solid waste landfill has been closed in accordance with the approved specifications in the closure plan.

(b) The certification by a registered civil engineer or a certified engineering geologist shall be submitted by the operator and shall include a detailed, as-built description of all environmental containment, monitoring, control, collection and recovery systems remaining at the solid waste landfill during the post-closure maintenance period. This detailed, as-built description shall be incorporated into the approved post-closure maintenance plan.

(c) Any changes to the operational requirements, based upon the detailed, as-built description above, shall be included in the certification and shall be incorporated into the approved post-closure maintenance plan.

(d) The registered civil engineer or certified engineering geologist shall conduct and prepare records of inspection, quality control and quality assurance demonstrations, and other documentation necessary to support the certification and the detailed, as-built description to be maintained by the operator. These records shall closely adhere to the construction quality assurance procedures pertaining to final cover placement. Any documentation supporting the registered civil engineer or certified engineering geologist's closure certification must be retained and furnished to the CIWMB or the LEA upon request.

As discussed throughout this document, the Lopez Canyon Landfill will be closed in two phases. This Plan includes all of the elements required under Title 14 for a final closure for the Phase I portion of the landfill. Once the Phase I Closure activities are complete, the operator will certify the Phase I Closure in accordance with regulations. Phase II will be certified upon completion of closure construction activities in accordance with an approved Plan. It should be noted that the Plan (Phase II portion) will be amended in accordance with Title 14 to include all final closure plan requirements.

SECTION 13.0

DEMONSTRATION OF FINANCIAL RESPONSIBILITY

13.0 DEMONSTRATION OF FINANCIAL RESPONSIBILITY

In accordance with the California Code of Regulations, Chapter 5, Article 3.5, the Bureau of Sanitation (BOS) must demonstrate financial responsibility for closure and post-closure costs. Due to recent closure strategy changes, the BOS is working with the CIWMB to demonstrate financial responsibility for all closure and post-closure costs associated with the Lopez Canyon Landfill concurrent with the submittal of this document.

As of the writing of this Plan, the BOS has obtained approval of their financial mechanism. The mechanism was approved by the Los Angeles City Council and Mayor and the trust agreement initiated. An initial deposit will be made in February, 1993 in accordance with a schedule of payments presented to the CIWMB Financial Assurance Branch. The City of Los Angeles has not funded the landfill to the level required under CCR, Title 14, Section 18282. However, as mentioned above, the BOS has developed a strategy to fully fund the landfill by July, 1993 and bring the site into compliance. Under the mutual strategy developed with the CIWMB a deposit will be made into the Closure Account in July 1993. This deposit will fully fund the landfill in accorance with the formula presented in 14 CCR, Section 18282.

Additionally, the City has established a pledge of revenue agreement to assure that adequate funds are available to conduct post-closure monitoring and maintenance at the landfill throughout the post-closure period. This means financial assurance for the post-closure maintenance at the Lopez Canyon Landfill has been approved by the CIWMB.

SECTION 14.0

FINAL CLOSURE ENVIRONMENTAL DOCUMENTATION

14.0 FINAL CLOSURE ENVIRONMENTAL DOCUMENTATION

In accordance with 14 CCR 18270, the BOS implemented a CEQA review for the Phase I final closure. As discussed in Sections 1.4 and 1.8, the Conditional Use Permit for the site requires the BOS to implement closure of the Phase I final closure area (slopes of Disposal Areas A and B) upon approval of a closure plan.

An Initial Study Check List and Negative Declaration with Mitigation Measures was prepared and submitted to the City of Los Angeles Planning Department (the lead agency) for processing and approval. The environmental documentation addresses the Phase I final closure activities. This documentation is available upon request from the BOS. Figure 10-1 in Section 10.0 provides a tentative schedule for processing and certification of the Negative Declaration.

The BOS initially anticipated completion of the CEQA process by May, 1993. However, due to specific local community concerns regarding the project, the BOS is currently investigating design alternatives for the project which will prolong the process.