CALIFORNIA COASTAL COMMISSION
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Submitted: July 23, 2003
Staff: EL-SD
Staff Report: August 20, 2003
Hearing Date: September 10-12, 2003

STAFF REPORT: REVOCATION REQUEST

Application No.: R-6-01-129

Applicant: SeaWorld of California Agent: Patrick Owen

Description: **(APPROVED SEPTEMBER 9, 2002)** Construction of a splash down water ride, consisting of three towers (95, 89 and 83 feet high), interior and exterior sets with water effects, a 130,000 gallon exhibit tank for up to ten Commerson Dolphins, a gift shop, snack stand, restrooms, and several accessory structures, located on approximately 5.5 acres along and within the southern border of the enclosed theme park, east of the visitor entrance and adjacent to the main parking lot.

Site: 500 SeaWorld Drive, Mission Bay Park, San Diego, San Diego County. APN 760-037-01

Person Requesting Revocation: Sabrina Venskus, California Earth Corps

SUMMARY OF STAFF RECOMMENDATION

Staff recommends that the Commission deny the request for revocation on the basis that no grounds exist for revocation under Section 13105(a) of the Commission's regulations. The general topic of the landfill/toxic waste dump was extensively discussed during the Commission's review of the SeaWorld Master Plan in February, 2002. The main concern of the persons requesting revocation is that a January, 2002 Soil Vapor Study conducted for a site adjacent to the splash down ride location showed one very high count of hydrogen sulfide at one test well. The remainder of the opponents' contentions address potential errors in the application form and the absence of some reports and discussion of landfill/toxic waste dump issues in the permit findings. However, this issue was discussed at length during the public hearing for the SeaWorld Master Plan that occurred just seven months prior to the permit hearing and at which the Commission approved in concept the development subject to this permit. .

PROCEDURAL NOTE: The California Code of Regulations, Title 14 Division 5.5, Section 13105 states that the grounds for the revocation of a coastal development permit (or permit amendment) are as follows:

Grounds for revocation of a permit shall be:

a) Intentional inclusion of inaccurate, erroneous or incomplete information in connection with a coastal development permit application, where the Commission finds that accurate and complete information would have caused the Commission to require additional or different conditions on a permit or deny an application;

b) Failure to comply with the notice provisions of Section 13054, where the views of the person(s) not notified were not otherwise made known to the Commission and could have caused the Commission to require additional or different conditions on a permit or deny an application.

In addition, Section 13108(e) provides that if the Commission finds that the request for revocation was not filed with due diligence, it shall deny the request.

REQUESTOR'S CONTENTION:

The request for revocation contends that grounds for revocation in Section 13105(a) exist because the applicant submitted inaccurate, erroneous or incomplete information to the Commission in the coastal development permit application with regard to three issues, and that the submittal of accurate information would have led the Commission to deny the project. The three issues are the following:

(a) The first allegation is that the applicant failed to disclose a January, 2002 soil vapor study which indicated a severe health risk from hydrogen sulfide gas in an area close to the proposed ride location. The study was prepared for the applicant and was thus in the possession and knowledge of the applicant before the Commission acted on the subject permit application. According to the person requesting revocation, geological conditions at the site make the threat more significant, as seismic activity could cause subsidence.

(b) The second allegation is that the applicant failed to disclose studies and reports indicating the existence of an unlined and unfenced Class I hazardous waste dump underlying the SeaWorld leasehold. An industrial Class I hazardous waste dump had been operating in and around the ride location, and the exact dump boundaries are unknown. According to the person requesting revocation, numerous existing reports and studies addressing the toxic hazardous waste dump were not disclosed to the Commission with the coastal development permit application for the ride, and the staff report does not mention the dump. The applicant was aware, prior to Commission action on this permit, that a Technical Advisory Committee had been formed by the City Council to investigate the dump boundaries and any ongoing or potential leakage.

(c) The third allegation is that the applicant failed to disclose the existence of habitat areas in or near the proposed development and areas of state or federally listed rare, threatened or endangered species. According to the person requesting revocation, the project site is approximately 50 yards south of Pacific Passage, a primary least tern foraging area. Lights, noise and activity associated with the ride would interrupt and discourage use of the habitat. The site is approximately 120 yards north of a least tern nesting site, and the ride structure will obstruct the direct line of flight between the nesting and foraging areas. The project is approximately 250 yards north of the San Diego River Estuary and approximately 350 yards north of Famosa Slough, both functioning wetlands harboring listed species. Additional traffic and parking generated by the ride could increase stress and displace sensitive species. These concerns are not mentioned in the staff report.

STAFF RECOMMENDATION: Staff recommends that the Commission **reject** the request for revocation because the person raising objections has not met the test of section 13105 of the California Code of Regulations.

MOTION : I move that the Commission grant revocation of Coastal Development Permit No. 6-01-129.

The staff recommends a **NO** vote on the motion. Failure of this motion will result in denial of the request for revocation and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of Commissioners present.

RESOLUTION TO DENY REVOCATION:

The Commission hereby denies the request for revocation of the Commission's decision on Coastal Development Permit No. 6-01-129 on the grounds that there is no:

(a) Intentional inclusion of inaccurate, erroneous or incomplete information in connection with a coastal development permit application, where the Commission finds that accurate and complete information would have caused the Commission to require additional or different conditions on a permit or deny an application.

STAFF NOTE:

A revocation of a permit rescinds a previously granted permit. Even if the permit is vested, i.e. the applicant has undertaken construction of the project, if the Commission revokes the permit, the applicant is required to stop work and if wishing to continue, to reapply for a coastal development permit for the project. If the evidence shows that there are grounds for revocation, the Executive Director, upon receipt of a request for revocation, can order the project to stop work. Section 13107 provides, in part: "Where the executive director determines, in accord with Section 13106, that grounds exist for revocation of a permit, the operation of the permit shall be suspended." In this case, the

Executive Director has not determined that grounds exist for revocation and the operation of the permit is not suspended.

Because of the impacts on an applicant, the grounds for revocation are necessarily narrow. The rules of revocation do not allow the Commission to have second thoughts on a previously issued permit based on information that comes into existence after the granting of the permit, no matter how compelling that information might be. Similarly, a violation of the Coastal Act or the terms and conditions of a permit or an allegation that a violation has occurred are not grounds for revocation under the California Code of Regulations. **The grounds for revocation are, of necessity, confined to information in existence at the time of the Commission's action.**

II. Findings and Declarations.

The Commission finds and declares as follows:

A. Detailed Project Description/Location. The subject permit authorized construction of a new attraction within the existing SeaWorld theme park consisting of a splash down water ride themed as the Lost City of Atlantis. The ride is proposed as a multi-structure, and multi-level, complex, and is approximately two-thirds complete at this time. The primary structures include one building with three towers (83, 89 and 95 feet in height), interior and exterior sets with water effects, and a 130,000 gallon exhibit tank for up to ten Commerson Dolphins. Accessory structures include a gift shop, snack stand, restrooms, and various operation and maintenance structures. The ride would be located on approximately 5.5 acres within the southern border of the developed theme park, east of the visitor entrance and adjacent to the main parking lot. SeaWorld is located within Mission Bay Park in the City of San Diego. It is situated adjacent to Mission Bay and is surrounded largely by City parklands consisting of grassy, open areas.

This was the first application for development under the new SeaWorld Master Plan Update, which the Commission voted to certify in February, 2002. The new master plan addresses build-out of SeaWorld over the next 15-20 years, and is divided into Tier 1, Tier 2 and Special Projects. The splash down ride is a Tier 1 project, and was described in detail in the master plan. An EIR was prepared, circulated for public review and approved by the City of San Diego for the master plan, which looked at the overall plan but also analyzed potential impacts and mitigation requirements for the identified Tier 1 projects. In approving the Master Plan as an LCP amendment, the Commission certified the plan with a number of suggested modifications. One modification was to relocate the splash down ride from the proposed master plan site on the bayfront to an area more within the developed areas of the park. This was done primarily to limit adverse impacts to views from public recreational areas outside SeaWorld, and also because the proposed master plan location did not provide an adequate setback from the riprapped shoreline of Mission Bay. The certified location occupies an area along the southern perimeter of the enclosed theme park, encroaching slightly into the existing main parking lot. Before the beginning of construction, this area was entirely paved.

B. Summary of Revocation Request's Contentions. The revocation request has been filed by Sabrina Venskus, representing California Earth Corps. Although their contentions are summarized below, the full text of the revocation request and attachments are included as Exhibit #1.

The revocation request (Exhibit #1) asserts that intentional inclusion of inaccurate, erroneous or incomplete information which, if known to the Commission, would have caused different conditions or denial of the permit are grounds that exist for the revocation of this permit. In summary, the allegations are: 1) that the applicant failed to disclose a January, 2002 soil vapor study which indicated a triple checked detection of over 1,820 ppm of hydrogen sulfide gas in a test well approx. 315 ft. from the Ride, and, the close proximity of the test well to an intense public use area such as the proposed Ride is extraordinarily significant, given the nearby incident involving H2S poisoning cause the death of one person and hospitalization of eight others in 1988; 2) that the applicant knowingly failed to disclose that an industrial Class I hazardous waste dump had been operating in and around the location of the Ride, and that the exact boundaries of the toxic hazardous waste dump are unknown; also, the applicant did not disclose studies and reports indicating the existence of the toxic hazardous waste dump, the staff report does not mention the dump, and the applicant was aware that a Technical Advisory Committee (TAC) had been formed by the San Diego City Council to address the boundaries of the dump vs. the City landfill and to what extent the dump's chemicals are leaking and migrating; and 3) that the applicant failed to disclose the existence of sensitive habitat areas in or near the proposed development and areas of state or federally listed rare, threatened or endangered species.

The contention notes that these concerns are not mentioned in the staff report, and the various supporting documentation is not in the subject permit file. In addition, the contention states that a subsequent denial by the Commission of an application to pave a portion of an adjacent site directly over the landfill/toxic waste dump for use as a parking lot proves the Commission would have denied the ride if the 2002 Soil Vapor Study, and other documentation, had been provided at the time. The contention does not allege that grounds for revocation exist pursuant to Section 13105(b) for failure to comply with notice requirements.

C. Analysis of the Revocation Request's Contentions with Respect to Section 13105 of the California Code of Regulations. As stated, the grounds for revocation are, of necessity, confined to information in existence at the time of the Commission's action. In this case, the Commission approved the subject permit on September 9, 2002. The three elements that must be proved before a permit can be revoked under Section 13105 (a) are:

- That the applicant provided inaccurate, erroneous or incomplete information,
- That the inaccurate, erroneous or incomplete information was supplied knowingly and intentionally, **AND**

- That if the Commission had accurate and complete information at the time it approved the application, it would have required additional or different conditions or denied the application.

D. Intentional Inclusion of Incomplete or False Information Provided by Applicant. The contention raised in the revocation request alleges grounds for revocation identified in Section 13105 (a) of the California Code of Regulations.
1. 2002 Soil Vapor Study. The Commission finds no evidence that SeaWorld deliberately withheld critical information in conjunction with the splash down ride permit review. The 2002 Soil Vapor Study was prepared by IT Corporation for SeaWorld, as required by the City of San Diego Solid Waste Local Enforcement Agency, and was given to the City on January 4, 2002, and to the Regional Water Quality Control Board on January 7, 2002; it has been available for public review since that time. These are the two public regulatory agencies charged with oversight of the landfill/toxic dump. The report provides results and recommendations from testing conducted in October, 2001, and does not address the splash down ride site specifically, but rather an undeveloped piece of land nearby the ride site. The report concludes that the site is similar to many others in Southern California near landfills and that development can occur consistent with common engineering practices. Page 4-4 of the report lists specific recommendations, and is part of Exhibit #1, attached.

Although the application for the splash down ride was submitted to this office in 2001, it was incomplete and held in abeyance during review of the SeaWorld Master Plan. The permit application file included a geological report for the then-proposed site, which was also part of the master plan review. Certification of the master plan included relocation of the splash down ride. Thus, when the master plan was certified, the applicant provided new plans for the ride in the location approved by the master plan. At that time, the application was filed and scheduled for Commission action. SeaWorld was not asked to submit new geological studies because the relocated site was also reviewed in the master plan as the future site for an expanded events center. Although the 2002 Soil Vapor Study was in existence by that time, it addresses only the SeaWorld 16-acre expansion area, and not the specific site of the splash down ride. Thus, although the Commission and its staff were unaware of the 2002 Soil Vapor Study at the time the Commission approved the subject permit, it does not contain relevant information, since the report does not directly address the relocated site of the splash down ride.

California Earth Corps claims that the Commission was not aware of the 2002 report when it acted on the splash down ride, but was aware of it when the Commission subsequently denied a permit application for paving a portion of the nearby expansion area. California Earth Corps contends that this information was pivotal in the Commission's action to deny Coastal Development Permit #6-03-006 for the parking lot. In reviewing the file and listening to the hearing tapes, there is nothing to indicate that the 2002 Soil Vapor Study was relied on in the Commission's decision to deny the permit. The report was not part of the file itself, and only one public speaker testified at the hearing; the report was not mentioned in that testimony, nor in any of the subsequent Commission discussion prior to the vote to deny. The Commission was aware of the Technical Advisory Committee (TAC) that is conducting current tests and studies

through reference in the staff report, and also felt that solutions other than capping the landfill with pavement might be more appropriate. It was also pointed out that most of the parking lot area was not required by SeaWorld immediately, but was intended to serve future development. This being the case, the Commission denied the application, with the intent that results and recommendations from the TAC would be available before the Commission reviewed the parking lot proposal again.

Thus, the Commission's denial of CDP #6-03-006 was not based on the 2002 Soil Vapor Study. Moreover, that proposal was for improvements directly over the landfill on area that had not previously been improved. The subject permit for the splash down ride is in a location not over the mapped landfill/toxic dump boundaries, and in a location already surfaced and used as a parking lot and portions of the improved theme park. Moreover, a significant portion of the parking lot will remain between the approved ride and the landfill/toxic dump.

2. Presence of Toxic Waste Dump. The contention that the Commission was unaware of the existence of the landfill/toxic dump and that it underlies the SeaWorld park is also not supported by the facts. This issue was widely discussed in the EIR, staff report, public testimony, and Commission discussion at the time of SeaWorld's Master Plan certification in February, 2002. That review included not only the master plan document, but an analysis of all the Tier I developments in the plan. The splash down ride received a great deal of attention at the public hearing, since staff was recommending it be relocated further from the water, and since both the public and the Commission recognized it as a very significant project that would be coming back to the Commission for permit approval in short order. In fact, the Commission approved the CDP for the ride only seven months after it acted on the master plan. The fact that the staff did not raise the same concerns again with the permit review was because the core issues of the ride had been resolved through the master plan certification process. Likewise, staff did not require the applicant to resubmit all the background materials with the permit application that had already been received and reviewed with the master plan. Staff did cite the Mission Bay Precise Plan, SeaWorld Master Plan, and EIR for both as substantive file documents in the permit staff report.

The revised findings for the City of San Diego LCP Amendment No. 2-2001-C (Sea World Master Plan) state the following:

> "A portion of the eastern Sea World leasehold is underlain by the inactive Mission Bay Landfill. The City of San Diego operated the landfill from approximately 1952 until 1959. The landfill reportedly accepted municipal solid waste and some liquid industrial wastes (including acids, alkaline solutions, solvents and paint wastes). The U.S. Environmental Protection Agency estimates that up to 737,000 gallons of industrial wastes may have been disposed at the landfill during its operation. After closure of the landfill, dredged material from Mission Bay (consisting of mostly fine-grained material) was placed on top of the former landfill surface to a depth of approximately 15 feet. A portion of the site is currently paved with a chip-seal

paving surface which allows for diffusion of landfill gasses while remaining impervious to water infiltration.

Several investigations of the landfill were conducted to evaluate the extent of potential chemical contamination. Samples for chemical analysis were collected from soils, surface water, sediments and groundwater from the landfill and surrounding areas. Investigations detected a number of chemicals in onsite soils and groundwater including heavy metals, volatile and semi-volatile organic compounds and chlorinated pesticides. In 1985, the Regional Water Quality Control Board (RWQCB) adopted Order No. 85-78, which required, among other things, routine monitoring of groundwater, surface water and sediments from Mission Bay and the San Diego River. In addition to routine monitoring, several additional soil and groundwater investigations were conducted in and around the landfill through 1997. The results of these investigations and continued routine monitoring indicate that low levels of chemicals were detected in soils and groundwater beneath and adjacent to the landfill. According to the RWQCB, these low levels of chemicals do not represent a significant threat to public health or the environment. Furthermore, the California Department of Toxic Substances Control (DTSC) and U.S. EPA previously evaluated the site in 1987 and 1993, respectively, and determined that the site did not pose a significant threat (see attached letters from the DTSC and RWQCB).

The RWQCB continues to be the lead agency for oversight for water quality issues at the Mission Bay Landfill. The City of San Diego continues to monitor the site in accordance with RWQCB Order 97-11, General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills. Routine monitoring has detected low levels of several chemical constituents in groundwater beneath and adjacent to the site. However, the concentrations of these chemicals have been well below any of the established action levels identified by the RWQCB, and do not appear to represent a significant threat to public health or the environment. The site is currently in compliance with the requirements of the City of San Diego Solid Waste, the RWQCB, and California Integrated Waste Management Board.

Commission staff has received public comments related to the presence of contaminants in groundwater beneath the landfill and the potential for migration of these chemicals offsite. The Commission's Water Quality staff has reviewed the available monitoring data regarding groundwater conditions at the Mission Bay Landfill. Staff concludes that data supports the determinations by the regulatory agencies overseeing the landfill that the low levels of chemicals detected do not represent a significant threat to public health or the environment. The same public comments were submitted during the comment period for the *Draft Environmental Impact Report for the Proposed Sea World Master Plan Update (EIR)*, dated March 12, 2001. These comments and related issues were fully and adequately analyzed by the lead agency in the Final EIR."

At time of review of the master plan and the ride application, the Commission was aware the landfill was alleged by members of the public to be a toxic waste dump. Submitted studies and documents, including but not limited to, the *Site Inspection Prioritization* prepared by Bechtel Environmental, Inc. in 1993 and the *Assessment Report SeaWorld Lease Expansion* prepared by Fluor Daniel GTI in 1997 acknowledged the site had been the recipient of up to 737,000 gallons of various industrial wastes, including waste acids, alkaline solutions, organic solvents and paint wastes. These reports are part of a binder submitted by SeaWorld during the master plan review. Two of the other documents in the binder include a lease amendment and the *Post Closure Land Use Plan for Mission Bay South Shores Phase III.* When this volume of material is already on record at the Commission office, it is not usual for copies of all such data, monitoring results, studies, etc. to again be submitted as part of a subsequent permit application. In addition, it was acknowledged there is some degree of uncertainty in the exact boundaries of past waste disposal operations at the Mission Bay Landfill. One of the objectives of the Technical Advisory Committee (TAC) is to investigate more closely the boundary of the landfill.

However, the location of the Splashdown Ride is within the already developed portion of the park and not immediately adjacent to the currently mapped landfill. An existing parking lot occupies the area between the ride site and the historic landfill. In addition, while the City has indicated the exact limits of the landfill have not been defined, numerous soil borings have been made in around the landfill, providing a basis for some understanding of the limits of trash. As part of the geotechnical investigation for the Ride, eight soil borings were within the project site and no trash was encountered.

Further, as part of the review by the TAC, the City Environmental Services Division has contracted with SCS Engineers to reevaluate the existing monitoring program and perform a full assessment to determine if the landfill poses a threat to the public or the environment. The scope of the work includes: 1) review of all previous investigations performed on the site; 2) development of a Site Assessment Plan (SAP) identifying the potential chemicals of concern and appropriate screening criteria; 3) implementation of the approved SAP; and 4) preparation of a final Site Assessment Report including recommendations if warranted. It is anticipated the draft SAP will be presented to the TAC in November 2003 for their input and comment. Implementation of the approved SAP will begin in 2004 with a final report expected in July 2004.

3. Proximity to Sensitive Habitats. The third allegation that the Commission was unaware of the existence of sensitive habitats and listed species in the general vicinity is also not substantiated. These matters were discussed extensively during the master plan review, and in relation to several past CDPs for SeaWorld projects. The presence of sensitive floral and faunal resources in the general area was one reason the ride was relocated further from the water's edge. Moreover, although these resources do exist throughout various parts of Mission Bay Park, their distance from the splash down ride location exceeds the Commission's typical buffer requirements. There are fully functioning wetlands in the Southern Wildlife Preserve south of SeaWorld, at a distance of about 1,200 feet from the splash down ride construction site. It appears that the

numbers given in the request for revocation are incorrect, as scaled plans of the area indicate a much greater distance between the ride and the identified sensitive features.

In addition, there are two designated least tern nesting sites, one located across Pacific Passage to the north (inactive for many years), and the other located between SeaWorld Drive and the Southern Wildlife Preserve south of SeaWorld (also inactive). These are located approximately 2,000 feet north and 600 feet south of the splash down ride site, respectively. The closest active least tern nesting sites are all a mile or more from SeaWorld.

4. Incomplete Filing Materials/Application. California Earth Corps has contended that SeaWorld's intent to supply incomplete or false information is proven by some of the responses in the application form. In particular, any updated geology reports and the 2002 Soil Vapor Report were not submitted as required in the application. The other contention is that the applicant responded "no" to questions of whether the site is within or nearby sensitive resources. With respect to the first issue, the identified reports did not exist at the time the application was submitted. When SeaWorld completed the file with updated plans nothing else was requested. The updated geology report is a requirement of the master plan prior to the issuance of building permits. Since the 2002 Soil Vapor Study is for a different site, SeaWorld was not required to submit it for the ride application. With respect to the questions about sensitive resources, no such resources exist on the ride site itself, or elsewhere within the developed portions of the SeaWorld leasehold. Whether or not SeaWorld is "near" such resources is subjective. Since it has been shown that the ride site is not within what would typically be a buffer zone, the Commission finds the "no" answer reasonable, and finds it does not represent a deliberate intent to deceive.

E. Affect of Complete and Accurate Information on the Commission Action. The question of whether such information would have swayed the Commission's decision on the subject permit is as significant as whether disclosure of all material was intentional or not . Earlier reports submitted with the master planning documents included the results of a significant amount of soil and water testing, including acknowledgement that both methane and hydrogen sulfide gases were present on the nearby landfill/toxic waste dump site. However, these reports did not indicate any existing public danger due to the low concentrations of these substances. Thus, the Commission was well aware of the existence and contents of the landfill/toxic waste dump when it approved the subject permit. The only additional information provided in the 2002 Soil Vapor Study was that one test well had produced an abnormally high reading for hydrogen sulfide during one test. The report itself goes on to state that this was either an anomaly or the result of a deposit of sulfur materials close to the probe, which took the sample from 15 feet underground, not on the ground surface. The report does not conclude that any immediate human health hazard exists at the site of the splash down ride, and monitoring for landfill gases continues at this time as recommended. The Commission's Water Quality Unit has reviewed the Soil Vapor Study, and did not feel that public health concerns were raised by its findings.

In its review of issues surrounding the presence of a historic landfill that may contain hazardous materials, the Commission must rely on the expertise of the number of agencies who have direct jurisdiction over control of discharges and emissions, both solid and gaseous, on land and in air and water, to reach conclusions regarding the presence of public health risks. As indicated in the attached correspondence from the City of San Diego Environmental Services Division and the Regional Water Quality Control Board (RWQCB), these agencies were aware, at the time of approval of the Splashdown Ride, of the results of the soil vapor assessment discussed in the January 2002 study and the ongoing efforts of the TAC to further investigate the limits of the landfill and potential need for remediation. However, there is no indication the continued buildout of SeaWorld park in the already developed portion of the leasehold and not the site of the historic landfill, poses any risk to health and safety of the park users.

The Commission finds nothing in this study that would suggest its inclusion in the permit review would have led to any different outcome than the Commission's September 9, 2002 approval with conditions. Therefore, there is no evidence of intentional inclusion of inaccurate or incomplete information, or that such inaccurate or incomplete information, had it been corrected or completed and presented to the Commission, would have caused the Commission to impose different conditions or deny the project.

5. Conclusion

The revocation request does not demonstrate that the applicant knowingly and intentionally provided inaccurate, erroneous, or incomplete information. Thus, the grounds necessary for revocation under Section 13105(a) of the Regulations has not been met. The Commission finds that the revocation request shall be denied because the contentions raised in the revocation request do not establish the grounds identified in Section 13105 (a) of the California Code of Regulations.

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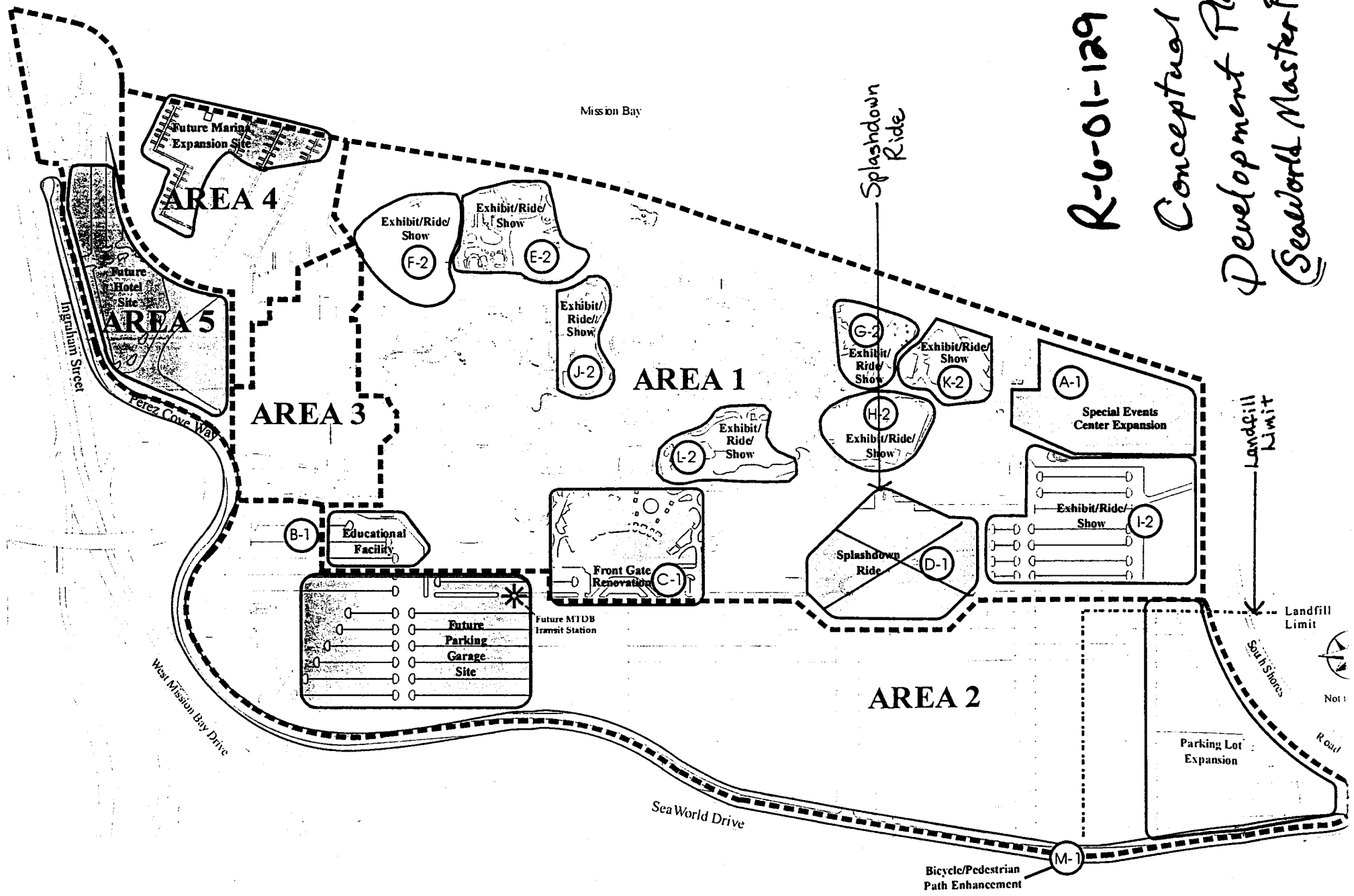
R-6-01-129

Conceptual Plan

Development (SeaWorld Master Plan)



Source: SeaWorld
Date: July 2001

07-27-00 15:27 RCVD

Department of Toxic Substances Control

Edwin F. Lowry, Director
400 P Street, 4th Floor, P.O. Box 806
Sacramento, California 95812-0806

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Gray Davis
Governor

FILE COPY

July 24, 2000

TIM-
HERE'S THE
DTSC LETTER
BAF 7.28

Mr. James P. Miller, Jr.
Mission Bay Park Toxic Cleanup
P.O. Box 60026
San Diego, California 62116

Dear Mr. Miller:

Thank you for your recent letter to Governor Davis and your the letter to us requesting that the Department of Toxic Substances Control (DTSC) assume the lead agency role for remediation of the Mission Bay Landfill (Site). You asked for this action on behalf of the citizen group, the Mission Bay Park Toxic Cleanup (MBPTC).

DTSC has carefully reviewed your letter and contacted other regulatory agencies involved with this site. Our research, which is described in detail below, indicates that the site is in compliance with the involved regulatory agencies' requirements. However, in order to ensure all parties have a clear understanding of future steps at the site, DTSC offers to coordinate a meeting with all pertinent regulatory agencies and MBPTC to address your concerns. The following are DTSC's findings which may prove useful to an overall understanding of agencies' roles for the landfill:

1. On November 1, 1984, DTSC (formerly the Department of Health Services) entered into an agreement with the City of San Diego (City), which places full responsibility on the City for any development of the Mission Bay Landfill site. The City also assured in the agreement that, if the City decides to proceed with the hotel project, the City will take all appropriate measures to protect public health and safety both during the construction of the project and after it is constructed. This agreement was signed when the City was considering developing part of the Mission Bay Landfill for a hotel complex. Later, DTSC conducted a Preliminary Assessment (PA) and determined that the site did not pose a significant threat. The PA also indicated that the County monitors the City's actions and that the City was the lead agency.

2. The United States Environmental Protection Agency (U.S. EPA) conducted several environmental assessments and finally completed a Hazard Ranking Score (HRS). The HRS score of 14.1 assigned was not high enough for the site

Letter Attachment to
SDICPA #2-2001-C

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to be listed on the National Priority List (NPL). Therefore, U.S. EPA recommended the status of No Further Remedial Action Planned and placed it in an archive status on this listing. According to Ms. Rachel Loftin of U.S. EPA, MBPTC recently requested U.S. EPA to reevaluate the HRS score and include the site on the NPL. In response to this request, U.S. EPA advised MBPTC to present information regarding the site's change of condition and additional data warranting HRS revision.

3. In a telephone conference with Mr. Mark Alpert of the San Diego Regional Water Quality Control Board (RWQCB), Mr. Alpert stated that in 1983, 16 groundwater monitoring wells were installed within the boundaries of the former landfill and four wells were installed off-site under the supervision of the RWQCB. Subsequently, on September 16, 1985, RWQCB Order No. 85-78, "Waste Discharge Requirement for the Site Closure of the City of San Diego Mission Bay Landfill" was adopted. Currently, the Mission Bay Landfill is regulated under the RWQCB Order No. 97-11, "General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills." Mr. Alpert also informed DTSC that the RWQCB and the City of San Diego, the Local Enforcement Agency (LEA), have a joint lead at the site.

4. In a telephone conference with Ms. Rebecca Lafreniere of the City of San Diego Solid Waste (CSDSW), she stated that CSDSW became the Certified LEA in November 1997 for the City of San Diego area. The County of San Diego is no longer monitoring CSDSW's actions. CSDSW is currently monitoring the site quarterly and found no outstanding violations. CSDSW is the lead agency for the maintenance of the site and RWQCB is the lead agency for the water quality issues. The owner of the property is the City of San Diego Environmental Services Department.

5. The California Integrated Waste Management Board (IWMB) also had some involvement at the site in the past according to Mr. Gino Yekta of IWMB. Mr. Yekta indicated that as long as the owner/operator is in compliance with Section 21190 of the California Code of Regulation, they have the right to develop the site. Approval from IWMB and LEA are required prior to any further development of the site. IWMB has not yet received a request for such an approval.

In summary, the site is in compliance with the CSDSW, RWQCB, and IWMB requirements. Since the City of San Diego and the RWQCB actively regulate the site, other regulatory agencies' involvement may not be necessary. However, as stated

Letter Attachment to
Master Plan Staff report

earlier, in order to ensure all parties have a clear understanding of the future steps which may be taken, DTSC offers to convene a meeting with all pertinent regulatory agencies and MBPTC to address the concerns you raise.

Please contact Ms. Nennet Alvarez, Chief of the Southern California Cleanup Operations Branch B at (714) 484-5459, if you would like to have DTSC arrange this meeting.

Very truly yours,

Edwin F. Lowry

Edwin F. Lowry
Director

cc: Mr. Robert Ferrier
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Mr. Matt Trainor
Department of Environmental Health
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Mr. Mark Alpert
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Letter Attachment to
Master Plan Staff Report

California Regional Water Quality Control Board

San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

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04-13-00 14:48 RCVD

CC: Ray P.

April 11, 2000

File Copy
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Mr. James P. Miller, Jr.
Mission Bay Park Toxic Cleanup
P.O. Box 60026
San Diego, CA

FILE: 06-378

Dear Mr. Miller:

MISSION BAY LANDFILL

Thank you for your letter dated March 8, 2000. You asked the Regional Board to begin immediate cleanup of industrial wastes, contaminated soil, and contaminated groundwater at the Mission Bay Landfill located along the southern boundary of the Bay. You asked for these actions on behalf of the citizen group, the Mission Bay Park Toxic Cleanup. Mr. Scott Andrews delivered the letter to the Regional Board during the Public Forum of the Regional Board meeting held March 8, 2000.

In the letter you stated "levels of heavy metals in the sediments have put Mission Bay in solid company with one of the most highly polluted water bodies in the nation." You identified a seismic hazard at the landfill which "would likely usher in a whole new episode of water contamination, possibly of catastrophic proportions." Please consider the following comments:

Background history of Mission Bay Landfill

The Mission Bay Landfill was operated by the City of San Diego from 1952 to 1959. The landfill was operated as a "trench and fill" type disposal area and received domestic and public refuse, including liquid "industrial-type" waste streams. Trenches were between 8 and 12 feet deep below ground surface, landfill deposits are reported to be approximately seven feet thick at the western end of the site to approximately 20 feet thick at the eastern end. After disposal activities ended at the Mission Bay Landfill in 1959, operations were relocated to the South Miramar Landfill in Kearny Mesa. During the original dredging of Mission Bay, the hydraulic material generated was disposed of as fill on the Mission Bay Landfill until 1962. In 1980, additional hydraulic fill was placed at the site. Approximately 15 feet of hydraulic fill now cover the original disposal surface. The estimated limits of the fill area are bound to the west by Sea World's east parking area, bound to the east by Interstate Highway 5, bound to the south by the San Diego River, and bound to the north by the boat launching basin and Mission Bay. This area is known as the South Shores Park (Figure A1).

The City of San Diego, Environmental Services Department and the Park and Recreation Department are the owner/operators of the site. The majority of the former landfill area is

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SDICPA #2-2001-C

undeveloped open space, however the City has proposed a staged development for the area in accordance with the "Mission Bay Park Master Plan" updated August 1994. The most significant development in the last seven years has been the construction of the boat launching basin, parking area, and landscaping improvements.

Water Quality Monitoring

In 1983, 16 ground water monitoring wells were installed within the boundaries of the former landfill and four wells were installed offsite (Figure A). Groundwater samples were analyzed for priority pollutant metals, semivolatile organics, volatile organics, organochlorine pesticides and polychlorinated biphenyls (PCB), cyanide, oil and grease, phenol, fluoride, sulfide, total organic halides. Groundwater samples contained heavy metals, 11 volatile organic compounds, 20 semivolatile organic compounds and chlorinated pesticides. No PCB's or cyanide were detected in groundwater. Figure A2 attached, lists select analytical data with the highest detected concentration of metals shown and detected levels of acetone and carcinogenic chemicals.

On September 16, 1985, Regional Board Order No. 85-78, "Waste Discharge Requirements for the Site Closure of the City of San Diego Mission Bay Landfill" was adopted. Included with the Order is, "Monitoring and Reporting Program (MRP) No. 85-78." The MRP required; nine surface water samples, four from Mission Bay and five from the San Diego River; nine sediment samples, four from Mission Bay and five from the San Diego. However, sediment sampling is no longer conducted at the site.

Subsequently, in 1996 the City of San Diego evaluated the sediment monitoring program in a report entitled, "Evaluation of Sediment Sampling Program- Mission Bay Landfill," prepared by EMCON and dated March 28, 1996. Based on sediment data collected between October 1985 through November 1995, the report concluded that there was no obvious indication of metal release attributed to the landfill and that the annual sediment sampling program did not significantly contribute to the knowledge of the impacts at the landfill. Furthermore, the report concluded that the detection of any future release is much more likely to be detected in the surface water and groundwater sampling program rather than the sediment sampling program.

The California Department of Health Services conducted a preliminary assessment of the site in February 1987, and concluded the landfill was not likely to become a source of contamination. The site was apparently under consideration for inclusion on the USEPA's Superfund, National Priorities List during the early 1990's, but was not ranked.

Currently, the Mission Bay Landfill is regulated under Regional Board Order No. 97-11, "General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills." Groundwater beneath the Mission Bay Landfill typically flows in a northerly direction with a very low gradient of approximately 0.001 to 0.003 foot per foot,

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based on the most recent monitoring report dated October 1999. The City of San Diego is currently monitoring the site on a quarterly basis for VOC's, inorganic and general parameters (pH, nitrogen, sulfate, arsenic, and chromium). Low concentrations of VOC's (MTBE, diethyl ether, dichloroethene) have been detected in several monitoring wells, however these compounds are believed to be from gasoline powered boats in Mission Bay and construction activities at Sea World. Regional Board staff generally concur with this evaluation.

Bay Protection Program

You requested the Regional Board take immediate action to clean up the site under the Bay Protection and Toxic Cleanup Program. The California State Water Resources Control Board adopted the Consolidated Toxic Hot Spot Cleanup Plan in June 1999 under this program. In the Cleanup Plan no toxic hot spots were identified in Mission Bay, although one location in north Mission Bay was identified as a site of concern. This site was associated with elevated levels of the pesticide Chlordane. Bay Protection Program stations located along the northern and southern boundaries of the Mission Bay landfill did not indicate the presence of toxic sediments using a sensitive amphipod sediment bioassay method used by federal and state agencies. After review by government agencies and by the public during 1998 and 1999, both the San Diego Regional Board and the State Board adopted the Cleanup Plan. The Regional Board is now involved with cleanup actions at the five toxic hot spots identified in the Plan. The seventeen sites of concern could also be considered for action by the Board.

I trust this letter provides you with sufficient information the Regional Board has regarding the Mission Bay Landfill and potential toxic hot spots in Mission Bay. I invite you to present specific information to assist the Board in identifying the wastes that have leaked from the landfill and the effects on Mission Bay you mentioned in your letter. Please contact Mr. Don F. Hoirup Jr., Associate Engineering Geologist of my staff, for questions pertaining to the landfill at (858) 627-3926 and Mr. Pete Michael, Environmental Specialist IV of my staff, for questions pertaining to the Toxic Hot Spot Program at (858) 467-2990. I look forward to seeing your information.

Respectfully,

JOHN H. ROBERTUS
Executive Officer
San Diego Regional Water Quality Control Board

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cityotsd/missbay/miller2 doc

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SAN DIEGO COAST DISTRICT

Peter Douglas
Executive Director
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

RE: Request and Petition For Revocation of Coastal Development Permit No. 6-01-129 (Sea World Adventure Park, Splash Down Ride)

Dear Mr. Douglas,

California Earth Corps is a non-profit organization whose mission is to bring about environmental justice through actions to suppress toxicant releases, toxic insult to the environment, toxic tort and chemical battery, especially to people of color and poverty, to champion equal use and access to Public Lands, especially the Coastline, and to defend Public Trust Doctrine as it applies to tidelands, rivers, lakes and streams. California Earth Corps ("Earth Corps") hereby requests the California Coastal Commission ("Commission") revoke the above-cited permit ("Ride") issued to Sea World San Diego ("Applicant") pursuant to Cal. Pub. Res. Code §30331 and 14 Cal. Code Reg. §§13104-13108.5.

I. Background

Sea World is located in Mission Bay Park, which is a dedicated public park with Sea World as a designated lessee. On August 8, 2001, the Applicant submitted to the Commission an application for development of the Ride at a shoreline location near the northeast corner of the park. The application was scheduled on the Commission's July 9, 2002 meeting agenda but the applicant requested the matter be postponed. On February 7, 2002, the Commission approved Sea World Master Plan LCP amendments subject to 36 conditions and modifications, one of which relocated the Ride to a location near the Sea World parking lot along the inner park edge just east of the hospitality center.

On May 10, 2002, the Applicant re-filed the Coastal Development Permit application for the relocated Ride. On September 9, 2002, the Commission approved the application. In January, 2003, the City certified the EIR for the Sea World Master Plan Expansion.

Exhibit 1
(Letter and exhibits A-H

In May, 2003, Earth Corps, along with other NGOs, became aware of an unlined and unfenced Class I hazardous waste dump underlying the Sea World park. Additionally, in May 2003, Earth Corps came into possession of documents that indicated a severe health and safety hazard at the development site. The documents were apparently withheld from the Commission in its consideration of the application for the Ride permit. These documents were in the possession of the applicant before and during the Commission's consideration of the Ride application, yet they were withheld from the Commission.

Furthermore, it appears that the Applicant failed to divulge significant information regarding sensitive habitat and endangered species in its Coastal Development Permit application.

II. Grounds For Permit Revocation

Section 13105(a) of the California Code of Regulations requires revocation of a coastal development permit where an applicant has intentionally included inaccurate, erroneous or incomplete information in connection with a coastal development permit application and where the Commission finds that accurate and complete information would have caused the Commission to require additional or different conditions on a permit or deny the application.

III. The Applicant Intentionally Excluded Material and Relevant Information From The Commission

Relevant and material information which the Applicant intentionally excluded from the Commission's review and consideration regarding the Ride permit includes: (1) a technical report indicating hazardous conditions at or near the site, (2) reports and studies documenting an unlined and unfenced Class I hazardous waste dump underlying an unknown expanse of the Sea World leasehold, and (3) disclosure of sensitive habitat areas in or near the proposed development, and disclosure of areas of state or federally listed rare, threatened or endangered species.

A) A technical report indicating hazardous conditions at or near the Ride, issued in January, 2002, entitled: "Results of Soil Vapor Assessment Sea World Expansion Plan, 16-acre Tract" ("January 2002 Study").

The January 2002 Study's subject location is the eastern area of the guest parking lot, which is adjacent to the Ride location. The report indicates a triple checked detection of over 1,820 parts per million (ppm) of hydrogen sulfide (H2S) gas in a test well within the guest parking lot. (Exhibit A). The test well, J-24, is only approximately 315 feet from the location of the Ride location's boundary. (See Map, Exhibit B). The close proximity of test well J-24 to an intense public use area such as the proposed Ride is extraordinarily significant, given that a nearby incident involving H2S poisoning caused the death of one person and hospitalization of eight others in 1988. Specifically, one

workman died and eight workmen were injured while digging the foundation for a South Shores boat launch ramp. The cause of the death and injuries was H2S poisoning. (Exhibit C). The boat launch ramp is farther away from the J-24 well than that of the Ride development.

This information is significant because it suggests that there is a severe health and safety risk associated with both building and operating the Ride. H2S is a potentially lethal gas. If inhaled, an extreme hazard exists at 10ppm and is potentially lethal at 100ppm. (Exhibit D).

Geological conditions at the site make the H2S threat much more significant than might be under other circumstances. The area is prone to liquefaction, near fault zones, and contains loose, unconsolidated fill which allows gases and liquids to migrate and move easily. These combined characteristics make for a potentially dangerous release of H2S gas up the Ride's pilings and foundations or other pathways. An earthquake or other geological incident could cause subsidence of the unconsolidated fill, collapsing the soils, cracking pavement and forcing toxic gas into the air. (Exhibit D).

In short, the January 2002 Study containing information about high levels of H2S near the Ride's perimeter should have been disclosed to the Commission. The applicant was legally required to give the Commission this information so that the Commission could consider the potential effects associated with H2S contamination and development of the Ride on coastal resources.

Proof of the Applicant's intent to include incomplete information is demonstrated by the following facts:

1) The Applicant did not disclose in its permit application the January 2002 Study even though Section II, Question #8 of the application specifically requested listing of any geologic or other technical reports. (Exhibit E). Yet this study was clearly within the possession and knowledge of the Applicant, because the cover sheet indicates it was prepared exclusively for Sea World San Diego.

2) The January 2002 Study was leaked to Earth Corps by a confidential informant who was gravely concerned about the continuing permitting of Sea World's expansion projects without proper disclosure of significant information.

B) Studies and reports indicating the existence of an unlined and unfenced Class I hazardous waste dump underlying the Sea World leasehold.

The Applicant knowingly failed to disclose that an industrial Class I hazardous waste dump had been operating in and around the location of the Ride, and that the exact boundaries of the toxic hazardous waste dump were unknown. (See Exhibit F, Cover Story, *San Diego Weekly Reader,* July 20, 2000 for in depth coverage of this matter).

Proof of the Applicant's intent to include incomplete information in the Coastal Development Permit application is demonstrated by the following facts:

1) The Applicant did not disclose in its permit application the studies and reports indicating the existence of the toxic hazardous waste dump even though Section II, Question #8 of the application specifically requested listing of any geologic or other technical reports. The only report disclosed was a "Report of Preliminary Geotechnical Investigation Sea World Atlantis Project," dated October 16, 2000." (Exhibit G). This report made no mention of the toxic hazardous waste dump and the geological considerations related thereto. Indeed, other relevant technical reports existed that were within the possession and knowledge of the Applicant, were clearly relevant to the Ride application, discussed the existence of the toxic hazardous waste dump, but were withheld from the Commission. (See Exhibit H, "Assessment Report Sea World Lease Expansion," prepared for Mr. Kevin Carr, Sea World of California, June 9, 1997 by Fluor Daniel GTI).

2) The staff report makes no mention of the Class I hazardous toxic waste dump.

3) The Applicant was aware at least as early as May 2002 that a Technical Advisory Committee (TAC) had been formed by the San Diego City Council to address: where are the exact boundaries of the industrial toxic waste dump (versus the City landfill); and, to what extent is the toxic waste dump's chemicals leaking and migrating?[1] However, the Applicant failed to disclose this extremely important and pertinent information to the Commission.

C) Failure to disclose the existence of sensitive habitat areas in or near the proposed development and areas of state or federally listed rare, threatened or endangered species

The applicant was in possession and had knowledge about the following facts at the time the Commission considered the Ride permit application. However, the Applicant knowingly withheld this information from the Commission:

1. The Project is approximately 50 yards south of the Pacific Passage (South Shore) of Mission Bay, a primary foraging location for California Least Tern (Sterna antillarum brownie).

This information is significant because noise, lights and activity associated with the Splash Down amusement ride would be expected to interrupt foraging and discourage use of this habitat. California Brown Pelicans, other terns and game fishes also prey on concentrations of anchovies and smelt in the shallow waters of the Passage. Eel grass beds and Tidewater Gobies were formerly present.

[1] The first official meeting of the TAC took place on August 16, 2002. A representative of Sea World, who is also a TAC member, attended.

2. The project is approximately 120 yards north of the Least Tern Nesting Site.

This information is significant because breeding birds carry fish taken in Pacific Passage in the shortest direct route to their nestlings; a route whose airspace would be blocked by the 90 foot high rollercoaster ride, forcing a longer route or different foraging or nesting site. This could have a direct impact on fledging success; hence a negative impact on total number of birds successfully fledged.

3. The project is ~250 yards north, but only across Sea World Drive from Sea World Parking Lot, from the San Diego River Estuary, a fully tidal wetland, and ~ 350 yards from the Famosa Wetlands, both highly functional salt marsh harboring at least eight listed species and occasionally host six more.

This information is significant because additional traffic and parking generated by this Ride could increase the stress and displace sensitive species.

Proof of the Applicant's intent to include incomplete information in the Coastal Development Permit application is demonstrated by the following facts:

1) The Coastal Development Application, Section III, question number 9 asks whether the proposed development is in or near (a) sensitive habitat areas, or (b) areas of state or federally listed rare, threatened, or endangered species. In both cases, the applicant checked the "No" box. (Exhibit E).

2) The staff report makes no mention of the above-referenced information regarding sensitive habitat areas and areas of state or federally listed endangered species.

IV. Inclusion Of Any of This Information Would Have Caused The Commission To Require Additional Or Different Conditions On A Permit Or Deny An Application

Disclosure of the January 2002 Study and information about the Class I hazardous waste dump would have either caused the Commission to require additional or different conditions on the permit, relocate the Ride, or deny the application altogether. This is clear by the fact that the Commission denied an application only eight months later by the same applicant based on the above-referenced information.

On May 7, 2003, the Coastal Commission denied a proposal for a 1,353 car parking lot across 10.5-acres ("Parking Lot"). At that time, members of the public had informed the Commission that a highly toxic hazardous waste dump was known to be located on San Diego's Mission Bay, underneath a portion of the Sea World leasehold. Thanks to the information provided by the public to the Commission staff, the Parking lot staff report included a detailed discussion of the dump. Staff pointed out that "Representatives of [the RWQCB] have indicated in the past that only minimal structural

improvements can occur over landfills and that capping the site with asphalt is the preferable use." Staff Report, App. No. 6-03-006, April 14, 2003, p. 5. Despite the staff's recommendation that the Commission approve the Parking Lot, members of the public pointed out that Sea World should be required to analyze and remediate the dump before it is granted a permit to pave over the site. The Commission agreed and denied the application.

In contrast to the Parking Lot staff report, the Ride staff report makes no mention of the hazardous waste dump despite the fact that the applicant knew that the relocated Ride is at least adjacent to, if not on top of, the toxic hazardous waste dump. Not surprisingly, then, the Ride staff report does not address the issue of removing the asphalt cap at the Ride location for construction of foundations for structures which range between 65 and 85 feet in height. If the Commission had known about the existence of the toxic hazardous waste dump, at the very least it most certainly would have heeded RWQCB's advice that only minimal structural improvements could occur and that capping the site with asphalt is the preferable use.

Unlike the Ride staff report, the Parking Lot staff report discusses the TAC investigation. The TAC's purpose is to determine constituents, boundaries and potential leakage of both the household landfill and the Class I toxic hazardous waste dump. The fact that the TAC investigation was ongoing was one reason why the Commission voted to deny the Parking Lot permit. In contrast, the Ride staff report makes no mention of the TAC investigation, even though the applicant knew of the TAC's existence at the time the Commission considered the Ride permit. Had the Commission been advised of the TAC's existence, mission and purpose, it would have likely determined that the TAC investigation be allowed to conclude prior to consideration of the Ride development permit at that location.

Finally, information regarding the close proximity of the proposed Ride to sensitive habitat areas and state or federally listed endangered species would have likely caused the Commission to either relocate the Ride or attach additional conditions to the permit in order to protect these areas and species from damage.

V. The Commission Executive Director Should Initiate Revocation Proceedings Immediately

The regulations require the Executive Director to review a petition for revocation and initiate revocation proceedings unless the request is "patently frivolous and without merit." 14 Cal. Code. Regs. §13106. If grounds exist for revocation of a permit, the operation of the permit shall be automatically suspended until the Commission votes to deny the request for revocation. §13107.

The Petitioner has specified with particularity the grounds for revocation of the above-cited permit. Therefore, Petitioner respectfully requests that the Executive

Director initiate revocation proceedings, immediately suspend the permit, and agendize the matter on the next regularly-scheduled Commission meeting. Time is of the essence because the Applicant is racing to complete the development. Construction must be halted immediately and the Commission must be given an opportunity to consider the Ride permit based on complete and accurate information.

Respectfully Submitted,

Sabrina Venskus, Esq.
For Petitioner California Earth Corps

cc: Ralph Faust
Deborah Lee
Don May

EXHIBIT A

Results of Soil Vapor Assessment SeaWorld Expansion Plan, 16-Acre Tract

Prepared for

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Prepared by
IT Corporation
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January 2002
IT Corporation Project 830418

IT CORPORATION
A Member of The IT Group

RESULTS OF SOIL VAPOR ASSESSMENT
SEAWORLD EXPANSION PLAN, 16-ACRE TRACT

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Appendix B Laboratory Analytical Report and Chain-of-Custody

List of Acronyms and Abbreviations

%	percent by volume
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
1,1,1-TCA	1,1,1-trichloroethane
C_2H_6	ethane
CH_4	methane
CO_2	carbon dioxide
COC forms	chain-of-custody forms
ESD	Environmental Services Department
FADLs	Field Activity Daily Logs
FID	flame ionization detector
FID/TCA	flame ionization detector/total combustion analysis
FDGTI	Fluor Daniel GTI, Inc.
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
H_2S	hydrogen sulfide
IDLH	immediately dangerous to life or health
IT	IT Corporation
Landfill	Mission Bay Landfill
LEA	Local Enforcement Agency, City of San Diego Solid Waste
LFG	landfill gas
M&RP	Monitoring and Reporting Program
MEK	2-butanone
N_2	nitrogen
O_2	oxygen
PCBs	polychlorinated biphenyls
ppb	parts per billion
ppmv	parts per million by volume
RWQCB	Regional Water Quality Control Board
SeaWorld	SeaWorld San Diego
SVOCs	semivolatile organic compound
TCD/GC	thermal conductivity detection/gas chromatography
TGNMO	total gaseous non-methane organics
TOCs	total organic compounds
VOCs	volatile organic compounds
WDRs	Waste Discharge Requirements

1.0 Introduction and Summary of Conclusions

On behalf of SeaWorld San Diego (SeaWorld), IT Corporation (IT) prepared this report to document soil vapor data collected from the 16-acre tract of the proposed SeaWorld development. The proposed development is near the City of San Diego's closed Mission Bay Landfill (Landfill). While the proposed development will not encroach upon the waste-fill area of the Landfill, this work was commissioned to assess the migration of landfill gas (LFG) from the Landfill to the development area, and to determine the nature and extent of detectable soil gas parameters of concern.

This work was conducted in general accordance with the work plan approved by the City of San Diego Solid Waste Local Enforcement Agency (LEA) (Appendix A). On October 22 and 23, 2001, IT directed the installation of temporary soil vapor probes at 28 locations. On October 23 and 24, 2001, IT staff collected soil vapor samples from these probes. Using portable field meters, the soil vapor samples were analyzed for methane, carbon dioxide, oxygen and total organic compounds (TOCs). Based on these field analytical results, additional soil vapor samples were collected from five probe locations that had detectable methane, and submitted to laboratories for more detailed analyses. 24 hr.

Elevated methane concentrations were observed at some of the sampling locations. No field methane concentrations greater than 0.5 percent by volume (%) were found at distances greater than 400 feet from the Landfill, and all methane concentrations greater than 5 % were observed within 300 feet of the approximate edge of the Landfill. No individual volatile organic chemicals (VOCs), such as petroleum VOCs or the halogenated VOCs present in degreasers, solvents and oil aerosol propellants, were detected in any of the laboratory samples. This suggests that the source of the methane is the decomposition of buried green waste or fill soil containing a relatively high organic content, rather than typical municipal solid waste.

The methane detected in the soil vapor immediately adjacent to the Landfill is routinely found, monitored and mitigated in developments in southern California near landfills, and can be properly addressed in future development at SeaWorld using common engineering practices.

2.0 Background

The SeaWorld Master Plan (ProjectDesign Consultants, 2001) proposes to build facilities on a portion of 16 acres of land located east of the existing SeaWorld Adventure Park and north of the Mission Bay Landfill, as illustrated in Figures 1 and 2. The wastes contained in the landfill may generate LFG which is composed of methane, carbon dioxide, and toxic and/or hazardous air contaminants that may be released through a permeable soil surface. Landfill gas, if present in the vicinity of the proposed expansion, could potentially present a hazard to the constructors and to the development.

The tract proposed for development was formed by placement of fill that was dredged from Mission Bay. The fill may contain natural organic matter. The decay of organic material in the fill may generate a naturally-occurring soil gas having similarities to landfill gas.

The Mission Bay Landfill was closed in 1959, and was covered (capped) with over five feet of soil between 1959 and 1962. The landfill is currently maintained in accordance with two documents.

- *Post Closure Land Use Plan for Mission Bay South Shores Phase III* (RDI&A, *et al.*, 1995). The post closure land use plan was prepared by the City's consultant and is functionally the City's Report of Waste Discharge and Post Closure Maintenance Plan for the landfill.

- *Order 97-11, General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills Within the San Diego Region* (RWQCB, 1997). The landfill owner, the City of San Diego, is required to comply with the Waste Discharge Requirements (WDRs) and Monitoring and Reporting Program (M&RP) presented in Order 97-11.

The City Environmental Services Department (ESD) performs groundwater and surface water detection monitoring at the frequency required by Order 97-11. The City has two groundwater monitoring wells on the perimeter of the landfill in the vicinity of the proposed SeaWorld expansion. The data collected by the City has not indicated a landfill release to groundwater in the vicinity of the proposed expansion area (EMCON/OWT, 2001).

In 1997, SeaWorld contracted Fluor Daniel GTI, Inc. (FDGTI) to perform a Phase II Environmental Assessment of the land east of the existing adventure park and north of the landfill (FDGTI, 1997). FDGTI drilled and constructed six groundwater monitoring wells, and

sampled and analyzed groundwater from the wells. The results indicated low concentrations of acetone and 2-butanone (MEK) were present in soil, and trace concentrations of 1,1,1-trichloroethane (1,1,1-TCA) were present in groundwater. Acetone had a maximum soil concentration of 220 micrograms per kilogram (µg/kg) (220 parts per billion by weight [ppb]). MEK was detected once in soil at a concentration of 36 ppb. 1,1,1-TCA had a maximum concentration of 7.2 micrograms per liter (µg/L) (7.2 ppb) in groundwater. FDGTI also detected hydrogen sulfide gas (9 parts per million by volume [ppmv]) and methane (1,000 ppmv) in one soil boring at a depth of 35 feet.

The Regional Water Quality Control Board (RWQCB) requested in 2001that the City ESD and SeaWorld jointly gauge and sample their respective wells to provide an up-to-date "snapshot" of groundwater elevations and groundwater concentrations. The joint monitoring event occurred in the week of July 9, 2001 (EMCON/OWT, 2001).

Wells within the proposed expansion area (LE-1, LE-4, LE-6, MBW-2, and MBW-3) were analyzed for VOCs, semivolatile organic compound (SVOCs), pesticides, herbicides, and polychlorinated biphenyls (PCBs), one VOC was detected. Diethyl ether was present in wells MBW-2 and MBW-3 at trace concentrations of 1.7 and 3.6 ppb (µg/L). One SVOC compound, bis(2-ethylhexyl)phthalate, was detected in Wells LE-1 and MBW-2 at concentrations of 11.2 and 3.6 ppb (EMCON/OWT, 2001).

The following table summarizes the groundwater and soil results reported by FDGTI (1997) and EMCON/OWT (2001).

Summary of Previously Collected Soil and Groundwater Data

Chemical Name (CAS Number)	Media Detected (Date)	Maximum Detected Concentration	Regulatory Limits	Notes
Acetone (67-64-1)	Soil (1997)	220 µg/kg	PRG 6,200 mg/kg	Chemical is a common laboratory contaminant, and the detection may be a false positive.
2-butanone (78-93-3)	Soil (1997)	36 µg/kg	PRG 28,000 mg/kg	Chemical is a common laboratory contaminant, and the detection may be a false positive.
1,1,1-trichloroethane (71-55-6)	Groundwater (1997) [not detected in 2001]	7.2 µg/L	MCL 200 µg/L PRG 540 µg/L	
Diethyl ether (60-29-7)	Groundwater (2001)	3.6 µg/L	PRG 1,200 µg/L	Chemical is a common laboratory contaminant, and the detection may be a false positive.
Bis(2-ethylhexyl)phthalate (117-81-7)	Groundwater (2001)	11.2 µg/L	MCL 4 µg/L PRG 4.8 µg/L	Chemical is a common laboratory contaminant, and the detection may be a false positive.

Explanation:
CAS = Chemical Abstracts Service registry number.
MCL = primary Maximum Contaminant Level for drinking water (California Dept. of Health Services).
PRG = Preliminary Remediation Goal (for industrial soil or tap water) published in the lookup table of screening values published in the U.S. EPA Region IX "PRG2000 Table."
µg/kg = micrograms per kilogram (parts per billion [ppb]).
µg/L = micrograms per liter (parts per billion [ppb]).
mg/kg = milligrams per kilogram (parts per million [ppm]).

General note about regulatory limits:

The MCLs and PRGs are provided here for comparison purposes only. The MCLs and PRGs for groundwater are only applicable to drinking water, and are not applicable at the subject site because the local groundwater is not used for drinking water purposes and the aquifer is not designated for beneficial use by the RWQCB.

3.0 Collection and Analysis of Soil Vapor Samples

This section addresses probe construction methods and details, sample collection methods, and analytical techniques used for soil vapor samples.

3.1 Soil Vapor Probe Construction

Soil vapor probes were constructed at the 28 locations illustrated in Figure 2. The locations were spaced at approximately 100-foot intervals. The temporary soil vapor probes were installed by HP Labs using a truck-mounted direct push/hammer Strataprobe drilling rig. The direct push drilling method advances a 2-inch-diameter drive point and produces no soil cuttings. The soil displaced by drilling is pushed laterally away from the boring.

The work plan proposed that soil vapor probes be installed at depths of 5- and 15-feet, at each location. Because of the shallow groundwater encountered at some locations, the proposed 15-foot probe was not completed at those locations. Instead, the deep probe was installed at 10 or 12 feet below ground surface or no deep probe was installed. No borings were advanced beyond the water table, which is between 10- and 20-feet below grade (EMCON/OWT, 2001). Table 1 lists the construction details for each soil vapor probe.

A typical deep probe included a steel penetration cone with gas inlet perforations. The cone attached to 1/8-inch diameter nylon tube that connected the penetration cone to the sampling port located above the ground surface. Silica sand was added to the annular space surrounding the gas inlet perforation to create a sand pack around the probe.

After completing the deep probe sand pack, bentonite was added to the annular space of the boring, and hydrated in two-foot lifts. When the annular space had been filled up to five feet below grade, a 1-inch long screen (connected to nylon tubing) was lowered down the boring into the annular space to act as the shallow vapor probe. This screen was then surrounded by sand. The remainder of the annular space was filled with bentonite, hydrated in two-foot lifts.

The surface expression of a typical vapor probe installation consisted of two 1/8-inch-diameter nylon tubes exiting the ground surface, and sealed with a Tygon ball valve. The ball valves allowed the tube to be sealed from atmospheric influence when the vapor probes were not in use, and allowed subsequent sampling at convenient times.

4.0 Analytical Results

This section describes the analytical results and provides an interpretation of the data.

4.1 Field Analytical Results

Table 2 provides tabulated results for the field analyses. The field methane measurements are illustrated in Figure 3.

Methane gas was not detected at 14 of the 28 probe locations; that is, the concentration of methane was below the detection limit of approximately 0.1 %. Six of the probe locations had methane concentrations greater than 1 %, and four probe locations had methane concentrations greater than 5 %. The highest methane concentration, 10.2 %, was detected at soil vapor probe J-28s. Total organic compound concentrations ranged from undetectable (<0.1 ppmv) to greater than 50,000 ppmv (the FID had a maximum detectable concentration of 50,000 ppmv). The highest TOC concentrations were detected at probes J-21s, J-24d, and J-28s. A qualitative comparison of the TOC and methane results indicates that the TOC and methane concentrations are approximately directly proportional.

Carbon dioxide concentrations ranged from non-detect (<0.1 %) to 19.5 %, and oxygen concentrations ranged from 7.2 % to 20.5 %. A qualitative comparison of the concentrations of methane, oxygen and carbon dioxide concentrations collected from the 28 probe locations indicates that, in general:

- Increasing methane concentrations corresponded to decreasing oxygen concentrations
- Increasing methane concentrations corresponded with increasing carbon dioxide concentrations.

4.2 Laboratory Analytical Results

Table 3 provides tabulated results for the five soil vapor samples analyzed at fixed base laboratories. The laboratory results are also depicted on the site plan in Figure 4. The laboratory analytical reports are provided in Appendix B.

Several observations are noted in the laboratory data.

- The laboratory methane results ranged from 0.43 % to 21.6 %, and were consistent with the field analytical results
- Ethane concentrations ranged from non-detect (<0.1 ppmv) to 14.4 ppmv
- The concentration of TGNMO ranged from 4.02 to 78.0 ppmv
- The concentration of hydrogen sulfide ranged from nondetect (<0.3 ppmv) to 1,820 ppmv
- No individual VOCs (e.g., halogenated VOCs and petroleum VOCs) were detected in the VOC individual analysis

4.3 Discussion of Analytical Results

Methane in shallow soil typically results from anaerobic decomposition of buried organic matter. The methane vapor that is generated by organic decay typically migrates away from the source toward areas of lower concentration via advection and diffusion. The distribution of methane field analytical results in Figure 3 illustrates that the highest methane concentrations (up to a maximum of 10.2 %), and all methane concentrations greater than 5 %, were observed within 300 feet of the approximate edge of the Mission Bay Landfill. At distances of greater than 400 feet from the landfill, the field methane concentrations were all below 0.5 %. The geographic distribution of methane data indicates that the source of methane is in the vicinity of the Mission Bay Landfill.

The field analytical results for a number of soil vapor probes (Figure 5) illustrate that elevated methane concentrations are coincident with decreased oxygen concentrations and increased carbon dioxide concentrations (e.g., probe J-28s, Table 2). These data relationships are consistent with anaerobic degradation being the source of methane.

Several probes have field analytical data that indicate aerobic degradation of organic matter. For instance, the presence of elevated TOC concentrations accompanied by near atmospheric concentrations of oxygen indicates that aerobic decomposition of organic material is occurring. Another indicator of aerobic decomposition is the presence of carbon dioxide with an absence of methane. This occurs because carbon dioxide is the respiratory by-product of aerobic microbial activity. Both of these indicators suggest that the fill contains a relatively high organic content that, in places, is degrading aerobically.

The low ethane concentrations (relative to methane) indicate that the methane source is decay of organic matter, and not petroleum natural gas.

Municipal solid waste landfill gas often contains trace concentrations of volatile organic compounds such as halogenated VOCs (e.g., the halogenated VOCs present in degreasers, solvents and old aerosol propellants) and petroleum VOCs (e.g., benzene, toluene, xylenes, ethylbenzene). No individual VOCs were detected in the soil vapor samples analyzed by GC/MS method. This suggests that the source of methane may not be typical landfill gas, such as municipal solid waste. Rather, the source of methane may be buried green waste or fill soil containing a relatively high organic content.

Volatile organic compounds were essentially not detectable in both groundwater and soil gas (the VOC detections in groundwater were only traces, or were possibly laboratory cross contamination). At other landfills, investigators have observed that the detection of VOCs in soil vapor is associated with corresponding detections of VOCs in groundwater, generally due to diffusion transport of VOCs from vapor into groundwater. In this investigation of Mission Bay Landfill, the VOC soil gas and groundwater results were both nondetect, which is consistent.

A portion of the organic matter may be in the form of sulfur compounds, which under anaerobic and sometimes under certain aerobic conditions, are converted to hydrogen sulfide. Typically, in most landfills, the hydrogen sulfide concentration is between 5 and 200 ppmv. The difference in the range is usually attributed to how much sludge the landfill received from sewage treatment plants or in a few cases the amount of construction material (drywall) accepted to the landfill. Sulfur reducing bacteria are present everywhere and these types of substrate lead to hydrogen sulfide production.

The unusually high concentration of hydrogen sulfide at one probe (1,820 ppmv in probe J-24d) is likely either an anomaly or the result of a deposit of sulfur materials in close proximity to the probe. Hydrogen sulfide is dangerous at a concentration of 10 ppmv and has an IDLH (Immediately Dangerous to Life or Health) concentration of 100 ppmv. While the concentration of the hydrogen sulfide in probe J-24d was above health safety limits, the concentration in the air above a landfill site is typically 2 to 3 orders of magnitude less, as the soil vapor dissipates into the atmosphere. However, caution and monitoring should still be applied at this location.

4.4 Discussion of Regulatory and Safety Issues

Our interpretation of the analytical data leads us to conclude that the Mission Bay Landfill is the source of relatively elevated concentrations of methane detected in soil vapor adjacent to the Mission Bay Landfill. This methane can be monitored and mitigated in future site development. In fact, methane is routinely monitored and mitigated at developments in southern California,

particularly in the Los Angeles Basin and Newport Beach areas where methane is encountered more frequently and methane mitigation measures are addressed in local building codes (methane in these areas is typically due to naturally occurring petroleum).

Landfill gas in this San Diego location is subject to the regulations in Title 27 -- the combined regulations relevant to landfills, enforced by the California Integrated Waste Management Board and the State Water Resources Control Board – and may be subject to additional regulations, including local building codes. IT believes that several safety practices and requirements of Title 27 apply to this site, based on the data collected in this study.

- The landfill owner should implement a landfill gas investigation, and possibly a gas monitoring program, that is in accordance with Title 27.
- The landfill owner must ensure "that the concentration of methane does not exceed the lower explosive limit for methane at the facility property boundary" (Title 27). The LEL for methane is 5 %.
- Enclosed structures such as enclosed buildings, basements, vaults and sumps, that are constructed within 1,000 feet of a landfill boundary may require periodic methane monitoring or continuous methane monitoring (e.g., a methane detector and alarm).
- If structures are built near the landfill, in the future, then the design may need to incorporate gas mitigation measures, such as active gas control measures (e.g., gas extraction wells) or passive gas control measures (e.g., cutoff trenches, slurry walls and vent trenches).
- If structures have the potential to accumulate methane gas in enclosed spaces, then gas control measures may need to be incorporated into the structure (e.g., flexible membrane liners beneath foundations and floors, passive or active vent systems, gas detectors with alarms, and ignition source control).
- If the landfill and surrounding land is paved with materials that are impermeable to landfill gas, then there is potential to increase the effective seal of the ground surface. This could result in increased concentrations of landfill gas accumulating within soil vapor.

The landfill gas documented in this investigation can be mitigated in future development using common engineering practices.

5.0 References

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6.0 Disclaimer

The statements, opinions and conclusions contained in this report are based solely upon the services performed by IT Corporation (IT) as described in this report and the Scope of Work as established for the report by Client's budgetary and time constraints and the terms and conditions of the agreement with Client. In performing these services and preparing the report, IT relied upon the work and information provided by others, including public agencies, whose information is not guaranteed by IT Corporation.

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This report was prepared in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

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TABLES

TABLE 1
Details of Temporary Soil Vapor Probes
SeaWorld San Diego

Probe ID	Approximate Elevation of Ground Surface (feet)	Depth of "Shallow" Probe (feet)	Depth of "Deep" Probe (feet)
J-1	21	5	10
J-2	10	5	NC
J-3	18	5	10
J-4	18	5	10
J-5	17	5	10
J-6	13	5	NC
J-7	11	5	NC
J-8	18	5	10
J-9	13	5	NC
J-10	15	5	10
J-11	20	5	10
J-12	16	5	10
J-13	16	5	10
J-14	21	5	15
J-15	18	5	10
J-16	18	5	10
J-17	19	5	12
J-18	19	5	15
J-19	20	5	15
J-20	18	5	15
J-21	19	5	15
J-22	19	5	15
J-23	19	5	15
J-24	19	5	15
J-25	20	5	15
J-26	19	5	15
J-27	20	5	15
J-28	20	5	15

Notes:
1) Soil vapor probes were installed on October 22 and 23, 2001.
2) The anulus between the deep and shallow probes was filled with bentonite.
3) The anulus surrounding the soil gas screens was willed with silica sand.
4) NC = not constructed

TABLE 2
Field Analytical Results
SeaWorld San Diego

Probe ID	Depth	Date	Time	Methane (CH_4) %	Carbon Dioxide (CO_2) %	Oxygen (O_2) %	Balance Gas %	Total Organic Compounds (TOC) ppmv	Notes
J-1	Shallow	10/24/2001	1230	0.0	0.0	20.4	79.6	36	
J-1	Deep	10/24/2001	1235	0.0	1.3	18.8	79.9	59	Slight sulfur odor
J-2	Shallow	10/24/2001	1240	0.1	3.5	18.0	78.4	2,564	Sulfur odor
J-2	Shallow	10/25/2001	645	0.0	2.8	18.8	78.4	2,600	
J-3	Shallow	10/24/2001	1355	0.0	1.0	18.4	80.6	41	
J-3	Deep	10/24/2001	1400	0.0	0.9	18.9	80.2	68	
J-4	Shallow	10/24/2001	1220	0.0	0.9	19.0	80.1	30	
J-4	Deep	10/24/2001	1225	0.0	0.8	19.2	80.0	29	
J-5	Shallow	10/24/2001	1210	0.0	0.6	19.7	79.7	32	
J-5	Deep	10/24/2001	1215	0.0	0.4	19.7	79.9	34	
J-6	Shallow	10/24/2001	1200	0.0	0.0	20.4	79.6	34	
J-7	Shallow	10/24/2001	1150	0.0	0.9	19.0	80.1	41	
J-8	Shallow	10/24/2001	1245	0.0	0.3	19.7	80.0	413	
J-8	Deep	10/24/2001	1250	0.0	1.0	18.7	80.3	1,110	
J-9	Shallow	10/24/2001	1130	0.0	3.5	16.5	80.0	46	
J-10	Shallow	10/24/2001	1135	0.0	0.4	19.8	79.8	43	
J-10	Deep	10/24/2001	1140	0.0	0.3	19.9	79.8	41	
J-11	Shallow	10/23/2001	1720	0.1	1.9	17.1	80.9	NA	
J-11	Shallow	10/24/2001	1255	0.0	1.4	19.0	79.6	41	
J-11	Deep	10/23/2001	1730	0.2	2.9	15.8	81.1	NA	
J-11	Deep	10/24/2001	1300	0.1	1.1	18.8	80.0	2,859	
J-12	Shallow	10/24/2001	1115	0.0	0.0	20.2	79.8	49	
J-12	Deep	10/24/2001	1120	0.0	0.9	18.9	80.2	55	
J-13	Shallow	10/24/2001	1105	0.0	0.8	19.2	80.0	275	
J-13	Deep	10/24/2001	1110	0.0	3.7	15.3	81.0	1,000	
J-14	Shallow	10/23/2001	1700	0.0	NA	NA	NA	NA	
J-14	Shallow	10/24/2001	1305	0.0	1.9	19.0	79.1	900	
J-14	Shallow	10/25/2001	730	0.0	3.8	18.1	78.1	1,600	Sulfur odor
J-14	Deep	10/23/2001	1710	6.1	5.7	12.6	75.6	NA	
J-14	Deep	10/24/2001	1310	0.7	0.8	19.3	79.2	13,900	
J-14	Deep	10/25/2001	730	1.6	1.9	18.3	78.2	35,000	Sulfur odor
J-15	Shallow	10/24/2001	1040	0.0	0.2	19.8	80.0	71	
J-15	Deep	10/24/2001	NA	0.3	1.1	18.9	79.7	4,380	

TABLE 2
Field Analytical Results
SeaWorld San Diego

Probe ID	Depth	Date	Time	Methane (CH_4) %	Carbon Dioxide (CO_2) %	Oxygen (O_2) %	Balance Gas %	Total Organic Compounds (TOC) ppmv	Notes
J-16	Shallow	10/24/2001	1055	0.1	0.2	20.0	79.7	2,420	
J-16	Deep	10/24/2001	1100	0.5	0.7	19.3	79.5	7,050	
J-17	Shallow	10/23/2001	1640	0.0	2.9	17.8	79.3	NA	
J-17	Shallow	10/24/2001	1345	0.0	0.6	19.8	79.6	37	
J-17	Deep	10/23/2001	1650	0.5	0.2	20.1	79.2	NA	
J-17	Deep	10/24/2001	1350	0.1	0.0	20.4	79.5	1,844	Strong sulfur odor
J-18	Shallow	10/23/2001	1600	0.1	8.9	15.8	75.2	NA	
J-18	Shallow	10/24/2001	1335	0.0	3.4	18.6	78.0	890	
J-18	Deep	10/23/2001	1620	0.0	0.0	20.3	79.7	NA	
J-18	Deep	10/24/2001	1340	0.0	0.0	20.4	79.6	34	
J-19	Shallow	10/23/2001	1530	0.0	0.0	20.4	79.6	NA	
J-19	Shallow	10/24/2001	1315	0.2	2.4	18.6	78.8	4,200	
J-19	Deep	10/23/2001	1545	NA	NA	NA	NA	NA	No vapor flow
J-19	Deep	10/24/2001	1320	0.0	0.0	20.5	79.5	38	
J-20	Shallow	10/24/2001	1000	0.2	0.2	20.2	79.4	2,778	
J-20	Deep	10/24/2001	1005	0.0	0.0	20.4	79.6	32	Very low vapor flow rate
J-21	Shallow	10/24/2001	945	6.2	5.5	16.2	72.1	>50,000	FID flame out
J-21	Shallow	10/25/2001	655	6.1	4.7	17.4	71.8	47,000	FID flame out
J-21	Deep	10/24/2001	950	0.0	0.0	20.5	79.5	32	
J-22	Shallow	10/23/2001	1345	0.0	5.1	17.2	77.7	NA	
J-22	Shallow	10/24/2001	1405	0.0	1.6	19.2	79.2	86	
J-22	Deep	10/23/2001	1345	NA	NA	NA	NA	NA	Water in probe line
J-22	Deep	10/24/2001	1410	NA	NA	NA	NA	NA	No vapor flow, water in vapor line
J-23	Shallow	10/23/2001	1400	1.6	8.9	15.3	74.2	NA	
J-23	Shallow	10/24/2001	1415	0.5	1.4	19.3	78.8	6,600	
J-23	Deep	10/23/2001	1400	NA	NA	NA	NA	NA	Water in probe line
J-23	Deep	10/24/2001	1420	0.0	0.0	20.4	79.6	30	
J-24	Shallow	10/23/2001	1420	0.0	5.5	16.0	78.5	NA	
J-24	Shallow	10/24/2001	1425	0.6	2.2	18.7	78.5	10,700	Sulfur odor
J-24	Shallow	10/25/2001	720	8.4	8.8	16.2	66.6	>50,000	Sulfur odor
J-24	Deep	10/23/2001	1440	1.8	1.2	18.9	78.1	NA	Strong sulfur odor
J-24	Deep	10/24/2001	1430	3.6	2.7	19.0	74.7	>50,000	Strong sulfur odor
J-24	Deep	10/25/2001	725	9.4	7.5	17.4	65.7	>50,000	FID Flame out; Strong sulfur odor

TABLE 2
Field Analytical Results
SeaWorld San Diego

Probe ID	Depth	Date	Time	Methane (CH_4) %	Carbon Dioxide (CO_2) %	Oxygen (O_2) %	Balance Gas %	Total Organic Compounds (TOC) ppmv	Notes
J-25	Shallow	10/23/2001	1500	0.0	2.5	17.9	79.6	NA	
J-25	Shallow	10/24/2001	1435	0.0	1.3	19.0	79.7	25	
J-25	Deep	10/23/2001	1515	0.0	0.0	20.4	79.6	NA	
J-25	Deep	10/24/2001	1440	0.0	0.0	20.4	79.6	23	
J-26	Shallow	10/24/2001	900	2.1	2.3	19.4	76.2	34,000	
J-26	Deep	10/24/2001	915	0.0	0.0	20.4	79.6	2	
J-27	Shallow	10/24/2001	920	0.0	0.3	20.1	79.6	716	
J-27	Deep	10/24/2001	925	0.0	0.0	20.5	79.5	13	Water in probe line, strong sulfur odor
J-28	Shallow	10/23/2001	1335	10.2	19.5	7.2	63.1	1,775	
J-28	Shallow	10/24/2001	1445	6.0	7.6	15.5	70.9	>50,000	FID flame out
J-28	Shallow	10/25/2001	710	4.0	6.4	16.6	73.0	>50,000	FID flame out
J-28	Deep	10/23/2001	1340	0.0	0.0	20.5	79.5	2	
J-28	Deep	10/24/2001	1450	NA	NA	NA	NA	NA	Water in vapor line

NOTES
1) % = percent by volume
2) ppmv = parts per million by volume
3) Measurements were conducted after purging three liters from each vapor probe.
4) Methane, carbon dioxide, and oxygen levels were measured using a CES Landtec GEM 500. Methane levels were detected by infared absorbtion while carbon dioxide and oxygen were detected by galvanic cell.
5) Total organic compound (TOC) values were measured using a flame ionization detector (FID) calibrated to methane.
6) NA = not analyzed.

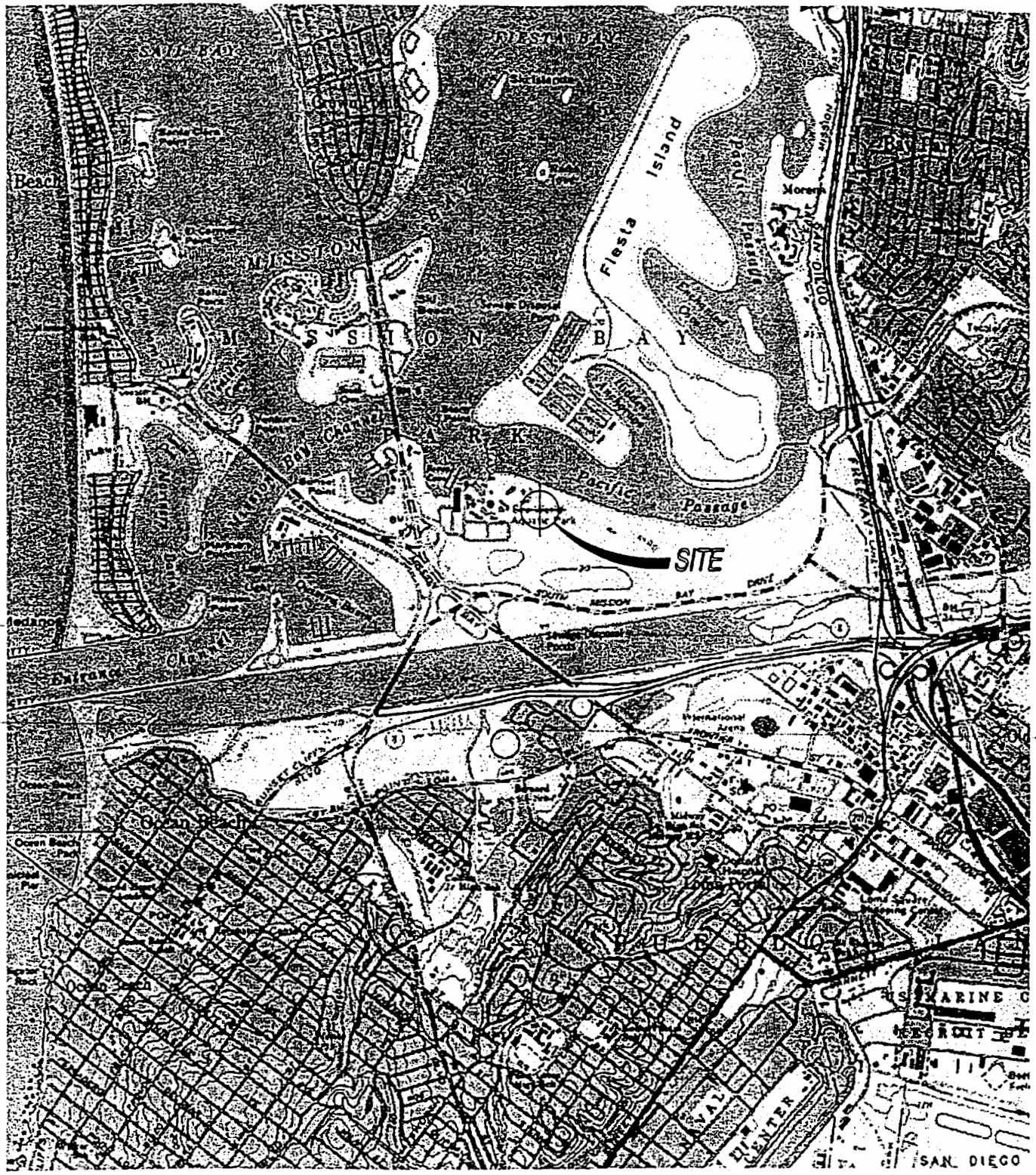
TABLE 3
Fixed Laboratory Analytical Results
SeaWorld San Diego

Probe ID	Depth of Probe	Methane (CH_4) (%)	Carbon Dioxide (CO_2) (%)	Oxygen (O_2) (%)	Nitrogen (N_2) (ppmv)	Hydrogen Sulfide (H_2S) (ppmv)	Ethane (C_2H_6) (ppmv)	Total Gaseous Non-methane Organics (ppmv)	Individual Volatile Organic Compounds (ppmv)
J-2	Shallow	0.43	7.51	16.2	75.5	ND (<0.3)	ND (<1.0)	4.02	ND (<1.0)
J-14	Deep	3.17	2.95	17.8	76.4	0.47	4.97	27.3	ND (<1.0)
J-21	Shallow	21.6	15.6	9.6	53.5	9.41	14.4	60.7	ND (<1.0)
J-24	Deep	13.1	10.9	16.0	60.2	1,820	7.55	78.0	ND (<1.0)
J-28	Shallow	8.97	14.9	11.3	65.2	ND (<0.3)	3.46	132	ND (<1.0)

Notes:
1) % = percent by volume
2) ppmv = parts per million by volume
3) Vapor samples were collected after purging three liters from each vapor probe.
4) The samples were collected on October 25, 2001.
5) Methane, carbon dioxide, and oxygen were measured by thermal conductivity detection/gas chromatorgraphy (TCD/GC).
6) Hydrogen sulfide was analyzed by gas chromatography with a Hall electrolytic conductivity detector operated in an oxidative sulfer mode
7) "Individual Volatile Organic Compounds" comprises 24 compounds measured by EPA Method 8260B. No compounds were detected in any of the five samples.
8) Total Gaseous Non-methane Organics (TGNMO) was measured by flame ionization detection/total combustion analysis (FID/TCA), EPA Method 25.
9) ND (<0.3) = analyte at or below reported detection limit

FIGURES

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
SCH 10/31/01			828286-B6



IT CORPORATION

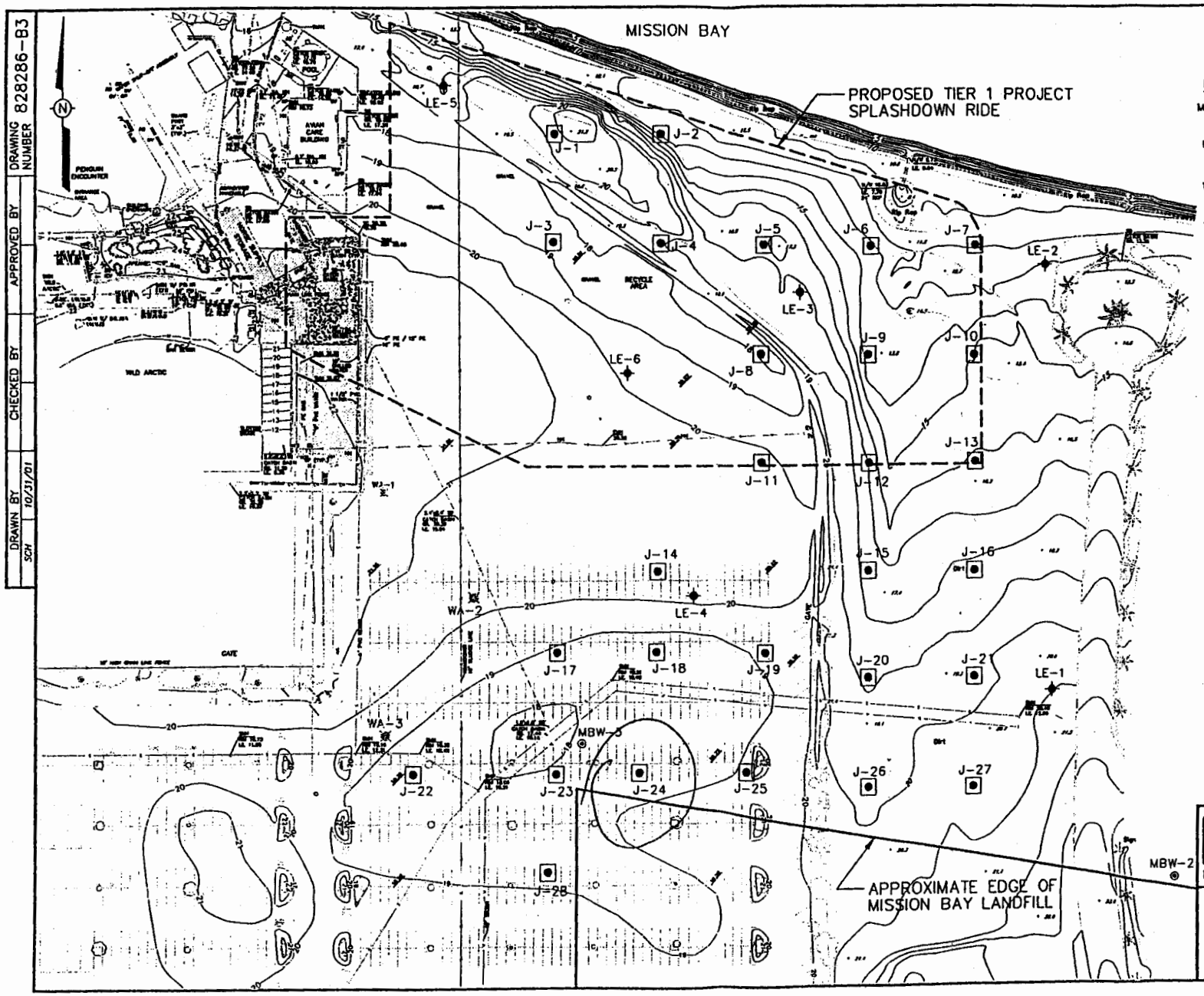
SEAWORLD
500 SEAWORLD DRIVE
SAN DIEGO, CALIFORNIA

FIGURE 1

SITE MAP

SOURCE
PRINTED FROM TOPO!
2001 NATIONAL GEOGRAPHIC HOLDINGS, INC.

SCALE
0 1/2 1 MILE



LEGEND:

MBW-2 ⊙ CITY ESD GROUNDWATER MONITORING WELL

LE-2 ✦ SEAWORLD GROUNDWATER MONITORING WELL

WA-1 ⊠ ABANDONED GROUNDWATER MONITORING WELL

J-3 ▣ TEMPORARY SOIL VAPOR PROBE

NOTE:

BASE MAP PROVIDED BY PGAV, INC. LAND SURVEY DATA REPORTED TO BE FROM HALE ENGINEERING SURVEYED AUGUST, 2000

UTILITY NOTE:

UNDERGROUND UTILITY LINES SHOWN ON THIS PLA ARE DERIVED FROM RECORDS OF INFORMATION PROVIDED BY SEA WORLD. LOCATION OF SURFAC SURFACE FEATURES AND THEIR GRADES ARE ACTU LOCATIONS. LOCATION OF UNDERGROUND UTILITIE MUST BE VERIFIED PRIOR TO CONSTRUCTION.

BENCHMARK:

ELEVATIONS SHOWN ON THIS PLAN ARE ON "SEAWORLD DATUM" (SWD). MEAN SEA LEVEL PER CITY OF SAN DIEGO IS REFERENCED AS FOLLOWS: CITY OF SAN DIEGO ENGINEER'S BRASS DISK IN THE NORTHWEST CORNER OF CONCRETE BOAT RAMP AT SOUTH SHORES PARK. ELEVATION 6.68 MSL = 9.82 SWD

SCALE

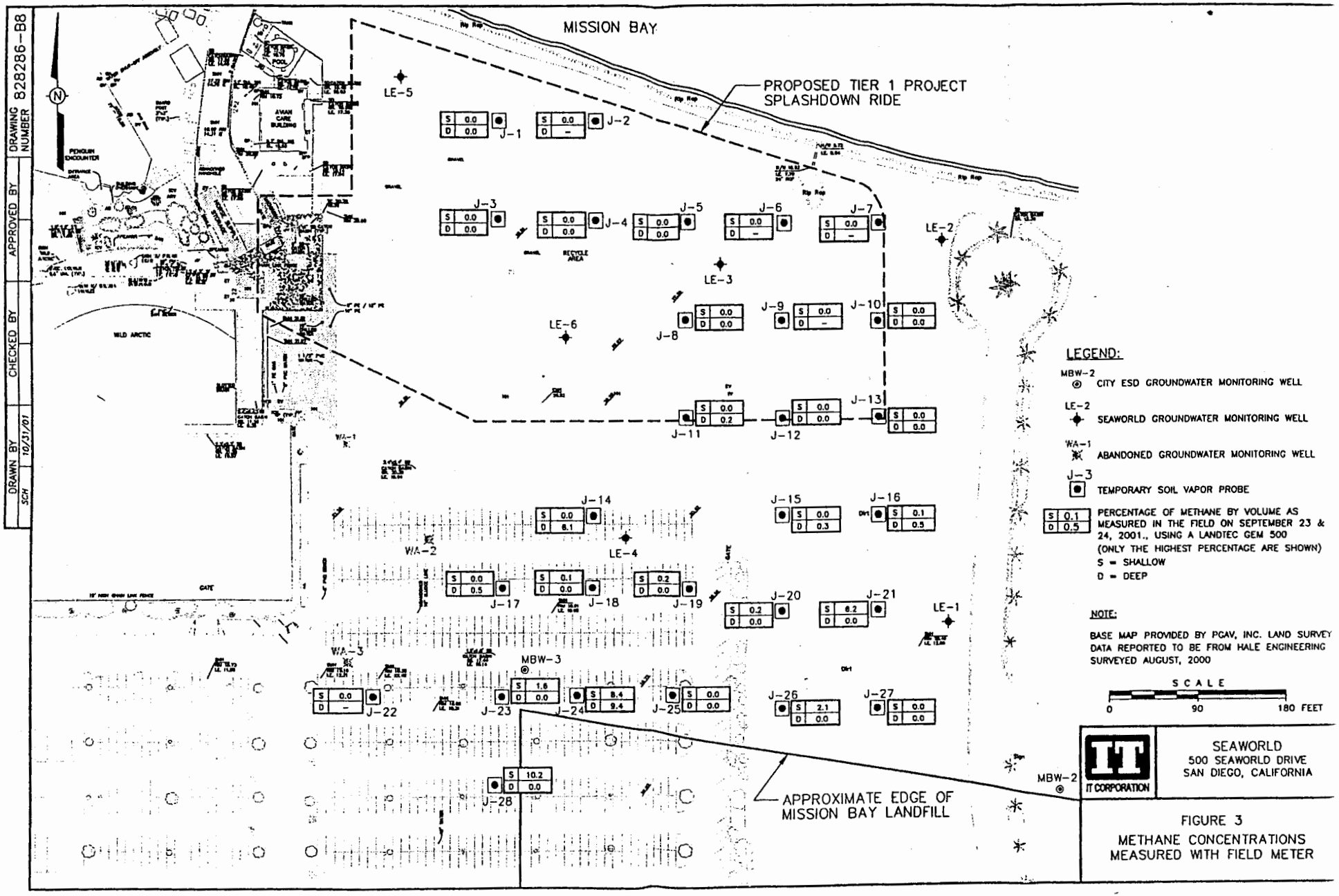
0 90 180 FEET

IT CORPORATION

SEAWORLD
500 SEAWORLD DRIVE
SAN DIEGO, CALIFORNIA

FIGURE 2
SITE PLAN AND LOCATION
OF SOIL VAPOR PROBES

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
SCH 10/31/01			828286-B3


MISSION BAY
PROPOSED TIER 1 PROJECT
SPLASHDOWN RIDE
LE-5
LE-2
LE-3
LE-6
LE-4
LE-1
J-1
J-2
J-3
J-4
J-5
J-6
J-7
J-8
J-9
J-10
J-11
J-12
J-13
J-14
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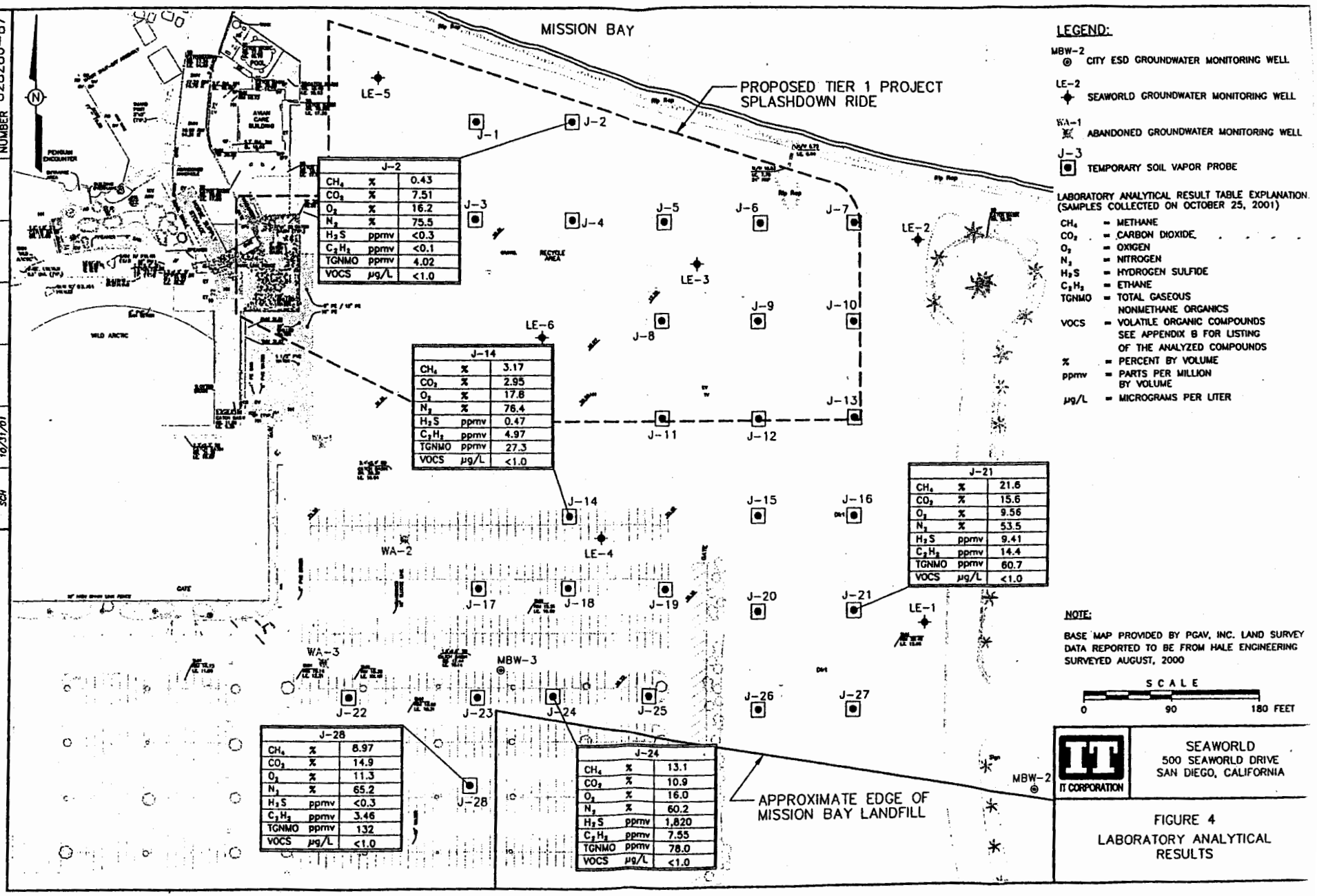
J-24
J-25
J-26
J-27
J-28
WA-1
WA-2
WA-3
MBW-3
MBW-2
APPROXIMATE EDGE OF
MISSION BAY LANDFILL
LEGEND:
MBW-2 CITY ESD GROUNDWATER MONITORING WELL
LE-2 SEAWORLD GROUNDWATER MONITORING WELL
WA-1 ABANDONED GROUNDWATER MONITORING WELL
J-3 TEMPORARY SOIL VAPOR PROBE
PERCENTAGE OF METHANE BY VOLUME AS MEASURED IN THE FIELD ON SEPTEMBER 23 & 24, 2001., USING A LANDTEC GEM 500 (ONLY THE HIGHEST PERCENTAGE ARE SHOWN)
S = SHALLOW
D = DEEP
NOTE:
BASE MAP PROVIDED BY PGAV, INC. LAND SURVEY DATA REPORTED TO BE FROM HALE ENGINEERING SURVEYED AUGUST, 2000
SCALE
0 90 180 FEET
IT CORPORATION
SEAWORLD
500 SEAWORLD DRIVE
SAN DIEGO, CALIFORNIA
FIGURE 3
METHANE CONCENTRATIONS
MEASURED WITH FIELD METER
DRAWING NUMBER 828286-B8
APPROVED BY
CHECKED BY
DRAWN BY SCH 10/31/01



J-2		
CH_4	%	0.43
CO_2	%	7.51
O_2	%	16.2
N_2	%	75.5
H_2S	ppmv	<0.3
C_2H_2	ppmv	<0.1
TGNMO	ppmv	4.02
VOCS	µg/L	<1.0

J-14		
CH_4	%	3.17
CO_2	%	2.95
O_2	%	17.8
N_2	%	76.4
H_2S	ppmv	0.47
C_2H_2	ppmv	4.97
TGNMO	ppmv	27.3
VOCS	µg/L	<1.0

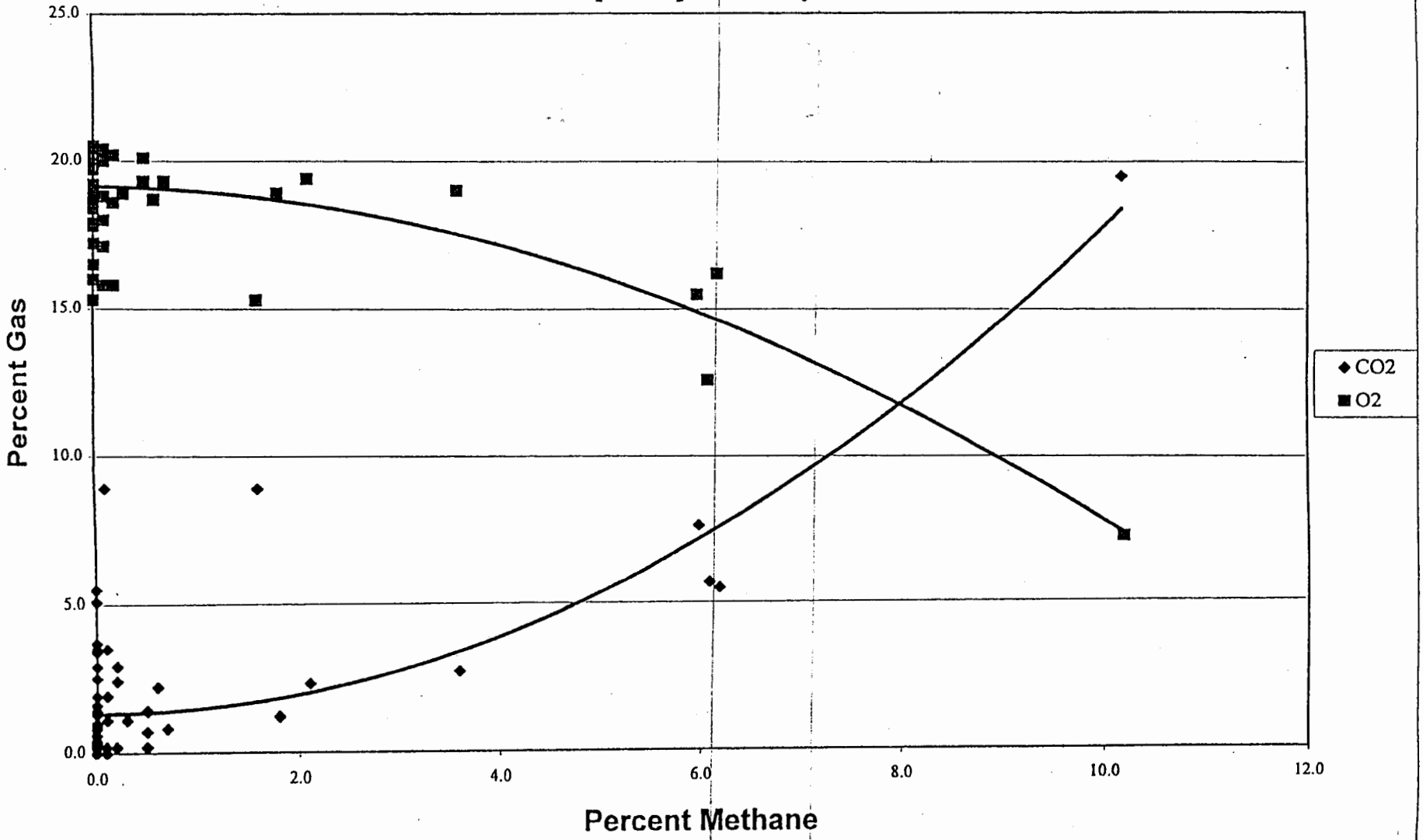
J-21		
CH_4	%	21.6
CO_2	%	15.6
O_2	%	9.56
N_2	%	53.5
H_2S	ppmv	9.41
C_2H_2	ppmv	14.4
TGNMO	ppmv	60.7
VOCS	µg/L	<1.0

J-28		
CH_4	%	8.97
CO_2	%	14.9
O_2	%	11.3
N_2	%	65.2
H_2S	ppmv	<0.3
C_2H_2	ppmv	3.46
TGNMO	ppmv	132
VOCS	µg/L	<1.0

J-24		
CH_4	%	13.1
CO_2	%	10.9
O_2	%	16.0
N_2	%	60.2
H_2S	ppmv	1,820
C_2H_2	ppmv	7.55
TGNMO	ppmv	78.0
VOCS	µg/L	<1.0

FIGURE 5

Methane vs CO_2 and O_2 Field Analytical Results



n:\seaworld\eir_work\Sheet1 Chart 2\Sheet1 Chart 2

APPENDIX A
WORK PLAN FOR SOIL VAPOR ASSESSMENT

IT Corporation
1230 Columbia Street, Suite 1200
San Diego, CA 92101-8517
Tel. 619.239.1690
Fax. 619.239.1238

A Member of The IT Group

July 20, 2001

IT Corporation Project 828286

Ms. Rebecca Lafreniere, REHS
Environmental Health Specialist
Solid Waste Local Enforcement Agency
City of San Diego
1222 First Avenue, MS 501
San Diego, CA 92101-4155

Work Plan for Soil Vapor Assessment
SeaWorld Expansion Plan, 16-Acre Tract

Dear Ms. Lafreniere:

On behalf of SeaWorld, IT Corporation (IT) prepared this work plan to collect soil vapor data from the 16-acre tract of the proposed SeaWorld expansion. While the proposed expansion will not be above the Mission Bay Landfill, and the landfill is not known to generate appreciable landfill gas (LFG), a concern has been expressed that landfill gas may be present in the proposed expansion area. The objectives of this work plan are to determine if landfill gas is present in the expansion area, and to determine the nature and extent of detectable soil gas parameters of concern.

On behalf of SeaWorld, IT requests that Solid Waste Local Enforcement Agency (LEA) review and comment on this work plan by August 3, 2001, prior to the beginning of field work which is scheduled to start in August of 2001. IT has also sent copies of this work plan to the San Diego Regional Water Quality Control Board (RWQCB) and City of San Diego Environmental Services Department (City ESD) to solicit their review and comment prior to field work.

Background

The SeaWorld Master Plan (ProjectDesign Consultants, 2001) proposes to build facilities on a portion of 16 acres of land located east of the existing SeaWorld adventure park and north of the Mission Bay Landfill, as illustrated in Figure 1. The wastes contained in the landfill may generate LFG which is composed of methane, carbon dioxide, and toxic and/or hazardous air

contaminants that may be released through a permeable soil surface. Landfill gas, if present in the vicinity of the proposed expansion, could potentially present a hazard to the constructors and the development.

The tract proposed for development was formed by placement of fill that was dredged from Mission Bay. The fill may contain organic matter. The decay of organic material in the fill may generate a soil gas having similarities to landfill gas.

The Mission Bay Landfill was closed in 1959, and was covered (capped) with over five feet of soil between 1959 and 1962. The landfill is currently maintained in accordance with two documents.

- Post Closure Land Use Plan for Mission Bay South Shores Phase III (RDI&A, RBF/Sholders and Sanford, Woodward-Clyde Consultants and Randall Lamb Consultants; 1995). The post closure land use plan is functionally a Report of Waste Discharge and Post Closure Maintenance Plan for the landfill.
- Order 97-11, General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills Within the San Diego Region (RWQCB, 1997). The landfill owner, the City ESD, is required to comply with the Waste Discharge Requirements (WDRs) and Monitoring and Reporting Program (M&RP) presented in Order 97-11.

The City ESD performs groundwater and surface water detection monitoring at the frequency required by Order 97-11. The City has two groundwater monitoring wells on the perimeter of the landfill in the vicinity of the proposed SeaWorld expansion. The data collected by the City has not indicated a landfill release to groundwater in the vicinity of the proposed expansion area. The City has also collected landfill gas data that indicate the landfill generates minor quantities of landfill gas (verbal communication between T. Mulder of IT and City ESD staff).

In 1997, SeaWorld contracted Fluor Daniel GTI (FDGTI) to perform a Phase II Environmental Assessment of the land east of the existing adventure park and north of the landfill. FDGTI drilled and constructed six groundwater monitoring wells, and sampled and analyzed groundwater from the wells. The results indicated low concentrations of acetone and 2-butanone (MEK) were present in soil, and trace concentrations of 1,1,1-trichloroethane (1,1,1-TCA) were present in groundwater. Acetone had a maximum soil concentration of 220 micrograms per kilogram (µg/kg) (220 parts per billion by weight [ppb]). MEK was detected once in soil at a concentration of 36 ppb. 1,1,1-TCA had a maximum concentration of 7.2 micrograms per liter (µg/L) (7.2 ppb) in groundwater. FDGTI also detected hydrogen sulfide gas (9 parts per million by volume [ppmv]) and methane (1,000 ppmv) in one soil boring at a depth of 35 feet.

The RWQCB has requested that the City ESD and SeaWorld jointly gauge and sample their respective wells to provide an up-to-date "snapshot" of groundwater elevations and groundwater concentrations. The joint monitoring event occurred in the week of July 9, 2001.

Based on the 1997 groundwater data from eight groundwater monitoring wells in the vicinity of the proposed development, IT concludes that the detectable volatile organic compounds (VOCs) in groundwater are present only at trace concentrations, and the low groundwater VOC concentrations do not indicate a significant human health risk to the proposed development. This conclusion should be re-evaluated after the joint groundwater data are available.

SeaWorld design and engineering staff plan to address soil gas concerns in two ways. First, this soil gas survey will be performed to determine if landfill gas impacts exist in the expansion area, and to determine the nature and extent of detectable soil gas parameters of concern. Second, if soil gas issues are identified, then proper mitigation measures will be designed and incorporated into the grading and construction plans. Soil and soil gas screening will be performed during grading and construction activities to monitor worker health and safety. The work proposed here will accomplish the first measure and allow planning of the second measure.

Soil Vapor Assessment Work Plan

The soil vapor assessment work plan proposed here was designed after four applicable or appropriate references.

- *County of San Diego, 2000. SAM Manual 2000. Prepared by Department of Environmental Health (DEH) Site Assessment and Mitigation (SAM) Division.* Section 5 of the SAM Manual provide guidance on site assessment techniques for soil gas surveys.
- *County of San Diego, 2001. Draft Guideline for Laboratory Analysis of Soil Gas Samples. Prepared by DEH SAM, dated May 21.* The guideline is intended for use whenever soil gas samples are collected for purposes of a human health risk assessment to be submitted to SAM.
- *South Coast Air Quality Management District (SCAQMD), 2000. Rule 1150.1. Control of Gaseous Emissions from Municipal Solid Waste Landfills.* Rule 1150.1 provides a useful set of rules for monitoring, sampling and analyzing landfill gas.
- *Los Angeles RWQCB. 1997. Interim Guidance for Active Soil Gas Investigation.*

The LFG parameters of concern include the potential fire/explosive potential of methane and the health risk exposure hazards of hydrogen sulfide and VOCs. The primary LFG components to be evaluated are the following.

Parameters of Concern	
Parameter	**Analytical Method**
Methane (CH_4)	Fixed or mobile lab analysis by gas chromatograph (GC) (EPA Method 18) or combustion analysis (EPA Method 25).
Hydrogen sulfide (H_2S)	Fixed or mobile lab analysis by sulfur chemiluminescence (SCAQMD Method 307-91) or flame photo ionization detector (FPD) (Air Resources Board [ARB] Method 16).
Volatile organic compounds (VOCs)[a]	Fixed or mobile lab analysis by GC/MS (County of San Diego, 2001).

[a] – Benzene, benzyl chloride, chlorobenzene, 1,2-dibromoethane (ethylene dibromide), dichlorobenzene, 1,1-dichloroethane (1,1-DCA), 1,2-DCA, 1,1-dichloroethene (1,1-DCE), cis-1,1-DCE, trans-1,1-DCE, dichloromethane (methylene chloride), tetrachloroethene (PCE), tetrachloromethane (carbon tetrachloride), toluene, 1,1,1-trichloroethane (1,1,1-TCA), 1,1,2-TCA, trichloroethene (TCE), trichloromethane (chloroform), vinyl chloride, xylene, Freon 11, Freon 12, and Freon 113.

Additional LFG components shall be collected to evaluate the nature and extent of soil gas conditions.

Parameters of Interest	
Parameter	**Analytical Method**
Methane (CH_4)	Field meter analysis by *Landtec GEM 500* (or equivalent meter) or flame ionization detector (FID) (methods in Rule 1150.1)
Carbon dioxide (CO_2)	Field meter analysis by *Landtec GEM 500* (or equivalent meter) (method in Rule 1150.1)
	Fixed or mobile lab analysis by GC (EPA Method 18) or combustion analysis (EPA Method 25).
Oxygen (O_2)	Field meter analysis by *Landtec GEM 500* (or equivalent meter) (method in Rule 1150.1)
	Fixed or mobile lab analysis by GC (EPA Method 18) or combustion analysis (EPA Method 25).
Hydrogen sulfide (H_2S)	Field meter analysis by *Jerome 631X* (or equivalent meter)
Total organic compounds (TOC)	Field meter analysis measured as methane by flame ionization detector (FID) (method in Rule 1150.1)
Total non-methane organic compounds (NMOC)	Fixed or mobile lab analysis by GC (EPA Method 18) or combustion analysis (EPA Method 25).

Sample spacing and depth. Active soil vapor samples will be collected from a depth of 5- and 15-feet, from temporary soil vapor probes spaced approximately 100 feet apart, at the approximate locations illustrated in Figure 1. The temporary soil vapor probes will be placed using a truck-mounted hydraulic-drive equipment, and left in place no longer than two to three days. No borings will be advanced below the water table, which is between 10- and 20-feet below grade. Because of the shallow water table, the proposed 15-foot depth of vapor sampling may actually be shallower at some locations.

In this field investigation, no permanent vapor monitoring points will be constructed. The need for permanent vapor sampling probes will be evaluated later, after evaluating the results of this investigation. The LEA may request the City ESD to install permanent LFG monitoring probes on the perimeter of the landfill, in accordance with Division 2, Title 27, which is the combined State Water Resources Control Board/California Integrated Waste Management Board (SWRCB/CIWMB) regulations for solid waste.

Timing. The proximity to Mission Bay makes it likely that there are tidal fluctuations in groundwater. During the period of falling groundwater levels, the soil may intake air from the ground surface. During the period of rising water levels the soil may exhaust soil vapor to the ground surface. In order to detect the highest concentrations, the soil vapor samples will be collected during period of rising tides.

Purging. A minimum of three volumes of vapor will be withdrawn prior to sampling to purge the vapor probe and sampling device of ambient air, and purging will continue until the TOC concentration remains constant for at least 30 seconds. If the soil has insufficient permeability to purge as described above, then a lower volume purge may be necessary.

Reproducibility and Representativeness. All data will be collected and analyzed in a uniform manner to ensure the samples are reproducible and representative.
Sample documentation. Field personnel will document all field activities on Field Activity Daily Logs (FADLs), sample collection logs, and chain-of-custody (COC) forms.

The COC form shall accompany the bag samples. Each time a bag changes hands, it shall be logged on the custody sheet with the time of custody transfer recorded. Laboratory personnel shall record the condition of the sample (full, three-fourths full, one-half full, one-fourth full or empty).

Several of the sample locations will be surveyed to establish ground coordinates to within 0.1 feet horizontal and 0.01 feet vertical. The remaining sample locations will be documented by measuring distances of probes from surveyed points.

Sampling and Analysis. All gas probes at each depth shall be monitored for methane, CO_2, O_2 and balance gas (primarily nitrogen) using a *Landtec GEM 500* LFG meter or equivalent meter. At each boring the sample with the highest methane concentration (measured by field meter) will be analyzed for TOC measured as methane using a portable flame ionization detector (FID) meeting the requirements of Section 3.2 of Rule 1150.1.

If the probe TOC concentration exceeds five percent methane, then a vapor sample from that probe will be analyzed at a fixed base lab for methane, H_2S, VOCs, CO_2, O_2 and NMOCs.

If the TOC does not exceed 5% by volume in any of the probes, then bag samples will be collected from the four probes with the highest methane concentration. Those four samples will be analyzed at a fixed base lab for methane, H_2S, VOCs, CO_2, O_2 and NMOCs.

All samples will be analyzed using the methods described in the tables above. Note that the table describes multiple methods for some analyses. To ensure that the sample results are reproducible and comparable, a single method will be selected and used throughout the project.

The bag samples shall be kept in light-sealed containers to avoid photochemical reactions and shall be analyzed no later than 72 hours after collection.

Analyses. The field analyses will be performed in accordance with procedures in Rule 1150.1 and the instrument manufacturer's calibration and operation instructions. The fixed base or mobile laboratory analyses will be performed at a laboratory that is certified by the California Department of Health Services (DOHS) Environmental Laboratory Accreditation Program (ELAP), using the analytical methods listed in the above tables.

Report. IT will prepare a report to describe the field procedures and analytical results. The soil vapor sampling locations will be illustrated on a topographic map drawn to scale. The analytical results will be presented in tabular format and illustrated by means of isopleth maps, as appropriate.

We look forward to receiving your review comments by August 3, 2001. If you have any questions, please call Tom Mulder at 619.533.7302.

Sincerely,
IT Corporation

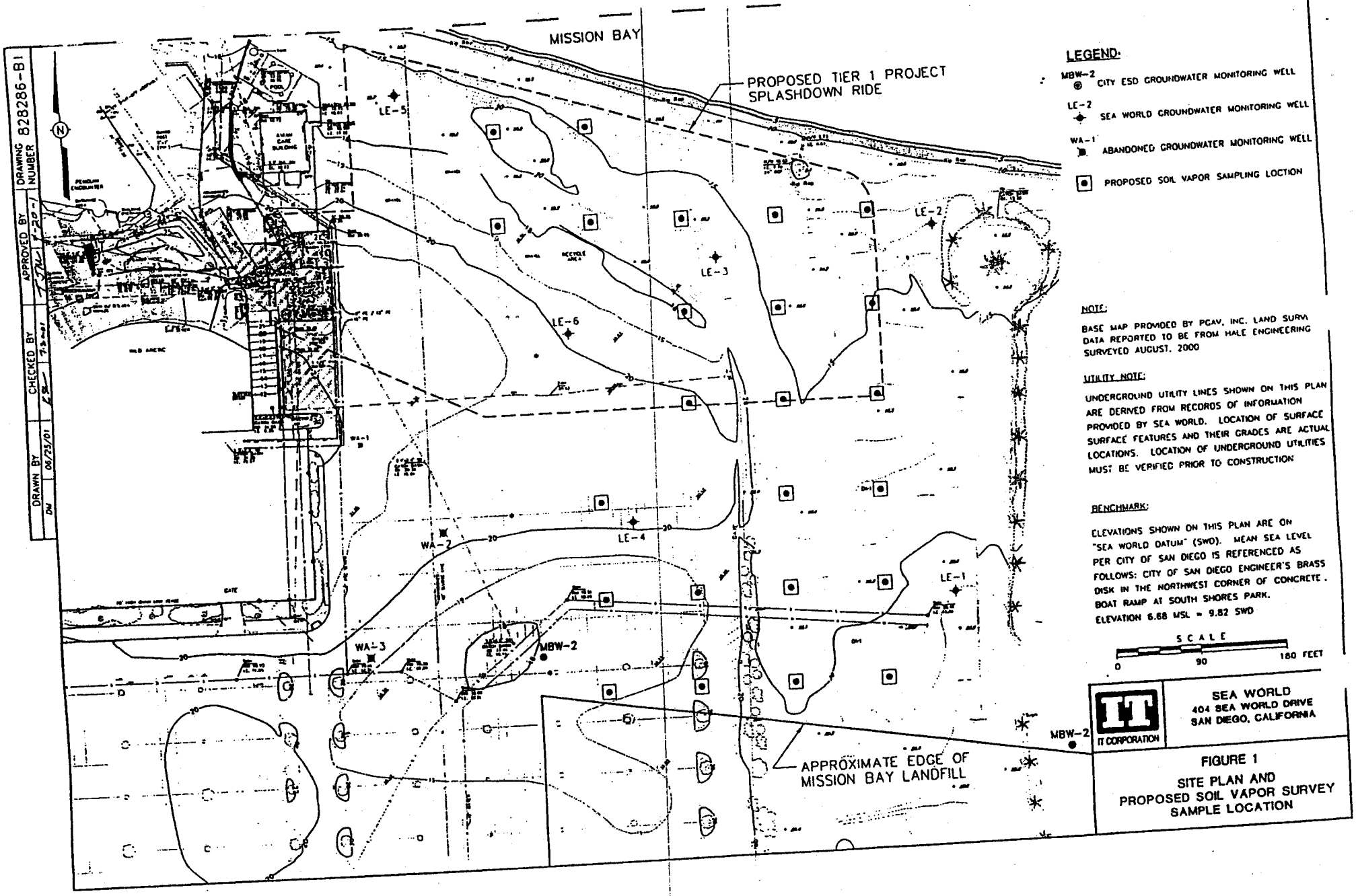
Thomas J. Mulder, RG, CEG, CHG
Project Manager

FOR Wayne Nakagawa, PE
Chemical Engineer

TJM:kae

enclosures Figure 1, Site Plan and Proposed Soil Vapor Survey Sample Location

c: Craig Carlisle, RWQCB
John Odermatt, RWQCB
Robert Ferrier, City ESD
Chris Gonaver, City ESD
George Morton, City ESD
Ray Purtee, City ESD
Diana Buchanan, IT Corp
Patrick Owen, SeaWorld
Greg Gourley, Sea World
Kevin Carr, SeaWorld
David Watson, Gray Cary
Robert Longstreth, Gray Cary
TJM/KSR/WN/JD/file/chron


MISSION BAY
PROPOSED TIER 1 PROJECT
SPLASHDOWN RIDE
LE-5
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LE-3
LE-6
LE-4
LE-1
WA-1
WA-2
WA-3
MBW-2
MBW-2
APPROXIMATE EDGE OF
MISSION BAY LANDFILL
LEGEND:
MBW-2
CITY ESD GROUNDWATER MONITORING WELL
LE-2
SEA WORLD GROUNDWATER MONITORING WELL
WA-1
ABANDONED GROUNDWATER MONITORING WELL
PROPOSED SOIL VAPOR SAMPLING LOCTION
NOTE:
BASE MAP PROVIDED BY PGAV, INC. LAND SURVI
DATA REPORTED TO BE FROM HALE ENGINEERING
SURVEYED AUGUST, 2000
UTILITY NOTE:
UNDERGROUND UTILITY LINES SHOWN ON THIS PLAN
ARE DERIVED FROM RECORDS OF INFORMATION
PROVIDED BY SEA WORLD. LOCATION OF SURFACE
SURFACE FEATURES AND THEIR GRADES ARE ACTUAL
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DISK IN THE NORTHWEST CORNER OF CONCRETE.
BOAT RAMP AT SOUTH SHORES PARK.
ELEVATION 6.68 MSL = 9.82 SWD
SCALE
0
90
180 FEET
IT CORPORATION
SEA WORLD
404 SEA WORLD DRIVE
SAN DIEGO, CALIFORNIA
FIGURE 1
SITE PLAN AND
PROPOSED SOIL VAPOR SURVEY
SAMPLE LOCATION
DRAWN BY
DW
06/25/01
CHECKED BY
APPROVED BY
DRAWING NUMBER
828286-B1

Mulder, Tom

From: Ray Purtee [RYP@sdcity.sannet.gov]
Sent: Friday, August 03, 2001 3:56 PM
To: tmulder@theitgroup.com
Subject: Soil Vapor Assessment Workplan

Our only comment to the workplan is to the third paragraph of page 2: since 1962 there has been additional cover material placed on the site in question. Without doing research, I cannot quantify how much additional cover has been placed. The point I'm making is that the area has not sat untended since 1962.

CITY OF SAN DIEGO SOLID WASTE LOCAL ENFORCEMENT AGENCY (LEA)
1222 First Avenue, MS 501 ○ San Diego, CA 92101-4155 ○ Tel (619) 446-5002 ○ Fax (619) 446-5001

August 24, 2001

Mr. Thomas Mulder, Project Manager
IT Corporation
1230 Columbia Street, Suite 1200
San Diego, CA 92101-8517

Faxed: 619-239-1238

Dear Mr. Mulder:

Subject: Work Plan for Soil Vapor Assessment, Sea World Expansion Plan, 16-Acre Tract

Per our telephone conversation earlier this month, the City of San Diego Solid Waste Local Enforcement Agency (LEA) has reviewed the proposed Sea World Soil Vapor Assessment Work Plan. To better assess the site in respect to potential landfill influences, the western end and northwest end of the landfill requires additional sampling locations. The LEA is requesting that a minimum of four additional sampling locations be added to the proposal to address these areas. Please submit a revised sampling location map identifying the new sampling locations.

Should you have any questions or would like to discuss this further, please contact me at (619) 446-5005.

Sincerely,

Rebecca Lafreniere

Rebecca Lafreniere
Solid Waste Inspector III

Cc: John Odermatt, RWQCB
Robert Ferrier, City ESD
Ray Purtee, City ESD
Patrick Owen, Sea World
Kevin Carr, Sea World

IT Corporation
1230 Columbia Street, Suite 1200
San Diego, CA 92101-8517
Tel. 619.239.1690
Fax. 619.239.1238

A Member of The IT Group

October 18, 2001

IT Corporation Project 830418

Ms. Rebecca Lafreniere
Solid Waste Local Enforcement Agency
City of San Diego
1222 First Avenue, MS 501
San Diego, CA 92101-4155

Work Plan for Soil Vapor Assessment
Response to LEA Comments
SeaWorld Expansion Plan, 16-Acre Tract

Dear Ms. Lafreniere:

In response to your comments of August 24, 2001, IT Corporation (IT) has added four soil vapor probe locations to the Work Plan for Soil Vapor Assessment. The four additional locations will be on the west and northwest side of the landfill. Enclosed is a revised site plan that shows all twenty-eight proposed vapor probe locations.

IT plans to begin the field work on October 22, and anticipates completing the field work by October 31, 2001.

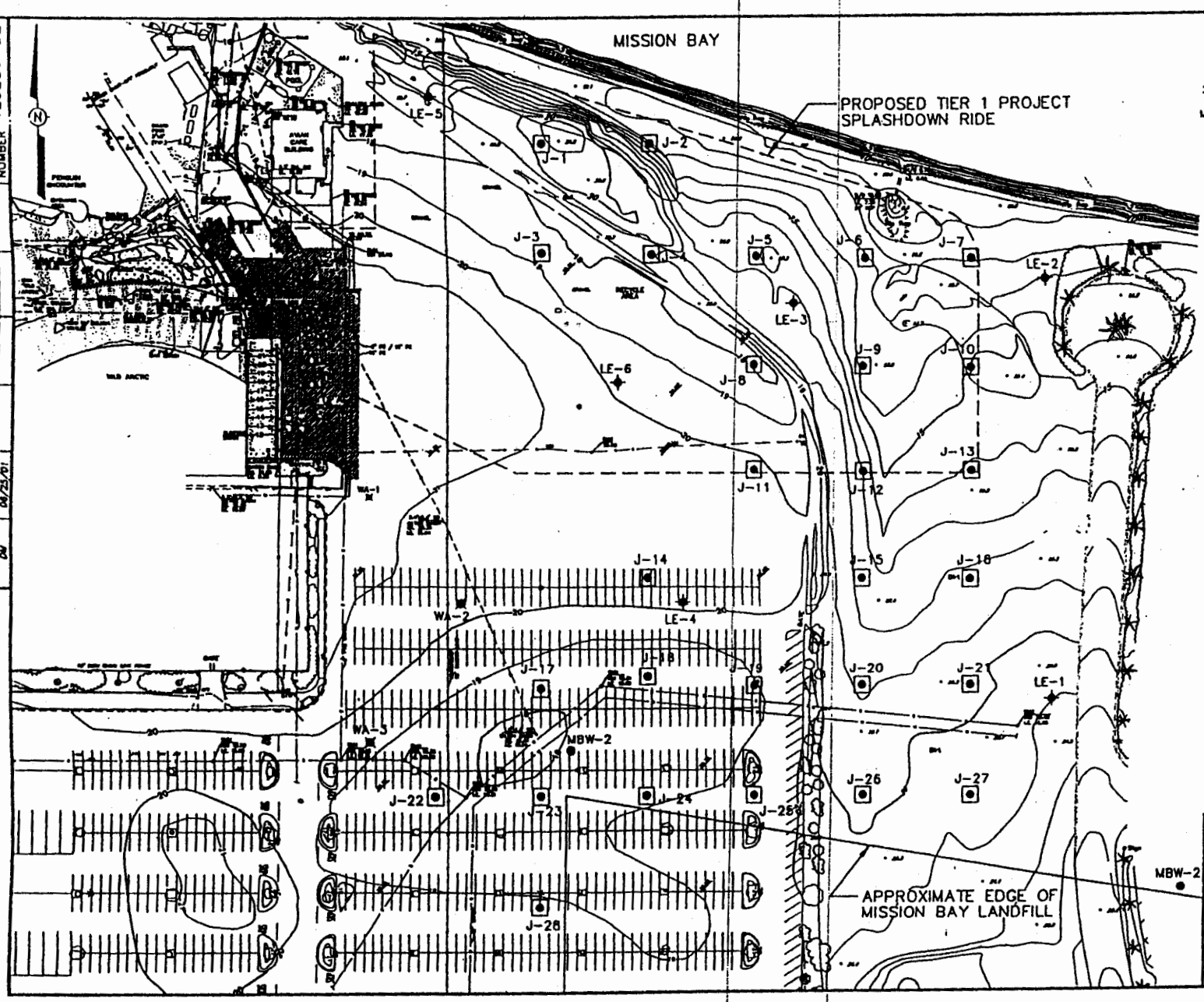
If you have any questions, please call Tom Mulder at 619.533.7302.

Sincerely,
IT Corporation

Thomas J. Mulder, RG, CEG, CHG
Project Manager
TJM:kae

enclosure

c: Craig Carlisle, RWQCB
John Odermatt, RWQCB
Robert Ferrier, City ESD
Ray Purtee, City ESD
Patrick Owen, SeaWorld
Greg Gourley, Sea World
Kevin Carr, SeaWorld
Robert Longstreth, Gray Cary



LEGEND:

MBW-2 CITY ESD GROUNDWATER MONITORING WELL

LE-2 SEA WORLD GROUNDWATER MONITORING WELL

WA-1 ABANDONED GROUNDWATER MONITORING WELL

J-3 PROPOSED SOIL VAPOR SAMPLING LOCATION

NOTE:

BASE MAP PROVIDED BY PGAV, INC. LAND SURVEY DATA REPORTED TO BE FROM HALE ENGINEERING SURVEYED AUGUST, 2000

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SCALE

0 90 180 FEET

IT CORPORATION

SEAWORLD
500 SEAWORLD DRIVE
SAN DIEGO, CALIFORNIA

FIGURE 1,
SITE PLAN AND FINAL
PROPOSED SOIL VAPOR SURVEY
SAMPLE LOCATION

DRAWN BY DW 06/25/01 CHECKED BY APPROVED BY NUMBER

APPENDIX B
LABORATORY ANALYTICAL REPORT AND CHAIN-OF-CUSTODY

11/9/01

IT Corporation
1230 Columbia Street, Suite 1200
San Diego, CA 92101

Project Name: Sea World
Project No.:

Attention: Mr. Tom Mulder

The following sample(s) were received and analyzed:

Date Received	Quantity	Matrix
10/26/01	5	Vapor

The samples were analyzed by one or more of the EPA methodologies or equivalent methods listed below.

VOCs -- EPA Method 8260

The results are included with a summary of the quality control procedures. Please note that the symbol "nd" indicates a value below the reporting limit for the particular compound in the sample.

Please feel free to call us to discuss any part of this report or to schedule future projects.

Sincerely,

Tamara Davis
Lab Director

Mobile One Laboratories is certified by the California Department of Health Services (certificate #s: 1194, 1561, 1921, 2088, 2278).

HP Labs Project # IT102601-10

148 S. Vinewood Street • Escondido, CA 92029 • Phone (760) 735-3208 • Fax (760) 735-2469

Report Summary

Narrative

Client: IT Corporation
Project: Sea World

Matrix: vapor
Units: ug/L

Date Analyzed: October 26, 2001

Since the analysis of benzyl chloride was requested for these samples and it is a compound not normally associated with the EPA Method 8260 calibration, it was searched as a tentatively identified compound (TIC). Each sample chromatogram was searched for the three ions associated with benzyl chloride (from the NSIT Library). Benzyl chloride was not identifed in any of the samples.

IT102601-10

Report Summary

EPA Method 8260B (5030 Prep.)

Client: IT Corporation
Project: Sea World

Matrix: vapor
Units: ug/L

Sample Name:		J-2 s	J-14 d	J-21 s	J-24 d	J-28 s	Method Blank
Analysis Date		26 Oct 2001	26 Oct 2001	26 Oct 2001	26 Oct 2001	26 Oct 2001	26 Oct 2001
Analysis Time		12:43 pm	1:27 pm	1:05 pm	2:31 pm	2:07 pm	11:40 am
Dilution Factor:	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Compound	E.Q.L	Amount Found	Amount Found	Amount Found	Amount Found	Amount Found	Amount Found
Dichlorodifluoromethane	1	nd	nd	nd	nd	nd	nd
Vinyl Chloride	1	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	1	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	1	nd	nd	nd	nd	nd	nd
Methylene Chloride	1	nd	nd	nd	nd	nd	nd
Freon-113	1	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	1	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	1	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	1	nd	nd	nd	nd	nd	nd
Chloroform	1	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	1	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	1	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	1	nd	nd	nd	nd	nd	nd
Benzene	1	nd	nd	nd	nd	nd	nd
Trichloroethene	1	nd	nd	nd	nd	nd	nd
Toluene	1	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane	1	nd	nd	nd	nd	nd	nd
Tetrachloroethene	1	nd	nd	nd	nd	nd	nd
Chlorobenzene	1	nd	nd	nd	nd	nd	nd
m,p-Xylene	1	nd	nd	nd	nd	nd	nd
o-Xylene	1	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	1	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	1	nd	nd	nd	nd	nd	nd

Surrogates	Spiked	QC Limits(% Rec.)		Percent Recovery				
DBFM	50 ng	75-125	98	106	102	102	98	99
1,2-DCA-d4	50 ng	70-130	99	104	100	98	97	96
Toluene - d8	50 ng	75-125	92	96	99	96	95	95
1,4-BFB	50 ng	75-125	89	94	90	91	89	89

Analyses performed by: Mark Lathrop

IT102601-10

Calibration Verification

EPA Method 8260B

Client: IT Corporation
Project: Sea World

Matrix: vapor
Units: ug/L

Sample Name: CCV
Analysis Date 26 Oct 2001
Analysis Time 11:08 am
Dilution Factor: 1

Compound		Amount Found	Percent Diff	CCC (-20 to +20%) Pass	EPA 8260 (-20 to +20%) Pass
Dichlorodifluoromethane		58	16		yes
Chloromethane		55	9		yes
Vinyl Chloride	CCC	57	14	yes	yes
Bromomethane		61	22		no
Chloroethane		59	18		yes
Trichlorofluoromethane		59	19		yes
1,1-Dichloroethene	CCC	50	1	yes	yes
Methylene Chloride		49	-3		yes
Freon-113		40	-20		no
trans-1,2-Dichloroethene		50	0		yes
1,1-Dichloroethane		54	8		yes
2,2-Dichloropropane		54	8		yes
cis-1,2-Dichloroethene		50	0		yes
Chloroform	CCC	53	6	yes	yes
Bromochloromethane		50	0		yes
1,1,1-Trichloroethane		51	2		yes
1,1-Dichloropropene		53	5		yes
Carbon Tetrachloride		51	3		yes
1,2-Dichloroethane		55	10		yes
Benzene		53	7		yes
Trichloroethene		51	1		yes
1,2-Dichloropropane	CCC	50	1	yes	yes
Bromodichloromethane		51	1		yes
Dibromomethane		51	2		yes
cis-1,3-Dichloropropene		49	-2		yes
Toluene	CCC	48	-4	yes	yes
trans-1,3-Dichloropropene		50	-1		yes
1,1,2-Trichloroethane		49	-2		yes
1,2-Dibromoethane		48	-3		yes
1,3-Dichloropropane		49	-1		yes

Calibration Verification

EPA Method 8260B

Client: IT Corporation
Project: Sea World

Matrix: vapor
Units: ug/L

Sample Name:

Compound		CCV Amount Found	Percent Diff		EPA 8260 (-20 to +20%) Pass
Tetrachloroethene		47	-6		yes
Dibromochloromethane		46	-8		yes
Chlorobenzene		51	1		yes
Ethylbenzene	CCC	50	0	yes	yes
1,1,1,2-Tetrachloroethane		53	5		yes
m,p-Xylene		101	1		yes
o-Xylene		50	0		yes
Styrene		50	0		yes
Bromoform		46	-8		yes
Isopropylbenzene		52	4		yes
1,1,2,2-Tetrachloroethane		48	-4		yes
1,2,3-Trichloropropane		47	-5		yes
n-propylbenzene		56	11		yes
Bromobenzene		51	2		yes
1,3,5-Trimethylbenzene		52	4		yes
2-Chlorotoluene		53	6		yes
4-Chlorotoluene		51	2		yes
tert-Butylbenzene		51	2		yes
1,2,4-Trimethylbenzene		52	3		yes
sec-Butylbenzene		51	2		yes
p-Isopropyltoluene		50	0		yes
1,3-Dichlorobenzene		49	-2		yes
1,4-Dichlorobenzene		48	-3		yes
n-Butylbenzene		53	7		yes
1,2-Dichlorobenzene		49	-3		yes
1,2-Dibromo-3-chloropropane		46	-8		yes
1,2,4-Trichlorobenzene		47	-7		yes
Hexachlorobutadiene		47	-6		yes
Naphthalene		41	-19		yes
1,2,3-Trichlorobenzene		44	-12		yes

Surrogates	Spiked	QC Limits(% Rec.)	
DBFM	50 ng	75-125	103
1,2-DCA-d4	50 ng	70-130	104
Toluene - d8	50 ng	75-125	97
1,4-BFB	50 ng	75-125	92

SUMMATION

CCC compounds pass the 8260B criteria

CALIBRATION VERIFIED

Footnote Summary

Footnote	Definition
E.Q.L.	Estimated Quantitation Limit
nd	Not detected above the E.Q.L. or detection limit.
J	The concentration reported is between the Method Detection Limit and the E.Q.L.
D	Concentration reported from a secondary dilution; E.Q.L.s adjusted accordingly.
B	Analyte found in the associated blank.
E	Analyte amount exceeds calibration range. Amount quantitated by extrapolation.
***	MS/MSD, LCS/LCSD recovery is outside QC range; no corrective action taken.
M	Surrogate recovery outside QC range due to matrix interference.
S	Because of necessary sample dilution, value was outside QC limits.
&	Gasoline range organics not identified as gasoline.
#	Diesel range organics not identified as diesel.
**	This compound has been screened by EPA method 8020. Any positive results should be confirmed by a second analysis.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 514597
Page 1 of 1

'roject Name/No. [1] SeaWorld
'e Team Members [2] J. DeWoody / S. Ceniga
Profit Center No. [3] /
Project Manager [4] Tom Mulder
urchase Order No. [6] 181761 OP
quired Report Date [11] 10/30/01

Samples Shipment Date [7] 10/25/01
Lab Destination [8] HP Lab
Lab Contact [9] Blayne H.
Project Contact/Phone [12] Tom Mulder 619-533-7302
Carrier/Waybill No. [13] Fed ex

Bill to: [5] IT Corp. San Diego

Report to: [10] IT Corp. 1230 Columbia St. Ste 1200 San Diego CA 92101 fax 619-239-1238

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
-2 s	Air	10/25/01 0650	1L Tedlar bag		Dark	VOCs by GC/MS SD County-2001 GC/MS		
-14 d		10/25/01 0730					FOR LAB USE ONLY	
21 s		10/25/01 0655						
28 s		10/25/01 0710						
24 d		10/25/01 0725					FOR LAB USE ONLY	

ecial Instructions: [23]

ssible Hazard Identification: [24]
n-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☑

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☒ Archive _____ (mos.)

rnaround Time Required: [26]
rmal ☐ Rush ☑

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

Relinquished by [28] (Signature/Affiliation) Sarah Ceniga	Date: 10/25/01 Time: 1500	1. Received by [28] (Signature/Affiliation)	Date: Time:
Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

omments: [29]
Analyze and report VOCs on attached list — by GC/MS

Write: To accompany samples
Yellow: Field copy
*See back or r
for special instructions.

MCA 3/15/91

Benzene, benzyl chloride, chlorobenzene, 1,2-dibromoethane (ethylene dibromide), dichlorobenzene, 1,1-dichloroethane (~~1,1-DCA~~), 1,2-DCA, 1,1-dichloroethene (1,1-DCE), cis-1,~~2~~-DCE, trans-1,1-~~D~~CE, dichloromethane (methylene chloride), tetrachloroethene (PCE), tetrachloromethane (carbon tetrachloride), toluene, 1,1,1-trichloroethane (1,1,1-TCA), 1,1,2-TCA, trichloroethene (TCE), trichloromethane (chloroform), vinyl chloride, xylene, Freon 11, Freon 12, and Freon 113

Analyze + Report above VOCs

COC # 514597 10/25/01

Monday, November 19, 2001

Tom Mulder
IT Corporation
1230 Columbia Street, Suite 1200
San Diego, CA 92101-8517

Dear Mr. Mulder:

This letter is in regards to the chain of custody for project number 181761 OP at Sea World (see copy enclosed). It has come to our attention the chain of custody was not signed "received" by HP Labs. These sample were indeed received by us via Fed Ex on 10/25/01. They arrived at our lab on 10/26/01 at 9:45 Am, and were analyzed that same day. Please except our apologies for this oversight. If there is anything we can do to help further please call us.

Sincerely,

Louise Adams

Louise Adams
Operations Manager

148 S. Vinewood Street • Escondido, CA 92029 • Phone (760) 735-3208 • Fax (760) 735-2469
132 N. Cedros Avenue • Solana Beach, CA 92075 • Phone (858) 793-0401 • Fax (858) 793-0404

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 514597
Page 1 of 1

Project Name/No. 1 SeaWorld
Sample Team Members 2 J. DeWoody / S. Ceniga
Profit Center No. 3 —
Project Manager 4 Tom Mulder
Purchase Order No. 6 181761 OP
Required Report Date 11 10/30/01

Samples Shipment Date 7 10/25/01
Lab Destination 8 HP Lab
Lab Contact 9 Blayne H.
Project Contact/Phone 12 Tom Mulder 619-533-7302
Carrier/Waybill No. 13 Fed ex

Bill to: 5 IT Corp. San Diego

Report to: 10 IT Corp. 1230 Columbia St. Ste 1200 San Diego CA 92101 fax 619-239-1238

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No.
1-2 S	Air	10/25/01 0650	1 L. Tedlar bag		Dark	VOCs by GC/MS SD County 2001 GC/MS		
1-14 d		10/25/01 0730					FOR LAB USE ONLY	
1-21 S		10/25/01 0655						
1-28 S		10/25/01 0710						
24 d		10/25/01 0725					FOR LAB USE ONLY	

COPY

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☑

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☑

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation) Sarah Ceniga	Date: 10/25/01 Time: 1500	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29
Analyze and report VOCs on attached list -- by GC/MS

AtmAA Inc.
23917 Craftsman Rd., Calabasas, CA 91302 • (818) 223-3277 • FAX (818) 223-8250
environmental consultants
laboratory services

October 31, 2001 LTR/582/01

Tom Mulder
IT Corp.
1230 Columbia St., Ste. 1200
San Diego, CA 92101

re: Sea World (P.O. No.: 181760 OP)

Dear Tom:

Please find enclosed the laboratory analysis report, quality assurance summary, and the original chain of custody form for five Tedlar bag samples received October 26, 2001.

The samples were analyzed for permanent gases, hydrogen sulfide, and total gaseous non-methane organics (TGNMO) as requested on the chain of custody form.

Sincerely,

AtmAA, Inc.

Michael L. Porter
Laboratory Director

Encl.
MLP/bwf

AtmAA Inc.
23917 Craftsman Rd., Calabasas, CA 91302 • (818) 223-3277 • FAX (818) 223-8250
environmental consultants
laboratory services

LABORATORY ANALYSIS REPORT

Permanent Gases, Hydrogen Sulfide, and Total Gaseous Non- Methane Organics (TGNMO) Analysis in Tedlar Bag Samples

Report Date: October 31, 2001
Client: IT Corp.
Project Location: Sea World
Client P.O. No.: 181760 OP
Date Received: October 26, 2001
Date Analyzed: October 26, 2001

ANALYSIS DESCRIPTION

Permanent gases were measured by thermal conductivity detection/gas chromatography (TCD/GC). Hydrogen sulfide was analyzed by gas chromatography with a Hall electrolytic conductivity detector operated in the oxidative sulfur mode. Total gaseous non-methane organics (TGNMO) was measured by flame ionization detection/total combustion analysis (FID/TCA), EPA Method 25 analysis.

AtmAA Lab No.:	02991-1	02991-2	02991-3	02991-4	02991-5
Sample I.D.:	J-2s	J-14d	J-21s	J-28s	J-24d
Components	*(Concentration in %,v)*				
Nitrogen	75.5	76.4	53.5	65.2	60.2
Oxygen	16.2	17.8	9.56	11.3	16.0
Methane	0.43	3.17	21.6	8.97	13.1
Carbon dioxide	7.51	2.95	15.6	14.9	10.9
	(Concentration in ppmv)				
Hydrogen sulfide	<0.3	0.47	9.41	<0.3	1820
Ethane	<1	4.97	14.4	3.46	7.55
TGNMO	4.02	27.3	60.7	132	78.0

The reported oxygen concentration includes any argon present in the sample. Calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.
The accuracy of permanent gas analysis by TCD/GC is +/- 2%, actual results are reported.
TGNMO is total gaseous non-methane organics (excluding ethane) measured and reported as ppm methane.

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY

(Repeat Analyses)

Project Location: Sea World
Date Received: October 26, 2001
Date Analyzed: October 26, 2001

Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %,v)			
Nitrogen	J-2s	75.4	75.6	75.5	0.13
	J-21s	53.4	53.6	53.5	0.19
Oxygen	J-2s	16.1	16.2	16.2	0.31
	J-21s	9.54	9.58	9.56	0.21
Methane	J-2s	0.43	0.43	0.43	0.0
	J-21s	21.5	21.7	21.6	0.46
Carbon dioxide	J-2s	7.47	7.55	7.51	0.53
	J-21s	15.5	15.7	15.6	0.64
		(Concentration in ppmv)			
Hydrogen sulfide	J-2s	<0.3	<0.3	---	---
	J-14d	0.46	0.48	0.47	2.1
	J-21s	9.28	9.54	9.41	1.4
	J-28s	<0.3	<0.3	---	---
	J-24d	1800	1840	1820	1.1
TGNMO	J-2s	4.03	4.02	4.02	0.12
	J-21s	59.5	61.9	60.7	2.0

Five Tedlar bag samples, laboratory numbers 02991-(1-5), were analyzed for permanent gases, hydrogen sulfide, and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 13 repeat measurements from the five Tedlar bag samples is 0.71%.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 514599
Page 1 of 1

Project Name/No. [1] SeaWorld
Sample Team Members [2] J. Dewoody / S. Ceniga
Profit Center No. [3] /
Project Manager [4] Tom Mulder
Purchase Order No. [6] 181760 OP
Required Report Date [11] 10/30/01

Samples Shipment Date [7] 10/25/01
Lab Destination [8] Atmaa
Lab Contact [9] Mike Porter
Project Contact/Phone [12] Tom Mulder 619-533-7302
Carrier/Waybill No. [13] FedEx

Bill to: [5] IT Corp
San Diego

Report to: [10] IT Corp
1230 Columbia St. Ste 1200
San Diego CA 92101
fax 619-239-1238

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
J-2 s	Air	10/25/01 0650	1L Tedlar bag		Dark	CH_4, H_2S, CO_2, O_2, N_2 NMOC's		Lab# -1
J-14 d		10/25/01 0730					FOR LAB USE ONLY	0991-2
J-21 s		10/25/01 0655						-3
J-28 s		10/25/01 0710						-4
J-24 d		10/25/01 0725						-5
							FOR LAB USE ONLY	

Special Instructions: [23]

Possible Hazard Identification: [24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☑

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☒ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☑

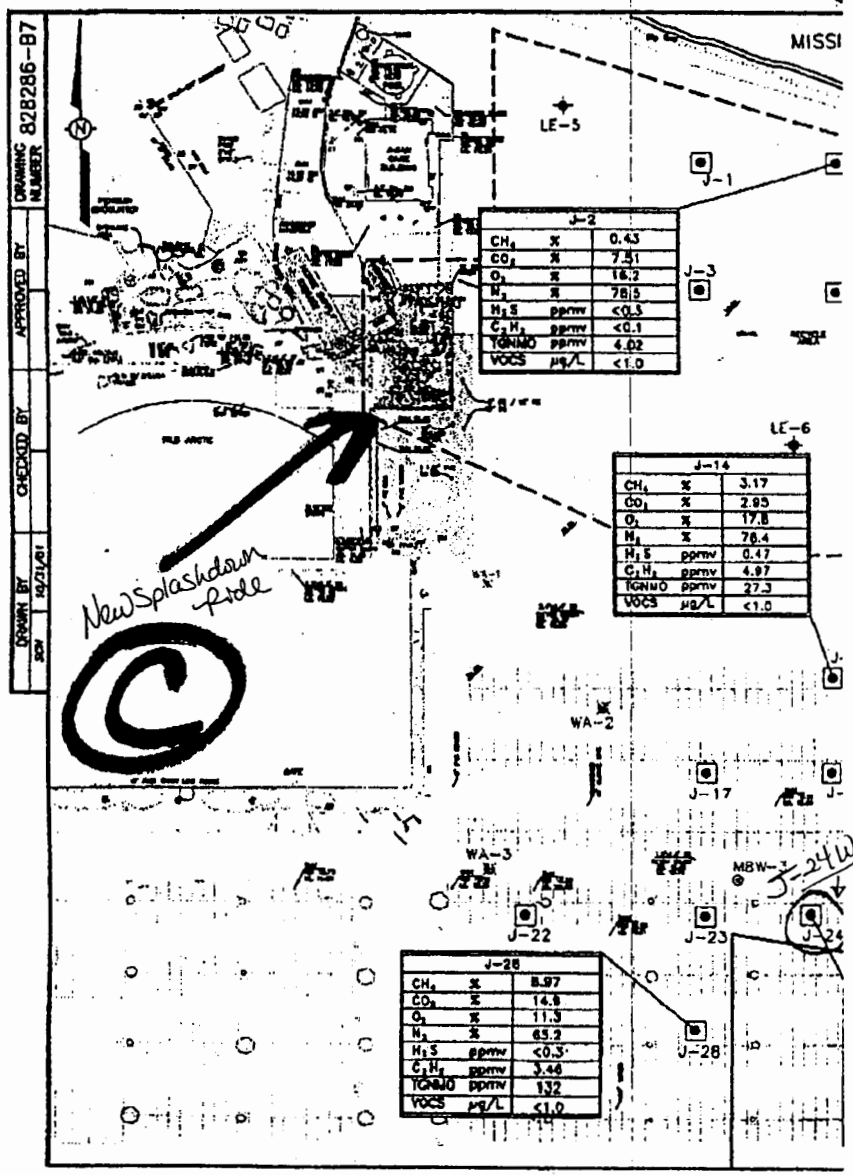
QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation) Sarah Ceniga	Date: 10/25/01 Time: 1500	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation) M Porter	Date: 10/26/01 Time: 1000
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

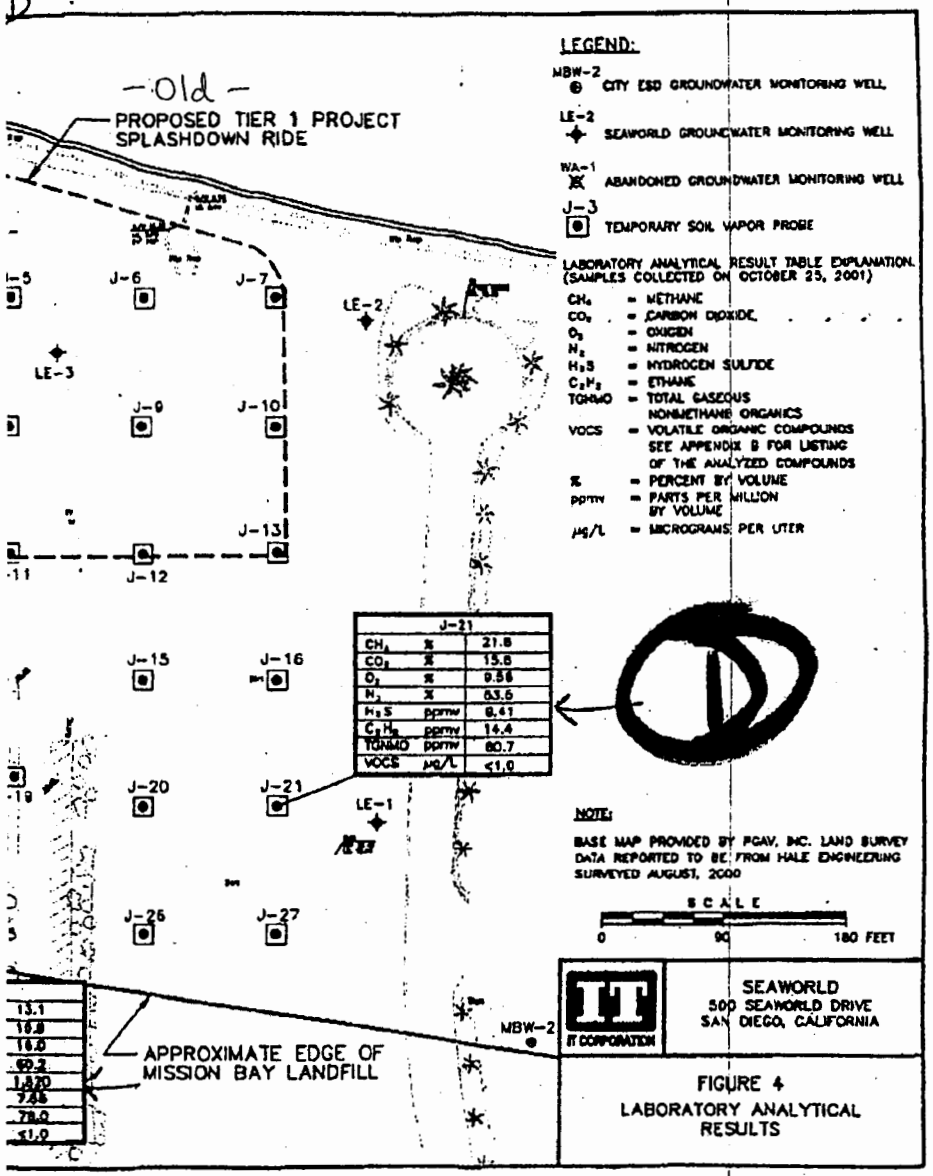
EXHIBIT B



J-2		
CH_4	%	0.43
CO_2	%	7.51
O_2	%	16.2
N_2	%	76.5
H_2S	ppmv	<0.3
C_2H_6	ppmv	<0.1
TGNMO	ppmv	4.02
VOCS	µg/L	<1.0

J-14		
CH_4	%	3.17
CO_2	%	2.93
O_2	%	17.8
N_2	%	76.4
H_2S	ppmv	0.47
C_2H_6	ppmv	4.97
TGNMO	ppmv	27.3
VOCS	µg/L	<1.0

J-28		
CH_4	%	8.97
CO_2	%	14.8
O_2	%	11.3
N_2	%	65.2
H_2S	ppmv	<0.3
C_2H_6	ppmv	3.46
TGNMO	ppmv	132
VOCS	µg/L	<1.0



J-21		
CH_4	%	21.8
CO_2	%	15.6
O_2	%	9.56
N_2	%	63.6
H_2S	ppmv	8.41
C_2H_6	ppmv	14.4
TGNMO	ppmv	80.7
VOCS	µg/L	<1.0

FIGURE 4
LABORATORY ANALYTICAL RESULTS

EXHIBIT C

W351

New tests slated for gas that hit 8 park builders | Decomposing trash believed likely source

The San Diego Union - Tribune; San Diego, Calif.; Oct 9, 1988; John Wilkens;

Sub Title: [UNION, 1,2 Edition]
Start Page: B-3
Personal Names: **Stephany, Gary**

Abstract:
Gary Stephany, director of county Environmental Health Services, said yesterday that eight workers reported being stricken by gas that smelled of rotten eggs Wednesday and Thursday at the 109-acre South Shores Park. The park is being built just east of Sea World over an old city dump.

Stephany said the source of the fumes had not been found, but officials said they were fairly certain that an earth mover hit a pocket of underground hydrogen sulfide gas created by decomposing trash.

County health workers tested the site Thursday but found no gas, Stephany said. This is one reason that they suspect a pocket of fumes was released. The gas never posed a danger to Sea World or other adjacent areas, Stephany said.

Full Text:
Copyright SAN DIEGO UNION TRIBUNE PUBLISHING COMPANY Oct 9, 1988

Additional tests are scheduled tomorrow to determine the source of fumes that sickened construction workers and halted grading last week at a city park being built in Mission Bay.

Gary Stephany, director of county Environmental Health Services, said yesterday that eight workers reported being stricken by gas that smelled of rotten eggs Wednesday and Thursday at the 109-acre South Shores Park. The park is being built just east of Sea World over an old city dump.

Three workers began suffering from vomiting, diarrhea and headaches and were taken to a hospital, where they were treated and released, Stephany said. The other five were less seriously affected and went home.

Stephany said the source of the fumes had not been found, but officials said they were fairly certain that an earth mover hit a pocket of underground hydrogen sulfide gas created by decomposing trash.

The rotten-egg smell is consistent with hydrogen sulfide gas, and is not unusual at an old landfill, Stephany said.

County health workers tested the site Thursday but found no gas, Stephany said. This is one reason that they suspect a pocket of fumes was released. The gas never posed a danger to Sea World or other adjacent areas, Stephany said.

Work at the site has been halted until tests are made by an engineering consultant tomorrow, he said. County officials may require revisions to the project's safety plan, depending on what the tests show.

Stephany said the existing safety plan calls for the workers to wear respirators because of possible hazards from the landfill and because of dust kicked up by the graders.

The workers stricken last week apparently had removed their masks temporarily, he said.

The plan also required the contractors, T.B. Penick & Sons Inc., to notify a safety officer and the county if and when such a gas was discovered, Stephany said, but that was not done. Instead, the county learned about the incident from the hospital where the workers were treated, he said.

Officials from the construction company and the city, which is overseeing the project, could not be reached for comment yesterday.

Grading began last month on the park's $4.5 million first phase, which will include a nine-acre lagoon, a 10-lane boat-launching ramp, a boat dock, a 265-space parking lot and picnic areas.

A second phase, costing about $8 million, will include grassy play areas, additional parking and restrooms. The park also will feature bike paths and playgrounds.

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W352

Project halted at Mission Bay as fumes hit workers

The San Diego Union - Tribune; San Diego, Calif.; Oct 8, 1988; Michael Richmond;

Sub Title: [TRIBUNE, 1,2 Edition]
Start Page: B-1
Personal Names: **Leppert, John**
Stephany, Gary
Johnston, Jeff

Abstract:
Work on a $4.5 million project in Mission Bay Park was halted this week after construction workers were stricken by gas fumes from an old city dump on the site.

A county Health Services Department official, Gary Stephany, said yesterday that eight workers went home sick as a result of exposure to the fumes. Jeff Johnston, project manager for the contractor, had said earlier that five workers became sick, were treated and were released from an emergency clinic the same day.

Johnston and Stephany, director of Environmental Health Services, speculated that the fumes were from hydrogen sulfide gas, a natural product of decomposing trash. The fumes apparently escaped when grading equipment uncovered buried trash, Stephany said.

Full Text:
Copyright SAN DIEGO UNION TRIBUNE PUBLISHING COMPANY Oct 8, 1988

Work on a $4.5 million project in Mission Bay Park was halted this week after construction workers were stricken by gas fumes from an old city dump on the site.

"Some of the workers complained of dizziness, headaches, sore throats, and some actually were throwing up," said John Leppert, an assistant to the city manager.

Leppert is overseeing the project.

The men were stricken Wednesday, and the contractor, T.B. Penick & Sons Inc., stopped work Thursday, Leppert said.

The workers were operating bulldozers grading the new 109-acre South Shores Park just east of Sea World and north of Sea World Drive.

A county Health Services Department official, Gary Stephany, said yesterday that eight workers went home sick as a result of exposure to the fumes. Jeff Johnston, project manager for the contractor, had said earlier that five workers became sick, were treated and were released from an emergency clinic the same day.

Johnston and Stephany, director of Environmental Health Services, speculated that the fumes were from hydrogen sulfide gas, a natural product of decomposing trash. The fumes apparently escaped when grading equipment uncovered buried trash, Stephany said.

Workers described the accompanying odor as "a terrible, terrible rotten-egg smell," Johnston said.

"We asked them to get checked out by a physician to make sure there were no permanent effects,"

Johnston said.

He said the city is considering abandoning some of the grading because of the gas problem.

Health department personnel tested for gases at the landfill Thursday but found no evidence of any, Stephany said. Additional testing is planned Monday by engineering consultants hired by the city.

Stephany said neither the city nor the contractor notified his department of the gas problem as required. He said the department was informed by Sharp Memorial Hospital, where some of the workers had gone for examinations.

Leppert said some workers began wearing respirators Thursday before the contractor decided to halt work until the problem was resolved.

The site is on land leading to a nine-acre lagoon cut into Mission Bay as part of the construction, Leppert said.

"There is no problem in the lagoon area," he said, adding that the fumes came from a point east of the lagoon.

Leppert said officials hope construction can resume Monday elsewhere in the project.

The project includes a 10-lane boat-launching ramp, a boat dock, a parking lot, an access road, restrooms and picnic areas.

The first phase, which began last month, is to cost some $4.5 million. The second phase, which will include additional restrooms, more parking space and grassy play areas, is estimated to cost $8 million.

City officials said concern over health problems resulting from the old landfill first arose about four years ago when a hotel was planned at the site. Test borings then found no hazardous materials, Stephany said, but evidence of methane gas was found.

The hotel project "is in a state of limbo," said Martin Breslauer, assistant director of the city Property Department.

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C085

RECEIVED
MAY 29 11 16 AM '90
ENVIRONMENTAL HEALTH SERVICES

OFFICE OF
THE CITY ATTORNEY
CITY OF SAN DIEGO

JOHN W. WITT
CITY ATTORNEY

CURTIS M. FITZPATRICK
ASSISTANT CITY ATTORNEY

RONALD L. JOHNSON
ASSISTANT CITY ATTORNEY

C. ALAN SUMPTION
CHIEF DEPUTY CITY ATTORNEY

EUGENE P. GORDON
CHIEF DEPUTY CITY ATTORNEY

LITIGATION DIVISION
525 "B" STREET, SUITE 2100
SAN DIEGO, CALIFORNIA 92101
(619) 533-4700
FAX (619) 533-4747

May 23, 1990

H 86426
TB 59-D2
Sea World Dr

Barbara Pyson
Department of Health Services
EHS/HMMD
P. O. Box 85261
San Diego, CA 92138-5261

Dear Ms. Pyson:

Elizabeth Carter, Administrator of the Estate of Harrison Carter v. City of San Diego, et al.

I am a Deputy City Attorney for the City of San Diego. I am investigating a gas leak that allegedly occurred at the Mission Bay Landfill on October 6, 1988. Nick Vent, the investigator who investigated the incident, told me a letter would be required for the release of the County records. I would like a copy of the County's complete file including photographs on this incident. I have included a copy of Hazardous Material Incident Report #5016 (HIRT 88-478) which may help you locate this file. If there is a charge for the records, please bill me.

If you have any questions concerning this request, please call me at 533-4794.

Sincerely yours,

JOHN W. WITT, City Attorney

By Deborah A. Hollingsworth
Deborah A. Hollingsworth
Deputy City Attorney

DAH:eh:Lit.
Enclosure

6/8 left msg
is mon 6/11 @ 8AM
ok

CASE # 615-395 8/22/89

C161

3/14/90 - after pull files - please note Mrkuckle begs proceeding. MRuckle

HMMD USE ONLY

Request # 3-46

REQUEST TO REVIEW HMMD RECORDS

SUBMIT TO:
County of San Diego
Department of Health Services
Environmental Health Services
Hazardous Materials Management Division
P.O. Box 85261
San Diego, CA 92138-5261
(619) 338-2222

CASE

(You may attach business card/overprint with business card if preferred.)

REQUESTED BY:

COMPANY NAME: CITY OF SAN DIEGO - CITY ATTY'S OFFICE

MAIL ADDRESS: 525 B St, Suite 2100
San Diego, CA 92101

CONTACT PERSON: Nancy Donnelly

PHONE: (619) 533-4765

A request is hereby made to review Hazardous Materials Management Division (HMMD) records, as indicated below for the following reason: Wrongful death litigation Heavy equipment operator died as a result of fumes, per Elizabeth Carter Telephone Request TAKEN By Marianne Ruckle

Signature	Title	Date
	Investigator	3/13/90

A separate form must be completed for each file/address requested.

Establishment Name	Address/City	Zip Code	File # (Optional)
Mission Bay South Shores Project	ADJACENT TO SEA WORLD Dr. Fumes 10/88		86426

TYPE OF INFORMATION REQUESTED (Check as many as apply)

- Landfill ☒ Routine Inspection Permit File
- ☐ Tank Removal
- ☐ Tank Installation
- ☐ Tank Leak Unauthorized Release
- ☒ Emergency Response
- ☒ Complaint SEWA Pi

HMMD USE ONLY BELOW THIS LINE

	H#	AT#	NT#	T#	HIRT# 88-478	# 017
Files pulled by/date:						
Conf. Info. to Cover? Checked by/date:	YES (NO)	YES NO	YES NO	YES NO	YES (NO)	YES (NO)
Confidential Info covered by/date:	N/A C.K 3/16				N/A C.K 3/16	N/A C.K 3/16

Date all files ready: 3/16 Requester notified by: Crystal Date: 3/16 Time: 9:15

2nd notification by: _____ Date: _____ Time: _____ 3rd notification: _____

Review Scheduled: Friday Date: 3/16 Time: 1:30 Rescheduled/Date: _____ Time: _____

Files reviewed by: Nancy Donnelly of City Attys Office Date: 3/16/90

☐ A review of records has been conducted and HMMD finds no record.

Signature	Title	Date

DHS:HM-9098 (3/90)

NANCY DONNELLY
LITIGATION INVESTIGATOR

AREA 619
533-4765

OFFICE OF CITY ATTORNEY
LITIGATION DIVISION
525 "B" STREET, SUITE 2000
SAN DIEGO, CALIFORNIA 92101

EXHIBIT D

SWAPE LLC
Soil Water Air Protection Enterprise
201 Wilshire Boulevard, Second Floor
Santa Monica California 90401

July 21, 2003

To: California Earth Corps
Don May
4927 Minturn Avenue
Lakewood, California 90712

Re: Hydrogen Sulfide and Methane at Mission Bay Landfill

Dear Mr. May:

My name is Paul Rosenfeld and I work for SWAPE LLC. I have a Ph.D. in Soil Chemistry from the University of Washington in Seattle, Washington. I am now an Adjunct Professor at the University of California, Los Angeles, teaching courses in Environmental Health Science. I have conducted human health risk assessments for various properties contaminated with a variety of contaminants including pesticides, polychlorinated biphenols, volatile organic compounds, semi-volatile organic compounds, and heavy metals. I have taught courses with the California Integrated Waste Management Board on alternative landfill cover design and I have worked at several different landfill facilities. I have also worked for the United States Navy Base Realignment and Closure (BRAC) Program and spent much of my time investigating contaminated buried material.

I have reviewed several articles discussing the contaminants at the Mission Bay Landfill and recognize that there are high methane and hydrogen sulfide concentrations in the subsurface soils that pose a threat to human health and the environment. The proposed ride "Voyage To Atlantis" also referred to as "Splash Down Thrill Ride" will be located very close to extremely high concentrations of hydrogen sulfide and methane that pose an immediate high risk to human health and the environment.

IT Corporation (2002) reported that vapor probe J-24 had a hydrogen sulfide concentration of 1820 ppmv. This location is approximately 315 feet away from the entrance of the proposed ride. On December 20 and 23, 1996 wells LE-1, LE-2 and LE-3 were drilled and installed in the lease expansion area. During the drilling LE-4, on December 23, hydrogen sulfide gas was detected at concentrations as high as 9 ppm and methane was detected at a maximum of 1,000 ppm (Flour Daniel GTI, 1997).

The National Institute of Occupation Safety and Health (NIOSH) permissible exposure limit (PEL) for hydrogen sulfide is 10 ppm and the concentration considered immediately dangerous to life and health (IDLH) for hydrogen sulfide is 100 ppm (NIOSH/OSHA 1981). The Office of Environmental Health Hazard Assessment (OEHHA) reference exposure level (REL) for hydrogen sulfide is 0.03 ppm. The REL are established at exposure levels that would not produce any adverse health effect. **Hence vapor probe J-24 has a hydrogen sulfide concentration 18 times the IDLH concentration; and exposure to this gas can result in immediate death.**

At high concentrations, hydrogen sulfide can paralyze the olfactory senses (NIOSH 1979). Note that the hydrogen sulfide odor TLV is lower than the OEHHA REL. Hydrogen sulfide is a severe eye irritant and may cause tissue damage (NIOSH/OSHA 1981). At low concentrations, gas can cause dizziness, headache, nausea, and irritation of the respiratory tract. At high concentrations, hydrogen sulfide can cause unconsciousness, respiratory failure, and death within minutes. In addition, hydrogen sulfide may be explosive at a wide range of concentrations in air from 4.3% to 46% by volume (NIOSH 1985a). Both methane and hydrogen sulfide are explosive gasses that form under anaerobic conditions when there is an absence of oxygen. The lower explosive limit of methane is 5% by volume (IT Corporation 2002).

Currently all that separates the public from this harmful gas is a layer of fill and asphalt, which may be breached of the landfill settlement, liquefaction and/or an earthquake. Landfills settle as organic waste decomposes over time. Much of the landfill is now covered by a Sea World parking lot with asphalt. The asphalt currently has cracks and will continue to crack. Because the asphalt has cracks, it is not air tight. The site conditions near the proposed ride are unsafe because the cap on the landfill does not have a protective barrier (e.g. polyethylene with a geocomposite textile for vapor recovery) to control gas releases. The entire site is constructed on unconsolidated landfill material and during an earthquake it is possible that a deadly hydrogen sulfide release may occur. The site is susceptible to liquefaction, according to Christian Wheeler Engineering (2002). Christian Wheeler Engineering (2002) noted that "Our analysis indicates that the potential for up to approximately 10 to 11.5 inches of seismically –induced, total settlement may be expected at the site, in its present condition, as a result of soil liquefaction caused by a 6.9 magnitude seismic event...." Hence, one can assume that lesser earthquakes will result in significant settling that will likely cause preferential pathways for release of hydrogen sulfide into the air, threatening the public and the environment.

IT Corporation (2002) recommended "If structures are built near the landfill, in the future, then the design may need to incorporate gas migration measures, such as active gas control measures (e.g., gas extraction wells) or passive gas control measures (e.g., cutoff trenches, slurry walls and vent trenches)." IT Corporation

Corporation went on to recommend "If the landfill and surrounding land is paved with materials that are impermeable to landfill gas, then there is potential to increase the effective seal of ground surface. This could result in increased concentrations of landfill gas accumulating within soil vapor." Hence, landfill settling, an earthquake, or liquefaction will likely create a pathway resulting in a hydrogen sulfide vapor release that will threaten human health and the environment.

Respectfully,

Paul Rosenfeld

Paul Rosenfeld Ph.D.
SWAPE LLC

REFERENCES:

Christian Wheeler (2002) "Report of Preliminary Geotechnical Investigation, Sea World Atlantis Project San Diego California." May 31.

Flour Daniel GTI (1996) ": Assessment Report Sea World Lease Expansion 1720 South Shores Road, San Diego California," Project Number 023450021. June 9th.

NIOSH [1979]. Criteria for a recommended standard: working in confined spaces. Morgantown, WV: U.S. Department of Health, Education, and Welfare, Public Health Service, Centers for Disease Control, National Institute for OccupationalSafety and Health, DHEW (NIOSH) Publication No. 80-106.

NIOSH [1985a]. NIOSH pocket guide to chemical hazards. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS [NIOSH] Publication No. 85-114.

NIOSH/OSHA [1981]. Occupational health guidelines for chemical hazards. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication.

IT Corporation (2002) Results of Soil Vapor Assessment Seaworld Expansion Plan, 16-Acre Tract. Project Number 830418.

EXHIBIT E

STATE OF CALIFORNIA -- THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

CALIFORNIA COASTAL COMMISSION
SAN DIEGO AREA
7575 METROPOLITAN DRIVE, SUITE 103
SAN DIEGO, CA 92108-4402
(619) 767-2370

APPLICATION FOR COASTAL DEVELOPMENT PERMIT

SECTION I. APPLICANT

1. Name, mailing address, and telephone number of all applicants.

SeaWorld Adventure Park

500 SeaWorld Drive

San Diego, CA 92109

619-226-3628 fax 619-226-3999

(Area code/daytime phone number) (Fax number)

Note: All applicants for the development must complete Appendix A, the declaration of campaign contributions.

2. Name, mailing address and telephone number of applicant's representatives, if any. Please include all representatives who will communicate on behalf of the applicant or the applicant's business partners, for compensation, with the Commission or the staff. (It is the applicant's responsibility to update this list, as appropriate, including after the application is accepted for filing. Failure to provide this information prior to communication with the Commission or staff may result in denial of the permit or criminal penalties.)

Patrick Owen, VP Design & Engineering

SeaWorld Adventure Park

500 SeaWorld Drive

San Diego, CA 92109 619-226-3628 fax 619-226-3999

(Area code/daytime phone number) (Fax number)

SECTION II. PROPOSED DEVELOPMENT

Please answer all questions. Where questions do not apply to your project (for instance, project height for a land division), indicate **Not Applicable** or **N.A.**.

1. **Project Location.** Include street address, city, and/or county. If there is no street address, include other description such as nearest cross streets.

500 SeaWorld Drive
number *street*

San Diego Sn Diego
city *county*

Assessor's Parcel Number(s) (obtainable from tax bill or County Assessor): 760-037-001

FOR OFFICE USE ONLY		
	RECEIVED	8/8/01.
	FILED	
6-01-129	FEE	2000 —
APPLICATION NUMBER	DATE PAID	8/8/01

6. Gross floor area excluding parking (sq.ft.) 24036 ft. sq.

Gross floor area including covered parking and accessory buildings (sq.ft.) 24036 sq. ft.

7. Lot area (within property lines) (sq.ft. or acre) 189.3 ac.

Lot coverage	Existing (sq.ft. or acre)	New proposed (sq.ft. or acre)	Total (sq.ft. or acre)
Building	12.544	0.552	13.096
Paved area	100.08	2.238	102.318
Landscaped area	43.176	2.710	45.886
Unimproved area	16.500	-5.500	11.000
Water	17.000	0.000	17.000
Grand Total (should equal lot area as shown in #7 above)			189.300

8. Is any grading proposed? ☒ Yes ☐ No

If yes, complete the following.					
a) Amount of cut	17536	cu. yds.	d) Maximum height of cut slope	7.0	ft.
b) Amount of fill	17536	cu. yds.	e) Maximum height of fill slope	7.0	ft.
c) Amount of import or export (circle which)	0.0	cu. yds.	f) Location of borrow or disposal site	on site	

Grading and drainage plans must be included with this application. In certain areas, an engineering geology report must also be included. See Section IV, paragraph 11 for the specifics of these requirements.

Please list any geologic or other technical reports of which you are aware that apply to this property

Report of Preliminary Geotechnical Investagatic
SeaWorld Atlantis Project Dated October 16, 200
Christian Wheeler Engineeing

9. Parking:

Number of parking spaces (indicate whether standard or compact)		
Existing spaces	Proposed new spaces	Net number of spaces on completion of project
8350	0	8350

Is any existing parking being removed? ☒ Yes ☐ No

If yes, how many spaces? 120 size 10'x18' (CAR)

3. Has any application for development on this site including any subdivision been submitted previously to the California Coastal Zone Conservation Commission or the Coastal Commission? ..... ☒ Yes ☐ No

If yes, state previous application number(s) Numerous over the last 25 years

4. Is the development between the first public road and the sea (including lagoons, bays, and other bodies of water connected to the sea) ..... ☒ Yes ☐ No

If yes, is public access to the shoreline and along the coast currently available on the site or near the site? ..... ☒ Yes ☐ No

If yes, indicate the location and nature of the access, including the distance from the project site, if applicable.
Mission Bay adjacent to SeaWorld Adventure Park

5. Does the development involve diking, filling, draining, dredging or placing structures in open coastal waters, wetlands, estuaries, or lakes? (Please check yes or no)

a) diking	*b) filling*	*c) dredging*	*d) placement of structures*
☐ Yes	☐ Yes	☐ Yes	☐ Yes
☒ No	☒ No	☒ No	☒ No

Amount of material to be **dredged** or **filled** (indicate which) N/A cu. yds.

Location of dredged material disposal site N/A

Has a U.S. Army Corps of Engineers' permit been applied for? ..... ☐ Yes ☒ No

6. Will the development extend onto or adjoin any beach, tidelands, submerged lands or public trust lands? ..... ☐ Yes ☒ No

For projects on State-owned lands, additional information may be required as set forth in Section IV, paragraph 10.

7. Will the development protect existing lower-cost visitor and recreational facilities? ..... ☐ Yes ☒ No

Will the development provide public or private recreational opportunities? ..... ☒ Yes ☐ No

If yes, explain.
SeaWorld provides passive recreation

2. Assessor's parcel map(s) showing the page number, the applicant's property, and all other properties within 100 feet (excluding roads) of the property lines of the project site. (Available from the County Assessor.)

3. Copies of required local approvals for the proposed project, including zoning variances, use permits, etc., as noted on Local Agency Review Form, Appendix B. Appendix B must be completed and signed by the local government in whose jurisdiction the project site is located.

4. Stamped envelopes addressed to each property owner and occupant of property situated within 100 feet of the property lines of the project site (excluding roads), along with a list containing the names, addresses and assessor's parcel numbers of same. The envelopes must be plain (i.e., no return address), and regular business size (9 1/2" x 4 1/8"). Include first class postage on each one. **Metered postage is not acceptable.** Use Appendix C, attached, for the listing of names and addresses. (Alternate notice provisions may be employed at the discretion of the District Director under extraordinary circumstances.)

5. Stamped, addressed envelopes (**no metered postage, please**) and a list of names and addresses of all other parties known to the applicant to be interested in the proposed development (such as persons expressing interest at a local government hearing, etc.).

6. A vicinity or location map (copy of Thomas Bros. or other road map or USGS quad map) with the project site clearly marked.

7. Copy(s) of project plans, drawn to scale, including site plans, floor plans, elevations, grading and drainage plans, landscape plans, and septic system plans. Trees to be removed must be marked on the site plan. In addition, a reduced site plan, 8 1/2" x 11" in size, must be submitted. Reduced copies of complete project plans will be required for large projects. NOTE: See Instruction page for number of sets of plans required.

8. Where septic systems are proposed, evidence of County approval or Regional Water Quality Control Board approval. Where water wells are proposed, evidence of County review and approval.

9. A copy of any Draft or Final Negative Declaration, Environmental Impact Report (EIR) or Environmental Impact Statement (EIS) prepared for the project. If available, comments of all reviewing agencies and responses to comments must be included.

10. Verification of all other permits, permissions or approvals applied for or granted by public agencies (e.g., Department of Fish and Game, State Lands Commission, U.S. Army Corps of Engineers, U.S. Coast Guard). For projects such as seawalls located on or near state tidelands or public trust lands, the Coastal Commission must have a written determination from the State Lands Commission whether the project would encroach onto such lands and, if so, whether the State Lands Commission has approved such encroachment. See memo to *"Applicants for shorefront development"* dated December 13, 1993.

11. For development on a bluff face, bluff top, or in any area of high geologic risk, a comprehensive, site-specific geology and soils report (including maps) prepared in accordance with the Coastal Commission's Interpretive Guidelines. Copies of the guidelines are available from the District Office.

SECTION V. NOTICE TO APPLICANTS

Under certain circumstances, additional material may be required prior to issuance of a coastal development permit. For example, where offers of access or open space dedication are required, preliminary title reports,

APPLICATION FOR COASTAL DEVELOPMENT PERMIT

APPENDIX A

DECLARATION OF CAMPAIGN CONTRIBUTIONS

Government Code Section 84308 prohibits any Commissioner from voting on a project if he or she has received campaign contributions in excess of $250 within the past year from project proponents or opponents, their agents, employees or family, or any person with a financial interest in the project.

In the event of such contributions, a Commissioner must disqualify himself or herself from voting on the project.

Each applicant must declare below whether any such contributions have been made to any of the listed **Commissioners** or **Alternates** (see last page).

CHECK ONE

[XXXXX] The applicants, their agents, employees, family and/or any person with a financial interest in the project **have not contributed** over $250 to any Commissioner(s) or Alternate(s) within the past year.

[ ] The applicants, their agents, employees, family, and/or any person with a financial interest in the project **have contributed** over $250 to the Commissioner(s) or Alternate(s) listed below within the past year.

Commissioner or Alternate _____

Commissioner or Alternate _____

Commissioner or Alternate _____

Signature of Applicant or Authorized Agent

July 30, 2001
Date

Please print your name Patrick Owen,VP Design & Engineering, SeaWorld

APPLICATION FOR COASTAL DEVELOPMENT PERMIT

APPENDIX B

LOCAL AGENCY REVIEW FORM

SECTION A (TO BE COMPLETED BY APPLICANT)

Applicant SeaWorld Adventure Park

Project Description SeaWorld's 2003 Expansion Project

Location 500 SeaWorld Drive, San Diego, CA

Assessor's Parcel Number 760-037-01-01

SECTION B (TO BE COMPLETED BY LOCAL PLANNING OR BUILDING INSPECTION DEPARTMENT)

Zoning Designation N/A _____ du/ac

General or Community Plan Designation SEAWORLD MASTER PLAN UPDATE _____ du/ac

Local Discretionary Approvals

☒ Proposed development meets all zoning requirements and needs no local permits other than building permits.

☐ Proposed development needs local discretionary approvals noted below.

Needed	*Received*	
☐	☐	Design/Architectural review
☐	☐	Variance for _____
☐	☐	Rezone from _____
☐	☐	Tentative Subdivision/Parcel Map No. _____
☐	☐	Grading/Land Development Permit No. _____
☐	☐	Planned Residential/Commercial Development Approval
☐	☐	Site Plan Review
☐	☐	Condominium Conversion Permit
☐	☐	Conditional, Special, or Major Use Permit No. _____
☑	☐	Other The proposed development is subject to California Coastal Commission certification of the SeaWorld Master Plan Update, which was approved by the Council of the City of San Diego on July 10, 2001. The SeaWorld Master Plan update contains specific design guidelines for this project.

CEQA Status

☐ Categorically Exempt *Class* _____ *Item* _____

☐ Negative Declaration Granted (Date) _____

☒ Environmental Impact Report Required, Final Report Certified (Date) 7-10-01 (LDR No. 99-0618)

☐ Other _____

Prepared for the City/County of SAN DIEGO by Anne Lowry

Date 7-30-01 Title Senior Planner

Application No._____

APPLICATION FOR COASTAL DEVELOPMENT PERMIT

APPENDIX C

LIST OF PROPERTY OWNERS AND OCCUPANTS WITHIN 100 FEET AND THEIR ADDRESSES
(MAKE ADDITIONAL COPIES OF THIS SHEET AS NECESSARY)

NONE ADJACENT		

APPENDIX D

DECLARATION OF POSTING

Prior to or at the time the application is submitted for filing, the applicant must post, at a conspicuous place, easily read by the public and as close as possible to the site of the proposed development, notice that an application for the proposed development has been submitted to the Commission. Such notice shall contain a general description of the nature of the proposed development. The Commission furnishes the applicant with a standardized form to be used for such posting. If the applicant fails to post the completed notice form and sign the Declaration of Posting, the Executive Director of the Commission shall refuse to file the application, or shall withdraw the application from filing if it has already been filed when he or she learns of such failure. 14 Cal. Admin. Code Section 13054(b).

Please sign and date this Declaration of Posting form when the site is posted; it serves as proof of posting. It should be returned to our office with the application.

Pursuant to the requirements of California Administrative Code Section 13054(b), I hereby certify that on July 30, 2001 (date of posting), I or my authorized representative posted the Notice of Pending Permit for application to obtain a coastal development permit for the development of

SeaWorld's 2003 Expansion Project

(description of development)

Located at 500 SeaWorld Drive, San Diego, CA 92109

(address of development or assessor's parcel number)

The public notice was posted at SeaWorld Adventure Park

(a conspicuous place, easily seen by the public and as close as possible to the site of the proposed development)

(signature)

July 30, 2001

(date)

*NOTE: Your application cannot be processed until this **Declaration of Posting** is signed and returned to this office.*

FOR OFFICE USE ONLY

PERMIT NUMBER 6-01-129

RECEIVED 8/8/01

DECLARATION COMPLETE

APPENDIX E

PERMIT APPLICATION FEE SCHEDULE

EFFECTIVE JANUARY 1, 1998, ALL PERMIT APPLICATION FEES ARE DEPOSITED IN THE COASTAL ACCESS ACCOUNT OF THE STATE COASTAL CONSERVANCY FUND. MONIES IN THE ACCOUNT ARE AVAILABLE TO PUBLIC AGENCIES AND OTHER ORGANIZATIONS FOR THE DEVELOPMENT, MAINTENANCE, AND OPERATION OF PUBLIC SHORELINE ACCESS FACILITIES (PUBLIC RESOURCES CODE SECTION 30620(c)(2)).

I. RESIDENTIAL PROJECTS

A. New single-family dwellings

De minimis waiver	☐	$ 200
Administrative permit	☐	$ 200 [1]
Regular calendar		
If 1,500 or less square feet [2]	☐	$ 250 [3]
If 1,501 to 5,000 square feet [2]	☐	$ 500 [3]
If 5,001 or more square feet [2]	☐	$ 1,000 [3]

B. Additions or improvements to single-family dwellings

De minimis waiver	☐	$ 200

If handled as an amendment to a previous coastal development permit, see Amendments (Section III.D.) below.

If not a waiver <u>or</u> an amendment to a previous coastal development permit, the fee is assessed according to the schedule in A. above (i.e., based on the calendar and/or size of the addition, plus the grading fee, if applicable).

C. Multiple residential projects (including residential subdivisions, resubdivisions and condominium conversions) [4]

2–4 units	☐	$ 600 [3]
5–16 units	☐	$ 2,000 [3]
17–166 units	☐	$ 120 /unit [3]
167 units or more	☐	$ 20,000 [3]

---

[1] Fee changes if removed from the Administrative Calendar and rescheduled on the Regular Calendar. Additional fee amount must be paid before item is scheduled for hearing on the Regular Calendar.

[2] Including gross internal floor space of main house, attached garage(s), covered patios, plus any detached structures intended for human habitation (e.g., guest houses, detached bedrooms, in-law units); not including patios or decks open to the sky, detached garages, barns, art studios, tool sheds, and other outbuildings not primarily intended for human habitation.

[3] Grading fee applies; see Item F.

[4] If land division and construction of residences are proposed together, the fee is based solely upon the construction of residences.

D. Extensions [7] and Reconsiderations

Single-family residences	☐	$ 200
All other developments	☐	$ 400

E. Request for continuance

1st request	☐	No charge
Each subsequent request (where Commission approves the continuance)	☐	$ 100

F.	De minimis and other waivers	☐	$ 200
G.	Public works facilities ..... [if public agency is applicant]	☐	No charge
H.	Temporary events ..... [if not scheduled on administrative calendar]	☐	$ 500

IV. ANY OTHER DEVELOPMENT NOT OTHERWISE COVERED

Development cost up to and including $100,000	☐	$ 600
$100,001 to $500,000	☐	$ 2,000
$500,001 to $1,250,000	☐	$ 4,000
$1,250,001 to $2,500,000	☐	$ 8,000
$2,500,001 to $5,000,000	☐	$ 12,000
$5,000,001 or more	☐	$ 20,000

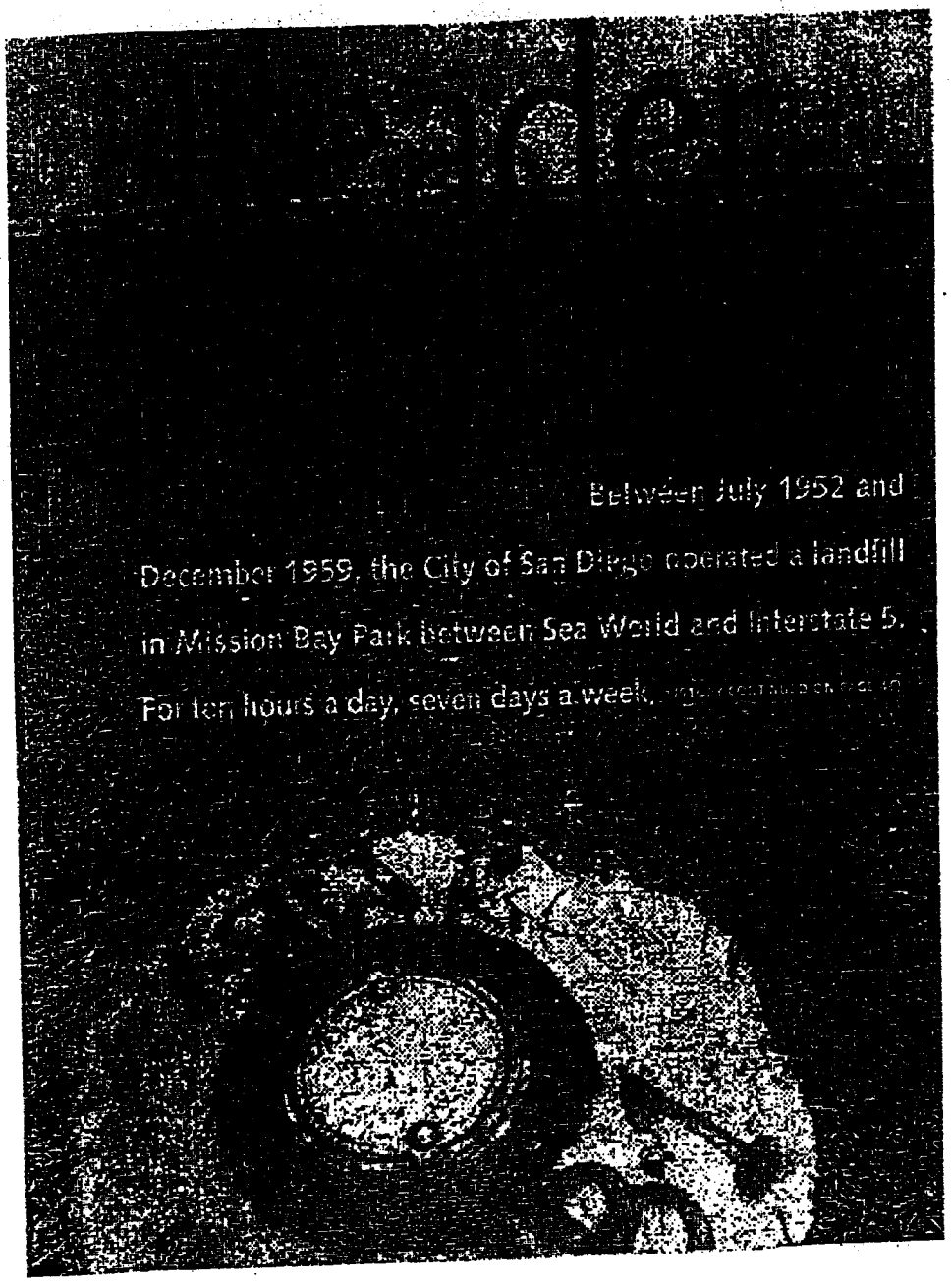
TOTAL SUBMITTED ..... $_____

ADDITIONAL NOTES

1. Fees are assessed at the time of application, based on the project as proposed initially. If the size of a proposed dwelling or the amount of proposed grading is amended during the application review process, the fee is not changed.
2. If different types of development are included on one site under one application, the fee is based on the sum of each fee that would apply if each development were applied for separately, not to exceed $20,000 (except as indicated in footnote 4).
3. Fees for after-the-fact permits shall normally be double the regular permit fee unless such added increases are waived by the Executive Director when it is determined that the permit could be processed by staff without significant additional review time resulting from the processing of the violation.

[7] If permit extension is objected to by Commission and application is set for a new hearing, then a new application fee is required, based on type of development and/or applicable calendar.

EXHIBIT F


Between July 1952 and
December 1959, the City of San Diego operated a landfill
in Mission Bay Park between Sea World and Interstate 5.
For ten hours a day, seven days a week,

5/4/01 3:59 PM

Something Stinks In Mission Bay

Documents from those files indicated that the toxic waste being dumped into the Mission Bay landfill in the 1950s exceeded Convair's (1957) estimates of 200,000 gallons a year.

City trucks hauled garbage to the 115-acre site—the sort of refuse you can see being dumped into the Miramar landfill. But during its operation, the Mission Bay landfill served as receiving grounds for millions of gallons of industrial wastes being produced by San Diego's aerospace industry. In some cases, these toxic substances were buried in steel drums. Other times they were poured into unlined holes 15 to 20 feet deep, below the level of the groundwater.

It is not possible to list the hazardous substances the city allowed to be dumped there. No cleanup of the Mission Bay landfill has been conducted. If anyone kept records of what substances companies were discarding there, the files have disappeared. After the permanent closure of the landfill in 1959, the memory of the toxic dumping seemed to vanish. In 1981, in response to a media report that a local firm might have deposited toxic materials at the landfill during the mid-1950s, Jim Gutzmer, the deputy director of the city's Solid Waste Division, responded (in a letter to a staffer at the local water quality control board), "The site was never knowingly used for toxic waste disposal.... We have no reason to believe any illegal dumping of toxic wastes took place at the site."

Within the next few months, Gutzmer apparently found a report that offered reason to believe that toxics had been dumped there. Written in February 1957 by the assistant chief plant engineer for Convair, the report asserted that a majority of the aerospace manufacturer's "process solutions" were being hauled and dumped "into the sanitary fill in the Mission Bay area." (The first laws regulating toxic-waste disposal were not enacted until the 1970s.) The plant engineer estimated that for 1957 through 1962 those deposits would amount to some 200,000 gallons annually of such substances as chromic, hydrofluoric, nitric, sulfuric, and hydrochloric acids; alkaline solutions; and paint and oily wastes.

Gutzmer further searched the records and (according to an October 1981internal memo on file at the Regional Water Quality Control Board) found another disturbing document, a 1959 letter written by a local resident complaining about "objectionable practices being conducted at the Mission Bay location." This resident reported, "I have seen loads of dead animals being ground up by a tractor and powerful acids being disposed of at this sanitary landfill. The fill is not covered at all times, and the access roads and surrounding area are littered with debris and dust." According to the memo, Gutzmer planned to meet with then-City Manager Ray Blair and contact state health officials to discuss these findings. The 1981 memo also stated that a study would be proposed to sample the landfill for the hazardous wastes Convair had reported dumping.

But amnesia appears to have set in again. By the summer of 1983, no such research had been conducted. The city was concentrating on development on the Mission Bay site of what was to be one of the biggest hotels in San Diego County. Known as the Ramada Renaissance Resort, the project was to include 638 rooms, tennis courts, swimming pools, racquetball courts, restaurants, and banquet rooms. An adjoining 20-acre, $1.4 million public park was planned. Revenues to the city were predicted to be more than a million dollars a year.

One week before Ramada was due to sign the lease, a news announcement brought development plans to a halt. On July 20, 1983, a local television station reported the revelations of an anonymous

Miller of the toxic cleanup group says calls to the regional Environmental Protection Agency headquarters have yielded no explanation for the 1993 turnaround, so the citizen group this past March sent a letter to the agency's regional director requesting a reevaluation. The agency since has invited Miller and his associates to submit information. They say they plan to send the Environmental Protection Agency a report about the misstated heavy-metal concentrations (in the 1983 Woodward-Clyde report) and concerns about fish contamination, along with test results about which they think agency officials may be ignorant.

One example, they say, is the amount of thallium in surface waters near the landfill over the last 15 years. Found in pure form in nature as an odorless and tasteless bluish-white metal, thallium combines with substances such as bromine, chlorine, fluorine, and iodine. Industrial processes employ such thallium compounds, which have also been used as a rat and ant poison. Humans who have ingested large amounts of the element over a short time have experienced "vomiting, diarrhea, temporary hair loss...effects on the nervous system, lungs, heart, liver, and kidneys...[and] death," according to the U.S. Department of Health and Human Services. (The effects of ingesting low levels of thallium over a long time or having skin contact with thallium are not known.) One federal government fact sheet adds that thallium "stays in the air, water, and soil for a long time and is not broken down," and it "builds up in fish and shellfish." A separate Environmental Protection Agency fact sheet confirms that thallium is "quickly bioaccumulated."

Because thallium builds up in sea life, the federal standard for thallium in fishing waters is just 6.3 parts per billion. Compare that to results of testing conducted by the city next to the old landfill in October 1985. Concentrations of thallium ranged from 900 to 1100 parts per billion. Yet no warnings about the fish caught in the area were posted. Subsequent test values have varied. In 1986 and 1987, the city reported concentration at 380 parts per billion. In 1988, the concentration was "less than 100" parts per billion. In 1997, thallium concentration was 91 parts per billion—more than 14 times the federal standard for fishing waters. Environmental Protection Agency literature describes the worst recorded conditions of thallium water pollution as 30 parts per billion, an amount found near ore-processing operations and streams draining ore-rich soils. Yet in the face of these test results, the City of San Diego has discontinued testing for thallium near the old landfill.

Asked about the thallium findings, Ferrier, the Refuse Disposal Division manner, responded, "There's nobody telling us that that spike in a single element like that is related to any kind of a release from the landfill." He elaborated, "It's impossible to release only thallium and not release everything else... That's not what leachate does. That's not the way landfills are.... So is there thallium in Mission Bay? I don't know, and I certainly don't know where it's coming from." If it is there, he declared, "It's not coming from the Mission Bay Landfill."

The members of Miller's group say that testing at and near the landfill over the last 15 years has yielded findings of other elevated pollutants. They cite a 1996 report written by a city consultant named EMCON that summarized concentrations of mercury found near the landfill between 1985 and 1995. The sampling reported amounts that were 17 to 600 times greater than the federal fishing-water standard.

Miller acknowledges that for all the research he and his associates have done, they haven't found any evidence that contamination from the landfill has harmed anyone except for the construction workers back in 1988. After news of the toxic deposits became public in 1983, a Bay

Park woman did write the county health department to report "an epidemic of cancer cases" in the area just downwind of the landfill. "I can name 19-20 cases in this small [two-block] area," she

Agency's assessments of the Mission Bay landfill as a cause for concern about the site and the scrutiny it has received.

The federal agency's awareness of the landfill apparently began around February 1984. At that time, the agency entered the Mission Bay landfill into an inventory of potential hazardous-substance sites. An Environmental Protection Agency evaluator gave the site a preliminary scoring to determine candidacy for the National Priorities List. This list is made up of waste sites known to have released hazardous materials to the environment and those posing a threat of such releases. Inclusion on it doesn't guarantee that the site will get Superfund monies for a cleanup, but it's a start. (The Superfund legislation, created by Congress in 1980, taxes chemical and petroleum industries to pay for finding, investigating, and cleaning up the nation's most hazardous waste sites.)

In its preliminary evaluation, the Environmental Protection Agency relied on the 1983 Woodward-Clyde report to assess the site. Although the evaluator gave the maximum number of points for quantity of materials deposited on the site and for toxicity the score came to 1.40 out of a possible 100. (To get on the National Priorities List, a site must score 28.5.)

In November 1989, another Environmental Protection Agency-funded assessment was conducted, and this one concluded that the landfill might be eligible for the National Priorities List. A report judged the potential for contamination of the surface water to be high, based on three factors: the landfill's proximity to Mission Bay, the quantity of waste, and the lack of containment of landfill materials. A contaminant release to the air was deemed possible.

In June 1990 the landfill underwent scoring according to a revised Environmental Protection Agency system. This time, according to a memorandum dated June 29, 1990, the evaluator discounted the groundwater (since no one would be drinking the brackish groundwater near the landfill). However, the old dump received positive scores for the air, surface-water, and "on-site exposure." The Mission Bay landfill's score came to 61.61, a number that placed it among the 50 most polluted hazardous waste sites in the country. A separate Environmental Protection Agency document appeared to elevate the landfill to "high priority."

In 1991, the San Diego dump site underwent an expanded Environmental Protection Agency-funded evaluation, scrutiny generally reserved (according to an agency publication) for sites "clearly headed for the NPL [National Priorities List]." This time, according to a September 25, 1991, memo, the evaluator gave the site a score of 49.06, lower than the previous score but above the cut-off for the priority listings. An accompanying memo criticized methods used by the City of San Diego and Woodward-Clyde. The memo said that the city and its consultants had used "detection levels" (for pollutants) that were so high they exceeded the Marine Ambient Water Quality Criteria. (Reporting that a substance cannot be detected above a certain level creates a sense of well-being but may mask contamination if the detection limit is too high.)

One more significant Environmental Protection Agency evaluation transpired at the landfill. In 1993, the agency hired Bechtel Environment, Inc., to evaluate the San Diego site. The Bechtel evaluator conducted no new tests, but in a report dated August 2, 1993, he judged only the air contamination potential to be significant. Groundwater, surface water, and soil offered no potential for transmitting the contamination in this evaluator's opinion. Nor did he explain why his opinion differed from previous evaluations. The old landfill's overall score thus amounted to only 14.01—too low to qualify for inclusion on the National Priorities List. The Environmental Protection Agency reacted swiftly. It placed the site in its archive, where no further action was planned.

question of whether hotel development could proceed. Miller has come to share this view and believes that the city's commitment to the project colored Woodward-Clyde's study. He argues that this bias is apparent throughout the report. Miller thinks the behavior of the city and Woodward-Clyde after the release of the study shows that something other than public-health concerns were uppermost in their minds.

The study results went to the state Department of Health Services in Sacramento, and officials there reviewed Woodward-Clyde's conclusions. On January 10, 1984, Thomas Bailey, a chief in the Toxic Substances Control Division, wrote a letter summarizing the state's response. Bailey pointed out that Woodward-Clyde had used criteria for hazardous waste that were not intended "for the purpose of assessing possible effects of long-term exposure." Furthermore, some of the chemicals found in the study "are of concern even at relatively low concentrations," Bailey declared in the letter. The division recommended several follow-up steps: a notice in the deed to inform future owners "of the presence of toxic chemical substances on the property"; and a ban on construction of "residences, schools, hospitals, day-care centers, or any other permanently occupied human habitation" and "permanent occupants of hotels, including live-in managers."

This dealt a blow to hopes for the Ramada resort. Bailey offered this: "Sites may be removed from this list [Abandoned Site List] as they are cleaned up or the potential hazard is mitigated. Accordingly, the list will appropriately reflect the status of the Mission Bay landfill when cleanup or mitigation is completed."

The following year, the city and the developer counseled by Woodward-Clyde, lobbied to get the state to revise this letter or replace it with one that would enable the project to proceed. Documents collected by Miller's group record conference calls involving up to nine representatives from the various parties, trips to Sacramento, and frequent correspondence. County officials joined in the efforts to pressure the state regulators to soften their reaction. Drafts of what the developer wanted the state to say (e.g., "We see no reason why the City and the developers of the hotel site cannot proceed immediately with the development of the hotel...") were sent north. The chief of the Toxic Substances Control Division yielded in a letter dated January 31,1985. "[I]ntended to clarify and supersede the...letter...dated January 10,1984," it neither retracted nor reaffirmed the old letter's technical comments, its call for a deed restriction, or its statements regarding cleanup and mitigation. But the new letter said the state would not designate the site a "hazardous waste property," and its said that the City and County of San Diego would bear responsibility for the Woodward-Clyde assessment of the site and for health and safety concerns associated with developing it.

Although the resort development never reached completion, the Woodward-Clyde study remains a force in discussions of the landfill. Robert Ferrier, the Refuse Disposal Division manager, cites it as a cause for belief that the old landfill is causing no problems. Ferrier points out that many other tests have been conducted since 1983. As with the Woodward-Clyde report, however, city officials and the citizens' group differ in their interpretations of test results.

Ferrier says the tests have painted a consistent and reassuring picture. "We have been testing for years, looking for any kind of difficulty resulting out of this, and we've yet to find it. We've been submitting the reports to all the regulatory agencies, and frankly...the people who get paid to do this for a living are not telling us that there is any kind of migration from that landfill." Ferrier says those government overseers have included the federal Environmental Protection Agency.

Members of the Mission Bay Park Toxic Cleanup group see the Environmental Protection

only recommendation at one point in time, my understanding is it's not. That was their recommendation at that time, but I haven't seen it substantiated by anybody else since."

The Mission Bay landfill's score

came to 61.61, a number that placed

it among the 50 most polluted

hazardous waste sites in the country.

Science Applications recommended further investigation into the heavy metals in fish living near the landfill. In its 1983 report, the consulting firm stated that a bottom-feeding fish should be "carefully selected so as to represent a worst-case situation.... The tissue to be analyzed should include the edible portions of the fish in order to establish a link between the Fish and the humans." But such testing has never been done, according to Greg Peters, staff member of the Regional Water Quality Control Board. Each year the water board gets money to test fish caught at about eight stations, Peters says. The closest station from which fish have been collected is "right downstream of Fashion Valley Road, which is maybe a mile and a half, two miles, upstream. This really wouldn't reflect what the landfill could possibly be contributing," he says. Fish have been collected from Tecolote Creek, upstream from where it enters Mission Bay. "So there again, we don't have any data on the possible influence of material in the landfill." Peters says the problem with analyzing fish caught near the San Diego River mouth is that "if you find a fish that has somewhat elevated levels [of a pollutant], you're not sure where it got it. Especially if it's a fish that also frequents the ocean and comes into that particular area where you caught him."

The landfill lobbying group says although the fish-toxicity table appears to be one of the most egregious errors in the 1983 study, other aspects of it trouble them too. Miller believes (based on the documents in the Woodward-Clyde report's appendix) that the consultants understated the toxic wastes deposited in the Mission Bay landfill. Miller thinks the report's statement that "Overall, no unusually large concentrations of heavy metals or hazardous organic chemicals were found in the landfill waste" is misleading. "I mean, we know that millions of gallons of toxic materials were dumped there. So where did they go?"

Miller says independent tests for cyanide in the soil and waste materials at the Mission Bay landfill cast doubt on Woodward-Clyde's 1983 testing. Although Woodward-Clyde reported it had failed to detect cyanide. Miller discovered an analysis conducted in the fall of 1983 by the California Department of Health Services. The state lab found cyanide in all samples from this site that it tested, with concentrations ranging from 10 to 35 parts per million.

Marx, the one-time county employee who works for URS (formerly Woodward-Clyde), downplayed the discrepancy. "This may just be a lab thing," he stated. If one set of tests had shown 10 parts per million and the other 3000 parts per million, "then I'd think there would be a scratch-your-head-and-really-look-at-this-a-lot-harder issue," he said.

Marx says his "overriding concern" with Woodward-Clyde's 1983 report was the "big-picture"

Science Applications, Inc., collected sediment and surface-water samples from the bay and the flood-control channel. Science Applications wrote a report of its findings (released in October 1983) and concluded that overall the waters of Mission Bay were "quite clean relative to priority pollutants," approximating the quality of open ocean water ("except for slightly increased levels of mercury"). When it came to sediments in the bay and channel, however. Science Applications stated that "there should be cause for concern." The consulting firm found more zinc, thallium, lead, nickel, and beryllium in the Mission Bay sediments than reported for the polluted New York Bight. The average level of mercury in Mission Bay was greater than that of the New York Bight or the Persian Gulf. And the levels were highest at the two collecting stations on either side of the landfill, making it suspect, in Science Applications' judgment, as "a probable source of metals."

Woodward-Clyde had based its reassuring statements about the Mission Bay fish consumption upon Science Applications' sediment data. How could this be? Miller and his associates noted that one of the tables in the Woodward-Clyde report did contain the same raw data that Science Applications had collected and reported. However, in the section where Woodward-Clyde analyzed the human health risks, the consultants had created another, more selective table. This table—the one most readers would peruse—is curious. It correctly states the amount of mercury that Science Applications found. But it understates the amount of four other heavy metals found in the sediments by a factor of a thousand. In other words, instead of 133 milligrams of lead per kilogram of sediment (the amount found by Science Applications in the flood-channel collecting station), Woodward-Clyde reported that only .133 milligrams had been found. Instead of 29 milligrams per kilogram of arsenic, Woodward-Clyde based its metal-consumption analysis upon an arsenic concentration of .029 milligrams per kilogram. The table does not report findings for eight other heavy metals identified by Science Applications.

When Miller and his associates reworked Woodward-Clyde's analysis based upon the heavy-metal concentrations found by Science Applications, they came up with the following estimates: Someone who eats seven ounces per month of Fish caught next to the landfill would be getting 13 times the amount of lead considered safe for consumption in drinking water. They would be consuming twice the amount of arsenic, 7 times the amount of beryllium, 3.65 times the amount of chromium, 6.7 times the amount of copper, and 25 times the amount of thallium allowed by drinking-water standards.

None of the authors of the Woodward-Clyde study remain with the firm, which was sold about two years ago and is now known by the name URS. However, David Marx, current manager of the office's Environmental Management Division, knows about the Mission Bay landfill. In 1983 Marx worked for the San Diego County health department. He read the Woodward-Clyde report when it was published and agreed to answer my questions about the report. Asked if Woodward-Clyde erred in representing the tables relating to heavy-metal concentrations, he said, "I really don't know how to answer that... There maybe an issue here. There may not be an issue." Further study of data and worksheets used by Woodward-Clyde might yield an explanation, he suggested. But before spending time and money to determine if explanatory data exists, "We would really need to hear from the city, who was our client in this particular project."

Robert Ferrier, deputy director of the city's Refuse Disposal Division, is the city employee who today bears responsibility for the Mission Bay Landfill. Asked whether Woodward-Clyde's table was in error, he said, "Perhaps. Perhaps not. There's no reason to assume SAI is right, any more than there is that Woodward-Clyde is." When reminded that Science Applications collected the data, Ferrier responded, "Oh, I understand that.... Well, I'm not saying I would trust one more than the other. That's all I'm saying. I mean, just because somebody makes a recommendation, if that was the

at times the breeze carries peppy voices of the park's animal-show announcers here. On the eastern side of the asphalt lot, dirt covers the old dump. Ash-colored mulch has been spread over some of the ground, but other sections lie naked. Short, mean plants grow here.

A wide concrete pathway lies beyond this section, next to the water. Sometimes someone strolls or Rollerblades along it. The Mission Bay Park Plan calls for additions: an amphitheater, playgrounds, picnic facilities. But no money has been budgeted to build these. "It could sit there for some time without anything further happening," one city official stated.

That's good news to Jace Miller. A shipwright and aspiring novelist who recently moved to Imperial Beach from Ocean Beach. Miller, 56, lobbies for cleanup of the old landfill. He explains that he became interested after reading a 1995 article about the imminent opening of the South Shores Park boat basin. He recalls, "I thought it would be impossible for the site to be benign, because of its location in a public park, sandwiched between two bodies of water, and because of the large amounts of toxics that had been dumped there." Miller says he started talking to the Sierra Club and Earth First and found, "No one knew about it. No one I talked to had ever heard about it. The general reaction was that it sounded pretty far-fetched. I began to get the impression that information about the dump had been kept from the public"

Miller says he enlisted other volunteers, and his group (dubbed Mission Bay Park Toxic Cleanup) has been researching the history of the site. Miller says, "I think it's a dangerous site and that the public should be warned about it." He says many of the site studies appear to contain serious flaws.

Miller's group believes that a disturbing error can be found in Woodward-Clyde's 1983 study. One of the most important conclusions of that study was that the toxic wastes deposited in the Mission Bay landfill do not pose a human health hazard. "There are practically no exposure pathways to humans," the report asserted.

The study's authors explained that the groundwater at the site was too salty to be drinkable. "Although ingestion of bay water by swimmers can occur, the amount actually swallowed by a person is normally extremely small; poisoning could occur only if acutely toxic amounts...were present in the water," they reasoned. Furthermore, the layers of dirt over the landfill appeared to be blocking the escape of any toxic gases.

Instead, the primary creatures at risk from landfill contamination "are the aquatic organisms inhabiting the San Diego River flood-control channel and Mission Bay," the report stated. It conceded that "consumption of highly contaminated fish has caused serious human health problems, particularly in Japan." The consultants looked at concentrations of toxic heavy metals found in the water and sediments of the flood-control channel and bay at sites near the landfill. In order to take into account the fact that heavy metals tend to "bioconcentrate" in the flesh of marine animals, the consultants multiplied the highest concentrations of those metals by two (the factor that they claim was recommended by the Environmental Protection Agency). Then they calculated how much of each of the metals would be consumed by a person eating 6.5 grams of fish a day (a little less than a quarter of an ounce, or roughly seven ounces of fish per month). When they compared this amount to the estimated safe consumption levels derived from drinking-water standards, they concluded that "no human health effects should result from consumption of fish inhabiting Mission Bay."

That statement apparently assuaged concerns of government regulators who read the Woodward-Clyde report 17 years ago. But Miller's group took a hard look at the analysis and the data upon which it was based. Woodward-Clyde didn't gather that data; another local consulting firm called

Contreras amended her recollection: "I'm beginning to think or recall that maybe there were just so many problems with the site that the deal fell apart."

In 1988 the city began carrying out other plans for the property (dubbed by then "South Shores Park"). The first, $4.5 million phase of these plans involved carving out a nine-acre cove north of the landfill. This was to serve as a boat-launching basin, and next to it a ten-lane boat ramp was to be constructed. Other improvements included a 16-acre parking lot, a public beach situated across the lagoon from the boat ramp, two boarding docks, and restroom facilities. Apprised of the City's plans, an engineer from the Regional Water Quality Control Board office had expressed concern to the city in a letter dated June 5, 1987, that excavation might "result in the disruption of the landfill cover and/or involve excavation and exposure of landfill waste materials." But Woodward-Clyde (once again the city's consultant) responded that a 50-foot buffer zone would be maintained between the boat basin and the boundaries of the old landfill. Furthermore, an earthen berm would separate the waters of the bay from the boat basin until the excavation was complete.

In early October 1988, about a month after grading began, some workers excavating the site smelled the odor of rotten eggs and began vomiting and experiencing headaches. Three were hospitalized, according to news reports. (One of the workers died thereafter, and ten months later his widow filed a wrongfull-death suit. The city paid $8500 to settle the suit, according to a note in the case files.) An environmental consultant brought in from Scottsdale, Arizona, to investigate the incident concluded that workers had encountered a pocket of hydrogen sulfide gas. Although Woodward-Clyde's 1983 study had not found this poison, workers' symptoms matched many of its effects. The consultant recommended that workers be required to wear oxygen masks.

More trouble developed. This time it took the form of a reddish-orange seepage that appeared in the side wall of a ground-cut at the level of the former water table. A field technician employed by the consulting firm collected liquid and soil samples. The results revealed elevated levels of pollutants: dichloroethene, a degreasing agent; TCA, a common industrial solvent; and carbon tetrachloride, the carcinogen whose dumping spurred Woodward-Clyde's 1983 report. The latter was found in a concentration more than 900 times the state's maximum for drinking water.

"We've broken the seal on the tomb, and the curse has been released," a San Diego Evening Tribune article in August 1989 quoted Michael Pallamary, a civil engineer who was chairman of a city panel seeking to clean up Mission Bay. The city ordered more testing of the surface water and sediments in the boat basin. Again Woodward-Clyde's findings were reassuring. None of the pollutants detected in the surface water qualified for classification as hazardous waste, the firm announced. Delays continued to plague the project. Not until 1996 did the city open the boat-launch ramp—six years behind the original schedule.

Today South Shores Park has an eerie, unfinished look. You reach it by turning in to an access road off Sea World Drive. This leads to an asphalt parking lot studded with palm trees set in planters designed to keep roots away from whatever lies below. Big enough for 240 cars and trailers, the parking lot often holds no more than 2 or 3 vehicles. At the northwest corner of the lot, two restroom facilities, gray with blue-tile accents, stand like sentries overlooking an expanse of the white concrete ramp that could accommodate ten powerboats. Yet many mornings, there are none, nor can any human figure be seen on the beach.

The old landfill lies beneath the access road and parking lot, but according to 1999 maps of the park, part of it also extends under the graded dirt to the west of the lot. This stretch abuts the eastern edge of Sea World's property, and official maps show it as a future parking site for the marine park;

September 1983. Woodward-Clyde also began burrowing into old files. Documents from those files indicated that the toxic waste being dumped into the Mission Bay landfill in the 1950s exceeded Convair's (1957) estimate of 200,000 gallons a year. One report attached to a 1958 letter from the superintendent of the city's sewerage division to the city manager estimated that four companies (Convair, Ryan, Rohr, and Astronautics) each year were generating 792,000 gallons of chromic, hydrofluoric, nitric, sulfuric, and hydrochloric acids; dichromate; cyanide; and paint and oil wastes. Other projections from this period refer to the need to dispose of at least one million gallons a year of industrial wastes. Contemporaneous documents state that some substances were going into the city sewers and the sea, as well as being dumped at the sites where they were generated or trucked to disposal facilities in the North County or Los Angeles. But the Mission Bay landfill received most of the poisonous wastes, according to the reports; several documents describe the facility as San Diego's only Class I landfill. (A Class I landfill is approved to receive toxic wastes.)

Woodward-Clyde released its study results on November 17, 1983. Contradicting documents in their appendix, the consultants stated—without any explanation—that "the total volume of hazardous waste being generated in San Diego during the late 1950s was less than 400,000 gallons/year." If three-quarters of this amount went into the Mission Bay landfill over its seven and a third years of operation, then the old dump would have received 2.2 million gallons of toxic waste, they concluded. (Stephen Lester, science director for the Center for Health, Environment, and Justice in Falls Church, Virginia, when contacted for this article, stated that "Most of the chemicals that are dumped in these landfills pretty much stay undegraded in the ground for tens and even hundreds of years.")

Magnetic and electromagnetic surveys revealed that the site harbored perhaps 5000 pounds of metal per acre, most of it at or below the water table. This confirmed old eye witness accounts that metal barrels of industrial wastes had been buried there. "At those depths (15 to 20 feet below the surface) most metallic drums or barrels should corrode to release their contents in less than ten years," the report said. Woodward-Clyde used the results of the magnetic surveys to decide where to bore for samples. But rather than choosing places where the most metal appeared to be concentrated, the consultants selected areas with "only moderate probabilities of containing barrels or barrel residues," according to the report. This was done "in order to limit the potential for rupturing any intact barrel during the field investigation." Even so, the subsequent chemical analyses found more than 60 Environmental Protection Agency "priority pollutants" on the property, including 12 heavy metals (elements such as mercury and arsenic), 38 organic compounds such as acetone and carbon tetrachloride, and 12 pesticides.

Despite this, Woodward-Clyde reassured the city that the resort development could proceed. The highest concentrations of pollutants found in the study "are low," the report announced, "and do not exceed existing California State or Federal criteria for the identification of hazardous waste." The low concentrations coupled with "the low potential for their migration, and the few pathways for human exposure" meant that "the landfill wastes do not pose a significant health hazard to humans." Semi-annual testing of the bay and flood-control-channel waters adjacent to the landfill should continue "for an indefinite period," they recommended, and they warned that if development proceeded, landfill gases might be released. These would need to be collected and disposed of. But no significant cleanup was necessary, according to Woodward-Clyde.

The Ramada development never got built. Asked about the project's history, Bonnie Contreras, a staff member in the city's Economic Development Division who worked on the development plans, said she couldn't remember what killed the project. "It seems to me that it was either the financing or just the partnership fell apart." Reminded of the toxic history of the site that emerged in 1983,

source who claimed to have been a truck driver during the 1950s. According to subsequent newspaper reports, the source said he had dumped hundreds of barrels of the carcinogen carbon tetrachloride at the Mission Bay landfill. This wasn't the first time someone had linked carbon tetrachloride to the old dump. An employee in the San Diego office of the state's Abandoned Site Project had received a tip about it after the office had opened in September 1982, according to an internal state government memo written in August 1983. The state employee had met with officials from the City of San Diego as well as from the county and had "expressed his concern that sampling should be done before there was any development of the area." But "No action was taken," according to the August 1983 memo. With the televised report of the truck driver's allegations, pandemonium erupted. Ramada announced that construction plans would be put on hold until the hotel chain could be convinced that the property was safe. Pressed by journalists, Gutzmer stated that the city had only become aware of the Convair letter in April 1983. "That was the first time...the city was made aware that industrial wastes had been mixed with household wastes," the San Diego Union quoted him as saying on July 24. Gutzmer implied that officials had no knowledge of the carbon tetrachloride dumping until the TV news report.

Then-City Councilman Mike Gotch (whose district included Mission Bay) told reporters that he had learned about the bay's toxic history from the TV news report. "If city staff knew it 90 days ago, why didn't members of the media know?" Gotch demanded, according to a July 26, 1983, article in the San Diego Union, apparently ignorant of the fact that city, state, and water-board officials had known about the Convair report two years before the news became public. Gotch's voice was among those that called for a study of the property.

In order to salvage the hotel-development project, city officials announced that they wanted to have that study completed in less than 60 days. The city council approved funding for the inquiry (which cost about $300,000), and the city handpicked the consulting firm to do the work. The council waived the consultant-selection process "because of the urgency," City Manager Ray Blair explained to a competing firm.

Chosen to conduct the study was Woodward-Clyde Consultants, a geophysical and environmental firm with experience in city-funded projects. Woodward-Clyde had done at least two previous studies for the city at the Ramada project site. Early in 1980 the consulting firm had dug test pits in an effort to define the boundaries and composition of the old dump. (The dump had been covered with material dredged up when Mission Bay was being created between 1960 and 1962.) Woodward-Clyde had concluded in a 1980 letter to the city that the property was "suitable for development" but had cautioned, "Special treatment of near-surface soils and underlying trash fill areas may be necessary...."

Evidently, Woodward-Clyde had not tested for toxic wastes in 1980, but the 1983 study was to make up for that. The study was to ascertain whether any hazardous materials were present at or near the landfill, and, if so, what their concentrations were. Woodward-Clyde proposed to collect groundwater from 20 wells to be drilled on and near the landfill site. Cover soil, landfill material, and underlying alluvium extracted from 21 boring sites would be scrutinized, and gases from 10 wells would be examined. Another consulting firm. Science Applications, Inc., would study surface water and sediment from Mission Bay and the San Diego River flood-control channel, two bodies of water that adjoin the landfill to the north and south. Woodward-Clyde was to assess whether any remedial measures or further field research was necessary.

The city asked the county and state health-services departments to review the proposed study, and officials from both pronounced it adequate. Sample collection began in late August and early

wrote, "a cancer case in al t every house." Although Miller's g) found a letter from the county acknowledging her concerns, they found no records indicating an investigation.

Miller asks, "Why wait?" until harm emerges. "Why not err on the side of caution and find out what is going on there? There are large amounts of toxic chemicals and heavy metals buried in Mission Bay, and nobody is taking any action." He adds, "The documented pattern of avoidance, denial, whitewash, and contradiction regarding the Mission Bay landfill is too pervasive to ignore."

Miller says his group hopes to file an environmental lawsuit against the city. They're seeking legal assistance with such an action. In the mean time, Miller has become convinced that "cleanup is the only option" for what he calls "America's Finest Toxic Waste Dump."

Ferrier, the city's Refuse Disposal Division deputy director, says the city has never evaluated costs of cleaning up the old landfill. But he suggests it would be an "interesting scenario" to recommend "that we ought to go into the middle of Mission Bay and excavate an area of that magnitude and transport it." Just imagine, the bureaucrat suggests, what people would say if you put the following question to them: "We're going to go dig this up and transport it across your street. Do you mind?"

—Jeannette De Wyze

EXHIBIT G

6-01-129

CHRISTIAN WHEELER
ENGINEERING

REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION

SEA WORLD ATLANTIS PROJECT
SAN DIEGO, CALIFORNIA

PREPARED FOR:

SEA WORLD ADVENTURE PARKS
200 SEA WORLD DRIVE
SAN DIEGO, CALIFORNIA
92109-7904

PREPARED BY:

CHRISTIAN WHEELER ENGINEERING
4925 MERCURY STREET
SAN DIEGO, CALIFORNIA
92111

CHRISTIAN WHEELER
ENGINEERING

October 16, 2000

SeaWorld Adventure Parks
200 SeaWorld Drive
San Diego, California 92109-7904

CWE 200.338.2

SUBJECT: REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION, SEA WORLD ATLANTIS PROJECT, SAN DIEGO, CALIFORNIA.

Ladies and Gentlemen:

In accordance with your request and our Proposal dated June 5, 2000, we have completed a preliminary geotechnical investigation for the subject project. The purpose of this report was to address the geotechnical and geologic aspects of the proposed project. We are presenting herewith our findings and recommendations.

In general, we found that the site is suitable to support the proposed Atlantis splash ride project, provided the site preparation and foundation recommendations presented in this report are strictly complied with. The main geotechnical conditions that will impact the prepared project are relatively shallow groundwater, compressible and liquefiable soils below the water table, groundshaking during major seismic events, and relatively loose soils above the water table. Specific recommendations to mitigate these conditions are presented in the accompanying preliminary geotechnical report, and include removal and replacement of the near-surface soils as uniformly compacted fill, construction of a pore water pressure dissipation blanket below critical structures, surcharging areas where settlement-sensitive structures will be constructed, and using concrete mat foundations with relatively light soil bearing pressures. The pore water pressure dissipation blanket and surcharging are only required for the three tower structures, the aquarium exhibit, and the LSS building.

If you have any questions after reviewing this report, please do not hesitate to contact the undersigned. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

Charles H. Christian, RGE #00215

Curtis R. Burdett, CEG #1090

cc: (2) SeaWorld
(1) Peller & Associates
(2) PGVA

REGISTERED PROFESSIONAL ENGINEER CHARLES H. CHRISTIAN No. GEOX0215 Exp. 9-30-01 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED GEOLOGIST CURTIS R. BURDETT No. 1090 CERTIFIED ENGINEERING GEOLOGIST Exp. 10-00 STATE OF CALIFORNIA

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CHRISTIAN WHEELER
ENGINEERING

REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED ATLANTIS WATER RIDE PROJECT
SEA WORLD ENTERTAINMENT PARK
SAN DIEGO, CALIFORNIA

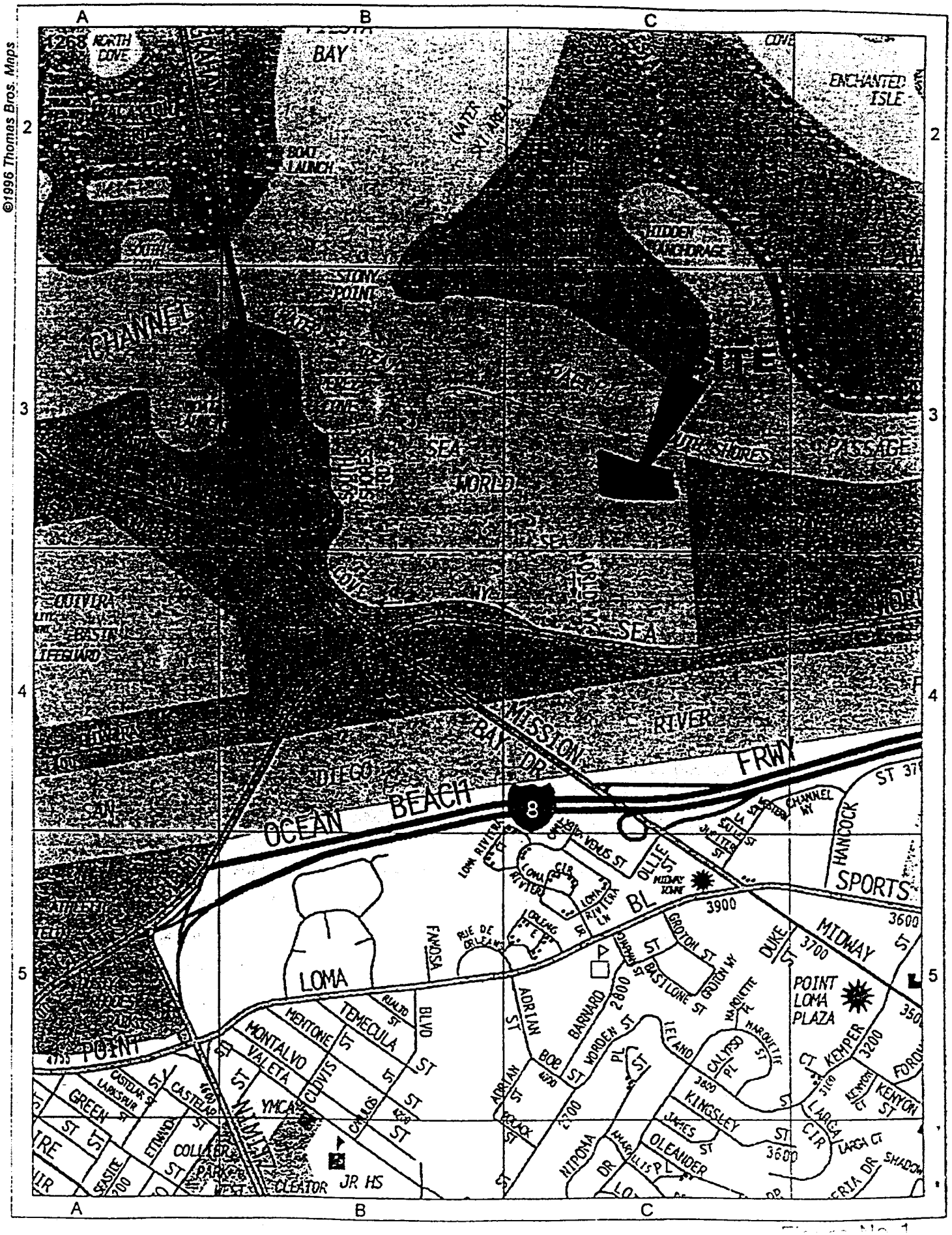
INTRODUCTION AND PROJECT DESCRIPTION

This report presents the results of our preliminary geotechnical investigation for the proposed Atlantis splash water ride project at the SeaWorld Entertainment Park, located on South Shores Drive, in San Diego, California. The following Plate No. 1 presents a vicinity map showing the location of the site.

The site of the subject project is located at the northeast corner of the Sea World leased property, in the Mission Bay area of San Diego, California. Most of the project area is relatively level and presently being used as a storage area for park support facilities, and as such, supports several temporary structures.

We understand that the proposed project is to consist of a major splash ride that will include the structural elements described below. It should be noted, however, that the project is still evolving and that some of the structural elements described below may change.

- **Ride Lift Tower:** The ride lift tower will be a relatively light, steel-frame structure that will be approximately 95 feet above exterior grade. The total static load of this structure is estimated to be 1,500 kips, with a mat foundation contact pressure of approximately 760 pounds per square foot. The exterior of the structure will consist of a light-gauge metal skin with vertical studs attached to the structural steel frame. The tower will have an inside elevator system to lift the ride cars to a track located near the top. A water channel for the ride cars will enter the structure on the west side. This channel will extend about 11 feet below the exterior grade. The bottom of the channel will coincide with the top of the concrete mat foundation. This tower will be structurally tied to the other two at various levels by structural elements and the elevated ride tracks.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BOAT LAUNCH
ENCHANTED ISLE
HIDDEN ANCHORAGE
STONY POINT
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GROTON ST
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- **Ride Drop Tower:** The ride drop tower, located west of the ride lift tower, supports the water slide where the ride cars drop about 60 feet to a shallow artificial lake. This structure will also be approximately 80 feet high and will be a relatively light, steel-frame structure with a light-gauge metal skin. The total static load of this structure is estimated to be 730 kips, with a mat foundation contact pressure of about 730 pounds per square foot. The same water channel that enters the lift tower passes through the center of this structure; however, the depth of the channel as it passes through this structure will only be about six to nine feet below the exterior grade. The above-grade ride tracks and a footbridge will connect the drop tower and the main tower.

- **Stair Tower:** The stair tower will be located northeast of the ride lift tower and will be about 85 feet high. This tower supports the above-grade ride tracks and has an interior stairway for maintenance and emergency exit. It will be connected to the elevator tower by the ride tracks at two levels and by a footbridge. This structure will also be a relatively light, steel-frame structure with a light-gauge metal skin, that will have a total static load of 740 kips and a mat foundation contact pressure of 560 pounds per square foot.

- **Elevated Ride Track:** The elevated ride track is a roller coaster type track that varies in height from zero to 77 feet above the ground surface. The track will be supported by steel columns, which, in turn, are supported by a partial concrete mat foundation system. Column static loads are expected to be 4.0 kips. Including the weight of the foundations, the total static load of 27 kips is estimated for each column, with a mat foundation contact pressure of 350 pounds per square foot.

- **Ride Water Channels:** The at-grade ride water channels wind through portions of the ride and through the two artificial lakes. These elements will be reinforced concrete structures about six feet deep. Static track loads in the ride water channels are estimated to be about 4.5 kips per linear foot. The bottom of the channel will act as a mat foundation system, which will have an estimated static contact pressure of approximately 560 pounds per square foot.

- **Artificial Lakes:** Two artificial lakes, approximately 4 feet deep, will be included in the construction. One lake will be located west of the drop tower and the other will be

located on the north side of the ride between the end of the elevated ride track and the exiting platform. The ride track will pass through these artificial lakes. The lakes' construction will consist of a liner with a three- to four-inch thick shotcrete ballast. The boundary grade separator walls will be reinforced concrete.

- **Coaster Station:** The ride channel at the coaster station (loading and exiting docks), and the ride car maintenance area and transfer track at the west end of the coaster station, will consist of a reinforced concrete structure with a depth of about six to ten feet below the loading and exit platforms. The channel in the maintenance cove/transfer track area is expected to have a static load of about 710 kips with a mat contact pressure of 250 pounds per square foot. The exiting/loading channel is expected to have a static load of 615 kips with a contract pressure of approximately 275 pounds per square foot.

- **Gift Shop:** A retail store, approximately 936 square feet in area, will be located south of the ride exit platform. This structure will be single-story and of light, steel-frame construction, with an on-grade concrete floor slab. This structure will be supported by a partial concrete mat foundation system, with a contract pressure of about 200 pounds per square foot. This includes the weight of the floor slab and the live load on it.

- **Aquarium:** West and south of the retail store, an above-grade aquarium will be constructed. This feature will consist of two circular tanks, one 24 feet and one 30 feet in diameter, that will extend approximately ten feet above the surrounding ground surface. These structures will have a concrete mat foundation and acrylic glass sides with steel or concrete mullions between the acrylic panels. The static mat foundation contact pressure is estimated to be about 950 pounds per square foot.

- **Ride Entrance Canopy:** A semi-circular, gated canopy will be constructed at the entrance to the ride, which will be located between the retail store and the drop tower. This structure will consist of a light steel-frame structure supported by a partial mat foundation. The static mat contact pressure for this structure is estimated to be 150 pounds per square foot.

- **Facility Support Building:** The facility support building will be located between the stair tower and coaster station. This structure will consist of a light, steel-frame building with metal siding. The structure will be supported by a partial mat foundation with a contact pressure of approximate 175 pounds per square foot. This building will contain the control consoles to operate the ride and will house the various equipment and other support elements for the water ride.

- **Ride Water Filter Tanks:** Filter tanks for the ride water will be located on the north side of the facility support building. The tanks are pre-manufactured elements that stand vertical on their own integral support system, which is bolted to the mat foundation. No other specific information is available at this time regarding the structural features of this filter system. However, we anticipate that the tanks will have a maximum height of about 12 feet and a maximum diameter of about 10 feet. We also anticipate that they will be supported by a full concrete mat foundation with static contract pressure of 570 to 750 pounds per square foot. We understand that this structure is not considered to be as critical, settlement-wise, as the LSS Building described in the following section.

- **LSS Building:** This building, located west of the aquarium, will be a single-story, masonry structure with a concrete mat foundation. The building will house filter and support equipment for the aquarium. The static mat foundation contact pressure in this area is estimated to be 570 to 750 pounds per square foot.

- **Locker Rooms:** A relatively small structure will be attached to the west side of the LSS Building, that will house employee lockers and dressing room facilities. This structure is a pre-engineered, light metal-frames building that will be supported by a partial concrete mat foundation. The static mat foundation contact pressure in this area is estimated to be 175 pounds per square foot.

- **Public Restroom:** A public restroom facility will be constructed west of the ride area and will be approximately 600 square feet in area. This structure will be single story and will be of light-gauge, metal frame construction. The building will be supported by shallow spread footings and will have an on-grade concrete floor slab.

Precise grading for the subject project is anticipated to consist of cuts and fills of less than about five feet from the existing grades.

This report has been prepared for the exclusive use of SeaWorld of California and their design consultants for specific application to the project described herein. Should the project be changed in any way, the modified plans should be submitted to Christian Wheeler Engineering for review to determine their conformance with our recommendations and to determine if any additional subsurface investigation, laboratory testing and/or recommendations are necessary. Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, express or implied.

SCOPE OF SERVICES

Our preliminary geotechnical investigation consisted of surface reconnaissance, subsurface exploration, obtaining representative soil samples, laboratory testing, analysis of the field and laboratory data and review of relevant geologic literature. Based on past experience in the vicinity of the subject site, and in consideration of the RFP, we drilled four test borings in the project area in order to explore the subsurface soil conditions and to obtain soil samples for laboratory testing. More specifically, the intent of our investigation was to include, as applicable, the following elements listed in the RFP:

a) General description of the site and its topography;
b) A short description of the building structure upon which the recommendations are based;
c) A summary of the field investigation and laboratory testing procedures;
d) A plan showing the location of numbered soil borings and the proposed structure;
e) A summary of the field exploration and laboratory test results, including logs of the borings and classification of the soils encountered in accordance with the Unified Soil Classification System;
f) Elevations of the groundwater table encountered in our borings;
g) Preliminary seismic assessment of the site;
h) Liquefaction potential of the site;
i) Preliminary recommendations, which will include the following:
    1. Excavation and backfill requirements, indicating compaction requirements;

2. Requirements for minimizing liquefaction;
3. Dewatering requirements;
4. Recommended foundation type and recommended allowable bearing capacity;
5. Settlement and differential settlement predictions;
6. Recommendations for resisting hydrostatic pressure on the below-grade elements of the building structure;
7. Lateral pressures against retaining and basement walls, including at-rest pressures;
8. Special construction requirements;
9. Recommendations and proposed geotechnical engineering services for final design of the building; and
10. Pertinent engineering and testing data substantiating the recommendations.

FINDINGS

SITE DESCRIPTION

The project site is located along the southern side of the Pacific Passage area of the Mission Bay Park, within the northeast portion of the existing SeaWorld facility, in San Diego, California. The northern portion of the project site is currently undeveloped and outside of the perimeter fencing along the northern side of the park. Landscaping storage areas, small detached office buildings, and trash compactors currently exist in the central portion of the project site. The southern portion of the subject site is within an existing parking area sealed with asphalt and chip-seal. The site is bounded to the north by undeveloped land and the Pacific Passage area of Mission Bay and to the east by a City boat ramp facility and parking lot. To the west, the site is bounded by existing SeaWorld park facilities, and to the south, parking and drive areas extend to Sea World Drive. The project area slopes gently to the northeast towards Mission Bay. Based upon the referenced topographic maps and site plans provided to us, on-site elevations are estimated to range from 22 feet Sea World Datum (SWD) within the southwest portion of the project area to approximately 16 SWD within the northeast corner of the project site.

Some underground utilities associated with the existing temporary improvements are expected to exist in the project area. Any such utilities are expected to be removed during demolishing. A storm drain pipe crosses the central portion of the project area from south to north. This storm drain is expected to be rerouted during the construction of the project.

GENERAL GEOLOGY AND SUBSURFACE CONDITIONS

GEOLOGIC SETTING AND SOIL DESCRIPTION: The subject site is located in the Coastal Plains Physiographic Province of San Diego County. Based on the results of our limited exploration and analysis of readily available, pertinent geologic and geotechnical literature, the site is underlain by man-placed fill materials over Quaternary-age bay deposits, which were observed to extend to depths greater than our maximum explored depth of 50 feet below existing site grades. These materials are described below:

ARTIFICIAL FILL (Qaf): Observed in each of our exploratory borings, mechanically- and hydraulically-placed fill materials were noted to extend to approximately 11 feet to 14 feet below existing site grades (9½ feet to 4½ feet SWD elevation). Based on the similarities in composition and consistencies of these fill materials, no differentiation between mechanically- and hydraulically-placed fills is utilized in this report. In general, the fill was noted to consist of silty sands (SM) and poorly graded sands (SP) in three of the four borings (B1, B3 and B4). These materials were heterogeneous, varied in consistency from loose to medium dense, and were noted to be generally moist. In B2, we encountered 6 feet of fill that consisted of sandy clay (CL) between a depth of 3 to 9 feet; the rest of the encountered soils in B3 were silty sands (SM) and poorly graded sands (SP) similar to the materials encountered in the other three borings. The sandy clay was noted to be moist, medium stiff, and very micaceous. Due to the variable density and compressible nature of the encountered fill materials, the existing fill materials are not considered suitable to support settlement-sensitive structures.

BAY DEPOSITS: Quaternary-age bay deposits were encountered at approximate depths of 11 feet to 16 feet below existing site grades (9½ feet to 4½ feet SWD). In general, the bay deposits were observed to vary from silty sands (SM) to clayey sands (SC) to sandy, silty clays (CL) and to poorly graded sands (SP). The predominant soil types appeared to consist of the sandier soils, with only a few relatively thin strata of sandy clay. The sandy clay layers were noted to be very soft to soft, while the silty sand and clayey sand layers were noted to be loose to medium dense. However, in both Borings B1 and B3, the soils below about 40 feet were found to be dense, slightly clayey sand (SC-SP) or dense to very dense, poorly graded sand (SP).

GROUNDWATER: Groundwater was encountered in each of our exploratory borings at depths ranging from approximately 12 feet to 14 feet below existing site grades. These depths correspond to a groundwater level which varies from a high of approximately 6½ feet SWD (observed within B1 and B2) to a low of 5 feet SWD (observed within B3 and B4). Therefore, the hydraulic gradient is gently sloping to the northeast, towards Mission Bay. Based on the nature of the proposed construction, as well as the observed depth to groundwater, we do not expect any groundwater problems to develop due to the proposed construction. The excavation for the ride pit in the elevator structure will, however, be very close to the groundwater table.

TECTONIC SETTING: It should be noted that much of Southern California, including the San Diego County area, is characterized by a series of Quaternary-age fault zones that consist of several individual, en echelon faults that generally strike in a northerly to northwesterly direction. Some of these fault zones (and the individual faults within the zone) are classified as "active" according to the criteria of the California Division of Mines and Geology. Active fault zones are those that have shown conclusive evidence of faulting during the Holocene Epoch (the most recent 11,000 years). The Division of Mines and Geology used the term "potentially active" on Earthquake Fault Zone maps until 1988 to refer to all Quaternary-age faults for the purpose of evaluation for possible zonation in accordance with the Alquist-Priolo Earthquake Fault Zoning Act. The Alquist-Priolo Act requires the State Geologist to zone faults that are "sufficiently active" and "well-defined" to have a relatively high potential for ground rupture. The Division of Mines and Geology no longer uses the term "potentially active" but the City of San Diego has elected to continue to use the term "potentially active" to refer to certain faults that demonstrated movement during the Pleistocene epoch (11,000 to 1.6 million years before the present) but that do not have substantiated Holocene movement. It should be recognized that the Alquist-Priolo Act (Division 2, Chapter 7.5, Section 2624) authorizes individual cities and counties to establish policies and criteria which are stricter than those established by the Alquist-Priolo Act.

A review of available geologic maps indicates that the active Rose Canyon Fault Zone is located approximately 1.4 miles east of the subject site. Other active fault zones in the region that could possibly affect the site include the Coronado Bank and San Clemente Fault Zones to the west, the offshore segment of the Newport-Inglewood and Palos Verdes Fault Zones to the northwest, and the Elsinore, Earthquake Valley, San Jacinto, and San Andreas Fault Zones to the northeast.

GEOLOGIC HAZARDS

GENERAL: No geologic hazards of sufficient magnitude to preclude the construction at the site, as we presently understand it, are known to exist. The subject site is located within Geologic Hazard Category 31 of the "City of San Diego SEISMIC HAZARD STUDY, Geologic Hazards and Faults". Geologic Hazard Category 31 refers to areas which possess a high potential for soil liquefaction due to such factors as shallow groundwater and the presence of hydraulic fills. A discussion of the results of our detailed analysis of the liquefaction potential at the site is presented below in the Liquefaction section of this report.

LANDSLIDE POTENTIAL AND SLOPE STABILITY: As part of this investigation we reviewed the publication, "Landslide Hazards in the Southern Part of the San Diego Metropolitan Area" by Tan, 1995. This reference is a comprehensive study that classifies San Diego County into areas of relative landslide susceptibility. The subject site is located in Area 1. Land within Area 1 is considered to be the least susceptible to slope failures. Based on the absence of significant slopes within the vicinity of the subject site, the potential for slope failures can be considered negligible.

GROUND SHAKING: A likely geologic hazard to affect the site is ground shaking as result of movement along one of the major active fault zones mentioned above. The maximum bedrock accelerations that would be attributed to a maximum probable earthquake occurring along the nearest fault segments of selected fault zones that could affect the site are summarized in the following Table I.

TABLE I

Fault Zone	Distance	Max. Magnitude Earthquake	Maximum Bedrock Acceleration
Rose Canyon	1.4 miles	6.9 Magnitude	0.55 g
Coronado Bank	11 miles	7.4 Magnitude	0.30 g
Newport-Inglewood	30 miles	6.9 Magnitude	0.11 g
Elsinore	41 miles	7.1 Magnitude	0.09 g
Earthquake Valley	47 miles	6.5 Magnitude	0.06 g
Palos Verdes	55 miles	7.1 Magnitude	0.08 g
San Jacinto	64 miles	7.2 Magnitude	0.07 g

Probable ground shaking levels at the site could range from slight to moderate, depending on such factors as the magnitude of the seismic event and the distance to the epicenter. It is likely that the site will experience the effects of at least one moderate to large earthquake during the life of the proposed improvements.

SEISMIC DESIGN PARAMETERS: Based on a maximum magnitude (Mmax) earthquake of 6.9 along the nearest portion of the Rose Canyon Fault Zone, the Maximum Bedrock Acceleration at the site would be approximately 0.55 g. For structural design purposes, a damping ratio not greater than 5 percent of critical dampening, and Soil Profile Type S_E are recommended (UBC Table 16-J). Based on the site's location of approximately 4 kilometers from the Rose Canyon Fault Zone (Type B Fault), Near Source Factors N_a equal to 1.3 and N_v equal to 1.6 are also applicable. These values, along with other seismically related design parameters from the Uniform Building Code (UBC) 1997 edition, Volume II, Chapter 16, utilizing a Seismic Zone 4 are presented in tabular form below.

TABLE II

UBC – Chapter 16 Table Number	Seismic Design Parameter	Recommended Value
16-I	Seismic Zone Factor Z	0.40
16-J	Soil Profile Type	S_E
16-Q	Seismic Coefficient C_a	0.36 N_a
16-R	Seismic Coefficient C_v	0.96 N_v
16-S	Near Source Factor N_a	1.3
16-T	Near Source Factor N_v	1.6
16-U	Seismic Source Type	B

LIQUEFACTION: The subject site is in an area considered susceptible to liquefaction. In order to be subject to liquefaction, three conditions must be present: loose sandy deposits of a specified grain-size distribution, shallow groundwater, and earthquake shaking of sufficient magnitude and duration. Based on our site-specific study, it appears that both shallow groundwater is present at the site and strong earthquake shaking may affect the site. Additionally, as described in the Geologic Setting and Soil Description section of this report above, the materials below the shallow water table in the project area consisted of varying layers of silty sand (SM), clayey sand (SC), and slightly clayey sand (SP-SC), all of which are expected to possess grain size distributions conducive to liquefaction. As such, we have evaluated the potential for liquefaction at the site using the LIQUEFY2 computer program, version 1.50 (Blake, 1998).

Our analysis, which was performed in accordance with the procedure recommended by the National Center For Earthquake Engineering Research (NCEER, 1997), incorporates the geotechnical data obtained from the ground surface to 50 feet below existing site grades as observed in our Exploratory Boring B-1. Furthermore, our liquefaction analysis addresses the maximum magnitude (Mmax) seismic event that is considered probable along the nearest portion of the Rose Canyon Fault Zone.

The results of our analysis indicate that an approximately 3-foot-thick layer of saturated, loose, silty sand (SM), which was noted from 14 feet to 17 feet below existing site grades, possesses a factor of safety against soil liquefaction of 0.52 and is therefore considered liquefiable (see Plate No. 14). A three-foot-thick layer of saturated, loose, silty sand (SM), encountered at depth of 21½ feet to 24½ feet below existing site grades, was determined to possess a factor of safety against soil liquefaction of 0.27 and is therefore also considered liquefiable (see Plate No. 15). In addition, a six-foot-thick layer of saturated, medium dense, clayey sand (SC),possessing 21% fines and encountered at a depth of 37 feet to 43 feet below existing site grades, was determined to possess a factor-of-safety against soil liquefaction of 0.57 and is therefore also considered liquefiable (see Plate No. 15). These calculations assume a maximum bedrock acceleration of 0.55 g, based on a maximum magnitude earthquake of 6.9 along the nearest portion of the Rose Canyon fault Zone.

Good engineering practice requires that where the evaluation indicates that liquefaction is likely, the hazards that might reasonably be caused by liquefaction that could result in the collapse of a structure and/or loss of life be mitigated. In our opinion, the foundation recommendations contained in this report address this situation and provide a life-safety performance level for the addition. These recommendations do not, however, preclude the possibility of some structural damage and settlement occurring as a result of a major seismic event.

The estimated liquefaction-induced settlements of the site in its present condition are presented on Plate No. 17. Our analysis indicates that the potential for up to approximately three inches of seismically-induced, total settlement may be expected at the site as the result of soil liquefaction caused by a 6.9 Magnitude seismic event along the nearest portion of the Rose Canyon Fault Zone. As described in the referenced Special Publication 117, considerable difficulty exists in trying to "reliably estimate" the amount of differential settlement at a site caused by soil liquefaction. As such, a conservative estimate of differential settlement at any given site can be assumed to be two-thirds of the total liquefaction-induced settlement (CDMG, 1997). Therefore, the subject site may be assumed to be subject to up to approximately two inches of seismically-induced, differential settlement.

The above analysis is in no way a guarantee that the analysis will accurately predict the liquefaction potential at the site. The analysis provides general information only on the site liquefaction potential. It should be noted that many of the parameters used in liquefaction evaluations are subjective and open to interpretation, and that much is yet unknown about both the seismicity of the San Diego area and the phenomenon of liquefaction.

LATERAL GROUND SPREADING: Another concern is the possible lateral ground spreading that could occur at the site. Lateral ground spreading can occur when the viscous liquefied soils flow downslope, usually towards a river channel or shoreline. The project area is located adjacent to Mission Bay and displays a gentle overall downward trend to the northeast, towards Mission Bay. However, based on such factors as the relatively level area of the site, the relatively gentle hydraulic gradient observed within our exploratory borings, the distance of the project from the edge of the bay, and the shallow depth of Mission Bay, it is our opinion that if liquefaction were to occur during an earthquake, the site will likely experience only minor lateral movement towards Mission Bay.

FLOODING: As delineated on the referenced Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency, the site is located outside of the boundaries of both the 100-year and 500-year flood zones.

TSUNAMIS: Tsunamis are great sea waves produced by submarine earthquakes or volcanic eruptions. Due to the site's setback from the ocean, it is unlikely that the site would be affected by a tsunami.

SEICHES: Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays or reservoirs. Although the site is located adjacent to Mission Bay, due to the size and configuration of Mission Bay, it is our opinion that the risk potential for damage caused by seiches is relatively low.

SETTLEMENT ANALYSIS

STATIC SETTLEMENT ANALYSIS: Based on the subsurface conditions described above and the results of laboratory consolidation tests, we have calculated the amount of settlement for four different loading conditions. The calculations were based on adding loads equivalent to 2.5, 5, 7.5 and 10 feet of fill material above existing grades, with a fill unit weight of 125 pounds per cubic foot. This analysis indicate how much settlement can be expected if the project area is surcharged and/or a concrete mat foundation is used to support the building. Our analysis also considered the removal and recompaction of the upper 12 feet of fill material and assumed that only minimal settlement would occur in this zone if loaded with a surcharge or a mat foundation. Based on this, the table on the following page presents the anticipated settlements that were calculated:

TABLE III

Depth of Fill	Loading Pressure	Anticipated Settlement without recompaction	Anticipated Settlement with 12 feet of recompaction
2.5 feet	312.5 psf	0.8 inches	0.8 inches
5.0 feet	625 psf	3.0 inches	1.4 inches
7.5 feet	937.5 psf	4.1 inches	2.1 inches
10.0 feet	1250 psf	5.0 inches	2.6 inches

If the site can be surcharged and a mat foundation with a contact pressure of 75 percent or less than the surcharge pressure can be used to support the critical structure, we are of the opinion that the static settlement problem can be mitigated.

DYNAMIC SETTLEMENTS DUE TO LIQUEFACTION: Based on liquefaction analysis at this site and other sites within the park that we have been involved with, we estimate that, without surcharging, seismically-induced settlements for the site could be on the order of 3 to 4 inches. We estimate that with the anticipated site preparation recommendations and site surcharging, this magnitude of settlement could be reduced by approximately one half, or to about 1.5 inches. Further, we expect that at least one-quarter of this settlement would occur over a wide area. Thus, we estimate that with the surcharging, the differential settlement due to liquefaction-induced settlement could be on the order of one inch. Based on the lenticular nature of the bay deposits, this differential is expected to occur over a distance of about 50 to 100 feet.

One way to mitigate the seismically induced settlements would be to perform deep ground modification such as performing pressure grouting, installing stone columns or some other specialized procedure. Another option would be to support the structure(s) on a pile foundation system. Considering the type of structures anticipated and the depth to dense soils, the preferred alternate to basically eliminate the seismically induced settlements would probably be a deep ground modification operation. This opinion is based on the number of light, settlement-sensitive elements, such as the elevated track, the lakes, and the ride entrance/exit elements around the ride that would also need to be protected.

Based on the preliminary information we provided SeaWorld and their consultants regarding our settlement analysis, we assume that SeaWorld is willing to assume the risks associated with the anticipated seismically-induced settlements discussed above, without the deep ground modification procedures or the use of pile foundations. We have based the site preparation and foundation

recommendations presented herein on this assumption. If this is not the case, we need to be advised immediately.

CONCLUSIONS

In general, we found that the subject site is suitable to support the proposed splash ride project if the site preparation and foundation recommendations presented herein are strictly adhered to. The main geotechnical and geologic conditions that will impact the development of the subject project include undocumented fill materials that are marginally or poorly compacted, loose or soft, compressible bay deposits extending to a depth of about 35 feet below the surface of the site, relatively shallow groundwater, groundshaking during major seismic events, and liquefiable soils below the water table. Specific recommendations to mitigate these conditions are presented below, and include removal and replacement of the near-surface soils as uniformly compacted fill, construction of a pore water pressure dissipation blanket below critical structures, surcharging areas where settlement-sensitive structures will be constructed, and using concrete mat foundations with relatively light soil bearing pressures. The pore water pressure dissipation blanket and surcharging are only required for the three tower structures, the aquarium exhibit, and the LSS building.

RECOMMENDATIONS

GRADING AND EARTHWORK

GENERAL: All grading should conform to the guidelines presented in Appendix Chapter A33 of the Uniform building code, the minimum requirements of the City of San Diego, and the Recommended Grading Specifications and Special Provisions attached hereto, except where specifically superseded in the text of this report. Prior to grading, a representative of Christian Wheeler Engineering should be present at the preconstruction meeting to provide additional grading guidelines, if necessary, and to review the earthwork schedule.

OBSERVATION OF GRADING: Continuous observation by the Geotechnical Consultant is essential during the mass grading operation to confirm conditions anticipated by our investigation, to allow adjustments in design criteria to reflect actual field conditions exposed, and to determine that the grading proceeds in general accordance with the recommendations contained herein.

CLEARING AND GRUBBING: Site grading should begin with the removal of all existing structures and improvements in the project area and all vegetation and other deleterious materials from the portions of site that will be graded and/or will receive improvements. The resulting materials should be disposed of off-site. It is anticipated that some underground utility lines associated with the existing improvements will be encountered in the project area. These lines should be removed from the areas to be graded. There is a storm drain that crossed the project area that will need to be rerouted. The abandoned pipe should be removed and the resulting depressing backfilled with uniformly compacted fill material.

EXCAVATION CHARACTERISTICS: Planned excavations and excavations for the removal of unsuitable soils should be able to be accomplished using normal heavy grading equipment. However, it should be noted that oversize construction debris will be encountered in the area approximately delineated on the attached site plan. Some of this material may require special handling due to its size. Further, some debris may be found that will be unsuitable for replacement in structural fills; this material will need to be removed from the site. It can also be noted that our past experience in the park indicates that some very fat, highly plastic clays are sometimes encountered that are not suitable for use as structural fill material.

SITE PREPARATION: Site preparation for the various elements of the splash water ride project will basically consist of removal of the existing soils to a specified depth, depending on the type or structure and loading conditions, and replacing the excavated soils as uniformly compacted fill. For some of the more-critical structures, site preparation will include surcharging and construction of a pore water pressure dissipation blanket. The following provides specific recommendations for each of the proposed elements of the project.

ELEVATOR TOWER, DROP TOWER, STAIR TOWER, AQUARIUM AND LSS BUILDING: Site preparation for these elements should consist of removing the existing soils to elevation 12 feet SeaWorld Datum and stockpiling the excavated soils for later use as fill material. The minimum lateral limits of the excavations should extend at least ten (10) feet outside the perimeter of the mat foundation systems for the towers and five (5) feet outside the perimeter of the foundations for the aquarium and LSS building. The excavation for the three towers should be connected as indicated on Plate Number 1.

Once the excavations are made, a pore water pressure dissipation blanket should be constructed at the bottom of the excavations. The pore pressure dissipation blankets should be two feet thick and

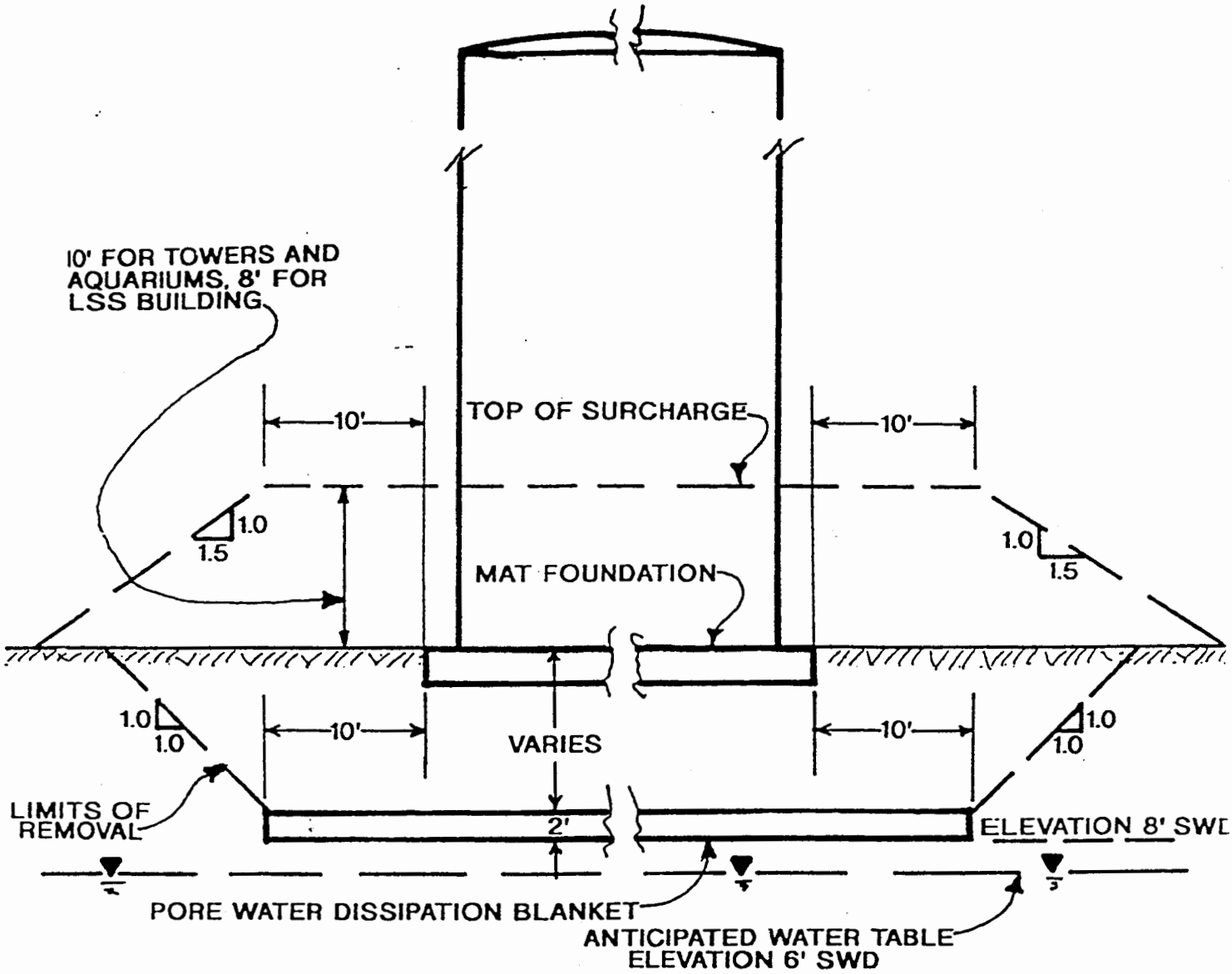
consist of ¾-inch crushed rock completely wrapped in filter fabric. The filter fabric should consist of Mirafi 140N or an equivalent product. The blanket should extend at least ten (10) feet outside the perimeter of the mat foundations of the towers and cover the entire excavation limits indicated on the following Figure Number 2. For the aquarium and LSS building, the blankets should extend at least five (5) feet outside the perimeter of the mat foundations. After the first foot of fill material is placed over the blanket, the rock should be densified using a small vibratory compactor similar to vibratory compactors used to compact trench backfill or retaining wall backfill.

Once the pore water pressure dissipation blankets are constructed, the stockpiled fill material should be replaced in the excavations in accordance with the recommendations presented hereinafter for structural fill material.

After the structural fill material is placed to finish pad grade, additional fill should be placed on the building pads to surcharge the areas. The surcharge should consist of lightly compacted soil placed to a minimum height of ten (10) feet above the finish pad grade. The top edge of the surcharge should match the excavation limits indicated on the following Figure Number 2. The side slopes should be constructed at an inclination of 1.5: (horizontal to vertical). The surcharge should be placed in a continuous operation as rapidly as practical. Once the surcharge is brought up to the proper height, settlement monuments should be placed on the top and monitored at least twice a week until it can be determined that the consolidation process in is the secondary stage. At this point, additional consolidation is considered to be relatively minimal. We anticipate that the surcharge period will take approximately six to eight weeks to reach the secondary consolidation stage.

The detail presented on the following Figure Number 2 summarizes the general limits of the site preparation recommendations presented above. If found necessary, some adjustment of the elevation of the pore pressure dissipation blanket can be made to allow construction of the ride track in the elevator tower area. Such adjustment should be approved by Christian Wheeler Engineering.

ELEVATED RIDE TRACK: Site preparation along the elevated track should consist of removal of the existing soils to a depth of at least eight (8) feet below finish grade and replacement of the excavated materials as structural fill. The minimum horizontal limits of this removal should extend at least eight (8) feet outside the edge of the mat foundation system that will support the elevated track. Deeper excavations may, however, be necessary if soils determined by the



DETAIL FOR

LIMITS OF PORE WATER PRESSURE BLANKET AND SURCHARGE FOR DROP TOWER, LIFT TOWER, STAIR TOWER, AQUARIUMS AND LSS BUILDING

NO SCALE

CWE 200.338 OCTOBER 16, 2000 Figure No. 2

geotechnical engineer to be unsuitable to support the fill material to be replaced are exposed. The excavation should not extend below the elevation of 12 feet SWD. If excessive pumping is encountered at a depth of eight feet, the bottom of the excavation may need to be stabilized. Specific recommendations should be provided by the geotechnical engineer during site preparation if this condition occur. Prior to replacing the overexcavated soils, the soils exposed at the bottom of the excavation should be processed to receive fill as recommended hereinafter.

AT-GRADE RIDE CHANNEL AND ARTIFICIAL LAKES: The existing soils below the at-grade ride channel and the artificial lakes should be removed to a minimum depth of three feet below the bottom of the mat foundations and concrete pool bottoms, and be replaced as structural fill. The minimum horizontal limits of this excavation should extend at least three (3) feet outside the edges of the ride track foundations and lake bottom foundations. If soils considered to be unsuitable to support the fill material top be replaced are exposed at this level, deeper removals may be necessary. Prior to replacing the overexcavated soils, the soils exposed at the bottom of the excavation should be processed to receive fill as recommended hereinafter.

RIDE WATER FILTER PLANT: We understand that this element is not considered to be a critical element and, therefore, can tolerate more settlement than the LSS Building. In order to reduce the static settlement to approximately two (2) inches, the upper eight (8) of soil below the bottom of the foundations should be removed and replaced as structural fill. If soils considered to be unsuitable to support the fill material to be replaced are exposed at this level, deeper removals may be necessary. Prior to replacing the overexcavated soils, the soils exposed at the bottom of the excavation should be processed to receive fill as recommended hereinafter.

SUPPORT FACILITY BUILDING, GIFT SHOP, ENTRY CANOPY AND RESTROOM FACILITY: The existing soils below the these structures should be removed to a minimum depth of six (6) feet below the bottom of the foundations and be replaced as structural fill. The minimum horizontal limits of this excavation should extend at least six (6) feet outside the edges of the perimeter foundations. If soils considered to be unsuitable to support the fill material to be replaced are exposed at this level, deeper removals may be necessary. Prior to replacing the overexcavated soils, the soils exposed at the bottom of the excavation should be processed to receive fill as recommended hereinafter.

EXTERIOR FLATWORK AREAS: In all areas that will receive on-grade concrete flat work, the existing soils within two (2) feet of the bottom of the concrete should be removed and be

replaced as structural fill. The minimum horizontal limits of this removal should extend at least two (2) feet outside the edges on the concrete. If soils considered to be unsuitable to support the fill material top be replaced are exposed at this level, deeper removals may be necessary. Prior to replacing the overexcavated soils, the soils exposed at the bottom of the excavation should be processed to receive fill as recommended hereinafter.

MISCELLANEOUS IMPROVEMENTS: Any other settlement-sensitive structures or improvements not specifically covered by the above site preparation recommendations should be brought to the attention of the geotechnical engineer. Site-specific recommendations can be provided for the site preparation for such structures and improvements when the particulars of the structures and improvements are know.

It should be realized that a considerable amount of buried construction debris was found to exist in the northwest portion of the subject project. The approximate area where this material is located is indicated on the Site Plan included herewith as Plate No. 1. This area most likely contains oversize materials and possibly other unsuitable materials and trash that will not be suitable for use in structural fills and will need to be exported and properly disposed of off site.

DEWATERING: Based on the proposed construction plans, it appears that the excavations will not extend below the water table. However, should it be found that dewatering will be necessary to excavate and construct structures below the water table, a contractor specializing in construction dewatering should be retained to design and perform the necessary dewatering. It is recommended that if dewatering is needed, it be performed as much as possible on a localized basis in order to minimum its impact on adjacent improvements.

PROCESSING OF FILL AREAS: Prior to placing any new fill soils or constructing any new improvements in areas that have been cleaned out to receive fill, the exposed soils should be scarified to a depth of 12 inches, moisture conditioned, and compacted to at least 90 percent relative compaction. This procedure is not necessary where the pore water pressure dissipation blankets are constructed. No other special ground preparation is anticipated at this time.

COMPACTION AND METHOD OF FILLING: All structural fill placed at the site should be compacted to a relative compaction of at least 90 percent of its maximum dry density as determined by ASTM Laboratory Test D1557-91. Fills should be placed at or slightly above optimum moisture content, in lifts six to eight inches thick, with each lift compacted by mechanical means. Fills should

consist of approved earth material, free of trash or debris, roots, vegetation, or other materials determined to be unsuitable by our soil technicians or project geologist. Fill material should be free of rocks or lumps of soil in excess of twelve inches in maximum dimension. However, in the upper five feet of pad grade, no rocks or lumps of soil in excess of six inches should be allowed.

Utility trench backfill within five feet of the proposed structures and beneath all pavements and concrete flatwork should be compacted to a minimum of 90 percent of its maximum dry density. The upper twelve inches of subgrade beneath paved areas should be compacted to 95 percent of the materials maximum dry density. This compaction should be obtained by the paving contractor just prior to placing the aggregate base material and should not be part of the mass grading requirements or operation.

SELECT GRADING: Most of the on-site soils exposed in our subsurface explorations are considered to be nondetrimentally expansive. Nondetrimentally expansive soils are defined herein as soils with an expansion index less than 50. Boring B2 did, however, encounter a six-foot-thick layer of highly expansive clay from three to nine feet below grade. Any expansive soil encountered during grading that is proposed to be used as fill material should be placed at least five (5) feet below finish pad grade, or it should be mixed with other on-site soils to produce a nondetrimentally expansive mixture of soil. Wherever detrimentally expansive soil is determined to occur naturally within five feet of finish pad grade in cut or ungraded areas, it should be removed and replaced with nondetrimentally expansive material

IMPORTED FILL MATERIAL: At this time, the need to import fill material has not been determined. If imported fill is necessary, it should be evaluated and approved by the Geotechnical Consultant prior to being imported. At least two working days notice of a potential import source should be given to the Geotechnical Consultant so that appropriate testing can be accomplished. The type of material considered most desirable for import is a nondetrimentally expansive granular material with some silt or clay binder. Further, the import material should have no more than 25 percent finer than the standard No. 200 sieve size, no rock larger than six inches and no more than 20 percent larger than the standard No. 4 sieve size.

FILL SLOPE CONSTRUCTION: Fill slopes may be constructed at an inclination of 2:1 or flatter (horizontal to vertical). Compaction of slopes should be performed by back-rolling with a sheepsfoot compactor at vertical intervals of four feet or less as the fill is being placed, and track-walking the face of the slope when the slope is completed. As an alternative, the fill slopes may be overfilled by at least

three feet and then cut back to the compacted core at the design line and grade. Keys should be made at the toe of fill slopes in accordance with the recommendations presented above under "Compaction and Method of Filling."

SURFACE DRAINAGE: Surface runoff into ungraded areas should be minimized. Where possible, drainage should be directed to suitable disposal areas via non-erodible devices such as paved swales, gunited brow ditches, and storm drains. Pad drainage should be designed to collect and direct surface water away from proposed structures and the top of slopes and toward approved drainage areas. For earth areas, a minimum gradient of one percent should be maintained.
The ground around the proposed buildings should be graded so that surface water flows rapidly away from the buildings without ponding. In general, we recommend that the ground adjacent to buildings slope away at a gradient of at least two percent. Densely vegetated areas where runoff can be impaired should have a minimum gradient of five percent within the first five feet from the structure.

SLOPE STABILITY

GENERAL: All slopes at the subject development will be constructed at a slope ratio of 2:0 horizontal units to 1.0 vertical unit (2:1) or flatter. Maximum cut and fill slope heights will be less than about 10 feet. Based on the relatively high strength parameters of the on-site granular soils, it is our opinion that the proposed slopes will be stable in regards to deep-seated slope failure and surficial slope failure. The proposed slopes will have a factor of safety against failure in excess of the normally required minimum safety factor of 1.5. All fill slopes should be constructed in accordance with the grading recommendations presented above.

EROSION CONTROL: The placement of cohesionless soils at the face of slopes should be avoided. Slopes should be planted as soon as feasible after grading. Sloughing, deep rilling and slumping of surficial soils may be anticipated if slopes are left unplanted for a long period of time, especially during the rainy season. Irrigation of slopes should be carefully monitored to insure that only the minimum amount necessary to sustain plant life is used. Over-irrigating could be extremely erosive and should be avoided.

FOUNDATION RECOMMENDATIONS

GENERAL: Based on the findings of our investigation and consultation with the project structural engineer, architect and SeaWorld design team, it was determined that the three towers should be

supported by full concrete mat foundations, while the other less settlement-sensitive structures may be supported by partial concrete mat foundations or, in the case of the rest room facility, by conventional spread footings. The successful performance of such foundations will, however, depend on the building pads being prepared are recommended above in the Grading and Earthwork section of this report. The following provides specific recommendations for the full and partial concrete mat foundations and for conventional spread footings for some of the miscellaneous improvements.

CONCRETE MAT FOUNDATIONS

GENERAL: It is recommended that full concrete mat foundations be used to support the three tower structures, the aquarium tanks and the LSS building. Partial concrete mat foundations should be used to support the remaining structures, including the elevated track, the tracks in the at-grade water channels, the entry canopy, the retail store, and the facility support building. The static foundation contact pressure for the full mat foundations should not exceed 950 pounds per square foot. The static foundation contact pressure for the partial mat foundations should not exceed 350 pounds per square foot. For the at-grade water channels, the static foundation contact pressure should not exceed 600 pounds per square foot. The mat foundations may be designed using a subgrade modulus of 200 pounds per cubic inch. The thickness and structural reinforcing requirements of the mat foundations should be provided by the project structural engineer.

ANTICIPATED SETTLEMENTS: Where the surcharge operation is performed, the static foundation contact pressure of the mat foundations will be approximately 75 percent of the surcharge pressure. Therefore, the anticipated static settlement is expected to be less than about one-quarter inch. This includes the three towers, the aquarium and the LSS building. The dynamic settlement caused by liquefaction during a major seismic event in the areas that have been surcharged is estimated to be approximately one inch. A differential settlement due to liquefaction is estimated to be roughly one inch, over a distance of between 50 to 100 feet.

The anticipated static settlement for the ride water filter plant is estimated to be approximately two inches. The dynamic settlement caused by liquefaction during a major seismic event in the area that could cause liquefaction is estimated to be roughly two inches, over a distance of between 50 to 100 feet.

The anticipated static settlements for the rest of the above-grade structures are estimated to be less than one inch. The dynamic settlement caused by liquefaction during a major seismic event in the

areas that have not been surcharged is estimated to be approximately three inches. Differential settlement due to liquefaction is estimated to be roughly two inches, over a distance of between 50 to 100 feet.

CONVENTIONAL FOUNDATIONS

GENERAL: Conventional spread footings for light structures, such as the restroom facility and other miscellaneous improvements, should be embedded at least 18 inches below finish pad grade. Continuous and isolated footings should have a minimum width of 12 inches and 18 inches, respectively. This assumes that the soils within the foundation influence depth zone are properly compacted. The foundation influence depth zone is defined herein as a depth of three times the width of continuous footings and 1.5 times the width of isolated footings.

BEARING CAPACITY: Conventional spread footings with the above minimum dimensions may be designed for an allowable soil bearing pressure of 2000 pounds per square foot. This value may be increased by one-third for combinations of temporary loads such as those due to wind or seismic loads.

FOOTING REINFORCING: Reinforcement requirements for foundations should be provided by a structural engineer. However, based on the anticipated soil conditions after site preparation, we recommend that the minimum reinforcing for continuous footings consist of at least one No. 5 bar positioned three inches above the bottom of the footing and one No. 5 bar positioned approximately two inches below the top of the footing.

LATERAL LOAD RESISTANCE: Lateral loads against foundations may be resisted by friction between the bottom of the footing and the supporting soil, and by the passive pressure against the footing. The coefficient of friction between concrete and soil may be considered to be 0.35. The passive resistance may be considered to be equal to an equivalent fluid weight of 350 pounds per cubic foot. This assumes the footings are poured tight against undisturbed soil. If a combination of the passive pressure and friction is used, the friction value should be reduced by one-third.

FOUNDATION EXCAVATION OBSERVATION: All foundation excavations should be observed by the Geotechnical Consultant prior to placing concrete to determine if the foundation recommendations presented herein are complied with. All footing excavations should be

excavated neat, level and square. All loose or unsuitable material should be removed prior to the placement of concrete.

ON-GRADE SLABS

INTERIOR SLABS: The interior slabs for buildings that will support heavy equipment loads should be designed by the project structural engineer. The minimum slab thickness for conventional slabs should be five inches. Interior slabs should be reinforced with at least No. 3 bars placed at 12 inches on center each way. The slab reinforcing bars should extend into the perimeter footings as required by the structural engineer. Slab reinforcing should be positioned on chairs at mid-height in the floor slab.

MOISTURE PROTECTION FOR INTERIOR SLABS: Interior concrete on-grade slabs that will support moisture-sensitive floor coverings should be underlain by a moisture barrier. We recommend that the minimum configuration of the subslab moisture barrier consist of a four-inch-thick blanket of coarse, clean sand and a visqueen vapor barrier. The sand should have 100 percent material passing the 1/4-inch sieve and less than ten percent and five percent passing the No. 100 and No. 200 sieves, respectively. The visqueen vapor barrier should have a minimum thickness of 10 mil and should be placed in the center of the sand blanket.

EXTERIOR CONCRETE FLATWORK: Exterior slabs should have a minimum thickness of four inches. Reinforcement should be placed in exterior concrete flatwork to reduce the potential for cracking and movement. Control joints should be placed in exterior concrete flatwork to help control the location of shrinkage cracks. Spacing of control joints should be in accordance with the American Concrete Institute specifications. When patio, walks and porch slabs abut perimeter foundations they should be doweled into the footings.

EARTH RETAINING WALLS

BEARING CAPACITY: The bearing capacity of retaining walls will be dependent on the compaction of the supporting soils. Assuming that the soils for a depth of at least 1.5 times the width of the footing are removed and replaced as compacted fill, it is our opinion that such foundations may be designed using an allowable soil bearing pressure of 2000 pounds per square foot. This pressure may be increased by one-third for temporary loading.

PASSIVE PRESSURE: The passive pressure for the prevailing soil conditions may be considered to be 350 pounds per square foot per foot of depth. This pressure may be increased one-third for seismic loading. The coefficient of friction for concrete to soil may be assumed to be 0.35 for the resistance to lateral movement. When combining frictional and passive resistance, the friction should be reduced by one-third. The upper 12 inches of exterior retaining wall footings should not be included in passive pressure calculations where abutted by landscaped areas.

ACTIVE PRESSURE: The active soil pressure for the design of unrestrained earth retaining structures with level backfill may be assumed to be equivalent to the pressure of a fluid weighing 35 pounds per cubic foot. An additional 13 pounds per cubic foot should be added to this value for 2:1 (horizontal to vertical) sloping backfill. These pressures do not consider any other surcharge. If any are anticipated, this office should be contacted for the necessary increase in soil pressure. These values assume a drained backfill condition. Waterproofing details should be provided by the project architect. A suggested wall subdrain detail is provided on the attached Plate Number 26. We recommend that the Geotechnical Consultant be retained to observe all retaining wall subdrains to verify proper construction.

BACKFILL: All backfill soils should be compacted to at least 90 percent relative compaction. Expansive or clayey soils should not be used for backfill material. The wall should not be backfilled until the masonry has reached an adequate strength.

LIMITATIONS

REVIEW, OBSERVATION AND TESTING

The recommendations presented in this report are contingent upon our review of final plans and specifications. Such plans and specifications should be made available to the Geotechnical Engineer and Engineering Geologist so that they may review and verify their compliance with this report and with Appendix Chapter A33 of the Uniform Building Code.

It is recommended that Christian Wheeler Engineering be retained to provide continuous soil engineering services during the earthwork operations. This is to verify compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our best estimate of the project requirements based on an evaluation of the subsurface soil conditions encountered at the subsurface exploration locations and on the assumption that the soil conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the foundations and/or cut and fill slopes may be influenced by undisclosed or unforeseen variations in the soil conditions that may occur in the intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the Geotechnical Engineer so that he may make modifications if necessary.

CHANGE IN SCOPE

This office should be advised of any changes in the project scope or proposed site grading so that we may determine if the recommendations contained herein are appropriate. It should be verified in writing if the recommendations are found to be appropriate for the proposed changes or our recommendations should be modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they are due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Government Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our borings, surveys, and explorations are made, and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for the interpretations by

others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the responsibility of SeaWorld, or their representatives to ensure that the information and recommendations contained herein are brought to the attention of the structural engineer and architect for the project and incorporated into the project's plans and specifications. It is further their responsibility to take the necessary measures to insure that the contractor and his subcontractors carry out such recommendations during construction.

FIELD EXPLORATIONS

Four subsurface explorations were made at the locations indicated on the Site Plan included herewith as Plate Number 1 on July 6 and 7, 2000. These explorations consisted of borings drilled with a truck-mounted drill rig. The fieldwork was conducted under the observation and direction of our engineering geology personnel.

The explorations were carefully logged when made. The boring logs are presented on the following Plate Numbers 2 through 9. The soils are described in accordance with the Unified Soils Classification. In addition, a verbal textural description, the wet color, the apparent moisture and the density or consistency are provided. The density of granular soils is given as either very loose, loose, medium dense, dense or very dense. The consistency of silts or clays is given as either very soft, soft, medium stiff, stiff, very stiff, or hard.

Undisturbed samples of typical and representative soils were obtained and returned to the laboratory for testing. The undisturbed samples were obtained by driving a 2 and 3/8-inch inside diameter split-tube sampler ahead of the auger using a 140-pound weight free-falling a distance of 30 inches. The number of blows required to drive the sampler each foot was recorded and this value is presented on the attached boring logs as "Penetration Resistance." Bulk samples of disturbed soil and undisturbed chunk samples were also collected in bags from the auger cuttings during the advancement of the borings and from the test trench excavations and returned to the laboratory for testing.

LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. A brief description of the tests performed is presented below.

a) **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.

b) **MOISTURE-DENSITY:** In-place moisture contents and dry densities were determined for representative soil samples. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The dry unit weight is determined in pounds per cubic foot, and the in-place moisture content is determined as a percentage of the soil's dry weight. The results of these tests are summarized in the boring logs.

c) **GRAIN SIZE DISTRIBUTION:** The grain size distribution was determined for selected representative sample of the fill and bay deposits in accordance with ASTM D422. The results of this test are presented on Plate Numbers 18 and 19.

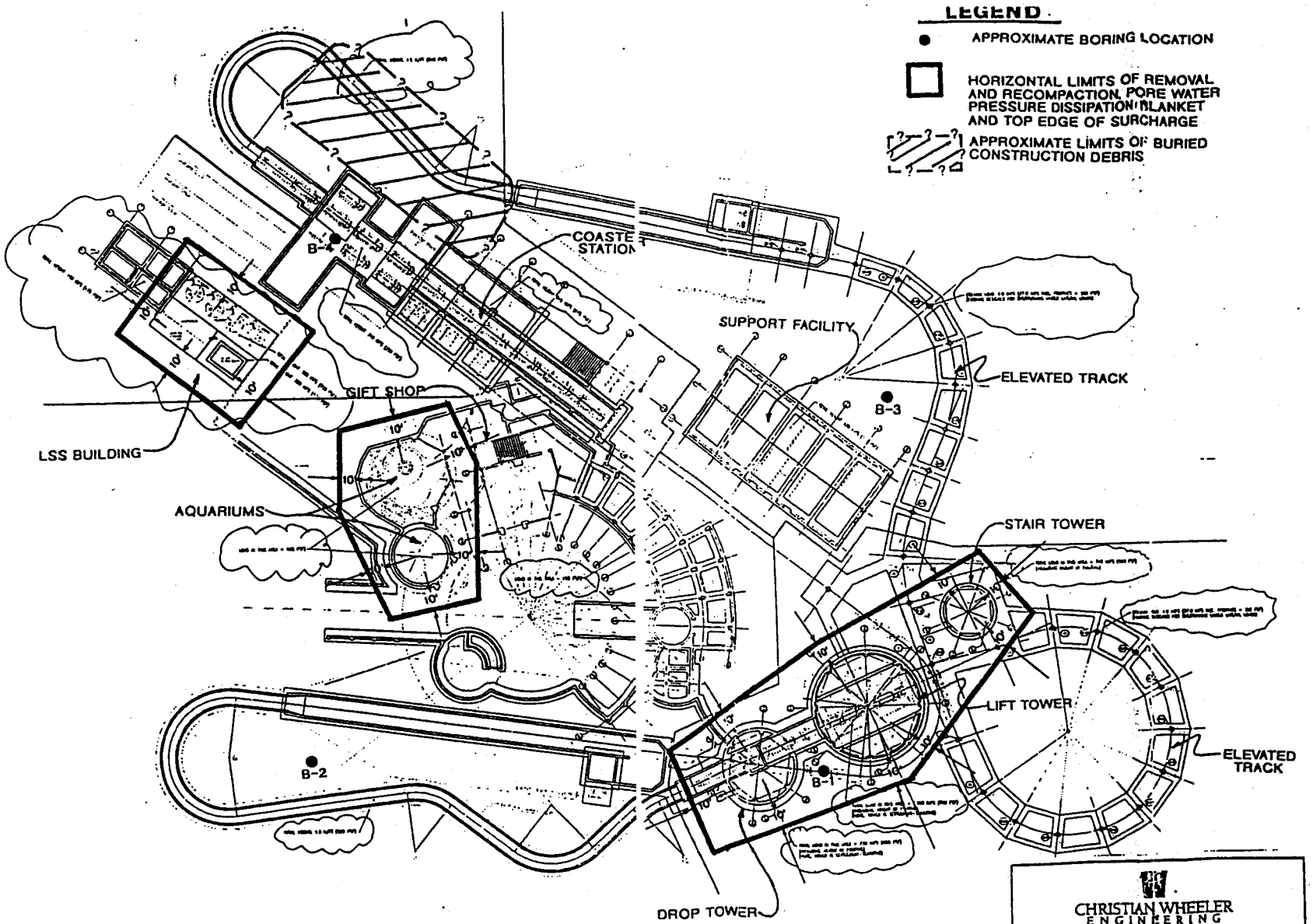
d) **MAXIMUM DESITY/OPTIMUM MOISTURE CONTENT:** The maximum dry density and optimum moisture content of one of the typical on-site soil samples was determined in the laboratory in accordance with ASTM Standard Test D-1557-91. The results of these tests are presented on Plate Number 18.

e) **DIRECT SHEAR TEST:** Direct shear tests were performed to determine the failure envelope based on yield shear strength. The shear box was designed to accommodate a sample having a diameter of 2.375 inches or 2.50 inches and a height of 1.0 inch. Samples were tested at different vertical loads and a saturated moisture content. The shear stress was applied at a constant rate of strain of approximately 0.05 inch per minute. The results of these tests are presented on the attached Plate Number 19.

f) **EXPANSION INDEX TEST:** An Expansion Index test was performed on a representative sample of clayey soil likely to be present at finish grade. The test was performed on the portion of the sample passing the #4 standard sieve. The sample was

brought to optimum moisture content and then dried back to a constant moisture content for 12 hours at 230 ± 9 degrees Fahrenheit. The specimen was then compacted in a 4-inch-diameter mold in two equal layers by means of a tamper, then trimmed to a final height of 1 inch, and brought to a saturation of approximately 50 percent. The specimen was placed in a consolidometer with porous stones at the top and bottom, a total normal load of 12.63 pounds was placed (144.7 psf), and the sample was allowed to consolidate for a period of 10 minutes. The sample was allowed to become saturated, and the change in vertical movement was recorded until the rate of expansion became nominal. The Expansion Index determined is reported on the attached Plate Number 18 as the total vertical displacement times the fraction of the sample passing the #4 sieve times 1000.

g) **CONSOLIDATION TEST:** Consolidation tests were performed on selected "undisturbed" samples. The consolidation apparatus was designed to accommodate a 1-inch-high by 2.375-inch or 2.500-inch diameter soil sample laterally confined by a brass ring. Porous stones were placed in contact with the top and bottom of the sample to permit the addition of pore fluid during testing. Loads were applied to the sample in a geometric progression, after vertical movement ceased, resulting deformations were recorded. The percent consolidation is reported as the ratio of the amount of vertical compression to the original sample height. The test sample was inundated at some point in the test cycle to determine its behavior under the anticipated loads as soil moisture increases. In addition, at a selected vertical load, time versus settlement was recorded to determine the time rate characteristics of the soil. The results of the consolidation and time rate tests are presented in the form of a curve on Plate Numbers 20 through 25.



A1 FOUNDATION LOADS
FOUNDATION PLAN

CHRISTIAN WHEELER ENGINEERING

ATLANTIS PROJECT

BY: CHC/HC	DATE: OCT 16, 2000
JOB NO: 200.338	PLATE NO.: 1

Peckham Guyton Albers & Viets Inc.

FOUNDATION PLAN
FOUNDATION LOADS

2003 Expansion
SeaWorld San Diego
Busch Entertainment Corporation

S1.0L

200.338

LOG OF TEST BORING NUMBER B-1

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	20.5 feet SWD	Depth to Water:	14 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: SAMPLE TYPE	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
2		Artificial Fill (Qaf): Dark brown, moist, medium dense, fine to medium grained, SILTY SAND (SM), slightly micaceous. (to 2½ feet)	US		35	11.5	120.7	MD DS
4		Light brown, fine to medium grained POORLY GRADED SAND (SP), moist, loose to medium dense, micaceous.	US		18	5.4	92.0	
6		Grades to gray in color, becomes dry to damp, medium dense to dense, slight gravels to 1".						
8								
10			US		55	1.8	96.6	
12		Bay Deposits (Obd): Black, fine to medium grained SILTY SAND (SM), moist to wet, loose, micaceous.						
14	▽	Becomes saturated at 14 feet.						
		* No ring recovery.	US*		14			
16								
18		Black, fine grained SILTY CLAYEY SAND (SC), saturated, loose, very micaceous.	SPT		4			SA
20								

Continued on Plate No. 3.

CHRISTIAN WHEELER ENGINEERING

ATLANTIS PROJECT

SEA WORLD DRIVE, SAN DIEGO, CALIFORNIA

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	2

LOG OF TEST BORING NUMBER B-1 (continued)

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	20.5 feet SWD	Depth to Water:	14 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: SAMPLE TYPE	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		Black, SILTY CLAYEY SAND (SC), saturated, loose.						
22		Black, fine to medium grained SILTY SAND (SM), saturated, loose, very micaceous.	US		7			CS
24		Black, fine grained CLAYEY SAND-SANDY CLAY (SC-CL), saturated, very loose/very soft, slightly micaceous.	SPT		3			SA
26								
28								
30		Dark gray, fine grained SILTY SAND-SANDY SILT (SM-ML), saturated, medium dense, micaceous.	US		24			CS
			SPT		14			SA
32								
34			SPT		12			
36								
38		Dark gray, fine to coarse grained CLAYEY SAND (SC), saturated, medium dense, abundant shell fragments, micaceous.						
40			US		19			CS

Continued on Plate No. 4.

CHRISTIAN WHEELER ENGINEERING

ATLANTIS PROJECT

SEA WORLD DRIVE, SAN DIEGO, CALIFORNIA

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	3

LOG OF TEST BORING NUMBER B-1 (continued)

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	20.5 feet SWD	Depth to Water:	14 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: SAMPLE TYPE	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
42		Dark gray, fine to coarse grained CLAYEY SAND (SC), saturated, medium dense, abundant shell framens.	SPT		17			SA
44		Becomes medium dense to dense, decreasing shell fragments, trace gravels.						
46			US		48			DS
48		Gray, fine to coarse grained, CLAYEY SAND-POORLY GRADED SAND (SC-SP), saturated, dense to very dense, slight gravels.	SPT		63			SA
50		Boring Terminated at 50 feet. Groundwater encountered at 14 feet.						

CHRISTIAN WHEELER ENGINEERING

ATLANTIS PROJECT

SEA WORLD DRIVE, SAN DIEGO, CALIFORNIA

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	4

LOG OF TEST BORING NUMBER B-2

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	21.5 feet SWD	Depth to Water:	14 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: SAMPLE TYPE	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
2		**Fill (Qaf):** Dark brown, moist, medium dense, fine to medium grained SILTY SAND (SM).	US		49	10.4	116.5	
4, 6, 8		Dark gray, moist, medium stiff, SILTY CLAY (CL), very micaceous.	US		12			DS, PI
10, 12, 14	▽	Light gray, moist, medium dense, fine to medium grained POORLY GRADED SAND (SP), micaceous.	US		16	3.5	96.2	
		At 14 feet becomes saturated.	US		29	18.8	96.8	
16, 18, 20		**Bay Deposits (Qbd):** Black and light gray, saturated, soft to loose, alterating layers (up to 6 inches thick) of SILTY CLAY (CL), with abundant organic debis and fine to medium grained POORLY GRADED SAND (SP).	US		8	44.0	76.2	

Boring terminated at 20 feet.

CHRISTIAN WHEELER ENGINEERING

SEA WORLD ATLANTIS PROJECT

500 Sea World Drive, San Diego

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	5

LOG OF TEST BORING NUMBER B-3

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	17 feet SWD	Depth to Water:	12 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLE TYPE	BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
2		**Fill (Qaf):** Medium brown, moist, medium dense, fine to medium grained SILTY SAND (SM), occasional gravels to 2 inches.	US		36	13.4	109.4	
4, 6, 8		Light brown, moist, medium dense, fine to coarse grained POORLY GRADED SAND (SP), abundant shell fragments.	US		32			DS
10			US		41	20.3	96.2	
12, 14		**Bay Deposits (Qbd):** Black, moist, medium stiff, SILTY CLAY (CL), micaceous, slight organic debis. At 13 feet becomes saturated.						
16		Dark, saturated, loose to medium dense, fine to medium grained SILTY SAND (SM), micaceous.	US		17	30.5	87.2	
18, 20			US		15			

Boring continued on Plate 7.

CHRISTIAN WHEELER ENGINEERING

SEA WORLD ATLANTIS PROJECT

500 Sea World Drive, San Diego

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	6

LOG OF TEST BORING NUMBER B-3 (continued)

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	17 feet SWD	Depth to Water:	12 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: SAMPLE TYPE	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
22		Dark, saturated, loose to medium dense, fine to medium grained SILTY SAND (SM), micaceous.						
24			SPT		24			
26			US		14	29.5	94.2	
28		Black, saturated, loose to medium dense, fine to medium grained CLAYEY SAND (SC), micaceous.	US		17			
30		Black, saturated, very soft, SANDY SILTY CLAY (CL).	SPT		2			PI HA
32								
34		Black, saturated, loose to medium dense, fine to medium grained CLAYEY SAND (SC), slight shell fragments.	SPT		10			
36								
38		Gray, saturated, medium dense, fine to coarse grained POORLY GRADED SAND (SP).	US		36	16.3	117.2	
40								

Boring continued on Plate 8.

CHRISTIAN WHEELER ENGINEERING

SEA WORLD ATLANTIS PROJECT

500 Sea World Drive, San Diego

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	7

LOG OF TEST BORING NUMBER B-3 (continued)

Date Excavated:	7/6/00	Logged by:	DRR
Equipment:	IR-A300	Project Manager:	CHC
Surface Elevation:	17 feet SWD	Depth to Water:	12 feet
Hammer Weight:	140 lbs	Drop of Hammer:	30 inches

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: SAMPLE TYPE	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		Gray, saturated, medium dense, fine to coarse grained POORLY GRADED SAND (SP).	SPT		20			
42								
44		At 45 feet becomes dense.	SPT		35			
46								
48								
50			US		50/5"	13.0	119.0	
		Boring terminated at 50 feet.						
52								
54								
56								
58								
60								

CHRISTIAN WHEELER
ENGINEERING

SEA WORLD ATLANTIS PROJECT
500 Sea World Drive, San Diego

BY:	HC	DATE:	October 16, 2000
JOB NO.:	200.338	PLATE NO.:	8

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
ROSE CANYON	1.4(2.3)	6.9	0.549	X
CORONADO BANK	11.1(17.9)	7.4	0.296	IX
NEWPORT-INGLEWOOD (Offshore)	29.5(47.4)	6.9	0.110	VII
ELSINORE-JULIAN	41.3(66.5)	7.1	0.094	VII
ELSINORE-TEMECULA	44.1(71.0)	6.8	0.076	VII
EARTHQUAKE VALLEY	47.3(76.2)	6.5	0.062	VI
ELSINORE-COYOTE MOUNTAIN	52.2(84.0)	6.8	0.067	VI
PALOS VERDES	54.6(87.9)	7.1	0.076	VII
ELSINORE-GLEN IVY	61.1(98.3)	6.8	0.059	VI
SAN JACINTO-COYOTE CREEK	63.5(102.2)	6.8	0.058	VI
SAN JACINTO-ANZA	63.6(102.3)	7.2	0.071	VI
SAN JACINTO - BORREGO	67.2(108.2)	6.6	0.050	VI
SAN JACINTO-SAN JACINTO VALLEY	69.8(112.3)	6.9	0.056	VI
NEWPORT-INGLEWOOD (L.A.Basin)	70.8(114.0)	6.9	0.056	VI
CHINO-CENTRAL AVE. (Elsinore)	74.6(120.0)	6.7	0.059	VI
SUPERSTITION MTN. (San Jacinto)	77.5(124.8)	6.6	0.044	VI
LAGUNA SALADA	78.3(126.0)	7.0	0.054	VI
WHITTIER	78.9(127.0)	6.8	0.049	VI
COMPTON THRUST	80.1(128.9)	6.8	0.059	VI
ELMORE RANCH	81.9(131.8)	6.6	0.043	VI
SUPERSTITION HILLS (San Jacinto)	82.6(132.9)	6.6	0.042	VI
ELYSIAN PARK THRUST	84.8(136.5)	6.7	0.053	VI
SAN JACINTO-SAN BERNARDINO	86.5(139.2)	6.7	0.043	VI
SAN ANDREAS - Southern	88.0(141.6)	7.4	0.061	VI
SAN ANDREAS - San Bernardino	88.0(141.6)	7.3	0.058	VI
SAN ANDREAS - Coachella	90.5(145.6)	7.1	0.051	VI
PINTO MOUNTAIN	94.1(151.4)	7.0	0.047	VI
BURNT MTN.	95.4(153.6)	6.4	0.034	V
SAN JOSE	95.8(154.1)	6.5	0.043	VI
BRAWLEY SEISMIC ZONE	97.1(156.3)	6.4	0.034	V
IMPERIAL	97.1(156.3)	7.0	0.046	VI
EUREKA PEAK	98.0(157.7)	6.4	0.033	V
CUCAMONGA	98.4(158.3)	7.0	0.055	VI
SIERRA MADRE	98.4(158.4)	7.0	0.055	VI

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

-END OF SEARCH - 34 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ROSE CANYON FAULT IS CLOSEST TO THE SITE.

IT IS ABOUT 1.4 MILES (2.3 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5495 g

NCEER [1997] Method

LIQUEFACTION ANALYSIS SUMMARY

File Name: DRR.OUT

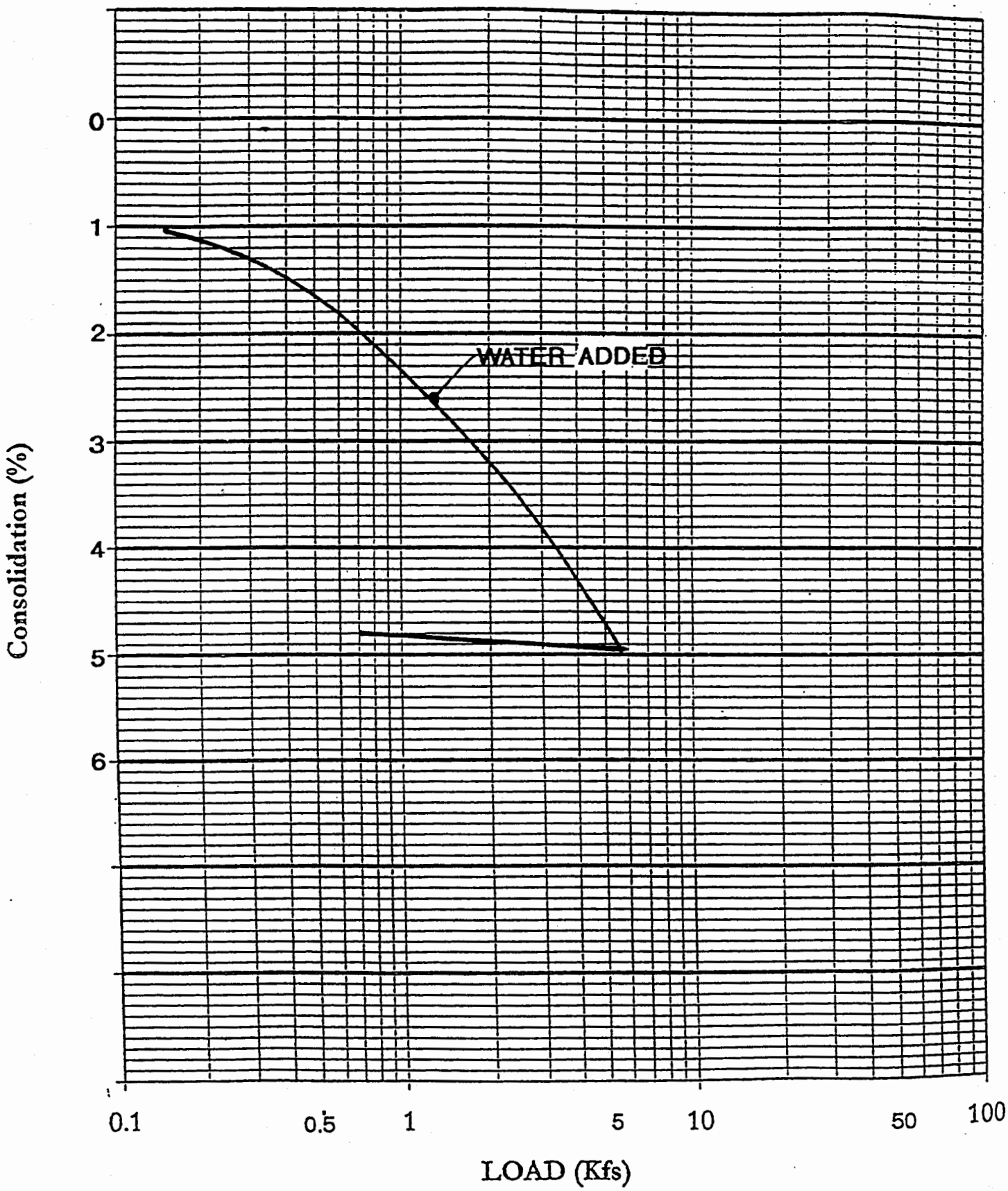
SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
1	0.25	0.015	0.015	22	-	*	*	*	*	*	**
1	0.75	0.045	0.045	22	-	*	*	*	*	*	**
1	1.25	0.075	0.075	22	-	*	*	*	*	*	**
1	1.75	0.105	0.105	22	-	*	*	*	*	*	**
1	2.25	0.135	0.135	22	-	*	*	*	*	*	**
2	2.75	0.165	0.165	11	0.02	*	*	*	*	*	**
2	3.25	0.195	0.195	11	0.02	*	*	*	*	*	**
2	3.75	0.225	0.225	11	0.02	*	*	*	*	*	**
2	4.25	0.255	0.255	11	0.02	*	*	*	*	*	**
2	4.75	0.285	0.285	11	0.02	*	*	*	*	*	**
2	5.25	0.315	0.315	11	0.02	*	*	*	*	*	**
2	5.75	0.345	0.345	11	0.02	*	*	*	*	*	**
2	6.25	0.375	0.375	11	0.02	*	*	*	*	*	**
2	6.75	0.405	0.405	11	0.02	*	*	*	*	*	**
3	7.25	0.435	0.435	34	0.05	*	*	*	*	*	**
3	7.75	0.465	0.465	34	0.05	*	*	*	*	*	**
3	8.25	0.495	0.495	34	0.05	*	*	*	*	*	**
3	8.75	0.525	0.525	34	0.05	*	*	*	*	*	**
3	9.25	0.555	0.555	34	0.05	*	*	*	*	*	**
3	9.75	0.585	0.585	34	0.05	*	*	*	*	*	**
3	10.25	0.615	0.615	34	0.05	*	*	*	*	*	**
3	10.75	0.645	0.645	34	0.05	*	*	*	*	*	**
3	11.25	0.675	0.675	34	0.05	*	*	*	*	*	**
4	11.75	0.705	0.705	8	5.29	*	*	*	*	*	**
4	12.25	0.735	0.735	8	5.29	*	*	*	*	*	**
4	12.75	0.765	0.765	8	5.29	*	*	*	*	*	**
4	13.25	0.795	0.795	8	5.29	*	*	*	*	*	**
4	13.75	0.825	0.825	8	5.29	*	*	*	*	*	**
4	14.25	0.855	0.847	8	5.29	1.105	14.0	0.153	0.967	0.349	0.54
4	14.75	0.885	0.862	8	5.29	1.105	14.0	0.153	0.966	0.355	0.53
4	15.25	0.915	0.876	8	5.29	1.105	14.0	0.153	0.964	0.360	0.52
4	15.75	0.945	0.890	8	5.29	1.105	14.0	0.153	0.963	0.365	0.52
4	16.25	0.975	0.905	8	5.29	1.105	14.0	0.153	0.962	0.371	0.51
4	16.75	1.005	0.919	8	5.29	1.105	14.0	0.153	0.961	0.376	0.50
5	17.25	1.035	0.934	4	-	-	-	-	-	-	--
5	17.75	1.065	0.948	4	-	-	-	-	-	-	--
5	18.25	1.095	0.962	4	-	-	-	-	-	-	--
5	18.75	1.125	0.977	4	-	-	-	-	-	-	--
5	19.25	1.155	0.991	4	-	-	-	-	-	-	--
5	19.75	1.185	1.006	4	-	-	-	-	-	-	--
5	20.25	1.215	1.020	4	-	-	-	-	-	-	--
5	20.75	1.245	1.034	4	-	-	-	-	-	-	--
5	21.25	1.275	1.049	4	-	-	-	-	-	-	--

NCEER [1997] Method

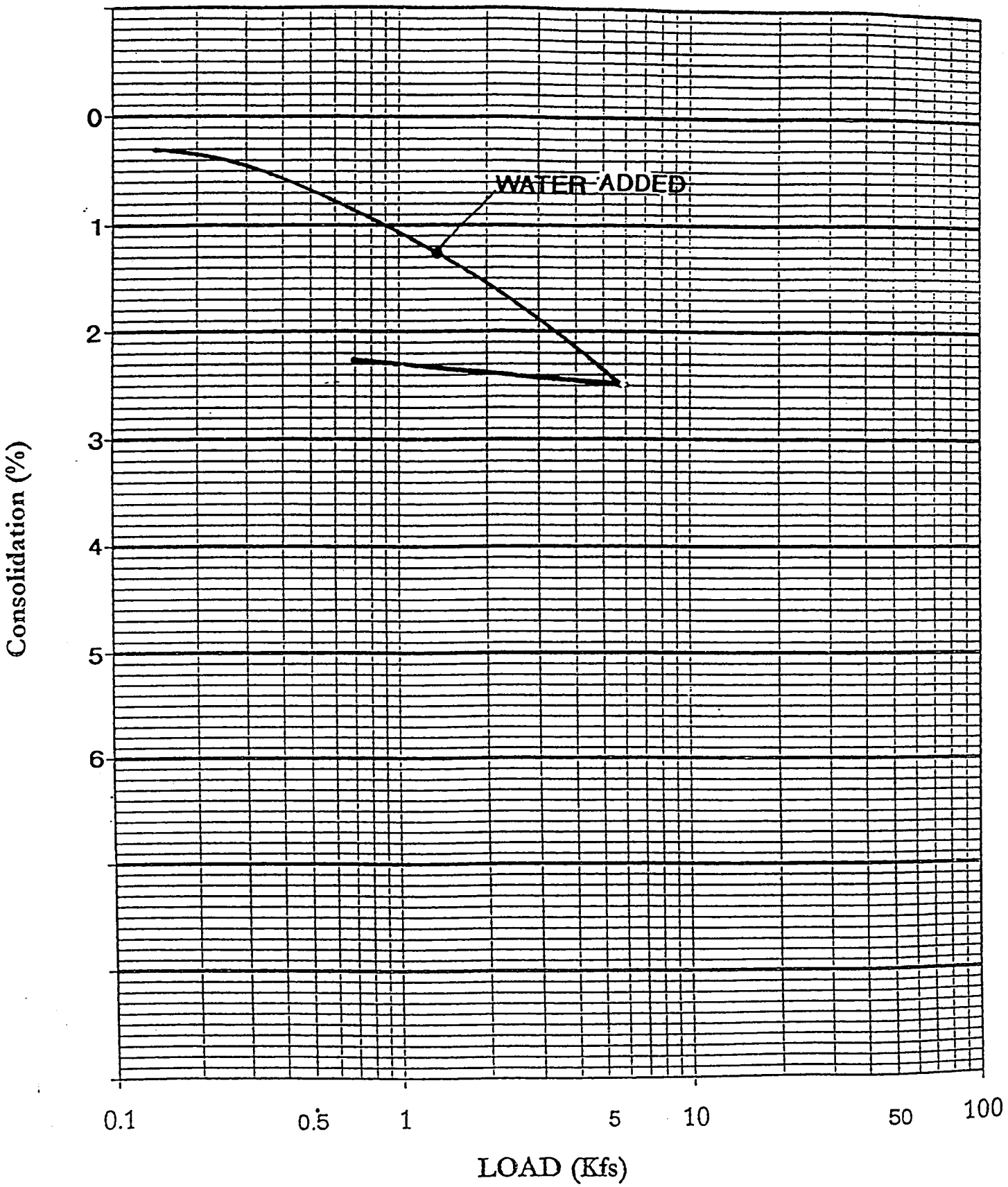
LIQUEFACTION ANALYSIS SUMMARY

File Name: DRR.OUT

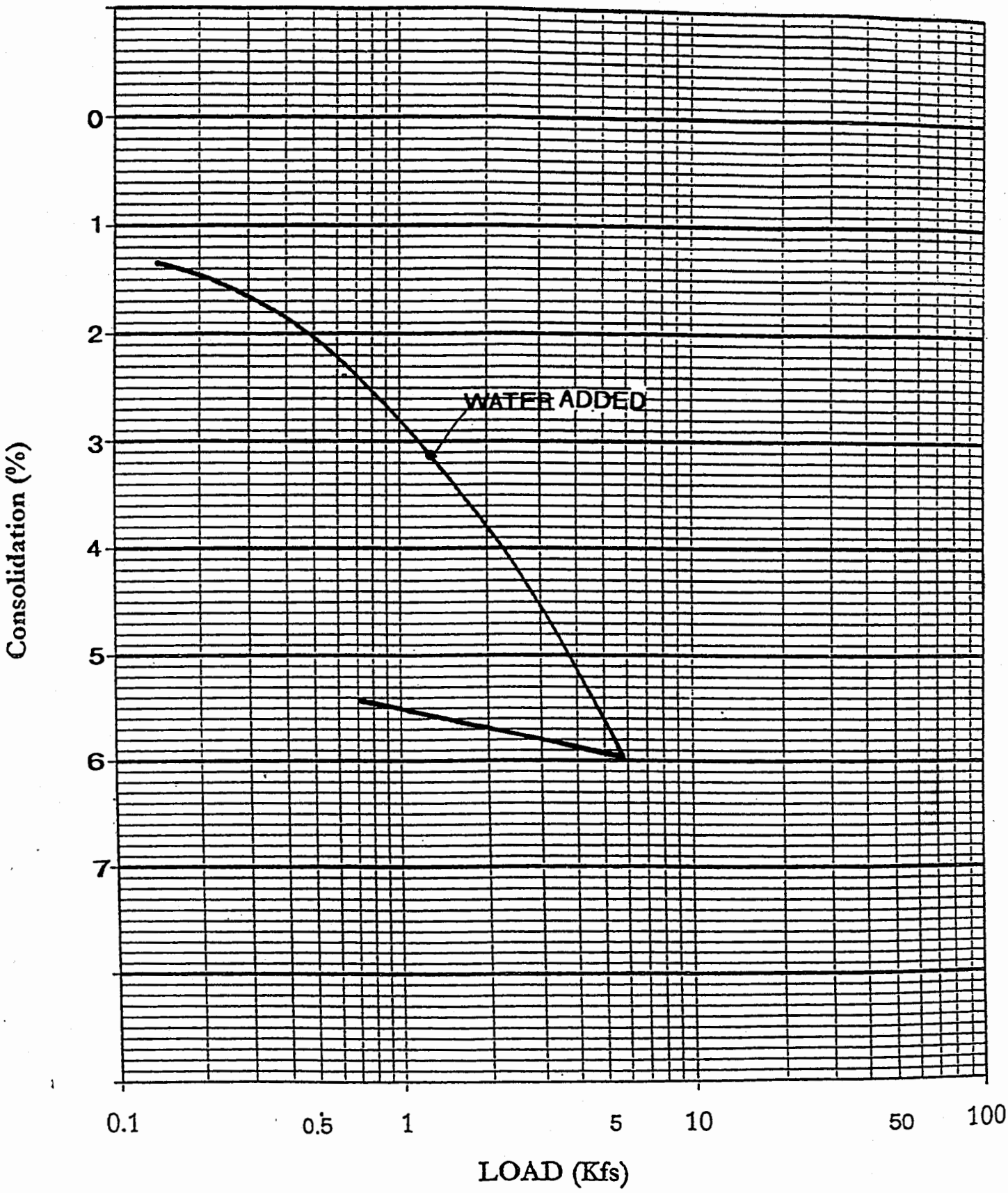
SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
6	21.75	1.305	1.063	4	3.96	1.001	8.3	0.092	0.949	0.417	0.27
6	22.25	1.335	1.078	4	3.96	1.001	8.3	0.092	0.948	0.420	0.27
6	22.75	1.365	1.092	4	3.96	1.001	8.3	0.092	0.947	0.423	0.27
7	23.25	1.395	1.106	4	3.96	0.962	8.3	0.091	0.946	0.426	0.26
7	23.75	1.425	1.121	4	3.96	0.962	8.3	0.091	0.945	0.429	0.26
7	24.25	1.455	1.135	4	3.96	0.962	8.3	0.091	0.943	0.432	0.26
8	24.75	1.485	1.150	4	-	-	-	-	-	-	--
8	25.25	1.515	1.164	4	-	-	-	-	-	-	--
8	25.75	1.545	1.178	4	-	-	-	-	-	-	--
8	26.25	1.575	1.193	4	-	-	-	-	-	-	--
8	26.75	1.605	1.207	4	-	-	-	-	-	-	--
8	27.25	1.635	1.222	4	-	-	-	-	-	-	--
8	27.75	1.665	1.236	4	-	-	-	-	-	-	--
8	28.25	1.695	1.250	4	-	-	-	-	-	-	--
8	28.75	1.725	1.265	4	-	-	-	-	-	-	--
9	29.25	1.755	1.279	14	-	-	-	-	-	-	--
9	29.75	1.785	1.294	14	-	-	-	-	-	-	--
9	30.25	1.815	1.308	14	-	-	-	-	-	-	--
9	30.75	1.845	1.322	14	-	-	-	-	-	-	--
9	31.25	1.875	1.337	14	-	-	-	-	-	-	--
9	31.75	1.905	1.351	14	-	-	-	-	-	-	--
9	32.25	1.935	1.366	14	-	-	-	-	-	-	--
9	32.75	1.965	1.380	14	-	-	-	-	-	-	--
10	33.25	1.995	1.394	12	-	-	-	-	-	-	--
10	33.75	2.025	1.409	12	-	-	-	-	-	-	--
10	34.25	2.055	1.423	12	-	-	-	-	-	-	--
10	34.75	2.085	1.438	12	-	-	-	-	-	-	--
10	35.25	2.115	1.452	12	-	-	-	-	-	-	--
10	35.75	2.145	1.466	12	-	-	-	-	-	-	--
10	36.25	2.175	1.481	12	-	-	-	-	-	-	--
10	36.75	2.205	1.495	12	-	-	-	-	-	-	--
11	37.25	2.235	1.510	17	5.13	0.803	20.8	0.211	0.871	0.461	0.57
11	37.75	2.265	1.524	17	5.13	0.803	20.8	0.211	0.867	0.461	0.57
11	38.25	2.295	1.538	17	5.13	0.803	20.8	0.211	0.863	0.460	0.57
11	38.75	2.325	1.553	17	5.13	0.803	20.8	0.211	0.859	0.460	0.57
11	39.25	2.355	1.567	17	5.13	0.803	20.8	0.211	0.855	0.459	0.57
11	39.75	2.385	1.582	17	5.13	0.803	20.8	0.211	0.851	0.459	0.57
11	40.25	2.415	1.596	17	5.13	0.803	20.8	0.211	0.846	0.458	0.57
11	40.75	2.445	1.610	17	5.13	0.803	20.8	0.211	0.842	0.457	0.57
11	41.25	2.475	1.625	17	5.13	0.803	20.8	0.211	0.838	0.457	0.57
11	41.75	2.505	1.639	17	5.13	0.803	20.8	0.211	0.834	0.456	0.57
11	42.25	2.535	1.654	17	5.13	0.803	20.8	0.211	0.830	0.455	0.57
11	42.75	2.565	1.668	17	5.13	0.803	20.8	0.211	0.826	0.454	0.58
12	43.25	2.595	1.682	30	3.79	0.779	30.7	Infin	0.822	0.453	NonLiq



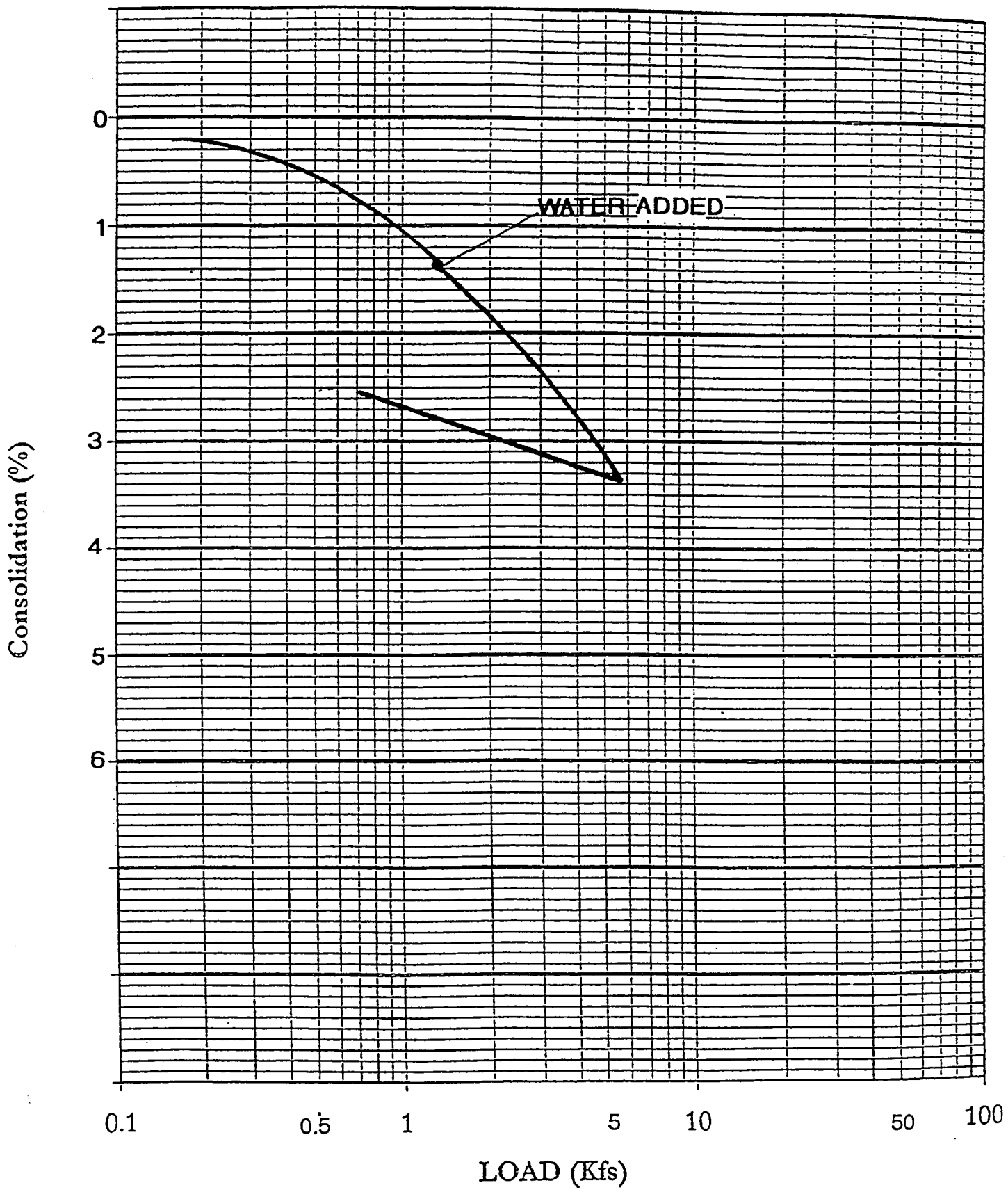
CHRISTIAN WHEELER	B-1 @ 40'	DATE: OCTOBER 2000
	JOB NUMBER:	PLATE NUMBER:



CHRISTIAN WHEELER	B-3 @ 20'	DATE: OCTOBER 2000
	JOB NUMBER:	PLATE NUMBER:



CHRISTIAN MICHELER	B-3 @ 30'	DATE: OCTOBER 2000
	JOB NUMBER:	PLATE NUMBER:



CHRISTIAN WHEELER	BY: B-4 @ 15'	DATE: OCTOBER 2000
	JOB NUMBER:	PLATE NUMBER:

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San Diego County, 1973, Flight 30, Photographs 10 and 11; Scale: 1 inch = 1000 feet (approximate).

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RECOMMENDED GRADING SPECIFICATIONS - GENERAL PROVISIONS

SEA WORLD ATLANTAS RIDE PROJECT
SEA WORLD ENTERTAINMENT PARK
SAN DIEGO, CALIFORNIA

GENERAL INTENT

The intent of these specifications is to establish procedures for clearing, compacting natural ground, preparing areas to be filled, and placing and compacting fill soils to the lines and grades shown on the accepted plans. The recommendations contained in the preliminary geotechnical investigation report and/or the attached Special Provisions are a part of the Recommended Grading Specifications and shall supersede the provisions contained hereinafter in the case of conflict. These specifications shall only be used in conjunction with the geotechnical report for which they are a part. No deviation from these specifications will be allowed, except where specified in the geotechnical report or in other written communication signed by the Geotechnical Engineer.

OBSERVATION AND TESTING

Christian Wheeler Engineering shall be retained as the Geotechnical Engineer to observe and test the earthwork in accordance with these specifications. It will be necessary that the Geotechnical Engineer or his representative provide adequate observation so that he may provide his opinion as to whether or not the work was accomplished as specified. It shall be the responsibility of the contractor to assist the Geotechnical Engineer and to keep him appraised of work schedules, changes and new information and data so that he may provide these opinions. In the event that any unusual conditions not covered by the special provisions or preliminary geotechnical report are encountered during the grading operations, the Geotechnical Engineer shall be contacted for further recommendations.

If, in the opinion of the Geotechnical Engineer, substandard conditions are encountered, such as questionable or unsuitable soil, unacceptable moisture content, inadequate compaction, adverse weather, etc., construction should be stopped until the conditions are remedied or corrected or he shall recommend rejection of this work.

Tests used to determine the degree of compaction should be performed in accordance with the following American Society for Testing and Materials test methods:

Maximum Density & Optimum Moisture Content - ASTM D-1557-91
Density of Soil In-Place - ASTM D-1556-90 or ASTM D-2922

All densities shall be expressed in terms of Relative Compaction as determined by the foregoing ASTM testing procedures.

PREPARATION OF AREAS TO RECEIVE FILL

All vegetation, brush and debris derived from clearing operations shall be removed, and legally disposed of. All areas disturbed by site grading should be left in a neat and finished appearance, free from unsightly debris.

After clearing or benching the natural ground, the areas to be filled shall be scarified to a depth of 6 inches, brought to the proper moisture content, compacted and tested for the specified minimum degree of compaction. All loose soils in excess of 6 inches thick should be removed to firm natural ground which is defined as natural soil which possesses an in-situ density of at least 90 percent of its maximum dry density.

When the slope of the natural ground receiving fill exceeds 20 percent (5 horizontal units to 1 vertical unit), the original ground shall be stepped or benched. Benches shall be cut to a firm competent formational soil. The lower bench shall be at least 10 feet wide or 1-1/2 times the equipment width, whichever is greater, and shall be sloped back into the hillside at a gradient of not less than two (2) percent. All other benches should be at least 6 feet wide. The horizontal portion of each bench shall be compacted prior to receiving fill as specified herein for compacted natural ground. Ground slopes flatter than 20 percent shall be benched when considered necessary by the Geotechnical Engineer.

Any abandoned buried structures encountered during grading operations must be totally removed. All underground utilities to be abandoned beneath any proposed structure should be removed from within 10 feet of the structure and properly capped off. The resulting depressions from the above described procedure should be backfilled with acceptable soil that is compacted to the requirements of the Geotechnical Engineer. This includes, but is not limited to, septic tanks, fuel tanks, sewer lines or leach lines, storm drains and water lines. Any buried structures or utilities not to be abandoned should be brought to the attention of the Geotechnical Engineer so that he may determine if any special recommendation will be necessary.

All water wells which will be abandoned should be backfilled and capped in accordance to the requirements set forth by the Geotechnical Engineer. The top of the cap should be at least 4 feet below finish grade or 3

feet below the bottom of footing whichever is greater. The type of cap will depend on the diameter of the well and should be determined by the Geotechnical Engineer and/or a qualified Structural Engineer.

FILL MATERIAL

Materials to be placed in the fill shall be approved by the Geotechnical Engineer and shall be free of vegetable matter and other deleterious substances. Granular soil shall contain sufficient fine material to fill the voids. The definition and disposition of oversized rocks and expansive or detrimental soils are covered in the geotechnical report or Special Provisions. Expansive soils, soils of poor gradation, or soils with low strength characteristics may be thoroughly mixed with other soils to provide satisfactory fill material, but only with the explicit consent of the Geotechnical Engineer. Any import material shall be approved by the Geotechnical Engineer before being brought to the site.

PLACING AND COMPACTION OF FILL

Approved fill material shall be placed in areas prepared to receive fill in layers not to exceed 6 inches in compacted thickness. Each layer shall have a uniform moisture content in the range that will allow the compaction effort to be efficiently applied to achieve the specified degree of compaction. Each layer shall be uniformly compacted to the specified minimum degree of compaction with equipment of adequate size to economically compact the layer. Compaction equipment should either be specifically designed for soil compaction or of proven reliability. The minimum degree of compaction to be achieved is specified in either the Special Provisions or the recommendations contained in the preliminary geotechnical investigation report.

When the structural fill material includes rocks, no rocks will be allowed to nest and all voids must be carefully filled with soil such that the minimum degree of compaction recommended in the Special Provisions is achieved. The maximum size and spacing of rock permitted in structural fills and in non-structural fills is discussed in the geotechnical report, when applicable.

Field observation and compaction tests to estimate the degree of compaction of the fill will be taken by the Geotechnical Engineer or his representative. The location and frequency of the tests shall be at the Geotechnical Engineer's discretion. When the compaction test indicates that a particular layer is at less than the required degree of compaction, the layer shall be reworked to the satisfaction of the Geotechnical Engineer and until the desired relative compaction has been obtained.

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction by sheepsfoot roller shall be at vertical intervals of not greater than four feet. In addition, fill slopes at a ratio of two horizontal to one vertical or flatter, should be trackrolled. Steeper fill slopes shall be over-built and cut-back to finish contours after the slope has been constructed. Slope compaction operations shall result in all fill material six or more inches inward from the finished face of the slope having a relative compaction of at least 90 percent of maximum dry density or the degree of compaction specified in the Special Provisions section of this specification. The compaction operation on the slopes shall be continued until the Geotechnical Engineer is of the opinion that the slopes will be surficially stable.

Density tests in the slopes will be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Where failing tests occur or other field problems arise, the Contractor will be notified that day of such conditions by written communication from the Geotechnical Engineer or his representative in the form of a daily field report.

If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor shall rework or rebuild such slopes until the required degree of compaction is obtained, at no cost to the Owner or Geotechnical Engineer.

CUT SLOPES

The Engineering Geologist shall inspect cut slopes excavated in rock or lithified formational material during the grading operations at intervals determined at his discretion. If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions shall be analyzed by the Engineering Geologist and Geotechnical Engineer to determine if mitigating measures are necessary.

Unless otherwise specified in the geotechnical report, no cut slopes shall be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agency.

ENGINEERING OBSERVATION

Field observation by the Geotechnical Engineer or his representative shall be made during the filling and compaction operations so that he can express his opinion regarding the conformance of the grading with acceptable standards of practice. Neither the presence of the Geotechnical Engineer or his representative or

the observation and testing shall release the Grading Contractor from his duty to compact all fill material to the specified degree of compaction.

SEASON LIMITS

Fill shall not be placed during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations shall not be resumed until the proper moisture content and density of the fill materials can be achieved. Damaged site conditions resulting from weather or acts of God shall be repaired before acceptance of work.

RECOMMENDED GRADING SPECIFICATIONS - SPECIAL PROVISIONS

RELATIVE COMPACTION: The minimum degree of compaction to be obtained in compacted natural ground, compacted fill, and compacted backfill shall be at least 90 percent. For street and parking lot subgrade, the upper six inches should be compacted to at least 95 percent relative compaction.

EXPANSIVE SOILS: Detrimentally expansive soil is defined as clayey soil which has an expansion index of 50 or greater when tested in accordance with the Uniform Building Code Standard 29-2.

OVERSIZED MATERIAL: Oversized fill material is generally defined herein as rocks or lumps of soil over 6 inches in diameter. Oversized materials should not be placed in fill unless recommendations of placement of such material is provided by the Geotechnical Engineer. At least 40 percent of the fill soils shall pass through a No. 4 U.S. Standard Sieve.

TRANSITION LOTS: Where transitions between cut and fill occur within the proposed building pad, the cut portion should be undercut a minimum of one foot below the base of the proposed footings and recompacted as structural backfill. In certain cases that would be addressed in the geotechnical report, special footing reinforcement or a combination of special footing reinforcement and undercutting may be required.

EXHIBIT H

FLUOR DANIEL GTI

ASSESSMENT REPORT
SEA WORLD LEASE EXPANSION
1720 SOUTH SHORES ROAD
SAN DIEGO, CALIFORNIA
HMMD CASE NO. H21142
June 9, 1997

Fluor Daniel GTI Project 023400221

Prepared for:
Mr. Kevin Carr
Sea World Of California
1720 South Shores Road
San Diego, California 92109-7995

Fluor Daniel GTI, Inc.
Submitted by:

for

Fred Essig
Staff Geologist

Anthony D. Konzen
Senior Project Manager

Fluor Daniel GTI, Inc.
Approved by:

Kyle S. Rheubottom, RG
Operations Manager

REGISTERED GEOLOGIST
STATE OF CALIFORNIA

023400221
0221R-02.20/Sea World/LE/#1

6450 Lusk Boulevard, Suite E208 / San Diego, CA 92121 USA (619) 453-8415 FAX (619) 453-2688

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7. 1,1,1-Trichloroethane Concentrations in Groundwater

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2. Soil Analytical Results, Sampled December 20 and 23, 1996 and January 9, 1997, Sea World, 1720 South Shores Drive, San Diego, California
3. Groundwater Analytical Results, Sampled January 20, 1997 and April 29, 1997, Sea World, 1720 South Shores Drive, San Diego, California

Appendices

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2. Boring Permit
3. Non-hazardous Waste Data Forms
4. Soil Sampling QA/QC Procedures, Laboratory Analytical Reports, and Chain-of-Custodies

1.0 INTRODUCTION

1.1 Site Identification

Company Name:	Sea World of California
Site Address:	1720 South Shores Road San Diego, California 92109
Assessors Parcel No.:	435-480-15
HMMD Case No.:	H00905
Property Owner:	City of San Diego Real Estate Assets 1200 Third Avenue San Diego, California 92101 (619) 236-6985 Attn: Linda Fierro
Contact Person:	Mr. Kevin Carr 1720 South Shores Road San Diego, California 92109 (619) 226-3934
Responsible Party:	Sea World of California 1720 South Shores Road San Diego, California 92109

1.2 Purpose of Work

The purpose of this investigation was to summarize past and present site use, and analyze soil and groundwater in the subsurface for the presence of gasoline hydrocarbons, volatile organic and semi-volatile organic compounds, and CAM metals.

The investigation centered on a parcel of City-owned land immediately east of the Sea World Park Boundary. The parcel is within the inactive Mission Bay Landfill and is currently under a landfill monitoring program overseen by the Regional Water Quality Control Board (RWQCB)(Figures 1 and 2). Wells MBW-2 and 3 shown on Figure 2 were installed by the City of San Diego and are included in the RWQCB monitoring program.

1.3 Background

Site activities performed to date are summarized below.

- The City of San Diego used the area as an unrestricted Class 1 landfill from 1952 to 1959.
- Between 1959 and 1962, 5 to 20 feet of hydraulic fill was placed over the landfill.
- Woodward-Clyde Consultants (WWC) submitted a summary of a comprehensive investigation into the extent and hazardous waste content of the City of San Diego's Mission Bay Landfill. (WWC, 1983).
- California RWQCB Order No. 85-78 (September 16, 1985) established periodic sampling of groundwater within the landfill plus surface water and sediment sampling of Mission Bay and the San Diego River.
- In 1996 Sea World planned to lease the parcel immediately to the east of the park.
- In December 1996 and January 1997, Fluor Daniel GTI, Inc. (Fluor Daniel GTI) conducted Phase I and Phase II investigations on the undeveloped parcel located east of the Sea World property boundary. On April 29, 1997, an additional round of groundwater samples was collected from wells LE-1 through LE-6 for metals analyses.

1.4 Scope of Services

Fluor Daniel GTI performed or subcontracted the following work in accordance with the *Cost Estimate For Phase I and II Site* for Sea World Expansion - East (Fluor Daniel GTI, 1996).

<u>Phase I Investigation</u>

- Compiled a Phase I assessment report in general accordance with the instructions from Sea World dated April 22, 1996. The assessment data was compiled from the following sources; regulatory file reviews, personal interviews, site reconnaissance, data base reviews, and review of photographic archives.

Phase II Investigation

- Obtained permits to drill and install six groundwater monitoring wells.
- Obtained an Underground Service Alert number and met with utility companies prior to drilling.
- Drilled, logged, sampled, and installed six wells ranging in depth from 33 to 35 feet below grade (Figure 2).
- Collected soil samples at approximate 5-foot intervals for lithologic evaluation and laboratory analysis.
- Purged and sampled the 6 monitoring wells (2 events).
- Coordinated analysis of 12 soil samples and 6 groundwater samples.
- Prepared a "30-day" drilling report as required by the San Diego County Site Assessment and Mitigation Division (SAMD).
- Prepared an assessment report summarizing Phase I research and this most recent landfill-site assessment.

2.0 GEOLOGY AND HYDROGEOLOGY

2.1 Geology

As mapped by Kennedy and Peterson (1975), the site is built upon land reclaimed by hydraulic fill which is apparently underlain by formations included in the Eocene Poway and La Jolla Groups. The site is situated on the south side of Mission Bay essentially at sea level (Figure 1). The study area has little relief except that dictated by structures in the vicinity.

2.2 Site Geologic Description/Soil Types

As observed from the borings drilled by Fluor Daniel GTI on December 20 and 23, 1996 and on January 9, 1997, the site is underlain by hydraulic fill that extends to the maximum depths explored. The hydraulic fill is characterized by randomly distributed sand and sand/silt mixtures with trace amounts of gravel. Boring logs from the recent drilling investigation are presented in Appendix 1.

The November 17, 1983 WWC report described encountering various types of landfill waste (i.e., wood, paper, glass, etc.) during 1980 test pit excavation. Landfill debris was not encountered during December 1996 through January 1997 drilling investigation, indicating that the borings were not within the landfill limits.

2.3 Hydrogeology

The site lies within the Mission San Diego Hydrologic Subarea (HSA 7.11) of the Lower San Diego Hydrologic Area (HA 7.10) of the San Diego Hydrologic Unit (HU 7.00). Because the site is west of Interstate 5, there are no beneficial uses for groundwater (RWQCB, San Diego Region Basin Planning Area).

Surface drainage in the vicinity of the site is toward Mission Bay immediately to the north. The San Diego River floodway is located approximately one-half mile to the south. There are no permanent streams in the area surrounding the site (Figure 1).

Groundwater depths gauged on January 20, 1997 ranged from 11.68 to 21.32 feet below grade. Because of significant tidal influence, groundwater gradient and flow were not determined. Groundwater elevations are presented in Figure 3 and Table 1.

The tidal influence on groundwater elevation was measured in well LE-3 on January 9, 1997. The groundwater elevation in LE-3 declined 4.2 feet between 8:50 AM and 3:30 PM. Because of this tidal influence and the likelihood of lateral permeability variations due to the random nature of artificial fill emplacement, a groundwater gradient map was not prepared.

2.4 Summary of the Phase I Report

The WWC *Site Assessment Report* summarizes the findings of a comprehensive investigation into the extent and hazardous waste content of the City of San Diego's Mission Bay Landfill. According to the report, the landfill occupies approximately 115 acres in the southeast corner of Mission Bay. The lease expansion is located above the western extent of the landfill. The City of San Diego used the area as an unrestricted Class I landfill from 1952 to 1959. The landfill received up to 25,000 cubic yards of municipal and commercial waste per month. Of most concern, the landfill reportedly received unknown amounts of hazardous industrial wastes including: carbon tetrachloride, methyl-ethyl ketone, toluene, chlorinated cleaning solvents, paint and oil waste, sulfuric acid, hydrofluoric

acid, chromic acid, hydrochloric acid, cyanide, zinc chromate, and cadmium. Between 1959 and 1962, 5 to 20 feet of hydraulic fill was placed over the landfill. The scope of the site assessment investigation performed by WWC included reviewing landfill operation documents, photographs and reports, interviewing landfill eyewitnesses, conducting geophysical and soil gas surveys, and drilling and sampling soil borings and groundwater monitoring wells. The report had a number of conclusions: 1) As many as 130 metallic drums per acre were dumped in the landfill. Most of these drums would have corroded and released their contents within ten years. 2) Elevated concentrations of arsenic, cadmium, copper, lead, mercury, and zinc were observed in landfill waste samples. The metals likely exist as metallic sulfides which have limited mobility. 3) Hydrocarbon pollutant concentrations were generally low. Detectable acetone concentrations were on the order of 1 parts per million (ppm). Naphthalene and phenanthrene were detected at concentrations up to 13 ppm and 6.2 ppm, respectively. 4) Carbon tetrachloride, cyanide, and polychlorinated biphenyls (PCBs) were not detected in soil samples. 5) Groundwater samples contained elevated concentrations of arsenic, copper, nickel, lead, and zinc. Acetone was detected in groundwater at concentrations up to 41,000 parts per billion (ppb). Eleven other volatile organic compounds were found at concentrations up to 50 ppb. Twenty extractable organic compounds were found at concentrations up to 5 ppb.

3.0 HEALTH AND SAFETY

A site-specific health and safety plan was prepared prior to drilling. An "Agreement and Acknowledgment" statement was signed by on-site personnel indicating that the health and safety plan had been read and understood. Hydrogen sulfide and methane gas were identified site-specific hazards and air monitoring was performed continuously throughout the well drilling and installation procedure.

4.0 PERMITTING

A boring permit for six monitoring wells was acquired from the San Diego County HMMD prior to drilling (Appendix 2).

5.0 PRELIMINARY DRILLING ASSESSMENT

5.1 Drilling

On December 20 and 23, 1996, wells LE-1, LE-2, and LE-3 were drilled and installed in the lease expansion area (Figure 2). During the drilling of LE-4, on December 23, hydrogen sulfide gas was detected at concentrations as high as 9 ppm and methane was detected at a maximum of 1,000 ppm. Drilling was immediately halted and boring LE-4 was backfilled. On January 9, 1997 the drilling was again mobilized following additional study and preparation for the hydrogen sulfide and methane hazard. Wells LE-5 and LE-6 were installed and boring LE-4 was re-drilled and converted to a monitoring well. To minimize exposure to methane and hydrogen sulfide gasses, work was conducted up-wind and fans were used to ventilate the work area.

The wells were drilled with a CME-75 drill rig using 8 and 9-inch diameter hollow-stem augers.

5.2 Soil and Groundwater Disposal

On May 1, 1997, seventeen drums of soil cuttings were disposed of at the waste disposal facility in McKittrick, California. Twelve drums of auger rinsate and well purge water were disposed of at DeMenno/Kerdoon in Compton, California on May 5, 1997. The soil and water were transported under non-hazardous waste manifests (Appendix 3).

Of the drums disposed of, nine soil and one water were generated during a previous investigation at the Sea World Wild Arctic Exhibit.

5.3 Soil Sampling and Analyses

Samples were collected at approximate 5-foot intervals for lithologic description and hydrocarbon analyses. Samples were collected in general accordance with the Quality Assurance/Quality Control procedures listed in Appendix 4.

Two soil samples were selected from each of the six borings for analysis. All soil samples were analyzed for hydrocarbon components using the EPA Method 8015 hydrocarbon screen. Additionally, all soil samples from borings LE-1 through LE-4 were analyzed for volatile organic

compounds by EPA method 8020 and one soil sample from each of the six borings was analyzed for volatile and semi-volatile organic compounds using EPA methods 8240, and 8270, respectively. Analyses of soil samples were performed by Del Mar Analytical, a State-certified laboratory. After further discussions with Sea World in April 1997, one sample from each boring was additionally analyzed for CAM metals.

5.4 Groundwater Sampling and Analysis

Wild Arctic well WA-3 was gauged and Lease Expansion wells LE-1 through LE-6 were gauged, purged, and sampled on January 20, 1997. Wells LE-1 through LE-6 were gauged, purged and sampled again on April 29, 1997.

One sample was submitted from each well for analysis. The samples collected on January 20 were analyzed for organic lead, total lead, volatile organics, and semi-volatile organics using the California DHS Method, and EPA Methods 7421, 8240, and 8270, respectively. The samples collected on April 29 were analyzed for CAM metals.

Chemical analyses of the groundwater samples were performed by Del Mar Analytical. Samples were collected in general accordance with the Quality Assurance/Quality Control procedures listed in Appendix 4. To reduce interference from soil particles in suspension, groundwater samples collected on April 29 were filtered and acidified at the laboratory prior to metals analyses.

6.0 FINDINGS

6.1 Soil Analytical Results

Twelve soil samples were analyzed for hydrocarbon components using the EPA Method 8015 hydrocarbon screen. Samples from wells LE-1 through LE-5 were screened in the C_6 to C_{44} range (gas standard and diesel standard) and analyzed for volatile organic (BTEX) compounds using EPA method 8020. Samples from wells LE-5 and LE-6 were screened against the C_{10} to C_{40} diesel fuel standard (Figure 4). Soil analytical data are summarized in Table 2. Laboratory reports are in Appendix 4.

Hydrocarbons within the C_{22} through C_{44} range were detected in soil from well LE-1 at 10 feet below grade (79 milligrams per kilogram, mg/kg). Hydrocarbons within the C_{10} through C_{44} range were detected in both samples from well LE-4 (200 mg/kg at 10 feet, 380 mg/kg at 15 feet below grade). The hydrocarbons sources for the C_{10} to C_{20} range are likely diesel-weight fuels and solvents; source materials for the C_{20} to C_{44} range include heavier oils such as hydraulic, motor, and natural oils.

One sample from each of the six borings was analyzed for volatile organics, semi-volatile organics, and metals using EPA methods 8240, 8270, and various EPA 6000 and 7000 methods. Acetone was detected 15 feet below grade in wells LE-3, LE-4, LE-5, and LE-6 at 26 micrograms per kilogram (µg/kg), 220 µg/kg, 21 µg/kg, and 14 µg/kg respectively (Figures 5 and 6). In well LE-4, 2-butanone (MEK) was detected 15 feet below grade at 36 µg/kg. Acetone and 2-butanone are solvents typically used in the aerospace industries, their detection most likely the result of aerospace manufacturing-waste disposal in the former landfill. These same constituents were detected at higher concentrations during the 1983 WWC investigation. Acetone and 2-butanone are not listed as constituents of concern in the Basin Plan guidelines.

	PRG top H_2O	PPB soil
Acetone	610	1600
MEK	1900	7300

Generally, metals analyses showed detectable concentrations of arsenic, barium, total chromium, cadmium, cobalt, copper, lead, molybdenum, nickel, vanadium and zinc. Sample LE-2-10 had a chromium concentration of 79 mg/kg which exceeded the soluble threshold limit concentration (STLC) by more than 10 times. However, the remaining samples and the statistical mean were below the 10 times limit. None of the metals exceeded the total threshold limit concentration (TTLC) values.

6.2 Groundwater Analytical Results

No total lead or organic lead were found in any of the groundwater samples. Groundwater analytical data is summarized in Table 3, laboratory reports are in Appendix 4.

On January 20, 1997, detectable 1,1,1-trichloroethane concentrations ranged from 2.4 micrograms per liter (µg/L) in wells LE-4 and LE-6 to 7.2 µg/L in LE-2. Only well LE-3 contained nondetectable 1,1,1-trichloroethane. The contaminant appears to be widely dispersed in a relatively uniform concentration, consistent with dated landfill disposal of barrels in a corrosive environment. 1,1,1-Trichloroethane is widely used as a solvent in the aerospace industry. Figure 7 shows the distribution of 1,1,1-trichloroethane in the "LE" series wells.

The groundwater Maximum Contaminant Limit (MCL) concentration in the Basin Plan for 1,1,1-trichloroethane is 200 µg/L. During this investigation, 1,1,1-trichloroethane concentrations did not exceed MCL limits (Table 3).

Generally, metals analyses showed detectable concentrations of barium, selenium, silver, and zinc (Table 3). A majority of the metals concentrations were below detection limits. Dissolved selenium, silver, and zinc concentrations exceeded Basin Plan oceanwater quality goals (RWQCB, 1994). However, applicable groundwater MCLs for these metals are unlisted in the Basin Plan.

7.0 SUMMARY

- In December 1996 and January 1997, wells LE-1 through LE-6 were drilled and installed. Landfill debris was not encountered during drilling.

- The site lies within the Mission San Diego Hydrologic Subarea (HSA 7.11) of the Lower San Diego Hydrologic Area (HA 7.10) of the San Diego Hydrologic Unit (HU 7.00). Based on the January 20, 1997 gauging, groundwater depths at the site were between 11.68 and 21.32 feet below grade. Due to tidal fluctuations, groundwater gradient and flow direction were not determined.

- Hydrocarbons within the C_{22} through C_{44} range were detected in soil from well LE-1 at 10 feet below grade (79 mg/kg). Hydrocarbons within the C_{10} through C_{44} range were detected in both samples from well LE-4 (200 mg/kg at 10 feet, 380 mg/kg at 15 feet below grade). The hydrocarbons sources for the C_{10} to C_{20} range are likely diesel-weight fuels and solvents, source materials for the C_{20} to C_{44} range include heavier oils such as hydraulic, motor, and natural oils.

- Acetone in soil was detected 15 feet below grade in wells LE-3, LE-4, LE-5, and LE-6 at 26 µg/kg, 220 µg/kg, 21 µg/kg, and 14 µg/kg, respectively. In well LE-4, 2-butanone (MEK) was detected 15 feet below grade at 36 µg/kg. Acetone and 2-butanone are solvents typically used in the aerospace industries, their detection most likely the result of aerospace manufacturing-waste disposal in the former landfill. Metals analyses generally showed detectable arsenic, barium, total chromium, cadmium, cobalt, copper, lead, molybdenum, nickel, vanadium and zinc. Concentrations were below levels discussed in the 1983 WWC report, and below TTLC levels. Some of the metals concentrations likely represent natural background concentrations.

- 1,1,1-trichloroethane was found in groundwater samples from every well except LE-3 at concentrations from 2.4 µg/L in well LE-4 and LE-6 to 7.2 µg/L in LE-2. The contaminant appears to be widely dispersed in a relatively uniform concentration, consistent with dated landfill disposal of barrels in a corrosive environment. 1,1,1-Trichloroethane is widely used as a solvent in the aerospace industry. The Basin Plan MCL concentration for 1,1,1-trichloroethane is 200 µg/L. During this investigation 1,1,1-trichloroethane concentrations did not exceed MCL limits. No other organic compounds listed in the Basin Plan as contaminants of concern were detected in this investigation.

- Detectable concentrations of barium, silver, selenium and zinc were measured in groundwater samples. Applicable Basin Plan groundwater quality goals are not listed. Chromium, cobalt, copper and other metals detected in the WWC wells were not detected in the "LE" series wells.

8.0 REFERENCES

California Water Resources Control Board and California Regional Water Quality Control Board, San Diego Region (9), June 1994, *Comprehensive Water Quality Control Plan for the San Diego Basin.*

California Water Regional Water Quality Control Board, San Diego Region, 1990, Resolution No. 90-55, *A Resolution Adopting Amendments to the Comprehensive Water Quality Control Plan for the San Diego Region.*

Fluor Daniel GTI, Inc., 1996, *Cost Estimate For Phase I and II Site for Sea World Expansion - East*, May 7.

Kennedy and Peterson, 1975, *Geology of the San Diego Metropolitan Area, California*, California Division of Mines and Geology, Bulletin 200.

Woodward-Clyde Consultants, 1983, *Site Assessment Report*, November 17.

TABLE 1
Monitoring Data
Sampled January 20, 1997
Sea World, 1720 South Shores Drive, San Diego, California

Well ID	DTW	TOC Surveyed Wellhead Elevation	Elevation of Water
WA-1	NA	22.22	
WA-2	NA	20.39	
WA-3	15.35	19.23	3.88
LE-1	21.32	24.36	3.04
LE-2	11.68	15.11	3.43
LE-3	14.85	19.99	5.14
LE-4	15.96	20.28	4.32
LE-5	15.37	21.17	5.80
LE-6	16.84	19.96	3.12

Notes:

1) All depths are reported in feet
2) DTW = depth to water
3) TOC = top of casing
4) NA = not available

TABLE 2
Soil Analytical Results
Sampled December 20 and 23, 1996 and January 9, 1997
Sea World, 1720 South Shores Drive, San Diego, California

Sample ID	Hydrocarbon Range	TPH Screen	TPH_g	B	T	E	X
LE-1-10	C_{22} - C_{44}	79	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-1-15	NA	<5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-2-5	NA	<5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-2-10	NA	<5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-3-10	NA	<5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-3-15	NA	<5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-4-10	C_{10} - C_{44}	200	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-4-15	C_{10} - C_{44}	380	<1.0	<0.0050	<0.0050	<0.0050	<0.015
LE-5-10	NA	<5.0	--	--	--	--	--
LE-5-15	NA	<5.0	--	--	--	--	--
LE-6-10	NA	<5.0	--	--	--	--	--
LE-6-15	NA	<5.0	--	--	--	--	--

Notes:

1) All results reported in mg/kg
TPH = total petroleum hydrocarbons; analyzed using EPA 3550/CA DHS Modified 8015
TPH_g = total petroleum hydrocarbons as gasoline; analyzed using EPA 5030/CA DHS Modified 8015/8020
B = benzene, T = toluene, E = ethylbenzene, X = xylenes; analyzed using EPA 5030/CA DHS Modified 8015/8020
< number = analyte below reported detection limit
NA = not applicable
-- = not analyzed

TABLE 3
Groundwater Analytical Results
Sampled January 20, 1997 and April 29, 1997
Sea World, 1720 South Shores Drive, San Diego, California

Well ID	1,1,1-Trichloroethane	Barium	Selenium	Silver	Zinc
LE-1	6.5	180	<10	85	<50
LE-2	7.2	<50	27	<50	74
LE-3	<2.0	70	33	<50	<50
LE-4	2.4	3,700	26	<50	<50
LE-5	4.8	<50	19	<50	<50
LE-6	2.4	310	45	<50	<50
Basin Plan Water Quality Goal	200[2]	NL	15[3]	0.7[3]	20[3]

Notes:

1) All results reported in µg/L
2) Basin Plan Groundwater Primary Maximum Contaminant Level, RWQCB, Region IX, 6/94
3) Basin Plan Ocean Water Quality Goal, RWQCB, Region IX, 6/94
4) NL = Maximum Contaminant Level not listed in Basin Plan
5) 1,1,1-trichloroethane by EPA Method 8240, barium, silver, and zinc by EPA Method 200.7, selenium by EPA Method 200.9

THE CITY OF SAN DIEGO

RECEIVED
AUG 2 0 2003
CALIFORNIA
COASTAL COMMISSION
SAN DIEGO COAST DISTRICT

August 19, 2003

Ms. Ellen Lirley
California Coastal Commission
7575 Metropolitan Drive, Suite 103
San Diego, CA 92108

Re: Coastal Development Permit #6-01-129 Revocation Request – Sea World Splashdown Ride

Dear Ms. Lirley:

This letter is in response to your letter dated August 13, 2003 requesting information related to the Coastal Development Permit #6-01-129 – Sea World Splashdown Ride (Ride) revocation request. Outlined below are our responses to your specific questions as they relate to the Mission Bay Landfill (Landfill).

The City of San Diego, Environmental Services Department (ESD) is responsible for compliance with all of the requirements of the Local Enforcement Agency (LEA) and the Regional Water Quality Control Board (Regional Board) as an owner and historic operator of the Landfill.

1. On January 4, 2002, the ESD received a copy of *Results of Soil Vapor Assessment Sea World Expansion Plan – January 2002* (Vapor Study). This Vapor Study was prepared by Sea World as required by the LEA and has been available for public review since it was released.

   At the March 21, 2003 Mission Bay Technical Advisory Committee (TAC) monthly meeting, the LEA presented a summary of this Vapor Study, to all in attendance including members of the California Earth Corps. The probe location map with corresponding analytical results was presented. Additionally, the results of this Vapor Study, and its significance, were discussed at several of our subsequent monthly meetings.

   The Vapor Study included the installation of 28 soil vapor probes. The referenced test well, J-24, located closest to the known limits of the Landfill, did measure 1820 parts per million (ppm) of hydrogen sulfide gas (H_2S). However, this sample was taken 15 feet below ground surface and 315 feet from the project site. No elevated levels of H_2S were found on the surface at any of the sample locations.

Exhibit 2
City Response

Exhibit "D" in the revocation request is a letter from Soil Water Air Protection Enterprise dated July 21, 2003. This letter mentions the finding of elevated levels of H_2S and methane, however it does not clarify that these concentrations were found below ground surface. There were no elevated levels found at the surface, consequently, there was no exposure to the workers or to the public.

The letter also references OSHA/NIOSH permissible exposure limit (PEL) for H_2S at 10 ppm and the concentration considered immediately dangerous to life and health (IDLH) as 100 ppm. For clarification, the PEL, as defined by OSHA, is the maximum 8-hour time-weighted average of any airborne contaminant and represents conditions to which nearly all workers may be repeatedly exposed day after day without adverse effect. The IDLH, as defined by NIOSH, represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.

The LEA and the Regional Board are the regulatory agencies overseeing the Landfill and surrounding development. They have both been very involved in the review of plans and reports to ensure the health and safety of the public and the environment. The LEA, in a letter dated April 25, 2003, approved the construction of the Ride. The ESD has no direct responsibility over the project site other than ensuring that Sea World is coordinating with the appropriate regulatory agencies.

The ESD is in full compliance with Title 27 regulations as regulated by the LEA. ESD performs annual landfill gas surface monitoring. With respect to the recommendations contained in the Vapor Study, the ESD has recently hired SCS Engineers to perform an assessment of the Landfill. Soil gas testing will be incorporated into this assessment.

2. The City of San Diego records identify only one site for the Landfill. These records indicate that the Landfill accepted both municipal and industrial waste and commingled these waste during disposal. The revocation request states "an industrial Class I hazardous waste dump had been operating in and around the location of the Ride and that the exact boundaries of the toxic hazardous waste dump were unknown". The Landfill was not operated or permitted as a Class I hazardous waste site, though records indicate that industrial waste was disposed of at the Landfill site.

   While the exact limits of the Landfill have not been defined, numerous soil borings have been made in around the Landfill, providing a basis for some understanding of the limits of trash. As part of the geotechnical investigation for the Ride, prepared by Christian Wheeler Engineering, eight soil borings were within the project site and no trash was encountered.

Ex. 2

In response to a request made to reclassify the Landfill as a Class I waste management unit, the Regional Board issued a letter dated August 4, 2003. A copy of this letter is attached for your reference.

3. The Mission Bay Technical Advisory Committee (TAC) was formed to address the issue of potential threats from the Landfill to the public and the environment by overseeing the development and implementation of a new site assessment for the Landfill. The first meeting was held on August 16, 2002. As previously mentioned, the ESD has entered into a consultant contract with SCS Engineers to reevaluate the existing monitoring program and perform a full assessment to determine if the landfill poses a threat to the public or the environment. The scope of their work includes; 1) review of all previous investigations performed on the site 2) develop a Site Assessment Plan (SAP) identifying potential chemicals of concern and appropriate screening criteria 3) implement the approved SAP and 4) prepare a Final Site Assessment Report including recommendations if warranted. It is anticipated that a Draft SAP will be presented to the TAC in November 2003 for their input and comment. Implementation of the approved SAP will begin in 2004 with a Final Report expected in July 2004.

4. Since 1985, the ESD has performed quarterly surface and groundwater monitoring as required by the Regional Board. Annual landfill gas monitoring is also performed. Additionally, the LEA and Regional Board perform regular inspections at the site. There has been no evidence that significant amounts of chemicals are leaking or migrating from the site. The City continues to perform maintenance on the Landfill site to ensure that proper drainage and cover are maintained which are in compliance with all regulatory requirements.

If you have any questions or would like further clarification, please contact me at (858) 573-1212.

Sincerely,

Chris Gonaver
Environmental Protection Division, Deputy Director

Enclosure

CG/smc

cc: Rebecca Lafreniere, City of San Diego Local Enforcement Agency
John Odermatt, San Diego Regional Water Quality Control Board

Ex. 2

California Regional Water Quality Control Board

San Diego Region

Winston H. Hickox
Secretary for
Environmental
Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9
9174 Sky Park Court, Suite 100, San Diego, California 92123-4340
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
Governor

August 4, 2003

Mr. John E. Wilks, III
Executive Board Member
Sierra Club, San Diego Chapter
3820 Ray Street
San Diego, CA 92104-3623

In reply refer to:
LDU:06-0378.02:mcdab

Dear Mr. Wilks:

SUBJECT: RECLASSIFICATION OF MISSION BAY LANDFILL

The purpose of this letter acknowledges our receipt of your letters (dated June 24, 2003 and July 9, 2003). This letter is also intended to provide a response to your requests that the San Diego Regional Water Quality Control Board ("Regional Board") reclassify the Mission Bay Landfill as a Class I waste management unit.

As you may be aware, the Regional Board classifies the Mission Bay Landfill as a Class III municipal solid waste (MSW) landfill. According to information available to the Regional Board:

- The Regional Board available records do not contain detailed information on the pre-disposal construction (if any) that may have taken place prior to the beginning of waste discharges (*circa* 1952) at the Mission Bay Landfill.
- The Mission Bay Landfill was likely operated as an MSW landfill, under the prevailing conditions in effect during the time period from 1952 to 1959.
- There is evidence to suggest that the Mission Bay Landfill received wastes that could/would be classified as hazardous materials/wastes (*i.e.* barrels of solvents, liquid acidic wastes, *etc.*) by current regulatory standards.

The current regulations, developed by the State Water Resources Control Board (SWRCB), do not classify waste management units (including landfills) based upon the nature of the waste that they received during their operational history. Waste Management Units are classified by a combination of the siting criteria and containment system criteria they can meet at the time of permitting for waste management/disposal operations.

To be reclassified as a Class I waste management unit; the Mission Bay Landfill would have to meet the applicable siting and lining requirements in California Code of Regulations (CCR), Title 23 ("**Chapter 15 – discharges of hazardous waste to land**") and current CCR Title 22 (*e.g.*, double-composite) liner standards. The SWRCB's classification method, as promulgated in 1984 under Subchapter 15, is based upon siting criteria and containment system criteria that a Class I Unit must meet.
State regulations referenced in CCR Title 23 and Title 27 may be accessed on-line at:

http://www.calregs.com/

The intent of the SWRCB, regarding application of current regulations to older Units, is expressed in CCR Title 23, Section 2510(g) and CCR Title 27, Section 20080(g). These regulations specifically exempt facilities that were closed, abandoned or inactive (CAI), prior to 1984, from meeting any but the new monitoring requirements. In addition, the decision on whether to apply the revised monitoring requirements is at the discretion of the appropriate Regional Board.

The Regional Board supports the efforts of the Mission Bay Technical Advisory Committee (TAC). On February 5, 2003; the Regional Board adopted a name change for the Order (Addendum No. 3 to Order No. 97-11) currently used to regulate the Mission Bay Landfill. The current title of the Order is as follows: *"General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Landfills Containing Hazardous and Nonhazardous Wastes within the San Diego Region."* The staff proposed this name change with consideration of a specific request from the Mission Bay TAC to provide recognition that the Mission Bay Landfill is likely to contain hazardous materials and/or wastes. You can see the supporting information and materials prepared by our staff and provided for consideration by our Regional Board members (see ITEM No. 6) on our web site at:

http://www.swrcb.ca.gov/rwqcb9/rb9board/feb03.html .

From participation of our staff at the Mission Bay TAC, we understand that the City of San Diego will contract for the completion of a site investigation to assess the current conditions at the Mission Bay Landfill. Further, our staff understands that the assessment will begin in October with results due back during July 2004. We look forward to reviewing the final site assessment report of results from that work.

The heading portion of this letter includes a Regional Board code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

Ex. 2

I hope that this letter helps to explain our regulatory constraints and position with regard to taking further action upon the request made in your letters dated June 24, 2003 and July 9, 2003. If you have any questions regarding this letter, please contact Mr. Brian McDaniel (TEL: 858-627-3927 or via email at mcdab@rb9.swrcb.ca.gov).

Sincerely,

JOHN R. ODERMATT
Senior Engineering Geologist, Land Discharge Unit

JRO:bkm

cc: Ms. Nicole Capretz, Office of the Council Representative for District 6, 202 C Street, 10th Floor, San Diego, CA 92101 (for distribution to all Mission Bay TAC members)

Mr. Chris Gonaver City of San Diego, Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123 (for distribution to all Mission Bay TAC members)

Ex. 2

California Regional Water Quality Control Board

San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9
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Phone (858) 467-2952 • FAX (858) 571-6972

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CALIFORNIA
COASTAL COMMISSION
SAN DIEGO COAST DISTRICT

August 18, 2003

Ms. Ellen Lirley, Coastal Planner
California Coastal Commission
7575 Metropolitan Drive, Suite 103
San Diego, CA 92108-4402

In reply refer to:
LDU:06-0378.02:mcdab

Dear Ms. Lirley:

SUBJECT: COASTAL DEVELOPMENT PERMIT #6-01-129 REVOCATION REQUEST – SEA WORLD SPLASHDOWN RIDE

This letter acknowledges our receipt of your letter via fax (dated August 13, 2003) requesting information concerning the Mission Bay Landfill and the status of further work being done at the request of the Mission Bay Landfill Technical Advisory Committee (TAC). Your letter references a technical report from 2002 entitled *"Results of Soil Vapor Assessment Sea World Expansion Plan, 16-Acre Tract"* prepared by the IT Corporation.

Your letter requested a response by August 19, 2003. The questions included in your letter are indicated below in italicized font with our response is indicated after each question.

1. *Please identify when you (the Regional Water Quality Control Board [RWQCB]) were first aware of the existence of the referenced study and what role it has played in any determination regarding Sea World proposals from that time forward. Please advise how your agency is implementing the recommendations on Page 4-4 of the Soil Vapor Report requiring conformance with Title 27 regulations; or, if not your agency, what agency is responsible for such implementation. Also, please identify what investigations you intend to pursue regarding the high levels of hydrogen sulfide detected during the soil vapor tests.*

   RWQCB staff Response: The RWQCB received the cited report on January 7, 2002.

   In general, the RWQCB provides regulatory oversight of discharger compliance with water quality requirements, those derived from the State Water Resources Control Board - SWRCB), included in California Code of Regulations (CCR), Title 27. The primary concerns of the RWQCB are related to any activity that may adversely affect the containment of the "wastes" - including solid wastes, waste constituents, and/or degradation products thereof - by the Mission Bay Landfill. Such activities must not adversely impact the containment of "wastes" by the landfill, contribute to (or directly create) conditions of pollution or nuisance, result in a violation of any State Water Quality Control Plans, or result in violations of the statutory requirements of the California Water Code.

Exhibit 3

RWQCB Response

The Local Enforcement Agencies (LEAs) oversee discharger compliance with Title 27 requirements derived from the CIWMB. The work of the LEAs generally include oversight of requirements relating to the protection of public health, including monitoring and control of landfill gases. It appears that the recommended practices, developed by the IT Corporation and listed on page 4-4 of the Report, were primarily developed to control potential impacts to public health from exposures to emissions and accumulations of landfill gas. The recommended mitigation measures would probably best be evaluated in conjunction with the regulatory requirements normally overseen by the City LEA.

The RWQCB encourages you to contact the City LEA to obtain their assessment of the conclusions and recommendations from the "Soil Vapor Report" referenced in your letter. The point of contact for the LEA is Ms. Rebecca Lafreniere, City of San Diego Local Enforcement Agency, 1010 Second Avenue, Suite 600 (MS 606L), San Diego, CA 92101-4998, TEL: 619-533-3694. The City LEA also participates in the Mission Bay TAC.

2. *The opponents identify two separate types of waste materials at, or near, the Sea World leasehold and splashdown ride site – a municipal landfill and a hazardous toxic waste dump. Please clarify whether these are distinct in location or intermingled, and their location in relation to the Mission Bay Landfill boundaries as shown in the 2002 study. Please also indicate the source of your conclusions.*

RWQCB staff Response: The information available for the RWQCB suggests that the Mission Bay Landfill operated between the years 1952 to 1959. Operational requirements and standards of practice for landfills existing in the 1950's were not necessarily the same as the waste classification and disposal practices that apply to currently operating solid waste disposal units. It is very likely that the landfill received a mixture of municipal, industrial, and commercial waste streams. It is not clear that there was any attempt to segregate wastes by source/type during waste disposal operations at the Mission Bay Landfill. As a result, the RWQCB concludes that various types of wastes are likely to be commingled within the waste management unit.

During the 1950's, industries diverted discharges of liquid industrial wastes away from the developing sewer conveyance and treatment system. As a result, dischargers of industrial liquid wastes were actively seeking alternative methods to dispose of their various waste streams. It appears that existing landfills offered one alternative method for various dischargers to dispose of their liquid industrial waste streams. The RWQCB files contain historical information (correspondence) indicating that at least one component of the waste stream discharged at the Mission Bay Landfill included various liquid wastes (including drums containing spent acids and solvent waste) from industrial operations at the former Convair Plant located in the City of San Diego. The RWQCB recently received requests from the Sierra Club- San Diego Chapter to "re-classify" the Mission Bay Landfill as a Class I waste management unit. Attached to this letter is our written response (dated August 4, 2003) to that request.

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There is a significant level of uncertainty regarding the exact boundaries of the past waste disposal operations at the Mission Bay Landfill. One of the objectives of the study requested by the Mission Bay Landfill TAC is to more exactly identify the boundary of the waste management unit.

3. *Please provide an update on the status of the Technical Advisory Committee's current investigations at the landfill, and advise the projected timeline for this investigation.*

RWQCB staff Response: The RWQCB was invited by Councilwoman Donna Frye's office to participate in the Mission Bay TAC. For an update on the status of the Mission Bay TAC, it is more appropriate that you contact the City representatives who regularly convene that group. I suggest you contact either of the following people:

Ms. Nicole Capretz, c/o Council Representative District 6, 202 "C" Street, 10th Floor, San Diego, CA 92101, via telephone at (619) 236-6616 or via email at ncapretz@sandiego.gov.

Mr. Chris Gonaver, City of San Diego – Environmental Services Department, 9610 Ridgehaven Court, Suite 310, San Diego, CA 92123, via telephone at (858) 573-1212 or via email at cgonaver@sandiego.gov.

4. *Please also provide a status report on the landfill, describing the current status and monitoring efforts, identifying any trends in data. In addition, please advise if any new information has come to your attention that changes your previous assessment and monitoring strategy.*

RWQCB staff Response: The City of San Diego (the City) is the "discharger" identified as being responsible for monitoring and maintenance at the Mission Bay Landfill. The RWQCB regulates the Mission Bay Landfill through waste discharge requirements (WDRs) issued to the City under Order 97-11 (attached to this letter). Order 97-11 prescribes requirements for regular maintenance, monitoring, and reporting for inactive landfills in the San Diego Region. Historically, the City has provided the RWQCB with technical reports of investigation results, analytical results for groundwater, and analytical results from surface water and sediment sampling in Mission Bay. The City is providing semi-annual monitoring reports to the RWQCB and the have performed landfill maintenance in compliance with Order 97-11. We anticipate the City will continue to do so in the future.

The City has reported that low concentrations of organic "waste constituents" being detected in groundwater monitoring wells associated with the Mission Bay Landfill. The detected concentrations of various constituents experience annual fluctuation in some of the wells associated with this site. It is difficult to confidently ascribe meaningful trends to the data due (in part) to the low concentrations observed in the wells. Concentrations of various organic and

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inorganic constituents have also been detected in surface waters and sediments in Mission Bay. However, the presence of other potential natural and anthropogenic sources of inorganic and/or organic constituents makes it difficult to determine if the detected constituents in surface waters or sediments were specifically derived from the Mission Bay Landfill. At this point in time, we are not aware of any information that would cause the RWQCB to require a change to the monitoring strategy for the Mission Bay Landfill. However, the RWQCB does look forward to reviewing the results from the investigation being done at the request of the Mission Bay TAC.

There is a large volume of information available in our office files, including a number of technical reports available for the Mission Bay Landfill. You or your staff are encouraged to review that information by scheduling a file review through our Records Officer (Ms. Sylvia Wellnitz TEL: 858-467-2952). The Files available for the Mission Bay Landfill include the following: File Nos. 06-0378.01 (Technical File), 06-0378.02 (Correspondence File), 06-0378.03 (Report File).

We also noted that our mailing address as listed on your letter was incorrect. For future reference, please use the address indicated on the letterhead of this letter. We hope that this information provided in this letter will help to address your concerns about the Mission Bay Landfill. If you have any questions regarding this letter, please contact Mr. Brian McDaniel (TEL: 858-627-3927 or via email at mcdab@rb9.swrcb.ca.gov).

Sincerely,

JOHN R. ODERMATT
Senior Engineering Geologist, Land Discharge Unit

JRO:bkm

Enclosures: Letter response to request from Sierra Club- San Diego Chapter
Order 97-11 addenda and Monitoring Requirements

cc: Ms. Nicole Capretz, Office of the Council Representative for District 6, 202 C Street, 10th Floor, San Diego, CA 92101 (for distribution to all Mission Bay TAC members) w/o Attachments

Mr. Chris Gonaver City of San Diego, Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123 (for distribution to all Mission Bay TAC members) w/o Attachments

Ms. Rebecca Lafreniere, City of San Diego Local Enforcement Agency, 1010 Second Avenue, Suite 600 (MS 606L), San Diego, CA 92101-4998 w/o Attachments

Ex. 3

California Regional Water Quality Control Board

San Diego Region

Winston H. Hickox
Secretary for
Environmental
Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9
9174 Sky Park Court, Suite 100, San Diego, California 92123-4340
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
Governor

JW

August 4, 2003

Mr. John E. Wilks, III
Executive Board Member
Sierra Club, San Diego Chapter
3820 Ray Street
San Diego, CA 92104-3623

In reply refer to:
LDU:06-0378.02:mcdab

Dear Mr. Wilks:

SUBJECT: RECLASSIFICATION OF MISSION BAY LANDFILL

The purpose of this letter acknowledges our receipt of your letters (dated June 24, 2003 and July 9, 2003). This letter is also intended to provide a response to your requests that the San Diego Regional Water Quality Control Board ("Regional Board") reclassify the Mission Bay Landfill as a Class I waste management unit.

As you may be aware, the Regional Board classifies the Mission Bay Landfill as a Class III municipal solid waste (MSW) landfill. According to information available to the Regional Board:

- The Regional Board available records do not contain detailed information on the pre-disposal construction (if any) that may have taken place prior to the beginning of waste discharges (*circa* 1952) at the Mission Bay Landfill.
- The Mission Bay Landfill was likely operated as an MSW landfill, under the prevailing conditions in effect during the time period from 1952 to 1959.
- There is evidence to suggest that the Mission Bay Landfill received wastes that could/would be classified as hazardous materials/wastes (*i.e.* barrels of solvents, liquid acidic wastes, *etc.*) by current regulatory standards.

The current regulations, developed by the State Water Resources Control Board (SWRCB), do not classify waste management units (including landfills) based upon the nature of the waste that they received during their operational history. Waste Management Units are classified by a combination of the siting criteria and containment system criteria they can meet at the time of permitting for waste management/disposal operations.

To be reclassified as a Class I waste management unit; the Mission Bay Landfill would have to meet the applicable siting and lining requirements in California Code of Regulations (CCR), Title 23 ("**Chapter 15 – discharges of hazardous waste to land**") and current CCR Title 22 (*e.g.*, double-composite) liner standards. The SWRCB's classification method, as promulgated in 1984 under Subchapter 15, is based upon siting criteria and containment system criteria that a Class I Unit must meet.
State regulations referenced in CCR Title 23 and Title 27 may be accessed on-line at:

http://www.calregs.com/

The intent of the SWRCB, regarding application of current regulations to older Units, is expressed in CCR Title 23, Section 2510(g) and CCR Title 27, Section 20080(g). These regulations specifically exempt facilities that were closed, abandoned or inactive (CAI), prior to 1984, from meeting any but the new monitoring requirements. In addition, the decision on whether to apply the revised monitoring requirements is at the discretion of the appropriate Regional Board.

The Regional Board supports the efforts of the Mission Bay Technical Advisory Committee (TAC). On February 5, 2003; the Regional Board adopted a name change for the Order (Addendum No. 3 to Order No. 97-11) currently used to regulate the Mission Bay Landfill. The current title of the Order is as follows: *"General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Landfills Containing Hazardous and Nonhazardous Wastes within the San Diego Region."* The staff proposed this name change with consideration of a specific request from the Mission Bay TAC to provide recognition that the Mission Bay Landfill is likely to contain hazardous materials and/or wastes. You can see the supporting information and materials prepared by our staff and provided for consideration by our Regional Board members (see ITEM No. 6) on our web site at:

http://www.swrcb.ca.gov/rwqcb9/rb9board/feb03.html

From participation of our staff at the Mission Bay TAC, we understand that the City of San Diego will contract for the completion of a site investigation to assess the current conditions at the Mission Bay Landfill. Further, our staff understands that the assessment will begin in October with results due back during July 2004. We look forward to reviewing the final site assessment report of results from that work.

The heading portion of this letter includes a Regional Board code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

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I hope that this letter helps to explain our regulatory constraints and position with regard to taking further action upon the request made in your letters dated June 24, 2003 and July 9, 2003. If you have any questions regarding this letter, please contact Mr. Brian McDaniel (TEL: 858-627-3927 or via email at mcdab@rb9.swrcb.ca.gov).

Sincerely,

JOHN R. ODERMATT
Senior Engineering Geologist, Land Discharge Unit

JRO:bkm

cc: Ms. Nicole Capretz, Office of the Council Representative for District 6, 202 C Street, 10th Floor, San Diego, CA 92101 (for distribution to all Mission Bay TAC members)

Mr. Chris Gonaver City of San Diego, Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123 (for distribution to all Mission Bay TAC members)

Ex. 3

California Regional Water Quality Control Board
San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9/
9174 Sky Park Court, Suite 100, San Diego, California 92123-4340
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
Governor

February 6, 2003

To: Interested/Affected Parites

Dear Representatives:

RE: ADDENDUM NO. 3 TO ORDER 97-11 REVISING THE TITLE OF ORDER NO. 97-11 AND ADDENDA THERETO: "GENERAL WASTE DISCHARGE REQUIREMENTS FOR POST-CLOSURE MAINTENANCE OF INACTIVE NONHAZARDOUS WASTE LANDFILLS WITHIN THE SAN DIEGO REGION."

On February 5, 2003, this Regional Board adopted tentative Addendum No. 3 to Order No. 97-11. Tentative Addendum No. 3 to Order 97-11 revises the title of the waste discharge requirements (WDRs) for inactive landfill sites under Order 97-11. This change is being implemented as a result of our review of the range wastes reportedly discharged into the waste management units (landfills) currently enrolled in Order 97-11.

The revised title for Order 97-11 is as follows:

"General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Landfills Containing Hazardous and Nonhazardous Wastes within the San Diego Region."

You are being sent a copy of Addendum No. 3 to Order 97-11 because you are either identified as a discharger responsible for a facility enrolled in Order 97-11, or the Regional Board has your name on an Interested Parties List for Order 97-11. If you are interested in reviewing the specific agenda materials for this action, please see the Regional Board agenda for February 5, 2003: Item No. 6 at the following address:

http://www.swrcb.ca.gov/rwqcb9/rb9board/meetings.html

Should you have any questions concerning the above matter, please contact Mr. John Odermatt at (858) 637-5595 or by email at **oderj@rb9.swrcb.ca.gov**.

Sincerely,

JOHN H. ROBERTUS
Executive Officer
JHR:jro
Enclosure: Addendum No. 3 to Order No. 97-11
Cc: Interested Parties List (see attached) with Enclosure

Ex. 3

Interested Parties List
Addendum No. 3 Order 97-11:
General Waste Discharge Requirements,
Inactive Landfills, San Diego Region

February 6, 2003

INTERESTED/AFFECTED PARTIES LIST

Mr. Joe Mello
Division of Clean Water Programs
State Water Resources Control Board
P. O. Box 944212
Sacramento, CA 94244-2120

Ms. Kerry McNeill
Department of Environmental Health
County of San Diego
9325 Hazard Way
San Diego, CA 92123

Mr. Paul Manasjan
City of San Diego
Solid Waste Local Enforcement Agency
Development Services
1222 First Avenue (MS501)
San Diego, CA 92101-4562

Mr. Jon Rollin
Department of Public Works
5469 Kearny Villa Road, #305
San Diego, CA 92123

Mr. Gino Yekta
CA Integrated Waste Management Board
1001 I Street
Sacramento, CA 95814

Mr. Safouh Sayed
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Mr. Benjamin Guerrero
Community Development Department
City of Chula Vista
276 Fourth Avenue
Chula Vista, CA 91910

San Diego Association of Governments
First Interstate Plaza
401 B Street, Suite 800
San Diego, CA 92101

Mr. Garth Koller
City of San Marcos
1 Civic Center Drive
San Marcos, CA 92069-2949

Southwest Division Naval Facilities
Engineering Command
2585 Callagan Highway, Building 99
Naval Station – San Diego
San Diego, CA 92136-5198
Attn: Mr. Robert Campbell

Navy Region Southwest
Assistant Chief of Staff, Environmental
Code N4512
33000 Nixie Way, Bldg. 50, Suite 326
San Diego, CA 92147-5110
Attn: Ms Theresa Morley

Mr. Kevin Heaton
Department of Environmental Health
County of San Diego
P.O. Box 129261
San Diego, CA 92112-9261

Mr. Tim Dillingham
CA Department of Fish and Game
4949 Viewridge Avenue
San Diego, CA 92123

Mr. Steve Wall
U.S. Environmental Protection Agency
(WST-7)
75 Hawthorne Street
San Francisco, CA 94105

Mr. Dave Byrnes
Air Pollution Control District
9150 Chesapeake Drive
San Diego, CA 92123

Mr. Steve Fontana, Deputy Director
City of San Diego – Environmental Serv Div.
9601 Ridgehaven Court, Suite 310
San Diego, CA 92123

Rupinder Uppal and Sudeep Dhillon, Trustees
The 333 Trust
1007 Los Alisos North
Fallbrook,CA 92028-3752

Mr. Tom Mulder
ENV America Incorporated
437 J Street
San Diego, CA 92101

Ex. 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 3 TO ORDER NO. 97-11

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR POST-CLOSURE MAINTENANCE OF
INACTIVE NONHAZARDOUS WASTE LANDFILLS
WITHIN THE SAN DIEGO REGION

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On April 9, 1997, this Regional Board adopted Order No. 97-11, *General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills within the San Diego Region.* Order No. 97-11 established landfill maintenance requirements and water quality monitoring for former landfills and burn sites that ceased operation prior to 1984.

2. Groundwater monitoring reports and pre-1984 historical data for landfills and burn sites covered under Order No. 97-11 indicate that wastes disposed into the facilities may have included significant quantities of wastes currently defined/characterized as "hazardous wastes", in addition to "designated", "nonhazardous" and or "inert" wastes.

3. The Regional Board has notified all dischargers and all known interested parties of its intent to add the term "hazardous" to the title of Order No. 97-11.

4. This action is exempt from the requirements of the California Environmental Quality Act (Public Resources Code 21000 et seq.) in accordance with Title 14, California Code of Regulations, Chapter 3, Section 15321.

5. The Regional Board, in a public meeting, heard and considered all comments pertaining to the proposed action.

IT IS HEREBY ORDERED,

1. Replace the title of Order No. 97-11 with the following: **"General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Landfills Containing Hazardous and Nonhazardous Wastes within the San Diego Region."**

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I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on February 5, 2003.

Issued by: John H. Robertus

JOHN H. ROBERTUS
Executive Officer

Ex. 3

California Regional Water Quality Control Board
San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9/
9174 Sky Park Court, Suite 100, San Diego, California 92123-4340
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
Governor

December 14, 2001

Mr. Jon Rollin
Inactive Waste Site Management
Department of Public Works
County of San Diego
5469 Kearny Villa Road
San Diego, CA 92123-1295

FILE: 06-0814.02

Dear Mr. Rollin:

RE: ADDENDUM NO. 2 TO ORDER NO. 97-11, GENERAL WASTE DISCHARGE REQUIREMENTS FOR POST-CLOSURE MAINTENANCE OF INACTIVE NONHAZARDOUS WASTE LANDFILLS WITHIN THE SAN DIEGO REGION

Enclosed is a copy of Addendum No. 2 to Order 97-11 which was adopted by the California Regional Water Quality Control Board (Regional Board) on December 12, 2001. Addendum No. 2 to Order No. 97-11 removes the San Ysidro burn site from regulation by waste discharge requirements for post-closure monitoring and maintenance.

Please note that the County of San Diego owns other facilities that are currently regulated by the requirements of Order 97-11. Addendum No. 2 to Order 97-11 also updates our mailing address for your future correspondence with the Regional Board.

If you have any questions or comments concerning this Addendum, please contact Mr. Brian McDaniel at (858) 627-3927.

Sincerely,

JOHN H. ROBERTUS
Executive Officer

JHR:jro:bkm
Enclosure /sanysidro

cc: Interested Parties List

Ex.3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 2 TO ORDER NO. 97-11

GENERAL WASTE DISCHARGE REQUIREMENTS FOR POST-CLOSURE MAINTENANCE OF INACTIVE NONHAZARDOUS WASTE LANDFILLS WITHIN THE SAN DIEGO REGION

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On April 9, 1997, this Regional Board adopted Order No. 97-11, *General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills within the San Diego Region.* Order No. 97-11 established landfill maintenance requirements and water quality monitoring for former landfills and burn sites that ceased operation prior to 1984.

2. The former San Ysidro burn site was included in Order 97-11 as a former burn site that may contain soluble constituents which are leachable to waters of the state under acidic conditions. Potential water quality impacts from this site could result from erosion during the rainy season, if waste is exposed and is not contained onsite.

3. The burn site ceased operation in 1957 as an open burn dump for municipal wastes generated in the local surrounding area. Residual burn ash wastes were reclassified as a non-hazardous waste by the Department of Toxic Substances Control on April 3, 1998.

4. On May 4, 2001, the County of San Diego submitted a site closure report for the former burn site. The report confirmed the removal of the residual burn ash wastes in support of clean closure of the site. An estimated 17,775 cubic yards of burn ash were excavated and disposed at the Otay Class I Landfill.

5. The Regional Board has notified the discharger and all known interested parties of its intent to remove the former San Ysidro burn site from the requirements of Order No. 97-11 for the County of San Diego.

Ex. 3

6. This action is exempt from the requirements of the California Environmental Quality Act (Public Resources Code 21000 et seq.) in accordance with Title 14, California Code of Regulations, Chapter 3, Section 15321.

7. The Regional Board, in a public meeting, heard and considered all comments pertaining to the proposed action.

IT IS HEREBY ORDERED,

1. The San Ysidro burn site be removed from Order No. 97-11.

2. Replace the **REPORTING REQUIREMENTS Item E.10** with the following:

> "The discharger shall submit reports required under this Order and other information requested by the Executive Officer, to:
>
> California Regional Water Quality Control Board
> 9174 Sky Park Court, Suite 100
> San Diego, CA 92123"

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on December 12, 2001.

issued by: John H. Robertus

JOHN H. ROBERTUS
Executive Officer
December 12, 2001

Ex. 3

INTERESTED PARTIES LIST
ADDENDUM NO. 2 TO ORDER NO. 97-11

Mr. Robert Ferrier
Environmental Services Department
9601 Ridgehaven Court, Suite 310
San Diego, CA 92123-1636

Mr. John Locke, IR Coordinator
North Island Environmental Department
N4512
33000 Nixie Way, Bldg. 50, Suite 335
San Diego, CA 92147-5110

Mr. Keith Forman, BRAC Coordinator
BRAC Program Office. Code 05BS.KF
1420 Kettner Boulevard, Suite 501
San Diego, CA 92101-2404

Mr. Rick Adcock
San Diego Unified Port District
P. O. Box 488
San Diego, California 92112

Mr. Garth Koller
City of San Marcos
1 Civic Center Drive
San Marcos, CA 92069-2949

Mr. John Richards
Office of the Chief Counsel
State Water Resources Control Board
Sacramento

Ms. Michele Stress
Department of Environmental Health
County of San Diego
9325 Hazard Way
San Diego, CA 92123

Mr. Gino Yekta
California Integrated Waste Management Board
Closure Branch
8800 Cal Center Drive
Sacramento, CA 95826

Ms. Patricia Henshaw
Supervising Hazardous Waste Specialist
County Of Orange
Health Care Agency
Local Solid Waste Enforcement Agency
2009 E. Edinger Avenue
Santa Ana, CA 92705

Ms. Patti Krebs
Executive Director
Industrial Environmental Association
701 B Street, #1445
San Diego, CA 92101

Mr. Haissam Salloum
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

San Diego Association of Governments
First Interstate Plaza
401 B Street, Suite 800
San Diego, California 92101

Mr. Tim Dillingham
California Department of Fish and Game
4949 Viewridge Avenue
San Diego, California 92123

Mr. David Hulse, Chief
Department of Planning and Land Use
County of San Diego
5201 Ruffin Road, Suite B
San Diego, California 92123-1666

Ms. Vicki Wilson, Director
County of Orange, IWMD
320 N. Flower Street, Suite 400
Santa Ana, California 92703

Mr. Gary Hartnett
Air Pollution Control District
County of San Diego
9150 Chesapeake Drive
San Diego, California 92123-1096

Ms. Laura Hunter
Environmental Health Coalition
1717 Kettner Blvd., Suite 100
San Diego, CA 92101

Ms. Mary Roush
City of San Diego
Planning Department
Development and Environmental Planning
1222 First Avenue, MS 501
San Diego, California 92101

Ms. Lori Saldana
Sierra Club, San Diego Chapter
3820 Ray Street
San Diego, CA 92104-3623

Mr. Craig Nicolaisen
Rainbow Planning Group
1934 Rice Canyon Road
Fallbrook, CA 92028

Mr. Jon Rollin
Inactive Waste Site Management, County of San Diego
5469 Kearny Villa Road
San Diego, CA 92123

Ms. Theresa Morley
Navy Region Southwest Environmental, Code
N4512.TM
33000 Nixie Way, Bldg. 50, Suite 326
San Diego, CA 92147-5110

Mr. John Herrie
City of Oceanside, Engineering Department
300 North Hill Street
Oceanside, CA 92054

Mr. Tom Calhoun, Director
San Diego Unified School District
Office of the Director, Annex 2-101
4100 Normal Street
San Diego, CA 92103-2682

Dr. Harinder Grewal
1007 Los Alisos North
Fallbrook, CA 92028

Ms. Lisa Babcock
Division of Clean Water Programs
State Water Resources Control Board
Sacramento

Mr. Paul Manasjan
Solid Waste Local Enforcement Agency
City of San Diego
1222 First Avenue, MS501
San Diego, CA 92101-4155

Mr. Mubashar Ahmad
Waste Management Department
County of Riverside
1995 Market Street
Riverside, California 92501-1719

Mr. Steve Moise
County of Riverside
Local Enforcement Agency
P. O. Box 7600
Riverside, CA 92513

Mr. Gordon Shackelford
Lakeside Planning Group
P. O. Box 2040
Lakeside, CA 92040

Ex. 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 1 TO ORDER NO. 97-11

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR POST-CLOSURE MAINTENANCE OF
INACTIVE NONHAZARDOUS WASTE LANDFILLS
WITHIN THE SAN DIEGO REGION

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On April 9, 1997, this Regional Board adopted Order No. 97-11, *General Waste Discharge Requirements for Post-Closure Maintenance of Inactive Nonhazardous Waste Landfills Within the San Diego Region*. Order No. 97-11 established landfill maintenance requirements and water quality monitoring for landfills that ceased operation prior to 1984.

2. Order No. 97-11 lists two types of waste management units (WMUs) and owners of landfills and burn ash sites that are subject to general waste discharge requirements. During fiscal year 99/00, the Regional Board identified additional WMUs that need to be added to Order No. 97-11. This Addendum contains updated attachments of the newly identified owners of landfills subject to general waste discharge requirements.

3. Owners of landfill and/or burn ash sites that are subject to this Order, are responsible for the protection of usable waters from discharge of wastes, gases, and leachate, during the landfill maintenance period. This responsibility continues with subsequent change in reuse of the landfill for purposes other than open space.

4. Landfill cover at inactive landfills which ceased operation prior to 1984 may not be adequate to minimize percolation of liquids through wastes as described in Title 27, Section 20705.

5. The Rainbow Canyon Landfill is currently regulated by Order No. 89-101, *Waste Discharge Requirements for the Closure of Rainbow Canyon Waste Management Unit, RANPAC Engineering Corporation, Riverside County*. Order No. 89-101 established requirements for clean closure of a former burn dump. To date, the Regional Board has not received any indication that the clean closure of the burn ash will occur. In addition, the discharger has not paid annual fee for waste discharge requirements from 1993 to 1997. To ensure adequate maintenance is performed, the Rainbow Canyon Landfill would be more suitably regulated under Order No. 97-11.

Ex. 3

6. The Regional Board has received notification from the Navy that the Old Marine Corp. Recruit Depot landfill will transfer ownership to the San Diego Unified Port District (SDUPD). The Navy has completed a "Finding of Suitability for Early Transfer" (FOSET) to document the assessment and evaluation of the environmental condition of the property and to determine the property's suitability for deed transfer. The SDUPD's plan for the inactive landfill include various airport uses, principally as a vehicle parking and staging area for shuttles, taxis, and airport employees. The transfer of ownership is reflected in Attachment No. 1 to this Addendum.

7. Inactive landfills are existing facilities and as such are exempt from the provisions of the California Environmental Quality Act in accordance with Title 14, California Code of Regulations, Chapter 3, Article 19, Section 15301.

8. The Regional Board has considered all water resource related environmental factors associated with the discharge of waste associated with these inactive landfills.

9. The Regional Board has notified interested parties of its intent to amend landfill maintenance requirements for these inactive landfills.

10. The Regional Board, in a public meeting heard and considered all comments pertaining to landfill maintenance of these inactive landfills.

IT IS HEREBY ORDERED, That Order No. 97-11 be amended as follows:

1. Add the following as Prohibition B.6:

   B.6 The use of pressurized water lines overlying waste is prohibited unless the water lines are designed in accordance with Maintenance Specification C.17 .

2. Replace **C. MAINTENANCE SPECIFICATIONS** with the following:

   C. MAINTENANCE SPECIFICATIONS

   General Maintenance Requirements

   1. The discharger shall prepare a maintenance plan by January 1, 2001, which contains, but is not limited to, the following:

      a. The persons, companies, or agencies responsible for each aspect of landfill maintenance, along with their addresses and phone numbers.

Ex. 3

b. Location maps indicating property boundaries and the existing limits of waste, internal roads, and structures inside the property boundary.

c. A location map of the current monitoring and control systems including drainage and erosion control systems and landfill gas monitoring and control systems.

d. A description of the methods, procedures, schedules and processes that will be used to maintain, monitor and inspect the landfill.

2. The landfill maintenance period shall continue until the Regional Board determines that remaining wastes in all waste management units (WMUs) will not threaten water quality.

3. The discharger shall comply with all applicable requirements of Title 27, CCR, Subchapter 5, Article 2.

4. The landfilled areas shall be adequately protected from any washout, erosion of wastes or cover material. The surface drainage system shall be designed to adequately handle the rainfall from a 100-year 24 hour storm event.

5. The structural integrity and effectiveness of all containment structures and the existing cover shall be maintained as necessary to correct the effects of settlement or other adverse factors.

6. Vegetation used at the site shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the existing cover.

7. The migration of landfill gas from the site shall be controlled as necessary to ensure that landfill gases and gas condensate are not discharged to surface waters or ground waters. Condensate shall be collected and removed from the site except as defined in 27CCR Section 20090(e).

Erosion Control

8. Annually, prior to the anticipated rainy season but not later than **October 31**, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion, ponding, flooding, or to prevent surface drainage from contacting or percolating through wastes at the facility. In addition, maintenance, and repairs necessitated by changing site conditions can be made at any time.

Ex. 3

9. Silt fences, hay bales, and other measures shall be used to control surface water runoff from landfill areas where landfill cover have been placed, and from areas where landfill containment system construction is occurring.

10. All areas, including surface drainage courses, shall be maintained to minimize erosion. Landfill cover shall be maintained to minimize percolation of liquids through wastes.

Surface Drainage

11. Surface water runoff within the boundary of the landfill (i.e., precipitation that falls on the landfill cover) shall be collected by a system of berms, ditches, downchutes, swales and drainage channels, and shall be diverted off the landfill to either the detention basins or to the natural watercourses offsite.

12. Surface drainage from tributary areas and internal site drainage from surface and subsurface sources shall not contact or percolate through waste and shall either be contained onsite or be discharged in accordance with applicable storm water regulations.

13. Surface drainage from the landfill is subject to State Board Order No. 97-03-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001, "Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities".

14. Where flow concentrations result in erosive flow velocities, surface protection such as asphalt, concrete, riprap, silt fences or other erosion control material shall be used for protection of drainage conveyance features. Interim bench ditches shall be provided with erosion control material and riprap to control erosion where necessary.

15. Where high velocities occur at terminal ends of downchutes or where downchutes cross the landfill cover access roads, erosion control material shall be applied to exposed soil surfaces.

16. Energy dissipators shall be installed to control erosion at locations where relatively high erosive flow velocities are anticipated.

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Report Frequency	Report Period	Report Due
Semiannually	April – September	October 30
	October – March	April 30
Annually	April – March	April 30

Monitoring reports shall be submitted to:

California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124-1331

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on June 14, 2000.

JOHN H. ROBERTUS
Executive Officer

Ex.3

No.	Landfill Name	Operation period	Facility Type	Site Address	Owner/ Operator	Address
8	Old Marine Corp. Recruit Depot	1950 - 1971	Class II-2 landfill	Naval Training Center	San Diego Unified Port District	Mr. Rick Adcock, San Diego Unified Port District, P.O. Box 120488, San Diego, CA 92112
11	Bell Jr. High	1963 - 1966	Class II-2 landfill	620 S. Briarwood, San Diego, CA 92139	San Diego Unified School District	Mr. Dossantoes, San Diego Unified School District, Facilities Development Department, Office of the Director, Annex 2-101, 4100 Normal Street, San Diego, CA 92103-2682
12	Bradley Park	1948 - 1968	Class II-2 landfill	Intersection of Rancho Santa Fe Road and Linda Vista, San Marcos, CA 92069	City of San Marcos	Mr. Garth Koller City of San Marcos 1 Civic Center Drive San Marcos, CA 92069-2949
13	Paradise Hills Park	1966-1967	Class II-2 landfill	Intersection of S side of Paradise Valley Rd and W side Potamac Street, SD, 92139	City of San Diego	Mr. Robert Ferrier, Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123-1636

No.	Site Name	Operation period	Facility Type	Site Address	O. r/ Operator	Address
4	Cactus Park	1947 - 1959	burn dump	Ashwood Street (southesterly side of park), Lakeside CA, 92040	County of San Diego	Jon Rollin, Inactive Waste Site Management,County of San Diego, 5469 Kearny Villa Road, San Diego, CA 92123
5	Rainbow Canyon Landfill	1950's - 1974	burn dump	NW1/4, Section 30, T8s, R2W, San Bernardino Base & Meridian Coordinate System	Dr. Harinder Grewal	Dr. Harinder Grewal, 1007 Los Alisos North, Fallbrook, CA 92028

Ex. 3

CALIFORNIA WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ORDER NO. 97-11
GENERAL WASTE DISCHARGE REQUIREMENTS FOR POST-CLOSURE MAINTENANCE OF INACTIVE NONHAZARDOUS WASTE LANDFILLS WITHIN THE SAN DIEGO REGION

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

BACKGROUND

1. Nonhazardous solid waste landfills (which include former Class II-2 landfills, former Class III landfills and burn dumps) have been regulated by the State Water Resources Control Board and the Regional Boards since the 1960's. The applicable regulations governing landfills is California Code of Regulations, Title 23, Division 3, Chapter 15, **Discharges of Waste to Land** (23 CCR).

2. Pursuant to 23 CCR 2510 (g), landfills which are closed, abandoned, or inactive on the effective date of these regulations (November 1984) are not specifically required to be closed in accordance with Article 8 requirements. However, these landfills are subject to post-closure maintenance requirements in accordance with 23 CCR 2581(b) and (c).

3. Pursuant to 23 CCR Section 2510 (g), persons responsible for discharges at landfills which are closed, abandoned, or inactive may be required to develop and implement a monitoring program. If water quality impairment is found, such persons may be required to develop and implement a corrective action program based on the provisions of Chapter 15.

4. The Regional Board may require formal closure of a landfill in accordance with 23 CCR Articles 8 and 9 under the following conditions: a) when there is a proposed site development or land use change that jeopardizes the integrity of the existing cover; b) when water quality impairment is found, as part of a ground water monitoring program; or c) when nuisance conditions exist that warrant such activity.

5. Pursuant to California Water Code, Section 13263, this Regional Board issues waste discharge requirements for post-closure maintenance of inactive landfills. In accordance with Section 13263(d) the Regional Board may prescribe requirements although no Report of Waste Discharge has been filed.

6. California Water Code, Section 13273, required the State Water Resources Control Board to develop a ranked list of all known landfills throughout the state on the basis of the threat to water quality. Water Code Section 13273 required the operator of each solid waste disposal site on the ranked list to conduct and submit to the

Ex. 3

appropriate Regional Board the results of a solid waste water quality assessment test (SWAT report) to determine if the site is leaking hazardous waste.

7. SWAT reports indicated that landfills (which were inactive prior to November 1984) which contain significant quantities of decomposable waste have leaked hazardous waste to ground water. Volatile organic constituents in ground water near the inactive landfills may have occurred through landfill gas migration. These impacts to ground water could cause a long-term loss of a designated beneficial use. Because of this potential impact to ground water quality, leaking inactive landfills are defined in Title 23, CCR, Section 2200 as a category "1" threat to water quality. A facility's "complexity" ranking is based on the type of facility. For inactive landfills, the complexity ranking is category "B".

8. Attachment No. 1 to this Order contains a list of persons who own or operated the inactive landfills that contain significant quantities of decomposable waste. Attachment No. 1 to this Order may be updated, as necessary, when additional information warrants.

9. Landfills that do not contain significant quantities of decomposable waste such as those which were operated by open burning of refuse may also impact water quality. However, the residual waste material may contain soluble constituents which are leachable to waters of the state under acidic conditions. Potential water quality impacts from these landfills could result from erosion during the rainy season, if waste is exposed and is not contained onsite. Surface water quality objectives may be exceeded in cases of extreme erosion of these landfill surfaces. Landfills that do not contain significant quantities of decomposable waste are a category "3" threat to water quality because potential discharges could degrade water quality without violating water quality objectives or cause a minor impairment of designated beneficial uses. The "complexity" rating is a category "C" for discharges that must comply with best management practices such as erosion control measures.

10. Attachment No. 2 to this Order contains a list of persons who own or operated these burn dumps that do not contain significant quantities of decomposable waste subject to these general waste discharge requirements. Attachment No. 2 to this Order may be updated, as necessary, when additional information warrants.

11. The issuance of this Order establishing general waste discharge requirements is consistent with the goal to provide water resources protection, enhancement and restoration while balancing economic and environmental impacts as stated in the Strategic Plan of the State Water Resources Control Board and the Regional Boards.

12. The issuance of this Order may supersede existing Orders which were issued to landfills which are in post-closure maintenance.

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13. The adoption of general waste discharge requirements for inactive landfills for post-closure maintenance would assist in:

    a. Protecting the ground waters and surface waters of the state from pollution or contamination.

    b. Simplifying and expediting the application process for the discharger.

    c. Reducing Regional Board time expended on preparing and considering individual waste discharge requirements for each project.

Water Quality Control Plan

14. The **Water Quality Control Plan Report, San Diego Basin (9)** (hereinafter Basin Plan), was adopted by this Regional Board on September 8, 1994, and subsequently approved by the State Water Resources Control Board (State Board) on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the Regional Board and approved by the State Board. The Basin Plan designates beneficial uses and narrative and numerical water quality objectives, and prohibitions which are applicable to the discharges regulated under this Order.

CEQA and Other Legal References

15. Inactive landfills are existing facilities and as such are exempt from the provisions of the California Environmental Quality Act in accordance with Title 14, California Code of Regulations, Chapter 3, Article 19, Section 15301.

16. The Regional Board, in establishing the requirements contained herein, considered factors including, but not limited to the following:

    a. Past, present, and probable future beneficial uses of water.

    b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

    c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

    d. Economic considerations.

    e. The need for developing housing within the region.

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f. The need to develop and use recycled water.

g. Beneficial uses to be protected and water quality objectives reasonably required for that purpose.

h. Other waste discharges.

i. The need to prevent nuisance.

17. The Regional Board has considered all water resource related environmental factors associated with the discharge of waste associated with these inactive landfills.

18. The Regional Board has notified interested agencies and all know interested parties of its intent to issue post-closure maintenance requirements for these inactive landfills.

19. The Regional Board in a public meeting heard and considered all comments pertaining to post-closure maintenance of these inactive landfills.

IT IS HEREBY ORDERED, That each person identified in Attachment No. 1 or 2 to this Order (hereinafter discharger), in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. ELIGIBILITY

1. In order to add an inactive landfill to either Attachment 1 or 2 to this Order, the discharger shall submit a complete report of waste discharge (RWD) and an appropriate filing fee for each inactive landfill. The RWD shall include the following:

   a. Form 200, *Application for Facility Permit/Waste Discharge*, filled out in accordance with the instructions.

   b. A discussion of the landfill and waste characteristics including:

      - Identification of the period during which waste was disposed of at the site;

      - Description of landfill disposal methods, operation and maintenance activities;

      - Description of types and quantities of waste disposed of;

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- Identification of the total volume of waste disposed of at the site;

- Any closure or post-closure activities conducted at the landfill subsequent to ceasing operation; and

- Present and future land use of the inactive landfill.

c. Documentation of how the discharger will comply with all applicable requirements of this Order for the inactive landfills in Attachment No. 1 & 2 to this Order.

d. A topographical scale map showing the location, users and uses of all wells located within one mile of the inactive landfill.

e. Any other information pertinent to protection of water quality or public health and prevention of nuisance.

2. The discharger shall receive authorization from the Regional Board which states that it is appropriate to regulate the inactive landfill under general waste discharge requirements, and an individual permit is not required. The authorization letter shall specify the following:

a. Any modification to Monitoring and Reporting Program No. 97-11.

b. Any other conditions necessary to protect the beneficial uses of the receiving water.

3. It may be necessary for a discharger authorized under this Order to apply for and obtain an individual waste discharge requirement with more specific requirements. When an individual waste discharge requirements with specific requirements are issued to a discharger, the applicability of this general permit to the individual permittee shall be terminated on the effective date of the individual permit.

4. Notwithstanding the conditions specified above, individual cases may be brought to the Regional Board for consideration of waste discharge requirements when deemed appropriate by the Executive Officer.

B. PROHIBITIONS

1. Discharges of wastes to lands which have not been specifically described to the Regional Board and for which valid Waste Discharge Requirements are not in force

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are prohibited.

2. The discharge of waste shall not:

   a. Cause the occurrence of coliform or pathogenic organisms in waters pumped from the basin;
   b. Cause the occurrence of objectionable tastes and odors in waters pumped from the basin;
   c. Cause waters pumped from the basin to foam;
   d. Cause the presence of toxic materials in waters pumped from the basin;
   e. Cause the pH of waters pumped from the basin to fall below 6.0 or rise above 9.0;
   f. Cause this Regional Board's objectives for the ground or surface waters as established in the Basin Plan, to be exceeded; and
   g. Cause pollution, contamination or nuisance or adversely affect beneficial uses of the ground or surface waters as established in the Basin Plan.

3. Odors, vectors, and other nuisances of waste origin beyond the limits of the landfill site are prohibited.

4. The discharge of waste to surface drainage courses or to usable ground water is prohibited.

5. Basin Plan prohibitions shall not be violated.

C. POST-CLOSURE MAINTENANCE SPECIFICATIONS

1. Annually, prior to the anticipated rainy season but not later than **October 31**, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion, ponding, flooding, or to prevent surface drainage from contacting or percolating through wastes at the facility.

2. The landfilled areas shall be adequately protected from any washout, erosion of wastes or cover material. The surface drainage system shall be designed to adequately handle the rainfall from a 100-year 24 hour storm event.

3. Surface drainage from the landfill is subject to State Board Order No. 91-13-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001, "Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities".

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4. The structural integrity and effectiveness of all containment structures and the existing cover shall be maintained as necessary to correct the effects of settlement or other adverse factors.

5. Vegetation used at the site shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the existing cover. Landscaping overlaying the landfill portion of the site shall be shallow rooted native grasses and shrubs suited for inland valleys of Southern California.

6. The migration of landfill gas from the site shall be controlled as necessary to ensure that landfill gases and gas condensate are not discharged to surface waters or ground waters. Condensate shall be collected and removed from the site except as defined in 23CCR Section 2511(e).

D. PROVISIONS

1. GENERAL PROVISION

Neither the treatment nor the discharge of waste shall create a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code.

2. DUTY TO COMPLY

The discharger shall comply with all conditions of this Order and any additional conditions prescribed by the Regional Board in addenda thereto. Any noncompliance with this Order constitutes a violation of the California Water Code and is grounds for: (a) enforcement action; (b) termination, revocation and reissuance, or modification of this Order; or (c) denial of a Report of Waste Discharge in application for new or revised Waste Discharge Requirements.

3. COMPLIANCE

In an enforcement action, it shall not be a defense for the discharger to say, it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order.

4. CORRECTIVE ACTION

The discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

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5. PROPER OPERATION AND MAINTENANCE

The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate laboratory and process controls including appropriate quality assurance procedures.

6. PERMIT REVISION

This Order may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this Order;

b. Obtaining this Order by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the discharger for the modification, revocation and reissuance, or termination of this Order, or notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

7. CHANGE IN OWNERSHIP

This Order is not transferable to any person except after notice to the Executive Officer. The Regional Board may require modification or revocation and reissuance of this Order to, change the name of the discharger and incorporate such other requirements as may be necessary under the California Water Code. The discharger shall submit notice of any proposed transfer of this Order's responsibility and coverage as described under Reporting Requirement E.3.

8. PROPERTY RIGHTS

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from liability under federal, state, or local laws, nor create a vested right for the owner and operator to continue the regulated activity.

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9. ENTRY AND INSPECTION

The discharger shall allow the Regional Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law to:

a. Enter upon the discharger premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location.

10. PERMIT REPOSITORY

A copy of this Order shall be maintained at the local offices of the discharger and shall be available to operating personnel at all times.

11. SEVERABILITY

The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.

12. EFFECTIVE DATE

This Order becomes effective on the date of adoption by the Regional Board. This Order supersedes Order Nos. 85-78 and 87-50.

E. REPORTING REQUIREMENTS

1. CHANGE IN DISCHARGE

The discharger shall file the following reports in accordance with the following schedule:

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a. Report of Waste Discharge

The discharger shall file a new Report of Waste Discharge at least 120 days prior to the following:

1) Significant change in post-closure maintenance activities which would significantly alter existing drainage patterns and slope configurations, or pose a potential threat to the integrity of the site;
2) Change in land use other than as described in the findings of this Order;
3) Significant change in disposal area, e.g. excavation and relocation of waste on site; or
4) Any planned change in the regulated facility or activity which may result in noncompliance with this Order.

b. Workplan

The discharger shall submit a workplan at least 30 days prior to any maintenance activities that could alter existing surface drainage patterns or change existing slope configurations. These activities may include, but not be limited to, significant grading activities, the importation of fill material, the design and installation of soil borings, ground water monitoring wells and other devices for site investigation purposes.

c. Written Notification

The discharger shall provide written notification at least 2 working days prior to any maintenance activities that are minor and/or routine in nature, do not add a significant amount of water, do not inhibit drainage, have limited potential for impacts to beneficial use of water, and will not interfere with future routine maintenance. These activities may include, but not be limited to:

1) routine maintenance grading and dust control;
2) landscaping with minimal/no water application;
3) gas surveys with temporary probes; or
4) replacement/removal of gas collection wells.

2. GENERAL REPORTING REQUIREMENT

The discharger shall furnish to the Executive Officer, within a reasonable time, any information which the Executive Officer may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The discharger shall also furnish to the Executive Officer upon request, copies of records required to be kept by this Order.

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3. CHANGE IN OWNERSHIP

The discharger shall notify the Executive Officer, in writing, at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage between the current owner and new owner for construction, operation, closure, or post-closure maintenance of a landfill. This agreement shall include an acknowledgement that the existing owner is liable for violations up to the transfer date and that the new owner is liable from the transfer date on. The agreement shall include an acknowledgement that the new owners shall accept responsibility for compliance with this Order which includes the post-closure maintenance of the landfill.

4. INCOMPLETE REPORTS

Where the discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Board, it shall promptly submit such facts or information.

5. ENDANGERMENT OF HEALTH AND ENVIRONMENT

The discharger shall report any noncompliance which may endanger health or the environment. Any such information shall be provided verbally to the Executive Officer within 24 hours from the time the owner becomes aware of the circumstances. A written submission shall also be provided within five days of the time the owner becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate, or prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

6. SLOPE FAILURE

The discharger shall notify the Executive Officer immediately of any slope failure occurring in a waste management unit. Any failure which threatens the integrity of the containment features or the waste management unit shall be promptly corrected after approval of the method and schedule by the Executive Officer.

7. LANDFILL GAS

The discharger shall operate and maintain a landfill gas migration control and detection system as required by the Air Pollution Control District (APCD) and the Local Enforcement Agency (LEA).

Ex. 3

8. MONITORING AND REPORTING PROGRAM

The discharger shall comply with the attached Monitoring and Reporting Program No. 97-11. Monitoring results shall be reported at the intervals specified in Monitoring and Reporting Program No. 97-11.

9. REPORT DECLARATION

All applications, reports, or information submitted to the Executive Officer shall be signed and certified as follows:

a. The Report of Waste Discharge shall be signed as follows:

1. **For a corporation** - by a principal executive officer of at least the level of vice-president.

2. **For a partnership or sole proprietorship** - by a general partner or the proprietor, respectively.

3. **For a municipality, state, federal or other public agency** - by either a principal executive officer or ranking elected official.

4. **For a military installation** - by the base commander or the person with overall responsibility for environmental matters in that branch of the military.

b. All other reports required by this Order and other information required by the Executive Officer shall be signed by a person designated in paragraph (a) of this provision, or by a duly authorized representative of that person. An individual is a duly authorized representative only if:

1. The authorization is made in writing by a person described in paragraph (a) of this provision;

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity; and

3. The written authorization is submitted to the Executive Officer.

c. Any person signing a document under this Section shall make the following certification:

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" I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

10. REGIONAL BOARD ADDRESS

The discharger shall submit reports required under this Order and other information requested by the Executive Officer, to:

California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd., Suite A
San Diego, California 92124-1331

F. Notifications

1. U.S. EPA REVIEW

These requirements have not been officially reviewed by the United States Environmental Protection Agency and are not issued pursuant to Section 402 of the Clean Water Act.

2. CIVIL MONETARY REMEDIES

The California Water Code provides that any person who intentionally or negligently violates any Waste Discharge Requirements issued, reissued, or amended by this Regional Board is subject to administrative civil liability of up to 10 dollars per gallon of waste discharged, or if no discharge occurs, up to 1000 dollars per day of violation. The Superior Court may impose civil liability of up to 10,000 dollars per day of violation or, if a cleanup and abatement order has been issued, up to 15,000 dollars per day of violation.

3. PENALTIES FOR INVESTIGATION, MONITORING OR INSPECTION VIOLATIONS

The California Water Code provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or falsifying any information provided in the monitoring reports is guilty of a misdemeanor and may be subject to administrative civil liability of up to 1000 dollars per day of violation.

Ex. 3

4. OTHER CLOSURE REGULATIONS

Closure of this waste management unit may be subject to regulations of the California Integrated Management Board and the San Diego County Air Pollution Control District.

5. CHAPTER 15 DEFINITIONS

Definitions of terms used in this Order shall be as set forth in California Code of Regulations Chapter 15.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on April 9, 1997.

JOHN H. ROBERTUS
Executive Officer

Ex. 3

CALIFORNIA WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

MONITORING AND REPORTING PROGRAM NO. 97-11 FOR POST-CLOSURE MAINTENANCE OF INACTIVE NONHAZARDOUS WASTE LANDFILLS WITHIN THE SAN DIEGO REGION

A. MONITORING PROVISIONS

1. All analyses shall be performed in a laboratory certified to perform such analyses by the California Department of Health Services or a laboratory approved by the Executive Officer. Specific methods of analysis must be identified. If methods other than U. S. EPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Executive Officer prior to use. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board.

2. If the discharger monitors any pollutants more frequently than required by this Order, using the most recent version of Standard U. S. EPA Methods, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the discharger's monitoring report. The increased frequency of monitoring shall also be reported.

3. The discharger shall report all instances of noncompliance not reported under Reporting Requirement E.5 of this Order at the time monitoring reports are submitted. The reports shall contain the information listed in Reporting Requirement E.5.

4. Sample collection, storage, and analysis shall be performed according to the most recent version of Standard U. S. EPA Methods, and in accordance with an approved sampling and analysis plan.

5. All monitoring instruments and equipment which are used by the discharger to fulfill the prescribed monitoring program shall be properly calibrated and maintained as necessary to ensure their continued accuracy.

6. The discharger shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this Order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer.

Ex. 3

7. Records of monitoring information shall include:

   a. The date, identity of sample, Monitoring Point from which it was taken, and time of sampling or measurement;

   b. The individual(s) who performed the sampling or measurements;

   c. Date and time that analyses were started and completed, and the name of the personnel performing each analysis;

   d. The analytical techniques or method used, including method of preserving the sample and the identity and volumes of reagents used;

   e. Calculation of results; and

   f. Results of analyses, and the MDL for each parameter.

   g. Laboratory quality assurance results (e.g. percent recovery, response factor)

8. The monitoring reports shall be signed by an authorized person as required by Reporting Requirement E.9.

B. SITE MAINTENANCE

1. The discharger shall perform quarterly inspections of the landfill site and report the results **semi-annually.** The report shall contain information on the sites condition and a discussion of any significant findings with regard to:

   a) General site condition;
   b) Surface cover and slope;
   c) Drainage facilities;
   d) Ground water and vadose zone monitoring networks;
   c) Methane gas control system;
   f) Observation of seepage from the site; and
   g) Maintenance activities at the site.

C. GROUND WATER DETECTION MONITORING PROGRAM

1. The ground water detection monitoring program contained in this section may be waived by the Executive Officer for: 1) inactive landfills that do not contain significant quantities of decomposable waste; or 2) landfills which have demonstrated through either completion of a SWAT questionnaire or a SWAT report that has been no discharge of hazardous substances to ground water.

Ex. 3

2. The discharger shall establish and maintain ground water wells at the landfill site to be used as part of the water quality monitoring program.

3. Prior to pumping monitoring wells for sampling, the static water level shall be measured in each well.

4. Prior to sampling monitoring wells, the presence of a floating immiscible layer in all wells shall be determined at the beginning of each sampling event. This shall be done prior to any other activity which may disturb the surface of the water in a well, e.g. water level measurements. If an immiscible layer is found, the Regional Board shall be notified within 24 hours.

5. The discharger shall submit a compliance evaluation summary of the ground water data obtained. The summary shall contain a table which includes the following information:

   a. Monitoring parameters;
   b. Detection limit of monitoring equipment;
   c. Measured concentrations found in the current sampling event

6. Water samples from the compliance points shall be collected, analyzed, and reported as shown in C.8 below.

7. For each monitored ground water body, the discharger shall measure the water level in each well and determine ground water flow rate and direction at least semi-annually, including the times of expected highest and lowest elevations of the water level for the respective ground water body. Ground water elevations for all background and downgradient wells for a given ground water body shall be measured within a period of time short enough to avoid temporal variations in ground water flow which could preclude accurate determination of ground water flow rate and direction.

8. The discharger shall submit a list of constituents to be monitored within 60 days of receipt of this Order. Ground water monitoring shall be conducted semiannually and monitoring results shall be submitted in accordance with Section E of this Monitoring and Reporting Program.

D. REPORTS TO BE FILED WITH THE BOARD

All reports shall be submitted no later than one month following the end of their respective Reporting Period. The reports shall be comprised of at least the following in addition to the specific contents listed for each respective report type:

Ex. 3

1. **Transmittal Letter**

A letter summarizing the essential points shall be submitted with each report. The transmittal letter shall include:

a. A discussion of any requirement violations found since the last such report was submitted and shall describe actions taken or planned for correcting the violations. If the discharger has previously submitted a detailed time schedule for correcting said requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter; and

b. A statement certifying that, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct. This statement shall be signed by an individual that meets the requirements contained in Reporting Requirement E.9.

2. **Semi-Annual Report**

The semi-annual report shall contain, but not be limited to the following:

a. Site maintenance outlined in section B of this Monitoring and Reporting Program.
b. Groundwater analysis and flow rate outlined in section C of this Monitoring and Reporting Program.
c. A map (or copy of an aerial photograph) showing the locations of observation stations, Monitoring Points, and Background Monitoring Points.

3. **Annual Summary Report**

The discharger shall submit an annual report to the Regional Board covering the previous monitoring year. The annual Reporting Period ends March 31.

a. For each monitoring point, submit in graphical format the laboratory analytical data for all samples taken within at least the previous four calendar years. Each graph shall plot the concentration of the constituent over time for a given monitoring point, at a scale appropriate to show trends or variations in water quality.

b. A comprehensive discussion of the compliance record, result of any corrective actions taken or planned which may be needed to bring the discharger into full compliance with the waste discharge requirements.

Ex. 3

No.	Landfill Name	WDID No.	Operation period	Facility Type	Site Address	Owner/ Operator	Address
1	Arizona/Balboa	6-0003.02	1935-36, 1952-74	Class II-2 landfill	2781 Pershing Drive, San Diego, CA 92101	City of San Diego	Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123-1636
2	Chollas, South	6-0007.02	1951-81	Class II-2 landfill	2781 Camito Chollas, San Diego, CA 92105	City of San Diego	Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123-1636
3	Encinitas	6-0017.02	1967-77	Class II-2 landfill	2099 Encinitas Blvd., Encinitas CA 92024	County of San Diego	Joseph Minner, Deputy Director, Dept of Public Works, County of San Diego, 5555 Overland Ave., MS 0383, San Diego, CA 92123-1295
4	Gillespie		1940-64	Class II-2 landfill	1706 Cuyamaca St., El Cajon, CA 92020	County of San Diego	Joseph Minner, Deputy Director, Dept of Public Works, County of San Diego, 5555 Overland Ave., MS 0383, San Diego, CA 92123-1295
5	Golf Course	6-0020.02	1940s-1965	Class II-2 landfill	Naval Air Station, North Island	US Department of the Navy	Commanding Officer, Naval Air Station, Environmental Compliance Division, P. O. Box 357040, San Diego, CA 92135-7040
6	Sweetwater I Hillsborough	6-1090.02	1948-62	Class II-2 landfill	Manzana Way, San Diego, CA 92139	County of San Diego	Joseph Minner, Deputy Director, Dept of Public Works, County of San Diego, 5555 Overland Ave., MS 0383, San Diego, CA 92123-1295
7	Maxson Street	6-0023.02	1960-69	Class II-2 landfill	300 North Coast Highway, Oceanside, CA 92054	City of Oceanside	James Stillman, City of Oceanside, Division Manager, Engineering Department, 300 North Hill Street, Oceanside, CA 92054
8	Old Marine Corp Recruit Depot	6-0035.02	1950-71	Class II-2 landfill	Naval Training Center	US Marine Corps	Commanding Officer, Attn: Keith Forman, Interim BEC, Naval Training Center, 33502 Decatur Road, Suite 120, San Diego, CA 92122-1449
9	SERE Camp	6-0047.02	1978 - 1982	Class II-2 landfill	SERE Camp, Warner Springs	US Department of the Navy	Commanding Officer, Naval Air Station, Environmental Compliance Division, P. O. Box 357040, San Diego, CA 92135-7040
10	Mission Bay	6-378.02	1952 - 1959	Class II-2 landfill	Mission Bay, Sea World Drive, San Diego, CA 92109	City of San Diego	Environmental Services Department, 9601 Ridgehaven Court, Suite 310, San Diego, CA 92123-1636

Ex 3

that contain insignificant quantities of decomposable waste
Ceased operations by November 1984

No.	Site Name	WDID No.	Operation period	Facility Type	Site Address	Owner/ Operator	Address
1	Admiral Baker		1965-late 70s	solid waste landfill	Admiral Baker golf course	Dept of the Navy	Department of the Navy, Commanding Officer, Naval Station San Diego, 3395 Sturevant St., Suite 6, San Diego, CA 92136-5071
2	Old Spanish Bight	6-0030.02	1917-40s	burn dump	Naval Air Station, North Island	US Department of the Navy	Commanding Officer, Naval Air Station, Environmental Compliance Division, P. O. Box 357040, San Diego, CA 92135-7040
3	San Ysidro		1947-1957	burn dump	S. Otay Mesa Rd and E. of Interstate 805	County of San Diego	Joseph Minner, Deputy Director, Dept of Public Works, County of San Diego, 5555 Overland Ave., MS 0383, San Diego, CA 92123-1294

8.3

c. A written summary of the monitoring results and monitoring system(s), indicating any changes made or observed since the previous annual report.

d. A topographic map at appropriate scale, showing the direction of ground water flow at the landfill site.

E. REPORTING

Monitoring reports shall be submitted to the Executive Officer in accordance with the following schedule:

Report Frequency	Report Period	Report Due
Semiannually	April - September	30 Days after the reporting period.
Annually	April - March	

Monitoring reports shall be submitted to:

California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124-1331

Ordered by _____
JOHN H. ROBERTUS
Executive Officer
April 9, 1997

Ex. 3

STATE OF CALIFORNIA – THE RESOURCES AGENCY

GRAY DAVIS, Governor

CALIFORNIA COASTAL COMMISSION
SAN DIEGO AREA
7575 METROPOLITAN DRIVE, SUITE 103
SAN DIEGO, CA 92108-4402
(619) 767-2370

Mon 9a

Filed:	May 10, 2002
49th Day:	June 28, 2002
180th Day:	November 6, 2002
Staff:	EL-SD
Staff Report:	August 19, 2002
Hearing Date:	September 9-13, 2002

SEE SUBSEQUENT PAGE 14
FOR COMMISSION ACTION

REGULAR CALENDAR
STAFF REPORT AND PRELIMINARY RECOMMENDATION

Application No.: 6-01-129

Applicant: SeaWorld Adventure Park Agent: Patrick Owen

Description: Construction of a splash down water ride, consisting of three towers (95, 89 and 83 feet high), interior and exterior sets with water effects, a 130,000 gallon exhibit tank for up to ten Commerson Dolphins, a gift shop, snack stand, restrooms, and several accessory structures, located on approximately 5.5 acres along and within the southern border of the enclosed theme park, east of the visitor entrance and adjacent to the main parking lot.

Site: 500 SeaWorld Drive, Mission Bay Park, San Diego, San Diego County. APN 760-037-01

Substantive File Documents: Certified Mission Bay Park Precise Plan; SeaWorld Master Plan Update; Rollercoaster Noise Surveys, dated 4/23/01; Final EIR for SeaWorld Master Plan Update, dated 5/31/2001

STAFF NOTES:

Summary of Staff's Preliminary Recommendation: This application was originally scheduled on the Commission's July 9, 2002 meeting agenda. However, a different SeaWorld matter was scheduled for City of San Diego City Council action the same day, and the applicant requested this matter be postponed to avoid a conflict. Staff is recommending approval with conditions which address visual resource and public access concerns. Specifically, the conditions require submittal of final plans, including landscaping plans, identify appropriate staging areas and construction windows, and restrict the color of those portions of the ride visible from outside SeaWorld.

I. PRELIMINARY STAFF RECOMMENDATION:

The staff recommends the Commission adopt the following resolution:

Exhibit 4
Original Staff Report

MOTION: ***I move that the Commission approve Coastal Development Permit No. 6-01-129 pursuant to the staff recommendation.***

STAFF RECOMMENDATION OF APPROVAL:

Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

RESOLUTION TO APPROVE THE PERMIT:

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act and will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

II. Standard Conditions.

See attached page.

III. Special Conditions.

The permit is subject to the following conditions:

1. Final Plans. PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicants shall submit to the Executive Director for review and written approval, final site plans, building plans and elevations approved by the City of San Diego, which shall clearly delineate the ride in its approved location, and otherwise be in substantial conformance with the preliminary plans submitted by the applicant, titled *"2003 Expansion, SeaWorld San Diego,"* dated August 10, 2001

The permittees shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without an amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

2. Revised Landscaping Plan. PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall submit a detailed landscape plan for the long-term plantings that indicates the type, size, extent and location of all plant materials, the proposed irrigation system and other landscape features. Said plan shall be in substantial conformance with the Planting Plan (sheet L1.2) dated 8/10/01, except as revised below, and shall be submitted to the Executive Director for review and written approval and include the following:

(a) Only drought tolerant native plant materials shall be utilized.

(b) Trees shall reach at least 60 feet at maturity.

(c) Existing mature vegetation along the theme park's eastern and southern perimeters shall be retained and maintained in good growing condition.

The permittees shall undertake development in accordance with the approved final landscaping plan. Any proposed changes to the approved landscaping plans shall be reported to the Executive Director. No changes to the approved landscaping plans shall occur without an amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

3. Construction Access/Staging Area/Project Timing. PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall submit plans showing all locations which will be used as staging and storage areas for materials and equipment during the construction phase of this project. The staging/storage plan shall be subject to review and written approval of the Executive Director. Use of public walkways and public parking areas, including on-street parking for the interim storage of materials and equipment shall not be permitted. If areas outside the leasehold are designated as staging/storage areas, or if construction will require any restrictions on traffic along Sea World Drive (such as lane closures), the plan shall also indicate that no work may occur during the summer months (Memorial Day weekend to Labor Day) of any year.

4. Coloration of Structure. To minimize visibility from outside SeaWorld, those portions of the approved splash down ride visible from outside SeaWorld shall not be finished in any solid white or bright color.

IV. Findings and Declarations.

The Commission finds and declares as follows:

1. Detailed Project Description. The applicant, SeaWorld, is proposing to add a new attraction to the existing theme park. This would consist of a splash down water ride themed as the Lost City of Atlantis, which is proposed as a multi-structure, and multi-level, complex. The proposed primary structures include one building with three towers (83, 89 and 95 feet in height), interior and exterior sets with water effects, and a 130,000

gallon exhibit tank for up to ten Commerson Dolphins. Proposed accessory structures include a gift shop, snack stand, restrooms, and various operation and maintenance structures. The proposed ride would be located on approximately 5.5 acres along and within the southern border of the enclosed theme park, east of the visitor entrance and adjacent to the main parking lot.

This is the first application for development under the new SeaWorld Master Plan Update, which the Commission voted to certify in February, 2002. The new master plan addresses build-out of SeaWorld over the next 15-20 years, and is divided into Tier 1, Tier 2 and Special Projects. The splash down ride is a Tier 1 project, and has been described in detail in the master plan. An EIR was prepared, circulated for public review and approved by the City of San Diego for the master plan, which looked at the overall plan but also analyzed potential impacts and mitigation requirements for the identified Tier 1 projects. The issues addressed with regard to the splash down ride are visual resources, public access, and water quality.

SeaWorld is located within Mission Bay Park in the City of San Diego. It is situated adjacent to Mission Bay and is surrounded largely by City parklands consisting of grassy, open areas. Mission Bay Park is an area of deferred certification, where the Commission retains jurisdiction and Chapter 3 policies of the Coastal Act are the standard of review, with the certified master plan used as guidance.

2. Visual Impacts. Section 30251 of the Coastal Act addresses visual resources, and states, in part:

> The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas....

Mission Bay Park is recognized nationally as a public resource providing a wide variety of passive and active recreational opportunities in a unique, visually-pleasing setting of rolling grassy areas, sandy beach and open water. Commercial leaseholds, including SeaWorld, are scattered throughout the park and include high-rise structures at four hotel sites, as well as the observation tower and gondola ride at SeaWorld. These few structures all predate the Coastal Act and the City's coastal zone height initiative which established a limit of 30 feet. No permanent structural improvements exceeding 30 feet in height have been approved anywhere in Mission Bay Park since passage of the Coastal Act and the City height initiative.

In 1998, SeaWorld secured passage of a new height initiative, exempting itself from the 30-foot limit. Following this, SeaWorld developed a detailed master plan that established development sites and design criteria for future buildout of the park, and redevelopment of existing areas. The initiative made it clear that heights exceeding the 30-foot limit

could be proposed within the SeaWorld leasehold, but the City Council and Coastal Commission would decide whether or not to approve the specific proposals. The currently developed portions of SeaWorld are heavily landscaped with a variety of mature trees, shrubs and groundcovers. Many existing trees are 60-80 feet tall and effectively screen the interior of the park from views from outside SeaWorld. In addition, the existing landforms and development in this area obscure any view of Mission Bay across the historic leasehold itself. Therefore, some taller elements in this area may be found consistent with Section 30251, depending on their exact location and design.

The appropriate height of any proposed structure must be thoroughly analyzed, taking into consideration the specific design details, siting, scale and bulk of the proposed development, the nature of surrounding development, and the potential for cumulative impacts from additional future development. The master plan, as modified by the Commission, identified a specific site for the proposed splash down ride within the developed area of the park close by the main parking lot. The proposed project site is the one the Commission approved in the master plan.

All of Mission Bay Park is a highly scenic public recreational resource, such that protection and enhancement of visual amenities is a critical concern in any proposed development in the park. The proposed ride is located within, but along the perimeter of, the existing enclosed Sea World theme park, adjacent to the main parking lot, but separated from it by a fence and existing landscaping. As the proposed ride is of the roller coaster variety, much of it will be higher than 30 feet, the typical height limit for the City of San Diego's coastal zone. It will occupy most of the delineated 5.5 acre site, but is not fully enclosed. Therefore, there will still be some views through/across the specific site, although such views are limited to persons already in the theme park. There is no existing bay view in this location.

Several separate structures are proposed to house the various elements of the ride and accessory facilities. The one proposed structure exceeding 30 feet in height houses the three ride towers necessary to create the ride experience: a lift tower, a drop tower and a stair tower, connected to each other by segments of track and portions of the building. The three towers are 95, 83 and 89 feet tall respectively, with approximate diameters of 50 feet, 36 feet and 24 feet. Due to the existing mature vegetation throughout much of the developed park, existing buildings 30 feet or less in height cannot be readily seen from outside the park.

The proposed structures which exceed 30 feet will be visible from some vantage points within and outside the SeaWorld leasehold; however, the Commission's primary concern with respect to view preservation, is to assure that views currently available to the general public recreating at Mission Bay Park are not obscured or significantly degraded. The public recreational amenities at South Shores Park are located immediately east of the SeaWorld leasehold, but approximately 2,000 feet distant from the proposed ride location. Across Pacific Passage to the north lies Fiesta Island. Along with South Shores, this is the last remaining large piece of undeveloped parkland designated for

public recreational uses. Like South Shores, anticipated improvements include grassy picnic areas, open play areas, restrooms and parking lots. These two areas are the closest to the SeaWorld leasehold, and thus most likely to be affected by development within the theme park.

The applicant has submitted computer generated pictures (see Exhibit A) to show the views from a number of locations, including South Shores and Fiesta Island. From both locations, the splash down ride will be visible; however, in its proposed location, there is a significant amount of intervening development, mature vegetation, and space to soften the views to the point where the structures will not be a domineering or prominent presence. Due to the roadside berm, which is densely vegetated to screen the parking lots, and the considerable distance across the parking lots (approximately 800-900 feet), the ride will not be readily discernable from Sea World Drive, based on the computer simulation. A couple photos were taken from more distant areas within Mission Bay Park. These demonstrate that the ride will appear as only a background object from both vantage points, as well as from more distant areas such as I-5, I-8, and the Presidio.

The applicant has submitted a conceptual landscaping plan for the splashdown ride site. This plan meets the specific design criteria identified in the certified SeaWorld Master Plan Update for this facility, which includes screening vegetation (trees) that will attain 60 feet in height at maturity. However, some of the species chosen are not native plants. Special Condition #2 requires submittal of a final, revised landscaping plan, requiring use of only drought-tolerant native vegetation and that selected species must meet the same height and screening criteria as contained in the Master Plan Update. Additionally, the condition requires retention and maintenance of all the existing mature trees/landscaping which provide a visual screen of the proposed ride structure from views from the land and water areas of Mission Bay Park and the surrounding communities.

In summary, the applicant is proposing the splash down ride in an appropriate location, consistent with the SeaWorld Master Plan that the Commission voted to certify. It's visibility from outside SeaWorld will be primarily limited to the three towers, it will be quite distant from public viewing areas, and it will blend in with surrounding mature vegetation. As proposed, the structures are colored in various hues of beige, terra cotta, green and blue. Special Condition #4 provides that the portions of the attraction visible from outside SeaWorld not be finished in any white or bright solid color. Special Condition #2 requires submittal of a final landscaping plan, requiring use of only drought-tolerant native vegetation which provides effective screening of the structures. Therefore, as conditioned, the Commission finds the proposed new attraction will be consistent with Section 30251 of the Act.

3. Public Access/Parking. The following Coastal Act policies are most pertinent to the proposed development, and state, in part:

Section 30211

Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

Section 30212

(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where:

(1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources,

(2) adequate access exists nearby.

Section 30604(c)

(c) Every coastal development permit issued for any development between the nearest public road and the sea or the shoreline of any body of water located within the coastal zone shall include a specific finding that the development is in conformity with the public access and public recreation policies of Chapter 3 (commencing with Section 30200).

Section 30252

The location and amount of new development should maintain and enhance public access to the coast by...(4) providing adequate parking facilities or providing substitute means of serving the development with public transportation, [and] (5) assuring the potential for public transit for high intensity uses....

SeaWorld is a private commercial leasehold within Mission Bay Park, a public park built primarily on tidelands granted to the City of San Diego. The site is located between the first coastal roadway and the bay. Although public lateral access is available along most of the Mission Bay shoreline, there is no public access through the fenced SeaWorld facilities, which extend to or beyond the waterline in places. Pedestrian and bicycle traffic can cross through the parking areas and rejoin the bayside pathway on either side of the leasehold. Vertical access to the shoreline is available both east and west of the Sea World leasehold.

The certified Mission Bay Park Master Plan cites a complete pedestrian access pathway around the bay as a future goal. In its recent action to certify the SeaWorld Master Plan, the Commission determined that additional pedestrian or bicycle access through the SeaWorld leasehold was not required to mitigate for the detailed Tier 1 projects identified in the plan, although additional access may be required for some or all of the Tier 2 projects in the future, as these are only identified as potential redevelopment sites. The

proposed splash down ride is one of the five Tier 1 projects proposed in the SeaWorld Master Plan as approved by the City and the Coastal Commission.

The Master Plan requires the widening and improvement of the existing bicycle/pedestrian path which currently runs around the inland perimeter of the SeaWorld leasehold. As approved by the City Council, the plan requires widening the existing 10-foot wide paved pathway, which follows SeaWorld Drive and Perez Cove Way for the most part, to 17 feet of path with a four to ten-foot landscape strip separating bicycle and foot traffic wherever possible. This would bring the path into compliance with current Mission Bay Park standards. In addition, the plan requires clear and adequate signage identifying the path as a public amenity.

Another public access benefit gained through the City's approval of the Master Plan is the off-site improvement of some of the missing segments of the existing shoreline access path around Mission Bay. These improvements total approximately 4,700 linear feet of 10-foot wide pathway, located between SeaWorld and the Fiesta Island causeway, where the current path is discontinuous in places. As approved by the City, this improvement is required to be in place by the end of 2002.

In its review of the SeaWorld Master Plan Update, the Commission expressed concerns regarding the direct loss of public parkland, failure to provide adequate shoreline setbacks for public access and the need to prioritize public recreational improvements over commercial development and leasehold expansion within Mission Bay Park. The Commission suggested changes to the plan policies to address implementation measures and funding mechanisms to assure completion of identified regional park improvements on South Shores and Fiesta Island concurrent with expansion of the SeaWorld leasehold or any other expanded commercial development in Mission Bay Park. Such private commercial development has a cumulative impact on traffic and circulation within the park and occupies land area otherwise available for lower cost visitor and recreational facilities which are high priority uses under the Coastal Act.

The Commission's suggested modification to the policy language indicates that completion of the planned public improvements within South Shores and Fiesta Island must be given a higher priority. The intent of the suggested language is to assure that significant commercial development in Mission Bay Park only proceeds commensurate with equitable public improvements identified in the plan.

With regard to the SeaWorld leasehold, the Commission's suggested modifications relating to provision of public recreational improvements would affect any development proposed on the 16.5 acre expansion area, i.e. the Special Event Center and the parking above the 10 acre landfill. The suggested modifications include a public access improvement, the waterfront promenade on South Shores Park which, if constructed by SeaWorld, would serve to offset in part the ongoing access constraints on lower cost visitor and recreational facilities in Mission Bay Park, which will be exacerbated by the proposed Tier 1 projects, and would allow all Tier 1 development to move forward.

There is an existing asphalt path from SeaWorld to the Fiesta Island Causeway, utilized by both bikers and pedestrians, which already provides access inland from the water's edge. Support facilities such as landscaping, shade structures, picnic tables, benches, trash cans, etc. are the type of public improvements lacking in the area.
The Commission found completion of the waterfront promenade would be an important first step by the City and SeaWorld toward completion of South Shores Park. The Commission found construction of the waterfront promenade will offset the impacts to public access associated with expansion of the SeaWorld leasehold in an area otherwise available to provide lower cost visitor and recreational facilities and will assure completion of a significant component of the planned South Shores park development commensurate with Tier 1 expansion plans.

Therefore, the Commission found these modifications are the minimum necessary to respond to known public needs, especially the need for additional low-cost public improvements. Areas of Mission Bay Park, in particular South Shores and Fiesta Island, are currently underutilized because they lack basic infrastructure, such as electricity, water, and sewer improvements, as well as conveniences like restrooms, picnic tables, benches, etc. As other Tier 1 developments within the 16 acre expansion area come forward, assurance of completion of these South Shore public improvements should accompany requests for coastal development permits. The applicant has indicated it is currently preparing a permit application for the Tier 1 access improvements and it should be coming before the Commission this fall. The other Tier 1 projects, which were all conceptually endorsed in the master plan, include educational facilities, front gate renovations and an enlarged and relocated special events center.

In conclusion, the proposed ride will have no effect on current public access patterns in this part of Mission Bay Park, since it is located within the already developed and enclosed portion of SeaWorld. Although the location originally proposed location in the master plan, which was along the perimeter of the bay, raised concerns that ride noise would affect the recreational experience of persons in nearby public park areas, the currently proposed site is within the already developed portion of the park, much further removed from public park areas. The Commission finds that construction and operation of the proposed splash down ride will not diminish any existing access opportunities or recreational experiences, and adequate lateral and vertical access is available to serve the demonstrated needs of the public in this area of Mission Bay Park, as specifically required in Section 30604(c) of the Coastal Act.

Another issue of great concern to the Commission is the traffic circulation problem, which currently exists in the area and is anticipated to worsen with future growth. Sea World Drive and Ingraham Street serve as major coastal access routes for all areas of Mission Bay Park, and the public beaches at Pacific Beach, Mission Beach and Ocean Beach, and serve as a popular commuter route as well. These are the only roadways serving SeaWorld. The proposed Mission Bay Park Master Plan amendments and SeaWorld Master Plan Update include a number of good policies on traffic issues, and include a range of mitigation measures to be implemented in the future based on overall growth and attendance counts at SeaWorld. In its review of these plan amendments, the

Commission found the major problem is not determining what improvements are needed, but prioritizing the improvements according to greatest need, and finding a means to fund and implement necessary improvements.

With respect to the proposed Tier 1 improvements, the necessary traffic improvements at the I-5/SeaWorld Drive Interchange and the I-8/I-5 Interchange are not triggered by these improvements, but are tied to the results of the Mitigation, Monitoring and Reporting Program required by the EIR for the SeaWorld Master Plan Update. The Caltrans Project Study Report will identify the phasing and funding of traffic improvements necessary to relieve congestion during peak summer recreational use and address the cumulative effects of increased population, commercial development and public recreational demand. Thus, the Commission supported the expenditure of the first mitigation monies toward completion of the Caltrans Project Study Report. It is SeaWorld's proposed Tier 2 development that may potentially be delayed if traffic mitigation is not guaranteed due to the status of Caltrans studies and project funding. This conclusion was drawn from the findings of the EIR for the SeaWorld Master Plan Update.

That EIR identifies traffic impacts and recommended mitigation for 2005 and 2020, but indicates the measures should not be tied to a specific year but, instead, SeaWorld should implement a Mitigation, Monitoring and Reporting Program (MMRP) to identify when the impacts occur, due to the uncertainty of SeaWorld attendance. The EIR indicates there are significant impacts to the SeaWorld Drive and I-5 interchange for 2005 and 2020 that are considered unmitigated if full funding for the CIP is delayed or never achieved. SeaWorld's monetary obligation to the CIP is tied to the MMRP. According to the EIR, when SeaWorld's project traffic exceeds the identified thresholds in the MMRP, SeaWorld will be responsible for its fair share contribution.

The Commission found the EIR analysis suggests there is a potential for significant impacts to occur from SeaWorld and any commercial expansion within Mission Bay Park without the assurance that adequate traffic mitigation measures will ever occur. This uncertainty is not acceptable within a regional and statewide visitor destination center such as Mission Bay Park, or consistent with Sections 30210 and 30250 of the Coastal Act. Therefore, the Commission suggested changes to the plan policies to address traffic matters in an attempt to help promote faster implementation of traffic improvements. They address needed freeway improvements, identify some potential funding mechanisms and require that the Caltrans Project Study Reports for I-5/I-8 improvements and at the I-5/SeaWorld Drive Interchange be utilized as a factor in determining when expansion of commercial development and/or leaseholds may occur within Mission Bay Park in the future. These reports are necessary to determine the phasing and funding of improvements necessary to relieve congestion during peak summer recreational use and address the cumulative effects of increased commercial development, population and public recreational demand.

The revision to the SeaWorld Master Plan Update, as proposed by SeaWorld and the City, establishes the exact amount of SeaWorld's share of traffic improvement monies, to be paid in five annual installments. The Commission augmented this revision to require

the first annual payment to be paid upon effective certification of the subject LCP amendment. It also added provisions for either a 3% annual increase, or an increase based on the Consumer Price Index, whichever is greater, to address increases in costs over the five-year payment period. The Commission found the City's and SeaWorld's proposal to pay traffic mitigation funds sooner than required by the EIR will expedite completion of the Project Study Report and the identification and phasing of the necessary traffic mitigations. The information in the Project Study Report will be utilized in determining traffic mitigation requirements associated with future development within Mission Bay Park. The Commission found such plan policies are necessary in order to prevent traffic congestion related to future development at SeaWorld and other portions of Mission Bay Park from impeding the public's ability to get access to the coast, pursuant to Sections 30250 and 30252 of the Coastal Act.

With respect to the adequacy of on-site parking, SeaWorld currently provides a total of 8,350 parking spaces for visitors, staff, and employees; parking spaces have not been specifically allocated for individual uses, but most employee parking occurs in the lots nearest the administrative facilities and, during times of heaviest park use, in the parking lot nearest the Hubbs Research laboratories, aquaculture tanks, and associated research and administrative functions, located northwest of SeaWorld proper, but within the overall leasehold boundaries. Although it is difficult to accurately analyze exactly how much parking a theme park such as Sea World normally requires, there is no indication that on-site parking facilities are currently inadequate.

In addition to on-site parking accommodation and fairly recent circulation improvements, Sea World is served by two public transit (bus) routes, #9 and #27. The Master Plan Update which the Commission recently voted to certify requires SeaWorld to provide financial incentives for visitors to take public transportation to SeaWorld. The Commission suggested policy revisions which discuss the promotion of public transportation as a way to reduce traffic volumes on the street system. Included is an offer by SeaWorld to reduce the price of admission by $5.00 to anyone showing proof of use of transit. The Plan Update identifies a number of other potential incentives, some already implemented and others to be implemented based on need. These include tram service for summertime weekends to transport people from the nearby trolley stations to SeaWorld, and additional financial incentives which might increase use of public transportation (buses and trolleys). Implementing a tram would encourage better ridership by recreational users. Other incentives suggested by SeaWorld are programs encouraging employee use of public transportation and advertising the availability of transit services in advertising brochures. The success of the above-mentioned range of incentives to encourage public transit will be evaluated in review of future development proposals within the SeaWorld leasehold to determine whether additional measures are warranted to assure compliance with the requirements of Section 30252 of the Coastal Act to facilitate the provision of transit service, especially for high intensity uses such as SeaWorld.

In summary, the Commission finds that adequate vertical and lateral access exists around the Sea World leasehold for the currently demonstrated needs of visitors to this portion of

Mission Bay Park. In addition, the on-site parking reservoir continues to be adequate for the facilities needs to date even with the proposed ride attraction and other Tier 1 projects. Special Condition #3 requires identification of all construction staging and storage areas, prohibiting the use of public areas for this purpose. If use of public areas or closure of travel lanes cannot be avoided altogether, then work must occur outside the summer season. Therefore, as conditioned, the Commission finds the proposal consistent with all of the cited public access policies of the Coastal Act.

3. Water Quality. The following Coastal Act policies addressing water quality are most applicable to the subject proposal, and state, in part:

Section 30230

> Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30231

> The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum population of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff ...

Over the years, concerns have been raised regarding SeaWorld's land and water operations with respect to maintaining optimum water quality. In particular, the manner in which surface runoff from the parking lots is discharged has been raised as a significant issue. This issue was addressed in detail in review of the master plan, and SeaWorld's grading, drainage, erosion and stormwater requirements were reviewed and found acceptable by the Commission's water quality unit. The proposed project is identified and fully described in the master plan, and is designed to be a part of the existing stormwater improvements. Moreover, the proposed splash down ride will not increase impermeable surfaces or significantly change existing patterns of runoff. In fact, since the specific project site is fully paved at this time, there will be a net decrease in impermeable surfaces as a result of this project, which includes the removal of some paving and replacement with landscape features. The subject proposal does not modify any of SeaWorld's existing water treatment, collection or discharge facilities. These facilities currently process runoff from some of SeaWorld's paved parking lots and nearly all of its developed venues; this treatment will continue. Therefore, as conditioned to address other concerns, the Commission finds the proposed development consistent with the cited policies of the Coastal Act.

4. Noise/Marine Mammals. Section 30230 of the Coastal Act, cited in the previous finding, protects marine resources and is the most applicable Coastal Act policy with regard to marine mammals that are held in captivity at SeaWorld. At the Commission hearing for the SeaWorld Master Plan, a number of citizens and Commissioners raised concerns over how the captive marine mammals at SeaWorld would be affected by noise generated by the ride. Of particular concern are the Commerson's Dolphins, which are proposed to be exhibited within the overall project site. The applicant has submitted a study of roller coaster noise conducted at two other Busch facilities (Orlando and Tampa), which indicates that proper design will assure that noise will not exceed current ambient levels experienced by the dolphins in their existing exhibit tank. Exhibit #1 is the two-page summary of that report and includes specific design recommendations which have been incorporated into the project plans.

5. Local Coastal Planning. Section 30604(a) also requires that a coastal development permit shall be issued only if the Commission finds that the permitted development will not prejudice the ability of the local government to prepare a Local Coastal Program (LCP) in conformity with the provisions of Chapter 3 of the Coastal Act. In this case, such a finding can be made.

Mission Bay Park is primarily unzoned. As a whole, Mission Bay Park is a dedicated public park, and SeaWorld is designated as Lease Area in the presently-certified Mission Bay Park Master Plan (land use plan). Although the Commission has certified the recent Mission Bay Park Master Plan amendment, incorporating the SeaWorld Master Plan as a component, it did so with suggested modifications that have not yet been adopted by the City. The proposed development is consistent with the designation in the Mission Bay Park Master Plan, and has been found consistent with all applicable Chapter 3 policies of the Coastal Act. No modifications to SeaWorld's lease with the City of San Diego, or other local discretionary actions, are required as a result of the improvements proposed herein. The master plan update addresses the height limit ballot measure, which approves greater-than-thirty-foot heights within the SeaWorld leasehold, but leaves final oversight to the City Council and Coastal Commission, who will review each proposed development on a case by case basis. Therefore, the Commission finds that approval of the project, as conditioned, will not prejudice the ability of the City of San Diego to prepare a fully certifiable LCP for its Mission Bay Park segment.

6. California Environmental Quality Act (CEQA). Section 13096 of the Commission's Code of Regulations requires Commission approval of coastal development permits to be supported by a finding showing the permit to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

As discussed herein, the proposed project will not cause significant adverse impacts to the environment. Specifically, the project, as conditioned, has been found consistent with the public access and recreation, visual resource, and water quality policies of the Coastal Act. There are no feasible alternatives or mitigation measures available which would substantially lessen any significant adverse impact which the activity might have on the environment and still achieve the purpose of the project. Therefore, the Commission finds that the proposed project is the least environmentally damaging feasible alternative and is consistent with the requirements of the Coastal Act to conform to CEQA.

STANDARD CONDITIONS:

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Interpretation. Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.

4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

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COMMISSION ACTION ON SEP 0 9 2002

☑ Approved as Recommended WC, S
☐ Denied as Recommended
☐ Approved with Changes
☐ Denied
☐ Other

MEMORANDUM

RECEIVED
MAY 1 0 2002
CALIFORNIA
COASTAL COMMISSION
SAN DIEGO COAST DISTRICT

TO: JIM ANTRIM, JIM MCBAIN AND PAT OWEN

FROM: ANN BOWLES

DATE: 4/19/01

RE: NOISE LEVELS FROM ROLLER COASTERS AT SWO/BUSCH GARDENS

CC: TOM GOFF, JACK PEARSON, DON KENT AND PAM YOCHEM,

Gentlemen:

I've read Larry Wolski and Rindy Anderson's report regarding the noise from the 'Journey to Atlantis' and other roller-coaster rides at Sea World of Orlando (SWO) and Busch-Gardens Tampa (BGT). A copy is attached for your review. The results are encouraging, as it should be possible to *improve* the noise environment for the Commerson's dolphins, and to prevent undue disturbance at the OSPER facility with some simple modifications to the construction plans.

From my perspective, the important points are as follows (I refer you to Figure 4 in the report):

1. The underwater ambient noise in the pools where the Commerson's dolphins are being held at SeaWorld San Diego is relatively high because their pool is coupled to the pumping and filtration. This noise is broad band, extending well up into the range of frequencies that Commerson's dolphins are thought to hear well (>1000 Hz). It is also continuous noise (as opposed to transient noise, which only lasts for brief periods).
2. The worst-case underwater exposure at the JTA ride in Orlando was in the splashdown pool. While levels were high briefly during splashdown events (transient levels reached 124.1 dB re 1 μPa), the ambient in the pool was actually lower than the levels currently experienced by the Commerson's dolphins.
3. Exposure in a pool adjacent to the ride was very moderate, particularly at the frequencies that Commerson's dolphins hear best. This was true of both ambient levels and splashdown events.

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Thus, simply isolating the new Commersons pool from the complex consisting of the ride and water management system will do much to reduce noise. Based on the plans I saw before Christmas, this is exactly how the new pool has been designed.

I also concur with the gist of the suggestions made in the report. My recommendations:

1. Put as much concrete between the new pool and the splashdown areas as possible. Sound is attenuated most effectively by mass. For example, peep holes in a solid wall attenuate noise more effectively than an acrylic wall.
2. Keep noisy sources such as loudspeakers either away from the pool or oriented away from the pool. Visitor noise will come and go, but loudspeakers will raise the ambient in the pool continuously.
3. Protect the surface of the pool from direct line-of-sight to the noisiest parts of the ride (splashdown, visitor entrance) with a wall. As the report shows in several places, sound transmits easily from air to water in shallow pools, but may be dramatically attenuated by a simple and fairly low barricade.

As I mentioned when we first talked about this, I'm also concerned about the noise and disturbance generated by increased traffic around the OSPER facility. I would suggest putting a wall around it that would block noise and traffic both from the people coming in to the ride and from the ride itself.

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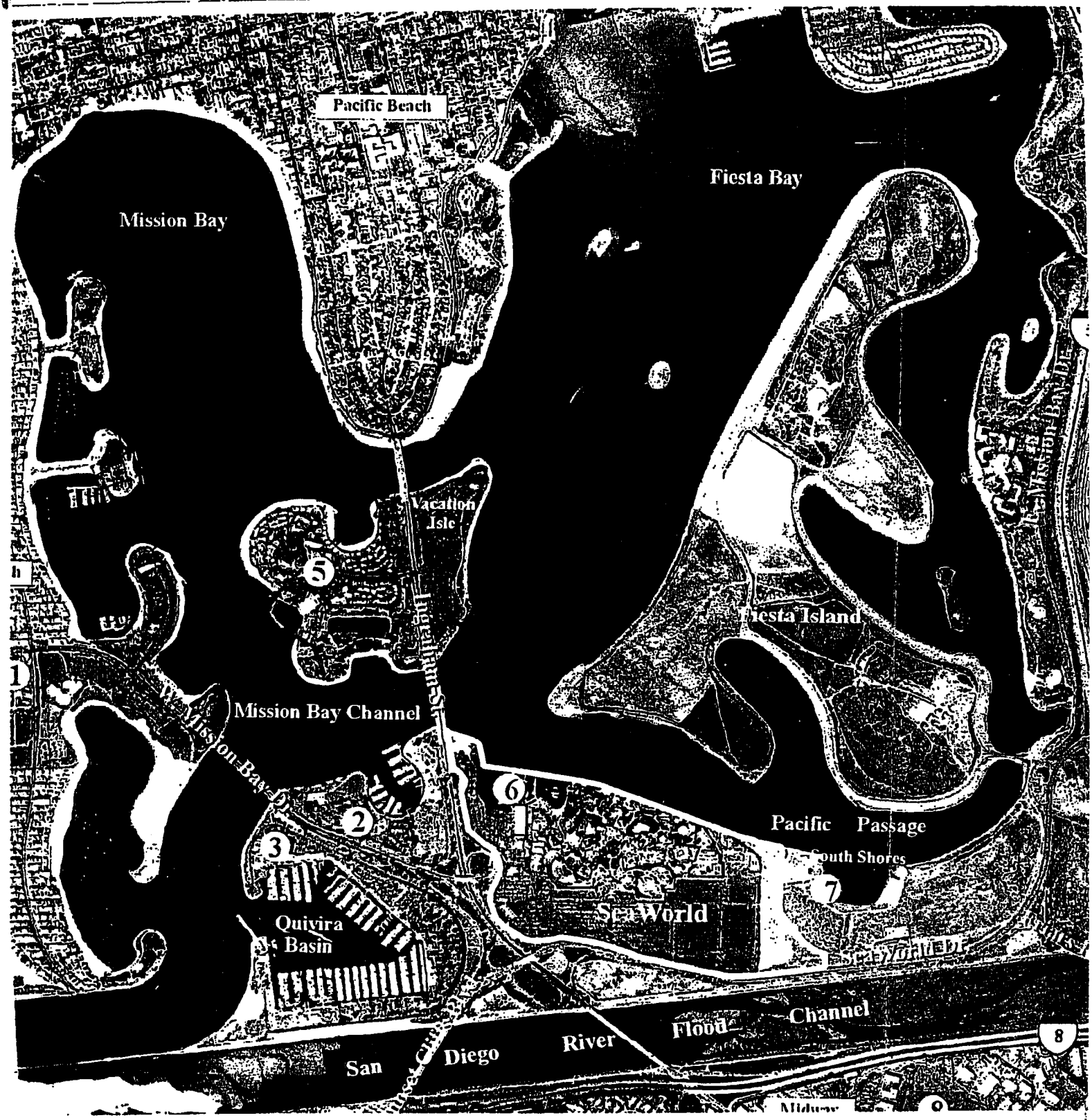

EXHIBIT NO. 2
APPLICATION NO. 6-01-129
Location Map

California Coastal Commission

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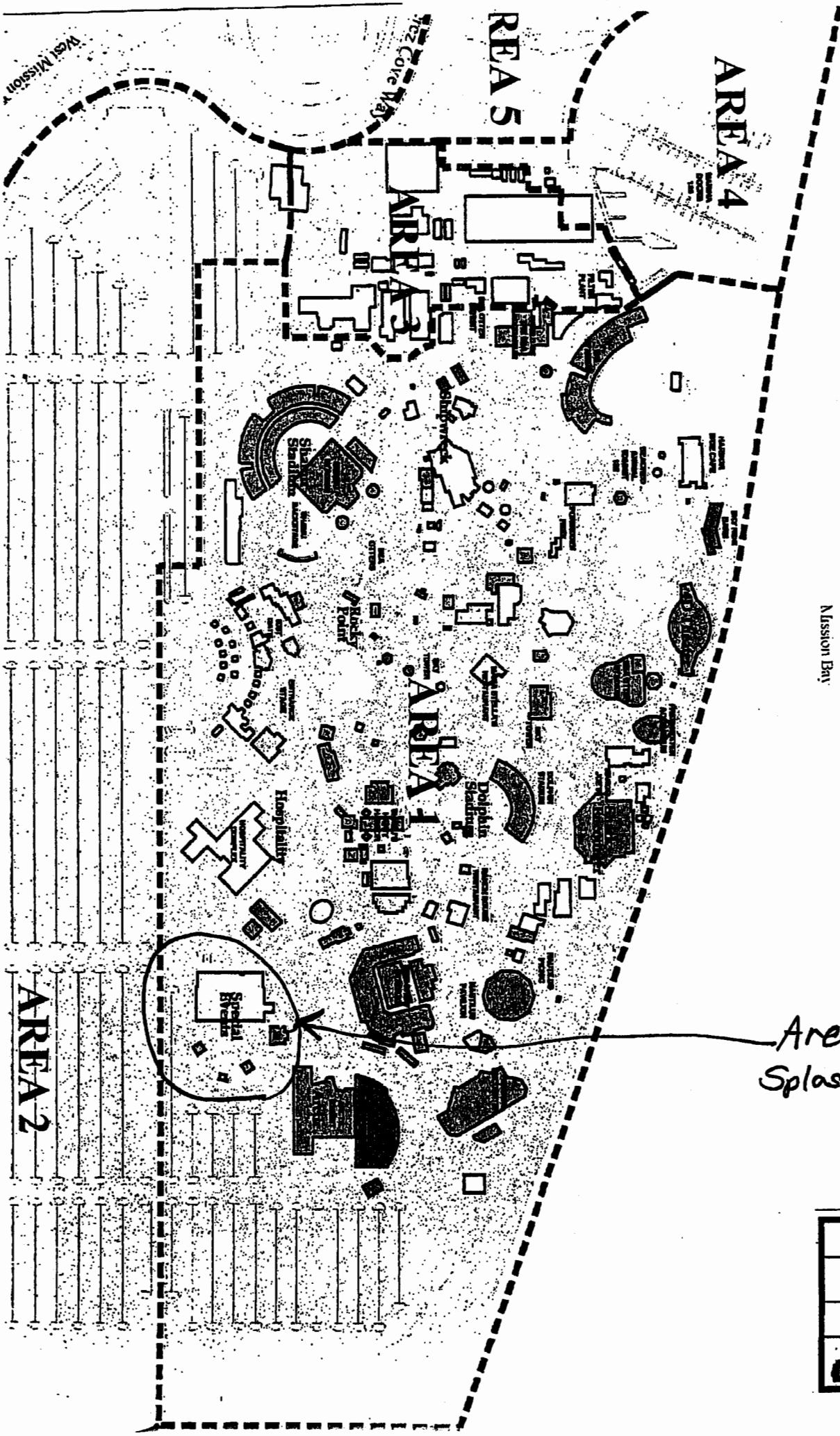

EXHIBIT NO. 3
APPLICATION NO. 6-01-129
Site Plan
Developed Area
California Coastal Commission

6-01-129

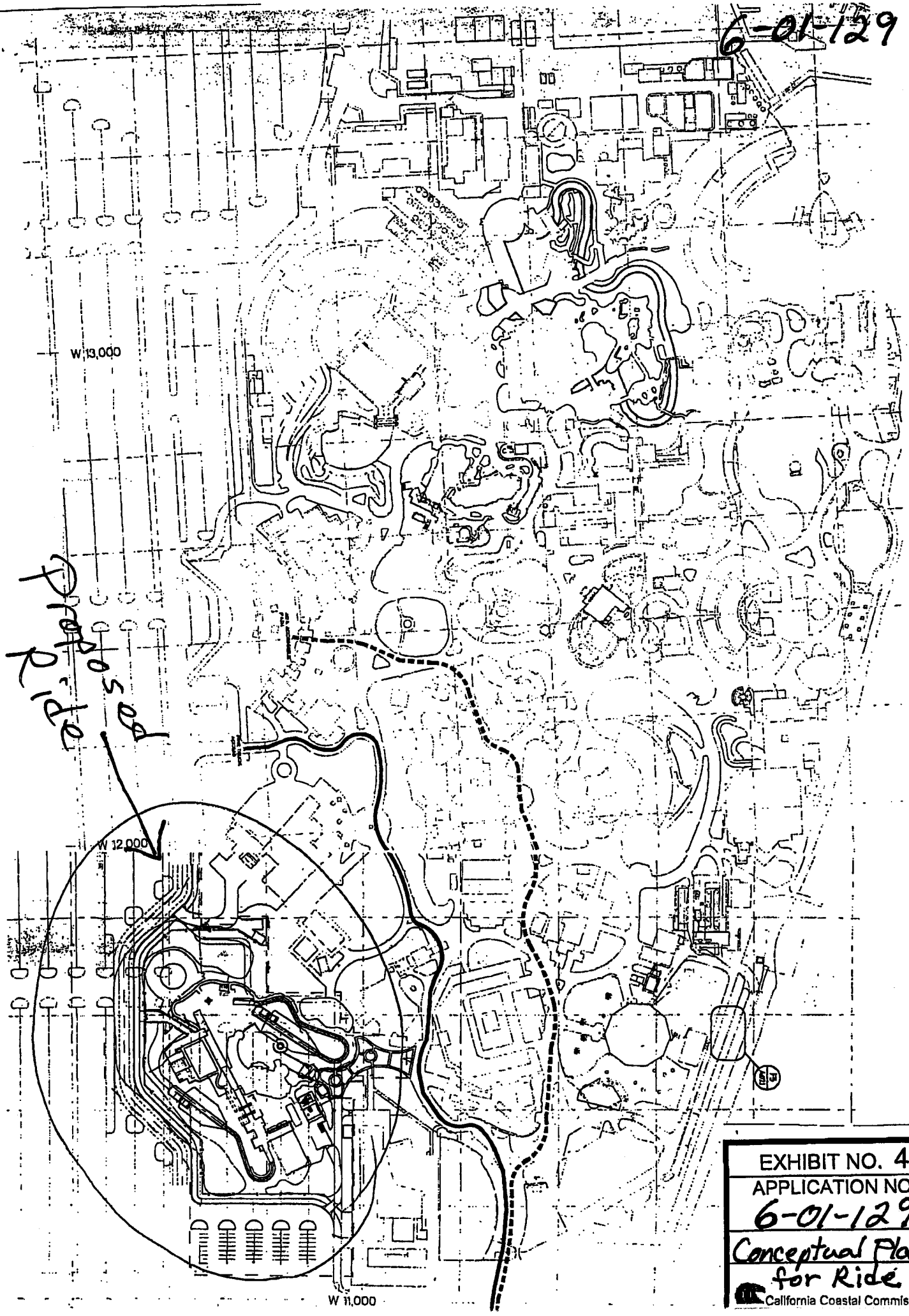

EXHIBIT NO. 4
APPLICATION NO.
6-01-129
Conceptual Plan for Ride
California Coastal Commission

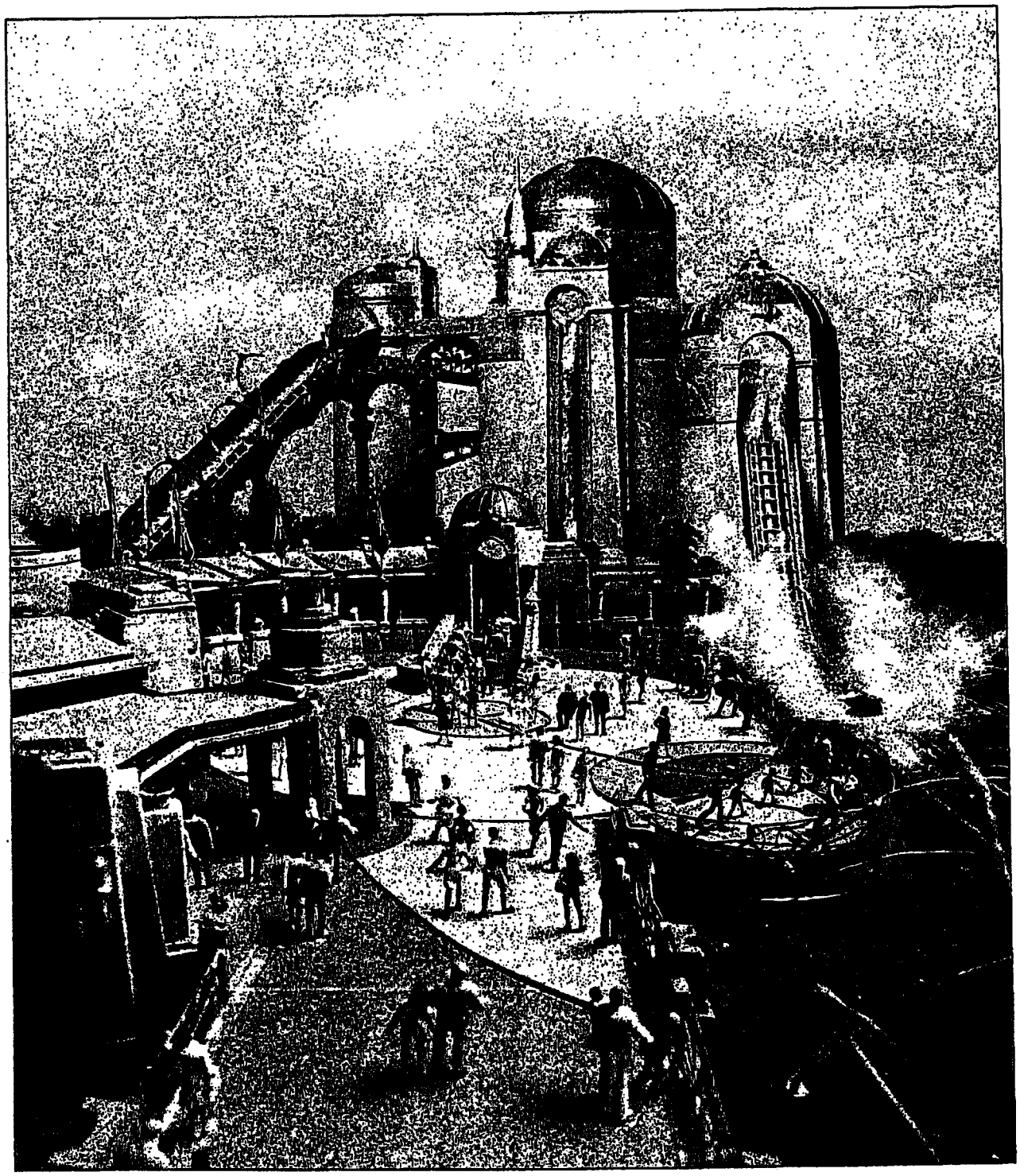

Figure II-5 Conceptual Splashdown Ride Elevation

EXHIBIT NO. 5
APPLICATION NO. 6-01-129
Conceptual elev
from inside SeaWorld

* Views from Outside SeaWorld are