4.0 MEASURES TO ENHANCE THE ENVIRONMENT OR TO AVOID OR MITIGATE ADVERSE ENVIRONMENTAL EFFECTS

Environmental and engineering planning has resulted in several measures which will mitigate adverse environmental impacts resulting from this project. Engineering planning has included evaluation of alternate designs for berthing and mooring, LNG transfer systems, LNG storage, and vaporization processes. A description and discussion of these alternatives is presented in Section 8.4. Extensive engineering design for ensuring the safety and reliability of the various operations and components of the plant have been included in the design and planning for this facility. Such measures include sensing devices, alarms, redundancy and key equipment units, safety design and emergency equipment. This portion of the project design is discussed in detail in Section 9.4. Protection of an existing salt marsh on the site is incorporated into the planning.

4.1 PREVENTIVE MEASURES AND MONITORING

4.1.1 Seawater Vaporization

Selection of the seawater vaporization process utilizing warm seawater available from the nearby Ormond Beach Generating Station would represent a significant design parameter mitigating the environmental impact of the facility. This design would result in the minimal emissions to the air for the alternatives studied and will not result in a cooled seawater discharge. Utilization of the seawater system combined with the Generating Station brings both discharges closer to ambient seawater temperatures. This is an important mitigating measure in that it utilizes otherwise wasted heat energy and significantly reduces the need for combustion of natural gas for the vaporization operation.

This alternative also eliminates the need for offshore construction of intake and outfall structures, since the existing generating station system will be utilized.

4.1.2 Site Location and Layout

The sites selected for this project represent a mitigation measure accomplished early in planning. That is, the berthing area will be constructed immediately adjacent to an existing harbor facility and the LNG plant site will be located in a developing industrial area near a power plant in a region generally zoned for industrial uses. Therefore, the impact upon land use and aesthetics is mitigated.

The facility layout has been planned to minimize the visual impact of the plant facilities. The LNG storage tanks have been placed so that they are not in line with Saviers Road, a major thoroughfare of Port Hueneme. Tanks have also

been located optimally from the point of view of site conditions and relationship to the community. The first two LNG storage tanks to be constructed of the possible total of three will be those which will have a lesser visual impact. The low-profile design selected for the LNG storage tanks is one which minimizes visual impact.

4.1.3 Noise Abatement

A noise criterion for the operating plant has been established on the basis of a noise survey (Sections 2.4.3.2 and 3.2.4.3). This survey included noise measurements in the area surrounding the site and emphasized the noise-sensitive elements of the community. Upon completion of construction, noise measurements will be taken in the community under operating conditions to ensure that the plant will not degrade the noise environment.

4.1.4 Installation of Facilities

During construction and installation of the various units of the LNG facilities, traffic access points to the site will be provided from the north, east, and west, to minimize traffic congestion and noise in the immediate site area. Heavy vehicle traffic, such as concrete trucks, will be routed, to the extent possible, along a variety of approaches to the site to minimize their effect upon the community.

The LNG transfer system between the berthing area and the LNG plant will be installed underground. While this design alternative is more expensive and requires some engineering development, it is more environmentally acceptable from the

aesthetic, traffic, and safety points of view as compared to an above-grade system.

Construction excavation will be planned, to the extent possible, to be accomplished during the dry seasons. This will minimize the possibility of erosion during earth work and grading. The shallow groundwater table will be lower, thereby reducing the need for any possible dewatering of excavations. Also, it is during the dry seasons that the destruction of wildlife would be minimized. Many birds visit the site seasonally; the lowest use by birds and other fauna, and the least breeding activity is during the late summer or early fall.

4.1.5 Public Health and Welfare

Extensive design considerations have been included in all aspects of the operation of this LNG facility. These are discussed in Sections 1.6.6 and 3.2.8. A detailed summary of safety design measures is included in Section 9.4. Examples of such measures include navigation and maneuvering equipment for the LNG ships, full height concrete dikes around the LNG storage tanks, automatic detection and alarm systems with automatic and redundant manual shutdown, and emergency equipment.

Discharges which may affect public health or water quality will be entered into the existing sewer system. During construction, chemical sanitary facilities will be provided. There is an existing measurement program for the outfall of the Ormond Beach Generating Station. This program is responsive to local authorities and will be continued after the completion of the combined seawater exchange system.

Procedures for ensuring service to the public and maintaining environmental values during maintenance or plant breakdowns are discussed in detail in Section 3.2.7.

4.1.6 Dredging

The effluent from the dredging operation during construction of the berthing area will be monitored. Requirements for the program will be specified by the California Regional Water Quality Control Board and will be strictly adhered to during construction.

Dredging will be accomplished during the winter when beach use is at a minimum. The turbidity associated with the dredging and discharging of sediments will be temporary and should have little adverse effect on water quality during the approximate 7-month period of dredging.

Construction of the breakwater will be essentially complete prior to commencement of dredging operations to protect dredging equipment from wave forces and to ensure the safety of the workers. The discharge of dredged sediments on the east side of the already constructed breakwater will minimize the amount of material which is washed back into the dredge area by currents.

4.2 ENVIRONMENTAL RESTORATION AND ENHANCEMENT

4.2.1 Ecological Enhancement

Consideration was given to the protection and enhancement of the coastal strand dune area, Pickleweed-saltgrass marsh, and the Hordeum grassland areas of the plant site. These indigenous plant communities are considered valuable assets and are incorporated into the overall planning scheme.

There are three principal areas of potential for ecological enhancement and restoration. They are: 1) protection of the southern portion of the land site from uncontrolled misuse; 2) provision of a lacking habitat feature in trees and shrubs through landscaping; and 3) the guaranteeing of the preservation of the existing wetlands area by noninterference with the present drainage pattern.

Although the salt marsh and coastal strand areas of the southern portion of the land site are not unique features, they are a diminishing coastal resource. By protecting that resource from misuse, a preserve will be created. The landscaping plan described in Section 4.2.2 is designed to accomplish these objectives.

Implementing the landscaping scheme will restrict vehicular trafic (except for emergency purposes) and provide sufficient isolation from both the plant facility and public abuse to restore this section of wetlands to near its natural state.

In order to guarantee the continued existence of the wetlands portion of the property, the source of water to the

marsh, the drainage canal, will remain unaltered. Applicant will maintain the canal located on the property acquired for this project.

The breakwater will provide ecological enhancement by providing solid substrate and protected waters.

4.2.2 Environmental Planning and Enhancement

In order to minimize visual and acoustical impact of the facility, mitigate its utilitarian character, and visually enhance the area as a whole, substantial in-depth environmental planning was undertaken. Particular concerns in this planning process were:

1. Mitigation of the visual impact of the mass and appearance of the LNG storage tanks and supportive equipment.

2. Preservation or enhancement of the area's indigenous plant and animal life.

3. Provision for public access to the immediate beach area.

4. Aesthetic enhancement of the area as a whole to upgrade the immediate site environment for the community's benefit.

Visual exposure analysis and a review of the various physical aspects of the site location in relationship to land uses in the surrounding area indicated four major visual (line-of-sight) exposures. The subsequent planning process dealt primarily with visual screening and line-of-sight considerations in the placement of the major physical LNG plant elements. The four exposures requiring mitigation were:

1. View from the community area to the north and northwest of the site, including residential and commercial areas.

2. Direct line-of-sight view from Saviers Road--a major community traffic carrier.

3. View from the coastal strand and offshore to the southwest of the site.

4. View from the northeast and east--the open land areas.

The landscape/environmental design study (Plates 4.2.2-1 and 4.2.2-2) dealt directly with solving these major exposure concerns.

Selection of the plant materials for the site dealt with specific considerations of visual characteristics, utility, and site conditions. Because of salt water intrusion, wind intensity, site exposure, and specific necessary screening characteristics, a very careful process of plant selection had to be employed. Minimal maintenance requirements and self propagation were considered essential for a successful long-term development.

Four general categories of plant material were used:

1. Wind buffer--tree and shrub groups.

2. Wind/visual screen--tree and shrub mass plantings.

3. Access--identification trees.

4. Community buffer--ornamental trees and shrubs.

Typical examples included the following:

Wind buffer:

Eucalytus lehmanin
Eucalyptus robusta
Atriplex leutiformis "breweri"
Cassia artemisiodes

Wind/visual screen:

Eucalyptus globulus
Eucalyptus camalderleusis
Accacia glandulicarpa
Accacia ungerup
Melaleuca armillaris
Melaleuca nesophila
Myoporum laetum

Access:

Phoenix canarieusis
Hakes suaveoleus

Community buffer:

Pinus halepensis
Populus tremonti
Callistemnon rigidus
Pittosporum crassifolium
Nerium oleander

Placement of plant material considered their horizontal and vertical screening properties and rates of growth. Visual screen trees such as Eucalyptus lehmanin and Eucalyptus robusta will be placed at a maximum distance from the LNG tank enclosures to provide optimal subtended angle screening during their growth period. Careful consideration was given to the LNG tank heights relative to the screening plant location and geometry. Low-level plant screens will be located to provide screening at the base of the taller screen trees and to provide a wind buffer. The entire plant material placement scheme is organized in an informal, random manner to soften the hard angle, hard surface features of the facility and to create a natural parklike environment. The majority of the trees and shrubbery will be planted prior to the construction phase of the LNG facility to gain maximum growth for the plant material and help mitigate potential visual and equipment noise conditions during the construction

period. Careful site planning and barrier placement will preclude damage to existing plant and wildlife on the site during the construction period.

The environmental planning considerations for the industrial drain crossing the site allow for maximum flexibility in treatment. To retain the "soft" nature of the planting scheme, it may be retained in its present configuration or, if necessary, it may be hardened by constructing concrete side walls and a pebble bottom. Either treatment is compatible with the suggested planning scheme.

Security barriers and fencing will be designed and integrated with plant material to minimize the customary utilitarian appearance of the facility. Access to the salt marsh area will be limited to pedestrians only; all vehicular traffic will be excluded. Fencing across the beach side of the salt marsh will be designed in a manner compatible with the transitory nature of the inundated area and to allow animal access to that portion of the property.

4.2.3 Public Access to Beach

Beach access for the public can be provided along the eastern boundary of the property. If built, it is is anticipated that the road will be dedicated to the community.

The benefits from this approach to the LNG plant site planning will be significant, providing the following features:

1. Minimum visual exposure of LNG tanks and plant equipment to the community and the beach areas.

2. Creation of an extensive landscaped environment in an area with relatively little aesthetic merit.

3. Significant potential for wildlife preservation and regeneration in the area.

4. Substantial acoustical shielding from the facility.

5. Shielding of residential areas from plant night lighting effects.

PERKINS ROAD

HUENEME ROAD

ORMOND BEACH

Slag Pool: Recommended
Cleared and decontaminated

Agriculture

Salt Marsh

Fence

Dunes

Hordeum
Grassland

Fence

Parking

Fence

Fence

VENTURA COUNTY
RAILROAD

ARCTURUS AVE

WIND BUFFER
Tree and Shrub Groups

WIND/VISUAL SCREEN
Tree and Shrub Mass Plantings

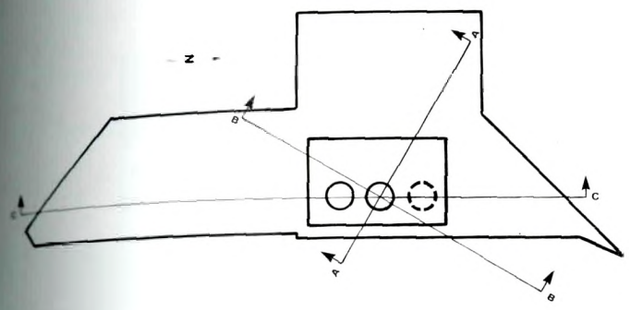
ACCESS
Identification Trees

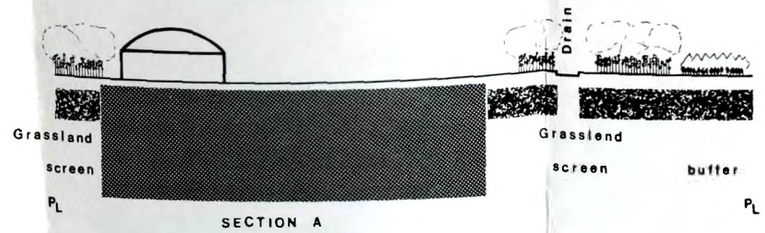
COMMUNITY BUFFER
Ornamental Trees and Shrubs

0 100 200 300 400 500
SCALE IN FEET

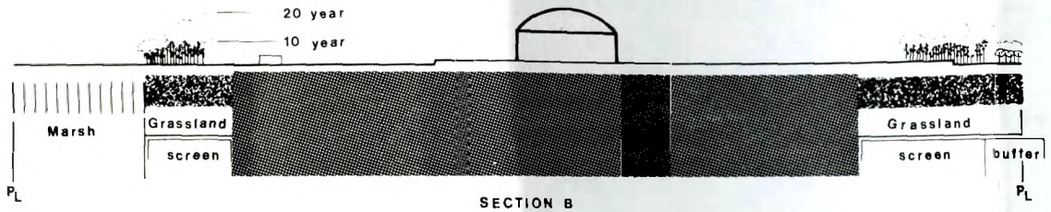
ENVIRONMENTAL PLANNING STUDY – SITE PLAN

PLATE 4.2.2-1





SECTION A



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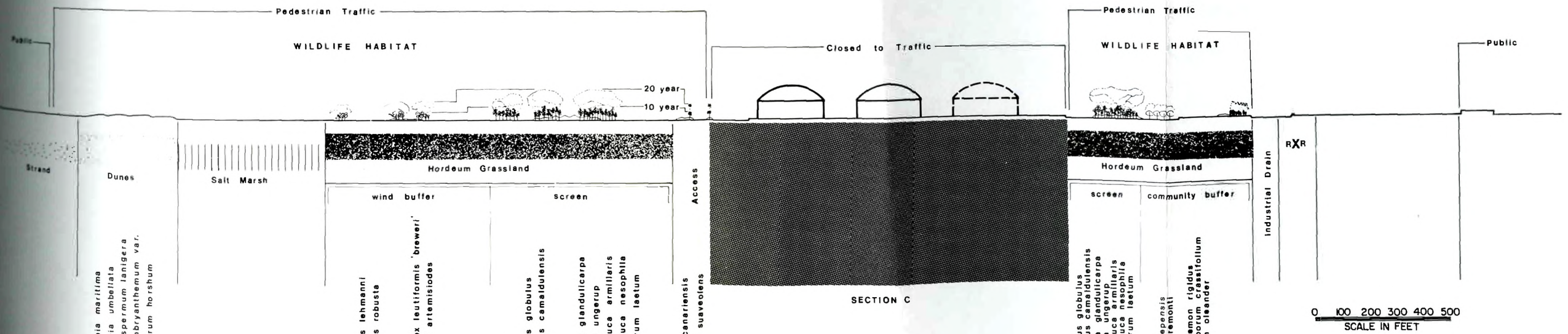

SECTION C

ENVIRONMENTAL PLANNING STUDY — SECTIONS THROUGH SITE

PLATE 4.2.2–2