Appendix E:

Final Remedial Action Plan (upper operable unit), Final Remedial Action Plan (lower operable unit), DTSC Letter, Proposed Elevated Residential Site Use Acceptability, Preliminary Remedial Design Refinements

Appendix E-1:

Final Remedial Action Plan (upper operable unit)

Final Remedial Action Plan
Cal Compact Landfill
(Upper Operable Unit)
Carson, California

SUBMITTED BY

BKK Corporation
2210 South Azusa Avenue
West Covina, California 91792

PREPARED BY

Brown & Root Environmental
A Division of Brown & Root, Inc.

4100 Clinton Drive (77020-6299)
Post Office Box 3
Houston, TX 77001-0003

October 1995

STATEMENT OF REASONS FOR
CAL COMPACT LANDFILL
UPPER OPERABLE UNIT
REMEDIAL ACTION PLAN

Pursuant to California Health and Safety Code (HSC), section 25356.1(d), the California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) has prepared this Statement of Reasons as part of the attached Remedial Action Plan (RAP) for the Cal Compact Landfill (Site), Upper Operable Unit (OU), at 20400 South Main Street, in the City of Carson, County of Las Angeled, State of California.

The RAP presents a summary of the Remedial Investigation (RI) to address volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and pesticides that have been detected in the Sites soil, waste zones, and groundwater in the Bellflower Aquitard at and near the Cal Compact Landfill. The RAP summarizes the results of a Baseline Risk Assessment performed to determine the potential risk to public health and the environment associated with the VOCs, SVOCs, metals, and pesticides found. The RAP also provides a discussion of the feasable remedial alternatiives that were evaluated in the Feasibility Study (FS). The RAP recommends a remedial alternative that will meet the objectives of protecting public health and the environment. The RAP proposes the construction of a landfill cap, landfill gas collection and treatment system and groundwater treatment system.

The DTSC believes that the attached RAP complies with the law as specified in California Health and Safety Code, section 25356.1. Section 25356.1(e) requires that RAPs "shall include a statement of reasons setting forth the basis for the removal and remedial actions selected." The statement of reasons "shall also include an evaluation of the consistency of the removal and remedial actions proposed by the plan with the federal regulations and factors specified in subdivision (d)..." Subdivision (d) specifies six factors against which the remedial alternatives in the RAP must be evaluated. The proposed remedial action is consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (the National Contingency Plan, "NCP"), the federal Superfund regulations. The attached RAP has addressed all these factors in detail. A brief summary of each factor follows. The statement of reasons also includes the preliminary Nonbinding Allocation of Responsibility (NBAR) as required by HSC section 25356.1(e).

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
st Broadway, Suite 425
each, CA 90802-4444

October 25, 1995

Mr. Paul W. Neff, Director
Regulatory & Environmental Compliance
BKK Corporation
2210 South Azusa Avenue
West Covina, California 91792

Dear Mr. Neff:

REMEDIAL ACTION PLAN (RAP) APPROVAL: CAL COMPACT LANDFILL, UPPER OPERABLE UNIT, CARSON, CALIFORNIA

The Department of Toxic Substances Control (Department) has completed its review of the subject RAP and has determined that this plan meets the statutory requirements under Section 25356.1, California Health and Safety Code. The Department hereby approves the Cal Compact Landfill, Upper Operable Unit RAP. Enclosed please find the RAP approval form for the subject Site.

If you should have any questions, please do not hesitate to contact Mr. Thomas Cota at (310)590-4898.

Sincerely,

Hamid Saebfar, Chief
Site Mitigation Cleanup Operations
Southern California Branch

Enclosure

cc: Ms. Barbara Coler, Chief
Statewide Cleanup Operations Division
Department of Toxic Substances Control
Region 2
700 Heinz Avenue, Suite 200
Berkeley, California 94710

Mr. Peter Sardagna
Project Manager
L.A. MetroMall, LLC
20400 South Main Street
Carson, California 90745

Mr. Stephen G. Smith
Project Executive
Brown & Root Building Company
P.O. Box 11103
Carson, California 90745

Mr. John H.C. Kuo, P.E.
Geotechnical Engineering Consultant
Brown & Root Environmental
Post Office Box 3
Houston, Texas 77001-0003

City of Carson
City Council Members
701 East Carson Street
P.O. Box 6234
Carson, California 90749

Ms. Christine M. Ketz
Environmental Planner
City of Carson
701 East Carson Street
P.O. Box 6234
Carson, California 90749

Mr. James E. Ross, Senior Engineer
California Regional Water
Quality Control Board
101 Centre Plaza Drive
Monterey Park, California 91754

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444
(310) 590-4945

November 1, 1995

Dear Interested Party:

APPROVAL OF THE REMEDIAL ACTION PLAN FOR THE UPPER OPERABLE UNIT OF THE FORMER CAL COMPACT LANDFILL SITE

The California Department of Toxic Substances Control (DTSC) has approved the final Remedial Action Plan (RAP) to remediate the Upper Operable Unit at the Cal Compact Landfill site at 20400 South Main Street, Carson, California. DTSC public noticed the Draft RAP and Supplemental Negative Declaration for the Upper Operable Unit (OU) for a thirty day comment period from August 25, to September 25, 1995.

The approved RAP includes details of the plan for remediating soil and groundwater of the Upper OU by (1) construction of a landfill cap, (2) construction of a landfill gas collection and treatment system, and (3) treatment of groundwater in the Upper OU. Construction of a landfill cap is intended to prevent both the release of landfill gas into the atmosphere and the movement of surface water into the waste zone and then into the underlying groundwater. The purpose of the groundwater treatment system is to remediate the contaminated groundwater in the Upper OU.

The remedial action planned for the site's Upper OU will mitigate the potential risk associated with existing site contaminants. In addition DTSC has determined that the construction of the landfill cap will have significant impacts on the environment which were fully disclosed in the City of Carson's Environmental Impact Report for the Metro 2000 project. DTSC has adopted a Statement of Overriding Consideration for the construction of the landfill cap: DTSC finds that the long-term benefits provided by the construction of the landfill cap will outweigh the short-term, adverse impacts caused by construction activities. Adverse impacts include emissions generated by trucks; other adverse impacts are dust and noise generated by cap construction activities. Benefits include containment of waste in place, control of contaminated surface water running off site, control of hazardous landfill gas emissions into the environment, and long-term control of dust and particulates containing hazardous substances. An additional investigation of former oil and water wells will be conducted during the implementation of the RAP. DTSC will report findings of this additional investigation and any appropriate remedy to those on the site mailing list.

Additional information about the investigation and cleanup of this site can be found in the local information repository at the Carson Public Library, 151 East Carson Street, Carson (310-830-0901) or by contacting Mr. Thomas Cota at 310-590-4898. If you wish to be added to the site mailing list, contact Mr. Ed Schumacher, Public Participation Specialist, at DTSC in Long Beach (310-590-5539).

Sincerely,

Hamid Saebfar, Chief
Site Mitigation Cleanup Operations
Southern California Branch

CAL COMPACT LANDFILL
UPPER OPERABLE UNIT
REMEDIAL ACTION PLAN
APPROVAL PROCESS

This is to certify that the attached Remedial Action Plan has been circulated for public comments and subsequently amended as deemed appropriate. The proposed remedial action has been determined to be reasonable and feasible.

The undersigned have further determined that the proposed remedial action:

( ) Will not have an adverse impact on the environment; or

( ) Will or may have an adverse impact but that specific measures will be taken to eliminate or reduce the adverse impact; or

(X) It is not feasible to eliminate or reduce the adverse impact but the overall adverse impact of not proceeding with site cleanup outweighs the adverse impact of the proposed cleanup.

The undersigned hereby approve and adopt the attached Remedial Action Plan.

Thomas M. Cota
Project Manager

10/25/95
Date

Hamid Saebfar, Chief
Site Mitigation Cleanup Operations
Southern California Branch

10/25/95
Date

portion of the project pursuant to the provisions of California Environmental Quality Act (CEQA) .

3. Mitigation measures were made a condition of the approval of the landfill cap portion of the project by the City of Carson.

4. A statement of Overriding Considerations was adopted for this project by the City of Carson in approving the Metro 2000 EIR.

5. Findings were made by DTSC pursuant to the provisions of CEQA which concur with those made by the City of Carson for the Finial Metro 2000 EIR.

Action As A Lead Agency: Pursuant to CEQA, DTSC prepared a Supplemental Negative Declaration (SCH# 95061061) for approval of the portion of the RAP which addresses construction of the landfill gas extraction and treatment system and the groundwater treatment system.

1. Construction and operation of the landfill gas collection and treatment system, and the groundwater treatment system will not have a significant effect on the environment.

2. A supplemental Negative Declaration was prepared for the landfill gas collection and treatment system, and the groundwater treatment system portion of the project pursuant to the provisions of CEQA.

3. Mitigations measures were not made a condition of the approval for the construction and operation of the landfill gas collection and treatment system, and the groundwater treatment system.

4. Findings were made pursuant to the provisions of CEQA.

This is to certify that the final EIR and the final Supplemental Negative Declaration, with comments and responses and record of project approval, are available to the general public at: Carson Public Library, 151 East Carson Street, Carson, California 92335 (310) 830-0901; and the Department of Toxic Substances Control 245 West Broadway, Suite 350, Long Beach, California 90802-4444 (310) 590-4868.

Signature (Public Agency)	10/25/95 Date	Branch Chief Title

Date received for filing at OPR:

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444

NOTICE OF DETERMINATION

FILED AND POSTED BY
OCT

To: Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

Los Angeles County Clerk
P.O. Box 592
Los Angeles, California 90053

From: Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, California 90802-4444

Subject: FILLING OF NOTICE OF DETERMINATION IN COMPLIANCE WITH SECTION 21108 or 21152 OF THE PUBLIC RESOURCE CODE.

Project Title: Remedial Action Plan, Cal Compact Landfill

State Clearinghouse Number: 93011037 and 95081061

Lead Agency Contact Person and Telephone Number:

Thomas M. Cota, (310) 590-4898

Project Location: 20400 Main Street, City of Carson, County of Los Angeles, State of California

Project Description: Approval of the Remedial Action Plan (RAP) for the Cal Compact Landfill Site. The RAP includes construction of a landfill cap, construction and operation of a landfill gas collection and treatment system, and construction of a groundwater treatment system.

This is to advise that the Department of Toxic Substances Control (DTSC) has approved the above described project on 10/25/95 and has made the following determinations regarding the above described project.

Action As A Responsible Agency: The Final Environmental Impact Report (EIR) prepared and certified by the City of Carson entitled Project and Program Environmental Report, Metro 2000 December 1993 (SCH# 93011037) is adequate for assessing the impacts of the landfill cap portion of the RAP.

1. The landfill cap portion of the project will have a significant effect on the environment.

2. An Environmental Impact Report was prepared for the landfill cap

Cal Compact Landfill-
Upper Operable Unit

REMEDIAL ACTION PLAN
ADMINISTRATIVE RECORD LIST

This Remedial Action Plan (RAP) Administrative Record List for the Cal Compact Landfill, Upper Operable Unit identifies all documents, (e.g., reports, data, policy and guidance documents, statutes and regulations, correspondence, California Environmental Quality Act documents, technical journals, etc.) that were relied on or considered when selecting the remedial action alternative implemented by the RAP. The document also shows that the public was notified of site activity and had opportunity to participate in the response selection process.

DATE	TITLE OF DOCUMENTS
6/15/87	Report on Potentially Responsible Parties, Cal Compact Site, Graham & James
3/18/88	Remedial Action Order, Cal Compact Landfill, Docket No. HSA 87/88-040
January 1990	Final Workplan, Cal Compact Landfill, Bryan A Stirrat & Associates
4/4/91	Monthly Groundwater Investigation, Cal Compact Landfill Site, December 1990, McLaren/Hart
~~9~~/23/91	Quarterly Groundwater Investigation, Cal Compact Landfill Site, August 1991, McLaren/Hart
1/10/92	Integrated Remedial Investigation of Cal Compact Landfill, Volume 1 through 11
3/17/92	Groundwater Monitoring for First Quarter 1992 (January-March), Cal Compact Landfill, McLaren/Hart
6/9/92	Groundwater Monitoring for Second Quarter 1992 (April-June), Cal Compact Landfill, McLaren/Hart
December 1993	Final Project and Program Environmental Impact Report Metro 2000, State Clearinghouse No. 93011037

12/ 21/ 1993	City of Carson, City Council, Resolution No. 93-128
1/18/94	DTSC Letter to Interested Parties on the Cal Compact Mailing List
7/6/94	Letter from Mr. Gary Colboth
8/9/94	DTSC Letter to mr. Gary Colboth
2/4/95	Memorandum from Chris Guerre, DTSC, Geological Support Unit
5/25/95	Remedial Action Order and Consent Order, Docket No. HSA 94/95-035, Bkk Corporation
June 1995	Revised Public Participation Plan, Cal Compact Landfill, BKK Corporation
June 1995	Cal Compact Mailing List
June 1995	Cal Compact Landfill Site Investigation Update Fact Sheet #2
6/15/1995	Remedial Investigation Update Public Meeting Agenda
July 1995	Remedial Investigation, Cal Compact Landfill, Volumes 1 through 8, Brown & Root Environmental
August 1995	Final Report Baseline Risk Assessment, Cal Compact Landfill, Volume 1 & 2, Brown & Root Environmental
8/4/95	Memorandum from Dr. A. Kimiko Klein, DTSC Staff Toxicologist
August 1995	Feasibility Study , Cal Compact Landfill, Brown & Root Environmental
August 1995	Draft Remedial Action Plan, Cal Compact Landfill, Brown & Root Environmental
8/14/95	DTSC Letter to Mr. Paul Neff, BKK Corporation, Accepting the Baseline Risk Assessment for the Cal Compact Landfill
8/21/95	DTSC Letter to Mr. Paul Neff, BKK Corporation, Approving Remedial Investigation and Feasibility Study.

8/23/95	Cal Compact Mailing List (Mandatory & General)
8/23/95	Draft Remedial Action Plan Record
8/23/85	DTSC Letter to Los Angeles County Clerk
8/24/95	DTSC Letter to the Supplemental Negative Declaration Mailing List
August 1995	Supplemental Negative Declaration Mailing List
August 1995	Cal Compact Landfill Fact Sheet #3
8/25/95	Cal Compact Public Notice in the Los Angeles Times
8/25/95	Cal Compact Public Notice in the Daily Breeze
August 1995	Initial Study, Cal Compact Landfill, Upper Operable Unit
August 1995	Initial Study Checklist, Cal Compact Landfill, Upper Operable Unit
August 1995	Proposed Supplemental Negative Declaration, Cal Compact Landfill
8/23/95	Notice of Preparation of an Environmental Document
8/23/95	Notice of Preparation of an Environmental Document, Los Angeles County Clerk, Stamped #95000329
8/23/85	DTSC Memorandum to the Office of Planning and Research
8/24/95	Supplemental Negative Declaration Mailing List, Cal Compact Landfill
8/28/95	DTSC Letters to the Potentially Responsible Parties
9/6/95	Transcript of Proceedings, Cal Compact Landfill, Draft Remedial Action Plan and Proposed Supplemental Negative Declaration
9/6/95	Letter from State of California Regional Water Quality Control Board, Los Angeles Region

9/6/95	Letter from Mr. Gary Colboth, Chair, South Dunbrooke Neighborhood Association
9/20/95	Letter from Mr. Gary Colboth, Chair, South Dunbrooke Neighborhood Association
9/21/95	Letter from County of Los Angeles - Department of Public Works
9/22/95	Letter from Mr. Martin J. McHale
9/22/95	Letter from South Coast Air Quality Management District
9/22/95	Letter from Heller, Ehrman, White & McAuliffe
9/25/95	Letter from Kelley Drey & Warren
9/25/95	Letter from Water Replenishment District of Southern California
9/25/95	Letter from County of Los Angeles - Department of Health Services Environmental Health Solid Waste Management Program
9/25/95	Fax from Mr. Paul Nihipali
9/26/95	Letter from State of California Integrated Waste Management Board
9/29/95	Letter from State of California Department of Transportation
10/11/95	Letter from Heller, Ehrman, White & McAuliffe
October 1995	Final Remedial Action Plan, Cal Compact Landfill, Upper Operable Unit, Brown & Root Environmental
10/25/95	Cal Compact Landfill Upper Operable Unit Remedial Action Plan Approval Process
10/25/95	DTSC letter to BKK Corporation Approving the Final Remedial Action Plan
October 1995	Los Angeles County Clerk Stamped Notice of Preparation of an Environmental Document
10/25/95	Supplemental Negative Declaration Approval

10/25/95	Supplemental Negative Declaration
10/25/95	Notice of Determination
10/25/95	Notice of Determination Checklist
10/25/95	DTSC Findings Pursuant to CEQA
10/25/95	DTSC Findings Checklist
10/25/95	Initial Study Cal Compact Landfill Upper Operable Unit
10/25/95	Initial Study Cal Compact Landfill Upper Operable Unit Checklist
11/1/95	DTSC Letter to Cal Compact Mailing List

STATUTES AND REGULATIONS, POLICY AND GUIDANCE DOCUMENTS

U.S. Environmental Protection Agency Guidance for Conducting Remedial Investigations and Feasibility Study, Interim Final, October 1988

Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part A), December 1989

Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part B and C), Development of Risk-based Preliminary Remediation Goals) December 1991

A Compilation of Water Quality Goals, September 1991, Staff Report of the California Regional Water Quality Control Board Central Valley Region

Remedial Action Plan Development and Approval Process, Department of Toxic Substances Control, Document # OPP 87-2, October 5, 1987

California Health and Safety Code

California Code of Regulations

National Oil and Hazardous Substances Pollution Contingency Plan ("National Contingency Plan," 40 Code of Federal Regulations, Section 300.400 et seq.),), Subpart E

California Environmental Quality Act Statutes and Guidelines 1992, with amendments dated July 4 1994.

This Final Remedial Action Plan for Upper Operable Unit (Bellflower Aquitard Unit) of the Cal Compact Landfill site was prepared under direct supervision and reviewed by:

David W. Prasifka

David W. Prasifka, P.E.
Brown & Root, Inc.
Registered Professional (Civil) Engineer
No. 30787 (State of California)

REGISTERED PROFESSIONAL ENGINEER
No. 30787
Exp. 3/31/95
CIVIL
STATE OF CALIFORNIA

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9.1 Implementation Schedule: Cal Compact Landfill - Remedial and Site Redevelopment

1.0 INTRODUCTION

1.1 Objectives

The Cal Compact Landfill in Carson, California is listed under the State of California, Department of Health Services, Toxic Substances Control Program (now Department of Toxic Substances Control [DTSC]) as a hazardous site. In March 18, 1988, the site was issued Remedial Action Order No. HSA87/88-040 requiring implementation of remedial activities.

As agreed under the Remedial Action Order and Consent Order, Docket No. HSA 94/95-035 between BKK Corporation (BKK) and the State of California on behalf of the Department of Toxic Substances Control (DTSC), the remedial strategy for the Cal Compact site is to provide remediation of the Upper Operable Unit. The Upper Operable Unit is defined as the site soils, the waste zone above and within the Bellflower Aquitard, and the Bellflower Aquitard down to, but not including the Gage Aquifer. Accordingly, this final Remedial Action Plan (RAP) covers only the UOU of the site.

The final RAP is based on site-specific data gathered from the Remedial Investigations (Phase I & II, McLaren/Hart Environmental Engineering Corp., 1991/1992 and Supplementary CPTs, B&R Environmental, 1995) as they pertain to the UOU. The purpose of the final RAP is to summarize the findings of the RI/FS and to identify the preferred alternative for a remedial action to be taken for the remediation of hazardous substances; describe the other remedial alternatives considered; and solicit public review and comments on the alternatives described.

This final RAP summarizes information contained in the Remedial Investigation (RI), Baseline Risk Assessment (BRA) and Feasibility Study (FS) Report (B&R Environmental, 1995). This final RAP describes the remedial alternative chosen for the UOU, how Remedial Action Objectives (RAOs) are to be met, and the schedule for RAP implementation.

Specific details on the remedial activities that will be carried out at the site will be provided in the Remedial Design (RD). The RD will be prepared and submitted to DTSC prior to initiating any remedial actions. Implementation of the remedial system will commence after final approval of the RD.

1.2 Site Identification

The Cal Compact Landfill is located at 20300 Main Street, Carson, California. It is situated between Main Street and the San Diego Freeway (Interstate 405) just south of Del Amo Boulevard (Figure 1.1). The landfill occupies approximately 157 acres and was in operation from April 1959 until about December 1964. The landfill was originally designated as municipal, Class II landfill and was closed around February 1965 (BCL, 1981). Adjacent land areas have been similarly used for sanitary landfill operations.

The site has an irregular configuration. Access to the property is from Main Street which forms a portion of the western site boundary. The remaining portion of the western boundary, along with the southern boundary of the site is defined by the Torrance Lateral Channel, a Los

Angeles County flood control channel. The eastern side of the property is bounded by the San Diego Freeway (Interstate 405). The northern side of the property is bounded by Del Amo Boulevard.

For the purpose of the remedial approach, the Cal Compact site is separated vertically into two operable units. These two operable units are: (1) UOU - the Bellflower aquitard and above and (2) Lower Operable Unit - the Gage aquifer and below. As agreed in the Consent Decree, the subject of this RAP is limited to the UOU.

1.3 Scope of RAP

This final RAP describes the remedial action alternatives chosen to mitigate the site. This final RAP was developed in accordance with the DTSC guidance, OPP #87-2, Remedial Action Plan Development and Approval Process (DTSC, 1987).

The final RAP document provides a summary of previous investigations of the UOU, including the RI, BRA, and FS. The primary objective of the FS is to insure the appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options were presented to DTSC and appropriate remedy selected. The final RAP also provides an implementation schedule for remedial action as well as a statement of financial responsibility by related parties.

The primary remedial action objective is to provide protection for human health and the environment. Based on the current site development plan, the ultimate remedial action objectives are to provide mitigation of existing contamination in such a way as to allow for the planned commercial development. There are no plans for any residential development on the property.

Specific RAOs consists of the following:

- Control infiltration of surface water to reduce the generation of leachate
- Prevent direct contact with contaminated soil or buried landfill waste
- Prevent further off-site migration of contaminated groundwater
- Capture, control, and treatment of the on-site contaminated groundwater and the contaminant plume that is now off site
- Control or prevent off-site migration of landfill gas
- Control or prevent potential releases of landfill gas to the atmosphere

To achieve the RAOs as listed, a combination of remedial action alternatives has been selected for implementation at the site. The recommended remedial action include: (1) containment of the impacted soil and buried waste through the use of a low-permeability or bentonite amended clay cap, (2) extraction and treatment of the contaminated groundwater, (3) collection and treatment of the landfill gas, and (4) long-term environmental monitoring of the groundwater and landfill gas. To obtain specific criteria for detailed design of the selected remedial systems, field investigations will be conducted as part of the RD. A detailed description of the recommended remedial action is presented in Section 7 of this report.

2.0 EXECUTIVE SUMMARY

2.1 Regulatory Consistency

The selected remedial alternatives will comply with the requirements of the Hazardous Substances Cleanup Bond Act, the Hazardous Waste Control Act, the Hazardous Substance Account Act, and other applicable State and Federal laws.

The selected remedies will be protective of human health and the environment through capping of the buried waste and monitoring and/or collecting and treating groundwater and landfill gas.

The selected remedies are consistent with the regulatory preference for remedies that permanently eliminate or significantly reduce the potential for: (1) migration of contaminants to groundwater, surface water, and air and (2) contact with potential human and environmental receptors.

The selected remedial alternatives comply with State and Federal applicable or relevant and appropriate requirements (ARARs). The selected remedial alternatives are cost-effective and consistent with site redevelopment plans.

2.2 Site History

Landfill operations began in April 1959 and continued until December 1964, with an approximate date of closing in February 1965 (BCL Associates [BCL], 1981). Aerial photographs from 1947 to 1961 indicate that the site had been in agricultural use before landfilling operations began. Prior to landfill operations, the site was undeveloped and gently rolling terrain. Surface elevations on the site prior to landfill usage ranged from 7 to 21 feet above Mean Sea Level (MSL). Landfill operations modified surface elevations and changed the surface water drainage patterns. The present surface elevation averages between 30 and 35 feet above MSL. Elevations on the site now vary from 11 feet above MSL near the northeast corner to 58 feet above MSL in the north-central portion of the site.

According to Los Angeles County records, Cal Compact, Inc., a California corporation, was issued an industrial waste disposal permit on July 17, 1959, which authorized Cal Compact to operate a Class II landfill on the site. Los Angeles County records showed that Cal Compact, Inc., was operated by Ben Kazarian and his son, Ben Kazarian, Jr.

Information indicates that operations were conducted initially in the northeast and southeast portions of the landfill. Filling operations expanded westward so that by 1964 the southwestern portion of the landfill was receiving refuse (BCL, 1981). The methods used during the landfill operation consisted of excavation, fill, and cover. All wastes were placed in trenches that were excavated adjacent to the haul roads. The haul road locations have remained unchanged throughout the time the landfill was in operation and are underlain by native soil materials.

As a Class II landfill, the Cal Compact facility was permitted to accept both municipal solid waste and specified industrial liquid wastes. Some of the wastes permitted to be accepted were the following:

- Solid organic and municipal refuse
- Drilling fluids
- Carbide or acetylene sludge
- Cleanings from interceptors, clarifiers, screen chambers for the treatment of wastewater from vehicle washing, ceramic manufacturing, laundering, and food processing
- Sludge derived from the softening of water (lime soda process)
- Paint sludge recovered from water circulated in paint spray booths
- Liquid latex wastes consisting of water and suspended synthetic rubber
- Carbon black slurry
- Diatomaceous earth filter agent (residue from filtering steam condensate).

BCL Associates (BCL, 1981) estimated that during the time that the landfill was in operation approximately 6.2 to 6.3 million cubic yards of municipal solid waste were placed in the landfill and that the landfill had a total volume of about 7.8 million cubic yards. BCL also performed a records search of the existing Los Angeles County Engineer Facilities files for the Cal Compact site (File Number I-4610-22) and found records covering the period of April 1959 through December 1964. Records covering December 1964 through estimated site closure in February 1965 were missing..

Records also contained monthly summaries of the liquid wastes that were reported as accepted at the site (BCL, 1981). However, these liquid waste record summaries only covered the period from June 1960 through June 1964, with the January 1961 record missing. Also missing were records from April 1959 to June 1960 and June 1964 to February 1965. On the basis of the available records, BCL identified specific waste streams that had been accepted at the site, and estimated that approximately 4 percent of the material received (50,815,395 gallons or 251,611 cubic yards) may now be considered hazardous by the State of California (BCL, 1981). There are no records documenting the disposal of drummed liquids in the landfill.

A 1982 California Department of Health Services (DHS) summary report on the Cal Compact site (DHS, 1982 in BKK Corp., 1990) states that waste hauler's records in the Los Angeles County Engineer Facilities files list additional amounts of landfill wastes that could currently be considered hazardous by the State. The DHS summary also states that an additional 1,301,030 barrels (54,643,260 gallons) of possibly hazardous wastes and 451,992 barrels (18,983,664 gallons) of miscellaneous liquid industrial wastes were also reported as received during 47 of the

66 months of landfill operation. This report also lists industrial wastes disposed at Cal Compact reported as follows:

- One hundred tons of organic resins and inorganic salts at the site during 1960.

- Two thousand cubic yards of waste containing heavy metals (iron, manganese, magnesium, zinc, copper, chromium III, chromium VI, and lead), organics (polar and non-polar solvents, oils and oil sludges, esters and ethers, and alcohols), and inorganic salts between 1961 and 1967 (Note: The landfill has a reported closing date of February 1965).

The Cal Compact site has been vacant and basically unused since closure of the landfill in 1965. Ground surfaces at the site are currently unpaved (except for the internal roads) and covered with a light growth of native weeds and scrub vegetation. The City of Carson has extended Del Amo Boulevard eastward across the northern portion of the site. Three trailers present on-site are used for field offices. Proposed future use includes commercial and light industrial development.

2.3 Remedial Action Alternatives

Remedial action alternatives combine technologies and process options that remained after screening. The six remedial alternatives were:

- No Action
- Limited Action (Monitoring of Groundwater and Landfill Gas)
- Excavation/Off-site Incineration/Groundwater Treatment
- Excavation/Off-site Disposal/Groundwater Treatment
- Containment/Collection and Treatment of Groundwater and Landfill Gas
- Containment/Collectin and Treatment of Groundwater and Monitoring of Landfill Gas

Limited Action, Excavation/Off-site Incineration/Groundwater Treatment, and Excavation/Off-site Disposal/Groundwater Treatment were eliminated due to high costs and the difficult implementability associated with excavation of over 7 million cubic yards of buried waste.

The remaining alternatives were evaluated against seven specific criteria. These evaluation criteria serve as the basis for the detailed analysis and the rationale for choosing the selected remedial alternative.

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reductions in toxicity, mobility, or volume
- Short-term effectiveness
- Implementability
- Cost

Two additional criteria, (1) State acceptance and (2) Community acceptance are formally evaluated based on review of the FS.

Results of the evaluation indicated that the preferred remedial action alternative should include a combination of the following actions.

- Construction of a low-permeability clay cover system for the entire site to contain the buried waste and the impacted soil on-site.
- Installation of groundwater extraction and treatment systems along the downgradient side of the site to intercept/capture groundwater contamination coming from the site. The perimeter groundwater system will also capture off-site migration of the groundwater contamination that exceeds the remediation goal.
- Installation of landfill gas extraction, control, and treatment system along the perimeter of the site within the waste zone to minimize the potential off-site migration.
- Implementation of long-term monitoring of the groundwater and landfill gases.
- Long term maintenance of the cap.

The preferred remedial actions have been determined to be protective of human health and the environment. These actions meet site-specific RAOs for the UOU. These actions were selected over other alternatives because: (1) they comply with the ARARs, (2) they are effective in preventing, minimizing, or significantly reducing the risk/exposure of the buried waste, contaminated groundwater, and landfill gases, (3) they employ proven technologies from similar remediation projects, (4) they are cost-effective, and (5) they are consistent with the proposed site development.

2.4 Financial Responsibility

Health and Safety Code (HSC) Section 25356.1(d) requires the Department of Toxic Substances Control (DTSC) to prepare a preliminary nonbinding allocation of responsibility (NBAR) among all identifiable potentially responsible parties (PRPs). Section 10 of this RAP contains this information.

3.0 SITE DESCRIPTION

3.1 Site History

The Cal Compact Landfill is located at 20300 Main Street, Carson, California between Main Street and the San Diego Freeway (Interstate 405) just south of Del Amo Boulevard (Figure 1.1). The landfill occupies approximately 157 acres and was in operation from April 1959 until about December 1964. The approximate date of closing was February 1965 (BCL, 1981). Adjacent land areas have been similarly used for sanitary landfill operations. The legal description of the Cal Compact site is:

> "Lots 2 through 9 inclusive of Tract No. 42385, in the City of Carson, in the County of Los Angeles, State of California, as per map recorded in Book 1056 Pages 84-88 of Maps, in the office of the County Recorder of said county.
>
> Except the oil, gas, petroleum and other hydrocarbon substances which lie below a plane parallel to and 500 feet below the natural surface of said land, without however, any right to enter upon the surface of said land, to explore for, develop or remove said substances, but with full right to explore for, develop and remove the same by means of wells and equipment having surface locations outside the outer boundaries of said land, in and under or recoverable from said land, as reserved in the deed from Del Amo Estate Company, a Corporation, Recorded January 1, 1964, in book D-2318, page 313 of Official Records, Instrument No. 2198."

Prior to the 1930s, land immediately surrounding the Cal Compact site was used primarily for agriculture and the site was undeveloped with gently rolling terrain. Limited residential development had taken place to the south and east. During the 1940s, industry was introduced to the area, and residential developments had become more extensive. The current light-industry based community was fully developed by the 1960s-1970s.

According to Los Angeles County records, Cal Compact, Inc., a California Corporation, was issued an industrial waste disposal permit on July 17, 1959, which authorized Cal Compact to operate a Class II landfill on the site. The methods used during the landfill operation consisted of excavation, fill, and cover. All wastes were placed in trenches that were excavated adjacent to the haul roads. The haul road locations have remained unchanged throughout the time the landfill was in operation and are underlain by native soil materials.

As a Class II landfill, the Cal Compact facility was permitted to accept both municipal solid waste and specified industrial liquid wastes. Some of the wastes permitted to be accepted were the following:

- Solid organic and municipal refuse

- Drilling fluids
- Carbide or acetylene sludge
- Cleanings from interceptors, clarifiers, screen chambers for the treatment of wastewater from vehicle washing, ceramic manufacturing, laundering, and food processing
- Sludge derived from the softening of water (lime soda process)
- Paint sludge recovered from water circulated in paint spray booths
- Liquid latex wastes consisting of water and suspended synthetic rubber
- Carbon black slurry
- Diatomaceous earth filter agent (residue from filtering steam condensate).

It was estimated (BCL, 1981) that approximately 6.2 to 6.3 million cubic yards of municipal solid waste were placed in the landfill and that the landfill had a total volume of about 7.8 million cubic yards. LA County records also showed monthly summaries of the liquid wastes that were reported as accepted at the site. On the basis of the available records, BCL identified specific waste streams that had been accepted at the site and estimated that approximately 4 percent of the material received (251,611 cubic yards) may now be considered hazardous by the State of California. The BCL summary table of liquid hazardous waste volumes disposed of at the Cal Compact landfill is included as Table 3.1.

In a separate effort by the California Department of Health Services (DHS, 1982 in BKK Corp., 1990), the DHS stated that a total of 2.6 million barrels (unit of measure, not a container, equivalent volume 540,540 cubic yards) of liquid industrial waste were reported in the Cal Compact landfill. Among these waste, the DHS summary also stated that 1,301,030 barrels (270,484 cubic yards) of possibly hazardous wastes and 451,992 barrels (93,969 cubic yards) of miscellaneous liquid industrial wastes were reported as received during 47 of the 66 months of landfill operation. In addition, waste hauler's records in the Los Angeles County files list additional 149,979 barrels (31,179 cubic yards) of landfill wastes that could currently be considered hazardous by the State (Table 3.2). Based on these records, it is estimated that a total of 301,663 cubic yards of waste within the liquid waste may be possibly hazardous. This report also listed industrial wastes disposed at Cal Compact reported as follows:

- One hundred tons of organic resins and inorganic salts at the site during 1960.
- Two thousand cubic yards of waste containing heavy metals (iron, manganese, magnesium, zinc, copper, chromium III, chromium VI, and lead), organics (polar and non-polar solvents, oils and oil sludges, esters and ethers, and alcohols), and inorganic salts between 1961 and 1967 (Note: The landfill has a reported closing date of February 1965).

The Cal Compact site has been vacant and basically unused since closure of the landfill in 1965. The site is presently on the State of California, Department of Health Services, Toxic Substances Control Program (now Department of Toxic Substances Control [DTSC]) list of toxic sites and is subject to a Remedial Action Order (RAO) No. HSA87/88-040, dated March 18, 1988, requiring implementation of a Remedial Investigation/Feasibility Study (RI/FS) and development of a Remedial Action Plan (RAP) for approval by DTSC.

3.2 Physical Description

Prior to landfill operations, the Cal Compact site was undeveloped and gently rolling terrain. Surface elevations on the site prior to landfill usage ranged from 7 to 21 feet above Mean Sea Level (MSL). Landfill operations modified surface elevations and changed the surface water drainage patterns. The present surface elevation averages between 30 and 35 feet above MSL. Elevations on the site now vary from 11 feet above MSL near the northeast corner to 58 feet above MSL in the north-central portion of the site.

Ground surfaces at the site are currently unpaved (except for the internal roads) and covered with a light growth of native weeds and scrub vegetation. The city of Carson has extended Del Amo Boulevard eastward across the northern portion of the site. Three trailers present on-site are used for field offices.

The site has an irregular configuration. Access to the property is from Main Street which forms a portion of the western site boundary. The remaining portion of the western boundary, along with the southern boundary of the site is defined by the Torrance Lateral Channel, a Los Angeles County flood control channel. The eastern side of the property is bounded by the San Diego Freeway (Interstate 405). The northern portion of the site is essentially defined by Del Amo Boulevard. The Dominguez Channel is situated north and east, and parallel to the San Diego Freeway. The Torrance Lateral Channel discharges to the Dominguez Channel.

For the purpose of the remedial investigation, the Cal Compact site is separated vertically into two operable units. These two operable units are: (1) UOU - the Bellflower Aquitard and above and (2) Lower Operable Unit - the Gage aquifer and below. The specific definition of the UOU includes site soils, the waste zone above and within the Bellflower Aquitard, and the Bellflower Aquitard down to, but not including, the Gage Aquifer. As agreed in the Consent Decree, only the UOU is addressed in this RAP.

Surface Features

The topography of the site is irregular and the surface drainage is poorly developed. The top of the waste and overlying soil cover lies topographically higher than the former haul roads in many areas of the site. Figure 3.1 presents a topographic map of the site. The former haul roads for the landfill are paved and are identified as Lenardo Drive and Stamps Drive on the site maps. These two roads are the only paved roads within the site and are underlain by water lines, electric lines, storm drains, and sewer systems. The water, electric, and sewer systems are currently inactive. Dirt roads border the site's eastern and southern perimeter along the San Diego Freeway and the Torrance Lateral Channel respectively.

Del Amo Boulevard is located outside the landfill and forms the northern boundary of the property. Three underground fuel lines, operated by Chevron, Shell, and UNOCAL, are located along or beneath Del Amo Boulevard. Two of the fuel lines are immediately north of the boulevard and the third is beneath the northernmost traffic lane.

The current surface topography and thickness of the soil cover may vary from that indicated by the investigations. Importing of soil and periodic grading of the ground surface for drainage and weed control has occurred and modified the surface.

Natural Resources

Based on the geologic history of the site and surrounding area, it is unlikely that there are any significant amounts of mineral resources present beneath the Cal Compact site. The nearest producing oil fields are the Torrance Oil Field (approximately 2 miles southwest) and the Dominguez Oil Field (approximately 2.5 miles northeast). Two exploratory oil wells were drilled and later abandoned in the northwest portion of the site. As both of these holes were "dry" it is unlikely that there are significant oil or gas reserves beneath the Cal Compact site. Details of the efforts made to determine these well locations on the Cal Compact site, and well construction and abandonment information are presented in Section 1.3.2.1 of the RI. On the basis of Los Angeles County Flood Control District (LACFCD) records, a groundwater well listed as Well No. 825 was drilled in November 1948 for livestock watering. There was no record of abandonment of the water well. It was indicated in a memo (Neff, 1991) that this well was backfilled with soil and capped with a steel plate.

There are no national or state parks, forests, wildlife reserves, or any prime agricultural land within 2 miles of the Cal Compact site. The site is over 2 miles away from a coastal wetland and over 1 mile away from a freshwater wetland.

Demography and Land Use

Demographics of the area surrounding the Cal Compact site are variable and include residential, commercial, light industrial, and several former Class II landfills (Figure 3.2). Residences are adjacent to the southern and western boundaries of the site. Two former landfills are located further west of the Cal Compact site. The San Diego Freeway (Interstate 405) runs along the eastern edge of the site. The Carson Mall (retail) is located east of the San Diego Freeway approximately 0.5 mile east of the site. A small, recreational baseball field and the Dominguez Golf Course, built over a former Class II landfill, border the northern edge of the site.

Active Groundwater Production Wells

Several existing or potential groundwater supply wells were identified within a two mile radius of the Cal Compact site. Only two wells, Dominguez Water Company (DWC) well 19A and

Well 79, appear to be active drinking water supply wells within two mile of the site. Details for these wells were obtained from previous and recent search records (BKK, 1990; McLaren/Hart [M/H], 1992, and Dominquez Water Wells) and are summarized in Table 3-3. The well locations are shown on Figure 3.3.

The closest known active production well to the site is DWC Well 19A at the intersection of Carson Street and Avalon Boulevard about 0.75 miles southeast of the site. Well 19A is 685 feet deep and is screened from a depth of 510 to 665 feet in the Silverado Aquifer. DWC Well 79 is approximately 1.5 miles south of the site near the intersection of 228th Street and Avalon Boulevard. Well 79 is 925 feet deep and is screened from a depth of 480 to 652 feet in Silverado Aquifer.

There were no available records reveals any known active groundwater from the Gage Aquifer within two mile radius of the site. The closest possible Gage well is DWC Well 75A near Main and Lomita approximately 2.75 miles south of the site. In Well 75A, the shallowest perforations are 210 to 290 feet. DWC personnel indicated that the Gage Aquifer is not tapped by any DWC well for use as a potable water source.

Climatology

The regional climate of southern California is modified by local geographic features but is determined principally by its location within the large-scale, semi-permanent high-pressure zone of the eastern Pacific. As is typical of coastal areas along the western shores of continents at lower latitudes, the region is characterized by sparse rainfall, with most of it occurring during the winter months (Keith, 1980).

During the spring and summer months, the predominant wind flow in the southern California coastal area is from the northwest. This wind pattern creates an offshore drift of warm surface water seaward to the southwest. The surface water is then replaced by cold water upwelling from below. The resultant cold ocean surface underlies warm, descending air on the eastern side of the high-pressure system and produces, by cooling and turbulent mixing, a persistent marine air layer at the ocean surface. The top of the marine air layer defines the base of a temperature inversion, above which the air is warm and dry. The presence of a cool marine layer of trapped air, capped by a temperature inversion, is the cause of the air pollution problem in the South Coast Air Basin.

Onshore sea breezes constitute the prevailing wind flow pattern at the Cal Compact site. In the morning winds usually come from a southerly direction and shift to be from the west and finally north-northwest by the early evening hours. Wind speeds typically range from 7 to 10 miles per hour. Offshore flow occurs at night and early morning with wind directions ranging from the north-northwest through northeast and east. Wind speeds average between 1 and 5 miles per hour.

Regional Hydrogeology

A regional geologic cross section showing the principal regional groundwater-bearing units of the Cal Compact site is presented in Figure 3.4. Shallow groundwater chemistry in the vicinity of the Cal Compact site has been documented by several investigations on file with the DTSC. The groundwater contains chemicals from surrounding landfills and from some neighboring industrial activities. Shallow groundwater is encountered under unconfined conditions in the Bellflower Aquitard but is not known to be used as a source of water.

Underlying the Bellflower Aquitard is the Gage Aquifer, a regional, confined aquifer. Recharge to the Gage and other, deeper aquifers is mainly from groundwater flowing from the Central Basin across the Newport-Inglewood Fault and Uplift. The Lynwood and Silverado Aquifers are used as domestic water sources by the Dominguez Water Company (DWC).

4.0 SUMMARY OF RI FINDINGS

4.1 Previous Investigations

Previous geologic studies and reports regarding the Cal Compact landfill are presented in Table 4.1. Summaries of these reports are presented below.

In 1975, Robert Stone and Associates conducted a geotechnical investigation for a mobile home park proposed for the site. Soil borings were completed to depths up to 76 feet below grade. It was concluded that most of the expected subsidence had already taken place and that additional subsidence should take place uniformly. The primary future development concern was management of potential methane gas accumulation.

In 1977, Converse Davis Dixon Associates conducted subsurface permeability and air testing for the proposed mobile home park. Subsurface soils consisted of natural and fill deposits of firm to stiff silty and sandy clay, clayey silt, and medium dense silty sand. Gas barriers constructed of site soil and bentonite clay mixtures were recommended to manage potential gases that may accumulate.

In 1978, Engineering-Science Inc. (ES) investigated landfill gases at the site. Soil vapor analyses indicated that methane and carbon dioxide were detected at concentrations of 40 to 50 percent and 20 to 35 percent, respectively, at depths of 5 feet and 15 feet below the ground surface. According to ES (1978), these concentrations were considered typical for a sanitary landfill undergoing anaerobic decomposition. Hydrogen sulfide was also detected at concentrations of 3 to 100 parts per million (ppm).

In 1981, BCL Associates conducted an investigation to determine the competency of the fill for pavement design and utility support. Shallow trenches and soil borings were excavated along the roadways. The soil was classified as sandy silt to clayey sand. BCL concluded that the property was suitable for development, with the exception of certain roadway sections that might require excavation, special mitigation and/or minor realignment.

BCL Associates also conducted an investigation of the waste, groundwater, and vapor on-site (BCL, 1981). Acid priority pollutants, such as carboxylic acids and dimethylbenzene-butanoic acid, were found above laboratory detection limits in the waste. Some metals were found above laboratory detection limits, but all were below Total Threshold Limit Concentrations as defined in Title 22 of the California Code of Regulations. Results of gas analyses indicated the presence of methane at 50 percent, carbon dioxide at 34 percent, and nitrogen at 13 percent. According to BCL (1981), "The results of the vapor sampling program indicate that due to biological degradation of organic materials contained in the landfill, as well as the presence of industrial wastes, the site is generating and emitting landfill gas (LFG) which contains low levels of toxic vapors." BCL also indicated that some contaminant mitigation measures may need to be taken depending on anticipated future land use.

BCL also drilled three soil borings (borehole numbers 2, 19, and 21) in their 1981 investigation. No groundwater monitor wells were constructed. Boreholes 2, 19, and 21 were located near the future locations of wells GW-1, GW-2, and GW-3, respectively. BCL also collected groundwater samples from boreholes 2 and 21. The samples were analyzed for metals, priority and nonpriority pollutants, and volatiles. According to BCL (1981), the groundwater table "fell so rapidly in hole number 19 that it was impossible to recover a sample." The groundwater samples were obtained by lowering a one quart jar into the open boring using a cable. BCL did not specify the analytical methods used to analyze the groundwater samples or the depths at which the groundwater samples were obtained. According to the analytical results of the BCL (1981) investigation, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc were detected in one or both of the groundwater samples analyzed. In addition, selected priority and nonpriority pollutants were detected in one or both of the groundwater samples. Pesticides (0.0017 to 0.002 ppm), ethylbenzene (0.015 ppm), and pentachlorophenol (0.0019 ppm) were detected in the sample from borehole 21.

4.2 McLaren/Hart Phases I and II Remedial Investigation Summary

As required in the Remedial Action Order (No. HSA87/88-040) dated March 18, 1988, McLaren/Hart (M/H) conducted Phase I and Phase II remedial investigations at the Cal Compact Landfill site. The Phase I investigation was performed in accordance with the work plan entitled "To Perform a Remedial Investigation/Feasibility Study at the Cal Compact Landfill," prepared by Bryan A. Stirrat & Associates (dated January 1990). The Phase I workplan was submitted to and approved by the lead agency, formerly the State of California Department of Health Services, Toxic Substances Control Program, Region 4, Site Mitigation Branch (now the State of California Environmental Protection Agency, Department of Toxic Substances Control [DTSC], Region 4, Site Mitigation Branch). The fieldwork for the Phase I remedial investigation was performed by McLaren/Hart between September 27 and November 16, 1990. The results from the Phase I investigation were presented in the McLaren/Hart report entitled "Remedial Investigation at the Cal Compact Landfill Site, 20300 Main Street, Carson, California," Volumes 1 through 9 (dated January 17, 1991). The Phase I report was submitted to the DTSC on January 17, 1991.

The Phase II investigation was performed in accordance with the McLaren/Hart work plan entitled "Phase II Remedial Investigation, Cal Compact Landfill, June 12, 1991." The Phase II workplan was submitted to and approved by the DTSC. The Phase II remedial investigation field activities were performed by McLaren/Hart between August 6 and October 30, 1991. An integrated report documenting the results from the Phase I and Phase II investigations was submitted to the DTSC on January 10, 1992.

In summary, the Phase I/II investigations consisted of:

- Evaluation of site hydrogeological conditions

- Chemical characterization of the soil cover and waste zone
- Evaluation of stormwater runoff water quality
- Vadose zone moisture sampling and analyses
- Groundwater chemical characterization
- Vadose zone and ambient air quality sampling and analyses
- Magnetics survey to identify the location of two former oil wells and one groundwater production well

The overall objectives of the remedial investigations were to determine the possible existence, nature, and approximate extent of contaminants of concern in the landfill soil cover and waste zone, surface water runoff, vadose zone moisture, and groundwater and air at the site.

Specific activities conducted during the Phase I/II remedial investigation included:

- Conducting waste soil sampling and analysis on 15 waste soil borings (WSB-1 through WSB-15). The waste soil boring locations are shown on Figure 4.1.
- Collecting surface water runoff samples and analyzing for metals, VOCs, SVOCs, and oil and grease. The surface runoff collection point locations are shown on Figure 4.2.
- Installing three lysimeters (L-1 to L-3) to monitor vadose zone moisture. The lysimeter locations are shown on Figure 4.2.
- Installing five vadose wells (VW-1 to VW-5) and several vadose wells for the landfill gas emissions at site. The vadose well locations are shown on Figure 4.2.
- Installing 11 gas probes at 1,000 foot spacings around the landfill perimeter to monitor potential lateral LFG emissions. Figure 4.3 shows the locations of the perimeter probes.
- Installing a climatronics wind system to collect upwind and downwind ambient air samples. As shown on Figure 4.3, three ambient air samples were collected from four locations during November 1990.
- Installing a total of 17 monitor wells (GW-1B, GW-1C, GW-2, GW-2B, GW-2C, GW-3B, GW-3C, GW-4, GW-5A, GW-5B, GW-5C, GW-6, GW-7, GW-7B, GW-7C, GW-8 and GW-7.1). Fifteen of the 17 monitor wells, including the downgradient off-site well (GW-7.1), were completed in the Bellflower aquitard. Two monitor wells (GW-2 and GW-7) were installed in the underlying Gage

aquifer. The groundwater sampling and analysis were conducted on about five seperate monitoring events. The groundwater monitoring locations are shown on Figure 4.4.

- Conducting soil sampling and laboratory analysis on nine monitoring well borings (GW-1C, GW-2B, GW-3A, GW-4, GW-5B, GW-6, GW-6B, GW-7B and GW-8).

- Conducting 17 Cone Penetration Tests (CPTs) (CPT-1 through CPT-6, CCPT-1, CCPT-4, CCPT-5, CCPT-7, DCPT-1.1, DCPT-1.2, DCPT-5.1, DCPT-7.1 and DCPT-7.2, UCPT-3 and UCPT-3A) along the landfill perimeter, interior haul roads, and outside the site boundary to an approximate depth of 90 feet below grade. The CPT locations, except for UCPT-3A, are shown on Figure 4.4.

- Collecting 15 groundwater samples using BAT Enviroprobes during CPTs. Eight of the groundwater samples were analyzed to further delineate the concentrations and lateral extent of the VOCs in the Bellflower aquitard. Three of the eight samples were collected from on-site locations (CCPT-1, CCPT-7, and CPT-3) and five of the samples were collected from off-site locations (DCPT-1.1, DCPT-5.1, DCPT-7.1, DCPT-7.2, and UCPT-3). The sampling locations are shown on Figure 4.4.

- Conducting aquifer slug tests on wells completed in the Bellflower aquitard to estimate hydraulic conductivity of the unit.

- Employing several types of geophysical surveys to identify the vertical and lateral extent of the waste zone in the landfill, including 42 Direct Current (DC) resistivity depth soundings, 10 Seismic Refraction (SR) lines, and Ground Penetrating Radar (GPR) measurements at 27 locations.

- Conducting a magnetics survey to determine the locations of the two former oil wells and one former groundwater production well.

Results of these investigations are presented in Section 4.4.

4.3 Supplementary CPT/Hydropunch Investigation

At the request of the DTSC, a supplemental field investigation was conducted at the Cal Compact Landfill site during the period of April 17 through May 10, 1995. Cone Penetration Testing (CPT) and hydropunch-type groundwater sampling were used to acquire additional lithologic, stratigraphic, hydrogeologic, and groundwater quality data for the Bellflower Aquitard. Water levels were measured and groundwater samples were collected for chemical analysis from the existing site monitor wells. Hydropunch technology was used to collect groundwater samples for chemical analysis at additional locations on the site.

In summary, the investigation conducted 32 CPTs, collected hydropunch type groundwater samples from 55 intervals at 37 locations, and measured water levels and collected groundwater samples from 15 monitor wells. Figure 4.5 shows the monitor well, CPT, and Hydropunch locations.

Results of the supplementary investigation are also summarized in Section 4.4.

4.4 Geologic and Hydrogeologic Investigation Results

Findings from the Final RI Report (B&R Environmental, July 1995) are briefly summaried below.

4.4.1 Surface Soil and Waste Zone

To delineate the thickness and areal extent of the buried waste and the existing soil cover, 15 soil samples were drilled. Using the waste soil boring data and the GPR results, the soil cover thickness, waste thickness, and the base of the waste were defined, see Figures 4.6, 4.7, and 4.8, respectively (M/H, 1992).

4.4.2 Groundwater Elevations and Flow

The static groundwater elevations for the Bellflower Aquitard at the Cal Compact site were measured at -21.51 to -29.05 feet MSL during 1990/1991 (M/H, 1992) and at -14.83 to -22.59 feet MSL on May 1995 (B&RE, 1995). These data indicated a water table rise of about 6.5 feet between 1990/1991 and 1995.

Based on these data, groundwater flow in the Bellflower Aquitard is generally in the south-southwest direction. This is consistent with the M/H's 1992 assessment. The groundwater contour map is presented in Figure 4.9. The gradient ranges from 0.001 feet/foot in the northwest portion of the site to 0.010 feet/foot in the southeast portion of the site. The central portion of the site has an average gradient of 0.004 feet per foot.

Groundwater flow within the Bellflower Aquitard is influenced by a number of factors including the site stratigraphy, possible leakage from the Dominguez Channel, irrigation on the golf course north of the site, and waste cell/haul road geometry. In addition to the site geometry, the geotechnical soil characteristics of the soil cover over the waste cells influences the infiltration of precipitation. Groundwater could potentially be in contact with the base of the waste cells under the western half of the site since the elevation of the potentiometric surface is above the elevation of the waste cell base.

4.4.3 Background Soil and Groundwater Concentrations

Background metal concentrations in soil at the Cal Compact Landfill site were calculated based on analytical data obtained from soil samples collected at depths of 10 and 30 feet at monitor well GW-2B and GW-4 locations which are upgradient from the waste. The background soil metals concentration are presented in Table 4.2. Background groundwater metals concentrations were determined in the same fashion based on analytical results from eight sampling events between November 1990 and May 1995 from the four upgradient monitor wells GW-1C, -2C, -3C and GW-4. Results of the background groundwater metal concentration are listed in Table 4.3. Background concentrations for anthropogenic chemicals in both soil and groundwater are assumed to be zero.

4.4.4 Surface Water and Runoff Concentrations

Background

Surface runoff samples were collected by the County of Los Angeles, Department of Public Works (LADPW) from the Torrance Lateral Channel immediately upgradient of the site at Main Street and analyzed. The analytical results for one sample collected on February 28, 1991, are listed in Table 4.4 (M/H, 1992) as background values.

Metals in Rainwater Runoff

Four surface runoff samples at three locations were collected and analyzed for metals on February 28, 1991. An earlier sample collected on January 4, 1991 at location SWC-3 was also analyzed for a limited suite of metals. Results of these analytical data are presented in Table 4.5 (M/H, 1992). For comparison purposes, drinking water Maximum Contaminant Levels (MCLs) are also included in this table.

Volatile Organic Compounds

Seven VOC samples were collected from four surface water locations at the landfill between January and March 1991. Only xylene (4 ppb) was detected at SWC-3.

Semivolatile Organic Compounds

Four SVOC samples were collected at three surface water sampling locations at the landfill in January and February 1991. Only bis (2-ethylhexyl) phthalate (4 ppb) and butyl benzyl phthalate (8 ppb) were detected in the January 1991 sample at location SWC-2.

Oil and Grease

Oil and grease analyses were performed on one sample collected on January 4, 1991 at location SWC-2, and on four samples collected at four locations during the February/March 1991 sampling round (M/H, 1992). The analytical results indicated no detectable total petroleum hydrocarbons (concentrations < 0.5 ppm) in the January sample. Oil and grease were detected in samples from all four sampling locations during the February/March sampling event. The concentrations detected ranged from 0.36 to 0.62 ppm. These concentrations may be the result of laboratory error since a concentration of 0.34 ppm was detected in the method blank (M/H, 1992).

4.4.5 Soil Cover Concentrations

Metals

Sixteen samples of the soil cap covering the waste trenches were collected from 15 locations. Metals that were detected at concentrations higher than the identified background concentrations are listed below.

Metal	Concentration Range (ppm)
Antimony	1.8 - 4.8
Beryllium	<0.05 - 0.1
Calcium	4,800 - 50,000
Lead	<0.5 - 39
Silver	<0.05 - 5.4
Zinc	40 - 190

Volatile Organic Compounds

Sixteen samples of the soil cover were collected from 15 locations. Toluene (0.006 to 0.014 ppm) was found in four samples. It was the only VOC detected.

Semivolatile Organic Compounds

Sixteen samples of the soil cover were collected from 15 locations. Only one location, WSB-1, detected the following, acenaphthene (0.47 ppm), bis (2-ethylhexyl) phthalate (1.1 ppm), butyl benzyl phthalate (0.72 ppm), dibenzofuran (0.38 ppm), diethyl phthalate (1.8 ppm), 2,4-dimethyl phenol (0.37 ppm), 2-methyl-naphthalene (0.32 ppm), 4-methyl-phenol (1.1 ppm), naphthalene (0.53 ppm), and phenanthrene (0.7 ppm) were detected at WSB-1 location only.

Pesticides and PCBs

Pesticides were detected in soil cover samples at 10 of 15 sampled locations. Pesticides 4,4'-DDT, its breakdown products (4,4'-DDD and 4,4'-DDE), alpha-BHC, beta-BHC, and endrin were detected at concentrations ranging from 0.0008 to 0.063 ppm.

No PCBs were detected in any of the soil cover samples.

4.4.6 Waste Zone Concentrations

Metals

A total of 13 composite waste zone samples, collected at 15 locations, were analyzed for metals. Metals that were detected at higher than background concentrations are:

Metal	Concentration Range (ppm)
Antimony	1.7 - 4.8
Calcium	60 - 67,000
Chromium	11 - 44
Copper	20 - 27,000
Lead	<0.5 - 340
Molybdenum	<0.1 - 2.1
Nickel	5.9 - 56
Zinc	57 - 570

Volatile Organic Compounds

A total of 34 waste zone samples, collected at 15 locations, were analyzed for VOCs. The detected VOCs are:

Constituent	Concentration Range
Acetone	0.026-2.6 ppm
Benzene	0.025-0.041 ppm
2-butanone	0.102-0.477 ppm
Carbon disulfide	0.005-0.008 ppm
Chlorobenzene	56 ppm
1,4-dichlorobenzene	0.037-124 ppm
Ethyl benzene	0.005-120 ppm
2-hexanone	0.032 ppm
4-methyl-2-pentanone	0.17 ppm
Methylene chloride	0.011-0.030 ppm
Toluene	0.009-12 ppm
Xylenes	0.016-10 ppm

Semivolatile Organic Compounds

A total of 12 composite waste zone samples, collected at 12 locations, were analyzed for SVOCs. The detected SVOCs are summarized below:

Constituent	Concentration
Benzo(a)anthracene	0.80 ppm
Benzo(b)fluoranthene	0.72 ppm

Bis(2-ethylhexyl)phthalate	0.33-7.5 ppm
Butylbenzylphthalate	0.26-5.0 ppm
Chrysene	0.30-0.98 ppm
1,4-dichlorobenzene	16 ppm
Diethylphthalate	2.8 ppm
di-N-butylphthalate	0.51-0.52 ppm
Fluoranthene	0.69 ppm
2-methylnaphthalene	0.29-16 ppm
4-methylphenol	0.50-4 ppm
Naphthalene	0.50-52 ppm
Phenanthrene	0.24-224 ppm
Phenol	1.0-1.5 ppm
Pyrene	0.26-0.55 ppm

Pesticides and PCBs

A total of 13 composite waste samples, collected from 13 locations, were analyzed for pesticides and PCBs. The only pesticides detected were:

Constituent	Concentration
4,4'-DDT	0.034 to 0.08 ppm
4,4'-DDD	0.003 to 0.10 ppm
4,4'-DDE	0.0034 to 20 ppm
Alpha-BHC	0.044 ppm
Dieldrin	0.0013 and 0.59 ppm

No PCBs were detected in any of the waste zone samples.

4.4.7 Groundwater Concentrations

The nature and both lateral and vertical extent of groundwater contamination at the Cal Compact Landfill site were identified by tabulating and mapping contaminant concentrations in the Final RI Report (B&RE, 1995). The data used for this evaluation is based on all available data from the relevant investigations (M/H, 1991/1992 and B&RE, 1995).

VOC Lateral Distribution

Summaries of the groundwater VOC data are compiled in Table 4.6 from M/H's investigations and Tables 4.7 (hydropunches) and 4.8 (CPTs) from the supplementary investigation (B&RE, 1995). Based on data presented in Tables 4.7 and 4.8, Figure 4.10 shows the total VOC concentrations detected in groundwater samples from the sands of the Bellflower aquitard. As shown in Figure 4.10, the highest concentration of total VOCs are located along the southwest corner of the site extending approximately 1200 feet northwest along the southwest perimeter. Highest total VOC detected was about 50,300 ppb. VOC concentrations decrease rapidly from the area of highest VOC concentration going off-site following the southwesterly direction of groundwater flow. SCPT-36, located 370 feet off-site in a southwesterly direction, from the area of highest VOC concentration contained a total VOC concentration of 1.5. ppb at a depth of 62 feet below grade (-51 feet MSL). SCPT-37, located approximately 720 feet off-site in a southwesterly direction from the area of highest VOC concentration, shows a decrease in total VOC concentration to 0.5 ppb at a depth of 59 feet below grade (-45 feet MSL). The decrease in VOC concentration to an almost non-detect concentration from concentrations as high as 50,000 ppb in a short horizontal distance indicates slow groundwater movement and contaminant dilution.

In a similar manner as Figure 4.10, Figure 4.11 shows BTEX concentrations in the groundwater from the sands of the Bellflower aquitard. Again, the highest area of BTEX concentration is located along/near the southwest side of the property line with a highest BTEX value of 50,300 ppb. Comparisons of the BTEX and total VOC show that BTEX components are the main contaminants in groundwater at the site. Two areas of the site, north central and southeastern, show total VOC contamination of 140.6 ppb and 73.4 to 81.6 ppb, respectively, but do not have a significant component of BTEX.

VOC Vertical Distribution

To illustrate the vertical distribution of the VOCs in the Bellflower sand, total VOCs are evaluated alongside with cross sections of inferred stratigraphy under the site. Figures 4.12 and 4.13 represent the crosss sections along the west/southwest and south side of the property boundaries, respectively. As shown in these figures, VOC concentrations are primarily located in the Bellflower sands at depths of -30 to -50 feet MSL. Again, the total VOC concentrations decrease rapidly toward the base of the UOU. VOC concentrations detected close to the base of the Bellflower Aquitard range from non-detect to 11.0 ppb.

Lateral and Vertical Distribution of SVOCs

The lateral distribution of semivolatiles in groundwater from the sands of the Bellflower Aquitard is limited to the areas of highest VOC concentrations. The SVOCs detected in the groundwater are summarized below

Constituent	Concentration (ppb)
Bis(2-ethylhexyl)phthalate	<4.0 - 9.2
2-methylnaphthalene	<1.0 - 210
di-N-butylphthalate	<2.0 - <50, 2.2, 2.3
2,4-dimethylphenol	<1 - <25, 36
Naphthalene	<1 - 910

Distribution of Metals in Groundwater

Metal concentrations in groundwater exhibit a similar lateral distribution as the VOCs and BTEX distributions shown on Figures 4.10 and 4.11. The highest levels of contamination occur in the southwest and southeast sections of the site. A summary of the metal concentrations in the groundwater which exceeded both the analytical detection limits and the primary (California State or federal) MCLs are summarized as follows.

Metals	Concentration Range (ppm) All Monitor Wells	CPTs (1995)	MCLs
Aluminum	0.13 - 420	0.34 - 160	1000 (State only)
Antimony	0.021 - 0.027	0.01 - 0.29	0.006 Fed. only)
Arsenic	0.01 - 0.23	0.019 - 0.76	0.05
Beryllium	ND	0.002 - 0.007	0.004 (Fed. only)
Chromium	0.02 - 0.65	0.03 - 0.43	0.05
Lead	ND	0.005 -0.26	0.05
Nickel	0.01 - 0.56	0.02 - 0.78	0.1 (Fed. only)
Selenium	0.01 - 0.03	0.034 - 1.73	0.01
Silver	0.052 - 0.24	ND	0.05
Thallium	0.13 - 0.14	0.04 - 0.26	0.002 (Fed. only)

To illustrate the vertical distribution of the hazardous metals across the site, total RCRA metal concentrations are shown alongside with cross sections of inferred stratigraphy under the site. Figures 4.14 and 4.15 represent the crosss sections along the west/southwest and south side of the property boundaries, respectively. Along with metal concentrations, Total Dissolved Solids (TDS) and field Conductivity measurements are also shown at where samples were taken.

4.5 Air Investigation Results

4.5.1 Vapor Monitoring

Air sampling of five vadose wells was conducted by M/H. Two Calderon[1] compounds, vinyl chloride (2.0 to 20.5 ppm) and benzene (1.4 to 8.8 ppm) were detected in all five wells.

Concentration ranges for the detected non-Calderon VOCs are as follows:

Constituent	Concentration
Ethylbenzene	13.9 to 276 ppm
Toluene	7.6 to 45.7 ppm
Xylenes	9.0 to 49.4 ppm
Dichlordifluoromethane	8.4 to 39.6 ppm

[1] Assembly Bill 3525 (Calderon) of 1984 and amendments require the testing of air emissions from existing solid waste site for the purpose of solid waste air quality assessment test. Specific Calderon compounds include: Chloroethene (Vinyl Chloride), Benzene, 1,2-Dibromoethane (Ethylene Dibromide), 1,2-Dichloroethane (Ethylene Dichloride), Dichloromethane (Methylene Chloride), Tetrachloroethane (Perchloroethylene), Tetrachloromethane (Carbon Tetrachloride), 1,1,1-Trichloroethane (Methyl Chloroform), Trichloroethylene, and Trichloromethane (Chloroform).

Other gas compounds ranged in volume percent concentration (volume gas/ volume air) are as follows:

Constituent	Concentration
Methane	26.7 to 64.4%
Carbon monoxide	<0.1%
Carbon dioxide	15.7 to 30.6%
Oxygen	0.2 to 9.2%
Nitrogen	15.5 to 43.4%

4.5.2 Lanfill Gas Monitoring

M/H installed 11 gas probes at 1,000 foot spacings around the landfill perimeter to monitor potential lateral LFG emissions. The concentration ranges detected at these gas probes are as follows:

Calderon Compounds	Concentration Range in ppb (no. of point detected)	
Vinyl chloride	80.9 (1)	
Benzene	1.4 - 57.3 (5)	
Methylene chloride	4.6 - 9.3 (8)	
Perchloroethylene	2.0 - 57.9 (8)	
Methyl chloroform	2.5 - 3.2 (3)	
Trichloroethylene	7.5 (1)	
Chloroform	8.2 - 4.0 (2)	
Non-Calderon compounds		
trans-1,2-Dichloroethene	3.4 - 4.7 (7)	
Toluene	4.4 - 17.7 (11)	(note: blank is 5.4 ppb)
Xylenes	3.3 - 957.0 (5)	
Chlorotrifluoromethane	9.2 - 420.0 (6)	
Dichlordifluoromethane	4.5 - 129.0 (6)	
Trichlorofluoromethane	2.8 - 26.9 (3)	
Methane (ppmv)	48.5 - 29,981 (2)	

4.5.3 Ambient Air

A Climatronics wind system was installed to collect upwind and downwind ambient air samples. Three ambient air samples were collected from four locations during November 1990. All collections were reported in milligrams per cubic meter. Benzene (0.005 to 0.039), methyl chloroform (0.017 to 0.065), and toluene (0.017 to 0.091) were detected in all the samples at all locations. Methylene chloride (0.023 to 0.118) was detected in all samples except for the one collected (<24 hrs./downwind) on November 15, 1990. Xylene (0.018 to 0.082), perchloroethylene (0.022) and dichlorofloromethane (0.080 to 0.093) were detected.

5.0 SUMMARY OF RISK ASSESSMENT

5.1 Biological Investigation Results

Sensitive ecosystems are defined as natural ecosystems which are rare in the project arearelict ecosystems which provide unique habitats or are composed of unique assemblages of plants and animals. As an example, sensitive ecosystems would include rookeries, wetland, remnant native prairies, or critical habitats of threatened or endangered species.

The vicinity surrounding the site is heavily disturbed by human activity, predominantly urban development. Most natural habitats in this area have been replaced by residential, commercial and transportation land uses with some open space remaining in the form of vacant lots, utility rights-of-way, and a golf course. The Cal Compact Landfill site has been totally disturbed by excavation and fill activities.

Plant life in the project vicinity consists almost entirely of landscaping in residential areas, parks, golf courses and around commercial establishments. The Cal Compact site has been extensively graded and cleared on a regular basis since closure of the landfill. Due to the grading and clearing, the site is mostly covered with indigeous weeds. Plant species occurring on-site are primarily introduced grassy species found throughout coastal, urban regions of Southern California. Animal species present within the project area consist of mammalian, avian and reptilian species which have adapted to urban environments in Southern California (Carson City, 1993). Due to the past site activities (i.e., landfill and agricultural uses) at the site, specific biological investigations were not deemed necessary. Ecosystems potentially present in the project area were reviewed through use of the U.S.G.S. quadrangle map (Torrance Quadrangle) and the Metro 2000 - Final Project and Program Environmental Impact Report, dated November, 1993.

The water bodies closest to the site are the Torrance Lateral Channel and the Dominquez Channel. Both of these features are man-made, concrete-lined, drainage channels. Both are utilized for flood control and stormwater run-off. Drainage from the site is channeled into four concrete storm drains which flow into the Torrance Lateral Channel, which empties into the Dominquez channel. Due to the nature of the facilities and the lack of natural environments, no ecological receptors are present in these concrete structures.

Human activity such as heavy urban development around the site vicinity and specifically, grading and clearing of the site, have eliminated any sensitive ecosystems from the immediate project area. Due to the heavily urbanized nature of the area, most fauna (except birds) from remnant natural areas in the region would be precluded from migration onsite.

Based on the past and present uses of the site, and the vicinity around the site, there are no areas that will be impacted by the site's remediation, that meet the definition of a sensitive ecosystem.

5.2. Contaminants Of Concern

Not all compounds identified in the RI pose significant health risks; thus not all identified compounds need to be considered in future remedial actions. Two lists of contaminants can be generated from the baseline risk assessment, the Contaminants of Concern (COCs), which actually present potential risk, and those that are not COCs. The purpose of identifying COCs is to focus on the contaminants which require remediation for the protection of human health and the environment.

The National Contingency Plan (NCP) defines the point of departure for unacceptable risk as one in a million (1×10^{-6}) for carcinogenic compounds. The acceptable limit for noncarcinogenic effects is a hazard index (HI) of less than 1.0. A HI of greater than 1.0 is considered indicative of a potential toxic effect. However, since multiple contaminants are being considered, the screening point of departure for this FS is set at a 10^{-7} carcinogenic risk and a Hazard Index of 0.2 to ensure no significant contaminants are eliminated. Therefore, any contaminant with a cancer risk level or HI less than this FS point of departure is not typically considered significant and is not subject to further consideration.

Chemical contaminants of concern, by media, are shown in Table 5-1.

5.3 Summary of Baseline Risk Assessment

The purpose of the baseline risk assessment is to evaluate the nature and extent of the human health risks associated with exposure to site-related chemicals under defined hypothetical future uses of the site. Previous investigations have demonstrated the presence of methane, certain volatile and semivolatile chemicals, and metals in soils, waste, and groundwater at the site.

The Risk Assessment was prepared under the direction of the State of California Environmental Protection Agency Department of Toxic Substances Control, Region 4, Site Mitigation Branch (DTSC) and in accordance with DTSC and USEPA guidelines (California Environmental Protection Agency, 1990; and USEPA, 1988a, 1989a, 1991a, 1991b) and the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). In accordance with USEPA guidance and with specific directions from DTSC, three hypothetical exposure scenarios for the Cal Compact site are evaluated. Each of the three scenarios assumes that no remedial actions or controls are in place. However, it is not the recommendation of B&RE that any of the future use scenarios evaluated in this assessment be pursued without adequate and appropriate remedial actions and controls.

Highly conservative assumptions regarding chemical concentrations, chemical fate/transport, and human exposure are incorporated into each of the three scenarios. The conservative nature of the parameters presents the "worst-case possibilities" in each case. For example, the actual thickness of the soil cover on the landfill ranges from a minimum of 3 feet up to 30 feet. The conservative risk assessment assumes that the soil cover is only 3 feet thick over the entire landfill. This significantly influences the amount of vapor migrating to the surface. The conservative assumptions used in this risk assessment are not intended to reflect actual conditions, but are used to "err on the side of safety."

The baseline risk assessment results are summarized below for each scenario. Age-specific increased cancer risks (carcinogens), and noncancer hazard indices (noncarcinogens) are presented, as well as the predominant pathways of exposure.

Hazard Index (HI) is a numerical representation of the potential for noncarcinogenic health effects. If the HI exceeds unity (1), there may be concern for potential noncancer effects. Cancer risks calculation based on arithmetic or geometric mean (mean-based) and the 95% upper confidence limit of the mean (UCL - based) are presented. Cancer risk for 30-year exposure is the combined risks for 24-year adult exposure and 6-year child exposure. Existing risks are calculated based on revised representative concentrations and exposure input parameters.

Scenario I--Long-Term Residential Use

A hypothetical community with residential housing is developed on the landfill. This scenario assumes unrestricted disruption of the current soil cover (by the residents), and evaluates exposures for both children and adults living on the site. Consideration are made for the excavation of swimming pools, gardening, inhalation of vapors, drinking groundwater and other associated exposures. The scenario also evaluates the site-related risks to children and adults living off-site within neighboring residential communities.

- On-site Residents

  Increased cancer risk for child: 8.3×10^{-3} (mean-based); 1.4×10^{-2} (UCL-based).
  Increased cancer risk for adult: 6.9×10^{-3} (mean-based);1.2×10^{-2} (UCL-based)
  Noncarcinogenic health hazard index for child: 120 (mean-based); 210 (UCL-based)
  Noncarcinogenic health hazard index for adult: 26 (mean-based); 45.3 (UCL-based)
  Predominant exposure pathways - groundwater ingestion, vapor inhalation
  Explosive levels of methane gas reached in unventilated home space: 45 days

- Off-site Residents

  Increased cancer risk for child: 7.7×10^{-5} (mean-based); 7.6×10^{-5} (UCL-based).
  Increased cancer risk for adult: 5.0×10^{-5} (mean-based); 8.6×10^{-5} (UCL-based).
  Noncarcinogenic health hazard index for child: 0.9 (mean-based); 1.3 (UCL-based).
  Noncarcinogenic health hazard index for adult: 0.3 (mean-based); 0.4 (UCL-based).
  Predominant exposure pathways - vapor inhalation

Scenario II--Long Term Commercial/Industrial Use

A hypothetical situation, with workers on the site engaged in commercial or industrial activities. No disruption of the current soil cover occurs under this scenario. This scenario also estimated risks to the potential periodic on-site trespasser.

- On-site Adult Workers

  Increased cancer risk: 3.8×10^{-5} (mean-based); 6.6×10^{-5} (UCL-based).
  Noncarcinogenic health hazard index: 0.2 (mean-based); 0.3 (UCL-based).

Predominant exposure pathways - vapor inhalation

- Trespasser

  Increased cancer risk for child: 4.2×10^{-5} (mean-based); 7.3×10^{-5} (UCL-based).
  Increased cancer risk for adult: 3.2×10^{-5} (mean-based); 5.8×10^{-5} (UCL-based).
  Noncarcinogenic health hazard index for child: 0.05 (mean-based); 0.07 (UCL-based).
  Noncarcinogenic health hazard index for adult: 0.02 (mean-based); 0.02 (UCL-based).
  Predominant exposure pathways - vapor inhalation (carcinogenic effects); Dermal contact (noncarcinogenic effects)

Scenario III--2-Year Construction and Excavation Activities

This scenario evaluates risks to on-site workers and off-site residents during development, construction and excavation activities on the landfill over a period of two years. Under these conditions, the current soil cover is completely removed for a period of two years.

- Adult Worker

  Increased cancer risk: 5.0×10^{-5} (mean-based); 9.1×10^{-5} (UCL-based).
  Noncarcinogenic health hazard index: 1.6 (mean-based); 1.7 (UCL-based).
  Predominant exposure pathways - vapor inhalation

- Neighboring Off-site Resident

  Increased cancer risk for child: 1.6×10^{-4} (mean-based); 2.9×10^{-4} (UCL-based).
  Increased cancer risk for Adult: 3.4×10^{-5} (mean-based); 6.3×10^{-5} (UCL-based).
  Noncarcinogenic health hazard index for child: 4.6 (mean-based); 7.8 (UCL-based).
  Noncarcinogenic health hazard index for adult: 0.98 (mean-based); 1.7 (UCL-based).
  Predominant exposure pathways - vapor inhalation

Summary

The risk findings depend upon the assumptions regarding probable future use of the site. In particular, excavation activities associated with unrestricted construction and/or the development of the landfill into permanent homes is likely to result in greater risks to human health.

If the site is developed into permanent housing, the most immediate health hazard would be related to the possible accumulation of methane gas beneath housing structures and the potentially high injury or death rate that result from an explosion or fire. In addition, long-term residents might be subject to elevated cancer risks and noncarcinogenic health hazards. It should be noted that multiple regulatory restrictions are now in place in Southern California to avoid such hazards in the future.

In contrast, the estimated health risks are lower for the commercial/industrial future use scenario. Based on "reasonable maximum exposure" or "UCL-based" calculations, the estimated lifetime cancer risks to off-site residents/trespassers (1.3 per 100,000) and on-site workers (7.0 per 100,000) are well within target risk levels of 1 per 10,000 to 1 per 1,000,000..

6.0 EFFECTS OF CONTAMINATION UPON PRESENT, FUTURE, AND PROBABLE BENEFICIAL USES OF RESOURCES

6.1 Present Uses of the Land and Water in the Upper Operable Unit

The 157-acre Cal Compact Landfill site operated as a Class II landfill from 1959 until approximately 1965. The site became inactive and unproductive upon suspension of landfill operations. In 1978, the Carson Redevelopment Agency investigated the site's development potential. Thereafter, the site was rezoned mixed-use, commercial/light industrial and residential. Some basic infrustructure, underground utilities, roads and drainage, were installed. Development did not progress and the site remained generally unproductive. From 1991 to 1993, a concrete (demotition debris) crushing and recycling facility operated on small portion of the site. Since 1992, a small portion of the site, less than an acre, houses two mobile offices. The two offices are operated by Commercial Realty Project, Inc. Title to the site is currently held by World Industrial Center, LTD, a reorganized debtor under Chapter 11 of the U.S. Bankruptcy Code.

No significant beneficial use has been made of either the land or the groundwater in the Upper Operable Unit of the site. Except for the suspended development attempt, no significant beneficial use has been made of the land since the suspension of landfill operations in 1968. Since 1959, there are no records of any attempt to make beneficial use of the Bellflower Aquitard groundwater (Ref: record search, Section 1.3.3.1, RI, B&RE, 1995).

6.2 Future Uses of the Land and Water in the Upper Operable Unit

Currently, Commercial Realty Projects, Inc. plans to develop the site as commercial/light industrial. Generally, plans call for an enclosed, retail shopping mall near the center of the property, surrounded by access roads and parking lots. The perimeter of the property will provide additional retail and commercial building sites. The perimeter sites will also be served by access roads and parking lots. Except for specific stormwater run-off retention and landscaped areas, the entire site will eventually be covered by either building foundations, parking lots or roadways.

Currently, there are no specific plans to make beneficial use of the Bellflower Aquitard groundwater. However, consideration may be given to recycle some treated groundwater on site for irrigation purposes.

6.3 Probable Beneficial Uses of the Land and Water in the Upper Operable Unit

Remedial action of the Upper Operable Unit, as described in this final RAP, will allow the proposed redevelopment of the site to proceed. Redevelopment will produce substantial beneficial use of the land, including economic benfits in the form of new job opportunities for the community and new tax revenues for the City of Carson and the State of California.

In the future, the potential exists for treated effluent from the proposed Bellflower Aquitard groundwater extraction and treatment system, to be beneficially used for landscape irrigation. This potential future use of the Bellflower Aquitard groundwater will depend on the quantity and quality of the treated effluent.

7.0 REMEDIAL ACTION

7.1 Summary of Remedial Action Alternatives

The development, screening, and detailed analysis of remedial action alternatives is presented in the Final Report - Feasibility Study for Cal Compact Landfill (B&R Environmental, August 1995). Information contained in the FS report is summarized here.

The remedial alternatives for the site were assembled using the technologies and process options that remained after screening. The six remedial alternatives for the site include:

- "No Action"
- Limited Action (Monitoring of Groundwater and Landfill Gas)
- Excavation/Off-site Incineration/Groundwater Treatment
- Excavation/Off-site Disposal/Groundwater Treatment
- Containment/Collection and Treatment of Groundwater and Landfill Gas
- Containment/Collection and Treatment of Groundwater and Monitoring of Landfill Gas

Limited Action, Excavation/Off-site Incineration/Groundwater Treatment, and Excavation/Off-site Disposal/Groundwater Treatment were evaluated and eliminated due to high costs and the difficult implementability associated with excavation of over 7 million cubic yards of buried waste.

The remaining alternatives were evaluated against nine specific criteria. These evaluation criteria serve as the basis for the detailed analysis and the rationale for choosing the selected remedial alternative. The seven evaluation criteria are listed below:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reductions in toxicity, mobility, or volume
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

7.1.1 No Action

The No Action alternative involves no remedial activities at the Cal Compact site. The alternative provides a comparative baseline against which other alternatives can be evaluated.

This alternative will not achieve overall protection of human health and the environment, and will not actively reduce or control the migration of soil gas or groundwater contaminants to off-site areas. Risk associated with this alternative is the same as the baseline risk associated with the existing site conditions.

This alternative will not result in the reduction of toxicity, mobility, or volume of contaminants found at the site. There is no cost associated with this alternative. Implementation of this alternative is not anticipated to receive agency approval.

7.1.2 Containment/Collection and Treatment of Groundwater and Landfill Gas

The entire site would be capped. A foundation layer would be spread and compacted. Then a barrier layer of clay soil would be placed. A final, protective soil layer would complete the cap. Dust and vapor suppression controls will be implemented during cover installation

Groundwater will be collected and treated prior to discharge. The collection system will consist of a series of extraction wells placed along the western and southern boundaries of the site. The groundwater will be treated on site in a centrally located plant. Treatment will consist of precipitation of metals and carbon adsorption of VOCs and some SVOCs for discharge to surface water or carbon adsorption of VOCs and some SVOCs for discharge to the local sanitary sewer system. In either case, some treated groundwater may be used on-site as irrigation water. Monitor wells will be located around and off the site in both aquifers. Groundwater will be sampled quarterly to document the effectiveness of the remediation treatment system and determine compliance with the Remedial Action Goals (RAGs).

Gas collection will consist of a series of vertical extraction wells on the perimeter of the site. The collected gasses will be flared. Perimeter monitoring probes will be provided to determine the effectiveness of the systems. Landfill gas control will be provided when the results of gas monitoring indicate exceedance of the RAGs in association with relevant regulatory limits.

A surface cover will protect human health and the environment from exposure to contaminants of concern that are present in the buried waste. The surface cover will prevent dermal contact with the existing contaminants and reduce the potential for inhalation of landfill gases or particulates. Infiltration of surface waters will be greatly reduced by construction of a cover and will minimize the potential for additional landfill gas production and further migration of contaminants from the buried waste to the underlying groundwater. Off-site migration of contaminated groundwater will also be controlled through groundwater extraction and treatment. Landfill gas monitoring and control along the property boundary will control off-site migration of gases in the vadose zone. The collected landfill gases will be flared to eliminate contaminants from the environment.

Long-term risks from untreated buried wastes will be reduced by proper maintenance of the final cover. A post closure monitoring program will be developed to include activities to maintain and repair identified cover failures. Long-term risks associated with accumulated landfill gases and contaminants in groundwater will be reduced by implementing landfill gas monitoring and collection and treatment and groundwater collection and treatment. A monitoring program will evaluate each treatment systems effectiveness.

Although not a treatment, a surface cover will reduce the mobility of the contaminants of concern that are present in the buried waste. Mobility of these contaminants will be reduced by preventing infiltration of surface water into the buried waste. The mass of contaminants that are contained in the buried waste material will not be substantially reduced. Groundwater collection and treatment will reduce the volume and concentration of contaminants in the underlying aquifer. The reduction in the volume and concentration of contaminants in the groundwater reduces the risk and/or toxicity associated with this media. Collection and treatment of landfill gas will result in compliance with the relevant regulations.

Short-term risks that are associated with implementation of this alternative include creating dust/particulate emissions from the buried waste, releasing landfill gases, and direct contact with exposed buried waste. The community in the near vicinity of the site will be protected by utilizing techniques to reduce dust, particulate, and vapor emissions. Materials that are generated during construction of the groundwater extraction wells and landfill gas extraction wells equipped with gas monitoring probes will be handled in a manner that does not generate appreciable quantities of dust, particulates, or vapors. Waste materials that are removed from the site will be properly managed and disposed of at appropriate facilities.

The construction equipment and materials that will be used are readily available. Construction methods and techniques that will be employed follow industry standards. The groundwater and landfill gas extraction wells/probes will be constructed using standard drilling equipment and well construction materials. The groundwater and landfill gas systems proposed are currently in widespread use. Groundwater and landfill gas systems will be constructed using currently available equipment and materials. Construction of these systems will follow industry standards.

Capital costs for this alternative are high and O&M costs are high compared to the other alternative.

7.1.3 Containment/Collection and Treatment of Groundwater and Monitoring of Landfill Gas

The entire site would be capped. A foundation layer would be spread and compacted. Then a barrier layer of clay soil would be placed. A final, protective soil layer would complete the cap. Dust and vapor suppression controls will be implemented during cover installation. Groundwater will be collected and treated prior to discharge. Monitor wells will be located around the site and groundwater will be sampled on quarterly intervals . Perimeter landfill gas monitoring probes will be provided. Landfill gas will be analyzed periodically according to landfill gas monitoring plan to determine the presence of gas migration.

A surface cover will protect human health and the environment from exposure to contaminants of concern that are present in the buried waste. The surface cover would prevent dermal contact with the existing contaminants and reduce the potential for inhalation of landfill gases or particulates. Infiltration of surface waters will be greatly reduced which minimizes the potential for additional landfill gas production, and further migration of contaminants from the buried waste to the underlying groundwater. Off-site migration of these substances will also be reduced through groundwater extraction and treatment. This alternative will not actively reduce or control the migration of contaminants in soil gas to off-site areas. Lack of landfill gas controls will increase the potential for gases to collect under the surface cover and migrate upward.

Long-term risks from untreated buried wastes will be reduced by proper maintenance of the final cover. A post closure monitoring program will be developed to maintain and repair identified cover failures. Potential risks associated with landfill gas contaminants, if presence, will not be reduced.

Although not a treatment, a surface cover will reduce the mobility of the contaminants of concern that are present in the buried waste. Mobility of these contaminants will be reduced by preventing infiltration of surface water into the existing soil cover/buried waste. The volume of contaminants that are contained in the buried waste material will not be substantially reduced.

The short-term risks that are associated with implementation of this alternative include creating dust/particulate emissions from the existing soil cover/buried waste, releasing landfill gases, and direct contact with exposed buried waste. These risks will be mitigated during implementation of this alternative by incorporating proper safeguards.

The construction equipment and materials that will be used during construction activities are readily available. Construction methods and techniques that will be employed follow industry standards. Materials for dust, particulate, and vapor control, such as water, suppressant foam, and polyethylene sheeting, that will be used are also readily available.

Capital costs for this alternative are high and O&M costs are moderate compared to the other alternative.

7.2 Recommended Remedial Action

Information used in the selection of a preferred remedial action alternative is presented in Section 6.0 - Comparative Analysis in the FS Report. Summary of the comparative analysis (ref.: Table 6-1, FS Report) is shown in Table 7-1. Results of the comparative analysis indicated that the preferred remedial action alternative should include a combination of the following actions.

- Construction of a low-permeability clay cover system for the entire site to contain the buried waste and the impacted soil on-site.
- Installation of groundwater extraction and treatment systems along the downgradient side of the site to intercept/capture groundwater contamination coming from the site. The perimeter groundwater system will also capture off-site migration of the groundwater contamination that exceeds the remediation goals.

- Installation of a perimeter landfill gas extraction, control, and treatment system along the the site boundary within the waste zone. The perimeter landfill gas control and treatment system will be used to minimize the potential off-site migration and impacts to air quality standards in compliance with the relevant regulations. Additionally, an updated landfill gas survey will be conducted. Following the landfill gas survey, the data will be evaluated to determine whether a gas collection system is necessary to achieve regulatory compliance. Based upon survey results and regulatory agencies approval, a landfill gas collection system may or may not be required.

- Implementation of long-term monitoring of the groundwater and landfill gases.

- Long-term maintenance of the landfill cap.

For the purpose of protecting the proposed site development, additional system design/installation including an interior landfill gas collection system for on-site building area will need to be constructed. Detailed descriptions of such syetm and/or requirements are presented in Section 8.0.

The preferred remedial actions have been determined to be protective of human health and the environment. These actions meet site-specific RAOs for the UOU. These actions were selected over other alternatives because: (1) they fully comply with the ARARs, (2) they are most effective in preventing, minimizing, or significantly reducing the risk/exposure of the buried waste, contaminated groundwater, and landfill gases, (3) they employ proven technologies from similar remediation projects, and (4) they are cost-effective.

To ensure the proper design, construction, and implementation of the systems indicated above, recommendations are also provided for the following actions/activities.

- Development and performance of detailed confirmatory investigations to obtain additional information for the RD. The planned confirmatory investigations include (1) groundwater aquifer pump test and (2) landfill gas survey.

During the RD phase, operation and maintenance and monitoring programs will also be developed for all remedial systems.

7.2.1 Confirmatory Investigations for Remedial System Design

7.2.1.1 Aquifer Pump Test

Aquifer testing will be conducted in the Bellflower Aquitard to verify specific hydrogeologic data required for the design of the groundwater extraction system. Prior to conducting the pump test, an aquifer pump test work plan will be prepared and submitted for DTSC review and approval. At least one pump test will be conducted. The pump test will be conducted in a newly installed well. Additional pumping tests, if needed will be conducted in either new wells or existing well locations. Each pump test will require the installation of an array of three observation wells (piezometers), spaced at 40, 80, and 160 feet from the test well. The target screening zone for the pump test wells will be in the Bellflower sand unit beneath the bottom of the waste (approximate interval between -25 and-60 MSL).

If required, aquifer slug tests may also be performed on existing monitoring wells to assist identifying the hydrogeologic parameters. Slug test data will be correlated against the pump test data to evaluate hydrogeologic characteristics.

7.2.1.2 Landfill Gas Survey

To ensure the compliance status of the site gases and emissions regarding the development/design of a landfill gas monitoring and control system, an updated landfill gas survey will be performed during the RD phase. The survey protocol will be based on Section II.A of the California Air Resource Board (CARB) guidelines including integrated surface sampling, ambient air monitoring at or near the site perimeter, and enhanced perimeter gas probes. Prior to conducting the survey, a landfill gas survey work plan will be prepared and submitted to DTSC, SCAQMD, and RWQCB for review and approval.

In accordance with California Health and Safety Code (H&S) Section 41805.5, a minimum of one integrated surface sampling grid will be established for the entire site. The integrated surface sampling will collect one continuous air sample three inches above the ground surface within the grid along the standard walking pattern. The sample will be analyzed for (1) Calderon[1] air contaminants and (2) total organic compounds measured as methane. Ambient air monitoring will be conducted at or near the site perimeter to verify existing air quality near the landfill according to the CARB guidelines. The sampling will consist of two, 24-hour samples and two, less-than-24-hour samples, to be performed on three different (not necessarily consecutive) days. The samples will be analyzed for Calderon air contaminants.

To verify the potential off-site gas migration, a minimum of 12 monitoring wells/probes will be installed at approximately 1000-foot spacings along the property boundaries. Each perimeter wellbore will nest a shallow probe at 5 to 10 feet depth, an intermediate probe at or near half the depth of the wellbore, and a deep probe at or near the depth of the wellbore above the permanent low seasonal water table. The specific depths of probes will be placed adjacent to most conductive (i.e., pervious) zones. The samples will be analyzed for (1) Calderon air contaminants, (2) total organic compounds measured as methane, and (3) VOCs. During sampling, the barometric pressure and ambient air temperature will also be measured at each probe location. The specific perimeter monitoring network will be performed according to CCR

[1] Assembly Bill 3525 (Calderon) of 1984 and amendments require the testing of air emissions from existing solid waste site for the purpose of solid waste air quality assessment test. Specific Calderon compounds include: Chloroethene (Vinyl Chloride), Benzene, 1,2-Dibromoethane (Ethylene Dibromide), 1,2-Dichloroethane (Ethylene Dichloride), Dichloromethane (Methylene Chloride), Tetrachloroethane (Perchloroethylene), Tetrachloromethane (Carbon Tetrachloride), 1,1,1-Trichloroethane (Methyl Chloroform), Trichloroethylene, and Trichloromethane (Chloroform).

Title 14, Article 7.8 .- Integrated Waste Management Board requirements for Gas Monitoring During Closure and Postclosure (Sections 17783 and seq.). The gas wells/probes will be maintained as a part of the overall perimeter monitoring network system for further monitoring. Specific number of the wells/probes will be identified in the landfill gas survey work plan and be approved by DTSC.

7.2.2 Landfill Cover System

Containment of the chemicals within the buried waste will be achieved by constructing a surface cover over the entire landfill site. The selected cover system addresses the waste containment to support the RAOs and also provides a cover system that can remain functional during anticipated landfill settlement.

As evaluated in the FS, the selected landfill cover alternatives consist of several components (layers) of material acting together as a complete cover system. Based on the evaluation, the alternative of using an impermeable asphalt layer was eliminated because of its relatively new and unproven record for the landfill cover application. The preferred cover system for the site is to install an 24 inch thick low-permeability clay layer as a basic barrier layer.

For future land use/development, additional design and construction considerations will be included to enhance the integrity of the cover system. Enhanced cover design and construction considerations for the future land use/development are described in Section 8.0.

Details of the preferred landfill cover system are shown in Figure 7-1. The cover system will use clean imported soil, free of toxic and deleterious substances and certified clean by supplier. The acceptance of the clean soil material/sources shall be approved by DTSC prior to utilization. Brief descriptions of the components of the cover system are summarized below.

- Foundation Layer. A compacted foundation layer serves to support the cover system. This foundation layer will have a thickness of 24 inches and will be constructed from existing soil cover material and/or suitable imported material. For the purpose of the RAP, a thickness of 12 inches of existing soil cover will be accounted for as a part of the foundation layer.

- Clay Layer. The barrier layer for the entire site will include the construction of a minimum of 24-inch clay material using suitable off-site borrowed soil having a permeability of $1x10^{-6}$ cm/sec or less. As needed, bentonite amended soil may be added to achieve the required permeability.

- Protective Soil Cover. A layer of compacted soil cover serves to protect the barrier layer. The protective soil cover is placed above the barrier layer and will have a thickness of 18 inches. This protective soil cover will be constructed from suitable imported material.

- Top Soil. A top soil layer of suitable material which supports vegetation with a root systems less than the depth of the top soil layer. A top soil layer is required only in the landscape areas if coordinated with the future site development activities. The top soil will have a normal thickness of 12 inches and may replace the top 6 inches of the protective soil cover.

Surface Cover Transitions

A conceptual drawing showing how each cover material will transition from one to another is presented in Figure 7-2. This figure also shows transitions to areas under buildings which will be part of future site development. The additional measures shown are not a part of the recommended remedial action. The final cover design will be engineered during the remedial design phase. The final cover design will also include details on liner selection, manufacturers, installation, specifications, and construction QA/QC control.

7.2.3 Groundwater Extraction and Treatment

Findings from the RI indicated that volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals are present in groundwater at concentrations above the defined background levels and in instances above the ARAR-based levels. Due to the uncertainty of contaminant sources and the potential impact of the surrounding properties, remedial alternatives are selected to combine the groundwater containment with the traditional extraction and treatment process. The preferred remedial alternative for groundwater remediation is to provide groundwater extraction and treatment along the downgradient side of the site. The proposed extraction well locations are presented on Figure 7-3. The purpose of the groundwater remediation is to prevent or significantly reduce potentially contaminated groundwater going off site or impacting other water sources.

7.2.3.1 Groundwater Containment and Extraction

Groundwater will be extracted through 6-inch diameter PVC or stainless steel vertical extraction wells along the downgradient site perimeter as shown on Figure 7-43. Based on the data provided in the RI from preliminary aquifer hydraulic characteristic testing, extraction wells will be arranged at 150 to 200 feet spacing. The extraction network will provide a drawdown of approximate 10 to 15 feet with a zone of influence of about 150 feet. It is anticipated that a total of 26 extraction wells will be required. The flow rate at each well is estimated at 3 to 5 gallons per minute (gpm) for a total estimated extraction rate of 78 to 130 gpm. Well headworks will consist of sample ports, sounding ports, pressure gauges, and valving. Each extraction well will be protected by a traffic rated vault box. Extracted groundwater will be routed to the treatment unit before discharging to the facility storm drain system for off-site discharge into the Torrance Lateral Channel or to the facility sanitary sewer system for off-site discharge into the local sanitary sewer system. In either case, some treated groundwater may be recycled within the development for irrigation purposes. Groundwater will be conveyed below surface to the treatment area using PVC piping.

Final design details and specifications for the extraction well system will be based on data collected during the previously described pump tests. Time frame for the extraction of groundwater to meet the RAGs may be determined as more detailed hydraulic and chemical data become available.

7.2.3.2 Groundwater Treatment

Groundwater quality data in the RI indicate the presence of VOCs, SVOCs or metals at concentrations above regulatory criteria at various locations along the site. As discussed above, preliminary sizing of the treatment system is based on approximately 100 gpm of extracted groundwater. The groundwater treatment system will consist of an equalization (holding tank) step, a filtering (screening) step to remove suspended solids, a precipitation/sedimentation step or steps to remove metals, a treatment step using activated carbon to remove organics, and a final polishing filter step to remove settlable solids prior to discharge.

Extracted groundwater will be directed to the equalization tank to account for equalization of flow from the individual pumps. The equalization tank will be followed with an in-line filter to remove suspended solids. The precipitation/sedimentation treatment step will precipitate and settle metal contaminants prior to the activated carbon system. Precipitated waste sludge which could contain heavy metals concentrated in amounts which may be hazardous will be transported off-site to an approved disposal or recycling facility.

The organic treatment step consists of two activated carbon adsorbers operated in series. Sampling stations will be located at the inlet and outlet of each carbon adsorber. A sampling program will be developed to meet the requirements of the NPDES or the local sanitary sewer pretreatment permit. Either of these permits will set the sampling frequency, discharge contaminant concentration limits, and reporting requirements for discharge of treated water into the storm drain system or the local sanitary sewer system.

The NPDES or pretreatment permit typically requires the following monitoring and reporting:

- Daily flow recording
- Periodic point of discharge sampling
- Monthly point of discharge reporting
- Annual reporting of yearly activities.

Table 7-2 presents the discharge limitations required to be achieved in order to discharge the treated groundwater off-site.

The sampling program will also serve to determine when carbon disposal and replacement is required. Sampling of each carbon adsorber will be used to determine when breakthrough has occurred. Spent carbon will be transported off-site to an approved disposal or regeneration facility.

Groundwater treatment equipment will be constructed on a reinforced concrete pad or equivalent structure located for ease of maintenance and considering future site development plans. The system will be secured by constructing a fence or block wall with appropriate access gates.

Detailed groundwater modeling to determine the duration of groundwater treatment required to meet the RAGs has not been undertaken. This modeling will be undertaken as more detailed information on the hydraulic and chemical characteristics of the aquifers become available. Treatment time frames for the purposes of the RAP cost estimate have been assumed to be 30 years.

Figure 7-4 shows a conceptual groundwater treatment system flow schematic. A final treatment system design and operation and maintenance program will be developed during the remedial design phase. Due to the contaminant characteristics in the groundwater, it is anticipated that treatability studies are required to fine-tune the precise treatment steps necessary to achieve the discharge limitations selected depending on the ultimate discharge location.

7.2.4 Landfill Gas Control and Treatment

As required under Section 17783 and seq., CCR Title 14, article 7.8 - Gas Monitoring and Control During Closure and Postclosure, landfill gas control is necessary when the results of gas monitoring indicate concentrations of landfill gas (i.e., methane and other trace gases) in excess of the compliance levels. To ensure the compliance status of the site gases and emissions, an updated landfill gas survey (Section 7.2.1.2) and perimeter monitoring program (Section 7.2.5.2) will be implemented. Pending confirmation of the landfill gas data, landfill gas control is assumed necessary in the FS. However, based upon survey results and regulatory agencies approval, the landfill gas control may or may not be required.

The preferred landfill gas control, collection, and treatment system will consist of: (1) a series of vertical gas extraction wells within outer edges of the waste cells along the site boundaries, (2) thermal destruction of collected gas using a flare unit, and (3) other gas monitoring and venting systems , if determined necessary and applicable. Figure 7-5 presents a conceptual gas extraction well detail. Figure 7-6 presents a conceptual flare unit design.

The gas control wells will be installed and screened at appropriate depths intercepting the pervious or semi-pervious zones above the water table. Depending on the presence of the methane and toxic contaminants, these wells will be designed either as a passive or active system to intercept/control the potential offsite migration. As required, the gas control system design will be conducted and submitted for DTSC's approved prior to implementation.. For the purpose of this RAP, the perimeter gas control system assumes the use of an active extraction system with a typical well spacing of 200 feet and an average depth of about 40 feet. As a result, a total of 55 wells will be constructed along the site boundaries as shown on Figure 7-7. Detailed design of the gas control system including actual number of wells and specific spacing will be determined based on the landfill gas survey as indicated in Section 7.2.1.1.

Based on the size of the site and the need of the perimeter landfill gas control, it is assumed that the landfill gas treatment will require the construction of a flare units including related collection headers, blowers, and gas sampling and processing components. Collected landfill gas will be delivered from the header system to the flare by a blower. The gas will pass through an automatic shut-off valve and a flame arrestor to prevent flash back. Landfill gas will be mixed with dilution air for efficient combustion at the flare burner elements. Dilution will be automatically introduced into the flare by a dilution air valve regulated by the combustion temperature. Supplemental fuel (natural gas or propane) will be automatically introduced into the flare to maintain the required combustion temperature and thermal efficiency. The flare will be equipped with standard safeguard controls and other required air emission control devices to monitor operating conditions and shut down the system when appropriate. The flare will be constructed or shielded from the travelling motorists as to minimize or reduce the potential for visual distraction.

For future land use/development, the landfill gas control will include the installation of a geosynthetic membrane layer and/or an active landfill gas ventilation system underneath the building structures. Specific landfill gas control for the future building structures is described under Section 8.0.

7.2.5 Site Environmental Monitoring

7.2.5.1 Quarterly Groundwater Monitoring

Quarterly groundwater monitoring for the UOU (Bellflower Aquitard) will be performed in accordance with relevant regulations set forth in Sec. 2550.7 (D), CCR Title 23, Chapter 15, Article 5 - Water Quality Monitoring for Corrective Action Program. The purpose of the groundwater monitoring system is to provide adequate and representative groundwater quality data to monitor the effectiveness and duration of the groundwater remedial action. Monitoring data will be used to adjust the remedial strategy so that chemical compounds detected in the groundwater are not migrating offsite.

The monitoring program will include monitoring points installed at appropriate locations and depths such as downgradient points (on-site and off-site), upgradient points, and monitoring points in the Gage aquifer beneath the UOU. For the purpose of this RAP, the proposed monitoring network will include the use of (1) approximately five new downgradient monitoring wells located outside the leading edge of the identified contamination area of concern near the west and southwest corner of the property, (2) one new upgradient well near the northeast property boundary, and (3) three new Gage monitoring wells, one upgradient and two downgradient. As appropriate, several existing monitoring wells including the two Gage wells will be redeveloped and used as a part of the monitoring program. Approximate locations of these wells are shown in Figure 7-7. Specific number and location of the wells will be determined during final development of the groundwater monitoring program and approved by DTSC. The first groundwater sampling event including all proposed monitoring wells will be implemented prior to initiating of any site work.

The new wells will be drilled and constructed using hollow stem auger or mud rotary drilling technologies, whichever is appropriate. Each well will be 4-inches in diameter and constructed of stainless steel screen and blank casing. The screen slot width and screen length will be based on findings from the previous RIs and lithologic data obtained during the drilling of each monitoring well and sieve analyses of representative water-bearing materials. Generally speaking, the Bellflower monitoring wells will be completed across the entire saturated interval in the Bellflower sand with a typical 10 feet screen section located above the bottom of the sand layer. Gage monitoring wells will screen the upper 20 feet of its water-bearing zone. A typical monitor well is illustrated in Figure 7-8.

Groundwater monitoring and sampling of all monitoring wells is to be initially conducted on a quarterly basis for one year and analyzed for 34 VOCs in the Target Compound List (TCL) using EPA Method 624, 65 SVOCs in the TCL using EPA Method 625, and a suite of 23 metals using EPA Methods 6010 and 7000 series. After one year, the frequency and the analyses to be performed should be re-evaluated and modified as appropriate. In general, the monitoring program will be conducted for 30 years or until that the groundwater contamination has been in continuous compliance with the preliminary remediation goals and upon DTSC and RWQCB written approval. A detailed groundwater monitoring program will be prepared and submitted for DTSC approval during the remedial design phase prior to implementation.

7.2.5.2 Landfill Gas Monitoring

Quarterly landfill gas monitoring at the Cal Compact site will be performed in accordance with relevant regulations set forth in Sec. 17783 et. seq., CCR Title 14, Division 7, Article 7.8 - Gas Monitoring During Closure and Postclosure. The purpose of the landfill gas monitoring is to provide early warning of potential off-site migration and to ensure proper control of the landfill gases. Specific requirements for the gas monitoring include (1) the concentration of methane gas must not exceed 1.25 percent by volume in air within on-site structure, (2) the concentration of methane gas must not exceed 5 percent by volume in air at the facility property boundary, and (3) trace gases must be controlled to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds. Monitoring data will be used to adjust the gas collection and treatment measures so that gas control and treatment system will be properly implemented.

The landfill gas monitoring system will include the use of a series of perimeter gas monitoring network as specified under CCR Title 14, Division 7, Article 7.8 - Integrated Waste Management Board requirements for Gas Monitoring During Closure and Postclosure (Sections 17783 and seq.). The planned monitoring network will utilize a total of 18 monitoring wells/probes including the initial 12 gas wells/probes to be installed for the proposed landfill gas confirmatory survey (Section 7.2.1.2). The monitoring network will be distributed along the entire property perimeter within the native soil. Spacing of the wells will be approximately 1000 feet along the north and east property boundaries and 500 feet along the south and west property boundaries near the neighboring residential area. Approximate locations of these wells are shown in Figure 7-7. Each perimeter wellbore will nest a shallow probe at 5 to 10 feet depth, an intermediate probe at or near half the depth of the wellbore, and a deep probe at or near the depth of the wellbore above the permanent low seasonal water table. The specific depths of probes will be placed adjacent to most conductive (i.e., pervious) zones.

Based on data revealed from the RI as well as the relevant monitoring requirements, the perimeter landfill gas monitoring will include the analysis of (1) Calderon air contaminants in particular Benzene and Vinyl Chloride, and (2) total organic compounds measured as methane.

As a general guidance, the landfill gas monitoring will be conducted on a quarterly basis during the postclosure care period of 30 years. The monitoring program may be re-evaluated and modified as appropriate if the gas control/monitoring warrants such changes. A landfill gas monitoring program will be prepared and submitted for DTSC's approval prior to implementation.

7.2.6 Former Oil and Water Wells Investigation

An additional investigation will be conducted during the implementation phase of the RAP to locate the former oil and water wells at the Site to address issues such as the risk of downward migration of contaminants into lower aquifers. To the extent feasible, the former water well and two oil wells will be located and abandoned to meet current regulatory standards. All available information regarding the location of these wells will be utilized in this investigation. The location of the wells will be re-surveyed using available historic data. Survey locations will then be compared to the prior investigations. Based on the results of these investigations, an excavation plan will be considered. This excavation plan shall be limited to those Site areas with the highest probability of finding the oil and water wells. Such limitation is further justified because of the risk associated with excavating buried hazardous substances. Prior to any excavation the health risk of such activities will be evaluated to assess the appropriateness of such excavation. Regulatory approval of all plans and permits will be obtained prior to any excavation activities.

A fate and transport modeling program may also be conducted to evaluate the potential risk to the lower aquifers. Should such program reveal that the potential risk to the lower aquifers from the abandoned wells is insignificant, then excavation, and well abandonment need not be pursued.

In the event that an excavation is conducted to locate these wells, DTSC may suspend such investigation if the investigation itself poses a human health or environmental threat. If the investigation fails to locate these wells, the search for these wells will cease and all other remedial activities will be implemented.

7.3 Consistency with ARARs

7.3.1 Chemical-Specific ARARs

Chemical-specific ARARs are usually health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. (CERCLA Compliance With Other Laws Manual: Interim Final, EPA/540/1G-89/006, August 1988)

The most common chemical-specific standards or references that are used to establish chemical-specific ARARs are:

- Federal Safe Drinking Water Act and California Primary and Secondary Drinking Water Standards establish levels for compounds found in public drinking water supplies as Maximum Contaminant Levels (MCLs) . The state may establish more stringent MCLs than the Federal standards.

- Federal Clean Air Act National Primary and Secondary Ambient Air Quality Standards and the California Air Quality Standards establish protective concentrations for compounds found in ambient air.

- Federal Clean Water Act and the California Water Quality Protection Standards set guidelines for concentrations of pollutants depending on the designated uses of the surface water body (i.e. noncontact recreational versus public drinking water supply).

- The State of California has an anti-degradation policy requiring cleanup to background water quality or to the lowest concentrations technically and economically feasible to achieve.

The recommended remedial action is consistent with the chemical-specific ARARs as discussed below.

The use of MCLs as an ARAR is considered relevant as required by DTSC and RWQCB although the groundwater quality for the Bellflower Aquitard may not be considered a source of drinking water and the recommended remedial action does not return (i.e. reinject) groundwater to the source. The State of California definition of a drinking water source is a source that has a total dissolved solids (TDS) of less than 3000 parts per million (ppm). Recent data collected at the site indicates that the upgradient wells are showing TDS concentrations above 3000 ppm.

Air emissions from the site (i.e. the landfill gas collection and treatment system) will require permitting under the state air quality standards as administered by the South Coast Air Quality Management District. Permitting includes submittal of a permit application, regulatory agency review, public comment, and approval. As stated in the permit, periodic monitoring (of the landfill gas) and reporting are required to determine compliance.

Discharges (both storm water runoff and the effluent from the groundwater treatment system - if discharged off-site) will require permitting under the National Pollutant Discharge Elimination System (NPDES) and state permitting program as administered by the Regional Water Board or the local sanitary sewer pretreatment standards to set compliance with water quality standards. Permitting includes submittal of a permit application, regulatory agency review, public comment, and approval. As stated in the discharge permit, periodic effluent quality monitoring and reporting are required to determine compliance and monitor treatment system efficiency.

In accordance with the ARAR requirements, specific Remedial Action Goals (RAGs) for the groundwater and landfill gas are proposed in Tables 7-3 and 7-4, respectively. The RAGs for groundwater are based on the State's non-degradation policy for on/off-site groundwater and on the State's interpretation that the Bellflower Aquitard may be a future drinking water source. If this interpretation becomes inappropriate in the future, or the proposed RAGs are demonstrated physically or economically unachievable, the RAGs for groundwater may be adjusted upon regulatory agencies approval.

7.3.2 Action-Specific ARARs

Action-specific ARARs are technology- or activity-based requirements for activities undertaken with respect to remedial actions. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. Action-specific ARARs do not determine the remedial alternative but indicate how a selected alternative must be achieved. Action-specific ARARs may establish performance levels, actions, or technologies, as well as specific levels for discharged or residual contaminants. (CERCLA Compliance With Other Laws Manual: Interim Final, EPA/540/1G-89/006, August 1988)

Some of the most common regulations and standards used to establish action-specific ARARs are:

- Federal Resource Conservation and Recovery Act and California hazardous waste regulations under the CCR Title 22
  - hazardous waste requirements for generators and transporters
  - hazardous waste treatment, storage, and disposal requirements
  - land disposal restrictions
  - land treatment requirements
  - minimum technology standards

- National Emission Standards for Hazardous Air Pollutants (NESHAPs) under the Clean Air Act

- National Pollutant Discharge Elimination System (NPDES) permitting program under the Clean Water Act and California Regional Water Quality Control Plan

- Department of Transportation (DOT) requirements for transportation of hazardous waste on public roadways

- Health and safety requirements for remediation workers under the Occupational Health and Safety Act (OSHA)

- State noise requirements for construction sites

The recommended remedial action is consistent with the action-specific ARARs as discussed below.

The removal of contaminants in the groundwater treatment system will generate wastes which will probably be hazardous and subject to the RCRA regulations. These wastes will consist of solids containing heavy metals and spent carbon with volatile organics adsorbed on the surface of the carbon. Handling, transportation, and disposal or recycle of these wastes will be conducted under the appropriate requirements. The owner of the site will be required to register as a hazardous and/or solid waste generator and comply with reporting requirements. Potentially hazardous wastes generated at the site from the groundwater treatment system will be transported by licensed haulers as required by the DOT and the State Department of Toxic Substances Control. These hazardous wastes will be disposed of in an appropriately permitted facility.

As discussed in the chemical-specific ARARs, air permits will be required for the groundwater treatment and landfill gas collection and control system. Additional requirements which may be relevant are found in the NESHAPs for controlling wastewater streams containing benzene. Should activities, such as grading or excavation, expose buried landfill material to the atmosphere, as defined by SCAQMD Rule 1150, an Excavation Management Plan will be submitted to SCAQMD. All required permits and approval shall be obtained prior to any landfill excavation activities.

The NPDES program regulates the discharge of effluent to off-site waters. This will control the discharge from the groundwater treatment system as discussed in the chemical-specific ARARs. If the option to discharge to the local sanitary sewer is pursued, this regulation will also determine the pretreatment requirements for discharge into a publicly owner treatment works (POTW).

Health and safety requirements for remedial construction workers at the site will be regulated by OSHA and will set limits on exposures and minimum training requirements. A Health and

Safety Plan will be written to determine levels of personnel protection and monitoring required for remedial construction workers.

Noise requirements for remedial construction will be monitored and controlled as necessary.

7.3.3 Location-Specific ARARs

The location of a site is fundamental in determining its impact upon human health and the environment. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities because they occur in specific locations. (CERCLA Compliance With Other Laws Manual: Interim Final, EPA/540/1G-89/006, August 1988)

These location-specific ARARs typically include restrictions on locations such as flood plains, if historic sites are present, if endangered species are present, delineated wetlands, etc. There can also be some local regulatory agency requirements that must be followed during remedial activities.

The recommended remedial action will be consistent with the location-specific ARARs as discussed below.

On-site systems for groundwater treatment and landfill gas collection and control will comply with local requirements such as building codes, Fire Marshall office inspections, traffic control, and nuisance ordinances such as noise.

Deed restrictions may be placed on the property because waste will be left in-place underneath the cap system. Notification of property transactions or transfers may be required, along with continued financial responsibility.

The following approvals and permits are required for implementation of the selected remedial alternative:

- DTSC approval of the final cover, groundwater treatment system, and landfill gas collection and treatment system. The engineering design for each element of the selected alternative will be submitted for DTSC for review and approval at the completion of the RD phase.
- RWQCB review and approval of the final cover design and groundwater treatment system.
- NPDES permit from the RWQCB for the discharge of treated groundwater.
- SCAQMD permit for landfill excavation during construction of the final cover.
- SCAQMD permit to construct and operate the landfill gas collection system and flare units.

- Various local agency permits for construction activities.

7.4 Mitigation Measures for Remedial Activities

The following mitigation measures are proposed to minimize potential impacts which may result from the remedial activities. The remedial activities include construction of a landfill cap, construction of a groundwater extraction, monitoring, and treatment system, and construction of a landfill gas control system.

7.4.1 Dust and Particulate Monitoring

Earthwork associated with landfill cap construction will generate dust and air borne particulates. To ensure proper protection of human health due to dust and particulate matters, dust/particulate samples will be collected and analyzed for suspended particulate matter of 10μ of less in size (PM_{10}), Lead particulate, and potential toxic air contaminants during the remediation process. Based on results of the Baseline Risk Assessment (B&R Environmental, 1995) for a two-year construction scenario, Chromium is the only air contaminant that exhibits a potential inhalation cancer risk (UCL) of $6.0x10^{-6}$, $3.3x10^{-6}$, and $1.3x10^{-6}$ for offsite resident child, on-site worker, and off-site resident adult, respectively. In all cases, Chromium contributes more than 99 percent of the total cancer risk for inhalation of particulates. Total hazardous index values fcr inhalation of particulates are all less than one for on- and off-site worker/resident under the two-year construction scenario. Thus, only Chromium will be monitored as a potential toxic air contaminants. The monitoring will include a baseline monitoring prior to initiating the remedial work and a real-time perimeter monitoring during the remediation.

The baseline monitoring will be used to assess pre-remediation surface soil condition that may impact the dust and particulate concern for the on-site remedial activities. Airborne substances to be monitored will include Hexavalent Chromium as potential toxic air contaminant and PM_{10} and Lead under the relevant air quality standards. To verify the concern of the suspended Chromium and Lead particulates, a minimum of five samples will be collected using High Volume Sampler which draws air particulates through the filter paper sampling media. The sample media will be sent to a state certified laboratory for specific analyses. Monitoring of PM_{10} will be conducted for one, 24-hour duration using PM_{10} monitoring procedures stated below.

Airborne particulate monitoring during remediation will be implemented by monitoring the PM_{10}, Lead, and Hex-Chromium. Initially, upon start-up of the earth work activities, PM_{10} will be monitored at eight perimeter monitoring points along east, south, west, and north site boundaries. Since wind direction changes, an on-site Anemometer will be used to monitor the wind speed and direction for the PM_{10} monitoring. Wind data collected will be used to identify the up- and down-wind PM_{10} readings. A MIE Miniram type (or equivalent) PM_{10} monitor will be used for real-time data reporting at every two-hour interval during the active work duration. Lead and Chromium (VI) monitoring will be conducted initially for three, one-day (not necessarily consecutive) periods at one downwind and one upwind locations. High Vol. filter samples will be collected and laboratory analyzed for monitoring result.

As remediation work progresses, the PM_{10} monitoring will be adjusted to one to two times a day and/or during relatively high wind/dust condition as determined by the site health and safety officer. Based on initial data results, periodic Chromium (VI) and Lead particulate monitoring will be conducted as determined by the site health and safety officer to ensure the compliance requirements.

All particulate monitoring data will be properly documented immediately upon measurements in a daily monitoring report to determine when the air quality is exceeding the significant effect. The significant effect will be set as "action levels" in accordance with the California air quality standards and/or site-specific risk assessment calculations to prevent adverse health concern. For the purpose of this RAP, action levels for particulate monitoring are established in Table 7-5. Should the monitoring result exceed the action level, field activities will be temporarily shut down until proper corrective actions are executed. Corrective actions will include immediately wetting the working area with water or appropriate dust suppressant and/or adjusting the field activities to ensure compliance requirements. Details of the air monitoring program will be included in earthwork contractor's work plan and approved by DTSC.

7.4.2 Dust and Particulate Control

The dust control measures will be in compliance with SCAQMD Rule 403. Based on anticipated engineering design considerations, the soil materials used to construct the cover will need to be preconditioned with water. The preconditioned soil should be damp enough to that it does not readily produce dust during placement. Dust and airborne particulate that is generated during placement of the material will be primarily controlled by wetting the working surface. Wetting will be performed as required to reduce fugitive dust, but not less than twice per day. As needed, commercially available additives, suppressant foams, and mulches will be considered to augment the standard water treatment. For disturbed dirt areas which remain inactive over an extended period of time, soil stabilization measures will be provided such as smooth rolling the surface with a steel drum roller or application of moisture retaining binders to form a sealed cover.

Roads must be cleaned, swept, or scraped at regular intervals in accordance with the City of Carson's haul route permit if required, or other applicable instrument acceptable to the City of Carson.

Fill material imported by haul trucks will be covered by a tarp or other means. Haul trucks exiting the site will be visually inspected at a dust control monitoring station to ensure they have been adequately cleaned/washed for residual dirt. All construction vehicle tires will be washed at the time these vehicles exit the site. To ensure proper execution, a staging, unloading, and cleaning process will be designed in earthwork contractor's work plan.

Other measures that will be considered and addressed in earthwork contractor's work plan are confining work to limited areas of the site at one time, suspending work during periods of high winds (i.e., greater than 25 mph for an extended period of time) and during Stage 2 or 3 Ozone Episodes, and placing final vegetation and surface treatments (area paving, etc.) as soon as practical in the construction schedule. Other intensive dust generating activities, such as abrasive blasting, drilling, and grinding will be controlled to the greatest extent feasible. Such control may include the use of screens or enclosures, water sprays or collection, and would be specific to the activity.

7.4.3 Traffic Control

To accommodate the anticipated haul truck traffic to support the cover construction, a haul route plan will be prepared in earthwork contractor's work plan. All truck staging will be within the project site. No transport of imported materials or off-site parking will be permitted in adjacent residential neighborhoods.

Construction traffic control measures such as signing and striping will be provided near the site entrance in accordance with the relevant traffic control plan. Traffic control plan will be submitted to the City of Carson, Engineering Services Director for approval. To minimize the potential impact of the haul truck traffic, a new traffic light, signing, or flagman will be provided at/near the site entrance (Del Amo and Main). The traffic signal timing will be evaluated by the City of Carson officials.

7.4.4 Construction Emission

The construction emission for the related remedial activities will be monitored at the property boundary on a periodic basis in accordance with relevant SCAQMD regulations. For general construction practice, the remedial activity will use only well maintained equipment with proper planning of equipment utilization, such as proper size and consolidated deliveries, to reduce rework and multiple handling. If feasible, diesel-powered construction equipment will be used to reduce exhaust emissions and evaporative and crankcase hydrocarbon emissions. For equipment utilizing the diesel drive internal combustion engine, an alternative diesel fuel with a maximum of 0.05 percent sulfur and a four degree retard will be used. NO_X control technologies, such as fuel injection timing retard will be applied for diesel engines and air-to-air after cooling.

Deliveries, other than concrete and earthwork related deliveries, will be restricted to non-peak travel periods whenever feasible to reduce engine idling time and low traffic speed.

7.4.5 Noise Control

To minimize the potential noise impacts caused by the related remedial activities, proper noise control procedures (in accordance with local regulations) will be established in earthwork contractor's work plan.

In general, loading, unloading, and staging areas will be located on-site and away from the noise-sensitive residential areas south and west of the site. Grading operations will be phased such that grading of the southerly and westerly portions of the site will be completed last. If night time activities are required, they will be limited to the low-noise level work. All nighttime hauling operations will utilize bottom dump trucks. During nighttime grading activities the following activities will prohibited.

- Operation of any machinery or equipment except for bottom dump trucks with trailers and tractors to assist unloading. Dump trucks will travel in the forward direction only.

- Soil spreading or compaction activities.

- Backing up of equipment fitted with safety alarms.

Noise monitoring will be conducted at the near-by residents property boundaries. The noise generated from the remedial activities will not exceed local standard established by the City of Carson or other regulatory agency.

7.4.6 Odor Control

The selected remedial activities do not include any soil excavation into the waste or the existing soil cover except some limited drillings for typical well construction. Due to limited waste disturbance, odor control should not be a problem during the remedial activities. Perimeter monitoring during construction will be provided to detect any potential odor problem so that mitigation measures can be implemented.

7.4.7 Health and Safety Plan

A site/activity specific health and safety plan will be prepared for remedial activities in order to ensure worker health and safety. The health and safety plan will establish on-site exclusion or decontamination zones, if applicable, which will be utilized for the duration of on-site remedial activities. The health and safety measures to be enacted will be consistent with 29 CFR 1910 and 8 CCR 5192.

8.0 PROPOSED FUTURE LAND USE

A company proposes to redevelop the project site for commercial/light industrial land use. The first phase of a two-phase development consists of an enclosed retail shipping mall near the center of the property with access roads and parking lots over the remaining area. Phase II development would add retail/office buildings near the perimeter of the site. This section describes additional design/construction considerations related to the proposed development, that work in conjunction with the preferred remedial actions (Section 7.0), to protect human health and the environment.

8.1 Deed Restrictions

Deed restrictions are a legal control to prohibit specific activities. Deed restrictions will be recorded on this property with the appropriate county recorders office to limit future land uses to commercial/light industrial activity, and to ban such uses as residential, hospitals, schools, and day care centers. In addition, the deed restriction will limit activities on the site such as deep excavations into the clay layer or buried waste or use of groundwater wells for domestic supply or for agriculture.

The deed restrictions will be approved by the Department of Toxic Substances Control prior to recording and run with the property. The recording of the deed restriction will put all potential buyers of the property on notice of the deed restrictions. Thus, the deed restrictions will remain in force regardless of future property transactions.

8.2 Landfill Cap for the Proposed Building Area

To provide extra protection and landfill cap integrity under the building area, additional cap design considerations are proposed, including:

- Provide a double liner system under the building
- Provide for differential settlement between the double liner and the building support piles
- Provide for landfill gas protection as required under CCR Title 14, section 17796 for post closure land use.

Accordingly, a geomembrane liner will be added under the building area. The geomembrane liner will be highly gas-impermeable and installed over the clay barrier layer described in Section 7.2.2. The geomembrane will be low density polyethylene (LDPE) and have a minimum thickness of 30 mils.

The geomembrane layer system will include:

- 6-inch thick sand layer. This sand layer is placed above the geomembrane liner to protect it during construction/installation activities, and to serve as a drainage layer. This sand layer is part of the protective layer as specified in Section 7.2.2.

- 12-inch thick sand/gravel aggregate layer. This layer is used as a part of the landfill gas control protection under the building area. This aggregate layer will be placed under the clay layer and wrapped with a geotextile filter to prevent the introduction of fines. Details of the landfill gas control is further described in Section 8.3.

Details of the double liner, enhanced landfill cap cover system for the building area are shown in Figure 8-1.

In parking areas and roadways, additional materials for the road base and pavement will be incorporated into the cover alternatives. These materials will provide an additional barrier to the landfill cover system while providing support for the traffic requirements. These materials are not considered as a part of this RAP and will be addressed during the site design and development stage.

8.3 Landfill Gas Control and Treatment for the Proposed Building Area

The landfill gas control and treatment system for the building area will consist of: (1) an active landfill gas control system of horizontal piping embedded in a sand/gravel layer, (2) thermal destruction of collected gas using a flare unit, and (3) gas monitoring and venting system.

Under the building areas, an active landfill gas control system will be installed under the clay cover system to protect against the landfill gases. The active landfill gas control system will consist of horizontal, perforated piping that is installed in the permeable aggregate layer (Section 8.2) below the clay/geomembrane layer. The active gas control will be a low pressure vacuum system to minimize potential drying of the clay layer. Spacing for these pipes will coincide with the spacing for the piling needed to support the building. A spacing of 15 feet is anticipated for the horizontal piping.

The ancillary components include a flare unit, collection headers, blowers, and gas sampling and processing components. Collected landfill gas will be delivered from the header system to the flare by a blower. The gas will pass through an automatic shut-off valve and a flame arrestor to prevent flash back. Landfill gas will be automatically mixed with supplemental gas or dilution air for efficient combustion at the flare. The flare will be equipped with standard safeguard controls to monitor operating conditions and shut down the system when appropriate. Detailed design of the flare system including size, emission limits, treatment components, and supplementary fuel requirements, will be provided during final design of the gas control system. Final design of the gas control/treatment system will be submitted for DTSC approved prior to implementation.

For the building safety/construction purpose, additional landfill gas venting or monitoring features are also be considered. These features include:

- Open ventilation provided by open parking structures or passive surface vent pipes to monitor or release methane from accumulating beneath the cap. As applicable, the vent pipe will be constructed with the ability to be connected to an induced draft exhaust system.

- A pile sleeve system to seal the liner to the building piles

- A landfill gas monitoring and alarm system for landfill gas in or under the building

These features will be designed in detail during the remediation system and/or building construction/design phase and will be part of the ongoing O&M activities.

8.4 Piling Construction

A pile foundation is anticipated to support the buildings located over the landfill refuse. The pile penetrations in the building areas will incorporate a sealable sleeve made out of steel, geomembrane or geocomposite (a composite layer of geomembrane and bentonite) material that is fastened or adhered to the geomembrane liner. The sleeve will be attached between the piles and the liner and provide controlled slacks to allow for settlement. The piles will be driven to the bearing soil below the waste. The annular space between the piling and sleeve will be sealed with a polymer material.

8.5 Mitigation Measures for the Proposed Site Development Activities

Mitigation measures for the proposed site development activities will be implemented to minimize impacts to the neighboring residents, public, and the environment. Specific recommended or code required mitigation measures for the development will be in accordance with "Final Project and Program Environmental Impact Report - Metro 2000" dated November 1993. The pertinent mitigation measures covered in the Final EIR include:

- Earth Grading - - Mitigation measures for earth grading include the control of fugitive dust and air borne particulates, the control of odor by limiting any excavation into waste, the implementation of a project geotechnical report and erosion control plan, the implementation of a mitigation monitoring plan acceptable to the City of Carson, provisions to obtain haul route approval and to provide traffic barriers and warning signs, provisions for temporary berm construction along the west and south site boundaries, and limited night time grading activities.

- Air Quality - - Air pollutant mitigation measures include the control of five sources of construction emissions: (1) combustion exhaustion of construction equipment, (2) fugitive dust, (3) construction deliveries and off-site hauling, (4) construction workers travel, and (5) building materials and architectural coatings.

- Traffic Control - - Mitigation measures include the control of access and on/off site parking, installing and utilization of a new traffic signal and traffic warning signs as well as provisions for implementing a haul route plan for construction traffic.

- Noise Control - - Mitigation measures include provisions to minimize potential noise impacts from pile driving, dynamic compaction, and other construction noise. A temporary berm will be provided along the length of the fill slope across from existing residential areas. Other provisions include limited night-time operations.

The Final EIR has been prepared in accordance with the requirements of CEQA and represents the independent judgment of the Lead Agency (City of Carson).

9.0 IMPLEMENTATION SCHEDULE

Figure 9-1 is the project schedule for remediation and redevelopment of the Cal Compact Landfill site. The ambitious schedule is designed to accomplish two principal objectives. First, remediation of the site. The remediation as proposed in the RAP is consistent with the future use of the site for commercial/light industrial development. Second, construction of a retail shopping mall, to return the site to beneficial use.

The two objectives are linked because remediation of the Upper Operable Unit will be primarily funded by the mall developer. The mall developer is not a PRP and therefore is participating in the remediation on a voluntary basis. As such, timely construction and eventual operation of the mall is a critical element to ensure that the remediation funds become available.

10.0 PRELIMINARY NONBINDING ALLOCATION OF RESPONSIBILITY

Health and Safety Code (HSC) Section 25356.1(d) requires the Department of Toxic Substances Control (DTSC) to prepare a preliminary nonbinding allocation of responsibility (NBAR) among all identifiable potentially responsible parties (PRPs). HSC section 25356.3(a) allows PRPs with an aggregate allocation in excess of 50% to convene an arbitration proceeding by submitting to binding arbitration before an arbitration panel. If PRPs with over 50% of the allocation convene arbitration, then any other PRP wishing to do so may also submit to binding arbitration.

The sole purpose of the NBAR is to establish which PRPs will have an aggregate allocation in excess of 50% and can therefore convene arbitration if they so choose. The NBAR, which is based on the evidence available to DTSC, is not binding on anyone, including PRPs, DTSC, or the arbitration panel. If a panel is convened, its proceedings are de novo and do not constitute a review of the provisional allocation. The arbitration panel's allocation will be based on the panel's application of the criteria spelled out in HSC section 25356.3(b) to the evidence produced at the arbitration hearing. Once arbitration is convened, or waived, the NBAR has no further effect, in arbitration, litigation or any other proceeding, except that both the NBAR and the arbitration panel's allocation are admissible in a court of law, pursuant to HSC section 25356.7 for the sole purpose of showing the good faith of the parties who have discharged the arbitration panel's decision.

The Cal Compact Site operated as a landfill between 1959 and 1965. A thorough PRP analysis was performed, and a volume of waste sent to the site has been calculated for all PRPs named in the NBAR. Generators as a group have been assigned an aggregate liability for the site of 80%. Transporters have been assigned an aggregate liability of 5%. Owners and Operators have been assigned the remaining 15%. DTSC has distinguished among owners and operators during the active phase of the landfill operation by assigning them a higher relative share than those who owned the facility after it ceased receiving wastes.

DTSC sets forth the following identifiable potentially responsible parties:

<u>Generators</u>

1. Phillips Petroleum Company (via acquisition/merger with Signal Oil & Gas)

2. Shell Chemical Company

3. Chevron Corporation (previously Standard Oil Co. of California)

4. UNOCAL Corporation (via merger with Union Oil of California)

5. Shell Oil Company

6. Atlantic-Richfield Oil Company (via merger of Atlantic Refining and Richfield Oil)

7. Long Beach Oil Development Company

8. Mobil Oil Corporation

9. E. I. du Pont de Nemours & Company (via merger with Continental Oil, a Delaware Corp./CONOCO Inc.)

10. Atchison, Topeka & Santa Fe Railway Company

11. Getty Oil Company (via merger with Tidewater Oil Inc.)

12. Southern California Gas Company

13. Exxon Corporation (via acquisition/merger of Humble Oil & Refining Company and Standard Oil of New Jersey)

14. Texaco, Incorporated

15. U. S. Borax, Incorporated

16. Minnesota Mining and Manufacturing

17. Gulf Oil Corporation

18. Southern Pacific Rail Corporation

Owners and Operators

19. BKK Corporation (Cal Compact, Inc.)

20. The Deutsch Company

21. L.A. MetroMall, LLC, a California Limited Liability Company

Transporters

22. BKK Corporation (Chancellor and Ogden)

The NBAR allocation is non-binding and preliminary and does not limit strict joint, and several liability under CERCLA and other laws. Commercial Realty Projects, Inc. has assumed 100 percent of the responsibility for the remediation of the Cal Compact Landfill Upper Operable Unit, as defined in this RAP, without prejudice to its right to seek contribution from other responsible parties.

Agent for Services of Process for the preliminary, nonbinding allocation of responsibility for the Cal Compact Landfill site:

Generators

1. Phillips Petroleum Company (via acquisition/merger with Signal Oil & Gas)

   Phillips Petroleum Company
   United States Corporation Company
   1455 Response Rd. Suite 250
   Sacramento, CA 95815

   separate agent for

   Signal Oil & Gas Co.
   C T Corporation System
   818 West 7th Street
   Los Angeles, CA 90017

2. Shell Chemical Company

   Shell Chemical Company
   Lee Prentice-Hall Corporation System, Inc.
   1455 Response Road, Suite 250
   Sacramento, CA 95815

3. Chevron Corporation (previously Standard Oil Co. of California)

   Chevron Corporation
   H. T. Walker
   225 Bush Street
   San Francisco, CA 94104

4. UNOCAL Corporation (via merger with Union Oil of California)

   UNOCAL Corporation
   Vickie Simonian
   1201 West 5th Street
   Los Angeles, CA 90017

5. Shell Oil Company

   Shell Oil Company
   C T Corporation System
   818 West 7th Street
   Los Angeles, CA 90017

6. Atlantic-Richfield Oil Company (via merger of Atlantic Refining and Richfield Oil)

   Atlantic-Richfield Oil Company
   C T Corporation System
   818 West 7th Street
   Los Angeles, CA 90017

7. Long Beach Oil Development Company

   Long Beach Oil Development Company
   J. J. Grigg, Jr.
   550 North Brand Blvd. # 1960
   Glendale, CA 91203

8. Mobil Oil Corporation

   Mobil Oil Corporation
   Lee Prentice-Hall Corporation System, Inc.
   1455 Response Road, Suite 250
   Sacramento, CA 95815

9. E. I. du Pont de Nemours & Company (via merger with Continental Oil, a Delaware Corp./CONOCO Inc.)

   E. I. du Pont de Nemours & Company
   C T Corporation System
   818 West 7th Street
   Los Angeles, CA 90017

10. Atchison, Topeka & Santa Fe Railway Company

   Atchison, Topeka & Santa Fe Railway Company
   P. J. Nelson
   3770 East 26th St.
   Los Angeles, CA 90023

11. Getty Oil Company (via merger with Tidewater Oil Inc.)

    Getty Oil Co. (Tidewater Oil, Inc.)
    L. N. Elsen
    10 Universal City Plaza
    Universal City, CA 91608-1097

12. Southern California Gas Company

    Southern California Gas Company
    Thomas C. Sanger
    555 W. 5th St.
    Los Angeles, CA 90013

13. Exxon Corporation (via acquisition/merger of Humble Oil & Refining Company and Standard Oil of New Jersey)

    Exxon Corporation (Humble Oil & Refining Company
    and Standard Oil of New Jersey)
    C T Corporation System
    818 West 7th Street
    Los Angeles, CA 90017

14. Texaco, Incorporated

    Texaco, Inc.
    L. N. Elsen
    10 Universal City Plaza
    Universal City, CA 91608-1097

15. U. S. Borax, Incorporated

    U. S. Borax, Incorporated
    C T Corporation System
    818 West 7th Street
    Los Angeles, CA 90017

16. Minnesota Mining and Manufacturing

    Minnesota Mining and Manufacturing
    C T Corporation System
    818 West 7th Street
    Los Angeles, CA 90017

17. Gulf Oil Corporation

Gulf Oil Corporation
H. P. Walker
225 Bush St.
San Francisco, CA 94104

18. Southern Pacific Rail Corporation

Southern Pacific Rail Corporation
T. S. O'Donnell
Southern Pacific Building
One Market Plaza, Suite 816
San Francisco, CA 94105

also main company: (SPTCO)

Southern Pacific Transportation Company
T. S. O'Donnell
Southern Pacific Building
One Market Plaza, Suite 816
San Francisco, CA 94105

<u>Owners and Operators</u>

19. BKK Corporation (Cal Compact, Inc.)

BKK Corporation (Cal Compact, Inc.)
Peter Weiner
Heller, Ehrman, White & McAuliffe
333 Bush Street
San Francisco, CA 94104-2878

20. Passive Owner: The Deutsch Company (active corp.)

The Deutsch Company
W. E. Holler
2444 Wilshire Blvd. #600
Santa Monica, CA 90403

also:

President: Alex Deutsch
Lester Deutsch, Pres. of D. Finance Company
same address (active corp.)

21. L.A. MetroMall, LLC, a California Limited Liability Company

L.A. MetroMall, LLC
Peter Weiner
Heller, Ehrman, White & McAuliffe
333 Bush Street
San Francisco, CA 94104-2878

Transporters

22. BKK Corporation (Chancellor and Ogden), 5.0%;

BKK Corporation (Chancellor & Ogden)
Peter Weiner
Heller, Ehrman, White & McAuliffe
333 Bush Street
San Francisco, CA 94104-2878

11.0 FUTURE/ONGOING OPERATION AND MAINTENANCE (O&M) REQUIREMENTS

11.1 Ongoing and Future Upper Operable Unit Site O&M and Monitoring Requirements

O&M and monitoring requirements are summarized for each of the systems associated with the RAP. Specific O&M Plan will be developed and submitted to DTSC for review and approval.

11.1.1 Landfill Cap

To limit the infiltration of stormwater through the landfill cap, observe and, if necessary, repair the surface drainage systems, erosion control measures, and stormwater retention basins. To limit stormwater infiltration and gas migration through the landfill cap, observe, and repair if necessary, differential settlement in parking areas, pavement breaks and other indications that the integrity of the landfill cap may be impacted.

11.1.2 Groundwater Extraction and Treatment System

Perform routine maintenance of all mechanical equipment (pumps, valves, meters, recorders, etc.) according to the manufacturer's instructions. Perform, as needed, maintenance of the extraction wells to maintain the desired flow rates. Observe the well and piping for signs of settlement or other indications of potential maintenance problems.

11.1.3 Landfill Gas Extraction and Flaring System

Perform routine maintenance of all mechanical equipment (flares, vacuum pumps, supplementary gas systems, valves, meters, recorders, etc.) according to the manufacturer's instructions. Perform, as needed. maintenance of the extraction wells to maintain the desired gas flow rates. Observe the gas wells and piping for signs of settlement or other indications of potential maintenance problems.

11.1.4 Site Monitoring Systems

Perform routine monitoring (sampling and analysis) of the groundwater monitoring wells in accordance with the RAP.

Perform routine monitoring (sampling and analysis) of the landfill gas and the exhaust gases from the landfill gas control and flare system in accordance with the RAP.

Perform routine monitoring (sampling and analysis) of the stormwater control, retention and discharge system in accordance with the RAP.

Perform routine monitoring (sampling and analysis) of the groundwater treatment system in accordance with the RAP.

11.2 Estimated Duration of O&M and Monitoring Activities

O&M and monitoring activities are anticipated to continue for a period of 30 years following implementation of the RAP, or until such time as the remediation achieves the Remedial Action Objectives (RAOs) or Remedial Action Goals (RAGs).

11.3 Estimated Cost of Conducting O&M and Monitoring and Source of Financing

The estimated cost of conducting the O&M and monitoring measures are summarized below: Post-closure care costs should be updated annually as a record of actual facility costs is developed.

	Estimated Annual O&M Factor	**Ref.**
Collection/Control Systems		
Landfill cap and ground surface observation	$ 10,000	1,3
Landfill cap and ground surface repairs	$ 50,000	1,4
Groundwater extraction and treatment system	260,000	1,2
Gas collection and flare system	89,000	1,4
Long-Term Monitoring		
Groundwater sampling and analysis	46,000	1,2
Gas monitoring	50,000	1,2
Stormwater monitoring	10,000	1,5
Treatment system effluent monitoring	50,000	1,5

References:

1. Feasibility Study, B&R Environmental, 1995.
2. Seminar Publication, Design, Operation, and Closure of Municipal Solid Waste Landfills, EPA, September 1994.
3. Based on 2 mh/wk @ $10 to $15/hr.
4. Budgetary amount based on engineers estimate.
5. Based on monthly reporting of composite analysis for the same constituent list as the groundwater monitoring wells.

11.4 Measures Which Will Assure Continued O&M

The owner and operator of the site will be primarily responsible for the on-going O&M and monitoring of the site. DTSC may also seek implementation of O&M from any other identified PRP(s).

11.5 Measures to Provide for Remediation of any Contamination Discovered in the Future

Remediation of contamination at the project site, discovered in the future shall be governed by the relevant law, regulations and cleanup agreements among the owner, operator, PRPs, and DTSC. Where appropriate, future remediation activities will be combined with the remedial systems in the RAP.

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TABLE 3.1

VOLUMES OF LIQUID INDUSTRIAL WASTES DISPOSED OF AT THE CAL COMPACT LANDFILL
(*Source:* McLaren/Hart, 1992 after BCL Associates, Inc., 1981)

WASTES	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1960													
Drilling fluid/muds[3]	NA	NA	NA	NA	NA	0	0	20,775	2,700	0	14,800	16,345	54,620
Paint wastes/sludges	NA	NA	NA	NA	NA	22	146	180	110	1,158	276	282	2,244
Tank bottoms	NA	NA	NA	NA	NA	0	0	50	0	0	100	0	150
Lime and water	NA	NA	NA	NA	NA	0	0	0	0	0	210	500	710
Waste oil	NA	NA	NA	NA	NA	0	0	0	0	80	0	0	80
Acetylene sludge	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	0
Solvents	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	0
Oil and water	NA	NA	NA	NA	NA	0	0	0	0	0	80	0	80
Totals by Month	–	--	–	--	--	22	146	21,005	2,810	1,238	15,486	17,127	
Total for Year													57,904
1961													
Drilling fluid/muds[3]	NA	2,100	13,200	9,700	2,340	10,850	6,855	3,443	19,210	122,560	20,970	25,125	236,353
Paint wastes/sludges	NA	257	6,112	363	253	286	214	102	190	168	144	40	8,129
Tank bottoms[2]	NA	107	72	32	0	0	0	35	0	40	300	0	566
Lime and water	NA	104	400	1,300	0	300	860	520	501	400	300	700	5,385
Waste oil	NA	0	0	0	0	0	0	0	0	0	0	0	0
Acetylene sludge	NA	60	0	0	0	0	0	0	0	0	0	0	60
Solvents	NA	0	0	0	0	6	0	0	0	0	0	0	6
Oil and water	NA	37	0	0	4	0	0	0	70	0	0	0	111
Totals by Month	–	2,665	19,784	11,395	2,597	11,442	7,929	4,080	19,971	123,168	21,714	25,865	
Total for Year													250,610

1 - Volumes expressed in barrels.
2 - 1.33 x figures for June 1960 - June 1964.
3 - Drilling fluid and muds consist primarily of water and clay mixtures with minor heavy metal additives and oily residue.

TABLE 3.1
Page 2 of 3
VOLUMES OF LIQUID INDUSTRIAL WASTES DISPOSED OF AT THE CAL COMPACT LANDFILL
(Source: McLaren/Hart, 1992 after BCL Associates, Inc., 1981)

WASTES	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1962													
Drilling fluid/muds[3]	33,525	35,015	53,111	37,792	25,095	33,045	28,385	29,120	15,008	33,608	23,536	12,124	359,564
Paint wastes/sludges	144	66	165	125	196	252	26	221	121	176	110	122	1,726
Tank bottoms[2]	110	122	195	242	100	350	137	0	0	1,595	1,030	572	4,453
Lime and water	0	300	600	800	600	800	800	500	300	300	0	200	5,200
Waste oil	0	0	0	0	0	0	0	0	0	0	0	0	0
Acetylene sludge	0	60	0	0	0	0	0	0	0	0	0	0	60
Solvents	0	0	0	0	0	0	0	0	0	0	0	0	0
Oil and water	50	0	0	0	0	0	0	0	0	0	0	0	50
Totals by Month	33,829	35,563	54,071	38,959	25,991	34,447	29,348	29,843	15,429	35,879	24,676	13,018	
Total for Year													371,053
1963													
Drilling fluid/muds[3]	10,853	5,433	4,365	1,640	5,655	4,225	2,465	24,182	14,421	13,529	1,930	11,805	100,503
Paint wastes/sludges	119	84	105	81	247	1,540	1,518	630	996	1,206	385	342	7,253
Tank bottoms[2]	322	1,760	2,240	4,550	1,780	385	1,936	2,984	55	5,903	1,135	100	23,140
Lime and water	800	400	300	1,900	0	700	416	500	600	260	0	600	6,476
Waste oil	0	0	0	0	0	0	0	0	0	0	118	0	118
Acetylene sludge	0	0	0	0	0	360	108	30	0	0	0	0	498
Solvents	0	0	0	0	0	0	0	0	0	60	0	0	60
Oil and water	0	0	0	0	0	0	0	0	60	100	700	0	860
Totals by Month	12,094	7,677	7,010	8,171	7,682	7,210	6,443	28,326	16,132	21,058	4,258	12,847	
Total for Year													138,905

[1] Volumes expressed in barrels.
[2] - 1.33 x figures for June 1960 - June 1964.
[3] - Drilling fluid and muds consist primarily of water and clay mixtures with minor heavy metal additives and oily residue.

TABLE 3.1
Page 3 of 3
VOLUMES OF LIQUID INDUSTRIAL WASTES DISPOSED OF AT THE CAL COMPACT LANDFILL
(Source: McLaren/Hart, 1992 after BCL Associates, Inc., 1981)

WASTES	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1964													
Drilling fluid/muds[3]	8,277	14,190	9,815	18,165	15,383	18,446	NA	NA	NA	NA	NA	NA	84,226
Paint wastes/sludges	425	189	380	200	1,127	514	NA	NA	NA	NA	NA	NA	2,835
Tank bottoms[3]	332	1,085	782	15	810	200	NA	NA	NA	NA	NA	NA	3,224
Lime and water	0	50	300	240	0	0	NA	NA	NA	NA	NA	NA	590
Waste oil	0	0	0	67	0	0	NA	NA	NA	NA	NA	NA	67
Acetylene sludge	0	0	0	0	100	100	NA	NA	NA	NA	NA	NA	200
Solvents	0	0	0	50	0	0	NA	NA	NA	NA	NA	NA	50
Oil and water	0	0	25	0	0	0	NA	NA	NA	NA	NA	NA	25
Totals by Month	8,984	15,514	11,302	18,737	17,420	19,260	–	–	–	–	–	–	--
Total for Year													91,217

TOTAL AMOUNTS OF LIQUID INDUSTRIAL WASTE DISPOSED OF AT THE CAL COMPACT SITE

Wastes	Totals for June, 1960 Through June, 1964 in Barrels	Estimated Total for April, 1959 - February, 1965[2] in Barrels	% of Estimated Total
Drilling fluids and muds[3]	835,266	1,110,904	92%
Paint wastes or sludges	22,187	29,509	2%
Tank bottoms	31,533	41,939	3%
Lime and water	18,381	24,447	2%
Waste oil	265	352	<1%
Acetylene sludge	818	1,088	<1%
Solvents	116	154	<1%
Oil and water	1,126	1,498	<1%
Totals	909,692	1,209,890	100%

1 - Volumes expressed in barrels.
2 - 1.33 x figures for June 1960 - June 1964.
3 - Drilling fluid and muds consist primarily of water and clay mixtures with minor heavy metal additives and oily residue.

TABLE 3.2

ADDITIONAL WASTE REPORTEDLY RECEIVED AT THE CAL COMPACT LANDFILL THAT CAN CURRENTLY BE CONSIDERED HAZARDOUS (DHS[a], 1982 in BKK Corp., 1990).

Reported Waste Type	Amount of Waste		
	Barrels	Gallons[b]	Cubic Yards[c]
Paint sludge. paint strip tank	15.412	647.304	3.204
Sulfur tar, shell tar	74.985	3.149.370	15.589
Lime soda water, lime, acetylene sludge, spent caustic, felt and soda ash, mud and lime, calcium and water	28.348	1.190.616	5.894
Tank Bottoms. oil sludge	27.505	1.155.210	5.718
Mud. oil and water. crude oil. waste oil	1.030	43.260	214
Styrene	200	8.400	42
Tile glaze	994	41.748	206
Kerosene, water and oil. degreasing solvent, solvent sludge	266	11,172	55
Dye and water	30	1.260	6
Lint and chemicals	110	4.620	23
Ink and trichloroethylene. oil and tric. (sic)	1.099	46.158	228
TOTAL	149.979	6.299.118	31.179

[a] Now the California Department of Toxic Substances Control.
[b] Assumes 42 gallons per barrel.
[c] Assumes 0.00495 gallons per cubic yard.

TABLE 3.3

EXISTING OR POTENTIAL GROUNDWATER PRODUCTION WELLS WITHIN A TWO MILE RADIUS OF THE CAL COMPACT LANDFILL

Well Name	State Well Number	Original Owner	Address	Year Drilled	Total Depth (ft)	Depth of Perforated Interval (ft)	Well Type	Status
795	4S 14W 01P01	Stauffer Chemical Co.	Normandie and Del Amo Blvd.	1943	727	486-560 603-650 673-714	Industrial Supply	Capped 1967 Recapped 1969
814A	4S 13W 06Q1	George Branning	19825 S. Main	1937	70	NA	Domestic and Irrigation	NA
818A	4S 13W 18P01	C.F. Fiesel	Ocean and Figueroa	1900	250	NA	Domestic and Irrigation	Capped 1950
818B	4S 13W 19B01	General Petroleum	Ocean and Main	1922	251	NA	NA	NA
825	4S 13W 07H01	Del Amo Estate	0.3 miles east of Main St. 750 ft. north of E. East Road	1948	720	676-672 644-640 636-570 562-555	Dairy	Capped 1961
834	4S 13W 05L01	Victoria Golf Course	Victoria and Avalon	1918	749	640-735	NA	Capped 1959
836A (DWC#19A)	4S 13W 05L01	Dominguez Water Corp.	418 E. Carson, Carson, CA	1991	685	510-665	Supply	Supply
860	NA	Frank Walter	Compton Ave and Main St.	1902	332	NA	NA	NA
865G	4S 13W 10E03	Shell Oil Co.	Wilmington and Dominguez St.	1955	1000	NA	NA	NA
865K	4S 13W 09H02	Shell Oil Co.	Wilmington and Dominguez St.	1968	1040	765-775 785-805 815-823 826-834 928-982	Industrial Supply	NA
888 (DWC#79)	4S 13W 20C01	Dominguez Water Corp.	228th Street, Carson, CA	1979	925	480-652	Supply	Supply
816	4S 13W 07L01	Sunset Oil	Figueroa and East Rd.	1946	580	528-580	Industrial Supply	NA
NA	4S 13W 06K07	Ray Buealy	NA	NA	NA	50-60	NA	NA

NA = Information Not Available.

Data Sources: Los Angeles County Department of Public Works, Hydraulic/Water Conservation Division
Dominguez Water Corporation
Water Replenishment District of Southern California
BKK (1990)

TABLE 4.1

SUMMARY OF REPORTS ON THE CAL COMPACT LANDFILL

Date	Author	Title
April 4, 1975	Robert Stone & Associates, Inc.	Draft Environmental Impact Report for the Silver Oaks Mobile Home Park, City of Carson
October 26, 1977	Converse Davis Dixon Associates	Soil Permeability Investigations for the (Proposed) Silver Oaks Mobile Home Park, Main Street and Del Amo Boulevard
July 1978	Engineering-Science Inc.	Report of Investigation of Landfill Related Problems at the 180 acre site
March 1981	BCL Associates	Environmental Assessment of Soils, Perched Groundwater, and Vapor Impacts at the Former Cal Compact Landfill Site in the City of Carson
April 1981	Engineering-Science Inc.	Report of Review of Environmental Assessment at Proposed Casa del Amo Mobile Home Park
September 1984	BCL Associates, Inc.	Geotechnical Exploration of the Proposed "A" Street and Del Amo Boulevard at the WIC Site Located in Carson, California
March 1985	J. H. Kleinfelder & Associates	Boring Logs for Cal Compact Site Southern California World Industrial Center Carson, California
January 1990	BKK Corporation	Final Draft Workplan to Perform a Remedial Investigation/Feasibility Study (RI/FS) at the Cal Compact Landfill, 20300 South Main Street, Carson, California.
April 2, 1991	Western Laboratories	Supplemental Evaluation of Geotechnical Considerations Pertaining to the Proposed Crushing Operation at the Cal Compact/Metro 2000 Landfill Site
September 18, 1991	Western Laboratories	Recreational Vehicle Storage for Interim Use of the Metro 2000 Landfill Site, West End of Lot 3, 20300 Main Street, Carson, California
October 31, 1991 (and addendums)	Western Laboratories	Rough Grading Recommendations Cal Compact/Metro 2000 Landfill Site, 20400 Main Street, Carson, California Addendum No. 1 November 22, 1991 Addendum No. 2 January 22, 1992
January 10, 1992	McLaren/Hart	Integrated Remedial Investigation Report of Cal Compact Landfill 20300 Main Street Carson, California
March 19, 1992	Western Laboratories	Settlement Modeling of the Refuse Zone at the Cal Compact landfill Site, 20400 Main Street, Carson, California
August 17, 1992	McLaren/Hart	Revised Integrated Remedial Investigation Report Cal Compact Landfill 20300 Main Street Carson, California
November 25, 1992	Western Laboratories	Geotechnical Engineering Report and Geological Review for the Proposed Metro Mall to be Constructed at 20400 Main Street, Carson, California

TABLE-4.2

BACKGROUND METAL CONCENTRATIONS IN SOILS

Sample Number	GW-2B	GW-2B	GW-4	GW-4	Mean 95%	Title 22 Total
	10'	30'	10'	30'	UCL	Threshold Limit
Analyte	mg/l	mg/l	mg/l	mg/l	mg/l	Criteria (mg/l)
Aluminum	9,000	15,000	17,000	16,000	29,800	none
Antimony	1.4	2.6	1.8	1.6	3.6	500
Arsenic	48	86	74	84	145	500
Barium	60	130	260	98	595	10,000
Beryllium	<0.05	<0.05	<0.05	<0.05	0.05	75
Cadmium	0.2	<0.2	2.5	0.4	10.3	100
Calcium	2,500	6,100	3,800	5,000	11,400	none
Chromium	18	11	10	14	26	2,500
Cobalt	4.7	8.8	8.7	10.0	18.9	8,000
Copper	16	32	26	31	59	2,500
Iron	16,000	23,000	24,000	23,000	35,000	none
Lead	<0.5	<0.5	<0.5	<0.5	0.50	1,000
Magnesium	3,200	8,500	12,000	10,000	35,700	none
Manganese	270	490	640	470	1,160	none
Molybdenum	<0.1	<0.1	<0.1	<0.1	0.10	3,500
Nickel	10	11	10	15	19	2,000
Potassium	1,500	4,400	3,600	3,900	11,300	none
Selenium	<0.2	<0.2	<0.2	<0.2	0.20	100
Silver	<0.05	<0.05	<0.05	<0.05	0.05	500
Sodium	160	2,600	1,900	3,600	55,000	none
Thallium	<0.2	<0.2	<0.2	<0.2	0.20	700
Vanadium	27	36	30	46	63	2,400
Zinc	34	54	50	67	105	5,000

UCL = Upper Confidence Limit.
A value of 1/2 the detection limit was used to calculate the 95% UCL concentration.
Any cell with the less than < is equal to the detection limit.

TABLE-4.3

BACKGROUND METAL CONCENTRATIONS IN GROUNDWATER FROM BELLFLOWER AQUITARD MONITOR WELLS

(SOURCE: REMEDIAL INVESTIGATION OF THE CAL COMPACT LANDFILL)

BELLFLOWER AQUITARD MONITOR WELL GW-1C

ANALYTE	NOV. 90 mg/l	DEC. 90 mg/l	JAN. 91 mg/l	APR. 91 mg/l	AUG. 91 mg/l	JAN. 92 mg/l	APR. 92 mg/l	MAY 93 mg/l
ALUMINUM	1.2	0.91	1.3	1.5	<.2	0.32	<0.20	NR
ANTIMONY	NR	NR	NR	NR	NR	NR	NR	NR
ARSENIC	0.017	<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.01
BARIUM	0.03	0.08	0.088	0.077	0.082	0.085	0.068	NR
BERYLLIUM	NR	NR	NR	NR	NR	NR	NR	NR
CADMIUM	NR	NR	NR	NR	NR	NR	NR	NR
CALCIUM	NR	NR	NR	NR	NR	NR	NR	NR
CHROMIUM	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
COBALT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	NR
COPPER	<0.01	<0.01	<0.05	<0.01	<0.01	<0.02	<0.02	NR
IRON	0.82	1.1	1.5	1.8	<0.10	0.39	0.12	NR
LEAD	NR	NR	NR	NR	NR	NR	NR	NR
MAGNESIUM	93	120	120	120	120	120	120	NR
MANGANESE	1.5	0.59	0.82	0.84	0.54	0.57	1.5	NR
MOLYBDENUM	<0.01	<0.01	0.01	<0.01	<0.01	<0.02	<0.02	NR
NICKEL	<0.01	0.02	0.011	0.021	0.013	<0.02	<0.02	NR
POTASSIUM	12	14	13	11	12	10	12	NR
SELENIUM	<0.02	<0.02	<0.02	<0.05	<0.05	<0.10	<0.10	<0.01
SILVER	NR	NR	NR	NR	NR	NR	NR	NR
SODIUM	78	230	210	200	210	290	240	NR
THALLIUM	NR	NR	NR	NR	NR	NR	NR	NR
VANADIUM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	NR
ZINC	0.04	0.07	0.18	<0.02	<0.02	<0.02	<0.02	NR

BELLFLOWER AQUITARD MONITOR WELL GW-2C

ANALYTE	NOV. 90 mg/l	DEC. 90 mg/l	JAN. 91 mg/l	APR. 91 mg/l	AUG. 91 mg/l	JAN. 92 mg/l	APR. 92 mg/l	MAY 93 mg/l
ALUMINUM	0.4	6.4	1.1	0.72	<.20	<0.20	<0.20	NR
ANTIMONY	NR	NR	NR	NR	NR	NR	NR	NR
ARSENIC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	NR
BARIUM	0.07	0.12	0.082	0.071	0.055	0.046	0.045	NR
BERYLLIUM	NR	NR	NR	NR	NR	NR	NR	NR
CADMIUM	NR	NR	NR	NR	NR	NR	NR	NR
CALCIUM	NR	NR	NR	NR	NR	NR	NR	NR
CHROMIUM	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
COBALT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	NR
COPPER	<0.01	0.34	<0.05	<0.01	<0.01	<0.02	<0.02	NR
IRON	0.1	12	1.3	0.87	<0.10	7.8	8.8	NR
LEAD	NR	NR	NR	NR	NR	NR	NR	NR
MAGNESIUM	270	370	310	380	340	340	350	NR
MANGANESE	3.4	4.7	4.8	4.5	3.8	3.8	3.1	NR
MOLYBDENUM	<0.01	0.03	0.033	0.023	0.015	<0.02	<0.02	NR
NICKEL	0.01	0.07	0.031	0.04	0.048	<0.02	<0.02	NR
POTASSIUM	23	23	21	21	24	21	30	NR
SELENIUM	<0.02	<0.02	<0.02	<0.05	<0.05	<0.10	<0.10	<0.01
SILVER	NR	NR	NR	NR	NR	NR	NR	NR
SODIUM	1200	930	740	840	970	940	1200	NR
THALLIUM	NR	NR	NR	NR	NR	NR	NR	NR
VANADIUM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	NR
ZINC	0.32	0.84	0.12	<0.02	<0.02	<0.02	<0.02	NR

BELLFLOWER AQUITARD MONITOR WELL GW-3C

ANALYTE	NOV. 90 mg/l	DEC. 90 mg/l	JAN. 91 mg/l	APR. 91 mg/l	AUG. 91 mg/l	JAN. 92 mg/l	APR. 92 mg/l	MAY 93 mg/l
ALUMINUM	0.18	0.82	12	4.1	<0.20	<0.20	<0.20	NR
ANTIMONY	NR	NR	NR	NR	NR	NR	NR	NR
ARSENIC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.01
BARIUM	0.04	0.04	0.11	0.062	0.027	0.057	0.18	NR
BERYLLIUM	NR	NR	NR	NR	NR	NR	NR	NR
CADMIUM	NR	NR	NR	NR	NR	NR	NR	NR
CALCIUM	NR	NR	NR	NR	NR	NR	NR	NR
CHROMIUM	<0.01	<0.01	0.041	<0.01	<0.01	<0.01	<0.01	<0.01
COBALT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	NR
COPPER	<0.01	<0.01	<0.05	0.012	<0.01	<0.02	<0.02	NR
IRON	0.11	1.1	14	6	<0.10	<0.10	0.10	NR
LEAD	NR	NR	NR	NR	NR	NR	NR	NR
MAGNESIUM	330	460	400	380	400	340	210	NR
MANGANESE	2.3	3	3.5	2.8	2.8	2.4	1.8	NR
MOLYBDENUM	<0.01	0.02	0.028	0.015	0.028	0.025	0.024	NR
NICKEL	0.04	<0.01	0.038	0.018	0.018	<0.02	<0.02	NR
POTASSIUM	29	28	28	22	28	22	19	NR
SELENIUM	<0.02	<0.02	<0.02	<0.05	<0.05	<0.10	<0.10	<0.01
SILVER	NR	NR	NR	NR	NR	NR	NR	NR
SODIUM	2100	2200	1940	1500	2100	1500	1100	NR
THALLIUM	NR	NR	NR	NR	NR	NR	NR	NR
VANADIUM	<0.01	<0.01	<0.01	0.013	<0.01	<0.02	<0.02	NR
ZINC	0.84	0.43	2.86	0.069	<0.02	<0.02	<0.02	NR

BELLFLOWER AQUITARD MONITOR WELL GW-4

ANALYTE	NOV. 90 mg/l	DEC. 90 mg/l	JAN. 91 mg/l	APR. 91 mg/l	AUG. 91 mg/l	JAN. 92 mg/l	APR. 92 mg/l	MAY 93 mg/l
ALUMINUM	22	420	3.2	12	<0.20	<0.20	<0.20	NR
ANTIMONY	NR	NR	NR	NR	NR	NR	NR	NR
ARSENIC	0.15	0.71	<0.05	<0.05	<0.05	<0.10	<0.10	<0.01
BARIUM	0.24	0.43	0.12	0.18	0.058	0.049	0.049	NR
BERYLLIUM	NR	NR	NR	NR	NR	NR	NR	NR
CADMIUM	NR	NR	NR	NR	NR	NR	NR	NR
CALCIUM	NR	NR	NR	NR	NR	NR	NR	NR
CHROMIUM	0.07	0.44	0.074	0.65	<0.01	<0.01	<0.01	0.05
COBALT	0.02	0.03	<0.01	<0.01	<0.01	<0.02	<0.02	NR
COPPER	<0.01	<0.01	<0.01	0.038	0.032	<0.02	<0.02	NR
IRON	25	56	3.7	19	<0.10	<0.10	<0.10	NR
LEAD	NR	NR	NR	NR	NR	NR	NR	NR
MAGNESIUM	430	920	510	520	540	580	640	NR
MANGANESE	3	5.4	4.2	5	5.4	6.2	6.3	NR
MOLYBDENUM	0.05	0.2	0.2	0.21	0.14	0.11	0.12	NR
NICKEL	0.3	0.58	0.23	0.28	0.17	0.18	0.13	NR
POTASSIUM	38	64	38	34	46	37	68	NR
SELENIUM	0.01	<0.02	<0.02	<0.05	<0.05	<0.10	<0.10	<0.01
SILVER	NR	NR	NR	NR	NR	NR	NR	NR
SODIUM	4500	9000	5100	5000	5800	5000	6300	NR
THALLIUM	NR	NR	NR	NR	NR	NR	NR	NR
VANADIUM	0.01	<0.01	0.012	0.037	<0.01	<0.02	<0.02	NR
ZINC	0.18	2.15	<0.02	0.026	<0.02	<0.02	<0.02	NR

BELLFLOWER GROUNDWATER
BACKGROUND METAL CONCENTRATIONS

ANALYTE	MEAN 95% UTL CONCENTRATIONS mg/l	CALIFORNIA PRIMARY MCL(1) mg/l	CALIFORNIA SECONDARY MCL(2) mg/l
ALUMINUM	420	1.0	0.2
ANTIMONY	NR	0.006	
ARSENIC	0.14	0.05	
BARIUM	0.23	1.0	
BERYLLIUM	NR	0.004	
CADMIUM	NR	0.005	
CALCIUM	NR	not specified	
CHROMIUM	0.28	0.05	
COBALT	0.02	not specified	
COPPER	0.14		1.0
IRON	56.00		0.3
LEAD	NR	0.05	
MAGNESIUM	884	not specified	
MANGANESE	10.2		0.05
MOLYBDENUM	0.16	not specified	
NICKEL	0.30	0.10	
POTASSIUM	58.0	not specified	
SELENIUM	0.11	0.05	
SILVER	NR		0.10
SODIUM	9000	not specified	
THALLIUM	NR	0.002	
VANADIUM	0.03	not specified	
ZINC	0.63		5.0

NR = NOT ANALYZED
UTL = UPPER TOLERANCE LIMIT.
(1) MCL = CALIFORNIA PRIMARY DRINKING WATER STANDARD-MAXIMUM CONTAMINANT LEVEL.
(PRIMARY MCLs ARE DERIVED FROM HEALTH BASED CRITERIA. WATER CONTAINING SUBSTANCES EXCEEDING THESE MCLs PRESENTS A RISK TO THE HEALTH OF HUMANS WHEN CONTINUALLY USED FOR DRINKING OF CULINARY PURPOSES).
(2)MCL = CALIFORNIA SECONDARY DRINKING WATER STANDARD-MAXIMUM CONTAMINANT LEVEL.
(SECONDARY MCLs ARE BASED ON CONSUMER ACCEPTANCE CRITERIA, SUCH AS TASTE, ODOR, AND APPEARANCE; DISTRIBUTION SYSTEM WATER CONTAINING SUBSTANCES EXCEEDING THESE MCLs MAY BE OBJECTIONABLE TO AN APPRECIABLE NUMBER OF PEOPLE, BUT IS NOT GENERALLY HAZARDOUS TO HEALTH).

DRAWN BY	L. KIZZIE
DATE:	07/19/95
DESIGNED BY:	K. HALL
DATE:	07/19/95
CAD DWG. NO.	TABLE.DWG

BACKGROUND METAL CONCENTRATIONS IN GROUNDWATER FROM BELLFLOWER AQUITARD MONITOR WELLS

SCALE: NONE | PROJ. NO: NQ-HU23 | REV. 0

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TABLE 4.4
CONSTITUENTS IN STORM WATER RUNOFF
AT THE CAL COMPACT LANDFILL
(Source: McLaren/Hart, 1992)

Parameter	Concentrations (ppm)	
	Dissolved	Total
Arsenic	<0.002	<0.002
Barium	0.03	0.08
Cadium	<0.01	<0.01
Chromium	<0.03	<0.03
Chromium +6	<0.02	<0.02
Copper	0.02	0.05
Iron	0.22	3.8
Lead	0.02	0.07
Manganese	0.10	0.28
Mercury	<0.001	0.003
Nickel	0.010	0.02
Selenium	<0.002	<0.002
Silver	<0.01	<0.01
Zinc	0.28	0.39
Oil and Grease		4.3
Total Organic Carbon		9.3
Biological Oxygen Demand		11.5
Total Suspended Solids		177
Volatile Suspended Solids		42

Cations	mg/l	meg/l	Anions	mg/l	meg/l
Ammonium	0.65	0.036	Bicarb.	40.504	0.664
Calcium	11.3	0.564	Carb.	0	0.000
Magnesium	3.7	0.304	Chloride	20	0.564
Potassium	2.5	0.064	Fluoride	0.26	0.014
Sodium	12.4	0.539	Nitrate	5.1	0.082
			Sulfate	10.2	0.212
Total		1.508	Total		1.536

Values prefixed with < are the method detection limit

TABLE 4.5
METALS CONCENTRATIONS IN SURFACE RUNOFF RAINWATER AND WATER COLLECTED FROM THE VADOSE ZONE EPA METHOD 6010 (Concentrations in parts per billion)
(Source: McLaren/Hart, 1992)

		Al	Na	Ca	K	Mg	Fe	Mn	Cr	Mo	Ni	Pb	Cd	Ba	Be	Sb	Tl	V	Zn	Cu(c)
State MCL(a)		1000	NS(b)	NS	NS	NS	300(c)	50(c)	50	NS	1000(c)	50	NS	1000	NS	NS	NS	NS	5000(c)	1000(c)
	Date																			
Surface Water																				
SWC-1	2/28/91	1800	32,000	24,000	7300	6800	2200	49	15	10	<10	<50	<10	56	<5	<20	<100	12	86	22
SWC-2	2/28/91	13,000	6500	18,000	5300	7500	14,000	260	23	<10	12	<50	12	110	<5	<20	<100	38	130	27
SWC-3	1/04/91	NA(d)	NA	NA	NA	NA	NA	NA	<10	<10	<10	<50	<10	60	<5	<20	<100	20	160	<50
	2/28/91	35,000	41,000	28,000	9200	19,000	47,000	660	56	20	40	<50	22	260	<5	30	130	100	180	59
Vadose Wells																				
VW-2	3/05/91	48,000	130,000	30,000	10,000	17,000	210,000	2900	78	<10	67	280	32	1300	11	36	<100	55	970	97
VW-3	3/05/91	6600	3,400,000	11,000	200,000	180,000	49,000	350	40	<10	54	<50	29	210	<5	<20	<100	16	180	13

(a) Maximum Contaminant Level (State primary drinking water standard)
(b) Not Specified
(c) Secondary Drinking Water Standard
(d) Not Analyzed

Values prefixed with < are the method detection limit

TABLE 4.6
Page 1 of 5
VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER SAMPLES FROM THE BELLFLOWER AQUITARD (Concentrations in parts per billion)
(Source: McLaren/Hart, 1992)

WELL	DATE	Benzene	Toluene	Ethyl Benzene	Xylenes	1,2-DCA (a)	TCE (b)	PCE (c)	Chlorobenzene
	State MCL (d)	1	100 (e)	680	1750	0.5	5	5	30
GW-1B	Nov., 1990	<1	1	<1	<1	72	30	15	112
	Dec., 1990 (f)	6	6	2	10	6	32	17	130
	Jan., 1991 (g)	2	1	<1	<1	54	30	16	124
	Apr., 1991 (h)	<1	<1	<1	<1	44	38	18	124
	Aug., 1991 (i)	<10	<10	<10	<10	46	<10	15	120
	Jan., 1992 (k)	<10	<10	<10	<10	34	29	13	99
	Apr., 1992 (n)	<10	<10	<10	<10	40	31	12	100
GW-1C	Nov., 1990	<1	4	<1	<1	<1	15	2	<1
	Dec., 1990	1	4	<1	6	<1	17	3	1
	Jan., 1991	<1	<1	<1	<1	<1	17	3	<1
	Apr., 1991	<1	<1	<1	<1	<1	17	2	<1
	Aug., 1991	<5	<5	<5	<5	<5	17	<5	<5
	Jan., 1992 (l)	<5	<5	<5	<5	<5	24	3	<5
	Apr., 1992	<5	<5	<5	<5	<5	20	2	<5
GW-2C	Nov., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	1	<1	<1	6	<1	1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	1	1	3
	Apr., 1991	<1	<1	<1	<1	<1	8	<1	<1
	Aug., 1991 (j)	<5	<5	<5	<5	<5	14	<5	<5
	Jan., 1992 (m)	<5	<5	<5	<5	<5	7	<5	<5
	Apr., 1992 (o)	2	6	2	7	<5	8	2	2

S9205039

(a) 1,2 - Dichloroethane
(b) Trichloroethylene
(c) Tetrachloroethylene
(d) State Maximum Contaminant Level (Primary Drinking Water Standard)
(e) State Action Level
(f) 26 ppb Vinyl Acetate
(g) 84 ppb vinyl chloride, 8 ppb 1,1-Dichloroethane
5 ppb Trans 1,2 Dichloroethylene, 4 ppb 1,1 Dichloroethylene
6 ppb 1,2 Dichloropropane
(h) 8 ppb 1,1 Dichloroethane, 4ppb trans 1 2 Dichloroethylene
(i) 46 ppb Vinyl Chloride, 240 ppb cis-1,2-Dichloroethene,
30 ppb 1,4 Dichlorobenzene, 15 ppb cis 1,2 Dichlorobenzene
(j) 20 ppb cis-1,2 Dichloroethene
(k) 9 ppb 1,1 Dichloroethane, 200 ppb cis-1,2-Dichloroethene,
4 ppb trans-Dichloroethene, 13 ppb Methylene Chloride,
4 ppb 1,2-Dichloropropane, 16 ppb 1,2-Dichlorobenzene,
28 ppb 1,4-Dichlorobenzene 56 ppb Vinyl Chloride
(l) 6 ppb Methylene Chloride
(m) 12 ppb cis-1,2-Dichloroethene, 5 ppb Methylene Chloride
(n) 9 ppb 1,1 Dichloroethane, 190 ppb cis-1,2-Dichloroethene,
2 ppb trans 1,2 Dichloroethene, 31 ppb 1,4 Dichlorobenzene,
17 ppb 1,2-Dichlorobenzene, 48 ppb Vinyl Chloride
(o) 14 ppb cis 1,2-Dichloroethene

TABLE 4.6
Page 2 of 5
VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER SAMPLES FROM THE BELLFLOWER AQUITARD (Concentrations in parts per billion)
(Source: McLaren/Hart, 1992)

WELL	DATE	Benzene	Toluene	Ethyl Benzene	Xylenes	1,2-DCA (a)	TCE (b)	PCE (c)	Chlorobenzene
	State MCL (d)	1	100 (e)	680	1750	0.5	5	5	30
GW-2B	Nov., 90-Apr., 92 (f)	-	-	-	-	-	-	-	-
GW-3B	Nov., 1990 (g)	<1	<1	<1	<1	<1	3	<1	<1
	Dec., 1990	<1	<1	<1	<1	<1	3	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	2	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	3	<1	<1
	Aug., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	3	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	3	<5	<5
GW-4	Nov., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	11	53	9	70	<1	<1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Aug., 1991	<5	<1	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5
GW-5A	Nov., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	<1	<1	<1	4	<1	<1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Aug., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5

S9205038

(a) 1,2 - Dichloroethane
(b) Trichloroethylene
(c) Tetrachloroethylene
(d) State Maximum Contaminant Level (Primary Drinking Water Standard)
(e) State Action Level
(f) Not Sampled due to Insufficient Water in Well
(g) 26 ppb Vinyl Acetate

TABLE 4.6
Page 3 of 5
VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER SAMPLES FROM THE BELLFLOWER AQUITARD (Concentrations in parts per billion)
(Source: McLaren/Hart, 1992)

WELL	DATE	Benzene	Toluene	Ethyl Benzene	Xylenes	1,2-DCA (a)	TCE (b)	PCE (c)	Chlorobenzene
	State MCL (d)	1	100 (e)	680	1750	0.5	5	5	30
GW-3C	Nov., 1990	3	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	<1	<1	<1	2	<1	<1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Aug., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5
GW-5B	Nov., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Aug., 1991	48	30	8	17	<5	<5	<5	<5
	Jan., 1992 (r)	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5
GW-5C	Nov., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	<1	<1	<1	3	<1	<1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Aug., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5
GW-6	Nov., 1990 (p)	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	<1	<1	<1	<1	<1	<1	<1	<1
	Jan., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Apr., 1991	<1	<1	<1	<1	<1	<1	<1	<1
	Aug., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5
GW-7B	Nov., 1990	3500	380	610	870	<25	<25	<25	<25
	Dec., 1990 (q)	2000	424	380	1300	<1	6	1	57
	Jan., 1991	2800	50	<20	1600	<20	<20	<20	<20
	Apr., 1991	3500	720	670	1500	<1	7	<1	70
	Aug., 1991	2800	100	590	240	<100	<100	<100	<100
	Jan., 1992	2600	<100	520	<100	<100	<100	<100	<100
	Apr., 1992 (s)	3100	61	640	<100	<100	<100	<100	63

E9206003

(p) 9 ppb Chloroform
(q) 21 ppb Styrene
(r) 6 ppb Methyle 'loride
(s) 100 ppb Met :hloride

TABLE 4.6

VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER SAMPLES FROM THE BELLFLOWER AQUITARD (Concentrations in parts per billion)

(Source: McLaren/Hart, 1992)

WELL	DATE	Benzene	Toluene	Ethyl Benzene	Xylenes	1,2-DCA (a)	TCE (b)	PCE (c)	Chlorobenzene
	State MCL (d)	1	100 (e)	680	1750	0.5	5	5	30
GW-7C	Nov., 1990	6700	18000	8300	9900	<100	<100	<100	<100
	Dec., 1990	6700	16000	1400	11000	<50	<50	<50	<50
	Jan., 1991	8200	20400	12600	12400	<100	<100	<100	<100
	Apr., 1991	5000	14000	1500	8400	<1	/	<1	10
	Aug., 1991	6300	5500	1800	4600	<500	<500	<500	<500
	Jan., 1992	7500	16000	2300	8300	<500	<500	<500	<500
	Apr., 1992	7200	15000	2200	9100	<500	<500	<500	<500
GW-8	Nov., 1990 (t)	<1	<1	<1	<1	<1	<1	<1	<1
	Dec., 1990	<1	<1	<1	<1	19	<1	<1	<1
	Jan., 1991 (u)	3	<1	<1	18	<1	<1	<1	<1
	Apr., 1991	<1	<1	48	<1	40	<1	<1	<1
	Aug., 1991	<5	<5	8	<5	51	<5	<5	<5
	Jan., 1992 (v)	<5	<5	30	<5	60	<5	<5	<5
	Apr., 1992	<5	<5	29	<5	58	<5	<5	<5
GW-7.1	Sep., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Oct., 1991	<5	<5	<5	<5	<5	<5	<5	<5
	Jan., 1992	<5	<5	<5	<5	<5	<5	<5	<5
	Apr., 1992	<5	<5	<5	<5	<5	<5	<5	<5

E9206004

(t) 2 ppb Chloroform
(u) 47 ppb 1,1-Dichloroethane
(v) 5 ppb Methylene Chloride

TABLE 4.6
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VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER SAMPLES FROM THE BELLFLOWER AQUITARD (Concentrations in parts per billion)
(Source: McLaren/Hart, 1992)

WELL/BAT	DATE	Benzene	Toluene	Ethyl Benzene	Xylenes	1,2-DCA (a)	TCE (b)	PCE (c)	Chlorobenzene
	State MCL (d)	1	100 (e)	680	1750	0 5	5	5	30
CCPT-1 @ 74' (f)	Aug. 1991 (h)	<0.5	<0.5	<0.5	<0.5	4 6	8.8	1 6	6
CCPT-7C @ 69' (g)	Aug. 1991 (i)	5000	9600	720	3500	40	2.1	<0.5	5.9
CPT-3 @ 61 (g)	Aug. 1991 (j)	1.2	0 94	<0.5	<0.5	0 89	0.54	<0.5	72
DCPT-1.1 @ 72' (g)	Aug. 1991	<0.5	0 77	<0.5	<0.5	<0 5	<0 5	<0 5	<0.5
DCPT-5.1 @ 65'	Aug. 1991	<0.5	<0 5	<0 5	<0.5	<0 5	<0.5	<0 5	<0.5
DCPT-7.1 @ 59' (g)	Aug. 1991	<0.5	0 90	<0 5	1 02	<0 5	<0 5	<0.5	<0.5
DCPT-7.2 @ 69'	Aug. 1991	<0.5	<0 5	<0 5	<0 5	<0.5	<0 5	<0 5	<0.5
UCPT-3 @ 65' (g)	Aug. 1991	<0.5	<0 5	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5

(a) 1,2-Dichloroethane
(b) Trichloroethene
(c) Tetrachloroethene
(d) State Maximum Contaminant Level (Primary Drinking Water Standard)
(e) State Action Level
(f) EPA Method 601
(g) EPA Methods 601 and 602
(h) 1 1 ppb cis-1,2-DCA; 0.65 ppb 1,1-DCA; 0.62 ppb 1,2-Dichlorobenzene; 1.2 ppb 1,4-Dichlorobenzene
(i) 1 7 ppb cis-1,2-Dichloroethene
(j) 7.0 ppb cis-1,2-Dichloroethene; 1.7 ppb 1,2-Dichlorobenzene; 7.1 ppb 1,4-Dichlorobenzene

TAB1_11.XLS
7/14/9

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number Analyte	SCPT- 02-78' ug/l	SCPT- 03-85' ug/l	SCPT- 04-72' ug/l	SCPT- 05-65' ug/l	SCPT- 05-80' ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	<0.5	<0.5	0.7	<0.5	<0.5
1,1-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	<0.5	<0.5	1.0	<0.5	<0.5
1,2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<2.5	<2.5	<2.5	<2.5	1.2
2-Butanone	<5.0	<5.0	<5.0	<5.0	16
Acetone	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	<0.5	<0.5	2.0	<0.5	<0.5
Ethyl Benzene	<0.5	<0.5	<0.5	<0.5	1.7
Methylene Chloride	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene	<0.5	<0.5	2.9	<0.5	1.3
Toluene	0.56	<0.5	<0.5	3.4	3.7
trans-1,2-Dichloroethene	<0.5	<0.5	0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	15.0	<0.5	8.3
Vinyl Chloride	<0.5	<0.5	10.0	<0.5	1.9
Xylenes	<1.0	<1.0	<1.0	<1.0	3.8
Total	0.6	NA	32.1	3.4	37.9

Note:

Any cell with the less than symbol < is equal to the detection limit.

NA = Not Applicable.

NR = No Analysis for this compound.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-
	6-82'	7-77'	08-54'	8-68'	8-88'
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<12.5	<50	<0.5
1,1,2-Trichloroethane	<0.5	<0.5	<12.5	<50	<0.5
1,1-Dichloroethane	<0.5	<0.5	<12.5	570	0.6
1,1-Dichloroethylene	<0.5	<0.5	<12.5	<50	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	<0.5	<12.5	<50	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<2.5	<2.5	<125	<250	<2.5
2-Butanone	<5.0	<5.0	<62.5	<500	<5.0
Acetone	<5.0	<5.0	<125	<500	<5.0
Benzene	0.8	1	4,800	16,000	16
Chlorobenzene	<0.5	<0.5	<12.5	<50	<0.5
Ethyl Benzene	<0.5	<0.5	1,600	1,500	5
Methylene Chloride	<5.0	<5.0	<125	<500	<5.0
Tetrachloroethylene	<0.5	<0.5	<12.5	<50	<0.5
Toluene	0.6	0.6	6,400	420	2.7
trans-1,2-Dichloroethene	<0.5	<0.5	<12.5	<50	<0.5
Trichloroethene	<0.5	<0.5	<12.5	<50	<0.5
Vinyl Chloride	<0.5	<0.5	<12.5	<50	<0.5
Xylenes	<1.0	<1.0	2,900	2,400	10
Total	1.4	1.6	15,700	20,890	34.3

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-
	09-66'	10-61'	11-68'	12-65'	12-82'	13-77'
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<0.5	<2.5	<0.5	<0.5	<0.5	0.5
1,1,2-Trichloroethane	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	<0.5	<2.5	<0.5	<0.5	<0.5	2.2
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentone	<2.5	<12.5	<2.5	<2.5	<2.5	<2.5
2-Butanone	<5.0	<25	<5.0	<5.0	7.5	<5.0
Acetone	<5.0	<25	<5.0	<5.0	<5.0	<5.0
Benzene	150	300	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	170	520	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<5.0	<25	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5
Toluene	6.6	36	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethene	<0.5	<2.5	<0.5	<0.5	<0.5	10
Trichloroethene	<0.5	<2.5	<0.5	<0.5	<0.5	35
Vinyl Chloride	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5
Xylenes	12.1	14.4	<1.0	<1.0	<1.0	<1.0
Total	338.7	870.4	NA	NA	7.5	47.7

Note:

Any cell with the less than symbol < is equal to the detection limit.

NA = Not Applicable.

NR = No Analysis for this compound.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SHP-	SCPT-	SHP-	SCPT-	SCPT-
	14-55'	15-69'	16-85'	17-84'	18-74'	19-68'
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	<0.5	14	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
2-Butanone	<5.0	11	<5.0	<5.0	<5.0	<5.0
Acetone	<5.0	6.2	<5.0	<5.0	<5.0	<5.0
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	0.7
Methylene Chloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene	<0.5	<0.5	<0.5	<0.5	<0.5	1.3
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	0.9
trans-1,2-Dichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	2
Vinyl Chloride	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
Total	NA	31.2	NA	NA	NA	6.3

Notes:

NA = Not Applicable.

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SCPT-	SCPT-	SCPT-	SHP-	SCPT-
	19-77'	19-94'	20-65'	20-74'	21-74'	22-59'
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<50
1,1,2-Trichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<50
1,1-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	1,000
1,1-Dichloroethylene	<0.5	<0.5	<0.5	<0.5	<0.5	<50
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<50
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<2.5	<2.5	<2.5	<2.5	<2.5	<250
2-Butanone	<5.0	<5.0	<5.0	11	<5.0	<500
Acetone	<5.0	<5.0	<5.0	6.5	<5.0	<500
Benzene	<0.5	<0.5	<0.5	0.7	<0.5	13,000
Chlorobenzene	<0.5	<0.5	310	<0.5	<0.5	<50
Ethyl Benzene	<0.5	<0.5	2.2	0.8	<0.5	1,400
Methylene Chloride	<5.0	11	<5.0	<5.0	<5.0	<500
Tetrachloroethylene	<0.5	<0.5	<0.5	<0.5	<0.5	<50
Toluene	<0.5	<0.5	2.1	0.8	<0.5	5,500
trans-1,2-Dichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<50
Trichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<50
Vinyl Chloride	<0.5	<0.5	<0.5	<0.5	<0.5	<50
Xylenes	<1.0	<1.0	<1.0	1.8	<1.0	6,400
Total	NA	11.0	314.3	21.6	NA	27,300

Notes:

NA = Not Applicable.

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-
	22-70'	22-87'	23-59'	23-70'	24-61'	24-62'D
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<50	<0.5	<100	<25	<50	<50
1,1,2-Trichloroethane	<50	<0.5	<100	<25	<50	<50
1,1-Dichloroethane	<50	51	<0.5	280	<50	<50
1,1-Dichloroethylene	<50	<0.5	<0.5	<0.5	<50	<50
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	430	<0.5	<100	<25	1,700	1,700
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<250	<2.5	<500	<125	<250	<250
2-Butanone	<500	<5.0	<1000	<250	<500	<500
Acetone	<500	<5.0	<1000	<250	<500	<500
Benzene	15,000	7.9	16,000	270	21,000	21,000
Chlorobenzene	<50	<0.5	<100	<25	<50	<50
Ethyl Benzene	1,600	1.7	2,300	140	1,200	1,200
Methylene Chloride	<500	<5.0	<200	<250	<500	<500
Tetrachloroethylene	<50	<0.5	<100	<25	<50	<50
Toluene	18,000	6.5	21,000	790	5,800	5,800
trans-1,2-Dichloroethene	<50	<0.5	<100	<25	<50	<50
Trichloroethene	<50	<0.5	<100	<25	<50	<50
Vinyl Chloride	<50	<0.5	<100	<25	<50	<50
Xylenes	8,300	6.9	11,000	760	2,300	2,300
Total	43,330	74.0	50,300	2,240	32,000	32,000

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SCPT-	SHP-	SCPT-	SCPT-	SHP-
	24-70'	25-61'	26-88'	27-62'	27-86'	28-67'
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<50	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	<50	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	<50	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	<50	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	1,600	<0.5	<0.5	2.4	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<250	<2.5	<2.5	<2.5	<2.5	<2.5
2-Butanone	<500	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	<500	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	18,000	0.7	<0.5	1.1	0.8	<0.5
Chlorobenzene	<50	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	980	<0.5	0.5	<0.5	<0.5	1.3
Methylene Chloride	<500	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene	<50	<0.5	<0.5	0.9	<0.5	<0.5
Toluene	1,400	0.8	2.8	<0.5	0.6	8.0
trans-1,2-Dichloroethene	<50	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<50	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride	<50	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes	1,100	<1.0	2.8	<1.0	<1.0	8.2
Total	23,080	1.5	6.1	4.4	1.4	17.5

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-	SCPT-
	28-57'	29-59'	30-66'	31-56'	32-63'	33-69'
Analyte	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5
1,1-Dichloroethane	4.1	<0.5	<5.0	1.2	<0.5	<0.5
1,1-Dichloroethylene	<0.5	1.0	<5.0	1.7	<0.5	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	0.7	<5.0	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentanone	<2.5	<2.5	<25	<2.5	<2.5	<2.5
2-Butanone	<5.0	<5.0	<50	<5.0	<5.0	<5.0
Acetone	<5.0	<5.0	<50	<5.0	<5.0	<5.0
Benzene	2.2	0.7	13	69	<0.5	0.5
Chlorobenzene	<0.5	<0.5	110	2.1	<0.5	<0.5
Ethyl Benzene	0.7	<0.5	<5.0	<0.5	<0.5	<0.5
Methylene Chloride	<5.0	<5.0	<50	<5.0	<5.0	<5.0
Tetrachloroethylene	<0.5	5.8	<5.0	49	0.5	<0.5
Toluene	1.6	0.6	<5.0	0.6	<0.5	<0.5
trans-1,2-Dichloroethene	<0.5	0.6	<5.0	1.2	<0.5	<0.5
Trichloroethene	<0.5	64	<5.0	31	1.8	<0.5
Vinyl Chloride	<0.5	<0.5	8.6	39	<0.5	<0.5
Xylenes	2.3	<1.0	<10	1.6	<1.0	<1.0
Total	10.9	73.4	131.6	196.4	2.3	0.5

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number Analyte	SCPT- 33-90' ug/l	SHP- 34-62' ug/l	SHP- 34-71' ug/l	SHP- 34-88' ug/l	SHP- 35-68' ug/l	SHP- 35-77' ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	<0.5	<0.5	1.4	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR
4-Methyl-2-pentone	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
2-Butanone	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	<0.5	<0.5	<0.5	<0.5	0.8	0.8
Chlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene	<0.5	<0.5	<0.5	1.0	1.1	<0.5
Toluene	<0.5	0.6	0.5	0.5	0.5	<0.5
trans-1,2-Dichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	0.9	5.5	2.3	<0.5
Vinyl Chloride	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total	NA	0.6	1.4	8.4	4.7	0.8

Notes:

NA = Not Applicable.

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

TABLE-4.7

Detection of Volatile Organic Compounds
Groundwater From Bellflower Aquitard Hydropunch Samples

Sample Number	SHP-	SCPT-	SHP-	SCPT-
	35-90'	36-62'	36-90'	37-59'
Analyte	ug/l	ug/l	ug/l	ug/l
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	NR	NR	NR	NR
1,2-Dichloroethane	<0.5	0.5	<0.5	<0.5
1,4-Dichlorobenzene	NR	NR	NR	NR
4-Methyl-2-pentanone	<2.5	<2.5	<2.5	<2.5
2-Butanone	<5.0	<5.0	<5.0	<5.0
Acetone	<5.0	<5.0	<5.0	<5.0
Benzene	10.0	1.0	0.5	0.5
Chlorobenzene	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene	<0.5	<0.5	<0.5	<0.5
Toluene	0.9	0.5	<0.5	<0.5
trans-1,2-Dichloroethene	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride	<0.5	<0.5	<0.5	<0.5
Xylenes	<1.0	<1.0	<1.0	<1.0
Total	10.9	2.0	0.5	0.5

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40 CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-1B

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	6	2	<1	<10	<10	<10	16
Chlorobenzene	112	130	124	124	120	99	100	<0.5
cis-1,2-Dichloroethene	NR	NR	NR	NR	240	200	190	NR
1,2-Dichlorobenzene	NR	NR	NR	NR	15	16	17	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	30	28	31	NR
1,1-Dichloroethane	<1	<1	8	8	<10	9	9	8.5
1,2-Dichloroethane	72	6	54	44	46	34	40	22
1,1-Dichloroethylene	<1	<1	4	<1	<10	NR	NR	0.9
1,2-Dichloropropane	<1	<1	6	<1	<10	4	NR	<5.0
Ethyl Benzene	<1	2	<1	<1	<10	<10	<10	3.6
Tetrachloroethylene	15	17	16	18	15	13	12	7.4
Toluene	1	6	1	<1	<10	<10	<10	6.4
trans-1,2-Dichloroethene	<1	3	5	4	<10	4	2	3.8
Trichloroethene	30	32	30	38	<10	29	31	22
Vinyl Chloride	<5	<6	84	<1	46	56	48	90
Xylenes	<1	10	<1	<1	<10	<10	<10	7.1
Total	230	212	546	236	748	488	480	187.7

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-1C

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	1	<1	<1	<5	<5	<5	8.9
Chlorobenzene	<1	1	<1	<1	<5	<5	<5	0.8
1,2-Dichloroethane	<1	<1	<1	<1	<5	<5	<5	1.2
Ethyl Benzene	<1	<1	<1	<1	<5	<5	<5	1.9
Tetrachloroethylene	2	3	3	2	<5	3	2	2.5
Toluene	4	4	<1	<1	<5	<5	<5	3.5
Trichloroethene	15	17	17	17	17	24	20	24
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	6.2
Xylenes	<1	6	<1	<1	<5	<5	<5	3.9
Total	21	32	20	19	17	27	22	52.9

Notes:

NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40CFR Method 624.

Any cell with the less than symbol < is equal to the detection limit.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-2B

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	NR	NR	NR	NR	NR	NR	NR	2.3
1,1-Dichloroethane	NR	NR	NR	NR	NR	NR	NR	1.9
1,1-Dichloroethylene	NR	NR	NR	NR	NR	NR	NR	3.9
1,2-Dichloroethane	NR	NR	NR	NR	NR	NR	NR	5.9
Tetrachloroethene	NR	NR	NR	NR	NR	NR	NR	11
Toluene	NR	NR	NR	NR	NR	NR	NR	0.5
trans-1,2-Dichloroethene	NR	NR	NR	NR	NR	NR	NR	2.1
Trichloroethene	NR	NR	NR	NR	NR	NR	NR	88
Vinyl Chloride	NR	NR	NR	NR	NR	NR	NR	36
Total	NA	NA	NA	NA	NA	NA	NA	151.6

Notes:
NR = No analysis of the groundwater from any sampling event except in May 95.
NA = Not Applicable.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-2C

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	1	<1	<1	<5	<5	2	3
Chlorobenzene	<1	<1	3	<1	<5	<5	2	11
cis-1,2-Dichloroethene	NR	NR	NR	NR	20	12	14	<1
1,1-Dichloroethane	<1	<1	<1	<1	<5	NR	NR	3.4
1,2-Dichloroethane	<1	<1	<1	<1	<5	<5	<5	3.6
Tetrachloroethylene	<1	<1	1	<1	<5	<5	2	4.8
Toluene	<1	<1	<1	<1	<5	<5	6	0.8
trans-1,2-Dichloroethene	NR	NR	NR	NR	<5	NR	NR	0.9
Trichloroethene	<1	1	1	8	14	7	8	32
Vinyl Chloride	<5	<5	<6	<5	<5	NR	NR	85
Xylenes	<1	6	<1	<1	<5	<5	7	<1
Total	NA	8	5	8	34	19	41	144.5

Notes:
NR = No Analysis for this compound. Laboratory used added compounds beyond those listed in the 40CFR Method 624.
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-3B

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	<1	<1	<1	<5	<5	<5	0.7
Ethyl Benzene	<1	<1	<1	<1	5	<5	<5	1.5
Toluene	<1	<1	<1	<1	<5	<5	<5	1.1
Trichloroethene	3	3	2	3	<5	3	3	3.2
Vinyl Acetate	26	NR	NR	NR	NR	NR	NR	<5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	<1	<1	<1	<5	<5	<5	3.8
Total	29	3	2	3	NA	3	3	10.3

Notes:
Any cell with the less than symbol < is equal to the detection limit.
NR = No analysis for this compound.
NA = Not Applicable.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-3C

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	3	<1	<1	<1	<5	<5	<5	1
Ethyl Benzene	<1	<1	<1	<1	<5	<5	<5	0.6
Toluene	<1	<1	<1	<1	<5	<5	<5	1.3
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	2	<1	<1	<5	<5	<5	1.8
Total	3	2	NA	NA	NA	NA	NA	4.7

Notes:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.
NR = No analysis for this compound.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-4

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	11	<1	<1	<5	<5	<5	<0.5
Ethyl Benzene	<1	9	<1	<1	<5	<5	<5	<0.5
Toluene	<1	53	<1	<1	<5	<5	<5	<0.5
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	70	<1	<1	<5	<5	<5	<1
Total	NA	143	NA	NA	NA	NA	NA	NA

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-5A

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	1	1	1	1	<5	<5	<5	<0.5
Ethyl Benzene	<1	<1	<1	<1	<5	<5	<5	0.9
Toluene	<1	<1	<1	<1	<5	<5	<5	0.7
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	4	<1	<1	<5	<5	<5	2.1
Total	NA	4	NA	NA	NA	NA	NA	3.7

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-5B

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	<1	<1	<1	48	<5	<5	<0.5
2-Butanone	NR	NR	NR	NR	NR	NR	NR	79
Ethyl Benzene	<1	<1	<1	<1	8	<5	<5	<0.5
Toluene	<1	<1	<1	<1	30	<5	<5	0.7
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	<1	<1	<1	17	<5	<5	1.1
Total	NA	NA	NA	NA	103	NA	NA	80.8

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.
NR = No analysis for this compound.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-5C

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	<1	<1	<1	<5	<5	<5	<0.5
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	3	<1	<1	<5	<5	<5	<1
Total	NA	3	NA	NA	NA	NA	NA	NA

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-6

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	<1	<1	<1	<5	<5	<5	<0.5
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Chloroform	9	NR	NR	NR	NR	NR	NR	<5
Total	9	NA	NA	NA	NA	NA	NA	NA

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.
NR = No analysis for this compound.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-7.1

Analyte	Sep. 1991	Oct. 1991	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<5	<5	<5	<5	<0.5
Toluene	<5	<5	<5	<5	<0.5
Ethyl Benzene	<5	<5	<5	<5	<0.5
Xylenes	<5	<5	<5	<5	<1.0
1,2-Dichloroethane	<5	<5	<5	<5	<0.5
Trichloroethene	<5	<5	<5	<5	<0.5
Tetrachloroethene	<5	<5	<5	<5	<0.5
Vinyl Chloride	<5	<5	<5	<5	<0.5
Chlorobenzene	<5	<5	<5	<5	<5
Total	NA	NA	NA	NA	NA

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.
NR = No analysis for this compound.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-7B

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	3500	2000	2800	3500	2800	2600	3100	7.8
2-Butanone	<250	<10	<200	<10	<500	NR	NR	26
Chlorobenzene	<25	57	<20	70	<100	<100	63	1
Ethyl Benzene	610	380	<20	870	590	520	640	1.2
Stryene	<1	21	<1	<1	<5	NR	NR	<0.5
Tetrachloroethylene	<25	1	<20	<1	<100	<100	<100	<0.5
Toluene	380	424	50	720	100	<100	61	5.8
Trichloroethene	<25	1	<20	<1	<100	<100	<100	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	870	1300	1600	1500	240	<100	<100	1
Total	5360	4184	4450	6460	3730	3120	3864	13.6

Note:
Any cell with the less than symbol < is equal to the detection limit.
NR = No analysis for this compound.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-7B Dup

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	NR	NR	NR	NR	NR	NR	NR	3.5
2-Butanone	NR	NR	NR	NR	NR	NR	NR	<5.0
Chlorobenzene	NR	NR	NR	NR	NR	NR	NR	<0.5
Ethyl Benzene	NR	NR	NR	NR	NR	NR	NR	<0.5
Stryene	NR	NR	NR	NR	NR	NR	NR	<0.5
Tetrachloroethylene	NR	NR	NR	NR	NR	NR	NR	<0.5
Toluene	NR	NR	NR	NR	NR	NR	NR	2.7
Trichloroethene	NR	NR	NR	NR	NR	NR	NR	<0.5
Vinyl Chloride	NR	NR	NR	NR	NR	NR	NR	<0.5
Xylenes	NR	NR	NR	NR	NR	NR	NR	<1.0
Total	NA	NA	NA	NA	NA	NA	NA	6.2

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.
NR = No analysis for this compound.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-7C

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	6700	6700	8200	5800	6300	7500	7200	260
Chlorobenzene	<100	<50	<100	10	<500	<500	<500	<1
1,2-Dichloroethane	<100	<50	<100	<1	<500	<500	<500	4.8
Ethyl Benzene	8300	1400	12600	1500	1800	2300	2200	360
Toluene	18000	16000	20400	14000	5500	16000	15000	270
Trichloroethene	<100	<50	<100	7	<500	<500	<500	<10
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<1
Xylenes	9900	11000	12400	8400	4600	8300	9100	760
Total	42900	35100	53600	29717	18200	34100	33500	1654.8

Note:
Any cell wtih the less than symbol < is equal to the detection limit.

Detection of Volatile Organic Compounds in Groundwater From Bellflower Aquitard Monitor Well GW-8

Analyte	Nov. 90	Dec. 90	Jan. 91	Apr. 91	Aug. 91	Jan. 92	Apr. 92	May 95
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	<1	<1	3	<1	<5	<5	<5	5.7
2-Butanone	<10	NR	NR	NR	NR	NR	NR	10
1,2 Dichloroethane	<1	19	<1	40	51	60	56	0.6
Ethyl Benzene	<1	<1	<1	48	8	30	29	1.2
Toluene	<1	<1	<1	<1	<5	<5	<5	2.2
Trichloroethene	<1	<1	<1	<1	<5	<5	<5	<0.5
Vinyl Chloride	<5	<6	<5	<5	<5	NR	NR	<0.5
Xylenes	<1	<1	18	<1	<5	<5	<5	2.2
Total	NA	19	21	88	59	90	85	21.9

Note:
Any cell with the less than symbol < is equal to the detection limit.
NA = Not Applicable.
NR = No analysis for this compound.

TABLE 5.1
CONTAMINANTS OF CONCERN
UPPER OPERABLE UNIT
CAL COMPACT LANDFILL

	SOIL	GROUNDWATER	VAPOR
METALS			
Antimony	X	X	
Arsenic	X	X	
Barium		X	
Beryllium	X	X	
Chromium		X	
Manganese		X	
Molybdenum		X	
Nickel		X	
Selenium		X	
Vanadium		X	
Zinc		X	
ORGANICS			
Benzene		X	X
Benzo(a)anthracene	X		
Benzo(b)fluoranthene	X		
alpha-BHC	X		
beta-BHC			
Bis(2-ethylhexyl)phthalate	X	X	
1,4-Dichlorobenzene			X
1,1-Dichloroethane		X	
1,2-Dichloroethane (EDC)		X	X
1,1-Dichloroethylene			X
Ethylbenzene		X	
Naphthalene		X	
Tetrachloroethylene (PCE)		X	X
Toluene		X	X
Trichloroethylene		X	X
Vinyl Chloride		X	X
Xylenes		X	X

TABLE 7.1

COMPARATIVE ANALYSIS OF ALTERNATIVES

ALTERNATIVES	OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	COMPLIANCE WITH ARARs	LONG-TERM EFFECTIVENESS AND PERMANENCE	REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT	SHORT-TERM EFFECTIVENESS	IMPLEMENTABILITY	PRESENT WORTH COST ($1,000s)
NO ACTION	Not Protective	Not applicable	Not effective - No action taken.	None - Does not treat.	Not effective - No action taken.	No implementation - No action taken	0
CONTAINMENT OF BURIED WASTE, COLLECTION AND TREATMENT OF GROUNDWATER AND LANDFILL GAS	More Protective	Complies with ARARs	Most effective - risk of exposure to buried waste reduced. Groundwater and landfill gas removed.	Provides long-term treatment of groundwater and landfill gas. No treatment of buried waste, but reduces mobility.	Effective - buried waste stays on site reducing exposure/risk to on-site workers and public. Provides treatment of groundwater and landfill gasses, but workers exposed to soil, water, and vapors during construction of extraction systems.	Implementable - *contruction* equipment, materials, and methods to implement surface cover and extraction wells are proven	27,193 ~~38,969~~
CONTAINMENT OF BURIED WASTE, COLLECTION AND TREATMENT OF GROUNDWATER, AND MONITORING OF ~~GROUNDWATER~~ ~~AND~~ LANDFILL GAS	Protective pending compliance with landfill gas levels	Complies with ARARs for buried waste and groundwater, but monitoring must trigger future response actions for long-term compliance with ARARs for landfill gas~~and~~ ~~groundwater~~.	Effective - risk of exposure to buried waste ~~and landfill~~ ~~gasses~~ reduced. Groundwater removed ~~Does not reduce risk associated with groundwater.~~	Provides long-term treatment of groundwater. No treatment of buried waste, but reduces mobility. No treatment of ~~groundwater or~~ landfill gasses.	Effective - buried waste stays on site reducing exposure/risk to on-site workers and public. Provides treatment of groundwater, but workers exposed to soil and water during construction of groundwater extraction system. Minor exposure to gas vapors	More Implementable - construction equipment, materials, and methods to implement this alternative are proven. No gas extraction means ~~L~~less construction effort required	23,838 ~~25,126~~

TABLE 7.2 PROPOSED OFF-SITE DISCHARGE LIMITATIONS

Constituent	**Typical NPDES Permit Requirements for Discharge of Treated Groundwater[a] Monthly Average/Maximum**	***Industrial Wastewater Effluent Limitations* for Joint Outfall Districts Phase I[b]**
Suspended Solids (mg/l)	50/75	-
BOD_5 @20°C (mg/l)	20/30	-
Oil and Grease (mg/l)	10/15	-
Turbidity (TUs)	50/75	-
Settleable Solids (ml/l)	0.1/0.2	-
Sulfides (mg/l)	-/1.0	-
Phenols (mg/l)	-/1.0	-
Chlorinated Phenolic Compounds (ug/l)	-/1.0	-
Benzene (ug/l)	-/1.0	-
Toluene (ug/l)	-/10.0	-
Xylene (ug/l)	-/10.0	-
Ethylbenzene (ug/l)	-/10.0	-
Carbon Tetrachloride (ug/l)	-/0.5	-
Tetrachloroethylene (ug/l)	-/5.0	-
Trichloroethylene (ug/l)	-/5.0	-
1,4-Dichlorobenzene (ug/l)	-/5.0	-
1,1-Dichloroethane (ug/l)	-/5.0	-
1,2-Dichloroethane (ug/l)	-/0.5	-
1,1-Dichloroethylene (ug/l)	-/6.0	-
Vinyl Chloride (ug/l)	-/0.5	-
Lead (mg/l)	-/0.05	40
Arsenic (mg/l)	-/0.05	3
Chromium (mg/l)	-/0.05	10 (total)
Silver (mg/l)	-/0.05	5
Cadmium (mg/l)	-/0.01	15
Selenium (mg/l)	-/0.01	-
Mercury (mg/l)	-/0.002	2
Copper (mg/l)	-/1.0	15
Zinc (mg/l)	-/5.0	25
Cyanide (total) (mg/l)	-	10
Nickel (mg/l)	-	12
Total Identifiable Chlorinated Hydrocarbons (mg/l)	-	Essentially None
Volatile Organics (total) (mg/l)	-	1.0

(a) California Regional Water Quality Control Board - Los Angeles Region, Discharges of Ground Water to Surface Waters, Order No. 91-092, Revised July 5, 1991.
(b) Sanitation Districts of Los Angeles County. (Rev. 120892)

TABLE 7.3

REMEDIAL ACTION GOALS FOR GROUNDWATER UPPER OPERABLE UNIT CAL COMPACT LANDFILL

Contaminant	Baseline Groundwater Risk[(a)]	Background Level (95% UTL)[(b)] mg/l	MCLs[(c)] mg/l	Proposed PRGs for Groundwater mg/l	Criterion Reference
METALS					
Antimony	X	NR	0.006 (Fed.)	0.006	MCL
Arsenic	X	0.14	0.05	0.05*	MCL
Barium	O	0.23	1.0	1.0	MCL
Beryllium	X	NR	0.004 (Fed.)	0.004	MCL
Chromium (total)	X	0.28	0.05	0.05*	MCL
Manganese	X	10.2	0.05 (Secondary)	10.2	Background
Molybdenum	X	0.16	-	0.16	Background
Nickel	X	0.3	0.1 (Fed.)	0.3	Background
Selenium	X	0.11	0.01	0.11	Background
Vanadium	X	0.03	-	0.03	Background
Zinc	X	0.63	5.0 (Secondary)	5.0	MCL
ORGANICS					
Benzene	X	-	0.001	0.001	MCL
Bis(2-ethylhexyl)phthalate	O	-	-	0.0052	Risk Based[(d)]
1,1-Dichloroethane	X	-	0.005	0.005	MCL
1,2-Dichloroethane (EDC)	X	-	0.0005	0.0005	MCL
1,1-Dichloroethylene	X	-	0.006	0.006	MCL
Ethylbenzene	O	-	0.68	0.68	MCL
Naphthalene	X	-	-	0.015	Risk Based[(d)]
Tetrachloroethylene (PCE)	X	-	0.005	0.005	MCL
Toluene	X	-	1.0 (Fed.)	1.0	MCL
Trichloroethylene	X	-	0.005	0.005	MCL
Vinyl Chloride	X	-	0.0005	0.0005	MCL

NR = Not Analyzed; UTL = Upper Tolerance Limit; * Required by DTSC and RWQCB.

(a) X denotes site-specific baseline risk calculated at greater than 1.0E-06 for cancer risk or 1.0 for noncancer risk; O denotes risk calculated at less than 1.0E-06 and greater than 1.0E-07 for cancer risk or less than 1.0 and greater than 0.2 for noncancer risk. Risk scenario is for on-site residential child who ingests groundwater.

(b) Ref: Table 3.1.B, Remedial Investigation Report, B&R Environmental, July 1995.

(c) California Maximium Contaminant Level (Primary Drinking Water Standards) except noted.

(d) Proposed RAG is calculated based on referenced concentration reflecting site-specific target cancer risk level of 1.0E-06 or noncancer hazard index of 1.0 for on-site child (most conservative) who ingests groundwater.

TABLE 7.4

REMEDIAL ACTION GOALS
FOR LANDFILL GAS
UPPER OPERABLE UNIT
CAL COMPACT LANDFILL

Contaminant	Baseline Vapor Risk[(a)]	Referenced Vapor Concentration[(b)] ug/m³	Proposed PRGs for Landfill Gas ug/m³ (ppmv)
ORGANICS			
Benzene	X	60	**60 (0.020)**
1,4-Dichlorobenzene	X	190	**190 (0.030)**
1,2-Dichloroethane (EDC)	X	70	**70 (0.020)**
1,1-Dichloroethylene	O	40	**40 (0.010)**
Tetrachloroethylene (PCE)	X	360	**360 (0.050)**
Toluene	X	29,500	**20,000 (5.0)**
Trichloroethylene	X	690	**500 (0.10)**
Vinyl Chloride	X	20	**25 (0.010)[(c)]**
Xylenes	X	57,500	**40,000 (10.0)**
Methane	-[(d)]	5 percent	**5 percent[(e)]**

(a) X denotes site-specific baseline risk calculated at greater than 1.0E-06 for cancer risk or 1.0 for noncancer risk: O denotes risk calculated at less than 1.0E-06 and greater than 1.0E-07 for cancer risk or less than 1.0 and greater than 0.2 for noncancer risk.

(b) Referenced vapor concentrations are calculated based on site-specific target risk value of 1.0E-06 of cancer level or 1.0 of noncancer hazard index for on-site child (most conservative) who inhales air at the surface level.

Vapor Conc., C_{sg} ($\mu g/m^3$) = $J_s \times L / D_e \times 10E{+}09$ Ref: Farmer Vapor Model and Box Model (Baseline Risk Assessment, B&RE. 1995)

where, J_s = vapor emission rate (mg/cm^2-sec) at surface
D_e = effective gas diffusion coefficient (cm^3/cm-sec)
L = thichness/distance of soil buffer between soil gas and surface (assumed 3 feet)

(c) CCR Title 17, Section 70200 California Ambient Air Quality Standards.

(d) Methane is not a COC; however, it is an ARAR limit.

(e) CCR Title 14, Section 17783 Gas Monitoring and Control.

TABLE 7.5

PROPOSED ACTION LEVELS FOR DUST AND PARTICULATE MONITORING

Airborne Substance	Proposed Action Level	Duration of Averaging Period	Criterion Reference
PM_{10}	50 $\mu g/m^3$ (ambient air)	24-hour average	CCR 17 Ambient Air Standards
PM_{10}	50 $\mu g/m^3$ (difference between down- and up-wind at perimeter)	5-hour average	SCAQMD Rule 403
PM_{10}	100 $\mu g/m^3$ [(a)] (difference between down- and up-wind at perimeter)	Instaneous real-time measurement	Proposed to meet SCAQMD Rule 403
Lead	1.5 $\mu g/m^3$	30-day average	CCR 17 Ambient Air Standards
Hex-Chromium	4.1×10^{-4} $\mu g/m^3$ [(b)]	Daily average	Proposed based on site-specific risk assessment calculations for risk level of 1×10^{-6}

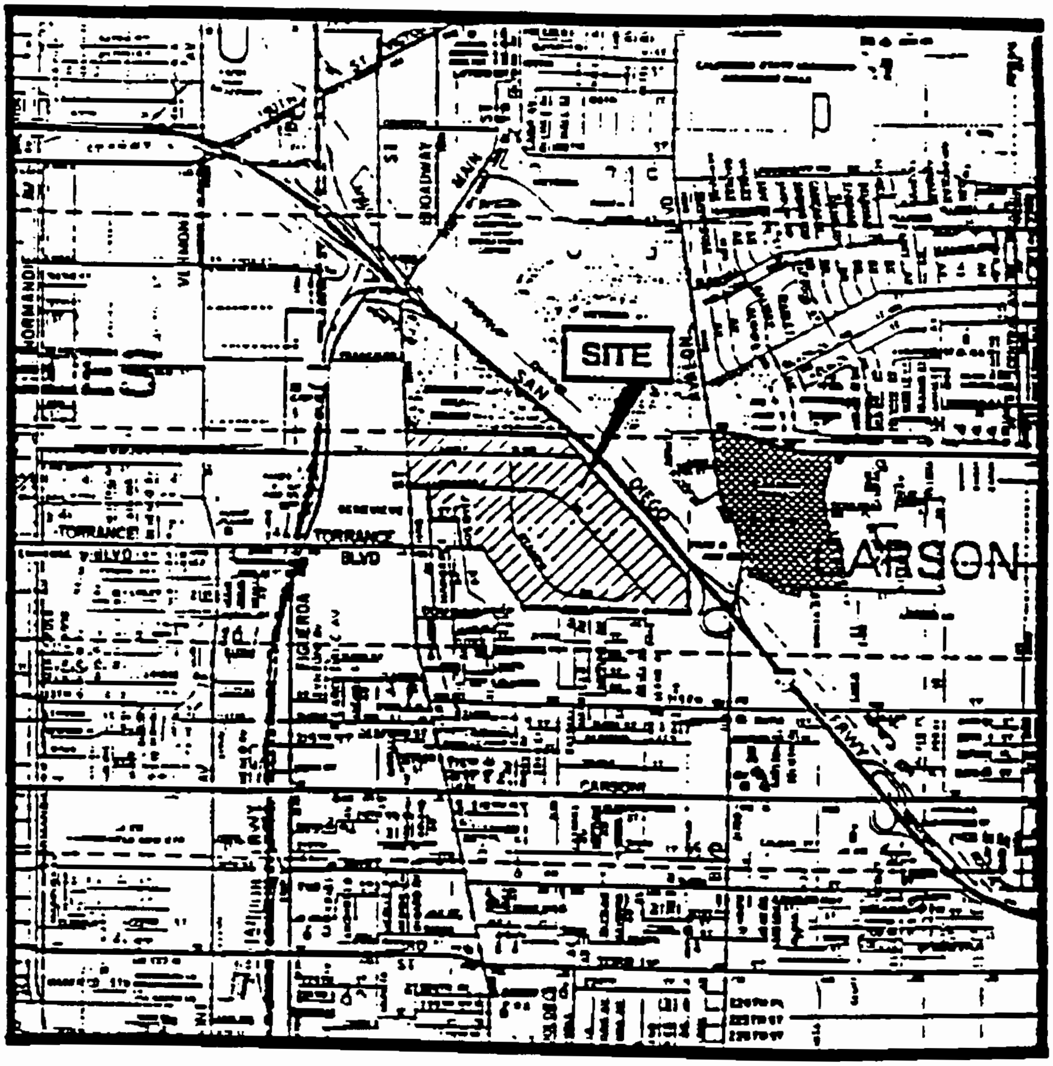
(a) Proposed action level will be adjusted based on results of the actual field data to meet SCAQMD Rule 403 requirements.

(b) Proposed action level for Chromium (VI) is calculated based on daily particulate concentration reflecting target cancer risk level of 1×10^{-6} for off-site child (most conservative) who constantly inhales particulate under a 2-yr construction period.

$$\text{Cancer Risk Level} = 1 \times 10^{-6} = \mathbf{Conc._{particulate\ (Cr)}} \times (RF \times IR_{air} \times EF \times ED \times B) / (BW \times AT) \times CSF$$

$$\begin{aligned}
\mathbf{Conc._{particulate,\ Cr\ (vi)}} &= 1E\text{-}06 / (RF \times IR_{air} \times EF \times ED \times B) \times (BW \times AT) / CSF \\
&= 1E\text{-}06 / (0.125 \times 20\ m^3/day \times 1 \times 2\ yr \times 1) \times (15\ kg \times 70\ yrs) \\
&\quad / 5.1E{+}02\ (mg/kg/day)^{-1} \\
&= 4.1E10\text{-}7\ (mg/m^3)
\end{aligned}$$

(Ref: Table 3-8, Baseline Risk Assessment, B&R Environmental, 1995)



SOURCE: McLAREN/HART (1992) FROM 1990 THOMAS BROTHERS GUIDE
LOS ANGELES COUNTY PAGES 68, 69

LEGEND

CAL COMPACT LOCATION

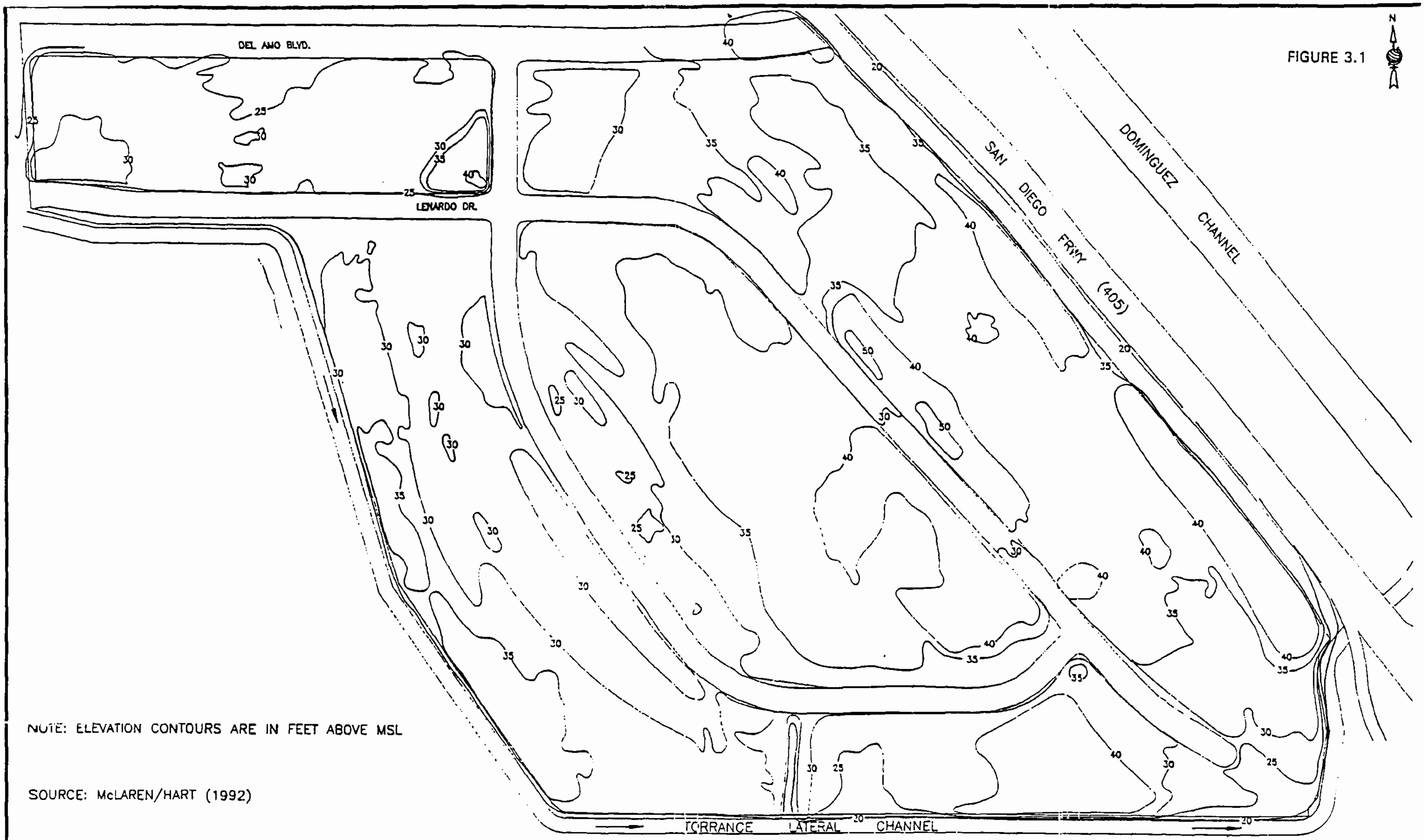
FIGURE 1.1

SITE LOCATION MAP OF THE
CAL COMPACT LANDFILL
20300 MAIN STREET
CARSON, CALIFORNIA

SCALE - FEET

Brown & Root Environmental
A Halliburton Company

FIGURE 3.1



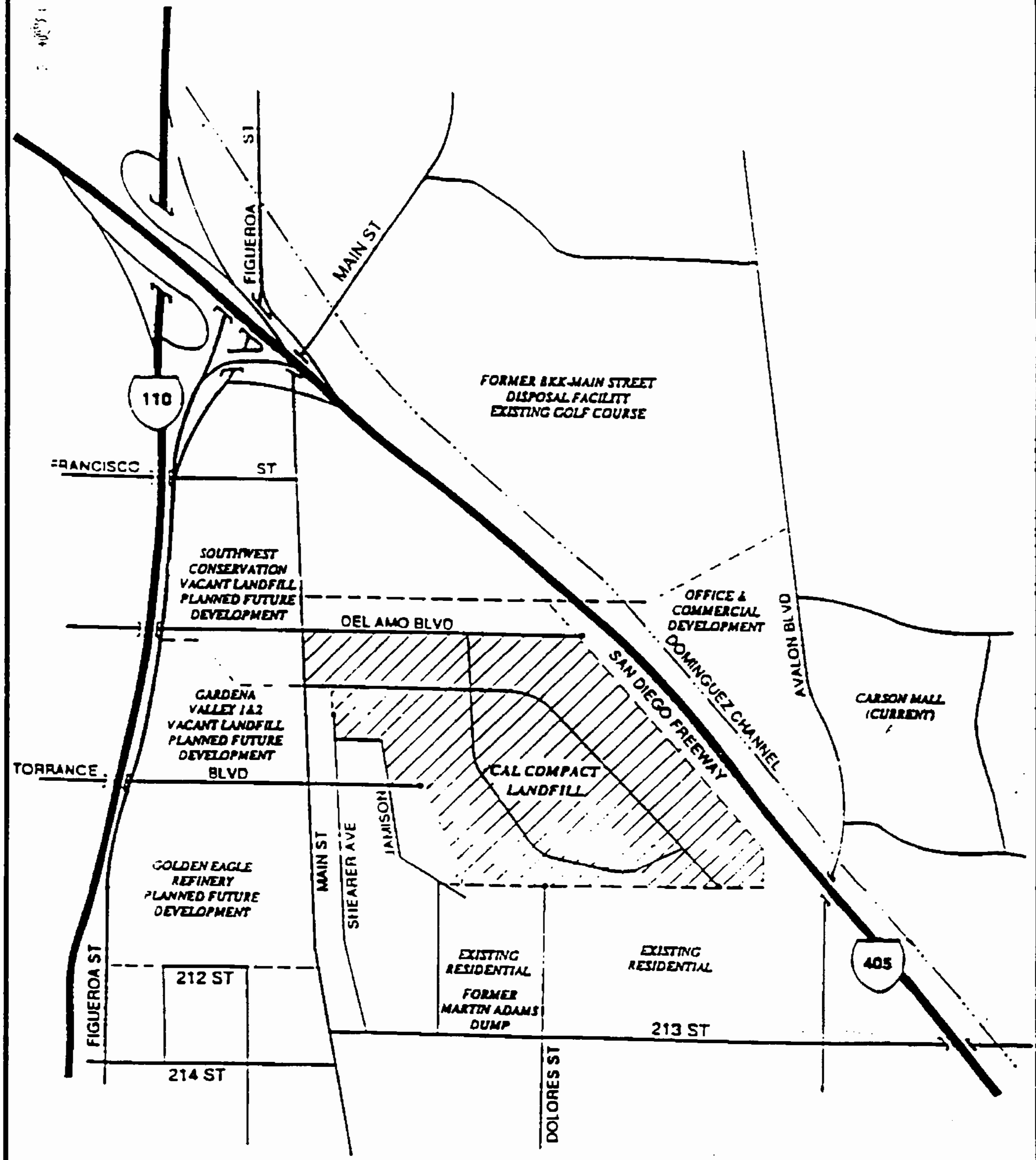
NOTE: ELEVATION CONTOURS ARE IN FEET ABOVE MSL

SOURCE: McLAREN/HART (1992)

300 150 0 300
SCALE – FEET

FIGURE 3.1
TOPOGRAPHIC MAP OF
THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company



SOURCE: McLAREN/HART (1993)

1750 875 0 1750

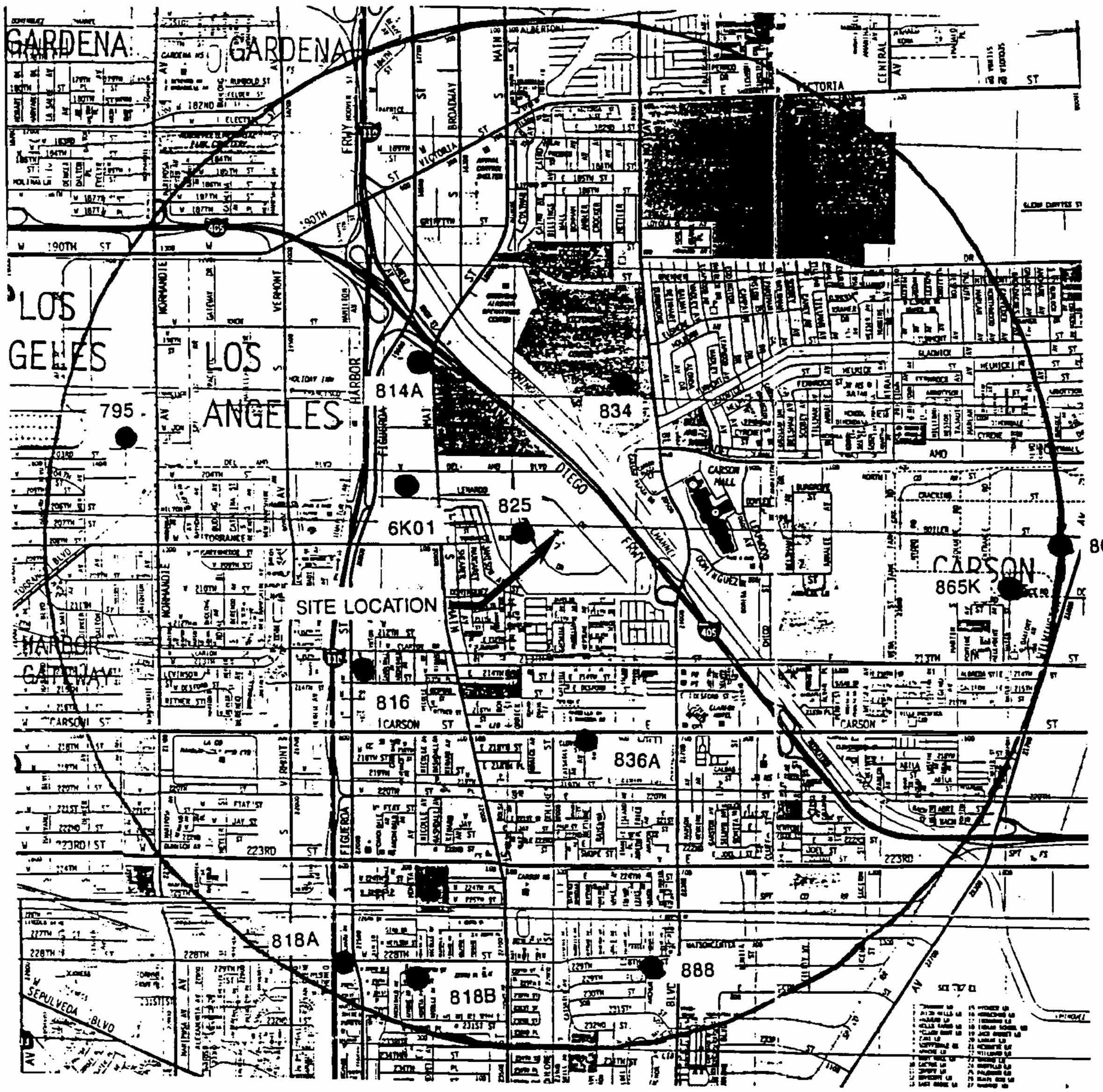
SCALE - FEET

FIGURE 3.2

LAND USE IN THE VICINITY OF THE CAL COMPACT LANDFILL

Brown & Root Environmental

A Halliburton Company



Brown & Root Environmental
A Halliburton Company

Detail Map Scale
1 Inch to 2400 Feet

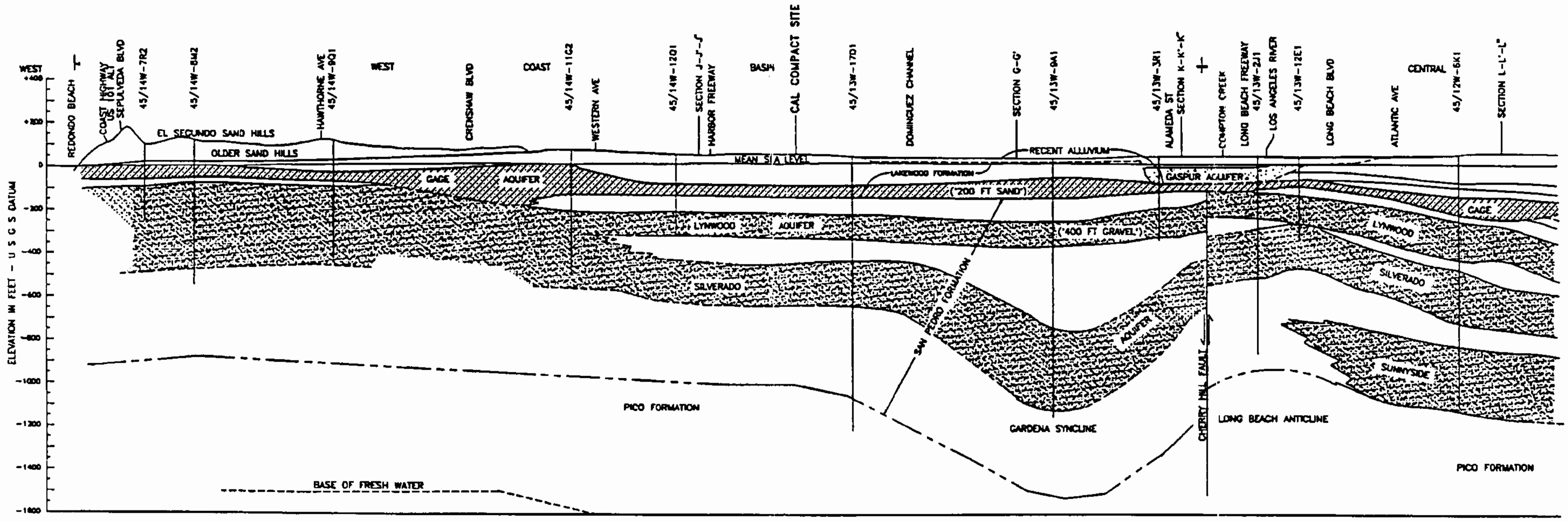
0 .25 .5 .75 1.0 Miles
0 .5 1.0 Kilometers

FIGURE 3.3

GROUNDWATER WELLS WITHIN
A TWO MILE RADIUS OF
CAL COMPACT LANDFILL
CARSON, CALIFORINA

LOC-BRVG/08/05/93

FIGURE 3.4



SOURCE: McLAREN/HART (1992) ADOPTED FROM: DEPARTMENT OF WATER RESOURCES BULLET 104-APPENDIX A, 1961 IN IDEALIZED GEOLOGIC SECTION E-E'-E"

LEGEND

- AQUICLUDES AND DEEPER UNDIFFERENTIATED FORMATIONS
- AQUIFERS IN RECENT ALLUVIUM (INCLUDES THE GASPUR AND BALLONA AQUIFERS)
- AQUIFERS IN LAKEWOOD FORMATION (INCLUDES THE ARTESIA, EXPOSITION, GAGE, AND GARDENA AQUIFERS)
- AQUIFERS IN SAN PEDRO FORMATION (INCLUDES THE HOLLYDALE, JEFFERSON, LYNWOOD, SILVERADO, AND SUNNYSIDE AQUIFERS)
- WATER WELLS
- OIL WELLS
- FAULTS

2000 1000 0 2000

SCALE - FEET

FIGURE 3.4

IDEALIZED GEOLOGIC CROSS SECTION THROUGH THE WEST COAST BASIN REGION IN THE VICINITY OF THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company

FIGURE 4.1

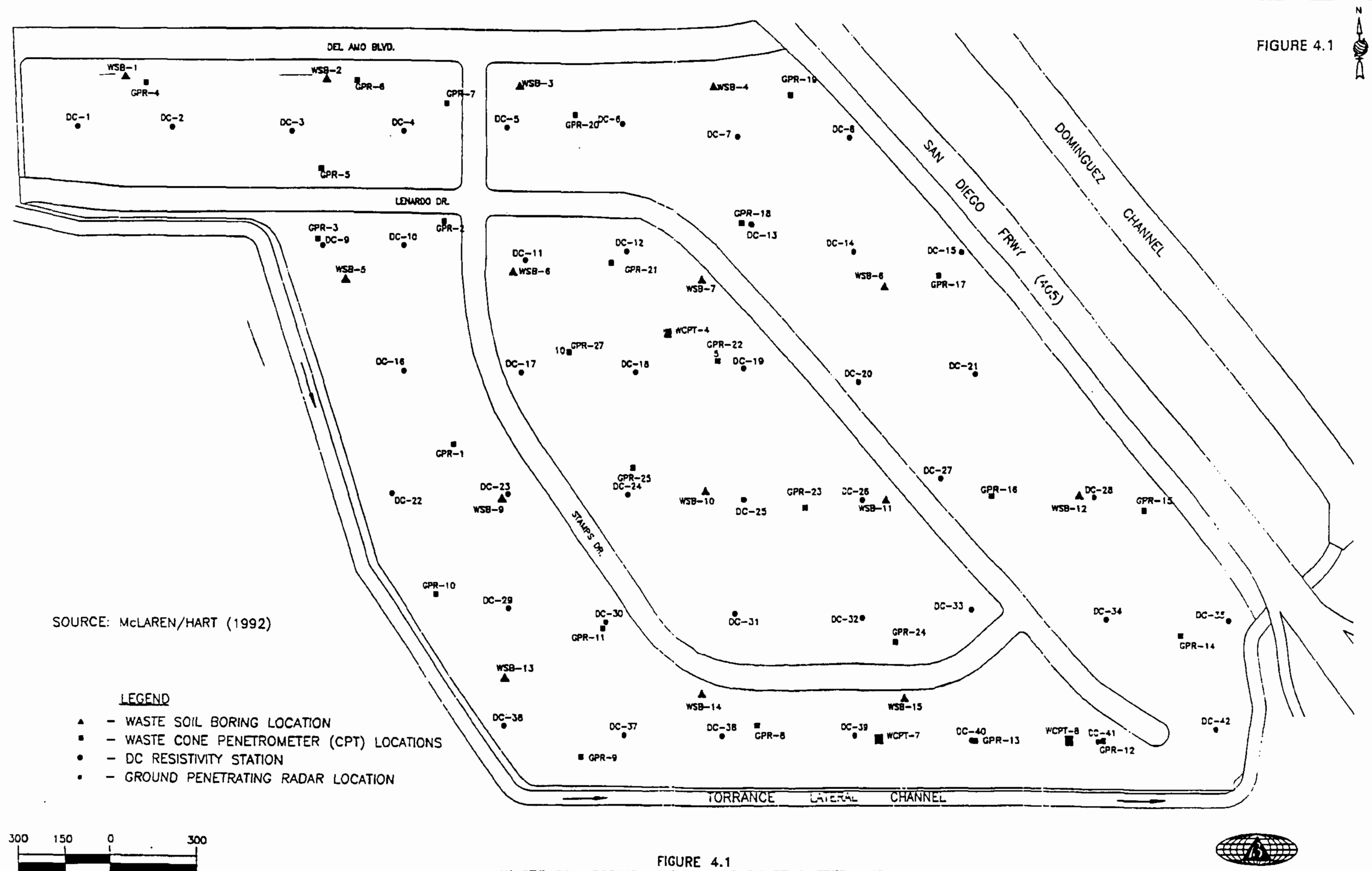


FIGURE 4.1
WASTE SOIL BORING, WASTE CONE PENETROMETER, AND GEOPHYSICAL SURVEY LOCATIONS AT THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company

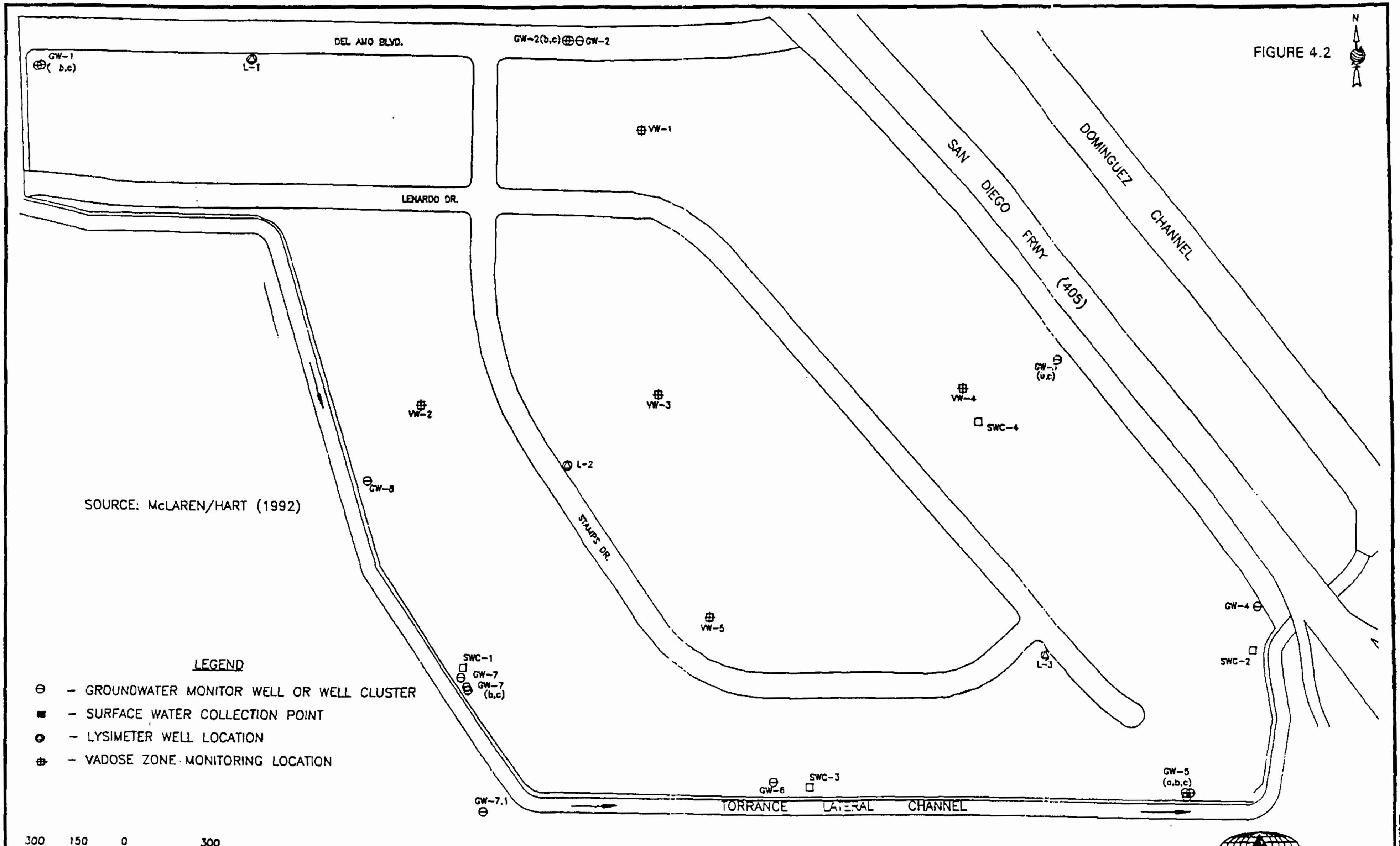


FIGURE 4.2
SURFACE WATER COLLECTION POINT, VADOSE ZONE WELL,
LYSIMETER, AND MONITOR WELL LOCATIONS AT THE CAL COMPACT LANDFILL

FIGURE 4.3

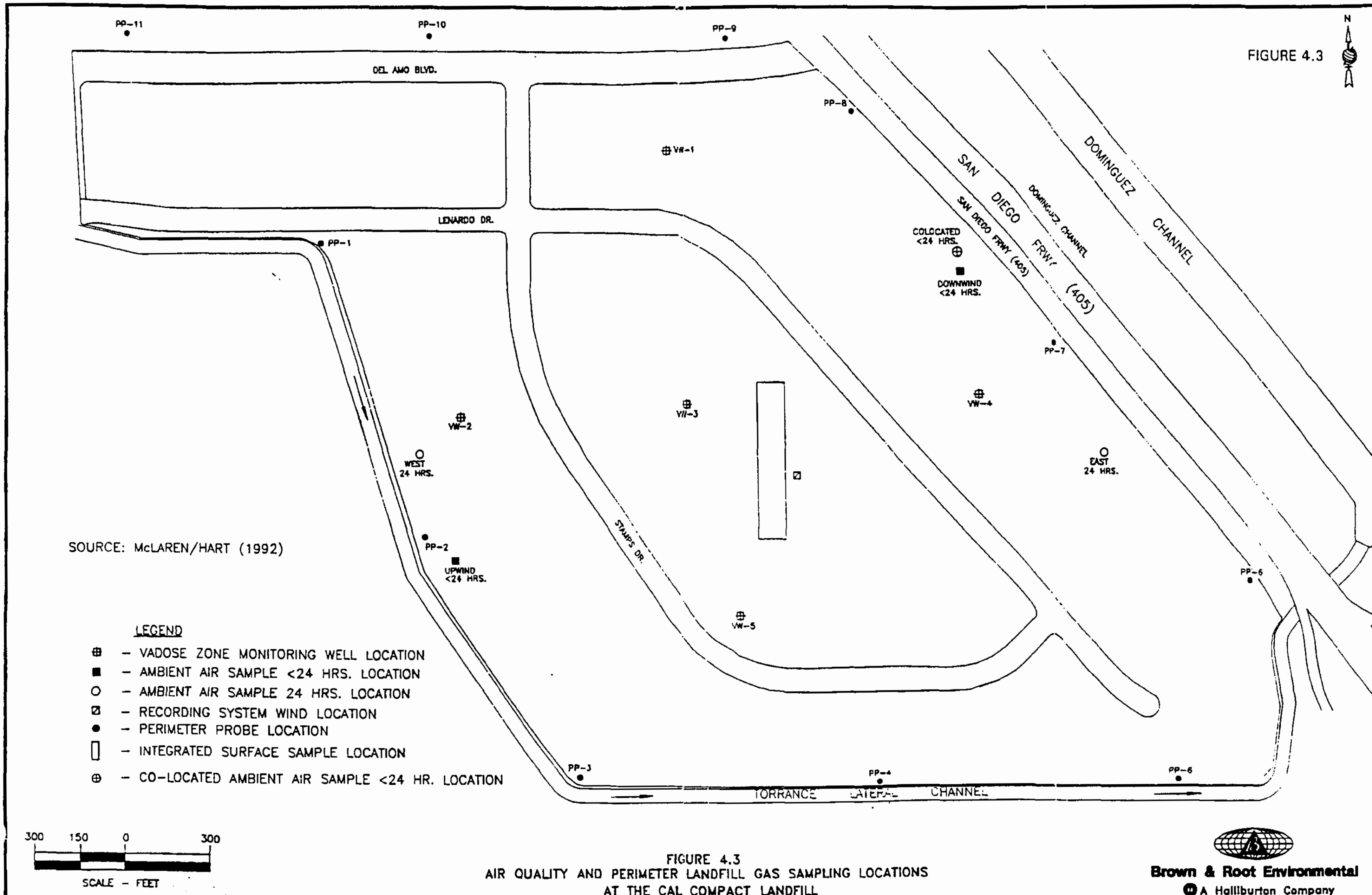
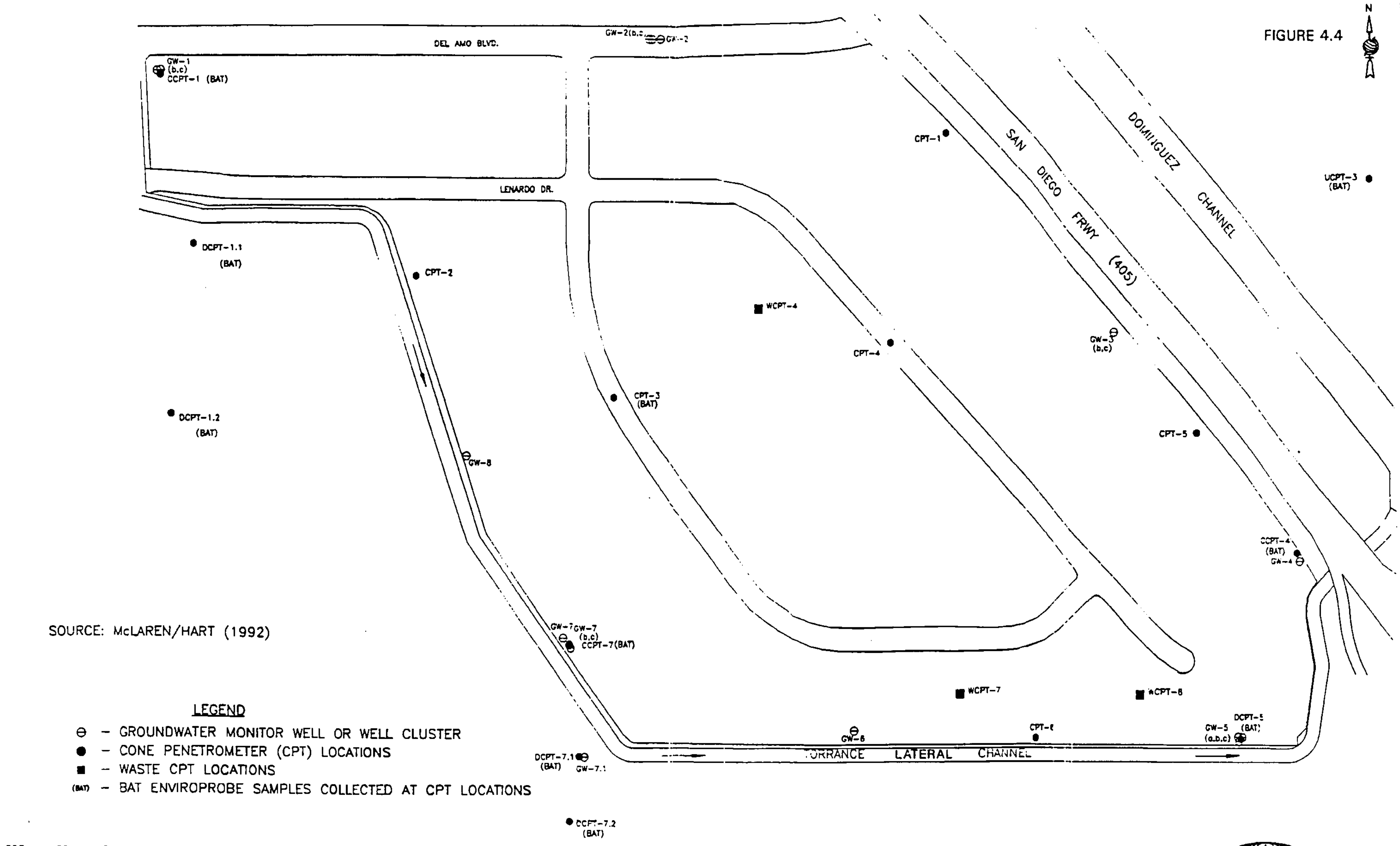


FIGURE 4.3
AIR QUALITY AND PERIMETER LANDFILL GAS SAMPLING LOCATIONS
AT THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company

FIGURE 4.4



SOURCE: McLAREN/HART (1992)

LEGEND

- ⊖ – GROUNDWATER MONITOR WELL OR WELL CLUSTER
- ● – CONE PENETROMETER (CPT) LOCATIONS
- ■ – WASTE CPT LOCATIONS
- (BAT) – BAT ENVIROPROBE SAMPLES COLLECTED AT CPT LOCATIONS

300 150 0 300

SCALE – FEET

FIGURE 4.4
GROUNDWATER MONITOR WELL, CONE PENETROMETER, AND BAT ENVIROPROBE SAMPLING LOCATIONS AT THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company

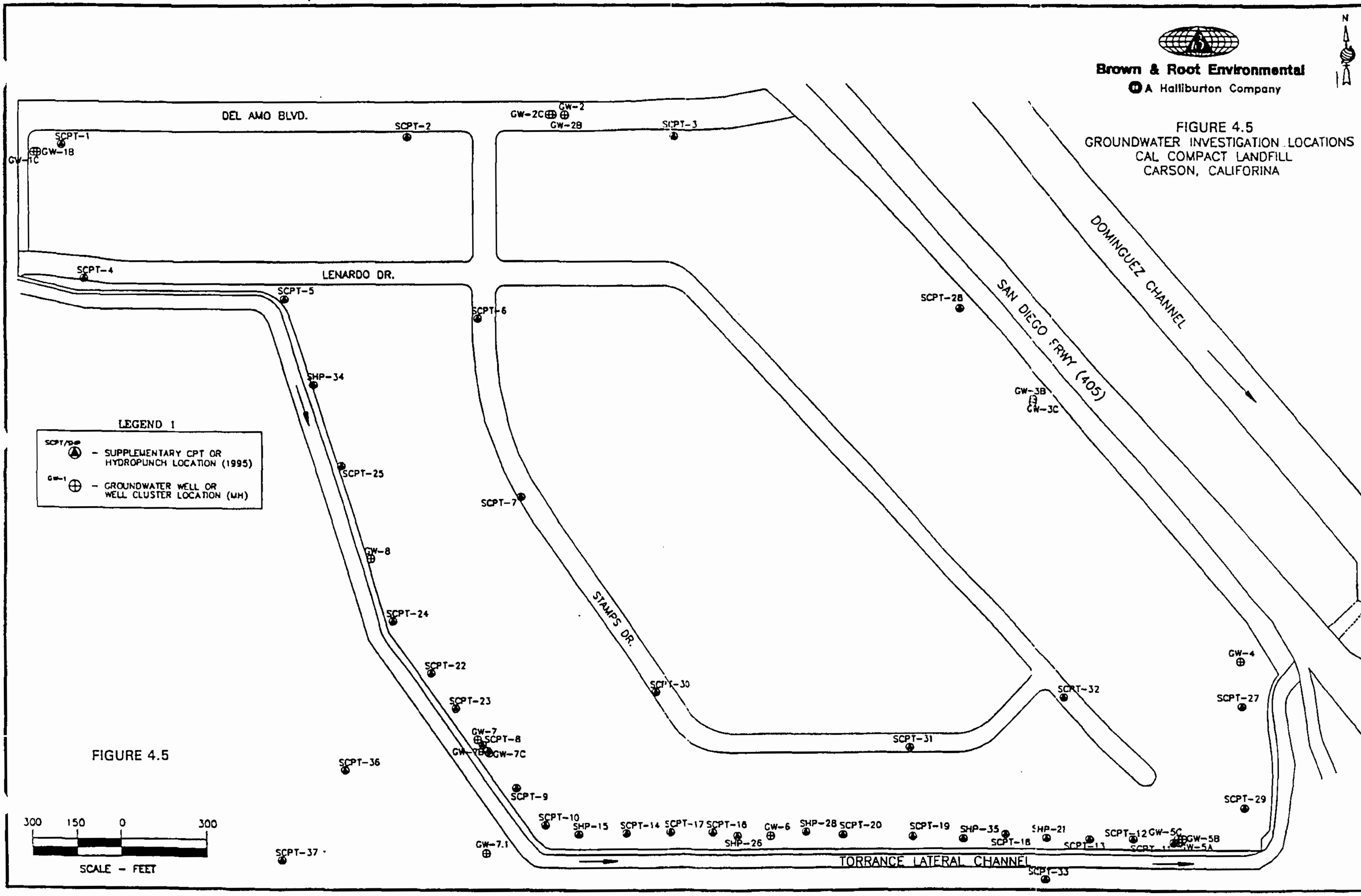
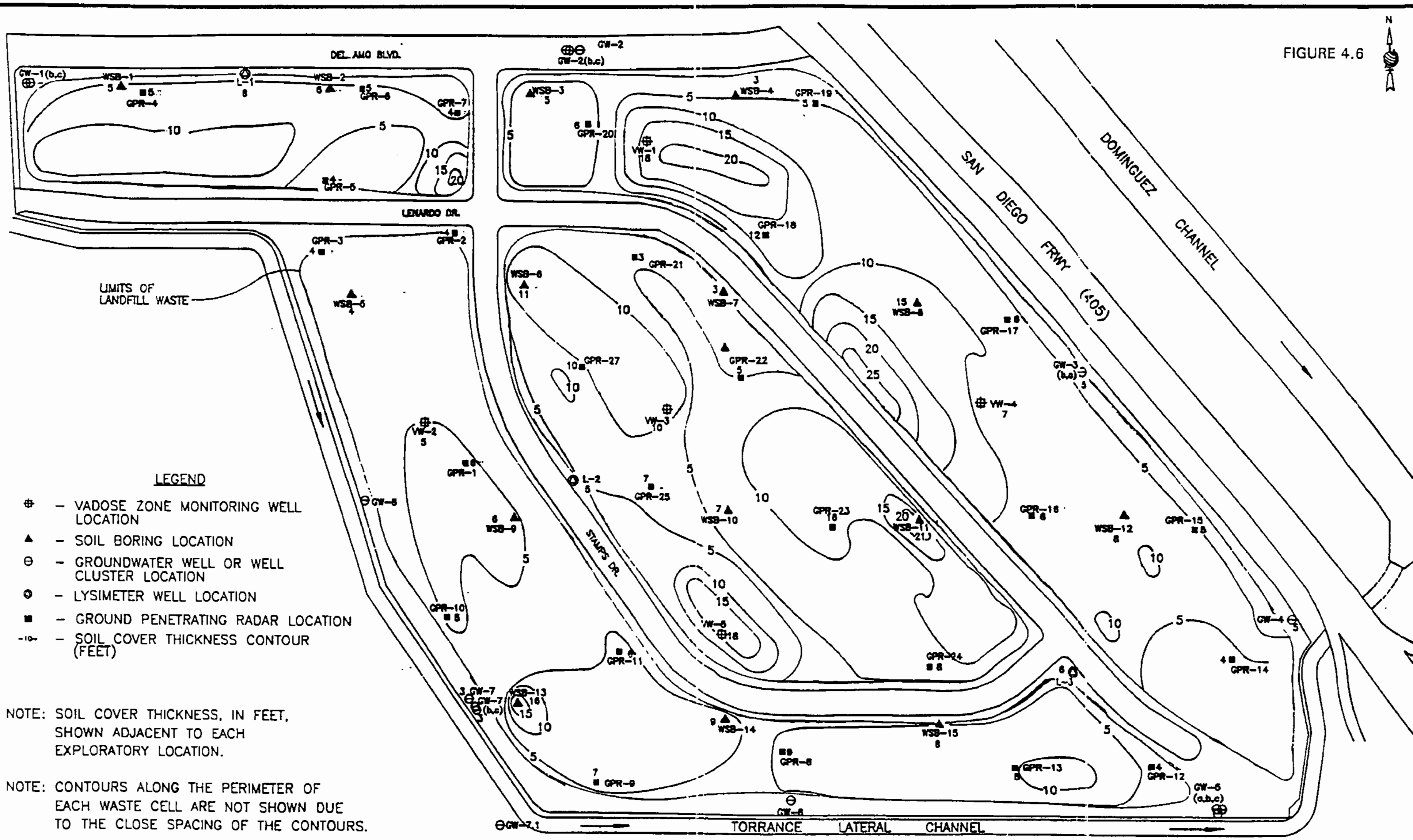

Brown & Root Environmental
A Halliburton Company
N
FIGURE 4.5
GROUNDWATER INVESTIGATION LOCATIONS
CAL COMPACT LANDFILL
CARSON, CALIFORINA
DOMINGUEZ CHANNEL
SAN DIEGO FRWY (405)
DEL AMO BLVD.
LENARDO DR.
STAMPS DR.
TORRANCE LATERAL CHANNEL
SCPT-1
GW-1B
GW-1C
SCPT-2
GW-2C
GW-2
GW-2B
SCPT-3
SCPT-4
SCPT-5
SCPT-6
SHP-34
SCPT-25
SCPT-7
GW-8
SCPT-24
SCPT-22
SCPT-23
GW-7
SCPT-8
GW-7B
GW-7C
SCPT-9
SCPT-10
SHP-15
SCPT-14
SCPT-17
SCPT-16
SHP-26
GW-6
SHP-28
SCPT-20
SCPT-19
SHP-35
SCPT-18
SHP-21
SCPT-13
SCPT-12
GW-5C
GW-5B
GW-5A
SCPT-33
SCPT-29
SCPT-27
GW-4
SCPT-32
SCPT-31
SCPT-30
SCPT-28
GW-3B
GW-3C
SCPT-36
SCPT-37
GW-7.1
LEGEND 1
SCPT/SHP - SUPPLEMENTARY CPT OR HYDROPUNCH LOCATION (1995)
GW-1 - GROUNDWATER WELL OR WELL CLUSTER LOCATION (MH)
FIGURE 4.5
300 150 0 300
SCALE - FEET

FIGURE 4.6



LEGEND

- ⊕ – VADOSE ZONE MONITORING WELL LOCATION
- ▲ – SOIL BORING LOCATION
- ⊖ – GROUNDWATER WELL OR WELL CLUSTER LOCATION
- ⊙ – LYSIMETER WELL LOCATION
- ■ – GROUND PENETRATING RADAR LOCATION
- -10- – SOIL COVER THICKNESS CONTOUR (FEET)

NOTE: SOIL COVER THICKNESS, IN FEET, SHOWN ADJACENT TO EACH EXPLORATORY LOCATION.

NOTE: CONTOURS ALONG THE PERIMETER OF EACH WASTE CELL ARE NOT SHOWN DUE TO THE CLOSE SPACING OF THE CONTOURS.

300 150 0 300

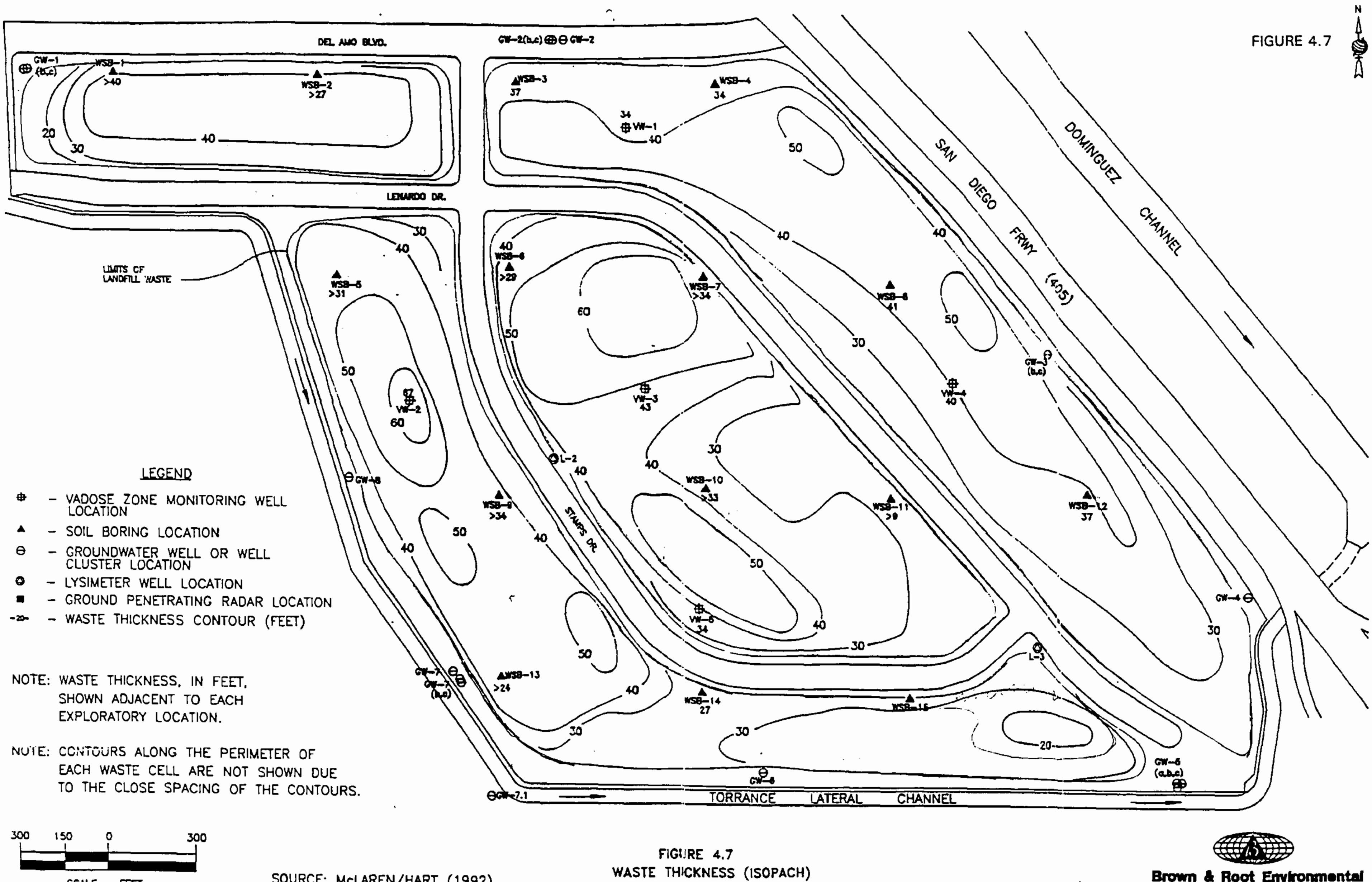
SCALE – FEET

SOURCE: McLAREN/HART (1992)

FIGURE 4.6
SOIL COVER THICKNESS (ISOPACH)
MAP OF THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company

FIGURE 4.7



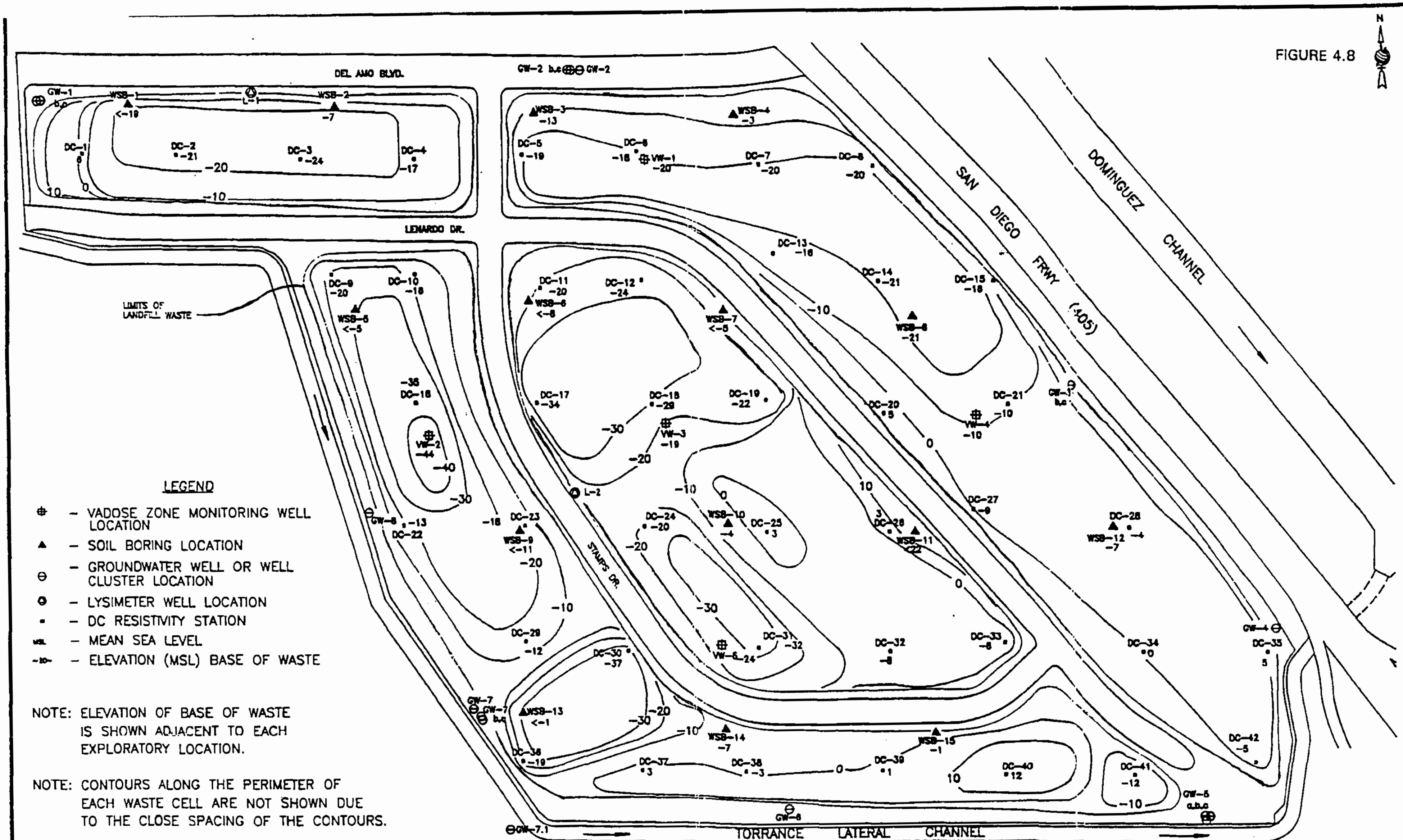
NOTE: WASTE THICKNESS, IN FEET, SHOWN ADJACENT TO EACH EXPLORATORY LOCATION.

NOTE: CONTOURS ALONG THE PERIMETER OF EACH WASTE CELL ARE NOT SHOWN DUE TO THE CLOSE SPACING OF THE CONTOURS.

SOURCE: McLAREN/HART (1992)

FIGURE 4.7
WASTE THICKNESS (ISOPACH)
MAP OF THE CAL COMPACT LANDFILL

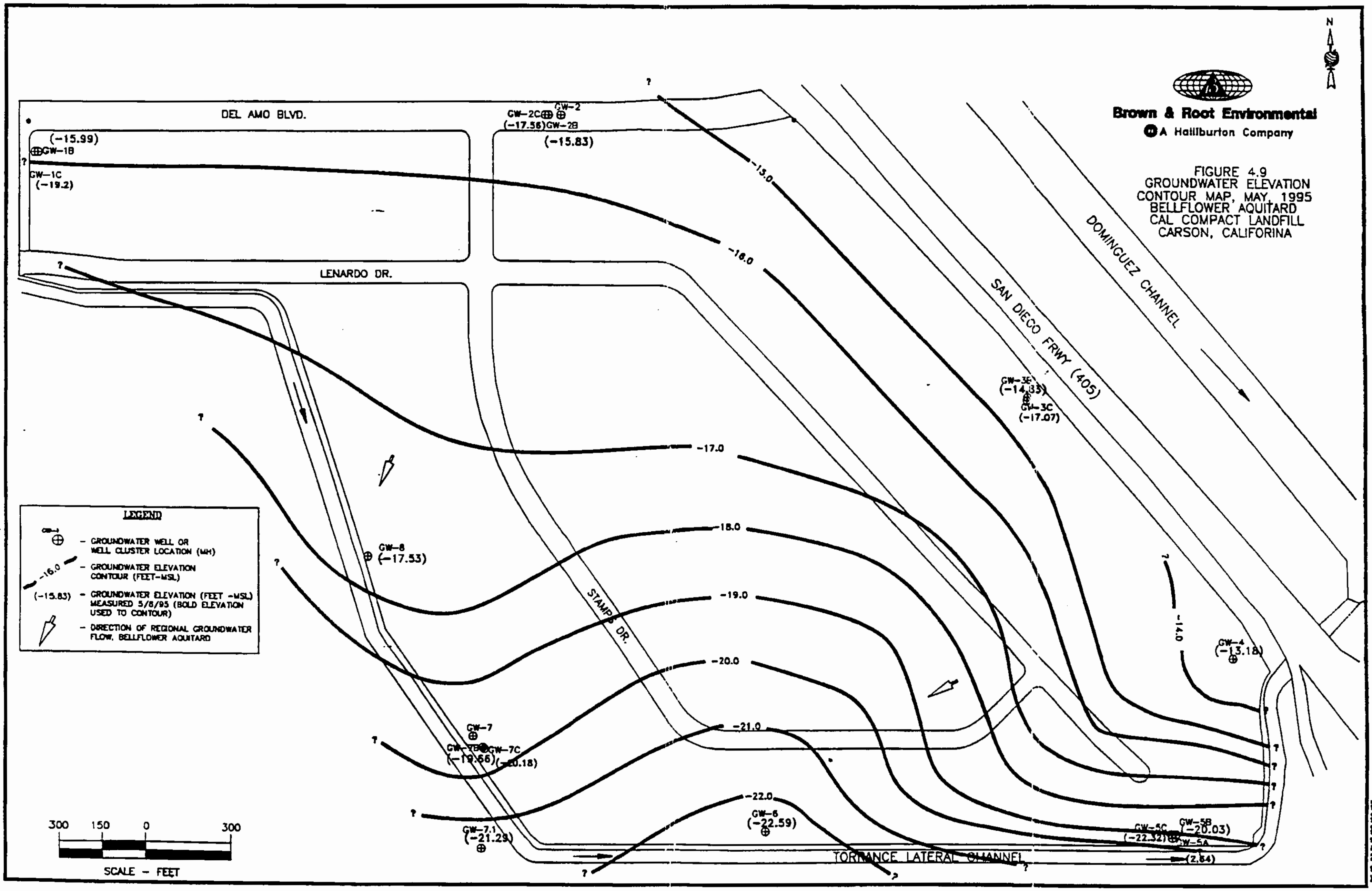
Brown & Root Environmental
A Halliburton Company



SOURCE: McLAREN/HART (1992)

FIGURE 4.8
SUBSURFACE STRUCTURE MAP OF THE BASE
OF THE WASTE/NATIVE MATERIAL CONTACT
AT THE CAL COMPACT LANDFILL

Brown & Root Environmental
A Halliburton Company


N
Brown & Root Environmental
A Halliburton Company
FIGURE 4.9
GROUNDWATER ELEVATION
CONTOUR MAP, MAY, 1995
BELLFLOWER AQUITARD
CAL COMPACT LANDFILL
CARSON, CALIFORINA
DEL AMO BLVD.
LENARDO DR.
STAMPS DR.
SAN DIEGO FRWY (405)
DOMINGUEZ CHANNEL
TORRANCE LATERAL CHANNEL
GW-1B (-15.99)
GW-1C (-19.2)
GW-2
GW-2C (-17.56)
GW-2B (-15.83)
GW-3B (-14.33)
GW-3C (-17.07)
GW-4 (-13.18)
GW-5B (-20.03)
GW-5C (-22.32)
GW-5A (2.84)
GW-6 (-22.59)
GW-7
GW-7B (-19.56)
GW-7C (-20.18)
GW-7.1 (-21.23)
GW-8 (-17.53)
-13.0
-14.0
-16.0
-17.0
-18.0
-19.0
-20.0
-21.0
-22.0
LEGEND
- GROUNDWATER WELL OR WELL CLUSTER LOCATION (MH)
- GROUNDWATER ELEVATION CONTOUR (FEET-MSL)
(-15.83) - GROUNDWATER ELEVATION (FEET -MSL) MEASURED 5/8/95 (BOLD ELEVATION USED TO CONTOUR)
- DIRECTION OF REGIONAL GROUNDWATER FLOW, BELLFLOWER AQUITARD
300 150 0 300
SCALE - FEET

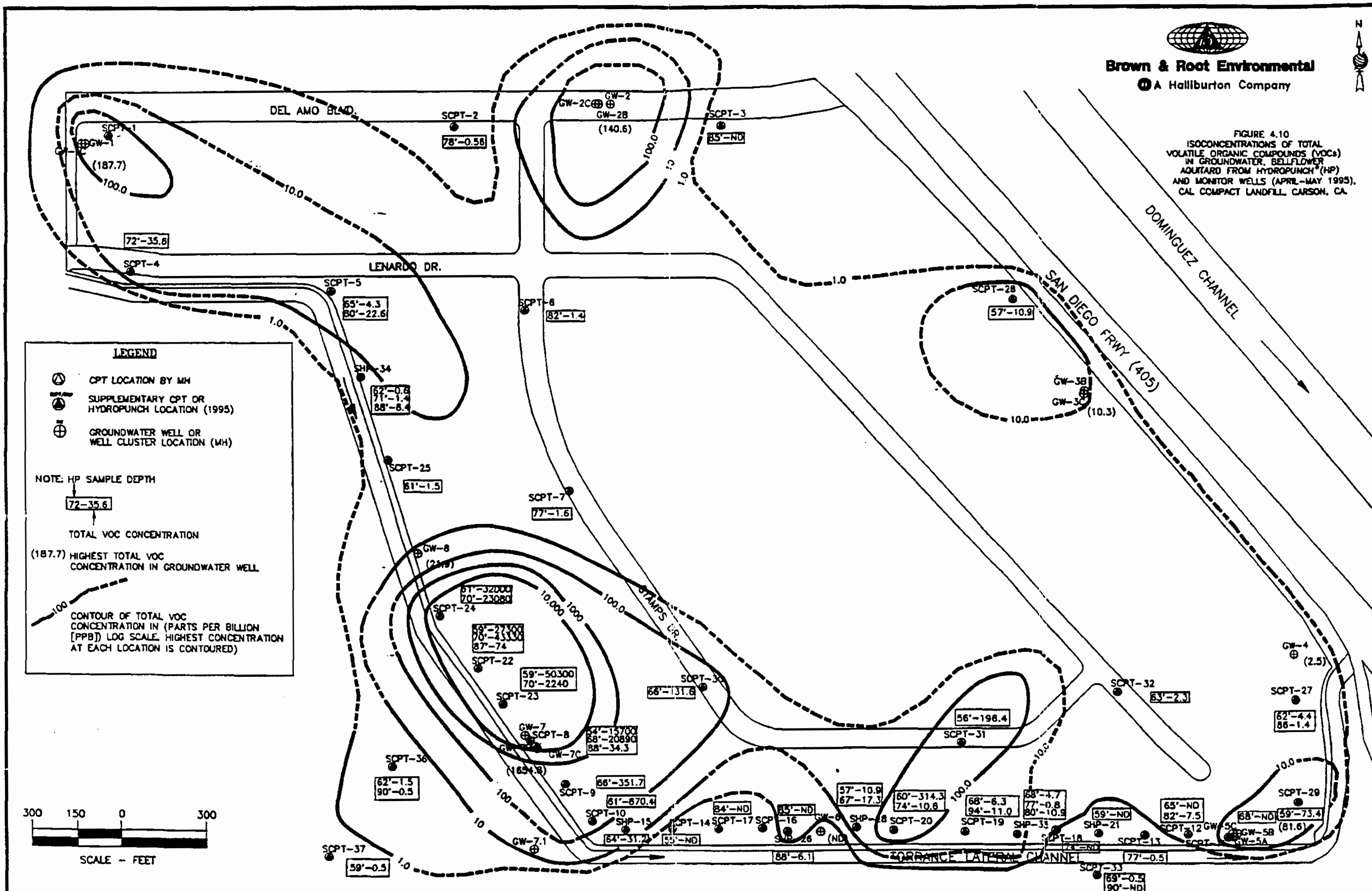
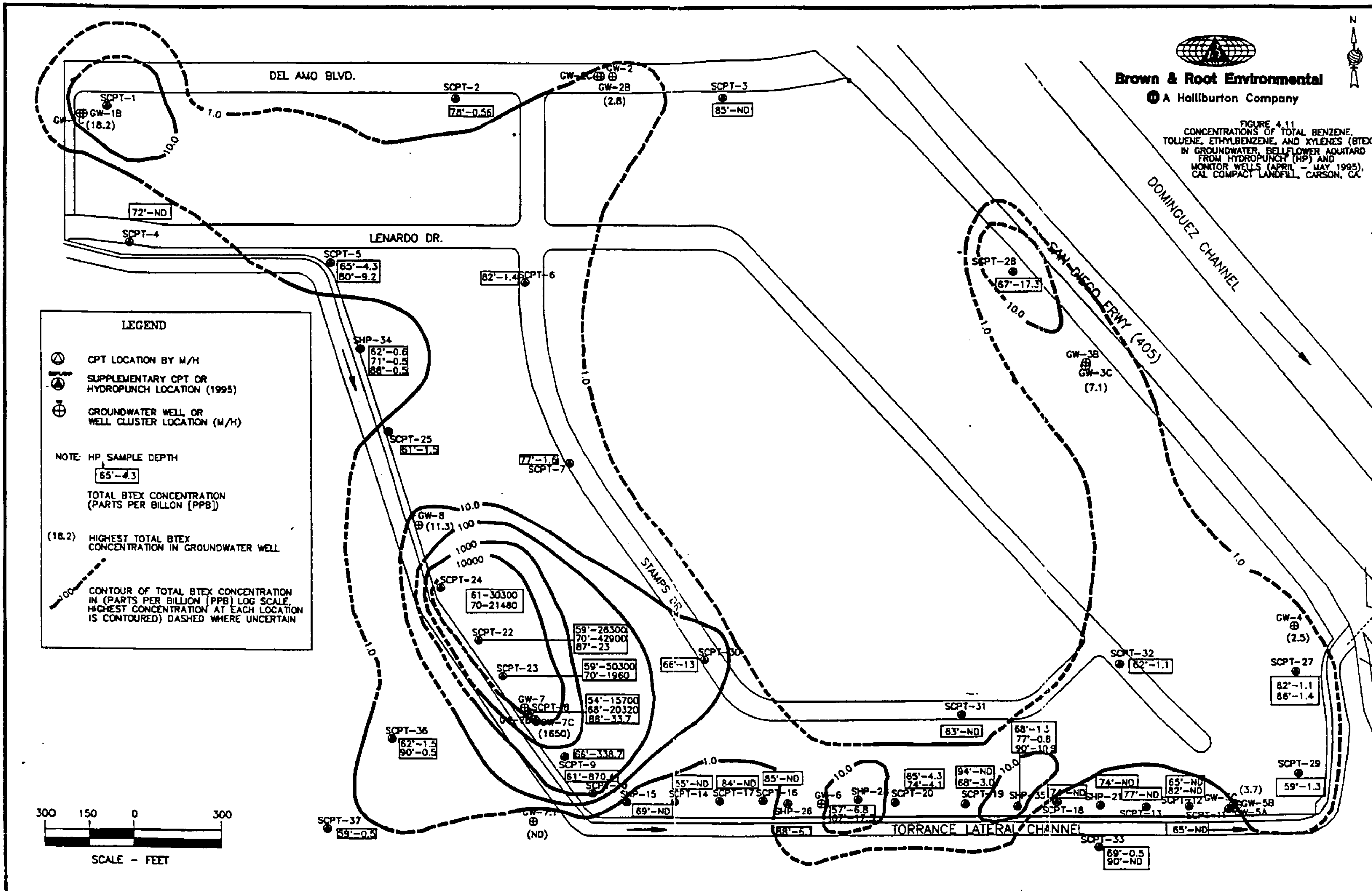
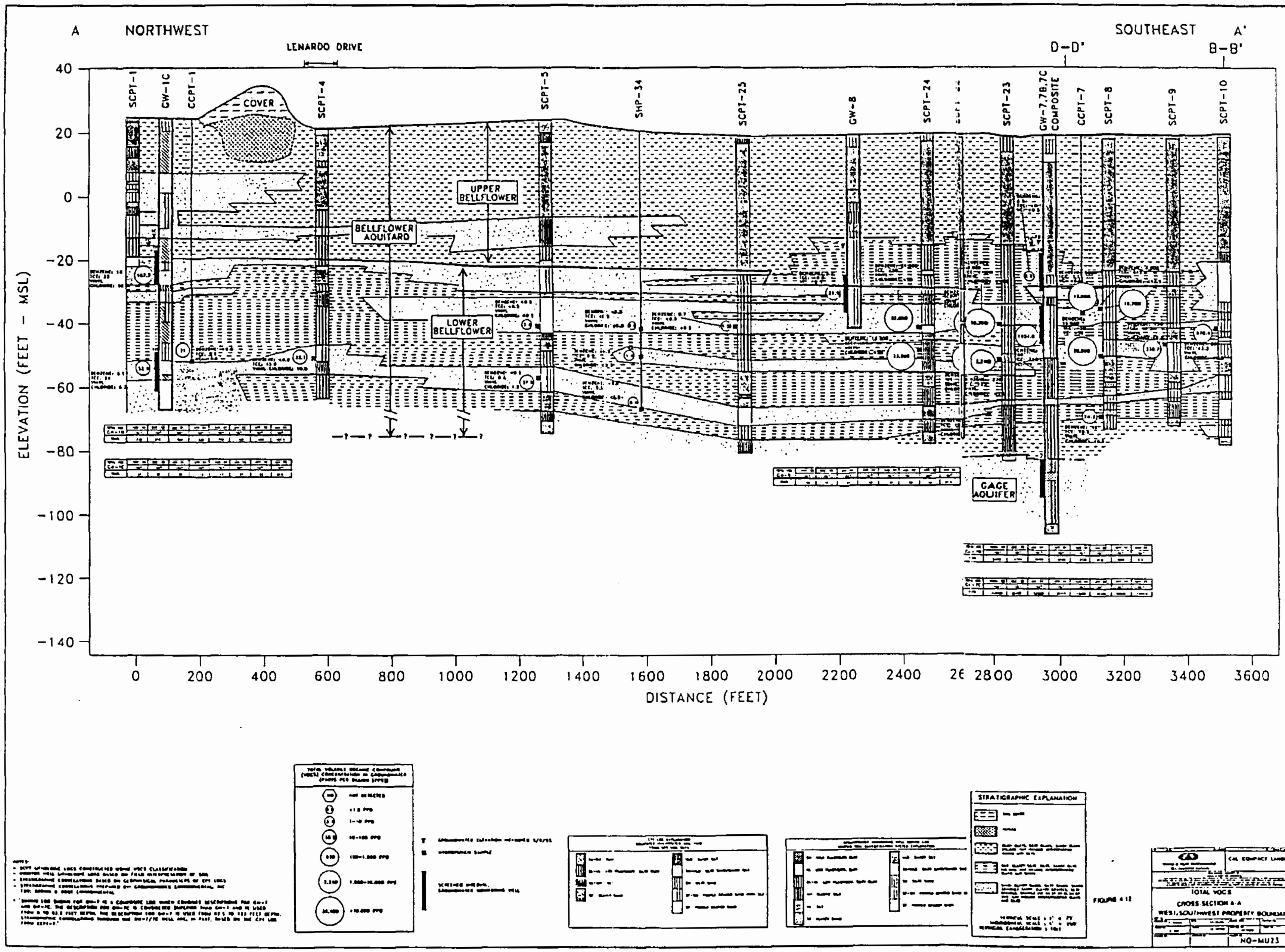


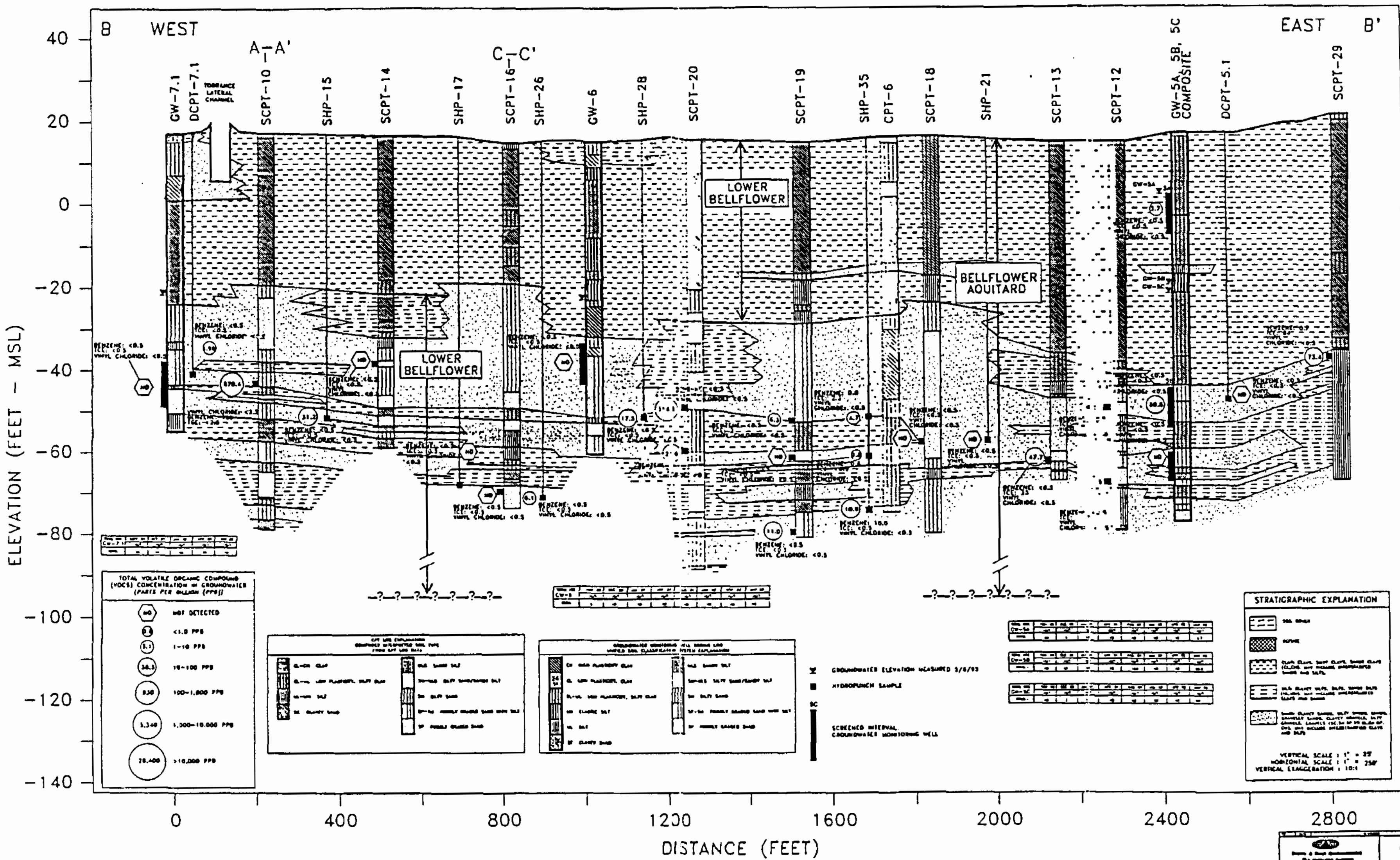
FIGURE 4.10
ISOCONCENTRATIONS OF TOTAL VOLATILE ORGANIC COMPOUNDS (VOCs) IN GROUNDWATER, BELLFLOWER AQUITARD FROM HYDROPUNCH® (HP) AND MONITOR WELLS (APRIL–MAY 1995), CAL COMPACT LANDFILL, CARSON, CA.



Brown & Root Environmental
A Halliburton Company
FIGURE 4.11
CONCENTRATIONS OF TOTAL BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES (BTEX) IN GROUNDWATER, BELLFLOWER AQUITARD FROM HYDROPUNCH (HP) AND MONITOR WELLS (APRIL – MAY 1995), CAL COMPACT LANDFILL, CARSON, CA
N
DOMINGUEZ CHANNEL
SAN DIEGO FRWY (405)
DEL AMO BLVD.
LENARDO DR.
STAMPS DR.
TORRANCE LATERAL CHANNEL
LEGEND
CPT LOCATION BY M/H
SUPPLEMENTARY CPT OR HYDROPUNCH LOCATION (1995)
GROUNDWATER WELL OR WELL CLUSTER LOCATION (M/H)
NOTE: HP SAMPLE DEPTH
65'–4.3
TOTAL BTEX CONCENTRATION (PARTS PER BILLON [PPB])
(18.2) HIGHEST TOTAL BTEX CONCENTRATION IN GROUNDWATER WELL
CONTOUR OF TOTAL BTEX CONCENTRATION IN (PARTS PER BILLION [PPB] LOG SCALE. HIGHEST CONCENTRATION AT EACH LOCATION IS CONTOURED) DASHED WHERE UNCERTAIN
300 150 0 300
SCALE – FEET
SCPT-1
GW-1B
(18.2)
SCPT-2
78'–0.56
GW-2
GW-2B
(2.8)
SCPT-3
85'–ND
72'–ND
SCPT-4
SCPT-5
65'–4.3
80'–9.2
82'–1.4
SCPT-6
SHP-34
62'–0.6
71'–0.5
88'–0.5
SCPT-25
61'–1.5
77'–1.6
SCPT-7
GW-8
(11.3)
SCPT-24
61–30300
70–21480
SCPT-22
59'–28300
70'–42900
87'–23
SCPT-23
59'–50300
70'–1960
GW-7
GW-7C
(1650)
54'–15700
68'–20320
88'–33.7
66'–338.7
SCPT-9
61'–870.4
66'–13
SCPT-30
SCPT-36
62'–1.5
90'–0.5
SCPT-37
59'–0.5
GW-7.1
(ND)
SHP-15
69'–ND
SCPT-14
55'–ND
SCPT-17
84'–ND
SCPT-16
85'–ND
SHP-26
88'–6.1
GW-6
SHP-2
57'–6.8
SCPT-20
65'–4.3
74'–4.1
SCPT-19
94'–ND
68'–3.0
SCPT-31
63'–ND
68'–1.3
77'–0.8
90'–10.9
SHP-35
SCPT-18
SHP-21
74'–ND
77'–ND
SCPT-13
SCPT-12
65'–ND
82'–ND
65'–ND
SCPT-33
69'–0.5
90'–ND
GW-5B
GW-5A
(3.7)
SCPT-29
59'–1.3
SCPT-27
82'–1.1
86'–1.4
GW-4
(2.5)
SCPT-32
62'–1.1
SCPT-28
67'–17.3
GW-3B
GW-3C
(7.1)
1.0
10.0
100
1000
10000



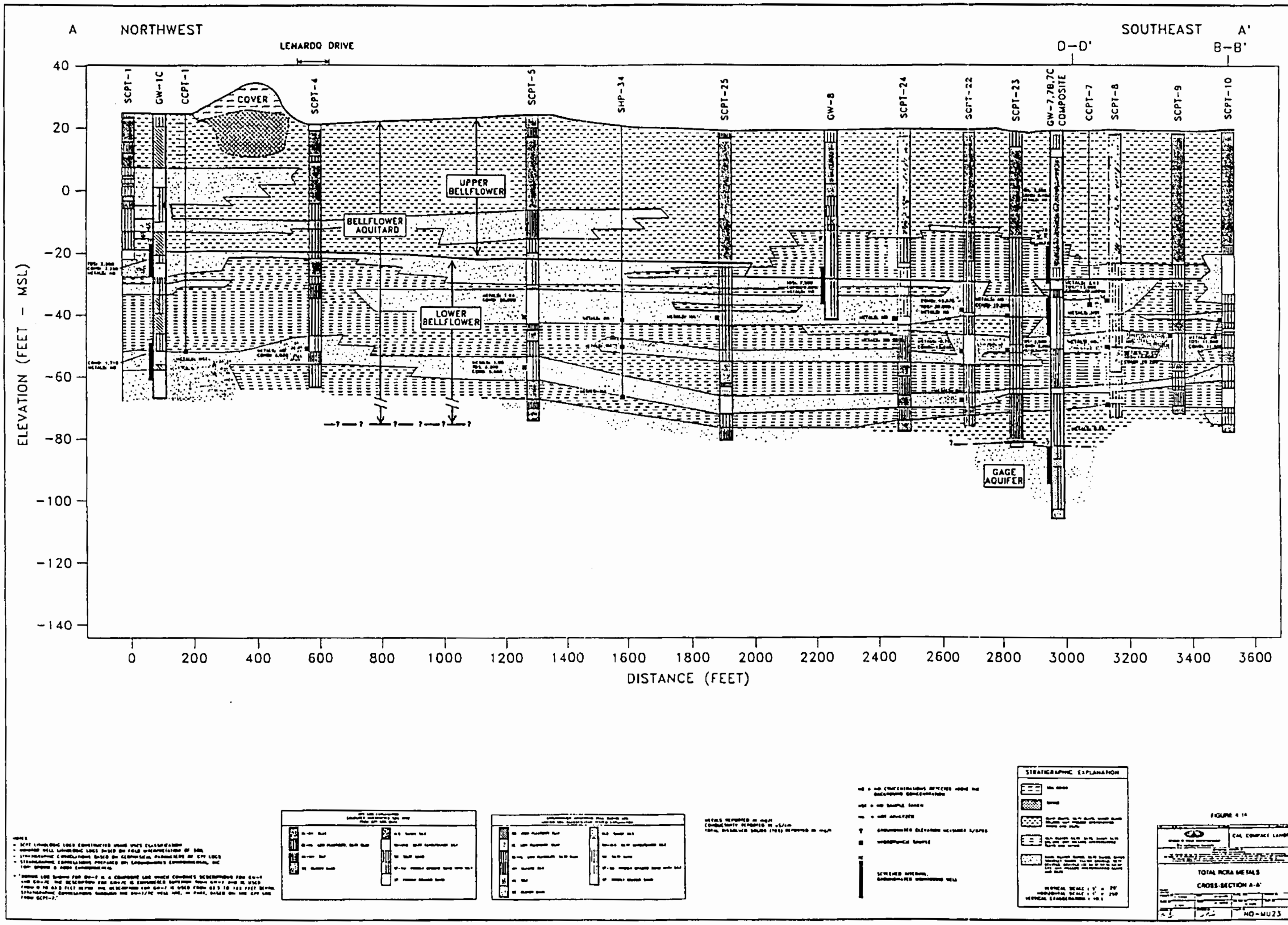
A
NORTHWEST
SOUTHEAST
A'
D-D'
B-B'
LENARDO DRIVE
SCPT-1
GW-1C
CCPT-1
COVER
SCPT-4
UPPER BELLFLOWER
BELLFLOWER AQUITARD
LOWER BELLFLOWER
SCPT-5
SHP-34
SCPT-25
GW-8
SCPT-24
SCPT-23
GW-7,7B,7C COMPOSITE
CCPT-7
SCPT-8
SCPT-9
SCPT-10
GAGE AQUIFER
ELEVATION (FEET - MSL)
DISTANCE (FEET)
40
20
0
-20
-40
-60
-80
-100
-120
-140
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2800
3000
3200
3400
3600
STRATIGRAPHIC EXPLANATION
TOTAL VOCS
CROSS SECTION A-A'
WEST/SOUTHWEST PROPERTY BOUNDARY
CAL COMPACT LANDFILL
NO-MU23



NOTES:
- SCPT LITHOLOGIC LOGS CONSTRUCTED USING USCS CLASSIFICATION
- MONITOR WELL LITHOLOGIC LOGS BASED ON FIELD INTERPRETATION OF SOIL
- STRATIGRAPHIC CORRELATIONS BASED ON GEOPHYSICAL PARAMETERS OF CPT LOGS
- STRATIGRAPHIC CORRELATIONS PREPARED BY: GREY-OWENS ENVIRONMENTAL, INC. FOR: BROWN & ROOT ENVIRONMENTAL

FIGURE 4.13

TOTAL VOC'S
CROSS SECTION B-B'
SOUTH PROPERTY BOUNDARY



A
NORTHWEST
SOUTHEAST
A'
LENARDO DRIVE
D–D'
B–B'
SCPT-1
GW-1C
CCPT-1
COVER
SCPT-4
SCPT-5
SHP-34
SCPT-25
GW-8
SCPT-24
SCPT-22
SCPT-23
GW-7,7B,7C COMPOSITE
CCPT-7
SCPT-8
SCPT-9
SCPT-10
UPPER BELLFLOWER
BELLFLOWER AQUITARD
LOWER BELLFLOWER
GAGE AQUIFER
ELEVATION (FEET - MSL)
DISTANCE (FEET)
40
20
0
-20
-40
-60
-80
-100
-120
-140
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
STRATIGRAPHIC EXPLANATION
FIGURE 4.14
CAL COMPACT LANDFILL
TOTAL RCRA METALS
CROSS-SECTION A-A'
NO-MU23

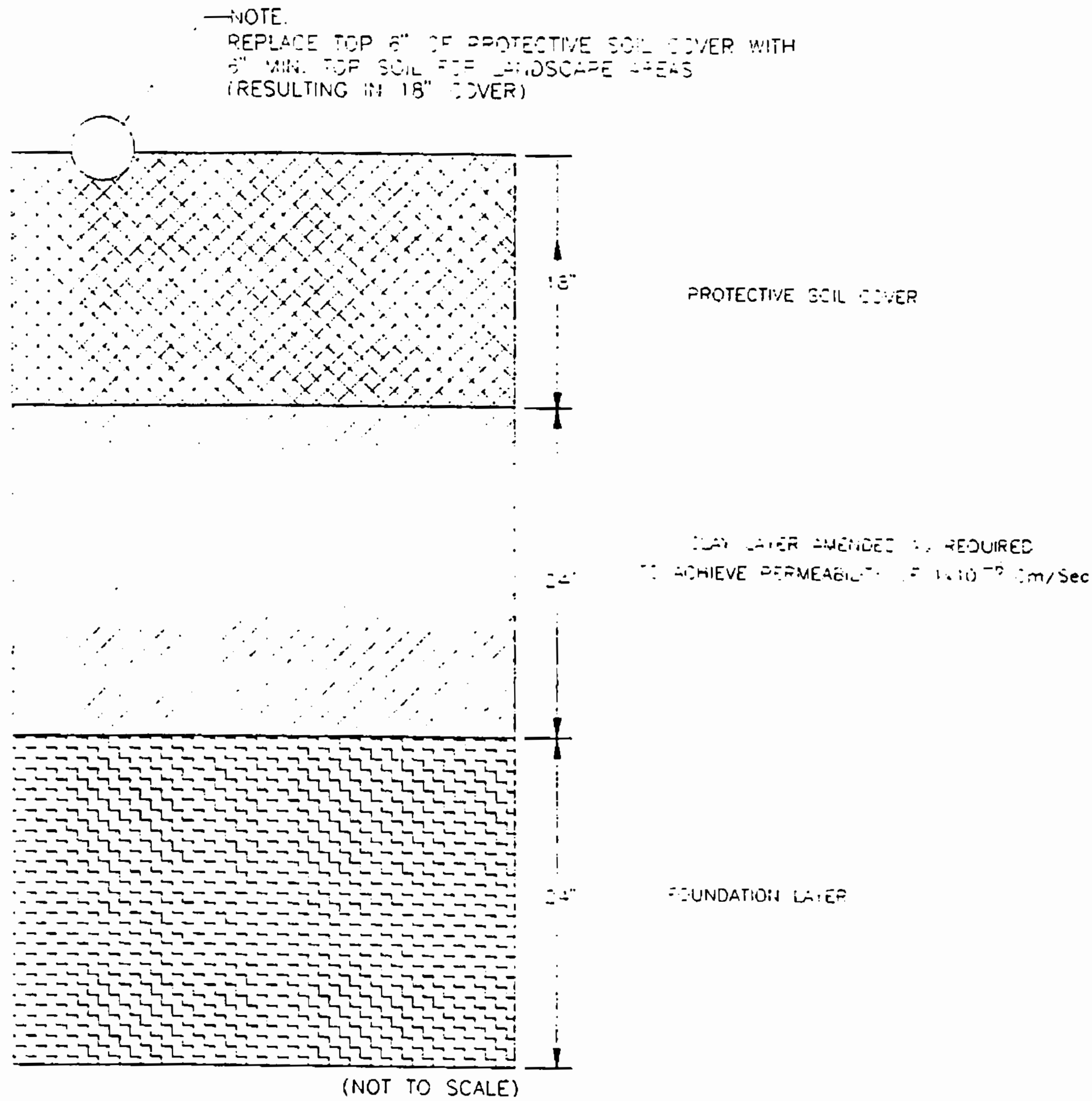


FIGURE 7.1
LANDFILL COVER

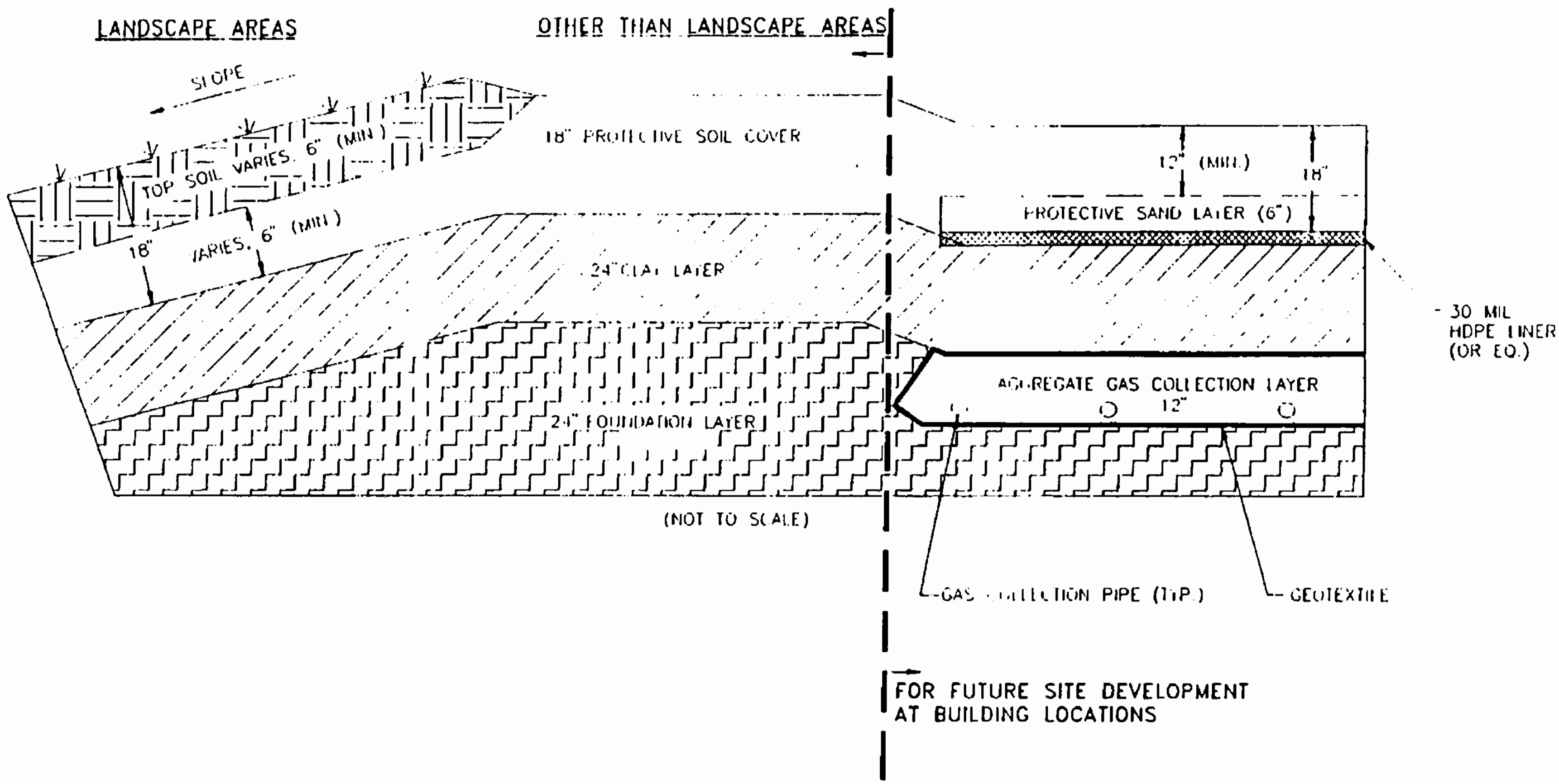
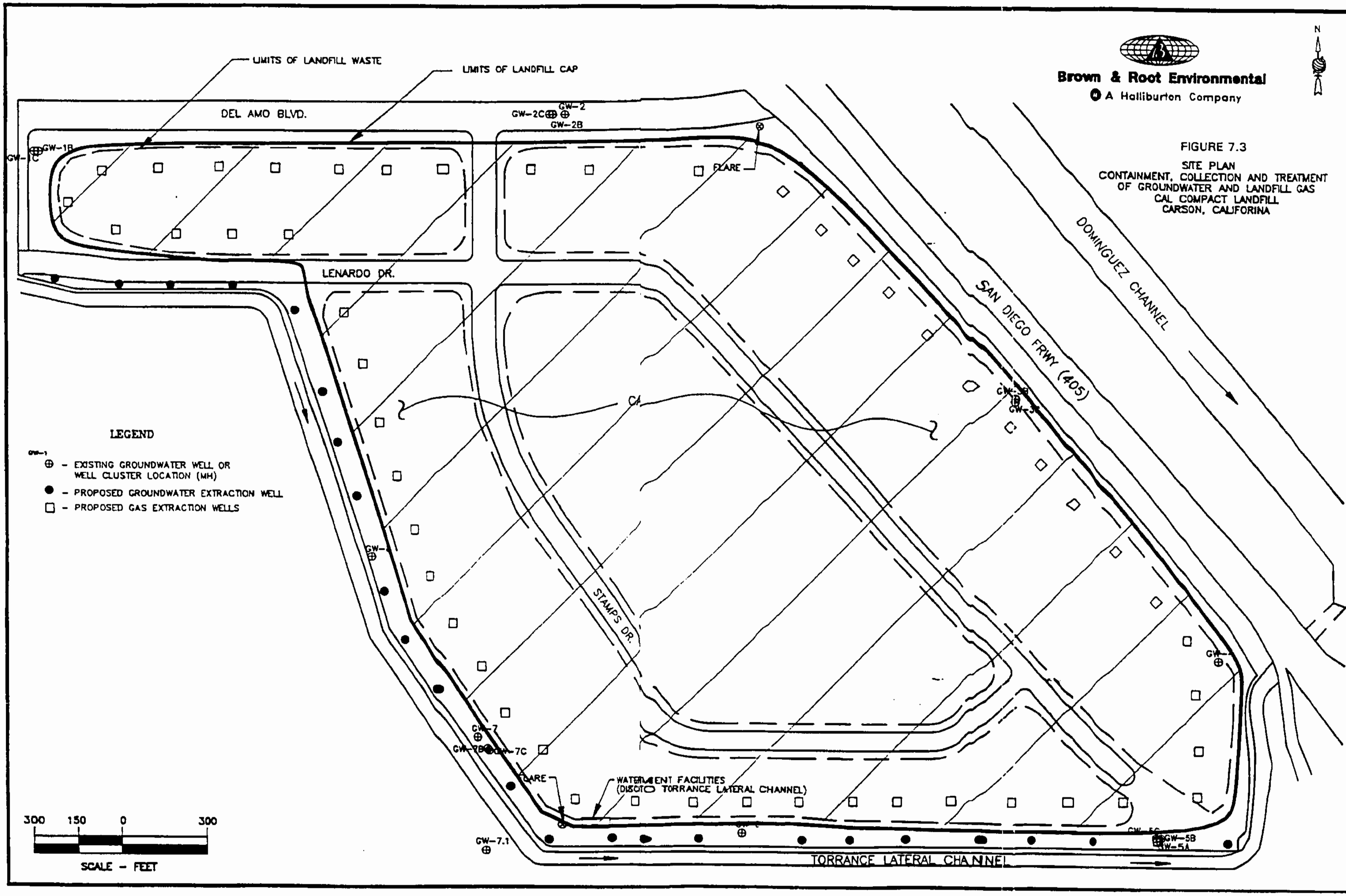


FIGURE 7.2
LANDFILL COVER TRANSITIONS


Brown & Root Environmental
A Halliburton Company
N
FIGURE 7.3
SITE PLAN
CONTAINMENT, COLLECTION AND TREATMENT
OF GROUNDWATER AND LANDFILL GAS
CAL COMPACT LANDFILL
CARSON, CALIFORINA
LIMITS OF LANDFILL WASTE
LIMITS OF LANDFILL CAP
DEL AMO BLVD.
LENARDO DR.
STAMPS DR.
SAN DIEGO FRWY (405)
DOMINGUEZ CHANNEL
TORRANCE LATERAL CHANNEL
FLARE
FLARE
WATER TREATMENT FACILITIES
(DISCHARGE TO TORRANCE LATERAL CHANNEL)
GW-1B
GW-2C
GW-2
GW-2B
GW-7
GW-7B
GW-7C
GW-7.1
GW-5B
GW-5A
LEGEND
EXISTING GROUNDWATER WELL OR
WELL CLUSTER LOCATION (MH)
PROPOSED GROUNDWATER EXTRACTION WELL
PROPOSED GAS EXTRACTION WELLS
300
150
0
300
SCALE - FEET

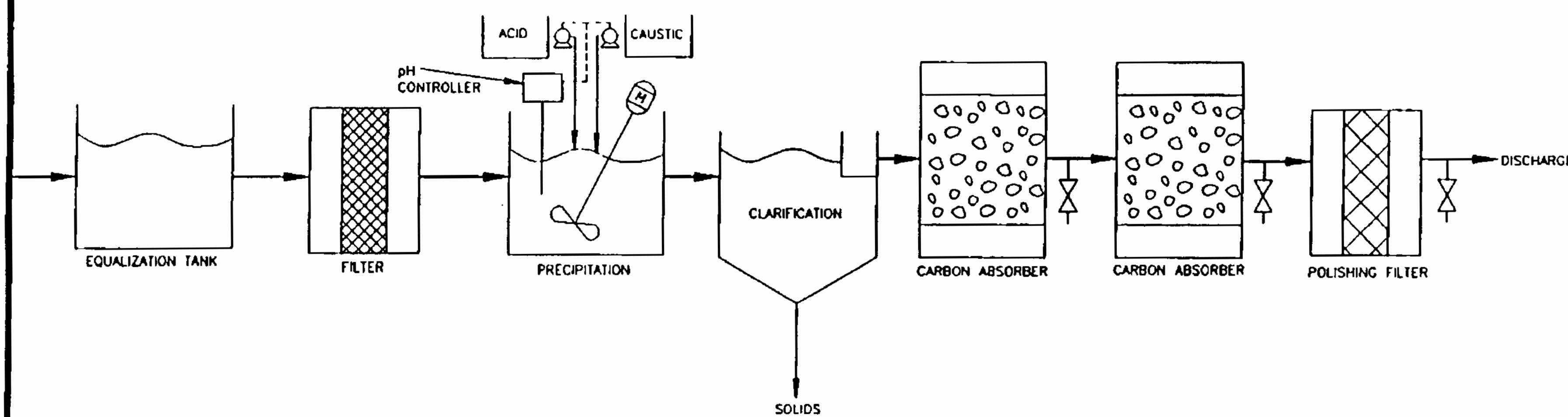


FIGURE 7.4

DRAWN BY: L.K.	CONCEPTUAL GROUNDWATER TREATMENT SYSTEM	Brown & Root Environmental A Halliburton Company
DATE: 06/01/95		
ENGINEER D. TUCK		
DATE 06/01/95		
CAD DWG NO: S-28 DWG	SCALE: NONE | DWG. NO. NO-MU23 | REV. 0	

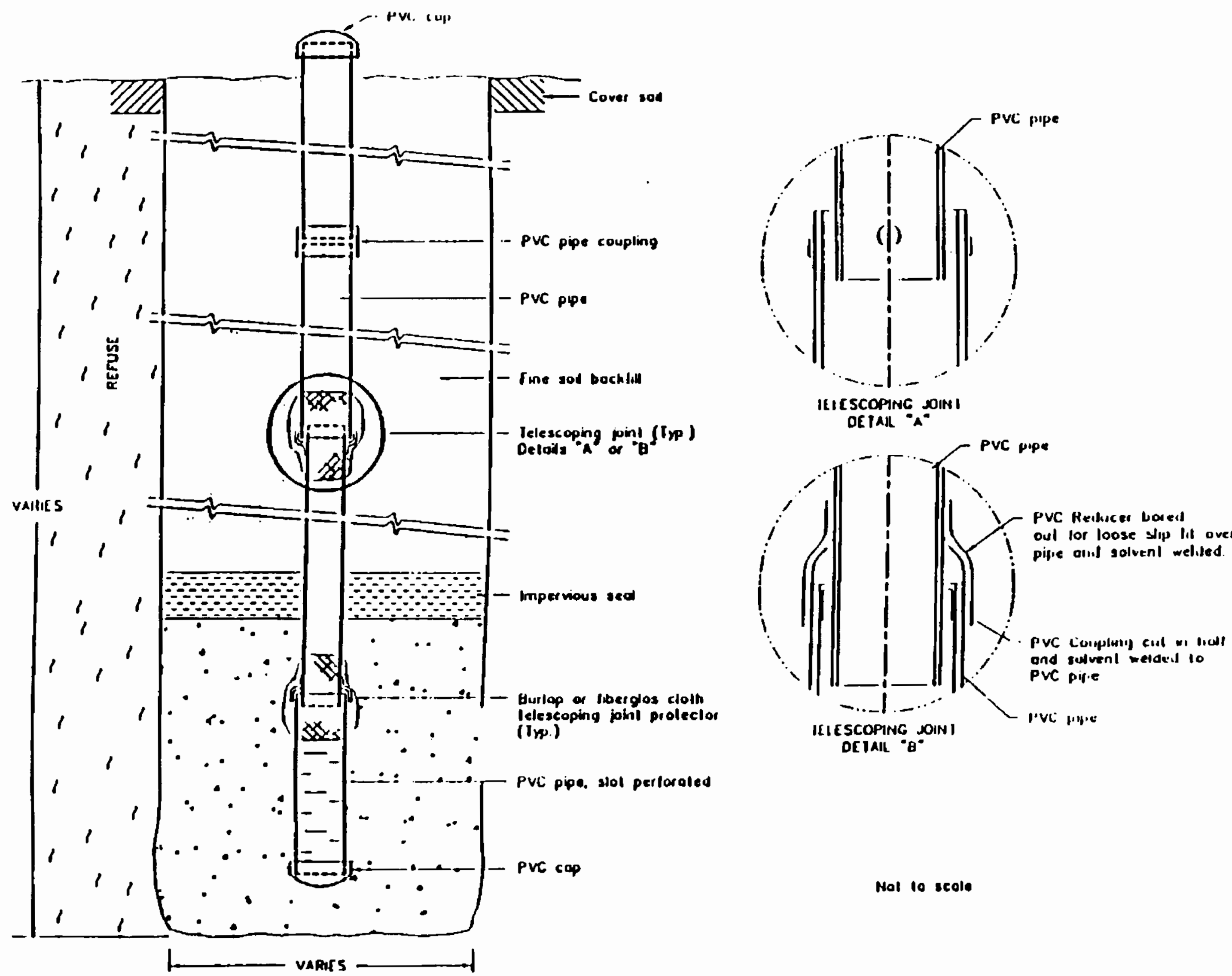
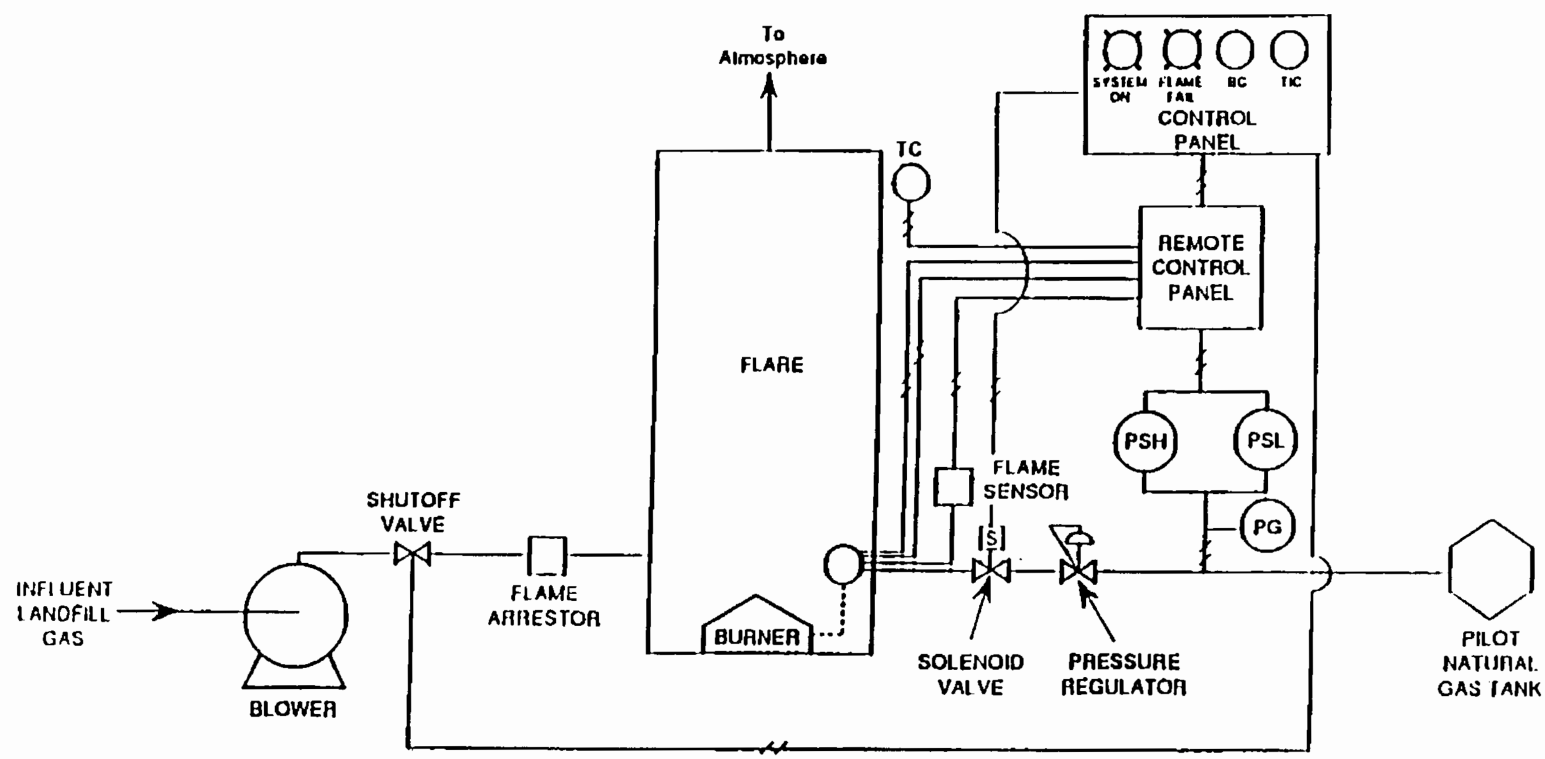


FIGURE 7.5
CONCEPTUAL GAS EXTRACTION WELL

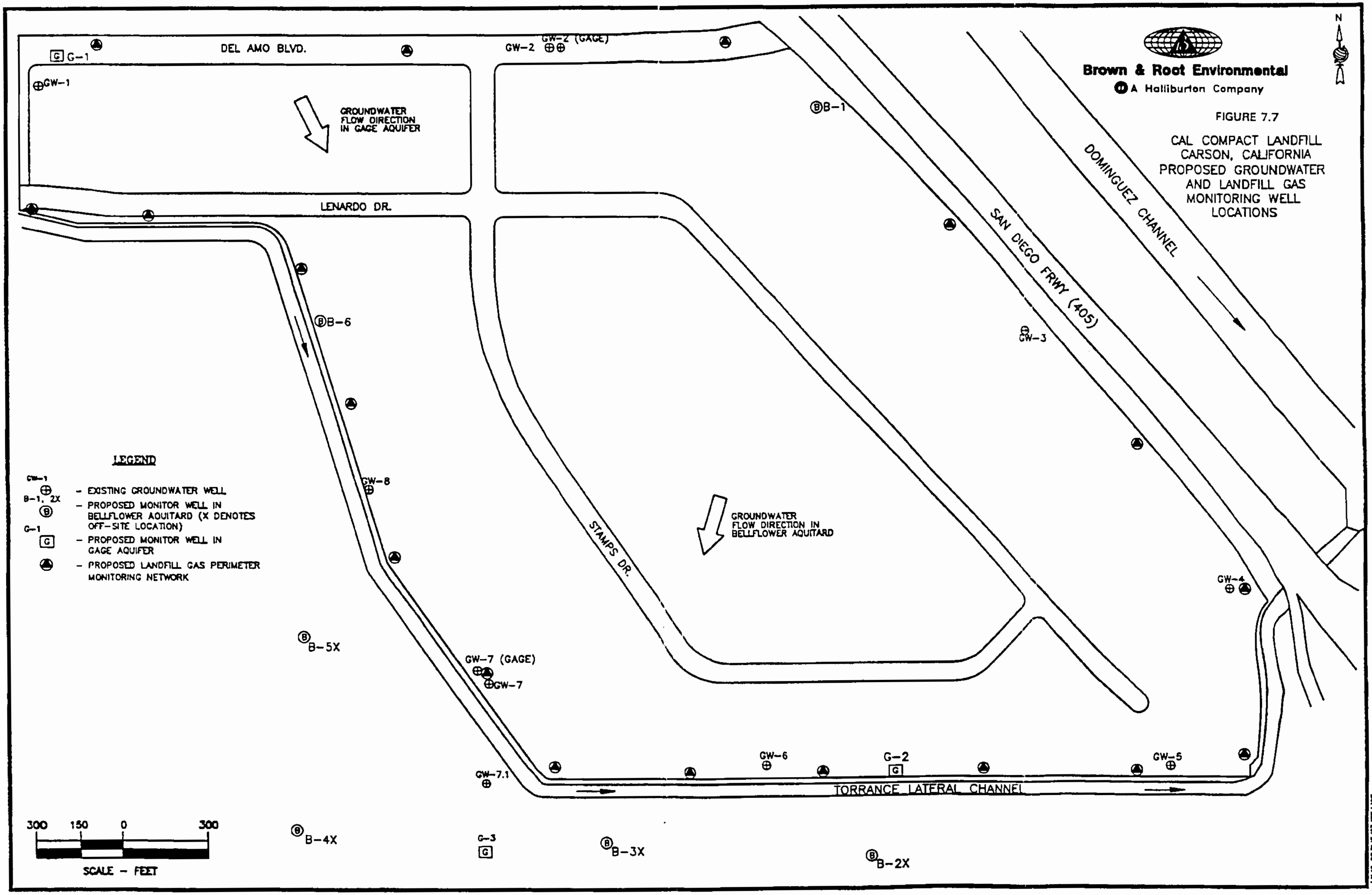


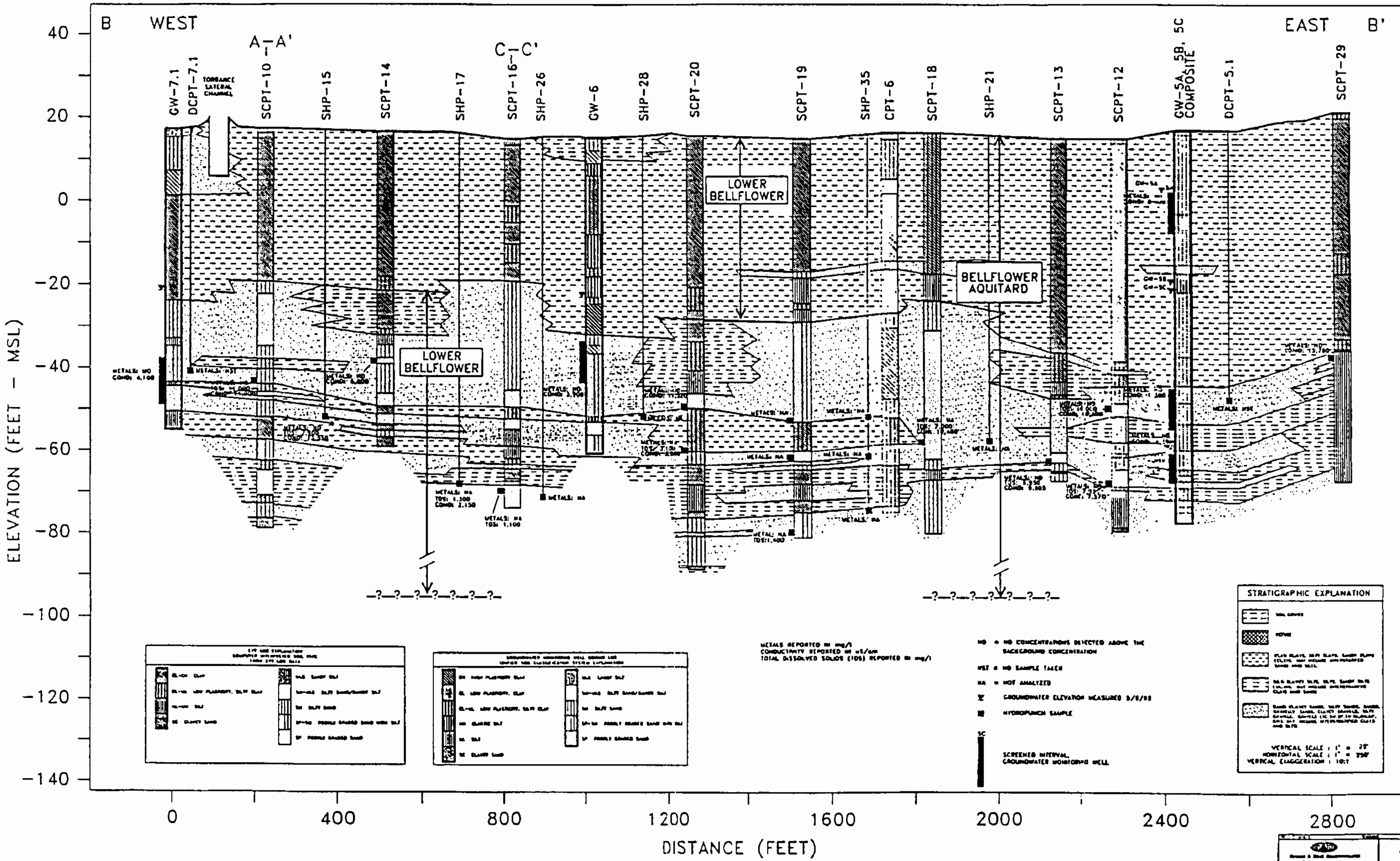
PSH	-	PRESSURE SWITCH HIGH
PSL	-	PRESSURE SWITCH LOW
PG	-	PRESSURE GAUGE
BC	-	BURNER CONTROL/RELAY
TIC	-	TEMPERATURE INDICATING CONTROLLER
TC	-	THERMOCOUPLE
⁄⁄	-	ELECTRIC SIGNALS

NTS

FIGURE 7.6

CONCEPTUAL FLARE SYSTEM DESIGN


Brown & Root Environmental
A Halliburton Company
FIGURE 7.7
CAL COMPACT LANDFILL
CARSON, CALIFORNIA
PROPOSED GROUNDWATER
AND LANDFILL GAS
MONITORING WELL
LOCATIONS
N
DEL AMO BLVD.
LENARDO DR.
STAMPS DR.
SAN DIEGO FRWY (405)
DOMINGUEZ CHANNEL
TORRANCE LATERAL CHANNEL
GROUNDWATER FLOW DIRECTION IN GAGE AQUIFER
GROUNDWATER FLOW DIRECTION IN BELLFLOWER AQUITARD
G-1
GW-1
GW-2
GW-2 (GAGE)
B-1
GW-3
GW-4
GW-5
G-2
GW-6
B-6
GW-8
GW-7 (GAGE)
GW-7
GW-7.1
G-3
B-5X
B-4X
B-3X
B-2X
LEGEND
GW-1 - EXISTING GROUNDWATER WELL
B-1, 2X - PROPOSED MONITOR WELL IN BELLFLOWER AQUITARD (X DENOTES OFF-SITE LOCATION)
G-1 - PROPOSED MONITOR WELL IN GAGE AQUIFER
- PROPOSED LANDFILL GAS PERIMETER MONITORING NETWORK
300 150 0 300
SCALE - FEET



NOTES:
- SCPT LITHOLOGIC LOGS CONSTRUCTED USING USCS CLASSIFICATION
- MONITOR WELL LITHOLOGIC LOGS BASED ON FIELD INTERPRETATION OF SOIL
- STRATIGRAPHIC CORRELATIONS BASED ON GEOPHYSICAL PARAMETERS OF CPT LOGS
- STRATIGRAPHIC CORRELATIONS PREPARED BY: GROUNDWORKS ENVIRONMENTAL, INC. FOR: BROWN & ROOT ENVIRONMENTAL

FIGURE 4.15

TOTAL RCRA METALS
CROSS-SECTION B-B'

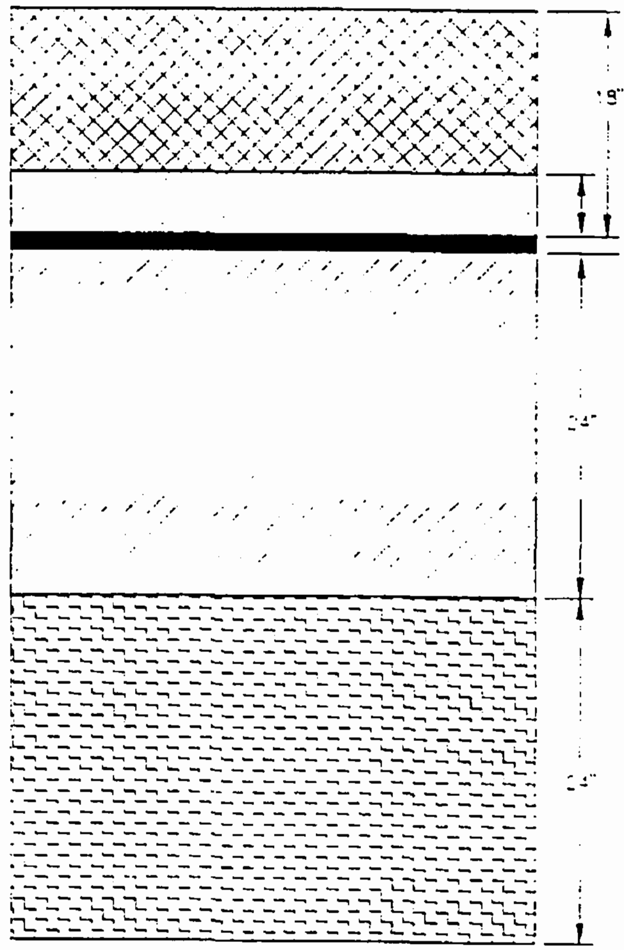


FIGURE 8.1
LANDFILL COVER WITH SYNTHETIC LINER
(FOR FUTURE SITE DEVELOPMENT AT BUILDING LOCATION)

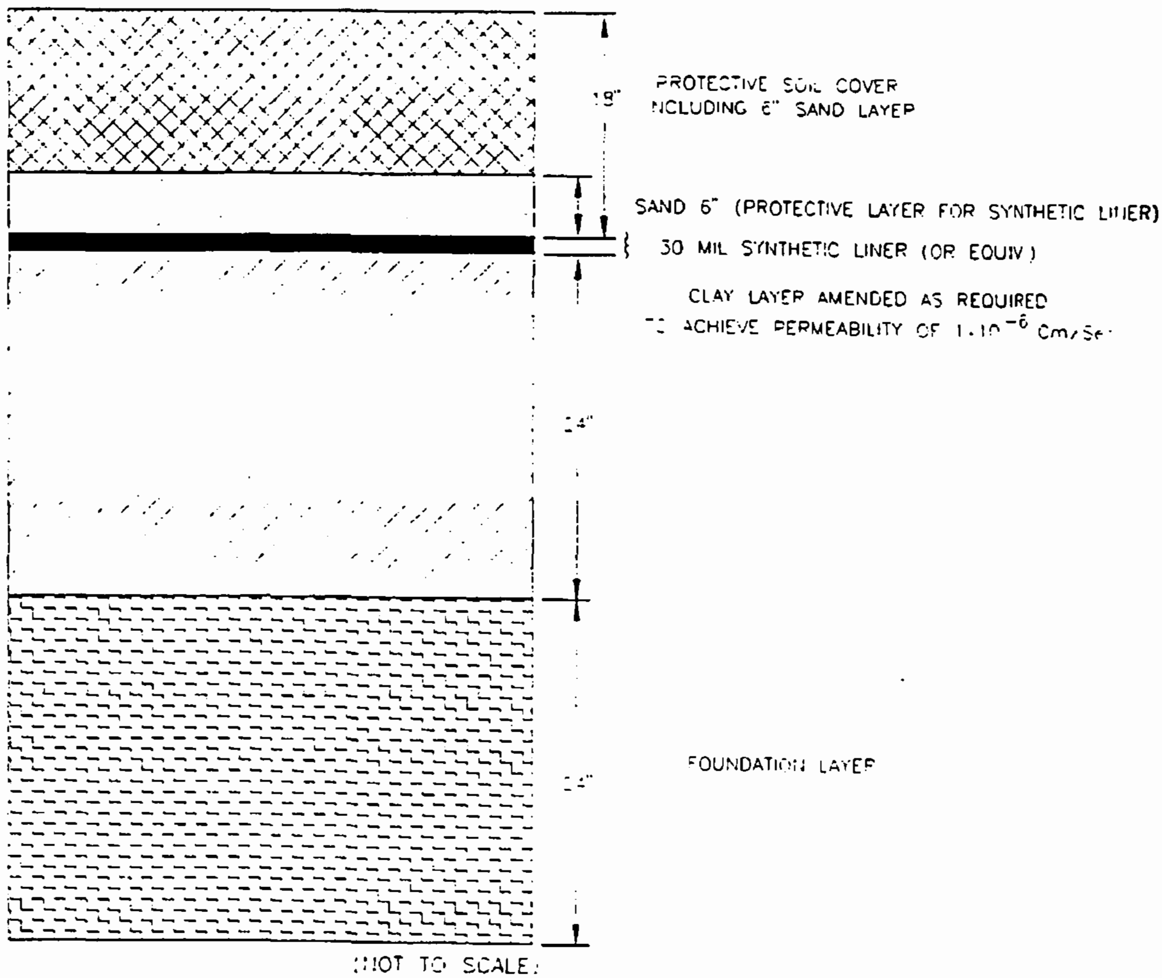
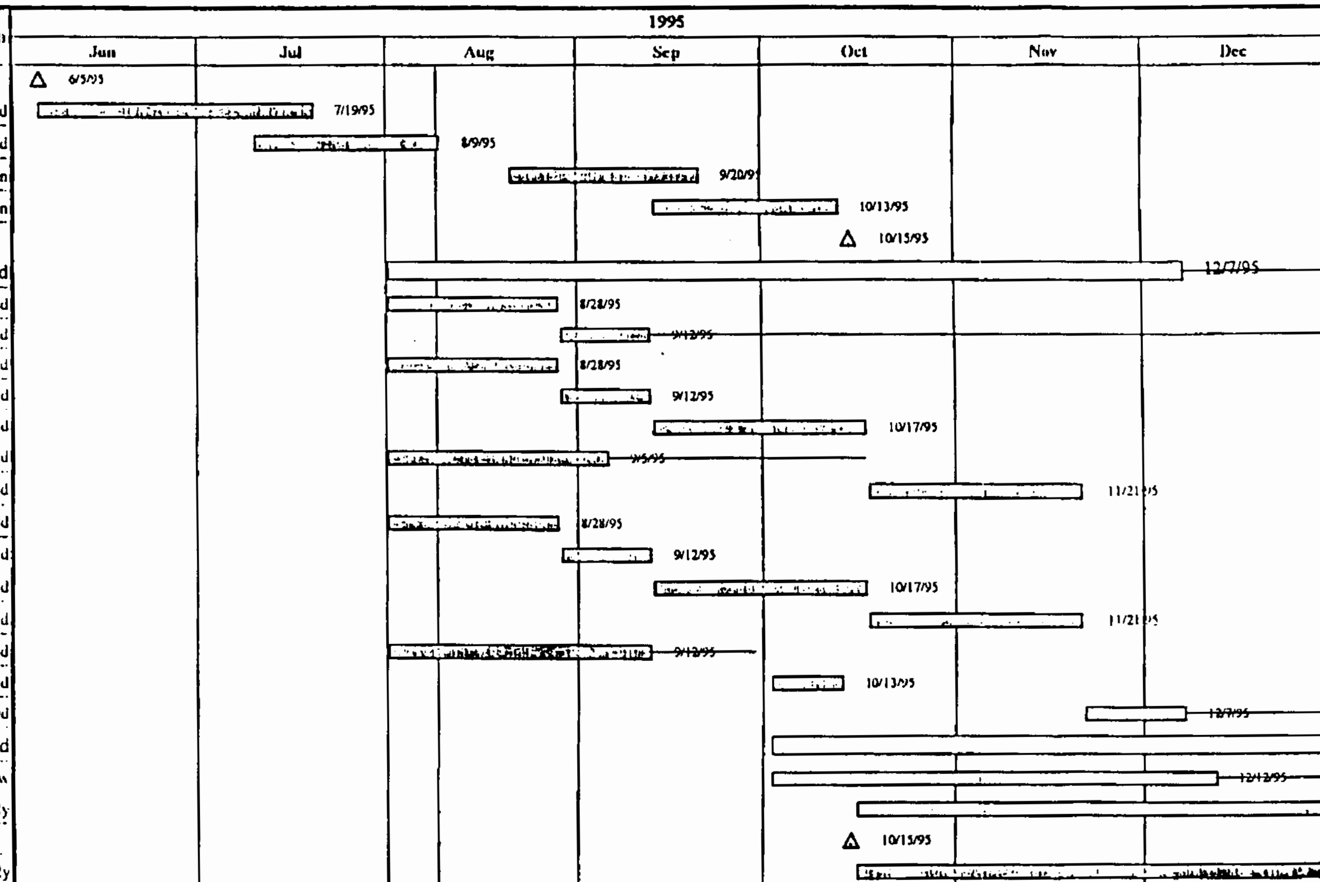


FIGURE 8.1
LANDFILL COVER WITH SYNTHETIC LINER
(FOR FUTURE SITE DEVELOPMENT AT BUILDING LOCATION)

FIGURE 9.1

Implementation Schedule: Cal Compact Landfill - Remediation and Site Redevelopment

Task Name	Start Date	Duration
Submittal of Draft RAP	6/5/95	
DTSC Review of Draft RAP	6/5/95	31d
Revision of Draft RAP	7/10/95	23d
Public Hearing/Comment on RAP	8/21/95	1mon
Final Approval of RAP	9/13/95	1mon
DTSC Issue Final RAP	10/15/95	
Remedial System Design	8/1/95	90d
Prep. of Qtr. GW Monitoring WP	8/1/95	20d
Approval of Qtr. GW Monitoring	8/29/95	10d
Prep. of Aquifer Pumping Test WP	8/1/95	20d
Approval of Aquifer Pump Test	8/29/95	10d
Conduct. Aquifer Pumping Test	9/13/95	25d
Conduct. GW Treatability Study	8/1/95	25d
Design of GW Treatment System	10/18/95	25d
Prep. of Landfill Gas Survey WP	8/1/95	20d
Approval of Landfill Gas Survey	8/29/95	10d
Conduct. Landfill Gas Survey	9/13/95	25d
Design of Landfill Control/Gas Mon. Syste	10/18/95	25d
Design of Landfill Cover System	8/1/95	30d
DTSC Review/Approval of Cover System	10/2/95	10d
DTSC Review/Approval of GW & Gas Syst	11/22/95	10d
Remedial Actions/Activities	10/2/95	532d
Initation of Remedial Work	10/2/95	10w
Remedial System Installation/Implementati	10/16/95	2y
Initation of Site Development/Construction	10/15/95	
Site Development/Construction	10/16/95	2y



Printed: 8/9/95
Page 1 (T1.6)

Milestone
Fixed Delay
Summary
Slack

Responsiveness Summary
Cal Compact Landfill
Upper Operable Unit

Draft Remedial Action Plan and
Proposed Supplemental Negative Declaration

This Responsiveness Summary section consists of written comments submitted to the Department of Toxic Substances Control (DTSC) during the public comment period for the Cal Compact Landfill, Upper Operable Unit, Draft Remedial Action Plan. The public comment period ran from August 25, 1995 through September 25, 1995 . A total of 13 comment letters were received and are identified as follows:

A State of California Regional Water Quality Control Board, Los Angeles Region

B Mr. Gary Colboth, Chair, South Dunbrooke Neighborhood Association

C County of Los Angeles - Department of Public Works

D Mr. Martin J. McHale

E South Coast Air Quality Management District

F Heller, Ehrman, White & McAuliffe

G Kelley Drey & Warren

H Water Replenishment District of Southern California

I County of Los Angeles - Department of Health Services Environmental Health Solid Waste Management Program

J Mr. Paul Nihipali

K State of California Integrated Waste Management Board

L State of california Department of Transportation

M Heller, Ehrman, White & McAuliffe

N Transcript of Proceedings from the September 6, 1995, public meeting for the Cal Compact Landfill draft Remedial Action Plan and proposed Supplemental Negative Declaration

Comment Letters and the Transcript of Proceedings from the September 6, 1995, public meeting for the Cal Compact Landfill draft Remedial Action Plan and proposed Supplemental Negative Declaration have been labeled "A" through "N" with comments identified with numbers along the left margin of each letter. Each comment letter is immediately followed by a "Response to Comment" page, with the response number corresponding to the number in the margin in the comment letter.

STATE OF CALIFORNIA

PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
101 CENTRE PLAZA DRIVE
MONTEREY PARK, CA 91754-2156
(213) 266-7500

SEP 8 1995

September 6, 1995

C 9-27-95

Mr. Thomas M. Cota
Department of Toxic Substances Control, Region 4
Site Mitigation Operations Branch
245 West Broadway, Suite 350
Long Beach, CA 90802-4444

REMEDIAL ACTION PLAN, CAL COMPACT LANDFILL, CARSON (File No. 59-045)
SCH NO. 95081061

Reference is made to your report entitled "Cal Compact Landfill, Upper Operable Unit", dated August, 1995. We have reviewed the subject document and offer the following comments:

A-1 — Final cover shall be designed in accordance with Title 23, CCR, Chapter 15, Section 2581.

A-2 — No waste water or storm water shall leave this site except as permitted by a National Pollutant Discharge Elimination System (NPDES) permit issued in accordance with the Federal Clean Water Act and the California Code of Regulations.

A-3 — Permanent drainage controls, structures, and facilities shall be graded and maintained to promote runoff of precipitation and to prevent ponding of liquids and surface water. Erosion or washout of refuse or cover materials by surface flow shall be prevented.

Thank you for the opportunity to review this project.

If you have any questions, please call Mr. Don Peterson at (213) 266-7576.

Rodney H. Nelson

RODNEY H.NELSON, Head
Landfills Unit

cc: Elizabeth Haven, California State Water Resources Control Board
Charlene Herbst, California Integrated Waste Management Board
Chris Belsky, State Clearinghouse
Richard Hanson, County of Los Angeles, Solid Waste Department

Response to comment received from the Los Angeles Regional Water Quality Control Board on the Cal Compact Landfill Project.

Comment 1:

Final cover shall be designed in accordance with Title 23, CCR, Chapter 15, Section 2581.

Response:

Comment noted and accepted.

Comment 2:

No waste water or stormwater shall be discharged from this Site except as permitted by a National Pollutant Discharge Elimination System (NPDES) permit issued in accordance with the Federal Clean Water Act and the California Code of Regulations, or as permitted through an indirect discharge permit through the appropriate Publicly Owned Treatment Works (POTW).

Response:

Comment noted and accepted.

Comment 3:

Permitted drainage controls, structures, and facilities shall be graded and maintained to promote runoff of precipitation and to prevent ponding of liquids and surface water. Erosion or washout of refuse or cover materials by surface flow shall be prevented.

Response:

Comment noted and accepted.

Sept. 6, 1995

Mr. Thomas Cota
Cal Compact Landfill Project Manager
Department of Toxic Substances Control
California Environmental Protection Agency
245 West Broadway, Room 425
Long Beach, CA 90802

Re: COMMUNITY QUESTIONS AND INPUT
CAL COMPACT SITE
COMMUNITY MEETING - Sept. 6, 1995 - CARSON COMMUNITY CENTER

Dear Mr. Cota:

Please treat this letter as community input that should be made part of the official file in this matter to the extent allowed by state laws regarding administrative procedures.

B-1 I raised a number of issues by letter to you dated June 15, 1995, four months ago, and many of those issues are not resolved by the Remedial Action Plan which is very general. The public need a very specific RAP to be able to make meaningful comments. My four page letter to you of June 15, 1995, raised some 15 categories of questions, many of which have not received a specific response. For the Department to say "we do not know" or "we do not have that data" does not meet your obligation to respond to public input. Unless citizens receive specific answers, these meetings to invite public input are mere charades.

I will highlight some of the questions asked earlier.

B-2 How will dangerous dust be avoided during the cleanup and construction?

B-3 Some of us remain concerned that we do not know the extent of the contamination. There is no record of what was dumped at the site for a 19 month period and the borings and monitoring wells have been on the perimeter or on internal roads, places that would not measure the worse contaminants. If it is too dangerous for testing and evaluation to bore into the heart of the landfill, will it not also be too dangerous to drive thousands of construction piles into that same fill? We appear to be in the situation of talking about cleanup without knowing the precise nature of the contamination.

B-4 Has the Department concluded that a landfill gas collection and

B-4 treatment system will not be initially required? How did the Department cone to that conclusion without boring into the heart of the landfill and collecting samples?

B-5 How many other contaminated sites in California have been cleaned up using the vertically-phased approach cleaning up the top half and proceeding with construction <u>without</u> cleaning up the lower half? (Lower half meaning the Lower Operable Unit and aquifer).

B-6 When would the lower half be cleaned up? What is the extent of the contamination of the lower half? How would the cleaning of the lower half be financed?

B-7 Is it the practice of the Department when faced with a project of "size and complexity" to "divide it into two operable units"? Is it further the practice of the Department to only clean up half the project?

B-8 In the past four months, has there been any attempts to hold any of the 12 PRPs liable for any cleanup costs? Are we on a course by which the shopping center tenants (or the bondholders in the event of default) will pay for the upper unit, and no one will pay for the lower unit because it will not be cleaned? Thus, none of the polluters would end up paying any of the costs of cleanup.

B-9 In what way has the Department coordinated with the Regional Water Quality Control Board about the vertical-phased two tier approach of cleaning the top but not the bottom? What is the opinion of the Water Board about the vertical-phasing of the cleanup?

B-10 If construction is permitted at the site, will it mean as a practical matter that the lower half will not be cleaned up?

B-11 The soil at the site will be unstable in the event of an earthquake. Does the Department have data to conclude that the proposed gas cap barrier, gas collection systems, and structures can withstand an earthquake which may produce signifcant debris consolidation, settlement, and liquefaction?

B-12 What will be done to the two abandoned wells on the site? What is the extent of the danger that the wells might become channels to allow contaminants to flow down into the lower aquifer and damage the drinking water supply? What specific provision is made for this in the RAP?

B-13 Have experts, other than those being paid by developers, been involved in providing data to the Department? Are the experts involved influenced by having a financial interest in having the project go forward? For example, you write that: "As a potentially responsible party, BKK has conducted the remedial investigation for the portion of the site known as the Upper Operable Unit." Is this analogous to asking the fox to investigate the chicken coop? Does not BKK have an <u>enormous</u> financial interest in having this project go forward so shopping mall tenants (or bondholders in default) will spend the millions

B-13 of dollars to clean up the site rather than having BKK spend its own money to clean the site?

B-14 What person concluded that the site cleanup could be accomplished without significant environmental impacts? Did that person realize that there would be massive truck traffic, earthmoving, dust, driving of thousands of piles into the ground adjacent to residential areas, pumping and treating of water that could contaminate additional groundwater, and related activities? A Negative Declaration seems wildly inappropriate.

Sincerely,

Gary Colboth

Gary Colboth, Chair
South Dunbrooke Neighborhood Association
19813 Dunbrooke Ave
Carson, CA 90746 (310) 516-3768

June 15, 1995

Mr. Thomas Cota
Cal Compact Landfill Project Manager
Department of Toxic Substances Control
California Environmental Protection Agency
245 West Broadway, Room 425
Long Beach, CA 90802

Re: COMMUNITY QUESTIONS AND INPUT
CAL COMPACT SITE
COMMUNITY MEETING - JUNE 15, 1995 - CARSON COMMUNITY CENTER

Dear Mr. Cota:

Please treat this letter as community input that should be made part of the official file in this matter to the extent allowed by state laws regarding administrative procedures.

The 157 acre site was used for a dump. Buried there is the equivalent of 2,700,000 barrels of waste much of which is volatile and semi-volatile organic compounds, pesticide, metals, paint sludge, latex from refineries, ink, grease, kerosene, carbon black slurry, and other hazardous substances. It is assumed that about half of the material dumped at the site would be considered to be hazardous substances. That dump site operated for about 66 months, and during about 19 of those months there were "no records" regarding what was dumped there. Thus, we are not aware of the real scope of the problem and the threat to air quality and ground water and problems of gas accumulations and land subsidence. Some of the waste is only covered by a few feet of dirt. Development would involve massive dirt moving, the driving of metal poles through the waste to solid ground, and the driving of heavy trucks and other equipment on a massive scale.

The State of California agencies have not approved construction at this contaminated site until there is remediation to comply with applicable laws. The following questions require your attention.

B-15 1. Since some of the buried waste is only covered by as little as two feet of dirt, what is the danger to people in the area of breathing airborne dust caused at the site from construction activities?

B-16 2. To my knowledge, only 15 soil borings and 17 groundwater monitoring wells have been completed on the 157 acre. That is about one boring and well per each ten acres. Since we do not know what was dumped there for a 19 month period, are these borings adequate to determine the nature of the contamination? Also, no monitoring wells were installed in the interior of the property or in the aquifers used for drinking water. How can you evaluate a remediation plan without a better evaluation of the extent of the contamination?

B-17 3. Does the DTCS intend to assess the extent of the contamination of the ground drinking water and to require that the ground drinking water be protected by the remediation plan?

B-18 4. Does the DTCS have reports from experts other than consultants paid by parties with a financial interest in having the construction project go forward? Will DTCS conduct and tests independent of those with such a financial interest?

B-19 5. There are at least two abandoned wells on the site. Will these abandoned wells provide channels for hazardous liquids to reach the aquifers and contaminate ground drinking water? Will the remediation plan deal with these wells?

B-20 6. The project would involve the pounding of thousands of pilings through the waste material and into solid ground below. These activities will change the flow and migration of contaminants and methane gas. How will the mitigation plan possibly anticipate and deal with these factors?

B-21 7. Will the pounding of thousands of pilings through the waste material and into the solid ground below involve a high risk of breaking through under ground earth layer barriers and, thereby, allowing hazardous liquids to move quickly into the underground drinking water?

B-22 8. Forcing heavy piles deep into the waste and ground involves dynamic compaction. What hazards exist based on the combination of the contaminants already there (not all of which are presently known), mixed with the methane gas, affected by dynamic compaction and the vibrations of trucks, equipment, and construction activities?

B-23 9. This area is close to the Inglewood-Newport earthquake fault which creates public safety concerns related to soil liquefaction. What is the depth to groundwater? Is it affected by annual rainfall amounts? Will the pounding of thousands of pilings and other vibrations at the site increase the danger of soil liquefaction? Would the soil liquefaction speed contaminants into the deep ground drinking water?

B-24 10. I assume that contaminated liquids will be pumped from the ground. Will a sufficient degree of groundwater extraction be achieved by proposed pumping plans?

B-25 11. There have been discussions about cleaning the top of the site but not the lower part, including that affecting the deeper aquifers. Why would the DTCS allow such a two tier approach? Is this a standard approach? Has it been used on other large contaminated sites? Should not both levels of the site be cleaned before the surface is developed? Since liquid contaminants tend to go downward pulled by gravity, is it not of great importance to clean up the deep contaminants as quickly as possible? Is not the deep material of great threat to the underground drinking water? Should not there be a plan to clean up both levels before construction is allowed?

B-25 (a) At how many other sites in CAlifornia in the last 10 years has the DTCS employed this vertically defined operable units, i.e., clean up the top but not clean up the bottom? If this has been done in other locations, what unusual issues arose?

(b) Has the Regional Water Quality Control Board agreed to such a two tier approach, i.e., clean up the top but not the bottom? Would you expect the RWQCB to consider such an approach to be appropriate and reasonable at this large site?

B-26 12. If a two tier cleanup plan is approved, will the DTCS require that a specific party be required to finance the cleanup of the lower level? How and when will that be determined? How can DTCS be confident that work should proceed on the top tier without a full plan for cleaning up the lower tier of the site?

B-27 13. The fact sheet indicates that the BKK corporation will take responsibility to complete the remediation of the upper unit. Who will be responsible to clean the lower level? If BKK cleans the upper unit, will BKK be excused for any responsibility for the lower level? What agency or court will make that decision about responsibility of various parties to clean the lower level?

B-28 14. The fact sheet cites 12 PRPs including BKK. Who are these others and what is DTCS doing to encourage them to meet their obligations to clean the site?

B-29 15. The fact sheet states that additional field work was conducted in May, 1995, to complete the remedial investigation of the upper operable unit. Has the field work been completed? What was done? What results are now to be made part of the public record? Are all of the findings available to the public? Was all or part of the work done by consultants paid by parties with a financial incentive to have the project go forward?

We look forward to hearing answers to these questions.

Sincerely,

Gary Colboth, Chair
South Dunbrooke Neighborhood Association
19813 Dunbrooke Ave
Carson, CA 90746 (310) 516-3768

Continued

The following are Response to Comments received from Mr. Gary Colboth on September 6, 1995 regarding the Cal Compact Landfill Project.

1. **Comment:**

The public needs a very specific Remedial Action Plan to be able to make meaningful comments.

Response:

The draft Remedial Action Plan (RAP) is specific in describing the proposed remedy. The purpose of the RAP is to summarize the findings of the Remedial Investigation (RI) Report, the Feasibility Study (FS) and to describe the proposed remedial alternative actions to be taken for the remediation of hazardous substances. The draft RAP provides the overall framework for the proposed remedial actions and does not contain, nor is it required to contain, specific engineering design details. The draft RAP complies with federal Superfund regulations contained in the National Oil and Hazardous Substances Pollution Contingency Plan (commonly referred to as the Nation Contingency Plan or NCP), U.S. Environmental Protection Agency's guidance documents, and the Department of Toxic Substances Control's (DTSC) policy and guidance documents.

The next phase of the Cal Compact Landfill (the Site) remediation process is the Remedial Design (RD) phase. During the RD phase a detailed engineering design plan will be submitted to DTSC for the construction of the remedial systems.

2. **Comment:**

How will the dangerous dust be avoided during the cleanup and construction?

Response:

Section 7.4 in the draft RAP, entitled "Mitigations Measures for Remedial Action", identifies specific activities required for dust suppression. All Site activities must comply with South Coast Air Quality Management District (SCAQMD) Rule 403 for fugitive dust. The following measures have been identified to reduce the generation of fugitive dust:

1. The use of water will be the primary control for dust. Soil wetting will be performed as required to reduce fugitive dust, but not less than twice per day. Commercially available additives, suppressant foams, and mulches will be considered if needed to augment the water treatment.

2. Soil stabilization measures will be utilized for areas that remain inactive over an extended period of time. Such measures include smooth rolling the surface with a steel

drum roller or the application of moisture-retaining binders to form a seal cover.

3. Roads will be cleaned, swept, or scraped at regular intervals in accordance with the truck route permit issued by the City of Carson.

4. Fill material imported by haul trucks will be covered by tarp or other means.

5. Haul trucks exiting the Site will be visually inspected at a dust control monitoring station to ensure that they have been adequately cleaned/washed for residual dirt.

6. All construction vehicle tires will be washed at the time these vehicles exit the Site.

7. A staging, unloading, and cleaning process will be designed in the earthwork contractor's workplan.

8. Other measures in the earthwork contractor's workplan will consider confining work at any one time to limited areas of the Site, suspending work during periods of high winds (i.e., greater than 25 mph for an extended period of time) and during Stage 2 to 3 Ozone Episodes, and placing final vegetation and surface treatments (area paving, etc.) as soon as practical in the construction schedule.

Section 7.4.1 in the draft RAP identifies specific dust and particulate monitoring requirements to be conducted during construction of remedial systems.

3. Comment:

Some of us remain concerned that we do not know the extent of the contamination. There is no record of what was dumped at the Site for a 19-month period and the borings and monitoring wells have been on the perimeter or on internal roads, places that would not measure the worse contaminants. If it is too dangerous for testing and evaluation to bore into the heart of the landfill, will it not also be to dangerous to drive thousands of construction piles into the same fill? We appear to be in the situation of talking about cleanup without knowing the precise nature of the contamination.

Response:

In DTSC's view, the Upper Operable Unit (Upper OU) principally composed of the waste zone in and above the Bellflower Aquitard has been adequately characterized in light of the proposed remedy. Even if it were true that some hazardous substances in the Upper OU have not been identified, the selected remedy will either capture such contaminants from further off-site migration, or will prevent their exposure to nearby residents or on-site users of the property. The Remedial Investigation (RI) adequately characterized the major classes of hazardous substances known to have been deposited at this Site, specifically, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals.

The Cal Compact landfill operated from late 1959 until approximately 1968. The landfill was permitted by the Los Angeles County to accept municipal solid waste and specified industrial waste. Records from the Los Angeles County indicate that the industrial waste included drilling fluids, paint sludges, liquid latex waste, and carbide or acetylene sludge. These types of compounds contain heavy metals, VOCs and SVOCs. While it is true that during a 19-month period operation records are not available, analytical data confirm the presence of hazardous substances known to be disposed at the Site based on the existing operation records.

To better appreciate what work has been performed, DTSC offers the following summary. Samples were collected at the Site from the following areas: 1) surface and run-off water, 2) soil cover, 3) waste zones, and 4) groundwater. These samples were collected and analyzed for hazardous substances using U.S. Environmental Protection Agency (EPA) approved analytical methods. The chemicals and compounds detected included metals, VOCs, SVOCs and pesticides. No polychlorinated biphenyls (PCBs) were detected. Soil samples were indeed collected from the waste zones at the Cal Compact Landfill. Sampling of the waste zones proved not to pose any special risk to on-site workers or nearby residents.

4. Comment:

Has the Department concluded that a landfill gas collection and treatment system will not be initially required? How did the Department come to that conclusion without boring into the heart of the landfill and collection samples?

Response:

No, DTSC has not concluded that a landfill gas collection and treatment system will not be required.

A landfill gas collection and treatment system is proposed in the draft RAP. However, to confirm the need for such a system, an additional landfill gas survey (LGS) will be required.

A LGS workplan will be submitted to DTSC, the SCAQMD and the Los Angeles Regional Water Quality Control Board (Water Board) for review. Final approval of the workplan shall be provided by DTSC prior to any field activities. The LGS will provide information on the concentrations of landfill gases being generated as well as design information required for a landfill gas collection and treatment system. DTSC, with concurrence by SCAQMD and the Water Board, will determine the need for a landfill gas collection system based on the results of the LGS. If a landfill gas system will be required, a detailed engineering design must be submitted to DTSC for approval.

The basis for the determination of the need for a landfill gas collection system does not depend upon borings into the "heart of the landfill". It depends upon extracting landfill gases through sampling probes inserted in and around the landfill - such probes will be employed during the Remedial Design (RD) phase of this process.

5. **Comment:**

How many other contaminated sites in California have been cleaned up using the vertically-phased approach cleaning up the top half and proceeding with construction without cleaning up the lower half? (Lower half meaning the lower Operable Unit and aquifer). Is it the practice of the Department when faced with a project of "size and complexity" to "divide it into two operable units"

Response:

DTSC does not track the specific number of sites managed in this way. A phased approach is an accepted practice in the field and, moreover, this approach complies with the NCP. DTSC directs your attention to the definition of an "Operable Unit" found in the Federal regulations at 40 CFR 300.5 as follows:

> "***Operable Unit*** means a discrete action that comprises an incremental step toward comprehensively addressing the problem. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of release, or pathway of exposure. The cleanup of the site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site., specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or actions that are concurrent but located in different parts of a site."

To our knowledge the waste zone is located above and within a well-characterized geological formation, the Bellflower Aquitard, which in our view represents the principal source of potential contamination to deeper off-site groundwater sources. 40 CFR 300.430(a)(i)(A) states that "Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." DTSC believes that the proposed remedy will immediately mitigate off-site migration and would thus provide DTSC the opportunity to assess potential releases, as yet unknown, to areas outside this operable unit.

To delay implementation of the remedy in order to first investigate the potential contamination in the Lower Operable Unit (Lower OU), would needlessly forestall a remedy which is appropriate for known contamination in the Upper OU. Should further investigations reveal that deeper areas are contaminated, additional wastewater treatment wells can be employed in further remedial processes. Furthermore, both the landfill cap and landfill gas collection system are appropriate control measures for any deeper contamination.

DTSC's practice is to strive to achieve meaningful environmental protection and, where a phased approach achieves that goal, to employ such an approach.

6. Comment:

How will the lower half be financed? When would the lower half be cleaned up?

Response:

DTSC has identified a number of Potentially Responsible Parties (PRPs) for the remediation of the entire Site. Among these PRPs are those identified in the Preliminary Non-Binding Allocation of Responsibility Section of the draft RAP.

DTSC plans to begin investigation of the Lower OU by all identified PRPs and, if necessary, to seek remediation of the Lower OU from these PRPs. DTSC has a number of enforcement tools at its discretion to achieve this purpose. Naturally, since litigation may be required, it is impossible to conclude when this process will lead to a successful outcome.

7. Comment:

Is it the practice of the Department to only cleanup half the project? What is the extent of the contamination of the lower half?

Response:

No, DTSC is not proposing to remediate only half the Site. DTSC is proposing to begin the remediation of the Upper OU and will pursue a separate remedial investigation for the Lower OU. Based on the results of the Lower OU investigation, a remedial action plan may be developed.

At the present time, DTSC knows very little about any hazardous substances in the Lower OU. A Lower OU remedial investigation will be conducted to determine the nature and extent of contamination in the lower aquifers. A Lower OU RAP, if needed, will address hazardous substances identified in the Lower OU which require remediation.

8. Comment:

In the past four months, has there been any attempts to hold any of the 12 PRPs liable for any cleanup cost? Are we on the course by which the shopping center tenants (or the bondholders in the event of default) will pay for the upper unit, and no one will pay for the lower unit because it will not be cleaned? Thus, none of the polluter would end up paying any of the costs of cleanup.

Response:

In the past four months, DTSC has achieved a cooperative agreement with the BKK Corporation to preform a Remedial Investigation/Feasibility Study (RI/FS) and prepare a draft RAP. DTSC intends to hold these named PRPs in the draft RAP, as well as other identifiable PRPs, liable for all cleanup costs. Future tenants of the property, simply by virtue of there tenancy, are not liable parties. Bondholders, in the event of default, likewise are not liable. DTSC will seek all available legal remedies at its disposal to make sure the polluters pay. In every case, there are litigation risks as well as the problem of insolvent PRPs. DTSC cannot predict or guarantee the outcome in any litigation matter.

9. Comment:

In what way has the Department coordinated with the Regional Water Quality Control Board about the vertical-phased two tier approach of cleaning the top but not the bottom? What is the opinion of the Water Board about the vertical-phasing of the cleanup?

Response:

DTSC and the Water Board staff have met to discuss the Cal Compact landfill project. The draft RAP and RI/FS have been submitted to the Water Board for review.

10. Comment:

If construction is permitted at the Site, will it mean as a practical matter that the lower half will not be cleaned up?

Response:

No, DTSC is committed to conducting a remedial investigation for the Lower OU. As stated in Response to Comment No. 5, a phased approach follows federal regulations for the remediation of hazardous releases at large and complex sites. Remediation of the Lower OU will be based on the results of a Lower OU investigation. As a practical matter, DTSC will require that any future development of the Site be conducted in a manner that will not interfere with DTSC's ability to investigate and remediate the Lower OU. Such requirements will include reasonable access agreements to investigate the Lower OU and, if necessary, to construct additional remedial systems.

11. Comment:

The soil at the Site will be unstable in the event of an earthquake. Does the Department have data to conclude that the proposed gas cap barrier, gas collection system, and structures can withstand an earthquake which may produce significant debris consolidation, settlement, and liquefaction?

Response:

The unremediated landfill, in its present condition, is subject to earthquake upset. The presence of the proposed cap and landfill gas collection system cannot adversely impact Site conditions or the adverse impacts of an earthquake. Moreover, if the systems were damaged by an earthquake, needed repairs will be made.

Insofar as structures related to commercial development of the Site, DTSC has no authority to approve or disapprove such development based upon seismicity analysis. These issues are local land-use and permitting authority decisions. Such approvals are not a part of the draft RAP.

However, insofar as these structures may impact the proposed remedial action, a workplan to study dynamic compaction and subsidence has been submitted to DTSC and the City of Carson. The proposed workplan outlines a pilot study to investigate the results of dymanic compaction on the soil cover and waste zone. The information obtained during this field investigation will be used in the remedial design phase to further ensure compatibility of development and remediation.

12. Comment:

What will be done to the two abandoned wells on the Site? What is the extent of the danger that the wells might become channels to allow contaminants to flow down into the lower aquifer and damage the drinking water supply? What specific provision is made for this in the RAP?

Response:

An extensive investigation was conducted to identify the location of the abandoned wells. The investigation for these wells included historical records review, magnetometer survey, and historical aerial photographic search. Although DTSC knows the general location of the three wells, DTSC does not know their precise location.

An additional investigation will be conducted during the implementation phase on the RAP to locate the former oil and water wells at the Site to address issues such as the risk of downward migration of contaminants into lower aquifers. To the extent feasible, the former water well and two oil wells will be located and abandoned to meet current regulatory standards. All available information regarding the location of these wells will be utilized in this investigation. The location of the wells will be re-surveyed using available historical data. Survey locations will then be compared to the prior investigations. Based on the results of these investigations, a excavation plan will be considered. This excavation plan shall be limited to those Site areas with the highest probability of finding the oil and water wells. Such limitation is further justified because of the risk associated with excavating buried hazardous substances. Prior to any excavation the health risk of such activities will be evaluated to assess the appropriateness of such excavation. Regulatory approval of all plans and permits will be obtained prior to any excavation activities.

A fate and transport modeling program may also be conducted to evaluate the potential risk to the lower aquifers. Should such program reveal that the potential risk to the lower aquifers from the abandoned wells is insignificant, then excavation, and well abandonment need not be pursued.

In the event that an excavation is conducted to locate these wells, DTSC may suspend such investigation if the investigation itself poses a human health or environmental threat. If the investigation fails to locate these wells, the search for these wells will cease and all other remedial activities will be implemented.

At this time, there is no data to indicate that the Silverado Aquifer (drinking water aquifer) has been or is presently adversely impacted.

13. Comment:

Have experts, other that those being paid by developers, been involved in providing data to the Department? Are the experts involved influenced by having a financial interest in having the project go forward? For example, you write that: "As a potentially responsible party, BKK has conducted the remedial investigation for the portion of the Site known as the Upper Operable Unit." Is this analogous to asking the fox to investigate the chicken coop? Does not BKK have an enormous financial interest in having this project go forward so shopping mall tenants (or bondholders in default) will spend the millions of dollars to clean up the Site rather than having BKK spend its own money to clean the Site?

Response:

DTSC oversees all site investigations and remedial activities conducted by PRPs. This oversight function helps to ensure that the samples collected and analyzed are free from bias or fraud. Confirmatory samples have been and will be sent to either DTSC's Hazardous Materials Laboratory or an independent laboratory, certified by the State, for data verification. California law makes it a crime to knowingly provide false or misleading information to DTSC. Furthermore, California law specifically provides for DTSC issuing orders to PRPs to investigate and remediate sites. The Legislature intended that PRPs conduct these activities. The Legislature also provided for severe penalties for fraud.

14. Comment:

What person concluded that Site cleanup could be accomplished without significant environmental impacts? Did that person realize that there would be massive truck traffic, earthmoving, dust, driving of thousands of piles into the ground adjacent to residential areas, pumping and treating of water that could contaminate additional groundwater, and related activities? A Negative declaration seems widely inappropriate.

Response:

DTSC determined that the remedy itself, as proposed and properly designed, will not have significant adverse environmental impact, as required by the California Environmental Quality Act (CEQA). That determination is separate and apart from the fact that existing Site conditions themselves may pose adverse environmental impacts. It is the remedy, not existing Site conditions, which is subject to CEQA analysis.

As for the other activities identified in this comment (truck traffic, earthmoving, dust, and driving of piles), these impacts have already been addressed in the Final Project and Program Environmental Impact Report, Metro 2000, prepared and certified by the City of Carson for the Site development.

The following are DTSC's response to comments contained in Mr. Gary Colboth letter dated June 15, 1995.

15. **Comment 1:**

Since some of the buried waste is only covered by as little as two feet of dirt, what is the danger to people in the area of breathing airborne dust caused at the Site from construction activities?

Response:

As discussed in the Response to Comment No. 2, dust mitigation measures have been incorporated into the draft RAP in order to minimize the generation of fugitive dust. Air monitoring shall also be conducted during the initial phase of the construction of the proposed cap.

16. **Comment 2:**

To my knowledge, only 15 soil borings and 17 groundwater monitoring wells have been completed on the 157 acre. That is about one boring and well per each ten acres. Since we do not know what was dumped there for a 19 month period, are these borings adequate to determine the nature of the contamination? Also, no monitoring wells were installed in the interior of the property or in the aquifers used for drinking water. How can you evaluate a remedial plan without a better evaluation of the extent of contamination.

Response:

Please refer to the Response to Comment No. 3. DTSC believes that the Upper OU has been adequately characterized in light of the proposed remedy. During the RI, several different investigative techniques were conducted to identify and characterize Site conditions. Groundwater samples were collected through the use of HydroPunch technique, which does not require construction of a monitoring well. Soil lithology was identified through the technique of Cone Penetrometer Testing.

17. **Comment 3:**

Does the DTSC intend to assess the extent of the contamination of the ground drinking water and to require that the ground drinking water be protected by the remediation plan?

Response:

Please refer to Response to Comments No. 5, 6, 7, 10, and 12.

18. **Comment 4:**

Does the DTSC have reports from other than consultants paid by parties with a financial interest in having the construction project go forward? Will DTSC conduct and tests independent of those with such a financial interest?

Response:

Please refer to Response to Comment No. 13.

19. **Comment 5:**

There are at least two abandoned wells on the site. Will these abandoned wells provided channels for hazardous liquids to reach the aquifers and contaminate ground drinking water? Will the remediation plan deal with these wells?

Response:

Please refer to response to Comment No 12.

20. **Comment 6:**

The project would involve the pounding of thousands of pilings through the waste material and into solid ground below. These activities will change the flow and migration of contaminants and methane gas. How will the mitigation plan possibly anticipate and deal with these factors?

Response:

The installation of pilings for development purposes are not part of the remedial action for the draft RAP. However, insofar as these pilings may impact the proposed remedial action, a workplan to study dynamic compaction and subsidence has been submitted to DTSC and the City of Carson. The proposed workplan outlines a pilot study to investigate the results of dymanic compaction on the soil cover and waste zone. The information obtained during this field investigation will be used in the remedial design phase of the process to further ensure compatibility of development and remediation.

DTSC does not believe that the pilings will affect groundwater flow and direction. As far as downward migration of the Upper OU contaminants, this should be minimized by proper pile design and installation whereby waste zone materials will simply be slightly displaced laterally. Vertical migration for Lower OU aquifers is unlikely, because piling depths are not proposed to extend to the Gage Aquifer. However, DTSC is requiring in the RAP the construction of additional groundwater monitoring wells in both the Bellflower Aquitard and Gage Aquifer. These wells will be installed and sampled prior to and throughout the construction activities. In the event that an adverse condition is detected, DTSC has several actions that can be taken, including but not limited to issuing a Stop Work Order.

21. **Comment 7:**

Will the pounding of thousands of pilings through the waste material and into the solid ground below involve a high risk of breaking through under ground earth layer barriers and, thereby, allowing hazardous liquids to move quickly into the underground drinking water?

Response:

See Response to Comment No. 18.

22. **Comment 8:**

Forcing heavy piles deep into the waste and ground involves dynamic compaction. What hazards exist based on the combination of the contaminants already there (not all of which are presently known), mixed with methane gas, affected by dynamic compaction and the vibrations of trucks, equipment, and construction activities?

Response:

As discussed in the Response to Comment No. 11 and 14, the draft RAP does not propose forcing heavy piles into the waste zones. The draft RAP proposes the construction of a landfill cap, gas collection and treatment system, and a groundwater collection and treatment system. Dynamic compaction is the process that would compact the Site's soils and waste zones; dynamic compaction will not be used to drive piles into the ground.

A Baseline Risk Assessment has been conducted for the Cal Compact Landfill. The most significant exposure pathways for off-site residents identified at the Site, in its present unremediated condition, are the inhalation of benzene and vinyl chloride vapors, and the inhalation of chromium as suspended soil particulates. Therefore, DTSC is proposing the construction of a cap and landfill gas collection and treatment system, which would contain and control off-site particulates as well as collect and treat gases generated from the Site. Dust suppression activities shall be conducted in order to minimize the generation of fugitive dust during cap construction. Please see Response to Comment No. 2. for required dust suppression activities.

23. **Comment 9:**

This area is close to the Inglewood-Newport earthquake fault which creates public safety concerns related to soil liquefaction. What is the depth to groundwater? Is it affected by annual rainfall amounts? Will the pounding of thousands of pilings and other vibrations at the site increase the danger of soil liquefaction? Would the soil liquefaction speed contaminants into the deep ground drinking water?

Response:

The elevation of groundwater contained in the Bellflower Aquitard is affected by annual rainfall. The static groundwater elevations for the Bellflower Aquitard at the Site were measured at -21.51 to -29.05 feet Mean Sea Level (MSL) (approximately 36 to 53 feet below ground surface) during 1990/1991 groundwater sampling events. In May of 1995, static groundwater elevations for the Bellflower Aquitard were measured at -14.83 to -22.59 feet MSL.

As stated in Response to Comment No. 20, the draft RAP does not propose forcing heavy piles into the waste zones. Please refer to Response to Comment No. 11, regarding liquefaction.

24. **Comment 10:**

I assume that contaminated liquids will be pumped from the ground. Will a sufficient degree of groundwater extraction be achieved by proposed pumping plans?

Response:

An Aquifer Test Workplan has been submitted to DTSC to determine the pumping rate for the groundwater collection system. The objectives of the aquifer test are: 1) determine effective pumping rates for the extraction wells, 2) determine the magnitude of capture zone as a result of pumping, and 3) obtain site-specific aquifer property data to aid in design of the groundwater collection and treatment system with respect to the number and spacing of wells. The results of the aquifer test will be incorporated into the final remedial design for this Site.

25. **Comment 11:**

There have been discussions about cleaning the top of the site but not the lower part, including that affecting the deeper aquifers. Why would DTSC allow such a two tier approach? Is this a standard approach? Has it been used on other large contaminated sites? Should not both levels of the site be cleaned before the surface is developed? Since liquid contaminants tend to go downward pulled by gravity, is it not of great importance to cleanup the deep contaminants as quickly as possible? Should not there be a plan to cleanup both levels before construction is allowed?

(a) At how many other sites in California in the last 10 years has DTSC employed this vertically defined operable units, i.e., cleanup the top but not cleanup the bottom? If this has been done in other locations, what unusual issues arose?

(b) Has the Regional Water Quality Control Board agreed to such a two tier approach, i.e., cleanup the top but not cleanup the bottom? Would you expect the RWQCB to consider such an approach to be appropriate and reasonable at this large site.

Response:

Please refer to Response to Comments No. 5, 7, and 9.

26. **Comment 12:**

If a two tier cleanup plan is approved, will the DTSC require that a specific party be required to finance the cleanup of the lower level? How and when will that be determined? How can DTSC be confident that work should proceed on the top tier without a full plan for cleaning up the lower tier of the site?

Response:

Please refer to Response to Comments No. 6, 5, and 10.

27. **Comment 13:**

The fact sheet indicates that the BKK Corporation will take responsibility to complete the remediation of the upper unit. Who will be responsible to cleanup the lower level? If BKK Corporation cleans the Upper OU, will BKK be excused for any responsibility for the Lower OU.

Response:

DTSC has entered into an agreement with the BKK Corporation to conduct the Remedial Investigation, Feasibility Study and prepare a draft RAP. BKK has been identified by DTSC as a PRP; therefore, they are liable, along with the other PRPs, for the investigation and remediation, if necessary, for the Lower OU.

28. **Comment 14:**

The fact sheet cites 12 PRPs including BKK. Who are these other and what is DTSC doing to encourage them to meet their obligations to clean the Site?

Response:

The other PRPs named in the 1987/1988 Remedial Action Order are: Signal Oil Company (C.K.A. Allied-Signal, Inc.), Shell Oil Company, Union Oil Company, Standard Oil of California (C.K.A. Chevron Corporation), Buttram Oil Company (C.K.A Buttram Energies, Inc.), Atlantic Richfield Company (ARCO), Continental Oil Company (C.K.A. CONOCO, Inc), Mobil Oil Corporation, Long Beach Oil Development Company, Del Amo Gardens, Inc., The Deutsch Company, Chancellor and Ogden, and World Industrial Center, Ltd.

As stated in Response to Comment No. 6 and 8, DTSC has identified a number of other Potentially Responsible Parties (PRPs) for the remediation of the entire Site. These PRPs have been notified that they have been so identified in the Preliminary Non-Binding Allocation of Responsibility Section of the draft RAP.

29. **Comment 15:**

The fact sheet states that additional field work was conducted in May 1995, to complete the remedial investigation of the upper cperable unit. Has the field work been complete? What was done? What results are now available to the public? Was all or part of the work done by consultants paid by parties with a financial incentive to have the project go forward?

Response:

Yes, the field work has been completed. The filed work conducted in May 1995, consisted of obtaining additional groundwater samples and information on Site soils. The data obtained from the field work is contained in the RI Report prepared by Brown & Root Environmental.

The RI Report along with the FS and draft RAP are available for public review in Carson Regional Library, located on Carson Street in the City of Carson and at DTSC's Long Beach office.

The field work was conducted by Brown & Root Environmental under DTSC's oversight. Brown & Root Environmental was contracted by the BKK Corporation.

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (818) 458-5100

HARRY W. STONE, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O.BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

September 21, 1995

IN REPLY PLEASE REFER TO FILE. WM-2

Mr. Thomas Cota
Department of Toxic Substances Control
245 West Broadway
Long Beach, CA 90802-4444

Dear Mr. Cota:

NEGATIVE DECLARATION FOR CAL COMPACT LANDFILL UPPER OPERABLE UNIT, CITY OF CARSON

Thank you for the opportunity to provide comments on the environmental document for the above-named project. We have reviewed the Negative Declaration in reference to Waste Management Division's areas of responsibility and offer the following comments:

C-1 The Los Angeles County Uniform Building Code, Section 308(c), requires that a building or structure located on or within 1,000 feet of a landfill containing decomposable material, must include the installation of a landfill gas migration protection system and/or control system. This office must be contacted for issuance of necessary permits.

C-2 The project site also contains active, abandoned or idle oil or gas wells. The Los Angeles County Building Code, Section 308(d) requires that buildings and/or enclosed structures located within 200 feet from oil or gas wells be provided with methane gas protection systems. This office must be contacted for issuance of necessary permits.

If you have any questions regarding this matter, please contact the undersigned at (818) 458-3561, Monday through Thursday, 7:00 a.m. to 5:30 p.m.

Very truly yours,

HARRY W. STONE
Director of Public Works

DAVID M. SMITH
Supervising Civil Engineer III
Waste Management Division

JR:al
JANET1\COMP.1

Enc.

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 1
To THOMAS N. COTA	From JANET RAYNER
Co.	Co. DPW
Dept.	Phone (818) 458-3564
Fax (310) 590-4932	Fax (818) 458-3593

Response to comment received from County of Los Angeles, Department of Public Works on the Cal Compact Landfill Project.

Comment 1:

The Los Angeles County Uniform Code, Section 308(c), requires that a building or structure located on or within 1,000 feet of a landfill containing decomposable material, must include the installation of a landfill gas migration protection system and/or control system. This office must be contacted for issuance of necessary permits.

Response:

Comment noted and accepted.

Comment 2:

The project site also contains active, abandoned or idle soil or gas wells. The Los Angeles County Building Code, Section 308(d) requires that buildings and/or enclosed structures located within 200 feet from oil or gas wells be provided with methane gas protection systems. This office must be contacted for issuance of necessary permits.

Response:

Comment noted and accepted.

Martin J. McHale
21111 Dolores Sp #158
Carson, CA 90745

September 22, 1995

Mr. Thomas M. Cota
Hazardous Materials Specialist
California Environmental Protection Agency
Department of Toxic Substances Control
Site Mitigation Branch
245 W. Broadway, Suite 425
Long Beach CA 90802-4444

RE: CAL-Compact Landfill (Metro 2000)

The situation in California demands that steps be taken today to ensure the adequate supply of potable water for our children and grandchildren. The number of contaminated aquifers today in California is staggering. Now, the Department of Toxic Substance Control (D.T.S.C.) wants to endanger another aquifer, the Silverado.

D-1 The D.T.S.C. plan to cap the millions of gallons of hazardous waste now on the site is badly flawed. Your statement on Tuesday night, September 19, 1995, that "all the contaminated water will be treated" is impossible to accomplish. The 3,000 piles driven below the fill and the protective membrane will perform as a straw, siphoning the now contaminated water into the Silverado aquifer.

D-2 The decision to remediate only the upper half of the site was made at a private conference by B.K.K., the potential responsible party, (P.R.P.), D.T.S.C., and Carson Realty Project, Inc. (C.R.P.), without any consideration or participation by citizens living in the community.

D-3 The claim of D.T.S.C. and others that the hazardous waste can not be moved because of the lack of facilities that will accept it is not true. Kettleman Hills in California is accepting hazardous waste presently. The cost of extricating and moving hazardous waste is costly. The old adage "Pay me now, Pay me later" is still true.

D-4 The D.T.S.C. statement that they do not have the resources at this time to ensure all the P.R.P.'s fulfill their responsibilities for the clean-up may be true. However, the federal environmental laws are also applicable, including the awarding of treble damages to P.R.P.'s who do not fulfill their obligations to clean up the hazardous waste they converted.

Californians want More Environmental Protection, not less. The decision to remediate only the top half of the Metro 2000 site, at this time, is haphazard and could have many unintended consequences.

Sincerely, Martin J. McHale

Martin J. McHale

cc: City of Carson City Council
Juanita McDonald, 55th District Assemblywoman

Response to comments received from Mr. Martin McHale on the Cal Compact Landfill Remedial Action Plan

Response to comment No. 1:

The proposed remedy for the groundwater contained in the Bellflower Aquitard is to install extraction wells along the down-gradient side (western and southern Site boundaries) of the landfill. This remedy should capture and prevent the further off-site migration of groundwater containing hazardous substances. The extracted groundwater will be treated to regulatory standards prior to being discharged.

As for the 3,000 piles mentioned, the draft RAP addresses the remedy for the remediation of the Upper Operable Unit (OU). The draft RAP does not contain, nor should contain, proposed future development designs. DTSC is aware of the proposed development of the Site, to the extent that any given construction activity, associated with any development of the Site, has the potential to cause further releases of hazardous substances, DTSC reserves the right to review and comment upon such non-remediation activities and, where necessary, enjoin such activities.

At this time it is premature to state that the proposed pilings will perform as a "straw", siphoning contaminated water into the Silverado. The exact depths of the pilings have to be determined. Furthermore, the depths of the pilings are not expected to penetrate the Gage Aquifer, the aquifer directly below the Upper OU.

Response to Comment 2:

DTSC held two public meetings, on June 15, and September 6, 1995, to discuss the remedial process at the Cal Compact Landfill. The meetings were part of the Public Participation Plan prepared for this Site to provide opportunities for public involvement in the remediation process. During both meetings the phased approach was addressed. Title 40 Code of Federal Regulations § 300.430(a)(ii)(A) states that "Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." The remedy selected for the Upper OU will reduce significantly the potential migration of any hazardous substances found in the Upper OU.

DTSC's Official Policy Document No. SM #92-1, dated July 1, 1992, Section II(h) defines an "Operable Unit" as "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure." It goes on to state that "The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems associated with the site... By dividing the site into separate operable units, emphasis is placed on addressing critical public health and environmental problems first." To our knowledge the waste zone is located above and within a well-characterized geological formation, the Bellflower Aquitard, which in our view represents the principal source of potential contamination to deeper off-site groundwater sources. DTSC believes that the proposed remedy will immediately control and mitigate off-site migration and would thus provide DTSC a meaningful first step without compromising our ability to continue investigating the Lower OU. Furthermore, the proposed remedy will be consistent with the final remedy for the Lower OU.

To delay implementation of this proposed remedy, in order to first investigate the potential contamination in the Lower OU, would needlessly forestall a remedy which is appropriate for the Upper OU and which will also minimize further migration of hazardous substances from the Upper OU to the Lower OU. The absence of the remedy for the Upper OU, or delay in its implementation, could only serve to increase future contamination of the Lower OU.

RESPONSE TO COMMENT 3:

To our knowledge no DTSC representative has claimed that "hazardous waste cannot be moved because of lack of facilities that will accept it". Excavation with off-site disposal was evaluated in the Feasibility Study (Section 5.1.4.2). There are several reasons why excavation and off-site disposal was not proposed as the final remedy. They include: a) increase in health risk, b) difficult to implement, and c) high cost.

Scenario III in the Baseline Health Risk Assessment addressed a 2-year construction and excavation scenario. The effects of excavation activities on adults working on the landfill and adults and children living in the neighboring residential areas were evaluated. The conclusion of the risk assessment was that inhalation of organic vapors would contribute to increase in risk. Cumulative cancer risks for the construction workers are 9.05×10^{-5} (Upper Confidence Level (UCL) Based); for off-site residents 3.56×10^{-4} (UCL-Based). This translates for the construction worker in an estimated lifetime cancer risk to not more than 9 cancers in an exposed population of 100,000 individuals; and for the off-site resident an estimated lifetime cancer risk of not more than 3.5 cancers in an exposed population of 10,000 individuals.

Response to Comment 4:

The comment that "The DTSC statement that they do not have the resources at this time to ensure all the PRPs fulfill their responsibility for the cleanup" is mis-quoted. What was stated was that DTSC does not have the resources to conduct the remedial activities proposed for the Cal Compact Landfill.

South Coast
AIR QUALITY MANAGEMENT DISTRICT
21865 E. Copley Drive, Diamond Bar, CA 91765-4182 (909) 396-2000

September 22, 1995

Mr. Thomas Cota, Project Manager
Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, CA 90802-4444

Dear Mr. Cota:

Thank you for the opportunity to review the Draft Remedial Action Plan (DRAP) and Supplemental Negative Declaration for the Cal Compact Landfill in Carson. Our staff has limited its review to the Executive Summary, Air Investigation Results (pp. 4-11 to 4-13), and the Remedial Action (pp. 7-1 to 7-20) sections of the DRAP dated August 8, 1995 and the Supplemental Negative Declaration dated August 24, 1995.

Based on this review, our staff has the following comments:

E-1

1. It is staff's understanding that a gas collection system for the interior portion of the landfill (under the proposed Metro Mall Project) will be installed and that a perimeter gas collection system will be installed if required. A distinction should be made in the documents between the "interior" gas collection system and the "perimeter" gas collection system to reduce confusion.

E-2

2. As landfill gas travels along wells and headers, condensate is typically generated. There is no mention of landfill gas condensate generation nor how this condensate will be collected, stored and/or treated. Of course, condensate collection, storage and/or treatment systems will require permits from the SCAQMD.

E-3

3. On page 7-15, the following statement is incorrect:

   "A SCAQMD permit may be required for excavation if wastes which may contain elevated concentrations of VOC's are disturbed."

   SCAQMD's Rule 1150, which regulates excavations at landfills, defines an excavation as "any activity which exposes buried wastes to the atmosphere." Earthmoving activities, such as grading, which may expose buried landfill material to the atmosphere, will require a Rule 1150 Excavation Management Plan.

E-4

4. Due to the size of this site and the amount of soil to be moved for the construction of the landfill cover, a Rule 403 Fugitive Dust Plan may be required, which may include PM10 upwind and downwind monitoring.

E-5

5. Page 7-17 describes the monitoring for PM10, Lead and Chromium during construction of the landfill cap. If buried wastes are not expected to be disturbed during remediation (page 7-15), why is it necessary to sample for

E-5 Lead and Chromium? Since heavy metals were disposed of at this site (page 2-3), has contamination spread? If earthmoving activities include disturbance of contaminated soils, a Rule 1150 Excavation Management Plan may be required which will specify upwind and downwind monitoring of dust and heavy metals and well as organic gases.

E-6 6. The landfill gas survey work plan mentioned in Secion 7.2.1.2 will be reviewed by our staff as a separate document.

Again, thank you for this opportunity to review the above mentioned documents. Our staff looks forward to working with you on this project. If you have any further questions, please call Ms. Linda Dejbakhsh at (909) 396-2614.

Very truly yours,

William C. Thompson

William C. Thompson, P.E.
Senior Manager
Public Facilities Branch
Stationay Source Compliance

LLD/landfill/calcomp/revdrap

cc: Fred Braganza, SCAQMD

Response to Comments received from SCAQMD on the Draft Remedial Action Plan for the Cal Compact Landfill.

Response to comment 1:

The RAP will be modified to provide a distinction between the "interior" gas collection system that is part of the proposed development and the "perimeter" gas collection system that is part of the remedial action.

Response to comment 2:

The final design of the landfill gas collection system has not been developed. The next stage of the remedial process is the remedial design/remedial action (RD/RA) stage. During the RD/RA stage final designs will be developed and approved. However, DTSC will inform the contractors of the possibility that a condensate collection, storage and/or treatment systems may be needed and these units would require SCAQMD permits.

Response to comment 3:

DTSC concurs with the comment regarding the need for obtaining a permit from SCAQMD should activities, such as grading, expose buried landfill material to the atmosphere. The RAP will be revised to read "should activities, such as grading or excavation, expose buried landfill material to the atmosphere, as defined by SCAQMD Rule 1150, an Excavation Management Plan will be submitted to SCAQMD. All required permits and approval shall be obtained prior to any landfill excavation activities."

Response to comment 4:

DTSC concurs with the comment that a Fugitive Dust Plan may be required in accordance with SCAQMD Rule 403. The draft RAP, section 7.4.1, page 7-17, contains specific monitoring activities to be conducted during field activities. The RAP will be revised to indicate that a Fugitive Dust Plan should be submitted to SCAQMD in accordance with Rule 403.

Response to comment 5:

As stated in the draft RAP section 7.4.1, page 17, to ensure proper protection of human health dust particulate samples will be collected and analyzed. These samples will be analyzed for lead and chromium because lead was detected in low concentration in the soil cover. And based on the Baseline Risk Assessment only chromium exhibits a potential inhalation cancer risk of 6.0×10^{-6}, 3.3×10^{-6}, and 1.3×10^{-6} for off-site resident child, on-site worker, and off-site resident adult, respectively.

Please refer to Response to Comment No. 3 in regards to Rule 1150 requirements.

Response to comment 6:

Comment noted and accepted.

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September 22, 1995

VIA FACSIMILE AND U.S. MAIL

Daniel P. Weingarten, Esq.
Staff Counsel
Department of Toxic Substances Control
245 W. Broadway, Suite 350
Long Beach, California 90802

The Nonbinding Allocation of Responsibility
in the Draft RAP for the Cal Compact Landfill

Dear Mr. Weingarten:

F-1

I am writing on behalf of BKK Corporation ("BKK") to provide comments on the Nonbinding Allocation of Responsibility ("NBAR") set forth in the draft remedial action plan (the "RAP") for the Cal Compact Landfill site (the "Site"). Under the heading "Transporters," the NBAR allocates 5.0% of the responsibility for the Site to "BKK Corporation (Chancellor & Ogden)." No other transporter is identified in the NBAR or allocated any responsibility. BKK objects to this allocation for the following reasons.

First, no evidence presented in the RAP or the NBAR indicates that Chancellor & Ogden ("C&O") ever arranged for the disposal of any hazardous substances at the Site by selecting the Site. "A transporter must select the disposal facility to be held liable under [CERCLA] § 107(a)(4)."[1/] Tippins Inc. v. USX Corp., 37 F. 3d 87, 94 (3rd Cir. 1994). The decision chiefly relied upon by the Tippins court, U.S. v. Western Processing Co., Inc., 756 F. Supp. 1416 (W.D. Wash. 1991), reached the same conclusion both on the basis of strict statutory construction and on the grounds of equity, explaining the latter grounds as follows:

1/ The Carpenter-Presley-Tanner Hazardous Substance Account Act ("HSAA"), California Health & Safety Code ("H&SC") §§ 25300 et seq., adopts the same standard. See H&SC § 25323.5.

> To restrict transporter liability to those situations where transporters have selected the site for delivery of hazardous waste is equitable. . . . [T]ransporters have a limited role in the activity surrounding hazardous substances. They neither create nor treat the material, but are responsible for its safe carriage between the point where it is generated and where it is left for disposal or treatment. If the transporter does not select the delivery site, the transporter's connection with the material is the most attenuated among potentially responsible parties. If the transporter does select the delivery site, the transporter's role becomes a less passive one. As one who actively selected a disposal site, the transporter may more equitably be subject to liability.

F-1

Id. at 1420; accord ; Alcatel Information Systems, Inc. v. State of Arizona, 778 F. Supp. 1092, 1095-96 (D. Ariz. 1991). Again, the RAP and the NBAR contain no evidence indicating any support for a finding that C&O ever "actively selected" the Site for the disposal of hazardous substances. In the absence of any such evidence, the law clearly provides that C&O bears no liability under either CERCLA or the HSAA, and therefore should not be included in the NBAR.

Second, the NBAR provides no explanation for why C&O is singled-out for inclusion in the NBAR. Surely, the Department has identified other transporters during its investigation of the Site. Why is C&O alone named in the NBAR? Not only is this clearly unfair, it casts doubt upon the process by which the Department allocated responsibility amongst transporters at the Site. Moreover, the NBAR provides no explanation for C&O's allocation of 5.0%.

F-2

Finally, the naming of C&O in the NBAR and the allocation to it, will have a serious detrimental impact upon BKK. Companies ought not to be named lightly in an NBAR, as such an identification can have a major impact upon the financial viability of a company. As discussed in greater detail above, there does not appear to be an adequate basis for naming C&O in the NBAR; and such an identification will cause C&O undue harm. Therefore, BKK respectfully requests that the Department remove C&O from the NBAR included in the final RAP.

We are looking forward to reviewing the Department's response to these comments. Please call me if you have any questions concerning the foregoing.

Very truly yours,

Peter H. Weiner

Peter H. Weiner

cc: Ronald R. Gastelum, Esq.
Paul Neff

Response to comments received from Heller, Ehrman, White &
!c ˙iffe regarding the Cal Compact Landfill draft Remedial
ıc. ɔn Plan.

:esponse to Comment 1:

The Department of Toxic Substances Control (DTSC) believes .hat there is substantial evidence in the administrative record :or DTSC to conclude that Chancellor & Ogden is liable under :ERCLA as a "transporter". It is reasonable to conclude that a arty which transported numerous wastes and conducted numerous ransactions played a role in selecting Cal Compact Landfill as he ultimate disposal site for these materials.

esponse to Comment 2:

The NBAR's purpose is to facilitate an allocation process mong PRPs. Your comment seeks information from DTSC which is xempt from disclosure to the public under California law, pecifically, attorney-client privilege materials as well as the xemption for agency deliberative processes found in the Public ecords Act and decisional law. Finally, that the naming of a arty in an NBAR may cause harm to that party is an insufficient asis to exclude the party from the NBAR.

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September 25, 1995

BY HAND

Mr. Thomas Cota
Project Manager
Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, California 90802-4444

Re: Comments on Draft Remedial Action Plan Regarding Former Cal Compact Landfill in Carson

Dear Mr. Cota:

The purpose of this letter and its attachment is to report to the Department of Toxic Substances Control ("DTSC") concerns regarding environmental issues related to the investigation and remediation of the former Cal Compact Landfill, located at 20300 South Main Street in Carson, California (the "Landfill"). This letter and its attachment are submitted in response to the draft Remedial Action Plan ("RAP") issued on August 25, 1995, and are submitted pursuant to California's Hazardous Substances Account Act, including Health and Safety Code Sections 25356.1 and 25358.7(c). In accordance with Section 25356.1(e), it is requested that DTSC review and consider these comments, and, in accordance with Section 25358.7(c), it is respectfully requested that DTSC respond to and incorporate the comments and responses in the RAP.

Various environmental reports regarding the Landfill have been prepared and submitted to DTSC. These reports include, among others, Remedial Investigation dated July 1995 (the "RI"), Final Report Baseline Risk Assessment, dated August 1995 (the "HRA"), Feasibility Study, dated August 1995 (the "FS"), and draft RAP dated August 1995 (collectively, the "Reports"). As is explained herein, the Reports are inadequate for responsible decision making as to how to remediate the Landfill. The draft RAP is defective in numerous significant respects and, therefore, should not be approved under Section 25356.1(f).

The investigative, remedial, and development activities at the Landfill, including those completed to date and those that will be undertaken in the future, are functionally interrelated and dependent on one another. Landfill redevelopment without resolution of environmental issues related to site characterization and remediation, many of which are not adequately addressed in the Reports, will likely have grave consequences for the City of Carson and is contrary to good health and safety practices and, therefore, public policy. Moreover, the proposed remediation strategy ignores the presence and possible migration of leachate within the Landfill, ignores soil conditions that may have a long term adverse affect on groundwater, and completely neglects the regional groundwater resources (including drinking water) that ultimately require protection. Essentially, what the draft RAP proposes is containment rather than remediation.

An Environmental Impact Report ("EIR") for this proposed development was previously approved. The EIR assumed that environmental issues related to hazardous substances at the Landfill would be addressed by a RAP. To the extent, therefore, that the draft RAP is deficient, the EIR becomes deficient.

The major concerns with the Reports may be summarized as follows (details of each point are discussed in the attachment):

1. The Contents of the Landfill Have Not Been Adequately Investigated.

- Threshold issue of whether the proposed phased approach is appropriate has been ignored. Significantly, there is no plan in place (and no financial commitments) for investigation or remediation of drinking water underlying the Landfill.

- Investigation that was conducted is woefully inadequate: there are too few borings overall and insufficient borings in the interior of the Landfill. The limited investigation conducted to date does not form the basis for a rational RAP that could pass the substantial evidence test.

2. The Proposed Remediation Plan Is Incomplete.

- Without explanation, the Feasibility Study was allowed to proceed without the benefit of a complete and approved Remedial Investigation.

- The Feasibility Study and draft Remedial Action Plan are grossly generic, with insufficient details. They "conceptually" discuss remediation but fail to give firm plans with *details*. Essentially, what is proposed is *containment* rather than *remediation*. In addition, the end use and associated engineering lack definition. Issues such as possible subsidence, existing contamination pathways, and contamination pathways that might be created or expanded have either not been discussed or have not adequately been discussed.

- The Health Risk Assessment is hopelessly flawed; among other things, its conclusions are based on references to outdated documents.

- The draft Remedial Action Plan is incomplete; significant issues are not discussed and have apparently not been considered, such as the effect the construction of the shopping center will have on the cap.

3. The Draft RAP Does Not Resolve Issues That DTSC Itself Previously Raised In Connection With The Landfill.

- DTSC's prior concerns, such as proper abandonment of the two oil wells and one drinking water well on site and investigation of the underlying drinking water, are not addressed and therefore not resolved by the draft RAP. Has DTSC abandoned these concerns or simply overlooked them?

4. The Draft RAP Does Not Contain Any Indication That There Are Proper Financial Assurances Regarding The Proposed Remediation.

- The Draft RAP leaves "blank" the section for Financial Responsibility (Section 2.4), and states "[t]o be provided by DTSC." A significant aspect of the draft RAP is groundwater and gas monitoring and cap maintenance for 30 years. Yet, the owner of the Landfill is in bankruptcy and the apparent possible future owner has made no demonstration of financial ability. It appears that the financial viability of any future owner is tied to the success of a shopping center development effort still in its preliminary stages. There is no provision in the draft RAP for the contingency of lack of funds and what effect this would have on the ongoing monitoring, operation, and maintenance.

5. The Proposed Redevelopment Plan Creates Significant Environmental Concerns that Have Not Been Addressed.

- No consideration in draft RAP of what effect the driving of piles and other aspects of shopping center construction will have on environmental issues on the Landfill. Indeed, there do not even appear to be in place final development plans from which an analysis of these issues reasonably could be made. Among other things, construction may create conduits for downward migration of contaminants into the drinking water and subsidence, especially where groundwater will be extracted.

- No consideration in draft RAP of various issues related to ongoing maintenance (30 years) of the Landfill cap.

- No consideration in draft RAP of what effect the Landfill cap and gas collection systems will have on possible subsidence or on the subsequent investigation/remediation of the Lower Operable Unit.

The report attached hereto provides a detailed analysis of each of the above points. Additionally, since we respectfully request complete responses from the DTSC as to each of the points raised in the attached report, for your convenience, attached as Exhibit A to the report is a copy of the enclosed report with bracketed numbers next to each point for which we request a response.

We appreciate your courtesy and cooperation in connection with this matter.

Very truly yours,

Dana A. Suntag

DAS:bhs

DETAILED ANALYSIS
FORMER CAL COMPACT LANDFILL
ENVIRONMENTAL ISSUES OF CONCERN TO CITY OF CARSON

The former Cal Compact Landfill (the "Landfill") consists of 157 acres, and was used as a Class II landfill from approximately April 1959 until December 1964. During that period, approximately 6.2 million cubic yards of solid waste and 540,000 cubic yards of liquid waste were placed in the landfill. Of the 540,000 cubic yards of liquid waste, the Department of Toxics Substances Control ("DTSC") estimates that 300,000 cubic yards would today be classified as hazardous. (Remedial Investigation report, § 1.2.1 (hereafter, the "RI")). The liquid waste consists of various hazardous substances, such as chlorinated solvents, waste oils, and oil exploration drilling mud. With the exception of recent interim uses, the Landfill has been vacant since 1965.

On May 25, 1995, BKK Corporation and the DTSC signed Remedial Action Order and Consent Order, Docket No. HSA 94/95-035, which outlines the proposed remediation and financial arrangements for the Upper Operable Unit ("UOU") of the Landfill. The UOU is defined as that area between the ground surface and the base of the Bellflower Aquitard, approximately 85 feet below the ground surface. Similarly, the draft Remedial Action Plan ("RAP") and other Reports (RI, Feasibility Study ("FS"), and Health Risk Assessment ("HRA")) address only the investigation and remediation of the UOU, and they fail to address any arrangements for investigation or remediation of the Lower Operable Unit ("LOU").

A developer has expressed a desire to develop the Landfill as an outlet shopping center.

In connection with the remedial process, various environmental reports have been submitted to the DTSC. (See Appendix). These reports take the position that the Landfill has been adequately characterized and that the remedial measures proposed will be appropriately protective of human health and the environment. Documents in the DTSC files indicate that the agency frequently has criticized the earlier reports (Nos. 1 through 7 in the Appendix), citing a range of technical errors and unsupported or improper conclusions. (See DTSC Memorandum, March 24, 1993, from Office of Scientific Affairs to Omoruyi Patrick). Contrary to standard DTSC procedure and CERCLA (see, e.g., 40 C.F.R. §§ 300.430 and 300.435 (incorporated by reference in Health and Safety Code § 25356.1(c))), the Draft RAP fails to indicate whether the DTSC has approved the RI, FS, or HRA.

The draft RAP and the Reports upon which it is based are inadequate and deficient in a number of significant respects such that the draft RAP should not be approved. A detailed explanation of the major concerns with the draft RAP and other Reports is as follows:

1. The Contents of the Landfill Have Not Been Adequately Investigated.

This issue is perhaps the most significant problem with the draft RAP, and it comprises several different concerns. First, the DTSC has made the decision to operate under a "phased approach": the DTSC has apparently approved the concept of remediating the UOU without remediating -- or even investigating -- the LOU. Thus, the remediation plan proposed in the draft RAP is, by definition, incomplete, because, by failing to address the LOU, it fails to propose a comprehensive remediation of the Landfill. This planned course of action will have farreaching consequences. Most significant is the fact that the LOU contains drinking water. Further, remediation of the UOU, as well as construction of the shopping center, may have a significant impact on the LOU, including among other things the creation of conduits for contaminants between the two operable units and making it more difficult to investigate the LOU at a later date. *None of these issues -- not even the issue of whether a phased approach is appropriate -- are even addressed in the draft RAP.*

G-1

Before the draft RAP can be approved, the threshold issue of whether to use a "phased approach" must be fully and properly analyzed.[1] After this analysis has been completed, appropriate reports must be submitted to the DTSC and the public, and there must be public hearings in accordance with the Hazardous Substances Account Act, regarding the appropriateness of the phased approach. Only if this procedure is followed can a RAP be approved in accordance with law.

Second, despite the sheer size of the Landfill -- 157 acres -- there has been precious little testing: only 15 soil borings, 17 groundwater monitoring wells, and 54 cone penetrometer test ("CPT") borings. This is significantly below the average number of borings completed at other State Superfund sites of similar size and complexity.[2] Thus, the testing to date is patently insufficient to fully and properly characterize this complicated site. Moreover, by virtue of this limited testing, there cannot be a finding that the draft RAP is based on substantial evidence and, therefore, the draft RAP cannot be approved. See Health and Safety Code § 25356.1(f). This is especially true because, as the Reports concede, there are *no records* of what wastes were deposited in the landfill for a period of 27 months out of the approximately 70 months the landfill was open (39 percent of the operational time of the landfill). (RI, § 1.2.1). It is crucial to a proper remediation of the Landfill that the Landfill

G-2

G-1

[1] A phased approach is also not appropriate for this Site under the standards set forth in 40 C.F.R. § 300.430(a)(ii), which is incorporated by reference in Health and Safety Code Section 25356.1(c).

G-2

[2] The degree of borings and wells at the Landfill each averages about .1 per acre. Comparisons with other DTSC sites are illuminating: at the McColl site in Fullerton there were 11 borings and 1 well per acre; at the BKK site in West Covina there were 2 borings and 1 well per acre; and at the Marine Corps Air Station at El Toro there were 5 borings and 1 well per acre.

G-2 first be adequately investigated and characterized. Otherwise, any remediation plan is, by definition, incomplete.

Third, there are significant inadequacies with the sampling that did occur. Of the 15 soil borings (*less than one boring per 10 acres*), 9 soil borings did not fully penetrate the landfill waste due either to drill rig refusal and/or the presence of explosive concentrations of methane gas. With respect to the CPT borings, they were conducted only either along the perimeter or on internal haul roads of the Landfill. The same is true of the groundwater monitoring wells: none of the groundwater monitoring wells were in the interior of the Landfill. Further, none of the groundwater monitoring wells were installed in the underlying Gage, Lynwood, and Silverado Aquifers -- the aquifers that are used for domestic water sources. (RI. § 1.6). Indeed, the Dominguez Water Company pumps water from these aquifers. (RI, § 1.6). Thus, because of the extremely limited nature of the testing, there does not exist the substantial evidence required to support approval of a draft RAP. Health and Safety Code § 25356.1(f). The Reports do not cite other successful landfill remediation plans where limited testing of this nature was successfully used.

G-3

Thus, the sampling that has been conducted to date is plainly insufficient to properly characterize the Landfill or to support a proper RAP. This is a significant problem, and it would be imprudent to begin an expensive remediation plan (and construction of a shopping center) without first properly characterizing the Landfill. Indeed, because of the limited site investigation, the following crucial analytical data is lacking:

- There is inadequate information regarding the nature of the wastes in the landfill cells;
- There is inadequate information regarding the nature and vertical and lateral extent of soil contamination;
- There is inadequate information regarding the nature and vertical and lateral extent of groundwater contamination;
- There is inadequate information regarding the presence and characteristics of leachate in the landfill and its possible release into the underlying soils and groundwater; and
- There is inadequate information regarding the distribution and migration routes for explosive landfill gases.

G-4 Significantly, the RI states that groundwater is in contact with landfill waste in the western portion of the Landfill. (RI, § 2.3.2). This is evidenced by the fact that the highest contaminant concentrations (50,000 micrograms per kilogram total volatile organic compounds) were identified in CPT samples SHP-22 and SHP-23 and groundwater monitoring well GW-7, which are located on the western boundary of the property. (RI,

§ 3.1.4). Further, the RI also states that there is a downward vertical gradient at the Landfill (RI, § 2.3.2), so groundwater contaminants would be expected to migrate downward, ·ibly into the underlying drinking water aquifers.

In the absence of a comprehensive characterization of the contaminant conditions at the Landfill, including migration pathways, the feasibility of the proposed remediation cannot be properly evaluated and the draft RAP is inadequate.

2. <u>The Proposed Remediation Plan is Incomplete</u>.

First, as indicated above, without a complete and proper characterization of the Landfill, no proper remediation plan can be proposed.

Second, here, the DTSC allowed the FS to proceed to evaluate remedial alternatives without having the RI completed for the Landfill. This is not only inconsistent with standard DTSC policy, but it is imprudent because work on an FS should begin only after a thorough investigation of the site has been completed, from which an appropriate body of data has been developed. Nonetheless, here, the DTSC files indicate that the FS was allowed to begin in the absence of an approved RI with the understanding that deficiencies in the RI would be addressed during the execution of the FS. (<u>See</u> DTSC Memorandum, November 18, 1993, from Margie Youngs to Gloria Conti). *Therefore, it follows that to the degree that the RI is deficient and flawed, the FS is deficient and flawed.*

Further, the FS and draft RAP are very general in nature and fail to contain si; ;ant details. Proposed "concepts" are discussed, but the documents fail to include specifics for crucial aspects of the proposed remediation such as the cap or the groundwater ınd landfill gas collection and treatment systems. For instance, the draft RAP concedes that ıo specific program has been developed for the groundwater and landfill gas monitoring ystems, and that the specific number and locations of the groundwater wells has not even een determined. (Draft RAP, §§ 7.2.5.1 and 7.2.5.2). The same is true for monitoring of ıe air during the remediation: the draft RAP states that "details" will be provided at a later ate. (Draft RAP, § 7.4.1). There are similar inadequacies in the draft RAP with respect to ·affic and noise concerns. (Draft RAP, §§ 7.4.3 and 7.4.5). Without more detailed plans :garding the proposed remediation, the effectiveness of the remediation -- and therefore the :aft RAP -- cannot be properly evaluated.

The Health Risk Assessment ("HRA") is also flawed, including references to ıtdated regulatory guidelines that may significantly effect the risk calculations and the ıdings. Among others are the following errors:

- The report refers to a 1990 guidance despite DTSC's release, in 1992, of its *Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities*. Also, the analysis failed to use cancer slope factors from the updated 1994 guidance and used instead the 1992 guidance.

- The executive summary states that the existing risks for the hypothetical scenarios are well within the risk calculated for average background concentrations of selected air pollutants common in the Los Angeles area. This is a major departure from the risk standards DTSC has established. DTSC usually looks at cancer risks of one in one million as being a subject of concern, while the risk from background air pollutants can be as high as one in one thousand. Therefore, the comparison used is irrelevant and misleading.

6-7

- The HRA does not explain how the vapor well data was used.

- Air monitoring was conducted at only one time during the year. This obviously would not give a representative concentration of what would be in the air for the entire year. Moreover, it is not explained how this data is used in the HRA.

- Threshold Limit Values ("TLVs") were used to derive some of the noncancer reference exposure levels. TLVs should not be used for a residential scenario because their original purpose was to protect a worker.

- The second scenario in the HRA (under which the Landfill would be put to long term commercial use, similar to the proposed shopping center) failed to account for vapors that may migrate into a building and therefore affect indoor shoppers. Moreover, this scenario assumes that there will be no disruption of the soil. This is not a reasonable assumption because there will be paving, hauling, heavy equipment traffic (with attendant settling of soil), landscaping, etc. *Therefore, there is no proper risk estimate for the planned land use.*

6-8

The draft RAP is also seriously lacking in details regarding the numerous geotechnical issues associated with the cap and the design of the methane gas collection and groundwater pump-and-treat systems. For instance, how will the cap respond to an earthquake, along with possible liquefaction? The area is prone to flooding; how will the cap respond to flooding? What is the likelihood of subsidence and differential settling and what are the likely consequences? There are no contingency plans to cover these issues. How will construction on the Landfill affect the cap? What about the heavy truck and equipment traffic that will pass through? What about paving of parking lots? Will the construction workers be trained in construction techniques that will preserve the integrity of the cap? Will they have the proper technology? What about simple things like the planting of trees and other landscaping? How will the roots, etc. affect the cap? Is the draft RAP realistic in assuming that there will be adequate maintenance of the cap (including seals on the pilings, etc.) for the anticipated life, 30 years? (Draft RAP, § 7.2.5.2). No operation and maintenance plan has even been developed yet. (Draft RAP, § 11.1). What will happen to ongoing operation and maintenance if the shopping center is not successful?

Further, although the FS suggests that the most effective cap for the Landfill would be an impermeable synthetic membrane (see FS, § 4.2.1.2 "synthetic membrane is highly reliable"; § 4.2.2.2 "impermeable synthetic membrane is most reliable"; see also Tables 4-1, 4-2, 4-3, which indicate that a synthetic membrane is less susceptible to cracking than a soil cap), the FS ultimately concludes, without any explanation, that the cap will, instead, consist of soil and clay. The draft RAP similarly fails to explain why the proposed synthetic membrane cap was rejected. In so doing, the draft RAP fails to abide by the requirements of Health and Safety Code Section 25356.1(d), under which a RAP must "set forth the reasons for rejection of alternative removal and remedial actions." Moreover, the draft RAP also fails of one of its stated purposes, to "[c]ontrol infiltration of surface water to reduce the generation of leachate." (Draft RAP, § 1.3). Indeed, it is only under the proposed locations of the shopping center buildings that it is planned to provide a synthetic liner. (FS. § 5.3.2.1). This raises the additional concern that until there are firm plans for the locations of the buildings, how can the cap be installed? What about buildings that may be constructed in Phase II of the construction?[3]

6-9

Moreover, the draft RAP proposes a groundwater extraction well spacing of 150-200 feet with a pump rate of 3 to 5 gallons per minute ("gpm"). There is no supporting data to determine the suitability of these estimates. Given the limited water production capabilities of the Bellflower Aquitard (RI. § 2.3.2; Draft RAP, § 6.1), it is highly unlikely that a 3-5 gpm flow rate will produce a 75 to 100 foot radius of influence. It is likely that the proposed the degree of pumping will not remove the toxics; at best, it may keep them from spreading. Thus, the draft RAP fails of one of its stated intended objectives: the "[c]apture, control. and treatment of the on-site contaminated groundwater and the contaminant plume that is now off site." (Draft RAP, § 1.3).

6-10

Rather than complete a thorough investigation of the groundwater at the Landfill. and thereby develop a factual basis for characterizing the nature and distribution of conditions that will require remediation and/or monitoring, the draft RAP proposes very limited investigation and remedial responsibilities -- essentially limited to the Bellflower Aquitard. Indeed. there is simply no plan whatsoever for investigation, let alone treatment. of the groundwater contained in the underlying regional aquifers. This vertical partitioning of the groundwater contamination at the base of the Bellflower Aquitard should not be approved.

6-11

The proposed remediation strategy, with its focus on landfill gas, ignores the presence and possible migration of leachate within the landfill, ignores soil conditions that may have a long term adverse affect on groundwater, and completely neglects the regional groundwater resources (including drinking water) that ultimately require protection.

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[3] Moreover, although the draft RAP mentions the fact that the FS proposed and then rejected an asphalt cap, it is curiously silent on the idea of a synthetic cap or why that proposed cap was rejected.

3. <u>The Draft RAP Does Not Resolve Issues that DTSC Previously Raised in Connection with the Landfill: Therefore, Clarification of these Issues is Requested from DTSC.</u>

6-12 The DTSC project file contains numerous references to previous concerns raised by the DTSC regarding the investigation and proposed remediation and redevelopment of the property. Some examples are the concerns the DTSC had regarding liquefaction and compaction of the landfill waste. (DTSC Memorandum, January 29, 1993, from Permitting and Enforcement Geological Service Unit to Karen Baker). Some of DTSC's prior concerns do not appear to be remedied by the RI/FS, HRA, or draft RAP, as evidenced by the lack of any discussion of the two issues cited above. It is unclear whether RI/FS, HRA, and draft RAP have simply failed to properly alleviate DTSC's concerns or whether DTSC has instead abandoned its prior concerns. In either case, DTSC should respond and comment on these issues. These issues include the following two major concerns:

- The hydrogeologic characterization of the Landfill has not been completed. There has been no investigation whatsoever on what impact there would be to the Gage, Lynwood, and Silverado Aquifers by virtue of the following: (i) remediation of the UOU and (ii) construction of a large shopping center. Concerns regarding the impact to these aquifers are significant, especially because at least the Silverado Aquifer is a source of drinking water.

6-13

- Any prudent remediation of the Landfill must include proper abandonment of the three former wells (two oil wells and one water well) located in the western portion of the Landfill. The RI specifically concedes that the wells were not abandoned consistent with current standards. (RI, § 1.3.2.1). Indeed, the water well was not abandoned consistent with *any* standards. Yet, the RI is silent on the potential problems that the wells may create. (RI, § 1.3.2.1). Moreover, the draft RAP does not propose any additional investigation or excavation as to the wells. According to the RI, all three well casings extend into the waste cells. (RI, § 1.3.2.1). As a result, groundwater and leachate have been in contact with the casings and have, most likely corroded through. Thus, there is a significant risk of downward migration into the underlying drinking water. It is crucial that there be no conduit for downward vertical migration of contaminants. Again, this issue is simply not addressed in the draft RAP.

6-14 Aside from the above, there are other areas in which the draft RAP (and the investigation and studies that it is based on) are not thorough or complete and do not take into account significant issues that should be considered as part of a clean-up of the Landfill. For instance, the DTSC has deviated from its usual policy by approving of the characterization and remediation of the site in two phases and in allowing an FS to be conducted before completion of an RI. Neither the RI/FS nor the draft RAP give an analysis of why the DTSC decided to approve of the use of this unusual approach on this Landfill. Therefore, an explanation from DTSC for why it decided to approve of the phased approach is warranted. Moreover, the DTSC should indicate whether the California Regional Water

6-14 Quality Control Board has been consulted regarding this strategy and whether it has approved the phased approach in writing. If so, a copy of that writing should be provided.

6-15 Moreover, the draft RAP fails to indicate whether the DTSC has approved the RI, FS, or HRA. Approval by the DTSC of these reports is a standard requirement, which should be met before the proposed remediation and redevelopment activities should be allowed to begin.

4. <u>The Draft RAP Does Not Contain Any Indication That There Are Proper Financial Assurances Regarding the Proposed Remediation</u>.

The draft RAP is plainly incomplete in that, under the section "Financial Responsibility," it states simply "[t]o be provided by DTSC." This is indicative of the overall incomplete nature of the draft RAP. Without any financial commitment to conduct the remediation (including the long term operation and maintenance that is a significant aspect of it), how can the draft RAP possibly be approved? This is especially true given the size of the Landfill (and therefore the significant amount of money it will take to pay for the remediation and subsequently to perform the necessary maintenance).

6-16 The draft RAP also states that "[t]he owner and operator of the site will be responsible for the ongoing [operation and maintenance] and monitoring of the site." (Draft RAP, § 11.4). However, the owner of the Landfill is in bankruptcy and the apparent possible future owner has made no demonstration of financial ability. It appears that the financial viability of any future owner is tied to the success of a shopping center development effort still in its preliminary stages. This is especially significant given that the draft RAP proposes monitoring and maintenance for some 30 years. Yet, there is no provision in the draft RAP for the contingency of lack of funds at some time after the remediation has begun. A partial, incomplete remediation could be more harmful than no remediation at all. What assurances are there that the developer has the financial wherewithal to live up to obligations to maintain the remedial activities? The draft RAP mentions none. The developer expects to benefit financially from the project and is not being required to fund any portion of the remediation according to the draft RAP. (Draft RAP, § 9). Yet, it is proposed that the developer be immunized from any environmental liability, notwithstanding the importance of a commitment to fund the ongoing long term operation and maintenance. There should be a demonstration of financial responsibility adequate to cover long term operation and maintenance.

6-17 The funding of the remediation is contingent on the success of the issuance of bonds, which is contingent on the successful leasing of the shopping center. This financial structure does not constitute a firm plan or commitment for funding the remediation. Moreover, any change in the amount of funds required to complete the remediation (and given the other concerns raised in these comments, there is a substantial risk of such an increase) may cause the proposed financing structure to prove untenable. This is a significant concern. Thus, there needs to be a contingency plan in place to cover the possibility that (i) the remediation

will not be completed because of a lack of funding, and (ii) the ongoing operation and maintenance of the groundwater and landfill gas treatment systems will be discontinued
6-17 because of a lack of funding. Indeed, there could be increased exposures to the surrounding residents -- at levels greater than if there was no development at all -- if the operation of the remediation system and the maintenance of the Landfill cease after the proposed development is constructed.

5. <u>The Proposed Redevelopment Plan Creates Significant Environmental Concerns that Have not been Addressed</u>.

The prior development plan, which included a large shopping mall consisting of three-story structures, required the importation of a large volume of fill soil and installation of deep driven piles. The current redevelopment plans still include the shopping mall located in the center of the Landfill as Phase I, and office buildings constructed on the Landfill boundaries as Phase II.

From a review of DTSC files, it is not clear whether the dynamic deep compaction considered in the prior development plan will be performed. However, the FS and draft RAP call for the shopping center structures to be supported by piles driven into the soil underlying the waste cells, and while the FS and draft RAP are silent on the issue, previous
6-18 plans called for the piles to be driven until refusal. (One of the problems with the draft RAP is that if fails to address engineering issues associated with the proposed development and there do not appear to be final plans for such development.) The driving of pilings in this manner creates a significant concern, because, for the most part, soils of the Bellflower Aquitard underlie the waste cells, and in some areas the Bellflower Aquitard soils are as thin as six feet. (RI, § 2.2.5). The thickness of soil required to key in the driven pilings was not given in the FS or draft RAP. Penetration of the Bellflower Aquitard soils by the driven piles may provide a conduit for contaminant migration. These issues do not appear to have been appropriately reviewed in connection with the draft RAP. These issues must be carefully reviewed by the DTSC before a RAP can be approved.

Another issue that is not discussed is the possibility of subsidence. This always is a concern in a landfill. Here, it is even more of a concern because of the fact that groundwater will be extracted, leaving gaps that might promote subsidence. Moreover, subsidence is also a special concern here because of the heavy equipment that will be driven and operated on the Landfill.

Preservation of the landfill cap will be required to maintain the effectiveness of the methane gas collection system and to prevent exposure to workers and visitors to the Landfill. A detailed maintenance plan addressing any digging activity, such as utility trenching or planting of landscaping, as well as proper repair of the cap, will need to be prepared and submitted. This is simply absent from the draft RAP.

Further, the presence of the landfill cap and methane gas collections systems will complicate the subsequent characterization and remediation of the LOU. Possible boring locations will be reduced due to constraints with the proposed development. The completion of numerous borings and wells may compromise the integrity of the landfill cap from the numerous penetrations and subsequent repairs.

6-19

The contemplated importation of fill soil, unresolved issues of soil compaction, and deep pilings are all issues relevant to the environmental condition of the Landfill and the need to complete site characterization and aspects of the remediation before beginning site development.

CONCLUSION

The above summarizes the major environmental issues and concerns that have not adequately been addressed in the draft RAP. These issues and concerns are significant, and they must be properly resolved before a RAP can be approved by the DTSC. Without a proper analysis and resolution of these issues, the draft RAP will fail of its primary objective: "to provide protection for human health and the environment." (Draft RAP, § 1.3).

APPENDIX

1) McLaren/Hart, January 1990. *Remedial Investigation/Feasibility Study (RI/FS) Work Plan.*

2) McLaren/Hart, June 11, 1991. *Draft Interim Use Risk Assessment.*

3) Western Laboratories, October 31, 1991. *Geotechnical Engineering Report.*

4) McLaren/Hart, January 10, 1992. *Integrated Remedial Investigation Report (11 Volumes).*

5) McLaren/Hart, April 1991 to March 1992. *Groundwater Monitoring Reports.*

6) McLaren/Hart, November 1993. *Final Feasibility Study Report.*

7) McLaren/Hart, December 1993. *Baseline Risk Assessment Report.*

8) Brown and Root Environmental, July 1995. *Remedial Investigation Report.*

9) Brown and Root Environmental, August 1995. *Feasibility Study.*

10) Brown and Root Environmental, August 1, 1995. *Baseline Risk Assessment.*

11) Brown and Root Environmental, August 8, 1995. *Draft Remedial Action Plan.*

Responses to Kelley Drye & Warren Comments on the Draft Remedial Action Plan for the Cal Compact Project.

Response to Comment 1:

DTSC supports its decision that a "phased approach is appropriate for this Site". In accordance with Title 40 C.F.R. § 300.430(a)(ii)(A) "Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." The remedy selected for the Upper Operable Unit (OU) will reduce significantly the potential migration of any hazardous substances found in the Upper OU.

Due to the size and complexity of the Site, DTSC determined that a phased analysis and response was appropriate to achieve a complete remediation of the Site. Therefore, DTSC divided the Site's remediation into two operable units, which, addressed separately in a phased approach, shall be intended to achieve a final remedy. The first operable unit, referred to as the Upper OU, consists of Site soils, the waste zone above and within the Bellflower Aquitard, and the Bellflower Aquitard down to, but not including, the Gage Aquifer. The second operable unit, referred to as the Lower OU, is composed of the Gage, Lynwood, and Silverado Aquifers, and all other areas impacted by the areal extent of any hazardous substances which may have migrated or may migrate either from the aquifers just mentioned or from the Upper OU.

DTSC's Official Policy Document No. SM #92-1, dated July 1, 1992, Section II(h) defines an "Operable Unit" as "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure." It goes on to state that "The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems associated with the site... By dividing the site into separate operable units, emphasis is placed on addressing critical public health and environmental problems first." To our knowledge the waste zone is located above and within a well-characterized geological formation, the Bellflower Aquitard, which in our view represents the principal source of potential contamination to deeper off-site groundwater sources. DTSC has determined that the proposed remedy will immediately control and mitigate off-site migration and thus provide a meaningful first step without compromising our ability to continue investigating the Lower OU. Furthermore, the proposed remedy will be consistent with the final remedy for the Lower OU.

To delay implementation of this proposed remedy, in order to first investigate the potential contamination in the Lower OU, would needlessly forestall a remedy which is appropriate for the Upper OU and which will minimize further migration of hazardous substances from the Upper OU to the Lower OU. Absent the proposed remedy for the Upper OU or delay in its implementation only serves to increase the likelihood of migration of hazardous substances to the Lower OU. Please see Response to Comments from Mr. Colboth, Number 5,6 and 7.

Response to Comment 2:

Sites are evaluated on an individual basis due to unique hazards, environmental conditions, and site specific circumstances. Therefore, comparison of the Cal Compact Landfill Site to other sites is not appropriate.

DTSC has determined that the Remedial Investigation (RI) adequately characterized Site conditions in light of the proposed remedy. The proposed remedy provides overall protection of human health and the environment. The proposed remedy will remove, control and treat landfill gases and contaminated groundwater contained in the Bellflower Aquitard and provide containment of the waste buried at the landfill. The construction of a landfill cap, landfill gas collection and treatment system, and groundwater collection and treatment system are all proven and accepted methods for remediating landfills. The proposed remedy would be the same even with extensive sampling, because the remedy captures emissions from all pathways. The U.S. Environmental Protection Agency (U.S EPA) "Guidance for Conducting Remedial Investigation and Feasibility Study Under CERCLA" (RI/FS Guidance), October 1988, provides for a sampling approach that encourages key data collection, directed toward providing information relevant to selection of a remedial action. Therefore, overall site characterization efforts can be continually scoped to minimize the collection of unnecessary data and maximize data quality. DTSC has determined that the sampling activities conducted during numerous field investigations adequately characterized Upper OU conditions and reflect the type of industrial waste identified in the available records. There are no sampling results to indicate that during the period in which records are not available that other types of waste were disposed of at this landfill.

Response to Comment 3:

DTSC has determined that sampling locations in the Upper OU adequately represent the waste disposed of in the landfill (see response to comment 2 above), and exhaustive sampling is not warranted in light of the proposed containment remedy.

The comment that "none of the groundwater monitoring wells were installed in the underlying Gage, Lynwood, and Silverado Aquifers -- the aquifers that are used for domestic water sources." is incorrect. The Dominguez Water Company is currently only pumping potable water from the Silverado Aquifer. The Silverado Aquifer is located approximately 500 feet below mean sea level (MSL) beneath the Site. Furthermore, two monitoring wells were installed in the Gage Aquifer (GW-2 & GW-7), which is the aquifer lying immediately below the Upper OU. In October 1991, January 1992, and April 1992, groundwater samples from these wells were analyzed. Toluene, at a concentration of 6 parts per billion (ppb), was detected above the detection limit of 5 ppb, for volatile organic compounds. Semi-volatile organic compounds were not detected above the detection limit. Several metals were detected including sodium, potassium, nickel, iron, and zinc.

Even if the Gage Aquifer were significantly contaminated, for which there is no evidence, the proposed remedy would further ensure that the Gage Aquifer does not become more contaminated. The absence of the proposed remedy could only serve to increase future contamination of the Gage Aquifer and the deeper aquifers below.

DTSC has further concluded that there is sufficient Site data collected during field activities to support the proposed remedy. DTSC has determined that the RI adequately addressed: the nature of the waste in the landfill cells; the nature and vertical extent of soil contamination; the nature and vertical and lateral extent of the groundwater contamination; and the distribution and migration routes of landfill gases for the proposed remedy. DTSC has identified all the major classes of hazardous substances in the landfill, and the remedy addresses all potential exposure pathways for each of these major classes. The classes of hazardous substances are consistent with the known materials sent to the landfill. Additional investigation would needlessly delay remediation activities. This is why a phased approach is delineated in the federal regulations. Otherwise, parties opposing any remediation could always assert that more investigation is necessary.

Response to Comment 4:

The comment that there is a downward vertical gradient at the landfill such that groundwater contaminants would be expected to migrate downward, possibly into the underlying drinking water aquifers, is córrect. However, the conclusion that this finding justifies further characterization does not follow. On the contrary, it justifies a prompt remedial response, which in this case will substantially minimize this migration pathway.

Response to Comment 5:

DTSC believes that the RI is sufficiently complete for the remedy proposed in the RAP. Please refer to Response to Comment 1,2, and 3 above.

The U.S. EPA RI/FS Guidance states that "the RI and FS are to be conducted concurrently and that data collected in the RI influences the development of the FS, which in turn affects the data needs and the scope of treatability studies and additional field investigations." Furthermore, DTSC's Official Policy SM #92-1, also adopts the same approach, that the RI and FS be conducted concurrently.

The purpose of the RI "is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternative." (see 40 C.F.R. § 300.430(d)(1)). The RI's purpose is, therefore, linked to remedy selection, as a matter of law. This subsection provides that the RI and FS need not be performed sequentially, but instead that "site characterization activities should be fully integrated with the development and evaluation of alternatives in the feasibility study" (see 40 C.F.R. § 300.430(d)(1)). Characterization thus must be linked to the range of proposed alternatives.

Response to Comment 6:

DTSC believes that the FS and draft RAP are specific and contain sufficient specific details to justify selection of the proposed remedy of the Upper OU. The primary objective of the FS is to ensure that appropriate remedial objectives are developed and evaluated, so that relevant information concerning the remedial action options can be presented and an appropriate remedy selected (40 C.F.R. § 300.430 (d) and (e)). The purpose of the RAP is to summarize the findings of the RI/FS and to describe the proposed remedial alternative actions to be taken for the remediation of hazardous substances. The draft RAP provides the overall framework for the proposed remedial actions but does not contain, nor is it required to contain, specific engineering design details. The draft RAP complies with federal Superfund regulations contained in the National Oil and Hazardous Substances Pollution Contingency Plan (commonly referred to as the National Contingency Plan or NCP), U.S. Environmental Protection Agency's guidance documents, and DTSC's policy and guidance documents.

The next stage of the Cal Compact Landfill remediation process is the remedial design/remedial action (RD/RA) stage. The RD/RA stage includes the development of the actual design of the selected remedy and implementation of the remedy (40 C.F.R. §

300.435(a). It is in the RD stage that detailed engineering designs will be submitted to DTSC for the construction of the remedial systems.

Response to Comment 7:

a) The list of references in the Final Report Baseline Risk Assessment (BRA) for the Cal Compact Landfill was not updated. However, information provided in the 1992 DTSC Supplemental Guidance for Human Health Multimedia Risk Assessment at Hazardous Waste Sites and Permitted Facilities was used in this health risk assessment where that guidance was necessary for the most complete portrayal of risks. An example is the evaluation of lead exposure at this Site using a method described in the DTSC Supplemental Guidance (see BRA page 4-4). During the four-year course of review and oversight of the conduct of this health risk assessment, toxicologists at DTSC have provided the most up-to-date guidance possible. For example, the statistical treatment of sampling data at this Site followed the U.S. EPA Supplemental Guidance to RAGS: "Calculating the Concentration Term (May 1992)", which supersedes the guidance provided in the DTSC Supplemental Guidance. The chemical bioavailability values listed in Table 3-3 of the BRA represent the most recent values that have appeared in the scientific literature.

This health risk assessment utilized the California EPA Cancer Slope Factor list of 1994 (see footnote to Table 4-1 of the BRA). If values were not available on that list, the on-line database of the U.S. EPA Integrated Risk Information System (IRIS) was used. As shown in the footnotes to Table 4-1 of the BRA, the database was assessed in 1995 which is as up-to-date as possible.

b) The executive summary lists the calculated risks and hazards for the different scenarios. The comparison only places those risks in context with risk from the surrounding environment and has no bearing on the point of departure for consideration for action by the DTSC.

c) The BRA includes an explanation of how the vapor well data were used. The vapor well data were used in predicting future vapor emissions and air concentrations at the site. The highest concentration of a chemical in vapor well/perimeter probe gases was put into the Farmer Model to estimate vapor emissions and subsequent air concentration of that chemical (see Section 3.3.1 of the BRA). Air concentrations were used to estimate the health risks due to inhalation of volatile chemicals.

d) The air monitoring data from the Site showed little difference from ambient air data for the Los Angeles area.

Therefore, these data were not used in the health risk assessment. Instead, air concentrations were estimated using vapor emissions calculated from either the Farmer Model or the Jury Behavior Assessment Model. These models used the highest concentration of a chemical found in either soil, vapor well/perimeter probe gases, or ground water as the input parameter (see Sections 3.3.1 and 3.3.2 of the BRA).

e) We agree that Threshold Limit Values should not be used for risk assessment purposes. The health risk assessment contains a brief discussion of this issue (see page 4-3, third paragraph of the BRA). In this discussion, it is noted that using these values ultimately results in a higher cumulative hazard (that is, more conservative) than if the U.S. EPA oral reference doses had been used. We accepted the calculated hazard indices, because they are conservative and protective of the public health.

f) The long-term commercial/industrial use scenario was not intended to estimate the residual risks after remedial action is completed and with the proposed development in place. The scenario assumes commercial use of the property as the property now exists. Therefore, the risks from indoor air concentrations are not evaluated. The assumption was made that the Site is not capped in any way with relatively impermeable materials, such as asphalt and concrete. However, disruption of soil and other construction activities are considered in the 2-year construction and excavation scenario. The residual risk for the planned shopping mall should be included in a future document describing that approved land use.

Response to Comment 8:

As stated in Response to Comment No. 6, the final engineering designs will be drafted and submitted to DTSC during the RD stage of the remedial process and these designs will address geotechnical issues related to the remediation. The construction of the landfill cover will meet all regulatory and engineering requirements. Moreover, current Site conditions present a threat to human health and the environment due to the lack of a properly designed landfill cover. As for construction workers, all personnel working at the Site will have experience and the proper training required to perform their duties.

In regards to the planting of trees and landscaping, please see page 7-7 of the RAP. A top soil layer of suitable material which supports vegetation with a root system less than the depth of the top soil layer will be constructed in an area where landscaping is planned. The top soil will have a normal thickness of 12 inches. Beneath the top soil layer lies a protective soil cover. This protective soil cover provides the clay layer with an additional measure of protection. Furthermore, the use of vegetation with a shallow root system should also ensure that the clay layer will not be adversely affected.

As assurance that the remedial systems are properly operated and maintained (O&M), DTSC and the developers will enter into an O&M agreement. As part of the remedial process, an O&M Plan will be drafted and submitted to DTSC for approval after the draft RAP has been approved. Furthermore, DTSC will provide direct oversight of the O&M activities conducted at this Site. The shopping center's commercial success will not be a factor in the O&M of the remedial systems. DTSC will seek O&M financial assurance from future Site developers as well as from PRPs.

Response to Comment 9:

The evaluation of the synthetic membrane was inadvertently omitted from the final Feasibility Study. The FS will be revised to include the synthetic membrane evaluation. The results of the clay layer compared to the synthetic membrane were: the clay layer was ranked the better alternative based on overall performance. Because of its simple configuration, the clay layer was assessed better for ease of installation, relative ability to make repairs, and overall cost.

Response to Comment 10:

In section 7.2.1.1, Aquifer Pump Test, page 7-5, of the draft RAP, it states that "Aquifer testing will be conducted in the Bellflower Aquitard to verify specific hydrogeologic data required for the design of the groundwater extraction system." The well spacing and pumping rate are estimates used for conceptual purposes only. In the RD stage of the remediation, the exact number and spacing of wells will be determined based on data collected during the aquifer pump test.

Response to Comment 11:

DTSC has determined that the RI/FS supports the remedy proposed in the RAP, and the remedy will provide protection to human health and the environment, for reasons stated in Response to Comments No. 1, 2, 3, and 4.

Response to Comment 12:

DTSC has determined the hydrogeologic characterization of the Upper OU is sufficiently complete for a draft RAP, and a phased approach enables DTSC to mitigate hazardous substances found in the Upper OU prior to completing an investigation of the

Lower OU. The first operable unit, referred to as the Upper OU, consists of Site soils, the waste zone above and within the Bellflower Aquitard, and the Bellflower Aquitard down to, but not including, the Gage Aquifer. The second operable unit, referred to as the Lower OU, is composed of the Gage, Lynwood, and Silverado Aquifers, and all other areas impacted by the areal extent of any hazardous substances which may have migrated or may migrate either from the aquifers just mentioned or from the Upper OU.

To our knowledge the waste zone is located above and within a well-characterized geological formation, the Bellflower Aquitard, which in DTSC's view represents the principal source of potential contamination to deeper off-site groundwater sources. 40 CFR 300.430(a)(i)(A) states that "Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." DTSC has concluded that the proposed remedy will immediately mitigate off-site migration. And the proposed remedy will not interfere with the ability to assess potential releases as yet unknown to areas outside this operable unit.

To delay implementation of the proposed remedy, in order to first investigate potential contamination in the Lower OU, would needlessly delay implementing a remedy which is appropriate for the Upper OU. Should further investigations reveal that deeper areas are contaminated, additional waste water treatment wells can be employed in further remedial processes. Furthermore, both the landfill cap and landfill gas collection systems are appropriate control measures for any later discovered, deeper contamination.

DTSC's practice is to strive to achieve meaningful environmental protection and, where a phased approach achieves that goal, to employ such an approach.

DTSC is not proposing to remediate only half the Site. DTSC is proposing to begin the remediation of the Upper OU and to pursue a separate remedial investigation for the Lower OU. Based on the results of a Lower OU investigation, a remedial action plan may be developed.

The construction of the shopping center is not a remedy proposed in the draft RAP. DTSC does not have the authority to issue Land Use Permits, which are the province of local authorities. However, insofar as these structures may impact the proposed remedial action, a workplan to study dynamic compaction and subsidence has been submitted to DTSC and the City of Carson.

The proposed workplan outlines a pilot study to investigate the results of dynamic compaction on the soil cover and waste zone. The information obtained during this field investigation will be used in the remedial design stage to further ensure compatibility of development and remediation.

In order to monitor any potential impacts from the construction of the proposed development and remedial activities, DTSC has required that additional monitoring wells be installed in the Gage Aquifer prior to the start of any construction activity.

Response to Comment 13:

An extensive investigation was conducted to identify the location of the abandoned wells. The investigation for these wells included historical records review, magnetometer survey, and historical aerial photographic search. Although DTSC knows the general location of the three wells, DTSC does not know their precise location.

An additional investigation will be conducted during the implementation phase on the RAP to locate the former oil and water wells at the Site to address issues such as the risk of downward migration of contaminants into lower aquifers. To the extent feasible, the former water well and two oil wells will be located and abandoned to meet current regulatory standards. All available information regarding the location of these wells will be utilized in this investigation. The location of the wells will be re-surveyed using available historical data. Survey locations will then be compared to the prior investigations. Based on the results of these investigations, a excavation plan will be considered. This excavation plan shall be limited to those Site areas with the highest probability of finding the oil and water wells. Such limitation is further justified because of the risk associated with excavating buried hazardous substances. Prior to any excavation the health risk of such activities will be evaluated to assess the appropriateness of such excavation. Regulatory approval of all plans and permits will be obtained prior to any excavation activities.

A fate and transport modeling program may also be conducted to evaluate the potential risk to the lower aquifers. Should such program reveal that the potential risk to the lower aquifers from the abandoned wells is insignificant, then excavation, and well abandonment need not be pursued.

In the event that an excavation is conducted to locate these wells, DTSC may suspend such investigation if the investigation itself poses a human health or environmental threat. If the investigation fails to locate these wells, the search for these wells will cease and all other remedial activities will be implemented.

At this time, there is no data to indicate that the Silverado Aquifer (drinking water aquifer) has been or is presently adversely impacted by Site conditions.

Response to Comment 14:

DTSC is following its policy by proceeding with a phased approach and conducting the RI and FS concurrently. In fact, DTSC is following both U.S. EPA and DTSC policies in conducting site remediation activities. See also, Response to Comments No. 1, 3, 4, 5, 11, and 12.

Response to Comment 15:

DTSC accepted the Baseline Health Risk Assessment on August 14, 1995, and approved the RI and FS on August 21, 1995.

A statement will be incorporated into the RAP stating the dates DTSC approved and/or accepted these documents.

Response to Comments 16:

Financial assurance for implementation of the final RAP is not a legal requirement pursuant to California Health and Safety Code (H&SC) 25356.1. DTSC has authority under Chapter 6.8 of H&SC to seek compliance with the remedy selected in a final RAP from any identifiable PRPs. There is no requirement under law that DTSC first have a full commitment of financial resources from the PRPs before it can prepare or approve a RAP. A final RAP simply represents an approved plan to remediate part or all of a site. So long as the approved plan was adopted pursuant to federal and state procedural guidelines, the plan is legally sufficient.

The previous owner of the Site was in bankruptcy, however, the Site has been purchased by L.A. MetroMall, LLC, a Limited Liability Company. The RAP will be modified to reflect the fact that DTSC may also seek implementation of O&M from any other identified PRP(s) as well as from any person(s) who may acquire title to the Site in the future.

Response to comment 17:

The draft RAP does not propose the construction of a shopping center or any other redevelopment structures. The draft RAP proposes the construction of a landfill cap, landfill gas collection and treatment system, and a groundwater collection and treatment system. DTSC will review and provide comments on all future development designs and activities that might have an adverse impact on the Site. The final approval of all designs associated with the development of the proposed shopping center lies with the local agencies, not with DTSC. DTSC has the regulatory authority to approve the remedial designs for the activities identified in the RAP.

Response to Comment 18:

As stated in Response to Comments No. 6 and 8, the next stage of the remediation process, after the approval of the RAP, is the remedial design/remedial action (RD/RA) stage. The RD/RA stage includes the development of the actual design of the selected remedy and implementation of the remedy (40 C.F.R. § 300.435(a). At that time, detailed engineering designs will be submitted to DTSC for the construction of the remedial systems. Prior to DTSC certifying that the remedial system are operating properly, an O&M Plan will be submitted for approval. The O&M Plan will contain specific operations details and maintenance schedules for each remedial system.

A test workplan for deep dynamic compaction has been submitted to DTSC for review. Dynamic compaction is not associated with remedial activities, but rather, the proposed development of the Site. Therefore, dynamic compaction was not included in the draft RAP. However, to the extent that any given construction activity has the potential to cause further releases of hazardous substances, DTSC at all times reserves the right to review and comment upon such non-remediation activities.

Response to Comment 19:

DTSC is committed to conducting a remedial investigation for the Lower OU. Remediation of the Lower OU will be based on the results of a Lower OU investigation. As a practical matter, DTSC will require that any future development of the Site be conducted in a manner that will not interfere with DTSC's ability to investigate and remediate the Lower OU. Such requirements will include reasonable access agreements to investigate the Lower OU and, if necessary, to construct additional remedial systems.

WRD
WATER REPLENISHMENT DISTRICT
OF SOUTHERN CALIFORNIA

September 25, 1995

Mr. Thomas Cota
Project Manager
Department of Toxic Substance Control
245 West Broadway
Suite 350
Long Beach, CA 90802

SUBJECT: Cal Compact Landfill Draft Remedial Action Plan

Dear Mr. Cota:

The Water Replenishment District of Southern California (WRD) encompasses the urban coastal plain of Los Angeles County. WRD is responsible for managing and protecting the groundwater supplies of the Central and West Coast Basins. We are therefore interested in the clean up activities for the Cal Compact Landfill site. Unfortunately we have not received full information regarding this site, but we do have a general understanding of what is included in the draft Remedial Action Plan and offer the two following points for consideration:

H-1

1) A review of available data indicates that there is no informataion that a former groundwater production well on the site has been destroyed. This well (identified by state well number 4S/13W-07H01) is 720 feet deep and has perforations from 555 to 676 feet, within the Silverado Aquifer. We are very concerned with this well because if it is not properly destroyed it may serve as an artificial conduit for contamination migration from the former landfill into deeper production aquifers such as the Silverado Aquifer.

H-2

2) WRD is concerned that there might not be adequate information to support that control and containment of the contamination rather than a clean up effort is adequate.

We appreciate the opportunity to voice our concerns regarding the Cal Compact Landfill site.

Sincerely,

Fred Cardenas

Fred Cardenas
General Manager

Response to comment received from the Water Replenishment District of Southern California on the Cal Compact Draft Remedial Action Plan.

Response to Comment 1:

An extensive investigation was conducted to identify the location of the abandoned wells. The investigation for these wells included historical records review, magnetometer survey, and historical aerial photographic search. Although DTSC knows the general location of the three wells, DTSC does not know their precise location.

An additional investigation will be conducted during the implementation phase on the RAP to locate the former oil and water wells at the Site to address issues such as the risk of downward migration of contaminants into lower aquifers. To the extent feasible, the former water well and two oil wells will be located and abandoned to meet current regulatory standards. All available information regarding the location of these wells will be utilized in this investigation. The location of the wells will be re-surveyed using available historical data. Survey locations will then be compared to the prior investigations. Based on the results of these investigations, a excavation plan will be considered. This excavation plan shall be limited to those Site areas with the highest probability of finding the oil and water wells. Such limitation is further justified because of the risk associated with excavating buried hazardous substances. Prior to any excavation the health risk of such activities will be evaluated to assess the appropriateness of such excavation. Regulatory approval of all plans and permits will be obtained prior to any excavation activities.

A fate and transport modeling program may also be conducted to evaluate the potential risk to the lower aquifers. Should such program reveal that the potential risk to the lower aquifers from the abandoned wells is insignificant, then excavation, and well abandonment need not be pursued.

In the event that an excavation is conducted to locate these wells, DTSC may suspend such investigation if the investigation itself poses a human health or environmental threat. If the investigation fails to locate these wells, the search for these wells will cease and all other remedial activities will be implemented.

At this time, there is no data to indicate that the Silverado Aquifer (drinking water aquifer) has been or is presently adversely impacted by Site conditions.

Response to Comment 2:

DTSC believes that sufficient site data was collected during field activities to support the proposed remedy. DTSC has identified all the major classes of hazardous substances in the landfill, and the remedy addresses all potential exposure pathways for each of these major classes. An aquifer pump test will be conducted in order to obtain additional information required for the remedial design of the groundwater treatment system.

COUNTY OF LOS ANGELES - DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL HEALTH
SOLID WASTE MANAGEMENT PROGRAM
2525 Corporate Place, Room 150, Monterey Park, California 91754
(213) 881-4151

September 25, 1995

TO: Thomas Cota
Site Mitigation Operations Branch

FROM: Arlene Block, REHS IV
Solid Waste Management Program

Arlene Block

SUBJECT: SUPPLEMENTAL NEGATIVE DECLARATION REVIEW, CAL COMPACT LANDFILL, CARSON, CALIFORNIA

Thank you for the opportunity to respond to the proposed Negative Declaration for the Cal Compact Landfill. We have several comments or concerns.

I-1 The proposed landfill gas extraction system will consist of vertical wells installed at the perimeter of the waste zone. We are concerned that the amount of gas generated and collected by a perimeter system will not be sufficient to maintain a flare without supplemental supplied natural gas. Installation of additional interior wells may enrich the landfill gas mixture. We understand that the cap over the landfill will be increased so that little or no gas will be released at the surface, however, that may not improve the gas flow through the system significantly.

I-2 We would also be interested in knowing how the footings for buildings to be constructed on top of the landfill will be designed and sealed. Will there be a liner under the building and/or gas monitoring equipment?

Some of these issues may have been addressed in previous documents. If so, please let us know where we can find the information.

Response to comments received from the County of Los Angeles - Department of Health Services Environmental Health, Solid Waste Management Program on the Cal Compact Landfill Draft Remedial Action Plan.

RESPONSE TO COMMENT 1:

The final designs for the landfill gas collection and treatment system have not been developed. A landfill gas emission and monitoring program needs to be conducted in order to obtain additional information for the final designs. The gas extraction well placement will be based on the results of the emission and monitoring program. The final design will contain the exact location and number of extraction wells and the operating requirement for the landfill gas collection and treatment system.

RESPONSE TO COMMENT 2:

The draft Remedial Action Plan (RAP), on which the Department of Toxic Substances Control (DTSC) is acting on, does not address the proposed site development. The draft RAP addresses the proposed remedy for the remediation of the Upper Operable Unit at the Cal Compact Landfill (the Site). DTSC is aware of the proposed development of the Site and to the extent that any given construction activity, associated with any development of the Site, has the potential to cause further releases of hazardous substances, DTSC at all times reserves the right to review and comment upon such non-remediation activities, and if necessary, to exercise its lawful authority to enjoin such activities.

Section 8.2 and 8.3 of the draft RAP addresses the landfill cap and landfill gas control and treatment systems, respectively, for the proposed building area. A synthetic liner and a gas control and treatment system are proposed for the building area. The City of Carson will provide the final approval of these designs.

The Final RAP and supporting documents are available for review at the Carson Public Library, Reference Section, 151 East Carson Street, Carson, California 90745 or at the Department of Toxic Substances Control 245 West Broadway, Suite 350, Long Beach, California 90802. For an appointment to review the records at the DTSC office, please contact Ms. Julie Johnson at (310) 590-4980.

Tom -- I am forwarding this to you and hope that you will address these issues in your public comment section

Councilmember
Lorelie
Olaes

Sept. 25, 1995

CITY COUNCIL

'95 SEP 25 A10:58

(FAX sent
Sept 25, 1
2:25

Councilwoman Olaes.

The following is regarding the Metro 2000 project.

J-1 Toxic fume gases which is still underground, should be transform into vapor, this procedure would eliminate the pollution to our environment

J-2 What are the results of the sounding test, & the percentage or report of toxic/hazard waste regarding this project:

J-3 Can they specify what will be done with Clay materials which I know is there.

Thank You
Paul Nihipali
Public Works Comm.

Response to comments received from Paul Nihipali on the Cal Compact Remedial Action Plan.

1. Comment:

Toxic fume gases which is still underground should be transform into vapor, this procedure would eliminate the pollution to our environment.

Response:

DTSC believes that the proposed landfill gas collection and treatment system is protective of the environment. The system will collect landfill gases "underground" through a series of extraction wells. These gases will be transported through a network of pipes to a landfill flare unit. Landfill gases will be destroyed by thermal destruction.

2. Comment:

What are the results of the sounding test, and the percentage or report of toxic/hazard waste regarding this project?

Response:

DTSC is unaware of a "sounding test". However, there is a scheduled Deep Dynamic Compaction Test scheduled to begin in late October 1995. The results of this test is not expected to be available until late November 1995.

BLC Associates estimated that during the time that the landfill was in operation approximately 6.2 to 6.3 million cubic yards of municipal solid waste were placed in the landfill and that the landfill had a total volume of about 7.8 million cubic yards. On the basis of available records it was estimated that approximately 4 percent of the total material received may be considered hazardous by the State of California, using today's standards.

3. Comment:

Can they specify what will be done with clay materials which I know is there.

Response:

DTSC is unaware of what clay materials are being referred to in this comment. However, a clay layer is being proposed as part of the landfill cap. The clay layer will be placed on top of a base layer of soil and covered with a protective layer of soil.

State of California

California Environmental Protection Agency

Memorandum

To : Chris Belsky
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, California 95814

Date: September 26, 1995

Thomas M. Cota
Department of Toxic Substances Control
Site Mitigation Operations Branch
245 West Broadway, Suite 350
Long Beach, California 90802-4444

RECEIVED
SEP 27 1995
STATE CLEARING HOUSE

9-27-95

From : John Loane, Associate Waste Management Specialist
Environmental Review Section, Permits Branch
Permitting and Enforcement Division
California Integrated Waste Management Board

Subject: SCH #95081061 - Proposed Negative Declaration (ND) for the approval of the draft Remedial Action Plan (RAP) for groundwater and landfill decomposition gas (LFG) collection and treatment at the Cal Compact Landfill (CCLF), Los Angeles County.

California Integrated Waste Management Board (CIWMB or Board) staff have reviewed the ND for the project cited above.

Project Description

The CCLF is located on 157 acres at 20400 Main Street in the City of Carson. BKK Corporation is requesting approval of the draft RAP for the CCLF, Upper Operable Unit from the Department of Toxic Substances Control (Toxics). The proposed project for which Toxics is acting upon addresses the construction and operation of a groundwater and LFG collection and treatment system. Mitigations for minimizing the potentially significant environmental and human health and safety effects of the proposed project are addressed incorporated into the RAP. The landfill cap construction, which will be occurring during the same construction period, was addressed in the Metro 2000 Environmental Impact Report, dated December 1993.

California Environmental Quality Act Review

California Environmental Quality Act (CEQA) compliance is required for the establishment, expansion, or change in operation(s) of a Solid Waste Facility (SWF) requiring the issuance or revision of a Solid Waste Facilities Permit (SWFP).

The Board must ensure that local SWFs meet required state standards for the protection of public health, safety, and the environment. The Board implements this goal through programs such as: permit oversight for solid waste facilities, certification and evaluation of Local Enforcement Agencies which administer specific provisions of Assembly Bill (AB) 939, otherwise known as the Integrated Waste Management (IWM) Act; review of environmental documents for proposed, new or expanded solid waste facilities for compliance with CEQA; enforcement of state standards for solid waste facilities; corrective action programs for facilities out of compliance with state standards; and research and development for special waste management issues.

CIWMB staff's review of a ND is to help decision-makers 1) identify potential impacts from proposed projects, 2) determine whether any such impacts are significant, and 3) ascertain whether significant impacts can be mitigated to a level of insignificance in compliance with the CEQA statute and guidelines. In order for CIWMB staff to ascertain that the ND is adequate for our use in the permitting process, the proposed project must be described in sufficient detail and the potential environmental impacts must be identified clearly in the environmental assessment and offer "mitigating measures, if any, included in the project to avoid potentially significant effects", CEQA Guidelines, Article 6, section 15071(e).

K-1

NOTE: Page 3 of the ND refers to Section 15381 as being in the Public Resources Code (PRC). This Section is in the California Code of Regulations, Title 14, Chapter 3. Assembly Bill 314 and Senate Bill 749 amended Section 21081.6 of the PRC to require that mitigation measures to lessen potential environmental impacts are to be enforceable.

Solid Waste Facility Permit (SWFP)

CIWMB staff are not clear, from the information provided in the ND, if the proposed project will constitute a revision of the SWFP. The Local Enforcement Agency (LEA) will need to make this determination. For the purposes of this project CIWMB staff offer the following comments and questions as a 'commenting agency' (not a Responsible Agency) in order to assist the Lead Agency in identifying significant environmental issues and to facilitate the evaluation process.

Excavation of Landfilled Refuse

K-2 If excavation of landfilled refuse occurs/will occur at the CCLF during construction activities, CIWMB staff requests that the LEA be contacted and informed immediately.

Thank you for the opportunity to review this document. If you have any questions regarding these comments, please contact me at (916) 255-4069.

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, 120 SO. SPRING ST.
LOS ANGELES, CA 90012-3606
TDD (213) 897-6610

IGR/CEQA/INITIAL STUDY
Department of Toxic Substances Control
REMEDIAL ACTION PLAN: CAL COMPACT LANDFILL
8056
Vic. LA-405-11.4, LA-110-8.03

September 29, 1995

Mr. Thomas M. Cota
Department of Toxic Substances Control
Site Mitigation Operations Branch
245 West Broadway, Suite 350
Long Beach, CA 90802-4444

Dear Mr. Cota:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above-referenced document. This project involves construction and operation of a landfill gas collection and treatment system and a groundwater treatment system

Based on our preliminary review, we have the following comment:

-1 The landfill gas flare should be constructed or shielded from the traveling motorists as to minimize or reduce the potential for visual distraction.

If you have any questions regarding this response, please call me at (213) 897-4429.

Sincerely,

Steve Buswell

Steve Buswell
IGR/CEQA Coordinator
120 So. Spring Street
Los Angeles, CA 90012

Response to comments received from the Department of Transportation on the cal Compact Landfill Project.

RESPONSE TO COMMENT 1:

Comment noted and accepted. The RAP will include the statement that "The landfill gas flare will be constructed or shield from the traveling motorists as to minimize or reduce the potential for visual distraction."

HELLER EHRMAN WHITE & McAULIFFE
ATTORNEYS
A PARTNERSHIP OF PROFESSIONAL CORPORATIONS

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San Francisco
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Facsimile (415) 772-6268
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Writer's Direct Dial Number
(415) 772-6566

Anchorage
Los Angeles
Palo Alto
Portland
Seattle
Tacoma

October 11, 1995

17422-0001

VIA FACSIMILE AND U.S. MAIL

Mr. Thomas M. Cota
Hazardous Materials Specialist
California Environmental Protection Agency
Department of Toxic Substances Control
Site Mitigation Operations Branch
245 West Broadway, Suite 425
Long Beach, California 90802-4444

Draft RAP for the Former Cal Compact Landfill Site

Dear Mr. Cota:

M-1 I am writing on behalf of Commercial Realty Projects, Inc. ("CRP") concerning the nonbinding preliminary allocation of responsibility ("NBAR") contained in the draft remedial action plan ("RAP") for the former Cal Compact Landfill site. In accordance with the many conversations that Peter Weiner and I have conducted with you and Dan Weingarten since early September, CRP has agreed -- for the purposes of the NBAR alone -- to assume 100% of the responsibility for the site to be allocated in the final RAP's NBAR.

Please call me if you have any questions.

Very truly yours,

Nicholas W. van Aelstyn

Nicholas W. van Aelstyn

cc: Daniel P. Weingarten, Esq.
Peter H. Weiner, Esq.

Response to comments received from Heller, Ehrman, White & McAuliffe regarding the Cal Compact Landfill draft Remedial Action Plan.

1. Comment:

Commercial Realty Projects, Inc. has agreed -- for the purpose of the NBAR alone -- to assume 100% of the responsibility for the site to be allocated in the final RAP's NBAR.

Response:

DTSC accepts the comment and the Non-Binding Allocation of Responsibility (NBAR) will be revised to read as follows:

> The above allocation is non-binding and preliminary and does not limit strict, joint, or several liability under CERCLA and other laws. Commercial Realty Projects, Inc. has assumed 100% of the responsibility for the remediation of the Cal Compact Landfill Upper Operable Unit, as defined in this RAP, without prejudice to its right to seek contribution from other responsible parties.

0001

In RE:)
)
CAL COMPACT LANDFILL)

TRANSCRIPT OF PROCEEDINGS
Carson, California
Wednesday, September 6, 1995
JOHN F. BIEHL, CSR NO. 5859
JOB NO. 155423

0002

In RE:)
)
CAL COMPACT LANDFILL)

Transcript of Proceedings, taken before the California Department of Toxic Substances, at 901 East Carson Street, Carson, California, commencing at 6:00 p.m. on Wednesday, September 6, 1995, before JOHN F. BIEHL, Certified Shorthand Reporter No. 5859.

Page 3

Carson, California, Wednesday, September 6, 1995 6:00 p.m.

DR. SCHUMACHER: Well, I think we can begin tonight's meeting.

I would like to welcome you to tonight's public meeting seeking your input into the proposal by the California Toxic Substances Control – can you hear me in the back?

I want to welcome you to tonight's public meeting seeking your input into the proposal by the California Department of Toxic Substances Control, also known as DTSC, to remediate hazardous substances from the Cal Compact Landfill site. We invite public participation in this effort as the California Environmental Protection Agency's mission is to protect the health and environment of the public from the landfill and exposure to hazardous substances.

DTSC is working with BKK Corporation, who is a potentially responsible party by virtue of BKK merging with a former operator. The department is working with BKK to investigate the site's contamination and to investigate feasible alternatives to remedy that contamination. This former landfill is

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located at 82030 Main Street in Carson, and I believe fact sheets – extra copies were available at the rear table as you came in.

We have two objectives for tonight's meeting: One is to present the DTSC draft remedial action plan and proposed negative declaration for the former Cal Compact Landfill site. And we also want to seek public comments to these two documents during the 30-day public comment period that began August 25th and will end September 25th.

While the former landfill doesn't represent an immediate threat, remedial action is being proposed now to prevent a long-term potential threat to public health and the environment.

DTSC is working now with BKK to investigate the contamination in the DTSC site mitigation remediation program. After the draft remedial action plan, commonly known as a RAP, is approved, the current owner of the property, Commercial Realty Projects, Incorporated, who has a security interest in the property, will be responsible for site remediation activities, with DTSC oversight, of course.

Tonight we have several presentations, and you all received, as you signed in, a package of

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handouts. The agenda is the cover sheet.

As shown on the first page, there will be presentation on the site cleanup process, the site background, the remedial investigation, the health risk assessment and the remedial action proposal.

These presentations should take about 40 minutes to complete.

After the last presentation, I'll return to explain how we'd like to receive your formal comments. Please save your questions for that question-and-comment period.

We have made speaker cards available, and if you didn't receive one, it's okay, we can just accept comments. I'll recognize one or two folks at a time, and we'll take people in order. At that time, I'll explain how we'd like to receive your comments.

We included a comment sheet that should be the last page in your handout. It's also on DTSC letterhead, and we can receive written or verbal comments. So if you can keep that comment sheet, those should be postmarked no later than September 25th. The department will consider public comments on the draft remedial action plan before deciding how to proceed.

We're here tonight for public input and

Page 6

we'll carry your formal comments back to our office for the full consideration they deserve before making a final decision about approving the draft RAP, the remedial action plan, and the proposed negative declaration.

Tonight's meeting is part of the department's public participation program to inform and provide the public with opportunities to be involved in decisions for the site.

We have a court reporter, as you may have noticed, for tonight's public meeting who is making a formal record of public comments and a transcript of the entire meeting. That transcript, I've been told, will be available at the local information repository, which is at the Carson library, and DTSC Long Beach office in approximately two weeks. The exact location of the repository as well as the names and numbers of the project contacts are also in the fact sheet. And there again, there are extra copies at the rear table if you haven't received one of those to date.

As part of the public participation program we announced the 30-day public comment period in a display advertisement in the local news sections of both the L.A. Times and the Daily Breeze as well as the aforementioned fact sheet, and that fact sheet

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was mailed to approximately 1,800 addresses on the developed site mailing list.

Again, we want to keep that mailing list current and up to date. Please sign in, if you haven't, before you leave so we can keep that mailing list current and accurate.

Tonight on our panel we have three DTSC staff and one representative from BKK Corporation.

Mr. Hamid Saebfar is from DTSC. Mr. Saebfar is branch chief in the site mitigation branch, and he will explain the site cleanup process.

We invited Mr. Paul Neff, director of regulatory compliance for BKK Corporation, to provide information on the site background.

Mr. Thomas Cota. Tom is the DTSC project manager for the site and will address the remedial investigation. Then Dr. Kimi Klein, DTSC staff toxicologist, will present a summary of the health risk assessment findings. Then Mr. Cota will return with a presentation on the remedial action proposal.

The question-and-comment period, as I said, will follow that last presentation. Also here tonight representing DTSC is Mr. Dan Weingarten, staff attorney. Dan.

With this presentation then, under

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cleanup process, let me introduce to you again Mr. Hamid Saebfar.

MR. SAEBFAR: Thank you, Ed. Good evening, ladies and gentlemen.

As Ed mentioned, my name is Hamid Saebfar, and I'm the chief of site mitigation for the Department of Toxic Substances Control, one of the agencies within California EPA.

The department is charged with the mission to protect the public health and environment.

We do this primarily in three basic steps wherein the department can regulate the management of hazardous wastes.

We conduct or oversee the remediation of hazardous waste and we promote the development of alternative technologies through pollution prevention, also resource recovery and recycling.

My responsibility on the site mitigation program consists of site evaluation, investigation and remediation of properties contaminated with hazardous substances in Southern California, which covers an area from Santa Barbara to San Diego County.

Tonight I would like to briefly explain the department's role at the Cal Compact Landfill, the site mitigation process, including the California

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Environmental Quality Act, commonly referred to as CEQA, and the role of BKK Corporation in the development of the draft remedial action plan, also known as the RAP.

The department's role in this project is to ensure that all applicable state and federal laws and regulations are met and followed during the mitigation for this site.

Site mitigation begins with the identification of the potential hazardous substances released at the site.

After the site has been identified, a preliminary endangerment assessment is conducted. The preliminary assessment consists of a record search, limited field investigation and risk assessment to determine if the site poses a threat to public health and the environment.

If the preliminary endangerment assessment determines that there is a threat to public health, a comprehensive field investigation is conducted.

The next phase is called the remedial investigation, during which a significant number of soil, air and groundwater samples are taken at various locations at the site to determine the area and extent

Page 10

of contamination.

As part of this investigation, a baseline risk assessment is prepared to identify the potential risks associated with the site. During the remedial investigation, a feasibility study is also conducted to evaluate various remedial alternatives. The remedial alternatives identified in the feasibility study are further evaluated using various criteria in developing a proposed draft RAP, which is the subject of our discussion here tonight.

Once the RAP has been finalized, a remedial design, which is an engineering document that specifies exactly how remedial systems are constructed, is prepared, approved and implemented.

Upon completion of the RAP, the site is certified and the remediation then will proceed to the long-term operation and maintenance phase.

It's important to note that throughout this process DTSC implements a meaningful public participation plan, and the criteria of community acceptance is fundamental to our final decision-making process. That is why we are here tonight, accepting your comments regarding the draft RAP and the proposed supplemental negative declaration which was prepared to comply with CEQA requirements.

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The department has been working with BKK Corporation, one of the potentially responsible parties for this site, in preparing the RI/FS and the draft RAP. The department and BKK have entered into an enforceable administrative consent agreement in which BKK has agreed to perform the RI/FS -- the RAP for the upper operable area of the site.

Due to the size and complexity of this site, the department has determined that its phased analysis and response is necessary and appropriate to achieve a complete remediation of this site. In this phased approach, we have divided the site into two operable units.

The first operable unit is designated as upper operable unit, consisting of soil and a waste zone above and within the Bellflower Aquitard, which includes an area from the surface to approximately 90 feet below mean sea level.

The second operable unit covers the area below the 90 feet which consists of the Gage, Lynwood and Silverado aquifers and all areas impacted by the aerial extent of any hazardous substances which may have migrated or may migrate from the site.

The department will pursue potentially responsible parties in characterizing and, if

Page 12

necessary, remediating the lower operable unit at a later date.

As I mentioned earlier, we're here tonight to discuss the draft RAP for the upper operable unit and to hear your thoughts on this proposal. Comments will be accepted tonight and during the remainder of the public comment period, which concludes on September 25th.

Now I would like to introduce Mr. Paul Neff of BKK Corporation who will give you a brief description of the Cal Compact Landfill.

Thank you.

MR. NEFF: Thank you, Hamid.

My name is Paul Neff, I'm with BKK Corporation. We are the entity that merged the former Cal Compact, Incorporated, the company who was the operator of the site sometime ago -- a couple of decades ago.

I want to give you a very brief history of the landfill and tell you about its location and its size.

The site is located in Carson. It's bounded on the north by the Del Amo Boulevard extension, on the west by Main Street as well as a residential area. It's bounded on the south by the

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Torrance lateral channel, as you can see in the sketch, as well as a residential area, and it's bounded on the east by the San Diego Freeway and the Dominguez Channel. It occupies approximately 157 acres.

The sketch that you see on the screen depicts the general landfill configuration as it occurred.

This site was permitted by the Los Angeles County Department of Public Works with an industrial waste discharge permit for a Class II landfill, which means it was permitted to accept commercial and certain specified industrial wastes.

Some of these today are categorized as hazardous wastes.

The site was filled in a sequence, beginning on the east by opening long trenches to a depth -- a maximum depth of approximately 60 feet.

The deepest zone that we have on-site -- the deepest waste zone we have on-site that we have found is about 60 feet thick. The soil was piled to one side of the trench, the trench was filled and a portion of that soil was used each day for cover. And when the trench was finally filled altogether and mounded, then that trench was completed and a new trench was opened up.

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But as you can see, this was not a complete filling of the entire site. These haul roads are, today, paved streets and they sit over undisturbed native soil. So we have relatively discrete waste zones around the site.

The permits where issued for this site for very practical reasons at the time. The site was unused. The area in the '30s was largely agricultural and this was a low area and it was subject to annual flooding. And one of the purposes of granting landfilling permits in the area, as well as others nearby, was the construction of usable land.

The site took -- over its history -- it was operated between 1959 and it was -- operation ceased in early 1965. It accepted somewhere between 6 and 8 million cubic yards of waste, of which it's estimated, perhaps, 3- to 500,000 cubic yards might be, today, categorized as hazardous.

With that, I'm going to turn things over to Thomas Cota, who is the project manager for DTSC for the remedial investigation and feasibility study and preparation of the draft RAP for the project, who will go into the outcome of the RI and the FS.

MR. COTA: Good evening, ladies and gentlemen.

As Paul mentioned, my name is Thomas

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Cota. I'm the project manager for the Cal Compact Landfill for the Department of Toxic Substances Control. My presentation tonight will cover the remedial investigation, the feasibility study and later on I'll address the draft remedial action plan, commonly referred to as a draft RAP, the California Environmental Quality Act and a proposed project schedule.

Over the last several years there have been a number of remedial investigations conducted at the Cal Compact Landfill. The information collected during these investigations has been compiled into the remedial investigation report.

First, I'd like to explain some terms that I'll be using during my presentation.

An aquitard. An aquitard is a layer of soil and rock below the ground surface that contains some water; however, it's not enough water to be pumped for beneficial uses.

An aquifer. An aquifer, on the other hand, is a layer of soil and rock below the surface of the earth that is fully saturated with water and then, when pumped, will provide significant amounts of water.

I'll be using cross-sections. And a

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cross-section is a photograph or a drawing of a plain surface exposed as you cut through that surface. In a minute, I'll have -- there's a cross-section up on the slide, and I'll explain a little bit more how the cross-sections where developed.

Data collected during the remedial investigation fill work permits us to depict the site conditions through the use of these cross-sections.

As you can see -- maybe we can turn down one more set of lights. I don't know if it --

As you can see on this cross-section, there's a lot of information contained on here. And let me identify some of the more important -- or just identify some of the information.

This red section right here consists of the cover soil on top of a waste zone. The waste zone is this blue section. This could represent, looking at it here, one of these areas of where waste was deposited. This green layer is a unit of clay or a layer of clay which was identified during our field investigations. The yellow and red zones identify different types of soil such as sand, silt, silty sands.

This whole unit, from the top surface down to approximately 80 to 90 feet below mean sea

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level is the upper operable unit. The Bellflower Aquitard starts approximately about 15 to 20 feet below mean sea level and goes down to roughly 80 to 90 feet below mean sea level.

The Gage aquifer starts roughly below that and extends down to the top of the Lynwood, and further on down is the Silverado aquifer, which is the drinking water aquifer.

I'd like to show you how we take a cross-section. During our field investigations, we obtained a number of samples along the western portion of the property. We take this information, kind of tilt it this way and we run it from here to here.

This section is marked with an A going to an A prime. You can see up here we have A and over here is our A prime. As we start along here, you can see where we cross a waste zone that is depicted by the blue going along to the south.

These points that go vertically across the site are areas in which we took soil or groundwater samples. Samples were taken at different locations and different elevations. The blue circles indicate groundwater samples that were detected with total volatile organic compounds. The soil cover thickness varies from 3 feet to a maximum thickness of

Page 18

30 feet with an average thickness of approximately 4 feet.

Several heavy metals, such as zinc and leads, where detected in the soil cover; however, these metals where found below hazardous waste concentrations. Volatile organic and semi-volatile organic compounds were also detected in the soil cover. An example of volatile organic compounds is toluene. An example of semi-volatile organic compounds is naphthalene. Low levels of pesticides where also detected. DDT and its breakdown product DDD were the types of pesticides identified.

The waste zone – can you show that other cross-section?

The next one – this cross-section goes from C to C prime. And let me show you where this one's going from. This is taking it from this point to this point, turning it this way and we'll run it this way.

The waste zone – see a little bit better – here and here thickness increases from 0 adjacent to the small voids to a maximum thickness of 60 feet in the interior of the waste cells.

Laboratory analysis from samples obtained in the waste zone detected volatile organic compounds

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such as benzene, toluene and xylene, semi-volatile organic compounds such as naphthalene and phenol, heavy metals such as chromium, lead and nickel, and pesticides such as DDT and breakdown products.

An air survey in the waste zone was conducted by McClaren Hart in 1991. The result of an air study identified several chemicals in a gaseous state, among them ethylbenzene, toluene, xylene, dichlorofluoromethane, methane, carbon monoxide and nitrogen.

Groundwater in the Bellflower Aquitard is first encountered at a relatively shallow depth, approximately 50 feet below ground surface, approximately somewheres around here. The groundwater contained in the Bellflower Aquitard is not a drinking source, nor is it used for other beneficial uses; however, water coming from the site may threaten other beneficial waters near the site.

The Bellflower Aquitard extends down to a depth of 80 to 90 feet below mean sea level throughout the site. Several groundwater investigations have been conducted at this site over the past several years. The groundwater moves very slowly from the Bellflower Aquitard in a south-southwesterly direction this way.

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Samples where collected at approximately 100- to 300-foot intervals along the western and southwestern portion of the site. The hazardous substances identified can be grouped into three major classes: Volatile organic compounds, semi-volatile organic compounds and metals. No pesticides where detected in the groundwater. The dispersion of these chemicals varied along the perimeter of the site.

This overhead depicts the total volatile organic compounds and the plumes which we've identified.

The highest concentration of these compounds were identified in the south-southwesterly section; however, all along the southern portion total volatile organic compounds where also identified and up along in through here.

Some off-site contamination has also been detected, as you can see on this map, along the southwestern side of the site.

Now I'd like to discuss the feasibility study. The remedial alternatives where evaluated in the feasibility study.

The feasibility study process involves the development, screening and detailed evaluation of the remedial alternative actions. The remedial

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alternative evaluation in the feasibility study for the Cal Compact Landfill included no action in which the site would be left as is, limited action monitoring of the groundwater and landfill gases, excavation and off-site incineration with groundwater treatment, excavation and off-site disposal with groundwater treatment, containment with collection and treatment of landfill gases and groundwater, containment with monitoring of landfill gases and the collection and treatment of groundwater.

These alternatives where evaluated using the criteria identified in the National Contingency Plan. The National Contingency Plan are the federal regulations that are followed by the state in the remedial process of hazardous waste sites.

The nine evaluation criteria are overall protection of human health and environmental compliance, the applicable or relevant and appropriate requirements commonly referred to as ARAR's, long-term effectiveness and permanence, reduction in toxicity, mobility and volume through treatment, short-term effectiveness and implementability cost, state acceptance and community acceptance.

Now I would like to introduce Dr. Kimi Klein, staff toxicologist from the Department of Toxic

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Substances Control to discuss the baseline risk assessment.

Dr. Kimi Klein.

DR. KLEIN: Is it on? Okay.

My name is Dr. Kimi Klein. I'm a toxicologist with the Department of Toxic Substances located in Sacramento, and I'm down here to describe to you the risk assessment that was done for this site. I wanted to tell you that the risk assessment was done, assuming the first alternative in the feasibility – in Tom's list of remedial alternatives, that is assuming no action has been taken at this site.

Before I describe and summarize the risk assessment, I will just give you a brief overview of what the risk assessment is. It's a series of boxes that look like this.

As Tom has described, the very first part of a risk assessment is to collect data and evaluate data. And he's told you that there's been a considerable amount of work done to collect data that describes the physical characteristics at the site as well as identifying the chemicals that are present at that site in the soil, in the groundwater underlying the site and also that could be evaporating into the

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air above the site. And that is what we do in the data collection – data evaluation part of the risk assessment.

The other part of a risk assessment is that after identifying those chemicals which we have found at the site, we try to determine what those chemicals can do to either humans in regard to their health, or to the environment, and that's what we do in the toxicity assessment portion of the risk assessment.

So, after having identified the chemicals, we identify those health effects that might occur if you are exposed to those chemicals.

The major portion of a risk assessment that we do in the department is exposure assessment.

And in an exposure assessment,

which I'm going to go into more detail in just a few minutes, we try to determine what the dose is of – that people could be – that people could take in by being – living on the site, near the site, working on the site, near the site, et cetera. So we try to determine what the exposure is to those people and what the dose might be.

Then, finally, after we determine what the dose is of all of chemicals that are coming from

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that site and having information about the toxicity of those chemicals, then we can describe what the risk would be as a result of that exposure. So basically in a nut shell that's what the risk assessment process is.

Now, as I said, the major portion of our risk assessment is exposure assessment. And the outcome is what are the doses; what are the doses that people are getting if they live at the site, live near the site, if they work on the site, if they're doing construction work at the site, et cetera.

So we try to – so that's – that's what our final outcome is. We do that by trying to determine how is a chemical released from the site; who are the populations that may be exposed to the site; what are the ways that people can be exposed, that is to say, are they breathing the air, if so, how much air are they breathing; are they in getting the water that's been contaminated by the site, if so, how much are they getting and the like.

So finally – here's a lovely original drawing of a very simple schematic of a very complex site.

This is the landfill with the waste.

This is the Bellflower Aquitard, and these are the

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different things that can happen to chemicals that have been deposited at the landfill over its operating life. And these arrows here are put there to describe the direct air emissions of the volatile chemicals that Tom described.

So, the chemicals, they have the ability to evaporate in the air, chemicals that have the – that have been generated in the landfill and then subsequently go – get into the air. And that is really a major exposure pathway at this site.

The other major exposure pathway is the leaching of chemicals from the site to the groundwater, and that is – simply means the movement of chemicals from the waste cell through the soil and into the groundwater.

So basically what this risk assessment did was we looked at three different kinds of scenarios. The first scenario that we looked at was, okay, what if we allowed housing to be built directly on the site, and not only did we allow housing to be built on the site, but the people who lived in those houses grew vegetables that they were going to eat.

And not only that, but each house would have a well that took – that reached the Bellflower, and that this water would be the water that they would drink

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and that they would bathe in and that they would shower in.

We also, under this scenario, looked at the houses that might be – that, in fact, do exist right off-site here and tried to determine what the risk would be. That was the first scenario.

In that scenario we found that the risk where, in deed, quite high. And most of that risk is due to the ingestion of the contaminated groundwater. About 11 percent of the risk comes from the inhalation of chemicals that are in the air.

And when I say, "risk," I mean there's actually three kinds of risk that we look at. One is cancer risk, which I'm sure all of you are familiar with. The other is a risk due to noncarcinogenic or noncancer effects of certain chemicals.

I mean, not all chemicals – not all bad chemicals cause cancer, but there are other kinds of effects that might occur. For example, it might have some effects on the reproductive system or you can have some effects on the central nervous system and the like.

The third kind of risk that we looked at is the risk due to the accumulation of methane, which is a very common landfill gas that is quite explosive

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if it is contained within a closed – in an enclosed area. And we looked at – so those are the three kinds of risk that we looked at under this scenario which I just described, and all of those risks are quite high.

The second scenario we looked at is very close to what we think the real use of this site, which is a commercial or industrial scenario. And in this scenario, rather than living on the site, we assumed that workers worked on the site, that there was a building here and workers came – came to work here, but they did not drink the water; that they did not – there where no wells in our scenario that reached the Bellflower aquifer (sic), instead, they drink the water that is supplied by the city.

Under this scenario, then, as you can well imagine, most of that risk comes from inhaling the air that is contaminated with chemicals, either being generated by the site or evaporating by the site. This risk is on the order of 1 in – 1 in 10,000; that is to say, if 10,000 people were exposed to the chemicals that exist at this site over the period of their working life, perhaps 1 of them might get cancer.

The noncarcinogenic risks where rather

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low, but in this case the methane risks where about the same as they would be for a house, if you assume that the commercial building had some areas that were below ground where methane could, in deed, accumulate.

Now, the third scenario that we looked at was a construction scenario or an excavation scenario.

And this scenario assumes for a period of two years there would be extensive construction going on.

You can well imagine that, perhaps, there would be an increase in the chemicals that might volatilize off from the site, but here again we did not assume that construction workers would be drinking the water from the Bellflower, we assumed they would be drinking water from the city water supply. In this scenario the risks where somewhat in between the residential scenario and the commercial scenario.

So that is my presentation. And I will give the microphone back to Tom Cota.

MR. COTA: Now I'd like to address the draft remedial action plan, the California Environmental Quality Act, and the proposed project schedule.

The chosen remedial actions for the upper operable unit at the Cal Compact Landfill include containment, construction of the landfill cap over the entire site and collection and treatment of the

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landfill gases, and collection and treatment of the groundwater contained in the Bellflower Aquitard.

Briefly, I will mention the remedial alternatives chosen and how they will provide protection for the human health and the environment.

Containment by construction of a landfill cap. The construction of landfill cap will provide a protected barrier. It will contain the waste in place. It provides a protective barrier from the waste, the landfill gases, and from the dust that is currently being generated from the site soil cover. It prevents contaminants found in the soil from washing off-site during rain storms. It prevents contaminants -- it prevents rain water and surface water from percolating through the waste zone. This reduces the amount of additional groundwater contaminants from which can be mentioned the leachate that would be generated. And it aids in reducing the generation of landfill gases.

The collection and treatment of the landfill gases. By collecting and treating the landfill gases, we will prevent the escape of these gases to the atmosphere. It reduces the chances of human exposure to the landfill gases. It reduces the chances of upset by reducing the potential buildup of

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the landfill gases. And it provides a permanent destruction of these gases through treatment through a landfill gas flare.

The collection and treatment of groundwater. The groundwater treatment system will collect and treat the downgradient contaminated water flowing from the upper operable unit. This will reduce the chance of human exposure to the contaminants found in the groundwater. It controls or prevents further off-site migrations. It reduces the concentration of contaminants available to migrate downward to the lower aquifer.

The construction of landfill cap involves implementation of clean fill soil that will be compacted on the existing soil cover. A site-specific health and safety plan will be submitted to the department prior to the start of any field work.

The landfill gas system will consist of a series of gas collection wells installed along the perimeter of the waste zone. The collected gases will be thermally treated in a landfill flare unit located to the northeast -- located in the northeast portion of the landfill -- northeast portion of the site and permitted by the South Coast AQMD. The flare system will be equipped with required air pollution devices

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to meet all their codes prior to its operation.

The groundwater treatment system. The groundwater treatment system will be designed to capture all of the contaminated groundwater coming from the site and to contain and pull back off-site contaminations. The system will consist of a series of groundwater extraction wells located along the west and southern perimeter of the site.

The extracted water will pass through a series of filters to remove the metals, then through a series of activated carbon canisters to remove volatile and semi-volatile compounds. The treated groundwater will then be used for site irrigation or discharge to sewer or storm drain systems.

The draft RAP identifies specific monitoring, measured -- and field activities required during the construction phases. They include the following: A dust and particulate monitoring plan.

Air will be monitored for lead, hexavalent chromium and particulates smaller than 10 microns in size.

There will be dust and particulate control which will comply with South Coast Air Quality Management District Rule 403. Use of water suppression devices to prevent the generation of dust. Roads will be swept regularly. Trucks will

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be tarped and washed prior to exiting the site.

There will be a traffic control plan.

Traffic and vehicles must follow a site-specific route plan. Transportation of materials or off-site parking in residential neighborhoods will not be permitted.

There will be a noise control and monitoring plan. In general, loading and unloading and staging areas will be located away from residential areas. Noise monitoring will be conducted at nearby residents' property boundaries.

There will be an odor control monitoring plan wherein objectionable odors will be identified and will have to meet the South Coast Air Quality Management nuisance requirements.

There will be a health and safety plan for each specific activity to be conducted under the remedial action plan.

Now I'd like to talk about the CEQA process. Under the California Environmental Quality Act process, the department is required to complete an initial study to identify any potentially significant impact the remedial project may pose to the environment. If the project does not pose a significant impact to the environment, a negative declaration is typically prepared; however, if the

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initial study indicates that the project may pose a significant environmental impact, then a mitigated negative declaration or an environmental impact report, commonly known as an EIR, is prepared.

An EIR was proposed and certified by the city of the Carson for the preparation for future development of the site. Part of the EIR addressed the construction of the landfill cap. The department, acting as a responsible agency, has reviewed the EIR and has concurred with the city of Carson's findings.

However, some of the remedial activities where not fully addressed in the EIR due to the fact that it was not feasible at that time; therefore, the department conducted an initial study addressing the landfill gas and groundwater collection and treatment systems.

The initial study indicates that, as proposed, no significant impacts on the environment will

result from the proposed activities, which are (19) the construction and operation of the landfill gas (20) collection system and groundwater collection and (21) treatment system. The department has, therefore, (22) proposed a supplemental negative declaration for this (23) project.
(24) Project schedule. After the public (25) comment period has ended, the department will review

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(1) and address all comments received. During this time, (2) some field investigation for pilot studies may take (3) place at the site. These investigations are required (4) to obtain additional information for future designs.
(5) The department and the city of the Carson (6) will review all submitted workplans and approve them (7) prior to any field activities. A final notice of the (8) department's decision to approve or modify the (9) existing RAP will be provided to interested parties on (10) the Cal Compact mailing list. Once the remedial (11) action plan is approved, it will take approximately (12) one year to construct the landfill cap. The gas and (13) groundwater treatment systems should only require (14) three to five months to install.
(15) Prior to any remedial or construction (16) activities, additional groundwater monitoring wells (17) will be installed and sampled. The proposed schedule (18) is to start construction on the remedial activities (19) once the RAP is approved.
(20) This concludes my presentation. and I (21) thank you for your cooperation and attention.
(22) DR. SCHUMACHER: Thank you, Tom.
(23) The Department of Toxic Substances (24) Control's next step regarding public formal comments (25) are, first, we will hear your comments tonight and

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(1) continue to receive written comments until the end of (2) the public comment period, September 25th.
(3) If you have comments after tonight, (4) please submit them in writing. If you wish to review (5) the draft remedial action plan and the proposed (6) supplemental negative declaration, they are both (7) available at the information repositories located at (8) the local library in Carson or DTSC's Long Beach (9) office.
(10) Second, written responses to each comment (11) will be prepared. After the close of this public (12) comment period, we will review all comments and (13) compare them with the draft remedial action plan, (14) proposed negative declaration and see if those (15) documents need to be modified. If they do, then (16) modifications will be made.
(17) The department staff prepares a document (18) called response to comments. It's a written document, (19) and all who submit formal comments during this 30-day (20) public comment period will be mailed a copy of that.
(21) Response to comments is the official written response (22) from the Department of Toxic Substances Control to all (23) who have submitted formal comments. It includes a (24) restatement of all comments and the department's (25) response to each of those comments.

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(1) Staff of the department will address (2) questions tonight whenever possible in addition to (3) receiving formal comments. When we reach a final (4) decision on the draft RAP and proposed negative (5) declaration, we'll place a copy of that final remedial (6) action plan in the information repositories for (7) review. And if it wasn't clear already, this response (8) to comments is part of that final remedial action (9) plan.
(10) The primary purpose of tonight's meeting (11) is, in fact, to listen and receive all of your formal (12) comments on the two documents that we have addressed (13) tonight relating to the current site mitigation (14) activities at the site. I can recognize speakers one (15) at a time for you to give us your formal comments.
(16) We would ask that you come up and use the (17) microphone in the audience and speak slowly and (18) clearly, as that will help the court reporter to hear (19) and record your comments, and please state your name (20) for the record.
(21) Also, we have the room reserved tonight (22) until 10:00. We can use as much of that time for your (23) participation this evening or as much of that time as (24) is needed.
(25) I can recognize folks one at a time.

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(1) The gentleman coming up.
(2) MR. KANE: Good evening. I'm Murray Kane. I'm (3) an attorney for Commercial Reality Projects, Inc.
(4) I wanted to clarify the record. It was (5) stated that they are the owner of the site and the (6) owner of the security interest. The accurate (7) statement would be, and the record should reflect, (8) that they hold a security interest in the site and (9) that they are not, as we speak, the owner of the site.
(10) So I just wanted to clarify the record.
(11) Thank you.
(12) DR. SCHUMACHER: Thank you very much. I'll (13) recognize the person --
(14) MR. COLBOTH: Gary Colboth, C-o-l-b-o-t-h, of (15) Carson, California.
(16) Please take my comments as community (17) input that should be made part of the official file in (18) this matter to the extent allowed by state laws (19) regarding administrative procedures.
(20) I raised a number of issues by letter to (21) you dated June the 15th, 1995, four months ago, and (22) many of those issues are not resolved by the remedial (23) action plan, which is very general. The public needs (24) a specific RAP to be able to make meaningful (25) comments.

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(1) My four-page letter to you, of June 15th, (2) raises some 15 categories of questions, many of which (3) I've not received any specific response. For the (4) department to say "We don't know" or "We don't have (5) that data" does not meet your obligation to respond to (6) public input. Unless citizens receive specific (7) answers, these meetings to invite public input are (8) mere charades.
(9) I'll highlight some of the questions (10) asked earlier.
(11) How will dangerous dust be avoided during (12) the cleanup and construction since the -- since the (13) cap has only 3 foot of dirt, and if you start moving (14) in there and doing construction, you're going to be (15) stirring up some of this dangerous waste.
(16) Some of us are concerned that we do not (17) know the extent of the contamination. There's no (18) record of what was dumped on that site for a 19-month (19) period, and the borings and monitor wells have been on (20) the perimeter and interior roads, places that would (21) not measure the worse contaminants. If it's too (22) dangerous for testing and evaluation to bore into the (23)

heart of the landfill, would it also not be too dangerous to drive thousands of construction piles into the same fill? We appear to be in the situation

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talking about cleanup without knowing the precise nature of the contamination to be cleaned up.

Has the department concluded that a landfill gas collection and treatment system will not be initially required? It's put on the chart as a given, a done deal, but in the flier that was mailed out, you talked about it appears to be necessary.

How did the department come to the conclusion without boring into the heart of the landfill and collecting samples whether or not we're going to need the gas collection and treatment system?

How many other contamination sites in California have been cleaned up using this vertically-phased approach without cleaning up the top half and proceeding with construction without cleaning up the lower half? When would the lower half be cleaned up? What is the extent of the contamination of the lower half? How would the cleaning of the lower half be financed?

Is it the practice of the department, when faced with a project of, quote, in your words, size and complexity, close quote, to, quote, divide it into two operable units, close quote? Is it, further, the practice of the department to only clean

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up half of the project when they're of great size and complexity?

In the past four months, has there been attempts to hold any of the other 12 PRPs, potentially responsible parties, liable for any cleanup costs?

Are we on a course by which the shopping center tenants or bond holder, in the event of default, will pay for the upper unit and no one will pay for the lower unit because it will not be cleaned up; thus, none of the polluters would end up paying any of the costs of cleanup?

In what way has the department coordinated with the regional water quality control board about the vertically-phased, two-tier approach of cleaning the top and not the bottom? What is the opinion of the water board about the vertical-phasing of the cleanup?

The soil at the site will be unstable in the event of an earthquake. Does the department have data to conclude that the proposed gas cap barrier, gas collection system, if we're going to have such a thing, and structures can withstand an earthquake which may produce significant debris consolidation, settlement and liquefaction?

What will be done to the two abandoned

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wells on the site? What is the extent of the danger that the wells might become channels to allow contaminants to flow down into the lower aquifer and damage the drinking water supply? What specific provision is made for the RAP? It seems to me the RAP should address some of those kinds of issues.

Have experts other than those being paid by developers been involved in providing data to the department? Are the experts involved influenced by having a financial interest in having the project go forward?

For example, you write that, quote, as a potentially responsible party, BKK has conducted the remedial investigation for the portion of the site known as the upper operable unit. Is this not analogous to asking the fox to investigate the chicken coop? Does not BKK have an enormous financial interest in having this project go forward so shopping mall tenants or, in the event of default, bond holders, will spend the millions of dollars to clean up the site rather than having BKK spend its own money to clean up the site?

What person concluded that the site cleanup could be accomplished without significant environmental impacts? Did that person realize that

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there would be massive truck traffic, earthmoving, dust, driving of thousands of piles into the ground adjacent to residential areas, pumping and treating of water that could contaminate groundwater and related activities?

It seems that a negative declaration in the face of all this seems wildly inappropriate.

I'll give you this, the writing, for your file.

DR. SCHUMACHER: Okay. All of these questions and comments will be entered into the record and be addressed in response to comments. But I think our branch chief wanted to be able to answer questions when possible tonight as to some information that we already have.

And, Hamid, maybe I can ask you if you had a response to some of the questions tonight. I'll also give you some additional information, and I'll give this to Hamid so he can look at the written copy.

MR SAEBFAR: I'm not going to try and attempt to answer all questions tonight, but as Ed says, we will go ahead and respond to these in the final RAP.

To answer questions about the regional quality control board involvement with this project, their involved with the project – they're assisting

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us in reviewing documents, so they're involved.

Concerning about the other concerns you raised about gas collection system, the gas collection system is part of the final remediation. When we started investigating the site, we were somewhat surprised to see the amount of gas we were collecting on the site, the amount of gas that's being generated from the site, and that's why the language was put in.

But usually when you deal with landfills, you deal with them three ways: You put a cap on it, you have a soil and gas collection system and you've got a groundwater leachate collection system and treatment system; and that's what you're having – that's what we're doing for this project. So it's pretty much consistent with closures of landfills.

Concerning the dust, truck traffic and all those issues, they really have been addressed in the EIR that was done. It – that's part of the negative declaration we did. The negative declaration really dealt with the soil, gas and groundwater treatment system. That's what we're dealing with as far as the negative dec. The rest of it is dealt with – the cap itself is dealt with in the EIR.

And also, I should point out that during our investigation and remediation there will be a

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health and safety plan that monitors the site to make sure the dust is adequately contained. And, again, when we do any excavation treatment, you would need permits from the South Coast Air Quality Management to make sure that's being adhered to. Those things will be addressed.
I couldn't write fast enough, but let me just tell you this, that we will go ahead and respond to your comments. It's an official document that you have submitted, and we will respond to them.
MR. COLBOTH: When will that –
I raised a bunch of issues.
MR. SAEBFAR: We will give you comments within the next two weeks. We also include your comments in the final RAP.
MR. COLBOTH: Okay.
MR. McHALE: My name is Marty McHale.
The state of the art is a term that has been bandied around an awful lot here today. Today state of the art, and tomorrow it becomes obsolete and inadequate and doesn't perform and can't fulfill its job, its performance is nil.
The gas collection system is one area I'm very worried about. It's only good as long as it's maintained. Has there been a long-range commitments

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for some responsible party to maintain this gas collection system or is it going to be like a lot of them, five years from now the thing is not running and it's obsolete? That's what I'm concerned about.
MR. SAEBFAR: As I mentioned earlier, that operation and maintenance is going to be addressed, the gas collection system and the cap at this site and the groundwater, we will have an agreement in place which includes financial assurances that this system is going to operate.
Given landfills, this system probably is going to operate for a number of years, but that is going to be part of the operation and maintenance agreements that we're going to have to make sure that's being done.
MR. McHALE: What recourse will this public have to, say, 10 years from now, 12 years from now, we find out that – I'm a neighbor of this project – that my home is full of methane, what recourse do I have to that?
MR. SAEBFAR: Well, hopefully we're doing the job. Again, our mission is to protect public health and the environment. We're going to make sure that responsible parties address it or the department will take action.

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MR. McHALE: It's a long-range commitment?
MR. SAEBFAR: Yes.
MR. McHALE: Thank you.
DR. SCHUMACHER: Did that answer your question, Mr. McHale?
MR. McHALE: Yes. Thank you.
DR. SCHUMACHER: Are there other questions? I didn't see too many hands out there this evening.
MR. WARNER: I'm Rodney Warner.
First, I'm a little confused with who the owner of the site is, since all the questions came up about securities and et cetera. Who's the owner of the site?
MR. WEINGARTEN: The owner of the site is – well, the owner's in bankruptcy, World Industrial Center.
There's a bankruptcy and, perhaps, the attorney for Sierra Peak can explain this better than I can, but there is a – there was a note, I think owned by the FDIC, security on the property, all right? And the bankruptcy trustee allowed that note to be purchased, okay, by Carson Realty Projects.
Carson Realty Projects owns the security interest in the property. Okay. They are not the titled owner of the property. The titled owner of the

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property would still presently be World Industrial Center until such time as the note is foreclosed upon.
DR. SCHUMACHER: Did that answer that question?
MR. WARNER: Yes, it did.
Ed said earlier, when the site was first opened, all the proper documents and permits where had, and what was – was there any illegal dumping at the site during this period?
MR. WEINGARTEN: Well, that's actually a controversial question. What's meant by "illegal"?
You're actually calling for a legal conclusion about the activities.
Remember, these activities – this was a permitted landfill during the period of, I believe, 1959 through 1965. It was permitted to take many of these materials.
MR. WARNER: Sure.
MR. WEINGARTEN: Superfund law actually postdates these activities, and there's obviously some argument.
I'm not going to state the department's position on whether these activities would, in our view, be considered legal. We believe that we have the legal authority to force potentially responsible parties to pay for the investigation and cleanup of

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these hazardous substances released there.
The argument about whether this –
whether the activity at the time was legal is still controversial in the legal community and in the courts, but it's not really, at this point, material to our authority to enforce, especially under federal law.
MR. WARNER: The discussion about – I forget who was having the discussion about the city water versus the Bellflower aquifer. The Bellflower aquifer, is that drinking water?
MR. COTA: No, it's not.
DR. SCHUMACHER: Tom.
MR. COTA: First of all, the Bellflower is an aquitard, it doesn't produce enough water to be used to be beneficial as an aquifer. It is not a drinking water source. The drinking water source is found approximately 1000 or so feet below mean sea level, that would be the Silverado aquifer.
MR. WARNER: As far as intake doses that were discussed, what is the radius of that study? I mean, what radius is that going to be consumed? What area, one mile, two miles, 50 feet from the site? What is the radius going to be as far as studies to determine –

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DR. KLEIN: The assessment that was performed for the site was bounded by the site boundaries

itself for all of the scenarios that I described except for the off-site residents; that is to say, the person that's living off-site. So that's –
MR. WARNER: Is that realistic?
DR. KLEIN: It's realistic in the sense that –
well, you say in terms of what – when I talked about the risk assessment, I said that the two primary pathways is breathing air, and I presume that by your question you're saying is it realistic to say that air is going to stay on top of that site and not move anywhere?
MR. WARNER: Or even water pathways.
DR. KLEIN: Let's talk about the air first.
In terms of the air, common sense will tell you that even if you – the most conservative estimate of the exposure by breathing contaminated air would be to – assume that a house is being built right next to the site or a house exists right next to the site and the people that live in that house would be breathing the highest concentration of air coming off of that site.
And that, indeed, what that risk assessment – what our risk assessment says in regard

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to the drinking – in regard to the Bellflower Aquitard, as Tom says, the Bellflower Aquitard is not really a source of drinking water; however, to be very conservative and to assess the content of contamination in that groundwater, we assumed that – that it was a drinking water source.
We assumed that there was enough water there that you could pull up and actually use as a drinking water source. But, in fact, that was a very conservative assumption, because there's just simply not enough water there to act – to provide drinking water at all.
Does that answer your questions?
MR. WARNER: Basically.
DR. KLEIN: I can try to restate it to make it –
MR. WARNER: Basically answered the question.
I mean, like you said, there's not much you can do about air, so –
There was some discussion about public acceptance of the implementation. How is that going to be determined? Is it going to be some big massive vote in the South Bay area, or I didn't – I don't really know how the determination is going to be made that the public is going to accept this plan.

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DR. SCHUMACHER: Well, the first answer – then I'll yield to Dan – is the public participation plan for the site includes public participation in the process that you're participating in right now.
The public comment period lasts for 30 days. And we had public notice with a quite extensive mailing list, 1800 addresses as well as large quarter page of the L.A. Times and also the Daily Breeze; so we have the requirement of public notice and the public comment period. So you are participating right now in that.
There's no referendum or formal voting that will go on on any segment of this in the larger community, but I think Dan and Hamid will have something to add to that, but I wanted to start with that answer in terms of public participation program.
MR. WEINGARTEN: It is a legal requirement for the department to engage the public in responding to the plans that may, indeed, effect them. The decision-maker here is the department, but one of the requirements is we do take into account public participation and public comments in our final decision, which is embodied in the final RAP.
The draft RAP is a draft document. We

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are legally bound to take into account your comments, to respond appropriately. And where we deem it appropriate, to change elements of that draft RAP.
It's entirely feasible that that can happen. That would be reflected in the final RAP or in changes in the final RAP.
Part of the process is not a voting process, and it is limited to the fact of communication in terms of public participation.
MR. WARNER: I guess my last question is why not – well, the scenarios up there – one extreme would be excavation of the entire site, basically.
Why wasn't that taken into consideration? Why was it not chosen for implementation?
MR. COTA: We evaluated excavation of the site and shipping it off-site to an off-site incinerator.
When you look at the implementability, the effectiveness and the cost in that scenario, the cost was in the neighborhood of hundreds of millions of dollars to do that.
That scenario – the risk assessment also showed if we were going to excavate that site, it would take – or just the opening and exposing of the waste to the atmosphere, we would have a significant risk in that scenario. So that was another reason why

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it would not be an effective method for handling that site.
Typically with landfills you want to protect human health by preventing those exposures, not digging them up and creating an exposure pathway.
So we did study that in the feasibility study, and it was screened out due to cost and also potential risk of excavation of the waste itself.
MR. WARNER: What is the risk after everything is said and done, capped, et cetera? That – unless I missed, that wasn't discussed. What is the risk, at the point everything is done?
DR. KLEIN: The risk would be exceedingly small, because as you – I'll just put this up again.
Because really what Tom is saying is that they – what they've decided – what they think that they can do is – really they're going to put a cap here, and that will effectively make all of these arrows disappear; that is to say, the cap is going to prevent significant evaporation of chemicals that exist in the site, and it's going to – well, that's basically what the cap will do.
The gas collection system will then prevent that other – the land – the generation of –

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landfill gases will be – the landfill gases, as they are generated, will be collected by the system, and it will be – it will be incinerated in the flare. And so those two – those two things, which are here graphically depicted by the arrows, effectively disappear. So the risk will now – due to the inhalation of chemicals that are in the air will be virtually nil.

In regard to the groundwater, Tom was discussing the treatment system on the perimeter of the site that – I don't know, did you want to go into that or –

MR. WARNER: Since he says that's not drinking water, I've been only concerned about the Silverado, which is another 900 feet.

MR. WEINGARTEN: Kind of in commonsensical terms, this remedy has three components to it. Each of those components is designed to address health and environment issues. Each of those will minimize existing problems at the landfill as it currently exists.

The cap will minimize those kinds of –

you've got gaseous emissions because, remember, these chemicals, particularly the volatiles, exist both in the liquid and vapor phase. And in the vapor phase

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they can escape the landfill, they can be inhaled by nearby residents. The dust can be inhaled by neighboring residents. Liquids or particulates like metals can be carried in the dust. All that will be reduced significantly by having a cap. This has been well-established in many site – many landfills.

The gas collection system is needed as the gas might be funneled under the cap. This is a form of capturing all that gas and destroying it. As it exists right now, you've got a problem where you have water – rain water and groundwater that moves through the site. And by having a capture system downgradient, you will be able to pick up all this contaminated leachate pump it into a treatment system, treat it and then discharge water either to the sewer or to the – or perhaps through what we call an NPDA permit can be discharged to the storm drain permitted at safe levels.

This, in our view, is an ideal solution for the site. It will have great benefits to the local public in terms of public health and safety and at protecting future groundwater sources by minimizing off-site migrations. I think this is what, in our view, must be kept in mind. And we feel this is important and we think it is a very fine remedy for

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this site.

In the ideal world, if there was unlimited amounts of funds, maybe you could dig up all of this material and take it somewhere else, and that might be a Superfund problem at some other location.

And it has already been indicated that kind of scenario poses its own serious risks.

So boiling down some of the science into a commonsensical approach, this is commonsensical and will have a great benefit for the city in terms of lowering the risk to the neighbors.

DR. KLEIN: I just want to make a comment about – you said the Bellflower is not a drinking water source, and so why are we worried about it.

MR. WARNER: Everybody missed everything I said. I asked about the Silverado.

DR. KLEIN: The concern that we have is that the drinking water – the contaminants that are in the Bellflower Aquitard could move down into the lower aquifers over time, over, you know, many, many years, and so it's better to treat it now and just pull it off rather than allowing that type of downward –

MR. WEINGARTEN: You must understand the presence of the cap minimizes what drives contaminant from the waste zone downwards. The rain water

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percolating down doesn't inherently fall. There needs to be a driving force.

By placing the cap over it, we are minimizing, to a great extent, the ability of any percolating water to get into the waste zone and to draw it down. The horizontal movement of the groundwater through the waste zone can be picked up by the waste water in the treatment system.

MR. WARNER: That answers the question.

Last question, and then I'll sit down.

I think the site has been dormant for awhile. What political business – or what's the knee-jerk reaction to the situation? What started it up to cause the –

why not 20 years from now to even clean it up?

I don't know what started all this. The site was closed and we realized then we needed to clean this up. How come something wasn't started in 1968? Is that when it was closed?

MR. SAEBFAR: '69.

MR. WARNER: That's quite a long period of time.

MR. WEINGARTEN: We've had ongoing investigation on this site in the last – I think someone talked about the number of years. We had an order that was issued in 1988 to identify potentially

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responsible parties. Only BKK, of those parties, came forward and came up to bat, so to speak, and had people – consultants go on-site and begin to investigate the site.

We are, like most agencies, limited in our resources. We do not have infinite resources. If we have one party – to, perhaps, address a comment made earlier – who's coming forward to comply, we normally, at that point, do not take all our litigation resources and our manpower and try to litigate against other potentially responsible parties who will tend to take advantage of the fact we have a complying party and try to get as much out of that as possible.

And this site now really has, I think, resources which are eventually going to be committed to the site to do what otherwise probably would not take place. It's very limited resources to – in fact, we don't have this money to spend. I will say about six or seven or eight years ago we had a fairly significant bond expenditure plan which gave us a great advantage.

We could spend – we could have identified PRPs, so we'd order them to do something.

If they would do nothing, we could then spend our own

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money in cost recovery. We had a big hammer. We could spend our own money and then cost recover. We don't have that hammer.

The legislature has not seen fit to have another huge expenditure plan where we can have – at that time we had millions of dollars to put towards the site, now we have to look to other kinds of enforcement mechanisms and other kinds of mechanisms to clean up these sites, and this is certainly a good example of that kind of a process.

MR. WARNER: Thank you very much.

DR. SCHUMACHER: Can I have a show of hands for any additional questions?

Some of us will remain for a few minutes after the close of tonight's meeting if you do have any after-meeting questions for us.

We want to thank you for your time and participation tonight. And we will take all the comments that you have spoken into the record tonight and they will be responded to in the document that I described earlier.

On behalf of both the DTSC staff and Mr. Neff from BKK, still with us in the back, I want to thank you and ask you to please drive safely and wish you a good night.

INITIAL STUDY CHECKLIST FOR

CAL COMPACT LANDFILL
FINDINGS

The purposes of this checklist is to identify any reasonable possibility of "significant effect on the environment" as that term is used in Section 21068 of the Public Resources Code.

		Substantial or potentially substantial adverse change		
		Yes	Maybe	No
1.	**Earth** Will the project result in:			
a.	Unstable earth conditions or in changes in geologic structures?	X		
b.	Disruptions, displacements, compaction or overcovering of the soil?	X		
c.	Change in topography or ground surface relief features?	X		
d.	The destruction, covering or modification of any unique geologic or physical features?			X
e.	Any increase in wind or water erosion of soils, either on or off the site?		X	
f.	Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?			X

g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards? ___ ___ X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), entitled Final Project and Program Environmental Impact Report, Metro 2000; November 1993, which addressed potential impacts associated with the approval of the Merto 2000 Project (Metro Project). A portion of the Metro Project entails the importation of 2,032,500 cubic yards of soil associated with the construction of a landfill cap.

The City of Carson identified in the EIR potential impacts associated with grading activities proposed in the development of Phase I Project (which includes construction of the landfill cap). The Phaes I activities would serve to alter on-site topography and raise the overall grade of the project Site to accommodate installation of the landfill cap and specific project design features.

The City of Carson found and identified several mitigation measures that would minimize the potential impact from the grading operations. The mitigation measures identified include:

1) A grading permit for the project shall approved by the City of Carson Department of Building and Safety.

2) The project shall adhere to the recommendations of the geotechnical reports as approved by the Department of Building and Safety for foundation, excavation, subdrain system and other geotechnical components of the project design.

3) An erosion control plan shall be prepared by a California registered Civil engineer and implemented.

4) All excavation deeper than five feet shall be conducted in accordance with state and federal laws.

5) Construction of a temporary berm along the west and south boundaries of the project site adjacent to surrounding residential uses prior to the initiation of any on-site grading or other type of os-site construction activity.

6) Applicant shall obtain a haul route permit. All staging shall be on the project site. No transport of imported material shall be permitted through residential neighborhoods.

7) Any hydrocarbon-contaminated soil identified during grading must be removed and any contaminated source must be remediated according to the recommendations of the site assessment as approved by CAL/EPA.

8) No fill shall be placed until the City Grading Inspector has inspected and approved the bottom excavations.

9) The fill shall be placed under the inspection and approval of the District Engineer of the City's Building and Safety Division.

10) Backfill shall be placed and compacted as recommended and good drainage provided.

11) Utilities supports shall be designed to accept differential settlement.

The proposed project, the Remedial Action Plan (RAP), before the Department of Toxic Substance Control (Department) requires the construction of the landfill cap over the existing soil cover and waste zones. The landfill cap, which will cover the entire site, will consist of several components (layers) of material acting together as a complete cover system. The landfill cap will protect human and environmental exposures and provide containment of the chemicals within the buried waste. It will also reduce the potential inhalation of landfill gases or particulates. The infiltration of surface water and the generation of additional landfill gases will be greatly reduced by the construction of the landfill cover.

The proposed landfill cap will consist of the following components:

1. Foundation Layer - A compacted foundation layer to support the cover system. The foundation layer will have a thickness of 24 inches. It will be constructed of 12 inches of existing soil cover and 12 inches of imported soil.

2. Clay Layer - A clay layer (barrier layer) will be constructed over the entire site. The barrier layer will be a minimum thickness of 24 inches. The clay will have a permeability of $1x10^{-6}$ cm/sec or less.

3. Protective Soil Cover - A layer of compacted soil cover serves to protect the clay barrier layer. The protective cover will be placed above the barrier layer and have a thickness of 18 inches. The protective soil cover will be constructed from suitable imported soil.

4. Top Soil - A top soil layer of suitable soil to support vegetation, with a root system less than the depth of the top soil layer will be constructed in landscape areas only.

The top soil will have a thickness of 12 inches and may replace 6 inches of protective soil cover.

The City of Carson concluded, in section V.B. page V.B.1 - 16, that the grading activities associated with the Metro Project would alter on-site topography and raise the overall grade of the site. Given the location of the site within an urbanized area, and the additional separation the project site and adjacent residences (due to the raising of on-site finishing grade), proposed grading activities unto themselves are not concluded to be adverse or significant. However, the import of 2,032,500 cubic yards of fill material would cause temporary impact from dust, vehicle emissions and noise during the grading operations for about 334 working days. With the mitigation measures the impacts would be reduced.

The mitigation measures found in the Metro Project EIR have been incorporated into the RAP. The Department concurs with the findings of the City of Carson with regards to significant impact associated with the landfill cap activities. The Department finds that the significant impacts identified above cannot be feasibly mitigated to a level of insignificance through mitigation measures or project alternatives.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
2. **Air** Will the project result in:			
a. Substantial air emissions or deterioration of ambient air quality?	X		
b. The creation of objectionable odors?		X	
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?			X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential air impacts associated with the construction of the Metro 2000 Project.

The EIR, Section V.D, page V.D.1, identified that the development of the Merto Project Phase I (which includes the landfill cap) and the Phase II project (which is beyond the scope of the RAP) would result in a significant direct impact to air quality in the South Coast Air Basin. Development of Phase I project would generate peak daily construction emissions from truck hauling and grading related to the construction of the landfill cap.

In evaluating the hauling of fill material and grading operations the City of Carson found:

1) Total estimated daily emissions from truck hauling of fill material for each of the five criteria pollutants are as follows: (1) carbon monoxide -- 460.6 pounds, significance threshold of 550 pounds per day; (2) nitrogen oxides -- 189.8 pounds, significance threshold of 100 pounds per day; (3) reactive organic compounds -- 43.1 pounds, significant threshold of 75 pounds per day; (4) sulfur oxides -- 14 pounds, significant threshold of 200 pounds per day; and (5) particulate matter -- 1,337.7 pounds, significant threshold of 150 pounds per day. For the particulate emissions, approximately 75.7 % of the daily emissions are associated with truck travel on unpaved areas, 14,9% with the filling of haul trucks, 6.1% with emptying of the haul trucks, and the remaining 3.3 due to truck travel on paved roads.

2) For grading operations the project applicant has agreed to limit grading operations to a maximum of three acres per day. The daily fugitive dust emissions attributed to project grading operations would not exceed 79.2 pounds of PM 10 emissions on a daily basis. This emission level from a single source of grading operations is below the SCAQMD PM 10 significance threshold of 150 pounds per day.

The City of Carson established the following mitigation measures related to the construction equipment and fugitive dust resulting from the fill material and grading operations:

1) Control Technologies: Apply NOx control technologies, such as fuel injection timing retard for diesel engines and air-to-air after cooling.

2) Alternative Fuels: Any construction equipment using diesel drive internal combustion engines shall use diesel fuel with a maximum of 0.05% sulfur and a four degree retard.

3) Diesel-powered construction equipment rather than gasoline-powered equipment shall be used, to reduce exhaust emissions and evaporative and crankcase hydrocarbon (HC) emissions.

4) Construction Practices: Use only well maintained equipment, utilize proper planning to reduce rework and multiple handling, select equipment that is properly sized to minimize trips/use, consolidate deliveries, and maximize off-site construction (i.e., prefabbing and repainting).

5) Record Keeping: Log fuel use, hours of operation and periodic maintenance of all construction equipment to ensure proper maintenance.

6) Watering: Apply water sprays at regular and frequent intervals as required to reduce fugitive dust, but not less than twice per day.

7) Soil Stabilization: For disturbed dirt areas which remain inactive over a one-week period, soil stabilization measures should be undertaken such as application of moisture retaining binders which pull moisture out of the air to form a cohesive soil binder. Such measures shall be in accordance with SCAQMD Rule 403.

8) Road Clearing: Roads must be cleaned, swept, or scraped at regular intervals, but not less than once a working day, in accordance with a haul route permit if required, or other appropriate instrument satisfactory to the Director of Engineering Services.

9) Grading Activities: All grading activities shall cease during periods of high wind (i.e., greater than 25 mph for an extended period of time at the project site) and during Stage 2 or 3 ozone episodes.

10) All fill material carried by haul trucks shall be covered by a tarp or other means.

11) All construction vehicles tires shall be washed at the time these vehicles exit the project site.

12) Haul trucks exiting the site shall be visually inspected by a dust control monitor stationed at the guard gate entrance to check for residual dirt and to ensure that the haul trucks have been adequately sprayed to wash dirt off. As trucks leave the fill material source site, the contractor shall ensure that trucks are tarped and that tarps are adequately fastened.

13) Haul trucks shall, to the extent possible, only travel on paved or regularly watered roadways. Watering of these designated roadways shall be provided by the applicant.

The Department has incorporated the Metro 2000 EIR mitigation measures associated with the construction of the landfill cap into the RAP. The Department concurs with the findings of the City of Carson with regards to the landfill cap activities. The Department finds that significant impacts identified above cannot be feasibly mitigated to a level of insignificance through mitigation measures or project alternatives.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

Substantial or potentially substantial adverse change

3. **Surface & Ground Water** Will the project result in:

	Yes	Maybe	No
a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?			X
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	X		
c. Alterations to the course or flow of flood waters?			X
d. Change in the amount of surface water in any water body?			X
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to, temperature, dissolved oxygen or turbidity?		X	
f. Alteration of the direction or rate of flow of ground waters?			X
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?			X
h. Substantial reduction in the amount of water otherwise available for public water supplies?			X
i. Exposure of people or property to water related hazards such as flooding or tidal waves?			X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000;

November 1993, which addressed potential surface and ground water impacts associated with the construction of the Metro 2000 Project.

Storm water quality during the construction of the landfill cap will result in some soil loss due to sheet erosion of exposed soils. This erosion would be most serious along freshly-graded slopes. However, after completion of the proposed project the total debris production from the site would be lower than existing conditions. The EIR concluded in Section V.C, page V.C.1-9, that the proposed system provides greater protection against storm water runoff than the present system. Since the storm drain system currently in place was determined to be adequate by the Los Angeles County Department of Public Works based on an assumption of 100 percent imperviousness, the new system is considered to be adequate for the proposed Metro 2000 project. Therefore, there would be no environmental impact related to hydrology or the quantity of surface runoff.

Since only a temporary increase in soil erosion may occur during the construction of the landfill cap mitigation measures have been incorporated into the Merto 2000 Project.

The Department concurs with the findings of the City of Carson with regards to these findings. No additional measures are necessary to mitigate these impacts. The Department finds that significant impact identified above can be feasibly mitigated to a level of insignificance through mitigation measures or project alternatives.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

Substantial or potentially substantial adverse change

	Yes	Maybe	No
4. **Land Use** Will the project result in a substantial alteration of the present or planned land use of an area?	___	___	X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential land use impacts associated with the construction of the Metro 2000 Project.

The EIR concluded in Section V.A, page V.A.-21, that the implementation of the Project Buildout, Phase I & Phase 2, (which includes the construction of the landfill cover) is not expected to result in significant adverse impacts to surrounding land use. Furthermore, no changes in the General Plan designations would be required as a result of the proposed Phase I project and no adverse impacts were anticipated.

The Department concurs with the findings of the City of Carson with regards to these findings. The Department finds that no significant laand use impact should result for this project.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

Substantial or
potentially substantial
adverse change

	Yes	Maybe	No
5. **Natural Resources** Will the project result in an increase in the rate of use of any natural resources?	___	X	___

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential natural resources impacts associated with the construction of the Metro 2000 Project.

The EIR concluded in Section V.K, page V.K.-8, that Phase I of the project (which addressed construction of the landfill cap) would result in a increase in the amount of non-renewable resources consumed through the use of electricity, natural gas, gasoline and diesel fuel. However, the construction of the landfill cap is only a small portion of the Phase I project which includes the construction of a 1.8 million square foot shopping mall. Mitigation measures were identified for the construction and operation of the shopping mall that would mitigate impacts to natural resources to an acceptable level.

The Department concurs with the findings of the City of Carson. The Department finds that the mitigation measures contained in the Merto 2000 EIR will mitigate the impacts to natrual resources to an acceptable level.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

Substantial or potentially substantial adverse change

	Yes	Maybe	No
6. **Risk of Upset** Will the project involve:			
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential from risk of upset impacts associated with the construction of the Metro 2000 Project.

The EIR identified in Section V.I, potential sources of concern for risk of upset. They included the buried waste, groundwater and landfill gases. The installation of a landfill cover (cap) would reduce, minimize, or eliminate the following: 1)infiltration of surface water through the waste zone, 2) generation of additional landfill gases, human exposure to contaminants of concern present in the landfill, and potential inhalation of landfill gases or particulates.

The EIR for the MetroMall Project contained several mitigation measures, they included the following:

1. The Applicant shall receive approval for the proposed project's remediation program from the State of California Environmental Protection Agency, Department of Toxic Substances Control.

2. Prior to final project approval, the Applicant shall record a deed restriction granting Cal-EPA and/or its assignee a permanent right of access to specified areas of the project site for the purposes of monitoring, testing and treating of groundwater in the Gage, Lynwood and Silverado Aquifers. This right of access shall include the permission to construct and maintain wells and treatment facilities on the site.

3. Prior to issuance of any building permits the Applicant shall submit certification from Cal-EPA authorizing said permits and stipulating that the proposed dynamic compaction of the project site prior to installation of the landfill cap would not adversely impact successful implementation of the second operable unit of the site's remediation program addressing potential groundwater contamination of the Gage and/or Silverado deep drinking water aquifers.

4. All components of the Applicant's remediation program shall be approved by Cal-EPA and implemented prior to receipt of the Certificate of Occupancy from the City of Carson for the Phase I development. All collection and treatment facilities shall be in operation prior to project occupancy.

5. Collection and treatment facilities operated by the Applicant shall be maintained for the life of the project, unless the Department, RWQCB and SCAQMD establish that these facilities are no longer necessary for the remediation of groundwater and landfill gases.

The City of Carson concluded that "With implementation of the proposed mitigation measures, no adverse impacts are anticipated to occur with development of either the Phase I or Phase II projects.

The Department concurs with the findings of the City of Carson. The Department finds that significant impacts identified above can be feasibly mitigated to a level of insignificance through mitigation measures.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
7. **Transportation/Circulation** Will the project result in:			
a. Generation of substantial additional vehicular movement?	X		
b. Effects on existing parking facilities, or demand for new parking?			X
c. Substantial impact upon existing transportation systems?		X	
d. Alterations to present patterns of circulation or movement of people and/or goods?			X
e. Alterations to waterborne, rail or air traffic?			X
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?		X	

Explanation: The City of Carson Certified EIR for the MetroMall Project found that the proposed construction of the landfill cover would require a net import of 2,032,500 cubic yards (CY) of fill material. The applicant indicated that the fill material would be obtained from the MertoRail Red Line in the Hollywood area of the City of Los Angeles or other alternate sites. The importation of fill is proposed to occur between the hours of 7 a.m. and 7 p.m. Monday through Saturday (12 hours per day), and between the hours of 8 p.m. and 6 a.m. (10 hours per day). Based on the proposed program, importation of fill material to the project site would occur 22 hours a day. It is estimated that 334 working days would be required to complete the construction of the landfill cover. Based on this information, it was determined that a total of 145,179 truck carrying and average of 14 CY of fill material would be required to complete a necessary import of 2,032,500 CY of fill material. Approximately 55% of the fill material would be transported during the daytime period (7 a.m. to 7 p.m.), while the remaining 45% would occur during the nighttime period (8:00 p.m. to 6:00 a.m.).

Haul routes for the imported fill material are shown in Figure V.B.1-4, on page V.B.1-12 of the EIR. The specific haul routes may vary depending on the origin of the fill material (MetroRail source or Baldwin Canyon dam site), all haul trucks would utilize the same route south of the I-110/I-405 freeway interchange. Trucks would exit the Harbor freeway (I-110) at the Del Amo exit and then proceed north on Hamilton Avenue until reaching Del Amo Boulevard. The trucks would turn right on Del Amo and continue on this street until entering the project site. The returning trucks would exit the site by del Amo going west bound until reaching Figureora Street. The vehicles would make a left turn on figueroa until reaching the northbound entrance ramp to the Harbor Freeway (I-110). The trucks would then proceed north to the two donating sites.

By utilizing this haul route trucks avoid driving through areas lined by residential housing. As part of the requirement of the EIR and the Draft RAP the applicant is required to obtain haul route approval for all imported material from the City of carson Department of Engineering Services and all agencies with jurisdiction along the haul route. All project staging shall be on the project site. The transportation of imported materials is not permitted through residential neighborhoods.

The EIR identified that the construction associated with the landfill cover development would result in a significant direct impact to air in the South Coast Air Basin. Development of the landfill cover, which is proposed in the Remedial Action Plan, would generate construction emissions associated with the hauling of fill material over the SCAQMD significant threshold levels for nitrogen oxides and particulate matter (less that 10 microns in diameter--PM 10).

The City of Carson concluded that with implementation of the mitigation measures contained in the Merto 2000 EIR, impacts are anticipated to be significant with development of the Metro 2000, Phase I and Phase II projects.

The Department concurs with the findings of the City of Carson. The Department finds that significant impacts identified in the Metro 2000 EIR cannot be feasibly mitigated to a level of insignificance through mitigation measures or project alternativies.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
8. **Public Services** Will the project have an effect upon, or result in a need for new or altered governmental services in any or the following areas:			
a. Fire protection?	___	___	X
b. Police protection?	___	___	X
c. Schools?	___	___	X
d. Parks or their recreational facilities?	___	___	X
e. Maintenance of public facilities, including roads?	___	___	X
f. Other governmental services?	___	___	X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential public service impacts associated with the construction of the Metro 2000 Project.

Section V. J. of the EIR studied the potential impacts on public service. The EIR concluded that the development of the proposed project would increase the need for fire protection and emergency services in the area. With the implementation of the mitigation measures (associated with the operation of the Metro 2000 project) adverse effects associated the development of Phase I project would be reduced to acceptable levels.

The Department concurs with the findings of the City of Carson with regards to these findings. The Department finds the implamentation of the mitigation measures in the Metro 2000 EIR will reduce the impact on public service to an acceptable levels.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
9. **Energy** Will the project result in:			
a. Use of substantial amounts of fuel or energy?	X		
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?			X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential energy resource impacts associated with the construction of the Metro 2000 Project.

The proposed project will result in an increase in diesel fuel consumption during the construction of the landfill cover. The construction is expected to take 334 working days. This will be a temporary increase in fuel consumption. As identified in the Certified EIR for the Metro 2000 project, it is expected that 435 haul trucks per day will deliver imported soil to the project site. The proposed project should not have a significant impact on the diesel fuel consumption due to the short duration of the proposed project.

The City of Carson concluded that with implementation of the mitigation measures contained in the Merto 2000 EIR, impacts are anticipated to be mitigated to an acceptable level.

The Department concurs with the findings of the City of Carson. The Department finds that impacts identified in the Metro 2000 EIR were related to the development of the MetroMall not the construction of the landfill cap. The Department finds that the mitigation measures contained in the EIR for the Metro 2000 Project will reduce the impacts on energy resources to an acceptable levels.

The Department prepared an Initial Study and a

Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

Substantial or
potentially substantial
adverse change

	Yes	Maybe	No
10. **Utilities** Will the project result in a need for new systems, or substantial alterations to any utilities?	___	___	X

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential utility services impacts associated with the construction of the Metro 2000 Project.

The EIR for the MetroMall did not identify any required utilities for the construction of the landfill cover. Therefore, no substantial adverse impacts are anticipated.

The Department concurs with the findings of the City of Carson. The Department finds that no sinificant utility services impacts will result from the consrtruction of the landfill cap.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
11. Noise Will the project result in:			
a. Increases in existing noise levels?	X		
b. Exposure of people to severe noise levels?		X	

Explanation: The City of Carson prepared and certified an Environmental Impact Report (EIR), titled Final Project and Program Environmental Impact Report, Merto 2000; November 1993, which addressed potential noise impacts associated with the construction of the Metro 2000 Project.

The EIR for the Metro 2000 Project identified specific activities during the construction phase that would result in potential noise impacts. These activities included: importation of soil for grading, grading of the site, dynamic compaction, construction of the landfill cap, installation of the infrastructure, and pile-driving (of which pile driving and dynamic compaction are not include in the RAP). In addition, night time importation of soil would also result in an adverse significant impact to the residents to the south of the Project site. Mitigation measures have been required in, or incorporated into the Metro 2000 Project which reduce the noise levels during the construction to the extent possible. These mitigation measures include the following:

1. The Applicant shall create a temporary berm, 15 feet above on-site grade, along the length of the landfill slope across from existing residential areas. This sound berm shall be completed first and constructed during daytime hours, before any night hauling is allowed to commence.

2. The Applicant shall maintain the temporary construction berm at 15 feet above on-site grade during construction of the southerly portion of the Phase I project structure.

3. Night operations regarding fill importation will be strictly limited to unassisted (by dozers) bottom dumping and unload assist tractors.

4. Prohibited night-time activities will include: (a) operation of any machinery or equipment other than bottom dumping semis with trailers (in forward motion only); (b) no spreading or compaction activities; (c) no backing up of

equipment fitted with safety alarm.

5. The Applicant shall indemnify and hold harmless the City of Carson with regard to all claims by local property owners pertaining to structural or any other type of property damage as a result of on-site construction activities.

6. Pile drivers used on the site shall be equipped with noise control having a quieting factor of 10 dBA.

7. Loading and staging areas must be located on-site and away from the most noise sensitive uses surrounding the site as determined by the Department of Community development.

8. Construction contracts shall require project contractors to use electric power construction equipment with noise shielding and muffling devices.

9. During construction, the project shall comply with the City's Noise Ordinance and associated ordinances.

10. Information shall be provided to adjacent residents on a regular basis regarding construction activities and their duration.

11. Prior to the initiation of construction activities involving dynamic compaction, the Applicant and/or its contractors shall submit a report for City approval with documents preconstruction surveys of existing conditions of adjacent facilities.

12. Seismographs shall be developed of initial dynamic compaction activities to develop a permanent record of vibration levels at adjacent structures.

13. The Applicant shall notify adjacent property owners prior to the initiation of on-site dynamic compaction activities.

The City of Carson concluded that during construction, site activities such as pile driving, grqading, and dynamic compaction would have an adverse and significant noise impact upon adjacent residential areas to the south and west of the site. In addition, night time importation od soil by dump trucks would also result in an adverse significant impact upon residential areas to the south of the site. The potential noise impacts of the construction activities would only occur for the duration of the construction phase, and would terminate, once construction has been completed.

The Department concurs with the findings of the City of Carson. The Department finds that significant impacts identified in the Metro 2000 EIR cannot be feasibly mitigated to a level of insignificance through mitigation measures or project alternativies.

The Department prepared an Initial Study and a Supplemental Negative Declaration (SCH# 9508161) to address the impacts associated with the construction, operation and maintenance of the proposed landfill gas collection and treatment system and groundwater treatment system associated with the Upper Operable Unit at the Cal Compact landfill. The potential impacts of these system were not fully addressed in the City of Carson's EIR for the Metro 2000 Project. The Department has determined that the construction, operation and maintenance of these systems will not result in a significant impact to the environment.

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444

FINDINGS
PURSUANT TO THE
CALIFORNIA ENVIRONMENTAL QUALITY ACT
for Use of a Local Agency Environmental Impact Report
by the California Department of Toxic Substances Control
as a Responsible Agency
In Approving a Remedial Action Plan
for the
Cal Compact Landfill Site
Carson, California

The Department of Toxic Substances Control (DTSC) carefully reviewed the Final Environmental Impact Report (EIR) prepared and certified by the City of Carson (City) entitled *Project and Program Environmental Impact Report, Metro 2000 December 1993*, (SCH# 93011037). DTSC, using its independent judgment, finds:

1. The EIR for the Metro 2000 project:

   a) Adequately complied with the provisions of the California Environmental Quality Act (CEQA).

   b) Adequately addressed the impacts of a portion of the remedial project now before DTSC for decision.

   c) Is adequate for DTSC to assess potential impacts for construction of the landfill cap portion of the Remedial Action Plan (RAP) now before DTSC for approval. DTSC concurs with the findings made by the City of Carson in the EIR.

   BKK Corporation is requesting DTSC to approve a draft RAP for the Cal Compact Landfill Upper Operable Unit (Upper OU). The RAP is in accordance with Section 25356.1 of the California Health and Safety Code, and Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan, Title 40 Code of Federal Regulations Part 300 et. seq. The draft RAP addresses final remediation of the Upper OU and includes: construction of a landfill cap; construction and operation of a landfill gas collection and treatment system; and construction of a groundwater collection and treatment system.

   Pursuant to CEQA, DTSC prepared a Supplemental Negative Declaration (SCH# 95081061) for approval of the RAP for the Cal Compact Upper OU. The proposed remedial project for which DTSC is acting addresses the construction of the landfill gas collection and treatment system and the groundwater treatment system.

2. Significant Impacts Identified in the Metro 2000 EIR:

a) Degradation of Air Quality - The EIR identified that the construction associated with the landfill cap development would result in a significant direct impact to air in the South Coast Air Basin. Development of the landfill cap, which is proposed in the draft RAP, would generate construction emissions in excess of SCAQMD thresholds recommended for determining significant air quality impacts. Mitigation measures have been required in, or incorporated into the Metro 2000 project which reduce the air impacts during the construction to the extent possible, however, the impacts are still significant.

b) Significant Operation and Construction Noise Impact - The EIR identified that during the construction, the site preparation activities such as pile driving (not a part of the RAP), grading, and dynamic compaction would have an adverse and significant noise impact upon adjacent residential areas to the south and west of the project site. In addition, night time importation of soil would also result in an adverse significant impact to the residents to the south of the project site. Mitigation measures have been required in, or incorporated into the project which reduce the noise levels during the construction to the extent possible, however, the impacts are still significant. The significant construction noise impacts attributable to the development of the Phase I project are in large part due to the construction of the landfill cap and the proximity of the existing residences to the project site. The construction of a landfill cap would be a prerequisite for any development on the project site. DTSC concurs with the findings made by the City in the Metro 2000 EIR.

3. Departments of Toxic Substances Control - Statement of Overriding Considerations:

DTSC finds that some environmental impacts associated with the construction of the landfill cap cannot be feasibly mitigated to a level of insignificance through mitigation measures or project alternatives. In addition to the individual findings contained in Section 2 above, DTSC finds that the individual and collective benefits provided by the construction of the landfill cap will outweigh the adverse impacts caused by the project. These benefits are determined by DTSC to include the following:

a) The construction of the landfill cap provides containment of the waste zones. The landfill cap isolates the landfill contents and mitigate off-site migration through the use of engineering controls.

b) The landfill cap will provide surface controls designed to control direct surface water runoff and to prevent off-site surface water from running onto the site. These features will also reduce water infiltration into the waste zones thus minimizing leachate generation.

c) The landfill cap will control emissions of gas and odors from the landfill.

d) Reduction of water infiltration through the waste zones also serves to minimize the generation of landfill gases.

e) The construction of the landfill cap will enable the site to be redeveloped. The project site is the location of the proposed Metro 2000 project. The development of the Metro 2000 project is expected to generate 5,000 permanent jobs after Phase I and an additional 4,292 jobs after Phase II. The Cal Compact landfill has been a vacant non-productive parcel in the City of Carson. The redevelopment of this land would result in the generation of millions of dollars in tax revenue to the City of Carson and the State of California.

4. The significant impacts from the construction of the landfill cap have already been identified, described and full disclosed in the City of Carson EIR for the Metro 2000 Project. RAP approval will not involve any additional significant environmental impacts from the proposed landfill gas collection and groundwater treatment systems.

5. A Notice of Determination (NOD) indicating the results of the above findings will be filed with the State Clearinghouse of the Governor's Office of Planning and Research pursuant to CEQA Guidelines Section 15096(i).

Certified for DTSC by:

Date: 10/25/95

Hamid Saebfar, Chief
Site Cleanup Operations Branch
Southern California Branch

INITIAL STUDY CHECKLIST FOR

CAL COMPACT LANDFILL
UPPER OPERABLE UNIT
20400 MAIN STREET
CARSON, CALIFORNIA

The purposes of this checklist is to identify any reasonable possibility of "significant effect on the environment" as that term is used in Section 21068 of the Public Resources Code.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
1. **Earth** Will the project result in:			
a. Unstable earth conditions or in changes in geologic structures?			X
b. Disruptions, displacements, compaction or overcovering of the soil?			X
c. Change in topography or ground surface relief features?			X
d. The destruction, covering or modification of any unique geologic or physical features?			X
e. Any increase in wind or water erosion of soils, either on or off the site?			X
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?			X

g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards? ___ ___ _X_

Explanation: The construction of the landfill gas collection and treatment system will consist of the following:

1. A series of vertical gas control wells located within the outer edges of the waste cells along the site boundaries.

2. A thermal destruction unit (Flare) for the final treatment of the collected gases.

The vertical gas extraction wells will be connected by a series of pipes. The collected gases will be transported through these pipes to the flare system. Installation of these extraction wells will have a minimal impact on the landfill. Well installation will be conducted through the use of a hollow stem auger drilling rig or equivalent. The installation of these wells is to be deeper than 30 feet below ground surface. All waste generated during the installation of the extraction wells will be treated as hazardous waste until analysis indicates otherwise.

The proposed groundwater collection and treatment system will not have a substantial adverse effect on the earth due to the fact the groundwater extraction wells shall be installed along the perimeter of the southern and western boundary of the site. The wells will be installed using a hollow stem auger drilling rig, standard for the construction of groundwater extraction wells. All waste generated from the installation of the wells will be treated as hazardous waste until analytical analysis proves different.

The installation of the groundwater treatment system will not result in the movement of large amounts of soil or the stockpile of large amounts of soil. The extraction wells will be connected by a series of pipes. The extracted groundwater will be transported to the treatment system, treated water will then be discharged to the local sewer system or flood control channel. Some of the treated groundwater may be used for local irrigation onsite. The Remedial Action Plan has specific requirements for dust suppression in the event that any field activity generated dust. Real-time air monitoring for dust is also required in the Remedial Action Plan.

DTSC concludes that approval of this project as proposed would not result in a significant effect on the earth resources.

Substantial or potentially substantial adverse change

	Yes	Maybe	No
2. **Air** Will the project result in:			
a. Substantial air emissions or deterioration of ambient air quality?	___	___	X
b. The creation of objectionable odors?	___	___	X
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	___	___	X

Explanation: The proposed operation of the landfill gas treatment system will require permits to construct and operate from the SCAQMD (see ARARs Feasibility Study for Cal Compact Landfill). The proposed gas collection system will consist of a series of vertical gas extraction wells on the perimeter of the waste zones. The landfill collection system will be connected to a flare for 98 percent destruction of the collected gas. All SCAQMD's discharge requirements shall be meet. Air pollution control devices such as scrubbers shall be use, if required. The landfill collection wells and groundwater extraction and monitoring wells installation should not generate a significant amount of fugitive dust. Fugitive dust will be suppressed by the aid of water suppression or other related activities as needed. SCAQMD fugitive dust limitations will be adhered to during the construction of these wells.

In 1990, a vapor monitoring event was conducted at the project site. Two Calderon compounds were detected during the sampling event. Calderon compounds are chemicals established in California as indicators for hazardous waste landfills. Analytical results from five vadose wells detected vinyl chloride in concentrations ranging form 2 ppm (parts per million) to 20.5 ppm and benzene from 1.4 ppm to 8.8 ppm. Methane a non-Calderon compound was detected in the range of 26.7% to 64.4%. Other non-Calderon compounds detected included ethylbenzene, toluene, xylene and dichlorodifluoromethane.

An additional landfill gas survey is proposed as part of the remedial actions. A landfill gas survey workplan will be submitted to the SCAQMD and DTSC for approval. Once the landfill gas survey has been conducted, a detailed report shall be prepared and submitted. Based on the results of the survey, a detailed design of the landfill gas collection and treatment system will be submitted to DTSC for review and approval.

The remedial design for the landfill gas collection system and the groundwater treatment system shall meet all applicable building code, and fire code standards. All applicable permits shall be obtained (e.g. SCAQMD permits) prior to the construction and/or operation of the remedial system.

The groundwater treatment system should not result in a significant impact to the environment because it is a closed treatment system. Groundwater is extracted and transported to the treatment system through a series of pipes. The water is then passed through a equalization tank, a filter, precipitation unit, a clarification unit to remove solids, a series of carbon absorbers and a polishing filter. The treated water will be analyzed for volatile organic compounds prior to being discharged.

Substantial or potentially substantial adverse change

		Yes	Maybe	No
3.	**Surface & Ground Water** Will the project result in:			
a.	Changes in currents, or the course of direction of water movements, in either marine or fresh waters?	___	___	X
b.	Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	___	___	X
c.	Alterations to the course or flow of flood waters?	___	___	X
d.	Change in the amount of surface water in any water body?	___	___	X
e.	Discharge into surface waters, or in any alteration of surface water quality, including but not limited to, temperature, dissolved oxygen or turbidity?	___	___	X
f.	Alteration of the direction or rate of flow of ground waters?	___	___	X
g.	Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	___	___	X
h.	Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	X
i.	Exposure of people or property to water related hazards such as flooding or tidal waves?	___	___	X

Explanation: The proposed groundwater collection and treatment system will have an effect on the direction and rate of flow of the groundwater beneath the site. The groundwater treatment system will improve the quality of groundwater in the Bellflower Aquitard. The groundwater beneath the project site has been contaminated with volatile organic compounds, semi-volatile organic compounds and heavy metals from past landfill activities. The proposed groundwater collection and treatment system will capture contaminated groundwater at the southern and western portions of the site. The groundwater flow in the Bellflower Aquitard is in the southwesterly direction. Installing a groundwater collection system along the southern and western boundary should prevent further off-site migration. The groundwater collection and treatment system will not have an significant adverse effect on the regional groundwater flow due to its proposed size and flow rate.

The direction of the flow of groundwater should only be effected along the perimeter of the site and in this localized area. The extraction flow rate at each well is estimated to be at 3 to 5 gallons per minute, for a total estimated extraction rate of 78 to 130 gallons per minute.

The quality of groundwater should improve with the collection and treatment of the contaminated groundwater from the landfill. Although the groundwater in the Bellflower Aquitard in not of drinking water standards, remedial action goals established in the Draft RAP require groundwater leaving the project site to meet the drinking water standards or established background concentrations.

The treated groundwater will be discharged to either the storm drain system or to the sewer system. Treated groundwater shall meet the RWQCB discharge requirement prior to discharge from the site (see remedial action goals for treated groundwater contained in the Draft RAP and ARARs section of the Feasibility Study).

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
4. Plant Life Will the project result in:			
a. Change in the diversity of species, or number of any species of plant (including trees, shrubs, grass, crops, and aquatic plants)?			X
b. Reduction of the numbers of any unique, rare or endangered species of plants?			X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?			X
d. Reduction in acreage of any agricultural crop?			X
e. Deterioration of existing plant habitat?	X		

Explanation: The Cal Compact landfill is a closed class II landfill located in the City of Carson, California. The project is located in an area zoned CR-D-ORL (Commercial, Regional-Design Overlay Review-Organic Refuse Landfill) and ML-D-ORL (Manufacturing, Light-Design Overlay Review-Organic Refuse Landfill). The landfill has not operated since December 1964. General maintenance requires that indigenous species of weeds growing on the site be cleared. Weed are cleared in accordance with the local fire department regulations. Weed control activities recently (August 1995) cleared the site of these indigenous species of weeds. Contact with the Department of Fish and Game's Biologist, Ms. Canulae Davis requesting information regarding endangered plants, revealed no known endangered plants at project site.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
5. **Animal Life** Will the project result in:			
a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?	___	___	X
b. Reduction of the numbers of any unique, rare or endangered species of animals?	___	___	X
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	___	___	X
d. Deterioration to existing fish or wildlife habitat?	___	___	X

Explanation: The Cal Compact landfill is a closed Class II landfill located in the City of Carson, California. The project is located in an area zoned CR-D-ORL (Commercial, Regional-Design Overlay Review-Organic Refuse Landfill) and ML-D-ORL (Manufacturing, Light-Design Overlay Review-Organic Refuse Landfill). The landfill has not operated since December 1964. DTSC contacted the Department of Fish and Game requesting information on known endangered species of animals in the area of the site project. Fish and Game Biologist, Ms. Canulae Davis stated that to her knowledge there was no known endangered species of animals at the location of the proposed project. No endangered species or habitats of endangered animals are known to be present or have been encountered at the site, therefore, this project should not have an impact to endangered species.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
6. **Land Use** Will the project result in a substantial alteration of the present or planned land use of an area?	___	___	X

Explanation: The Cal Compact landfill is a closed class II landfill located in the City of Carson, California. The project is located in an area zoned CR-D-ORL (Commercial, Regional-Design Overlay Review-Organic Refuse Landfill) and ML-D-ORL (Manufacturing, Light-Design Overlay Review-Organic Refuse Landfill). The proposed project will not alter the present or planned land use because it is zoned for landfill uses.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
7. **Natural Resources** Will the project result in an increase in the rate of use of any natural resources?	___	___	X

Explanation: The project proposed will not result in an increase in the rate of use of any natural resource because the groundwater in the Bellflower Aquitard has been contaminated from past landfill operations. The proposed project will extract the contaminated groundwater and treat it to acceptable standards prior to discharge. The extraction and treatment should prevent the possible contamination of lower aquifers. No other natural resource should be effected as the result of this proposed project.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
8. **Risk of Upset** Will the project involve:			
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X

Explanation: The potential sources of concern for the risk of upset include the construction equipment use during the installation of the groundwater and landfill gas collection and treatment systems, and the landfill gas flare unit.

To minimize the chance of upset resulting from the equipment use during the construction of the proposed remedial systems, the contractor is required to use well maintained equipment capable of performing the required task. The landfill flare unit will be equipped with a blower switch off-valve, flame arrestor, flame sensor, burner control relay switch, and pressure regulators. These safety measures will be inspected and maintained in accordance with the operation and maintenance plan approved by the Department of Toxic Substances Control (DTSC). The system shall meet all fire codes and the construction shall meet the Uniform Building Codes. Design features for the system will permit periodic inspections for integrity of the gas handling equipment. The operation and maintenance plan shall include procedures for periodic equipment inspections and repairs that will reduce any risk of additional gas migration due to subsidence or earthquakes.

The groundwater extraction system will utilize 4-inch extraction well, submersible pumps, and 2-inch conveyance pipes. For operation safety concern, the extraction system will be equipped with standard safeguard control devices to monitor operating status and automatically shut off the system upon abnormal/emergency conditions. The system shall be designed to withstand the maximum credible earthquake and meet all applicable building codes.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
9. **Transportation/Circulation** Will the project result in:			
a. Generation of substantial additional vehicular movement?	___	___	X
b. Effects on existing parking facilities, or demand for new parking?	___	___	X
c. Substantial impact upon existing transportation systems?	___	___	X
d. Alterations to present patterns of circulation or movement of people and/or goods?	___	___	X
e. Alterations to waterborne, rail or air traffic?	___	___	X
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	___	___	X

Explanation: The construction and installation of the groundwater and landfill gas collection and treatment systems as proposed should not have a significant impact on the State's transportation system in the project area or surrounding area. During the construction of these systems no oversize vehicles will be used. The construction of the groundwater extraction wells and landfill gas extraction wells may require two to three drilling rig with sport vehicles. It will require approximately 2 to 3 months to construct the systems. A transportation route plan will be approved by the City of Carson for the MetroMall project and will be followed during the remedial activities at the site (see MetroMall EIR).

No over-size equipment is proposed during the construction of either the groundwater treatment system or the landfill gas collection and treatment system. The required on-site worker for the construction of the two systems is approximately 50 persons.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
10. **Public Services** Will the project have an effect upon, or result in a need for new or altered governmental services in any or the following areas:			
a. Fire protection?			X
b. Police protection?			X
c. Schools?			X
d. Parks or their recreational facilities?			X
e. Maintenance of public facilities, including roads?			X
f. Other governmental services?			X

Explanation: The proposed project should not have a substantial impact on required public service because, the proposed project requires the installation and operation of a landfill gas and groundwater collection and treatment system. The local fire department and police department will be notified of the proposed site activities. The local fire department already provides service to the project site. They require the annual removal of the weeds and small brush from the site in accordance with the fire code. The local fire department would be notified of the operation of the landfill flare unit and have access to inspect the unit upon request. Police protection should not be impacted due to the fact that the site is fenced and the project applicants will provide site security during the construction phase of the proposed project.

Schools, parks or other recreational facilities should not be impacted because this project does not cause a local population increase. The proposed project will not involve the construction of new dwelling or increase the site access to the public.

The local governmental agencies currently working on the remediation or regulating the proposed project site include DTSC, SCAQMD, the Regional Water Quality Control Board, and the Los Angeles County, Department of Health Services, Solid Waste Program.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
11. **Energy** Will the project result in:			
a. Use of substantial amounts of fuel or energy?	___	___	X
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	___	___	X

Explanation: The proposed project should not result in a significant increase in the demand for fuel or energy. It is estimated that two 15-hours power engines will be required to operate the landfill gas collection system. The projected power requirements for operating the proposed remedial systems are estimated at 900 and 540 Kwhr per day for the groundwater and landfill gas systems, respectively. The electrical power will be supplied by the Southern California Edison Company. The projected amount of electrical power should not have a significant impact during the life of this project.

Substantial or potentially substantial adverse change

	Yes	Maybe	No
12. **Utilities** Will the project result in a need for new systems, or substantial alterations to any utilities?	___	___	X

Explanation: The proposed project should not result in the need for new utilities systems or the substantial alterations to existing utilities. The proposed project will require an electrical connection for the proposed landfill gas and groundwater collection systems. The power should be supplied by Souther California Edison Company and require an electrical box connection. The landfill flare will require a natural gas connection for the operation of the flare. The maximum volume of natural gas required for operation of the flare is within the capacity of existing gas service in the area. The operation of the flare will be dependent on the production of landfill gases.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
13. **Noise** Will the project result in:			
a. Increases in existing noise levels?	___	X	___
b. Exposure of people to severe noise levels?	___	___	X

Explanation: The proposed groundwater and landfill gas collection and treatment systems should not have a significant increase in the noise levels at the project site. The proposed project is to install gas extraction wells at the perimeter of the waste zones and install groundwater extraction wells along the southern and western boundaries of the project site. Activities related to the construction of these systems will occur during the day time hours. The equipment proposed is standard environmental drilling equipment. A noise monitoring program will be established and based on the noise levels, engineering controls such as noise mufflers will be required (see mitigation measures contained in the Draft RAP). Construction activities for the wells is anticipated to last approximately 2 months.

The operation of the gas flare should not generate a significant increase in noise to the local residents due to the proposed location is in the northeast portion of the site, close to the 405 freeway. The groundwater treatment system will be located in a treatment compound. The operation of the groundwater and landfill gas collection and treatment systems will be required to be below the City of Carson's nuisance noise levels.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No
14. Public Health & Safety Will the project result in:			
a. Creation of any health hazard or potential health hazard (excluding mental health)?	___	___	X
b. Exposure of people to potential health hazards?	___	___	X

Explanation: A baseline heath risk assessment was conducted and has been approved by DTSC (see baseline Health Risk Assessment Report for Cal Compact Landfill, Brown & Root, August 1995). The health risk evaluated several different hypothetical use scenarios for the site. These hypothetical scenarios include: 1) a residential housing community developed on site, 2) long term commercial/industrial use, and 3) 2-year construction/excavation activities. DTSC concluded that based on the results of the risk assessment that the proposed industrial use should not have a significant adverse effect on public health and safety.

The landfill gas collection and treatment system should capture the gasses being produced and destroy them. Thus the potential exposure to the landfill gasses should be reduced. The proposed groundwater collection and treatment system should capture contaminated groundwater coming off of the landfill prior to going off-site. The groundwater will then be processed through a treatment system reducing the concentration of hazardous substances in the treated water. The treated water will then be used for irrigation, discharged to the sewer system or to the storm channel. The treated groundwater shall meet all discharge treatment standards prior to being discharged.

To ensure on-site safety to construction worker and site specific health and safety plan shall be submitted to DTSC for review and approval. All workers will be given a copy of the H&SP to read prior to commencement of work at the site. A safety meeting will be conducted at the start of each shift. A project safety coordinator shall be on-site during working hours. Occupational Safety and Health Association (OSHA) and CAL/OSHA regulation shall be adhered to during the remedial activities at the project site.

Substantial or potentially substantial adverse change

	Yes	Maybe	No
15. Aesthetics			
a. Will the project result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view? Will the proposal produce new light or glare?	___	___	X

Explanation: The project site is a vacant open landfill with indigenous weed covering the waste zones. The proposed project will not result in the obstruction of any scenic vista or view open to the public, or create an aesthetically offensive site because the landfill gas and groundwater collection system will be under the ground surface. The landfill flare will be located in an area away from the local residents and should not cause significant flashes of light or glare. The groundwater treatment compound will also be located along the Torrance Lateral Channel in the southwest portion of the project site.

Substantial or potentially substantial adverse change

	Yes	Maybe	No

16. Cultural/Paleontological

	Yes	Maybe	No
a. Will the project result in the alteration of or the destruction of a prehistoric or historic archaeological site?			X
b. Will the project result in adverse physical or aesthetic effects to a prehistoric or historic building structure, or object?			X
c. Does the project have the potential to cause a physical change which would affect unique ethnic cultural values?			X

Explanation: The proposed project will not result in the destruction of prehistoric and historic archaeological site. The project is the location of a closed landfill. During the landfill operation, the site was excavated and subsequently filled with municipal and industrial waste. There area no known prehistoric or historic archaeological artifacts at the project site.

	Substantial or potentially substantial adverse change		
	Yes	Maybe	No

17. Cumulative Effects

	Yes	Maybe	No
a. Will the project result in air or water contamination which by themselves are not significant, but when considered in light of other local sources, may be cumulatively significant?	___	___	X

Explanation: As stated above, the groundwater beneath the site is contaminated with volatile organic compounds, semi-volatile organic compounds and heavy metals. The result of previously conducted vadose zone air monitoring detected vinyl chloride, benzene, methane, ethylbenzene and other volatile organic compounds. The proposed project will collect the gasses that are generated and transport them to a landfill flare for destruction. Thus the potential for release into the atmosphere is reduced. The groundwater treatment system will collect the contaminated groundwater at the site's southern and western property boundary. The treated groundwater will be filtered and the chemical compounds striped from the water. The treated groundwater will then be discharged.

Additional projects in the area involving activities that could combine with this project activities to cause potentially significant adverse impacts include:

1. Remediation at the Former Golden Eagle Refinery

2. Remediation of the Lower Operable Unit, Cal Compact

The remediation of the groundwater at the Former Golden Eagle refinery is being conducted under the oversight of DTSC and the RWQCB. The thermal treatment units have been permitted to operate by the SCAQMD. The units have been operating within the permit requirements. The remedial investigation for the Lower Operable Unit has not been conducted at this time. The limited information on the Gage Aquifer indicated low levels of contamination. A separate remedial investigation and remedial action plan shall be developed for the Lower Operable Unit.

As proposed the cumulative effects of the proposed treatment system should not have a significant effect on the environment.

	Yes	No
Summary of Findings Based on study findings as explained here in, justification is made for the following conclusions:		
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	___	X
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term environmental goals?	___	X
c. Does the project have impacts which are individually limited, but cumulatively considerable?	___	X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	___	X
e. Do the activities of this project have an influence on recreation, aesthetics, noise, cultural resources, or any other environmental issues which have not been included in this checklist?	___	X

Determination of Significant Effect check one

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a **NEGATIVE DECLARATION will be prepared.** X

The project has been revised to incorporate special changes which assure that there will be no reasonable possibility of significant environmental effects, and **a NEGATIVE DECLARATION will be prepared.** ____

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet will be added to the project and listed in the Negative Declaration. **A MITIGATED NEGATIVE DECLARATION will be prepared.** Before the Negative Declaration is approved, the Department of Toxic Substances Control will develop a monitoring program to insure the implementation of these mitigation measures by this agency. All responsible agencies should develop monitoring programs for mitigation measures which are identified under their discretionary authority. ____

I find the proposed project MAY have a significant effect on the environment, **an ENVIRONMENTAL IMPACT REPORT shall be prepared** to determine if significant effects would result. ____

Signature Thomas M Cota Date 10/25/95
Thomas M. Cota
Project Manager

Signature [signature] Date 10/25/95
Hamid Saebfar, Chief
Site Mitigation Operations Branch
Southern California Regions

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444

INITIAL STUDY

CAL COMPACT LANDFILL
UPPER OPERABLE UNIT
20400 SOUTH MAIN STREET
CARSON, CALIFORNIA 90745

October 1995

I. Project Background:

The Cal Compact Landfill (the Site), located in Carson, California (see Figure 1), operated as a 157-acre municipal Class II landfill from April 1959, and continued until December 1964, with an approximated date of closing of February 1965. During the period of operations, an estimated 6.2 to 6.3 million cubic yards of municipal solid waste and 2.6 million barrels (unit of measure, not a container, equivalent volume 540,540 cubic yards) of liquid industrial waste were disposed of at the landfill. On the basis of available records, BCL Associates estimated that approximately 4 percent of the material received (50,815,395 gallons or 251,611 cubic yards) may now be considered hazardous by the State of California (Brown & Root 1995).

Prior to landfill operations, the Site was used for grazing, dairy operations, and agricultural uses. Surface elevations prior to landfill operations ranged from 7 to 21 feet above mean sea level (MSL). The current elevation at the Site vary from 19 feet to 58 feet above MSL. The change in elevation is a result of past landfill operations conducted at the Site.

According to Los Angeles County records, Cal Compact, Inc., a California corporation, was issued an industrial waste disposal permit on July 17, 1959, which authorized Cal Compact to operate a Class II landfill on Site. Los Angeles County records show that Cal Compact, Inc., was operated by Ben Kazarian and his son, Ben Kazarian, Jr. (commonly known as BKK Corporation).

The Department of Toxic Substances Control (Department) issued a Remedial Action Order, Docket No. HSA 87/88-040, under the jurisdiction of Section 25355.5(a)(1)(B) of the California Health and Safety Code, on March 18, 1988. In issuing the Remedial Action Order the Department required that any release or threatened release of a hazardous substance or hazardous waste to the air, soil, surface water and groundwater at or from the Site be thoroughly investigated and appropriate remedial actions taken.

Due to the size and complexity of the Site, the Department is using a phased approach and has divided the Site into two operable units. The Upper Operable Unit is composed of the top soil at the Site, the waste zone embedded in the recent alluvium and saturated soils of the Bellflower Aquitard, and the saturated soils and groundwater of the Bellflower Aquitard, down to the Gage Aquifer. The Lower Operable Unit is composed of the Gage, Lynwood and Silverado Aquifers, and all other areas impacted by the areal extent of any hazardous substances which may have migrated either from the aforementioned areas or may have migrated from the Upper Operable Unit. The remediation of the Lower Operable Unit will not be addressed in this document. A separate remedial investigation shall be conducted on the Lower Operable Unit.

The City of Carson conducted an Environmental Impact Report (EIR) for the Metro 2000 Project, (SCH #933011037) for the propose of complying with the California Environmental Quality Act. The Draft EIR was circulated to interested agencies between September 14, 1993, and October 29, 1993, for a 45-day comment period. Several public meetings were held during the comment period to accept comments on the draft EIR. The City of Carson adopted and certified the EIR Final Report for the Metro 2000 Project on December 21, 1993.

The certified EIR conducted by the City of Carson addressed the Department's role in the remediation of the project and outlined the proposed remediation components for the project Site. The proposed remedial activities are: 1) installation of a landfill cap to reduce the amount of percolation through the Site which in turn would reduce the production of leachate, 2) installation of groundwater extraction wells to pump and treat contaminated non-potable groundwater, and 3) installation of a gas collection system in each landfill cell.

The construction of the landfill cover requires the importation of approximately 2.1 million cubic yards of soil over a period of 334 working days. The City of Carson identified several mitigation measures required to lessen the impact of the proposed landfill cover. As part of the Draft Remedial Action Plan, mitigation measures identified for the construction of the landfill cover, transportation of soil, and grading activities have been incorporated into the Draft RAP.

II. Project Description:

BKK Corporation is requesting approval of a draft Remedial Action Plan (RAP) for the Cal Compact Landfill, Upper Operable Unit from the Department. This draft RAP is in accordance with Section 25356.1 of the California Health and Safety Code, and

Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations 300.400 et seq. The Department is acting as a Responsible Agency as that term is defined in the Title 14, California Code of Regulations, Section 15381.

The proposed project for which the Department is acting on addresses the construction and operation of a landfill gas collection and treatment system and a groundwater treatment system (see Figure 2). The construction of the landfill cover is not addresses in this document, however, it was addressed in the City of Carsons's EIR for the Metro 2000 project. The Department as a Responsible Agency has carefully reviewed the Final EIR entitled Final Project and Program Environmental Impact Report, MetroMall 2000, dated December 1993. The Department, using its independent judgement found that (a) the EIR for the Metro 2000 project adequately complied with the provisions of the California Environmental Quality Act, (b) adequately addressed the proposed construction of the landfill cover, (c) is adequate for the Department for assessing potential impacts for the Remedial Action Plan. The Department, after reviewing the Final EIR, concurred with the findings of the City of Carson. The Department drafted a Statement of Overriding Considerations addressing significant impacts from construction of the landfill cover that were not feasibly mitigated to a level of insignificant with the mitigation measures found in the EIR.

The objective for this project is to reduce or eliminate the potential threat to human health and the environment. The project objectives for the remediation of contaminated groundwater in the Bellflower Aquitard are to (1) limit production of leachate through control of surface water infiltration and minimize the impact to groundwater, (2) control and prevent off-site migration of groundwater contaminated from waste in the saturated zones, and (3) draw back and contain the contaminant plume that is off-site. The remedial objectives for the landfill gas collection and treatment system are (1) control production of landfill gases through control of surface water infiltration, (2) control or prevent off-site migration of landfill gases, and (3) to prevent future releases of landfill gases to the atmosphere under proposed land use scenarios.

The landfill gas system will consist of a series of vertical extraction wells installed at the perimeter of the waste zone. The extraction wells will be connected by conveyance piping to a landfill flare. The collected landfill gasses will be transported through the a series of pipes to the landfill flare for thermal destruction. The landfill flare will be one unit with a maximum 750 cfm capacity.

In 1990, a vapor monitoring event was conducted at the project Site. Two Calderon compounds were detected during the sampling event. Calderon compounds are chemicals established in California as indicators for hazardous waste landfills. Analytical results from five vadose wells detected vinyl chloride in concentrations ranging form 2 ppm (parts per million) to 20.5 ppm and benzene from 1.4 ppm to 8.8 ppm. Methane, a non-Calderon compound was detected in the range of 26.7% to 64.4%. Other non-Calderon compounds detected included ethylbenzene, toluene, xylene and dichlorodifluoromethane.

Landfill gas extraction wells will be installed using standard drilling practices such as a hollow stem auger drill rig. The design of the system shall be developed by a registered California civil engineer, submitted to the Department for review and approval. A Department approved quality control/quality assurance program shall be strictly followed by the contractors.

The proposed groundwater treatment system consists of a series of groundwater extraction wells installed along the western and southern portions of the project Site. The groundwater extraction wells will be installed in the Bellflower Aquitard saturated zone. The groundwater collection and treatment system will be designed to contain contaminated groundwater migrating from the Bellflower Aquitard beneath the Site and to capture contaminated groundwater off-site in the Bellflower Aquitard.

The remedial investigation identified groundwater contamination in the Bellflower Aquitard. Volatile organic compounds, semi-volatile organic compounds, and heavy metals were detected in the groundwater in the Bellflower Aquitard. The remedial investigation also concluded that some off-site contamination has occurred. The proposed groundwater collection and treatment system will be designed to control and contain both on-site and off-site contamination.

The groundwater system includes extraction wells, associated piping, dedicated wells pumps, a water equalization tank, filters, precipitation and clarification units, carbon absorbers units, and a final polishing filter unit.

The treated groundwater will be used for on-site irrigation, or discharged to the sewer system or storm drain system. The system is anticipated to treat approximately 100 to 150 gallons per minute. The spent activated carbon will be managed as hazardous waste and be transported to a permitted recycling center or disposal facility.

III. Project Location:

The Cal Compact Landfill is located at 20400 Main Street in the City of Carson, County of Los Angeles, California. The Site is located in the western portion of the City of Carson. It is bounded by Del Amo Boulevard to the north, the San Diego Freeway (I-405) to the east with the Dominguez Channel located just east of the San Diego Freeway (I-405), the Torrrance Lateral Channel to the south with residential development just south of the Torrance Lateral Channel, and Main Street and residential development on the west. The primary freeway access to the Site is by means of the Main Street ramps to the San Diego Freeway (I-405) and the Torrance Boulevard ramps to the Harbor Freeway (I-110). The Site is located within the City of Carson's Redevelopment Project Area No. 1.

IV. Identification of Environmental Setting:

The project will take place at the 157 acre Cal Compact Landfill Site. The Site is bounded by Del Amo Boulevard to the north, the San Diego Freeway (I-405) to the east with the Dominguez Channel located just east of the San Diego Freeway (I-405), the Torrance Lateral Channel to the south with residential development just south of the Torrance Lateral Channel, and Main Street and residential development on the west (see Figure 3). The Site is currently vacant except for three trailers used by the developer for their offices. The environmental setting of the project locale can generally be described as follows:

Noise

Existing ambient noise levels in the project locale are mostly the product of traffic along local streets, arterials, and freeways (I-405 and I-110). Existing noise levels measured during the afternoon peak travel hours range from approximately 54 dBA to almost 70 dBA (Metro 2000 EIR, September 1993). Noise levels are lower in the vicinity of the residential street than near the freeway and local streets. Noise levels are influenced by the freeway travel to varying degrees depending upon Site location.

Transportation/Circulation

Regional access to the Site vicinity is provided by the San Diego (I-405) and Harbor (I-110) freeways. From the San Diego Freeway, the project area is accessible via interchange at Carson Street, Avalon Boulevard, Wilmington Avenue, and Main Street. From the Harbor Freeway access to the area is provided by interchanges at the Figueroa Street, Hamilton Avenue, and Carson Street.

Existing traffic volumes peak in the morning and evening hours. Three public transit systems (the Carson Circuit, the metropolitan Transit Authority, and Torrance Transit) link the project area with California State University - Dominguez Hills, downtown Long Beach, Del Amo center, Redondo Beach Pier, UCLA-Medical Center and other locations.

Public Services/Infrastructure

Public and private utility infrastructure and services provided to the project area include water, wastewater, electricity, natural gas, telephone, cable television, fire and police protection, recreational facilities, schools, and libraries. Existing utility infrastructure and services on-site include water, sewer, telephone, electricity, and storm drain system.

Atmospheric Conditions - The Los Angeles Metropolitan area, located within the South Coast Air Basin is characterized by relatively poor air quality.

Topography, Geologic, and Hydrogeologic Setting - The Cal Compact Landfill lies between the relatively flat, central portion of the Los Angeles Basin about five miles north of the Pacific Ocean. In its natural condition, the project area was part of a natural inland drainage, known as the Dominguez Slough. The Dominguez Channel, from Century to Sepulveda Boulevards to Los Angeles Harbor, was built to drain water from the western portion of the South Bay. The current elevation at the Site varies from 19 feet to 58 feet above MSL.

On-site investigations have identified the presence of three abandoned wells; two oil wells and one water well. No evidence presently exists which indicates that these wells are a source of groundwater contamination. The possibility of these wells serving as a conduit for leachate into the Lower Operable Unit shall be investigated as part of the remedial investigation of the Lower Operable Unit.

The subsurface material beneath the Site shows changes in thickness resulting from their depositional history and in response to the Pleistocene Lakewood Formation. These soils are older alluvium, flood plain, and late Pleistocene marine and non-marine terrace deposits. The alluvial soils on-site consist primarily of silty clay, sandy clay, silt, clayey silt, sandy silt, and silty sand. Groundwater beneath the Site is relatively shallow, approximately 50 feet below MSL.

The Newport-Inglewood Fault Zone is the active fault zone nearest to the Site. This is one of the largest fault in Southern California. Specifically, the Avon-Compton segment of the Newport-Inglewood Fault Zone is located approximately 2.5 miles northeast of the Site. The next nearest active fault zone in the area is the Palos Verde Fault Zone, located approximately 5 miles southwest of the Site. The Site is located in the Unified Building Code seismic zone 4.

Bellflower Zone

The Bellflower Zone is the upper portion of the Lakewood Formation found throughout the Site from the ground surface to a depth of about 70 feet to 100 feet below ground surface. It contains a significant amount of fine grained sediments such as silts, sands and clays. As a result, it has historically been referred to as the Bellflower Aquiclude or Aquitard. The Bellflower Aquitard is not a source of drinking water generally due to its poor water quality and yield. The range of hydraulic conductivity values of the fine-graded Bellflower Zone soils are 4.2×10^{-7} cm/sec to 1.1×10^{-4} cm/sec.

Gage Aquifer

The Gage Aquifer is the lower portion of the Lakewood Formation. It contains primarily fine sand deposits. The California Department of Water Resources reported the transmissivity of the Gage Aquifer in the vicinity of the Site to be approximately 20,00 gpd/ft (gallons per day per foot). In the vicinity of the Site, the thickness of the Gage Aquifer is about 75 to 80 feet thick and its maximum depth is approximately 175 feet below ground surface. Due to the relative low yield and poor water quality, the Gage Aquifer is not currently used for municipal or industrial water supply.

Lynwood Aquifer

The Lynwood Aquifer is located in the upper portion of the San Pedro Formation. It is a confined aquifer, separated from the overlying Gage Aquifer and the underlying Silverado Aquifer by silt and clay deposits that range in thickness from 75 to 125 feet. It contains marine and non-marine deposits, and is characteristically composed of gravel or sand and gravel. In the vicinity of the Site, the Lynwood Aquifer is about 100 feet thick. Because of high well yields and adequate water quality, it is extensively used for industrial and municipal water supplies.

Silverado Aquifer

The Silverado Aquifer is located in the middle portion of the San Pedro Formation. It is regionally the largest and most productive aquifer in the Los Angeles Coastal Plain. It contains primarily gravel and sand, and in the vicinity of the Site it is about 200 feet thick. The top of the Silverado Aquifer is at a depth approximately 425 feet below ground surface. Because of its high yield to wells and good water quality it is extensively used for industrial and municipal water supplies.

The closest drinking water well is the Dominguez Water Company's Well No. 19A, located approximately near the intersection of Carson Street and Avalon Boulevard, approximately 0.5 miles southeast of the Cal Compact Landfill. The design of the well includes perforated casing at depths ranging from 510 feet to 665 feet below ground surface and has a sanitary seal from the depth of 200 feet to the ground surface. Based on the design, it is evident that the well used groundwater from the regional Silverado Aquifer and is sealed below the shallow Gage Aquifer.

V. Significant Effects and Mitigation Measures:

The project should not have a significant effect on the environment as that term is defined in Public Resources Code Section 21068. Conditions and/or controls on the project will be implemented through the RAP and through compliance with other public agency laws, ordinances, regulations and standards as described in, but not limited to, the Initial Study. Assuming full compliance with these controls, they are sufficient to limit project impacts to an insignificant level. Thus no additional mitigation measures are required. The attached checklist was used to identify possible significant effects.

No mitigation measures are proposed for this project.

VI. Consistency with Zoning Plans and Other Applicable Land Use Control:

The project Site is unoccupied, except for three trailers use by the MetroMall developer for offices. The project Site is located in an area zoned CR-D-OIL (Commercial, Regional-Design Overlay Review-Organic Refuse Landfill) and ML-D-OIL (Manufacturing, Light-Design Overlay Review-Organic Refuse Landfill).

The proposed remedial activities are consistent with the existing zoning at the project Site. The implementation of the RAP will allow use of the Site for its designated land use. A deed restriction shall run with the property; the deed restriction will restrict residential uses, school, day care center, and hospital uses, and excavation activities. Remedial activities will be consistent with Applicable or Relevant and Appropriate Requirements identified in the Feasibility Study and RAP for the proposed project.

VII. Names of People Participating in this Initial Study:

Mr. Thomas M. Cota
Hazardous Materials Specialist
California Environmental Protection Agency
Department of Toxic Substances Control
Region 4
245 West Broadway, Suite 425
Long Beach, California 90802

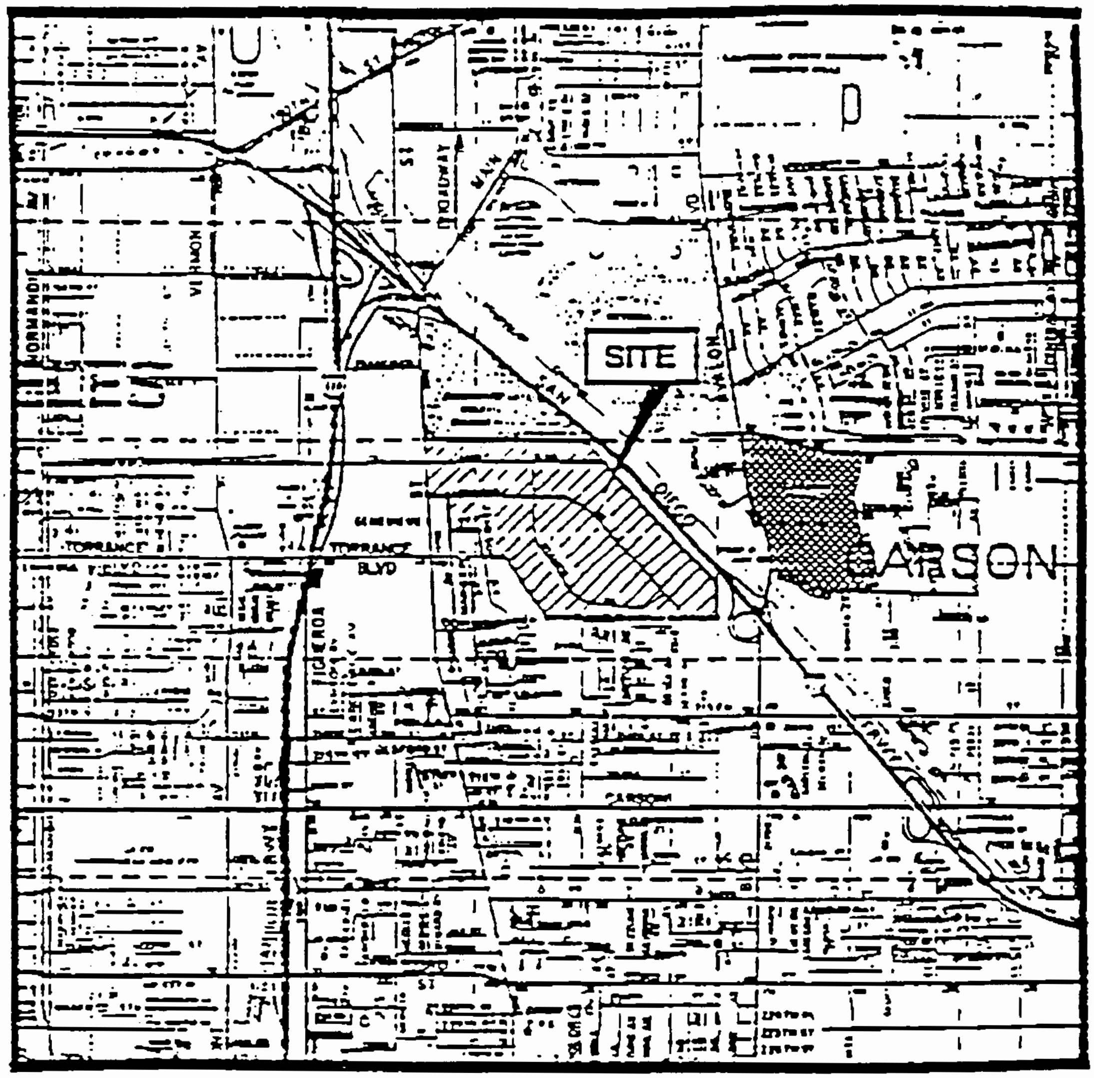
Mr. Mike Vivas
Department of Toxic Substances Control
400 P Street
P.O. Box 806
Sacramento, California 95812-0806

Mr. Eric Maher
Department of Toxic Substances Control
400 P Street
P.O. Box 806
Sacramento, California 95812-0806

VIII. List of Reference Materials Supporting the Initial Study Findings Regarding Potential Environmental Effects:

The technical reports which served as the source of information in preparing this document included: (1) Remedial

Investigation for the Cal Compact Landfill, Brown & Root Environmental, Volumes 1 through 8, July 1995; (2) Feasibility Study for the Cal Compact Landfill, Brown & Root Environmental, August 1995, (3) Final Report Baseline Risk Assessment for Cal Compact Landfill, Brown & Root Environmental, August 1995, (4) Draft Remedial Action Plan for Cal Compact Landfill, Brown & Root Environmental, August 1995, (5) Final Project and Program Environmental Impact Report Metro 2000, SCH #933011037, dated December 1993; City of Carson, City Council Resolution No. 93-128, dated December 21, 1993.



CAL COMPACT SITE LOCATION MAP

Figure 1

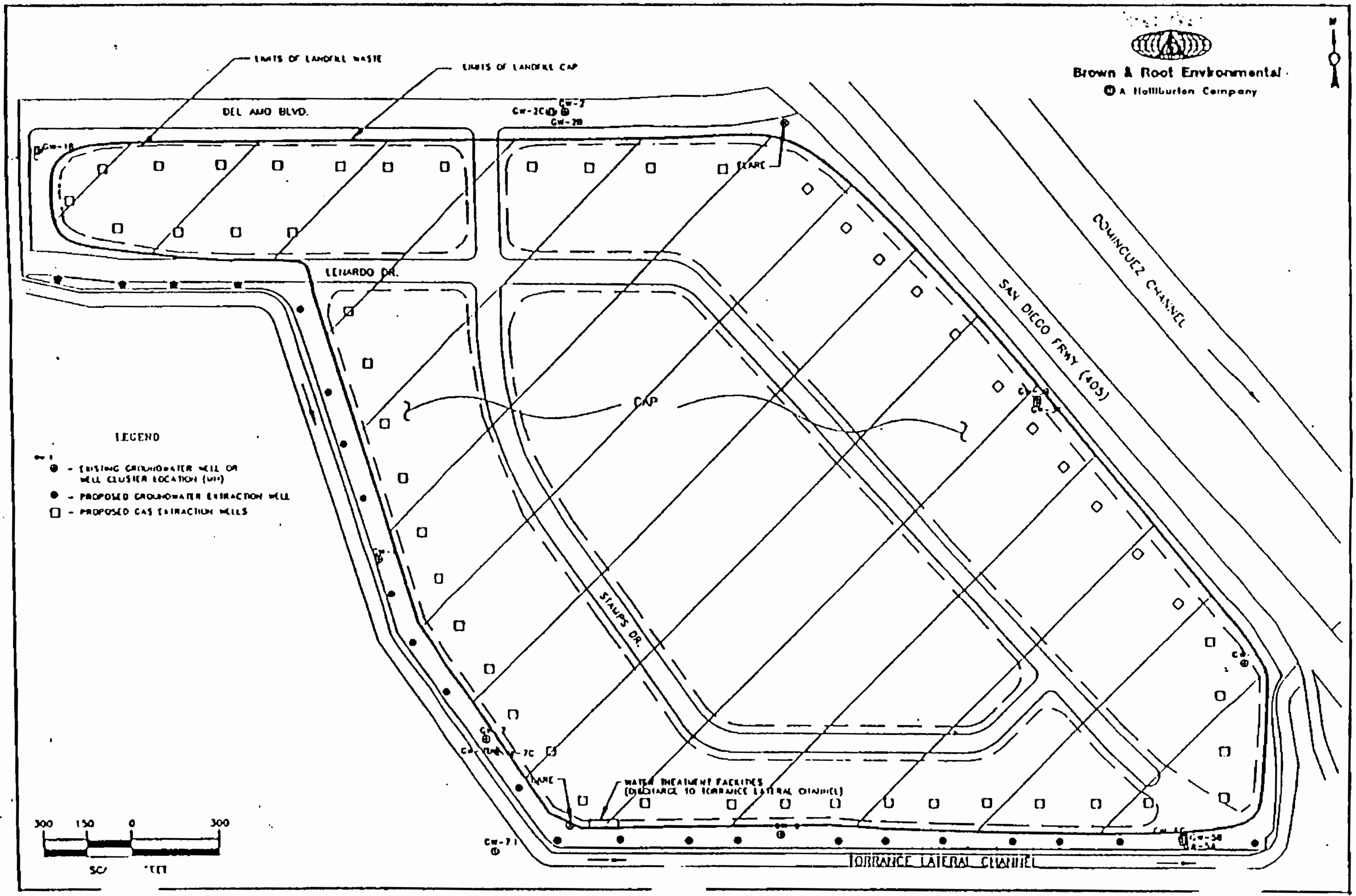
LEGEND

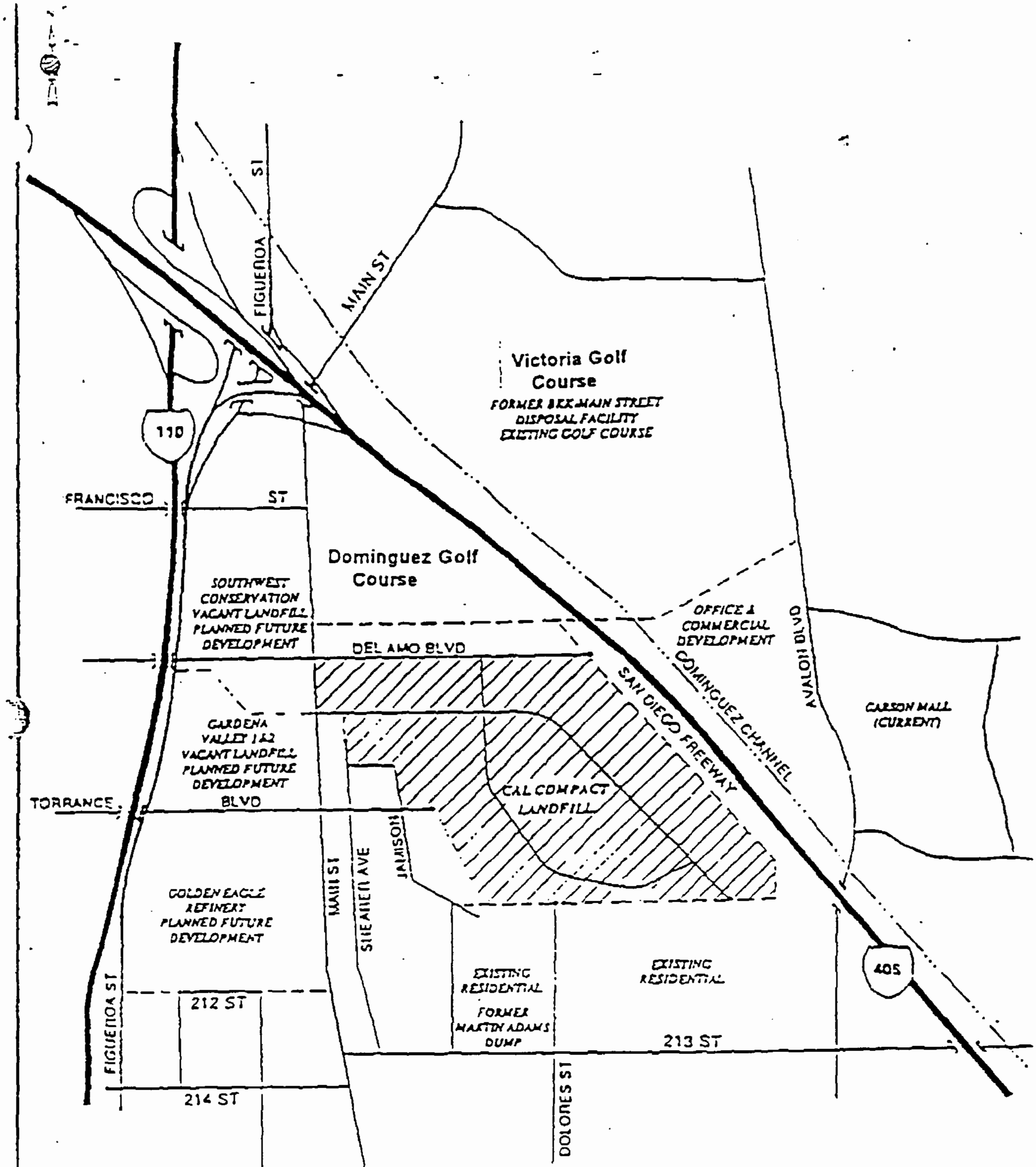
CAL COMPACT LOCATION

20 10 0 20

SCALE - FEET

CONTAINMENT, COLLECTION & TREATMENT OF GROUND WATER AND LANDFILL GAS CAL COMPACT LANDFILL





SOURCE: McLAREN/HART (1992)

1750 875 0 1750

SCALE - FEET

Figure 3

LAND USE IN THE VICINITY OF THE CAL COMPACT LANDFILL

Brown & Root Environmenta

A Halliburton Company

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444

SUPPLEMENTAL NEGATIVE DECLARATION
for

CAL COMPACT LANDFILL
UPPER OPERABLE UNIT
20400 South Main Street
Carson, California 90745

PROJECT PROPONENT:

Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, California 90802-4444

Contact: Thomas M. Cota (310) 590-4898

PROJECT DESCRIPTION:

BKK Corporation is requesting approval of a draft Remedial Action Plan (RAP) for the Cal Compact Landfill Upper Operable Unit from the Department of Toxic Substances Control (DTSC). This draft RAP is in accordance with Section 25356.1 of the California Health and Safety Code, and Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations 300.400 et seq. DTSC is acting as a Responsible Agency as that term is defined in the California Code of Regulations, Title 14, Section 15381.

The proposed project for which DTSC is acting on addresses the construction and operation of a landfill gas collection and treatment system and a groundwater treatment system. The construction of the landfill cover is not addressed in this document, however, it was addressed in the City of Carson's EIR for the Metro 2000 project. DTSC as a Responsible Agency has carefully reviewed the Final EIR entitled Final Project and Program Environmental Impact Report, MetroMall 2000, dated December 1993. DTSC, using its independent judgement, found that (a) the EIR for the Metro 2000 project adequately complied with the provisions of the California Environmental Quality Act, (b) adequately addressed the proposed construction of the landfill cover, and (c) is adequate for DTSC to assess potential impacts for the Remedial Action Plan. DTSC, after reviewing the Final EIR, concurred with the finding of the City of Carson. DTSC drafted a Statement of Overriding Conditions addressing significant impacts that were not feasibly mitigated to a level of insignificance with the mitigation measures found in the EIR.

The project objectives for this project is to reduce or eliminate the potential threat to human health and the environment. The project objectives for the contaminated groundwater in the Bellflower Aquitard are (1) limit production of leachate through control of surface water infiltration to minimize impact to groundwater, (2) control and prevent off-site migration of groundwater contaminated from waste in the saturated zone, and (3) draw back and contain the contaminant plume that is now off-site. The project objectives for the landfill gases are (1) control production of landfill gases through control of surface water infiltration and (2) control or prevent off-site migration of landfill gases and future releases of landfill gases to the atmosphere under proposed land use scenarios.

The landfill gas system will consist of a series of vertical extraction wells installed at the perimeter of the waste zone. The extraction wells will be connected by HDPE conveyance piping to a landfill flare. The collected landfill gasses will be transported through the series of pipes to the flare for thermal destruction. The landfill gas flare will be one unit with a maximum 750 cfm capacity.

In 1990, a vapor monitoring event was conducted at the project site. Two Calderon compounds were detected during the sampling event. Calderon compounds are chemicals established in California as indicators for hazardous waste landfills. Analytical results from five vadose wells detected vinyl chloride in concentrations ranging form 2 ppm (parts per million) to 20.5 ppm and benzene from 1.4 ppm to 8.8 ppm. Methane, a non-Calderon compound, was detected in the range of 26.7% to 64.4%. Other non-Calderon compounds detected included ethylbenzene, toluene, xylene and dichlorodifluoromethane.

Extraction wells will be installed using standard drilling practices such as a hollow stem auger drill rig. The design of the system shall be developed by a registered California civil engineer, submitted to DTSC for review and approval. A

Department approved quality control/quality assurance program shall be strictly followed by the contractors.

The proposed groundwater treatment system consists of a series of groundwater extraction wells installed along the western and southern portions of the project site. The groundwater extraction wells will be installed in the Bellflower Aquitard saturated zone. The groundwater collection and treatment system will be designed to contain contaminated groundwater migrating from the Bellflower Aquitard beneath the site and to capture contaminated groundwater off-site in the Bellflower Aquitard.

The remedial investigation identified groundwater contamination in the Bellflower Aquitard. Volatile organic compounds, semi-volatile organic compounds, and heavy metals were detected in the groundwater in the Bellflower Aquitard. The remedial investigation also concluded that some off-site contamination has occurred. The proposed groundwater collection and treatment system will control and contain both on-site and off-site contamination.

The groundwater system includes extraction wells, associated piping, dedicated wells pumps, a water equalization tank, filters, precipitation and clarification units, carbon absorbers units, and a final polishing filter unit.

The treated groundwater will be used for on-site irrigation, or discharged to the sewer system or storm drain system. The system is anticipated to treat approximately 100 to 150 gallons per minute.

PROJECT LOCATION DESCRIPTION:

The Cal Compact Landfill (the Site) is located at 20400 Main Street in the City of Carson, County of Los Angeles, California. The Site is located in the western portion of the City of Carson. It is bounded by Del Amo Boulevard to the north, the San Diego Freeway (I-405) to the east with the Dominguez Channel located just east of the San Diego Freeway (I-405), the Torrrance Lateral Channel to the south with residential development just south of the Torrance Lateral Channel, and Main Street and residential development on the west. The primary freeway access to the Site is by means of the Main Street ramps to the San Diego Freeway (I-405) and the Torrance Boulevard ramps to the Harbor Freeway (I-110). The Site is located within the City of Carson's Redevelopment Project Area No. 1.

FINDINGS OF SIGNIFICANT EFFECT ON ENVIRONMENT:

DTSC has determined that the project will not have a significant effect on the environment as that term is defined in the Public Resources Code Section 21068.

A copy of the Initial Study which supports this finding is attached.

MITIGATION MEASURES:

No mitigation measures have been proposed for this project.

Signature: Thomas M Cota Date: 10/25/95
Thomas M. Cota, Project Manager

Signature: H Saebfar Date: 10/25/95
Hamid Saebfar, Chief
Site Mitigation Cleanup Operations
Southern California Branch

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444

Supplemental Negative Declaration Approval

Project Title:

Cal Compact Landfill, Remedial Action Plan, Upper Operable Unit

State Clearinghouse Number:

95081061

Contact Person and Telephone:

Thomas M. Cota - (310) 590-4898

Project Location:

20400 Main Street, City of Carson, County of Los Angeles, State of California

Project Description:

BKK Corporation is requesting approval of a draft Remedial Action Plan (RAP) for the Cal Compact Landfill Upper Operable Unit from the Department of Toxic Substances Control (DTSC). This draft RAP is in accordance with Section 25356.1 of the California Health and Safety Code, and Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations 300.400 et seq. DTSC is acting as a Responsible Agency as that term is defined in the California Code of Regulations, Title 14, Section 15381.

The proposed project for which DTSC is acting on addresses the construction and operation of a landfill gas collection and treatment system and a groundwater treatment system. The construction of the landfill cover is not addressed in this document, however, it was addressed in the City of Carson's EIR for the Metro 2000 project. DTSC as a Responsible Agency has carefully reviewed the Final EIR entitled Final Project and Program Environmental Impact Report, MetroMall 2000, dated December 1993. DTSC, using its independent judgement, found that (a) the EIR for the Metro 2000 project adequately complied with the provisions of the California Environmental Quality Act, (b) adequately addressed the proposed construction of the landfill cover, and (c) is adequate for DTSC to assess potential impacts for the Remedial Action Plan. DTSC, after reviewing the Final EIR, concurred with the finding of the City of Carson. DTSC drafted a Statement of Overriding Conditions addressing significant impacts that were not feasibly mitigated to a level of insignificance with the mitigation measures found in the EIR.

The project objectives for this project is to reduce or eliminate the potential threat to human health and the environment. The project objectives for the contaminated groundwater in the Bellflower Aquitard are (1) limit production of leachate through control of surface water infiltration to minimize impact to groundwater, (2) control and prevent off-site migration of groundwater contaminated from waste in the saturated zone, and (3) draw back and contain the contaminant plume that is now off-site. The project objectives for the landfill gases are (1) control production of landfill gases through control of surface water infiltration and (2) control or prevent off-site migration of landfill gases and future releases of landfill gases to the atmosphere under proposed land use scenarios.

The landfill gas system will consist of a series of vertical extraction wells installed at the perimeter of the waste zone. The extraction wells will be connected by HDPE conveyance piping to a landfill flare. The collected landfill gasses will be transported through the series of pipes to the flare for thermal destruction. The landfill gas flare will be one unit with a maximum 750 cfm capacity.

In 1990, a vapor monitoring event was conducted at the project site. Two Calderon compounds were detected during the sampling event. Calderon compounds are chemicals established in California as indicators for hazardous waste landfills. Analytical results from five vadose wells detected vinyl chloride in concentrations ranging form 2 ppm (parts per million) to 20.5 ppm and benzene from 1.4 ppm to 8.8 ppm. Methane, a non-Calderon compound, was detected in the range of 26.7% to 64.4%. Other non-Calderon compounds detected included ethylbenzene, toluene, xylene and dichlorodifluoromethane.

Extraction wells will be installed using standard drilling practices such as a hollow stem auger drill rig. The design of the system shall be developed by a registered California civil engineer, submitted to DTSC for review and approval. A Department approved quality control/quality assurance program shall be strictly followed by the contractors.

The proposed groundwater treatment system consists of a series of groundwater extraction wells installed along the western and southern portions of the project site. The groundwater extraction wells will be installed in the Bellflower Aquitard saturated zone. The groundwater collection and treatment system will be designed to contain contaminated groundwater migrating from the Bellflower Aquitard beneath the site and to capture contaminated groundwater off-site in the Bellflower Aquitard.

The remedial investigation identified groundwater contamination in the Bellflower Aquitard. Volatile organic compounds, semi-volatile organic compounds, and heavy metals were detected in the groundwater in the Bellflower Aquitard. The remedial investigation also concluded that some off-site contamination has occurred. The proposed groundwater collection and treatment system will control and contain both on-site and off-site contamination.

The groundwater system includes extraction wells, associated piping, dedicated wells pumps, a water equalization tank, filters, precipitation and clarification units, carbon absorbers units, and a final polishing filter unit.

The treated groundwater will be used for on-site irrigation, or discharged to the sewer system or storm drain system. The system is anticipated to treat approximately 100 to 150 gallons per minute.

Project Approval:

DTSC of Toxic Substances Control has found on the basis of the Initial Study and the Supplemental Negative Declaration that there is no substantial evidence that the construction and operation of the landfill gas collection and treatment system and the groundwater treatment system will have a significant effect on the environment.

I hereby approve the Supplemental Negative Declaration for this project.

Signature: ______________________ Date: 10/23/95

Hamid Saebfar, Chief
Site Mitigation Cleanup Operations
Southern California Branch

Appendix E-2:

Final Remedial Action Plan (lower operable unit)

FINAL REMEDIAL ACTION PLAN FOR LOWER OPERABLE UNIT

CAL COMPACT LANDFILL
20400 SOUTH MAIN STREET
CARSON, CALIFORNIA

Prepared for:

CALCOMPACT DEFENSE GROUP

Prepared by:

URS

130 Robin Hill Road, Suite 100
Santa Barbara, California 93117

January 2005

FINAL REMEDIAL ACTION PLAN FOR THE LOWER OPERABLE UNIT

CAL COMPACT LANDFILL
20400 SOUTH MAIN STREET
CARSON, CALIFORNIA

PREPARED FOR:
CAL COMPACT DEFENSE GROUP

PREPARED BY:
URS CORPORATION

D. Gilbert Fates
California Registered Geologist #6123

January 2005

bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CD	Consent Decree
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethene
COC	Chemical of Concern
1,2-DCA	1,2-dichlorethane
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
IS/ND	Initial Study and Issuance of a Negative Declaration
LBF	Lower Bellflower Aquitard
MCLs	Maximum Contaminant Levels
MBF B/C	Middle Bellflower Aquitard B/C Sands
msl	Mean Sea Level
NBAR	Nonbinding Allocation of Responsibility
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	Operation and Maintenance
OU	Operable Unit
PRP	Potentially Responsible Party
P&T	Pump & Treat
RAP	Remedial Action Plan
RAW	Removal Action Work Plan
SARA	Superfund Amendments and Reauthorization Act
SOR	Statement of Reason
SVE	Soil Vapor Extraction
TCE	Trichloroethene
VOCs	Volatile Organic Compounds

This Final Remedial Action Plan (RAP) addresses the potential impact of groundwater contamination in the Upper Operable Unit (OU) on the Lower OU at the Cal Compact Landfill in Carson, California (Site). This Final RAP was prepared in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Chapter 6.8 of the California Health and Safety Code; and applicable guidance from the California Environmental Protection Agency – Department of Toxic Substances Control (DTSC) (DTSC, 1995). This Final RAP summarizes the results of the RAP process, describes the Site conditions, identifies removal action objectives, describes removal action alternatives, summarizes the evaluation of alternatives, and describes the recommended alternative.

The Site is an inactive Class II landfill located at 20400 South Main Street in Carson, County of Los Angeles, California. The approximately 157-acre landfill was active between 1959 and 1964, during which time it accepted both solid municipal wastes and industrial semi-liquid wastes for disposal. The Site has been vacant and unused since the closure of the landfill in 1965. In 1978, the California Department of Health Services (now, DTSC) began investigating the Site for soil and shallow groundwater contamination that allegedly resulted from the prior waste disposal practices. In 1988, the DTSC issued a Remedial Action Order under California Health and Safety Code 25355.5(a)(1)(B) to fourteen potentially responsible parties (PRPs). The order alleged the existence of a release or threatened release and public nuisance, and required the submittal of a workplan to identify the hazardous substances present and determine the extent of cleanup required.

In 1995, the DTSC entered into a Consent Order and Remedial Action Order with the former landfill owner (BKK), successor to Cal Compact Inc., for preparation of a RAP for the Upper OU. In 1995, the DTSC also entered into a Consent Decree (CD) with the Site owners, L.A. Metro Mall, LLC and Commercial Realty Projects, Inc., for implementation of the Upper OU RAP. In the CD, the DTSC divided the Site vertically into two principal OUs. The Upper OU was defined to include the shallow soil, the "waste zone", and the Bellflower aquitard, which was described to extend to a depth of approximately 110 feet below the Site. The Lower OU was defined as the deeper hydrostratigraphic units beginning with the Gage aquifer and extending down to the Silverado aquifer. The DTSC established the OU designations in prioritizing the remedial response to the areas of known impacts (Upper OU) versus potential impacts (Lower OU). Since contamination was known to be present in the Upper OU, the CD focused on the remediation of the Upper OU. The Lower OU was not addressed in the CD, but it did contain provisions for the DTSC to address the investigation and remediation of the Lower OU at a later date. Since that time, the Upper OU investigations and remediation activities have been addressed separately.

During this same time period, the validity of the hydrostratigraphic Site model used by the DTSC for defining OU boundaries had come under question based on noted differences with the hydrostratigraphic model developed for the nearby Montrose-Del Amo Superfund site (Dames & Moore, 1998). To address this uncertainty, URS/Dames & Moore conducted a detailed hydrostratigraphic investigation, which established the Upper OU/Lower OU boundary, as defined by the top of the Gage aquifer, to be deeper by approximately 100 feet than previously considered (URS/Dames & Moore, 2000). The DTSC has concurred with the findings of this study, which places the Upper OU/Lower OU boundary at a depth of approximately 200 feet below the Site. This redefinition of the Upper OU/Lower OU boundary has subsequently affected the remedial strategy for the Lower OU.

Results from the previous Upper OU investigations had indicated that the primary chemicals of concern (COCs) in groundwater were dissolved chlorinated and aromatic volatile organic compounds (VOCs), primarily trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichlorethane (1,2-DCA), vinyl chloride and benzene, toluene, ethylbenzene, xylenes (BTEX). These VOCs had been detected in localized areas within the Bellflower aquitard at concentrations above their respective maximum contaminant levels (MCLs) for drinking water. The results of the hydrostratigraphic investigation conducted by URS/Dames & Moore in 2000 confirmed that VOCs were locally present in the Bellflower aquitard (Middle Bellflower B/C sands [MBF B/C]), but not in the underlying Gage aquifer of the Lower OU, which is separated from the MBF B/C by approximately 50 feet of comparatively fine grained and low-permeability sediments comprising the Lower Bellflower aquitard (LBF).

Based upon the available groundwater monitoring and chemical fate and mobility modeling data, in conjunction with remedial actions for the Upper OU, the risk posed to the Lower OU is considered to be minimal. However in the interest of satisfying the provisions set forth in CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] §300.415 (b)(2)), and the California Health and Safety Code section 25323, a response action (herein referred to as a removal action) is merited given the potential for contamination of drinking water or sensitive ecosystems.

In accordance with the NCP requirement, two alternative actions were identified and considered: Alternative 1 - No Action; and Alternative 2 - Groundwater monitoring. Based on the comparison of these two alternatives, Alternative 1 would not provide sufficient protection to the Lower OU. However, Alternative 2 would achieve the NCP criteria of overall protectiveness of human health, short-term and long-term effectiveness, implementability, and State and community acceptance.

A groundwater monitoring plan for the Gage aquifer has already been prepared and approved by the DTSC (DTSC, 2002). Upon approval of the Final RAP for the Lower OU, a groundwater monitoring program will be implemented in accordance with techniques and methods described in the approved plan.

This Final Remedial Action Plan (RAP) identifies proposed removal/remedial action alternatives for groundwater in the Lower Operable Unit (OU) at the Cal Compact Landfill in Carson, California (Site). It has been prepared by URS Corporation (URS) on behalf the Cal Compact Defense Group pursuant to the Consent Decree (CD) entered in *Department of Toxic Substances Control, et al., versus Commercial Realty Projects, Inc., et al., United States District Court, Central District (No. 95-8773 MRP (MANx))*.

The proposed removal/remedial action area is located within a hazardous substance release Site; therefore, the action will be implemented in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 CFR §300.415]. CERCLA and NCP define removal action to include:

> *"the cleanup or removal of released hazardous substances from the environment; such actions as may necessarily be taken in the event of the threat of release of hazardous substances into the environment; such action as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances; the disposal of removed material; or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release."*

The United States Environmental Protection Agency (EPA) has classified removal actions into three types based on the circumstance surrounding the release or threat of release: emergency removal actions; time critical removal actions; and non-time critical removal actions. The California Health and Safety Code specifies preparation of necessary work plan documentation depending on the type and cost of the removal action (i.e., RAP, RAP equivalent or Removal Action Work Plan [RAW]), and authorizes the California Environmental Protection Agency – Department of Toxic Substance Control (DTSC) oversight responsibility of the process. For the Cal Compact Landfill, the DTSC has made the determination (DTSC, 2001) that a standard RAP should be prepared in accordance with the California Health and Safety Code section 25356 subdivisions (e) and (f). Subdivisions (e) and (f) outline the requirements for a Statement of Reason (SOR), evaluation of alternatives, evaluation of consistency with federal regulations, Nonbinding Allocation of Responsibility (NBAR), and public involvement during the RAP review process, including a public meeting and response to comments.

The Cal Compact landfill is an inactive Class II landfill located at 20400 South Main Street in Carson, County of Los Angeles, California (Figure 1, Vicinity Map). It is bounded to the north by the Dominguez Golf Course and vacant property, to the east by the San Diego Freeway (Interstate Highway #405), and to the south and west by single-family residences and mobile home parks. The Harbor Freeway (Interstate Highway #110) is located approximately 0.25 to 0.50 mile west of the Site. The approximately 157-acre landfill was active between 1959 and 1964, during which time it accepted both solid municipal wastes and industrial semi-liquid wastes for disposal. The Site has been vacant and unused since the closure of the landfill in 1965. Previous investigations had indicated that the primary chemicals of concern (COCs) threatening the Lower OU (Gage aquifer, Lynwood aquifer, and Silverado aquifer) were volatile organic compounds (VOCs), primarily trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichlorethane (1,2-DCA), vinyl chloride and benzene, toluene, ethylbenzene, xylenes (BTEX). These VOCs had been detected in localized areas within the Bellflower aquitard of the Upper OU at concentrations above their respective maximum contaminant levels (MCLs) for drinking water. The results of a recent hydrostratigraphic investigation indicate that VOCs were present in the Upper OU but not in the Lower OU (URS/Dames & Moore, 2000).

This Final Lower OU RAP addresses the applicable regulatory requirements set forth in California Health and Safety Code section 253561.1 (d), and presents the evaluation of the two non-time critical removal action alternatives under consideration for the Site, including (1) no action and (2) groundwater monitoring. This Final RAP will be used as the basis for the CERCLA removal action at the Site. The Administrative Record is included in Appendix A of this document. The Statement of Reasons, including the Nonbinding Allocation of Responsibility (NBAR), is included in Appendix B, and the California Environmental Quality Act (CEQA) documentation is included in Appendix C. The Responsiveness Summary is included in Appendix D of this Final RAP. The DTSC-approved Groundwater Monitoring Plan for the Lower OU is included in Appendix E.

This Final RAP is being issued in accordance with the DTSC public involvement policy, in which the public is encouraged to review and comment on the proposed removal action. To gain a more thorough understanding of the activities associated with this removal action, the public is encouraged to review the official administrative record, available at the Carson Public Library, 151 East Carson Street, Carson, California (telephone: 310.830.0901).

The Site background information presented below has been summarized from a variety of prior technical studies, including Brown and Root, 1995a, 1995b; Allwest Geoscience, 1999a, 1999b; Dames & Moore, 1998a; and URS/Dames & Moore, 2000. This section presents a brief description of the Site conditions and background, and is intended to satisfy the requirements of a RAP as defined in CERCLA.

According to disposal records, the Cal Compact landfill accepted more than six million cubic yards of material including municipal rubbish and construction debris, accounting for about 94% of the waste volume at the Site. It also accepted about 540,000 cubic yards (volume equivalent) of semi-liquid waste, principally drilling muds, accounting for about 6% of the waste volume at the Site. The landfill used the "excavate-fill-cover" method of disposal; the daily cover was estimated to total 1 million cubic yards of soil.

Two initial investigations were conducted at the Cal Compact landfill in 1978 and 1981. They encountered landfill gases (methane and carbon dioxide) as well as VOCs (mainly BTEX, TCE, cis-1,2-DCE, 1,2-DCA, and vinyl chloride) and metals in the Site soil and groundwater. In 1988, the California Department of Health Services (now, the DTSC), lead agency for the Site, issued a Remedial Action Order under California Health and Safety Code 25355.5(a)(1)(B) to fourteen potentially responsible parties (PRPs). The order alleged the existence of a release or threatened release and public nuisance, and required the submittal of a workplan to identify the hazardous substances present and determine the extent of cleanup required.

In 1995, the DTSC entered into a Consent Order and Remedial Action Order with the former landfill owner (BKK), successor to Cal Compact Inc., for preparation of a RAP for the Upper OU. In 1995, the DTSC also entered into a CD with the Site owners, L.A. Metro Mall, LLC and Commercial Realty Projects, Inc., for implementation of the Upper OU RAP. In the CD, the DTSC divided the Site vertically into two principal OUs. The Upper OU was defined to include the Site soils, the "waste zone" above and within the Bellflower aquitard and the Bellflower aquitard down to, but not including the Gage aquifer. The Lower OU was defined as the deeper hydrostratigraphic units beginning with the Gage aquifer and extending down to the Silverado aquifer. The DTSC established the OU designations in prioritizing the remedial response to the areas of known impacts (Upper OU) versus potential impacts (Lower OU). Since contamination was known to be present in the Upper OU, the CD focused on the remediation of the Upper OU. The Lower OU was not addressed in the CD, but it did contain provisions for the DTSC to address the investigation and remediation of the Lower OU at a later date. Since that time, the Upper OU investigations and remediation activities have been addressed separately.

The Lower OU was initially addressed in response to the concern over the definition of the hydrostratigraphic boundary between the Upper OU and Lower OU in relation to the vertical extent of known contamination (defined as "waste zone") that was used in the RAP for the Upper OU. The DTSC acknowledged at the time that the base of the Bellflower aquitard and top of the Gage aquifer were poorly defined and that accurate boundary definition was required in order to meet the remedial objectives for the Upper OU.

In 1998, Site-specific models (Dames & Moore, 1998) were developed to evaluate the hydrostratigraphic units of the Lower OU and Upper OU (specifically, the position of the Gage aquifer) and to assess the potential for downward migration of VOCs into the Lower OU. Input parameters for the models were based on the detailed work conducted at the nearby Montrose/Del Amo site and augmented by other available subsurface data, including drilling logs and geophysical logs from nearby water production wells. The interpretations placed the top of the Gage aquifer, which the DTSC defines as the top of the Lower OU, at an approximate elevation of –200 feet mean sea level (msl), or approximately 220 feet below ground surface (bgs). This is deeper than the interpretation presented in the Upper OU RAP, which puts the top of Gage aquifer at an approximate elevation of –90 feet msl, or approximately 100 feet bgs (Brown & Root, 1995c).

The result of the 1998 study supported the conclusion that the contamination previously attributed to the Gage aquifer actually reflected conditions in portions of the overlying Bellflower aquitard (Upper OU), specifically the Middle Bellflower B/C sands (MBF B/C) in the stratigraphic nomenclature adopted for the Montrose-Del Amo site. Figure 2 is a schematic hydrostratigraphic cross section illustrating the revised Site model.

In 2000, a hydrostratigraphic investigation was conducted to confirm the findings of the 1998 study. The stratigraphic conditions encountered during the 2000 investigation confirmed, with a high degree of precision, the interpretation that the Gage aquifer beneath the Site lies at a greater depth (by almost 100 feet) than previously interpreted for the Upper OU RAP. Furthermore, laboratory results for groundwater samples collected from the Gage aquifer indicated no VOCs or metals were present at detectable concentrations in the Lower OU, except for barium and zinc. The barium and zinc concentrations were reported well below MCLs.

Pursuant to a Consent Decree between DTSC and BKK Corporation (BKK) that was entered on February 4, 2004, BKK must implement the tasks and activities that are set forth in the final RAP for the Lower OU.

Numerous investigations have been conducted at the Site from 1978 to the present. These investigations evaluated environmental conditions with respect to potential chemical impacts to soil, groundwater and air at the Site and within the surrounding area. Early investigations focused on evaluating conditions in the vadose zone and shallow saturated zone, while later work evaluated conditions in deeper hydrostratigraphic levels.

The principal documents describing prior Site characterization studies include the following:

- McLaren/Hart – *Revised Integrated Remedial Investigation Report, Cal Compact Landfill,* December 10, 1992.

- Brown & Root – *Final Remedial Investigation Report of the Cal Compact Landfill.* Dated July 1995.

- Dames & Moore – *Hydrostratigraphy, Groundwater Flow, and Contaminant Transport, Cal Compact and Vicinity.* Dated December 22, 1998.

- Allwest Geoscience, Inc. – *Report of Supplemental Site Assessment and First Quarter Groundwater Sampling for LA Metromall (Former Cal Compact Site), 20400 South Main Street, Carson, California.* Dated January 8, 1999.

- URS/Dames & Moore – *Report of Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California.* Dated August 10, 2000.

The information presented below has been summarized from these prior technical studies. The reader is referred to the original source documents for a more detailed description of the nature and findings of prior investigations conducted at the Site.

Previous investigations at the Site have consisted of the following elements:

- Completion of soil borings and direct-push sampling points for the collection and laboratory analysis of soil and groundwater grab samples

- Completion of downhole geophysical profiles to aid in the evaluation of site hydrostratigraphy

- Installation of groundwater monitoring wells for the collection and laboratory analysis of groundwater samples

- Collection and laboratory analysis of surface water runoff samples

- Completion of hydraulic testing of monitoring wells to determine aquifer physical properties

- Completion of surface geophysical surveys to evaluate the depth of landfill wastes and locate former oil wells and water supply wells on Site

- Installation and sampling of vapor wells and vapor monitoring points to evaluate landfill gas conditions and the potential for lateral landfill gas migration

- Installation and operation of meteorological monitoring station and collection and laboratory analysis of ambient air samples

Prior investigations in the Upper OU have documented the presence of landfill gases (methane and carbon dioxide) as well as VOCs and metals in the Site soil and groundwater. Findings of these previous Upper OU investigations have indicated that the primary COCs in groundwater were dissolved chlorinated and aromatic VOCs, primarily TCE, cis-1,2-DCE, 1,2-DCA, vinyl chloride and BTEX. These VOCs had been detected in localized areas within the Bellflower aquitard at concentrations above their respective drinking water MCLs. Based upon the findings of prior remedial investigations completed for the Upper OU (McLaren/Hart, 1992; Brown & Root, 1995a), the following remedial actions have been proposed to mitigate threats posed by the contaminants detected in the Upper OU: (1) containment of impacted soil and buried waste by installation of an engineered landfill cap; (2) extraction and treatment of contaminated groundwater; (3) collection and treatment of landfill gasses; and (4) long-term environmental monitoring of groundwater and landfill gas (Brown & Root, 1995c). Remedial measures for the Upper OU have not yet been implemented.

The results of the more recent hydrostratigraphic investigation (URS/Dames & Moore, 2000) confirmed that VOCs were locally present in the MBF B/C sands (Upper OU), but not in the underlying Gage aquifer of the Lower OU, which is separated from the MBF B/C sands by approximately 50 feet of comparatively fine grained and low-permeability sediments comprising the LBF aquitard. Figure 3, Summary of Groundwater Analytical Results, shows the Gage aquifer sampling locations with corresponding groundwater analytical results from the 2000 URS/Dames & Moore investigation. An up-gradient location (MWL01) was reported to have TCE, cis 1,2-DCE, and vinyl chloride in the upper portion of the MBF B/C sands at concentrations slightly in excess of their respective state and/or federal MCLs. Additionally, a groundwater grab sample from the lower portion of the MBF B/C sands at a down-gradient location (MWL02) was reported to contain 1,2-DCA slightly above its MCL. No VOCs were detected for grab samples collected within the LBF aquitard, which directly overlies the Gage aquifer. All VOCs detected in the groundwater grab samples have been previously reported, typically at higher concentrations, in shallower Upper OU monitoring wells at the Site. No VOCs were detected in groundwater samples collected from the three monitoring wells installed in the Gage aquifer.

Based upon available data, it appears that certain COCs have penetrated into portions of the MBF B/C sands but have not entered the underlying Gage aquifer (Dames & Moore, 1998 and URS/Dames & Moore, 2000). The 40- to 50-foot thick interval of fine-grained sediments comprising the LBF aquitard appears to form an effective buffer protecting the Gage aquifer from potential downward migration of contaminants from the overlying Upper OU. Based on the fate and mobility model used for the Site (Dames & Moore, 1998), any future vertical migration of VOCs into the Lower OU would result in VOC contamination at lower concentrations (less than MCLs) than the concentrations detected in the groundwater grab samples. This takes into account the degradation process through hydrodynamic dispersion, molecular diffusion, sorption/desorption, and biotic or abiotic transformation (biodegradation).

Additional remedial investigations of the Lower OU are not currently warranted since the environmental actions taken to date (1978 through 2000) have included a characterization of the hydrostratigraphy of the Lower OU and a one-time baseline assessment of its water quality. Results for the baseline sampling event from the Gage aquifer indicated no VOCs are present at detectable concentrations in the Lower OU and that metals were not present at concentrations in excess of MCLs.

Based upon the available groundwater monitoring and fate and mobility modeling data, in conjunction with remedial actions proposed for the Upper OU, the risk posed to the Lower OU is considered to be minimal. However in the interest of satisfying the CERCLA and NCP requirements under 40 CFR §300.415(b)(2), a removal action is merited given the potential for contamination of drinking water or sensitive ecosystems. Therefore, the selected removal action should be designed to protect human populations against the potential health risk, namely ingestion of the COCs exceeding the Federal and State drinking water standards. It is judged that the selected Lower OU removal action (groundwater monitoring), in association with Upper OU remedial actions (landfill capping, SVE, and groundwater P&T), will provide adequate protection to human health and the environment.

long-term effectiveness, as a future removal action may possibly be required to address potential future migration of contamination from the Upper OU into the Lower OU aquifers.

Implementability. The technical feasibility of Alternative 1 is high. No technical difficulties are anticipated for well abandonment of the existing Gage aquifer groundwater monitoring wells. The technology to be employed is widely available, and services and equipment are readily available from multiple vendors.

The technical feasibility of the No Action alternative is, of course, high. The administrative feasibility of Alternative 1 would depend on State and public acceptance. For the purpose of this analysis, Alternative 1 assumes that the one-time groundwater sampling event already performed is sufficient to determine the impacts that the COCs present in the Upper OU have had on the Lower OU and the environment. With respect to implementation, State and community acceptance of Alternative 1 is considered to be low, as any potential future contamination in the Lower OU would go unnoticed and potentially threaten drinking water aquifers.

Cost. The estimated present worth of Alternative 1 is approximately $30,000. Expenditures would be for the abandonment of the three existing Gage aquifer monitoring wells and the proper management and disposal of drill cuttings and removed well materials.

Alternative 2 – Groundwater Monitoring

This alternative includes the periodic collection and analysis of groundwater samples from the Gage aquifer over a four-year period. Groundwater conditions within the Gage aquifer would be monitored using the three wells that were installed in 2000. Monitoring activities would be conducted on a quarterly basis for a period of two years, followed by semi-annual monitoring for an additional two years, and annual monitoring every third year thereafter for up to 50 years. If any VOCs are detected in the lower Bellflower aquitard during that period, the monitoring events will be increased to quarterly for a period of two years. A groundwater monitoring plan for the Gage aquifer has already been prepared and approved by the DTSC (DTSC, 2002), and is presented in Appendix E.

Effectiveness. Alternative 2 would provide engineering controls to detect the potential vertical migration of the COCs into the Gage aquifer from the overlying Upper OU. This alternative allows for future decisions to be made on any actions deemed necessary to inhibit or reduce the exposure pathways of concern. Alternative 2 is considered to provide long-term effectiveness for ongoing evaluation of potential groundwater impacts from the Upper OU to the Lower OU. Moreover, remedial actions for the Upper OU, including landfill capping, SVE and groundwater P&T will jointly act to minimize or eliminate the potential for contaminants present in the Upper OU to enter and possibly impact the underlying Lower

OU. Continued groundwater monitoring in Gage aquifer may be used to assess the effectiveness and success of these Upper OU remedial measures.

Implementability. The technical feasibility of Alternative 2 is considered to be high. No technical difficulties are anticipated for groundwater monitoring and sampling. The technology to be employed is widely used, and services are readily available from multiple vendors.

State and public acceptance of this alternative is also expected to be high, as it meets the removal action objectives as a protective remedy. For the purpose of this analysis, the planned monitoring period is assumed to be sufficient time to identify any potential impacts that conditions in the Upper OU may have on the Lower OU. The ultimate length and frequency of monitoring will be determined by the analytical results obtained, regulatory agency requirements, and the effectiveness of remedial action for the Upper OU.

If at some future time, monitoring data, obtained through sampling and laboratory analysis of groundwater samples, were to document the presence of any site-related VOC(s) at concentrations in excess of MCL(s) in the Lower Bellflower aquitard, then additional monitoring activities, beyond those anticipated by Alternative 2 and including the possible installation of additional monitoring wells, may be necessary. The nature and extent of any such increased monitoring is outside the scope of the remedy set forth in Alternative 2, and would need to be defined in a new RAP or other appropriate planning document that takes into account the scope and type of future contamination affecting the Lower OU.

Cost.[1] The estimated present worth for Alternative 2 is approximately $135,000. This value is comprised of the following:

• Estimated Capital Cost:	None
• Estimated Annual Operation and Maintenance (O&M) Cost:	None
• Estimated Quarterly Monitoring Annual Cost:	$18,620 x 2 years
• Estimated Semi-Annual Monitoring Annual Cost	$9,310 x 2 years
• Estimated Annual Monitoring Cost (each third year thereafter for up to 50 years)	$4,655 x 17 events
	Total $134,995

This cost estimate assumes that groundwater samples collected from the 3 existing wells will be analyzed for VOCs and dissolved metals. Alternative 2, which assumes 8 quarterly monitoring events followed by 4 semi-annual monitoring events, and up to 17 annual

[1] Estimated costs were developed jointly by DTSC and BKK Corporation in accordance with the February 4, 2004 Consent Decree between these parties.

DTSC has determined that a Notice of Exemption is applicable as the remedy consists of extracting and sampling non-contaminated groundwater from the Gage aquifer. The CEQA documentation is included in Appendix C.

This RAP is being issued to the public pursuant to applicable Federal laws, the NCP, the Superfund Amendments and Reauthorization Act (SARA), and the Cal-EPA Public Participation Policy and Procedure Manual, which requires specific public participation activities to be carried out in concert with technical activities. For non-time critical actions, federal and state regulations require a 30-day public comment period on the RAP at the time the draft document is made available for public review. The comment period may be extended depending on the circumstances. Additional public participation elements include preparing and distributing a fact sheet, issuing a public notification and conducting a public meeting.

A summary of the comments received and the response to those comments is included in Appendix D (Responsiveness Summary) of this Final RAP.

The proposed schedule for implementing a groundwater monitoring program for the Lower OU is tentatively set to begin in the Winter of 2004 or Spring of 2005, which is based on the anticipated time-frame for the DTSC's approval of the Final RAP. The groundwater monitoring program for the Lower OU, under the current DTSC-approved plan, would extend possibly up to the winter or spring 2059. The actual duration of the groundwater monitoring program may vary depending on future findings and decisions.

Allwest Geoscience, Inc. 1999a. Report of Supplemental Site Assessment and First Quarter Groundwater Sampling for LA Metromall (Former Cal Compact Site), 20400 South Main Street, Carson, California. January 8.

Allwest Geoscience, Inc. 1999b. Report of Second Quarter Groundwater Performed for LA Metromall (Former Cal Compact Site), 20400 South Main Street, Carson, California. April 2.

Brown & Root. 1995a. Remedial Investigation for Cal Compact Landfill, Carson, California.

Brown & Root. 1995b. Feasibility Study for Cal Compact Landfill, Carson, California.

Brown & Root. 1995c. Final Remedial Action Plan for 157 Acre Former Cal Compact Landfill, Carson, California. October.

California Environmental Protection Agency, Department of Toxic Substances Control. 1995. Memorandum – New Remedial Action Plan Policy, #EO-95-007-PP.

California Environmental Protection Agency, Department of Toxic Substances Control. 2001. Letter Correspondence: *Remedial Action Plan (RAP) Equivalent Proposal for Cal Compact Landfill, Carson, California*. August 9, 2001.

California Environmental Protection Agency, Department of Toxic Substances Control. 2002. *Groundwater Monitoring Program, Cal Compact Landfill, Carson. California.* December 2002.

Dames & Moore. 1998. Report "*Hydrostratigraphy, Groundwater Flow, and Contaminant Transport, Cal Compact and Vicinity*. December 22.

DTSC. See California Environmental Protection Agency.

EPA. See United States Environmental Protection Agency.

McLaren/Hart, 1992. *Revised Integrated Remedial Investigation Report, Cal Compact Landfill.* December 10.

URS/Dames & Moore. 2000. Report of Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California. August 10.

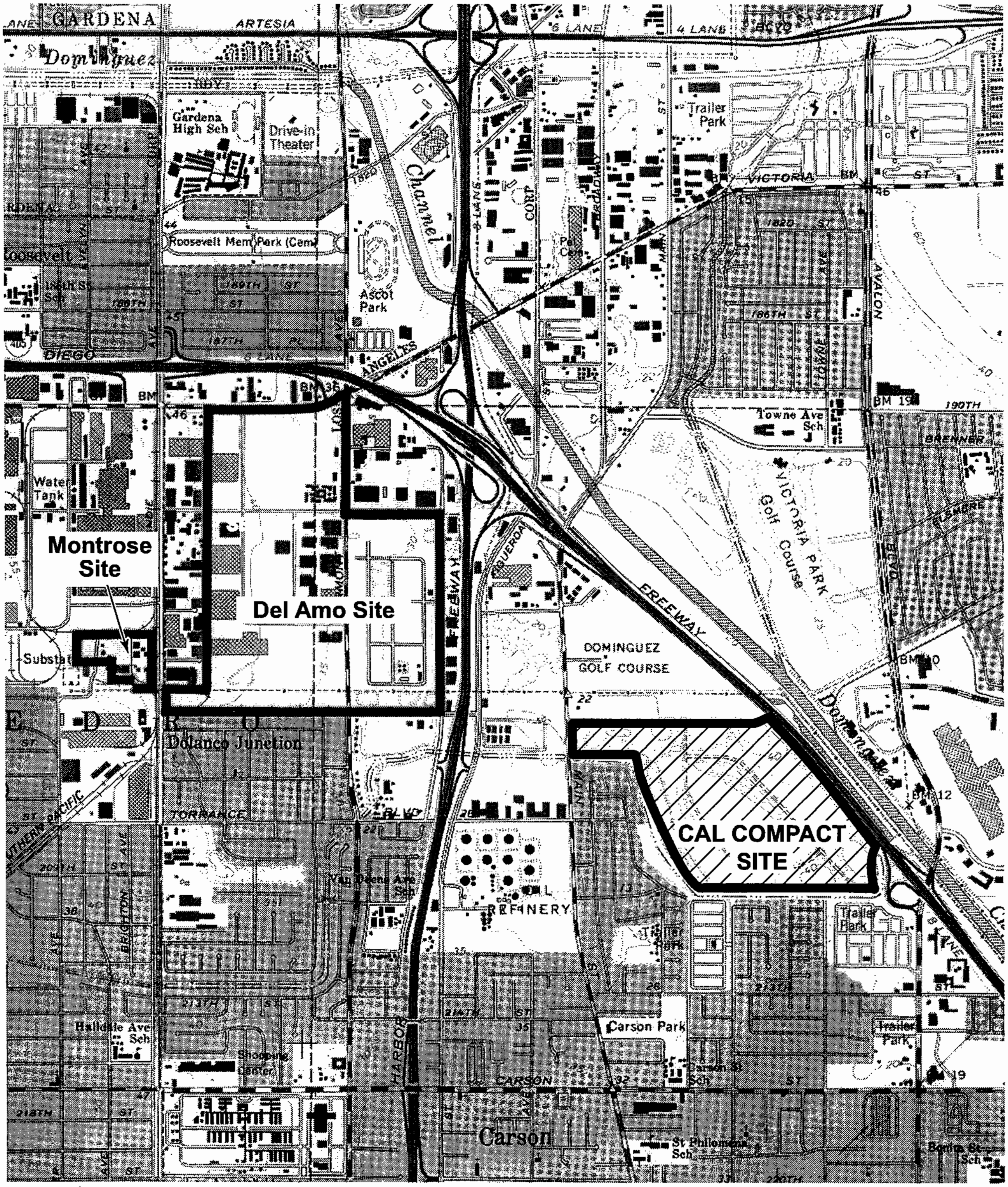
United States Code of Federal Regulations - 40 CFR Part 300. 1990. National Oil and Hazardous Substances Pollution Contingency Plan.

United States Environmental Protection Agency. 1993. Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA. 1993.

California Environmental Protection Agency, Department of Toxic Substances Control. 2004. *Feasibility Study Cal Compact Landfill Carson, California.* October 2004.

FIGURES

901/395



0 1/2 1

Scale in Miles

Base Map: *USGS 7.5' Topographic Quadrangle:*
Torrance, CA 1964 (Photorevised 1981)

FIGURE 1

VICINITY MAP

Cal Compact Landfill

URS

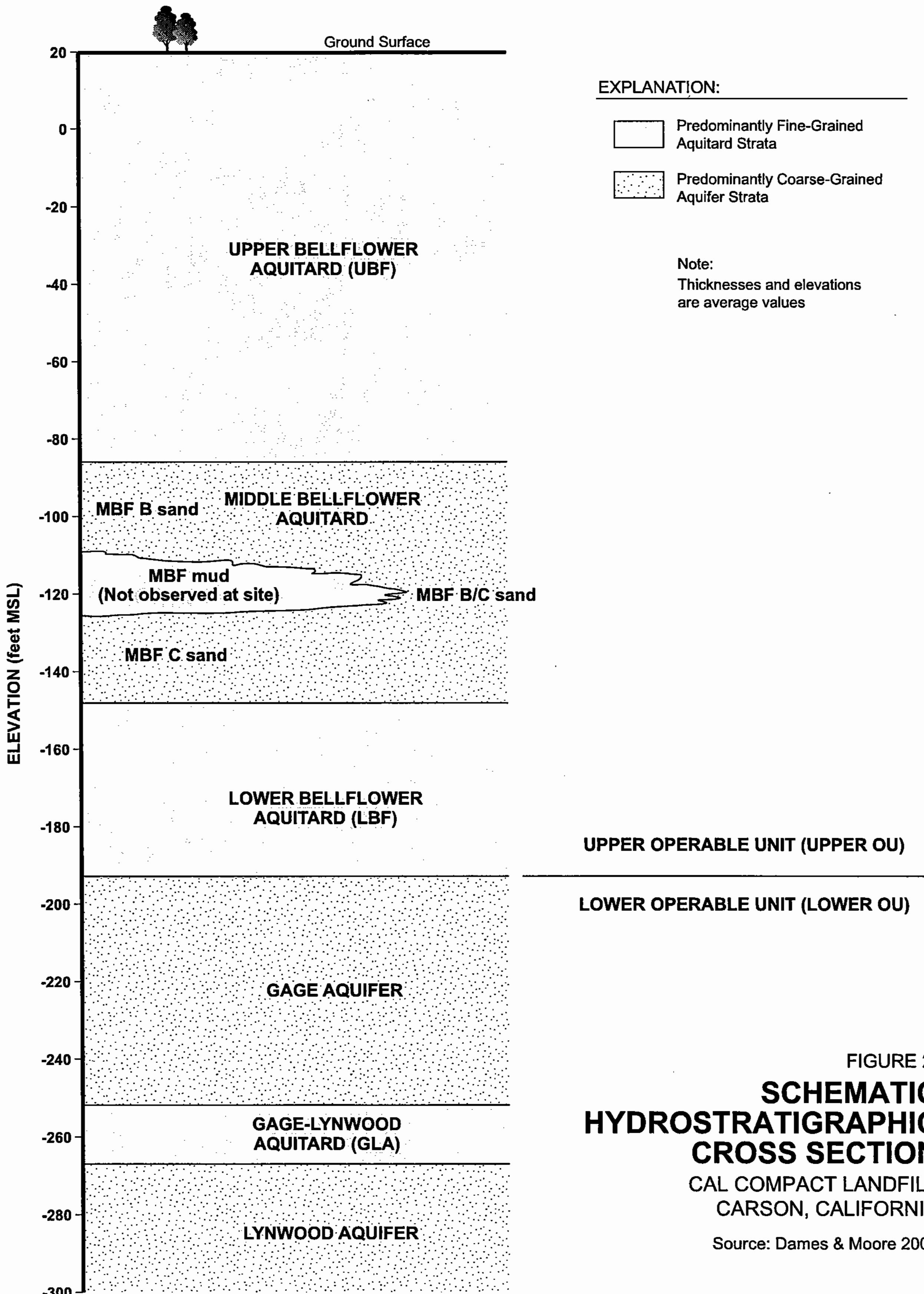


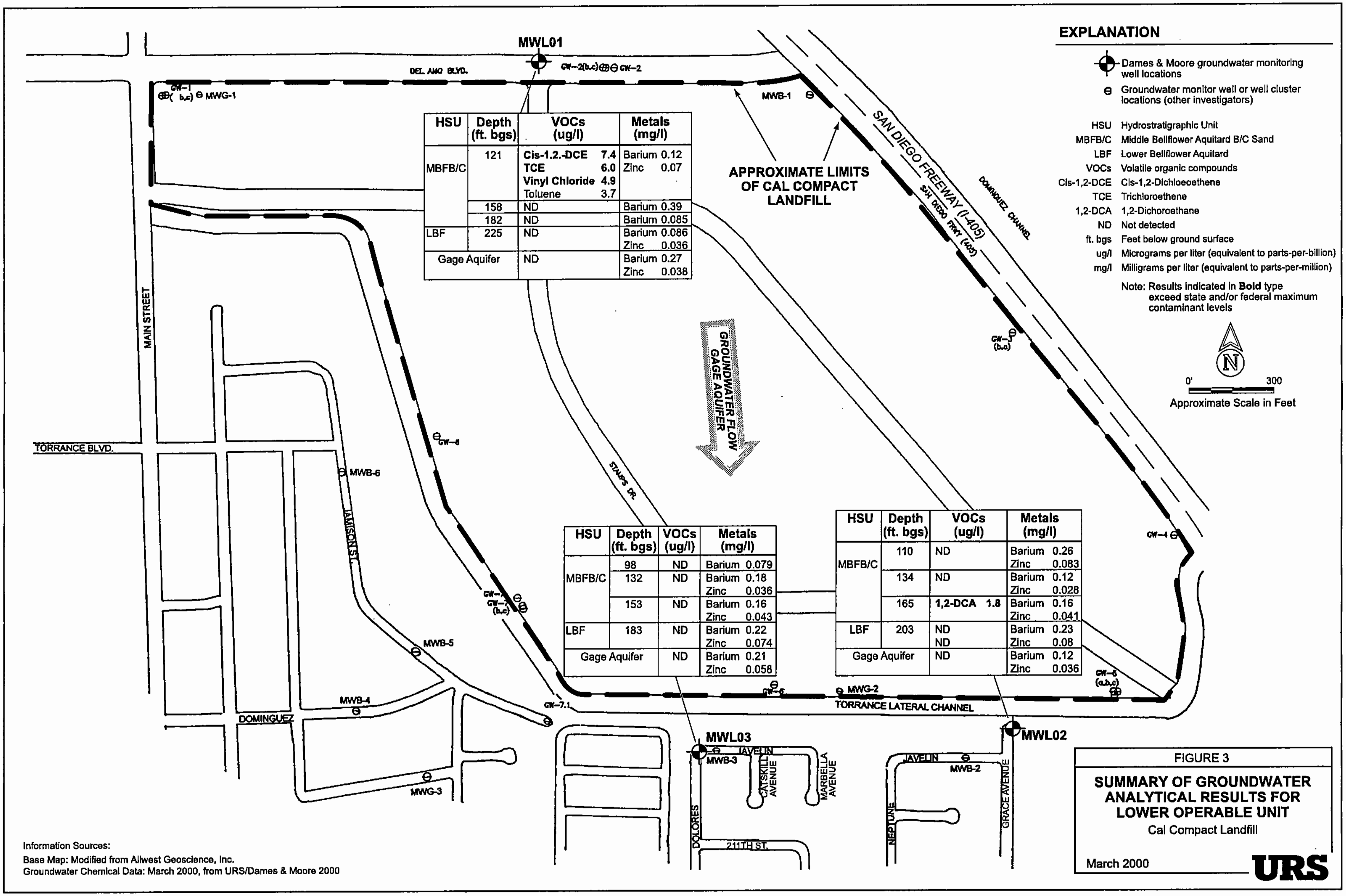
FIGURE 2

SCHEMATIC HYDROSTRATIGRAPHIC CROSS SECTION

CAL COMPACT LANDFILL
CARSON, CALIFORNIA

Source: Dames & Moore 2000

URS



MWL01

HSU	Depth (ft. bgs)	VOCs (ug/l)	Metals (mg/l)
MBFB/C	121	**Cis-1,2,-DCE 7.4** **TCE 6.0** **Vinyl Chloride 4.9** Toluene 3.7	Barium 0.12 Zinc 0.07
	158	ND	Barium 0.39
	182	ND	Barium 0.085
LBF	225	ND	Barium 0.086 Zinc 0.036
Gage Aquifer		ND	Barium 0.27 Zinc 0.038

MWL03

HSU	Depth (ft. bgs)	VOCs (ug/l)	Metals (mg/l)
MBFB/C	98	ND	Barium 0.079
	132	ND	Barium 0.18 Zinc 0.036
	153	ND	Barium 0.16 Zinc 0.043
LBF	183	ND	Barium 0.22 Zinc 0.074
Gage Aquifer		ND	Barium 0.21 Zinc 0.058

MWL02

HSU	Depth (ft. bgs)	VOCs (ug/l)	Metals (mg/l)
MBFB/C	110	ND	Barium 0.26 Zinc 0.083
	134	ND	Barium 0.12 Zinc 0.028
	165	**1,2-DCA 1.8**	Barium 0.16 Zinc 0.041
LBF	203	ND ND	Barium 0.23 Zinc 0.08
Gage Aquifer		ND	Barium 0.12 Zinc 0.036

EXPLANATION

- Dames & Moore groundwater monitoring well locations
- Groundwater monitor well or well cluster locations (other investigators)

HSU	Hydrostratigraphic Unit
MBFB/C	Middle Bellflower Aquitard B/C Sand
LBF	Lower Bellflower Aquitard
VOCs	Volatile organic compounds
Cis-1,2-DCE	Cis-1,2-Dichloeothene
TCE	Trichloroethene
1,2-DCA	1,2-Dichoroethane
ND	Not detected
ft. bgs	Feet below ground surface
ug/l	Micrograms per liter (equivalent to parts-per-billion)
mg/l	Milligrams per liter (equivalent to parts-per-million)

Note: Results indicated in **Bold** type exceed state and/or federal maximum contaminant levels

N

0' 300

Approximate Scale in Feet

FIGURE 3

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR LOWER OPERABLE UNIT

Cal Compact Landfill

March 2000

URS

Information Sources:
Base Map: Modified from Allwest Geoscience, Inc.
Groundwater Chemical Data: March 2000, from URS/Dames & Moore 2000

901/398

APPENDIX A

ADMINISTRATIVE RECORD

Administrative Record for Lower Operable Unit
Cal Compact Landfill
Carson, California

California Environmental Protection Agency, Department of Toxic Substances Control, 1999. Comment Letter: *Draft Work Plan, Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California*. September 23, 1999.

California Environmental Protection Agency, Department of Toxic Substances Control, 2000. Consent Decree entered in *Department of Toxic Substances Control, et al., versus Commercial Realty Projects, Inc., et al., United States District Court, Central District (No. 95-8773 MRP (MANx))*.

California Environmental Protection Agency, Department of Toxic Substances Control, 2002. Comment Letter: *Lower Operable Unit (OU) Remedial Action Plan (RAP) for Cal Compact Landfill, Carson, California*. March 6, 2002.

California Environmental Protection Agency, Department of Toxic Substances Control, 2002. Comment Letter: *Lower Operable Unit (OU) Remedial Action Plan (RAP) for Cal Compact Landfill, Carson, California*. July 15, 2002.

California Environmental Protection Agency, Department of Toxic Substances Control, 2002. Comment Letter: *Lower Operable Unit Remedial Action Plan for Cal Compact Landfill, Carson, California*. October 16, 2002.

California Environmental Protection Agency, Department of Toxic Substances Control. 2002. *Groundwater Monitoring Program, Cal Compact Landfill, Carson. California*. December 2002.

Dames & Moore. 1998. Report "*Hydrostratigraphy, Groundwater Flow, and Contaminant Transport, Cal Compact and Vicinity*. December 22, 1998.

Dames & Moore. 1999. *Draft Work Plan, Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California*. July 21, 1999.

Dames & Moore. 1999. *Work Plan Addendum, Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California*. July 21, 1999

Dames & Moore, 2000. Letter: *Confirmation of Revised Soil Boring/Monitoring Well Locations and Notification of Schedule for Planned Field Activities, Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California*. January 4, 2000.

Dames & Moore, 2000. Letter: *Groundwater Grab Sampling Program, Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California*. February 18, 2000.

URS/Dames & Moore. 2000. *Report of Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California.* August 10, 2000.

URS. 2000. *Groundwater Monitoring Program Cal Compact Landfill, Carson, California*. December 11, 2000.

URS, 2002. Letter: *Response to Agency Comments on Draft Remedial Action Plan, Lower Operable Unit – Cal Compact Landfill, Carson, California*. April 23, 2002.

URS, 2002. Letter: Suggested Alternative Comment Response, DTSC Letter to URS Corporation, Dated July 15, 2002, *Draft Remedial Action Plan – Lower Operable Unit, Cal Compact Landfill Site, Carson, California*. August 5, 2002.

California Environmental Protection Agency, Department of Toxic Substances Control. 2004. *Feasibility Study Cal Compact Landfill Carson, California.* October 2004.

APPENDIX B

STATEMENT OF REASONS,
NONBINDING ALLOCATION OF RESPONSIBILITY

(Prepared by DTSC)

Department of Toxic Substances Control

Terry Tamminen
Agency Secretary
Cal/EPA

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Arnold Schwarzenegger
Governor

PRELIMINARY NONBINDING ALLOCATION OF RESPONSIBILITY

California Health and Safety Code (Health and Safety Code) section 25356.1(e) requires a remedial action plan to include a nonbinding preliminary allocation of responsibility (NBAR) among all identifiable potentially responsible parties (PRPs) at a particular site, including those parties which may have been released, or may otherwise be immune from liability. Health and Safety Code section 25356.3(a) allows PRPs with an aggregate allocation in excess of fifty percent to convene an arbitration proceeding by submitting to binding arbitration before an arbitration panel. If an arbitration panel is convened, any other PRP may elect to submit to binding arbitration by the panel.

The purpose of the NBAR is to establish which PRPs may convene an arbitration proceeding by agreeing to submit to binding arbitration by the panel. The NBAR, which is based on the evidence currently available to DTSC, is not binding on anyone, including PRPs, DTSC, or any arbitration panel. If a panel is convened, its proceeding is de novo and does not constitute a review of the NBAR allocations. The arbitration panel will apportion liability for the costs of removal and remedial actions among all identifiable PRPs, regardless of whether those parties are before the panel, pursuant to the criteria in section 25356.3(c) of the Health and Safety Code. Pursuant to Health and Safety Code section 25356.7, once an arbitration decision is issued the NBAR and the arbitration panel's apportionment of liability, among other things, are admissible in a court of law only to show the good faith of the parties who have discharged their obligations under an arbitration decision issued, or cleanup agreement entered into pursuant to Health and Safety Code section 25356.4.

The Cal Compact site (Site) operated as a landfill between 1959 and 1965. A thorough PRP analysis was performed, and the volume of waste sent to the site has been analyzed for all PRPs named in the NBAR. In addition, DTSC has reviewed the progress of recent litigation involving the Site. Liability has been allocated as follows: Generators (other than Generators of Municipal Solid Waste) have been assigned 25%. Municipal Solid Waste Generators have been assigned 20%. Current Site Owners have been assigned 30%. Prior Site Owners, Operators and Transporters have been assigned 25%.

The NBAR allocation is non-binding and preliminary and does not limit (i) strict joint and several liability under CERCLA and other laws, or (ii) the obligations of parties who have signed settlements with DTSC. This allocation does not take into account (i) the potentially responsible parties' financial condition or ability to pay or (ii) the degree of cooperation that the potentially responsible parties have exhibited in response to past orders issued by DTSC. DTSC sets forth the following identifiable potentially responsible parties:

Generators (other than municipal solid waste generators)

1. ConocoPhillips Company (via acquisitions/mergers with Signal Oil & Gas Company, Continental Oil Company and Douglas Oil Company)
2. Shell Chemical Company
3. ChevronTexaco Corporation (via acquisitions/mergers with Standard Oil Company of California, Gulf Oil Corporation, Texaco Inc. and Tidewater Oil Company)
4. Unocal Corporation (formerly Union Oil Company of California)
5. Shell Oil Company
6. Buttram Energies, Inc.
7. BP Amoco Corporation (via acquisitions/mergers with Richfield Oil Company)
8. Long Beach Oil Development Company
9. Exxon Mobil Corporation (via acquisitions/mergers with Mobil Oil Corporation and Humble Oil & Refining Company)
10. Atchison, Topeka & Santa Fe Railway Company
11. Santa Fe International Corporation (formerly Santa Fe Drilling Company)
12. Sunray Dx Oil Company
13. Southern California Gas Company
14. Prudential Overall Supply Company
15. Exploration Drilling Company
16. Grover Collins Company, Inc.
17. Atlantic Oil Company
18. PPG Industries, Inc. (formerly Pittsburgh Plate Glass Company)

19. Camay Energy Corporation (formerly Camay Drilling Company)

20. U. S. Borax, Incorporated

21. Lockheed Martin Corporation (formerly Harvey Aluminum Company)

22. Minnesota Mining and Manufacturing Company

In addition, DTSC estimates that approximately 200 smaller quantity or de minimis generators fall into this "Generator Category."

Municipal Solid Waste Generators

A. Municipalities

1. Bell
2. Bellflower
3. Buena Park
4. Commerce
5. Compton
6. Cudahy
7. Culver City
8. Downey
9. El Segundo
10. Gardena
11. Hawthorne
12. Hermosa Beach
13. Huntington Beach
14. Huntington Park

15. Inglewood
16. Lakewood
17. Lawndale
18. Lomita
19. Long Beach
20. Los Alamitos
21. Los Angeles
22. Lynwood
23. Manhattan Beach
24. Maywood
25. Norwalk
26. Palos Verdes Estates
27. Paramount
28. Redondo Beach
29. Rolling Hills
30. Santa Ana
31. Santa Monica
32. Seal Beach
33. Signal Hill
34. South Gate
35. Torrance
36. Vernon

B. County of Los Angeles

C. Garbage Disposal Districts

   1. Athens-Woodcrest-Olivita Garbage Disposal District

   2. Belvedere Garbage Disposal District

   3. Firestone Garbage Disposal District

   4. Malibu Garbage Disposal District

   5. Walnut Park Garbage Disposal District

<u>Transporters</u>

1. BKK Corporation (via acquisition/merger with Chancellor & Ogden Company)

2. H&C Disposal Company

3. IT Transportation Corporation (via acquisitions/mergers with Routh Transportation, Kyle O. Mayes, Inc. and Fix & Brain)

4. The Arnold Group (via acquisition/merger with M. C. Nottingham Company)

5. Kalman Steel Products Company (via acquisition/merger with California Salvage Company, Inc.)

6. Western Waste Industries (formerly Western Refuse Hauling, Inc.)

7. Greenholm Metals, Inc.

8. Monarch Building Maintenance Company, Inc.

<u>Current Owners</u>

1. L.A. MetroMall, LLC, a California Limited Liability Company

2. Commercial Realty Projects, Inc.

Owners/Operators

1. BKK Corporation (via acquisition/merger with Cal Compact, Inc.)

2. The Deutsch Company

APPENDIX C

RESPONSIVENESS SUMMARY

(To be completed upon receipt of public comments)

Department of Toxic Substances Control

an C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

5796 Corporate Avenue
Cypress, California 90630

Arnold Schwarzenegger
Governor

Response to Comments

For
Draft Remedial Action Plan
And
Notice of Exemption

Former Cal Compact Landfill Site
20400 South Main Street, Carson, California 90745

1.0. Introduction

On November 23, 2004, the Department of Toxic Substances Control (DTSC) issued a public notice to accept public comments on a draft Remedial Action Plan (RAP) and Notice of Exemption outlining a plan to monitor groundwater at the former Cal Compact Landfill site, located at 20400 South Main Street, Carson, California, 90745, in Los Angeles County. The 30-day public comment period began November 23, 2004 and ended December 31, 2004. A public meeting was held December 7, 2004, at the Carson Community Center, 801 E. Carson Street, Room 107, Carson, California to present the groundwater monitoring proposal and receive public comments.

The 157 acre site is divided into two Operable Units (OUs), an Upper OU and a Lower OU. This draft RAP is for the Lower OU only. Groundwater monitoring for the Lower OU will provide the necessary controls to detect if future chemical migration occurs to the Lower OU. The draft RAP involves monitoring the Lower OU groundwater on a quarterly basis for two years, followed by semi-annual (twice per year) monitoring for two more years, and one groundwater monitoring event every three years for the remaining forty-six years of the program.

DTSC is required to respond to all public comments received during the 30-day public comment period. As of December 31, 2004, DTSC received no written, oral, or e-mailed public comments on the draft RAP or Notice of Exemption. Questions about the draft RAP, Notice of Exemption or other site documents should be directed to Mr. Daniel Zogaib, Project Manager, Department of Toxic Substances Control, 5796 Corporate Avenue, Cypress, California, 90630,
(714) 484-5483.

The RAP is now final. The final RAP, Notice of Exemption and other site documents can be viewed at:

Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630
Contact Ms. Julie Johnson at
(714) 484-5337 for an appointment

Carson Public Library
151 E. Carson Street
Carson, CA 90745
(310) 830-0901

APPENDIX D

FINAL CEQA DOCUMENTS

(Prepared by DTSC)

Terry Tamminen
Agency Secretary
Cal/EPA

Department of Toxic Substances Control

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630-4732

Arnold Schwarzenegger
Governor

NOTICE OF EXEMPTION

To: Office of Planning and Research
1400 Tenth Street, Room 222
Sacramento, California 95814

From: Department of Toxic Substances Control
Southern California Cleanup Operations
Branch, Cypress Office

Project Title: Remedial Action Plan for the Lower Operable Unit of Cal Compact Landfill

Contact Person: Dan Zogaib **Telephone:** (714) 484-5483

Project Location: 20400 South Main Street, Carson, California
City: Carson **County:** Los Angeles

Project Description:

Site Description: The proposed project is a Remedial Action Plan (RAP) for the Lower Operable Unit of the Cal Compact Landfill. The Cal Compact Landfill (Site) is divided into two operable units (OUs), an upper operable unit (UOU) and a lower operable unit (LOU). The UOU is defined as the shallow soils extending down through the waste zone to the bottom of the Bellflower aquitard. The LOU is defined as the start of the Gage aquifer, directly underlying the Bellflower aquitard, through the Lynwood aquifer and extending down to the Silverado aquifer. The Gage aquifer lies approximately 220 feet below ground surface (bgs) at the Site (Dames & Moore, 2000).

Currently, monitoring data from the UOU shows that the contamination has not been detected deeper than 100 feet bgs. Furthermore, when the three Gage monitoring wells were installed into the LOU in 2000, they were sampled and found to be free of any contaminants of concern (COCs) from the Site. Since the LOU currently does not show any impact from the UOU of the Site, no active remedies or institutional controls are necessary other than the monitoring of the three Gage monitoring wells.

Project Activities: The LOU monitoring program consists of sampling the three Gage monitoring wells as follows:

1. Quarterly sampling and analysis for volatile organic compounds (VOCs), California Title 22 metals (dissolved), and semivolatile organic compounds (SVOCs) for a period of two years;

2. Semiannual sampling and analysis for VOCs for a period of two years; and,

3. Sampling and analysis for VOCs every third year for a period of up to forty-six years.

If contamination is detected in the lower Bellflower aquitard during the monitoring period, the monitoring events will be increased to quarterly for a period of two years.

The goal of the LOU monitoring program is to ensure against vertical migration of the COCs from the UOU to the Gage aquifer. The three Gage monitoring wells will be used for the monitoring of vertical migration of Site COCs, as well as the horizontal groundwater flow gradient. The Gage monitoring wells are located such that there is one well upgradient of the Site and two wells downgradient of the Site.

Background: The Cal Compact Landfill is an inactive Class II landfill located at 20400 South Main Street in Carson, County of Los Angeles, California. It is bounded to the north by the Dominguez Golf Course and vacant property, to the east by the San Diego Freeway (Interstate Highway 405), and to the south and west by single family residences and mobile home parks. The Harbor Freeway (Interstate Highway 110) is located approximately 0.25 to 0.50 mile west of the Site. The approximately 157-acre landfill was active between 1959 and 1965, during which time it accepted both municipal solid wastes and industrial liquid and semi-liquid wastes for disposal. The Site has been vacant and unused since the closure of the landfill in 1965. Previous investigations had indicated that the primary COCs threatening the LOU were VOCs, primarily trichloroethene, cis-1,2-dichloroethene, 1,2-dichloroethane, vinyl chloride, benzene, toluene, ethylbenzene, and xylenes. These VOCs had been detected in localized areas within the Bellflower aquitard of the UOU at concentrations above their maximum contaminant levels (MCLs) for drinking water. In addition, SVOCs and heavy metals had been detected above background levels in localized areas within the Bellflower aquitard. The results of a recent hydrostratigraphic investigation indicate that Site related COCs were present in the UOU but not in the LOU (URS/Dames & Moore, 2000).

Name of Public Agency Approving Project: Department of Toxic Substances Control (DTSC).

Name of Person or Agency Carrying Out Project: BKK Corporation, on behalf of DTSC, will be implementing the LOU monitoring program.

Exempt Status: Title 14, California Code of Regulation (CCR), Section 15061(b)(3)
With certainty, no possibility of a significant effect on the environment.

Reasons Why Project is Exempt:

1. Although the LOU is listed on the Cortese List, the only activity proposed for the Site is the monitoring of the three Gage monitoring wells which have been shown previously to be free from contamination. The UOU is currently undergoing quarterly monitoring of soil gas and groundwater and has been since 1995 with no adverse impacts to human health and the environment.

2. Groundwater monitoring activities proposed will not result in any discharges or runoff to surface waters. Furthermore, the surface soils at the Site have not been found to contain any COCs from the landfill. The closest surface water bodies to the Site are the Torrance Lateral Channel and the Dominguez Channel. Both of these features are man-made, concrete lined, drainage channels. Due to the nature of these flood control and

stormwater run-off facilities, and the lack of natural environments, no ecological receptors are present in these structures.

3. There are no available records of any active groundwater wells in the Gage aquifer within a two mile radius of the Site. Both drinking water supply wells within two miles of the Site, Dominguez Water Company (DWC) Wells 19A and 79, are in the deeper Silverado aquifer and are well separated from any sources of contaminated from the site by depth, horizontal distance and a clay aquitard.

4. If at some future time, monitoring data obtained through sampling and laboratory analysis of groundwater samples were to document the presence of any Site-related VOC(s) at concentrations in excess of MCL(s) in the Lower Bellflower aquitard, then a new remedy would need to be developed for the LOU. The Remedial Action Plan for The Lower Operable Unit of The Cal Compact Landfill contains a re-opener in the event that any VOC(s) are found in the Lower Bellflower aquitard. Under such circumstances, DTSC would look to members of the Defense Group (pursuant to Section XIV.G of the Defense Group Consent Decree), as well as other potentially responsible parties, to plan and implement that new remedy.

5. The monitoring wells are locked and secured thus alleviating the need for institutional controls to protect the wells during the LOU monitoring program.

Signature: ______________________________ **Date:** ________________

Thomas M. Cota, Chief
Southern California Cleanup Operations
Branch, Cypress Office

Date received for filing at OPR:

APPENDIX E

DTSC-APPROVED GROUNDWATER MONITORING PLAN FOR LOWER OPERABLE UNIT

GROUNDWATER MONITORING PROGRAM
CAL COMPACT LANDFILL
CARSON, CALIFORNIA
URS Corporation - December, 2000
Revised By The Department of Toxic Substances Control - December, 2002

1.0 INTRODUCTION

Presented in this document is the scope of the groundwater monitoring program to be conducted for the Gage aquifer at the Cal Compact Landfill in Carson, California (site). This plan is a revised version of the plan prepared by the URS Corporation (URS) on behalf of the Cal Compact Defense Group (Defense Group) submitted to the Department of Toxic Substances Control (DTSC) in December, 2000. The December, 2000 plan was prepared in response to the DTSC requirement that the Defense Group develop a program to monitor groundwater conditions in the three Gage aquifer monitoring wells recently installed at the site (DTSC letter to URS, dated October 2, 2000). The December, 2000 document was submitted to fulfill the requirement that the Defense Group prepare a Remedial Action Plan (RAP) for the Lower Operable Unit (OU) at the site set forth at Section 10.c of the Consent Decree lodged with the court in the action captioned "Department of Toxic Substances Control *et. al.* versus Commercial Reality Projects, Inc. *et. al.*", Case No. 95-8773 (MANx). The Defense Group is under no obligation to implement this plan.

The general scope of the December, 2000 monitoring plan was previously discussed with DTSC staff and described under response to Comment 4 in URS' November 3, 2000 letter (URS, 2000) responding to DTSC comments on the Report of Hydrostratigraphic Investigation, Cal Compact Landfill, Carson, California (URS/Dames & Moore, 2000). The December, 2000 document was intended to formalize the general program described by DTSC at the time.

In the two years since DTSC accepted the December, 2000 groundwater monitoring plan, as drafted by URS, DTSC has determined that the option of Low-Flow (minimal drawdown) groundwater sampling procedures would be beneficial as it reduces the quantity of wastewater and facilitates faster sampling.

2.0 PURPOSE AND OBJECTIVES

The goal of this monitoring program is to establish a history of time-series data for the Gage aquifer groundwater conditions at the site and to evaluate potential future impacts to the Gage aquifer from the site.

The groundwater monitoring program will be conducted with the following objectives:

- Assess the spatial and temporal variation in Gage aquifer groundwater levels and flow conditions at the site; and,

- Record the spatial and temporal variation of dissolved contaminant concentrations, if any, in Gage aquifer groundwater.

3.0 SCOPE AND PROCEDURES

Groundwater conditions within the gage aquifer will be monitored using the three wells recently installed into this hydrostratigraphic unit by URS during March and April 2000. Monitoring activities will be conducted on a quarterly basis for a period of two years, followed by semi-annual monitoring for an additional two years, and triennial monitoring thereafter for up to 50 years. If any VOC is detected and confirmed through retesting in the lower Bellflower aquitard during that period, the monitoring events will be increased to quarterly for a period of two years.

It is anticipated that the following tasks will be performed during each monitoring event:

- Measure static groundwater levels in each of the three Gage aquifer monitoring wells;

- Collect groundwater samples and record appropriate field parameters from each monitoring location;

- Perform laboratory chemical analysis on the collected samples; and,

- Prepare a brief report to DTSC summarizing the results of each individual groundwater monitoring event.

All groundwater monitoring activities will be conducted in accordance with *Low-Flow (Minimal Drawdown) Groundwater Procedures by Robert W. Puls and Michael J. Barcelona* or the standard operating procedures outlined in Appendix A of the Work Plan and Work Plan Addendum documents for the Hydrostatigraphic Investigation, Cal Compact Landfill, Carson, California (Dames & Moore, 1999a and 1999b). The following sections further describe these tasks.

3.1 Measurement of Static Groundwater Levels

Static groundwater level measurements will be recorded at each of the three Gage aquifer monitoring wells during each monitoring event. Static groundwater level measurements will be made to the nearest 0.01-inch using an electronic well sounder, and the results will be recorded on a groundwater sampling field record. Multiple measurements will be conducted at each well location to ascertain that the measured depth is accurate and reproducible.

3.2 Groundwater Sampling (Standard Method Option)

Groundwater samples will be collected from each of the three recently installed Gage aquifer monitoring wells, including wells MWL01, MWL02, and MWL03. Each well is equipped with dedicated sampling pump systems, consisting of a Grundfos Rediflo-2® sampling pump attached to an integrated Teflon®-lined sampling tube, wire assembly and well seal. The system is hung in the well from a seal with watertight electrical and tube fittings. The Rediflo-2® pump is a variable speed three phase pump that utilizes a motor control box to allow flow rates between 0.1 and 6 gallons per minute.

Prior to sampling, each well will be thoroughly purged using the dedicated pump. A minimum of three well casing volumes will be purged prior to sample collection. During well purging physical parameters of pH, specific conductivity, temperature and turbidity will be measured to assess whether they have stabilized prior to sampling. Purge rates, purge volumes and field monitoring parameters will be recorded on the appropriate field forms.

Groundwater samples will be collected using the dedicated pump system. Samples will be collected from the discharge port of the sampling system directly into laboratory supplied sample containers appropriate for the analysis to be conducted. Groundwater samples collected for metals analysis will be filtered in the field using an in-line filter apparatus.

Groundwater generated during well purging will be temporarily stored in appropriately labeled containers. Appropriate management and disposition of purge water will be based upon the analytical results obtained.

Field quality assurance/quality control (QA/QC) samples will be collected during each groundwater monitoring event. Field QA/QC samples to be collected include trip blanks and field duplicate samples. One trip blank and one field duplicate sample will be collected during each monitoring event. Because dedicated equipment is to be used for sampling of wells, collection of equipment blank samples will not be necessary.

3.3 Groundwater Sampling (Low-Flow Option)

Groundwater samples will be collected from each of the three recently installed Gage aquifer monitoring wells, including wells MWL01, MWL02, and MWL03. Each well is equipped with dedicated sampling pump systems, consisting of a Grundfos Rediflo-2® sampling pump attached to an integrated Teflon®-lined sampling tube, wire assembly and well seal. The system is hung in the well from a seal with watertight electrical and tube fittings. The Rediflo-2® pump is a variable speed three phase pump that utilizes a motor control box to allow flow rates between 0.1 and 6 gallons per minute.

The pump intake will be kept at least two (2) feet above the bottom of the well to prevent disturbance and resuspension of any sediment or NAPL present in the bottom of the well. The depth of the pump will be recorded. The water level will be measured with the pump in the well before starting the pump. The well will be pumped at 200 to 500 milliliters per minute (ml/min). The water level will be monitored approximately every five minutes. Ideally, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 ft or less). Pumping rates will, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Care will be taken to maintain pump suction to avoid entrainment of air in the tubing. Each adjustment made to the pumping rate and the water level measured immediately after each adjustment will be recorded. During purging of the well, physical parameters of pH, turbidity, temperature, specific conductance, redox potential (Eh), and dissolved oxygen (DO) will be recorded every five minutes. When the indicator parameters have stabilized and show three consecutive readings as follows (Puls and Barcelona, 1996): +0.1 for pH, +3% for specific conductance, +10 mv for Eh, and +10% for DO and turbidity, the well will be considered stabilized and ready for sample collection.

Groundwater samples will be collected at a flow rate between 100 and 250 ml/min and such that the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft. Volatile organic (VOC) samples will be collected first and directly into the appropriate sample containers. All sample containers will be filled with minimal turbulence by allowing the groundwater to flow gently down the inside of the container.

Groundwater generated during well purging will be temporarily stored in appropriately labeled containers. Appropriate management and disposition of purge water will be based upon the analytical results obtained.

Field quality assurance/quality control (QA/QC) samples will be collected during each groundwater monitoring event. Field QA/QC samples to be collected include trip blanks and field duplicate samples. One trip blank and one field duplicate sample will be collected during each monitoring event. Because dedicated equipment is to be used for sampling of wells, collection of equipment blank samples will not be necessary.

Whichever groundwater sampling method is chosen for use must be adhered to for the duration of the groundwater monitoring program to ensure consistency of the results.

3.4 Analytical Program

The analytical program for the first two years of groundwater monitoring will be consistent with that performed previously for these Gage aquifer wells. Analysis to be conducted for the samples collected from each well during each monitoring event during the first two years will include the following:

- VOCs by EPA Method 8260b;

- California Title 22 Metals (dissolved) by EPA Method 6010b/7470; and,

- Semivolatile organic compounds by EPA Method 8270.

For all monitoring events after the first two years, analysis to be conducted for the samples collected from each well during each monitoring event will be analyzed only for VOCs using EPA Method 8260b.

In the event that any VOCs are found in the lower Bellflower aquitard, two years of quarterly monitoring will be conducted. Analysis to be conducted for the samples collected from each well during each monitoring event will include the following:

- VOCs by EPA Method 8260b; and,

- California Title 22 Metals (dissolved) by EPA Method 6010b/7470.

These analyses will be conducted on all primary groundwater samples as well as all field QA/QC samples collected during each monitoring event.

3.5 Reporting

Following the completion of field sampling activities, receipt of all associated analytical measurements, and validation of results, a brief summary report will be prepared and submitted to DTSC. Monitoring reports will summarize the results of all laboratory tests conducted, including data for all prior monitoring events, and present groundwater level measurements and interpreted groundwater flow direction. Monitoring reports will also include copies of analytical laboratory reports and chain-of-custody documentation for the groundwater samples collected and analyzed.

4.0 REFERENCES

California Department of Toxic Substances Control, 2000. Letter to URS re: Cal Compact Landfill, 204500 South Main Street, Carson, California. October 2, 2000.

Dames & Moore, 1999a. Draft Work Plan, Hydrostratigraphic Investigation. Cal Compact Landfill, Carson, California. July 21, 1999.

Dames & Moore, 1999b. Work Plan Addendum, Hydrostratigraphic Investigation. Cal Compact Landfill, Carson, California. December 3, 1999.

URS/Dames & Moore, 2000. Report of Hydrostratigraphic Investigation. Cal Compact Landfill, Carson, California. August 10, 2000.

URS, 2000. Letter to DTSC - Response to DTSC comments, Report of

Hydrostratigraphic Investigation. Cal Compact Landfill, Carson, California. November 3, 2000.

Puls, R.W. and M.J. Barcelona, 1996, Low-Flow (Minimal Drawdown) Ground- water Sampling Procedures, EPA/540/S-95/504.

Appendix E-3:
DTSC Letter

Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

5796 Corporate Avenue
Cypress, California 90630

Arnold Schwarzenegger
Governor

February 9, 2005

RECEIVED
FEB 14 2005
BLASLAND, BOUCK & LEE, INC.

Mr. Anthony Ward
Vice President
Blasland, Bouck & Lee, Inc.
801 North Brand Boulevard, Suite 1120
Glendale, California 91201

Dear Mr. Ward:

CAL COMPACT LANDFILL PROPOSALS PRESENTED TO DTSC

The Department of Toxic Substances Control (DTSC) has reviewed two documents prepared by Tetra Tech, Inc., dated December 27, 2004: "Preliminary Remedial Design Refinements Carson Marketplace Development", and "Proposed Elevated Residential Site Use Acceptability Carson Marketplace Development". The first document contains proposed refinements to the existing remedial design for the site, including approaches to the implementation of the landfill cap and gas collection and treatment systems. The second document presents a rationale for allowing elevated residential site use.

Following DTSC's review of these documents, a meeting was held on January 6, 2005 with representatives of Carson Marketplace, LLC, to discuss their development proposal for the Cal Compact Landfill site and DTSC's preliminary comments on the documents provided for review. DTSC believes the concepts presented for the proposed development are appropriate at a conceptual level and could be protective of human health and safety, however, as is common for all projects under DTSC's authority, more detailed plans are necessary before DTSC can make such a final determination. Ultimately, DTSC will need to review and approve detailed engineering specifications and appropriate testing for the proposed remedial design refinements before any development can begin.

A financial assurance mechanism acceptable to DTSC will also be necessary to ensure that the funds necessary to complete required remedial activities at the site are available. DTSC will also require that appropriate institutional controls be established to ensure that the integrity of the remedial systems are protected and maintained over time.

DTSC appreciates Carson Marketplace, LLC's efforts to conduct its due diligence on the site and we look forward to working with you to complete the process. If you have any questions, please contact me at (714) 484-5459.

Sincerely,

Thomas M. Cota, Chief
Southern California Cleanup Operations Branch - Cypress Office

cc: Mr. Dennis A. Ragen, Esq.
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Newport Beach, California 92660

Appendix E-4:

Proposed Elevated Residential Site Use Acceptability

PROPOSED ELEVATED RESIDENTIAL SITE USE ACCEPTABILITY
CARSON MARKETPLACE DEVELOPMENT
Former Cal Compact Landfill, Carson, California

December 27, 2004

PREPARED BY

TETRA TECH, INC.
348 W. Hospitality Lane, Suite 100
San Bernardino, CA 92408

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CARSON MARKETPLACE
PROPOSED ELEVATED RESIDENTIAL SITE USE ACCEPTABILITY

1.0 INTRODUCTION, BACKGROUND AND PURPOSE

The following sections include an introduction, background, and purpose for the proposed residential site use acceptability.

1.1 Introduction

This document presents to the Department of Toxic Substances Control (DTSC) the rationale for allowing elevated residential site use under to the Final Remedial Action Plan (RAP) for the Upper Operable Unit (Upper OU), dated October 1995, for the former Cal Compact Landfill, Carson California ("the Site"). Specifically, this proposal focuses on design features, land use controls, and a preliminary human health risk pathway analysis for the planned elevated residential component to the project. Key to this "elevated residential" development plan is to construct the residential units on the second floor. The first floor will be open to the atmosphere. Under this "elevated residential" scenario, the potential exposure pathways, including growing food, playing in backyards (as occurs with single family residences that are "slab on grade"), and vapor intrusion, will be eliminated. Consistent with DTSC past practice, "elevated residential" use is generally allowed where commercial uses are allowed. Given that the RAP allows commercial development on the Site, the analysis could stop there. However, this document goes beyond general policy considerations and carefully considers all design elements and potential exposure pathways to demonstrate that the proposed "elevated residential" use is safe at this specific Site. A positive indication of acceptability of this approach by DTSC is a critical element of the Carson Marketplace, LLC's (the "Prospective Buyer") consideration to purchase and develop the Site, and return it to beneficial use.

1.2 Background and Purpose

The Prospective Buyer (a teaming of Lennar Partners and Hopkins Real Estate Group who have formed Carson Marketplace LLC for this Site) is in the process of evaluating whether to purchase and develop the Site. An essential part of the due diligence for this Site is an evaluation of the implementability of the RAP relative to the "elevated residential" component of the Prospective Buyer's conceptual Site development plan (Figure1). As shown on Figure 1, the overall development plan presently includes retail, entertainment, hospitality, and lifestyle elements, in addition to the "elevated residential" component in the northern portion of the Site. Several other development scenarios are being developed, including constructing a National Football League (NFL) stadium on the Site. However, the residential use on the other scenarios will be similar to the plan in Figure 1. Based upon on-going discussions with DTSC management and staff, the Prospective Buyer understands that with proper planning, engineering design, human health risk analysis, and land use controls in place, development of the "elevated residential" component on the Site is feasible.

The Prospective Buyer has retained Tetra Tech, Inc. to:

- identify conceptual refinements to the current remedial design for the Site in order to incorporate the "elevated residential" component,
- propose alternative materials and configurations for the current RAP elements,
- identify prospective land use controls, and
- perform a preliminary analysis of human exposure pathways for Site contaminants.

Prior to preparing this proposal, Tetra Tech has reviewed the RAP, the existing design specifications, and all available relevant documents associated with the Site.

In order to issue a written indication of acceptability for "elevated residential" development on the Site, DTSC has suggested that the Prospective Buyer describe the features and controls that will protect residents from exposure to Site contaminants. This document does that by explaining how the building protection system, which will be constructed to comply with both the RAP requirements and building code requirements concerning subsurface landfill gas, will ensure the occupants' safety. As the next step in its acceptability analysis, we are asking DTSC to review and comment on the proposal in this document. Once any comments that DTSC might have are incorporated into the proposal, obtaining a written indication of acceptability from DTSC will enable the Prospective Buyer to complete due diligence and a pro forma for the Site.

Consistent with DTSC's request, the purpose of this document is to:

- summarize the overall building protection system based upon present-day technological options and the present Site development plan;
- summarize land use controls that would be anticipated for an "elevated residential" component; and
- present a preliminary analysis of exposure pathways with all of these systems and controls in place.

It is important to note that the overall building protection system presented in this document includes conceptual remedial design refinements to elements of the RAP, such as the landfill cap system and the landfill gas system. The refinements to the design of RAP elements are presented to DTSC in a separate document, and we anticipate that discussions relating to the acceptability of such refinements will occur in the context of DTSC's evaluation of that document.

2.0 SUMMARY OF PROPOSED BUILDING PROTECTIVE SYSTEMS

The following sections present the main elements of the proposed building protection system for the residential-use buildings. Modifications to the proposed design elements may occur during the preparation of the final design of the RAP elements and the approval process of the ultimate development plan.

2.1 General Concept

The proposed building protective systems employ the concept of eliminating all potential pathways for exposure of receptors in the buildings onsite from landfill gas and its constituent components. As will be discussed in this section, the pathways from the subsurface source of landfill gas and the receptors, including the occupants of the "elevated residential" units are blocked with several layers of engineered controls, with monitoring systems in the event the controls do not perform as intended.

2.2 Consistency with Regulations, Codes, and Practice

The need to protect building occupants from intrusion by subsurface gases has been recognized by engineers and public officials as a health and safety issue for decades, and has been the subject of many building codes and regulations from about the mid 1980s. Since that time, a significant body of standard engineering practices has developed and advanced with evolving technology to the point where there is now confidence by engineers and regulators in the adequacy of the standard designs. Many southern California jurisdictions have codified standards and/or have standard designs that are routinely enforced by the plan check and approval functions of their public works departments. Engineered systems for protection against subsurface gases have been designed, approved, and constructed for many thousands of commercial and residential buildings throughout southern California. The building protective systems proposed for the Carson Marketplace are consistent with all regulations, codes, and practices and the final designs will be subject to detailed review by all applicable jurisdictions before their final approval and implementation. In as much as the proposed systems exceed the requirements of those regulations, codes, and practices, they represent extra and redundant protection for the occupants of buildings, particularly the "elevated residential" units, at the Carson Marketplace.

2.3 General Description of Proposed Systems

Table 1 summarizes the multiple layers of protection or engineered controls that make up the overall building protection system. These components will be designed to accommodate anticipated settlement of the landfill. Note that for commercial buildings six layers of protection are provided, and for the "elevated residential" buildings seven layers of protection are provided, of the following types (from the bottom up).

1. A permanent, full-time landfill gas collection system will be constructed and operated below the cap (required by the RAP).

2. A primary geomembrane system will be constructed and maintained that is part of the Site-wide landfill cap and that extends under the buildings and is sealed to the pile foundation system of the buildings (required by the RAP).

3. A sub-slab passive venting system consisting of a network of perforated pipes embedded in a gravel layer will be constructed under each building slab.

4. A full time methane detection system that senses the presence of gas in the sub-slab venting system and which will provide notification according to appropriate protocols and which can trigger the active gas removal from the sub-slab system will be operated.

5. A secondary membrane system that seals the bottom of the building slab will provide additional protection. (Note that the structural slab itself is expected to be at least 12 inches thick, with all openings sealed with caulk, and topped with a finish floor or surface sealant [required by the RAP]).

6. In the case of the "elevated residential" structures, an open-air naturally ventilated space is planned between the structural slab and the first occupied enclosed area. The role of the openly ventilated space beneath the "elevated residential" units in providing additional protection to building occupants is recognized by many codes and the plan check departments of permitting jurisdictions.

7. Building heating, ventilation, and air conditioning (HVAC) systems will be operated that provides air changes, ventilation, and building pressurization according to modern HVAC design principles for maintaining indoor air quality. The role of the HVAC design in providing additional protection to building occupants is becoming increasingly recognized by the Environmental Protection Agency (EPA), regulatory agencies, professional associations, and the plan check departments of permitting jurisdictions.

2.4 Conceptual Details of Protective System for Commercial Buildings

Figure 2 shows a conceptual design for the protective system for commercial buildings. In addition to the details shown on the figure, the following also apply.

- ❑ The permanent, full-time landfill gas collection system will be located under the primary membrane, where it will collect subsurface gas. The system will consist of horizontal and vertical collection pipes that maximize the effectiveness of gas collection under the building footprint and take advantage of the subsurface geometry of the trash prism.

- ❑ The landfill cap that covers the entire area where trash is present consists of a layer of compacted foundation soil, a linear low-density polyethylene (LLDPE) membrane system (the primary membrane), and a cushion geotextile layer to protect the membrane during construction. The landfill cap will extend uninterrupted across the Site and under the buildings.

- ❑ Depending upon final design, the secondary membrane system will be comprised either of sheet high-density polyethylene (HDPE) or spray-applied cloroprene modified asphalt (CMA), such as the Liquid Boot product manufactured by LBI Technologies. In either case, the membrane system would be designed to adhere to the bottom of the structural slab and form a unified system when the concrete slab is poured. The secondary membrane system will also include one or two geotextile layers as needed for construction.

- Both the primary and secondary membrane will be sealed to each pile cap, as shown in the conceptual detail provided in Figure 3. These methods of booting have been employed for many years and have a proven track record of being effective.

2.5 Conceptual Details of Protective System for "Elevated Residential" Buildings

Figure 4 shows a conceptual design for the protective system for the "elevated residential" buildings. As shown, the system proposed for the residential buildings is the same as for the commercial buildings except for the added protection of the open-air naturally ventilated space between the structural slab and the first occupied enclosed area. Figure 5 architecturally illustrates the cross-section of a typical "elevated residential" building with the ground floor parking element open on three sides below the second floor residential units.

3.0 OPERATIONS, MAINTENANCE, AND MONITORING

The integrity and long-term effectiveness of the engineering controls in providing protection to building occupants will be provided by a comprehensive program of construction quality assurance and an ongoing operations, maintenance, and monitoring (OM&M) protocol, described briefly below.

3.1 Construction Quality Assurance

The construction of membrane systems is subject to stringent specifications and extensive construction quality assurance (CQA) standards that employ standardized test methods and equipment. The final Remedial Design Report will include a detailed CQA manual for the installation of the primary and secondary membrane systems.

3.2 Full Time Methane Detection and Alarm System

As shown in Table 1 and Figures 3 and 4, the entire landfill Site, including the building locations, will be covered by a geomembane landfill cap system from under which landfill gas will be actively collected. Therefore, only if there is a breach in the primary membrane system under a building and if landfill gas overcomes the vacuum of the landfill gas system and escapes, can gas intrude into the space under the building slab. As described above, this sub-slab space itself is separated from the building slab and the building space by a secondary membrane. As part of the proposed monitoring program, full time electronic infra-red sensors will be used to detect any methane that may be present in the sub-slab space between the two membrane systems, which are below the "elevated residential" units. The detection and alarm system will be designed and operated to transmit signals to a central station according to a protocol that will be designed and approved by the permitting jurisdictions, and will have the ability to indicate which sensor detects methane. The system will also be able to trigger an autodialer to notify OM&M personnel and to trigger active gas removal from the sub-slab area by a blower system for each building or logical grouping of buildings. The final

Remedial Design Report will include a full and detailed OM&M plan and manual for the detection and alarm system.

3.3 Periodic Sampling and Analysis of Sub-Slab Air

In addition to the full-time methane detection system deployed to monitor the sub-slab air, routine and periodic air samples will be collected from the sub-slab venting system and subjected to laboratory analysis to determine all constituents of the air sample and their concentrations. The final Remedial Design Report will include a full and detailed OM&M plan and proposed laboratory protocols. A Site-specific Communications Plan will be prepared that addresses how the results of the sampling and analyses will be distributed to the appropriate regulatory agencies and/or facility management personnel.

3.4 OM&M of Other Engineered Facilities

As described above, the membrane system and the landfill gas system provide the first layers of protection to the building occupants. Therefore, in addition to the OM&M of the specific building systems addressed above, the OM&M of the landfill gas collection system and the membrane system will also be addressed in the final Remedial Design Report.

4.0 DESCRIPTION OF LAND USE CONTROLS

In order to ensure the integrity of the landfill's primary and secondary geomembrane layers and prevent any direct contact with subsurface contaminants, several land use control measures are anticipated as part of the "elevated residential" development. These include the following:

- ❑ No access to below grade soils for Site occupants;
- ❑ No in-ground pools, spas or fountains;
- ❑ No on-Site groundwater wells for potable use;
- ❑ No Site redevelopment without appropriate regulatory review and mitigation measures;
- ❑ No below grade elevator pits/sumps that penetrate the primary liner;
- ❑ No penetration of the floor slab except according to protocols established by the OM&M Manual, which will include specific designs, procedures, and inspections intended to maintain/restore the integrity of the secondary liner system and sub-slab venting system;
- ❑ Use of clean soil for above grade landscaping features; and
- ❑ Protection of primary liner against damage from future construction and utility repair including three feet or more of soil cover on top of primary geomembrane, and custodial function to review, approve and inspect utility repairs and any below-grade construction.

The means and methods for implementing these land use controls shall be described in an Implementation Plan and submitted to DTSC for review and approval. All future residential use and other occupant sensitive uses will be limited to second floor or higher locations.

5.0 PATHWAY ANALYSIS

The proposed land use controls and building protection systems should be sufficient to prevent on-Site occupants of the "elevated residential" units from being exposed to (e.g., contacting) the underground contaminants and landfill gases at the Site. As discussed below, all of the exposure pathways for on-Site occupants of the "elevated residential" units will be incomplete. Incomplete exposure pathways do not pose health hazards.

For soils at the Site, no contact will be possible under planned future conditions. Firstly, there will be no residential access to below-grade soils because the entire Site will be covered with either asphalt or concrete. Second, there will also be several more layers of protection below the concrete/asphalt to prevent direct contact with the landfill materials (see Proposed Building Protection Systems section above). For example, in areas that are not below buildings, soil cover will be placed below the paving and road base (i.e., below two layers of protection), while in the areas where "elevated residential" buildings are located, the first floor garage, with its concrete floor and built-in geomembrane, will provide additional layers of protection between foundation soils and the cap above the landfill materials. Third, all green areas will consist of clean fill primarily in cement planters placed over the cement/asphalt at the Site. Fourth, construction of subsurface structures, such as swimming pools, will be prevented by land use controls. Land use controls will also prevent Site redevelopment without appropriate regulatory approvals and mitigation measures. Therefore, under planned conditions, there will be no contact with soils at the Site.

In addition to the systems that are planned to prevent direct contact with soils, other building protection systems will be in place to mitigate the migration of gases generated in landfill materials into indoor air. The building protection systems will consist of multiple (up to six) layers of: geomembranes, active and passive soil gas removal systems, and concrete slabs, with several layers functioning redundantly (see Proposed Building Protection Systems section above). Most importantly, the residential units will be elevated above the uppermost protection systems that will consist of a ground-floor open-air parking area with concrete flooring and roofing. This means that the first level of residential units will be on the second floor of any structures built at the Site, and in the unlikely event that gases were able to migrate through the multi-layered lower protection systems, they would be emitted to the atmosphere within the parking area and not into the second-floor, "elevated residential" units. These multiple layers of protection ensure that future residents would only be exposed to ambient atmospheric conditions and not to landfill gases.

Direct exposure to groundwater (i.e., consumption and dermal contact while bathing) will also be incomplete. As described above in the section on land use controls, a deed restriction will be used to prevent the potable use of groundwater from the Site. Further, since groundwater at the Site does not come to the surface and subsurface exposures will be restricted by land use controls, there will be no contact with groundwater contaminants at the Site.

Altogether, the proposed building protection systems and land use controls will eliminate all potential residential exposures to contaminants in landfill materials, soil, soil gas, and groundwater at the Site. Thus, under proposed future conditions (assuming multiple redundant building protection systems with an ongoing OM&M protocol and land use controls), exposures and health hazards for future occupants of the "elevated residential" units at the Site should not differ from ambient conditions within the City of Carson.

6.0 SUMMARY OF INDICATION REQUEST

The purpose of this document is to present DTSC with sufficient information concerning issues relating to "elevated residential" development on the Site to allow the agency to provide a written indication that the residential component of the Prospective Buyer's proposed project could be constructed if certain conditions are met. To that end, this document describes the physical barriers and venting systems that will be constructed under the buildings to prevent the migration of landfill gas, the monitoring system that will be installed to confirm gases are being adequately controlled, the further elimination of potential exposure pathways for residential occupants due to the fact all residential development will be on the second floor or above, and the land use controls that will be imposed to protect the remedy and prevent occupants from exposure to underground contaminants. Based on these design steps and land use controls, all potential exposure pathways for future occupants of the projects will be eliminated.

We ask that DTSC evaluate the information and analysis contained in this document and provide feedback on any outstanding issues or concerns. We will then address those issues and concerns with the goal of reaching agreement on the content and analysis presented in this proposal. Once we are in agreement, we request that DTSC provide an indication of the acceptability of "elevated residential" development on the proposed portion of the Site.

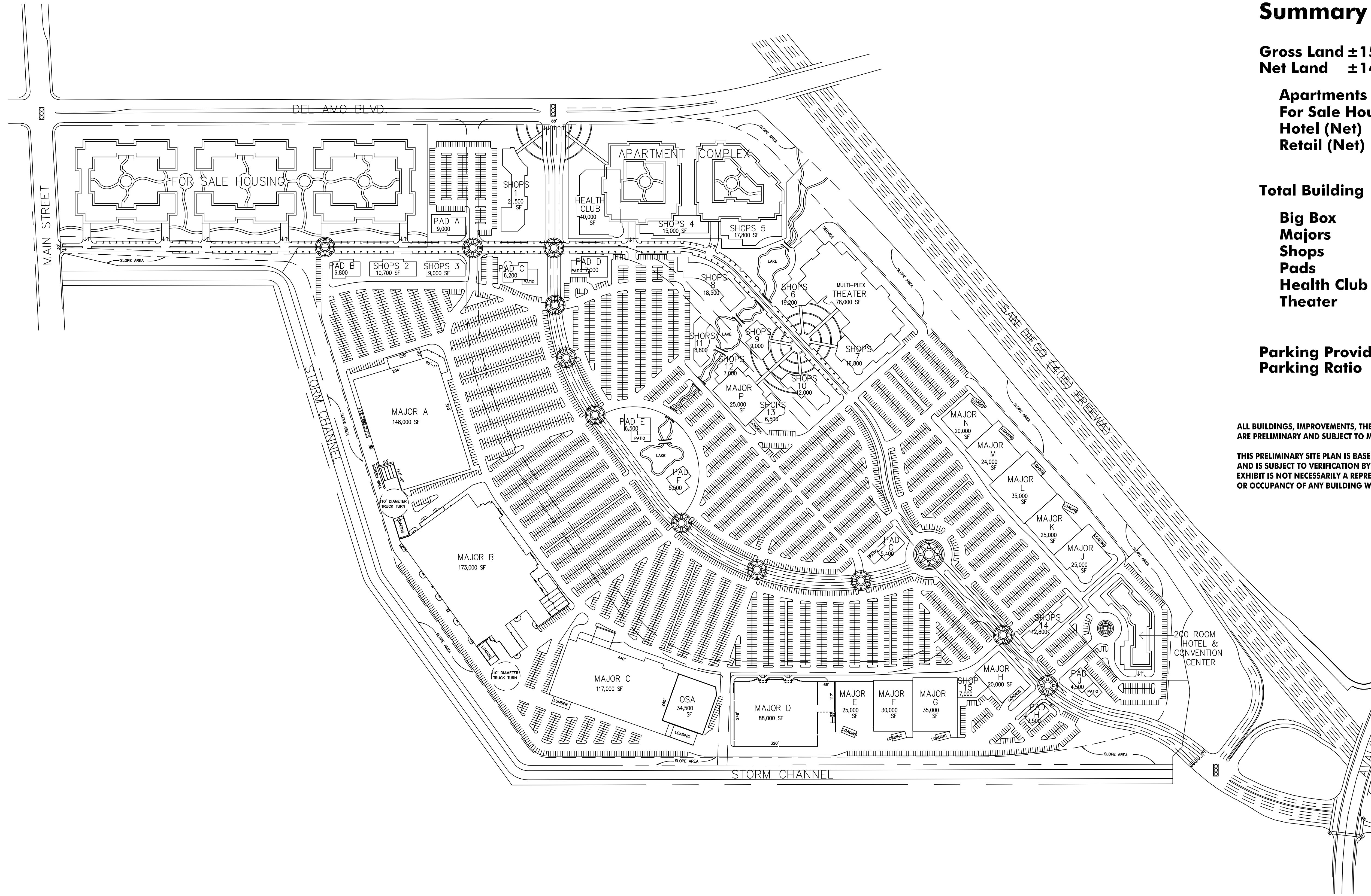
We also anticipate that DTSC may want additional analysis and safeguards to be in place before giving final approval for the "elevated residential" development to proceed and that the indication of acceptability may be conditioned upon completion/implementation of such steps. For example, based upon discussions to date, we expect that DTSC may require the following:

1. Formal risk analysis based upon the building protection systems and land use controls described in this document;
2. Mechanism for funding long-term O&M for the building protection systems; and
3. Implementation plan for the land use controls

We therefore request DTSC to provide a written indication of the acceptability of including an "elevated residential" component in the proposed development for the Site and to identify any conditions or requirements that would have to be met to obtain final approval.

Table 1
Overview of Proposed Building Protection Layers
Carson Marketplace

Commercial Buildings	**"Elevated Residential" Buildings**
R e c e p t o r s	R e c e p t o r s
6. HVAC system in building providing ventilation, air changes, and building pressurization.	7. HVAC system in building providing ventilation, air changes, and building pressurization.
	6. "Elevated residential" units, with an open-air naturally ventilated space below a structural slab and the first occupied enclosed area.
5. Secondary membrane system adhered to bottom of 12-inch thick concrete structural slab with openings caulked and topped with finish floor or surface sealant.	5. Secondary membrane system adhered to bottom of 12-inch thick concrete structural slab with openings caulked and topped with finish floor or surface sealant.
4. Full time electronic methane detection and alarm system deployed to monitor sub-slab venting space	4. Full time electronic methane detection and alarm system deployed to monitor sub-slab venting space
3. Sub-slab venting system	3. Sub-slab venting system
2. Site-wide landfill cap with geomembrane system	2. Site-wide landfill cap with geomembrane system
1. Site-wide full time active landfill gas collection system	1. Site-wide full time active landfill gas collection system
Source of subsurface gas – refuse prism below landfill cap	Source of subsurface gas – refuse prism below landfill cap



Summary

Gross Land	±157.23 AC	±6,848,817 SF
Net Land	±145.42 AC	±6,334,400 SF
Apartments (Net)		±8.30 AC
For Sale Housing (Net)		±15.94 AC
Hotel (Net)		±2.73 AC
Retail (Net)		±118.45 AC
Total Building		1,154,000 SF
Big Box		526,000 SF
Majors		264,000 SF
Shops		191,600 SF
Pads		54,400 SF
Health Club		40,000 SF
Theater		78,000 SF
Parking Provided		6,850 stalls
Parking Ratio		5.93/1000

ALL BUILDINGS, IMPROVEMENTS, THEIR OCCUPANTS AND THE USES AS SHOWN ON THIS PLAN ARE PRELIMINARY AND SUBJECT TO MODIFICATION AT THE OWNER'S DISCRETION WITHOUT NOTICE.

THIS PRELIMINARY SITE PLAN IS BASED ON INFORMATION FURNISHED TO NADEL ARCHITECTS INC AND IS SUBJECT TO VERIFICATION BY LEGALS, SURVEYS AND GOVERNING AGENCIES ETC. THIS EXHIBIT IS NOT NECESSARILY A REPRESENTATION AS TO IDENTITY, TYPE, SIZE, LOCATION, TIMING OR OCCUPANCY OF ANY BUILDING WITHIN THIS CENTER.

0 400

north

PRELIMINARY SITE PLAN

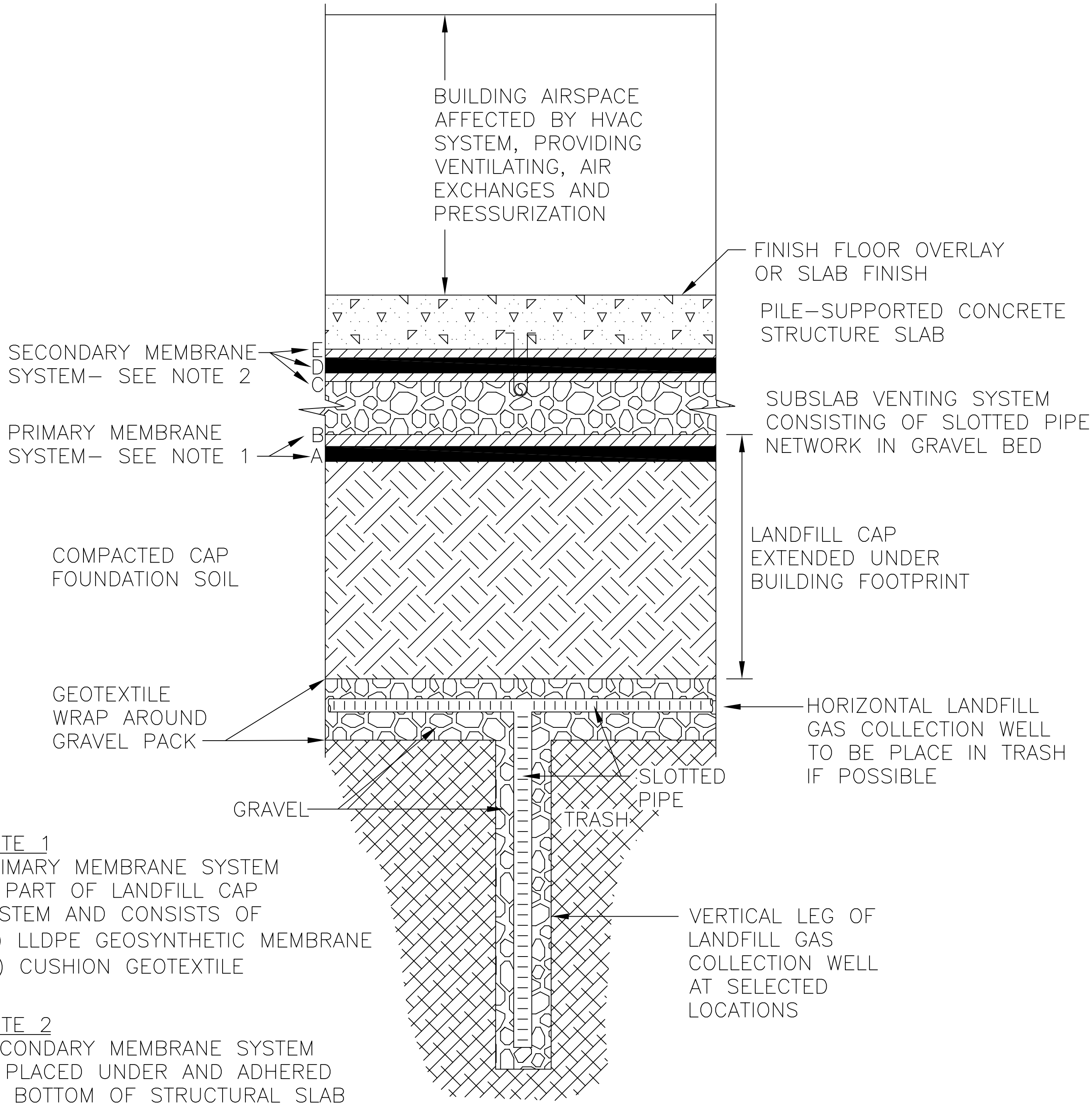
CARSON MARKETPLACE
CARSON, CA.

FIGURE 1 SITE PLAN

DATE: OCT. 20, 2004
NADEL JOB#: 04-247

1990 S. BUNDY DR., FOURTH FLOOR
LOS ANGELES, CA. 90025
T:310.826.2100 F:310.826.0182
WWW.NADELARC.COM

Nadel retail Architects Inc



NOTE 1
PRIMARY MEMBRANE SYSTEM IS PART OF LANDFILL CAP SYSTEM AND CONSISTS OF
(A) LLDPE GEOSYNTHETIC MEMBRANE
(B) CUSHION GEOTEXTILE

NOTE 2
SECONDARY MEMBRANE SYSTEM IS PLACED UNDER AND ADHERED TO BOTTOM OF STRUCTURAL SLAB AND CONSISTS OF:
(C) GEOTEXTILE, (D) HDPE OR LIQUID BOOT MEMBRANE, AND (E) GEOTEXTILE LAYER IF LIQUID BOOT (NOT NEEDED IF HDPE IS USED)

NOT TO SCALE

SOURCE: BRYAN A. STIRRAT & ASSOCIATES

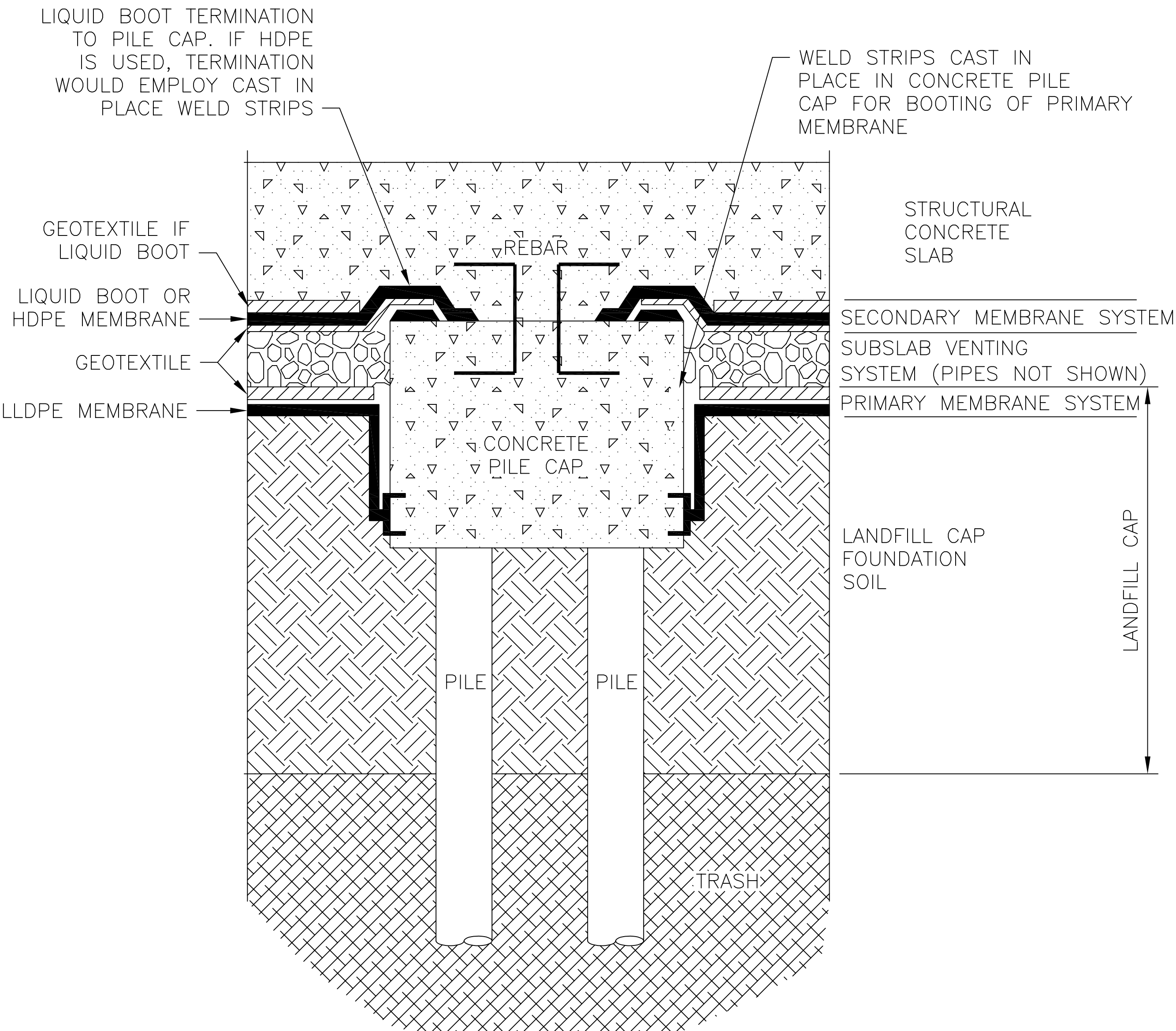
CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP | LENNAR PARTNERS An LNR Company

CONCEPTUAL ILLUSTRATION OF PROTECTIVE MEASURES FOR COMMERCIAL BUILDINGS

NOV. 2004	TETRA TECH, INC. SAN BERNARDINO	FIGURE 2

X:\GIS\CALCOMP\PROTECT-1.DWG



NOTE: PRIMARY MEMBRANE TO BE DESIGNED TO ACCOMODATE ANTICIPATED SETTLEMENT UNDER BUILDING.

SOURCE: BRYAN A. STIRRAT & ASSOCIATES.

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP

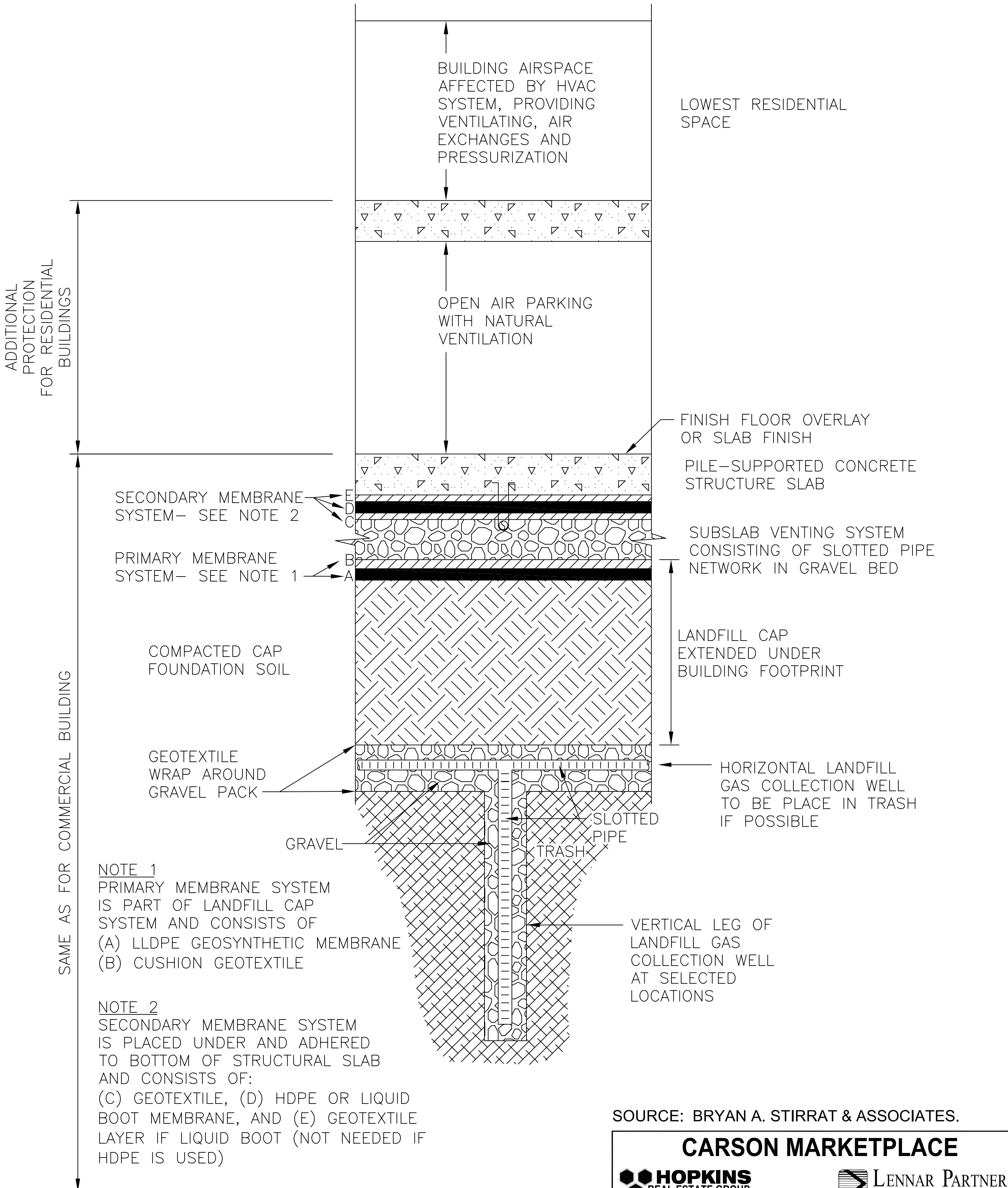
LENNAR PARTNERS An LNR Company

CONCEPTUAL ILLUSTRATION OF MEMBRANE BOOTING TO PILE CAP

NOT TO SCALE

NOV. 2004	TETRA TECH, INC. SAN BERNARDINO	FIGURE 3

X:\GIS\CALCOMP\PROTECT-3.DWG



SOURCE: BRYAN A. STIRRAT & ASSOCIATES.

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP   LENNAR PARTNERS An LNR Company

CONCEPTUAL ILLUSTRATION OF PROTECTIVE MEASURES FOR RESIDENTIAL BUILDINGS

NOT TO SCALE

NOV. 2004	TETRA TECH, INC. SAN BERNARDINO	FIGURE 4

X:\GIS\CALCOMP\PROTECT-2.DWG

NOT TO SCALE

SOURCE: NADEL ARCHITECTS, INC.

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP

LENNAR PARTNERS An LNR Company

CROSS-SECTION
TYPICAL RESIDENTIAL BUILDING

NOV. 2004

TETRA TECH, INC.
SAN BERNARDINO

FIGURE 5

X:\GIS\CALCOMP\X-SECT.DWG

Appendix E-5:

Preliminary Remedial Design Refinements

PRELIMINARY REMEDIAL DESIGN REFINEMENTS
CARSON MARKETPLACE DEVELOPMENT
Former Cal Compact Landfill, Carson, California

December 27, 2004

PREPARED BY
TETRA TECH, INC.
348 W. Hospitality Lane, Suite 100
San Bernardino, CA 92408

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Appendices

CARSON MARKETPLACE
PRELIMINARY REMEDIAL DESIGN REFINEMENTS

1.0 INTRODUCTION AND PURPOSE

The following sections describe the introduction and purpose of preliminary remedial design refinements.

1.1 Introduction

This document presents to the Department of Toxic Substances Control (DTSC) the proposed preliminary refinements to the remedial design specifications prepared pursuant to the Final Remedial Action Plan (RAP) for the Upper Operable Unit (Upper OU), dated October 1995, for the former Cal Compact Landfill, Carson California ("the Site"). Specifically, this proposal focuses on design features and approaches to the implementation of the landfill cap and the gas collection and treatment systems, and is based upon our current understanding of the development plan and remedial approach. A positive indication of acceptability of this approach by DTSC is a critical element of the Carson Marketplace, LLC's (the "Prospective Buyer") consideration to purchase and develop the Site, and return it to beneficial use.

1.2 Background and Purpose

The Prospective Buyer (a teaming of Hopkins Real Estate Group and Lennar Partners) is in the process of evaluating whether to purchase and develop the Former Cal Compact Landfill (the "Site"). Presently, the Prospective Buyer plans to close on this purchase in March 2005. An essential part of the due diligence for this Site is an evaluation of the implementability of the RAP relative to the Prospective Buyer's conceptual Site development plan (Figure 1). As shown on Figure 1, the development plan upon which this proposal is based includes retail, entertainment, hospitality, lifestyle, and residential elements. Based upon recent communications with DTSC, the Prospective Buyer understands that with proper planning, engineering design, human health risk analysis and land use controls in place, the development of the Site is feasible. As the development process progresses, we may request that DTSC evaluate this proposal in light of alternative site plan scenarios; in that case, we would submit additional information and documentation.

The Prospective Buyer has retained Tetra Tech, Inc. (Tetra Tech) to identify conceptual refinements to the current remedial design for the Site in order to incorporate the current Site development plan, and to propose alternative materials and configurations for the current RAP elements. Prior to preparing this proposal, Tetra Tech has reviewed the RAP, the existing design specifications, and all available relevant documents associated with the Site.

In order to issue a written indication of acceptability for the proposed design refinements, DTSC has suggested that the Prospective Buyer describe these proposed refinements in writing to allow DTSC to review them. This written indication will help enable the Prospective Buyer to complete due diligence and a pro forma for the Site.

Consistent with DTSC's suggestion, the purpose of this document is to summarize the preliminary remedial design refinements for the landfill cap and gas extraction systems based upon present-day technological options and the present Site development plan. This document describes a preliminary design for the primary remedial elements of the RAP, including the landfill cap system and the landfill gas system (the "RAP Elements"). A key function of this document is to demonstrate how the remedial design for RAP Elements (with the refinements) would provide the needed protections for the planned use of the Site and how the detailed designs that would ultimately be developed will conform with the existing Final RAP and the Consent Decrees. The proposals for remedial design refinements to the groundwater extraction and treatment system, and inclusion of elevated residential units in the development will be presented to DTSC under separate covers.

1.3 Proposed Site Development Plan – Carson Marketplace

The Prospective Buyer is in the process of evaluating whether to purchase and develop the Site. The current name used for this development is the Carson Marketplace. As shown on Figure 1, the overall development plan presently includes retail, entertainment, hospitality, and lifestyle elements, in addition to the residential component in the northern portion of the Site. The Carson Marketplace shall include approximately 24 acres of residential development and 118 acres of retail/commercial development. Other development plans are being considered at this time, including the possibility of constructing a National Football League (NFL) football stadium at the Site. The proposed refinements would also be applicable to the other development plans, including the NFL stadium alternative. We anticipate that we will provide additional information regarding the NFL stadium alternative in the future.

1.4 Summary of Preliminary Remedial Design Refinements

The Landfill Cap System is proposed to be constructed using an impermeable Linear Low Density Polyethylene (LLDPE) geomembrane. The geomembrane cap system can achieve the Remedial Action Objectives (RAO) and provide improved benefits as follows:

- ❑ Controls infiltration of surface water to reduce the generation of leachate
- ❑ Prevents direct contact with contaminated soil or buried landfill waste
- ❑ Incorporates currently stockpiled soil located at the Site
- ❑ Minimizes the need to import or export large quantities of soil which enhances community safety by reducing the numbers of large trucks traveling through the neighborhood
- ❑ Provides a consistent impermeable layer that is superior to clay for this project
- ❑ Integrates with building and infrastructure barrier systems more easily
- ❑ Reduce installation and maintenance costs in comparison to a clay cap
- ❑ Shortens installation schedule and eliminates hauling earthen materials to the Site
- ❑ Provide for improved efficiency and reliability of landfill gas collection.

The Landfill Gas Extraction and Treatment System is proposed to be constructed similar to that system described in the current RAP. However, the system will be improved by adding both horizontal and vertical wells within the Site, not just around the Site boundary. The system will be designed to automatically collect condensate and deliver landfill gas to a treatment facility that will include a flare system. This system will be integrated with systems constructed under buildings and the landfill cap and can achieve the following RAOs and benefits:

- ❑ Control or prevent off-Site migration of landfill gas

- ❑ Control or prevent potential releases of landfill gas to the atmosphere
- ❑ Remove landfill gas from within the Site, not just around the Site boundary
- ❑ Provide additional protection to occupants residing within buildings and servicing infrastructure
- ❑ Potential to stabilize the buried landfill waste more quickly and minimize the overall generation of landfill gas, thereby reducing the need for long-term operations and maintenance activities

2.0 OVERVIEW OF REQUIREMENTS FROM PRIOR DOCUMENTS

The following sections provide a brief summary of the remedial requirements presented in the 27 December 1995 Consent Decree (Civil Action No. 95-8773) and the 18 October 1995 Final Remedial Action Plan Cal Compact Landfill (Upper Operable Unit) Carson, California.

2.1 Review of Consent Decree Requirements

Section VIII-D Remedial Design of the Consent Decree requires that upon approval of the Final Remedial Action Plan (RAP) that a Remedial Design (RD) be prepared and submitted to the DTSC for review and approval. The RD shall describe in detail the technical and operational plans for implementation of the Final RAP which shall include the following elements, as applicable:

- ❑ Design criteria, process unit and pipe sizing calculations, process diagrams, and final plans and specifications for facilities to be constructed
- ❑ A description of the equipment used to excavate, handle, and transport contaminated material
- ❑ A field sampling and laboratory analysis plan addressing sampling during implementation to confirm achievement of the performance objectives of the Final RAP
- ❑ A transportation plan identifying routes of travel and final disposal destination of generated wastes
- ❑ For groundwater extraction systems - aquifer test results; capture zone calculations; specifications for extraction and observation monitoring wells; and a plan to demonstrate that capture is achieved
- ❑ An updated Health and Safety Plan addressing implementation activities
- ❑ Identification of any necessary permits and agreements
- ❑ An operation and Maintenance Plan including any required monitoring
- ❑ A detailed schedule for implementation of the remedial action consistent with the schedule contained in the approved Final RAP including procurement, mobilization, construction phasing, sampling, facility startup, and testing
- ❑ A Quality Assurance Project Plan ("QAPP") addressing quality assurance and quality control measures to be employed during implementation of the Final RAP and Operation and Maintenance

2.2 Review of Final RAP Requirements

The results of the comparative analysis presented in the existing RAP indicated that the preferred remedial action alternative should include a combination of the following actions.

- Construction of a low-permeability clay cover system for the entire Site to contain the buried waste and the impacted soil onsite

- Installation of groundwater extraction and treatment systems along the downgradient side of the Site to intercept/capture groundwater contamination coming from the Site. The perimeter groundwater system is intended to also capture off-Site migration of the groundwater contamination that exceeds the remediation goals

- Installation of a perimeter landfill gas extraction, control, and treatment system along the Site boundary within the waste zone. The perimeter landfill gas control and treatment system will be used to minimize the potential off-Site migration and impacts to air quality standards in compliance with the relevant regulations. Additionally, an updated landfill gas survey will be conducted. Following the landfill gas survey, the data will be evaluated to determine whether a gas collection system is necessary to achieve regulatory compliance

- Implementation of long-term monitoring of the groundwater and landfill gases

- Long-term maintenance of the landfill cap

To ensure the proper design, construction, and implementation of the systems indicated above, recommendations were also provided in the RAP for development and performance of detailed confirmatory investigations to obtain additional information for the RD. The planned confirmatory investigations include a landfill gas survey.

During the RD phase, the RAP requires that operation and maintenance and monitoring programs be developed for all remedial systems.

2.2.1 Preferred Remedial Action as per Existing RAP

The following sections summarize in further detail the components of the preferred remedial action presented in the existing Final RAP. The components to be discussed in these sections include: confirmatory investigations for remedial system design, the landfill cover system, landfill gas control collection and treatment, and the former oil and water wells investigation. In Section 3.0, refinements to the remedial actions for the landfill gas system and cap are proposed. The landfill groundwater remediation system will be discussed in a document submitted to DTSC under a separate cover.

2.2.1.1 Confirmatory Investigations for Remedial System Design

Landfill Gas Survey - To ensure the compliance status of the Site gases and emissions regarding the development/design of a landfill gas monitoring and control system, the RAP requires an updated landfill gas survey be performed during the RD phase. The survey protocol will be based on Section II.A of the California Air Resource Board (CARB) guidelines including integrated surface sampling, ambient air monitoring at or near the Site perimeter, and enhanced perimeter gas probes. Prior to conducting the survey, a landfill gas survey work plan must be prepared and submitted to DTSC, the South Coast Air Quality Management District (SCAQMD), and the Regional Water Quality Control Board (RWQCB) for review and approval.

2.2.1.2 Landfill Cover System

The RAP specifies that containment of the landfill gas and chemicals within the buried waste be achieved by constructing a cover system that will use clean imported soil. A brief description of the components of the cover system in the RAP is provided below.

- Foundation Layer. A compacted foundation layer serves to support the cover system. This foundation layer will have a thickness of 24 inches and will be constructed from existing soil cover material and/or suitable imported material. For the purpose of the RAP, a thickness of 12 inches of existing soil cover will be accounted for as a part of the foundation layer.

- Clay Layer. The barrier layer for the entire Site will include the construction of a minimum of 24-inch clay material using suitable off-Site borrowed soil having a permeability of 1×10^{-6} cm/sec or less. As needed, bentonite amended soil may be added to achieve the required permeability.

- Protective Soil Cover. A layer of compacted soil cover serves to protect the barrier layer. The protective soil cover is placed above the barrier layer and will have a thickness of 18 inches. This protective soil cover will be constructed from suitable imported material.

- Top Soil. A top soil layer of suitable material which supports vegetation with root systems less than the depth of the top soil layer. A top soil layer is required only in the landscape areas if coordinated with the future Site development activities. The top soil will have a normal thickness of 12 inches and may replace the top six inches of the protective soil cover.

2.2.1.3 Landfill Gas Control and Treatment

The RAP further provides that the preferred landfill gas control, collection, and treatment system consist of: (1) a series of vertical gas extraction wells within outer edges of the waste cells along the Site boundaries, (2) thermal destruction of collected gas using a flare unit, and (3) other gas monitoring and venting systems, if determined necessary and applicable.

The RAP specifies that the gas control wells will be installed and screened at appropriate depths intercepting the pervious or semi-pervious zones above the water table. Depending on the presence of the methane and toxic contaminants, these wells must be designed either as a passive or active system to intercept/control the potential off-Site migration. The perimeter gas control system assumes the use of an active extraction system with a typical well spacing of 200 feet and an average depth of about 40 feet. As a result, the RAP requires a total of 55 wells to be constructed along the Site boundaries. Detailed design of the gas control system including actual number of wells and specific spacing is to be determined based on the landfill gas survey.

Based on the size of the Site and the need of the perimeter landfill gas control, the RAP assumes that the landfill gas treatment will require the construction of a flare unit including related collection headers, blowers, and gas sampling and processing components. The RAP provides that collected landfill gas will be delivered from the header system to the flare by a blower. The gas is to pass through an automatic shut-off valve and a flame arrestor to prevent flash back. Landfill gas is to be mixed with dilution air for efficient combustion at the flare burner elements. Dilution is to be automatically introduced into the flare by a dilution air valve regulated by the combustion temperature. Supplemental fuel (natural gas or propane) is to be automatically introduced into the flare to maintain the required combustion temperature and thermal efficiency. The flare is to be equipped with standard safeguard controls and other required air emission control devices to monitor operating conditions and shut down the system when appropriate. The flare is to be constructed or shielded from the traveling motorists to minimize or reduce the potential for visual distraction.

2.2.1.4 Former Oil and Water Well Investigation

The RAP called for an additional investigation to be conducted during the implementation phase of the RAP to locate potential former oil and water wells at the Site and to address issues such as the risk of downward migration of contaminants into lower aquifers. To the extent feasible, the RAP requires that the former water well and two oil wells be located and abandoned to meet current regulatory standards. All available information regarding the location of these wells is to be utilized in this investigation. Under the RAP, the location of the wells is to be re-surveyed using available historic data. Survey locations are then to be compared to the prior investigations. Based on the results of these investigations, an excavation plan is to be considered. This excavation plan must be limited to those Site areas with the highest probability of finding the oil and water wells. Such limitation is necessary because of the risk associated with excavating buried hazardous substances. Prior to any excavation, the RAP requires that the health risk of such activities be evaluated to assess the appropriateness of excavation. Regulatory approval of all plans and permits must be obtained prior to any excavation activities.

2.2.2 Mitigation Measures During Remedial Construction

The following mitigation measures were proposed in the RAP to minimize potential impacts which may result from the remedial activities. The mitigation measures include:

- ❑ Dust and Particulate Monitoring
- ❑ Dust and Particulate Control
- ❑ Traffic Control
- ❑ Construction Emission
- ❑ Noise Control
- ❑ Odor Control
- ❑ Health and Safety Plan

2.2.3 Proposed Future Land Use

The preferred remedial alternative presented in Section 7 of the RAP addressed the remediation of the Site in its undeveloped state. Section 8 of the RAP discusses further requirements that will be necessary to redevelop the project Site for commercial/light industrial land use. This section describes additional design/construction considerations in the RAP that are related to the proposed development and that must be executed in conjunction with the preferred remedial actions to protect human health and the environment.

2.2.3.1 Deed Restrictions

Deed restrictions are a legal control to prohibit specific activities. Under the RAP, deed restrictions must be recorded on this property with the appropriate county recorders office to limit future land uses to commercial/light industrial activity, and to ban such uses as residential, hospitals, schools, and day care centers. In addition, the deed restrictions must limit activities on the Site such as deep excavations into the clay layer or buried waste or use of groundwater wells for domestic supply or for agriculture.

The RAP provides that the deed restrictions will be approved by the DTSC prior to recording and run with the property. The recording of the deed restriction is intended to put all potential buyers of the property on notice of the-deed restrictions, which will remain in force regardless of future property transactions.

2.2.3.2 Landfill Cap for the Proposed Building Area

To provide extra protection and landfill cap integrity under the building area, the RAP proposes additional cap design considerations are proposed, including:

- ❑ Provide a double liner system under the building
- ❑ Provide for differential settlement between the double liner and the building support piles
- ❑ Provide for landfill gas protection as required under CCR Title 14, section 17796 for post closure land use.

Accordingly, the RAP requires that a geomembrane liner be added under the building area. The geomembrane liner must be highly gas-impermeable and installed over the clay barrier layer described as part of the preferred alternative. The geomembrane must be low density polyethylene (LDPE) and have a minimum thickness of 30 mils.

Under the RAP, the geomembrane layer system will include the following elements.

- ❑ <u>6-inch thick sand laver.</u> This sand layer is to be placed above the geomembrane liner to protect it during construction/installation activities, and to serve as a drainage layer. This sand layer is part of the protective layer specified in preferred alternative.
- ❑ <u>12-inch thick sand/gravel aggregate laver.</u> This layer is used as a part of the landfill gas control protection under the building area. This aggregate layer is to be placed under the clay layer and wrapped with a geotextile filter to prevent the introduction of fines.

In parking areas and roadways, additional materials for the road base and pavement are to be incorporated into the cover alternatives. The RAP specifies that these materials will provide an additional barrier to the landfill cover system while providing support for the traffic requirements. These materials are not considered as a part of the RAP and are to be addressed during the Site design and development stage.

2.2.3.3 Landfill Gas Control and Treatment for the Proposed Building Area

The RAP provides that the landfill gas control and treatment system for the building will consist of: (1) an active landfill gas control system of horizontal piping embedded in a sand/gravel layer, (2) thermal destruction of collected gas using a flare unit, and (3) gas monitoring and venting system.

Under the building areas, the RAP states that an active landfill gas control system must be installed under the clay cover system to protect against the landfill gases. The active landfill gas control system is to consist of horizontal, perforated piping that is installed in the permeable aggregate layer below the clay/geomembrane layer. The active gas control is also to be a low pressure vacuum system to minimize potential drying of the clay layer. Spacing for these pipes is to coincide with the spacing for the piling needed to support the building.

Under the RAP, the ancillary components are to include a flare unit, collection headers, blowers, and gas sampling and processing components. Collected landfill gas is to be delivered from the header system to the flare by a blower. The gas is to pass through an automatic shut-off valve and a flame arrestor to prevent flash back. Landfill gas is to be automatically mixed with supplemental gas or dilution air for efficient combustion at the flare. The flare is to be equipped with standard safeguard controls to monitor operating conditions and shut down the system when appropriate. Detailed design of the flare system including size, emission limits, treatment components, and supplementary fuel requirements, are to be provided during final design of the gas-control system. Final design of the gas control/treatment system is to be submitted for DTSC approved prior to implementation.

Under the RAP, for the building safety/construction purpose, additional landfill gas venting or monitoring features must also be considered. These features include:

- ❑ Open ventilation provided by open parking structures or passive surface vent pipes to monitor or release methane from accumulating beneath the cap. As applicable, the vent pipes must be constructed with the ability to be connected to an induced draft exhaust system
- ❑ A pile sleeve system to seal the liner to the building piles
- ❑ A landfill gas monitoring and alarm system for landfill gas in or under the building

The RAP requires that these features be designed in detail during the remediation system and/or building construction/design phase and be part of the ongoing operations and maintenance (O&M) activities.

2.2.3.4 Piling Construction

A pile foundation is anticipated to support the buildings located over the landfill refuse. The RAP requires that the pile penetrations in the building areas incorporate a sealable sleeve made out of steel, geomembrane or geocomposite (a composite layer of geomembrane and bentonite) material that is fastened or adhered to the geomembrane liner. The sleeve must be attached between the piles and the liner and provide controlled slack to allow for settlement. The piles must be driven to the bearing soil below the waste. The annular space between the piling and sleeve must be sealed with a polymer material.

3.0 PROPOSED REMEDIAL ACTION DESIGN REFINEMENTS

The components to be discussed in the following sections include the proposed remedial action design refinements for the landfill cover system, and the landfill gas control collection and treatment system. The groundwater collection and treatment system will be discussed in separate document submitted to the DTSC for consideration.

The described refinements enhance the overall program by improving environmental protection, reduce initial capital expenditures, minimize potential O&M challenges and costs, better integrate into the planned future development, minimize development construction and post-development operational challenges, and saves valuable time. All of these refinements are important and necessary to make the Carson Marketplace financially viable and successful, complete environmental remediation, and return the land to beneficial use. During DTSC's review of this document, the proposed refinements may be slightly modified as an outcome of ongoing discussions with the Prospective Buyer and other stakeholders. Modifications to these refinements may also occur during the preparation of the final design of the RAP elements and the approval process of the ultimate development plan.

3.1 Perspective on RAP Requirements

Although the Final RAP generally describes the required remedial systems, the Remedial Design process will ultimately define the specific details of the systems that will be implemented at every location on the Site. These details will be documented on the construction drawings and specifications. As part of the design process, it is important to evaluate certain technology improvements that have occurred since adoption of the Final RAP in 1995. Inclusion of currently available technology in the design is expected to provide additional or equivalent protection and/or lower the cost of implementing the Final RAP.

The sections below present the Prospective Buyer's proposed refinements to the 1995 Remedial Design, consistent with the objectives and performance requirements of the Final RAP.

3.2 Preliminary Landfill Cap System and Design

As shown in Figure 1, the Prospective Buyer's Site development plan encompasses the entire landfill surface. A landfill cap is to be placed over the entire Site, except over the existing solid soil roads that separate the landfills into distinct cells. To accommodate the Site development plan, the landfill cap design is tailored to accommodate three types of surface features identified below:

- ❑ Open outside areas that will typically be paved parking lot areas of the Site development plan
- ❑ Areas of outdoor space located above the pile-supported structural concrete slab due to the fact that the structural concrete slab is larger than the building footprints
- ❑ Areas where building footprints are located above the pile-supported structural concrete slab

The landfill cap is proposed to be continuous across each cell of the Site, and throughout the Site the landfill cap works with the landfill gas system, described in Section 3.3. The system is designed to meet landfill closure requirements and to protect users of the Site from exposure to landfill gas and contact with waste. In locations under building footprints, a secondary membrane system will also be installed, as required by the RAP.

An overview of the proposed landfill cap system is presented in the following sections and in the following figures. Where appropriate, the relationship between the landfill cap and the landfill gas system and the future building protection system is shown.

- Figure 2 - Conceptual Illustration of Landfill Cap and Landfill Gas System in Open Outdoor Areas

- Figure 3 - Conceptual Illustration of Landfill Cap and Landfill Gas System Plus Sub-Slab Venting and Drainage System in Areas of Outdoor Space Located Above Pile-Supported Structural Slab

- Figure 4 - Conceptual Illustration of Landfill Cap and Landfill Gas System Plus Building Protection System in Areas of Buildings Located on Pile-Supported Structural Slab

- Figure 5 - Conceptual Illustration of Membrane Booting to Pile Cap

- Figure 6 - Transition of Cap Construction and Details of Primary Membrane Settlement Compensation Flaps

3.2.1 Landfill Cap In Open Areas

Figure 2 illustrates the cross section design of the proposed landfill cap for the open areas, such as parking lots, and documents how the Site-wide landfill cap is adapted to be functional at this location, from the bottom up.

- **Deep Dynamic Compaction** - The in-place trash will be subjected to a program of deep dynamic compaction that is intended to pre-consolidate the upper layers of the landfill trash, reduce future settlement, and provide a more uniform substrate over which to construct the landfill cap. It is expected that the deep dynamic compaction program will significantly benefit the long term performance of the cap and the development plan by reducing incidents of differential settlement, resulting in reduced operational and maintenance concerns. The deep dynamic compaction will be conducted in a way that does not expose trash and will include a provision to immediately apply soil in the event trash exposure becomes a concern. The finished surface after the deep dynamic compaction operation will be a clean and smooth soil surface.

- **Horizontal Landfill Gas Collectors** - As more completely described in Section 3.3, a system of horizontal landfill gas collectors will be arrayed across the outside areas. In most locations it is anticipated that the horizontal gas wells can be constructed by trenching through the compacted foundation soil and be placed at or near the top of the refuse column. This location provides for an effective collection of landfill gas across a wide area under the landfill cap.

- **Compacted Foundation Soil** - The foundation layer of the landfill cap will be placed directly upon the soil surface after the deep dynamic compaction is performed. The foundation layer will consist of two or more feet of soil placed and compacted and rolled smooth per engineering specifications in preparation for the placement of the primary membrane. The grade of the foundation layer will be engineered to result in proper drainage of any water that might infiltrate through cracks in the pavement down onto the top of the geomembrane.

- **Primary Membrane** - Once the foundation soil has been graded and prepared according to the engineered plan, the primary geomembrane will be installed. A Linear Low Density Polyethylene (LLDPE) membrane will be used because it has favorable properties that make it the most widely used geomembrane for landfill capping. Technical information and specifications for typical LLDPE products are presented in Appendix A. The geomembrane will be placed in accordance with strict and standardized construction quality assurance (CQA) protocols to verify proper manufacture and installation. Appendix A also includes sample engineering specifications that incorporate CQA provisions.

- **Cushion Geotextile** – On top of the primary geomembrane will be placed a cushion geotextile that is intended to protect the geomembrane during subsequent stages of construction. Typically, the cushion geotextile is a non-woven polypropylene with a weight of 12 or 16 ounces per square yard, and feels much like a carpet pad. Even though the overlying soil is screened to remove items that may puncture the geomembrane, the cushion geotextile is proposed to be installed as added precaution to protect the membrane system.

- **Geonet Drainage Composite** - In order to provide a preferential pathway for removal of water from the sloped surface of the membrane, a geonet drainage composite will be placed upon the membrane surface. A geonet composite is composed of two layers of crisscrossed high density polyethylene (HDPE) geonets wrapped in geotextile. The purpose of the crisscrossed geonets is to transmit fluids in the plane of the nets even when loaded by overburden, and the purpose of the geotextile wrap is to prevent the clogging of the geonet from the infiltration of fines. The geonet composite will be laid in one foot wide strips across the grade of the geomembrane in a manner that intercepts the flow across the grade at specified intervals. The downstream end of the geonet composite strips are positioned such that the drainage conducted off the surface of the membrane is delivered to the Site drainage system.

- **Protective Layer of Compacted Soil Over Primary Membrane System** - Over the cushion geotextile and the geonet composite drainage strips will be placed several feet of clean soil. The first six inches of backfill against the cushion geotextile and membrane is screened if necessary to remove rocks/debris 1 inch or larger which could pose a threat of membrane puncture. Although the total thickness of the protective soil layer is likely to vary from place to place around the Site as may be necessary to achieve finished grade for the paving system and to provide sufficient depth of soil for utility and irrigation lines, the thickness is expected to range between two and six feet. This soil layer also protects the membrane system from all but the most extensive excavations that may be subsequently required as part of the long term maintenance of the Site. All such excavations that expose the membrane system will be subject to rigorous procedural protocols designed to protect the membrane and to repair it as may be necessary.

- **Development Pavement System** - The development pavement system, which is likely to consist of pavement base and asphalt paving, will be constructed over the compacted protective soil layer. The surface water drainage from the top of the landfill cap will managed by grading of the parking lots and the storm water collection system. Even though the pavement is not part of the proposed landfill cap system as proposed, the pavement provides an additional barrier which results in infiltration into the compacted protective cover soil to be minimal.

3.2.2 Landfill Cap Under Slabs Outside Building Footprints

Figure 3 illustrates the cross section design of the proposed landfill cap under the structural concrete slabs that are outside of building footprints and documents how the Site-wide landfill cap is adapted to be functional in these areas. The cross-section layers are described below in sequence from the bottom up.

- **Same Site-Wide Landfill Cap Up Through Primary Membrane** - The cross section design of the proposed Site-wide landfill cap (shown in Figure 2), including all layers up through the primary membrane and cushion geotextile, extends in a continuous manner under the concrete structural slabs and buildings, as shown in Figure 3.

- **Pile Supports, Connection of Membrane, and Settlement Compensation** - Because the structural slabs will be supported by deep piles founded in soil beneath the refuse layers, deep dynamic compaction is not needed in areas where structural slabs will be constructed. As shown in Figure 5, the primary membrane will be attached to the pile cap by welding the membrane to HDPE channels embedded in the concrete cap at the time of forming and pouring. This weld of the membrane to the attachment channel is the same weld used to join sheets of membrane and is subject to the same rigorous CQA procedures. Typically, rupture tests show that the weld attachment is stronger than the membrane itself. Because deep dynamic compaction will not be applied to the refuse substrate in the areas where the pile-supported structural slabs will be constructed, that area is somewhat more susceptible to settlement than the cap system in open areas. Therefore, in addition to the excellent elongation properties of LLDPE membrane to compensate for settlement, a settlement compensation flap will be constructed at all locations where connections are made to pile caps and the adjacent area has not been subjected to deep dynamic compaction. Figure 5 illustrates the concept of the settlement compensation flaps. Notice that if settlement were to occur within the waste prism under the slab, the settlement compensation flap would accommodate the displacement even without creating stresses within the membrane or transmitting stresses to the location where the membrane is welded to the attachment strip embedded in the pile cap.

- **Sub-Slab Venting and Drainage System** - Above the primary membrane and the cushion geotextile, a layer of gravel will be placed that will act as a drainage medium for any water which may get down to the membrane. Even though the structural slab is expected to consist of solid concrete, provisions must be provided for drainage so that water does not build up on the membrane if some sort of leakage were to occur. The membrane surface will be sloped to drain and the gravel drainage layer will be designed to discharge into the Site drainage system. Even though there is a membrane positioned lower in the cross section, the gravel layer also serves as a backup venting layer to allow the removal of landfill gas from below the slab in the event of some kind of membrane breach. As shown in Figure 3, vent pipes are also provided that are attached under the slab and which would terminate in vent risers above the slab.

3.2.3 Landfill Cap Under Slabs Within Building Footprints

Figure 4 illustrates the cross section design of the proposed landfill cap under the structural concrete slabs that are within the building footprints and documents how the Site-wide landfill cap is adapted to be functional in these areas. The cross-section layers are described below from the bottom up.

- **Same Site-Wide Landfill Cap Up Through Primary Membrane** - As shown in Figure 4, the cross section design of the proposed Site-wide landfill cap (shown in Figure 2), including all layers up through the primary membrane and cushion geotextile, extends in a continuous manner under the concrete structural slabs.

- **Same Connection of Membrane and Settlement Compensation** - The membrane in this area also will be connected to the pile caps and a settlement compensation flap provided, as illustrated in Figures 5 and 6.

- **Same Sub-Slab Venting System** - The sub-slab venting system in the area of the building footprints (Figure 4) is generally the same as in areas outside the building footprints (Figure 3) except that it is not necessary to slope the membrane or provide membrane drainage provisions in the areas under buildings.

- **Addition of Secondary Membrane** - As required by the RAP, a secondary membrane will be provided in building footprint areas. Depending upon final design, the secondary membrane system will be comprised either of sheet high density polyethylene (HDPE) or a spray-applied cloroprene modified asphalt (CMA) such as the Liquid Boot product manufactured by LBI Technologies. In either case, the membrane system would be designed to adhere to the bottom of the structural slab and form a unified system when the concrete slab is poured. The secondary membrane system will also include one or two geotextile layers as needed for construction. The secondary membrane system will also be attached to the pile caps as shown in Figure 5.

- **Addition of Vertical Legs on Landfill Gas Wells** - As shown in Figure 4, and as more fully described in Section 3.3, the horizontal gas collectors under the buildings are supplemented by vertical legs that allow for more efficient collection of landfill gas from under the building slabs.

3.2.4 Comparison of Proposed Landfill Cap Versus RAP Landfill Cap

The approved RAP includes a "traditional" compacted clay cap that emerged as the standard prescriptive design for landfill caps as the new federal and state regulations evolved in the late 1980s and early 1990s. All of the regulations, however, allow for alternative designs that provide for equal or improved performance, and over the years, a number of alternative designs and materials have been advanced to cope with special Site conditions or design issues associated with compacted clay caps.

One of those alternative cap designs involves the use of geomembranes instead of compacted clay to fulfill the infiltration barrier function of the landfill cap. This section addresses how the geomembrane cap proposed for this project compares with the compacted clay cap of the approved RAP, with a view toward illustrating the superior performance of the proposed design to meet regulatory requirements and provide protection for the occupants of the Site as it is developed.

The proposed geomembrane cap and construction approach is superior to the approved compacted clay cap in the following ways.

- **Lower Permeability**: The proposed Linear Low Density Polyethylene membrane proposed for the Site is, for all practical purposes, considered impermeable.[1] Clay caps are usually specified to have permeability to water of 10^{-6} or 10^{-7} cm/sec under specific ASTM test conditions. In a semi-arid environment, such as the project Site, a clay cap must receive sufficient irrigation to maintain this level of effectiveness. If a clay cap were to become desiccated due to insufficient water supply to it, the permeability of the clay cap would be governed by the permeability of the overlying soil or the foundation soil, typically 10^{-3} to 10^{-5} cm/sec, depending upon soil type and compaction.

- **Better Cap Drainage and Reduced Opportunity for Infiltration**: The proposed cap includes provisions for drainage of infiltrated water off the membrane surface with the use of strip drains. This approach means that the "residence time" of water on the surface of the geomembrane is short, thus reducing the possibility of water mounding on and damaging the liner. In a typical compacted clay cap, water must be allowed to reach the clay layer in order to keep it hydrated and effective as a barrier.

[1] A more complete statement is available from technical literature available from GSE, a leading manufacturer of geomembranes, as follows: "Polyethylene" is, for practical purposes, considered impermeable. Be aware, however, that all materials are permeable to some extent. Permeability varies with concentration, temperature, pressure and type of permeant. The rates of permeation are usually so low, however, that they are insignificant. As a point of reference, polyethylene is commonly used for packaging of several types of materials. These include gasoline, motor oil, household cleaners (i.e. bleach), muratic acid, pesticides, insecticides, fungicides, and other highly concentrated chemicals." Permeability of LLDPE has been estimated at 10^{-10} to 10^{-12} cm/sec.

Too much or too little water reaching the clay cap each have consequences that are not issues with a drained geomembrane cap. It should be noted that, with the paving system planned as part of the Site development system, and with the planned long term maintenance plan for the paving, it is likely that very little water will ever penetrate down to the geomembrane layer to be drained off by the strip drains.

- **Greater Assurance of Long Term Performance**: Long term performance of a landfill cap can be gauged in terms of its ability to maintain its integrity under anticipated stresses to which it is subjected (in the case of landfill caps, the long term differential settlement conditions), and its ability to maintain its integrity against potential degradation in the environment in which it is placed. In the case of the proposed membrane liner and construction approach, deep dynamic compaction will be employed over large areas of the Site in order to pre-consolidate as much of the remaining potential settlement as possible and to provide a more uniform substrate over which to construct the geomembrane cap. In addition, LLDPE has excellent elongation properties (see Appendix A) and has been developed to meet the challenge of maintaining integrity of differential settlement in landfill cover applications.[2] Where the membrane is placed over areas that will not receive deep dynamic compaction but is secured to pile caps that do not move as the adjacent waste settles, the proposed design includes settlement compensation flaps which allow extra membrane to be unfurled, avoiding excessive membrane tensile forces. In terms of in-place membrane "life" versus degradation factors to which it is subjected, product durability studies indicate[3] that the geomembrane proposed for the Carson

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[2] GSE product information states that LLDPE has been effectively used in over 50 million square feet of landfill cover applications. This project alone includes 5.7 million square feet of LLDPE. For perspective, consider that landfill final cover projects that would require membrane covers are a relatively recent phenomena because most of the older landfills that have been closed are unlined and cover regulations require (in part) that the final cover have a permeability equal to or lower than the base liner. Thus, the old landfills without liners which have been closed were eligible under the regulations for cover systems less sophisticated and less protective than that provided by geomembrane covers. Undoubtedly, as more of the modern lined landfills reach capacity and close, geomembranes will be required to comply with that regulatory standard.

[3]GSE product information was consulted to provide the following perspective: Membranes are made of high quality virgin polyethylene which demonstrates excellent chemical resistance to a great number and combinations of chemicals. It is exactly this property that makes polyethylene the lining material of choice in environmental engineering applications. In order to gauge the durability of material in contact with a chemical mixture, testing is required that includes testing under the range of chemicals in the proposed environment and evaluating changes to the many properties of the liner material. Extensive tests have been conducted to illustrate such resistive properties in aggressive chemical environments such as landfill liners and waste ponds. Landfill caps are a much less stressful environment in which the geomembrane is encased in clean soil on both its top and bottom and subject only to potential contact by landfill gas. Perspective is also provided by Koerner, Halse, and Lord in their paper "Long Term Durability and Aging of Geomembranes," 1990, in ASCE Geotechnical Special Publication No. 26, entitled "Waste Containment Systems: Construction, Regulation, and Performance." In this publication, the authors seek to address the frequently asked question "how long will it last" by systematically examining all of the potential degradation factors that affect geomembranes with a view toward seeking a straightforward answer to that question. They conclude that there is no straightforward easy answer. Part of this is because real life field applications are significantly different from the laboratory test conditions, that the expected life of the materials is far longer than they have actually been used, that accelerated test methods do not accurately portray long term performance, and that it is difficult, if not impossible, to recover samples of materials that have been in place for a number of years because they

Marketplace will not experience any degradation that impairs its performance for the foreseeable future (over 50 years). In the case of the compacted clay cap in the RAP without deep dynamic compaction, more incidents and larger magnitudes of differential settlement are anticipated, and differential settlement would result in some breaches of the clay cap's integrity because the clay does not have properties that work to resist forces within the cap that result from differential settlement. Long-term performance of the clay cap is also heavily dependent on keeping the clay from desiccating.

- **Definitive Seals Under Buildings**: By using a geomembrane, the proposed design can take advantage of proven methods of connecting membrane to structures that is not available for sealing clay caps to buildings. The seals involve welding the membrane to attachment flanges embedded in the concrete cap at the time of forming and pouring. Tests show that welds are typically stronger than the geomembrane material itself. These definitive seals offer a high degree of protection to occupants of the Site from exposure to landfill gas.

- **Utilities Better Isolated**: The proposed design provides for placing utilities in the protective soil layer above the membrane, which helps isolates them from intrusion by landfill gas. If a clay cap were to be used and utilities were similarly located in the overlying protective soil, there would still be potential that landfill gas could penetrate the clay cap and enter utility conduits and corridors.

- **Better Gas Collection Efficiency**: As discussed in several paragraphs above, a geomembrane provides a better seal than a clay cap, which allows for more efficient tuning and operation of a landfill gas collection system, thus providing better protection.

3.3 Preliminary Landfill Gas System and Design

The landfill gas system design (Site-wide and under buildings) provides a significant opportunity to provide protection to the Site in an efficient manner that conforms with the cap design and the various uses and development details at the Site. In general, the proposed LFG extraction and treatment system would not differ from the LFG system required in the RAP. The LFG system will use vertical and horizontal wells, as well as the prescribed flare system. The system will be

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are typically covered with waste materials. A useful conclusion of their research is, however, that burial of geomembrane in soil (such as in a landfill cap) greatly diminishes and even eliminates many of the degradation processes affecting geomembrane. Given that the best gauge of long term performance is the systematic recovery and examination of materials that have been in service for a number of years, another issue arises. GSE product literature states that older materials were manufactured differently and to different standards than today's improved materials. Nevertheless, in a few cases where older materials in place for 20 years have been in place in aggressive environments and later recovered for testing and examination, no significant reduction in the primary physical properties was observed. Tisinger and Giroud also address the question in their paper "The Durability of HDPE Geomembranes" (Geotechnical Fabrics Report, September 1993) by reviewing many of the same issues as did Korner, Halse, and Lord, as well as other authors who have published relevant information. They quote an EPA ad hoc committee on durability as concluding that such materials should maintain their integrity in the waste disposal facility environment in "terms of hundreds of years." It is generally thought by geomembrane engineers and installers that most long term poor performance will come from faulty installation or construction damage rather than by degradation of the material itself.

optimized and be fine-tuned to the specific building locations, the final landfill cap, and the results of the supplemental LFG survey. It is anticipated that the system will include an automated condensate collection and conveyance system for minimizing future maintenance and labor.

The landfill gas system for the developed Site must be more extensive than for a landfill that is closed and used only as undeveloped open space. After completion of an updated landfill gas survey during the RD phase as required by the RAP, a comprehensive LFG collection and treatment system will be designed. The features of the proposed landfill gas system are described below.

- **Horizontal Gas Collectors in Open Areas**: Because the outdoor areas of the Site development plan are mostly paved and will be entirely covered with a geomembrane landfill cap, horizontal gas collectors will be used as the most effective way to collect landfill gas from under the landfill cap over large areas. These horizontal collectors consist of flexible perforated pipe with sleeved sections that "telescope" to accommodate settlement. The horizontal collectors will be installed in a gravel-filled trench located as close as possible to the interface between the top of trash and the bottom of the landfill cap foundation layer. Geotextile is used to line the gravel-filled trench to prevent clogging by fines. These horizontal gas collectors will be located at intervals throughout the Site such that the zones of influence of adjacent collector lines overlap, assuring that all areas under the landfill cap will experience landfill gas extraction.

- **Special Gas Collectors Under Building Footprints**: Noting that the Site consists of five distinct landfill cells and that the buildings are generally located over the centerline of the landfill cells, the trash prism under the buildings is thinner at the edges of the building and deeper under the center of the buildings. Even though horizontal gas collectors would be very effective in these locations, the particular geometry of the buildings and waste prisms offers the opportunity to collect landfill gas even more effectively. As shown in Figure 4, a vertical leg will be added to the horizontal gas collectors under the buildings so that more landfill gas throughout its source area can be collected at lower applied vacuum. This keeps more gas away from the bottom of the building footprints and provides more opportunity for precise controls. Because most of the buildings will be located around the perimeter of the Site, these vertical legs of the horizontal gas collectors under buildings will also be located around the perimeter of the Site and function as vertical wells around the perimeter of the Site as required by the RAP. Together, the system of horizontal and vertical gas collection well legs provide protection at all locations at the Site and will control landfill gas from migrating offsite.

- **Extensive Built-in Features for Tuning, Monitoring, and Troubleshooting**: Because gas production in a landfill is not uniform either spatially or temporally and subject to many factors, the key to a good landfill gas control system is the ability to tune it as needed to adjust to changes in the amount and locations of gas being produced. The proposed system will have sampling and monitoring ports and sensitive tuning valves located at well heads and along header lines that will allow detailed tuning, monitoring, and troubleshooting. Appropriate "legs" will be created in the system so that zone controls can be implemented; for example, the landfill gas wells under a specific building footprint will be capable of individual control that does not affect, or be affected by, the control settings made for the adjacent building.

- **Looped Header System**: All of the wells will be tied into a looped header system that provides a redundant path of vacuum to all wells. Thus, if a section of header must undergo some sort of temporary repair, all or most of the wells will continue in service. The headers will be installed underground within the protective layer above the membrane of the landfill cap and be graded to accommodate settlement and condensate drainage.

- **Condensate Management System**: Condensate that drains out of the headers will be captured in sumps located at intervals along the headers at header low points. The sumps will be outfitted with an automatic pneumatic pumping system that senses condensate levels in each sump and, according to preset protocols, pumps it into a condensate return line. The compressed air lines from the gas equipment facility to the sumps and the condensate return lines from the sumps to the gas equipment facility will be located within the same trench as the headers.

- **Gas Equipment and Treatment Facility**: The equipment for the operation of the system and the treatment of the collected gas will be located in a single secured facility. It is anticipated that the groundwater remediation equipment and the central station of the building monitoring system will also be located at the same facility. The following landfill gas equipment that is expected to be included at the facility: (a) primary and backup blowers, (b) flare and controls, (c) generator to provide backup power if needed and associated above-ground fuel tank, (d) compressor to provide compressed air for the condensate management system, (e) condensate storage tank, (f) programmed logic controller that monitors and automatically operates the system, (g) autodialer that will contact a human on-call technician at any hour in the event of malfunction, (f) monitoring ports and gauges, and (h) appropriate utility services needed to operate the system. This system is likely to include a natural gas connection to operate the flare and destroy the landfill gas in the event that gas volumes are too low to sustain the flare. It should be noted that at some point in the future, it is expected that the flare can be removed and the remaining small amounts of gas effectively treated with activated carbon canisters. Therefore, the facility will be designed with this feature in mind. The condensate may be treated in the groundwater treatment system, destroyed in the flare, discharged to the sewer, or be removed periodically from the tanks for off-Site disposal.

- **Monitoring System for Buildings**: Even though the Site-wide landfill gas system will effectively collect landfill gas from under the landfill cap, the buildings will be additionally equipped with a building protection and monitoring system, which is described in more detail in a separate document.

- **Security Features**: All elements of the system will be properly secured to prevent tampering and vandalism. Control valves and monitoring ports will be contained in locked subsurface vaults and the equipment and treatment facility will be fenced, locked, and alarmed.

- **Comprehensive OM&M Plan**: All aspects of the landfill gas system will addressed in a comprehensive operations, maintenance, and monitoring (OM&M) plan that will provide assurance that the system will always be operated and monitored as designed, that the equipment is maintained, and that equipment parts and supplies are on hand and easily located as needed.

4.0 OTHER CONSIDERATIONS

The following sections describe other refinement and design aspects that will be considered.

4.1 Approach to Former Oil and Water Well Investigations

The Allwest Geoscience, Inc. report, dated December 3, 1998 correctly identified the infeasibility of well re-abandonment due to the following factors: oil well casings are estimated at depths in excess of 50 feet below existing ground surface; 20 feet of perched leachate above the estimated top of the well casing; potential health risks and liabilities from vapor emissions, particulates, excavated materials, and leachate; and fire and explosion risks. It should also be noted that the three well access methodologies (drilling & casing, unshored excavation, and shored excavation) identified in the report over simplified the construction parameters and risks associated with achieving the desired depth to exposing the oil and water well casings. However if any of the three well access methods were to be employed the following plans, programs, and procedures (or some form thereof) would need to be developed and implemented:

- Environmental Evaluation of Potential Site Contaminants
- Geotechnical and Waste Slope Stability Evaluation
- Health Risk Assessment (onsite personnel & surrounding community)
- Dewatering (leachate extraction) Program Design and Installation
- High Volume (large capacity) Temporary Storage System for Extracted Leachate
- Waste Management and Disposal Plan for Leachate and Excavated Waste
- Transportation Program for Offsite Disposal of Leachate and Excavated Waste
- Community Outreach and Notification Program
- Vapor and Odor Emissions Collection/Suppression Program
- Spill Prevention and Mitigation Program
- Site Security Program
- Emergency Action Plan/Emergency Response Plan and Spill Notification
- Fire Prevention Plan
- Site Training, Health and Safety Hazard Awareness, and Personnel Monitoring Program

- ❑ Storm Water Collection, Handling, and Disposal System
- ❑ Site Monitoring and Alarm Systems/Safety Shut Down and Emergency Shut Down Program
- ❑ Submittal of above plans, programs and procedures to appropriate city, county, state, and/or other appropriate regulatory oversight agency for review and approval prior to implementation

Exposure of the oil well casings would not be guaranteed by any of the proposed access programs and the volume of excavated material would greatly exceed previous estimated volumes. Also, there is no guarantee that if the wells were located and exposed, that they could be successfully re-abandoned. Considering the difficulty in exposing the oil well casings under the existing Site conditions and the associated health risks to personnel and the community, the high risks and costs to expose the oil wells for abandonment would not be justified, especially with the high probability for failure.

If the water well is found to be located beneath the landfill waste, exposing the water well casing would include construction and health concerns similar to those for the oil wells. However, if the amount of landfill material is not as thick over the water well the costs to expose the water well may be justifiable.

Although it appears, based upon existing information, that reabandonment and closure of the three potential wells would be infeasible, to further evaluate this issue, it is proposed to do a literature review to confirm whether the wells existed, and if they did, where they are located. Determining the general location of the wells could also be critical to determining the potential constraints the wells may have on the Site development plan. The California Division of Oil and Gas and Geothermal Resources (DOGGR) may not allow the placement of structures over the former test wells and therefore locating these wells, to the extent they exist, is important.

In this regard, we are asking DTSC for an indication as to whether it is likely that the abandonment of the wells will not be required since there is a low probability of success. If it is DTSC's position that the abandonment still be attempted, we then request an indication if Section VII.E of the original Consent Degree still applies.

4.2 Coordination with Development Team

It has been the Team's experience that partnership and excellent communications with the client, regulators, and other stakeholders are key factors in successful execution of complex Guaranteed Fixed-price Remediation (GFPR) projects. By addressing each of the stakeholders' needs, we have been successful in aligning all parties' interest in and commitment to project completion.

It is anticipated that all involved parties will participate in weekly development team conference calls and quarterly development team meetings during the planning, design and construction phases of the project. Additional meetings may be required to address unforeseen issues or other challenges.

4.3 Coordination with DTSC

It is anticipated that the Prospective Buyer, the City, DTSC and the Development Team will be partners with respect to implementing the remediation program. Under the terms that will be defined in the final agreements, it is anticipated that Tetra Tech will be responsible for and will coordinate with state and local regulators regarding the landfill closure systems. Included with the regulatory agency coordination are the actual permitting activities. The Team will compile a list of all required and relevant permits, and develop a schedule for obtaining these permits.

It is envisioned that the regulatory coordination will include regular team meetings involving the Prospective Buyer, Tetra Tech, DTSC, and possibly other agencies or stakeholders, such that progress can be discussed, schedules checked, and issues identified. This will work in conjunction with the more frequent Development Team Coordination program discussed.

4.4 EIR Coordination and Integration

The objective of an environmental impact report (EIR) is to document the impacts of a project on the environment for review by the public and the decision making body. In order to accomplish this objective it is important that a complete and accurate description of the proposed project be provided to the authors of the EIR. Because of the complex and accelerated nature of this project, it is imperative that the development team provide the EIR authors with the proper project description and keep them updated on any changes to the description. In addition, as the impacts related to the proposed project are identified and the mitigations for the impacts developed, the mitigation measures need to be coordinated with the development team so the mitigations can be incorporated into the overall development plan.

It is planned that the development team and the EIR authors closely coordinate their activities, particularly for an accelerated project like this. An incomplete or inaccurate EIR could delay construction.

4.5 Projected Remedial Design Schedule

It is estimated that Remedial Design and permitting tasks will take an estimated 18 months, including reviews by DTSC. During this period the overall development design, the insurance guarantees/policies and financial assurances, and the required operations and maintenance protocols shall be finalized. Scheduled submittals and reviews at 10, 50 and 90 percent completion shall be included in a master RD schedule.

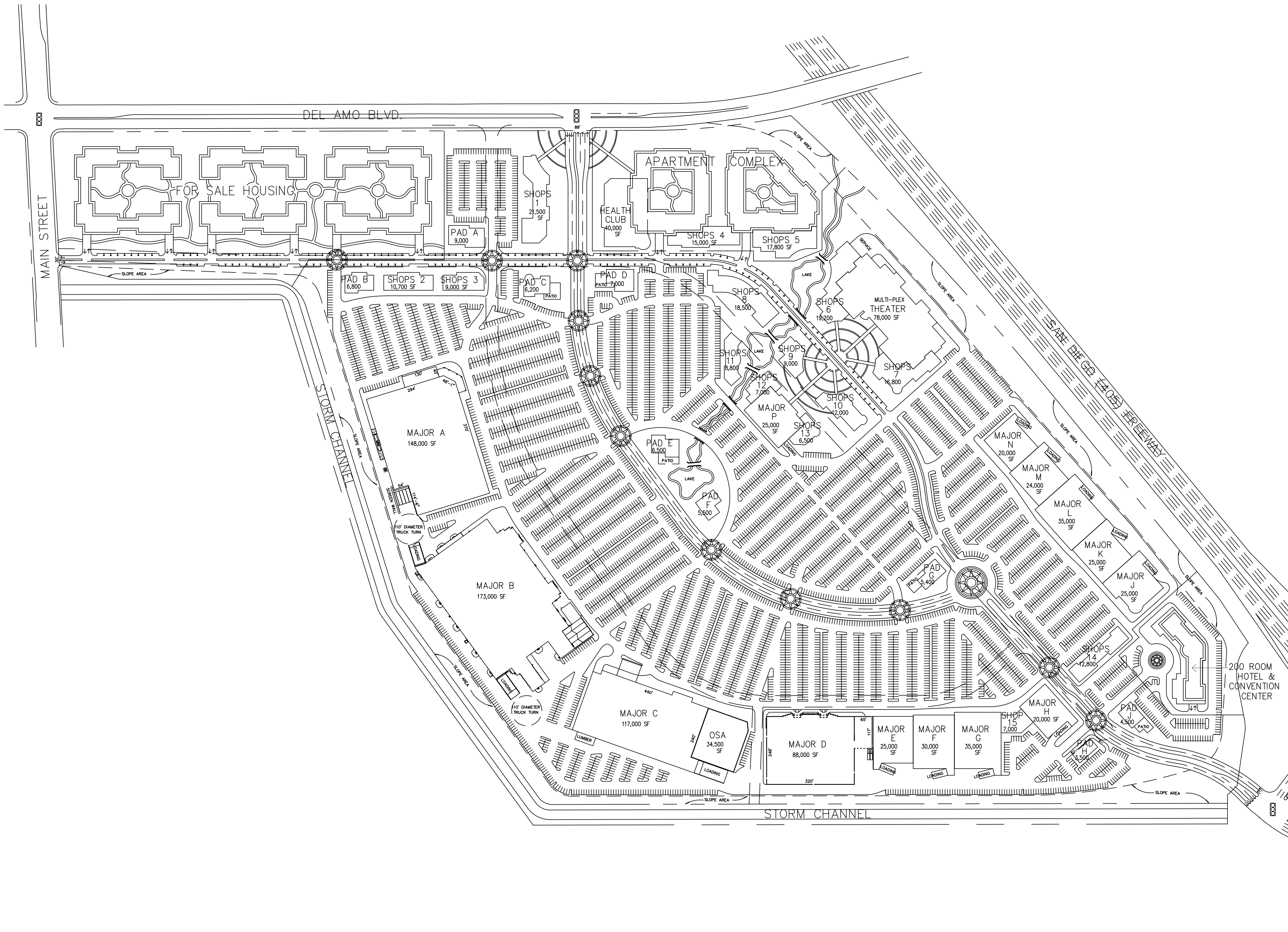
4.6 Financial and Long Term Assurances

The structure of financial assurance for implementation of the remedy will be submitted in a separate proposal.

5.0 CLOSING COMMENTS AND INDICATION REQUEST

The purpose of this document is to present DTSC with sufficient information concerning issues relating to the proposed development on the Site to allow the agency to provide a written indication that the remedial design refinements proposed for the landfill closure system are acceptable. To that end, this document describes remedial design refinements to the landfill cap and landfill gas systems that satisfy the requirements of the Consent Decree and Final RAP. It is based upon our current understanding of the site plan and remedial approach – it is possible that this proposal will be modified as the development process progresses and the remedial design is more fully developed. We would of course obtain DTSC input and approval, as appropriate, on any such modifications. Separate proposals will be submitted for remedial design refinements to the groundwater collection and treatment system and for the inclusion of elevated residential units in the development project.

We ask that DTSC evaluate the information contained in this document and provide feedback on any outstanding issues or concerns. Tetra Tech and the Development Team will then address those issues and concerns with the goal of reaching agreement on the content and analysis presented in this proposal. Once we are in agreement, Tetra Tech requests that DTSC provide a written indication of the acceptability of the proposed remedial design refinements of the landfill cap and gas systems, and identify any conditions or requirements that would have to be met to obtain final approval.



Summary

Gross Land	±157.23 AC	±6,848,817 SF
Net Land	±145.42 AC	±6,334,400 SF
Apartments (Net)		±8.30 AC
For Sale Housing (Net)		±15.94 AC
Hotel (Net)		±2.73 AC
Retail (Net)		±118.45 AC
Total Building		1,154,000 SF
Big Box		526,000 SF
Majors		264,000 SF
Shops		191,600 SF
Pads		54,400 SF
Health Club		40,000 SF
Theater		78,000 SF
Parking Provided		6,850 stalls
Parking Ratio		5.93/1000

ALL BUILDINGS, IMPROVEMENTS, THEIR OCCUPANTS AND THE USES AS SHOWN ON THIS PLAN ARE PRELIMINARY AND SUBJECT TO MODIFICATION AT THE OWNER'S DISCRETION WITHOUT NOTICE.

THIS PRELIMINARY SITE PLAN IS BASED ON INFORMATION FURNISHED TO NADEL ARCHITECTS INC AND IS SUBJECT TO VERIFICATION BY LEGALS, SURVEYS AND GOVERNING AGENCIES ETC. THIS EXHIBIT IS NOT NECESSARILY A REPRESENTATION AS TO IDENTITY, TYPE, SIZE, LOCATION, TIMING OR OCCUPANCY OF ANY BUILDING WITHIN THIS CENTER.

0 400

north

PRELIMINARY SITE PLAN

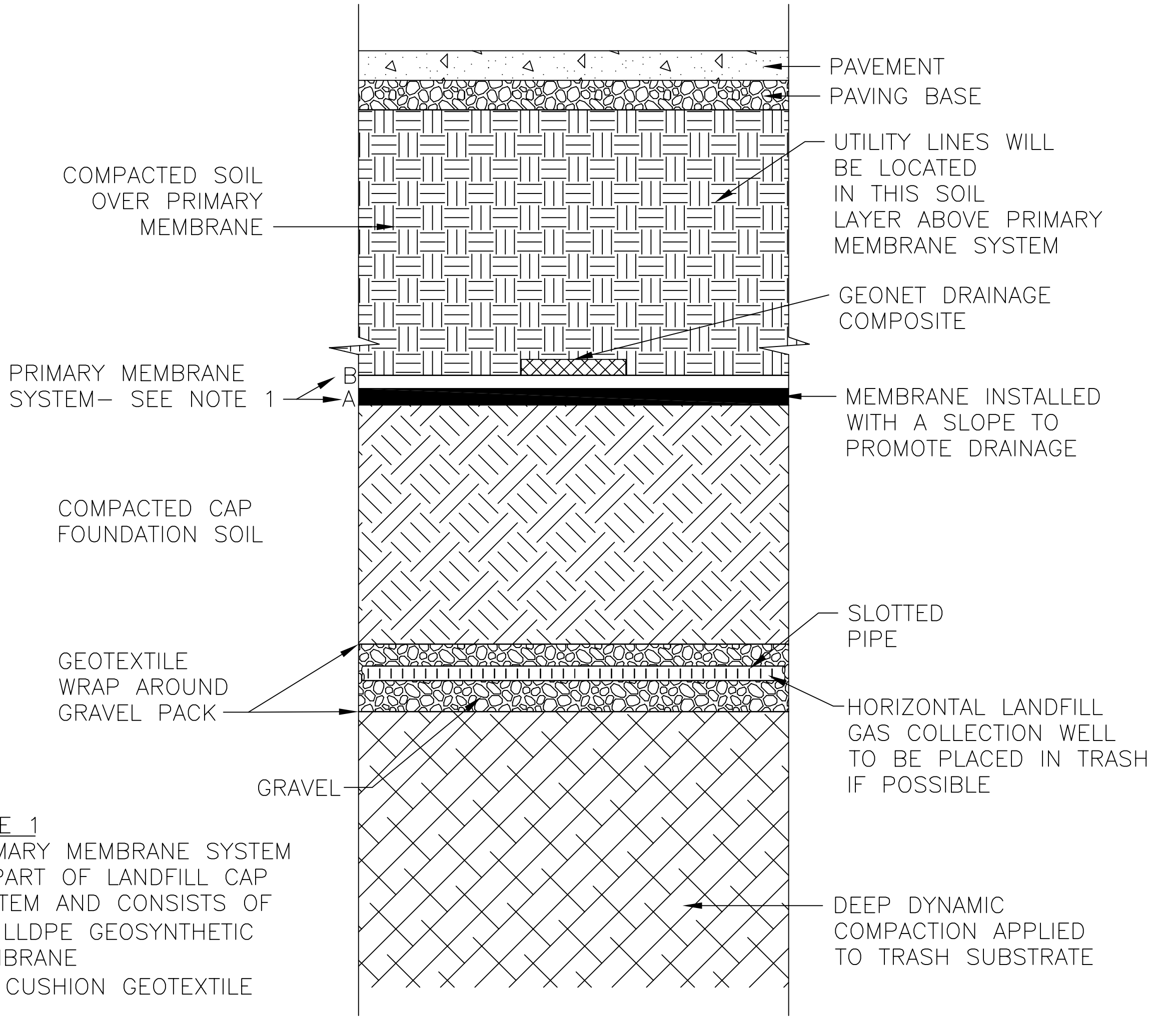
CARSON MARKETPLACE
CARSON, CA.

FIGURE 1 SITE PLAN

DATE: OCT. 20, 2004
NADEL JOB#: 04-247

1990 S. BUNDY DR., FOURTH FLOOR
LOS ANGELES, CA. 90025
T:310.826.2100 F:310.826.0182
WWW.NADELARC.COM

Nadel Retail Architects Inc



NOTE 1
PRIMARY MEMBRANE SYSTEM IS PART OF LANDFILL CAP SYSTEM AND CONSISTS OF
(A) LLDPE GEOSYNTHETIC MEMBRANE
(B) CUSHION GEOTEXTILE

NOT TO SCALE

SOURCE: BRYAN A. STIRRAT & ASSOCIATES

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP

LENNAR PARTNERS
An LNR Company

CONCEPTUAL ILLUSTRATION OF LANDFILL CAP AND LANDFILL GAS SYSTEM IN OPEN OUTDOORS AREAS

DEC 2004

TETRA TECH, INC.
SAN BERNARDINO

FIGURE 2

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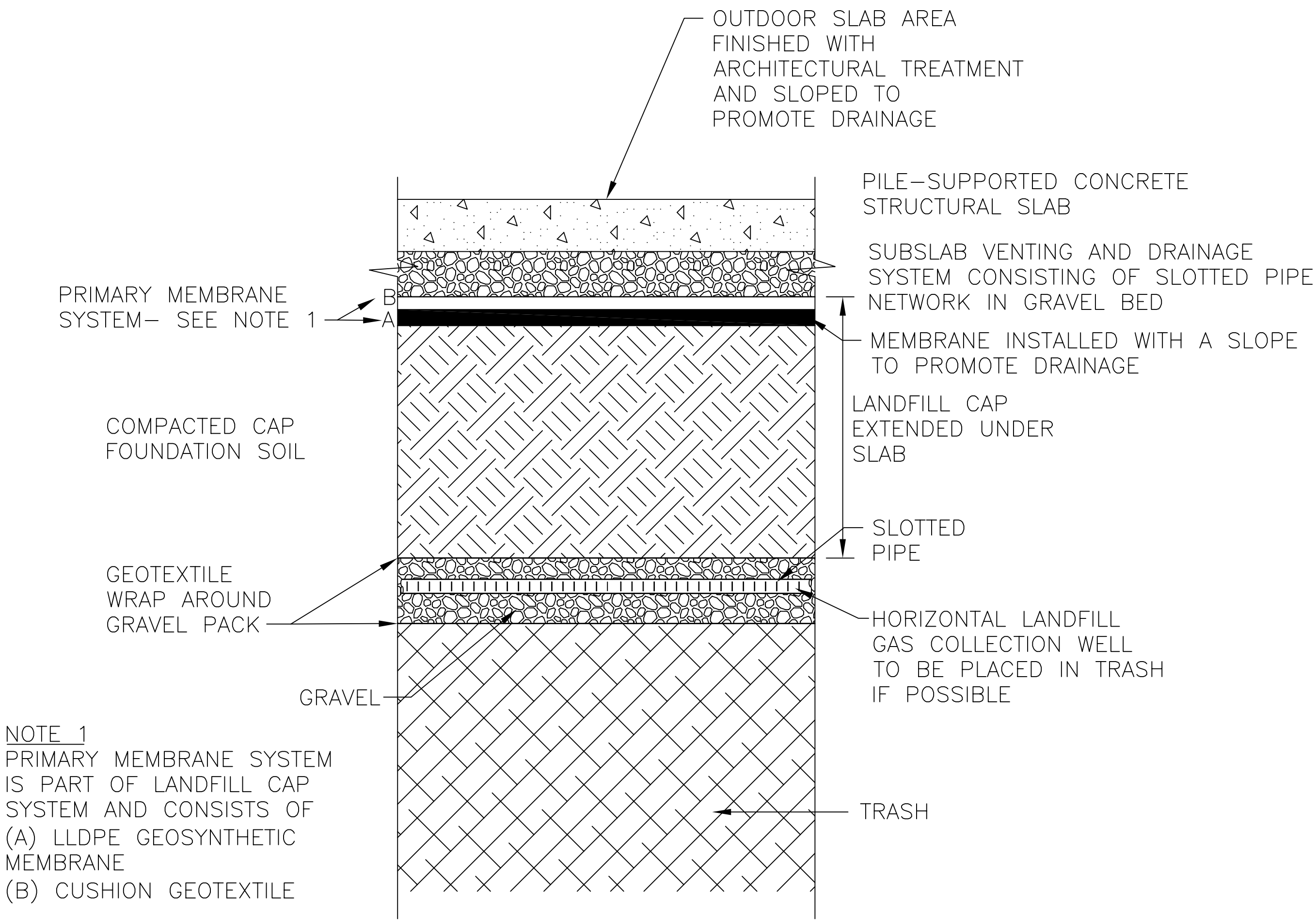

SOURCE: BRYAN A. STIRRAT & ASSOCIATES

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP — LENNAR PARTNERS An LNR Company

CONCEPTUAL ILLUSTRATION OF LANDFILL CAP AND LANDFILL GAS SYSTEM PLUS SUBSLAB VENTING AND DRAINAGE SYSTEM IN AREA OF OUTDOOR SPACE LOCATED ABOVE PILE-SUPPORTED STRUCTURAL SLAB

DEC 2004	TETRA TECH, INC. SAN BERNARDINO	FIGURE 3

NOT TO SCALE

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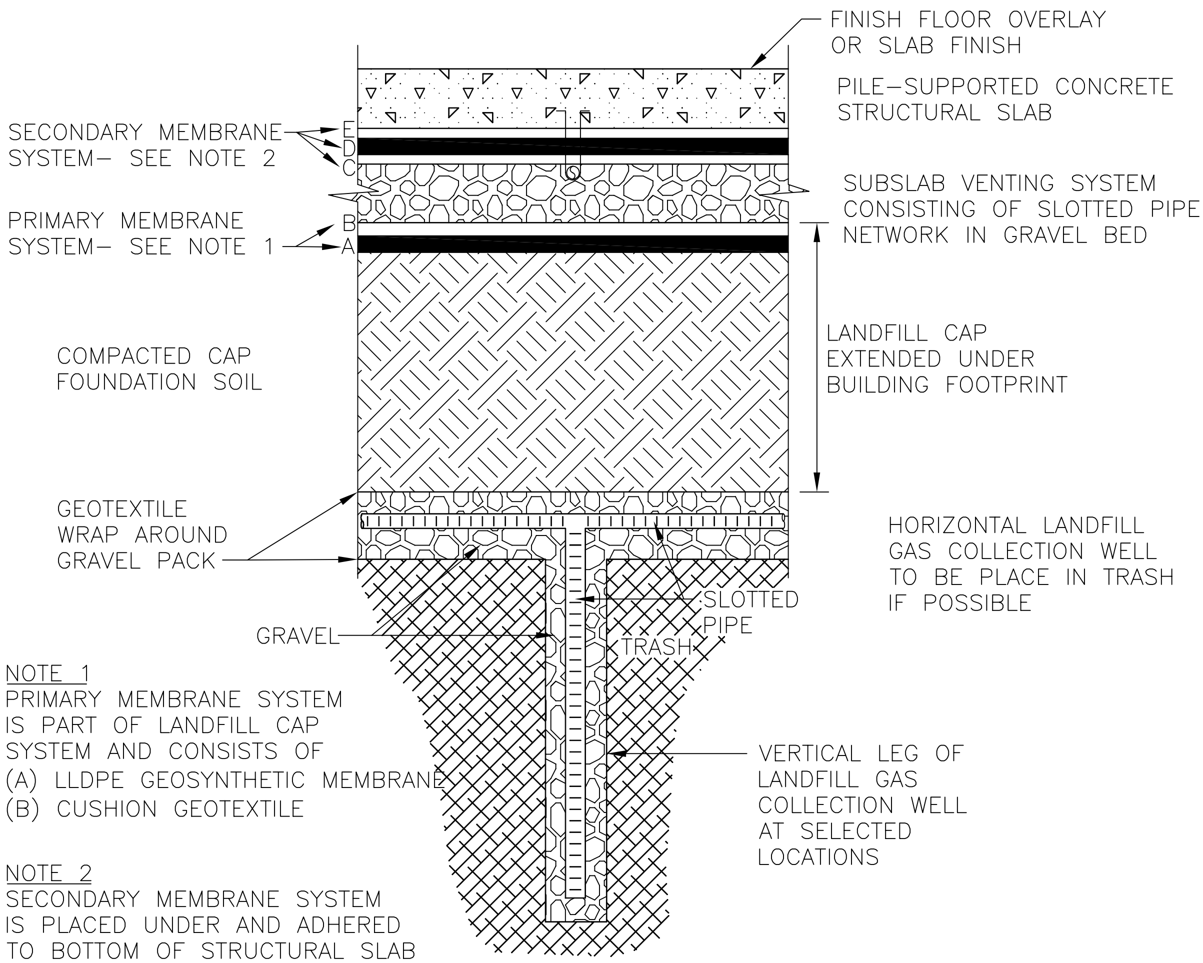

NOTE 1
PRIMARY MEMBRANE SYSTEM IS PART OF LANDFILL CAP SYSTEM AND CONSISTS OF
(A) LLDPE GEOSYNTHETIC MEMBRANE
(B) CUSHION GEOTEXTILE

NOTE 2
SECONDARY MEMBRANE SYSTEM IS PLACED UNDER AND ADHERED TO BOTTOM OF STRUCTURAL SLAB AND CONSISTS OF:
(C) GEOTEXTILE, (D) HDPE OR LIQUID BOOT MEMBRANE, AND (E) GEOTEXTILE LAYER IF LIQUID BOOT (NOT NEEDED IF HDPE IS USED)

SOURCE: BRYAN A. STIRRAT & ASSOCIATES

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP — LENNAR PARTNERS An LNR Company

CONCEPTUAL ILLUSTRATION OF LANDFILL CAP AND LANDFILL GAS SYSTEM PLUS BUILDING PROTECTION SYSTEM IN AREAS OF BUILDINGS LOCATED ON PILE-SUPPORTED STRUCTURAL SLAB

DEC 2004	TETRA TECH, INC. SAN BERNARDINO	FIGURE 4

NOT TO SCALE

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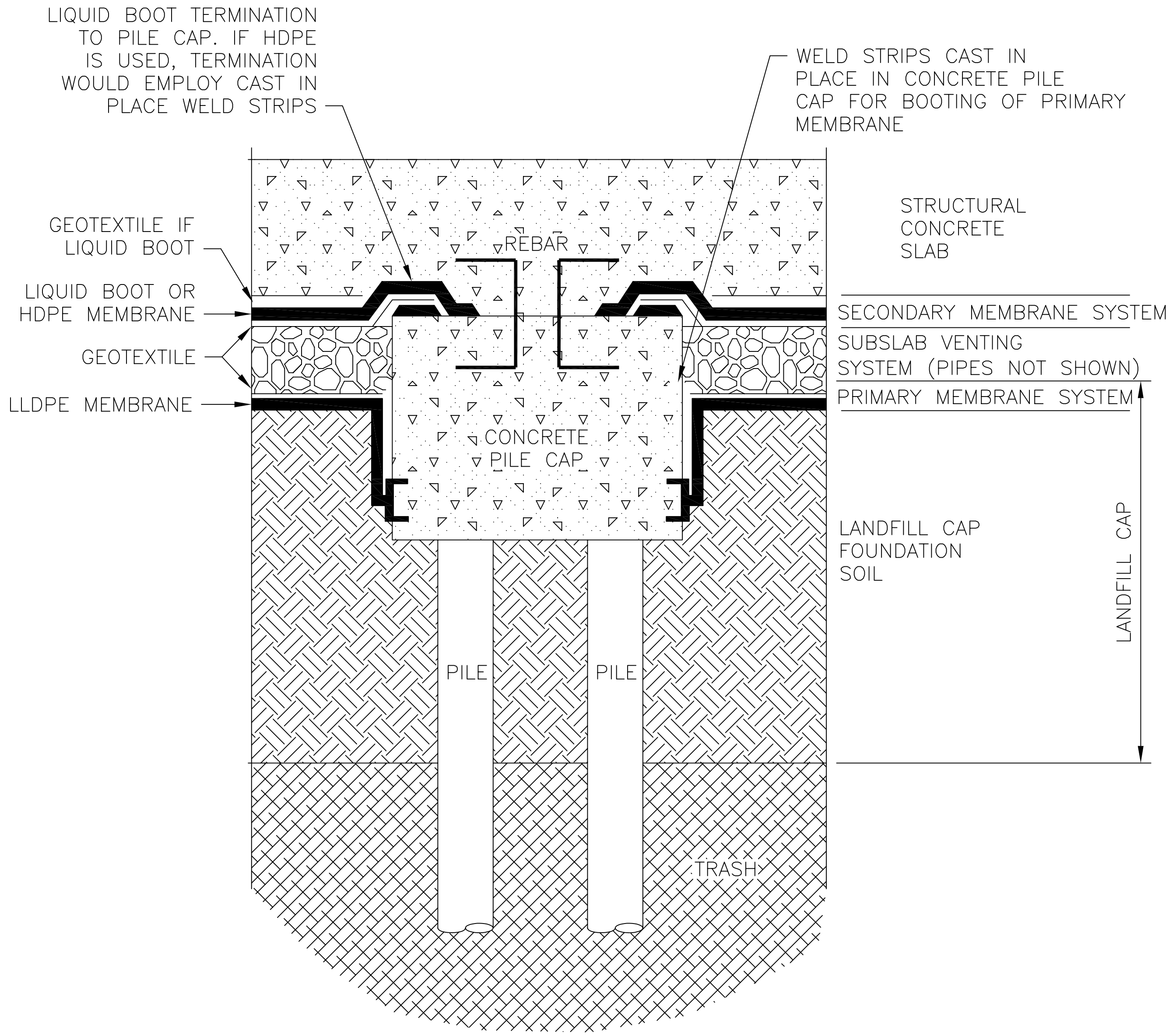

SOURCE: BRYAN A. STIRRAT & ASSOCIATES

CARSON MARKETPLACE

HOPKINS REAL ESTATE GROUP

LENNAR PARTNERS
An LNR Company

CONCEPTUAL ILLUSTRATION OF MEMBRANE BOOTING TO PILE CAP

NOT TO SCALE

DEC 2004

TETRA TECH, INC.
SAN BERNARDINO

FIGURE 5

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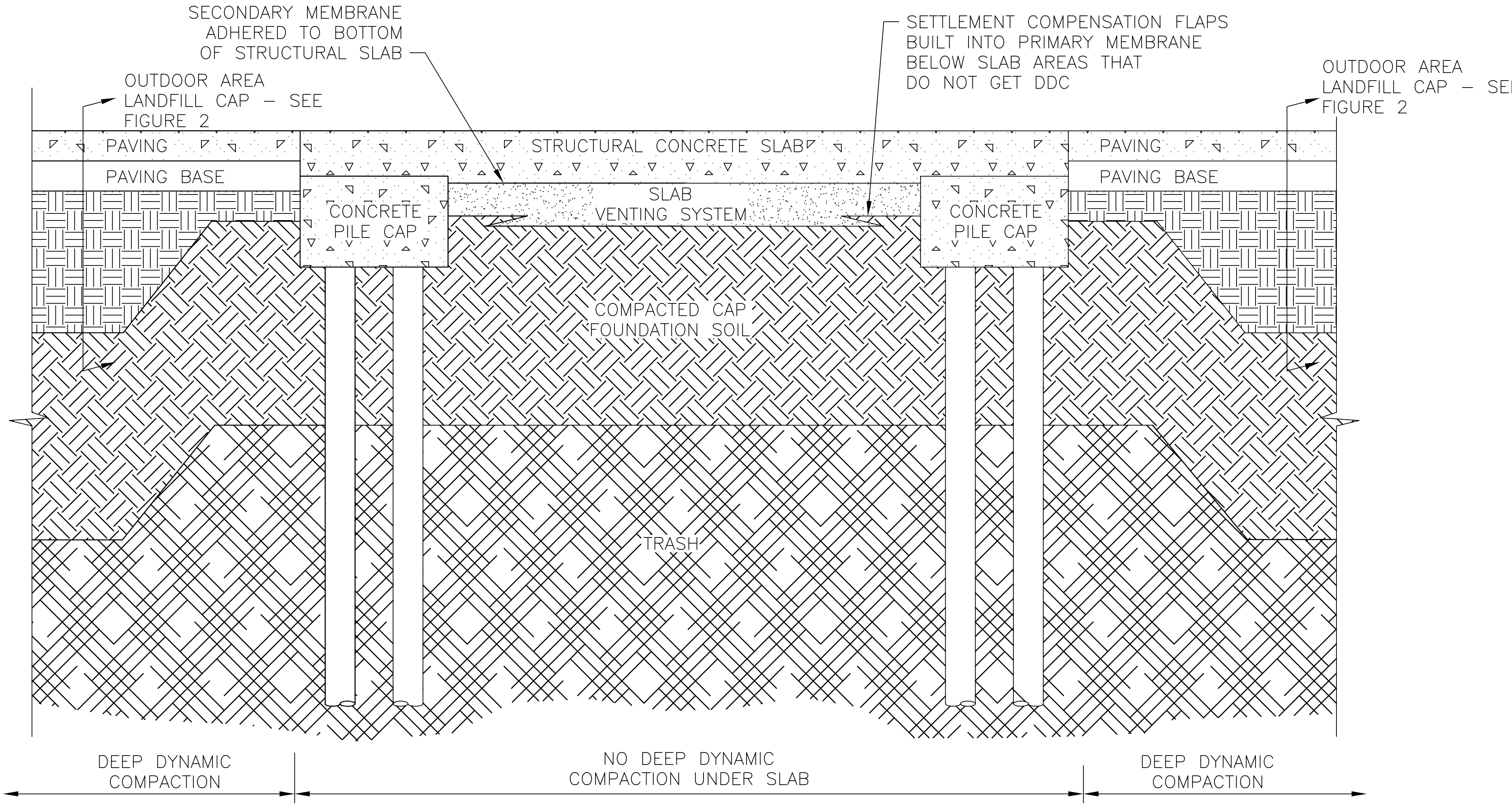

SOURCE: BRYAN A. STIRRAT & ASSOCIATES

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HOPKINS REAL ESTATE GROUP

LENNAR PARTNERS An LNR Company

TRANSITION OF CAP CONSTRUCTION AND DETAILS OF PRIMARY MEMBRANE SETTLEMENT COMPENSATION FLAPS

DEC 2004

TETRA TECH, INC.
SAN BERNARDINO

FIGURE 6

NOT TO SCALE

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Appendix A

Technical Information and Specifications

LLDPE (Linear Low Density Polyethylene) Geomembrane for Landfill Caps

LLDPE Textured Geomembranes

Americas Operations

GSE UltraFlex Textured

Data Sheets(PDF) • Drop-In Specifications(DOC) • Application Sheet(PDF) • FAQs

GSE Ultraflex Textured is a premium grade linear low density polyethylene (LLDPE) geomembrane liner that has a textured surface on one or both sides of the liner. It is a coextruded, textured liner, with the textured surface as an integral part of a three layer co-extruded geomembrane sheet. GSE UltraFlex Textured is available in rolls 22.5' (6.9 meters) wide.

Primary features of GSE UltraFlex Textured:

- Made from resins, specifically designed for geomembrane production
- Textured surface improves liner and cover soil stability on slopes
- Outstanding flexibility to accommodate differential settlement
- Enhanced elongation (uniaxial and multiaxial)
- Proven history of success
- Backed by the GSE commitment to quality

GSE UltraFlex White Textured

Data Sheets(PDF) • Drop-In Specifications(DOC) • Application Sheet(PDF) • FAQs

GSE UltraFlex White Textured is a premium grade linear low density polyethylene (LLDPE) textured geomembrane liner that combines the properties of GSE UltraFlex, the additional benefits of GSE White and a textured surface. GSE UltraFlex White Textured is produced from specially formulated polyethylene resins that are specifically designed to have the puncture resistance and flexibility required for geomembrane applications. GSE UltraFlex White Textured is a coextruded product, with one or two textured surfaces as integral layers of a three layer coextruded sheet. The White layer is a specially formulated, light-reflective, UV stabilized layer, specifically designed to aid in post installation damage detection and to reduce the heat build-up and the thermal expansion and contraction of the geomembrane. Either the black layer or both can be textured to increase surface roughness and frictional performance. GSE UltraFlex White Textured is commonly used in buried applications such as landfill closure caps or leach pads. GSE UltraFlex White Textured is available in rolls 22.5' (6.9 meters) wide.

Primary features of GSE UltraFlex White Textured:

- Reduces heat build-up and wrinkles in the liner by reflecting solar energy
- Improves detection of installation damage
- Dramatically reduces subgrade desiccation
- Outstanding flexibility
- Textured surface improves liner and cover soil stability on slopes
- Made from resins specifically designed for geomembrane production
- Backed by the GSE commitment to quality

Application Sheet

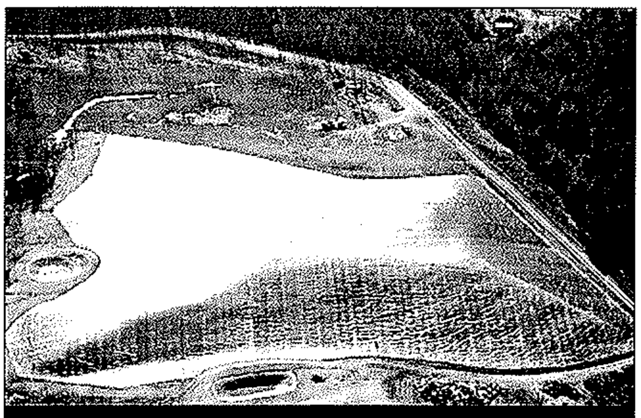
GSE UltraFlex Geomembranes

AN INNOVATION IN FLEXIBLE LINERS

GSE UltraFlex and UltraFlex Textured geomembranes are high quality LLDPE geomembranes that provide the following benefits:

- Superior flexibility
- Outstanding elongation
- Remarkable puncture resistance
- Proven reliability

GSE UltraFlex is available with either a black or white upper surface. GSE UltraFlex Textured is available as single or double sided textured geomembrane with a black or white upper surface.

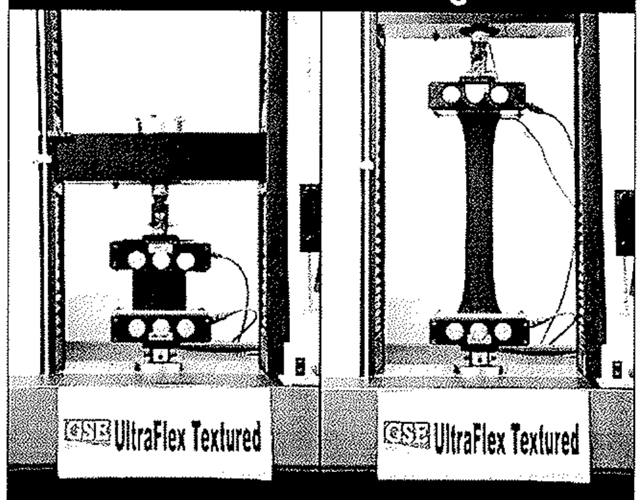


LLDPE landfill caps offer excellent elongation characteristics which facilitate differential settlement.

ELONGATION PROPERTIES UNIQUE TO LLDPE GEOMEMBRANES

GSE UltraFlex and UltraFlex Textured have higher tensile break elongation than do HDPE geomembranes. The excellent puncture resistance and ability to absorb multi-directional strain makes LLDPE perfect for applications such as landfill caps, closures, or any other situation where large differential settlement is expected such as bioreactors. Additional applications include mining projects, solid and liquid waste containment and aquaculture. Special non-routine testing such as wide-width and multiaxial has been performed on GSE UltraFlex and UltraFlex Textured to provide a more in-depth perspective of their unique and beneficial properties. In particular, the elongation tendencies of the GSE UltraFlex products have been thoroughly investigated. The wide-width tensile test is a measure for in-plane elongation properties. The multiaxial test simulates out-of-plane deformation, which is commonly expected to occur in many lining projects where the geomembrane is subjected to high localized stress. In both of these tests, the GSE UltraFlex products have dramatically high elongation properties.

Wide Width Tensile Elongation



The elongation potential in both the machine and transverse direction make UltraFlex Textured ideal for any application where settlement may be anticipated.

BENEFITS OF A ROUGHENED SURFACE

Perhaps the most important attribute textured geomembranes offer is the ability to improve geosynthetic profile stability which ultimately maximizes the available volume that can be contained by the geomembrane. The ability to line steeper slopes allows increases in design capacity providing cost savings. As mentioned previously, GSE UltraFlex Textured is available with a white upper surface. The white surfaced geomembrane has the same physical properties as the black surfaced geomembrane with the added benefit of a light reflective layer. This light reflective layer reduces heat gain, thereby reducing wrinkling, subgrade desiccation and worker fatigue.

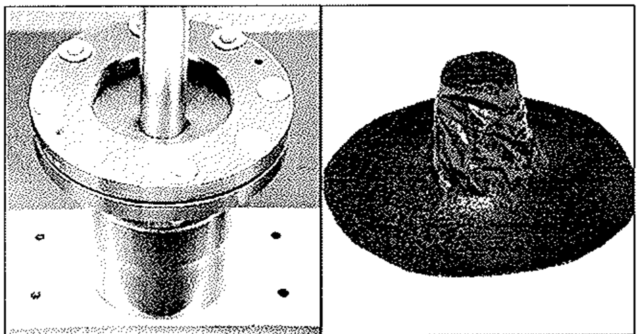
IN-LINE TEXTURING DECREASES LEAD TIME

GSE UltraFlex Textured is manufactured using coextrusion technology – the same technology used by GSE for the past fifteen years to produce GSE HD Textured, GSE Conductive and GSE White geomembranes. GSE UltraFlex Textured meets the increasing need for relatively thin LLDPE geomembranes because it is an in-line one-step texturing process. Availability to GSE customers is increased and lead times are minimized.

- Continued -

PROVEN RELIABILITY

GSE UltraFlex geomembranes have a long history of reliability. In fact, every GSE UltraFlex geomembrane used for containment purposes has proven to be successful. In addition to their exceptional performance, GSE UltraFlex products have excellent weldability under a variety of conditions. Extrusion and fusion welding can be performed with ease and confidence.



Outstanding puncture resistance.

PREMIUM RAW MATERIALS

GSE UltraFlex products are made from high quality linear low density polyethylene resins. The inherent structure of the resin is the reason this geomembrane possesses such enhanced flexibility. The absence of leachable additives to all GSE geomembranes allows them to maintain excellent resistance to brittleness that may occur over time when plasticizers are used.

GSE QUALITY ASSURANCE SYSTEMS

All GSE geomembrane production involves three levels of quality assurance. First, raw material suppliers must comply with GSE specifications on incoming resin. Before the resin is unloaded, GSE verifies the raw material test results that are submitted by our raw material suppliers by performing selected conformance tests. The second level of QA begins during actual production. As each roll is produced it is electronically monitored continuously over the full area for pinholes. Finally, GSE UltraFlex products undergo a rigorous Quality Assurance program after production to ensure the mechanical properties are intact and meet GSE current quality standards. GSE conducts routine in-house testing of the physical properties of GSE UltraFlex on every roll as it is produced.

The rough surface of UltraFlex Textured improves liner stability on slopes.

ADDITIONAL INFORMATION

If you have an upcoming project, please give us a call. We will provide you with recommendations, an estimate for material and installation and contacts for a GSE approved installer

AP017 R11/04/02

Americas	GSE Lining Technology, Inc.	Houston, Texas	800-435-2008	281-443-8564	Fax: 281-230-8650
Europe/Middle East/Africa	GSE Lining Technology GmbH	Hamburg, Germany		49-40-767420	Fax: 49-40-7674233
Asia/Pacific	GSE Lining Technology Company Ltd.	Bangkok, Thailand		66-2-937-0091	Fax: 66-2-937-0097

This application sheet is also available on our website at:

www.gseworld.com

GSE

GSE STANDARD PRODUCTS

Product Data Sheet

GSE UltraFlex Textured

GSE UltraFlex Textured is the coextruded textured version of GSE UltraFlex. It is a high quality, linear low density polyethylene (LLDPE) geomembrane with one or two coextruded, textured surfaces, and consisting of approximately 97.5% polyethylene, 2.5% carbon black and trace amounts of antioxidants and heat stabilizers; no other additives, fillers or extenders are used. The resin used is a specially formulated, proprietary virgin polyethylene and is designed specifically for flexible geomembrane applications. GSE UltraFlex Textured has excellent resistance to UV radiation and is suitable for exposed conditions. This product allows projects with greater slopes to be designed since frictional characteristics are enhanced. *These product specifications meet or exceed GRI GM17.*

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE		
Product Code			LUT040A000	LUT060A000	LUT080A000
Thickness, mils (mm) or per project specs	ASTM D 5994	every roll	36 (0.91)	54 (1.4)	72 (1.8)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.92	0.92	0.92
Tensile Properties (each direction)[1]	ASTM D 6693, Type IV	20,000 lb			
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		100 (18)	132 (23)	176 (30)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		500	500	500
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	22 (98)	33 (147)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	48 (214)	73 (325)	97 (432)
Carbon Black Content, %	ASTM D 1603	20,000 lb	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1
Asperity Height	GRI GM 12	second roll	+Note 2	+Note 2	+Note 2
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**		
Oxidative Induction Time, minutes	ASTM D 3895, 200° C O_2, 1 atm	200,000 lb	>100	>100	>100
Roll Length (approximate), ft (m)			700 (213)	520 (158)	400 (122)
Roll Width, ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			15,750 (1,463)	11,700 (1,087)	9,000 (836)

Notes:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- +Note 2: 10 mil average. 8 of 10 readings ≥7 mils. Lowest individual ≥ 5 mils.
- GSE UltraFlex Textured is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are average roll values.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.

DS016 R03/10/04

Americas	GSE Lining Technology, Inc.	Houston, Texas	800-435-2008	281-443-8564	Fax: 281-230-8650
Europe/Middle East/Africa	GSE Lining Technology GmbH	Hamburg, Germany		49-40-767420	Fax: 49-40-7674233
Asia/Pacific	GSE Lining Technology Company Ltd.	Bangkok, Thailand		66-2-937-0091	Fax: 66-2-937-0097

GSE STANDARD PRODUCTS

Product Data Sheet

GSE UltraFlex White Textured

GSE UltraFlex White Textured is the white surfaced version of GSE UltraFlex Textured. GSE UltraFlex White Textured geomembrane combines all of the benefits of a linear low density polyethylene textured geomembrane with those of GSE's patented white surface. This combination of characteristics creates a geomembrane designed for improved elongation and puncture resistance making it an excellent choice for landfill caps, leach pads and other applications where differential settlement is expected and enhanced interface friction is required. GSE UltraFlex White Textured is the only LLDPE on the market with many years of proven performance in applications throughout the world and is now available with GSE's patented white surface for reduced heat buildup on the liner by reflecting solar energy. Reducing liner temperature leads to fewer wrinkles and less subgrade desiccation. *These product specifications meet or exceed GRI GM17.*

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE		
Product Code			LUT040A010	LUT060A010	LUT080A010
Thickness, mils (mm) or per project specs	ASTM D 5994	every roll	36 (0.91)	54 (1.4)	72 (1.8)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.92	0.92	0.92
Tensile Properties (each direction)[1]	ASTM D 6993, Type IV	20,000 lb			
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		100 (18)	132 (23)	176 (30)
Elongation at Break, %	G.L. = 2.0 in (51 mm)		500	500	500
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	22 (98)	33 (147)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	48 (214)	73 (325)	97 (432)
Carbon Black Content[2], %	ASTM D 1603	20,000 lb	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1
Asperity Height	GRI GM 12	second roll	+Note 2	+Note 2	+Note 2
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**		
Oxidative Induction Time (minutes)	ASTM D 3895 200° C, O_2, 1 atm	200,000 lb	>100	>100	>100
Roll Length (approximate), ft (m)			700 (213)	520 (158)	400 (122)
Roll Width, ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			15,750 (1,463)	11,700 (1,087)	9,000 (836)

NOTES:

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- +Note 2: 10 mil average. 8 of 10 readings ≥7 mils. Lowest individual ≥ 5 mils.
- GSE UltraFlex White Textured is available in rolls weighing about 3,900 lb (1,769 kg).
- [1]The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variation of test results. Therefore, these tensile properties are average roll values.
- [2]GSE UltraFlex White Textured may have an overall ash content greater than 3.0% due to the white layer.
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.

DS020 R03/10/04

Americas	GSE Lining Technology, Inc.	Houston, Texas	800-435-2008	281-443-8564	Fax: 281-230-8650
Europe/Middle East/Africa	GSE Lining Technology GmbH	Hamburg, Germany		49-40-767420	Fax: 49-40-7674233
Asia/Pacific	GSE Lining Technology Company Ltd.	Bangkok, Thailand		66-2-937-0091	Fax: 66-2-937-0097

This product data sheet is also available on our website at:

www.gseworld.com

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Frequently Asked Questions

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GSE UltraFlex, GSE UltraFlex White, GSE UltraFlex Textured & GSE UltraFlex White Textured

Q: What is GSE UltraFlex?

A: GSE UltraFlex is a premium grade, linear low density polyethylene (LLDPE) geomembrane liner produced from specially formulated linear low density polyethylene resins. This product is also available in GSE UltraFlex White, GSE UltraFlex Textured, and GSE UltraFlex White Textured. All GSE UltraFlex geomembranes meet or exceed the material property requirements in GRI GM17 for LLDPE geomembranes.

Q: What are the benefits of using GSE UltraFlex?

A: GSE UltraFlex has an extensive proven record as the premier LLDPE material available with thousands of successful installations. GSE UltraFlex is produced with resins designed to provide outstanding elongation properties both uniaxial and multiaxial. Because of this, an LLDPE liner can more easily accommodate differential settlement and localized strain while maintaining liner integrity. Applications for GSE UltraFlex are caps and closures of landfills, leach pads and other installations that require excellent multiaxial performance to accommodate differential settlement.

Q: What is GSE UltraFlex Textured?

A: GSE UltraFlex Textured is the textured version of GSE UltraFlex. The textured surface(s) is produced using GSE's co-extrusion processing equipment. The texture is applied to one or two sides and is an integral component of a three layer co-extruded geomembrane. GSE UltraFlex Textured has very good frictional characteristics against a variety of soils and geosynthetic surfaces.

Q: Why use a textured liner?

A: Textured liners provide increased friction between the liner and soil interface as well as between the liner and other geosynthetics. This increase in friction helps keep cover soil in place and improves the overall liner stability on slopes.

Q: How much will GSE UltraFlex Textured improve frictional resistance?

A: Frictional resistance is extremely site specific and depends largely on the soil type and soil conditions of the particular installation. Friction and shear angle test results are affected by variables such as soil type, soil moisture content, applied loads, rate of shear stress and other factors. GSE strongly recommends site-soil specific testing to achieve the best site design. Contact your authorized GSE representative for general recommendations and a licensed professional engineer for specific site information.

Q: If I order 60 mil UltraFlex Textured, how will the thickness be measured?

A: During the manufacturing process the thickness of the textured sheet is continuously monitored to ensure that the core layer is 60 mil. Thickness is tested with a point micrometer probe for "valley to valley" thickness measurements per ASTM D 5994.

Q: What are GSE UltraFlex White and GSE UltraFlex White Textured?

A: They are high quality GSE UltraFlex and GSE UltraFlex Textured geomembranes that have an upper white, light reflective surface. The white surface is approximately 5 mils thick and part of the overall geomembrane thickness.

Q: What are the benefits of using a white surfaced geomembrane vs. a black geomembrane?

A: The white surface reflects radiant heat thereby reducing liner temperature and reducing the amount of wrinkling caused by thermal expansion. Mechanical damage that exposes the underlying black layer makes such damage much easier to identify.

Q: How much less will the white wrinkle compared to the black liner?

A: The amount of wrinkling is a function of the change (increase) of temperature. In many instances, reflection of radiant energy reduces wrinkles in GSE White by 50% or more.

Print this page

INTRODUCTION TO SAMPLE SPECIFICATIONS

GSE is the world leader in providing geosynthetic lining solutions, products and services to satisfy the needs of domestic and international and public and private companies engaged in waste management, wastewater treatment, mining, aquaculture and other industrial activities.

Gundle/SLT Environmental, Inc., the parent company of GSE, is a corporation formed in July 1995 by the merger of Gundle Environmental Systems, Inc. and SLT Environmental, Inc. It is listed on the New York Stock Exchange under the symbol "GSE". The company's headquarters and two separate manufacturing facilities are located in Houston, Texas. GSE's GundSeal GCL clay lining manufacturing plant is located in Spearfish, South Dakota. GSE's geotextile manufacturing plant is located in Kingstree, South Carolina. Other manufacturing facilities are located in Germany, the United Kingdom, Thailand and Egypt.

GSE is the leading worldwide manufacturer, supplier and installer of flexible geomembrane lining systems used to line and cap sanitary and hazardous waste landfills, to contain materials generated in certain mining processes and to contain liquids (potable, sanitary, wastewater and hazardous) and industrial products in ponds, tanks, pits, lagoons, reservoirs and canals.

GSE's lining systems meet the highest design criteria in the industry. The principal component of these lining systems is a geosynthetic membrane ranging from 20 mils to 120 mils (0.5 mm to 3.0 mm) in thickness. More complex liner systems may consist of several membrane liners interlaid with geosynthetic clay liners, geotextiles, reinforcing geogrids and synthetic drainage materials. The flexible geomembrane lining panels are generally welded together at the customer's jobsite using either an extrusion or a fusion (hot wedge) process. The welded seams are tested on site and in GSE's laboratory, on request, as part of its Installation Quality Assurance Program.

SECTION 02700

POLYETHYLENE GEOMEMBRANE LINER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications and guidelines for MANUFACTURING and INSTALLING geomembrane.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. D 1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
2. D 1238 Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
3. D 1505 Test Method for Density of Plastics by the Density-Gradient Technique
4. D 1603 Test Method for Carbon Black in Olefin Plastics
5. D 3895 Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
6. D 4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
7. D 5199 Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
8. D 5397 Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
9. D 5596 Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
10. D 5994 Standard Test Method for Measuring Core Thickness of Textured Geomembranes
11. D 6392 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
12. D 6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes

B. Geosynthetic Research Institute
1. GRI GM 13 Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes
2. GRI GM 17 Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes

1.03 DEFINITIONS

A. Lot- A quantity of resin (usually the capacity of one rail car) used in the manufacture of geomembranes. Finished roll will be identified by a roll number traceable to the resin lot used.

B. Construction Quality Assurance Consultant (CONSULTANT) - Party, independent from MANUFACTURER and INSTALLER that is responsible for observing and documenting activities related to quality assurance during the lining system construction.

C. ENGINEER- The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.

D. Geomembrane Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geomembrane rolls.

E. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY)- Party, independent from the OWNER, MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the OWNER.

F. INSTALLER- Party responsible for field handling, transporting, storing, deploying, seaming and testing of the geomembrane seams.

G. Panel- Unit area of a geomembrane that will be seamed in the field that is larger than 100 ft^2.

H. Patch- Unit area of a geomembrane that will be seamed in the field that is less than 100 ft^2.

I. Subgrade Surface- Soil layer surface which immediately underlies the geosynthetic material(s).

1.04 SUBMITTALS POST-AWARD

A. Furnish the following product data, in writing, to ENGINEER prior to installation of the geomembrane material:
   1. Resin Data shall include the following.
      a. Certification stating that the resin meets the specification requirements (see Section 1.09).
   2. Geomembrane Roll
      a. Statement certifying no recycled polymer and no more than 10% rework of the same type of material is added to the resin (product run may be recycled).

B. The INSTALLER shall furnish the following information to the ENGINEER and OWNER prior to installation:
   1. Installation layout drawings
      a. Must show proposed panel layout including field seams and details
      b. Must be approved prior to installing the geomembrane
         1. Approved drawings will be for concept only and actual panel placement will be determined by site conditions.
   2. Installer's Geosynthetic Field Installation Quality Assurance Plan

C. The INSTALLER will submit the following to the ENGINEER upon completion of installation:
   1. Certificate stating the geomembrane has been installed in accordance with the Contract Documents
   2. Material and installation warranties
   3. As-built drawings showing actual geomembrane placement and seams including typical anchor trench detail

1.05 QUALITY ASSURANCE

A. The OWNER will engage and pay for the services of a Geosynthetic Quality Assurance Consultant and Laboratory to monitor geomembrane installation.

1.06 QUALIFICATIONS

A. MANUFACTURER
   1. Geomembrane shall be manufactured by the following:
      a. GSE Lining Technology, Inc.
      b. approved equal
   2. MANUFACTURER shall have manufactured a minimum of 10,000,000 square feet of polyethylene geomembrane during the last year.

B. INSTALLER

1. Installation shall be performed by one of the following installation companies (or approved equal)
    a. GSE Lining Technology, Inc.
    b. GSE Approved Dealer/Installers
2. INSTALLER shall have installed a minimum of [ ] square feet of HDPE geomembrane during the last [ ] years.
3. INSTALLER shall have worked in a similar capacity on at least [ ] projects similar in complexity to the project described in the contract documents, and with at least [ ] square feet of HDPE geomembrane installation on each project.
4. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.
5. The INSTALLER shall provide a minimum of one Master Seamer for work on the project.
    a. Must have completed a minimum of 1,000,000 square feet of geomembrane seaming work using the type of seaming apparatus proposed for the use on this Project.

1.07 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

A. Labeling - Each roll of geomembrane delivered to the site shall be labeled by the MANUFACTURER. The label will identify:
    a. manufacturer's name
    b. product identification
    c. thickness
    d. length
    e. width
    f. roll number

B. Delivery- Rolls of liner will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.

C. Storage- The on-site storage location for geomembrane material, provided by the CONTRACTOR to protect the geomembrane from punctures, abrasions and excessive dirt and moisture for should have the following characteristics:
    a. level (no wooden pallets)
    b. smooth
    c. dry
    d. protected from theft and vandalism
    e. adjacent to the area being lined

D. Handling- Materials are to be handled so as to prevent damage.

1.08 WARRANTY

A. Material shall be warranted, on a pro-rata basis against Manufacturer's defects for a period of 5 years from the date of geomembrane installation.

B. Installation shall be warranted against defects in workmanship for a period of 1 year from the date of geomembrane completion.

1.09 GEOMEMBRANE

A. Material shall be smooth/textured polyethylene geomembrane as shown on the drawings.

B. Resin

1. Resin shall be new, first quality, compounded and manufactured specifically for producing geomembrane.
2. Natural resin (without carbon black) shall meet the following minimum requirements:

Property	Test Method	HDPE	LLDPE
Density [g/cm^3]	ASTM D 1505	0.932	0.915
Melt Flow Index [g/10 min.]	ASTM D 1238 (190/2.16)	≤ 1.0	≤ 1.0
OIT [minutes]	ASTM D 3895 (1 atm/200°C)	100	100

C. Geomembrane Rolls

1. Do not exceed a combined maximum total of 1 percent by weight of additives other than carbon black.
2. Geomembrane shall be free of holes, pinholes as verified by on-line electrical detection, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.
3. Geomembrane material is to be supplied in roll form. Each roll is to be identified with labels indicating roll number, thickness, length, width and MANUFACTURER.
4. All liner sheets produced at the factory shall be inspected prior to shipment for compliance with the physical property requirements listed in section 1.09, B, and be tested by an acceptable method of inspecting for pinholes. If pinholes are located, identified and indicated during manufacturing, these pinholes may be corrected during installation.

D. Smooth surfaced geomembrane shall meet the requirements shown in the following table(s) for the following material(s):

1. Table 1.1 for black HDPE
2. Table 1.2 for white-surfaced HDPE
   a) The geomembrane shall be a white-surfaced, coextruded geomembrane.
   b) The white surface shall be installed upwards.
3. Table 1.3 for smooth conductive HDPE
   a) The geomembrane shall have a coextruded, electrically conductive layer.
   b) The conductive layer is installed downward.
   c) Electrical testing shall be performed after liner installation by the INSTALLER.
4. Table 1.4 for black LLDPE
5. Table 1.5 for white-surfaced LLDPE
   a) The geomembrane shall be a white-surfaced, coextruded geomembrane.
   b) The white surface shall be installed upwards.

E. Textured surfaced geomembrane shall meet the requirements shown in the following table(s) for the following material(s).

1. Table 2.1 for black coextruded textured HDPE
2. Table 2.2 for white-surfaced coextruded textured HDPE
   a) The geomembrane shall be a white-surfaced, coextruded geomembrane.
   b) The white surface shall be installed upwards.
3. Table 2.3 for black coextruded textured LLDPE
4. Table 2.4 for white-surfaced coextruded textured LLDPE
   a) The geomembrane shall be a white-surfaced, coextruded geomembrane.
   b) The white surface shall be installed upwards.

F. Extrudate Rod or Bead

1. Extrudate material shall be made from same type resin as the geomembrane.
2. Additives shall be thoroughly dispersed.
3. Materials shall be free of contamination by moisture or foreign matter.

1.10 EQUIPMENT

A. Welding equipment and accessories shall meet the following requirements:
   1. Gauges showing temperatures in apparatus (extrusion welder) or wedge (wedge welder) shall be present.
   2. An adequate number of welding apparati shall be available to avoid delaying work.
   3. Power source must be capable of providing constant voltage under combined line load.

1.11 DEPLOYMENT

A. Assign each panel a simple and logical identifying code. The coding system shall be subject to approval and shall be determined at the job site.

B. Visually inspect the geomembrane during deployment for imperfections and mark faulty or suspect areas.

C. Deployment of geomembrane panels shall be performed in a manner that will comply with the following guidelines:
   1. Unroll geomembrane using methods that will not damage geomembrane and will protect underlying surface from damage (spreader bar, protected equipment bucket).
   2. Place ballast (commonly sandbags) on geomembrane which will not damage geomembrane to prevent wind uplift.
   3. Personnel walking on geomembrane shall not engage in activities or wear shoes that could damage it. Smoking will not be permitted on the geomembrane.
   4. Do not allow heavy vehicular traffic directly on geomembrane. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 6 psi.
   5. Protect geomembrane in areas of heavy traffic by placing protective cover over the geomembrane.

D. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction of the material.

1.12 FIELD SEAMING

A. Seams shall meet the following requirements:
   1. To the maximum extent possible, orient seams parallel to line of slope, i.e., down and not across slope.
   2. Minimize number of field seams in corners, odd-shaped geometric locations and outside corners.
   3. Slope seams (panels) shall extend a minimum of five-feet beyond the grade break into the flat area.
   4. Use a sequential seam numbering system compatible with panel numbering system that is agreeable to the CONSULTANT and INSTALLER.
   5. Align seam overlaps consistent with the requirements of the welding equipment being used. A 6-inch overlap is commonly suggested.

B. During Welding Operations
   1. Provide at least one Master Seamer who shall provide direct supervision over other welders as necessary.

C. Extrusion Welding
   1. Hot-air tack adjacent pieces together using procedures that do not damage the geomembrane.
   2. Clean geomembrane surfaces by disc grinder or equivalent.
   3. Purge welding apparatus of heat-degraded extrudate before welding.

D. Hot Wedge Welding
1. Welding apparatus shall be a self-propelled device equipped with an electronic controller which displays applicable temperatures.
2. Clean seam area of dust, mud, moisture and debris immediately ahead of hot wedge welder.
3. Protect against moisture build-up between sheets.

E. Trial Welds
1. Perform trial welds on geomembrane samples to verify welding equipment is operating properly.
2. Make trial welds under the same surface and environmental conditions as the production welds, i.e., in contact with subgrade and similar ambient temperature.
3. Minimum of two trial welds per day, per welding apparatus, one made prior to the start of work and one completed at mid shift.
4. Cut four, one-inch wide by six-inch long test strips from the trial weld.
5. Quantitatively test specimens for peel adhesion, and then for shear strength.
6. Trial weld specimens shall pass when the results shown in Table 3 are achieved in both peel and shear test.
   a. The break, when peel testing, occurs in the liner material itself, not through peel separation (FTB).
   b. The break is ductile.
7. Repeat the trial weld, in its entirety, when any of the trial weld samples fail in either peel or shear.
8. No welding equipment or welder shall be allowed to perform production welds until equipment and welders have successfully completed trial weld.

F. Seaming shall not proceed when ambient air temperature or adverse weather conditions jeopardize the integrity of the liner installation. INSTALLER shall demonstrate that acceptable seaming can be performed by completing acceptable trial welds.

G. Defects and Repairs
1. Examine all seams and non-seam areas of the geomembrane for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.
2. Repair and non-destructively test each suspect location in both seam and non-seam areas. Do not cover geomembrane at locations that have been repaired until test results with passing values are available.

1.13 FIELD QUALITY ASSURANCE

A. MANUFACTURER and INSTALLER shall participate in and conform to all terms and requirements of the Owner's quality assurance program. CONTRACTOR shall be responsible for assuring this participation.

B. Quality assurance requirements are as specified in this Section and in the Field Installation Quality Assurance Manual if it is included in the contract.

C. Field Testing
1. Non-destructive testing may be carried out as the seaming progresses or at completion of all field seaming.
   a. Vacuum Testing
      1) Shall be performed in accordance with ASTM D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
   b. Air Pressure Testing
      1) Shall be performed in accordance with ASTM D 5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
   c. Other approved methods.

2. Destructive Testing (performed by CONSULTANT with assistance from INSTALLER)
   a. Location and Frequency of Testing
      1) Collect destructive test samples at a frequency of one per every 1500 lineal feet of seam length.
      2) Test locations will be determined after seaming.
      3) Exercise Method of Attributes as described by GRI GM-14 (Geosynthetic Research Institute, http://www.geosynthetic-institute.org) to minimize test samples taken.
   b. Sampling Procedures are performed as follows:
      1) INSTALLER shall cut samples at locations designated by the CONSULTANT as the seaming progresses in order to obtain field laboratory test results before the geomembrane is covered.
      2) CONSULTANT will number each sample, and the location will be noted on the installation as-built.
      3) Samples shall be twelve (12) inches wide by minimal length with the seam centered lengthwise.
      4) Cut a 2-inch wide strip from each end of the sample for field-testing.
      5) Cut the remaining sample into two parts for distribution as follows:
         a) One portion for INSTALLER, 12-inches by 12 inches
         b) One portion for the Third Party laboratory, 12-inches by 18-inches
         c) Additional samples may be archived if required.
      6) Destructive testing shall be performed in accordance with ASTM D 6392, Standard Test Method for Determing the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
      7) INSTALLER shall repair all holes in the geomembrane resulting from destructive sampling.
      8) Repair and test the continuity of the repair in accordance with these Specifications.
3. Failed Seam Procedures
      1) If the seam fails, INSTALLER shall follow one of two options:
         a) Reconstruct the seam between any two passed test locations.
         b) Trace the weld to intermediate location at least 10 feet minimum or where the seam ends in both directions from the location of the failed test.
      2) The next seam welded using the same welding device is required to obtain an additional sample, i.e., if one side of the seam is less than 10 feet long.
      3) If sample passes, then the seam shall be reconstructed or capped between the test sample locations.
      4) If any sample fails, the process shall be repeated to establish the zone in which the seam shall be reconstructed.

1.14 REPAIR PROCEDURES

A. Remove damaged geomembrane and replace with acceptable geomembrane materials if damage cannot be satisfactorily repaired.

B. Repair any portion of unsatisfactory geomembrane or seam area failing a destructive or non-destructive test.

C. INSTALLER shall be responsible for repair of defective areas.

D. Agreement upon the appropriate repair method shall be decided between CONSULTANT and INSTALLER by using one of the following repair methods:
   1. Patching- Used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.
   2. Abrading and Re-welding- Used to repair short section of a seam.

3. Spot Welding- Used to repair pinholes or other minor, localized flaws or where geomembrane thickness has been reduced.
4. Capping- Used to repair long lengths of failed seams.
5. Flap Welding- Used to extrusion weld the flap (excess outer portion) of a fusion weld in lieu of a full cap.
6. Remove the unacceptable seam and replace with new material.

E. The following procedures shall be observed when a repair method is used:
1. All geomembrane surfaces shall be clean and dry at the time of repair.
2. Surfaces of the polyethylene which are to be repaired by extrusion welds shall be lightly abraded to assure cleanliness.
3. Extend patches or caps at least 6 inches for extrusion welds and 4 inches for wedge welds beyond the edge of the defect, and around all corners of patch material.

F. Repair Verification
1. Number and log each patch repair (performed by CONSULTANT).
2. Non-destructively test each repair using methods specified in this Specification.

1.15 MEASUREMENT AND PAYMENT

A. Payment for geomembrane installation will be as per contract unit price per square foot, as measured parallel to liner surface, including designed anchor trench material and is based upon net lined area.

B. Net lined area is defined to be the true area of all surfaces to be lined plus designed burial in all anchor trenches, rubsheets, and sacrificial layers.

C. Prices shall include full compensation for furnishing all labor, material, tools, equipment, and incidentals.

D. Prices also include doing all the work involved in performing geomembrane installation completely as shown on the drawing, as specified herein, and as directed by the ENGINEER.

Table 1.1: Minimum Values for Smooth Black-Surfaced HDPE Geomembranes

Property	Test Method[1]						
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5199	30 (0.75) 27 (0.69)	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)	100 (2.5) 90 (2.3)	120 (3.0) 108 (2.7)
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94	0.94	0.94
Carbon Black Content, %	ASTM D 1603, mod.	2.0	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 2*	*Note 2*	*Note 2*	*Note 2*	*Note 2*	*Note 2*
Tensile Properties: *(each direction)*	ASTM D 6693						
Strength at Yield, lb/in (kN/m)		63 (11)	84 (15)	130 (23)	173 (30)	216 (38)	259 (45)
Strength at Break, lb/in (kN/m)		122 (21)	162 (28)	243 (43)	324 (57)	405 (71)	486 (85)
Elongation at Yield, %	(1.3" gauge length)	13	13	13	13	13	13
Elongation at Break, %	(2.0" gauge length)	700	700	700	700	700	700
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)	84 (373)
Puncture Resistance, lb (N)	ASTM D 4833	59 (263)	79 (352)	119 (530)	158 (703)	198 (881)	238 (1059)
Notched Constant Tensile Load, hours	ASTM D 5397, app.	400	400	400	400	400	400
Oxidative Induction Time, min.	ASTM D 3895	100	100	100	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 1.2: Minimum Values for Smooth White-Surfaced HDPE Geomembranes

Property	Test Method[1]					
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5199	30 (0.75) 27 (0.69)	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)	100 (2.5) 90 (2.3)
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content[2], %	ASTM D 1603	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 4*	*Note 4*	*Note 4*	*Note 4*	*Note 4*
Tensile Properties: *(each direction)*	ASTM D 6693					
Strength at Yield, lb/in (kN/m)		63 (11)	84 (15)	130 (23)	173 (30)	216 (38)
Strength at Break, lb/in (kN/m)		122 (21)	162 (28)	243 (43)	324 (57)	405 (71)
Elongation at Yield, %	(1.3" gauge length)	13	13	13	13	13
Elongation at Break, %	(2.0" gauge length)	700	700	700	700	700
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	59 (263)	79 (352)	119 (530)	158 (703)	198 (881)
Notched Constant Tensile Load, hours	ASTM D 5397, app.	400	400	400	400	400
Oxidative Induction Time[3], min.	ASTM D 3895	100	100	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 GSE White may have overall ash content greater than 3.0% due to the white layer.
3 The OIT values apply to the black layer only.
4 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 1.3: Minimum Values for Smooth Conductive HDPE Geomembranes

Property	Test Method[1]				
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5199	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)	100 (2.5) 90 (2.3)
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94
Carbon Black Content[2], %	ASTM D 1603, modified	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 5*	*Note 5*	*Note 5*	*Note 5*
Tensile Properties[3]: *(each direction)* Strength at Yield, lb/in (kN/m) Strength at Break, lb/in (kN/m)	ASTM D 6693	84 (15) 162 (28)	130 (23) 243 (43)	173 (30) 324 (57)	216 (38) 405 (71)
Elongation at Yield, %	(1.3" gauge length)	13	13	13	13
Elongation at Break, %	(2.0" gauge length)	700	700	700	700
Tear Resistance, lb (N)	ASTM D 1004	28 (124)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	79 (352)	119 (530)	158 (703)	198 (881)
Notched Constant Tensile Load, hours	ASTM D 5397, appendix	400	400	400	400
Oxidative Induction Time[4], min.	ASTM D 3895	100	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 GSE Conductive and GSE Conductive White may have an overall ash content of greater than 3.0% due to the conductive and/or white layers.
3 Due to surface effects caused by the conductive layer, these tensile properties are minimum average values.
4 The OIT values apply to the non-conductive black layer only.
5 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 1.4: Minimum Values for Smooth Black-Surfaced LLDPE Geomembranes

Property	Test Method[1]					
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5199	30 (0.75) 27 (0.69)	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)	100 (2.5) 90 (2.3)
Density, g/cm^3	ASTM D 1505	0.92	0.92	0.92	0.92	0.92
Carbon Black Content, %	ASTM D 1603, mod.	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 2*	*Note 2*	*Note 2*	*Note 2*	*Note 2*
Tensile Properties: *(each direction)* Strength at Break, lb/in (kN/m)	ASTM D 6693	114 (20)	152 (27)	228 (40)	304 (53)	380 (66)
Elongation at Break, %	(2.0" gauge length)	850	850	850	850	850
Tear Resistance, lb (N)	ASTM D 1004	16 (71)	22 (100)	33 (150)	44 (200)	55 (250)
Puncture Resistance, lb (N)	ASTM D 4833	46 (205)	62 (276)	92 (409)	123 (547)	154 (685)
Oxidative Induction Time, min.	ASTM D 3895	100	100	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 1.5: Minimum Values for Smooth White-Surfaced LLDPE Geomembranes

Property	Test Method[1]		
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5199	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)
Density, g/cm^3	ASTM D 1505	0.92	0.92
Carbon Black Content[2], %	ASTM D 1603, modified	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 4*	*Note 4*
Tensile Properties: *(each direction)* Strength at Break, lb/in (kN/m)	ASTM D 6693	152 (27)	228 (40)
Elongation at Break, %	(2.0" gauge length)	850	850
Tear Resistance, lb (N)	ASTM D 1004	22 (100)	33 (150)
Puncture Resistance, lb (N)	ASTM D 4833	62 (276)	92 (409)
Oxidative Induction Time[3], min.	ASTM D 3895	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 GSE UltraFlex White may have overall ash content greater than 3.0% due to the white layer.
3 The OIT values apply to the black layer only.
4 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 2.1: Minimum Values for Black Surfaced Coextruded Textured HDPE Geomembranes

Property	Test Method[1]					
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5994	30 (0.75) 27 (0.69)	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)	100 (2.5) 90 (2.3)
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content, %	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 4*	*Note 4*	*Note 4*	*Note 4*	*Note 4*
Tensile Properties[2]: *(each direction)* Strength at Yield, lb/in (kN/m) Strength at Break, lb/in (kN/m)	ASTM D 6693	63 (11) 45 (8)	84 (15) 60 (11)	130 (23) 90 (16)	173 (30) 120 (21)	216 (38) 150 (27)
Elongation at Yield, % Elongation at Break, %	(1.3" gauge length) (2.0" gauge length)	13 150	13 150	13 150	13 150	13 150
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	54 (240)	72 (320)	108 (480)	144 (641)	180 (801)
Notched Constant Tensile Load [3], hours	ASTM D 5397, appendix	400	400	400	400	400
Oxidative Induction Time, min.	ASTM D 3895	100	100	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are minimum average roll values.
3 NCTL on coextruded textured product is conducted on representative smooth membrane samples.
4 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 2.2: Minimum Values for White-Surfaced Coextruded Textured HDPE Geomembranes

Property	Test Method[1]					
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5994	30 (0.75) 27 (0.69)	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)	100 (2.5) 90 (2.3)
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content[6], %	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 4*	*Note 4*	*Note 4*	*Note 4*	*Note 4*
Tensile Properties[2]: *(each direction)* Strength at Yield, lb/in (kN/m) Strength at Break, lb/in (kN/m)	ASTM D 6693	63 (11) 45 (8)	84 (15) 60 (11)	130 (23) 90 (16)	173 (30) 120 (21)	216 (38) 150 (27)
Elongation at Yield, % Elongation at Break, %	(1.3" gauge length) (2.0" gauge length)	13 150	13 150	13 150	13 150	13 150
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	54 (240)	72 (320)	108 (480)	144 (641)	180 (801)
Notched Constant Tensile Load [3], hours	ASTM D 5397, appendix	400	400	400	400	400
Oxidative Induction Time, min.[5]	ASTM D 3895	100	100	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are minimum average roll values.
3 NCTL on coextruded textured product is conducted on representative smooth membrane samples.
4 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.
5 The OIT values apply to the black layer only.
6 GSE HD Textured White may have overall ash content greater than 3% due to the white layer.

Table 2.3: Minimum Values for Black Surfaced Coextruded Textured LLDPE Geomembranes

Property	Test Method[1]			
Thickness, mil (mm) Minimum Average Lowest Individual Reading	ASTM D 5994	40 (1.0) 36 (0.91)	60 (1.5) 54 (1.4)	80 (2.0) 72 (1.8)
Density, g/cm^3	ASTM D 1505	0.92	0.92	0.92
Carbon Black Content, %	ASTM D 1603, modified	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 3*	*Note 3*	*Note 3*
Tensile Properties[2]: *(each direction)* Strength at Break, lb/in (kN/m)	ASTM D 6693	100 (18)	132 (23)	176 (30)
Elongation at Break, %	(2.0" gauge length)	500	500	500
Tear Resistance, lb (N)	ASTM D 1004	22 (100)	33 (150)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	48 (214)	73 (325)	97 (432)
Oxidative Induction Time, min.	ASTM D 3895	100	100	100

1 Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
2 The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are average roll values.
3 Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 2.4: Minimum Values for White-Surfaced Coextruded Textured LLDPE Geomembranes

Property	Test Method[1]			
Thickness, mil (mm)	ASTM D 5994			
Minimum Average		40 (1.0)	60 (1.5)	80 (2.0)
Lowest Individual Reading		36 (0.91)	54 (1.4)	72 (1.8)
Density, g/cm^3	ASTM D 1505	0.92	0.92	0.92
Carbon Black Content[(2)], %	ASTM D 1603, modified	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	*Note 5*	*Note 5*	*Note 5*
Tensile Properties[(3)]: (each direction)	ASTM D 6693			
Strength at Break, lb/in (kN/m)		100 (18)	132 (23)	176 (30)
Elongation at Break, %	(2.0" gauge length)	500	500	500
Tear Resistance, lb (N)	ASTM D 1004	22 (100)	33 (150)	44 (200)
Puncture Resistance, lb (N)	ASTM D 4833	48 (214)	73 (325)	97 (432)
Oxidative Induction Time [(4)], min.	ASTM D 3895	100	100	100

[1]Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.
[2] GSE UltraFlex White Textured may have an overall ash content greater than 3.0% due to the white layer.
[3] The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are average roll values.
[4] The OIT values apply to the black layer only.
[5] Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

Table 3.1: Minimum Weld Values for HDPE Geomembranes

Property	Test Method	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)	120 (3.0)
Peel Strength (fusion), ppi (kN/m)	ASTM D 6392	49 (8.6)	65 (11.4)	98 (17.2)	130 (22.8)	162 (28.4)	196 (34.3)
Peel Strength (extrusion), ppi (kN/m)	ASTM D 6392	39 (6.8)	52 (9.1)	78 (13.7)	104 (18.2)	130 (22.8)	157 (27.5)
Shear Strength (fusion & ext.), ppi (kN/m)	ASTM D 6392	61 (10.7)	81 (14.2)	121 (21.2)	162 (28.4)	203 (35.5)	242 (42.4)

Table 4.1: Minimum Weld Values for LLDPE Geomembranes

Property	Test Method	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Peel Strength (extrusion), ppi (kN/m)	ASTM D 6392	36 (6.3)	48 (8.4)	72 (12.6)	96 (16.8)	120 (21.0)
Peel Strength (fusion), ppi (kN/m)	ASTM D 6392	38 (6.7)	50 (8.8)	75 (13.1)	100 (17.5)	125 (21.9)
Shear Strength (fusion & ext.), ppi (kN/m)	ASTM D 6392	45 (7.9)	60 (10.5)	90 (15.8)	120 (21.0)	150 (26.3)

END OF SECTION

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