

**Subsidence
Overview
and
Task Description**

(Redondo Beach King Harbor -- Breakwater Evaluation)

by

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Community Health & Safety
Full Disclosure**

Examples of Subsidence in the Los Angeles Basin

Inglewood Field

- a) Map
- b) subsidence

Wilmington-Torrance Field

- a) Maps and interrelationship
- b) subsidence

United States Geological Survey Data on Oilfield Subsidence

R15W

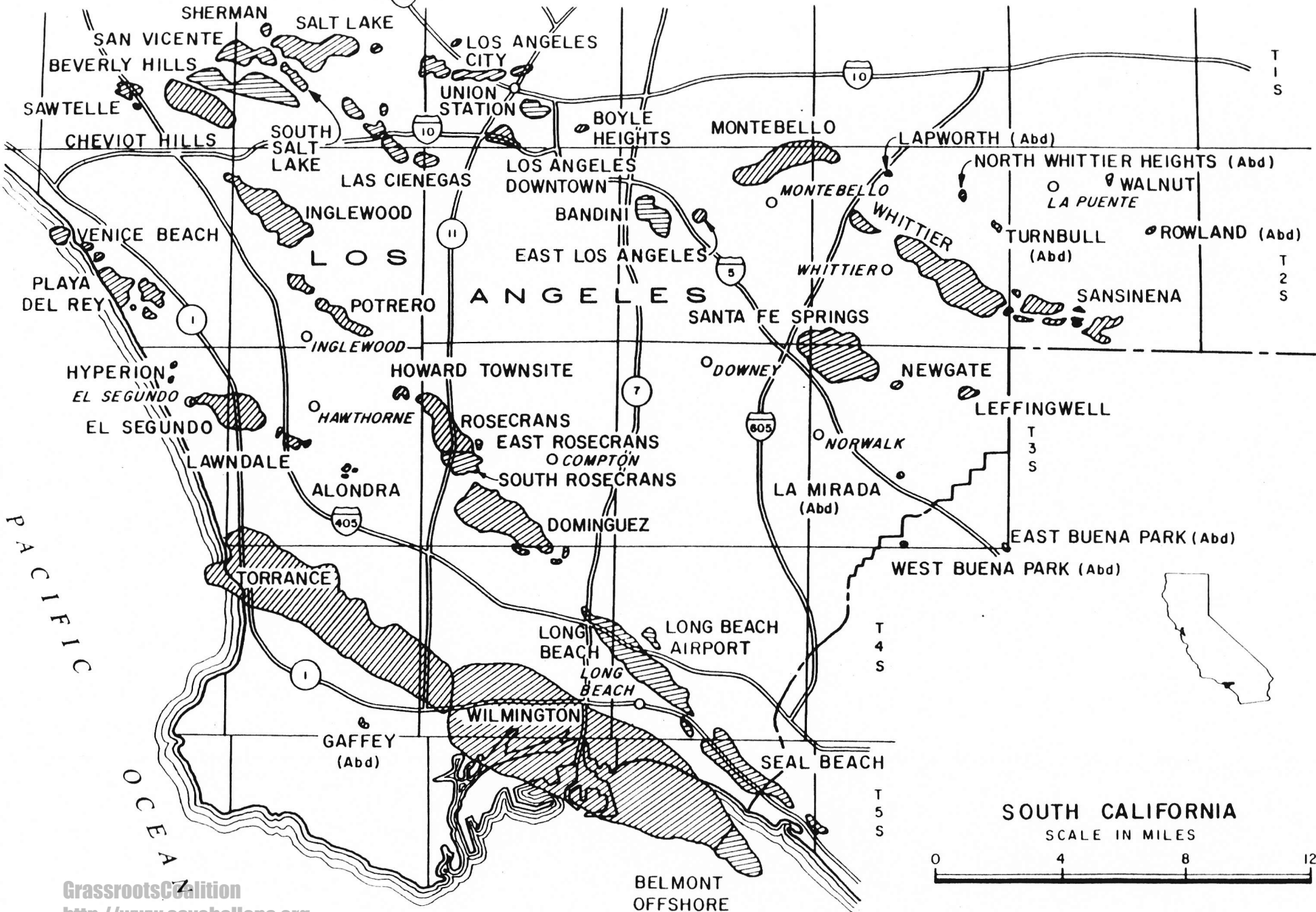
R14W

R13W

R12W

R11W

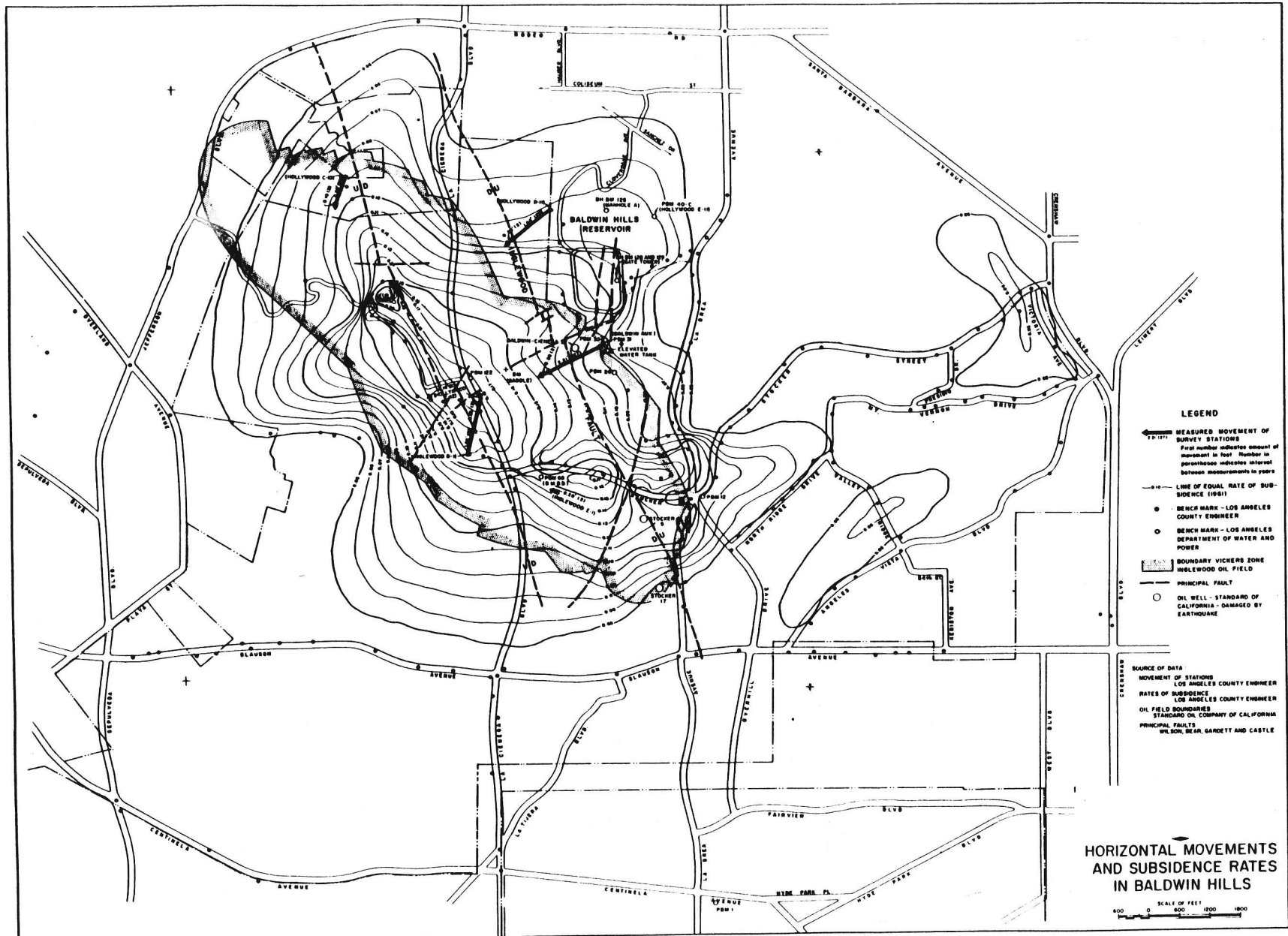
R10W



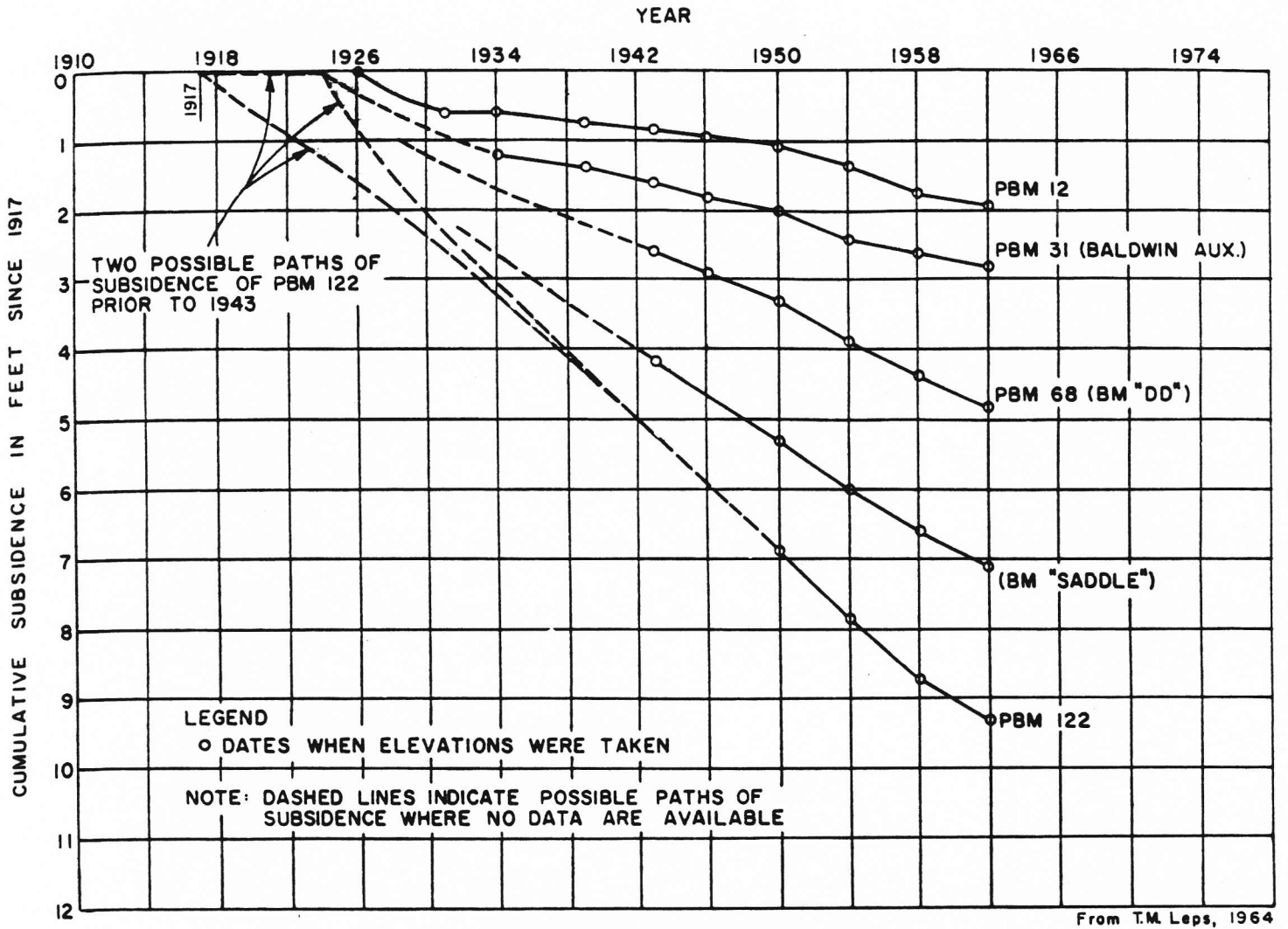
PACIFIC OCEAN

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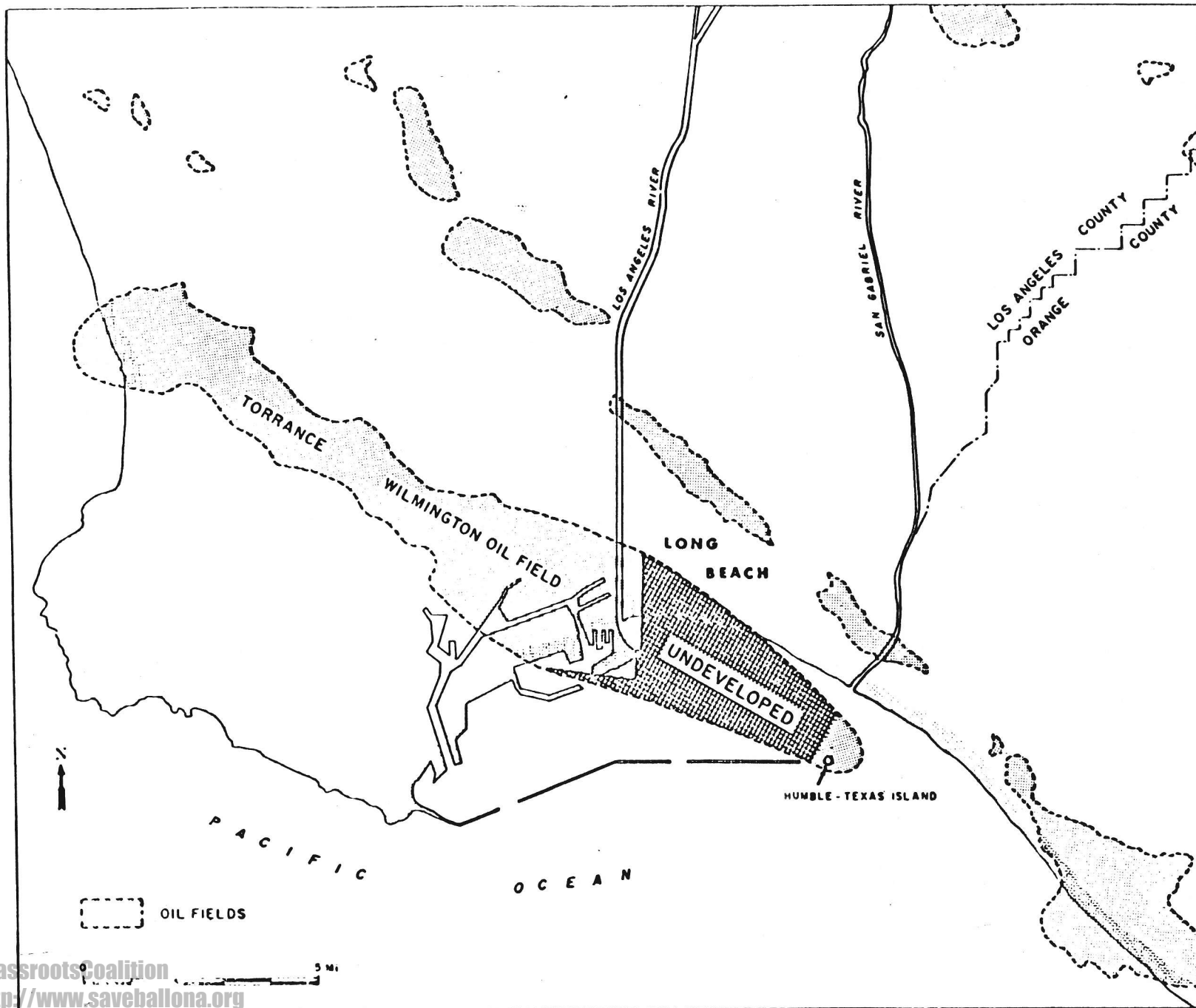
OILFIELDS OF SOUTHERN CALIFORNIA



Horizontal movements and subsidence rates in Baldwin Hills.

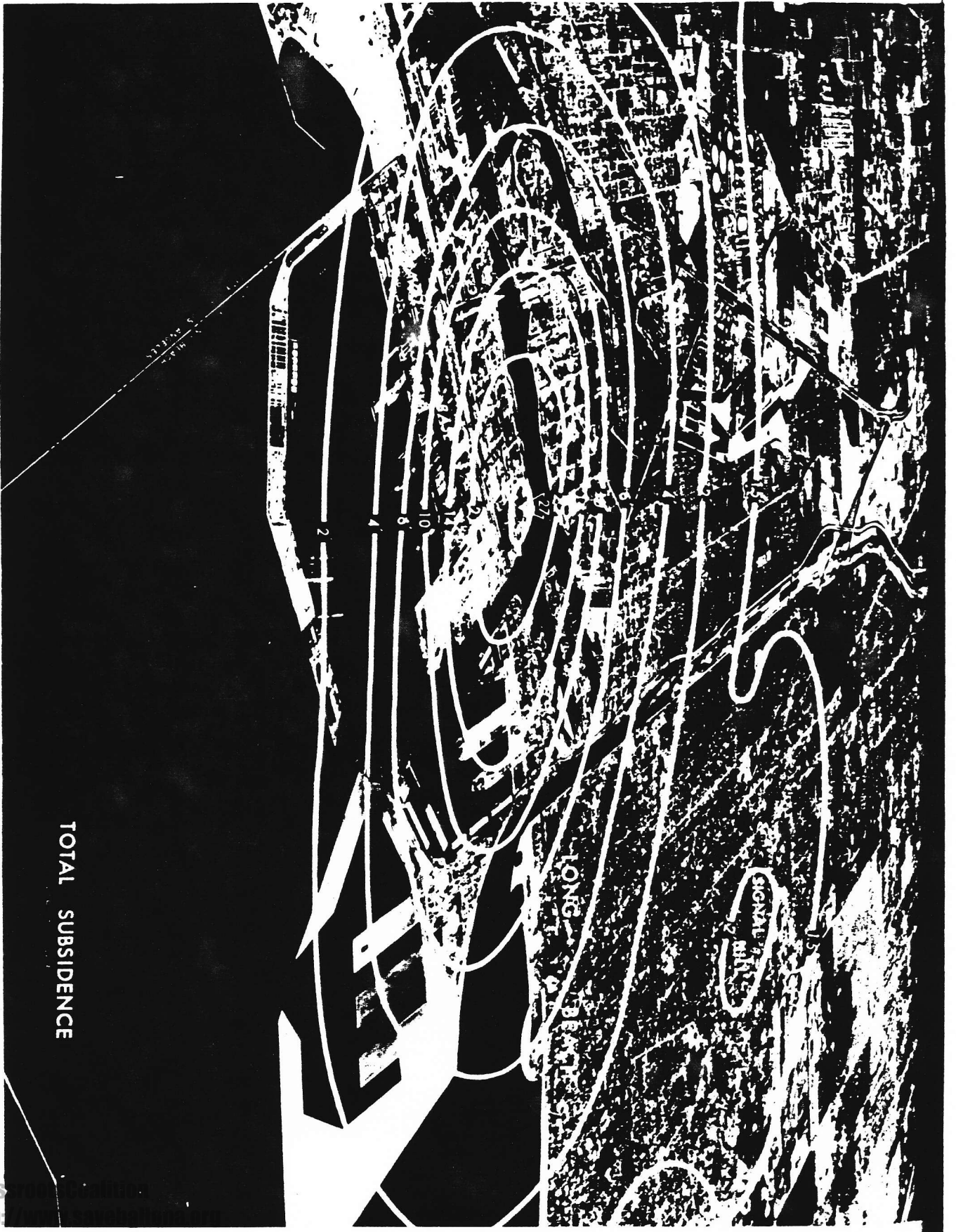


SUBSIDENCE OF BENCH MARKS
BALDWIN HILLS AREA



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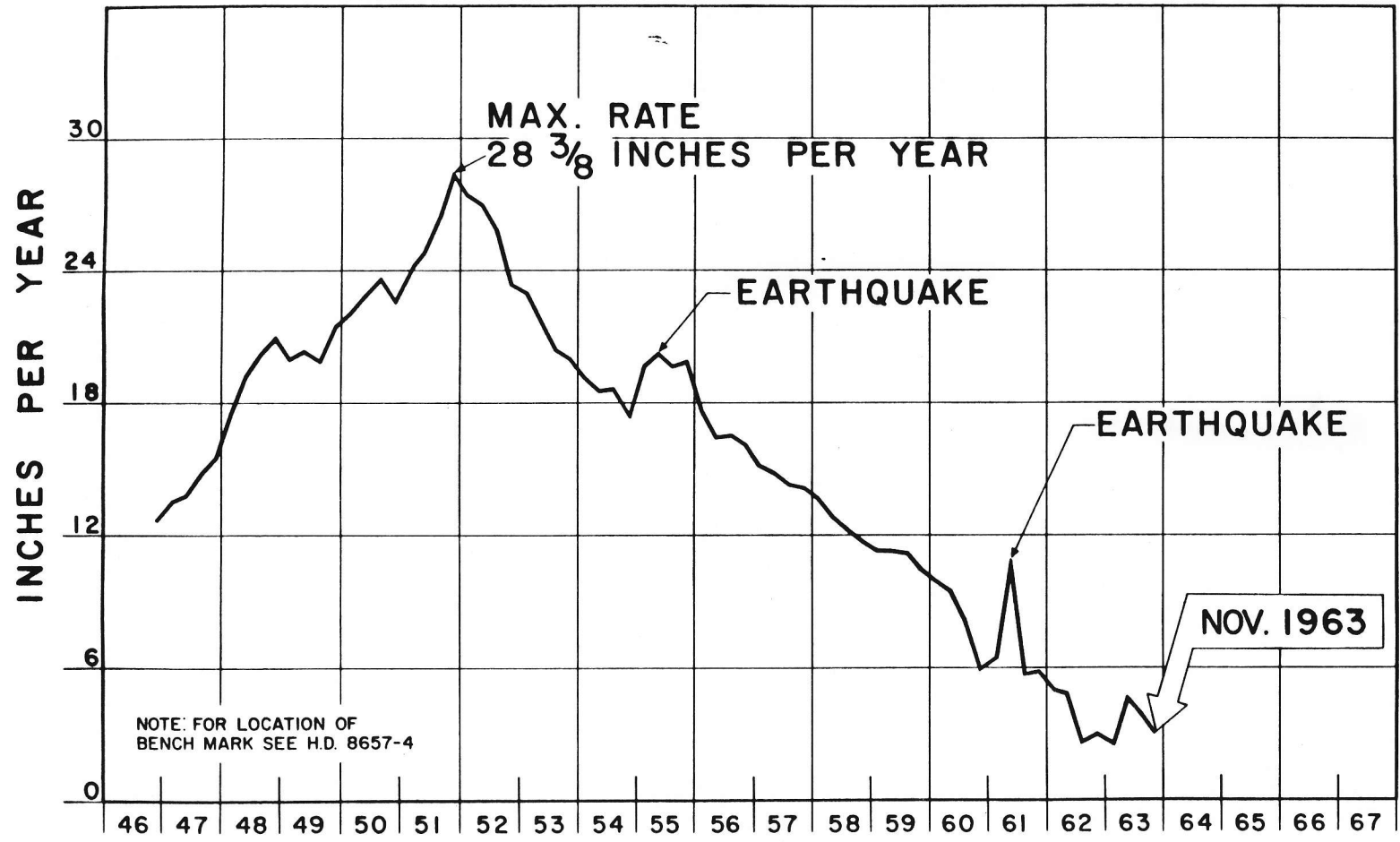
Map of Southwestern Los Angeles Basin showing the location of the Wilmington Oil Field and other oil fields.



TOTAL SUBSIDENCE

Air photo of Area with superimposed Isobases of the total subsidence, 1928 - 1963.

SUBSIDENCE RATE CENTER OF SUBSIDENCE BOWL

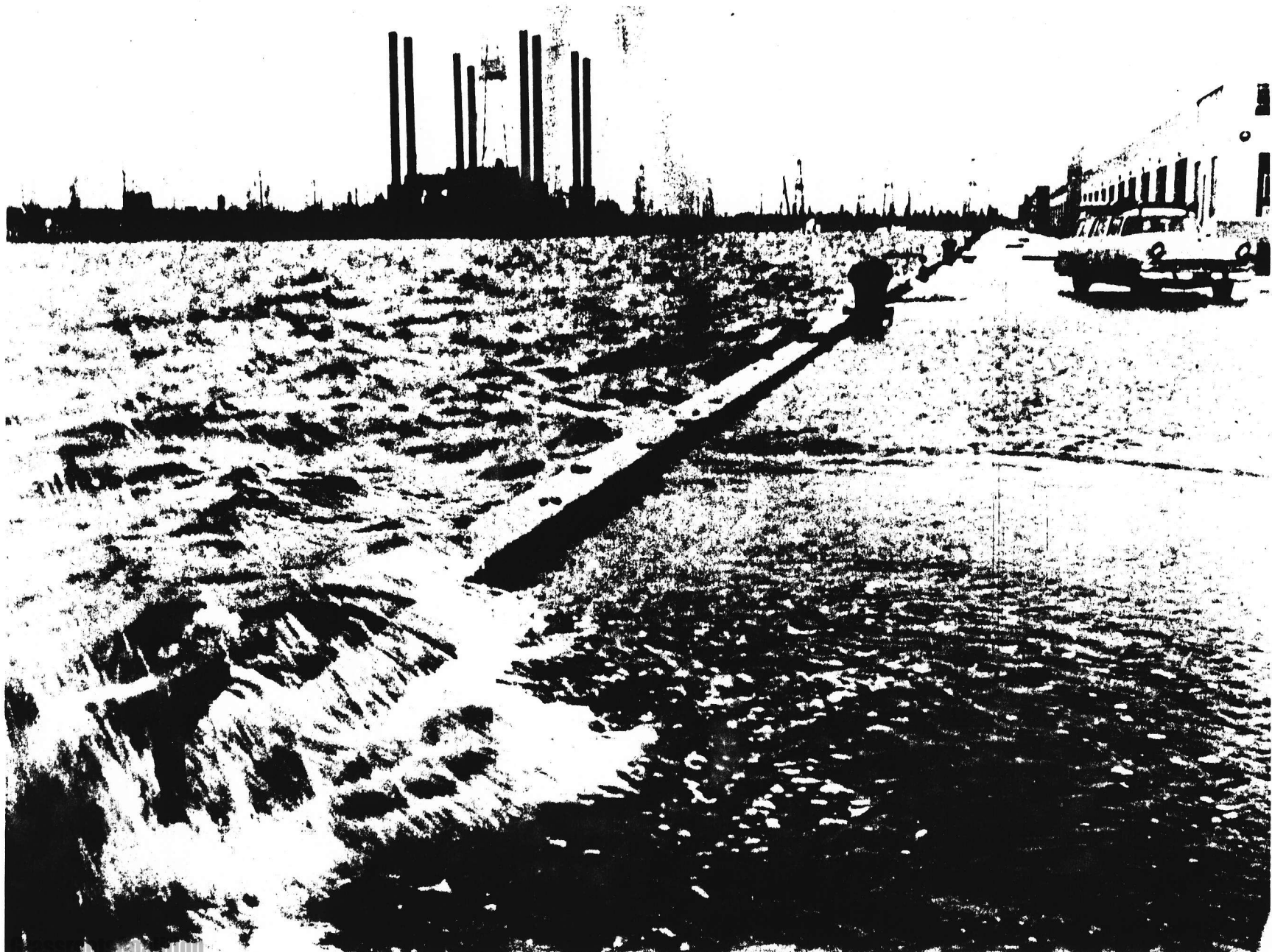


NOTE: FOR LOCATION OF BENCH MARK SEE H.D. 8657-4

B.M. NO. 8772

YEAR

H.D. 8658



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Community Health & Safety Municipal wharf inundated at high tide due to subsidence. Area subsequently raised.

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PRELIMINARY GEOLOGIC ENVIRONMENTAL MAP OF THE GREATER LOS ANGELES AREA, CALIFORNIA

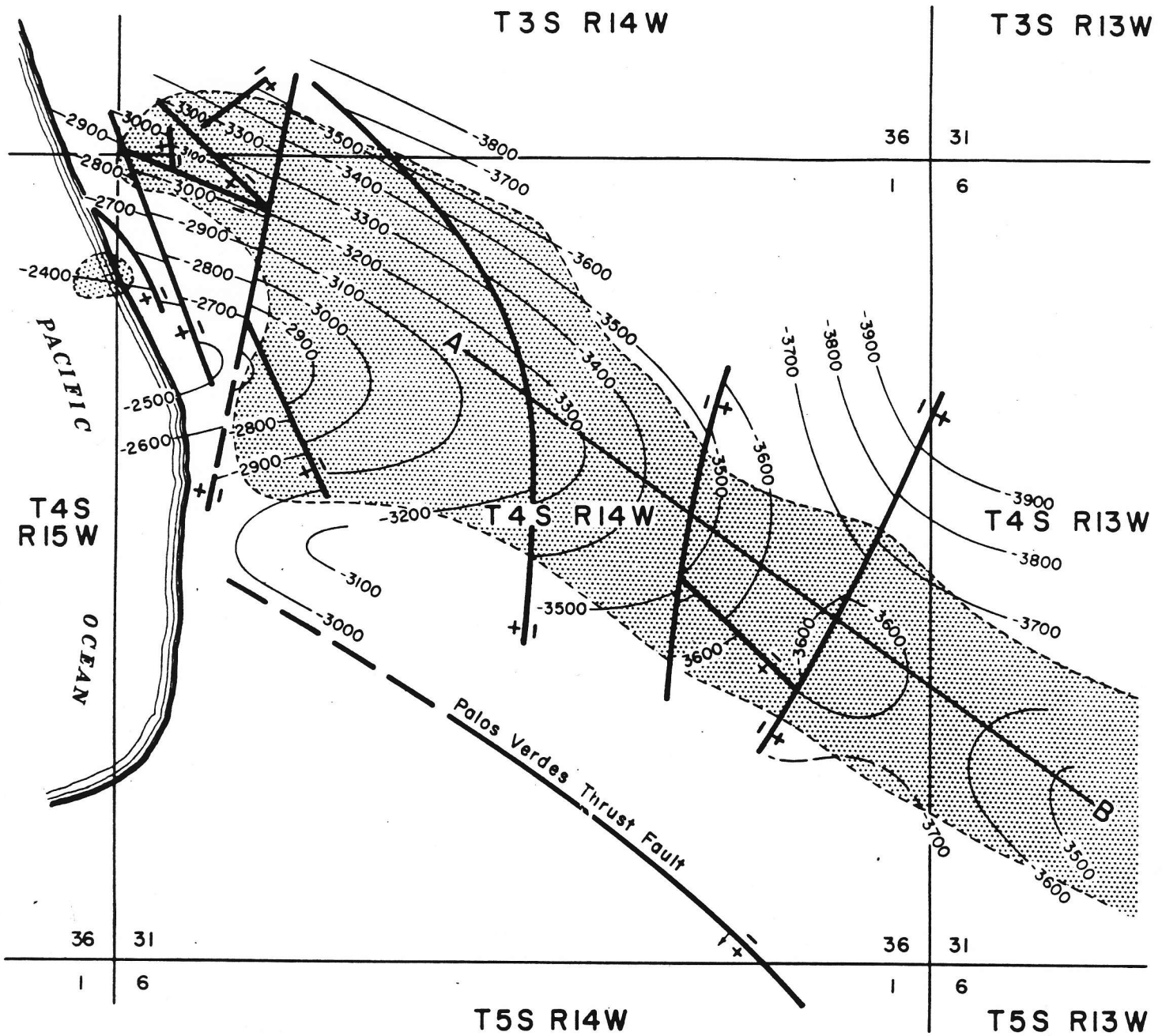
showing recency of faulting, areas of historic surface subsidence, large landslides,
and generalized characteristics of rock and sediment

by C. M. Wentworth, J. I. Ziony, and J. M. Buchanan

1969



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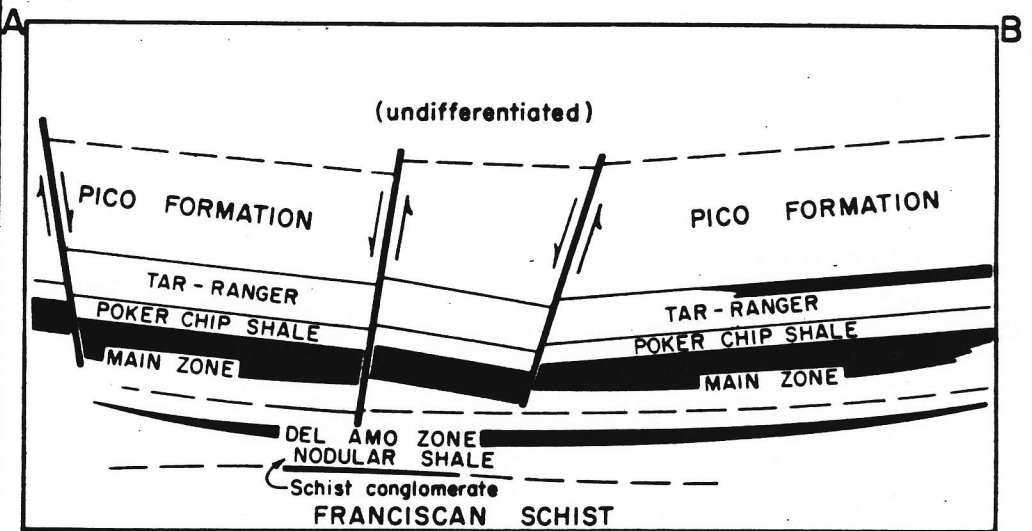


CONTOURS ON TOP OF MAIN ZONE

 PRODUCTIVE AREA

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EPOCH	FORMATION	Thick-ness (Feet)
RECENT- PLEIS- TOCENE		600
PLIOCENE	Upper	Pico 1800
	Lower	Repetto Tar-Ranger 400
MIOCENE	Upper	Main Puente Del Amo 2230
JURASSIC (?)	Franciscan schist	?



Factors Common to subsidence prone areas

Sand reservoirs with thick vertical sections

Large drop in reservoir pressures

Large amounts of gross production

Porosities of 30 to 40%

Tension faulting with resultant graben block formation

Unconsolidated sediments for overburden

U. S. Army Corps of Engineers

Design Considerations for

Breakwater Construction

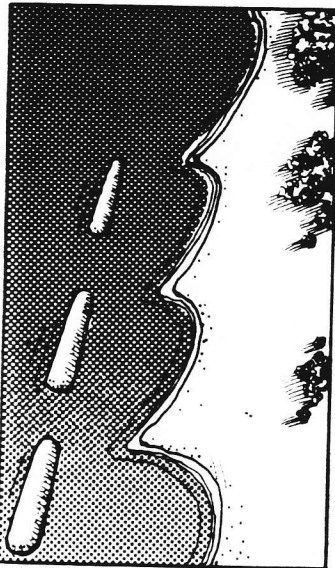
Determination of Wave Conditions

Wave Runup Modeling

Overtopping Considerations



US Army Corps
of Engineers



SHORE PROTECTION MANUAL

VOLUME I

Coastal Engineering Research Center

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
3909 Halls Ferry Road
Vicksburg, Mississippi 39180-6199



1984
Second Printing

Approved For Public Release; Distribution Unlimited

Prepared for

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Washington, DC 20314



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US Army Corps
of Engineers



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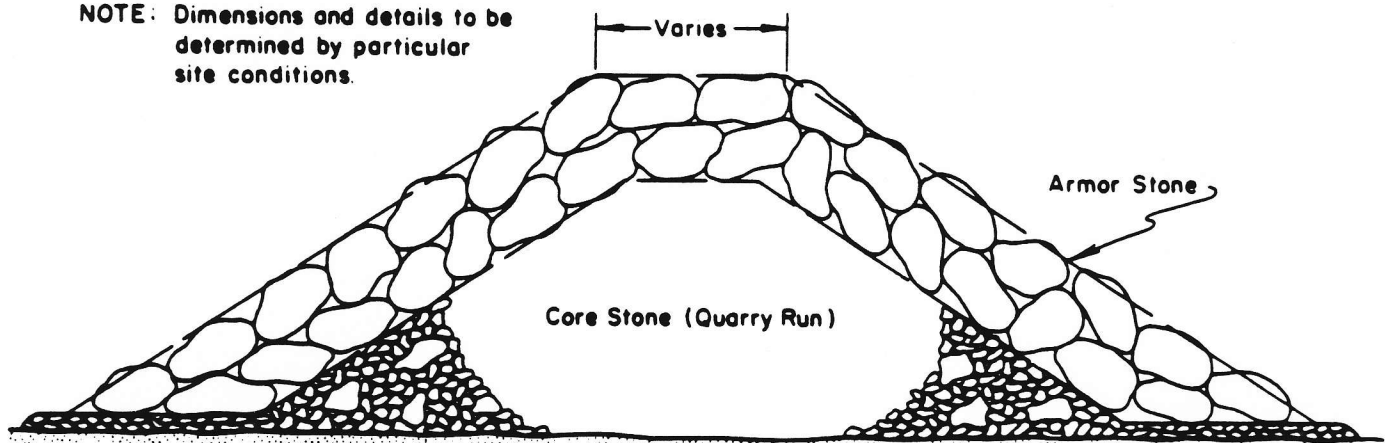
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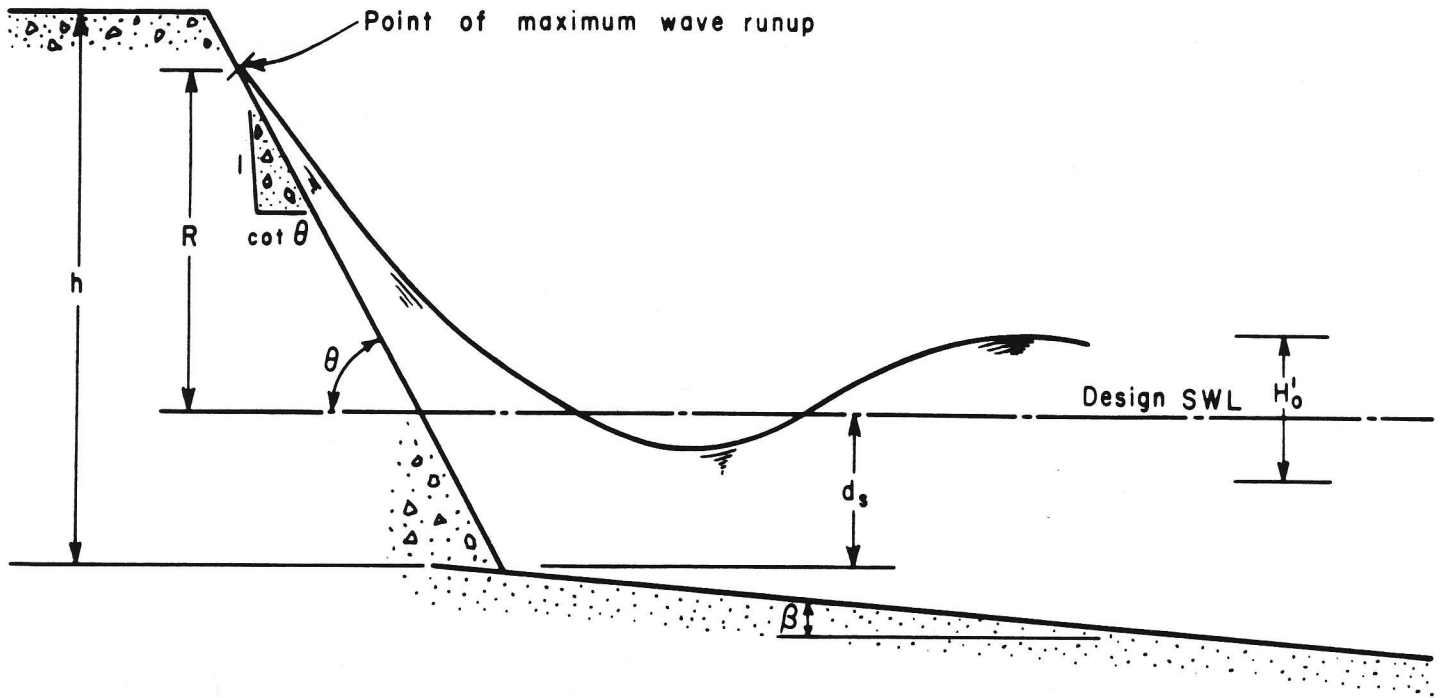
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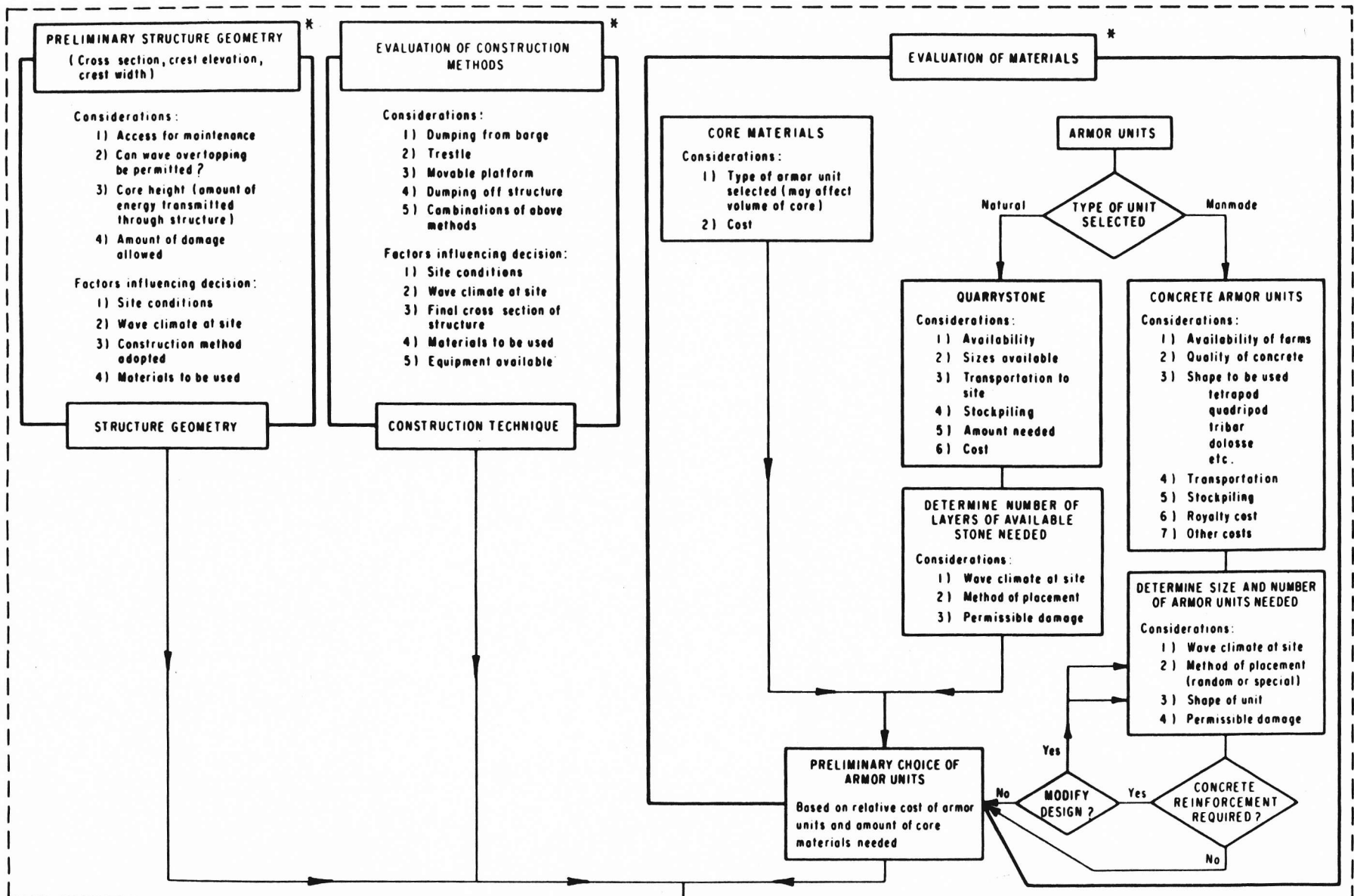
NOTE: Dimensions and details to be determined by particular site conditions.



CROSS SECTION

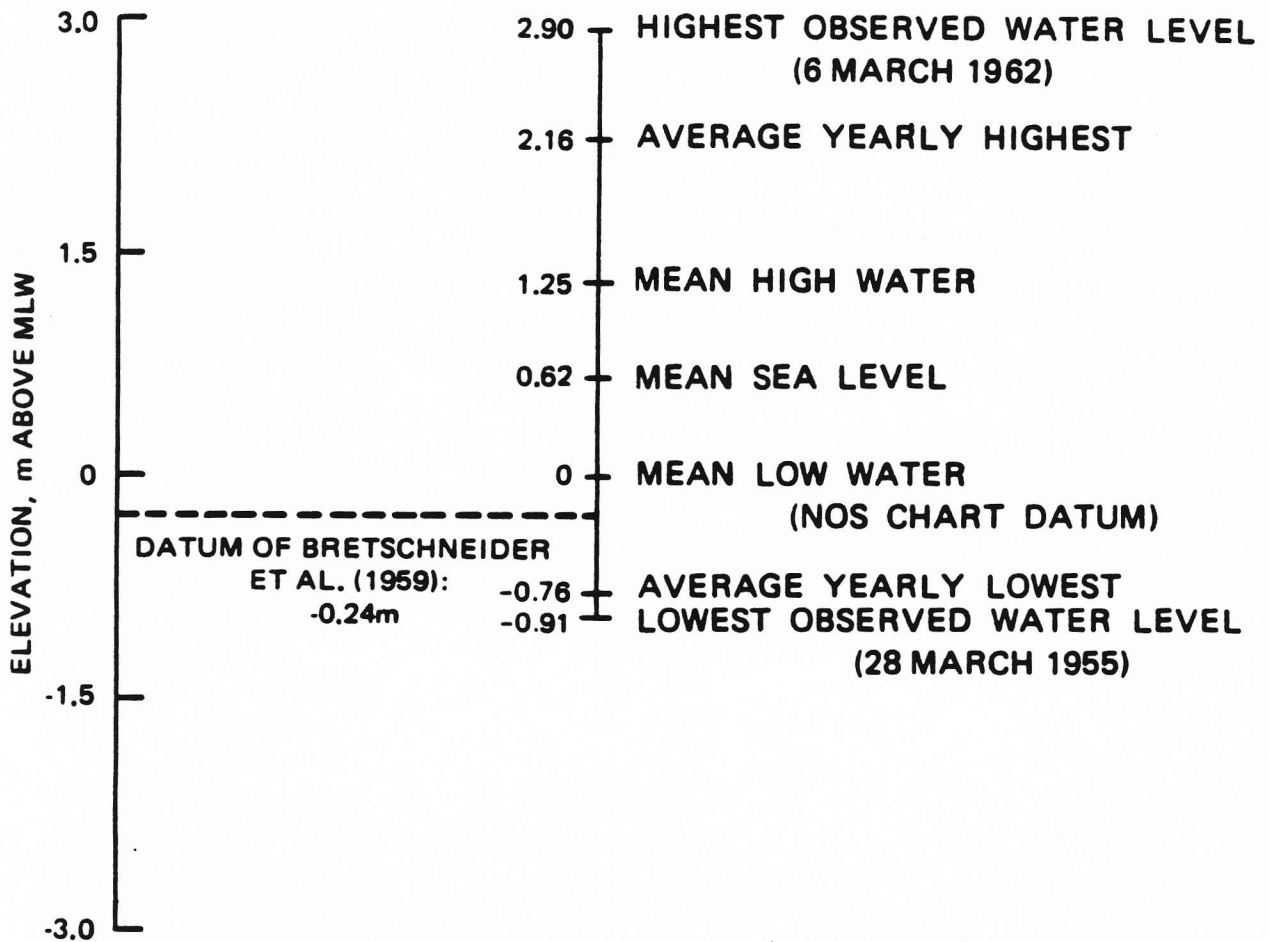


Definition sketch: wave runoff and overtopping.



* NOTE: Three phases of preliminary design are highly interrelated and generally must be performed concurrently

Figure 7-118. Logic diagram for preliminary design of rubble structure.



Required Evaluation

1. Evaluate survey benchmark data
 - a) County Data
 - b) Redondo Beach Data
 - c) U.S. Army Corps of Engineers Data
 - d) Division of Oil and Gas
 - e) Other

2. Relate Survey data to Oil Fields
 - a) Geologic Review
 - b) Production History
 - c) Reservoir Pressures
 - d) well location map

3. Construct subsidence model
 - a) Relate to specific oil well production
 - b) Overall subsidence for area
 - c) Time dependent considerations
 - d) Reconciliation with existing models
 - e) Historical considerations

Required Evaluation

4. Relate subsidence influence on King Harbor Shore Protection:
 - a) Influence on breakwater design
 - b) Influence on wave formation
 - c) Performance of comparable shore protection

5. Corrective Action available:
 - a) City of Redondo Beach
 - b) U. S. Army Corps of Engineers

Ultimate Task Description

**Determine the Influence of
subsidence on the U.S. Army
Corps of Engineers Design
criteria for the Redondo Beach
Breakwater**