THE BOARD OF DIRECTORS OF BROAD BEACH GEOLOGIC HAZARD ABATEMENT DISTRICT

Adopted this Resolution on November 6, 2011, by the following vote:

AYES: **Karno, Grossman, Levitan, Lotman, Marquis**

NOES: **None.**

ABSENT: **None.**

ABSTAIN: **None.**

RESOLUTION NO. 2011/03

RESOLUTION APPROVING THE BROAD BEACH GEOLOGIC HAZARD ABATEMENT DISTRICT PLAN OF CONTROL

WHEREAS, on September 12, 2011, the Malibu City Council adopted Resolution No. 11-41, approving and ordering the formation of the Broad Beach Geologic Hazard Abatement District (GHAD) as described in the landowner petition and in the GHAD Plan of Control dated March 30, 2011; and

WHEREAS, on September 12, 2011, the Malibu City Council appointed the following five landowners as the initial GHAD Board of Directors: Steven Levitan, Zan Marquis, Norton Karno, Marshall Grossman and Jeff Lotman (GHAD Board); and

WHEREAS, the GHAD Board recognizes that the GHAD is a political subdivision of the State of California, governed in accordance with GHAD Law (Pub. Res. Code §§ 26500 *et seq.*); and a legal entity that is separate and distinct from the City of Malibu and the at the GHAD operations are independent of the City functions; and

WHEREAS, on October 9, 2011, the GHAD Board held a public hearing on the Plan of Control and the recommendations from such hearing including certain proposed revisions to the Plan of Control (such as revised language to reflect the planned assignment of pending beach restoration permit applications from the TPOA to the GHAD);

WHEREAS, the proposed revisions to the Plan of Control have been completed; and

WHEREAS, the Plan of Control is exempt from the provisions of the California Environmental Quality Act (Pub. Res. Code §§ 21000 *et seq.*) in accordance with Public Resources Code sections 21080(b)(4) and 26559.

The Board of Directors of the GHAD HEREBY RESOLVES THAT:

1. The GHAD approves the Plan of Control dated November 3, 2011, attached hereto as Exhibit A and incorporated herein;

2. This Resolution shall become effective immediately upon its passage and adoption.

ATTEST: [redacted]
Clerk of the GHAD Board

EXHIBIT A

PLAN OF CONTROL

BROAD BEACH GEOLOGIC HAZARD ABATEMENT DISTRICT (GHAD)

Submitted to:
Broad Beach Geologic Hazard Abatement District

Prepared by:
ENGEO Incorporated

March 30, 2011
Revised November 3, 2011

Project No. 8588.000.000

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ENGEO INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
8588.000.000

March 30, 2011
Revised November 3, 2011

Ms. Patricia E. Curtin
Attorney, Broad Beach Geologic Hazard Abatement District
Morgan Miller Blair
1331 North California Boulevard, Suite 200
Walnut Creek, CA 94596-4544

Subject: Broad Beach Geologic Hazard Abatement District (GHAD)
Malibu, California

GEOLOGIC HAZARD ABATEMENT DISTRICT (GHAD) PLAN OF CONTROL

Dear Ms. Curtin:

ENGEO is pleased to present the Broad Beach Geologic Hazard Abatement District (GHAD) Plan of Control.

We are glad to be of service to you on this project. If you have any questions concerning the contents of this plan, please do not hesitate to contact us.

Sincerely,

ENGEO Incorporated

Eric Harrell, CEG

Uri Eliahu, GE

Jeffrey A. Adams, PhD, PE
eh/ue/jaa/dt

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1.0 AUTHORITY AND SCOPE

The Broad Beach Geologic Hazard Abatement District ("GHAD" or "District") was formed on September 12, 2011 under authority of the California Public Resources Code (Division 17, commencing with Section 26500). Geologic Hazard Abatement Districts are political subdivisions of the State of California and are not an agency or instrumentality of a local agency.

Section 26509 of the Public Resources Code requires a Plan of Control, prepared by a State Certified Engineering Geologist, as a prerequisite to formation of a GHAD. Pursuant to Section 26509, this Plan of Control was prepared by an Engineering Geologist certified pursuant to Section 7822 of the Business and Professions Code and describes the geologic hazards, their location, and the area affected by them. It also provides a plan for the prevention, mitigation, abatement, or control thereof.

As used in this Plan of Control, and as provided in Section 26507, "geologic hazard" means an actual or threatened landslide, land subsidence, soil erosion, earthquake, fault movement, or any other natural or unnatural movement of land or earth.

1.1 PROPERTY IDENTIFICATION

The GHAD boundary is shown in Exhibit B. The GHAD area includes areas adjacent to and within the vicinity of Broad Beach in Malibu, California. The legal description of the land included within the Broad Beach GHAD is included in Exhibit A.

2.0 BACKGROUND

2.1 SITE CONDITIONS

The Broad Beach area is located at the base of the Santa Monica Mountains and adjacent to Santa Monica Bay in Malibu, western Los Angeles County, California. Properties within the Trancas Property Owners Association (TPOA), and adjoining and adjacent properties, include those adjacent to Broad Beach, extending from Point Lechuza on the west to Zuma Beach on the east. Although beach width can vary seasonally as well as from year to year, Broad Beach reportedly has been consistently narrowing in width since the early 1970s. In general, very little, if any, dry beach exists at higher tide levels, especially in the western portion of the above-described area. Additionally, temporary armoring (including sandbags) from earlier emergency repairs has become increasingly exposed with time. An emergency rock revetment was installed seaward of the homes in 2010 along most of the length of the beach to protect the private properties.

2.2 CURRENT AND PROPOSED IMPROVEMENTS

The Broad Beach area consists of residential structures situated south of Broad Beach Road and adjacent to the beach. Lots within the area typically include residential structures situated relatively close to Broad Beach Road to maximize open space adjacent to the beach. Additionally, vertical access is provided to the beach via two (2) public walkways, and lateral access is provided from the adjacent Zuma Beach.

Various portions of the beach have been subjected to emergency repair/protective measures in years past due to storms and related erosion events. Because of the general and continuing narrowing of the beach, additional protective measures will be implemented. The measures may include beach nourishment and rehabilitation of dunes with associated vegetation and habitat. Additionally, the recently installed rock revetment is anticipated to need periodic inspection.

3.0 SITE GEOLOGY

3.1 SITE SETTING

The Santa Monica Mountains are an east-west trending range approximately 50 miles long and 9 miles wide. Elevations in the range extend from sea level to over 3,000 feet. The coastline associated with the Santa Monica Mountains is characterized by numerous pocket beaches bounded by headlands. The headlands result from the high erosional resistance of the bedrock in comparison with the surrounding materials. Headlands from deltaic deposits, such as cobbles and boulders found at the mouths of streams, are also present (Patsch and Griggs, 2007).

Broad Beach stretches from Point Lechuza on the west to Zuma Beach on the east. It is situated within a sub-cell of the Santa Monica Littoral Cell (Patsch and Griggs, 2007). Until 1979, Broad Beach had been naturally replenished from a combination of deposition from rivers, seacliff erosion, dune erosion, and littoral drift.

The natural condition of beaches in the Santa Monica Littoral Cell tends to be narrow due to the lack of significant sand sources, high rates of longshore or littoral transport, and the natural loss of sand into submarine canyons (Patsch and Griggs, 2007). Additionally, human intervention over the years, including roadway construction, damming of rivers and creeks, and seacliff armoring, have further reduced the volume of sand available for deposition. The reduced natural sources of sand have been somewhat offset by beach nourishment in various portions of the cell area south and east of Malibu; however, these nourishment activities have not generally been performed in the Malibu area.

Development in the Malibu area began in the 1920s when access was granted for the construction of Pacific Coast Highway. The construction of the highway necessitated large cuts into the existing hillsides and subsequent expansion required additional grading work.

Residential development in the Broad Beach area reportedly began in the 1930s with the sporadic construction of residential structures. The structures generally did not have municipal facilities. Septic systems and leach fields were installed for these early developments. Development occurred in the Broad Beach area through the 1980s and 1990s and continues through this date. Additionally, several properties have been redeveloped, and in some cases, adjacent properties have been merged to accommodate larger lots and structures.

4.0 GEOLOGIC HAZARDS

The following geologic hazards for the Broad Beach area have been identified for the properties within the GHAD and are expected to remain to some extent after the improvements have been installed.

- Beach/dune erosion
- Flooding property damage from sea-level rise and storms
- Coastal cliff erosion
- Seismically induced ground shaking
- Tsunami

4.1 BEACH AND DUNE EROSION

Beaches essentially act as coastal storm barriers. A beach's size, shape and sand volume help determine how well the beach can protect a developed area during a storm. Each of the various elements of a beach, such as bluffs, dunes, berms, offshore sand bars, and even the width and slope of the beach itself, offers a level of natural protection against hurricanes and coastal storms by absorbing and dissipating the energy of breaking waves, either seaward or on the beach itself.

Beach and dune erosion is a natural process that occurs on a continuing basis. As described elsewhere in this document, beaches within the Santa Monica Littoral Cell tend to be relatively narrow in a natural condition. However, significant natural events, as well as human intervention, have reduced the sand available for natural replenishment within the Broad Beach area. Also, narrow, eroding beaches have insufficient sand volume to protect developed coastal areas from the effects of hurricanes and storms. Significant destruction from flooding, wave attack, and storm surge is more likely as an eroding beach develops a steeper slope and the coastline retreats inland, ever closer to people and property along the shore. As a result, net beach loss in the vicinity of Broad Beach will continue and likely accelerate without protective intervention.

Where an inadequate natural supply of sand exists (as at Broad Beach), hard structures such as seawalls, bulkheads, and revetments can protect upland areas but do nothing to protect the beach. Sand retention structures such as breakwaters, groins, and artificial reefs can effectively retain sand and reduce erosional losses only when an adequate supply of sand moves through the system. However, even where those structures are effective, the protection occurs at the expense of unprotected, down-drift beaches. Therefore, consideration of any such structures must occur only after appropriate analysis, which may lead to elimination of the proposed structures, establishment of minimum beach widths as "thresholds" that trigger supplemental nourishment events, or modification of the structural design to eliminate or reduce adverse shoreline impacts. Additionally, regulatory agency approvals of hard structures along the coastline, even if adverse shoreline impacts are absent or minimal, have become increasingly difficult.

Additionally, no device, conventional or unconventional, creates sand in the surf zone. Any accumulation of sand produced by a structure alone is at the expense of an adjacent section of the shore. This fact distinguishes structures and other devices from beach nourishment, which addresses the basic problem in coastal erosion - the shortage of sand. Consequently, beach nourishment is the only shore protection alternative that directly addresses the problem of a lack of sand, because it is a process of adding sand from outside the eroding system. The proposed improvements will mitigate the effects of erosion on the beach, and the recently installed revetment will serve as a barrier to landward erosion.

Therefore, protection of the beach, dunes, structures, and infrastructure will require nourishment of the beach, and possibly constructing new dunes, improving existing dunes, or a combination of the above. Beach nourishment and sculpting will restore the width of the beach and provide a protective barrier for structures and properties, as well as inward stretches of the beach. Dune reconstruction will also include the removal of non-native habitat and increase habitat construction (including native vegetation). When completed, these improvements will repair existing damage and prevent future inundation- and erosion-related damage from storm surges, wave run-up, and overtopping, as described below.

A higher and wider beach berm, formed by the careful placement of imported beach sand (or nourishment) would reduce wave energy, which would reduce the waves' impact and erosive force. A nourished beach, with sufficient sand volumes and healthy dunes, absorbs storm energy, even during slow-moving storms, and helps prevent damage to structures and infrastructure. The gradual slope of a nourished beach causes storm waves to break farther seaward, as the waves would then form in shallower water. As water rushes up the beach, energy dissipates. Water running back down the beach redistributes sediment, which is deposited in deeper water and moved along the shore. The deposition of sediments in deeper water often creates an offshore sand bar that causes the waves to break farther offshore, further weakening the incoming wave energy, and protecting the dunes and property behind the beach. This gradual and successive weakening of wave energy can significantly reduce damage from waves, inundation, and erosion. The nourished beach berm and dunes also provide a "sand reservoir" that remains landward during normal conditions and also provides sand during major storm events, which allows beaches to recover, rebuild, and continue to provide protection.

The discussion above pertains equally to property protected by a seawall or revetment. Shifting the breaking wave energy farther offshore and dissipating it on the beach reduces or eliminates the wave energy directed into a protective structure. Without beach nourishment, the beach will continue to erode, which will allow deeper water to extend more landward, as described above. This condition allows larger, more powerful waves closer to dunes and properties, which cause increased erosion, wave splash, and flooding, increasing wear and tear on, and undermining, existing shore protection devices, shortening the devices' useful life.

4.2 FLOODING FROM SEA-LEVEL RISE

Sea-level rise, associated with climate change due to natural and/or anthropogenic sources, may pose adverse effects to the residents of the Broad Beach area. Coastal zones are particularly vulnerable to climate variability and change. Key concerns specifically affecting the Broad Beach area include land loss, changes in maritime storms and flooding, and responses to sea level rise (EPA, 2009). A discussion of the implications of sea-level rise is presented in Appendix A.

The improvements and ongoing maintenance provided by the GHAD will mitigate the effects of sea-level rise. Beach nourishment projects are designed and engineered to work like natural beaches, allowing sand to shift continuously in response to changing waves and water levels. Beaches have historically adapted to significant changes in mean sea level over geologic time, and every replenishment project is designed to include a substantial amount of sacrificial sand. This sacrificial sand is replaced at intervals of time as beaches are "re-nourished," typically every 5 to 10 years, depending upon the characteristics of a particular beach. The GHAD will provide a financial reserve for this ongoing dune maintenance, beach nourishment, and sculpting, and will allow the flexibility necessary to respond to changing conditions and counteract the effects of increased wave action associated with sea-level rise.

Although the extent and magnitude of rising sea levels cannot be accurately predicted, current California planning guidance assumes an annual rate of sea-level rise of 0.03 foot per year for the next 40 years (State of California, 2010). Under these conditions, predicted sea-level rise is not expected to overwhelm any particular replenishment project before its next scheduled infusion of sand. In contrast, without any beach nourishment or shore protection, the existing beach foreshore slope could retreat 20 to 30 feet landward by 2050, based on sea-level rise alone.

However, even if the rate of sea-level rise is significantly higher than predicted, federal policy requires the design of a beach replenishment project (e.g., the height, width, and length of beach) to account for the change in water elevation. Although this may affect the volume of sand needed and the cost to place that sand on the beach over the life of a project, these increased costs are likely insignificant in comparison to the overall benefit provided by the beach. Further, as described above, beach nourishment projects by their nature allow for long-term adaptation to changing conditions.

Further, beaches independently respond to sea-level rise. Tidal and wave action helps to increase the elevation of the beach that lies above the high-water mark (the berm). The build-up of a berm, in turn, provides a reservoir of sand at the back of the beach to compensate for any beach consumed by the rising ocean. As the sea level rises, so does the berm, and by the same amount. However, the shoreline will move landward unless it is replenished with additional sand.

4.3 COASTAL CLIFF EROSION AND INSTABILITY

Although not adjacent to Santa Monica Bay, the bluff located to the north of Broad Beach may be susceptible to erosion from stormwater run-off and other overland water flow. Additionally, a Seismic Hazards Map dated February 7, 2002, indicates the bluff areas to the north of Broad Beach are susceptible to seismically induced landslides. These effects are not considered likely to affect proposed improvements within the District.

4.4 SEISMICALLY INDUCED GROUND SHAKING

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking, soil liquefaction, lateral spreading, and land subsidence. These hazards are discussed in the following sections.

The site is not currently mapped within an Alquist-Priolo Earthquake Fault Zone and no known active faults cross the site. Therefore, the possibility of primary ground rupture is considered remote.

An earthquake of moderate to high magnitude generated within the Los Angeles Region, similar to those that have occurred in the past, could cause considerable ground shaking at the site. Site improvements should be designed by accounting for potential site shaking and ground accelerations.

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total, loss of shear strength because of pore pressure build-up under the reversing cyclic shear stresses associated with earthquakes. A Seismic Hazards Map dated February 7, 2002, indicates the Broad Beach area is within a zone considered at risk for liquefaction (Figure 1). Site improvements should be designed by accounting for potential liquefaction effects.

4.5 TSUNAMI

Tsunamis are long sea waves, generated by displacements associated with earthquakes. These waves can reach great heights when they encounter shallow water. Given the location of the beach and properties within the District with respect to Santa Monica Bay, tsunamis have the potential to occur in the Broad Beach area (Figure 2). As shown in the figure, the inundation zone includes the nourishment area. Site improvements should be designed to account for the potential of tsunamis. Proposed site improvements affecting the beach should be approved by the GHAD Manager prior to construction.

5.0 GHAD RESPONSIBILITIES

The GHAD has responsibility for the construction as well as ongoing monitoring and/or maintenance of the following improvements on the beach:

- Beach nourishment and sculpting
- Rehabilitation of dunes
- Beach drainage improvements

5.1 BEACH

As the beach within the District and immediately adjacent to the existing residential parcels is an amenity that benefits all of the property owners within the District, the funding of the maintenance of the beach should be shared by all current and future property owners within the GHAD's boundaries. As provided in Section 26532 and 26533 of the Public Resources Code, the lands included within the GHAD may be publicly or privately owned, but the boundaries of the GHAD cannot divide a parcel.

The Broad Beach GHAD is charged with responsibilities that relate to the prevention, mitigation, abatement, and control of geologic hazards, which includes the maintenance of facilities that enhance geologic and hydrogeologic stability. As currently planned, existing beach drainage facilities will be modified to accommodate the revised beach geometry resulting from the anticipated beach nourishment. The GHAD will not be responsible for the ongoing maintenance of these drainage systems or for the treatment of stormwater emanating from such facilities. These stormwater drainage facilities will be maintained by the same agencies as have maintained them prior to the GHAD's formation. Additionally, the revetment, beach nourishment, and habitat restoration are intended to lessen the effects of beach erosion. Beach nourishment and sculpting will restore the width of the beach and provide a protective barrier for structures and properties, as well as landward stretches of the beach. When completed, these improvements will repair existing damage, and, when combined with the restored dunes and revetment structure, will prevent future inundation and erosion-related damage from storm surges, wave run-up, and overtopping. Proactive maintenance, assessment, repair and replacement of facility improvements (including beach sculpting) will be the responsibility of the GHAD, subject to the limitations of this Plan of Control. In addition, the GHAD shall have the right to approve any construction, maintenance or repair within the GHAD boundaries, which the GHAD determines has the potential to impact geologic/geotechnical stability.

6.0 CRITERIA FOR GHAD RESPONSIBILITY

In forming the GHAD and establishing the assessment levels and budgets for the District, it is important to define clearly the limits of the GHAD's responsibilities. The GHAD will accept responsibility for property as described in Section 7.0 of this Plan of Control. However, the intent of this Plan of Control is not to extend the GHAD's responsibilities to every potential situation of instability; rather, the following are exclusions from GHAD responsibility.

6.1 ISOLATED OR REMOTE FEATURE REQUIRING MITIGATION

The GHAD shall not have responsibility to monitor, abate, mitigate or control any feature or event that does not involve damage to or pose a significant threat of damage to site improvements.

6.2 GEOLOGIC HAZARDS RESULTING FROM NEGLIGENCE OF PROPERTY OWNER

The GHAD may decline to prevent, mitigate, abate or control geologic hazards which occurred or resulted from any negligence of a homeowner and/or a homeowner's contractors, agents or employees in developing, investigating, grading, constructing, maintaining or performing or not performing any work on private property.

6.3 PROPERTY NOT ACCEPTED

The GHAD shall not have responsibility to repair damage which is situated on a parcel of real property which the GHAD has not accepted in accordance with Section 7.0, below. The GHAD, however, may monitor, abate, mitigate or control geologic or hydrogeologic hazards on a parcel of real property which: (1) the GHAD has not accepted in accordance with Section 7.0, below, and (2) is not excluded from GHAD responsibility by Sections 6.1 and 6.2; provided, however, that GHAD responsibility on such parcel shall be limited to the extent necessary to address damage or a significant threat to damage site improvements which are within a parcel of real property which the GHAD has accepted in accordance with Section 7.0, below.

6.4 GEOLOGIC HAZARD WHICH REQUIRES EXPENDITURE IN AMOUNT EXCEEDING THE VALUE OF THE THREATENED OR DAMAGED IMPROVEMENT

The GHAD may elect not to prevent, mitigate, abate or control a geologic hazard where the anticipated expenditure required to be funded by the GHAD to prevent, mitigate, abate or control the geologic hazard will exceed the value of the structure(s) and site improvement(s) threatened with damage or loss.

6.5 GHAD FUNDING OR REIMBURSEMENT FOR DAMAGED OR DESTROYED STRUCTURES OR SITE IMPROVEMENTS

The GHAD will not be responsible for reimbursing a property owner for the expenses necessary to repair or replace a damaged or destroyed structure, site improvement, landscaping, including the revetment. In the future, the GHAD Board of Directors, at its discretion, may recommend additional beach nourishments. These nourishment events may be performed to address localized or widespread beach erosion, as appropriate. Prior to the funding of future beach nourishments, the GHAD Board of Directors will do the following:

1. Evaluate the efficacy of the previous sand nourishment, including such quantitative parameters as elapsed time between nourishments, beach width loss rate, and remaining beach width.

2. Evaluate new technologies that may provide a more attractive beach protection alternative from a financial or technical standpoint.

3. Evaluate the state-of-the-art and the state-of-the-practice with regard to beach nourishment and other beach protection strategies.

4. Evaluate the permitting, legal, and social, and environmental factors that have evolved since the previous beach nourishment event and determine if any of these factors or combination thereof may affect anticipated nourishment activities.

6.6 NO REIMBURSEMENT OF EXPENSES INCURRED BY PROPERTY OWNERS

The GHAD will not be obligated to reimburse a property owner for expenses incurred for the prevention, mitigation, abatement, or control of a geologic hazard absent a written agreement between the property owner and the GHAD to that effect, which agreement has been executed prior to the property owner incurring said expenses, and following an investigation conducted by the GHAD.

7.0 ACCEPTANCE

7.1 ACTIVATION OF ASSESSMENT

An annual assessment shall be promptly authorized on all parcels in the GHAD. The assessment shall be levied by the GHAD on each individual parcel beginning the first fiscal year following formation of the GHAD and the authorization of the assessment.

7.2 RESPONSIBILITY FOR GHAD ACTIVITIES

The GHAD shall not have the responsibility to perform the outlined activities until 1) the GHAD has been formed, 2) the assessment has been activated as outlined in the previous section, and 3) the GHAD has accepted maintenance responsibilities for the project improvements. The GHAD shall accept responsibility when the project improvements have been completed in accordance with improvement plans and all permit requirements have been satisfied. This turn-over date may be extended at the sole discretion of the GHAD Board of Directors provided that the assessments shall continue to be levied during the extension period and that notice of such extension is delivered to the GHAD Manager at least 30 days prior to the turn-over date.

Given the capital expenditures necessary for construction, the GHAD will likely seek a lending source to provide the necessary funding. As a result, much of the collected assessment will be used to service the resulting debt. The remaining portion of the collected assessment will be used to fund ongoing maintenance activities as well as a cumulative reserve for future large-scale expenditures.

7.3 PROCESS FOR GHAD ASSUMING TPOA'S PERMITTING POSITION

The GHAD may seek to assume the responsibilities for permitting and construction of the proposed improvements. As such, the TPOA will provide to the GHAD, for valuable consideration, all information necessary to obtain the applicable permits. It is intended that an agreement will be reached between the TPOA and the GHAD shortly after formation.

8.0 BROAD BEACH MANAGEMENT PLAN

The GHAD shall be responsible for the maintenance of beach stabilization and hydrogeologic features in common beach areas. The GHAD's maintenance responsibilities include prevention, abatement, vegetation control, and control of erosion hazards within the project area, as provided in Sections 4, 5 and 6.

General maintenance of drainage improvements constructed within and solely serving the common beach area for the beach nourishment project will be the GHAD's responsibility. As mentioned in earlier sections of this document, existing beach drainage facilities will be modified to accommodate the revised beach geometry resulting from the anticipated beach nourishment. The GHAD will not be responsible for the ongoing maintenance of these drainage systems or for the treatment of stormwater emanating from such facilities. These stormwater drainage facilities will be maintained by the same agencies that have been responsible for system maintenance prior to the GHAD's formation. Additionally, the GHAD will have the following maintenance responsibilities as outlined above:

- Inspection of revetment structures.
- Inspection and maintenance of the restored dunes (not including dune surface vegetation, and habitat management).
- Monitoring of accumulated erosion and beach recession.

9.0 PRIORITY OF GHAD EXPENDITURES

Emergency response and scheduled repair expenditures by the GHAD are to be prioritized by the GHAD Manager, utilizing its discretion, based upon available funds and the approved operating budget. If available funds are not sufficient to undertake all of the identified remedial and preventive stabilization measures, the expenditures are to be prioritized as follows in descending order of priority:

(A) Prevention, mitigation, abatement or control of geologic hazards that have either damaged or pose a significant threat of damage to habitable structures, critical underground utilities or paved streets.

(B) Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to ancillary structures.

(C) Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to beach amenities.

(D) Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage limited to loss of dune vegetation or other similar non-essential amenities.

(E) Prevention, mitigation, abatement or control of geologic hazards existing entirely on beach property and which have neither damaged nor pose a significant threat of damage to any site improvements.

As permitted by California Public Resources Code Sections 26591 and 26593, in performing its duties as described above, the GHAD may seek financial assistance from public and private entities including, but not limited to, FEMA, City and County agencies, insurance companies, etc.

10.0 MAINTENANCE AND MONITORING SCHEDULE

GHAD-maintained facilities should be inspected by GHAD Manager or its consultants as presented below. The GHAD Manager shall be a licensed Geotechnical Engineer in the State of California. The annual budget should be calculated so that inspections will be scheduled to occur two times per year (or as outlined below) and as necessary after heavy storm events, defined as greater than a 5-year storm. The regular inspections should be scheduled to take place in October, prior to the beginning of the historic "rainy season" or "storm season". The second inspection should occur in March or April, toward the end of the rainy season or storm season.

The timing, frequency and other details regarding such maintenance, inspection and similar activities will be set forth in a beach management plan prepared by the GHAD Manager.

The GHAD shall obtain copies of erosion and wave studies, geologic assessments, and geotechnical reports related to beach rehabilitation and site improvements and keep these reports on file in the records of the GHAD. In addition, copies of any earthwork and/or construction-related testing and observation reports that will be finalized at the completion of the improvements, when as-built drawings are available, shall be maintained as part of the GHAD records.

Following are guidelines for a monitoring plan. The actual scope and frequency of monitoring events shall be at the discretion of the GHAD Manager.

- The GHAD Manager or its consultants are responsible for inspecting the beach, sand dunes, and revetment structure on a regular schedule. The inspector should check for any deformations, including evidence of distress, erosion, or compromise of the integrity of the improvements. Repairs and maintenance should be performed on a regular schedule. The GHAD will not be responsible for the surface of the dunes, their vegetation, or management of dune-related habitat. Maintenance and management of the dune vegetation and habitat, which is within a sensitive environmental area, will be the responsibility of each respective parcel owner. The area of parcel owner responsibility is the entirety of the dune up to but not including the sandy beach.

- The bluff facing should also be checked for erosion, sloughing, or other evidence of geologic instability.

SELECTED REFERENCES

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Patsch, K., and Griggs, G., Development of Sand Budgets For California's Major Littoral Cells: Eureka, Santa Cruz, Southern Monterey Bay, Santa Barbara, Santa Monica (Including Zuma), San Pedro, Laguna, Oceanside, Mission Bay, And Silver Strand Littoral Cells, Institute Of Marine Sciences, University Of California, Santa Cruz, California Department Of Boating And Waterways, California Coastal Sediment Management Workgroup, 2007.

State of California Department of Mines and Geology, Seismic Hazard Zones, Point Dume Quadrangle, 2002.

State of California, Tsunami Inundation Map for Emergency Planning, Point Dume Quadrangle, March 1, 2009.

State Of California, Sea-Level Rise Interim Guidance Document, Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team, October 2010.

United States Environmental Protection Agency (USEPA), Commentary on Coastal Zones and Sea Level Rise, USEPA website (www.epa.gov), 2009.

FIGURES

Exhibit A:	**Broad Beach GHAD – Legal Description**
Exhibit B:	**Site Plan and GHAD Boundary**
Figure 1:	**Seismic Hazard Zones**
Figure 2:	**Tsunami Inundation Map**

FIGURES

EXHIBIT "A"
LEGAL DESCRIPTION

IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, BEING THAT PORTION OF THE RANCHO TOPANGA MALIBU SEQUIT, AS CONFIRMED TO MATTHEW KELLER BY PATENT, RECORDED IN BOOK 1, PAGE 407 ET SEQ. OF PATENTS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE NORTHERLY PROLONGATION OF THE EASTERLY TRACT LINE OF TRACT NO. 12314, RECORDED IN BOOK 232, PAGES 23 AND 24, OF MAPS, IN THE OFFICE OF SAID COUNTY RECORDER WITH THE SOUTHERLY LINE OF THAT 60-FOOT STRIP OF LAND DEEDED TO SAID COUNTY OF LOS ANGELES, BY DEEDS RECORDED IN BOOK 21735, PAGE 135 AND IN BOOK 21722, PAGE 190 OF OFFICIAL RECORDS IN THE OFFICE OF SAID COUNTY RECORDER;

THENCE WESTERLY ALONG SAID SOUTHERLY LINE PARALLEL WITH THE CENTERLINE OF BROAD BEACH ROAD THE FOLLOWING 4 COURSES:

1. NORTH 55°10'30" WEST 693.12 FEET TO THE BEGINNING OF A CURVE TANGENT WITH SAID LINE, CONCAVE SOUTHERLY, AND HAVING A RADIUS OF 1980.00 FEET;
2. WESTERLY 290.86 FEET ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 08°25'00" TO THE BEGINNING OF A LINE TANGENT WITH SAID CURVE;
3. NORTH 63°35'30" WEST 530.42 FEET;
4. NORTH 64°54'00 WEST 625.20 FEET TO THE INTERSECTION OF THE NORTHERLY PROLONGATION OF THE WESTERLY TRACT LINE OF SAID TRACT NO. 12314 WITH THE SOUTHERLY LINE OF SAID 60-FOOT STRIP OF LAND;

THENCE ALONG SAID SOUTHERLY LINE NORTH 64°54'00" WEST 107.00 FEET TO THE NORTHEASTERLY CORNER OF TRACT NO. 12909, RECORDED IN BOOK 263, PAGES 37 AND 38, OF MAPS, IN THE OFFICE OF SAID COUNTY RECORDER;

THENCE ALONG THE NORTHERLY LINES OF SAID TRACT NO. 12909 THE FOLLOWING 5 COURSES:

1. NORTH 64°54'00" WEST 307.62 FEET TO THE BEGINNING OF A CURVE TANGENT WITH SAID LINE, CONCAVE SOUTHERLY, AND HAVING A RADIUS OF 1974.15 FEET;
2. WESTERLY ALONG SAID CURVE 199.27 FEET THROUGH A CENTRAL ANGLE OF 05°47'00" TO THE BEGINNING OF A LINE TANGENT WITH SAID CURVE;
3. NORTH 70°41'00" WEST 672.67 FEET TO THE BEGINNING OF A CURVE TANGENT WITH SAID LINE, CONCAVE SOUTHWESTERLY, AND HAVING A RADIUS OF 2980.00 FEET;
4. WESTERLY ALONG SAID CURVE 615.90 FEET THROUGH A CENTRAL ANGLE OF 11°50'30" TO THE BEGINNING OF A LINE TANGENT WITH SAID CURVE;
5. NORTH 82°31'30 WEST 615.67 FEET TO THE NORTHEASTERLY CORNER OF TRACT NO. 31986, RECORDED IN BOOK 1081, PAGES 78 AND 79 OF MAPS, IN THE OFFICE OF SAID COUNTY RECORDER;

THENCE ALONG THE NORTHERLY LINES OF SAID TRACT NO. 31986 NORTH 82°31'30" WEST 118.84 FEET TO THE NORTHWESTERLY CORNER OF SAID TRACT NO. 31986;

THENCE ALONG SAID SOUTHERLY LINE NORTH 82°31'30" WEST 105.00 FEET TO THE NORTHEASTERLY CORNER OF TRACT NO. 32003, RECORDED IN BOOK 1081, PAGES 28 AND 29, OF MAPS, IN THE OFFICE OF SAID COUNTY RECORDER;

THENCE ALONG THE NORTHERLY LINES OF SAID TRACT NO. 32003 NORTH 82°31'30" WEST 300.02 FEET TO THE NORTHEASTERLY CORNER OF TRACT NO. 25166, RECORDED IN BOOK 695, PAGES 29 THROUGH 31, OF MAPS, IN THE OFFICE OF SAID COUNTY RECORDER;

THENCE ALONG THE EASTERLY LINE OF SAID TRACT NO. 25166 SOUTH 07°28'30" WEST 65.06 FEET TO THE NORTHEASTERLY CORNER OF LOT 16 OF SAID TRACT NO. 25166;

THENCE ALONG THE NORTHERLY LINES OF SAID LOT 16 THE FOLLOWING 2 COURSES:

1. NORTH 84°58'01" WEST 131.25 FEET;
2. SOUTH 76°12'50" WEST 31.00 FEET TO THE EASTERLY END OF THE CENTERLINE OF VICTORIA POINT ROAD (A PRIVATE ROAD) PER SAID TRACT NO. 25166;

THENCE ALONG SAID VICTORIA POINT ROAD CENTERLINE THE FOLLOWING 5 COURSES:

1. NORTH 17°26'00" WEST 11.00 FEET;
2. SOUTH 72°34'00" WEST 105.92 FEET TO THE BEGINNING OF A CURVE TANGENT WITH SAID LINE, CONCAVE SOUTHEASTERLY, AND HAVING A RADIUS OF 1000.00 FEET;
3. SOUTHWESTERLY ALONG SAID CURVE 134.68 FEET THROUGH A CENTRAL ANGLE OF 07°43'00" TO THE BEGINNING OF A LINE TANGENT WITH SAID CURVE;
4. SOUTH 64°51'00" WEST 68.42 FEET TO THE BEGINNING OF A CURVE TANGENT WITH SAID LINE, CONCAVE NORTHWESTERLY, AND HAVING A RADIUS OF 100.00 FEET;

5. SOUTHWESTERLY ALONG SAID CURVE 51.65 FEET THROUGH A CENTRAL ANGLE OF 29°35'30" TO THE MOST NORTHWESTERLY CORNER OF LOT 7 OF SAID TRACT NO. 25166;

THENCE ALONG THE WESTERLY LINES OF SAID LOT 7 THE FOLLOWING 3 COURSES:

1. SOUTH 04°26'30' WEST 110.00 FEET;
2. SOUTH 56°26'55" WEST 59.24 FEET;
3. SOUTH 32°46'52" EAST 15.00 FEET TO THE MOST WESTERLY CORNER OF LOT 6 OF SAID TRACT NO. 25166;

THENCE ALONG THE SOUTHWESTERLY LINES OF SAID LOT 6 THE FOLLOWING 3 COURSES:

1. SOUTH 32°46'52" EAST 12.00 FEET;
2. NORTH 57°13'08" EAST 16.36 FEET;
3. SOUTH 40°20'10" EAST TO THE MEAN HIGH TIDE LINE OF THE PACIFIC OCEAN;

THENCE NORTHERLY, NORTHEASTERLY, AND EASTERLY ALONG THE MEAN HIGH TIDE LINE OF THE PACIFIC OCEAN AND ALONG THE SOUTHERLY LINES OF THE LAND DESCRIBED IN THE FOLLOWING TRACTS AND DEEDS:

1. SAID TRACT NO. 25166;
2. SAID TRACT NO. 32003;
3. SAID TRACT NO. 31986;
4. SAID TRACT NO. 12909;
5. GRANT DEED 00-0644320 RECORDED APRIL 28, 2000 IN THE OFFICE OF SAID COUNTY RECORDER;
6. GRANT DEED 04-0646973 RECORDED MARCH 18, 2004 IN THE OFFICE OF SAID COUNTY RECORDER;
7. SAID TRACT NO. 12314;
8. GRANT DEED 20072854217 RECORDED DECEMBER 28, 2007 IN THE OFFICE OF SAID COUNTY RECORDER;
9. GRANT DEED 96-1557431 RECORDED SEPTEMBER 23, 1996 IN THE OFFICE OF SAID COUNTY RECORDER;
10. GRANT DEED 3411 RECORDED APRIL 03, 1967 IN THE OFFICE OF SAID COUNTY RECORDER;
11. GRANT DEED 20080278549 RECORDED FEBRUARY 02, 2008 IN THE OFFICE OF SAID COUNTY RECORDER;
12. GRANT DEED 3527 RECORDED DECEMBER 30, 1958 IN THE OFFICE OF SAID COUNTY RECORDER;
13. GRANT DEED 05-1153695 RECORDED MAY 17, 2005 IN THE OFFICE OF SAID COUNTY RECORDER;
14. GRANT DEED 20080934875 RECORDED MAY 28, 2008 IN THE OFFICE OF SAID COUNTY RECORDER;
15. GRANT DEED 20091411424 RECORDED SEPTEMBER 16, 2009 IN THE OFFICE OF SAID COUNTY RECORDER;
16. GRANT DEED 99-2390992 RECORDED DECEMBER 29, 1999 IN THE OFFICE OF SAID COUNTY RECORDER TO THE EASTERLY LINE OF THE LAND DESCRIBED IN SAID GRANT DEED 99-2390992;

THENCE ALONG SAID EASTERLY LINE OF THE LAND DESCRIBED IN SAID GRANT DEED 99-2390992 NORTH 36°37'30" EAST TO A NON TANGENT CURVE CONCAVE NORTHEASTERLY, AND HAVING A RADIUS OF 10,050.00 FEET, SAID CURVE ALSO BEING THE SOUTHERLY LINE OF THE 100 FOOT WIDE STRIP OF LAND (PACIFIC COAST HIGHWAY) CONVEYED TO THE STATE OF CALIFORNIA BY THE DEED RECORDED IN BOOK 20716 PAGE 385, OF OFFICIAL RECORDS;

THENCE WESTERLY ALONG SAID SOUTHERLY LINE OF THE 100 FOOT WIDE STRIP OF LAND THE FOLLOWING 2 COURSES:

1. NORTHWESTERLY ALONG SAID CURVE 208.29 FEET THROUGH A CENTRAL ANGLE OF 01°11'15";
2. NORTH 48°39'15" WEST 228.77 FEET TO THE INTERSECTION OF THE NORTHERLY PROLONGATION OF THE EASTERLY LINE OF THE LAND DESCRIBED IN SAID GRANT DEED 3411 WITH THE SAID SOUTHERLY LINE OF THE 100 FOOT WIDE STRIP OF LAND;

THENCE ALONG SAID NORTHERLY PROLONGATION OF THE EASTERLY LINE OF THE LAND DESCRIBED IN SAID GRANT DEED 3411 SOUTH 34°49'30" EAST 10.07 FEET TO THE NORTHEASTERLY CORNER OF THE LAND DESCRIBED IN SAID GRANT DEED 3411;

THENCE ALONG THE NORTHERLY LINE OF THE LAND DESCRIBED IN SAID GRANT DEED 3411 NORTH 48°39'15" WEST TO THE NORTHWESTERLY CORNER OF THE LAND DESCRIBED IN SAID GRANT DEED 3411;

THENCE ALONG THE WESTERLY LINE OF THE LAND DESCRIBED IN SAID GRANT DEED 3411 SOUTH 34°49'30" WEST 32.91 FEET TO THE SAID SOUTHERLY LINE OF THE 60-FOOT STRIP OF LAND PARALLEL WITH BROAD BEACH ROAD;

THENCE ALONG THE SAID SOUTHERLY LINE OF THE 60-FOOT STRIP OF LAND PARALLEL WITH THE CENTERLINE OF BROAD BEACH ROAD NORTH 55°10'30" WEST 121.95 FEET TO THE **POINT OF BEGINNING.**

AS SHOWN ON THE ATTACHED EXHIBIT "B" AND BY THIS REFERENCE MADE A PART HEREOF.

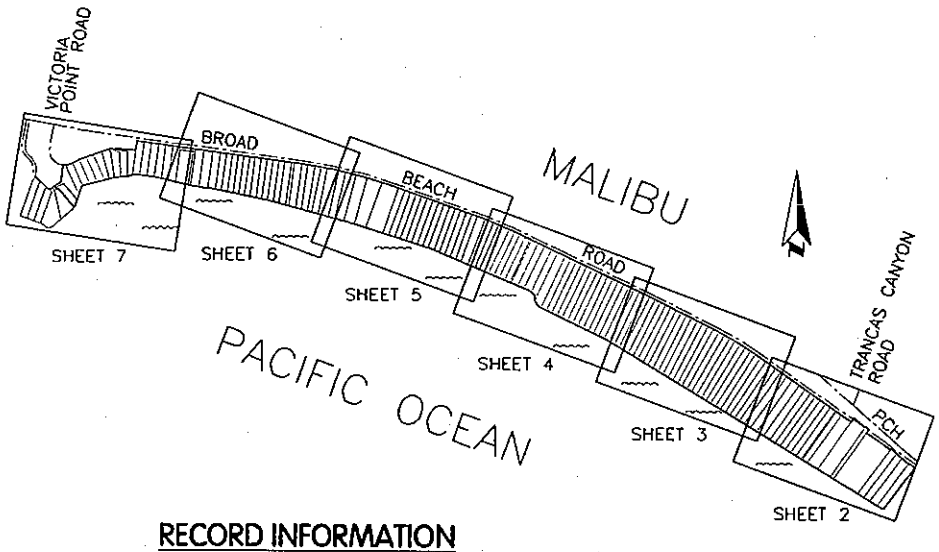
SUBJECT TO ALL COVENANTS, RIGHTS, RIGHTS-OF-WAY, AND EASEMENTS OF RECORD, IF ANY.

THIS REAL PROPERTY DESCRIPTION HAS BEEN PREPARED BY ME, OR UNDER MY DIRECTION, IN CONFORMANCE WITH THE PROFESSIONAL LAND SURVEYOR'S ACT.

FINAL ELECTRONIC COPY 3/15/11
RICHARD C. MAHER, PLS 7564 DATE
THIS DOCUMENT IS PRELIMINARY UNLESS SIGNED

KDM MERIDIAN, INC.
(949) 768-0731

03/14/11	EXHIBIT "B" PLOT TO ACCOMPANY LEGAL DESCRIPTION	SHEET 1 OF 7



RECORD INFORMATION

THE CENTERLINES, RIGHTS-OF-WAY, AND PROPERTY LINES SHOWN HERON ARE BASED ON THE FOLLOWING RECORD MAPS AS FILED IN THE OFFICE OF THE LOS ANGELES COUNTY RECORDER:

TRACT NO. 12314	BOOK 232	PAGES 23-24
TRACT NO. 12909	BOOK 263	PAGES 37-38
TRACT NO. 31986	BOOK 1081	PAGES 78-79
TRACT NO. 32003	BOOK 1081	PAGES 28-29
TRACT NO. 25166	BOOK 695	PAGES 29-31
RECORD OF SURVEY	BOOK 76	PAGES 20-21
F.M. 11698-1		PAGES A1-A8
F.M. 11260-2		PAGES A1-A13

DEEDS REFERENCED AS XX-XXXXXXX INDICATE RECORDED INSTRUMENT NUMBER IN THE LOS ANGELES COUNTY RECORDERS OFFICE.

(1) 60-FOOT STRIP OF LAND DESCRIBED IN DEEDS RECORDED IN BOOK 21735, PAGE 135 AND BOOK 21722, PAGE 190, FILED IN THE OFFICE OF THE LOS ANGELES COUNTY RECORDER

LINE TABLE

LINE	BEARING	DISTANCE
L1	S07°28'30"W	65.06'
L2	N84°58'01"W	131.25'
L3	S76°12'50"W	31.00'
L4	N17°26'00"W	11.00'
L5	S72°34'00"W	105.92'
L6	S64°51'00"W	68.42'
L7	S04°26'30"W	110.00'
L8	S56°26'55"W	59.24'
L9	S32°46'52"E	27.00'
L10	N57°13'08"E	16.36'
L11	S34°49'30"W	10.07'
L12	N48°39'15"W	100.66'
L13	S34°49'30"W	32.91'
L14	N55°10'30"W	121.95'

CURVE TABLE

CURVE	DELTA ANGLE	ARC LENGTH	RADIUS
C1	7°43'00"	134.68'	1000.00'
C2	29°35'30"	51.65'	100.00'

LEGEND

P.O.B. POINT OF BEGINNING
℄ CENTERLINE

PREPARED BY:

FINAL ELECTRONIC COPY 3/15/11

RICHARD C. MAHER, PLS 7564 DATE
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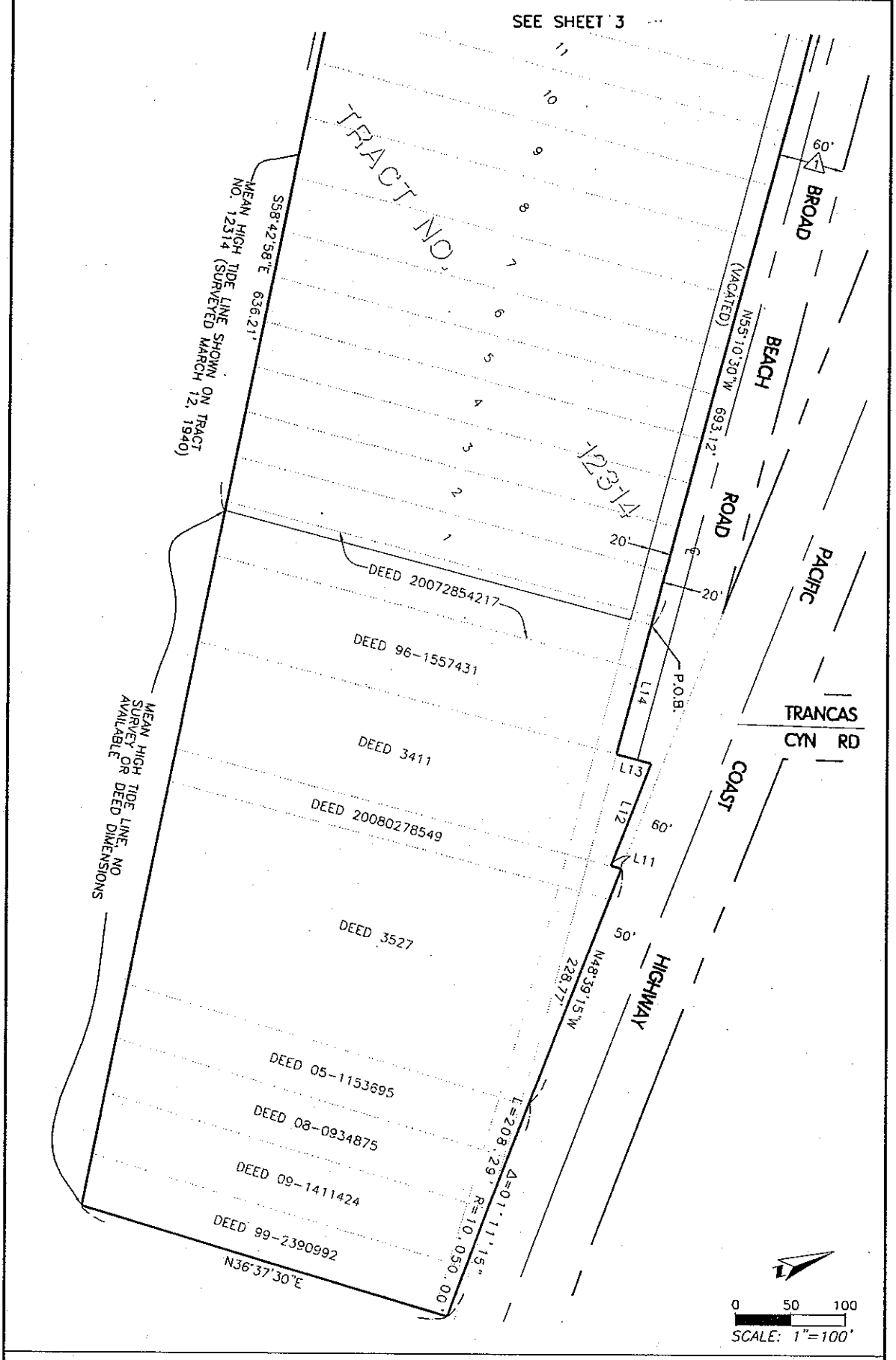
	PLAT TO ACCOMPANY LEGAL DESCRIPTION	



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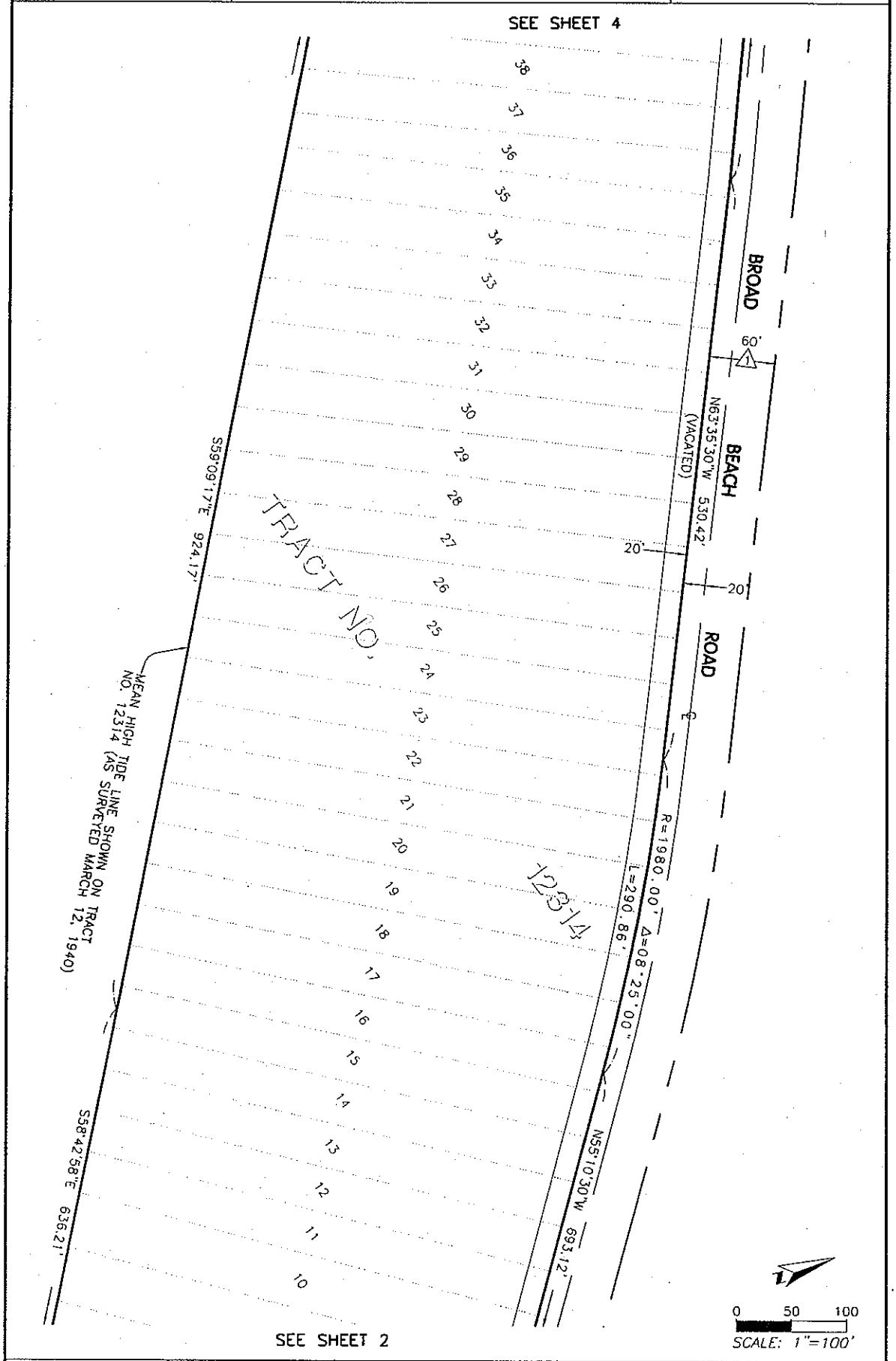
03/14/11	EXHIBIT "B" PLAT TO ACCOMPANY LEGAL DESCRIPTION	SHEET 3 OF 7



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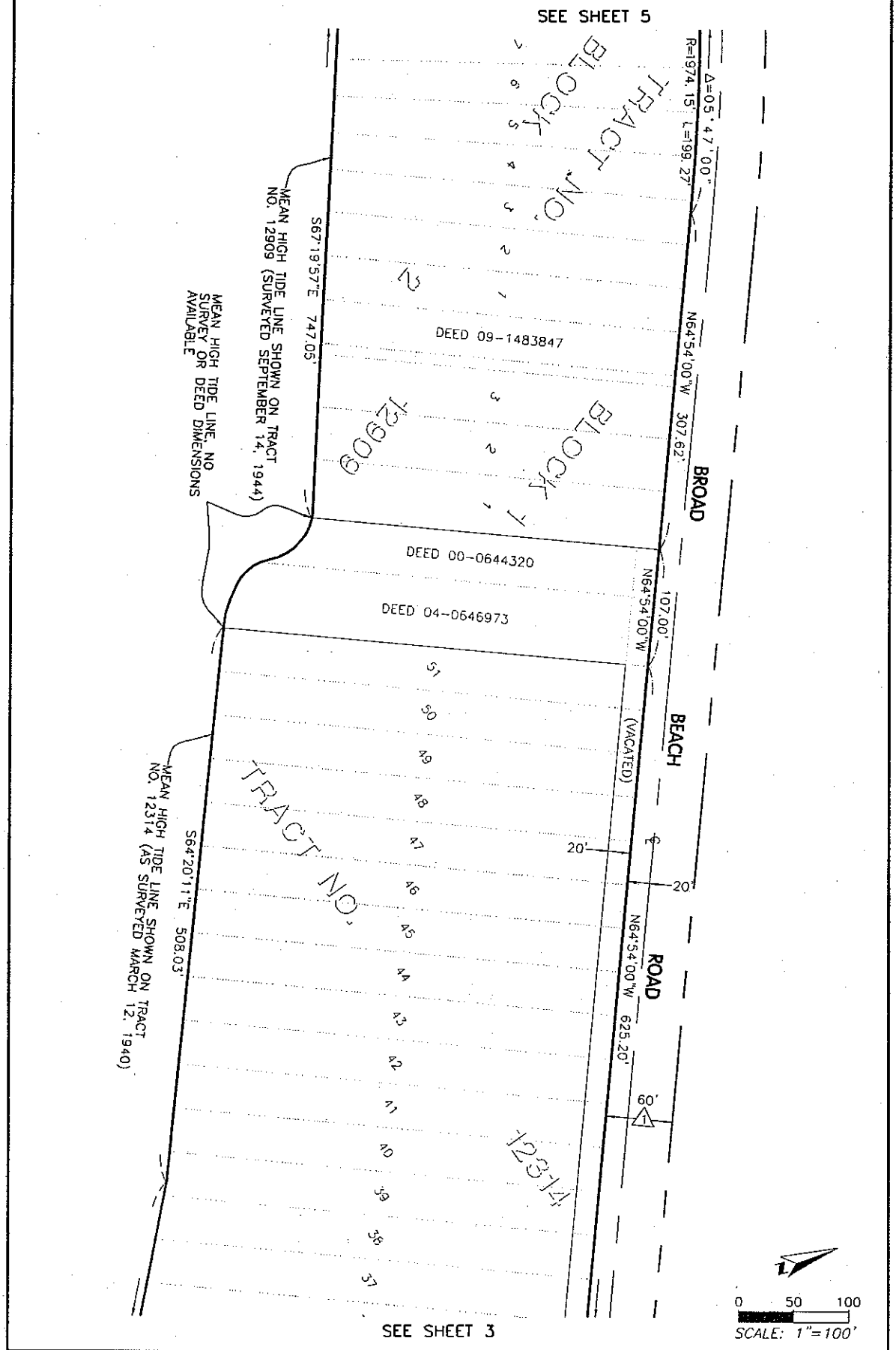

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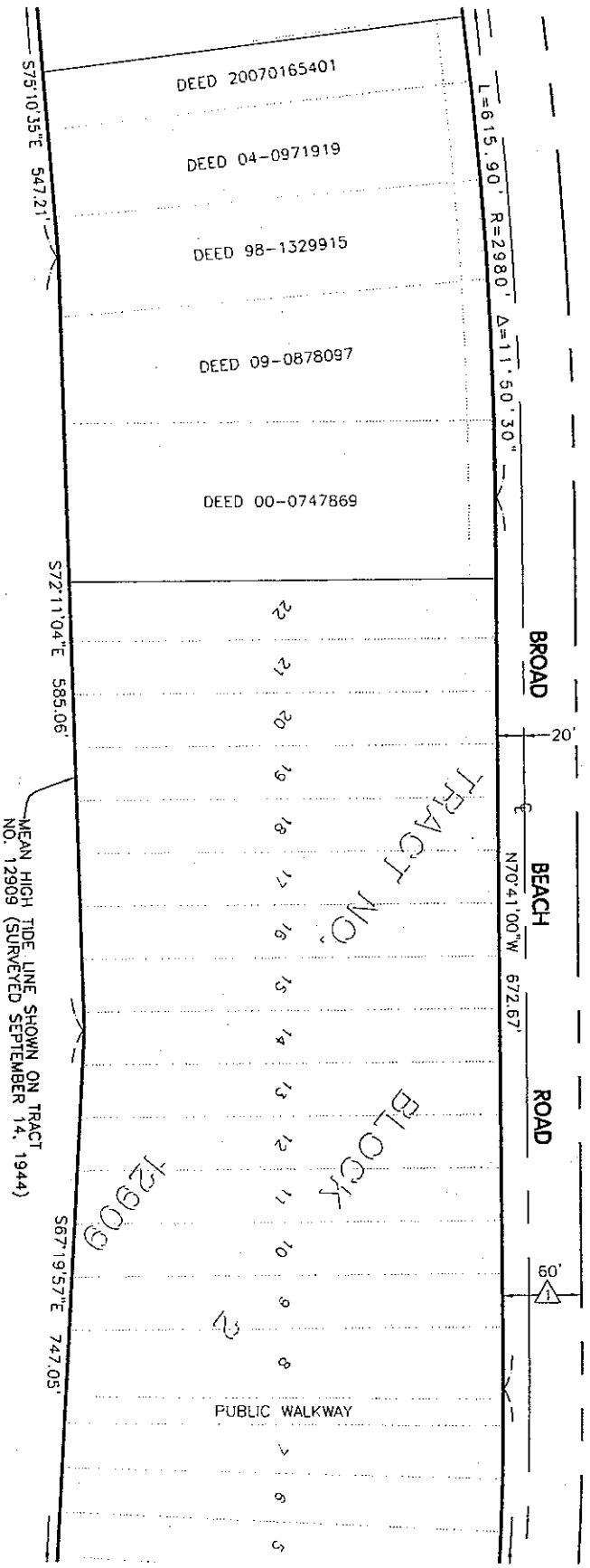
SEE SHEET 6



SEE SHEET 4

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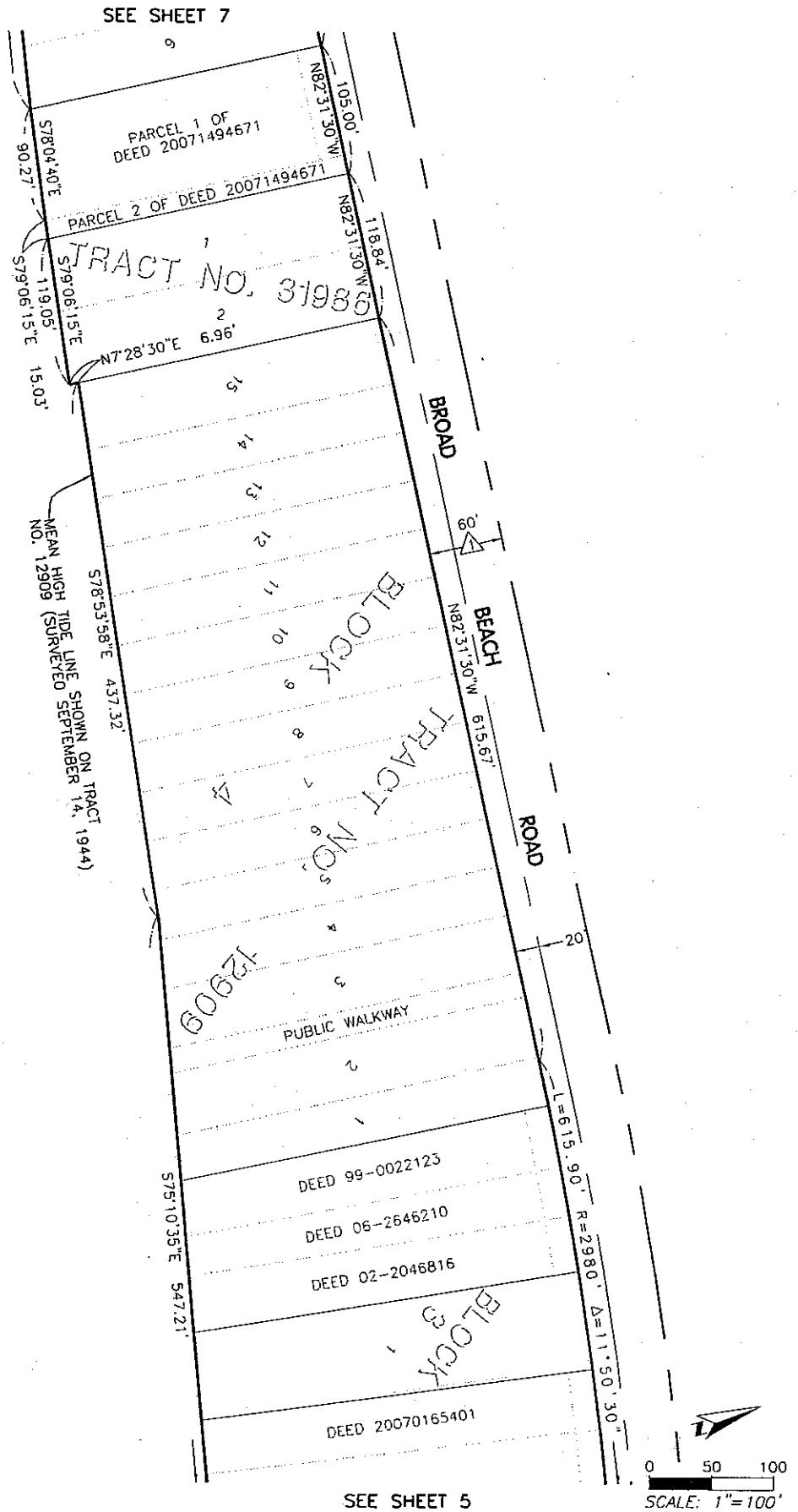

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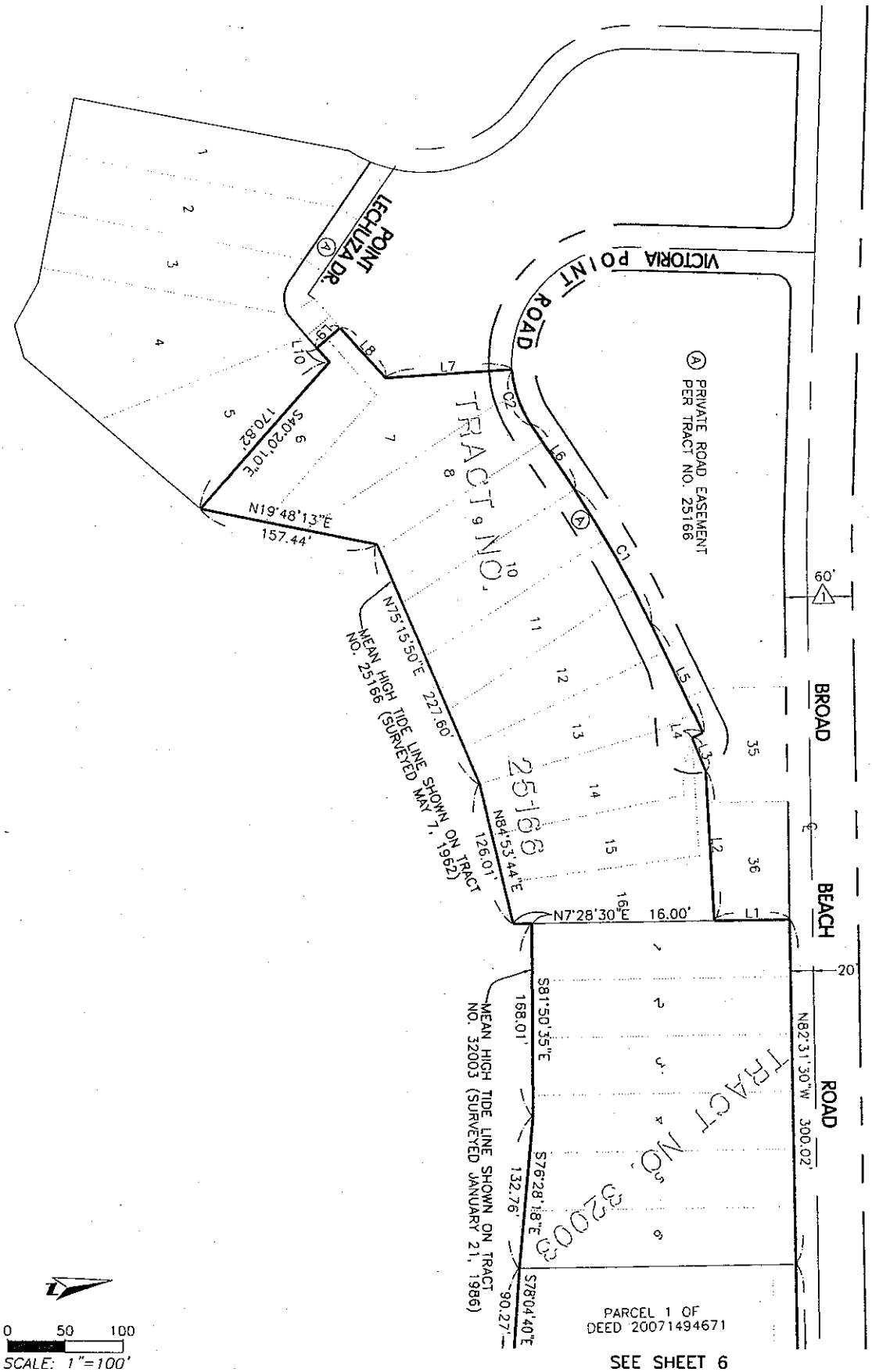

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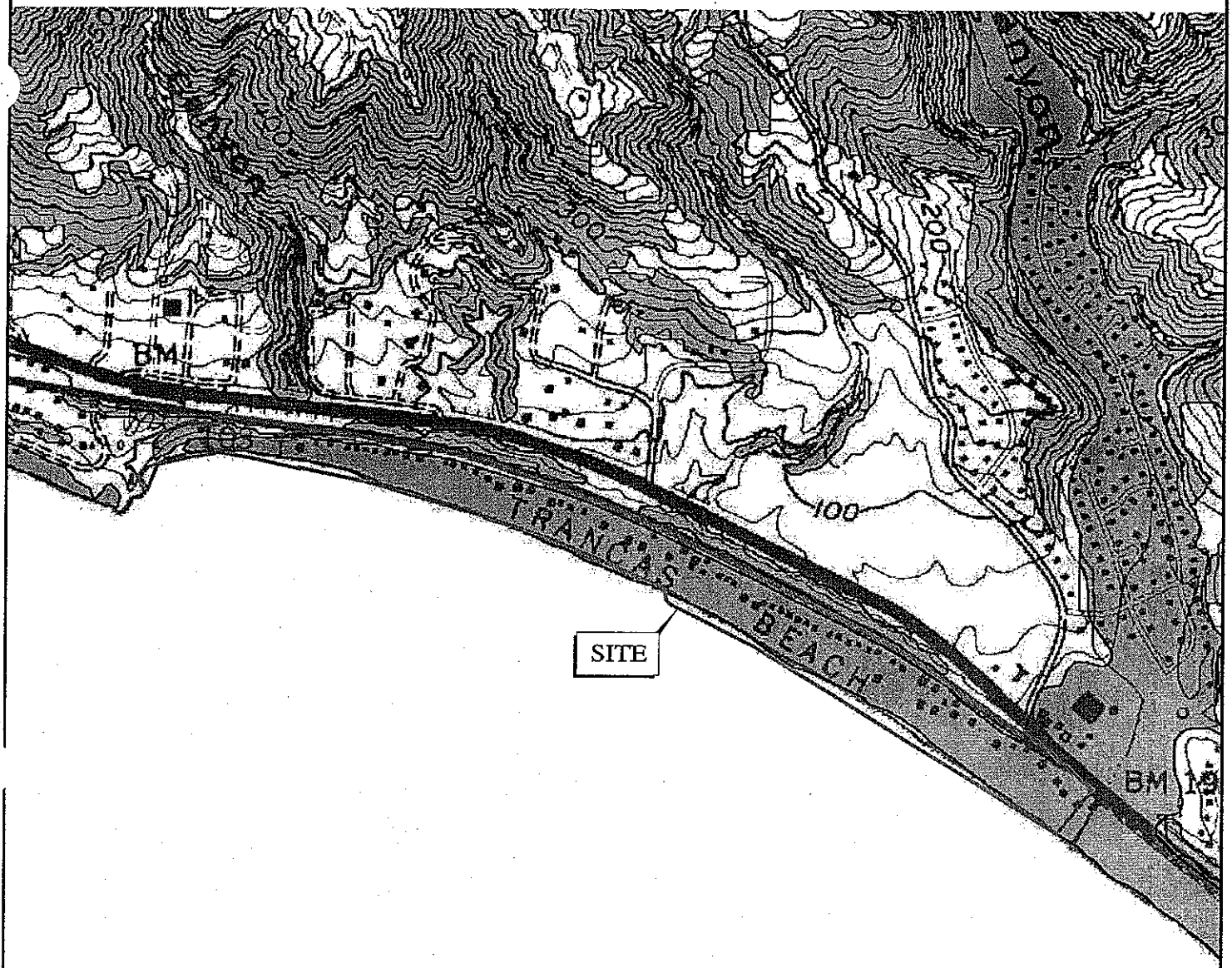

EXPLANATION

LIQUEFACTION

AREAS WHERE HISTORIC OCCURRENCE OF LIQUEFACTION, OR LOCAL GEOLOGICAL, GEOTECHNICAL AND GROUNDWATER CONDITIONS INDICATE A POTENTIAL FOR PERMANENT GROUND DISPLACEMENTS SUCH THAT MITIGATION AS DEFINED IN PUBLIC RESOURCES CODE SECTION 2693(c) WOULD BE REQUIRED

EARTHQUAKE-INDUCED LANDSLIDES

AREAS WHERE PREVIOUS OCCURRENCE OF LANDSLIDE MOVEMENT, OR LOCAL TOPOGRAPHIC, GEOLOGICAL, GEOTECHNICAL AND SUBSURFACE WATER CONDITIONS INDICATE A POTENTIAL FOR PERMANENT GROUND DISPLACEMENTS SUCH THAT MITIGATION AS DEFINED IN PUBLIC RESOURCES CODE SECTION 2693(c) WOULD BE REQUIRED

N

0 FEET 1000

0 METERS 500

BASE MAP SOURCE: CALIFORNIA DEPARTMENT OF CONSERVATION, CALIFORNIA GEOLOGICAL SURVEY, 2002

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SEISMIC HAZARD ZONE MAP
BROAD BEACH GHAD
MALIBU, CALIFORNIA

PROJECT NO.: 8588.000.000		FIGURE NO 1
SCALE: AS SHOWN		
DRAWN BY: DLB	CHECKED BY: TB	

G:\Drafting\DRAFTING2_Dwg\8588\000\GHAD\8588000000-1-Liquefaction-EQ-0411.dwg Plot Date: 4-08-11 dborde

ORIGINAL FIGURE PRINTED IN COLOR

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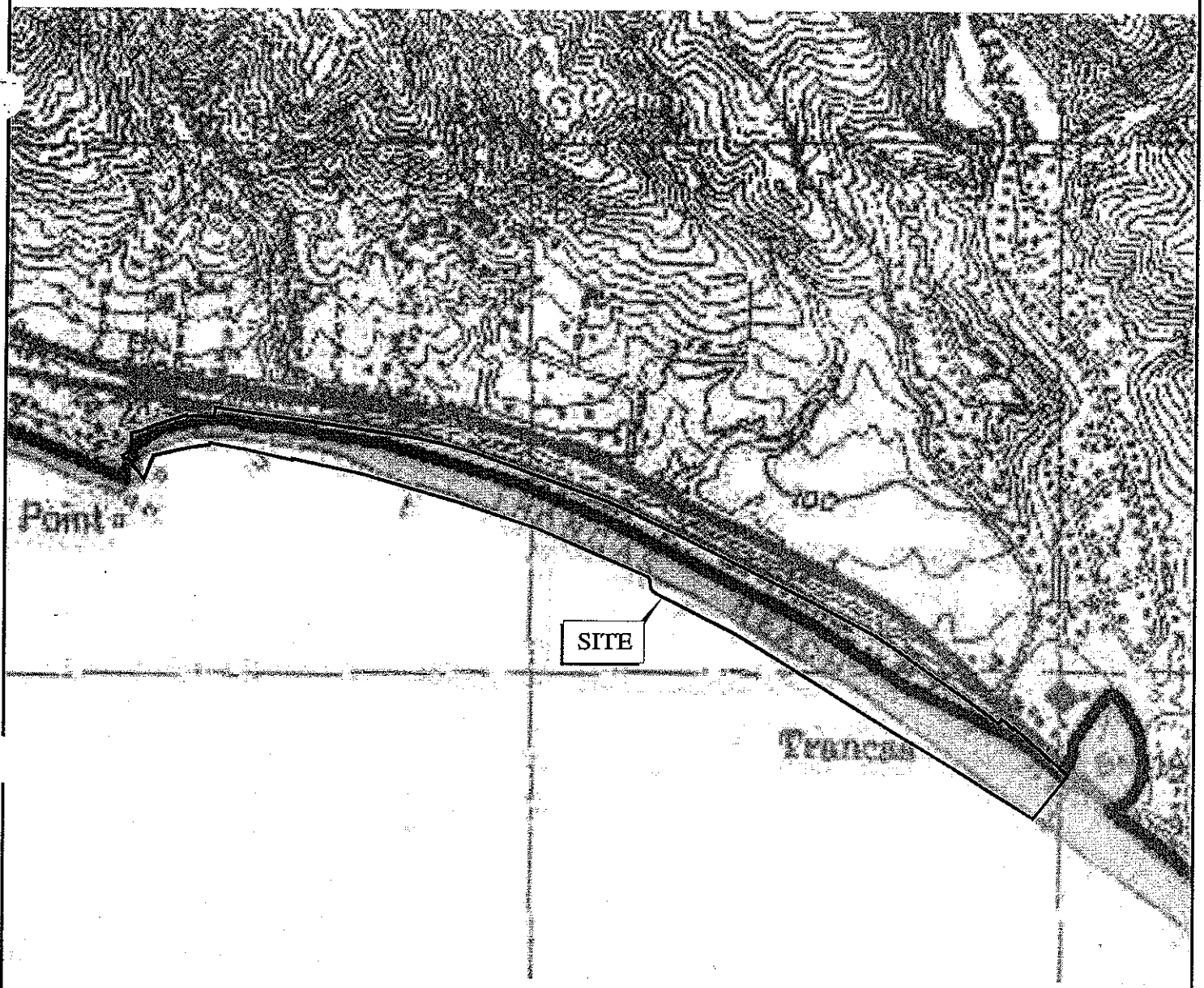

EXPLANATION

TSUNAMI INUNDATION LINE

TSUNAMI INUNDATION AREA

N

0 FEET 1000

0 METERS 500

BASE MAP SOURCE: CALIFORNIA EMERGENCY MANAGEMENT AGENCY, CGS, USC

ENGEO Expect Excellence

TSUNAMI INUNDATION

BROAD BEACH GHAD

MALIBU, CALIFORNIA

PROJECT NO.: 8588.000.000		FIGURE NO 2
SCALE: AS SHOWN		
DRAWN BY: DLB	CHECKED BY: TB	

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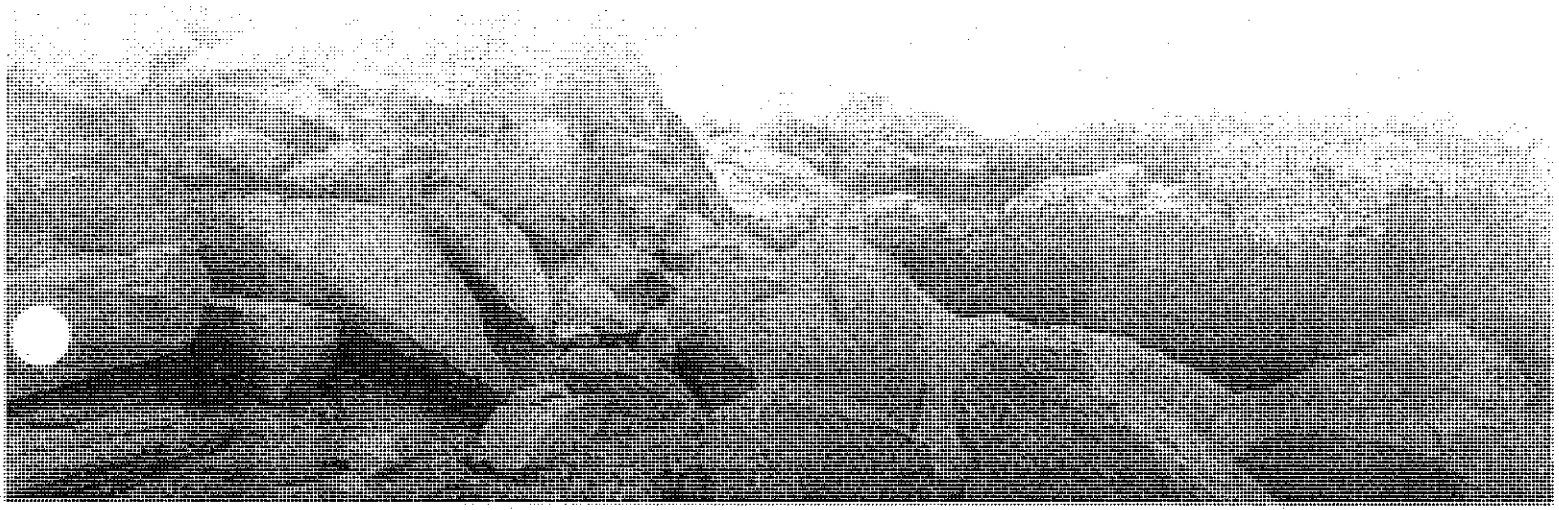
ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

Sea-Level Rise Commentary

APPENDIX A



SEA-LEVEL RISE COMMENTARY

Higher temperatures are expected to further raise sea level by expanding ocean water, melting mountain glaciers and small ice caps, and causing portions of Greenland and the Antarctic ice sheets to melt (EPA, 2009). The International Panel on Climate Change (IPCC) estimates that the global average sea level will rise between 0.6 and 2 feet in the next century (IPCC, 2007).

The range reflects uncertainty about global temperature projections and how rapidly ice sheets will melt or slide into the ocean in response to the warmer temperatures. Furthermore, some processes affecting sea level have long (centuries and longer) time-scales, so that current sea level change is also related to past climate change, and some relevant processes are not determined solely by climate. Climate models, satellite data and hydrographic observations demonstrate that sea level is not rising uniformly around the world (EPA, 2009). Depending on the region, sea level has risen several times the global mean rise or has actually fallen (IPCC, 2007).

Sea-level rise also increases the vulnerability of coastal areas to flooding during storms for several reasons. First, wave action builds on top of a higher base of water. Considering only this effect, a Report to Congress by FEMA (1991) estimated that existing development in the United States Coastal Zone would experience a 36 to 58 percent increase in annual damages for a 1-foot rise in sea level, and a 102 to 200 percent increase for a 3-foot rise. Shore erosion also increases vulnerability to storms, by removing the beaches and dunes that would otherwise protect coastal property from storm waves (FEMA 2000). Sea-level rise also increases coastal flooding from rainstorms, because low areas drain more slowly as sea level rises (EPA, 2009).

Other impacts of climate change may further enhance or mitigate coastal flooding. Flooding from rainstorms may become worse if higher temperatures lead to increasing rainfall intensity during severe storms (EPA, 2009).