SEISMIC SAFETY ELEMENT
IMPLEMENTATION PROGRAM

This section contains a description of different problem areas which the Seismic Safety Element must address, recommendations for a workable implementation program, and comments on the availability of data. One factor to point out is the importance of a sufficient date base to allow for the development of workable implementation programs. Various types of information, their level of aggregation and scope, must be compatible with recommendations outlined in this section further information is obtained through a consultant. This section should be viewed as a selection of alternatives which may be pursued to achieve desired seismic safety goals and objectives.

Location of Active or Potentially Active Faults

The City of Hermosa Beach is located near several active or potentially active fault zones, and therefore, may be affected by seismic activity in the future. There are no known fault lines within the City and the locations of past epicenters do not incicate the presence of unidentified faults areas in Hermosa Beach.

The fault lines most likely to affect Hermosa Beach are the Newport-Inglewood Fault, located approximately seven miles east of the City, and the San Andreas Fault. Both fault zones are discussed in detail in the following sections.

(1) The Newport-Inglewood Fault

The Newport-Inglewood Fault is potentially most detrimental to Hermosa Beach because of the frequency of activity and proximity to the City. This fault line follows a northwest to southeast direction, from Beverly Hills to Newport beach, where it continues offshore.

The epicenter location map and related earthquake magnitudes reveal a general pattern. In the area north of Dominguez Hills, smaller earthquakes with a magnitude of 3.9 or less are apparent. On the other hand, the southern segment of the Newport-Inglewood Fault displays higher earthquake intensities. All seismic activity of 5.0 or greater magnitude have occurred in this southern segment.

Table 11 lists the occurrence of earthquakes and energy release for the entire Newport-Inglewood Fault. It should be noted that seismic activity before 1933 is not listed because the seismograph and Richter Scale, the measures of earthquake magnitude, were not utilized extensively at that time. Four earthquakes in 1933 and 1941 account for more than 97.2% of the energy released along the Newport-Inglewood Fault since 1932.

These earthquakes are :

		Richter Reading
a. Long Beach Earthquake;	March 10, 1933	6.3
b. Singal Hill Earthquake;	October 2, 1933	5.4
c. Gardena, Calif;	October 22, 1941	5.0
d. Torrance-Gardena Earthquake;	November 14, 1941	5.1

Problabe Future Movement on the Newport-Inglewood Fault

In attempting to forcast potential seismicity along the Newport-Inglewood Fault Line, the Basic assumption followed was that a historical pattern would set the parameters for future occurrences. Furthermore, magnitude would be the basic measuring device rather than intensity (Mercalli Scale) because the latter mechanism is only useful in highly urbanized areas. Our assumptions are controversial because the Richter Scale has only been utilized extensively since 1933, and in terms of " geologic time ", no historical patterns may have emerged since then. Unfortunately, this problem is insurmountable because of data constraints. All forecasts of future seismicity in this report utilize information gathered since 1933.

In Table 1, seismic activity along the Newport-Inglewood Fault was categorized according to magnitude (4.0 and over) and years (since 1933).

PROBLEM AREA 1: EXISTING PRIVATE STRUCTURES

According to the Hermosa Beach Housing Element, more than seventy per cent of the homes in the City were constructed before 1960. (See Table Below) Our information indicated that approximately 25% of all structures in Hermosa Beach were built before adoption of the 1933 Building Code Ordinance, which addressed the issue of seismic safety. The Seismic Safety Element must therefore cope with two distinct problems, (1) structures which were constructed before seismic factors were included in the 1933 Building Code, and (2) buildings which are structurally wead because of age, lack of maintenance, or previous earthquake activity.

HOUSING AGE, YEAR-ROUND UNITS
CITY OF HERMOSA BEACH
TABLE 3

Year Structure Built	Number of Structures	Percent
1969 - Present	504	6.10
1960 - 1968	1,553	18.81
1950 - 1959	2,354	28.53
1940 - 1949	1,648	19.97
1939 or earlier	2,194	26.59
Total	8,253	100.00

Although the latest Census does not include a survey of deteriorated or dilapidated structures, it is estimated that at least ten percent of the buildings in Hermosa Beach fall into this category.

Since the City of Hermosa Beach is already fully developed, and furthermore, the population growth rate is steadily declinin, no dramatic increase in new construction starts in anticipated. The Seismic Safety Element's main thrust must therefore be directed at identifying and evaluating structural hazards in existing buildings, and pursuing an objective of eliminating deficiencies.

The Planning and Building Departments should conduct a survey of existing structures in the City, according to the following priority system:

TABLE 4

Priority Rank	Type of Structure or Land Use	Example
1	Emergency Services and Public Utilities	Hospitals, Fire, Police Stations, Water and Sewer Facilities
2	High Occupancy, Involuntary Risk	Schools, Hotels, Library
	Moderate Occupancy, Involuntary Risk	Apartments, Condominiums
3.	Low Occupancy, Involuntary Risk	Residences
	High Occupancy, Voluntary Risk	Shopping Center, Theater
4	Moderate Occupancy, Voluntary Risk	Small businesses
	Low Occupancy, Boluntary Risk	Warehouses

This survey should consider the structural characteristics, occupancy level and general function of buildings.

RECOMMENDATION 1:

Evaluate structures according to survey results, which will identify any structural hazards, and probable seismicity in each section of the City.

COMMENT:

The identification of existing structural deficiencies and evaluation will require coordination between the Building Department and Planning Department. Each structure should be evaluated according to potential localized impacts, for example, tsunami inundation or landslides.

RECOMMENDATION 2:

Develop amendents to the Building Code which will mitigate against structural hazards in existing buildings, according to a pre-determined acceptable level of risk.

Adopt the Uniform Building Code, 1976 edition, when available, or make the necessary amendments to the existing Building Code. Chapter 70 (Grading of the Uniform Building Code) should be strengthened to require geological and soils engineering investigations in assessing the stability of natural or graded slopes, potential liquifaction and subidence areas, and critical seismic zones where groung acceleration values exceed 1970 and 1973 U.B.C. Standards. To insure this, the City should retain, as required and practical a qualified engineering geologist to review reports, and assist the Building and Safety Department in public projects.

COMMENTS:

The City of Long Beach has recently developed and adopted a revised Building Code which specifically addressed the problem of seismic hazards in that area. The Long Beach Code provides a systematic and practical procedure for the inspection and evaluation of earthquake hazardous buildings. Procedures were established for implementing regulations and socio-economic factors were included. Appropriate appeal processes and optional plans for owners were outlined in the ordinance. Hermosa Beach may use the Long Beach Code as a guide in the development of an ordinance for the City.

EMERGENCY COMMUNICATION OBJECTIVES

Provide adequate emergency communication capacity both internally and in coordination with other local, regional and State agencies under all potential hazard situations.

Implementation:

1. Develop capacity for use of Sate wide frequency.

2. Develop direct radio contact from Communication Center in Police Department to County Sheriff.

3. Actively participate in and upgrade the HEAR program in Hermosa Beach.

4. Provide for back-up capacity with a RACES unit in Hermosa Beach.

5. Implement 911 Program.

Various proposals should be investigated to encourage voluntary compliance to the amended Building Code. These alternatives include tax incetives, low interest loans, or Federal Support Programs.

RECOMMENDATION 3:

Pursue a policy of enforcement of the Amended Building Code. All critical facilities constructed prior to 1948 should be reviewed by a structural engineer for potential hazards. Since many of these structures have regional impact, the source of funding for the inspection of the program ought to be at the regional level. High pressure natural gas, petroleum, electrical power transmission lines should be reviewed for safety and land use compatibility. A program of building inspection in the following priority order should be initiated by the Building Department to identify:

a. The earthquake resistant capacities of all critical facilities relative to the design level seismic events identified in this document.

b. All high occupancy normal facilities (office buildings commercial center, hotels ect.) Built before 1961 that a off non-earthquake resistant construction having relative damagability potential of 5 or greater .

c All other normal facilities built before 1961 that are of non-earthquake resistant construction having a relative damagibility potential of 5 or greater.

Although it is desirable to eliminate structural hazared throughout the City, the Planning Department must seriously consider externalities such as unreasonable hardship, human dislocation, or socio-economic disruption, which may result from enforcement of the Building Code. Therefore, during discussions related to the level of acceptable risk and development of the Building Code, the general public should be invented and aware of potential impacts. If a trade-off is necessary, the appropriate political body and community must decide on the most acceptable course of action.

PROBLEM AREA 2: LAND USE AND DEVELOPMENT REGULATIONS

Current land use laws and development regulations do not adequately consider seismic factors. It is desirable for the City of Hermosa Beach to develop regulations which will alleviate seismic hazards in all future construction. The most practical method toward achieving this end is to utilize present statutory-based devices for development and land use control.

RECOMMENDATION 1:

Develop a Seismic Overlay Map which identifies unique earthquake hazards in the City according to various categories of risk or zones of the severity of potential seismicity.

COMMENT:

Although the City is geographically confined, and therefore, subject to the same earthquake magnitudes, it is possible that localized conditions may result in amplified effects or different types of impact. Topography, steepness of slope, unstable soil conditions, or proximity to the ocean may result in landslides, liquifaction or tsunami inundation.

RECOMMENDATION 2:

Amend current Zoning and General Plan Ordinances to reflect potential seismic hazards.

COMMENT:

The Planning Department can utilize a Seismic Overlay Map to evaluate current zoning and General Plan designations as they relate to potential seismicity. If future land uses are clearly incompatible with probable earthquake hazards, appropriate amendments should be considered.

RECOMMENDATION 3:

Require consideration of seismic factors during the preparation of Environmental Impact Reports for new construction

COMMENT:

The introduction of seismic factors in EIR preparation is a Planning Department decision. This recommendation obviously assumes that pertinent and detailed information on seismicity will be available so that suitable evaluations will be possible.

RECOMMENDATION 4:

Require special geologic and soils reports for all proposed major structures in areas of high seismic risk.

COMMENT:

In order to implement this recommendation it will be necessary to develop operational definitions for "major structures" and "areas of high seismic risk". A suitable criteria for defining major structures should not be construction cost, but rather, the number of persons who will occupy the building at any given time. As stated before, the primary consideration of the Seismic Safety Element is the protection of human lives, with secondary consideration given to the preservation of property. Areas of high seismic risk can be identified on a Seismic Overlay Map.

PROBLEM AREA 3: ESSENTIAL STRUCTURES AND SERVICES

Certain structures and service facilities require special attention because their functions are particularly vital during emergencies. As discussed under the "Concept of Acceptable Risk", these structures and facilities are Priority One items, that is, they must comply with stringent structural standards. The Implementation Program will also direct resources toward the identification and eradication of hazards in these facilities before other existing structures are considered. Priority One items include most public buildings, emergency shelters, medical facilities, major evacuation routes and utility systems. The Building Code should include a section which will apply high structural and design standards to proposed essential buildings and service systems.

RECOMMENDATION 1:

Identify all essential structures and services within the City.

COMMENT:

Each responsible agency should provide maps for the following service facilities, accurately identifying the location and key functional units throughout the system:

ESSENTIAL STRUCTURE OR SERVICE	RESPONSIBLE AGENCY
Water	California Water Company
Electricity	Southern California Edison Company
Sewers	South Bay Sanitation District & City of Hermosa Bch.

Police and Fire	City of Hermosa Beach
Communications	City of Hermosa Beach
Telephone	General Telephone of California
Evacuation Routes	City of Hermosa Beach
Hospital	Regional Civil Defense Coordinator

Map "F", on the following page, identifies several essential structures in Hermosa Beach.

RECOMMENDATION 2:

Survey all essential structures and facilities in Hermosa Beach to collect information on structural characteristics, occupancy levels, and primary disaster relief functions.

RECOMMENDATION 3:

Evaluate structures according to survey results, which will identify structural deficiencies, and probable seismicity in each section of the City.

COMMENT:

The identification of existing structural deficiencies and evaluation will require coordination between the Building Department, Planning Department, Civil Defense coordinator, and appropriate agency. Each structure should be evaluated according to its disaster relief functions, potential localized seismic impacts, and the ability of a facility to provide vital emergency services during a major earthquake. Priority One facilities must be able to withstand a 6.5 magnitude earthquake with no interference to the structure's primary emergency function.

RECOMMENDATION 4:

Incorporate specific structural and design standards in the Building Code which will be applicable to essential structures and service facilities.

COMMENT:

Structural and design standards must be developed so that all Priority One facilities will be able to withstand a 6.5 magnitude earthquake (Newport-Inglewood Fault) with no interference to the structure's primary emergency function, as outlined in the City's Emergency Operations Plan. Each responsible agency should bear the cost of improvements, if they are necessary, and the Planning Department should provide information on alternative sources for funds.

PROBLEM AREA 4: PUBLIC EDUCATION

Many citizens in Hermosa Beach are not aware of the potential seismic risk in their neighborhoods. Civil Defense agencies and the Fire Department distribute literature on a regular basis, however, the City should provide additional information on probable localized impacts and positive measures which individuals may pursue to mitigate against hazards.

RECOMMENDATION 1:

Prepare brochures for general distribution indicating probable earthquake activity, differentiated impacts in various sections of the City, appropriate response plans, and suggestions for homeowners to correct structural deficiencies.

COMMENT:

It should be noted that the primary purpose of these brochures is to provide supplementary information, that is, various types of detailed information which are not included in Civil Defense literature. Maps of tsunami inundation zones, areas subject to potential landslides or liquifaction, and areas of unstable soils should be identified in the brochures. Data clearly defining probable expected earthquake intensities and localized impacts must be included. The Building Department may also provide suggestions for homeowners to take corrective measures to lessen seismic risk.

RECOMMENDATION 2:

Public services should be available to the general populace, which will be available on request, to encourage individuals to take actions to mitigate against seismic hazards. Planners and Building Officials would be available to identify structural weaknesses in residences, offer suggestions to correct deficiencies, and provide information on seismic hazards and citizen response plans.

PROBLEM AREA 5: DISASTER PREPAREDNESS PLAN

The Emergency Operations Plan (EOP) is the City's official document describing procedures and duties for various public agencies to follow during a disaster. The EOP is highly dependant on close coordination among various public and private agencies, and therefore, an adequate communications system is very important. The overall plan should be evaluated in terms of its applicability to earthquake disasters. Although the Seismic Safety Element is specifically concerned with earthquake disaster planning, recommendations for improvement of the EOP may overlap with other contingency plans.

RECOMMENDATION 1:

During the early stages of program development, consult the Civil Defense Director for his comments and recommendations.

RECOMMENDATION 2:

Evaluate the present Emergency Operations Plan to determine its effectiveness during an earthquake disaster.

COMMENT:

The Planning Staff has reviewed the Emergency Operations Plan and have reached several tentative conclusions:

a. The EOP appears to be an operative plan and clearly defines procedures for each responsible agency.

b. There are several deficiencies in the EOP in that although proper procedures have been established, each responsible agency does not have detailed information which would be required during an emergency. Information requirements would include maps locating various service facilities, lists of resources which are available (rescue trucks, number of hospital beds, etc...), and a priority system for implementation. In the absence of this information, the EOP is highly dependant on effective communications among agencies. This dependence would not be so critical if information was circulated on a regular basis.

c. The Civil Defense coordinator should inspect various emergency facilities on a regular basis. It appears that emergency shelters may be unsafe, particularly during an earthquake disaster, and adequate water and food supplies are not available. These basic necessities are vital during an emergency and certain agencies are responsible for maintaining an adequate level of resources.

RECOMMENDATION 3:

Include earthquake disaster response plans during regularly-scheduled emergency practice sessions at various schools and public institutions.

COMMENT:

Disaster training and practice sessions should be required for certain personnel and public institutions. Schools and hospitals, their personnel, and other places of assembly should be included in this program.

PROBLEM AREA 6: SEISMIC SAFETY RESEARCH

Since the field of seismology has only recently received public exposure and funding, it is anticipated that this area of interest will undergo rapid changes as research progresses. It is therefore desirable for the City to acquire updated literature on seismology as it becomes available.

RECOMMENDATION 1:

Installation and service by the county of Los Angeles (or other appropriate regional agency) of a seismograph in an appropriate location for the South Bay Beach Cities. Comment: It would be desireable for the South Bay Beach Cities which share similar geological and demographic characteristics. The presence of sand dunes throughout the area may result in amplified earthquake intensities.

Most seismographs, on the other hand, are located on firm alluvium near major fault zones and the applicability of this information to Hermosa Beach is questionable.

RECOMMENDATION 2:

Gathering, compilation, and interpretation of local and regional seismic studies as they become available.

COMMENT:

The government regulation requiring Seismic Safety Studies applies statewide and other studies, prepared by municipalities or regional agencies, may be pertinent to Hermosa Beach. One consideration is the compilation of alternative methods developed by other agencies to cope with the seismic problem.