

Environmental
Statement
FAMILY
HOUSING

ACIS, Fac

PUBLIC WORKS DEPARTMENT
CAMP LEJEUNE, NORTH CAROLINA

DEPARTMENT OF THE NAVY
CANDIDATE ENVIRONMENTAL IMPACT STATEMENT (CEIS)

CONSTRUCTION OF FY 76-77 FAMILY HOUSING
UNITED STATES MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

WM. F. FREEMAN ASSOCIATES
ARCHITECTS - ENGINEERS - PLANNERS
HIGH POINT, NORTH CAROLINA
FEBRUARY 1975

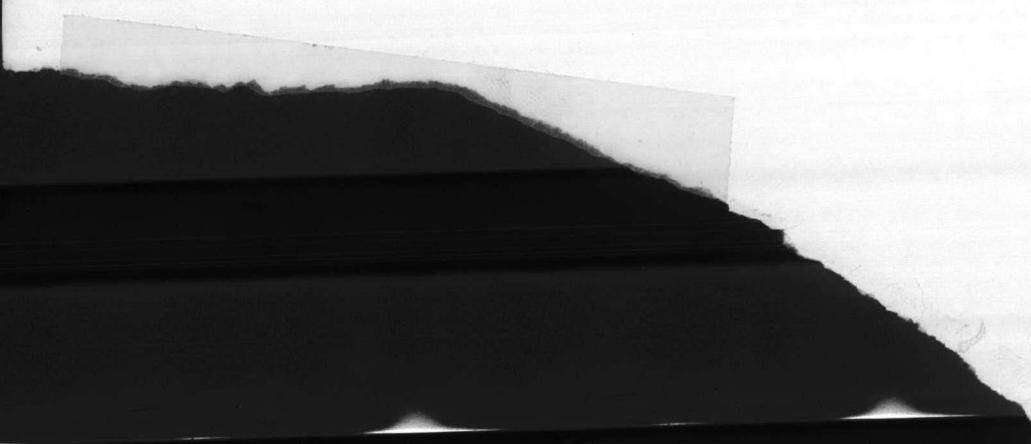
PUBLIC WORKS DEPARTMENT
CAMP LEJEUNE, NORTH CAROLINA

"Prepared by ATLANTIC DIVISION, NAVY
COMMAND in accordance with OPNAV
compliance with Section 102 (2) (C)
Act of 1969."

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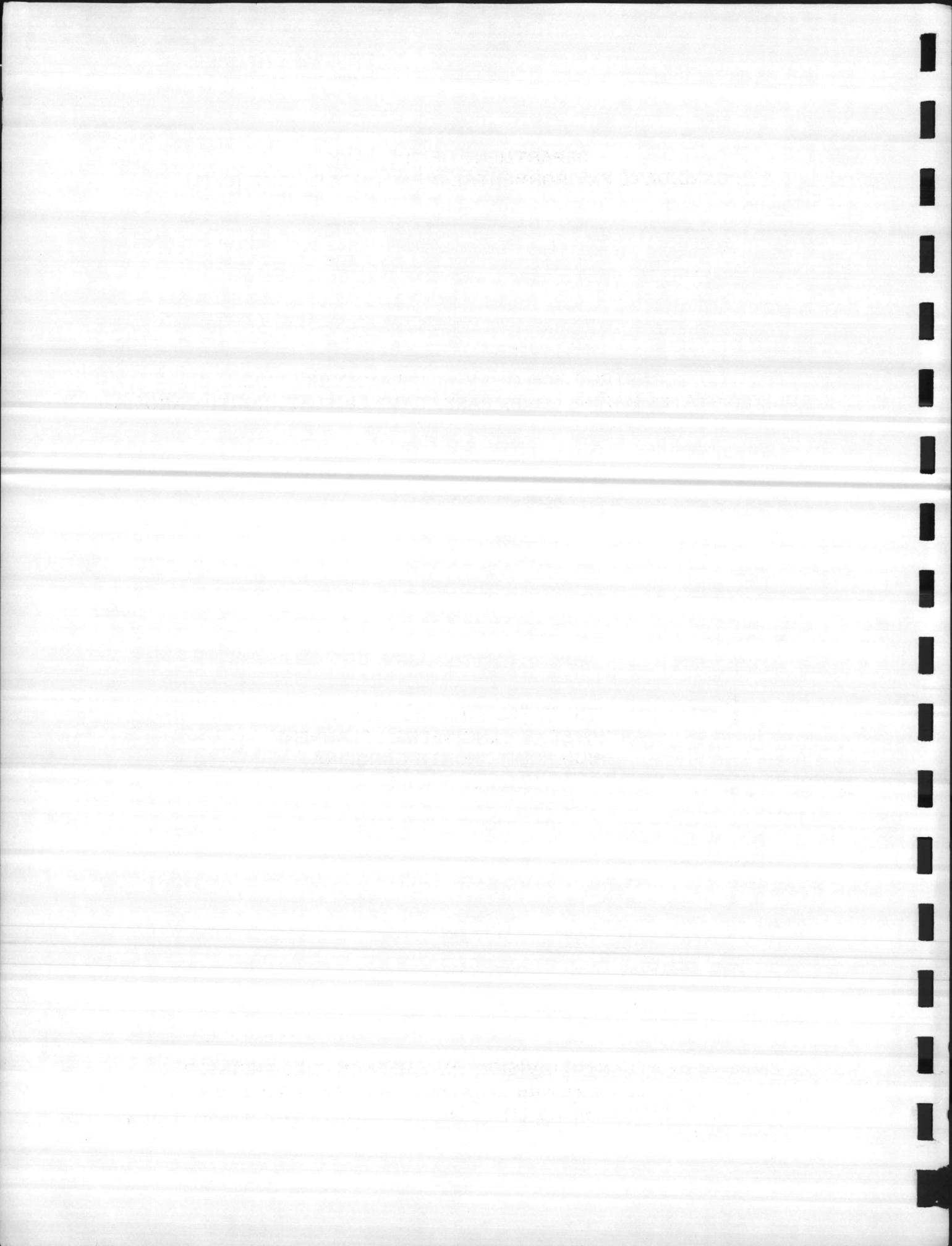


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I.

INTRODUCTION



I. INTRODUCTION

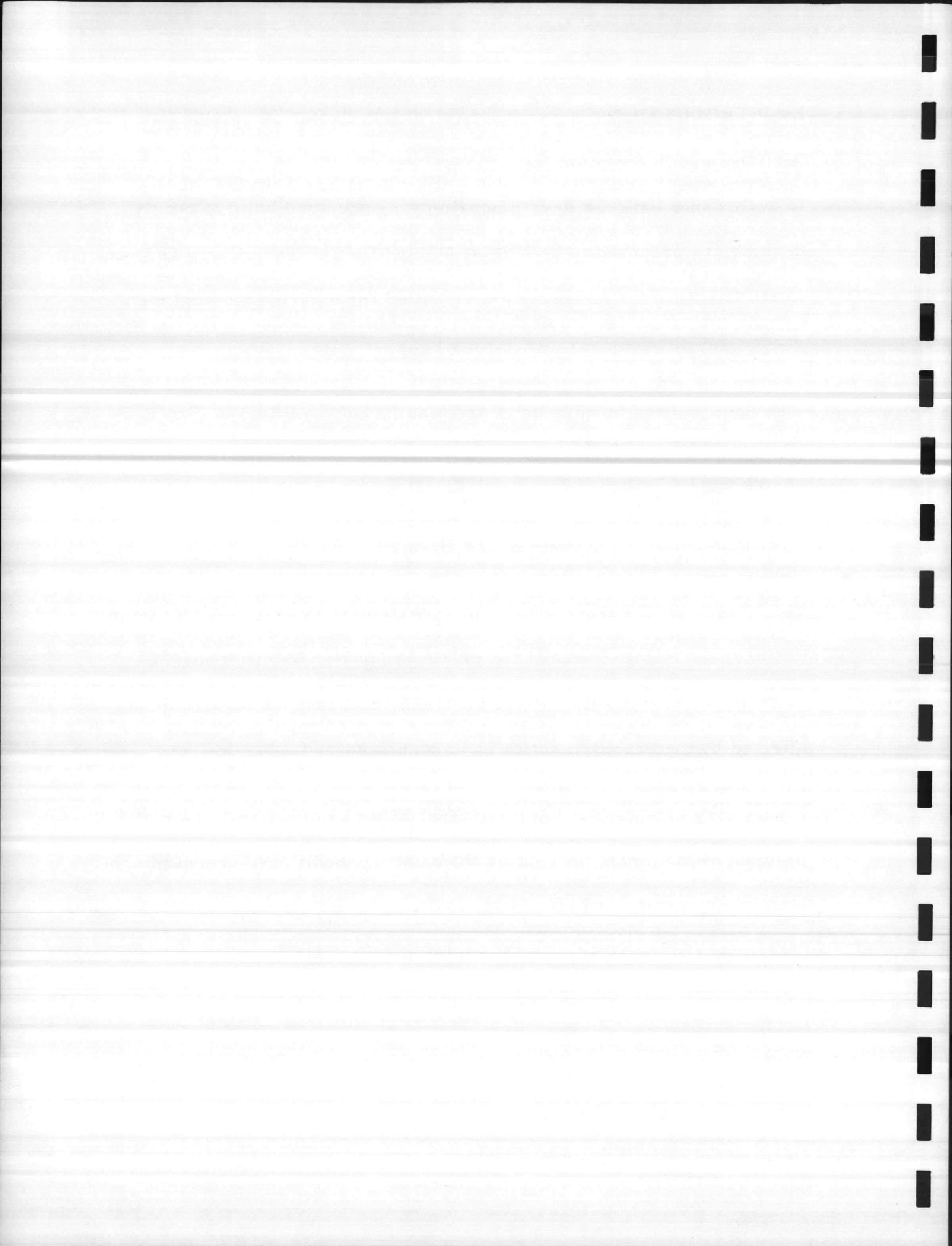
A. Project Description

In accordance with the Navy's housing program, 500 units of family housing are proposed to be built at Marine Corps Base, Camp Lejeune, North Carolina. This housing is specified for married enlisted men, grades E-4 through E-9.

The 500 proposed housing units are also included within the Navy's replacement housing program. As such, the new housing is designated "replacement housing" and will replace 500 of the more than 1600 units already declared inadequate on the Base.

This Candidate Environmental Impact Statement investigates the potential environmental impact of the proposed housing on three possible sites on the Base. All areas of environmental concern thought to be affected by the proposed action have been assessed.

A summary of Potential Environmental Effects follows with the main body of the Statement presenting the existing conditions, proposed project, alternatives, and effects in detail.



SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

See Section IV for Explanation of Impacts

	Project Impact on Environment				Environmental Impact on the Project (1)			
	short-term (2)		long-term		short-term (2)		long-term	
	Beneficial (3)	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)

JACKSONVILLE AND ONSLOW COUNTY

Economic	*	o	*	o	o	o	o	o
Schools and other Facilities	o	o	o	o	o	o	o	o
Military-Civilian Relations	o	●	*	o	o	o	o	o

MARINE CORPS-LEJEUNE
LAND USE

Land Use Pattern	o	o	o	o	o	o	*	o
Historic Preservation	o	o	o	o	o	o	o	o

DESIGN

Housing Density	o	o	*	o	o	o	*	o
Housing Appearance	o	●	*	o	o	o	*	o

- Key: * = significant positive impact - substantial
 * = significant positive impact - slight
 o = insignificant or no impact
 ● = significant negative impact - slight
 ● = significant negative impact - substantial

- (1) i. e. suitability of project surroundings for housing and effects on the quality of life of project residents
- (2) Total construction period (2 phases)
- (3) Assuming usual or reasonable measures to minimize adverse effects (described herein)

	Project Impact on Environment				Environmental Impact on the Project (1)			
	short-term (2)		long-term		short-term (2)		long term	
	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)
SCHOOLS								
School Funding	o	o	o	●	o	o	o	o
School Size	o	o	o	●	o	o	*	o
School Busing	o	●	o	●	*	o	*	o
OTHER FACILITIES								
Police and Fire	o	o	o	o	*	o	*	o
Library and Recreation	o	o	o	●	*	o	*	o
Medical and Shopping	o	o	o	o	*	o	*	o
TRANSPORTATION								
Public Transportation	o	o	o	o	*	o	*	o
Arterial Circulation	o	o	o	o	*	o	*	o
Accessibility	o	o	o	o	*	o	*	o
SANITARY SEWAGE								
Sewer Mains	o	o	o	o	o	o	*	o
Pumping Stations	o	o	o	o	o	o	*	o
Treatment Plants	o	o	o	o	o	o	*	o

	Project Impact on Environment				Environmental Impact on the Project (1)			
	short-term (2)		long-term		short-term (2)		long term	
	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)
DRAINAGE AND FLOOD CONTROL								
Storm Runoff	o	●	o	●	*	o	*	o
Flood Hazard	o	o	o	o	o	o	o	o
OTHER UTILITIES								
Solid Waste Disposal	o	o	o	o	o	o	o	o
Water	o	●	o	o	*	o	o	o
Electric	o	●	o	o	*	o	o	o
ENERGY RESOURCES								
Fuel Oil	o	●	o	●	o	o	o	o
Electric Power Generation	o	o	o	o	o	o	o	o
Busing and Car Pools	o	o	*	o	o	o	*	o
AIR RESOURCES								
Ambient Quality	o	●	o	o	o	o	o	o
Particulate and SO ₂ Pollution	o	●	o	o	o	o	o	o
CO and Other Pollution	o	●	o	o	o	o	o	o

	Project Impact on Environment				Environmental Impact on the Project (1)			
	short-term (2)		long-term		short-term (2)		long term	
	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)	Beneficial	Adverse (3)
WATER RESOURCES								
Raw Water Supply	o	o	o	o	o	o	o	o
Ambient Quality	o	o	o	o	o	o	o	o
LAND RESOURCES								
Forests	o	●	o	●	o	o	*	o
Wildlife	o	●	o	●	o	o	*	o
Soils	o	●	o	o	o	o	o	o
ENVIRONMENTAL SAFETY								
Noise Pollution	o	●	o	o	o	o	o	o
Explosives Hazard	o	o	o	o	o	o	o	o

II.

EXISTING CONDITIONS AND PROJECT REQUIREMENTS



A. HISTORY OF BASE HOUSING AND MISSION

Introduction

This section includes a brief history of the housing and population characteristics of the area as well as a description of the present Marine Corps housing needs at Camp Lejeune. The economy of Onslow County is tied very closely to Camp Lejeune itself and although most military bases are designed to be independent unto themselves, their housing problems are shaped and defined by the surrounding environment and vice versa. Within the scope of this project, the interrelationships that exist between Camp Lejeune and the surrounding area of Onslow County and the City of Jacksonville are discussed.

This CEIS was prepared within the limits of housing needs identified within the last available Camp Lejeune Housing Survey. This survey was initiated in January, 1974 and approved on October 17, 1974. Camp Geiger is included but the New River Marine Air Station (helicopters) are specifically not included in that survey.

Construction History:

Camp Lejeune family housing units now in place totals 3,995 of which 2,345 are adequate units and 1,650 are inadequate units. This total includes 225 mobile home spaces. This housing has been built in defined phases in response to military housing program legislation. The average age of family housing units is 20 + years and they are predominately single family

detached units; the balance being duplexes and triplexes. Some 74% of the single-family base housing is between 22 and 32 years old having been built in two primary phases; 1,129 units in 1942 and 1,846 units in 1952. The remaining 26% are 800 single family units built in 1961 and 225 mobile home spaces. The bulk of the inadequate units are so designated because of their small size, bedroom count and condition as compared to the standards for military housing as contained within the current Design Manual, DM-35, Family Housing, August'71. The total number of units on base has declined slightly in recent years as base owned inadequate mobile homes have been eliminated at Knox Trailer Park and Camp Geiger Trailer Park and several dilapidated units have been removed from Tarawa Terrace. The 1969 and 1974 totals are:

	<u>1969</u>	<u>1974</u>
Single Family	3,776	3,770
Mobile Homes	<u>593</u>	<u>225</u>
	4,369	3,995

Camp Lejeune Mission

Camp Lejeune houses three major commands and two tenant commands whose mission and functions are briefly summarized below from data contained in the Master Plan, Marine Corps Base, Camp Lejeune, 24 March, 1970.

1. Marine Corps Base - The mission of the base is to provide housing, training facilities, logistical support, and certain administra-

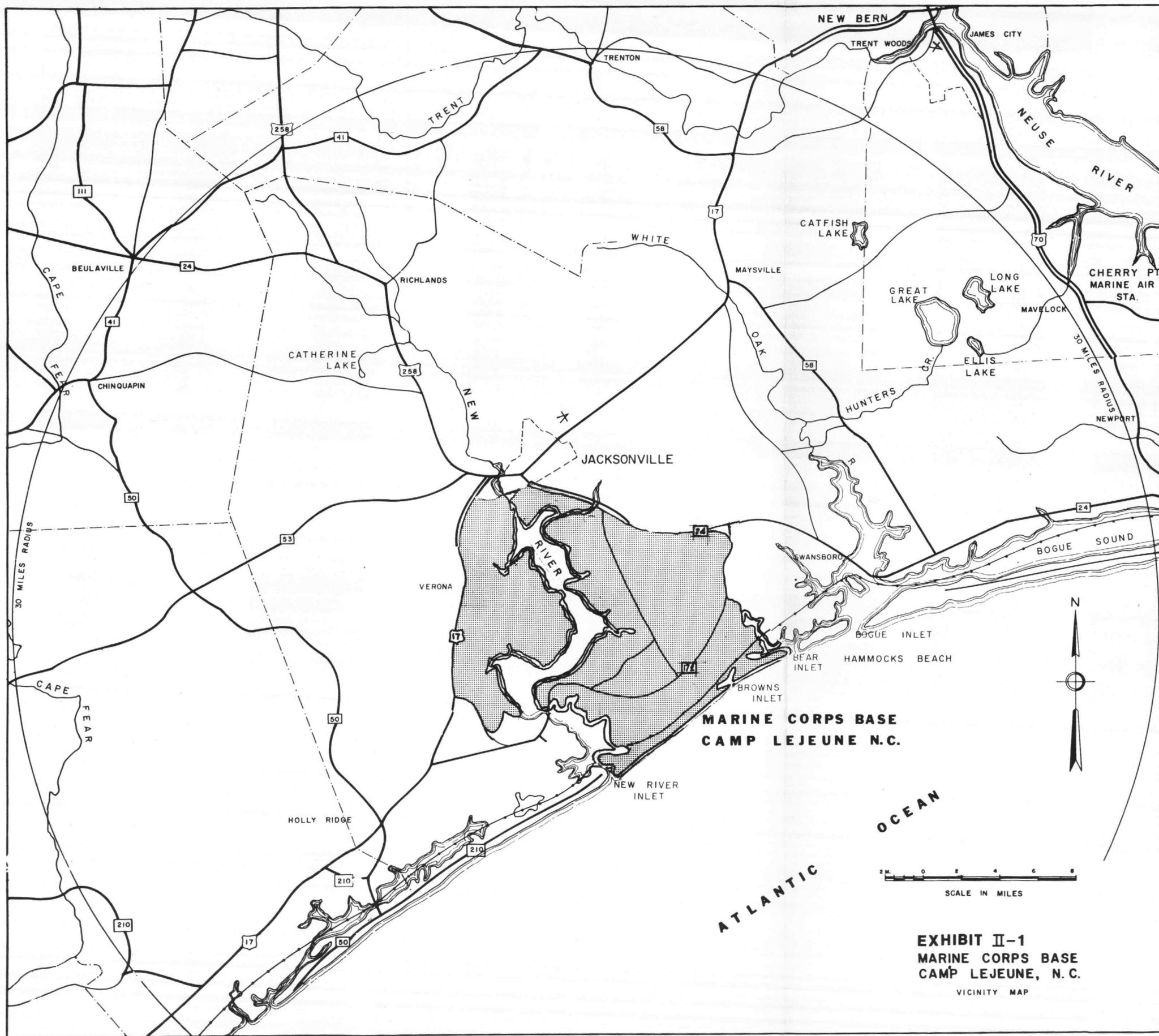
tive support for Fleet Marine Force units, to conduct specialized schools and other training as directed and to receive, process, and conduct individual combat training. The Marine Corps Base administers all of the permanent facilities located throughout the 110,000 acre reservation.

2. Second Marine Division - The mission of the Second Marine Division is to execute amphibious assault and other operations as may be directed, supported by Marine Aviation, Force Troops units, and Naval Forces. The second Marine Division is basically an infantry division and the major portion of the Marine Corps East Coast force in readiness.

3. Force Troops - The force troop mission is to command, administer, and train assigned units in order to provide combat service and technical support as required by the Fleet Marine Force, Atlantic. Force Troops constitutes the major source of heavy combat support and specialized technical support assignable to a mobilized combat unit such as the Second Marine Division.

4. U. S. Naval Hospital - This 500 bed Naval Hospital provides medical services for all assigned Military personnel and their dependents at Camp Lejeune.

5. Field Medical Service School - This is a Navy unit organized for the training of Navy personnel for combat zone medical assistance. The unit is completely dependent upon the Marine Corps Base for all its operational support; however, its academic and logistical support is provided by Navy facilities elsewhere.



**MARINE CORPS BASE
CAMP LEJEUNE N.C.**

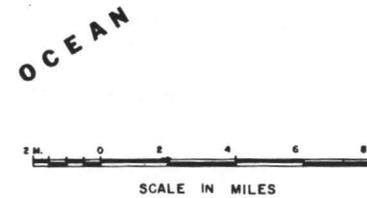
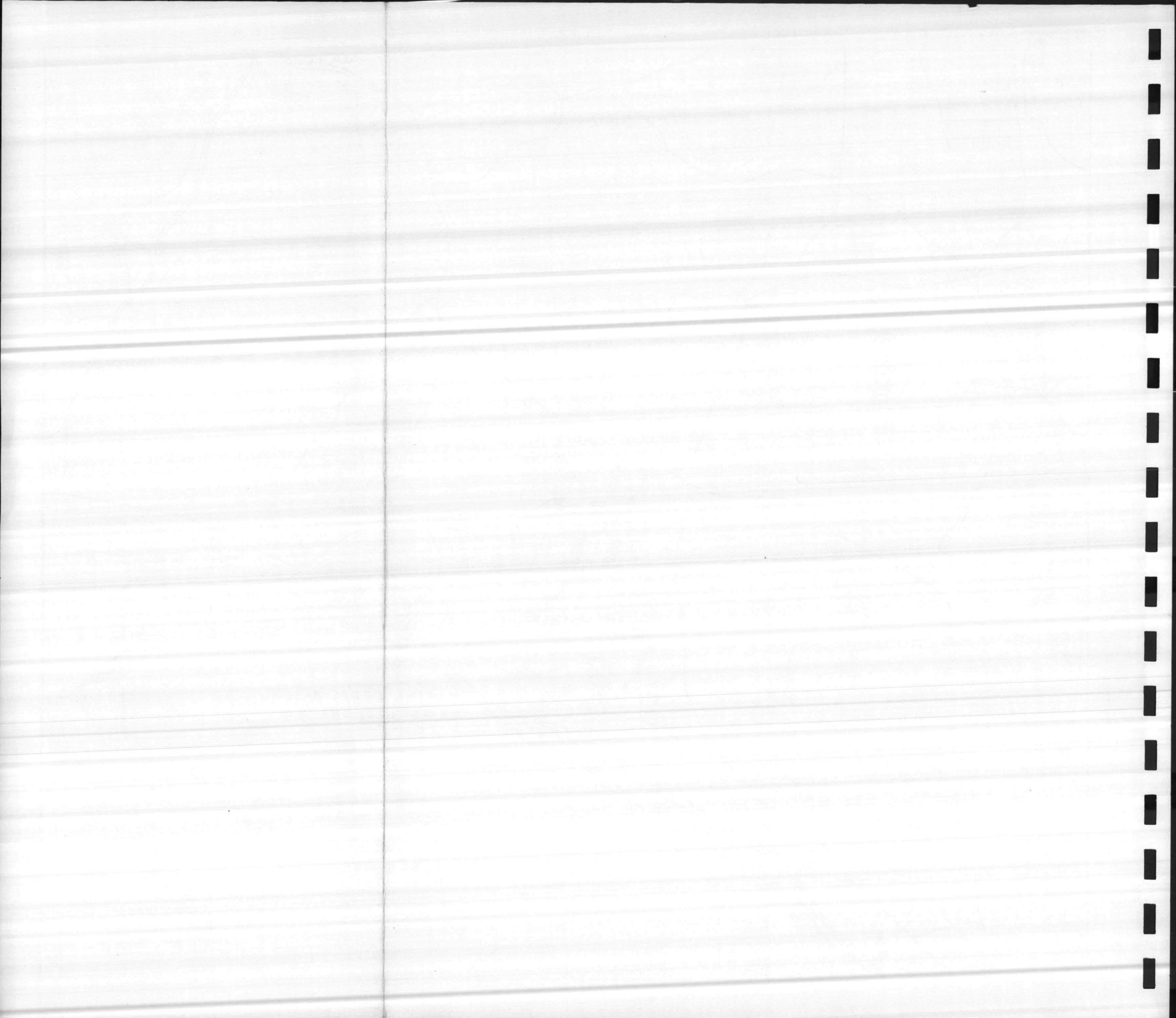


EXHIBIT II-1
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
VICINITY MAP



B. POPULATION OVERVIEW

The proposed housing is located at Camp Lejeune within Onslow County. Camp Lejeune and other Marine Corps Facilities in the coastal region of North Carolina were developed in 1941. The population growth of the City of Jacksonville and Onslow County since 1941 has occurred both directly and indirectly from the number of marines (and their dependents) at Camp Lejeune. During the thirty years from 1940 to 1970 the population of Onslow County grew by some 475% while the region as a whole grew by some 67%. (1)

Development of the 110,000 acre Camp Lejeune facilities occurred primarily during the early 1940's. A steady growth and upgrading to permanent facilities has occurred ever since and continues today as older, uneconomical buildings and utility systems (most of which are original construction) are replaced. In 1970 the Onslow County population was 103,126 persons. Age, sex and race characteristics for the 1970 population, as published in the Onslow County Statistical Summary, are contained in the Appendix.

(1) Population and Socio-Economic Base Study

Population growth had been 19.6% during the 1960 - 1970 decade and apparently has not changed appreciably since then.

Onslow County Population projections for 1974 are not available.

The 1940 through 1970 period is summarized in table II-1.

TABLE II-1
 ONSLOW COUNTY POPULATION, 1940-1970

<u>Year</u>	<u>Population</u>	<u>(1)</u> <u>Camp Lejeune and Percent</u>		<u>Jacksonville</u>	<u>All Other</u>
1940	17,939	-0-		873	17,064
1950	42,047	N. A.		3,960	N. A.
1960	86,208	34,000	39%	13,491	38,717
1970	103,126	43,248	42%	16,021	43,857

(1) Population within the military areas of Camp Lejeune, Camp Geiger and New River Air Station.

C. ONslow COUNTY HOUSING OVERVIEW

The very strong growth rates during the entire period from 1940-1970 have dictated the complementary expansion of the housing inventory. During the decade from 1960-70, this expansion produced some 660 new units of private housing annually and the housing industry has become one of the strongest sectors in the local economy.

Military personnel and their dependents occupied the majority of the 24, 599 occupied housing units in Onslow County in 1969. It is of interest to note that the incidence of military preferring to live off-base and purchase homes is apparently increasing among higher pay grade officers, (commissioned and non commissioned) and at the same time there is a waiting list indicating a concurrent preference for on-base housing among lower pay scale enlisted personnel, especially the young married marine grade E-1 through E-3 who is not eligible for family housing.

Existing housing units in Onslow County in 1969 contained:

<u>Type Unit</u>	<u>County Only</u>	<u>Camp Lejeune</u>
Single Family	13, 196	4, 211
Mobile Home	3, 688	982
Apartment	2, 522	-
Total	<u>19, 406</u>	<u>5, 193</u>

The popularity of the mobile home among the young married marine and others is evidenced by the three hundred mobile home parks found within Onslow County. An estimated 5000 spaces are included within these parks. The number of those units occupied by military families is not available but at the very least is a significant percentage. The low estimated vacancy rate indicates that there remains a healthy demand for this housing type.

It is believed that the off-base housing stock available and affordable to the lower pay scale enlisted personnel will remain scarce in the immediate future as the local housing industry builds for the new home market with prices varying from \$35,000 to \$50,000 and over, insuring readily available units for officers and senior non-commissioned officers.

TABLE II-2
RESIDENTIAL HOUSING (1)

Housing in Onslow County has increased in number and quality since 1960. To determine this, a land use survey was made to document each dwelling in the County. The following chart illustrates the results of that survey as well as a comparison of those results with U.S. Census data taken in 1960.

	TOTAL UNITS		TOTAL** VACANT UNITS		SOUND*** HOUSING		DETERIO-- RATING*** HOUSING		DILAPI- DATED*** HOUSING	
	1960	1969	1960	1969	1960	1969	1960	1969	1960	1969
Onslow County	18,648	24,599	1,463	933	15,005	17,679	2,551	5,473	1,192	1,447
White Oak Twp.	2,907	4,254	226	160	2,334	3,250	412	695	161	309
Stump Sound Twp.	1,690	2,305	323	164	1,157	1,040	447	991	86	274
Richlands Twp.	1,905	2,427	203	291	974	1,018	599	1,057	332	352
Swansboro Twp.	1,333	1,878	105	65	1,177	1,139	113	643	43	96
Jacksonville Twp.	10,813	13,735	606	253	9,363	11,232	880	2,087	570	416
* Jacksonville	4,063	4,952	280	33	3,409	4,088	415	819	239	45
* Holly Ridge	305	262	111	30	287	20	9	142	9	100
* Richlands	316	308	26	13	232	172	55	120	29	16
* Swansboro	349	417	33	6	338	217	10	193	1	7

* Towns are included in township totals.

** Vacant Units not included in total units column.

*** Includes vacant and occupied houses.

**** Holly Ridge in Stump Sound Township.

***** Camp Lejeune is included in this table. All military housing is included in sound column.

(1) Table is from the Onslow County Statistical Summary, July 1970.



D. CAMP LEJEUNE HOUSING NEEDS

Annual Housing Survey

The annual housing survey prepared by the Base Housing Office each year is the basic planning document used for determination of Marine housing needs. Inputs from this formal document (DD Form 1378) serve as program justification for the 5 year Marine Corps Family Housing Program. The last survey was initiated in January, 1974, and reviewed and approved in October, 1974.

The annual housing survey does not include any units which are unsuitable as defined by either of the following documents:

1. NAVFAC Design Manual, DM-35, Family Housing.
2. Department of Defense Construction Manual, DOD 4270.1-N.

Unsuitability results from the application of standards as to area of unit, number of bedrooms, location, or condition.

Additionally, units may be considered unsuitable (a) due to unacceptable maintenance costs of either the units themselves or the supportive utility systems, (b) by command decisions applicable to all marine facilities, such as the present policy to replace all Wherry Act housing.

The Base Housing Office has determined that there are 1650 such unsuitable units on Camp Lejeune, although officially, only 950 units in Tarawa Terrace II have been so designated. These are the units not included in the survey.

Based upon the total permanent party housing strength at Camp Lejeune, the number of married personnel and the number of families that are voluntarily separated, the annual housing survey indicates an effective housing requirement of 8663 dwelling units.

In order to meet this demand for family housing, both military owned and privately owned facilities are included. The survey lists a total housing inventory as follows:

Military Owned	2320 units
Privately Owned	<u>5199</u> units
Total	7519 units

Table II- 3 gives the location and number of units within Camp Lejeune. It should be noted that there is a discrepancy between these two lists of 25 suitable units (2320 vs. 2345).

Based upon the existing requirement and the present inventory, the annual survey projects a net housing deficit of 1144 units.

Requirement	8663 units
Inventory	<u>7519</u> units
Deficit	1144 units

If the 1650 unsuitable units were counted, the deficit of 1144 units would not exist.

The housing survey breaks down the 1144 unit deficit by bedroom requirements. It is interesting to note that there is a very large deficit of one and two bedroom units and a deficit of four bedroom units but that there is a surplus of three bedroom units which tends to reduce the total deficit. The breakdown is as follows:

one and two bedroom deficit	- 1452 units
three bedroom surplus	+ 671 units
four bedroom deficit	- 363 units
Total Deficit	1144 units

The annual survey also reveals:

1. All of the housing deficit is with the enlisted men category.
2. 570 eligible enlisted families were involuntarily separated due to lack of adequate quarters on or near the Base.
3. A total of 3225 families were not suitably housed, the majority of which (1650) were in military housing and the remainder (1575) were in unsuitable private housing. (See Table II-3)
4. A significant decrease in the private units planned or under construction. (Interviews conducted as part of this CEIS indicate several hundred starts planned verses the 42 listed in the survey). Planned housing starts in January, 1972, were listed at 477. The decline in planned starts can be attributed to both a generally dismal housing economy for the past year and the lack of a backlog in the military market. The vacancy rate established by the survey was three percent in January 1970.

Waiting List

As was demonstrated by the annual housing survey there are over twice as many families living off base as there are living on base. The Base Housing Office indicates that the majority of these families live off base

by preference in order to own their own home and to more fully participate in the life of the community. There is, however, a great demand for on-base housing as evidenced by a current waiting list (November 1974) (See Appendix X) of approximately 1300 families presently living off-base which desire housing accommodations on-base.

The most common reasons for this preference includes:

1. More housing for the money. The annual survey found that eligible enlisted personnel were paying more annually, a range of \$72 to \$629 more, than the MAHC (Maximum Allowable Housing Costs) rates. The difference meant additional spendable income for on-base families.
2. Better on-base schools. (See Section on Schools)
3. Convenience of lower cost, on-base shopping facilities.
4. Increased security.
5. Saving on time and money in commuting to place of work.
6. Complete recreational facilities at modest fees.

The most apparent deficiency illustrated by the waiting list is the lack of one and two bedroom units.

The conclusion to be drawn, therefore, is that under the present policy of the Marine Corps to furnish housing which meets certain minimum standards of suitability, there is a definite shortage of housing at Camp Lejeune. It is also apparent that many families presently living off-base do not enjoy the same benefits and convenience as on-base residents. This inequity would be alleviated by more on-base housing.

TABLE II- 3
CAMP LEJEUNE HOUSING - 1974

<u>Location</u>	<u>Type</u>	<u># Units</u>	<u>Year Built</u>	<u>Adequate or Inadequate</u>	<u>Total (1) Occupants</u>	<u>Ration of Occupancy</u>
Paradise Point	Officer	400	1942-48	Adequate	1539	3.92
Naval Hospital	As assigned	29	-	Adequate	91	3.96
Berkeley Manor	Senior Enlisted	677	1961-62	Adequate	3052	4.61
Paradise Point	Officer	123	1961	Adequate	529	4.45
Tarawa Terrace I	Enlisted	896	1952	Adequate	3099	3.59
Tarawa Terrace II	Enlisted	950	1952	Inadequate	3158	3.49
Midway Park	Enlisted	700	1942	Inadequate	1849	2.78
Knox Trailer Park	Enlisted	<u>225</u> 3995	-	<u>Adequate (2)</u> 2345 Adequate <u>1650</u> Inadequate 3995 Total	<u>629</u> 15,823	<u>3.59</u> 3.75

Notes:

(1) Total occupancy is assumed as units are vacant only for repair.

(2) Marine Corps Base provides trailer spaces only, units are privately owned.

TABLE II- 4
1973 Annual Housing Survey - Camp Lejeune (1)

Marine Families Unsuitably Housed in Private Quarters

In Substandard Units ⁽²⁾	1327	84
In Units of Excessive Cost	104	7
In Units at Excessive Distance from Base	144	9
TOTALS=	<u>1575</u>	<u>100%</u>

(1) Not including Marine Corps Air Station, New River
nor the 1650 unsuitable on-base units.

(2) Substandard includes units deficient in bedroom count,
size and/or condition.

E. PROJECT REQUIREMENTS

Need for Proposed FY-76 - FY 77 Family Housing

The proposed 500 units of housing is intended as replacement housing for married senior and junior enlisted men. The replacement housing program mandates a one for one removal of existing inadequate units.

The Annual Housing Survey has demonstrated that the principle reason there is a housing deficit of 1144 units on the base is because 1650 of the existing dwelling units are unsuitable for occupancy and therefore cannot be included in the total housing inventory. If all of the unsuitable units are replaced under the replacement housing program the deficit can be eliminated. This project speaks directly to that need and results from several years of effort by base officials and the Marine Corps to fund a replacement program.

A family housing feasibility study prepared in April, 1973 by Bartholomew and Wakeham, Architects, indicated that replacement of the Tarawa Terrace II inadequate units would cost only 5-10% more than the costs of renovating these units to Navy family housing standards. Given the results of this study together with existence of the 1650 inadequate units on base there is a demonstrated need for the proposed 500 replacement units.

Housing Program

Projections made in 1974 by the Marine Corps called for 500 units of replacement housing to be built in FY 76-77. These projections are part of the Marine Corps five-year family housing program. Housing and planning officials at Camp Lejeune expect that eventually all existing substandard units at Tarawa Terrace and Midway Park will be replaced. Annual Marine housing programs are presented to Congress with the Military Construction Program and are approved only after exhaustive review and a balancing of resources against missions and needs. There is no way of accurately predicting how many replacement units, beyond the presently proposed 500 units will be approved in succeeding fiscal years.

Proposed Sites

Three sites containing 272 acres are analyzed within this CEIS while only approximately 67 acres will be used to accommodate the proposed 500 units. Navy design criteria requires an average density of 7-8 units per acre for the proposed type of family housing.

All three sites considered are within existing family housing areas; one is within the Tarawa Terrace area and two are within the Paradise Point mainside housing area.

Proposed Units

The proposed 500 units are all for enlisted personnel, both Junior and Senior grades. The proposed townhouse design is in accordance with Navy Design Manual DM-35. Planning criteria and unit designations are fully discussed within this Statement.

The exact location and size of the 500 units to be demolished as part of this action are now known; however, the Base Housing Office indicates they are most likely to be within the existing 950 units of inadequate housing at Tarawa Terrace II.

Proposed Funding

This project is part of the FY76 Military Construction Program which has been approved by the Department of Defense, but for which Congress has not yet appropriated funds. Normally, the Congress would act on an appropriations bill for FY76 in late spring or early summer of 1975. Until funds are appropriated, the proposed housing units are not assured.

Basic development costs for this project could run as much as \$14,000,000. Additionally, the cost of demolishing the existing inadequate units is estimated at \$432,000. This construction estimate is based on the allowable average costs described in DM-35, and demolition costs are taken from estimates prepared by the Camp Lejeune Public Works Department for demolition of Tarawa Terrace II. (See Appendix VI)

Funds available for construction or demolition have not been fixed or even assured at this time.

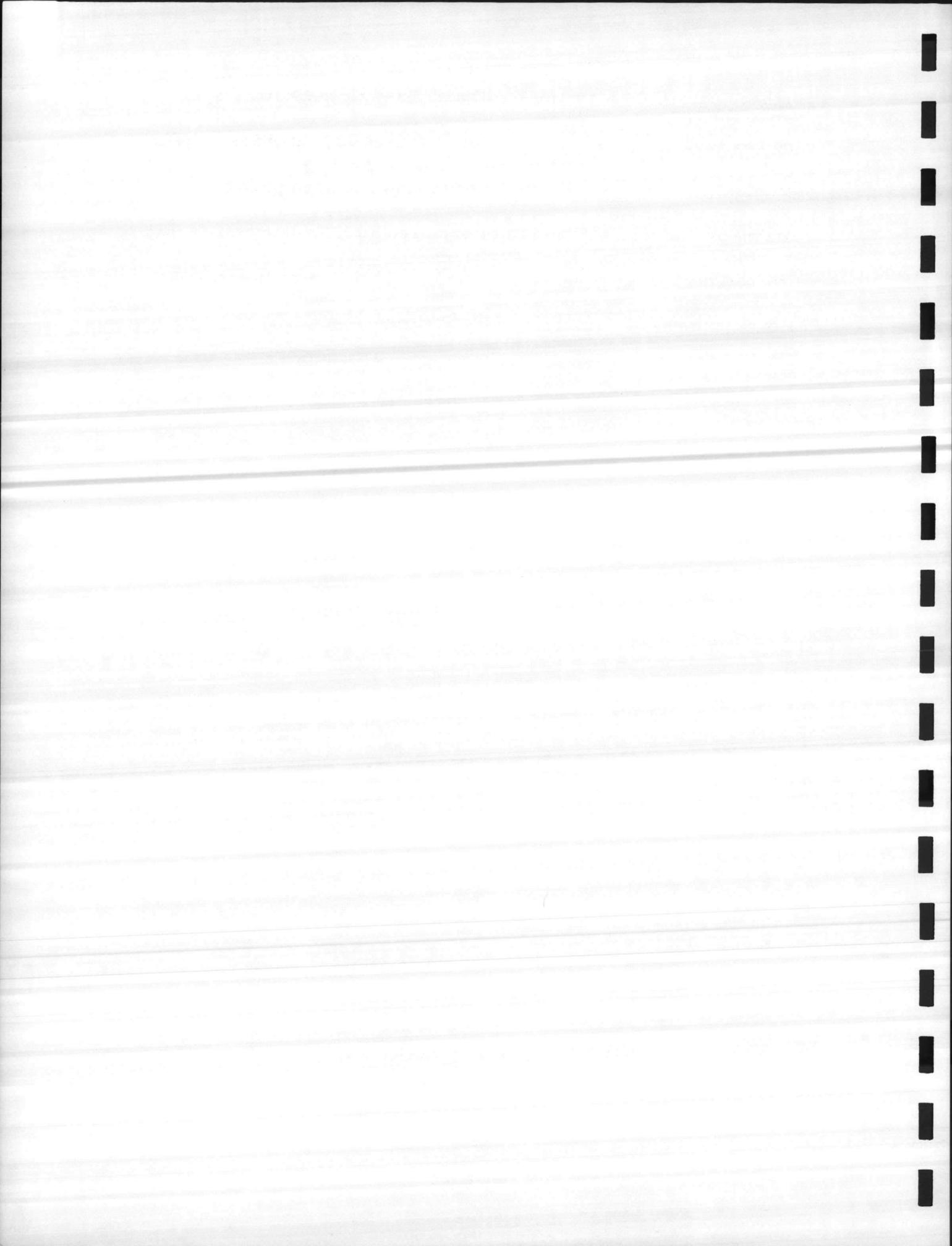
Environmental Impact Determination

Determination of environmental impact is confined to the scope of the proposed 500 units of replacement housing and the demolition of the 500 unsuitable units only.

All available data in determining the environmental impact was analyzed by the investigative team. Data not published was developed in a series of interviews with appropriate officials. Probable impact on the following aspects of the environment were investigated: air quality, water quality, marine pollution, fish, wildlife, and other land eco-systems, solid waste disposal, noise, energy, consumption, land use and management, protection of environmentally critical areas, population density, neighborhood desirability, historic and

archaeological preservation, soil and plant conservation, hydrology and the supporting aspects of outdoor recreation, utilities, traffic, community facilities, and the political and social implications.

Alternative actions and sites are explored as it is determined that alternatives will enhance environmental quality or at the least be less detrimental on environmental quality.



F. SITE LOCATIONS AND SURROUNDINGS

Tarawa Terrace Site

The Tarawa Terrace Housing Area is located adjacent to the northern boundary of Camp Lejeune. This boundary is contiguous with N. C. Highway No. 24. The housing area is separated from the main portion of the base by Northeast Creek. There is no access to the main base except via Route 24 and entrance through the main gate. It is thus effectively separated from the main base.

The site selected for investigation is a 20 acre parcel of land at the western edge of the housing area. The northern boundary of the site is Bouganville Road and the east boundary is Knox Road, the main road leading to Knox Trailer Park. The east boundary is adjacent to the existing housing area known as Tarawa Terrace II and the southern boundary is through undeveloped woods.

The site is completely undeveloped. It is wooded with vegetation as described in Section N. See Exhibits II-3 and II-7.

The site is almost completely flat. There is a drainage ditch across the eastern portion of the site however, and the change in topography at this point is approximately 10 feet. The average elevation is 20 feet above mean sea level.

Area Surrounding the Site

On the north, west and south sides of the site the land is undeveloped woodland. To the east is the Tarawa Terrace housing area which is primarily for enlisted men of grades E-4 through E-6. It is composed of approximately 1850 one-story housing units, both single family detached and row type. The first section known as Tarawa Terrace No. I was built in 1951 and the second section, Tarawa Terrace No. II was built in 1952. All 950 units in TT2 have been declared inadequate and 900 units in TT1 are of like condition, although not yet officially designated inadequate. There are two schools, a recreation center and recreational facilities, and a shopping center within the area. The Base Housing Office is also located in Tarawa Terrace.

Less than one half a mile south of the site on Knox Road is the Knox Trailer Park. There are presently 225 mobile homes there with another 112 spaces under construction.

The Camp Lejeune Railroad is 600 feet north of the site. This is a spur line used to bring supplies into Camp Lejeune and Cherry Point. There are only one or two trains on this line a week. It is separated from Tarawa Terrace by dense woods similar to that on the site.

Just north of the railroad line is N. C. Highway 24. This is the principal highway to the base and runs through Jacksonville by the Main Gate of the Base.

A typical commercial strip development extends from Jacksonville to the Main Gate along the north side of the highway. Included within the commercial area are restaurants, automobile agencies, theatres, and miscellaneous shopping facilities.

Paradise Point Site

Paradise Point is one of the sections of Camp Lejeune which have been designated, within the overall Master Plan, to be used for Family Housing. The area is bounded on the north by Northeast Creek, on the east by Holcomb Boulevard, on the west by New River, and on the south by Wallace Creek. It is just north of the main base operations at Hadnot Point but is effectively separated from it by Wallace Creek.

There are approximately 4000 acres within the Paradise Point Area. A linear pattern of development of housing extends along Seth Williams Boulevard adjacent to the New River on the western portion of Paradise Point. This housing is occupied by commissioned officers, grade W-1 and up. There are approximately 525 housing units in this section of Paradise Point.

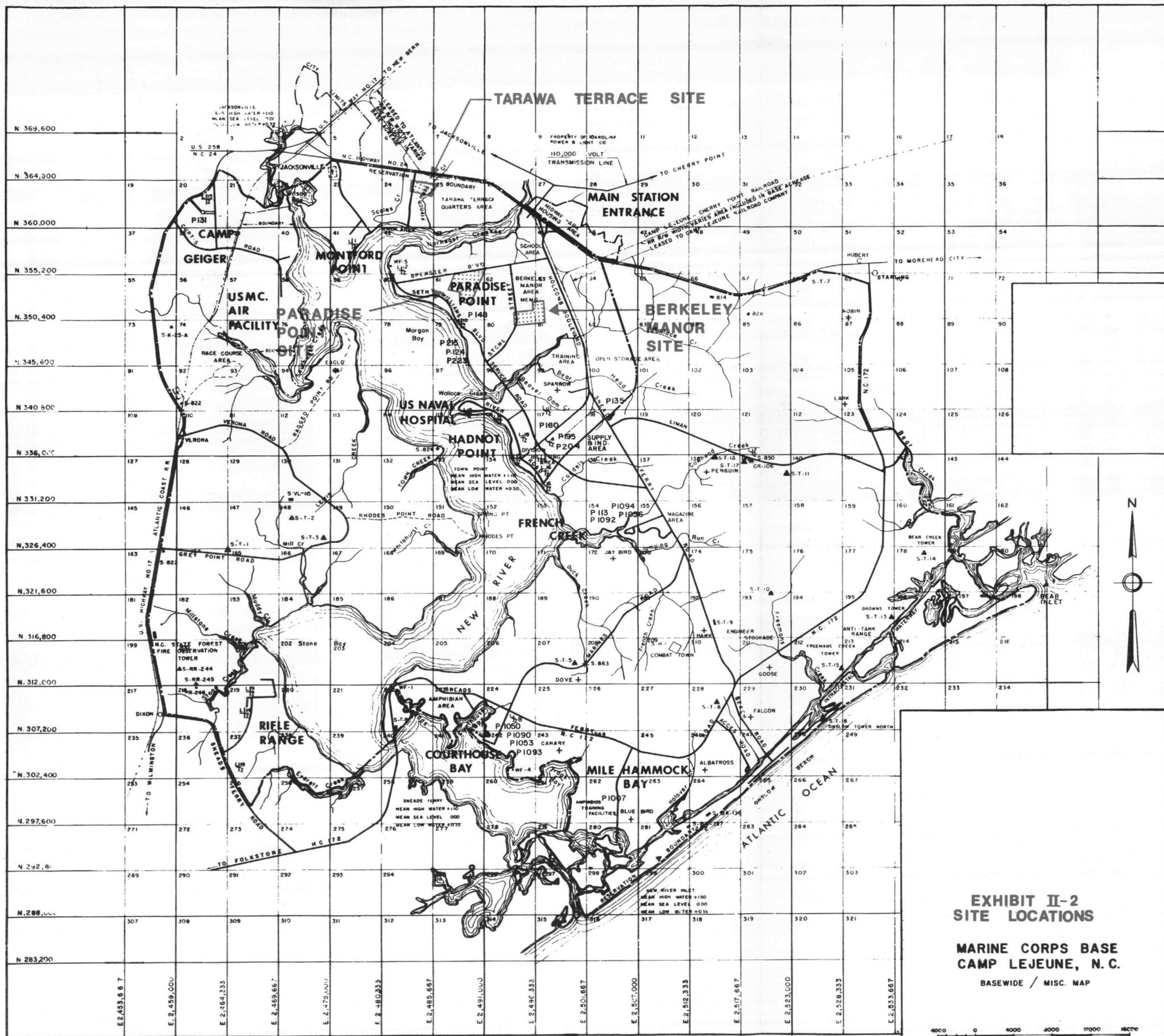
Within the eastern portion of Paradise Point is the Berkeley Manor MEMQ. This housing development constructed in 1961 includes approximately 677 dwelling units and is occupied by SNCO of grades E7-E9.

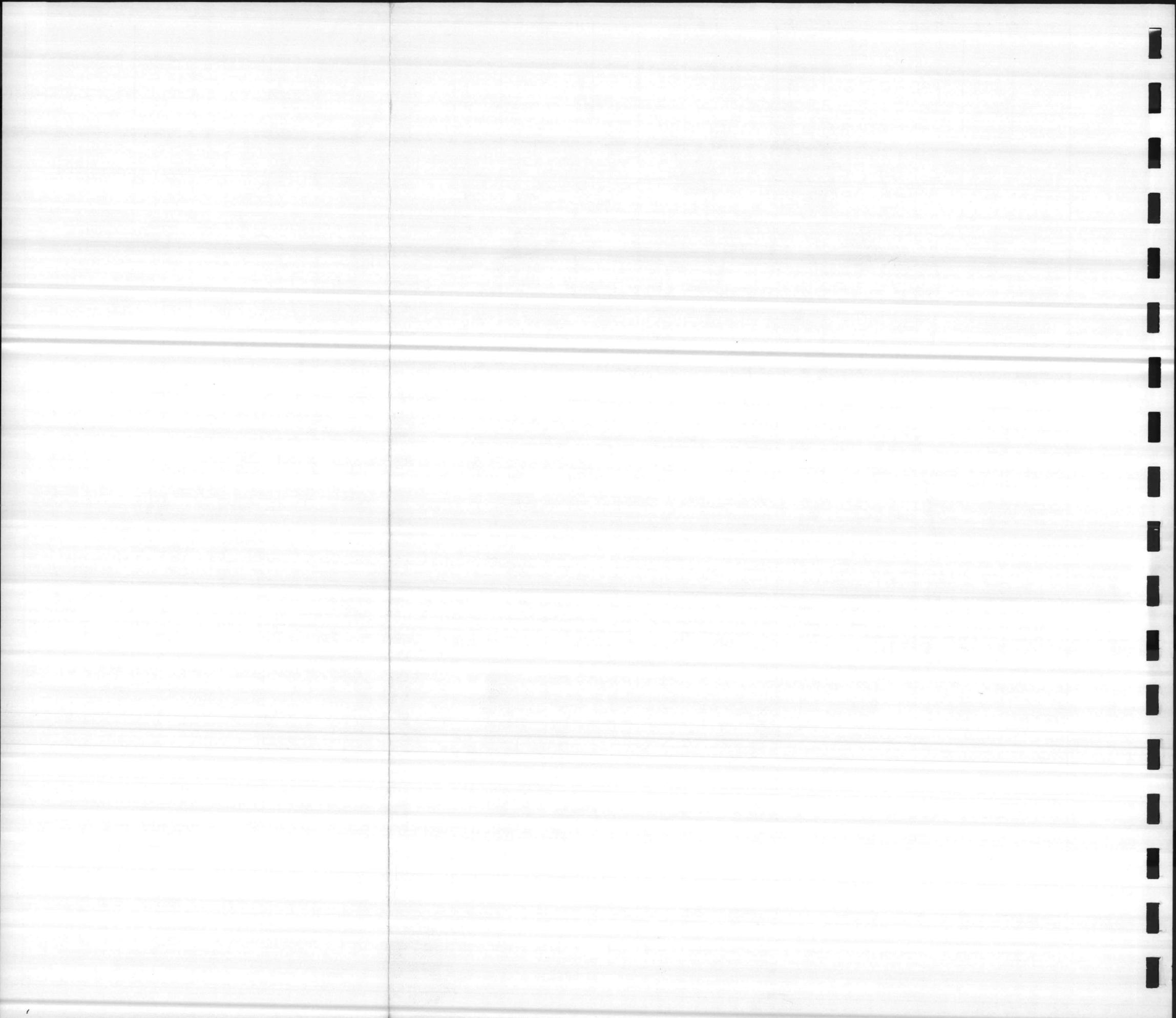
The Paradise Point Site under consideration in this investigation lies between the two areas mentioned above. Its northern boundary is Brewster Boulevard and the western boundary is Charles Street. An existing housing area is on the south. The site comprises 175 acres. The site itself is completely undeveloped and is entirely wooded. See Exhibits II-9, II-13, and II-14.

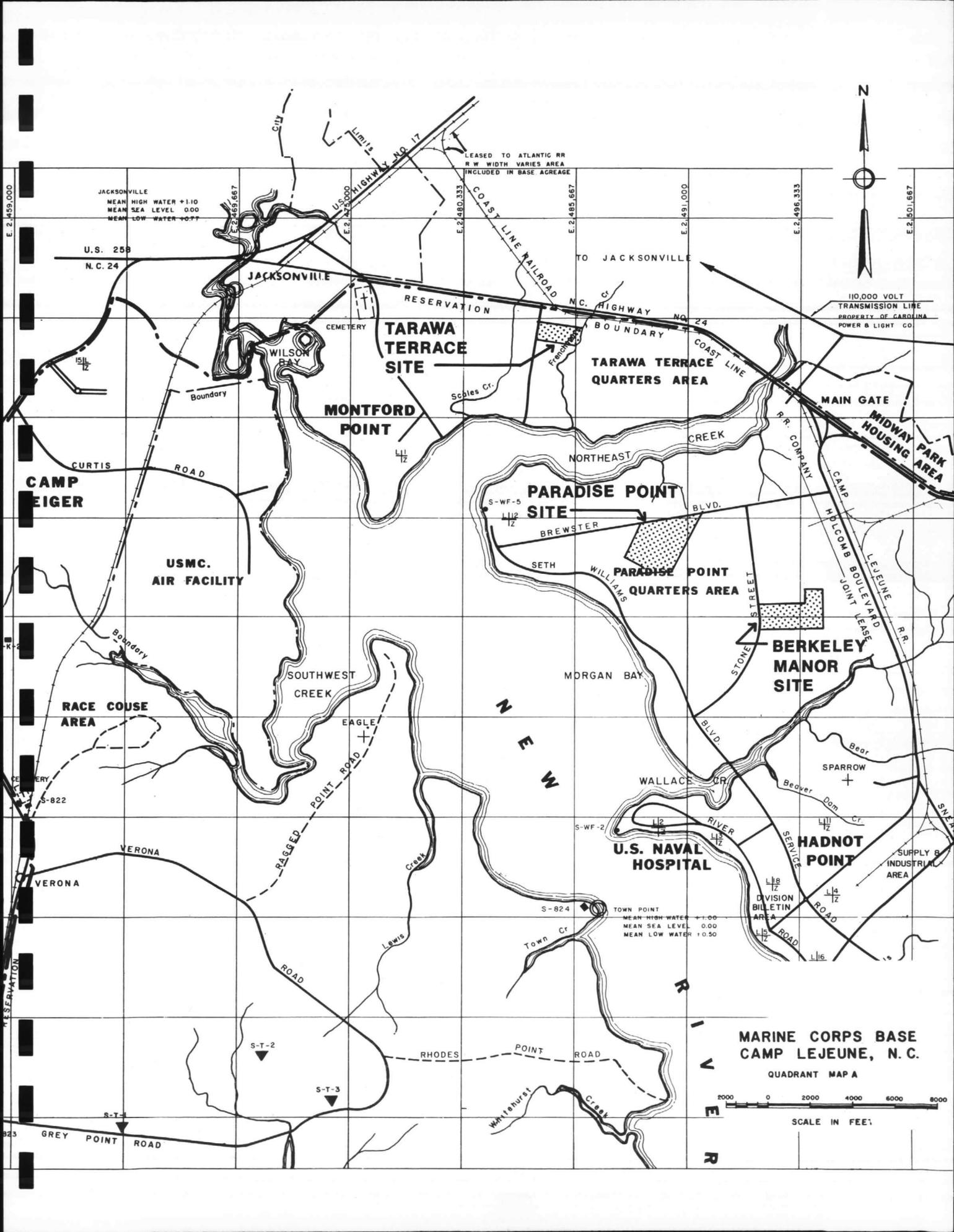
As seen in Exhibit II-10 the land is relatively flat. Only along the drainage ditch on the western portion of the site is there any appreciable change in topography and this is not at all severe. The drainage ditches are only a couple of feet deep and do not impose any severe limitation on development. Average elevation is 20 feet above mean sea level.

Area Surrounding the Site

The land north of the site is undeveloped. It is covered with vegetation identical to that on the site. The same is true of the area to the east and southeast of the site. As seen in Exhibit II-11 this area is also undeveloped.







JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.77

LEASED TO ATLANTIC RR
 R R WIDTH VARIES AREA
 INCLUDED IN BASE AGREEMENT

U.S. 259
 N.C. 24



110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO

**CAMP
 EIGER**

**USMC.
 AIR FACILITY**

**RACE COUSE
 AREA**

VERONA

VERONA

GREY POINT ROAD

JACKSONVILLE

**MONTFORD
 POINT**

**TARAWA
 TERRACE
 SITE**

**TARAWA TERRACE
 QUARTERS AREA**

**PARADISE POINT
 SITE**

**PARADISE POINT
 QUARTERS AREA**

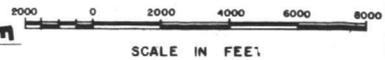
**BERKELEY
 MANOR
 SITE**

**U.S. NAVAL
 HOSPITAL**

**HADNOT
 POINT**

**MARINE CORPS BASE
 CAMP LEJEUNE, N. C.**

QUADRANT MAP A



SCALE IN FEET

**N
 E
 W**

**R
 I
 V
 E
 R**

CITY

Limit 12
 U.S. HIGHWAY NO. 17

COAST LINE RAILROAD

TO JACKSONVILLE

N.C. HIGHWAY NO. 24

MAIN GATE

MIDWAY PARK
 HOUSING AREA

CAMP

H.B. COMB JOINT LEASE

LEJEUNE R.R.

R.R. COMPANY

BLVD.

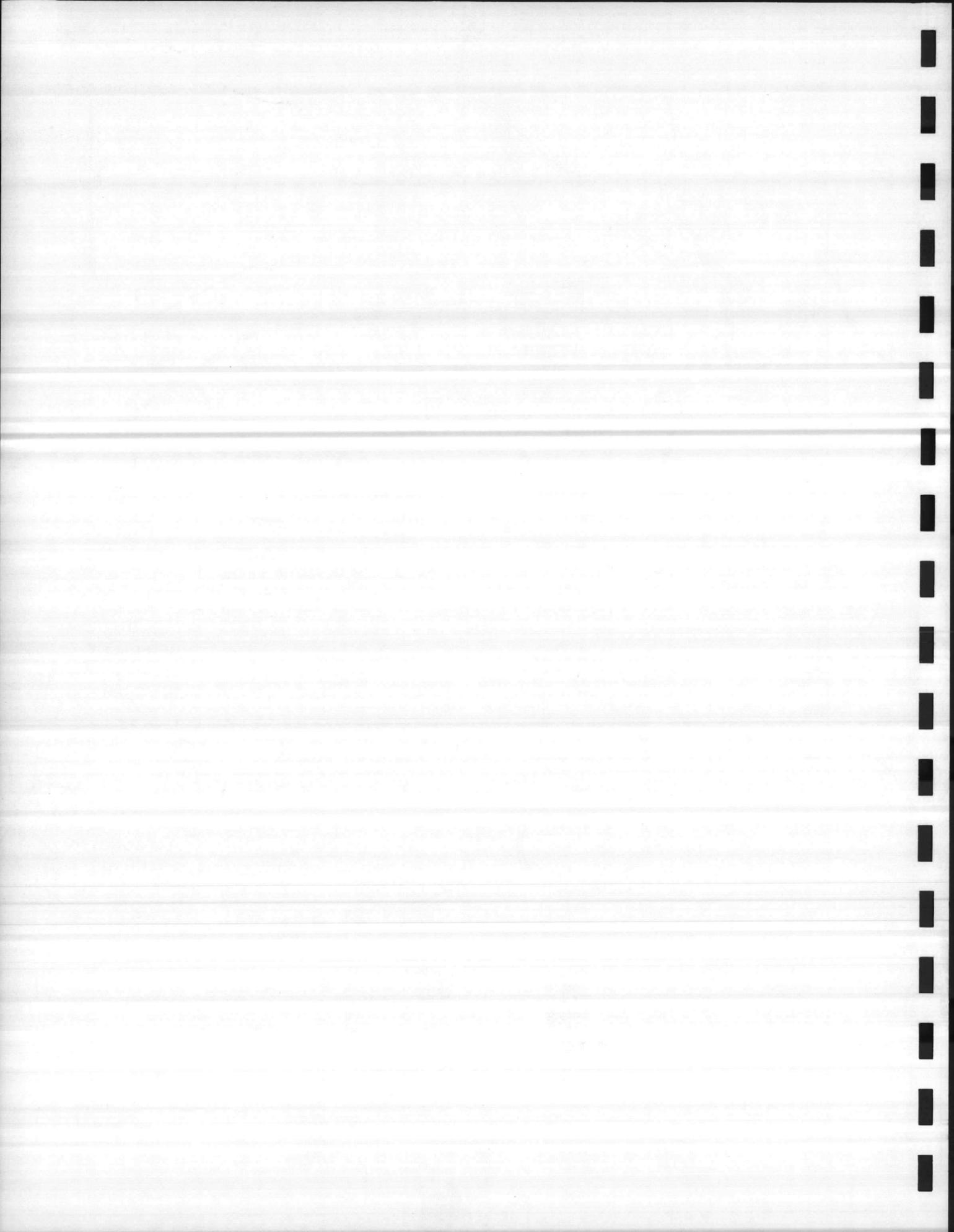
STONE STREET

BLVD.

WALLACE CR.

RIVER

ROAD



5-6-73

N12BI

MCB

173

212



PROJECT BOUNDARY

N.C. 24

R.R.

TRAILER PARK

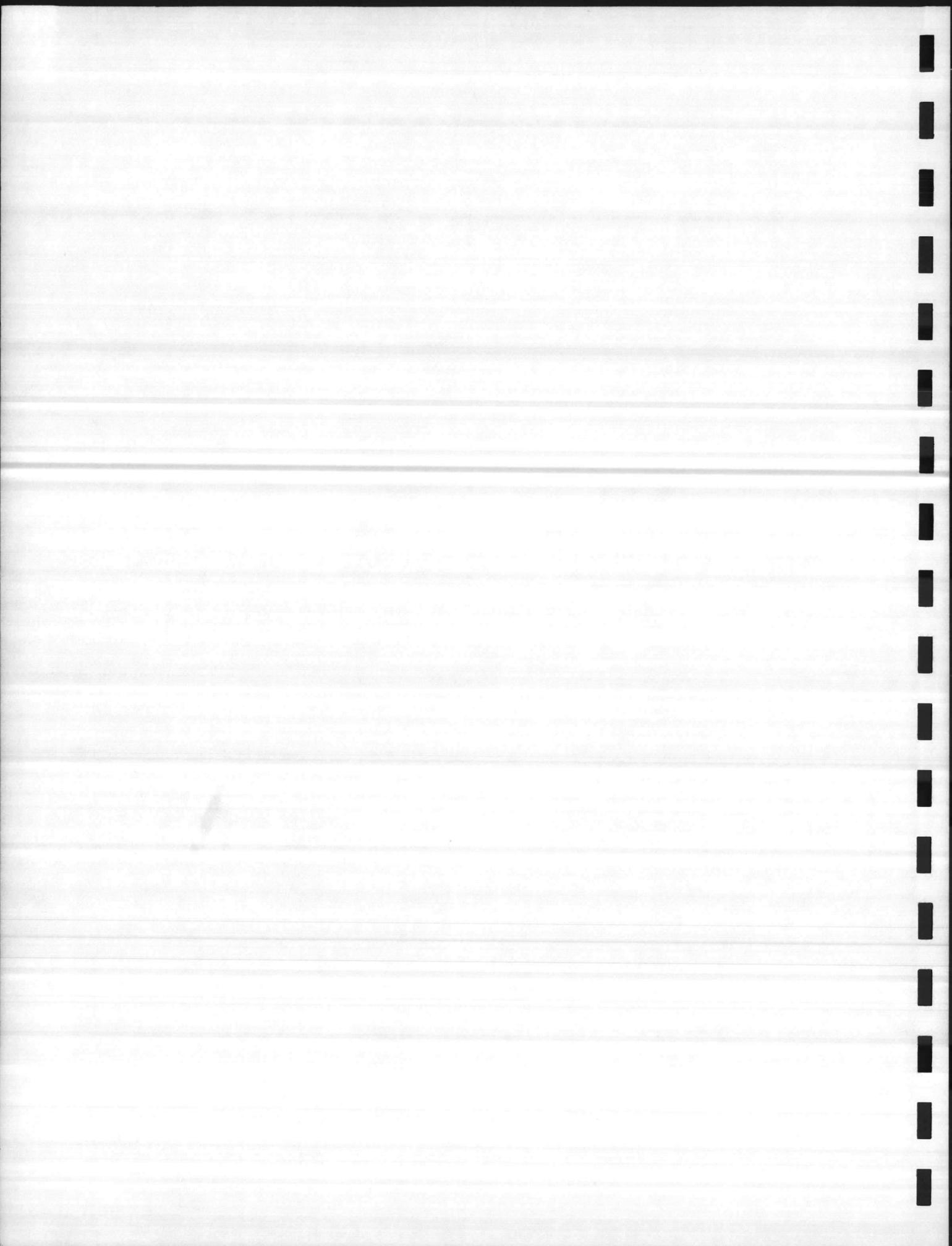
TARAWA TERRACE II

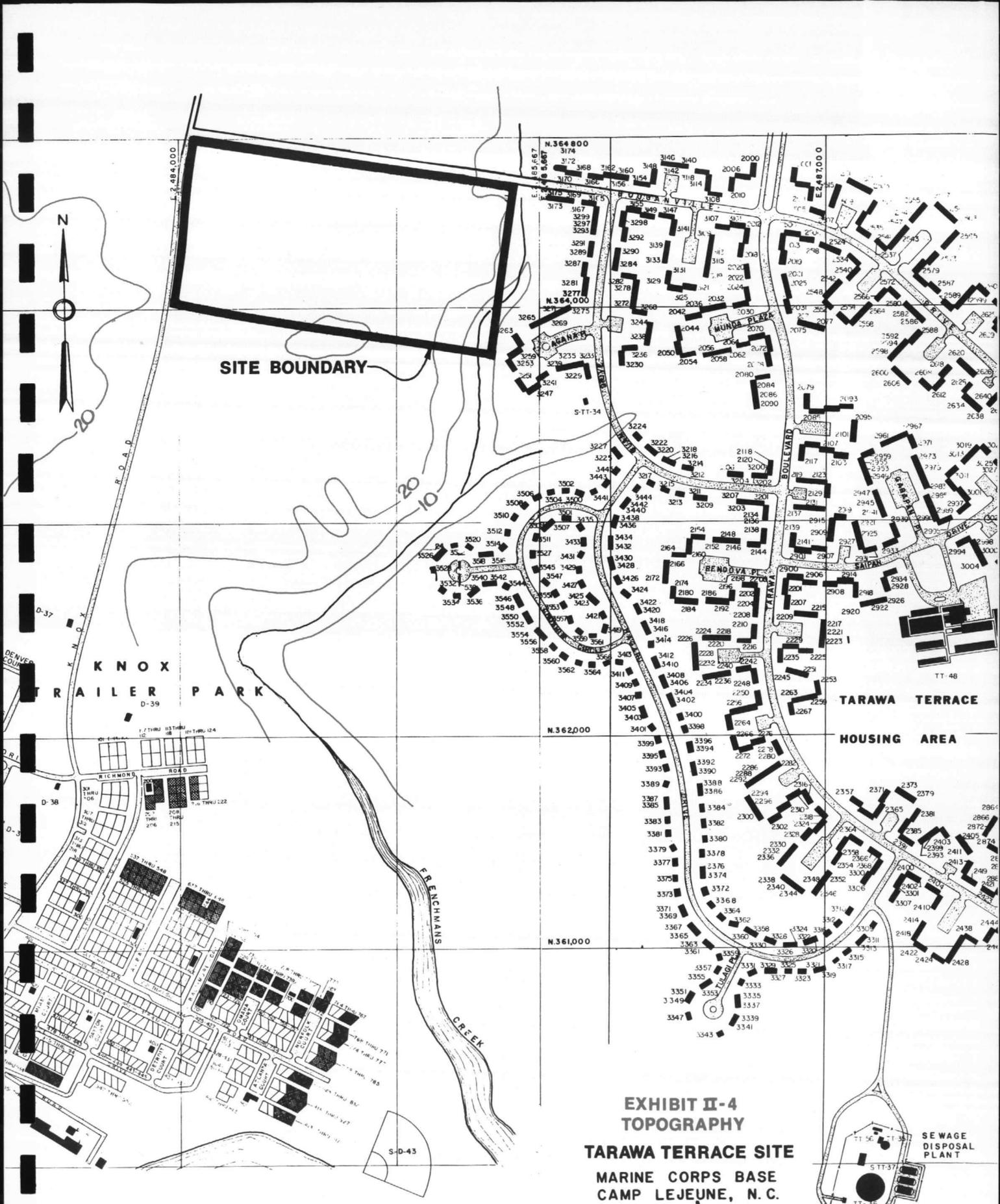
ELEMENTARY SCHOOL

SHOPPING CENTER

KNOX RD

AERIAL PHOTOGRAPH - TARAWA TERRACE SITE





SITE BOUNDARY

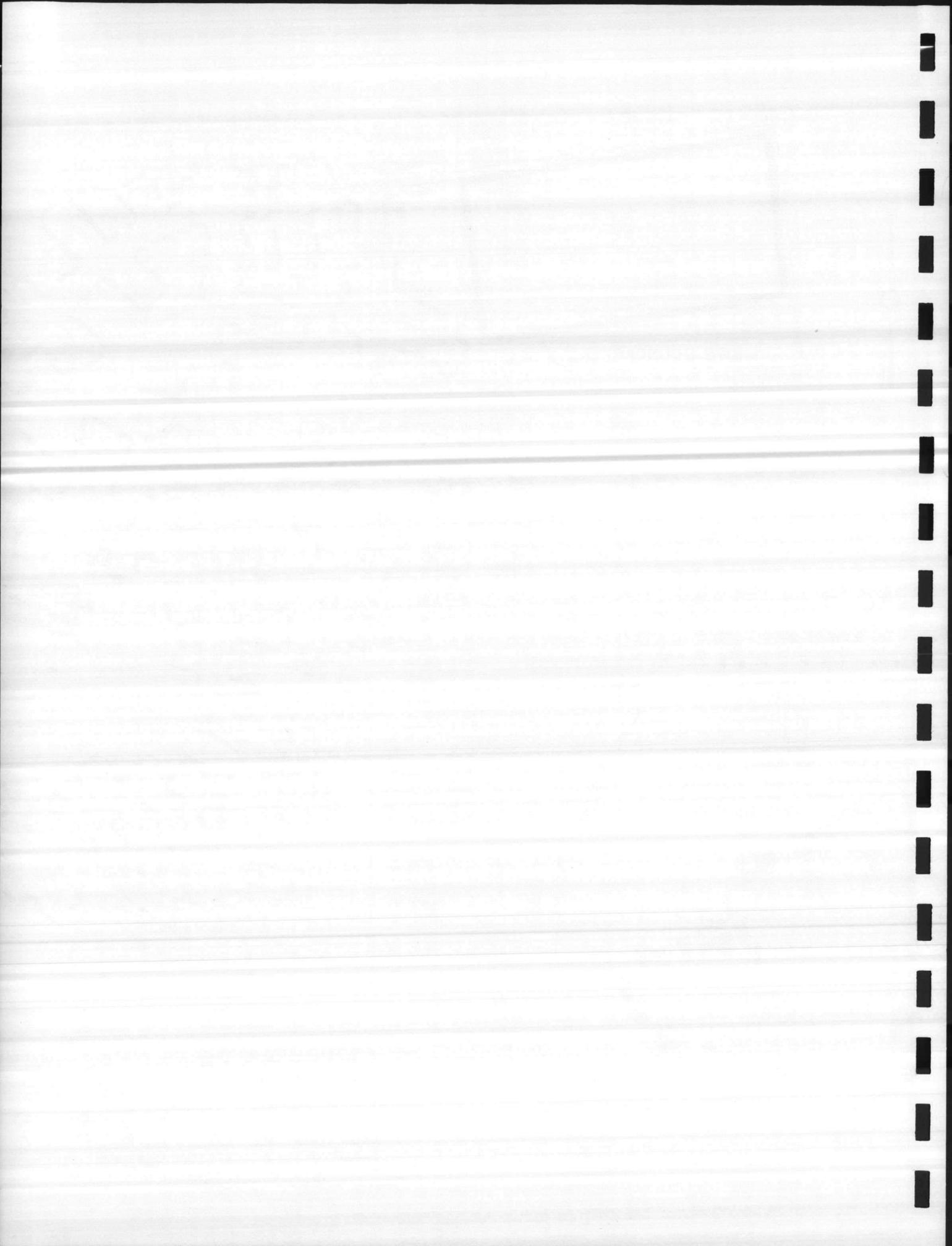


KNOX TRAILER PARK

TARAWA TERRACE HOUSING AREA

EXHIBIT II-4 TOPOGRAPHY
TARAWA TERRACE SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
TARAWA TER. HOUSING AREA





TO N. C. 24

WOODS

TO SHOPPING CENTER

DRAINAGE DITCH

SITE BOUNDARY

UNDEVELOPED WOODS



KNOX TRAILER PARK

EM AND MOQ HOUSING

ELEMENTARY TARAWA SCHOOL

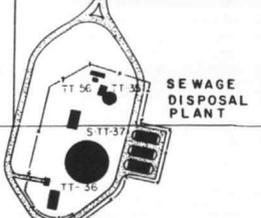
HOUSING AREA

FRENCHMAN'S CREEK

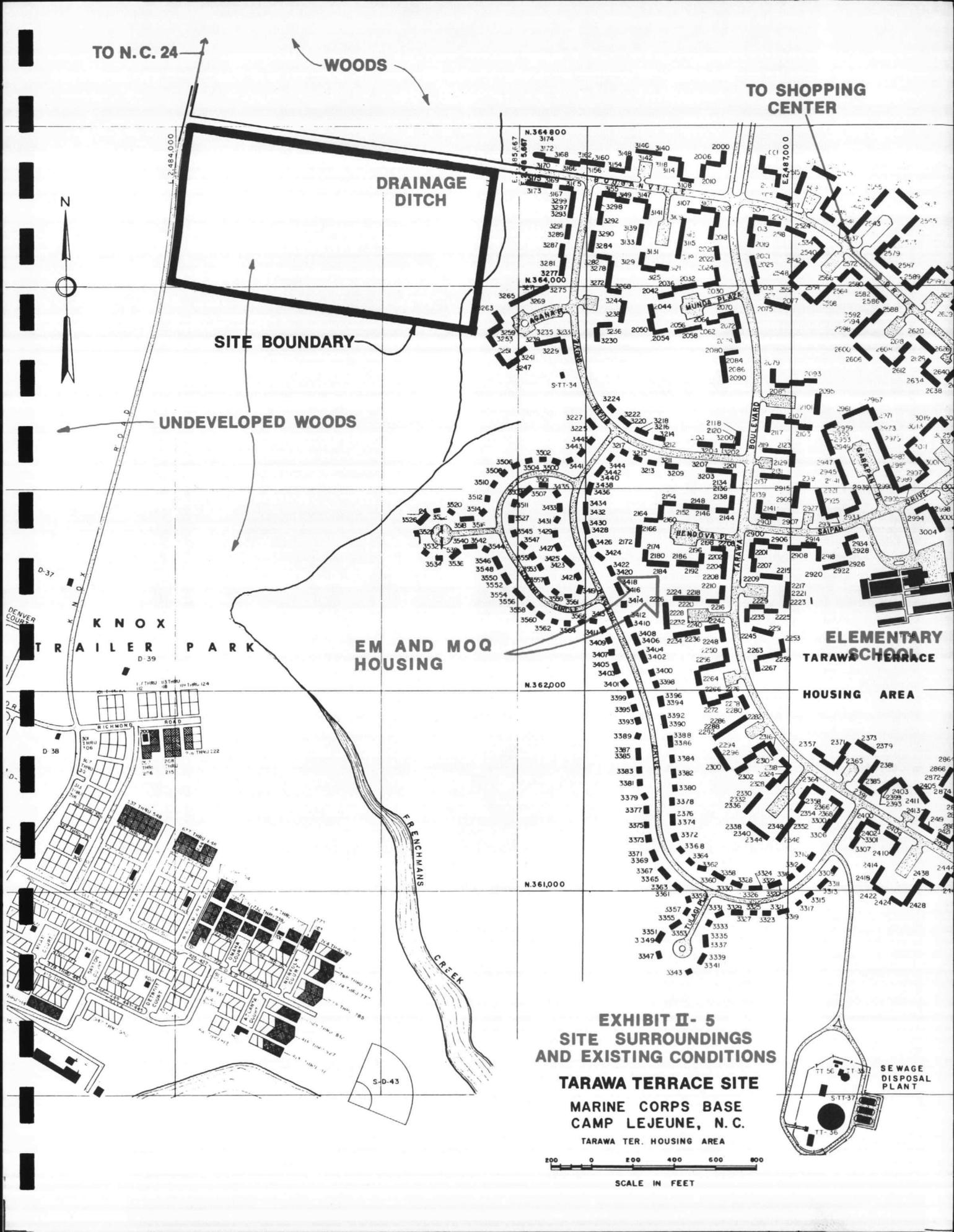
**EXHIBIT II - 5
SITE SURROUNDINGS
AND EXISTING CONDITIONS**

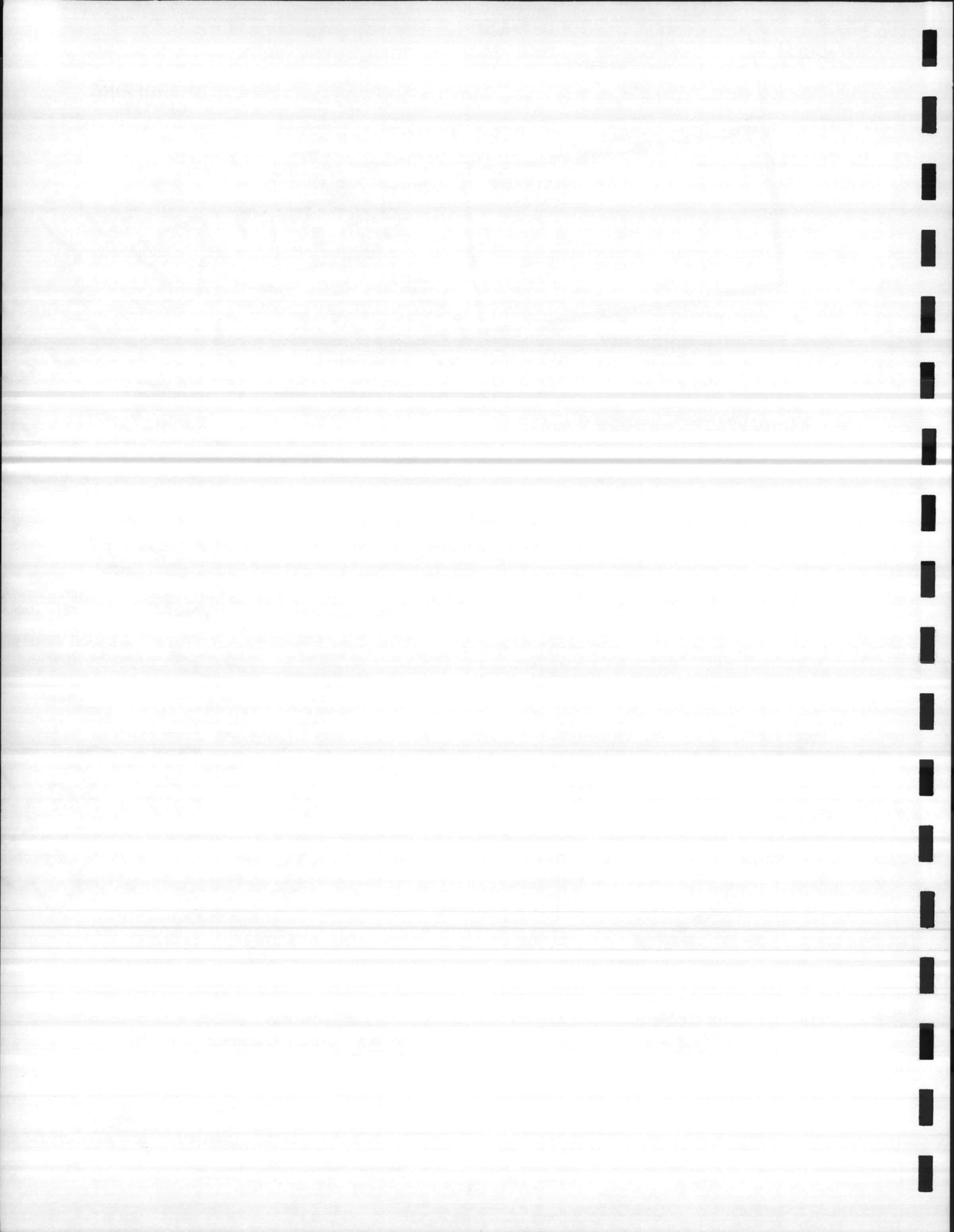
**TARAWA TERRACE SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.**

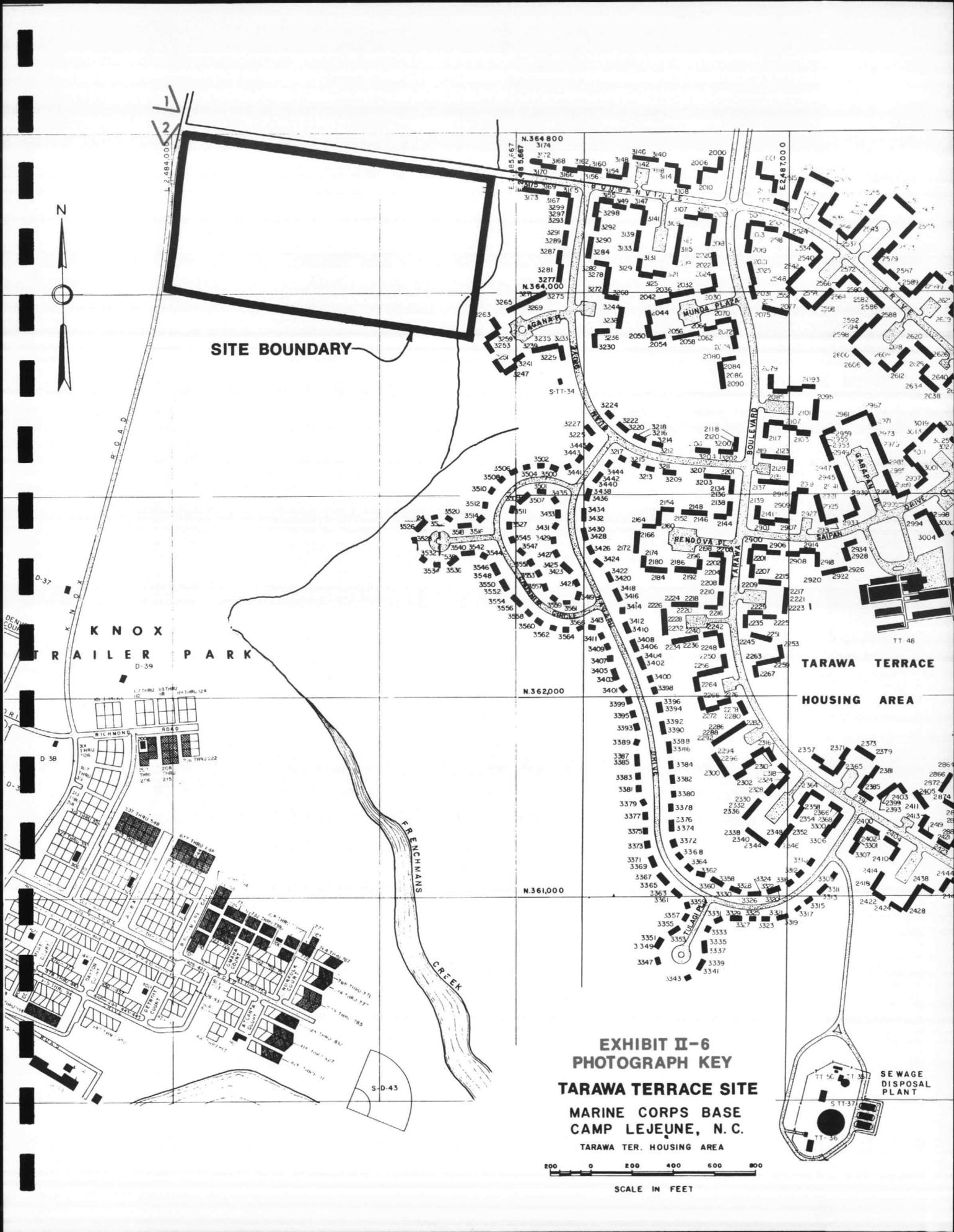
TARAWA TER. HOUSING AREA



SCALE IN FEET







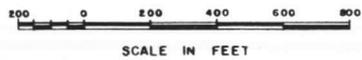
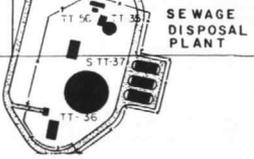
SITE BOUNDARY



KNOX TRAILER PARK
D-39

TARAWA TERRACE HOUSING AREA

**EXHIBIT II-6
PHOTOGRAPH KEY
TARAWA TERRACE SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
TARAWA TER. HOUSING AREA**



SCALE IN FEET

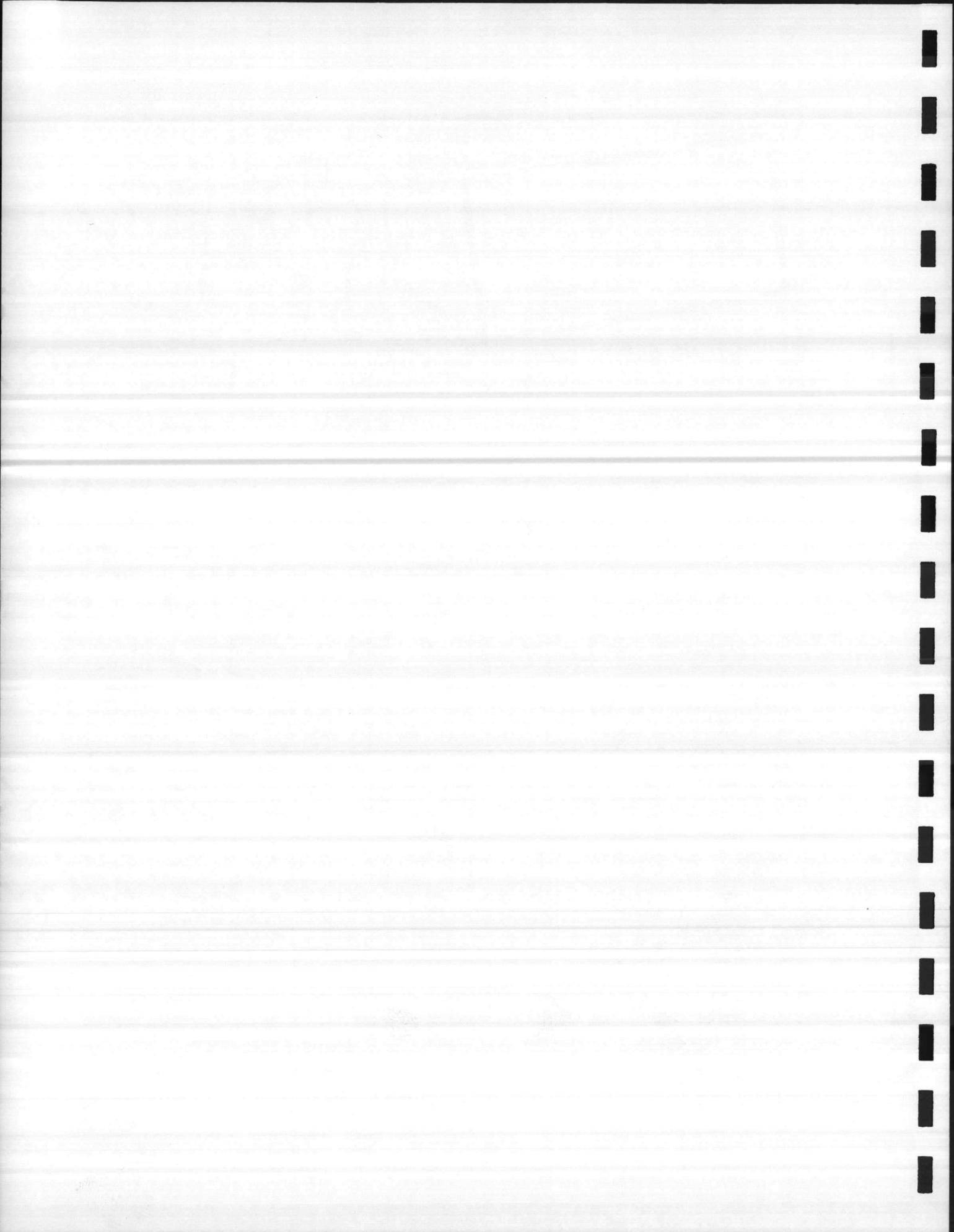
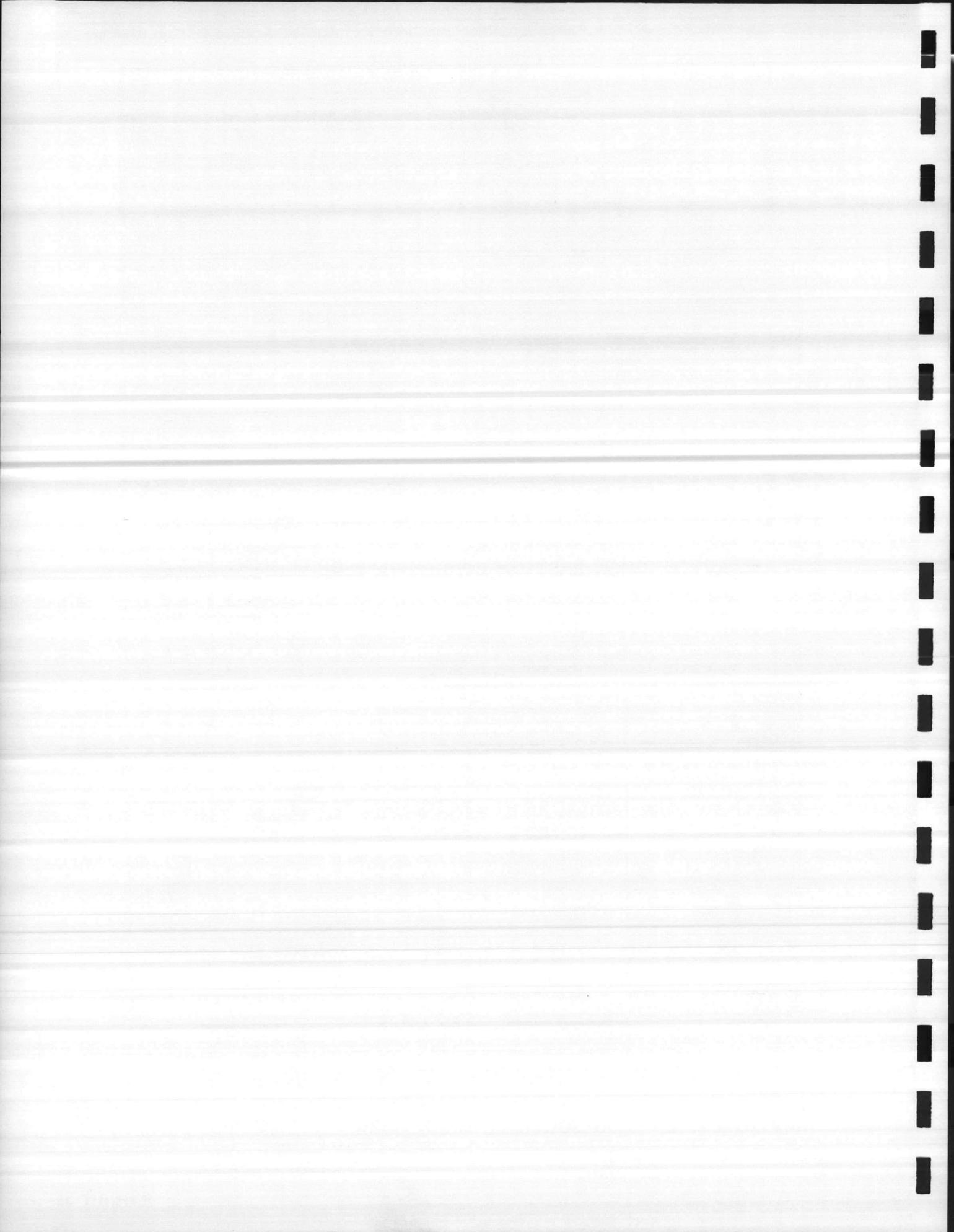


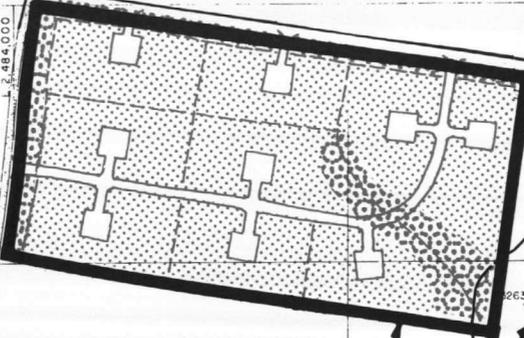


PHOTO KEY 1 - VIEW EAST ON BOUGANVILLE DRIVE



PHOTO KEY 2 - VIEW SOUTH ON KNOX ROAD





SITE BOUNDARY

LEGEND



OPEN

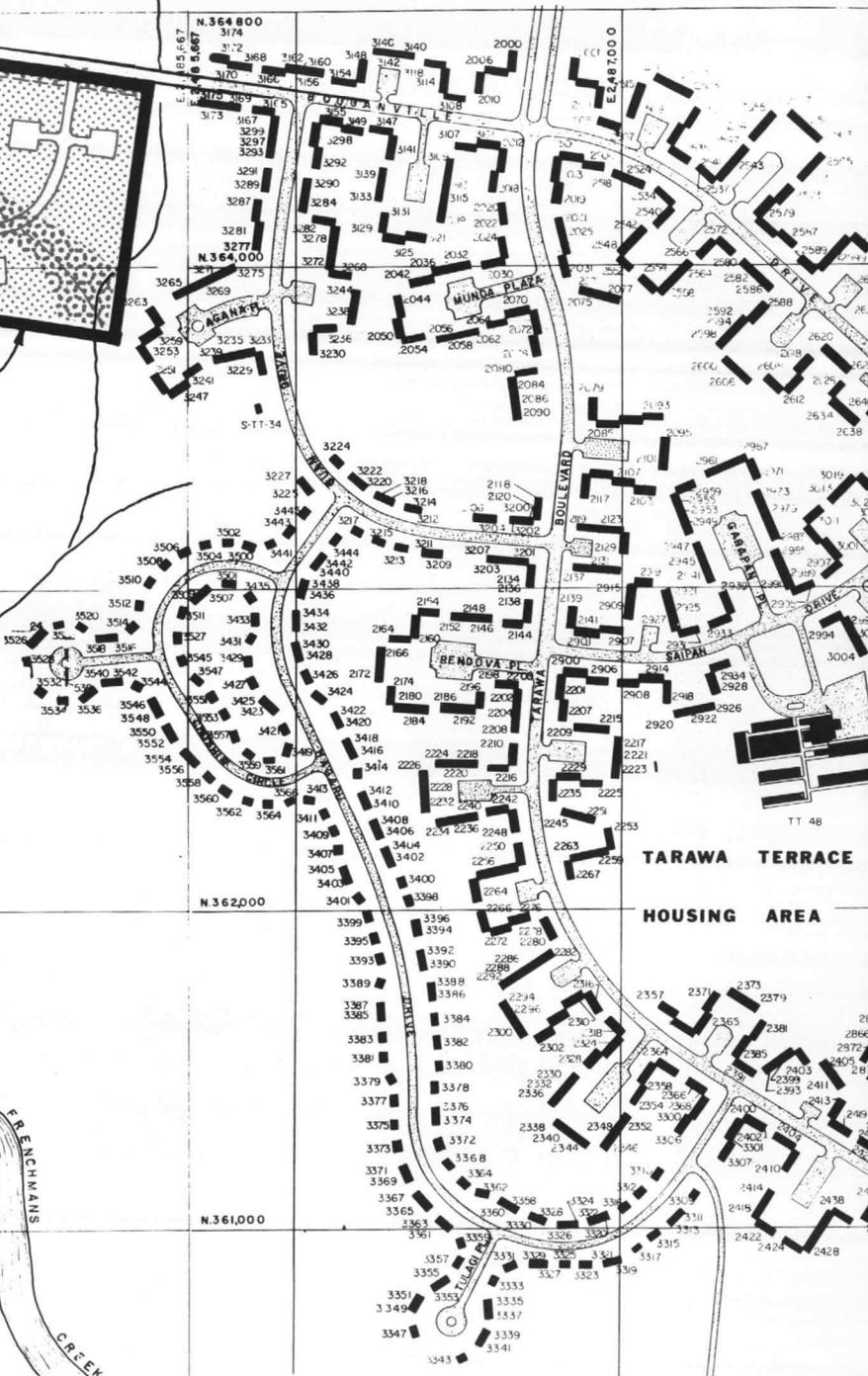


PEDESTRIAN WALKWAY



FAMILY HOUSING

KNOX TRAILER PARK

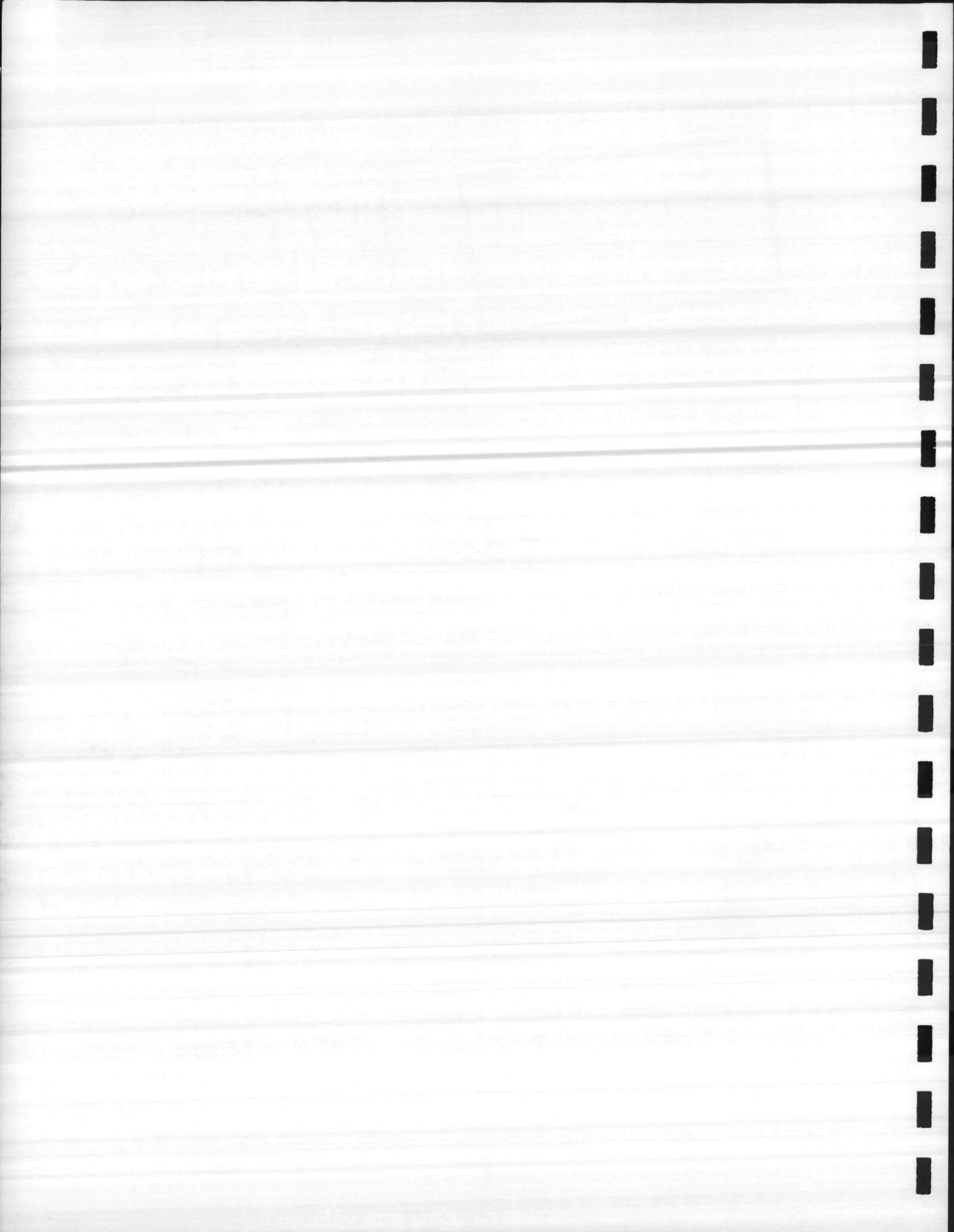


**EXHIBIT II-8
POSSIBLE SITE DEVELOPMENT**

**TARAWA TERRACE SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
TARAWA TER. HOUSING AREA**



SCALE IN FEET



To the west of the site is an 18-hole golf course. Immediately north of this golf course on the north side of Brewster Boulevard is a second 18-hole golf course.

South of the proposed housing site is a portion of the existing Paradise Paradise Point MOQ housing development, the Officers Club, Bachelor Officers Quarters, recreational facilities and several service buildings including child care facilities and a fire station.

To the east of the site is undeveloped wooded land extending to Stone Street approximately 3/4 of a mile away. This area is almost identical to the project area in so far as topography and vegetation cover is concerned. A power line crosses this area and runs contiguous to the south boundary of the project area.

Berkeley Manor Site

The Berkeley Manor site is within the general housing area known as Paradise Point and therefore also within the area designated for Family Housing by the Master Plan. There are 77 acres under consideration in this site.

The north boundary of the proposed site is contiguous to existing housing. The west boundary is Stone Street and the east and north boundaries go through undeveloped wooded land. See Exhibits II-16, II-20, and II-21. The site is completely wooded and is not developed. A sanitary sewer line runs through the site adjacent to a small creek on the eastern portion of the property. The land is relatively flat with no severe topographical changes except adjacent to the creek. The change in elevation at the creek approaches twenty feet in some locations. The creek forms an effective barrier to land to the east. See Exhibit II-17. The average elevation of the site is 30 feet above mean sea level.

Area Surrounding the Site

The area to the east and south of the proposed site is undeveloped woods. This woods is comprised of vegetation, as described in Paragraph N of this section.

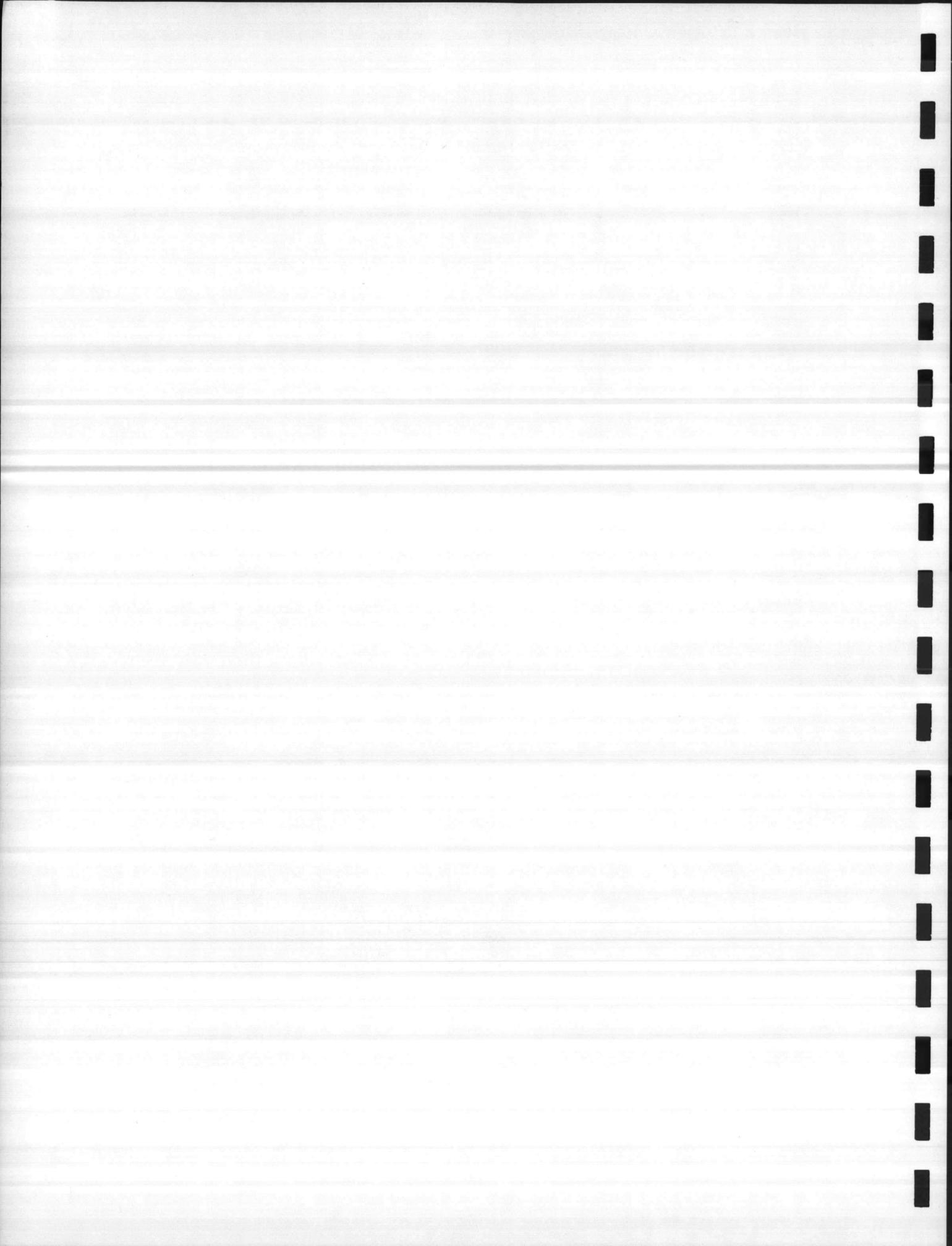
Holcomb Boulevard, the main entrance road to Camp Lejeune, is approximately 1800 feet east of the site at its nearest point. It is separated from the site by dense woods.

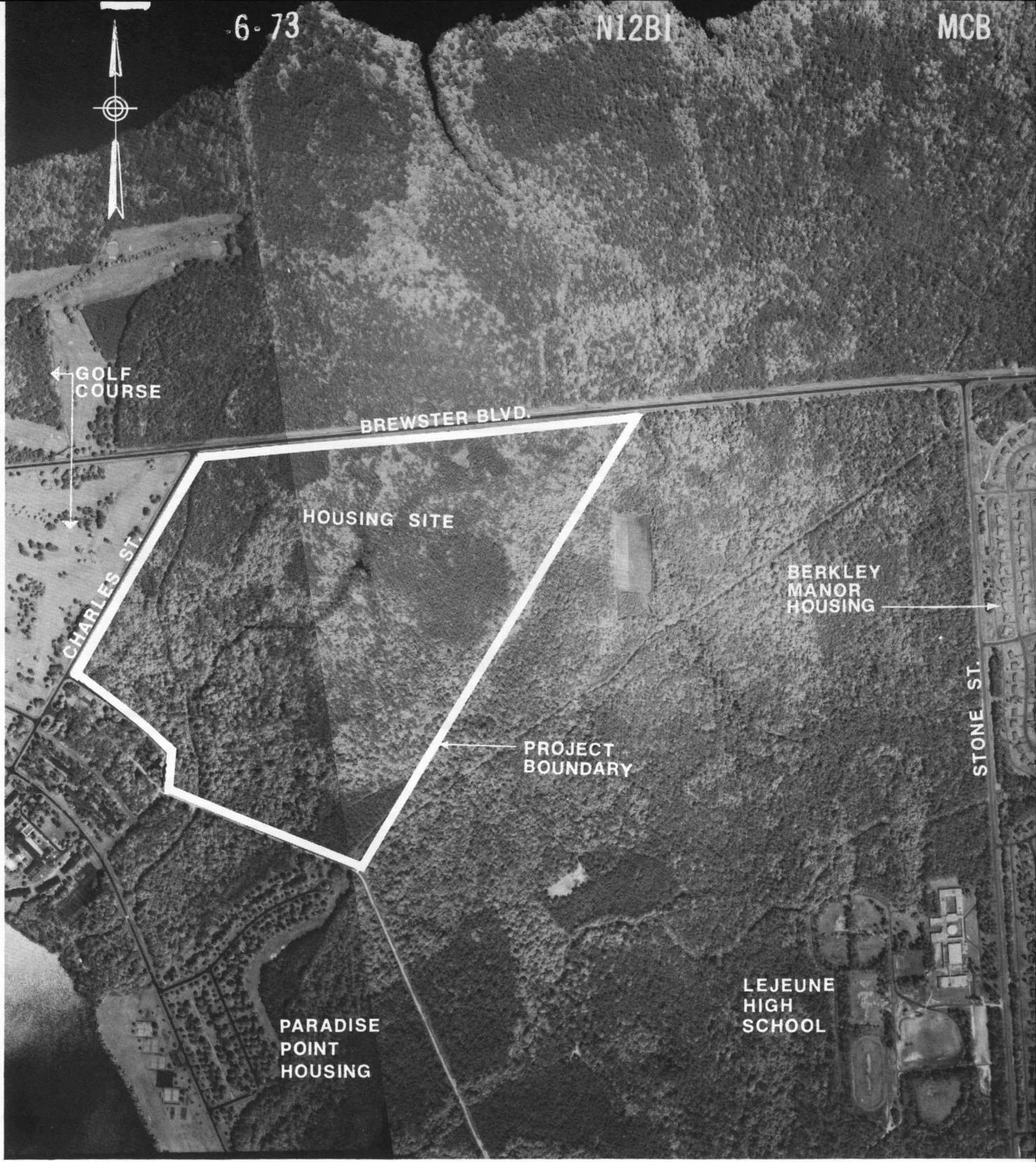
One third of a mile to the south is Wallace Creek which divides the family housing area from the main base operations. This creek flows directly into the new River and is a collector for all of the drainage ditches and small creeks in this area of the camp.

The base riding stable is just southwest of this housing site on Stone Street. This stable is available to all base personnel and dependents.

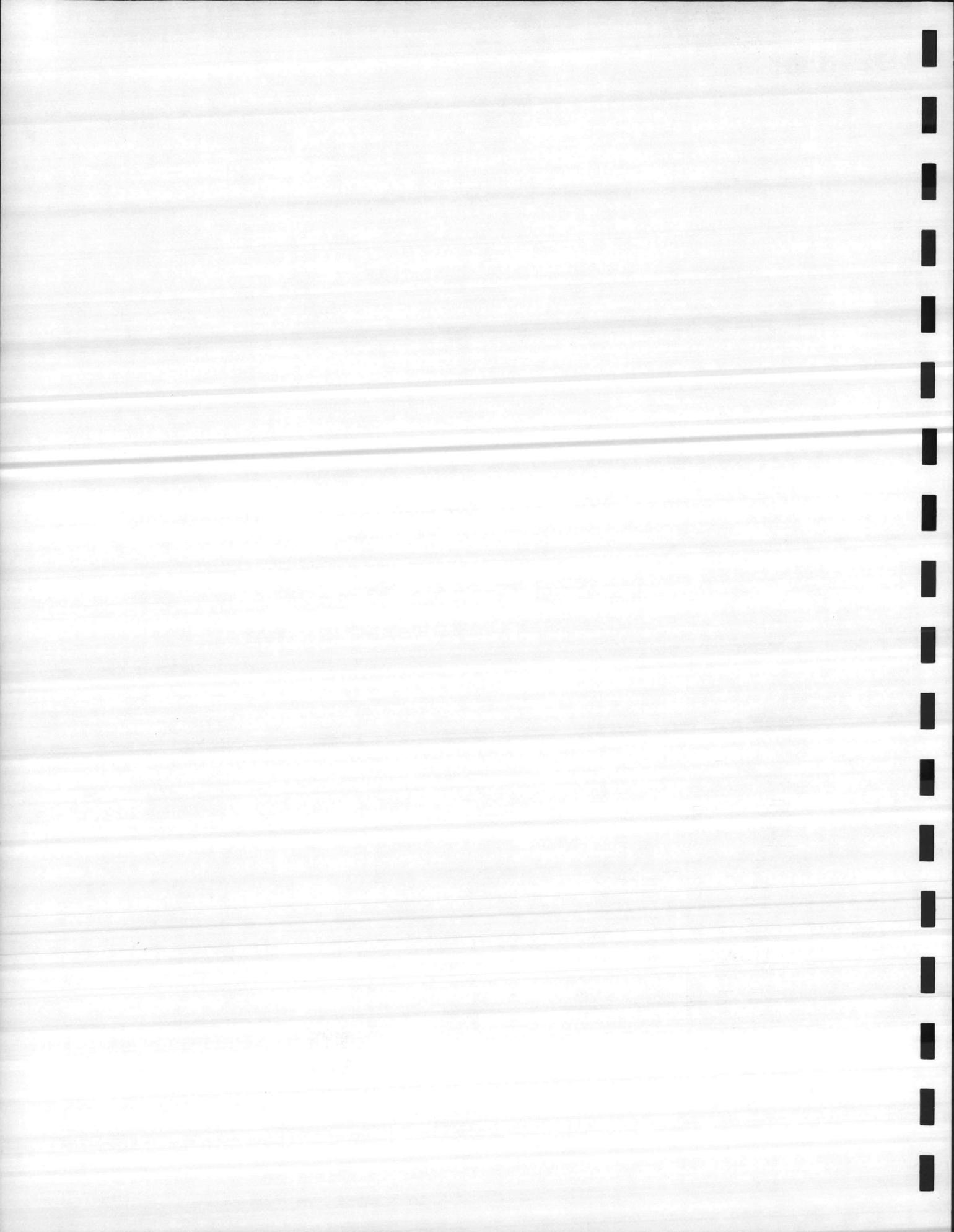
The area west of Berkeley Manor is undeveloped woods extending all the way to the Paradise Point housing developments adjacent to the New River. The Camp Lejeune High School is only 1000 feet from the site to the northwest, on the west side of Stone Street.

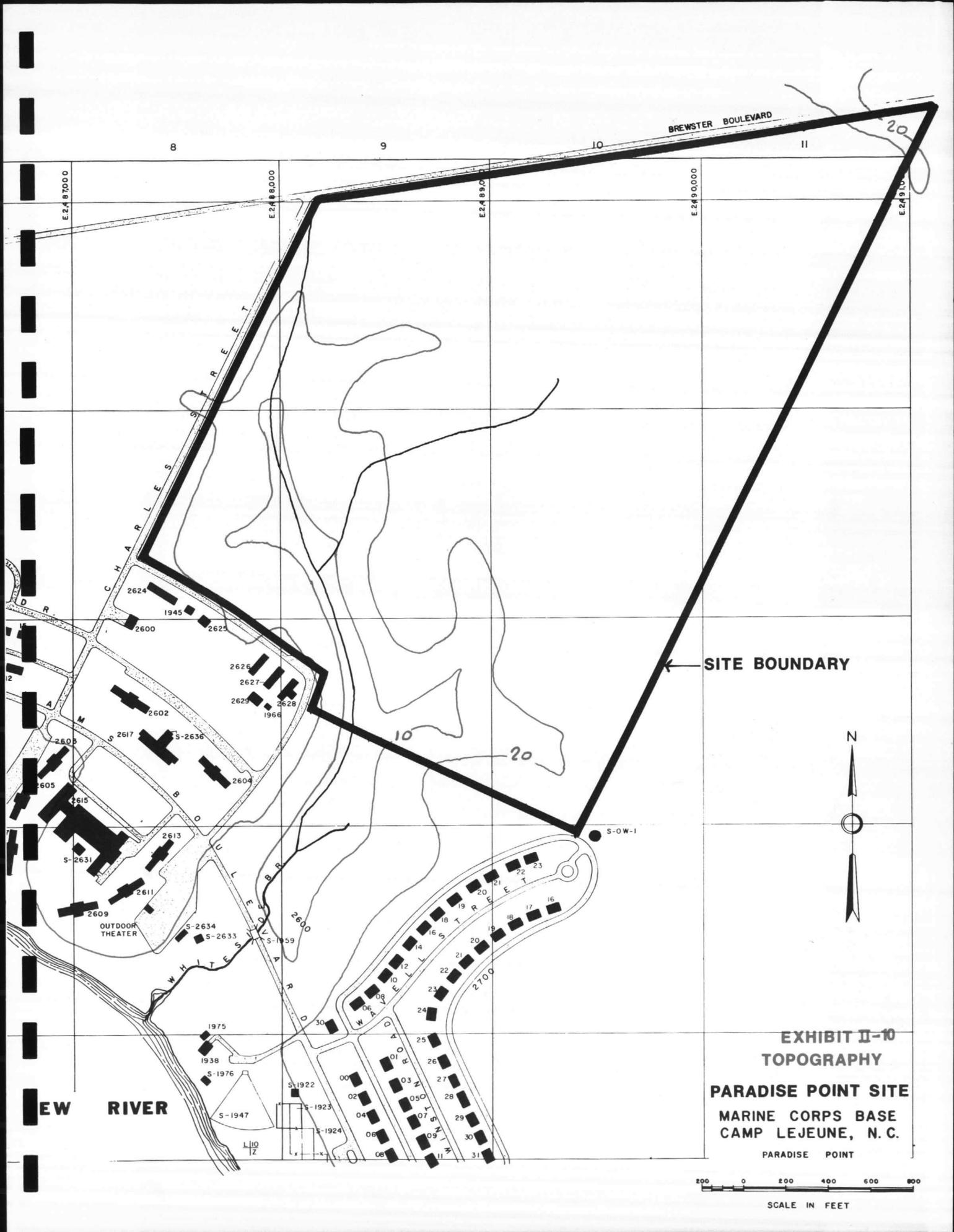
To the north of this site is the single family housing development known as Berkeley Manor. This area made up of 677 homes is occupied primarily by SNCO'S with the exception of some NCO'S in four bedroom units. The area is very attractive and well maintained as seen in the accompanying photographs. All of the dwelling units are single family detached units.





AERIAL PHOTOGRAPH - PARADISE POINT SITE

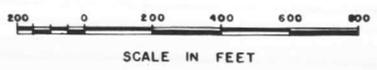


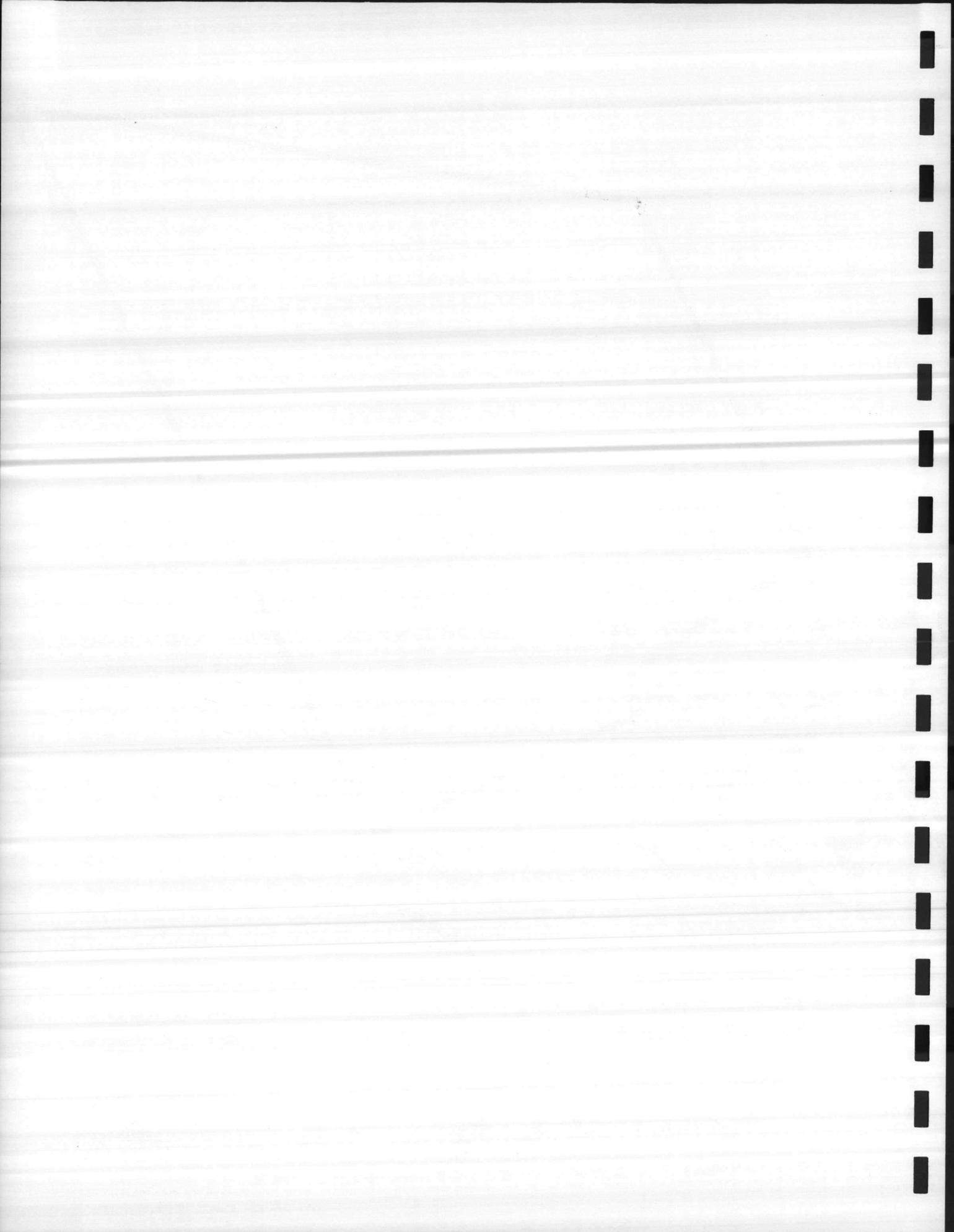


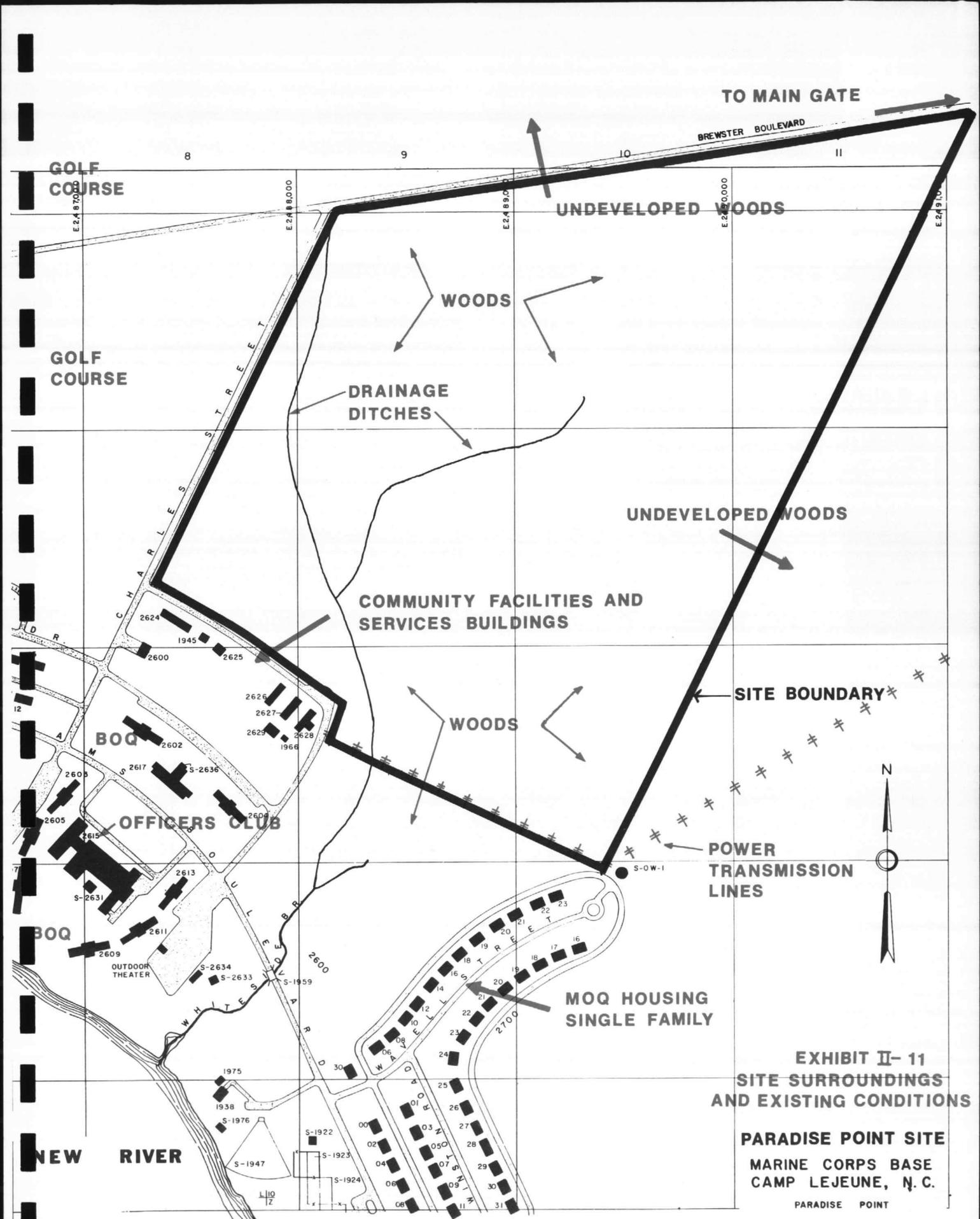
← SITE BOUNDARY



EXHIBIT II-10
TOPOGRAPHY
PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.
PARADISE POINT







TO MAIN GATE

BREWSTER BOULEVARD

GOLF COURSE

8

9

10

11

UNDEVELOPED WOODS

WOODS

DRAINAGE DITCHES

GOLF COURSE

UNDEVELOPED WOODS

COMMUNITY FACILITIES AND SERVICES BUILDINGS

SITE BOUNDARY

WOODS

BOQ

OFFICERS CLUB

POWER TRANSMISSION LINES

BOQ

OUTDOOR THEATER

MOQ HOUSING SINGLE FAMILY

NEW RIVER

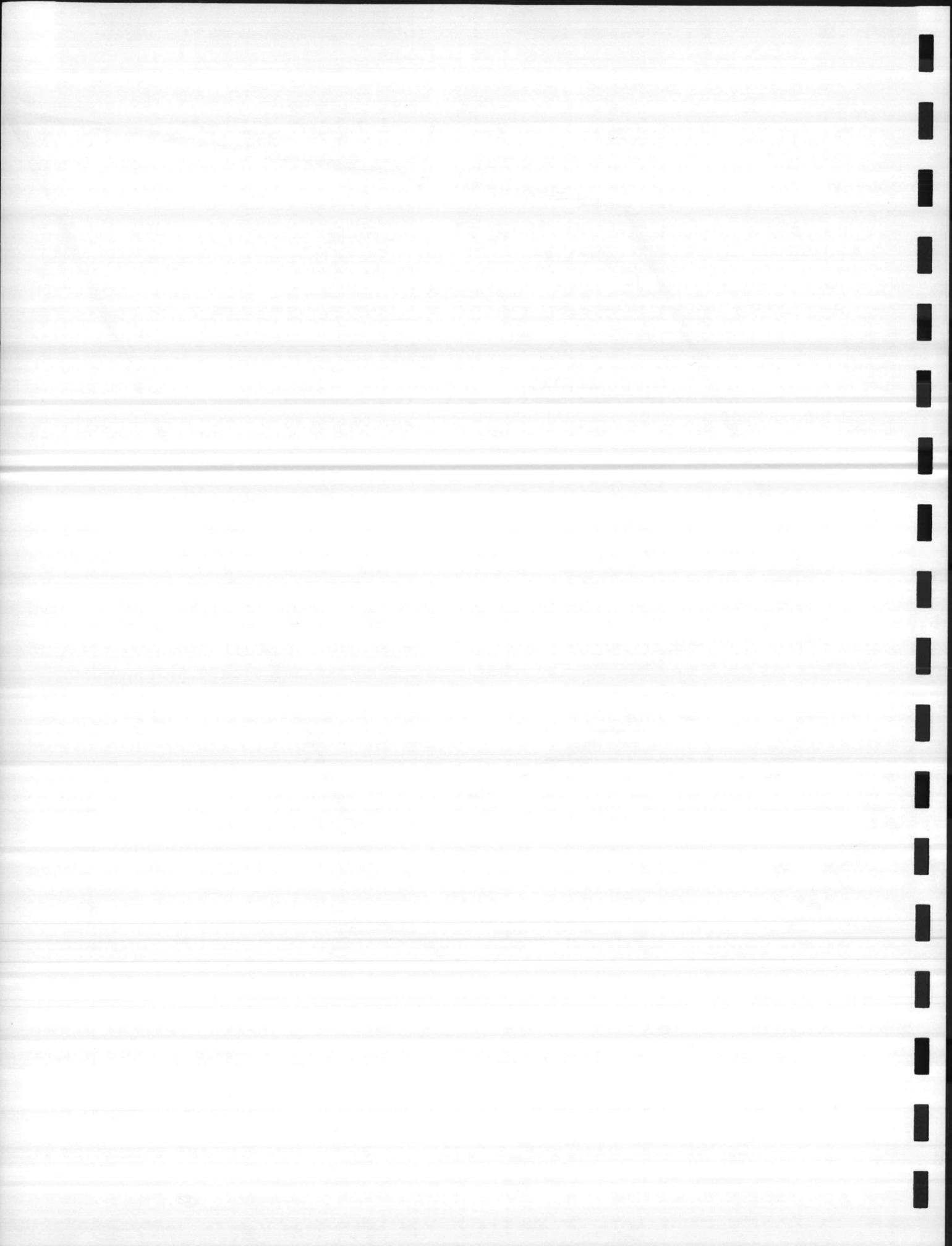
EXHIBIT II- 11
SITE SURROUNDINGS
AND EXISTING CONDITIONS

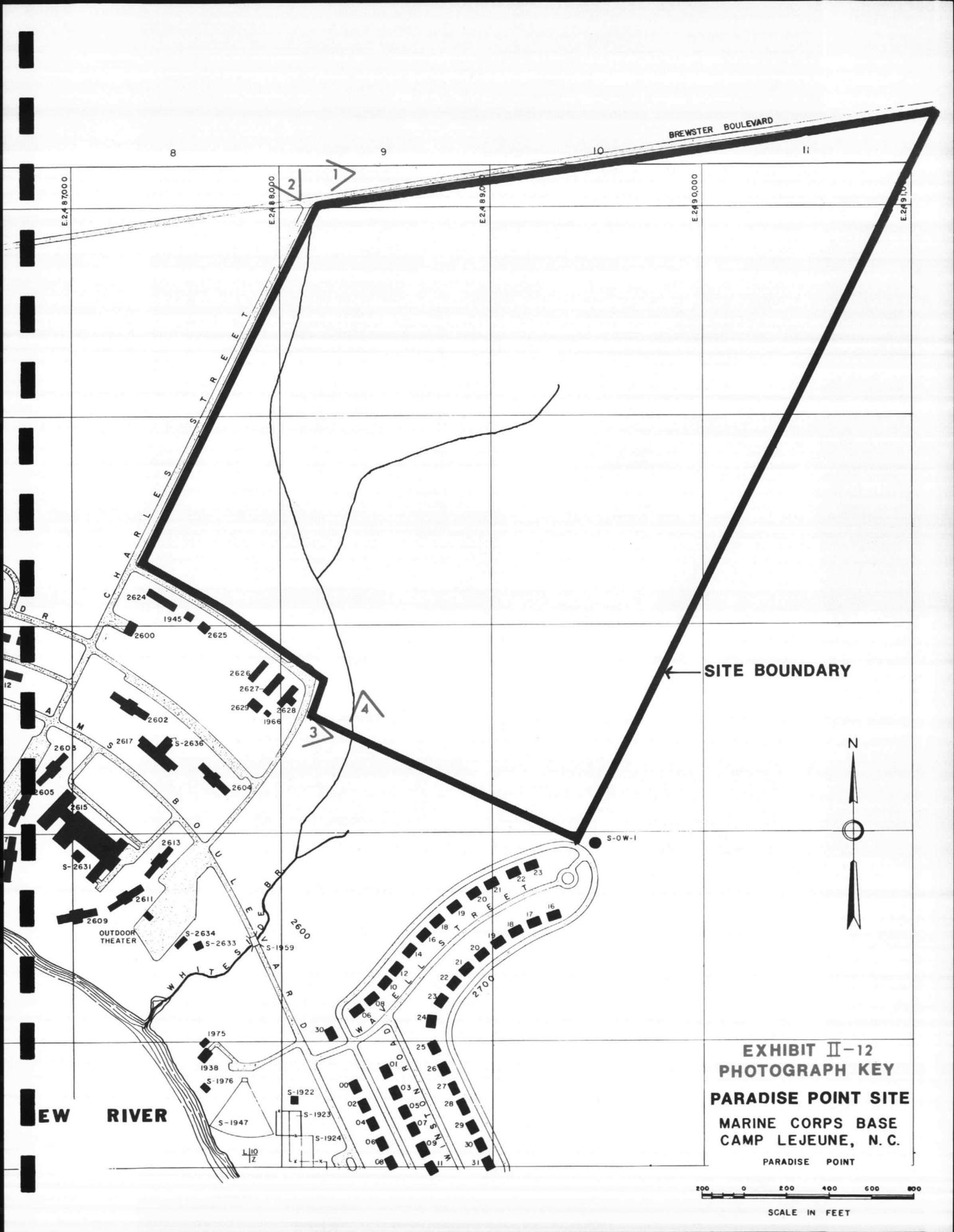
PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

PARADISE POINT

0 200 400 600 800

SCALE IN FEET





BREWSTER BOULEVARD

8

9

10

11

E 24 87000

E 24 88000

E 24 89000

E 24 90000

E 24 91000

C H A R L E S
S T R E E T

← SITE BOUNDARY



EXHIBIT II-12
PHOTOGRAPH KEY
PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.
PARADISE POINT



SCALE IN FEET

EW RIVER

L I O
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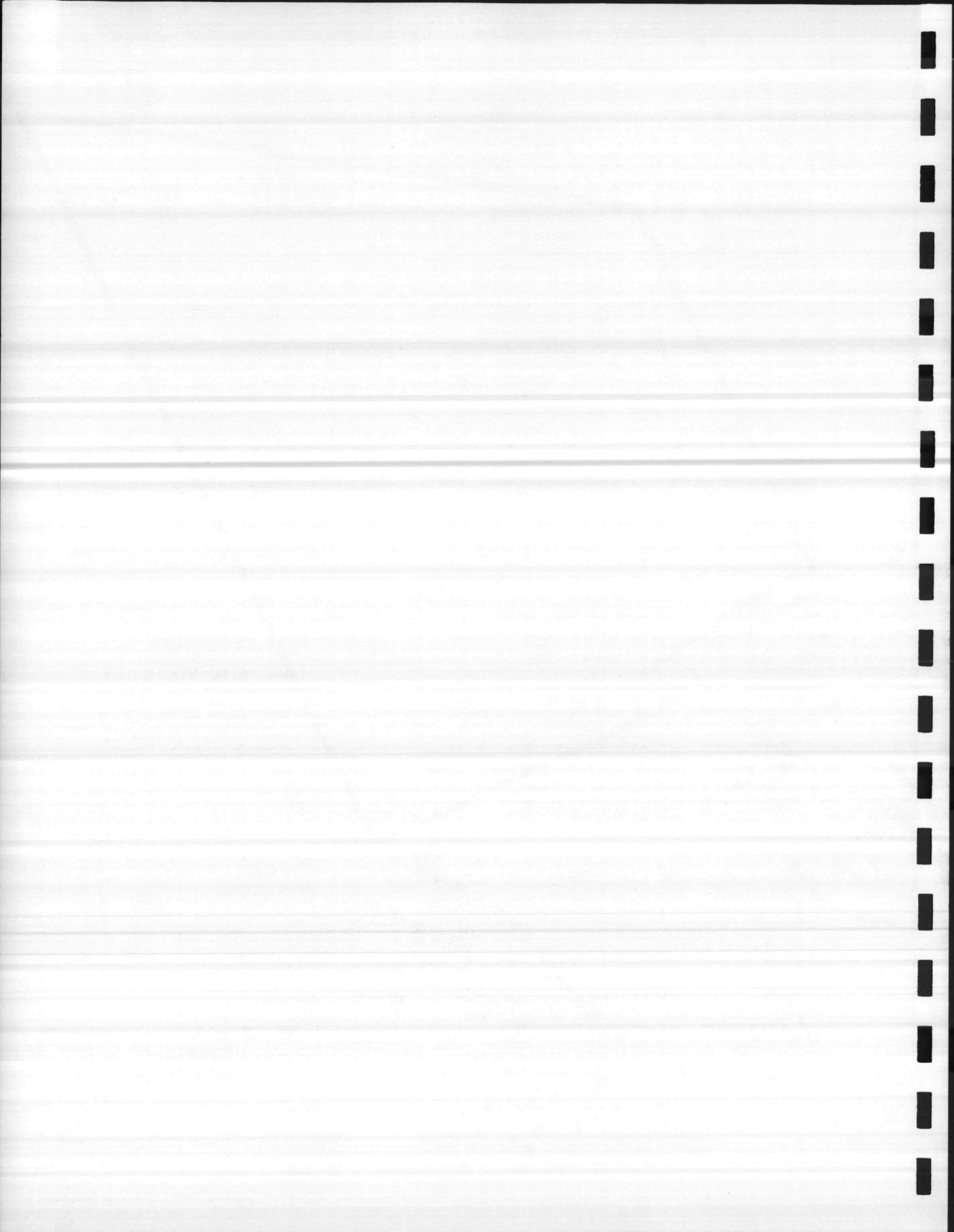
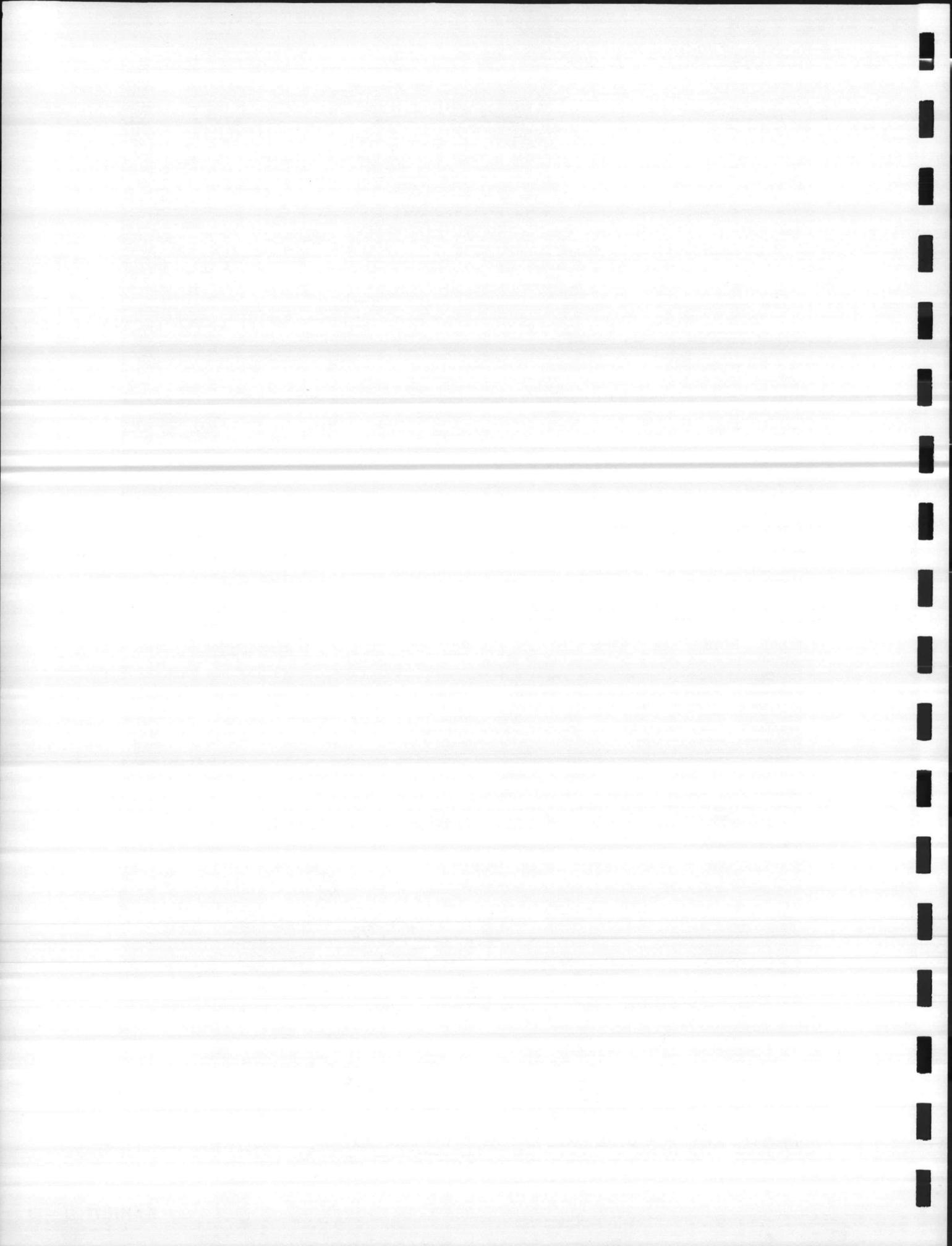




PHOTO KEY 1 - VIEW EAST ON BREWSTER BOULEVARD



PHOTO KEY 2 - VIEW SOUTH ON CHARLES STREET



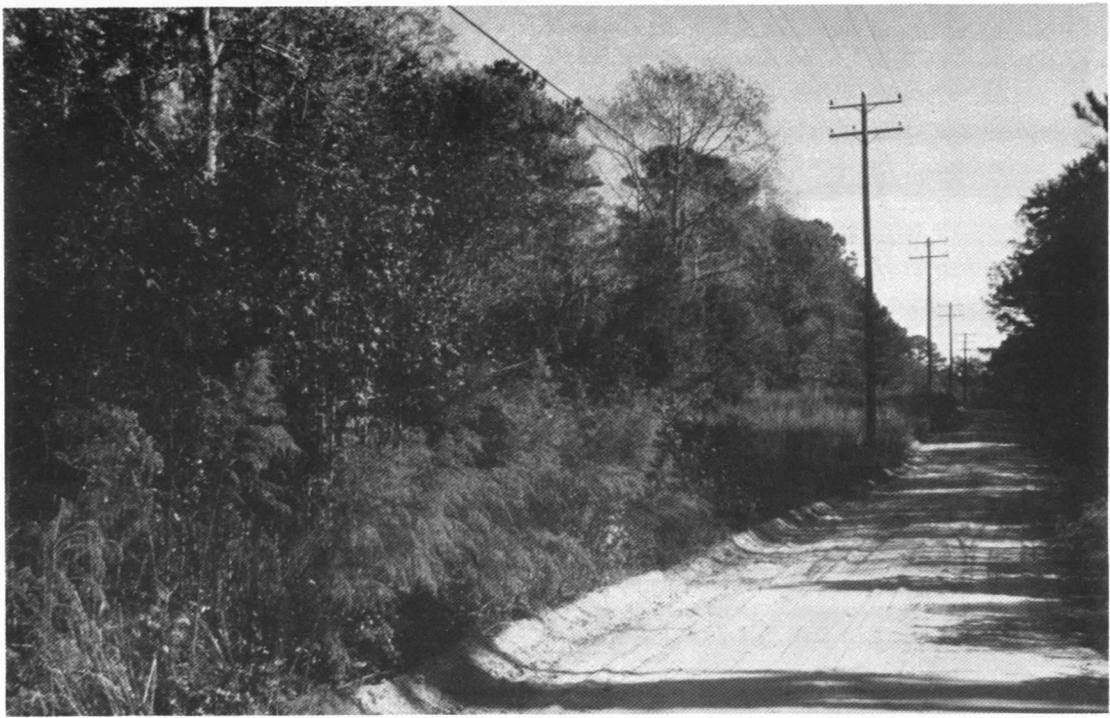
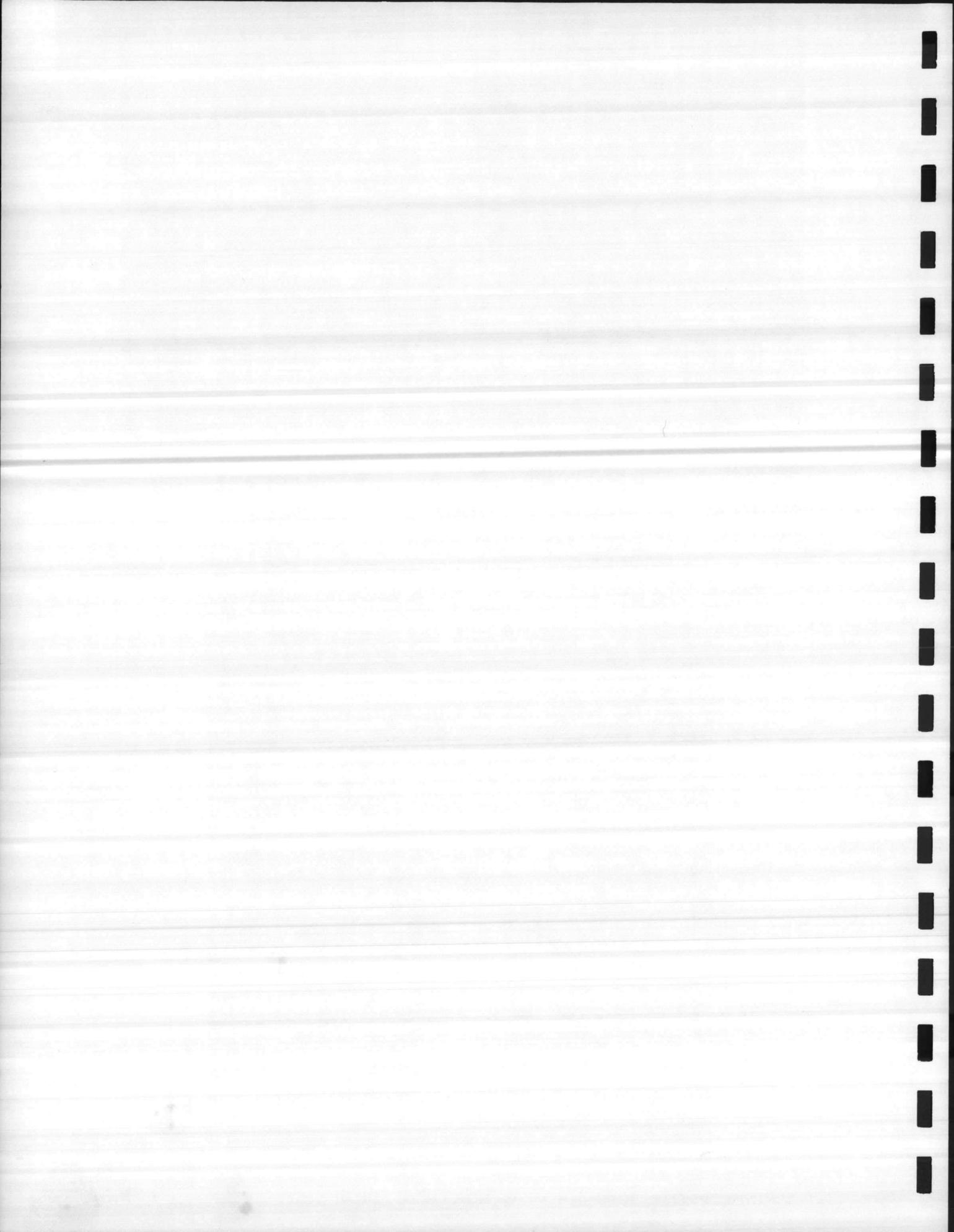
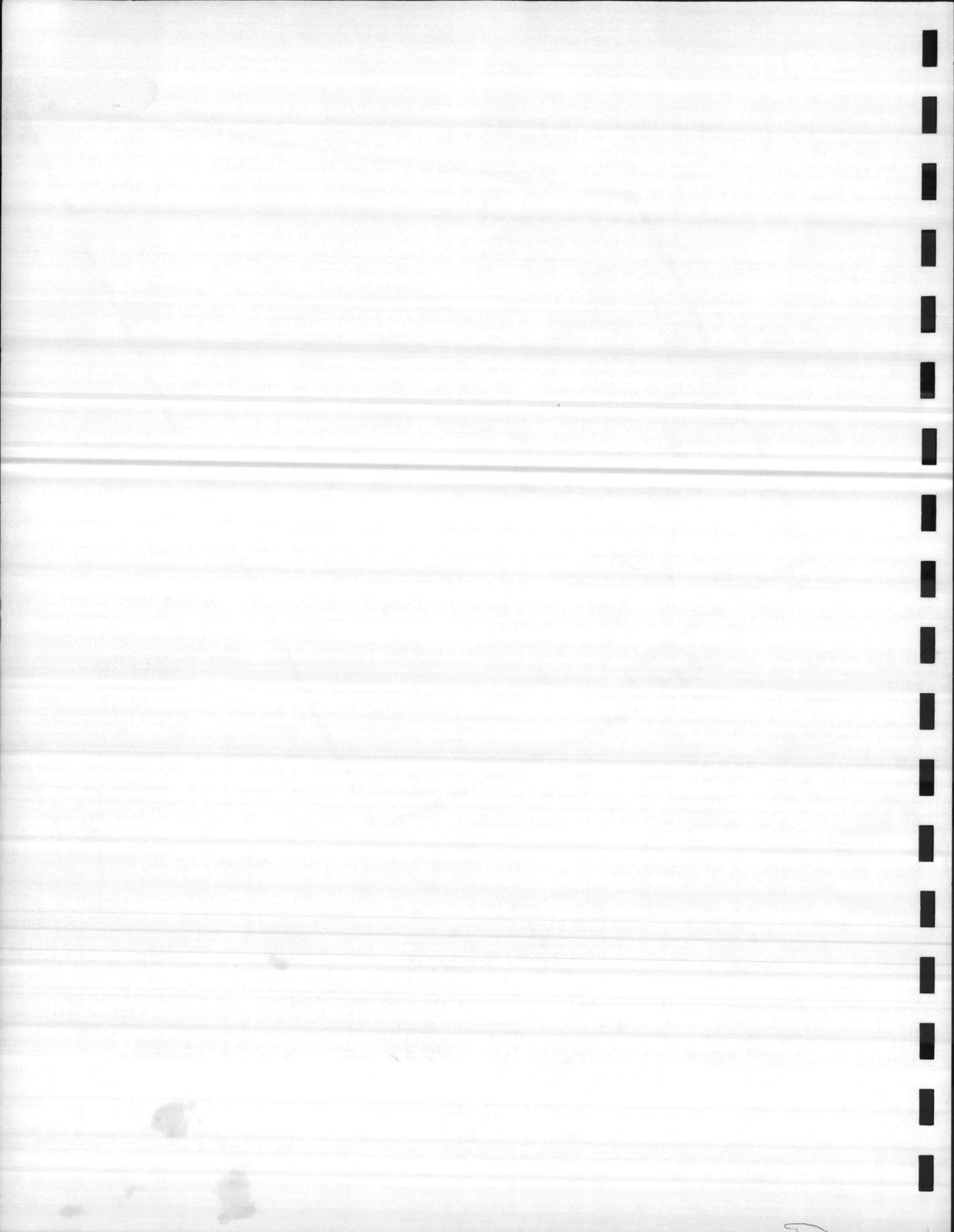


PHOTO KEY 3 - VIEW EAST ALONG SOUTHERN BOUNDRY LINE



PHOTO KEY 4 - VIEW NORTH OF DRAINAGE DITCH





5-6-73

N12B1

MCB

173 16



LEJEUNE
HIGH
SCHOOL

BERKELEY
MANOR
HOUSING

STONE ST.

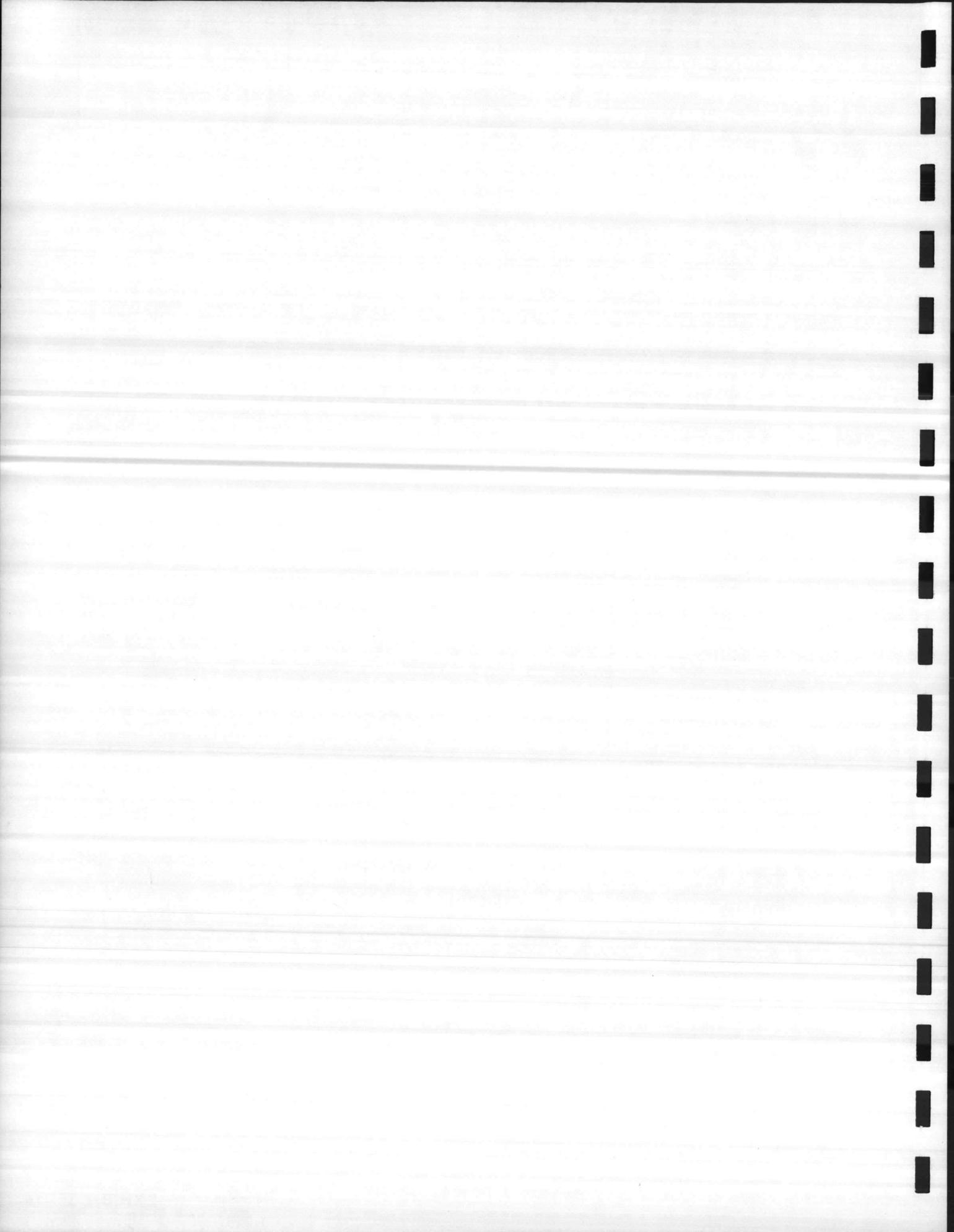
HOUSING SITE

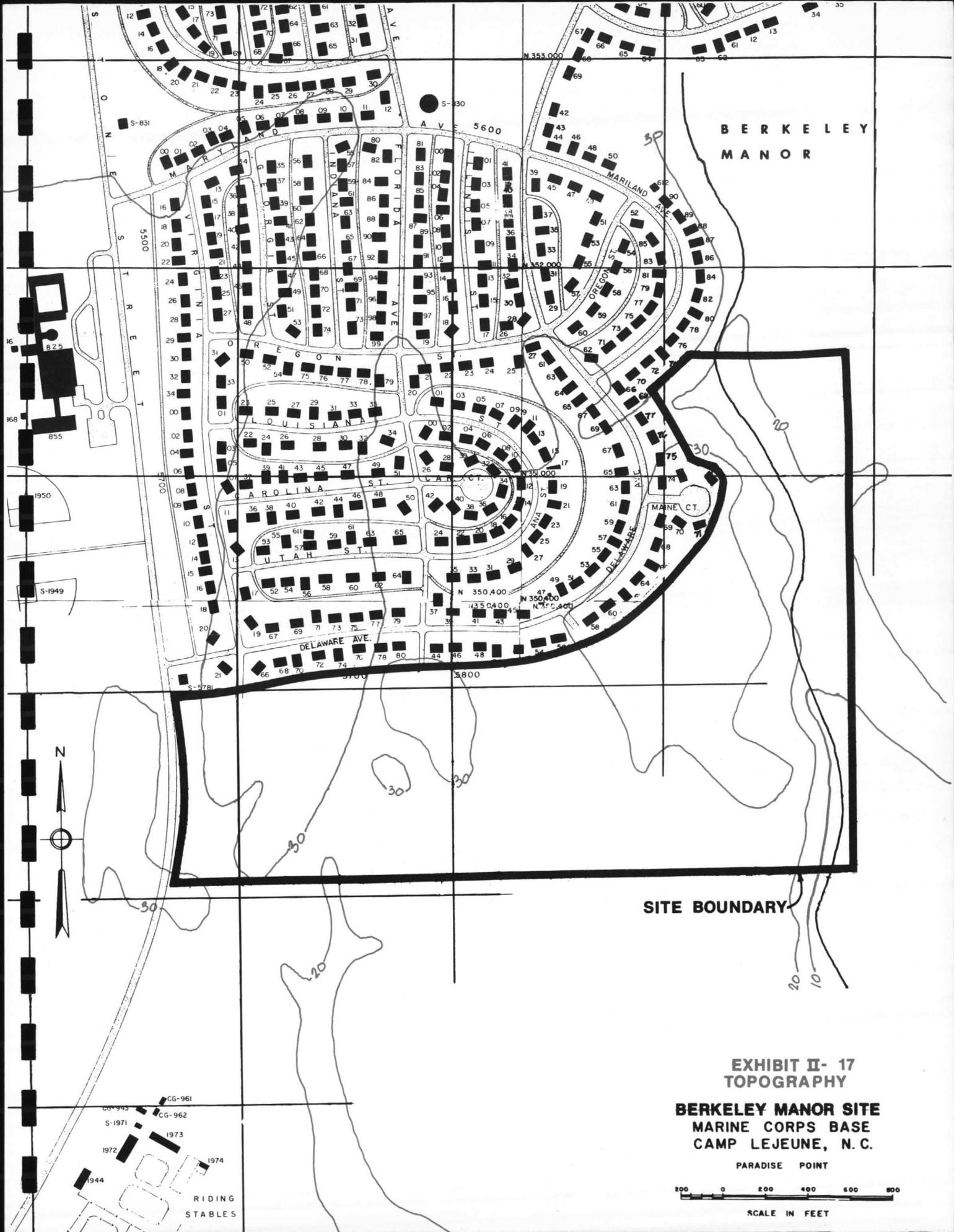
PROJECT BOUNDARY

RIDING
STABLES

HOLCOMB RD.

AERIAL PHOTOGRAPH - BERKELEY MANOR SITE





BERKELEY
MANOR

SITE BOUNDARY

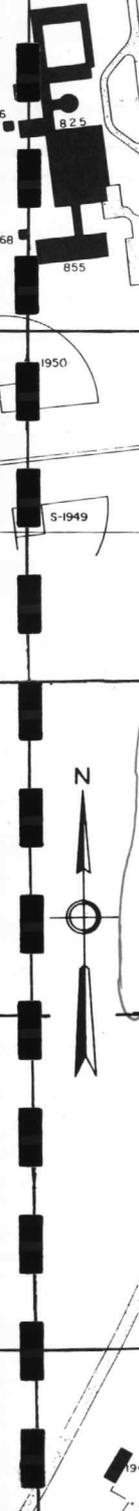
EXHIBIT II- 17
TOPOGRAPHY

BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

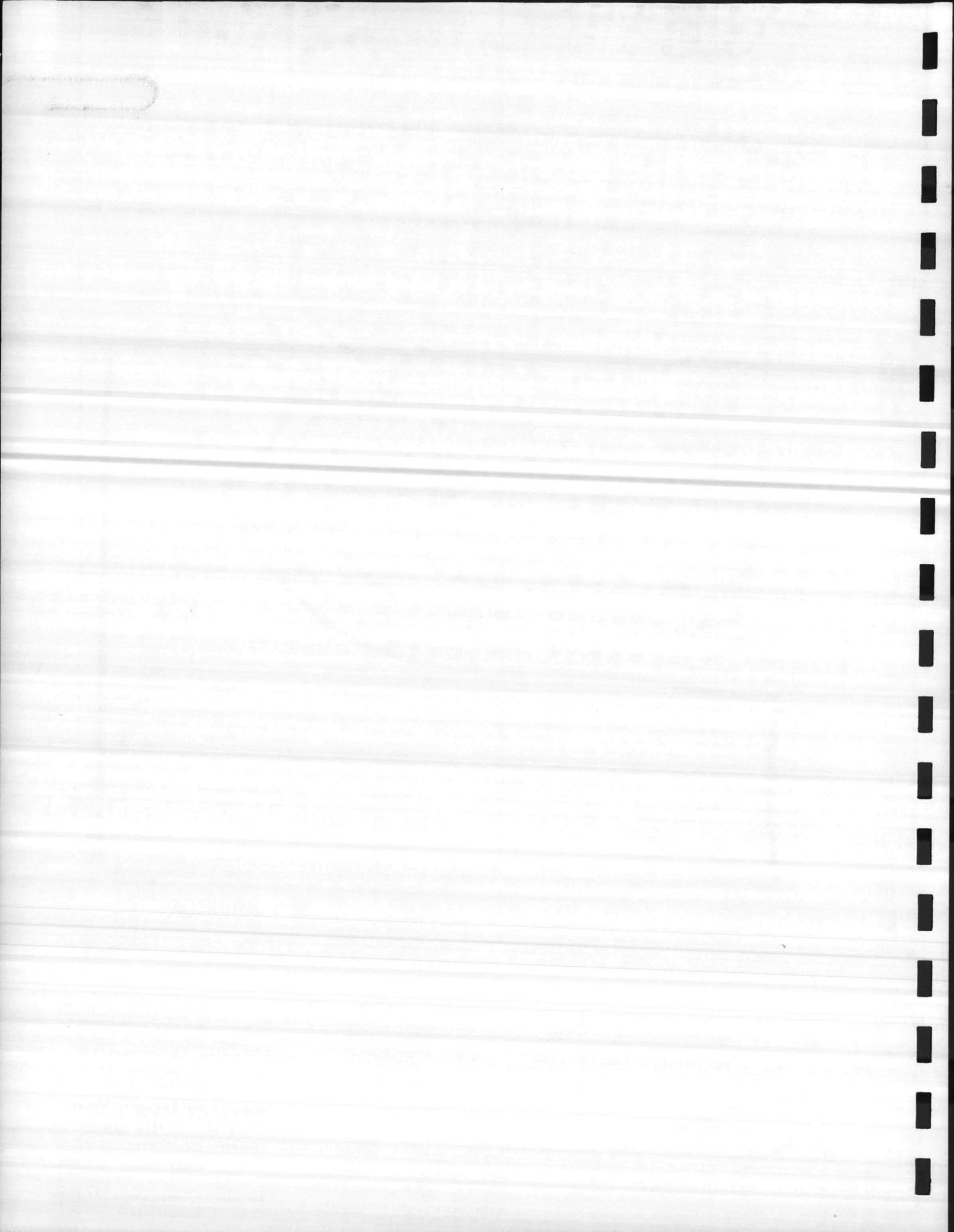
PARADISE POINT

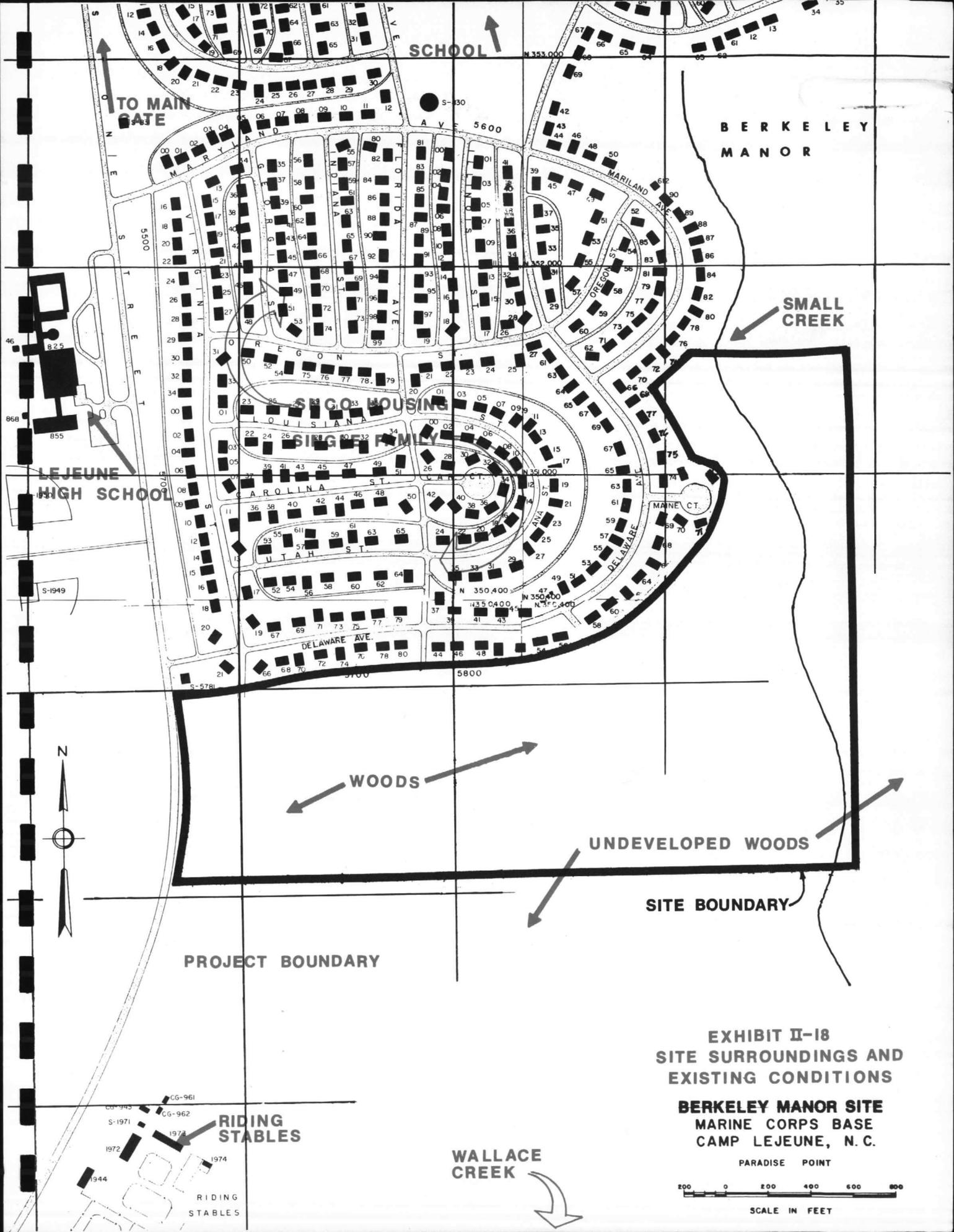


SCALE IN FEET



CG-961
CG-962
S-1971
1972
1973
1974
1944
RIDING
STABLES





SCHOOL

TO MAIN GATE

BERKELEY MANOR

SMALL CREEK

SINGLES HOUSING
SINGLE FAMILY

LEJEUNE HIGH SCHOOL

WOODS

UNDEVELOPED WOODS

SITE BOUNDARY

PROJECT BOUNDARY

EXHIBIT II-18
SITE SURROUNDINGS AND
EXISTING CONDITIONS

BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.

PARADISE POINT

WALLACE CREEK



SCALE IN FEET

RIDING STABLES

RIDING STABLES

CG-961

CG-962

1972

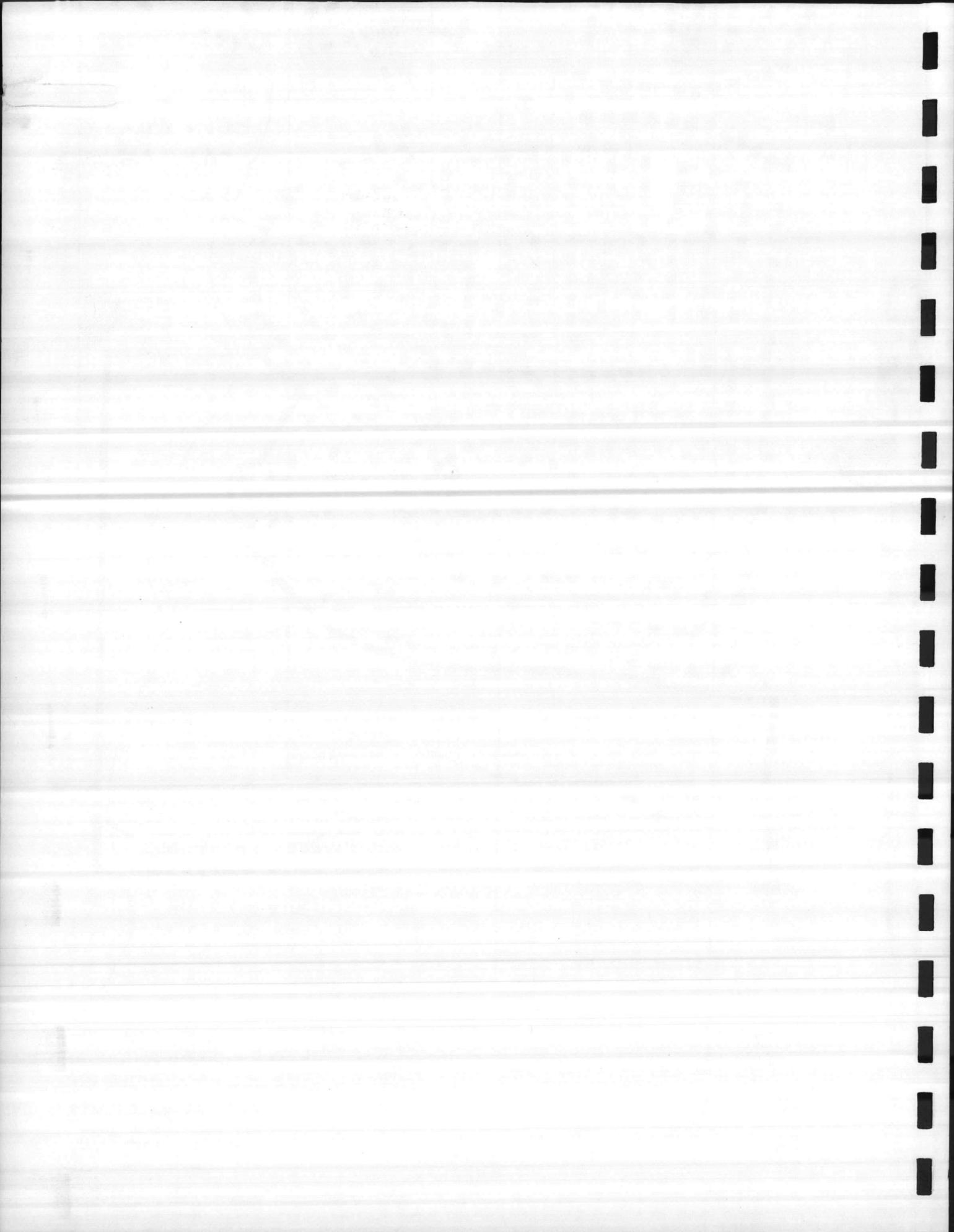
1974

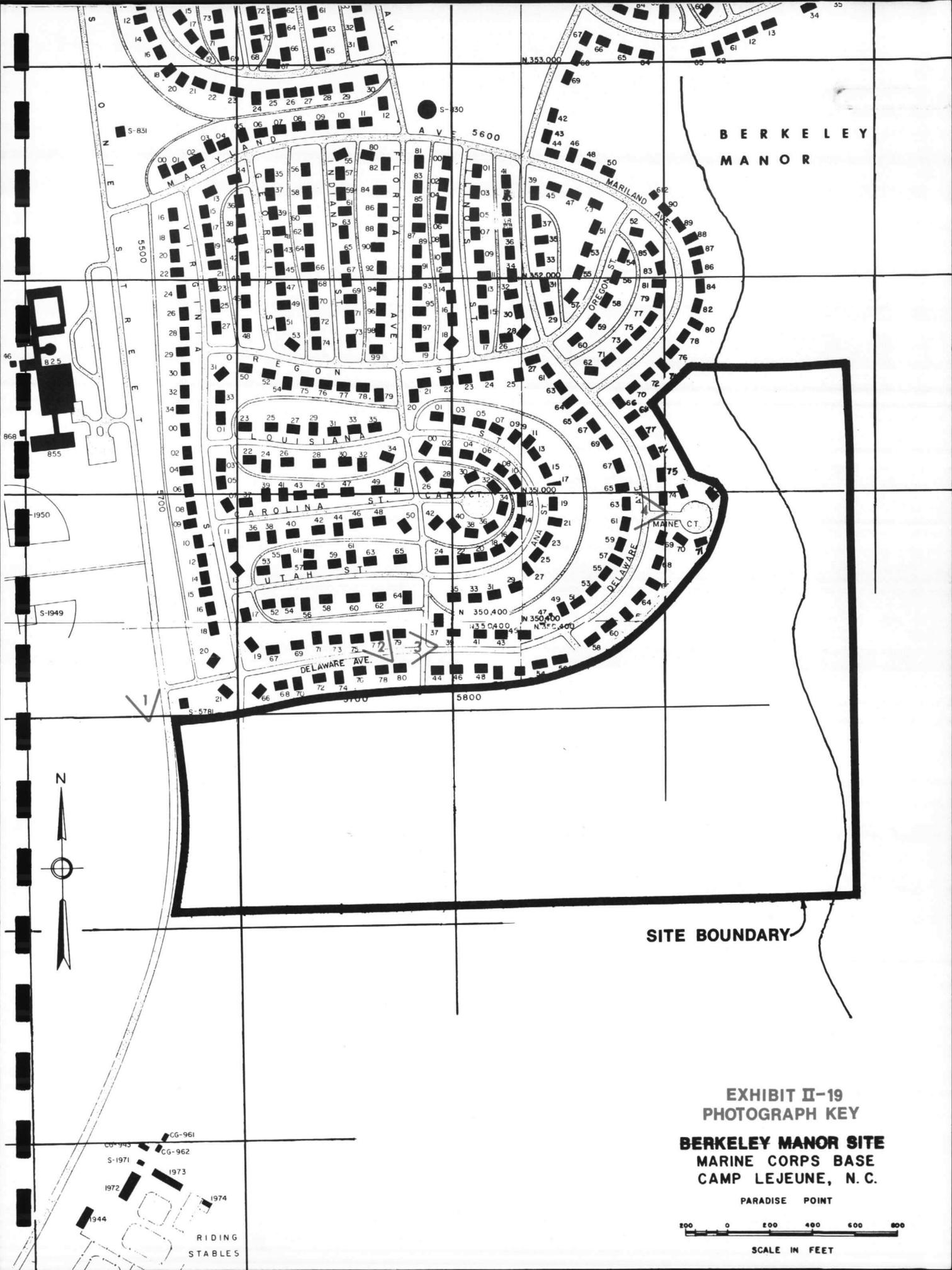
1944

1971

CG-943







BERKELEY
MANOR

SITE BOUNDARY

EXHIBIT II-19
PHOTOGRAPH KEY

BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

PARADISE POINT



SCALE IN FEET

CG-961
CG-962
S-1971
1973
1972
1974
1944
RIDING
STABLES



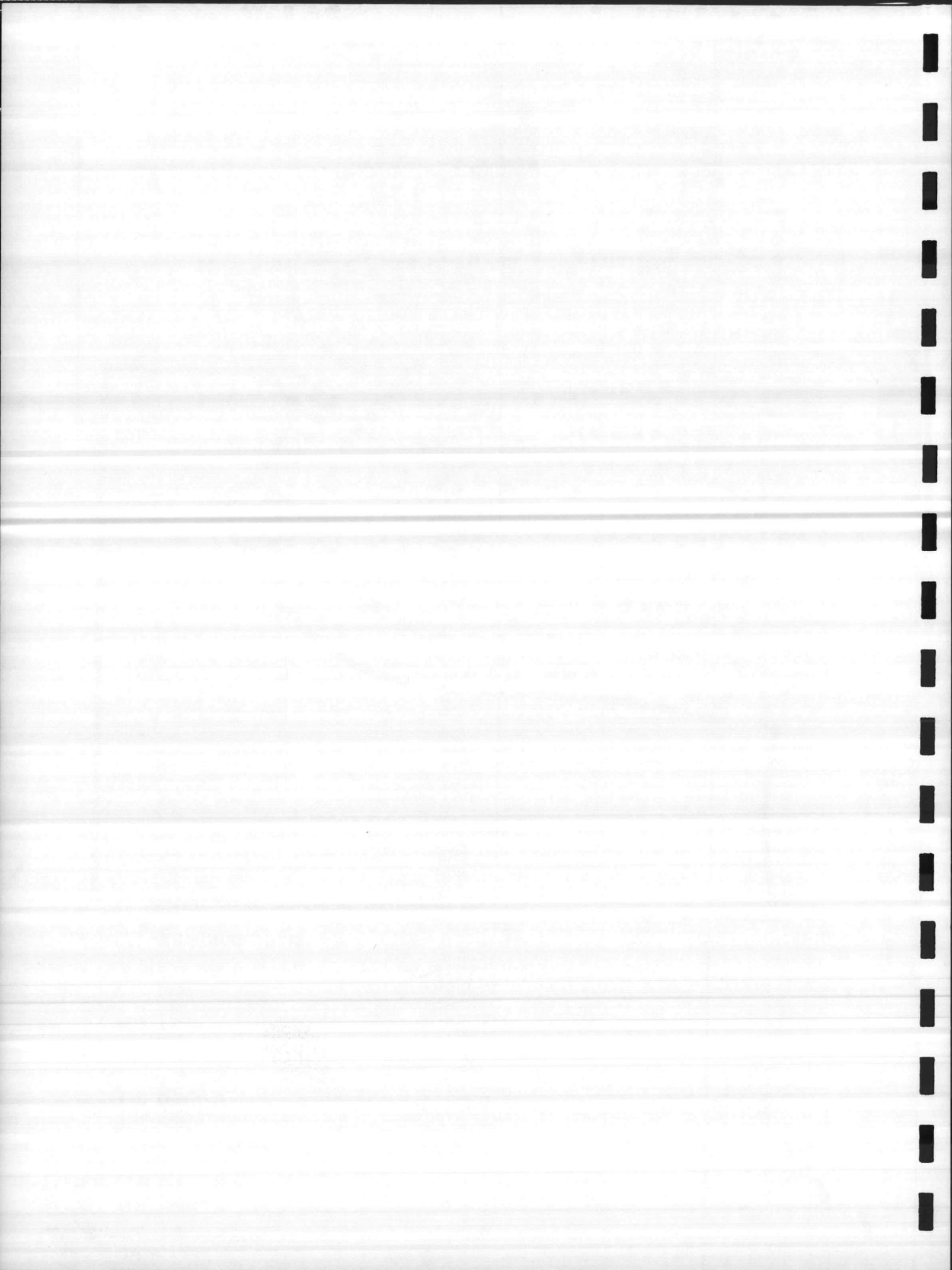




PHOTO KEY 1 - VIEW SOUTH ON STONE STREET



PHOTO KEY 2 - VIEW TOWARD SITE FROM DELAWARE STREET

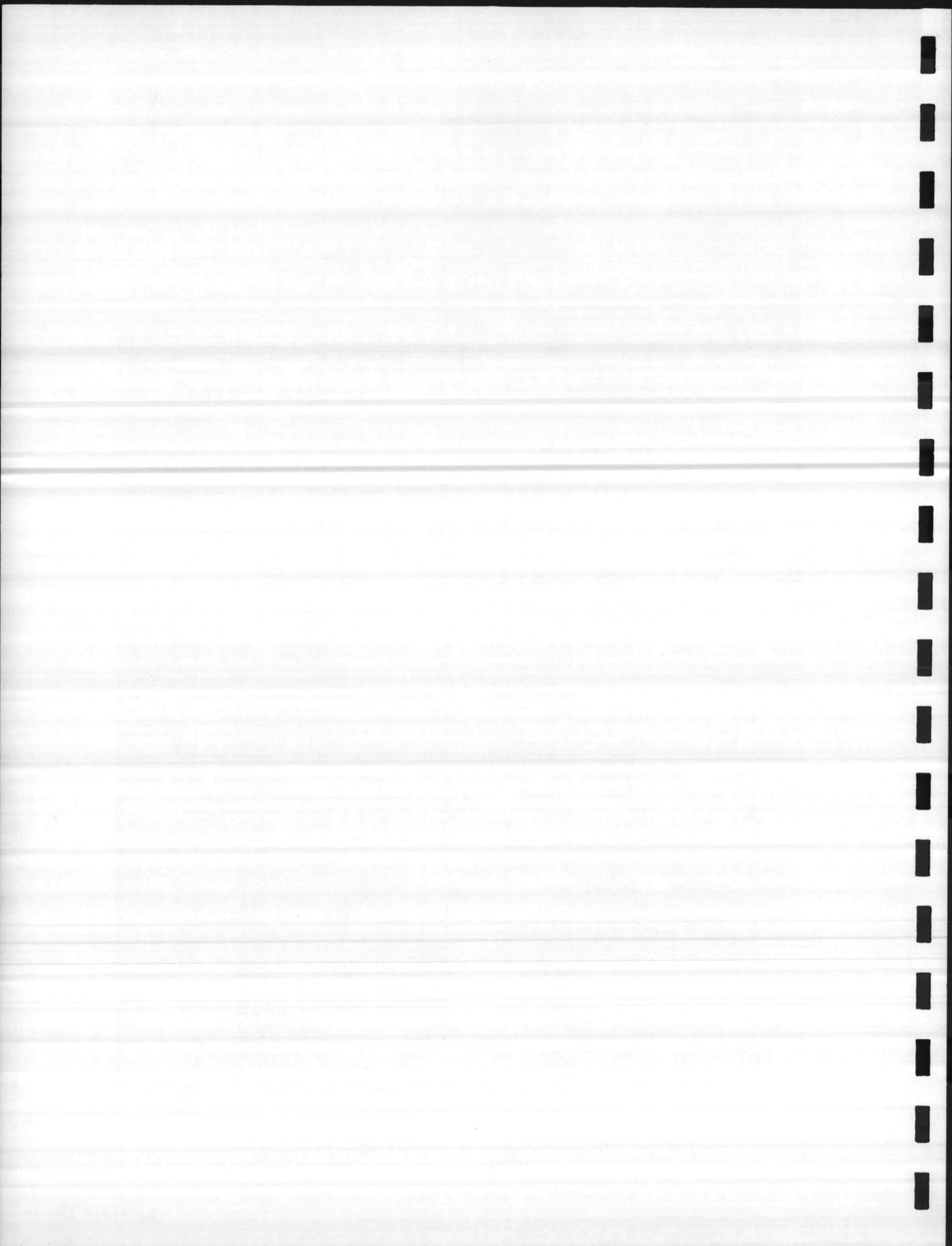
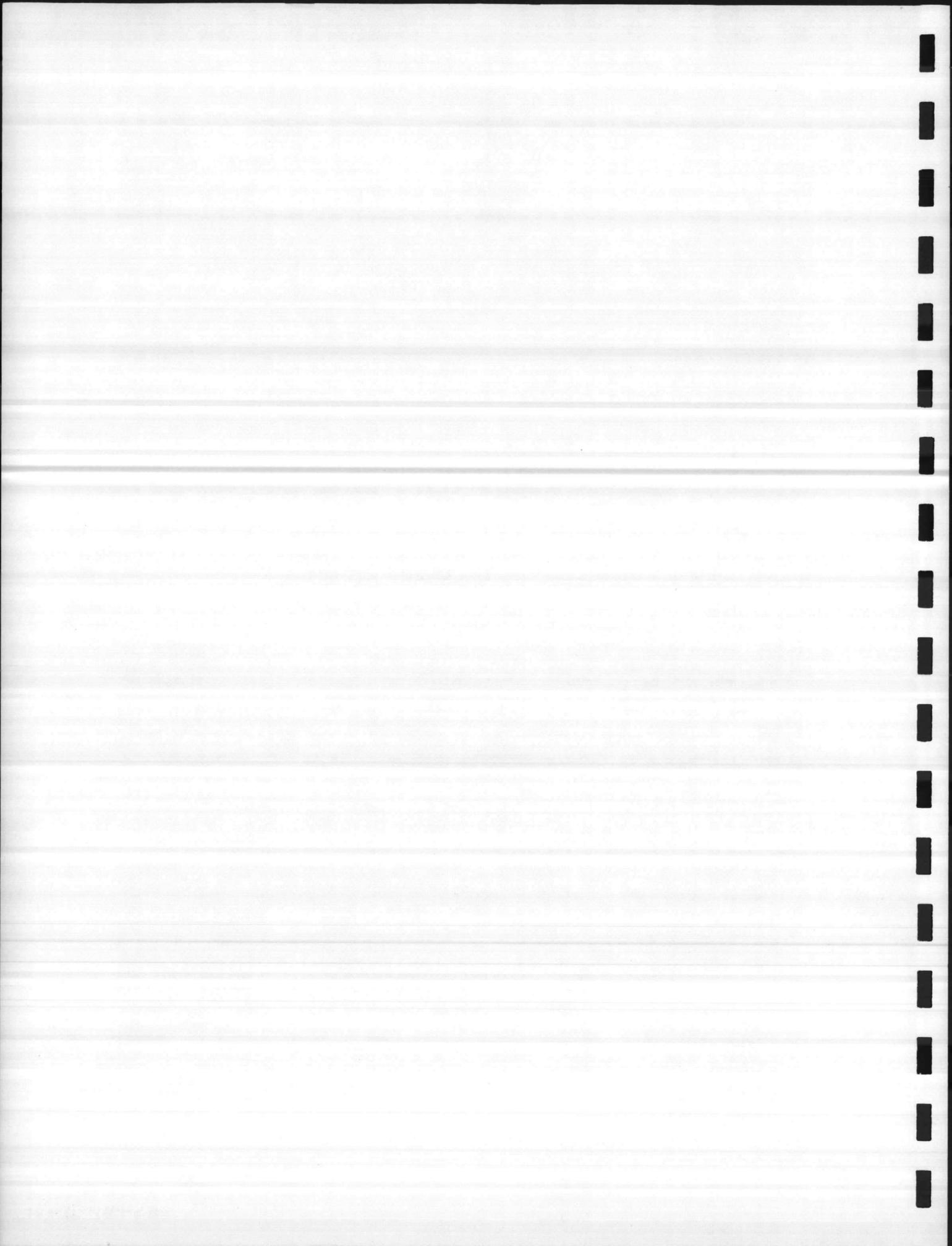


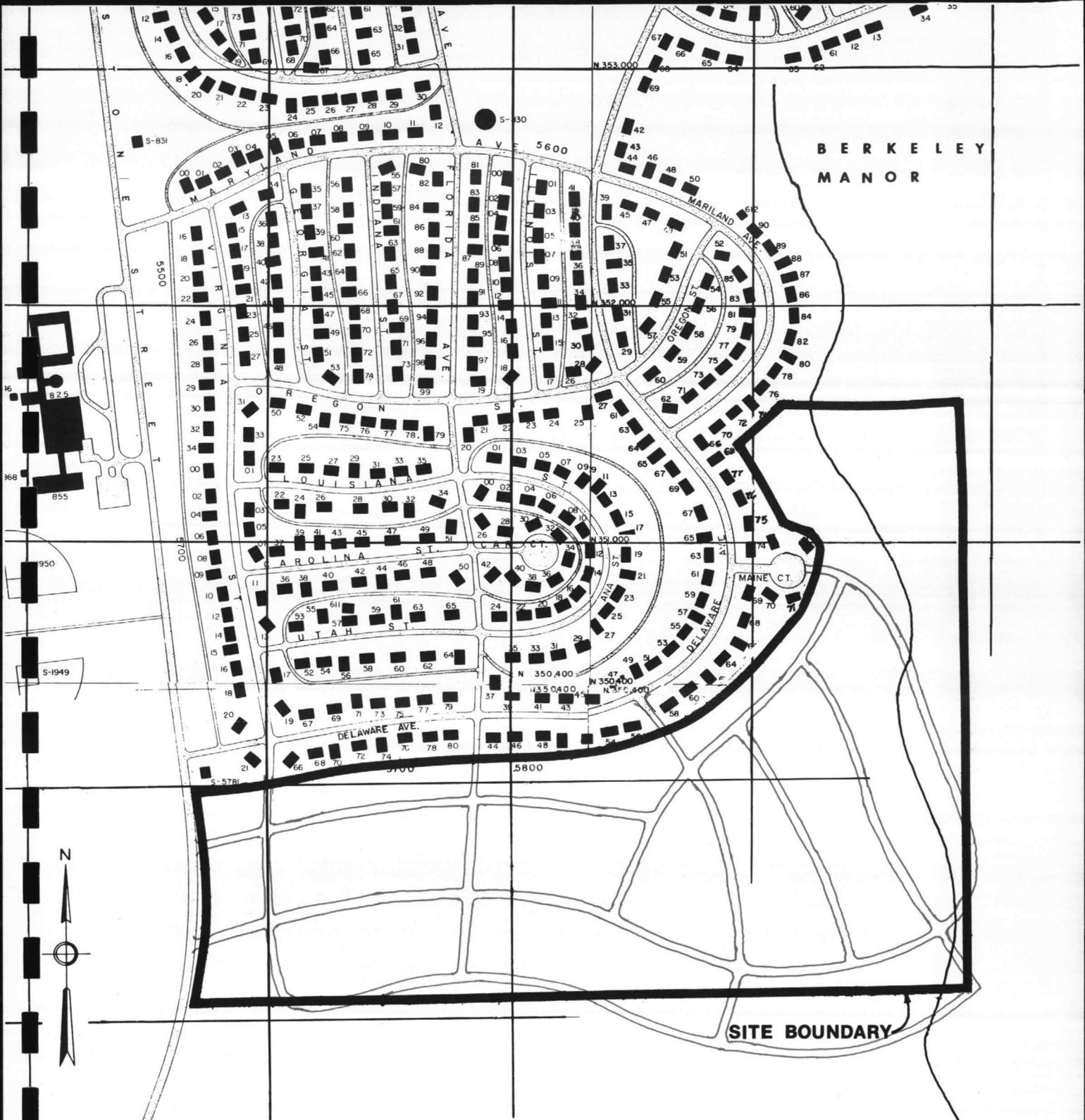


PHOTO KEY 3 - VIEW EAST ON DELAWARE STREET



PHOTO KEY 4 - VIEW EAST INTO SITE ON MAINE CT.





BERKELEY
MANOR

SITE BOUNDARY

EXHIBIT II-23
1958 SITE PLAN

BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

PARADISE POINT



SCALE IN FEET



G. PROPOSED SITE DEVELOPMENT

1. Site Planning Criteria

Based upon a directive from the Commandant of the Marine Corps, June 14, 1974, to the Commanding General, Camp Lejeune, the Marine Corps Five Year Family Housing Construction Program has programmed a total of 1650 replacement units for Camp Lejeune.

These units do not include units for personnel identified as ineligibles (E-1 through E-3). Under the Navy's replacement program, a one-for-one replacement ratio is required. Consequently, demolition of a like number of inadequate units will be required.

There are presently 1650 housing units at Camp Lejeune which have been declared inadequate. They are located as follows:

Tarawa Terrace #2	950 units
Midway Park	<u>700</u> units
Total	1650 units

Correspondence from the Office of the Commanding General, Camp Lejeune to the Commandant of the Marine Corps dated August 27, 1974 states that the first increments of new housing will be at Paradise Point and that "demolition of Tarawa Terrace housing will follow completion of each increment of the replacement housing".

The first 500 units of replacement housing are proposed to be constructed in two increments of 250 units each, one in FY 76 and one in FY 77. They are to be for senior enlisted men (SEM) and junior enlisted men (JEM). The following design criteria is applicable.

a. Increment No. 1, FY 76

four bedroom units	70 SEM (grades E-7 through E-9)
three bedroom units	180 JEM (grades E-4 through E-6)

Increment No. 2, FY 77

four bedroom units	50 SEM
four bedroom units	50 JEM
three bedroom units	50 JEM
two bedroom units	100 JEM

b. The following density (in units per buildable acre) as set forth in DM-35 shall apply:

Bedrooms	Units per acre
2	7.5
3	6.7
4	6.0

c. The Land Use Intensity (LUI) for family housing shall be in accordance with NAVFAC DM-35 and the HUD Manual of Acceptable Practices, Vol. 4, 4930.1, 1973. The range of LUI set forth in DM-35 for the EM category is 4.0 - 4.5, the normal LUI being 4.1. See Table II-5.

- d. Based upon the LUI determined from the appropriate living unit size and number of units per gross acre, the amount of recreation space, open space, cars parked, and livability space shall be determined. These figures shall apply to the proposed housing. See Table II-6.
- e. The plans for the proposed units must comply with all federal, state and local ordinances affecting the development.
- f. The NAVFAC DM-35 (Family Housing) and the Department of Defense Construction Manual (DOD 4270.1 M) shall be used as a guide for all aspects of the proposed development.
- g. As set forth in DM-35 the statutory cost limitation for dwelling units built in conterminous United States must include cost of land acquisition, design fees, site preparation, utilities, and other support. The average cost of all units may not exceed \$27,500 per unit with a maximum of \$42,000 for any one unit under the 1975 FY congressional authorization act.
- h. The proposed method for the design and construction of the 500 replacement housing units will be the Turnkey method. The use of this method dictates a performance standard, in this case the NAVFAC DM-35, DOD 4270. IM, and FHA Minimum Property Standards without specifying a specific site plan or any definite floor plan which would bind a prospective private developer. The Turnkey developer must base his contract proposal on his own site plan and unit plans. His proposal must be within the statutory per unit ceiling cost and must satisfy all Navy criteria.

Because the Turnkey method is to be used for this project, no site plans for either site have been prepared. In order to analyze the impact of the 500 units upon the sites this Statement proposes a schematic land use plan for each site and uses a sample dwelling unit cluster from DM-35. These are suggestive only and do not represent detailed site analysis nor are they intended to commit any potential developer to a specific plan.

It should be noted that in 1958, when the General Site Plan was prepared for the Capehart Housing in Berkeley Manor, a proposed street layout was made for the site under consideration. This area was to be for future expansion of the existing Berkeley Manor development. The road pattern was laid out to accommodate a single-family detached unit pattern similar to the existing development. Development of this site was never initiated. See Exhibit II-23.

TABLE II-5

INTENSITY OF DEVELOPMENT*

Single Family Dwelling Land-Use Intensity Numbers

Net Living Unit Size	Number of Living Units per Gross Acre										
	4	5	6	8	10	12	14	16	18	20	25
600 sq. ft.	-	-	-	3.2	3.5	3.8	4.0	4.2	4.4	4.5	4.8
700 sq. ft.	-	-	3.0	3.4	3.7	4.0	4.2	4.4	4.6	4.7	5.1
800 sq. ft.	-	3.0	3.2	3.6	3.9	4.2	4.4	4.6	4.8	4.9	5.3
900 sq. ft.	-	3.1	3.4	3.8	4.1	4.4	4.6	4.8	4.9	5.1	5.4
1000 sq. ft.	3.0	3.2	3.5	3.9	4.2	4.5	4.7	4.9	5.1	5.3	-
1100 sq. ft.	3.1	3.4	3.6	4.1	4.4	4.7	4.9	5.1	5.2	5.4	-
1200 sq. ft.	3.2	3.5	3.8	4.2	4.5	4.8	5.0	5.2	5.4	-	-
1300 sq. ft.	3.3	3.6	3.9	4.3	4.6	4.9	5.1	5.3	-	-	-
1400 sq. ft.	3.4	3.7	4.0	4.4	4.7	5.0	5.2	5.4	-	-	-
1500 sq. ft.	3.5	3.8	4.1	4.5	4.8	5.1	5.3	-	-	-	-
1600 sq. ft.	3.6	3.9	4.2	4.6	4.9	5.2	5.4	-	-	-	-
1700 sq. ft.	3.7	4.0	4.3	4.7	5.0	5.3	-	-	-	-	-
1800 sq. ft.	3.8	4.1	4.4	4.8	5.1	5.4	-	-	-	-	-
1900 sq. ft.	3.9	4.2	4.4	4.9	5.2	5.4	-	-	-	-	-
2000 sq. ft.	3.9	4.2	4.5	4.9	5.3	-	-	-	-	-	-

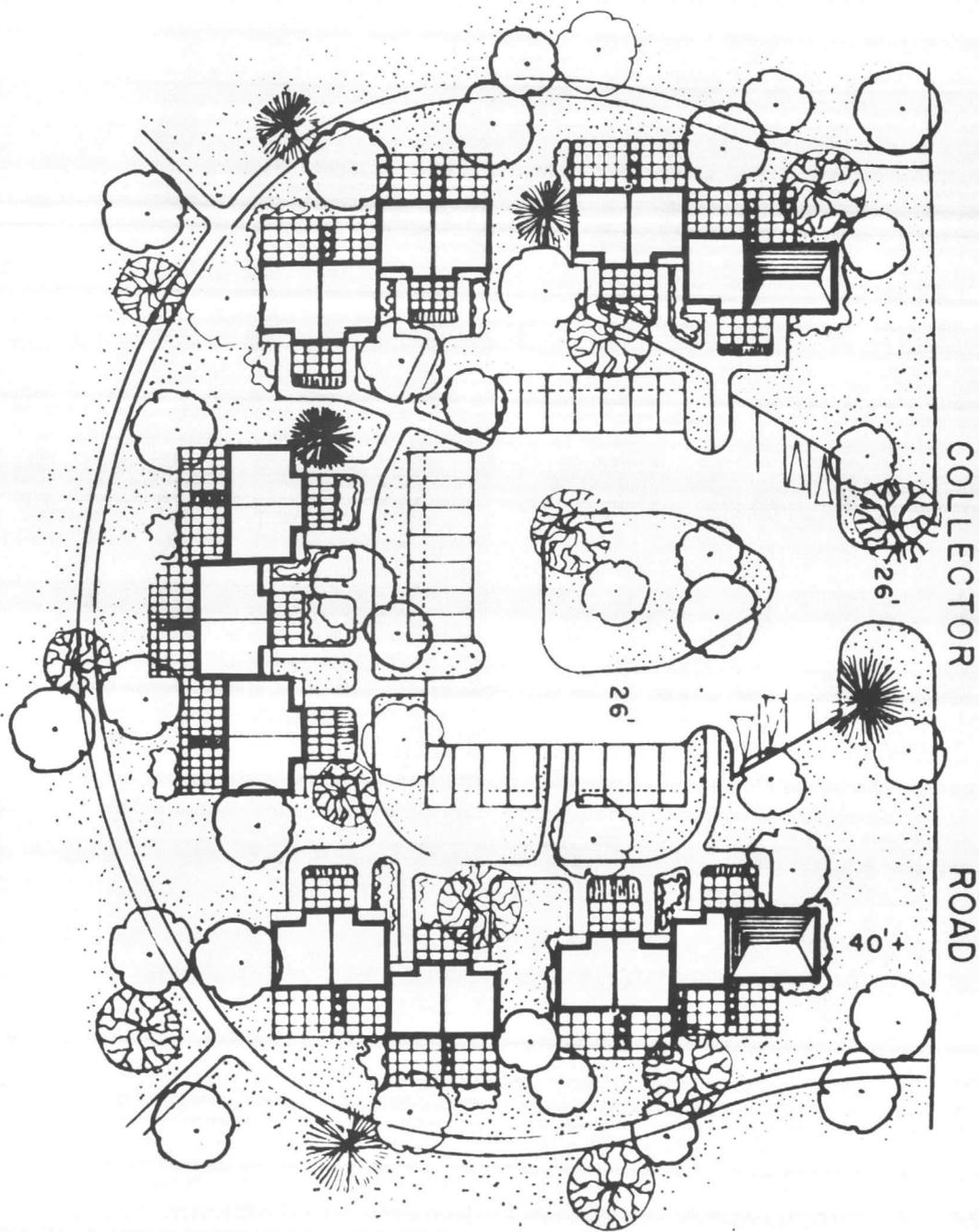
*Source: Department of Housing and Urban Development, Manual of Acceptable Practices, Volume 4, 4930.1, 1973.

TABLE II-6
INTENSITY OF DEVELOPMENT

SINGLE FAMILY DWELLING LAND-USE INTENSITY CRITERIA

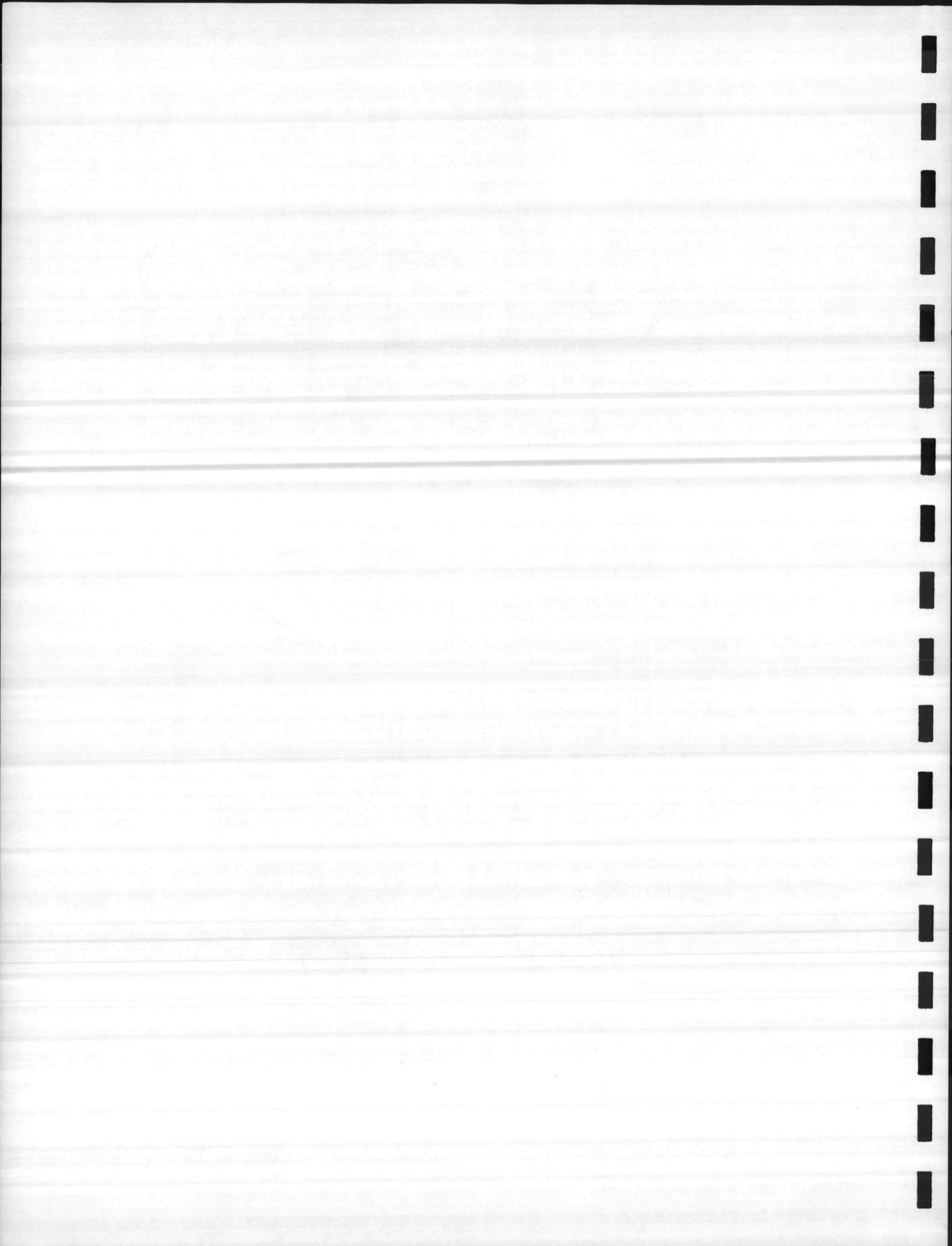
Land Use Intensity (LUI)	Floor Area Ratio (FAR)	Open Space Ratio (OSR)	Livability Space Ratio (LSR)	Recreation Space Ratio (RSR)	Occupant Car Ratio (OCR)	Total Car Ratio (TCR)
3.0	.100	.80	.65	.025	2.0	2.2
3.1	.107	.80	.62	.026	1.9	2.1
3.2	.115	.79	.60	.026	1.9	2.1
3.3	.123	.79	.58	.028	1.8	2.0
3.4	.132	.78	.55	.029	1.7	1.9
3.5	.141	.78	.54	.030	1.7	1.9
3.6	.152	.78	.53	.030	1.6	1.8
3.7	.162	.77	.53	.032	1.6	1.8
3.8	.174	.77	.52	.033	1.5	1.7
3.9	.187	.77	.52	.036	1.5	1.7
4.0	.200	.76	.52	.036	1.4	1.6
4.1	.214	.76	.51	.039	1.4	1.6
4.2	.230	.75	.51	.039	1.4	1.5
4.3	.246	.75	.49	.039	1.3	1.5
4.4	.264	.74	.48	.042	1.3	1.5
4.5	.283	.74	.48	.042	1.2	1.4
4.6	.303	.73	.46	.046	1.2	1.4
4.7	.325	.73	.46	.046	1.2	1.3
4.8	.348	.73	.45	.049	1.1	1.3
4.9	.373	.72	.45	.052	1.1	1.3
5.0	.400	.72	.44	.052	1.1	1.2
5.1	.429	.72	.43	.055	1.0	1.2
5.2	.459	.72	.42	.056	1.0	1.2
5.3	.492	.71	.41	.059	.99	1.1
5.4	.528	.71	.41	.062	.96	1.1

Source: Department of Housing and Urban Development, Manual of Acceptable Practices, Vol. 4, 4930.1, 1973.



**EXHIBIT II-24
TYPICAL HOUSING CLUSTER**

Source: Army DM-35



2. Unit Planning Criteria

Under the turnkey method of construction the design and planning of the dwelling units is controlled by performance specifications just as the site development is controlled. By specifying quality standards, and in the case of the size of the units, by specifying an allowable range of square footage, the prospective contractor is not limited to a specific unit or design; he is allowed the freedom to propose his own design and he is more free to employ construction techniques or to use materials which may be more indigeneous to the area.

The basic guide to the dwelling unit design is NAVFAC DM-35. This Manual together with the latest edition of the HUD Manual of Acceptable Practices, Design Standards for Construction of Permanent Family Housing for Federal Personnel, and other special instructions issued by the Navy provides a prospective developer with the basic standards which the project must meet.

A special directive, NAVFACINST 11101.85B, issued October 10, 1974, sets forth the floor area limitations for type of unit by occupancy rank and bedroom composition. The floor areas for the proposed units are:

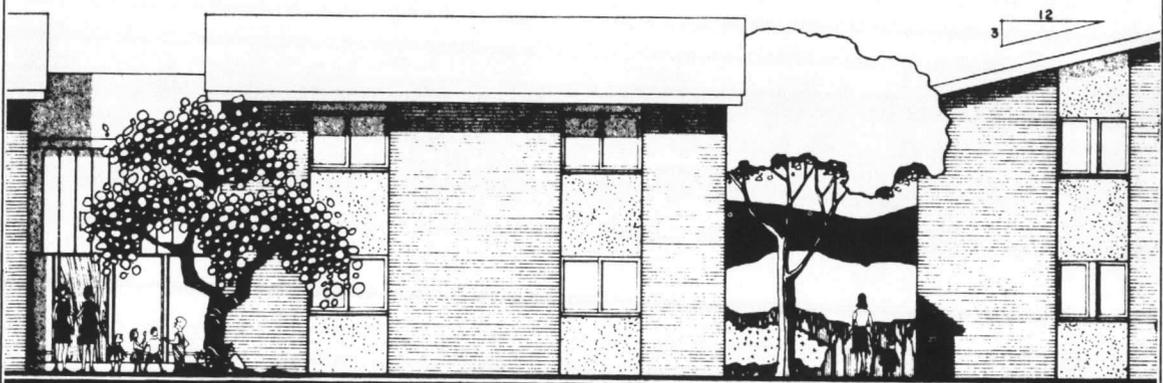
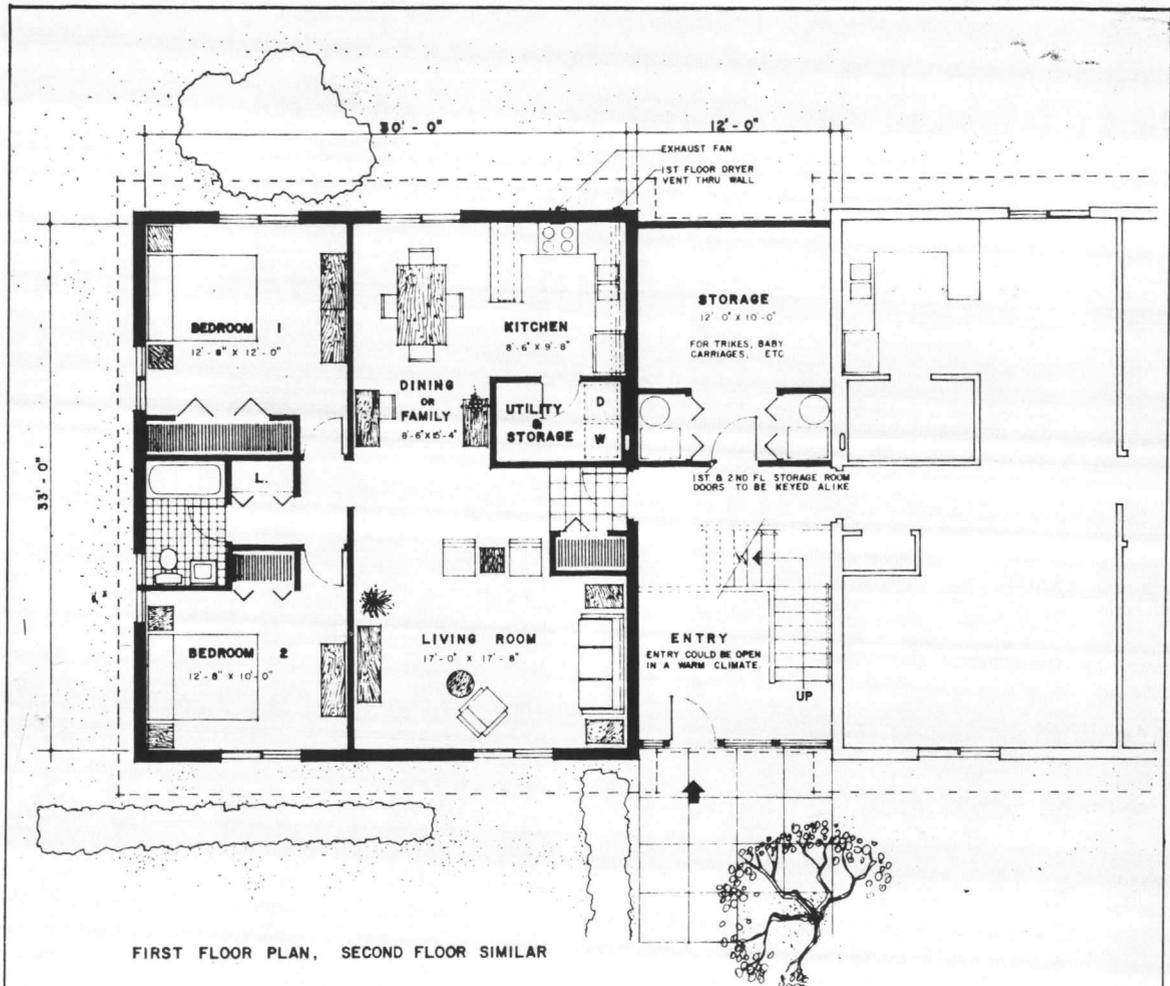
NET FLOOR AREAS

<u>Type of Unit</u>	<u>Min. SF</u>	<u>Basic SF</u>	<u>Max. SF</u>
SEM - 4 Bedroom	1,350	1,450	1,450
JEM - 4 Bedroom	1,250	1,350	1,418
JEM - 3 Bedroom	1,080	1,200	1,260
JEM - 2 Bedroom	930	950	950

DM-35 specifies that the dwelling unit type for all enlisted men shall be townhouse type. It is possible, however, within the turnkey concept of construction, for the prospective developer to propose other types of units so long as the LUI and densities are within allowable limits. The design manual includes illustrations of several types of townhouses, for hillside and for flat sites, which serve as a guide to prospective developers. An example of a two-, three-, and four-bedroom unit taken from the Manual is included for purposes of illustrating the general form and layout the units will take.

Criteria for individual room sizes, minimum storage spaces, quality of materials, and acceptable construction practices are all set forth in DM-35.

NAVFACINST 11101.85B states that townhouse structures are to be limited to a maximum of six living units per building.

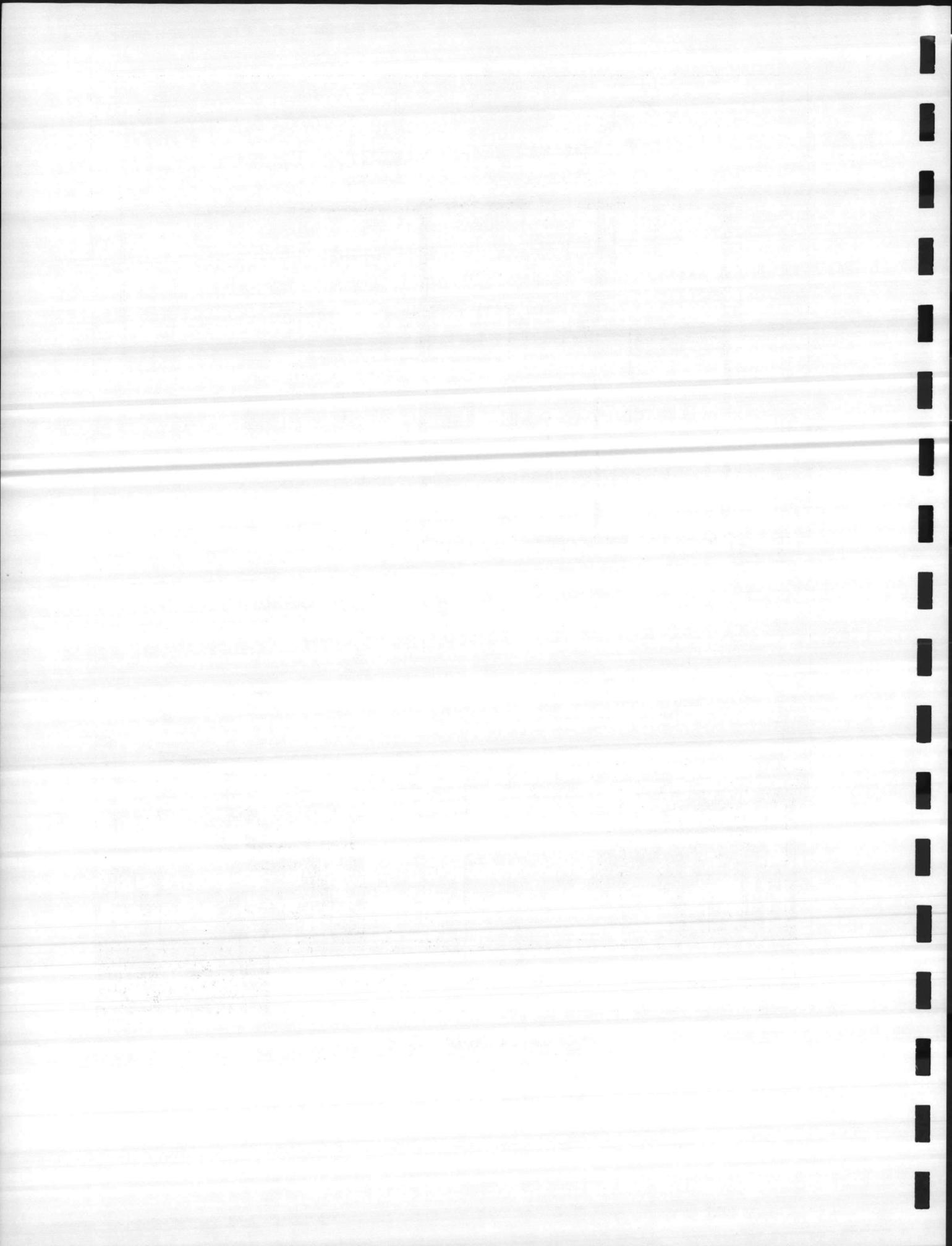


GROSS AREA 1075 SQ. FT.
 NET AREA 945 SQ. FT.



PERSONNEL TYPE BEDROOMS HOUSE TYPE
EM CGO · 2 BR · 7
 IDENTIFICATION SYMBOL

EXHIBIT II-25
 EM CGO 2-Bedroom Unit, 2-Story 4-Unit Building



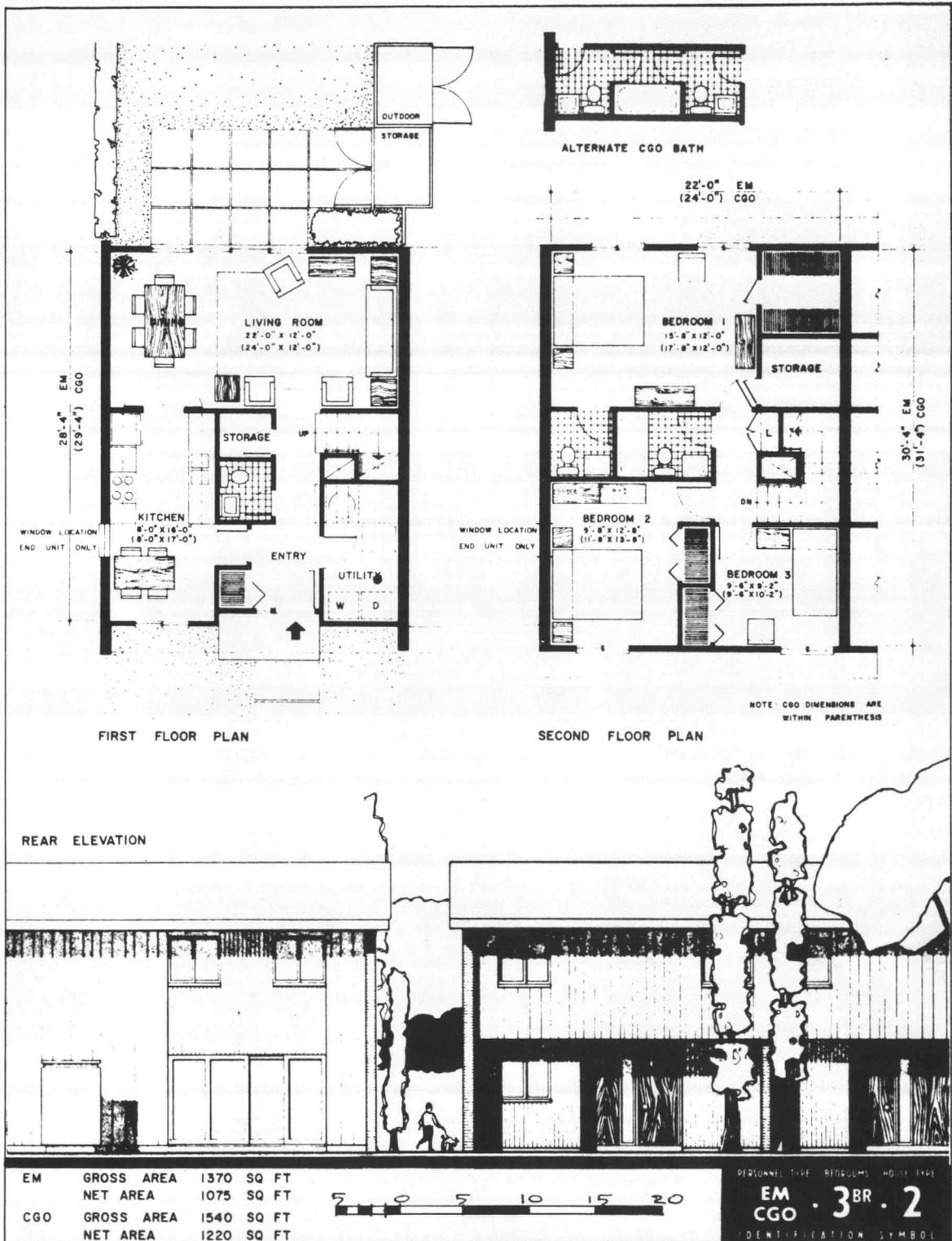
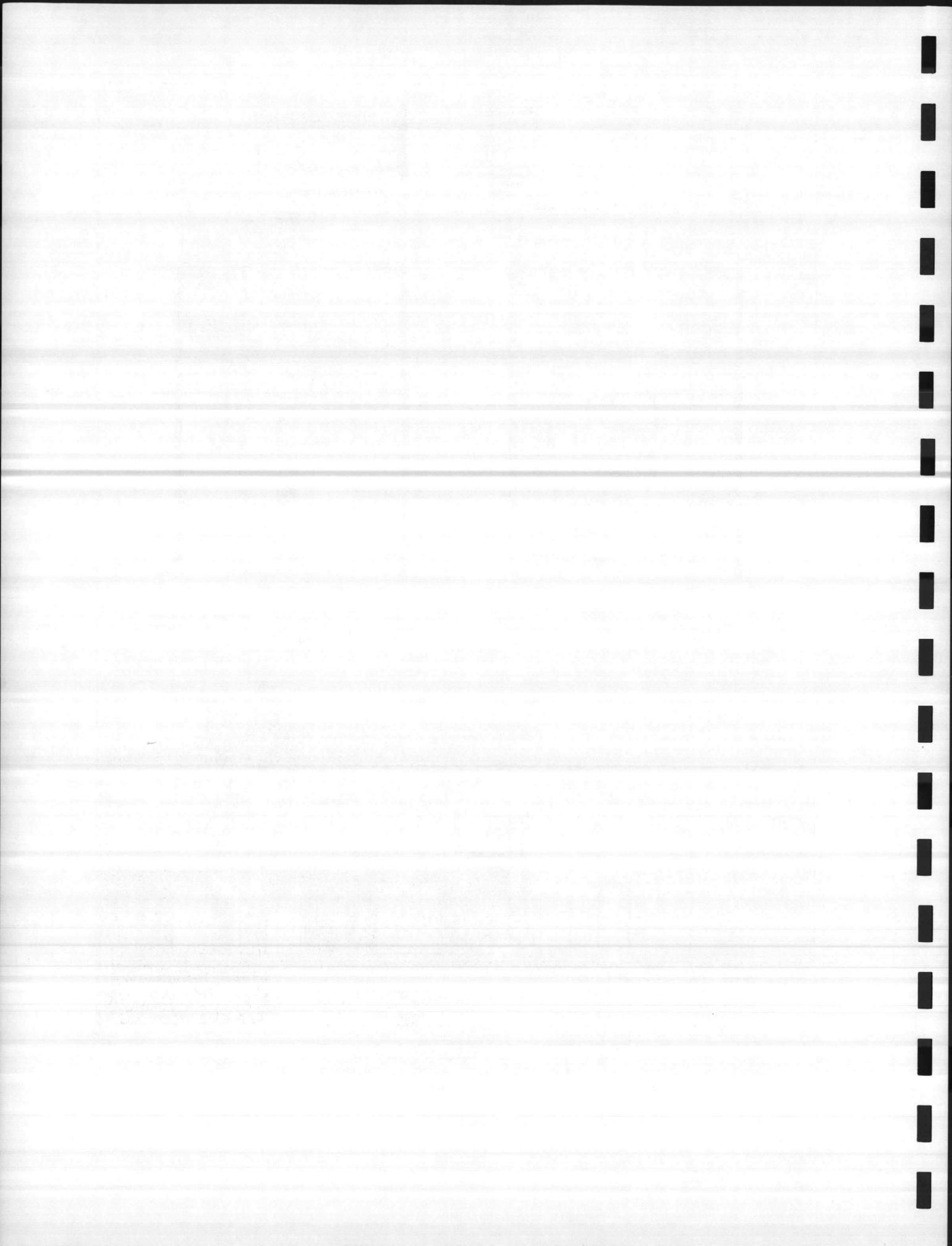


EXHIBIT II-26
EM CGO 3-Bedroom 2-Story Townhouse



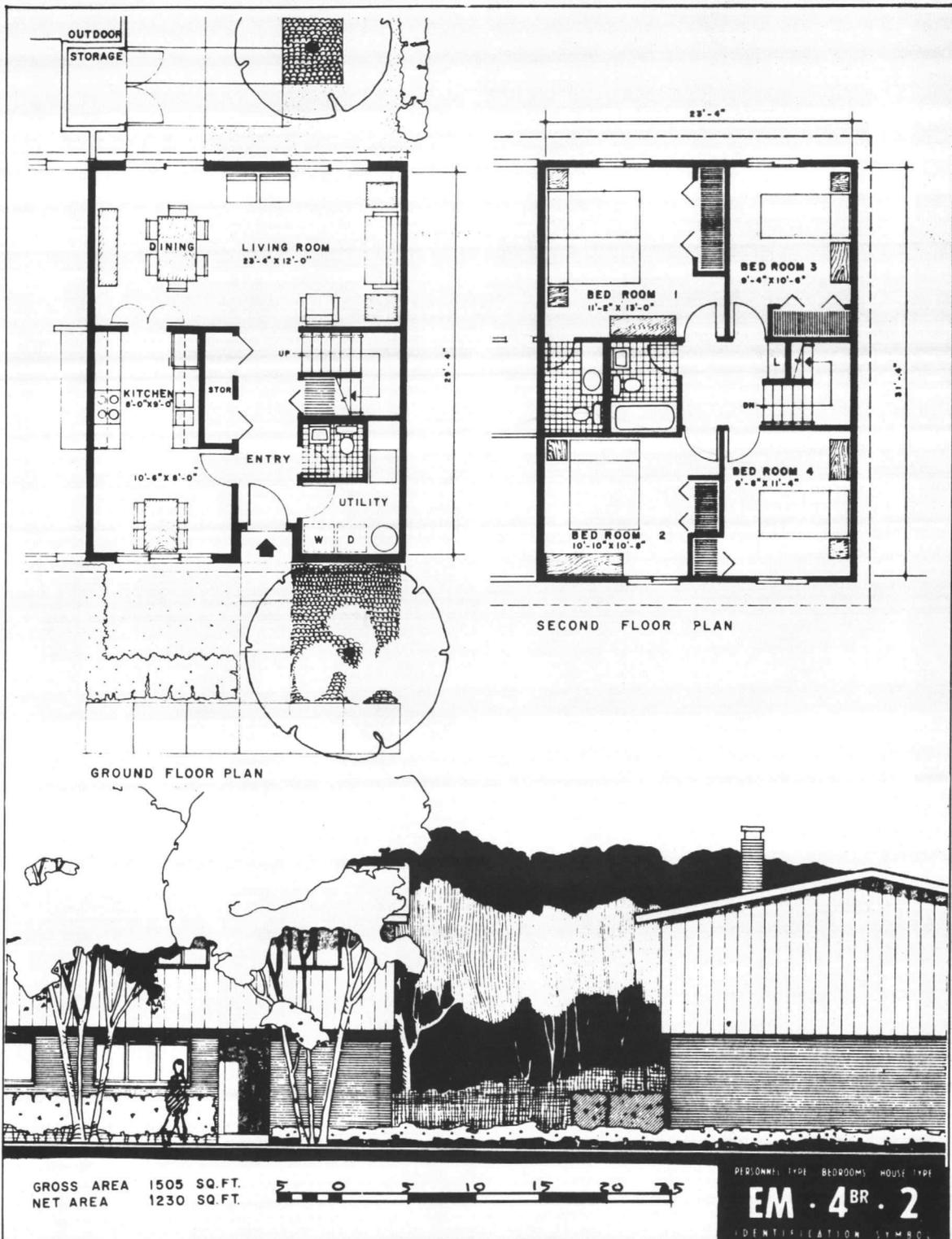
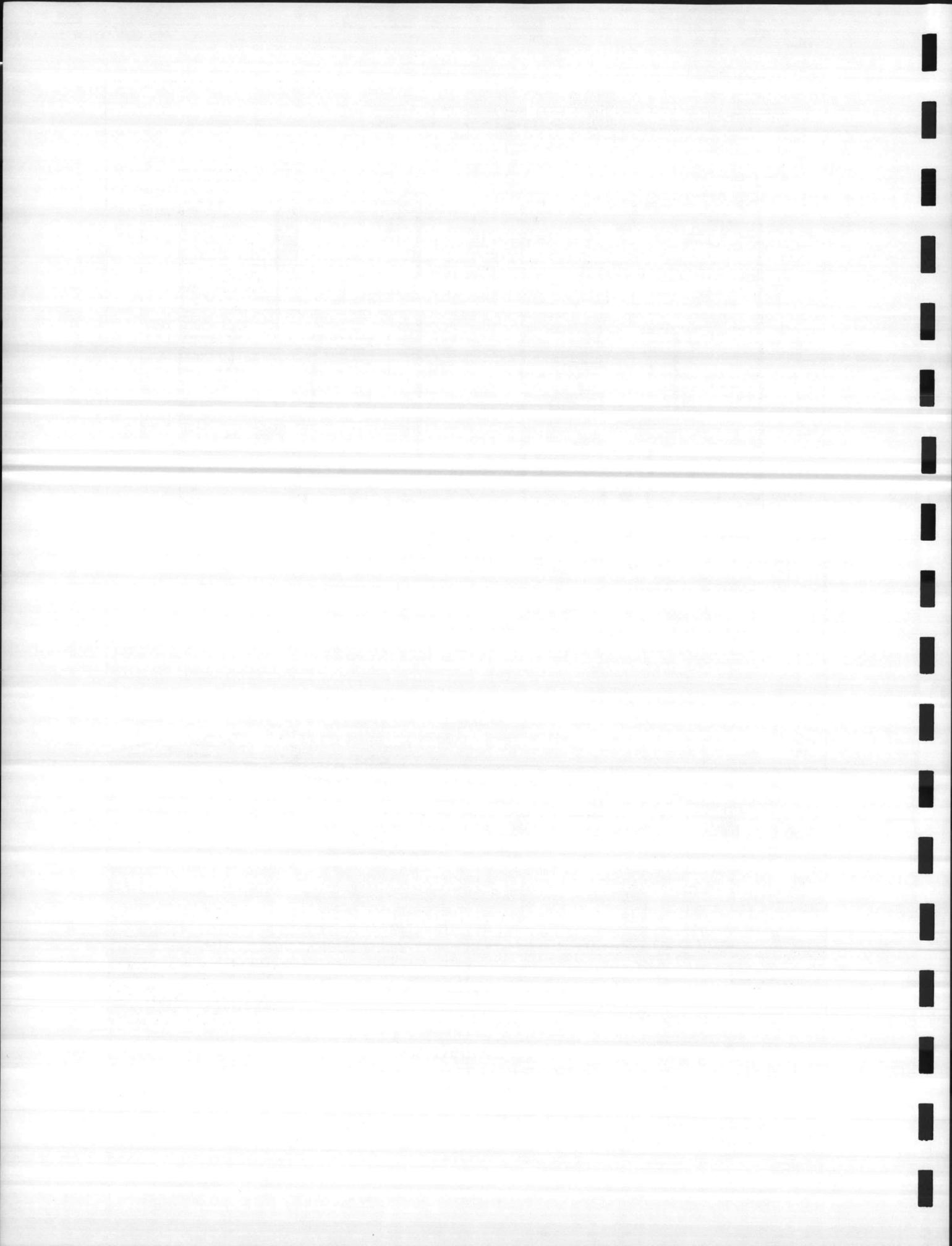


EXHIBIT II-27
 EM 4-Bedroom 2-Story townhouse

Source: Navy DM-35



3. Compatibility With Existing Housing and Controls

a. Density

The proposed dwelling units will be the first townhouse type units constructed at Camp Lejeune. All of the units in Berkeley Manor and Paradise Point, with the exception of the BOQ's, are single family detached homes. In Tarawa Terrace there is a combination of detached houses and row type houses, all single story.

By using the townhouse type units a completely different land use pattern is established. The dwelling units will be closer together thereby affecting economies of construction. Less building materials, less utilities, less paving, all contribute to a more cost conscious approach to construction. The land is also better utilized; fewer small unusable spaces are created and larger, more efficient areas are provided, thus preserving more land in its natural state. The average existing densities in the several housing areas are shown below.

Tarawa Terrace	4.5 DU/AC.
Berkeley Manor	2.3 DU/AC.
Paradise Point	1.5 DU/AC.

With regard to density only, the proposed housing which is to be from 7-8 DU/Ac., will be much denser than any of the existing areas.

Density, however, is not the only basic criteria for site development.

As explained in the section on Planning Criteria an important consideration in site planning is the Land Use Intensity (LUI). This rate or measure

which is based on the relationship of total floor area to total land area can also be used to compare the existing developments to that proposed.

The lower the LUI number, the lower the density will be. Intensities lower or higher than those that have been established as favorable for certain building types within the HUD Manual of Acceptable Practices tend to under or over develop the property.

Using the average unit gross square footage and the average densities of each area, the existing LUI is approximately:

Area	Ave. Unit Sq. Ft.	Density	LUI
Tarawa Terrace	930	4.5	3.0
Berkeley Manor	1340	2.3	3.0
Paradise Point	1225	1.5	2.0

A LUI of 3.0 is the minimum recommended by the HUD Manual of Acceptable Practices. The NAVFAC DM-35 recommends a LUI of 4.0-4.5 for EM housing. The proposed housing will therefore have a much higher intensity of development than the existing housing areas.

Because the density and LUI is to be different from the existing housing does not mean the proposed development will not be compatible. On the contrary, the larger open spaces which may be left natural around the new housing can provide buffer and transition zones to reduce the visual impact of the new units. Better internal pedestrian circulation, shorter walking distances, less streets for children to cross, and better organization of land uses will all result.

b. Architecture

Architecturally, the proposed housing will be different from the existing units. While some of the new units may be one story, the majority will be two stories. Only the units in Paradise Point are now two stories. Through the use of materials similar to those on the existing houses, the design of the new units can be made harmonious with the old.

Brick, wood siding, asphalt shingles, and other items of trim and finish similar to those now in use should be used on the new units.

The tall pine trees in the area will also serve to reduce the apparent height difference of the units.

c. Ordinances and Controls

Construction within the State of North Carolina is governed by the North Carolina State Building Code. This code consists of five sections: General Construction, Fire Resistance Ratings, Plumbing, Heating, and Electrical. The proposed housing, however, must comply with the minimum design standards of the Department of the Navy. These design standards are set forth in the Design Manual--Family Housing (NAVFAC DM-35). Those standards not specified in this document must meet those prescribed in the Department of Defense Construction Criteria Manual (DOD 4270.1-M) Other controlling documents are the HUD Manual of Acceptable Practices and the Minimum

Property Standards for Multi-Family Housing, One and Two Living Units. A general review of these documents indicates that they are at least as restrictive as the North Carolina Code.

There are no local building or zoning ordinances which would have jurisdiction over the proposed action.

H. HISTORIC AND CULTURAL SITES

The North Carolina Historical Commission has reviewed the National Register of Historic Places and any anticipated additions pursuant to the National Historic Preservation Act of 1966, and found that there are no historic sites; districts or structures within Onslow County. Accordingly there are no properties listed or eligible for listing in the National Register of Historic Places which will be affected by the proposed housing.

In accomplishing the above research for the North Carolina Coastal Resources Commission, the Historical Commission also found that there were not any historical or archeological sites owned or assisted by the State of North Carolina or any properties or areas that are or may be designated by the Secretary of the Interior as Registered Natural Landmarks or as National Historic Landmarks.

Onslow County Courthouse records date back over 260 years and no known historic, archeological or architectural sites will be affected by this action. The only structures that will be involved in demolition are the existing inadequate housing units in the Tarawa Terrace Housing Area.

All proposed sites involved are presently undeveloped and heavily wooded. As the entire Camp Lejeune area has been farmed since the early 1700's it is conceivable that some artifacts or relics lie on or beneath the surface. The nearby New River, the oldest river in North America, has been traveled and traversed by the indigenous Indian and the early immigrant settlers. As the sites involved have never been disturbed by construction or landfill nor have they been subject to intensive outdoor recreational use, they could contain relics which are irreplaceable. However, local base authorities are not aware of any such sites.

I. RELATED FEDERAL ACTIVITIES

The proposed replacement housing when coupled with other potential or planned federal, state or local activities could conceivably have a significant impact on life style, growth trends, land use patterns, utility services and other community services in a cumulative way whereas the proposed action, in itself, would not. Accordingly, interviews were conducted with officials of the following entities to establish which, if any, related projects would need to be considered in impact assessments:

- Camp Lejeune
- City of Jacksonville
- Jacksonville Chamber of Commerce
- Jacksonville Board of Realtors
- Onslow County
- Neuse River Council of Governments
- Coastal Resources Commission
- State Planning Department

The only project deemed to have a cumulative impact when added to the proposed replacement housing was a project to improve the Water and Sewage Treatment facilities in Tarawa Terrace. The Tarawa Terrace site, if built upon, would require that these planned improvements be expanded. (See Utilities Section). There still exist a tertiary cumulative impact in that it is possible that the housing units removed from Tarawa Terrace would in time be replaced with larger units for enlisted grade personnel in order to meet new minimum standards.

The proposed replacement housing itself would not add to the total area population but could add slightly to the Camp Lejeune population. In the construction/demolition exchange there could be a net gain of approximately 300 bedrooms which could increase the population of Camp Lejeune by approximately 400 persons. It is not known if existing on-base larger families will occupy all the new four-bedroom units and therefore it is not certain whether the Camp population will grow.

J. EDUCATION

Camp Lejeune has particularly good facilities for education; from pre-school programs through high school for dependent children living on-base, and a wide range of community college and correspondence courses for all service personnel, including adult dependents.

Camp Lejeune Dependents Schools

The Marine Corps, under the supervision of the U. S. Dept of Health and Welfare, Office of Education (H. E. W.) operates an independent on-base school system. All of the maintenance, construction, and operating funds are provided by HEW. These funds are provided only after it has been determined that the local school system cannot accommodate the on-base pupils. Under present policy it is the responsibility of the Marine Corps Base, Camp Lejeune to educate those children who either reside on-base or who are approved for base housing and can move on-base within three months.

The existing system includes a high school, a junior high school and five elementary schools. Additionally there is one deactivated elementary school capable of being remodeled and two pre-school nursery programs which operate separately from the Kindergarten.

Table II-7 indicates the current enrollment and designed plant capacities for each of the seven active schools and Table II-8 indicates the typical 1974 enrollment by grade on November 1, 1974.*

* Enrollment, expressed in average daily attendance, for the last six years is shown in Table II-7

TABLE II-7

CAMP LEJEUNE DEPENDENT'S SCHOOLS

<u>School</u>	<u>Designed Capacity</u>	<u>Current Enrollment</u>
Lejeune High School	750	746
Brewster Jr. High	650	593
Delalio E.S.	500	432
Tarawa Terrace #1, E.S.	500	589
Tarawa Terrace #2, E.S.	655	580
Berkeley Manor E.S.	600	500
Stone Street, E.S.	630	475
Other: E.S.	400	0 ⁽¹⁾
	<u>4285</u>	<u>3915</u>

(1) School now Deactivated.

TABLE II-8

CAMP LEJEUNE DEPENDENT'S SCHOOLS

Nov. 1, 1974, Membership

School	Spec. Ed.	K	One	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten	Eleven	Twelve	TOTAL
Stone Street			77	73	74	72	89	90							475
Berkeley Manor			69	80	83	99	87	91							509
Tarawa Terrace #1		357	106	69	60										592
Tarawa Terrace #2	25		92	81	75	117	104	88							582
Delalio		73	63	57	60	57	60	53							433
Brewster Jr. High									340	262					602
Lejeune High School											252	213	164	121	750
TOTAL															3943

Enrollment, projections for the Base School System are not available although Enrollments are expected to remain level for the next 3 to 5 years. As the amount of on-base housing will not increase appreciably as a result the proposed replacement housing program, school enrollments for the next several years should increase only slightly because of the addition of more four bedroom units which will replace existing two and three bedroom units. Married enlisted men's four bedroom units would yield a ratio of occupancy between 4.5 and 5.0 per unit. Estimating the additional bedrooms to be added in the replacement process, the transfer of some families from the units to be demolished, and the probable mix of family sizes expected to occupy the proposed new units the school age population can be expected to increase by 240 students adding approximately 138 children to grades kindergarten, through sixth; also would be 60 preschool age children. These totals are listed in table II-9.

TABLE II-9
IMPACT TO BASE SCHOOL POPULATION

<u>Age Group</u>	<u>Expected No. of additional Children</u>	<u>Expected percent of total</u>
Pre-Kindergarten	60	20
Elementary (K-6)	138	46
Junior High (7-9)	45	15
High School (10-12)	57	19
	<u>300</u>	<u>100%</u>

The addition of this number of children assumes the current enrollment will remain stable during the 2-3 year building-demolition process. Because of changing mission requirements it is not possible to predict the exact family size and on-base population. Total authorized permanent party strength and school enrollments have dropped slightly during recent years. It should also be noted that smaller family sizes are the trend into the foreseeable future.

The existing physical plant is described below.

Lejeune High School, located on 64 acres just across from Berkeley Manor Housing Area, was constructed in 1961 for a pupil population of 750. The present enrollment is 746, however the facility is considered slightly overcrowded by school administrators. The school contains 36 classrooms, 8 special activity rooms along with a gymnasium locker rooms and cafeteria.

Brewster Junior High School built in 1944 occupies a 20 acre site near the intersection of Brewster and Holcomb Boulevard and is designed for pupil population of 650 with a present enrollment of 593. The facility houses 25 regular classrooms, 7 special purpose rooms and an auditorium, cafeteria and locker rooms.

Dalalio Elementary School built in 1963 is located at the adjacent New River Marine Air Base and was designed to accomodate 500 students. The current enrollment is 432 and the facility contains 16 classrooms, 3 special purpose rooms and a cafeteria.

Tarawa Terrace #1 Elementary School built in 1967 is located on 20 acres at the N.C. #24 entrance to this housing area. The school was constructed for a pupil population of 500 and consists of 19 regular classrooms, cafeteria, auditorium and four special purpose rooms. The current enrollment is 589 pupils.

Tarawa Terrace II Elementary School built in 1954 occupies a 19 acre site in the center of this housing area. The school was constructed for the pupil population of 930 although under present educational standards the design capacity is 655. It presently houses 580 pupils. In addition to 25 regular classrooms the facility has cafeteria, auditorium and nine special purpose rooms.

Berkeley Manor Elementary School built in 1967 occupies of 15 acre site in the center of this large housing area. The current enrollment is 500 pupils and the facility consisting of 23 classrooms, auditorium, cafeteria and four other special purpose rooms, was constructed for a 600 pupil capacity.

Stone Street Elementary School built in 1959 was designed for 630 students and currently houses some 475 students. The facility has 21 regular classrooms, cafeteria and four special purpose rooms.

Midway Park Elementary School built in 1944 is located across N.C. #24 from the main gate in within a large concentration (700 units) of small 2 bedroom units and because of the location and condition of the facility and maintenance costs it was deactivated in 1972. The building contains 15 classrooms, a library and cafeteria and renovation for re-use is feasible should it be required.

Of the 3943 pupils now enrolled, some 3025 or 76.7% are bused daily. Buses are provided by the Base transportation system which has additional capacity if required.

Achievement

On-base schools presently enjoy comparatively high Achievement records and the Standard Aptitude Tests (SAT) results for all grades except the 6th have been above both the North Carolina and national averages. School administrators believe the sixth grade test to be poorly constructed.

Onslow County Schools

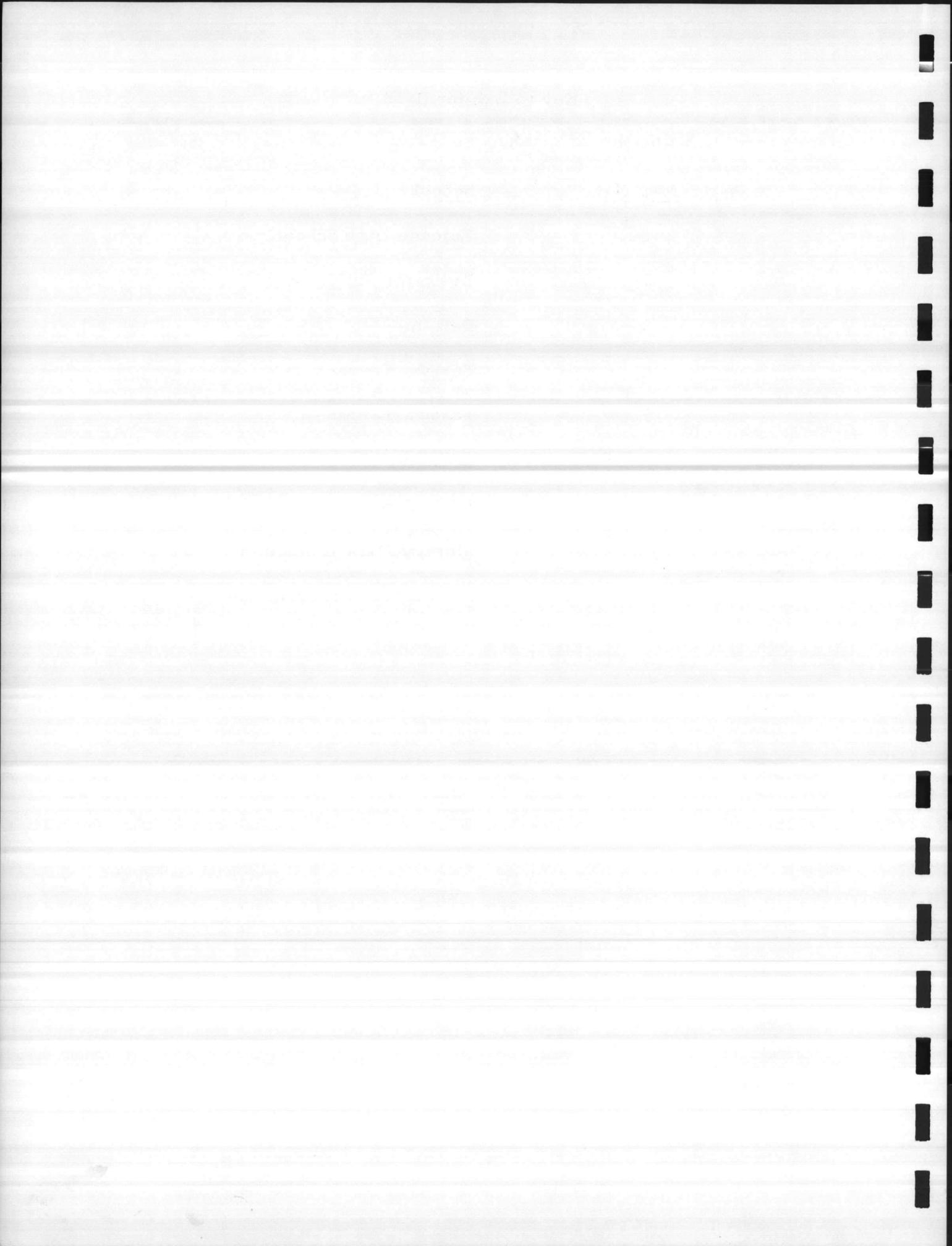
The Onslow County school system which includes the City of Jacksonville, has a current enrollment of 15,032 pupils of which 3,748 or 25% are military dependents. This percentage has remained essentially constant for the last five years. Enrollment was up some 200 pupils this 74-75 school year due primarily to an increased Kindergarten enrollment which resulted from an expanding state Kindergarten program. This state program will provide Kindergarten for all eligible children by approximately 1978. The school system operates five high schools and seventeen grade schools throughout the County. These schools and enrollments are listed in Table II-10.

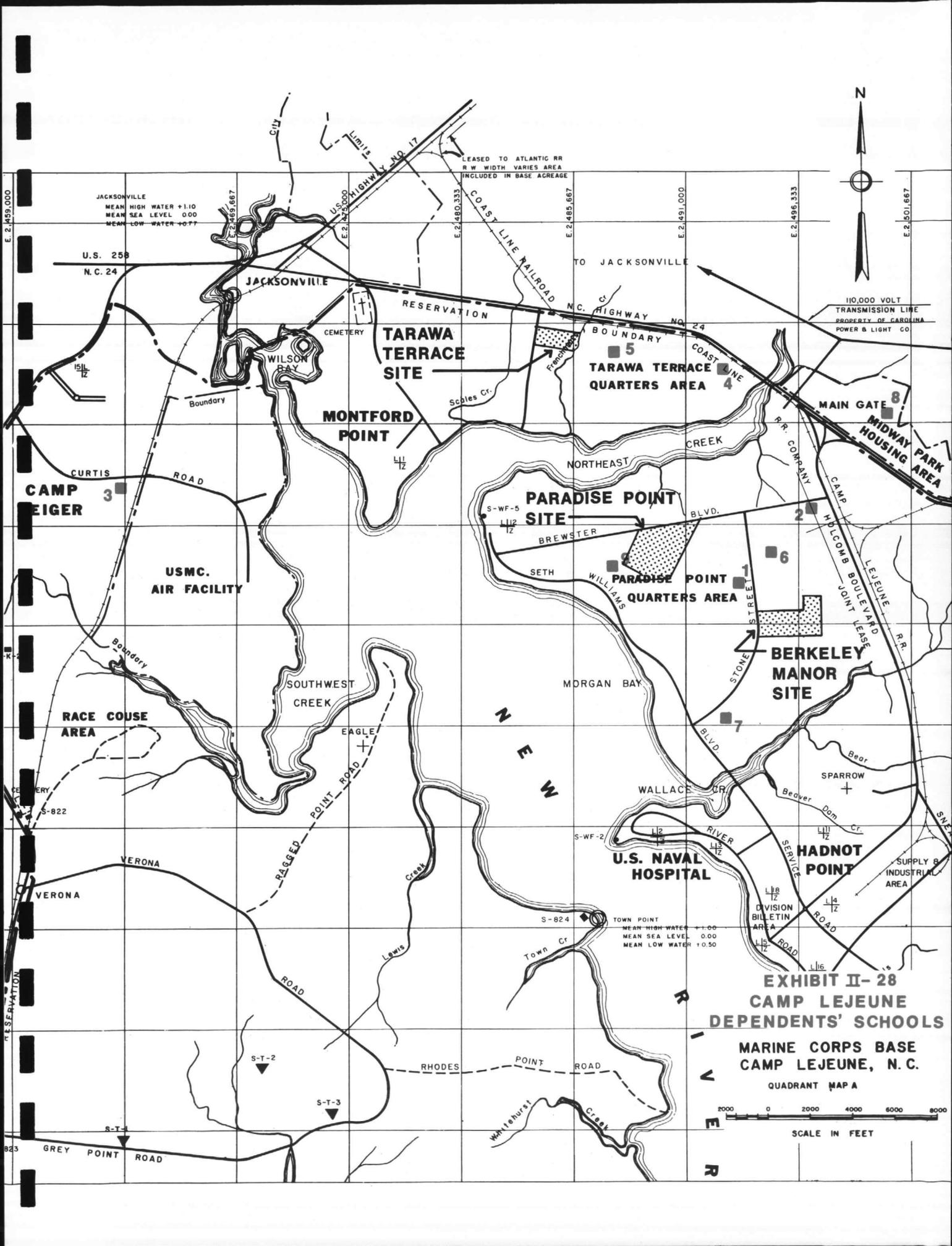
Military dependents living off base attend Onslow County Schools.

Practically, there are no dependents living on-base that attend county schools. For each military dependent attending county schools, H. E. W. provides impact aid of \$231.64 per pupil. The total cost per child,

Key to Exhibit II-28

<u>Map No.</u>	<u>School</u>
1	Lejeune High School
2	Brewster Jr. High
3	Defalio
4	Tarawa Terrace I
5	Tarawa Terrace II
6	Berkeley Manor
7	Stone Street,
8	Midway Park Elementary
9	Pre-School Program Schools





JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER +0.77

LEASED TO ATLANTIC RR
 R.W. WIDTH VARIES AREA
 INCLUDED IN BASE ACREAGE

U.S. 258
 N.C. 24



110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO.

JACKSONVILLE

TARAWA
 TERRACE
 SITE

TARAWA TERRACE
 QUARTERS AREA

MONTFORD
 POINT

PARADISE POINT
 SITE

PARADISE POINT
 QUARTERS AREA

MIDWAY PARK
 HOUSING AREA

CAMP
 EIGER

USMC.
 AIR FACILITY

BERKELEY
 MANOR
 SITE

RACE COUSE
 AREA

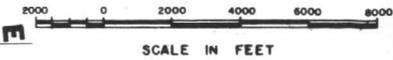
U.S. NAVAL
 HOSPITAL

HADNOT
 POINT

EXHIBIT II-28
 CAMP LEJEUNE
 DEPENDENTS' SCHOOLS

MARINE CORPS BASE
 CAMP LEJEUNE, N.C.

QUADRANT MAP A



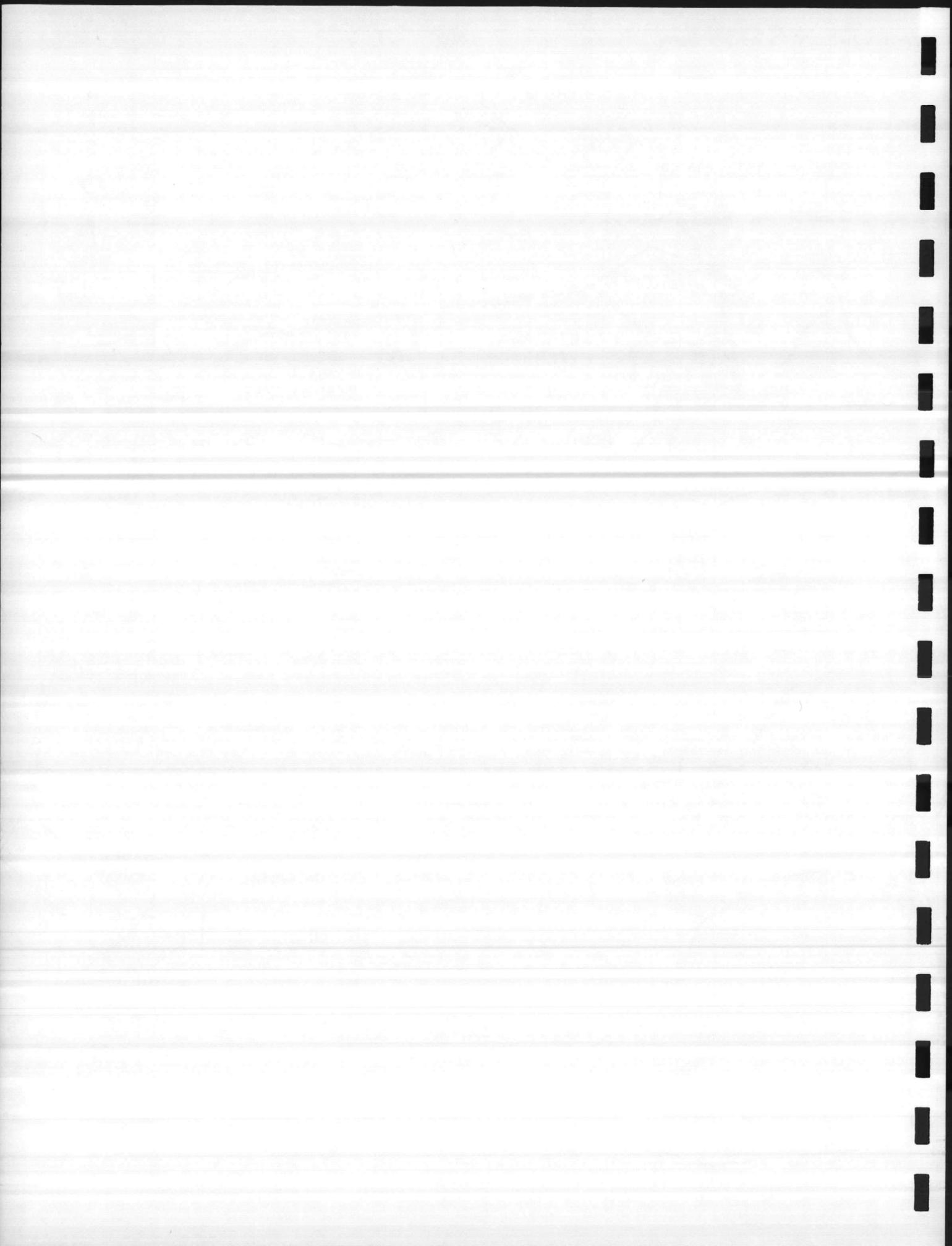
SCALE IN FEET

R
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825



which presently exceeds \$800 per pupil is derived principally from state funds and local property taxes. In Onslow County the majority of military families living off base own their homes and pay property taxes. Military families are exempt from personal property taxes however if they are not legal residents of Onslow County.

The number of military dependents attending county schools is not expected to change significantly as a result of the proposed action.

Continuing Education

Continuing education services and facilities are excellent at Camp Lejeune and the Base Education office is continually scheduling and improving a variety of courses which range from high school equivalency courses through college level work. Courses are offered through four different institutions: East Carolina University Continuing Education Center (on-base), Coastal Carolina Community College (in Jacksonville), the Base Learning Center, and the Armed Forces Institute correspondence courses. Most of these courses are offered on the base. The federal government will normally cover 75% of the cost of those courses which are not offered free.

Library

The base maintains a central library and two branch libraries which together contain over 50,000 volumes. The library will attempt to provide any book specifically requested.

TABLE II-10
 ONSLOW COUNTY SCHOOL - NOV. 1974

<u>SCHOOL</u>	<u>GRADES</u>	<u>AVERAGE DAILY MEMBERSHIP</u>
Bell Fork	4-6	499
Blue Creek	K-6	643
Clyde Erwin	K-3	475
Dixon	K-8	998
Dixon High	9-12	456
Jacksonville Jr.	9-12	843
Jacksonville Sr.	10-12	1604
Morton	K-6	681
Northwoods	1-6	506
Northwoods Park	7-9	979
Parkwood	1-6	420
Richland	K-5	875
Richland High	9-12	590
Silverdale	1-3	206
Summersill	K-6	473
Swansboro	1-3	435
Swansboro Middle	4-6	510
Swansboro High	7-12	982
Tabernacle	4-8	777
Thompson	K-6	580
Trexler	608	585
White Oak High	9-12	916
		<u>15,033</u>

K. COMMUNITY FACILITIES

1. Existing Fire Protection

Fire protection at Camp Lejeune is provided by a base fire department. There are nine fire stations strategically located throughout the base in order to minimize running distances and time. All stations are manned full time and all are equipped with fire fighting equipment. While all stations respond to a fire anywhere on base if needed, only the station closest to the fire normally responds.

The Navy has Prescribed Running Distances (maximum distance from fire house) which they use as a guide for locating fire stations. For single family detached residential areas the running distance is 5 miles and for multi-family housing projects a running distance of 3 miles is used.

For the two sites located in Paradise Point and Berkeley Manor three fire stations are well within the 3-mile running distance and a fourth is just on the limit of the 3-mile radius. See Exhibit II-29.

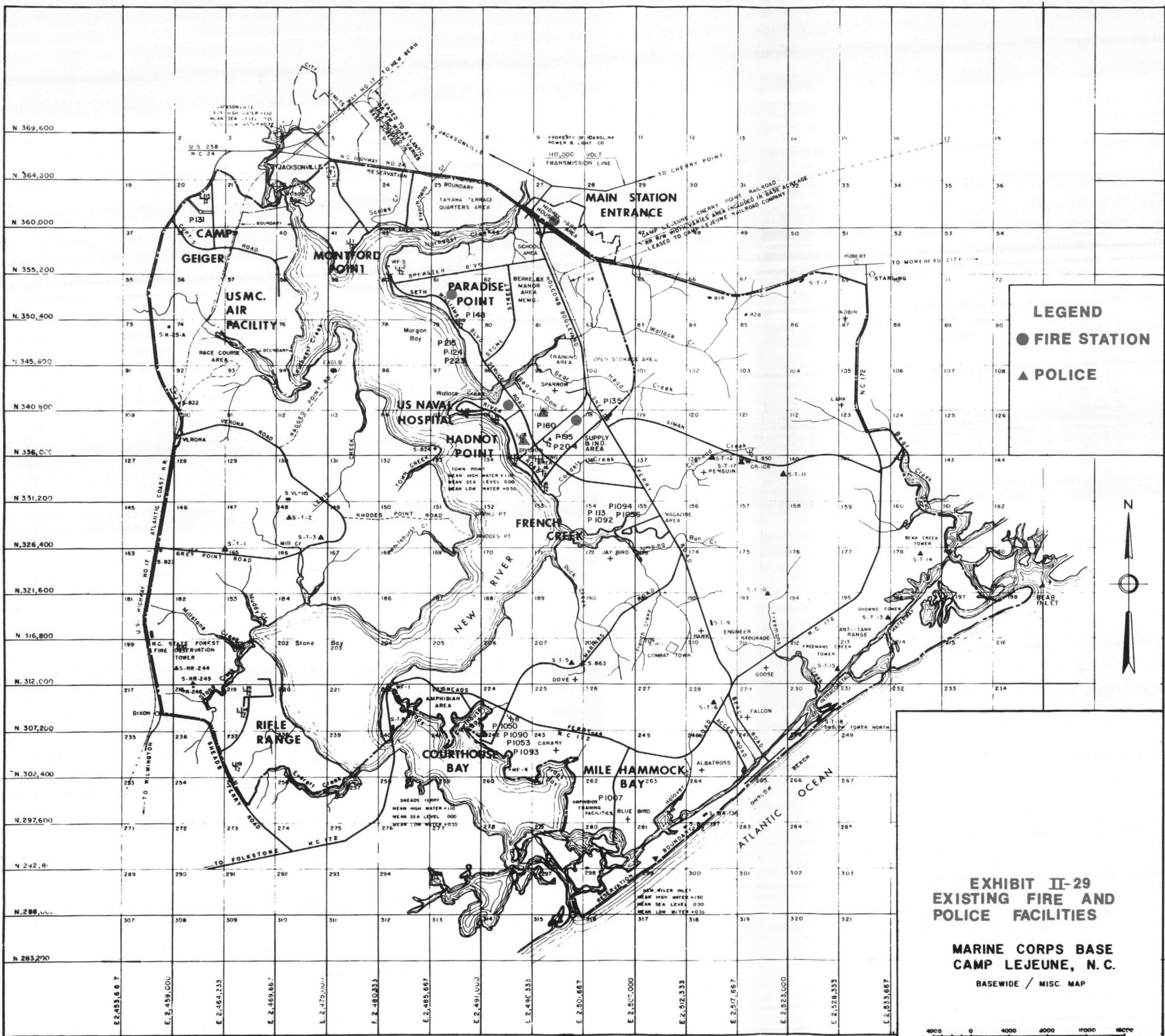
The Charles Street Station is only 250 feet from the southwest corner of the Paradise Point site. This station is equipped with two 750 gal. / min. pumpers. There are ten firemen permanently assigned to this station, four of which are on duty at all times.

The Midway Park Station is located in Midway Park just opposite the main gate. This station is equipped with one 750 gal./min. pumper and one 500 gal./min. forestry pumper. The forestry pumper is different from other pumpers in that it carries more capacity on the truck itself than does the standard pumper. Fourteen persons are assigned to this station with five on duty at all times.

The third station within the three mile limit of the proposed housing sites is the main station. Here a fourteen man staff has two 750 gal./min. pumpers and a first-aid truck. Five persons are on duty continually.

The Holcomb Boulevard Station is the most remote of the four which might serve the family housing area. There are two 750 gal./min. pumpers and one 500 gal./min. forestry pumpers here; twelve persons are permanently assigned, and five are on duty at all times.

The Tarawa Terrace Site is served by the Midway Park Station which is within the three-mile limit. The second closest station serving this site is the Charles Street station. This station, however, is approximately five miles from the site.

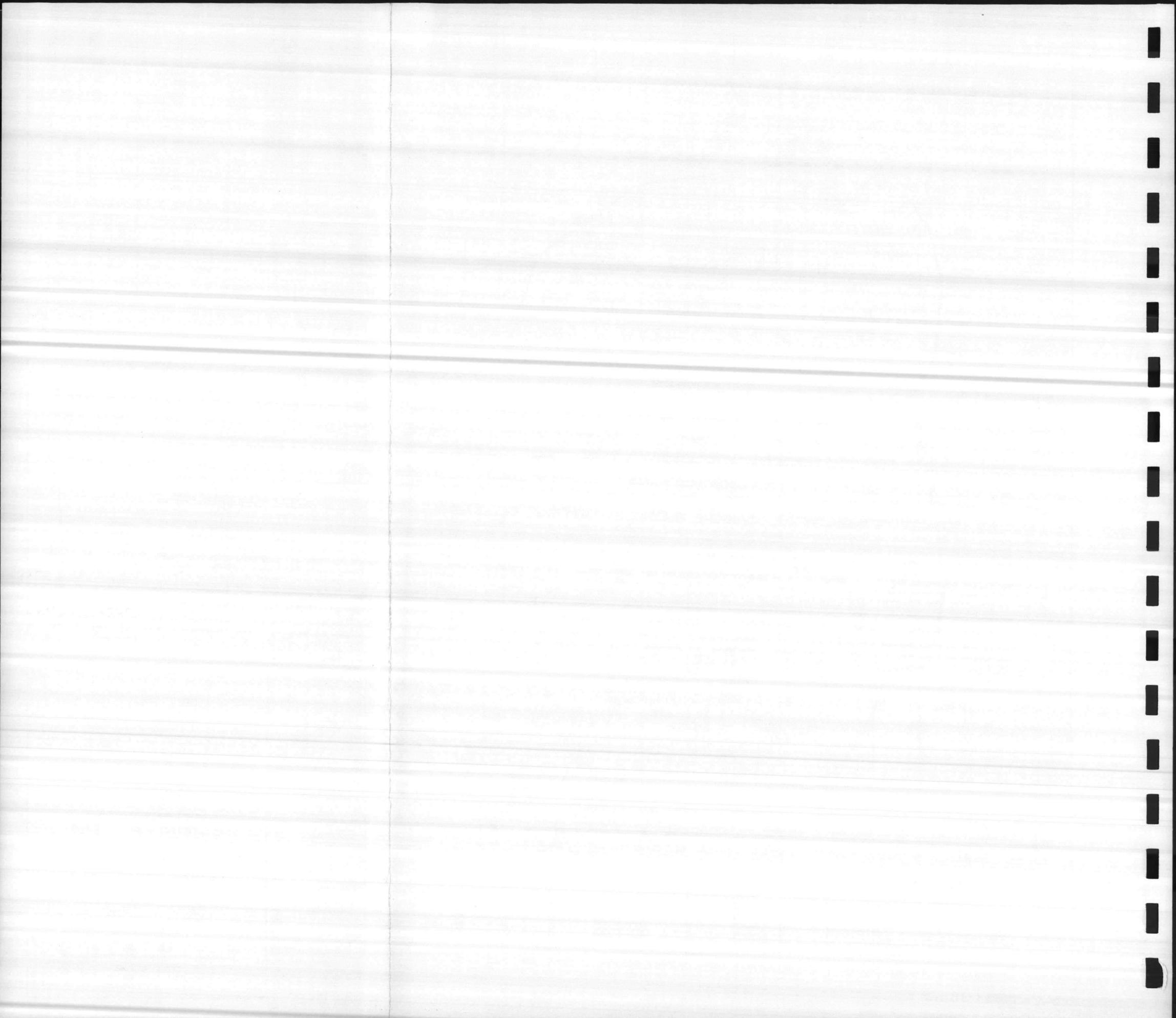


LEGEND
 ● FIRE STATION
 ▲ POLICE

**EXHIBIT II-29
 EXISTING FIRE AND
 POLICE FACILITIES**

**MARINE CORPS BASE
 CAMP LEJEUNE, N. C.**
 BASEWIDE / MISC. MAP

0 4000 8000 12000 16000
 SCALE IN FEET



2. Existing Police Protection

Police protection for all personnel and all areas of the base is provided by the Camp Lejeune Military Police. Therefore, protection at the proposed sites would be under the jurisdiction of this agency.

The headquarters and nearest station to the sites is located in Building 37, Virginia Dare Drive, in the Hadnot Point area. Driving time from this station to the Paradise Point and Berkeley Manor housing area is only 5-6 minutes; to the Tarawa Terrace site the time is approximately 10 minutes.

There are mobilized patrols which periodically traverse the housing areas and are on immediate call. There are also military police located at the main gate and other gates and posts throughout the base which could respond to emergency calls.

3. Recreation Facilities

Existing recreational facilities at Camp Lejeune are shown in Exhibit II-30. The main base housing area, Paradise Point, contains the majority of recreational facilities. Virtually all these facilities are within a convenient 10-15 minute drive from Paradise Point. Traveling time for the Tarawa Terrace, Midway Park and Knox Trailer Park occupants, which comprise 63% of the base family population, is between 15-25 minutes.

All the facilities described below are available to military personnel, their dependents and bonafide guests. Reasonable fees are charged for membership in special purpose clubs and for the rental of equipment.

Horseback riding from the Base Stables, near the Berkeley Manor housing area, is available daily. Approximately forty horses and 10 ponies are available for riding and trail riding on the many trails winding through the main base housing area. Instruction and rental stalls for private horses are also available.

The Wallace Creek Boathouse at the Gottschalk Marina offers boats, sailboats and canoes for recreation on Wallace Creek and New River. Additionally a boat hobby shop can be used to maintain private boats. The Lejeune area abounds in boating and fishing facilities.

Two eighteen hole golf courses on the north western peninsula (Paradise Point) of the family housing area are available for daily use. A golf pro, pro shop and driving range complement these courses.

Tennis courts are available in the various locations throughout the base; a tennis center on River Road with eight courts is the largest.

Play fields including baseball, softball, football and volley ball are available to all housing areas. Picnic facilities are available at Hospital Point on Wallace Creek.

As mentioned above Onslow Beach is approximately a 30 minute drive from the main base housing area. Swimming, camping and fishing facilities are available. Deep sea fishing boats operate out of Swansboro, Sneads Ferry and Surf City. Located nearby in Swansboro is the Hammocks Beach State Park, an island of 894 acres offering swimming and camping.

Varied other recreational facilities are located in Camp Lejeune with most concentrated in the Hadnot Point Base Headquarters area. These facilities include: several movie theaters including a drive-in theater; varied club and hobby shops including Ceramics, Woodshop, Rod & Gun Club, Ecology Club, Flying Club, Auto Shops, Skeet and Trap Shooting and a bowling center with 32 lanes. The Midway Park, Tarawa Terrace and Knox Trailer Park housing area have community centers which offer special classes, assorted crafts, and special events.

4. Existing Health Facilities

Medical and dental services are provided to personnel and their dependents through dispensaries, the Naval Hospital, the family out-patient clinic at the hospital and dental clinics. The services available to families to be housed in the proposed units are:

The Naval Hospital, a 500 bed hospital which serves all local eligible military personnel including those retired, is located at Hospital Point. This location is readily accessible to the Paradise Point housing area and approximately a twenty minute drive from the proposed Tarawa Terrace site. The hospital offers full services and specialized diagnostic studies, care and treatment.

The dependents out-patient clinic located within the hospital will be available and convenient to the occupants of the proposed new housing.

The main dispensary located in the Hadnot Point area provides all routine health care services to active duty personnel. This dispensary is within a 15 minute drive from the proposed Paradise Point sites and 20 minutes from the Tarawa Terrace site. Dental clinics for service personnel and emergency dependent use are located at the Tarawa Terrace Shopping Center and in the Hadnot Point area, convenient to both proposed housing sites.

5. Existing Shopping Facilities

Shopping facilities are shown in Exhibit II-30. Available facilities are located (A) on-base in the Hadnot Point Area and at the Tarawa Terrace Shopping Center (B) along Highway 24 from the Lejeune Main gate west to Jacksonville and (C) in the Jacksonville central business district.

A. On-Base Shopping Facilities are concentrated at Hadnot Point where the Main exchange and Commissary are located. These two facilities along with a bank, gas station, cleaners, beauty shop, alteration shop offer all items available in a small modern department store and supermarket.

Tarawa Terrace contains a neighborhood shopping center which offers a food store (commissary), gas station, bank, beauty shop, barber shop, laundrymat and several specialty stores.

B. Shopping Facilities available on Route 24, the northern boundary of the Tarawa Terrace housing area are varied and typical of strip commercial zones; restaurants, gas stations, automobile sales and repair, furniture stores, and the like. A shopping center on Western Boulevard opposite the Tarawa Terrace II area and another, the New River Shopping Center, located two miles west and just inside the Jacksonville City limits offer food, drugs, clothing, banking and a variety of specialty shops.

C. The Jacksonville Central Business District (CBD) is oriented towards clothing, recreational facilities and small variety stores. Marine family shopping is not significant in the CBD.

Key to Exhibit II-30

EDUCATION:

1. Library
2. East Carolina University - Extension
3. Base Learning Center

SHOPPING:

4. Main Exchange
5. Commissary Store and Shopping
6. Retail Shopping on Rt. #24

HEALTH:

7. Naval Hospital
8. Dependents Outpatient
9. Dispensary

RECREATION:

10. Golf Course
11. Boat House
12. Stable
13. Onslow Beach & Camping
14. Hadnot Point Area: bowling, theaters, pool, ceramics

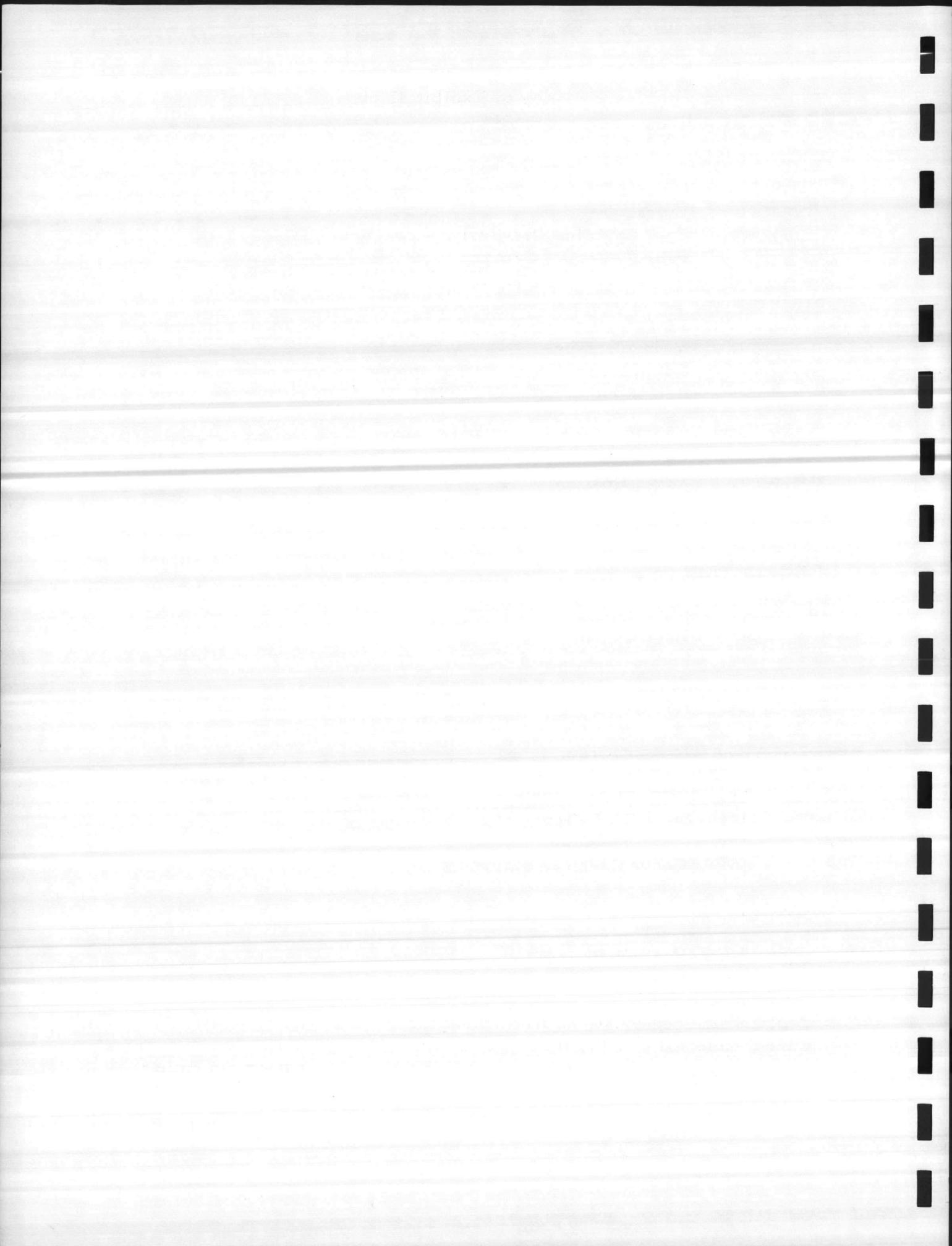
RESTAURANTS & SOCIAL

15. NCO Club
16. Staff NCO Club
17. Officer's Club
- [6] Convenience Restaurants

OTHER:

18. Post Office
19. Bus Station

Also at scattered locations throughout the base there are ballfields, tennis courts, handball courts, theaters, activity clubs, auto body shops and a variety of other indoor and outdoor recreational facilities too numerous to list.



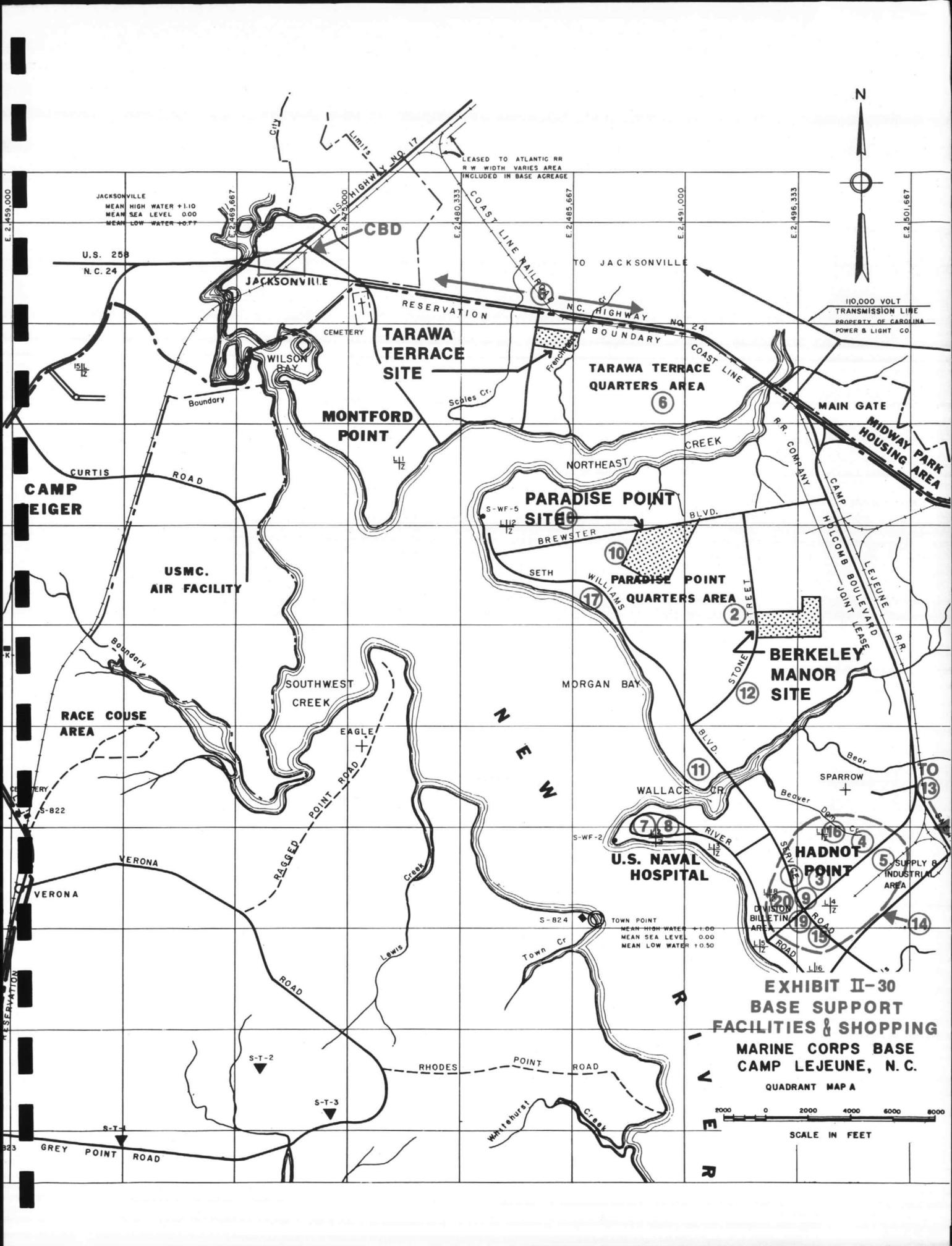


EXHIBIT II-30
BASE SUPPORT
FACILITIES & SHOPPING
MARINE CORPS BASE
CAMP LEJEUNE, N. C.
 QUADRANT MAP A



JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER +0.77

TOWN POINT
 MEAN HIGH WATER +1.00
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER +0.50

LEASED TO ATLANTIC RR
 R.W. WIDTH VARIES AREA
 INCLUDED IN BASE ACREAGE

110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO.

E. 2,489,000
 E. 2,491,000
 E. 2,493,000
 E. 2,495,000
 E. 2,497,000
 E. 2,499,000
 E. 2,501,000
 E. 2,501,667

U.S. 258
 N.C. 24

TO JACKSONVILLE

MAIN GATE

MIDWAY PARK HOUSING AREA

CAMP HILCOMB BOULEVARD JOINT LEASE

LEJEUNE R.R.

TO 13

SUPPLY & INDUSTRIAL AREA

TO 14

TO 15

TO 16

TO 17

TO 18

TO 19

TO 20

N
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W

R
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V
E
R

CAMP EIGER

USMC AIR FACILITY

RACE COUSE AREA

VERONA

GREY POINT ROAD

MONTFORD POINT

TARAWA TERRACE SITE

TARAWA TERRACE QUARTERS AREA

PARADISE POINT SITE

PARADISE POINT QUARTERS AREA

BERKELEY MANOR SITE

U.S. NAVAL HOSPITAL

HADNOT POINT

JACKSONVILLE
 CEMETERY

RESERVATION

BOUNDARY

Boundary

ROAD

Boundary

SOUTHWEST CREEK

RAGGED POINT ROAD

VERONA

S-T-2

S-T-3

RHODES

POINT ROAD

WANTHURST CREEK

S-824

TOWN CR.

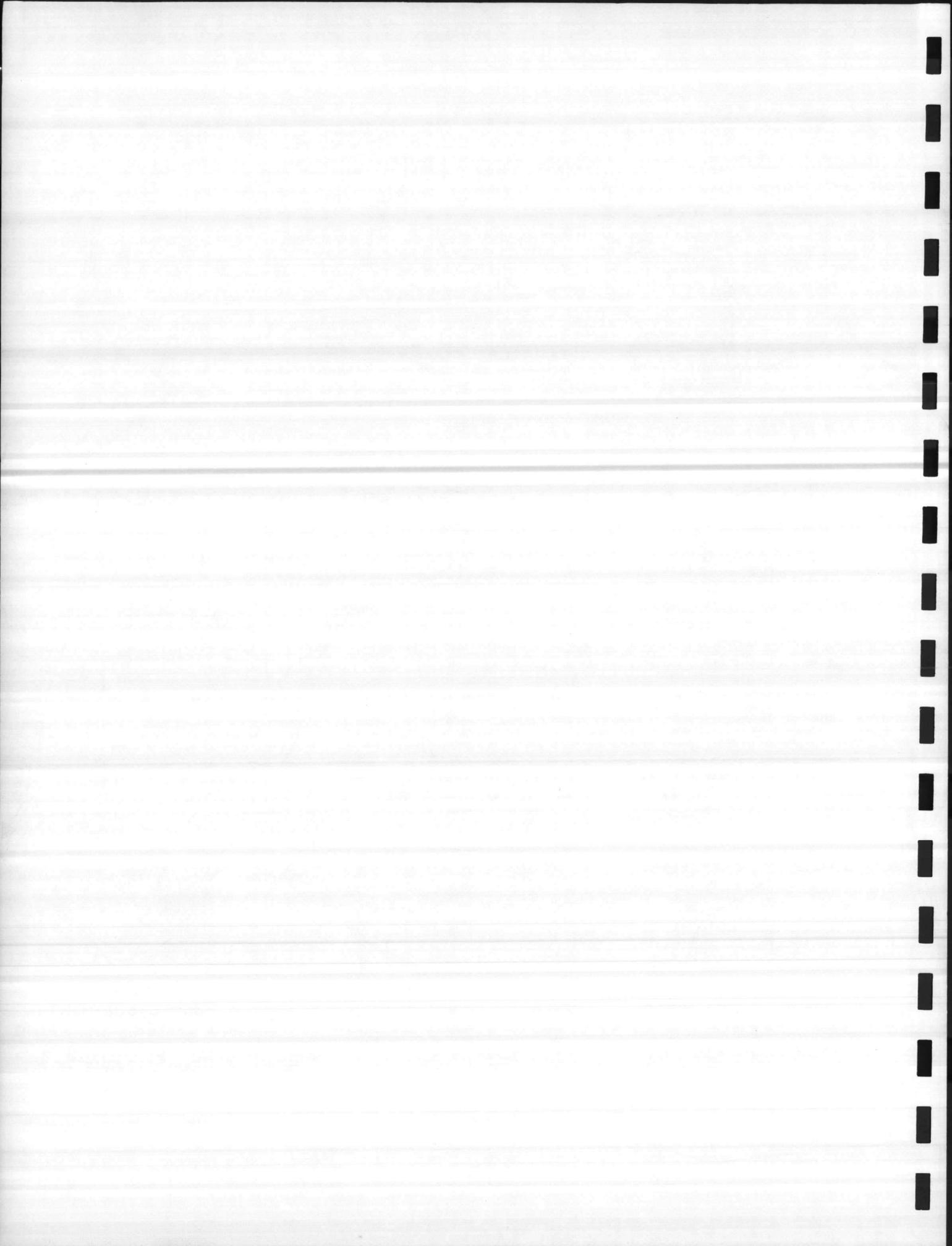
S-WF-2

WALLACE CR.

RIVER

S-WF-5

LI 12



L. TRANSPORTATION

1. Existing Arterial Traffic and Circulation

a. Tarawa Terrace

The Tarawa Terrace housing site is situated approximately 900' south of North Carolina Highway No. 24 which is the main thoroughfare between the Camp Lejeune area and Jacksonville and is also the coastal highway between Jacksonville and Morehead City. The 1974 average 24 hour day-all-vehicles-traffic volume along the Camp Lejeune stretch of the highway was approximately 36,000 vehicles in both directions. In 1977 the traffic passing the intersections of this site is expected to increase to 39,400 vehicles per day (based on the national average growth rate of 3 percent per year).

All access to the site will be from NC No. 24 at two locations. The western point of access will be along Knox Road, the road along the western boundary of the site, and can be utilized with little physical modification. This road will provide entry for approximately 75 percent of the traffic generated by the new housing.

Additional traffic generated along Knox Road comes from the Knox Trailer Park which lies to the south of the proposed site. Knox Trailer Park has spaces for 225 units of which 185 spaces are presently occupied. These units have an average occupancy of 3.6 persons. This occupancy will generate approximately 7.2 daily vehicle trips. The total trailer park

will therefore generate a total of 1,620 daily vehicle trips (225 x 7.2) or 125 trips at peak hourly volume (PHV) to and from the Trailer Park along Knox Road. (See Table II-11)

Entry on the east side will be from Tarawa Boulevard which will handle the remaining 25 percent of the generated traffic to the site. This roadway presently carries traffic from the existing Tarawa Terrace II development (950 dwelling units) estimated to be roughly 6800 vehicle trips per day or 524 PHV.

Although actual design capacities are not known, the dimensions and cross sections characteristics together with visual observations indicate that N. C. #24 should be able to carry 3000 vehicles per hour each way (2 lanes) and Bouganville and Knox Road should be able to carry 1200 vehicles per hour each way (1 lane).

b. Berkeley Manor

Access to the Berkeley Manor Housing site is via Stone Street and Delaware Street. On the north side Stone Street intersects with Brewster Boulevard, and on the south side Stone Street intersects with Seth Williams Boulevard. Stone Street presently carries all the traffic generated in the Berkeley Manor Area and around the school located across Stone Street from the Berkeley Manor Site.

With the average family size of 4.61 persons for the 677 units within Berkeley Manor, it is computed that there is a traffic volume of 5600 vehicle trips per day in both directions along Stone Street. With a 50% - 50% split this means that there are 2800 vehicles going in each direction along Stone Street. Other estimates along this street as well as traffic through the area generate an estimated 200 vehicles in each direction. The estimated peak hourly volume is therefore 231 vehicles.

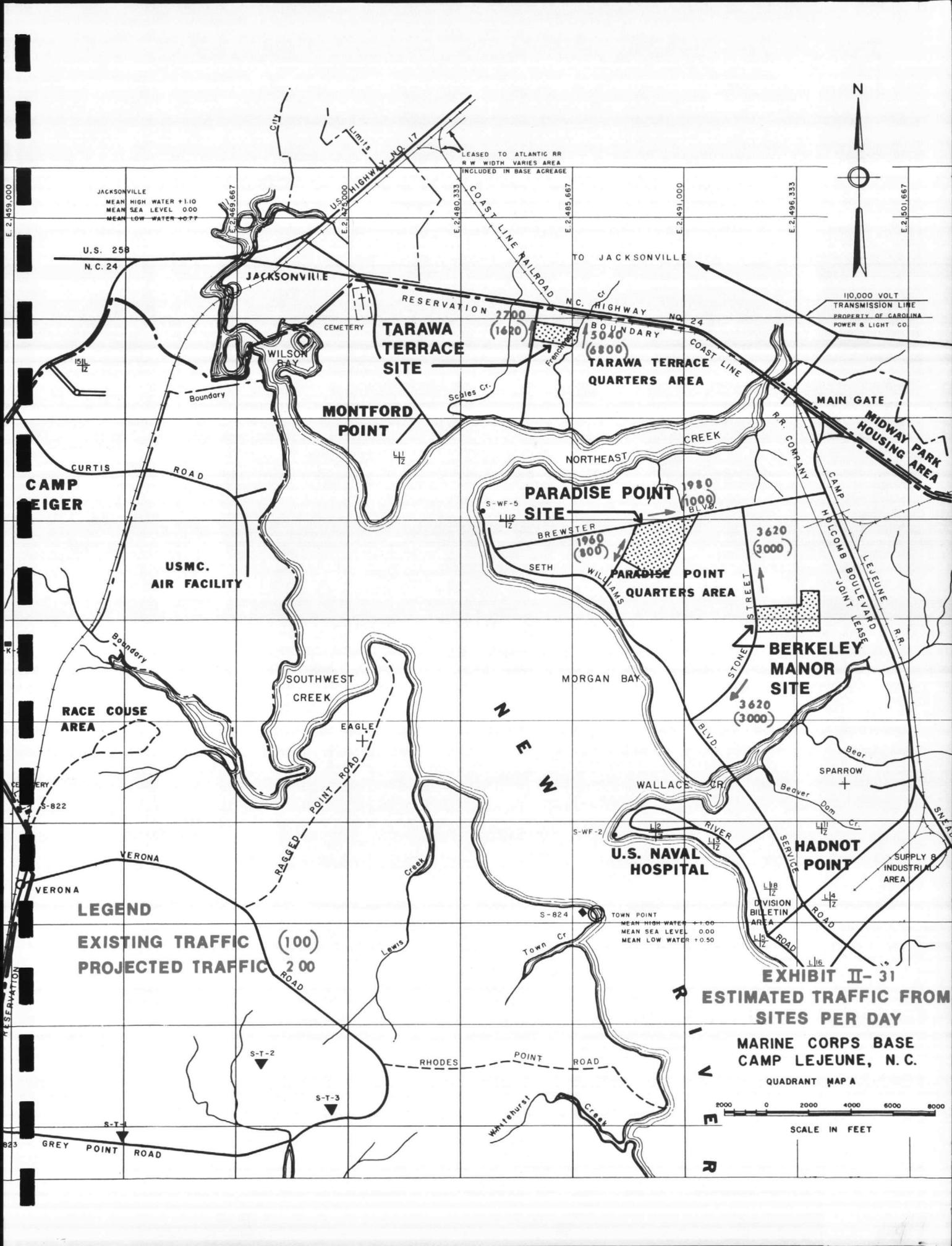
The two-lane streets adjacent to this site should, under existing conditions, be able to carry 1200 vehicles per hour each way.

c. Paradise Point

The access to the Paradise Point Housing Project is along Brewster Boulevard and Charles Street which intersects with Seth Williams Boulevard on the south. At the present there is very little traffic generated along Charles Street. This street is a connector between Brewster Boulevard and Seth Williams Boulevard and there is little development directly adjacent to the street. Some of the traffic generated along Charles Street comes from the child care center located on Charles Street at the southwest corner of the project site. The estimated traffic along Charles Street is 800 vehicles per day or 61 trips at peak hourly volume.

The estimated traffic load on Brewster Boulevard adjacent to the proposed site is 1000 vehicles daily or a PHV of 77 vehicles.

From visual observations it appears that the maximum capacity for both Brewster Boulevard and Charles Street, under existing conditions, should easily be approximately 1200 vehicles per hour in each direction.



JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.77

LEASED TO ATLANTIC RR
 R W WIDTH VARIES AREA
 INCLUDED IN BASE AGREEMENT

U.S. 258
 N.C. 24

110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO

JACKSONVILLE

TARAWA
 TERRACE
 SITE

TARAWA TERRACE
 QUARTERS AREA

MONTFORD
 POINT

PARADISE POINT
 SITE

PARADISE POINT
 QUARTERS AREA

BERKELEY
 MANOR
 SITE

HADNOT
 POINT

U.S. NAVAL
 HOSPITAL

CAMP
 MEIGER

USMC.
 AIR FACILITY

RACE COUSE
 AREA

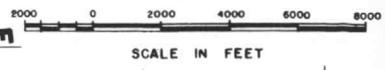
LEGEND

EXISTING TRAFFIC (100)
 PROJECTED TRAFFIC (200)

EXHIBIT II-31
 ESTIMATED TRAFFIC FROM
 SITES PER DAY

MARINE CORPS BASE
 CAMP LEJEUNE, N.C.

QUADRANT MAP A



SCALE IN FEET

N
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 W

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 V
 E
 R

CITY

US HIGHWAY No. 17

COAST LINE RAILROAD

TO JACKSONVILLE

RESERVATION 2700 (1620)

BOUNDARY 5040 (6800)

COAST LINE

MAIN GATE

MIDWAY PARK
 HOUSING AREA

CURTIS ROAD

NORTHEAST CREEK

CAMP H.L. COMB
 JOINT LEASE
 LEJEUNE R.R.

BREWSTER 1960 (800)

STONE STREET
 BLVD.

MORGAN BAY

BEAR DAM

VERONA

SOUTHWEST CREEK

WALLACE CR.

SERVICE ROAD

U.S. NAVAL HOSPITAL

DIVISION BILLETIN AREA

SUPPLY & INDUSTRIAL AREA

RAGGED POINT ROAD

S-WF-2

TOWN POINT
 MEAN HIGH WATER +1.00
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.50

RHODES POINT ROAD

S-T-2

S-T-3

GREY POINT ROAD

WATERHURST CREEK

E. 2,459,000

E. 2,469,667

E. 2,470,000

E. 2,480,333

E. 2,485,667

E. 2,491,000

E. 2,496,333

E. 2,501,667

4-B

CE

CE

RESERVATION

823

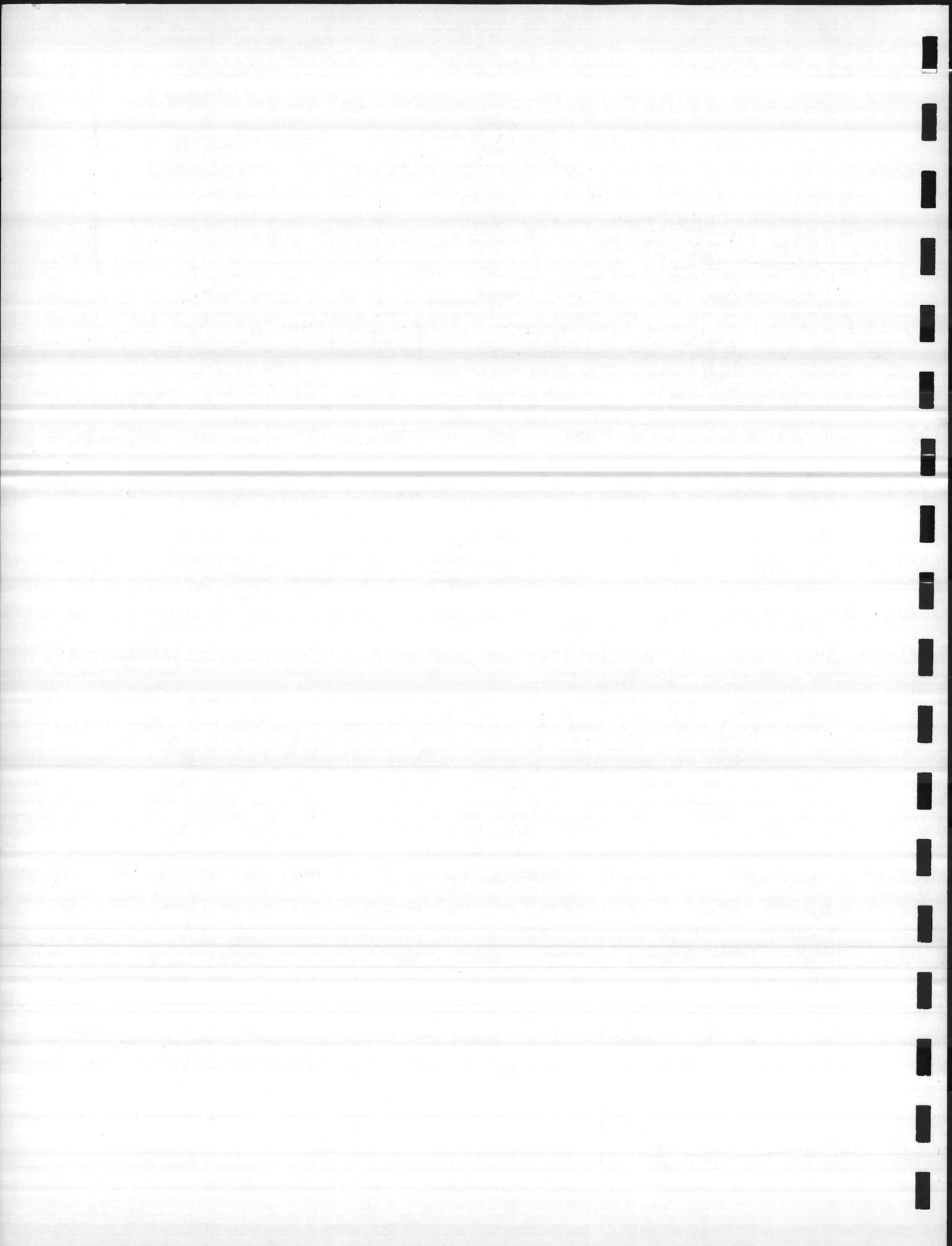


TABLE II-11

TRIP GENERATION BY FAMILY SIZE

<u>Family Size (Persons)</u>	<u>Daily Person Trips Per Household</u>	<u>Daily Vehicle Trips Per Household (75% of person trips)</u>
1	2.3	1.7
2	5.8	4.4
3	8.5	6.4
3.6 *	9.6 **	7.2
4 ****	10.3	7.7
4.61 ***	11.03 **	8.3
5	11.5	8.6
6 or more	12.9	9.7

PEAK HOURLY VOLUME (PHV)

The traffic volume on any street during the hour of highest use (generally 4 PM to 5 PM) can be determined by multiplying the total daily traffic by .0771.

*Tarawa Terrace Housing

**Interpolated Value

***Berkeley Manor Housing

****Paradise Point Housing

Simplified Methods for Major Street Planning, U. S. Department of Transportation, Federal Highway Administration, April, 1973.

2. Public Transportation

All of the sites under consideration are adequately served by the base bus system. There are four bus routes within the Camp and a shuttle bus throughout the Hadnot Point (main base) area. The four routes connect various points in the camp throughout the base to the base bus terminal which is located in Hadnot Point.

Bus route No. 2 serves the Tarawa Terrace housing area and bus route No. 3 serves the Paradise Point area, Berkeley Manor, and Tarawa Terrace. Bus route No. 2 makes only two stops daily in the Tarawa Terrace area; one at 5:10 AM and one at 6:25 AM. Bus route No. 3 makes five daily stops in Tarawa Terrace and four in the other two areas.

BUS ROUTE #3

<u>Paradise Point</u>	<u>Berkeley Manor</u>	<u>TT-1</u>	<u>TT-2*</u>
		0730	0735
		1130	1135
1205	1230		
		1330	1335
1405	1430		
		1530	1535
1605	1630		
		1730	1735
1805	1830		

*Denotes departure time at end of run from Tarawa Terrace II

There are presently ten stops in Paradise Point, eight in Berkeley Manor and ten in Tarawa Terrace.

Because these bus routes serve areas where the prime mode of transportation is the private automobile (especially Paradise Point and Berkeley Manor), four daily trips are sufficient to meet the demand.

In Tarawa Terrace where there are fewer private automobiles there is a need for two more trips than in the other areas.

The daily trips have been scheduled to serve the areas at times of peak demands. A recent count made over a six-day period, October 31-November 5, 1974, showed a total of 1029 passengers used Bus Route No. 3 and 1155 used Bus Route No. 2. Because no count was made based on stops or direction of travel it is not possible to determine just how many persons in the study area are riding the bus. The fact that these buses also serve other areas along the route means that there are many persons who ride the bus for a segment of the route only. Base personnel have indicated that the existing number of trips are adequate to serve the areas.

All of the bus routes originate and end at the bus terminal; therefore, it is possible to make connections with any bus in order to travel to any point throughout the base. It is also possible to make connections at the bus terminal with two civilian bus lines which connect Camp

Lejeune and the City of Jacksonville. The two lines, Continental Southeastern Lines, Inc., and Carolina Coach Company run a total of 28 daily round-trips between the base and the city.

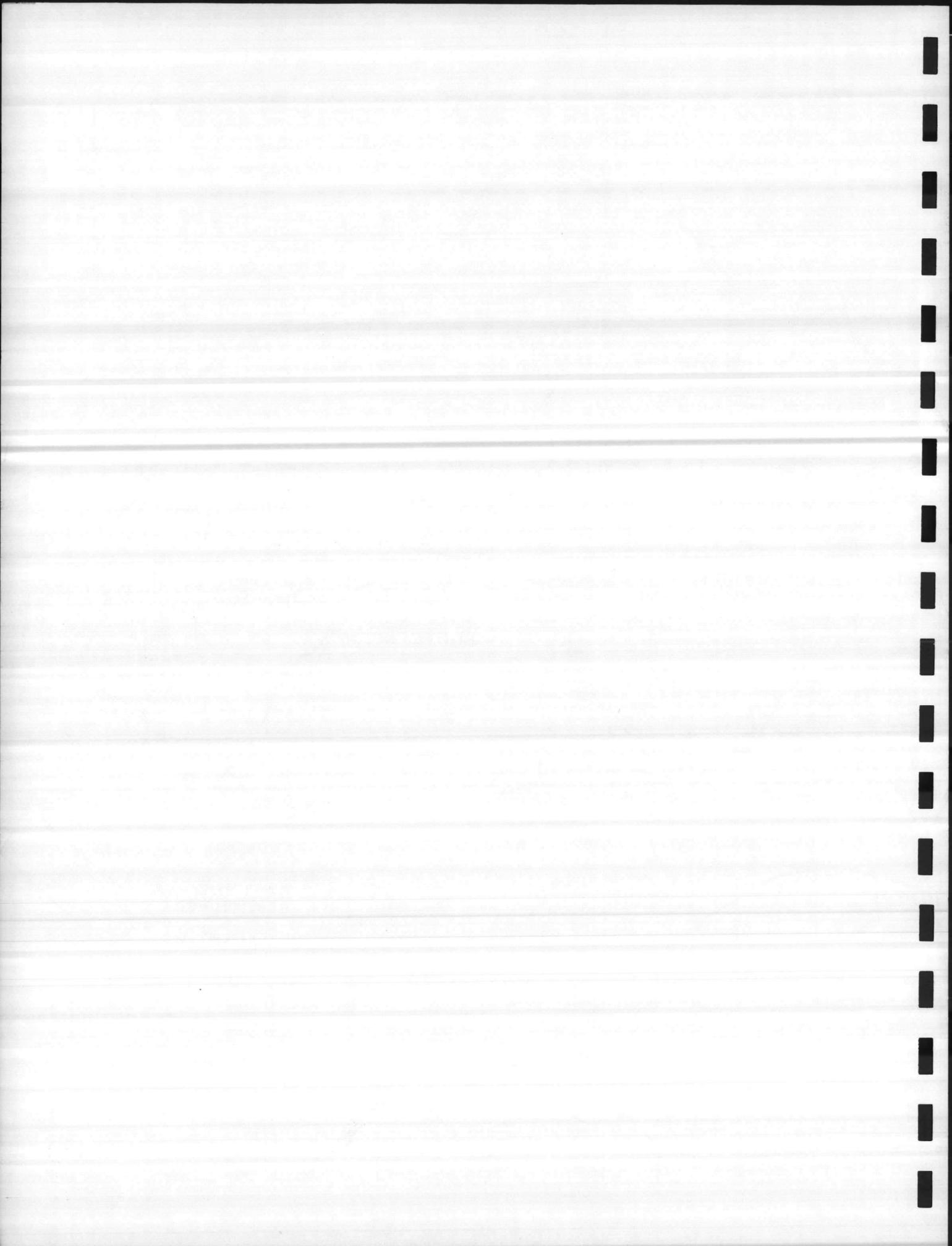
It should be noted that in the 1970 Master Plan for Camp Lejeune the problem of public transportation was addressed as follows:

" . . . a very significant portion of traffic in the Hadnot Point, Paradise Point, French Creek, and Hospital areas involved private vehicles used for both Military and personal purposes. . . . that short distance trips (within a geographical area or between two adjacent geographical areas) constituted a majority of the traffic problems.

Akin to the causes and effects of the traffic congestion in and around Hadnot Point are the parking problems caused by this intra-area vehicular traffic. The request for parking spaces, subsequently documented as Parking Needs, showed a duplication of needs because personnel needed a parking place both at their place of residence as well as at their place of work. Much of this problem cannot be alleviated; however, those enlisted personnel in the Hadnot Point/French Creek area apparently need some method of rapid transit to replace the needs of private vehicles, and at the same time, the system must be much less formal than the traditional taxi and bus service.

A system of mini-buses and/or mini-trains may well solve the traffic and parking problems. It is obvious that the availability of suitable land falls far short of providing for all of the parking areas requested, and needed, by the Activities. A preliminary system of open-type continuous loop operated vehicles could provide the best answer to this problem. "

No such rapid transit system has been installed to date. With the increase in the number of housing units in the Paradise Point and Berkeley Manor areas, the Master Plan recommendations become even more valid and should be pursued.



M. UTILITIES

1. Existing Water Resources

(a). Tarawa Terrace

The Tarawa Terrace site will be served by an existing water system which was built in the early 1950's to serve the original 2060 units of housing constructed at that time. This system is in poor condition and requires relatively high maintenance costs to keep it operational. A 6" water line is available within 500 feet of the site.

The existing water treatment plant which serves this area has a design capacity of 1 million gallons per day, and the wells from which the water supply is obtained have a maximum capacity of 1.5 million gallons per day. At present this plant has a peak demand of 1.2 million gallons per day during the summer. There is elevated storage capacity of 250,000 gallons for the Tarawa Terrace area. The service pumps for the distribution system have a pumping capacity of 3,100 gallons per minute.

The Montford Point system which is interconnected to the Tarawa Terrace system, is now operating at a capacity of 350,000 gallons per day. This is considerably below the plant design capacity of 750,000 gallons per day. The wells which supply the Montford Point plant are shallow wells and are only yielding approximately 400,000 gallons per day. The supply limits the capacity of the Montford Point Plant.

Both plants, the Tarawa Terrace water treatment plant and the Montford Point water treatment plant, have problems with the iron content of the water. Additional treatment equipment should be installed to alleviate the iron problem.

There is elevated storage capacity of 150,000 gallons for the Montford Point area, and a service pumping capacity of 2,750 gallons per minute.

(b). Paradise Point and Berkeley Manor

Paradise Point and Berkeley Manor are served by the Hadnot Point and the Holcombe Boulevard water treatment plants. These two plants are operating far below their designed capacity and can handle future expansion within the service area.

The Hadnot Point Plant located in building No. 20 has a design capacity of 5 million gallons per day. The present capacity of the wells supplying this plant is 5.5 million gallons per day. The present average demand on the plant is 3.5 million gallons per day with a peak demand of 4.8 million gallons per day. Storage for the Hadnot Point System consists of 3.25 million gallons of ground storage at the treatment plant and 1.2 million gallons of elevated storage. The distribution system service pumps have a total capacity of 7.500 gallons per minute. Under normal conditions this plant supplies water throughout the Hadnot Point complex including the Naval Hospital and

Paradise Point.

The other water treatment plant which also serves Paradise Point is the Holcombe Boulevard Plant which is located in building 670. This plant is a new facility and was added to relieve the demands on the Hadnot Point Plant. All of the housing in the Paradise Point area is served by the Holcombe Boulevard Plant. The distribution systems are interconnected and valved so that water from either plant can be directed to the Hadnot Point complex and all housing in Paradise Point. The Holcombe Boulevard plant has a design capacity of 2 million gallons per day. The present capacity of the supply wells are 2.3 million gallons per day. The present average demand on the plant is 0.85 million gallons per day with a peak demand of 1.5 million gallons per day. Elevated storage capacity for this system totals 700,000 gallons. Service pumping capacity totals 4,400 gallons per minute. Treated water storage at the Holcomb Boulevard plant totals one million gallons.

The combined design capacity of both plants is 7.0 million gallons per day with a combined present average demand of 4.35 million gallons per day. The total overhead tank capacity of both plants is 1.9 million gallons and the combined service pumping capability is 11,900 gallons per minute.

2. Electricity

High voltage lines (12470/7200 volts 3 phase) are, at present, available to all three proposed sites. Tarawa Terrace is served directly from C P & L lines who also has responsibility for service and maintenance right up to the housing units.

The other two sites, Berkeley and Paradise Point, are serviced from the Camp Lejeune High Voltage distribution system.

At the present time, plans are in process to modify and upgrade the 100 KV service from C P & L to 230-kv and to increase capacity of the entire 12,470 volt Camp Lejeune distribution systems estimated to be complete in 1976.

Economics

1. Present day costs (12-1-74)

<u>Fuel</u>	<u>Price</u>	<u>BTU'S</u>	<u>Cost per Mega BTU</u>
* Liquid Propane	\$. 207/gal	97,000	2.625¢
* #2 Fuel Oil	.34/gal	140,000	3.0¢
Electricity	.0215/kw hr	3,415	6.2¢

* 80% efficient

From the above, it can be concluded that under the present-day cost picture, liquid propane is the cheapest fuel and should be further evaluated in the design stages, taking into account initial costs for reworking the tank farm and installing pipe line distribution versus an oil tank installation for each housing unit. Electricity is not

recommended for heating purposes.

Telephones

Telephones on the base and at Tarawa Terrace are handled by Carolina Telephone and Telegraph. Both underground and overhead cables are present on the base.

3. Fuels

Natural Gas

Natural gas is not available at the Base in pipe lines

Liquidified Petroleum Gas

A portion of the housing at Tarawa Terrace II uses liquidified petroleum gas for heating; however, underground gas distribution lines are seriously deteriorated and any extension of the system would require extensive reworking of the tank farms and the underground pipe lines.

Fuel Oil

Number 2 fuel oil is used for heating throughout Berkeley Manor and Paradise Point. Some portions of Tarawa Terrace II, not using liquidified petroleum gas, use fuel oil for heating purposes.

Fuel oil is purchased in bulk quantities under government contract and stored on the base. Fuel oil deliveries are made by civilian oil jobbers under contract to Camp Lejeune.

4. Solid Waste Disposal

All solid wastes generated within Camp Lejeune are disposed of at the sanitary land fill located on Sneads Ferry Road between Lyman Road and Main Service Road. This area was selected by LANTDIV after required evaluation of watershed areas, drainage and other pertinent factors. The sanitary land fill area consists of approximately 1000 acres. The estimated life expectancy of this area, under present conditions, is 40 to 60 years.

In 1974, a total of 922, 598 cu. yds. (2957 cu. yds./day for a 6-day week of sanitary landfill) was buried. Of this total, 230, 650 cu. yds. was attributed to all the housing areas. All solid wastes from the housing areas are picked up by private contractors and delivered to the landfill area. Collections are made three times a week from each housing area.

The landfill is accomplished by the Trench and Cover method. This method requires that trenches be dug to accept the waste and immediately after filling, a dirt cover be placed over the fill. A 6" dirt cover is left on the fill at the end of each day and a final dirt cover of 2' - 6" thickness is left on the top of all fill.

The present base policy for disposal of debris from any demolition or construction site is for the private contractor to be responsible for disposing of the debris off-base. No wastes of this type are allowed

in the sanitary land fill area on-base.

The county's policy allows private contractors to use the county land fill areas free of charge. The closest county land fill area is on Peney Green Road but this area will soon be phased out. The closest county land fill area large enough to take the debris from the demolition of 500 dwelling units is the new Southwest Sanitary Land Fill site over 11 miles from the base. The county prefers however that solid wastes generated at the base be disposed of on-base rather than in the county.

5. Existing Sewer, Pumping and Treatment Facilities

(a). Tarawa Terrace II

The sewage treatment plant which serves Tarawa Terrace is a secondary treatment plant with a design capacity of 1.2 mgd which is presently treating an average daily flow of 0.73 mgd. Under construction at present is a new digester, four new drying beds and a chlorine contact chamber. These additions are to increase treatment efficiency at this plant and will not increase the plant capacity.

The plant was constructed in the early 1950's to handle the wastes of the community of 2060 units. There has been a decrease in the number of units served by the plant to 1843 units. The replacement units will not significantly affect the present load on the plant.

(b). Paradise Point and Berkeley Manor

The sewage disposal plant serving the Hadnot Point Area which also serves Paradise Point and Berkeley Manor is a secondary treatment plant with a design capacity of 8 million gallons per day. The plant is presently operating at a capacity of 5 million gallons per day. The conversion from a primary to a secondary treatment plant was completed about three years ago.

The Paradise Point area is served by three sewage lift stations which are located along the south side of Seth Williams Boulevard. Two of these stations have a capacity of 200 gpm and the third a capacity of 400 gpm. The site of development is served by an existing 15" sanitary sewer line along the Eastern boundary and can be served from the south by two 8" lines located behind the buildings along the street adjacent to the site.

Berkeley Manor is served entirely by a gravity flow system. There are sewer lines adjacent to the site from which service can be obtained. Along the South boundary of the site is a 10" line and along the Western boundary there are two 8" lines which may be used.

6. Drainage and Flood Control

Topographically the sites are very flat. They have no distinctive features that would require massive earth moving for construction and are reasonably well drained. The individual sites and their features are as described below:

(a). Tarawa Terrace

This site is approximately 20 feet above sea level and has no distinctive ridges. There is however a slight depression in the center of the site. A drainage channel exists along the eastern boundary of the proposed development. This channel provides drainage for the site and areas to the east and north of the site. Under Bouganville Drive there are two 48" pipes which carry drainage from north of the drive into the channel and a 36" pipe which carries drainage from the storm sewer system of the Tarawa Terrace II site into the channel.

Based on the topography and drainage pattern for the site, the approximate runoff, based on a 10-year storm, is estimated at 96 cfs. Exhibit II-35 illustrates the drainage pattern.

The existing channel along the eastern boundary of the site carries the storm water into Frenchman's creek, and thence into Northeast Creek which flows into New River.

The 100 year flood elevation is 9 feet above sea level. This site will not be effected since all elevations are above the 9 foot elevation.

(b). Berkeley Manor

This site is approximately 25 feet above sea level and has no distinctive features. There is, within the site, a slight ridge which has an elevation of 30 feet. A drainage swale extends into the site which will carry drainage from the site and from adjacent areas.

Based on the topography and drainage pattern for the site, the approximate runoff, based on a 10-year storm, is estimated at 810 cfs. Exhibit II-41 illustrates the drainage pattern.

The drainage swale which will carry the storm water from the site flows into Wallace Creek and thence into New River.

The 100 year flood elevation of 9 feet above sea level will not affect this site since all elevations are above 9 feet.

(c). Paradise Point

This site is approximately 15 feet above sea level, with the highest point reaching an elevation of 20 feet and the lowest point an elevation of 10 feet with the exception of a drainage swale when extends through the southwest corner of the site. Elevations in the vicinity of the swale

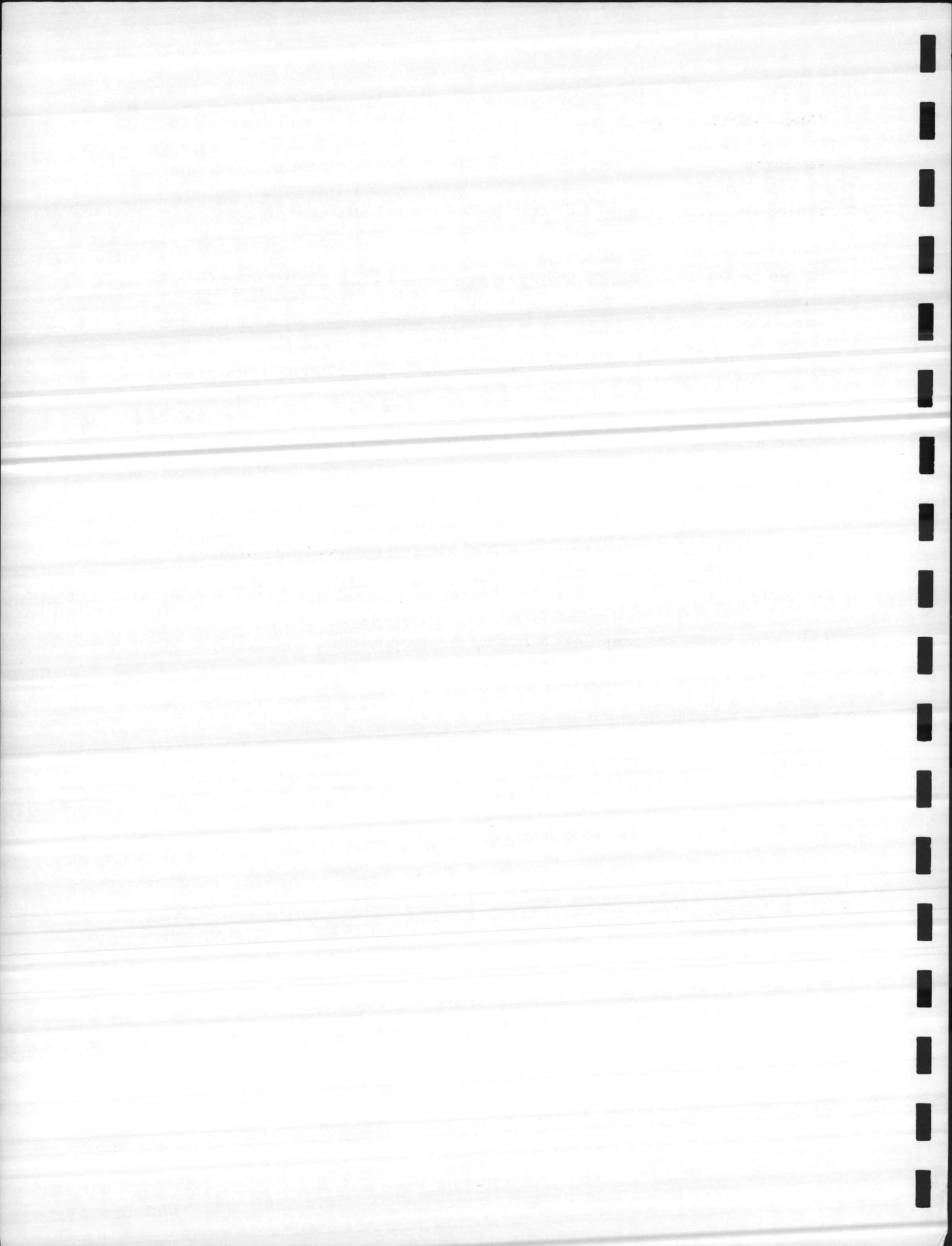
range between 8 to 10 feet in elevations. The site is drained to the swale by a series of channels extending out into the site. The channel drains through a single 48" pipe under a road adjacent to the site.

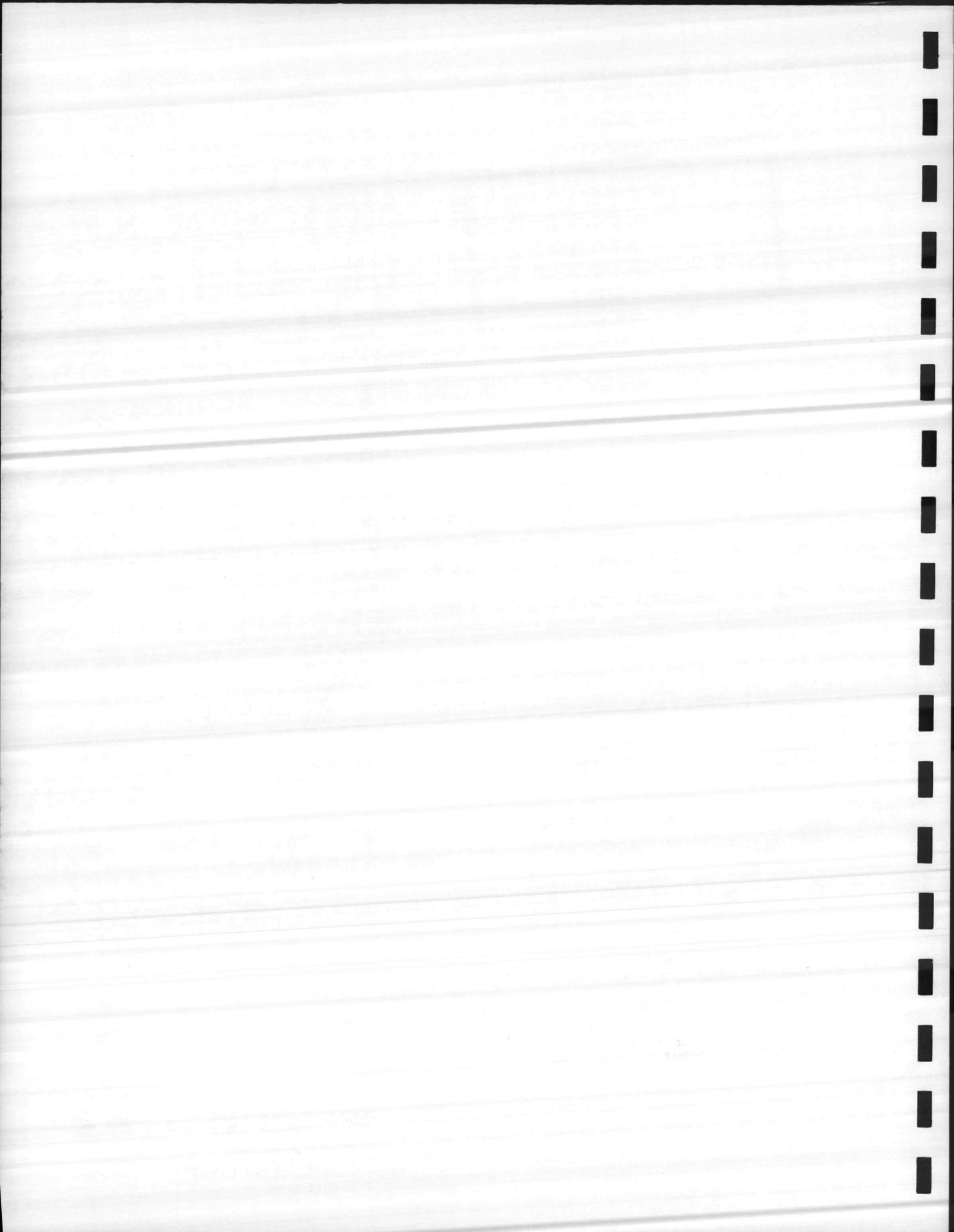
Based on the topography and drainage pattern for the site, the approximate runoff, based on a 10-year storm, is estimated at 189 cfs. Exhibit II-38 illustrates the drainage pattern.

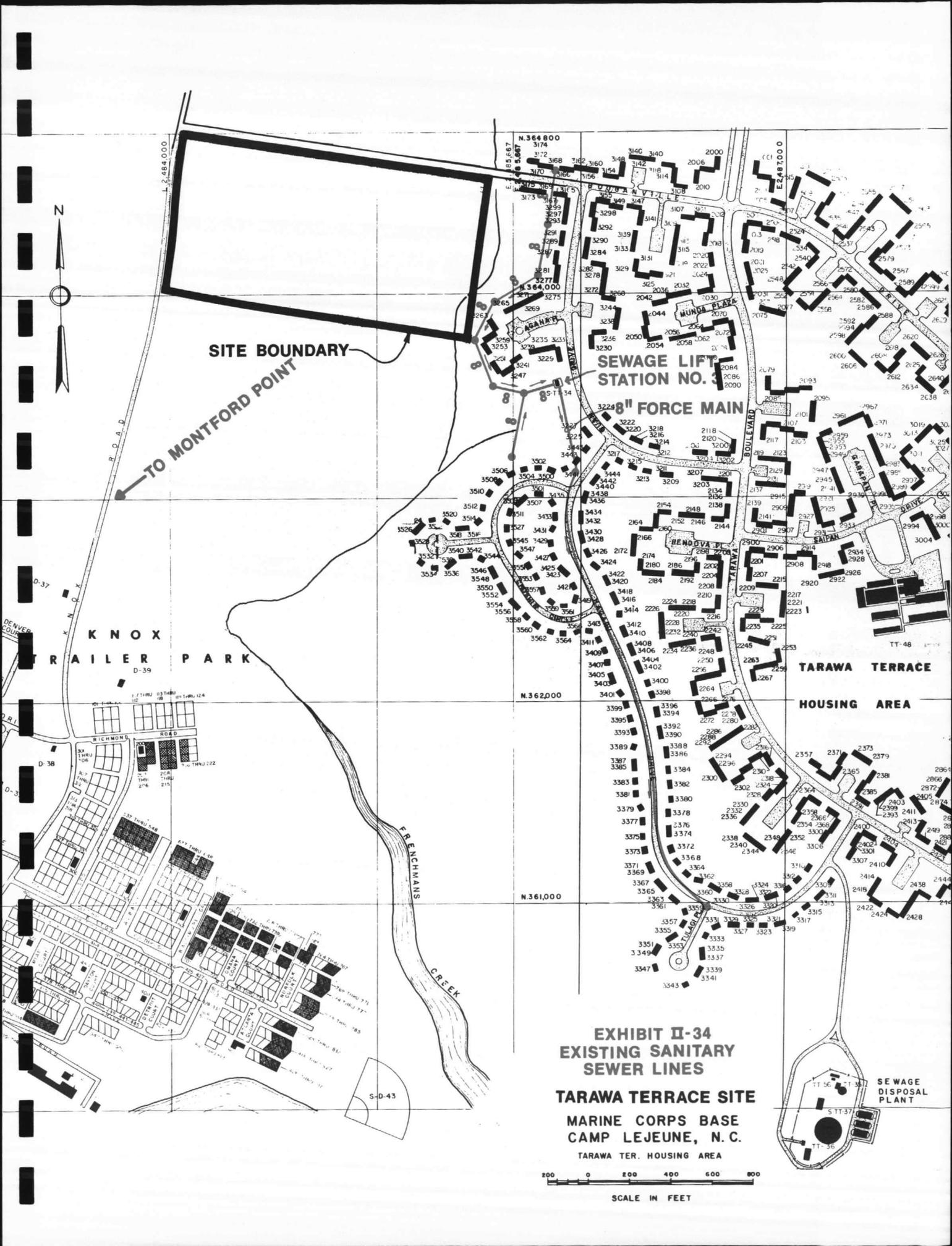
Drainage from the site flows into Whiteside Creek which flows into Morgan Bay and thence into New River.

The 100 year flood elevation is 9 feet above sea level and affects this site only in that elevations in the drainage channel are below 9 feet.

This area must be considered in any development.







SITE BOUNDARY

TO MONTFORD POINT

SEWAGE LIFT STATION NO. 1

32248" FORCE MAIN

KNOX TRAILER PARK

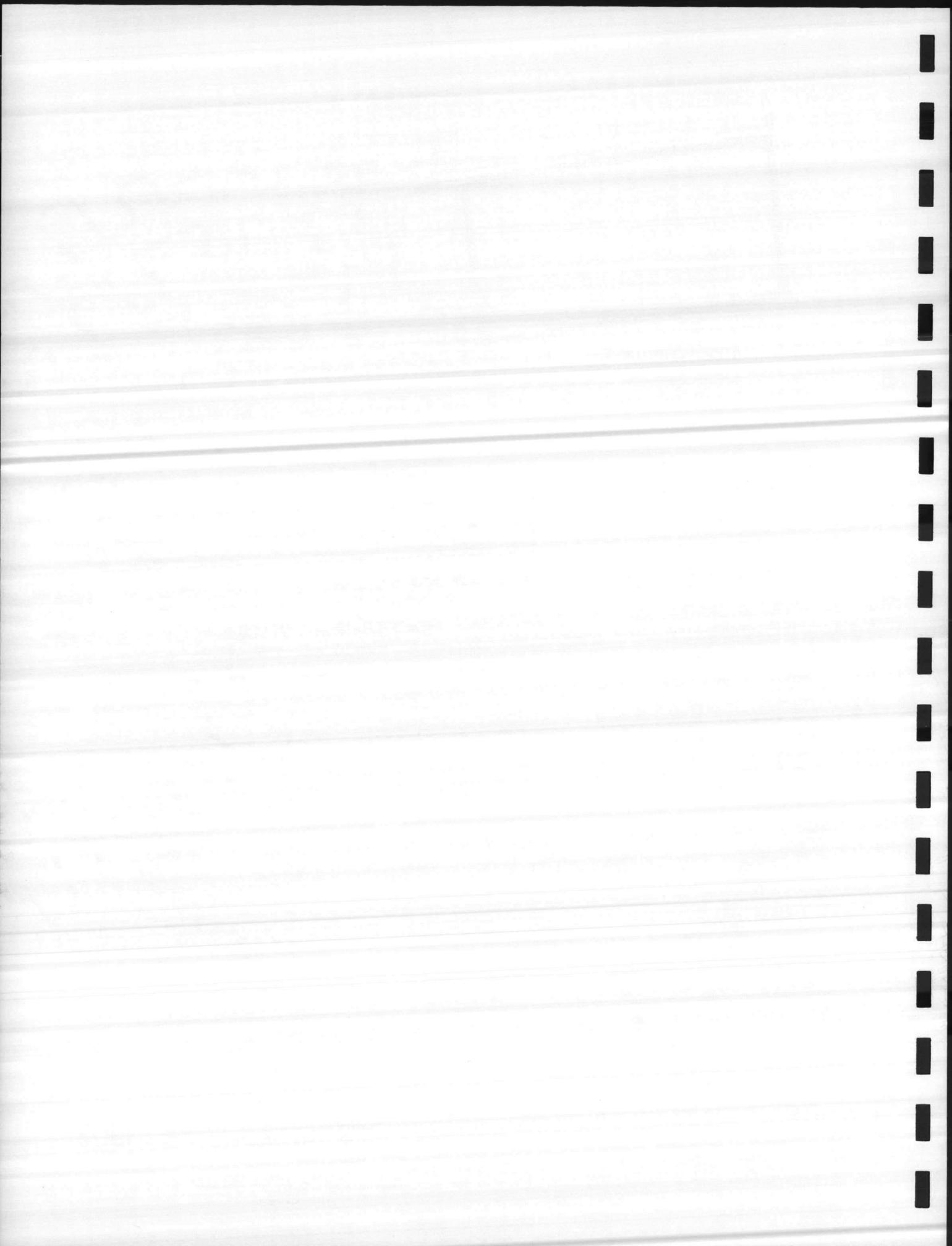
TARAWA TERRACE HOUSING AREA

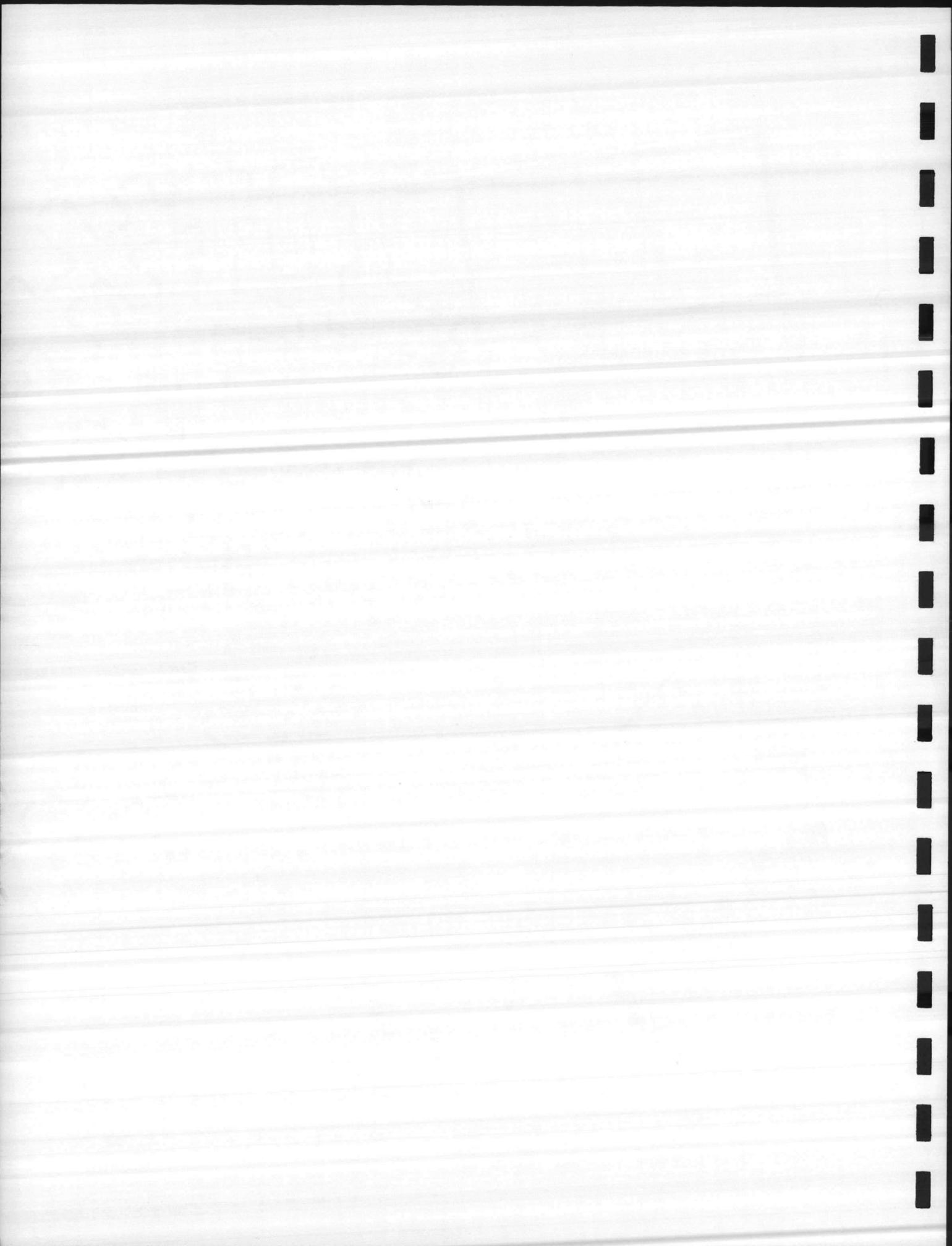
**EXHIBIT II-34
EXISTING SANITARY
SEWER LINES**

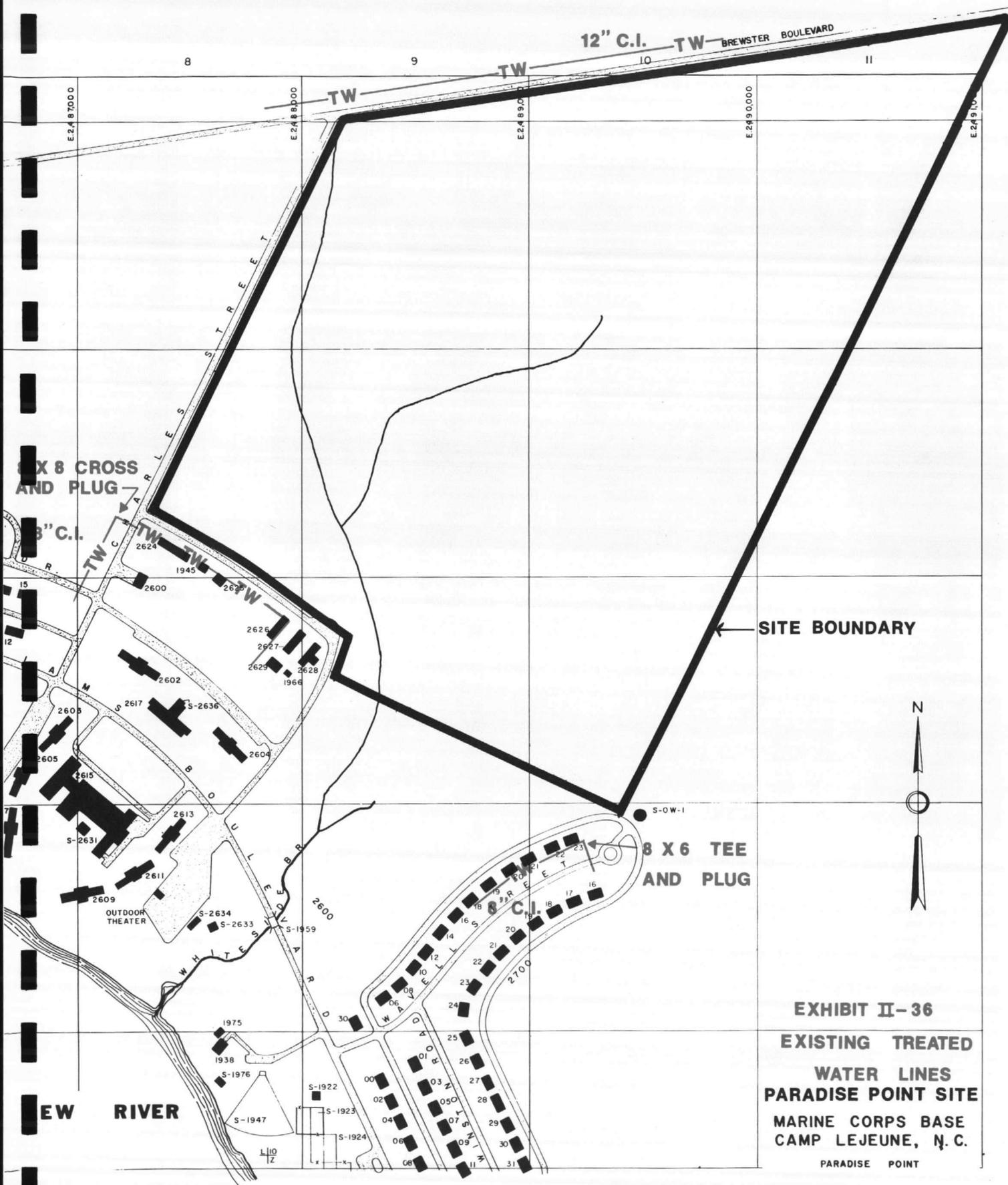
**TARAWA TERRACE SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
TARAWA TER. HOUSING AREA**

SEWAGE DISPOSAL PLANT









8 X 8 CROSS AND PLUG

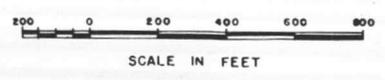
8" C.I.

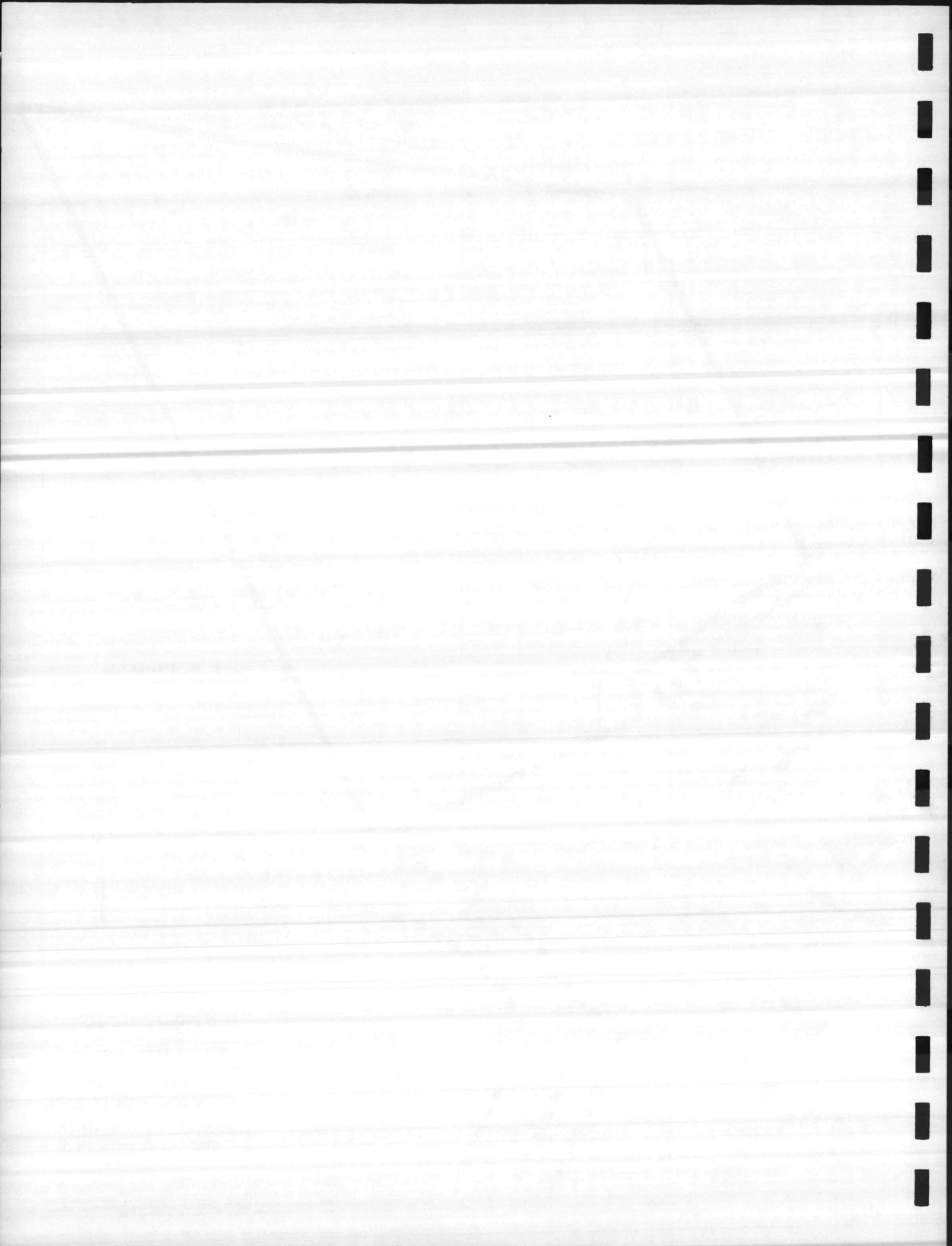
← SITE BOUNDARY

8 X 6 TEE AND PLUG



EXHIBIT II-36
EXISTING TREATED
WATER LINES
PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.
 PARADISE POINT





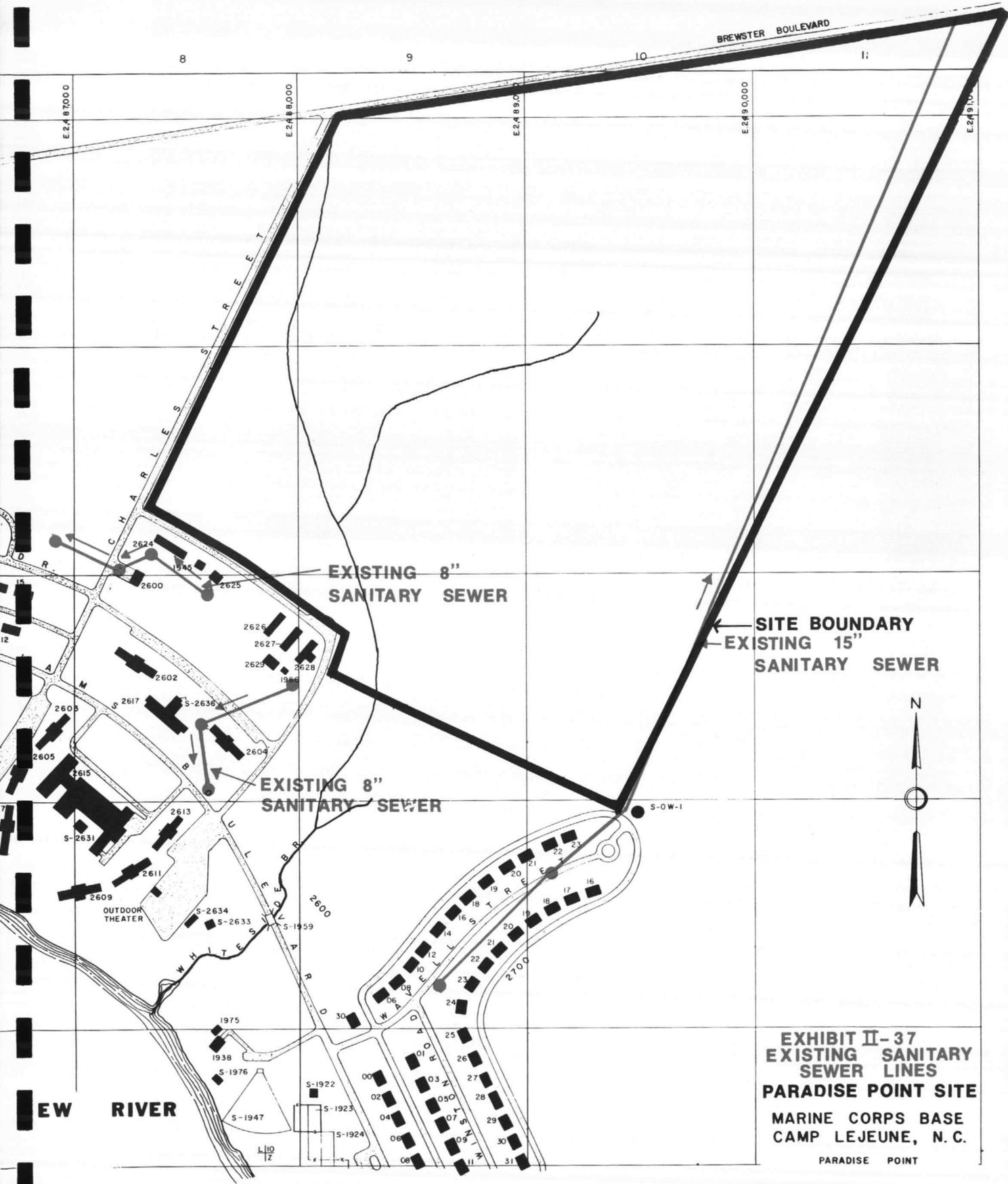
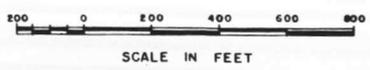
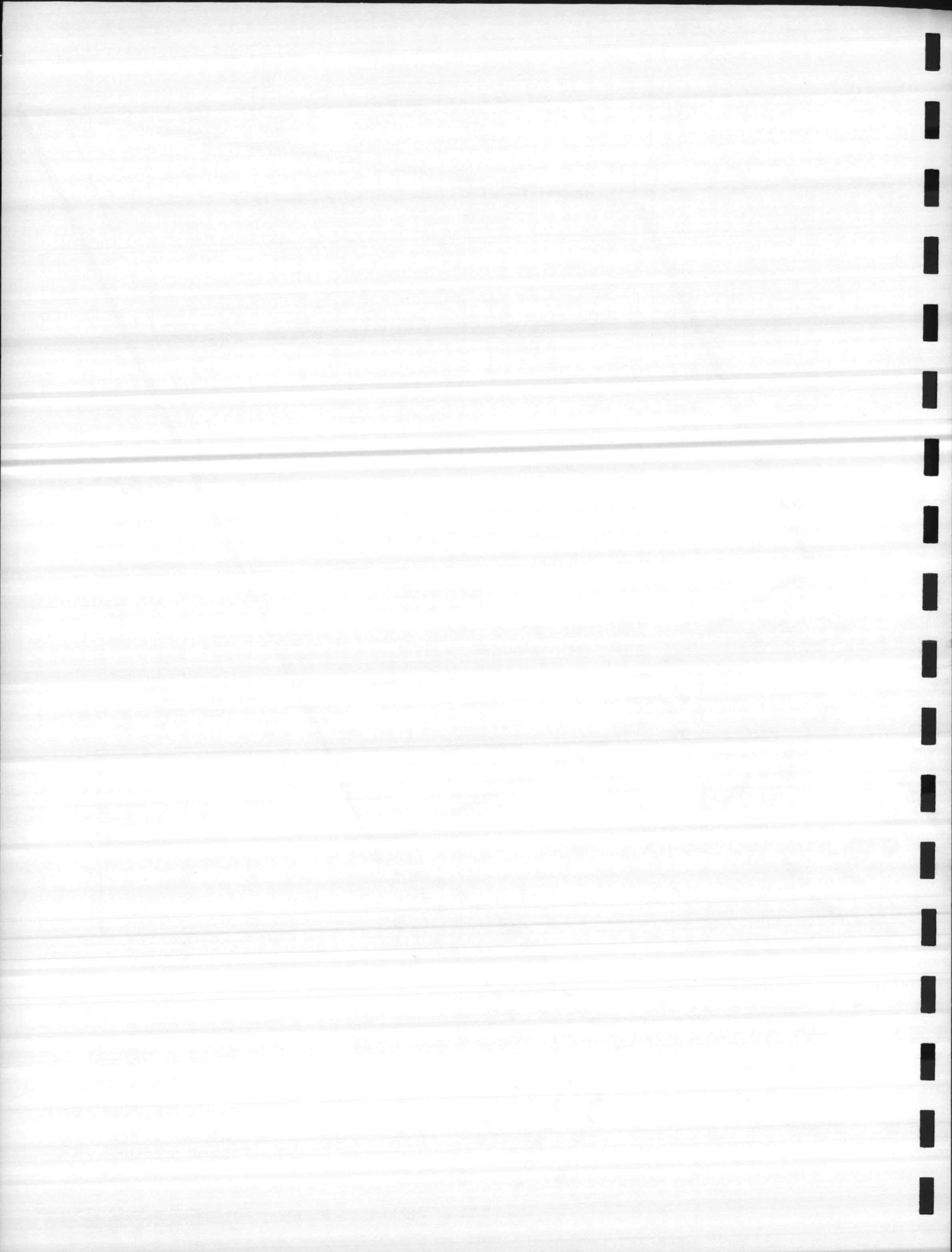
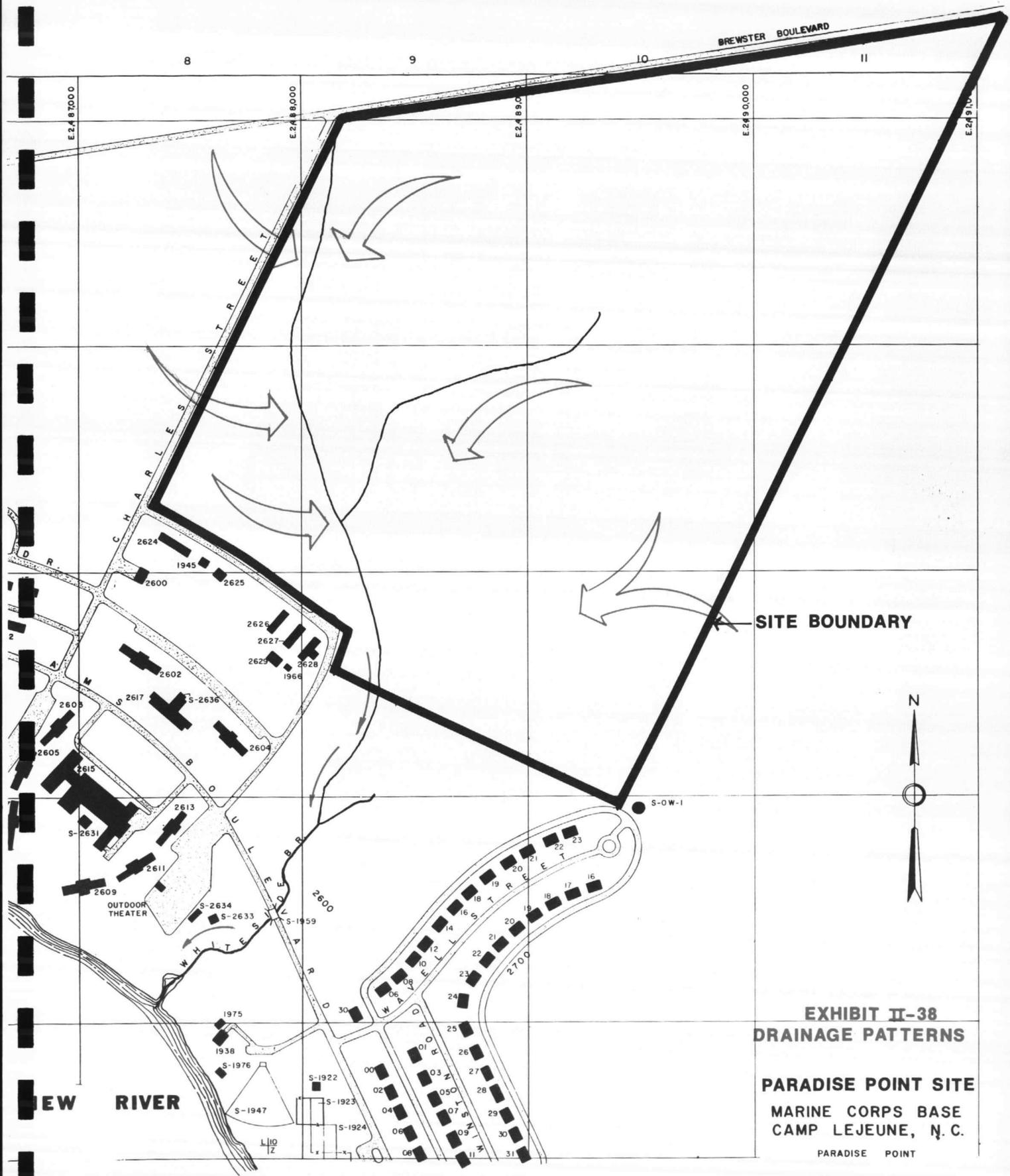


EXHIBIT II-37
EXISTING SANITARY
SEWER LINES
PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.
PARADISE POINT







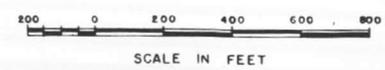
SITE BOUNDARY

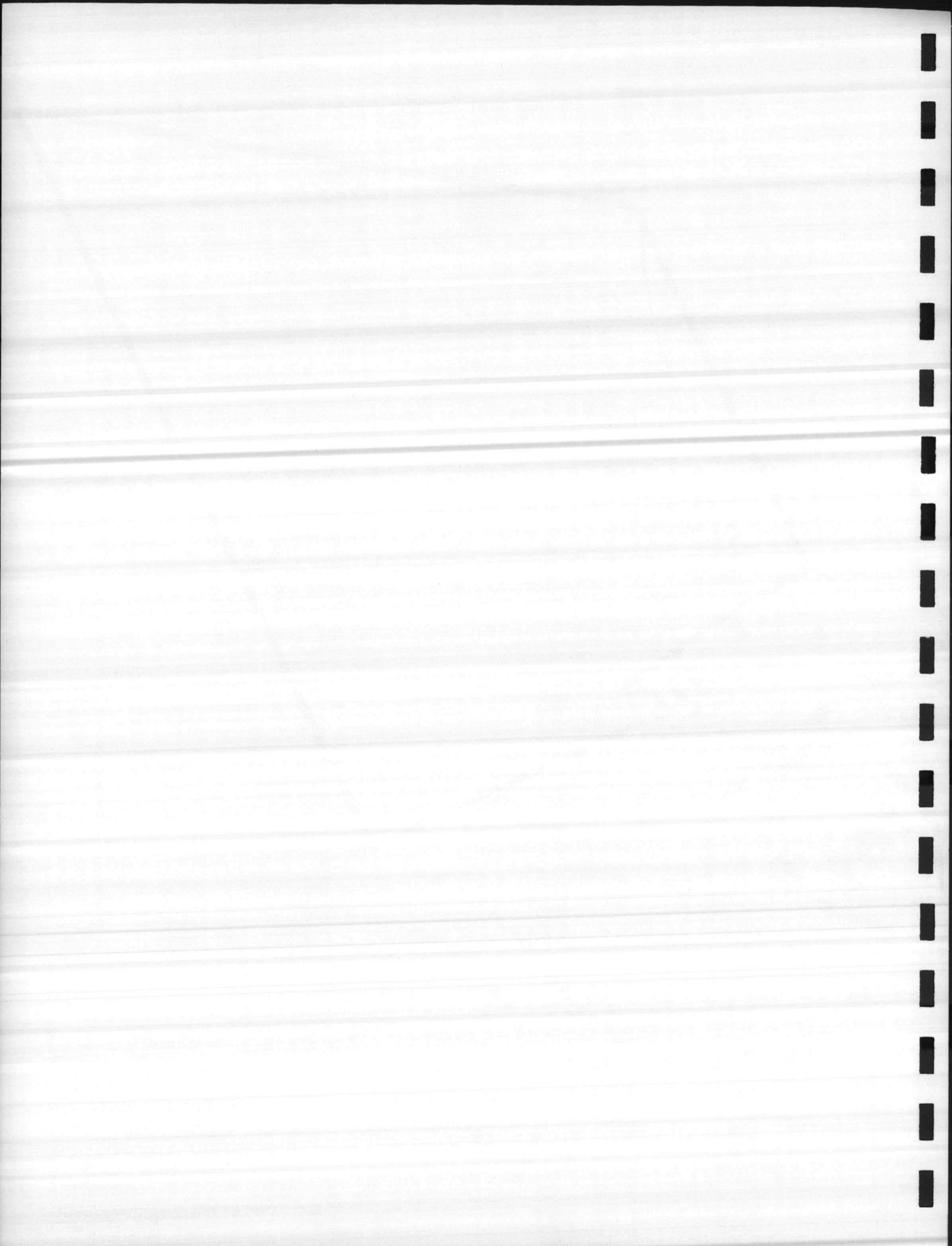


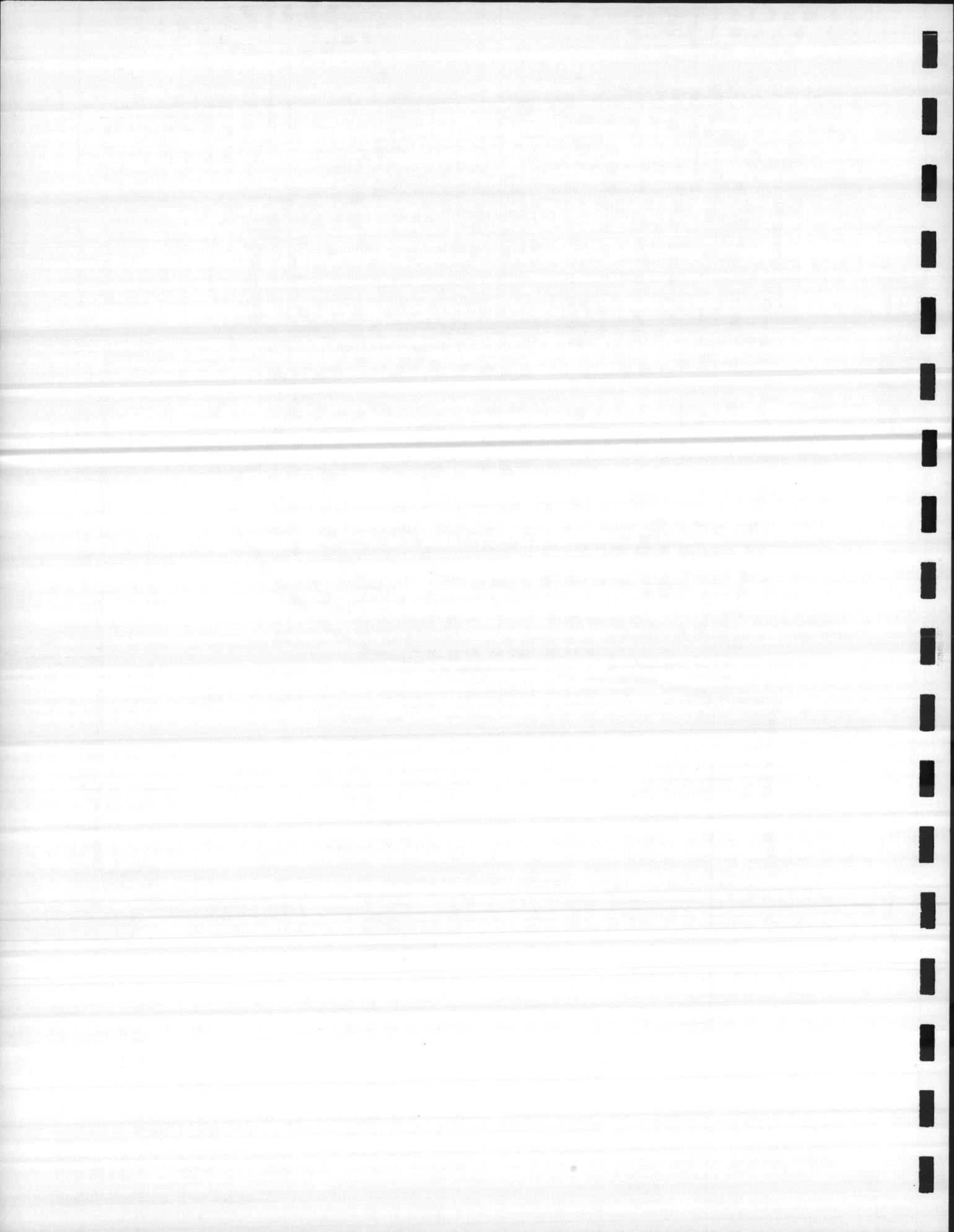
**EXHIBIT II-38
DRAINAGE PATTERNS**

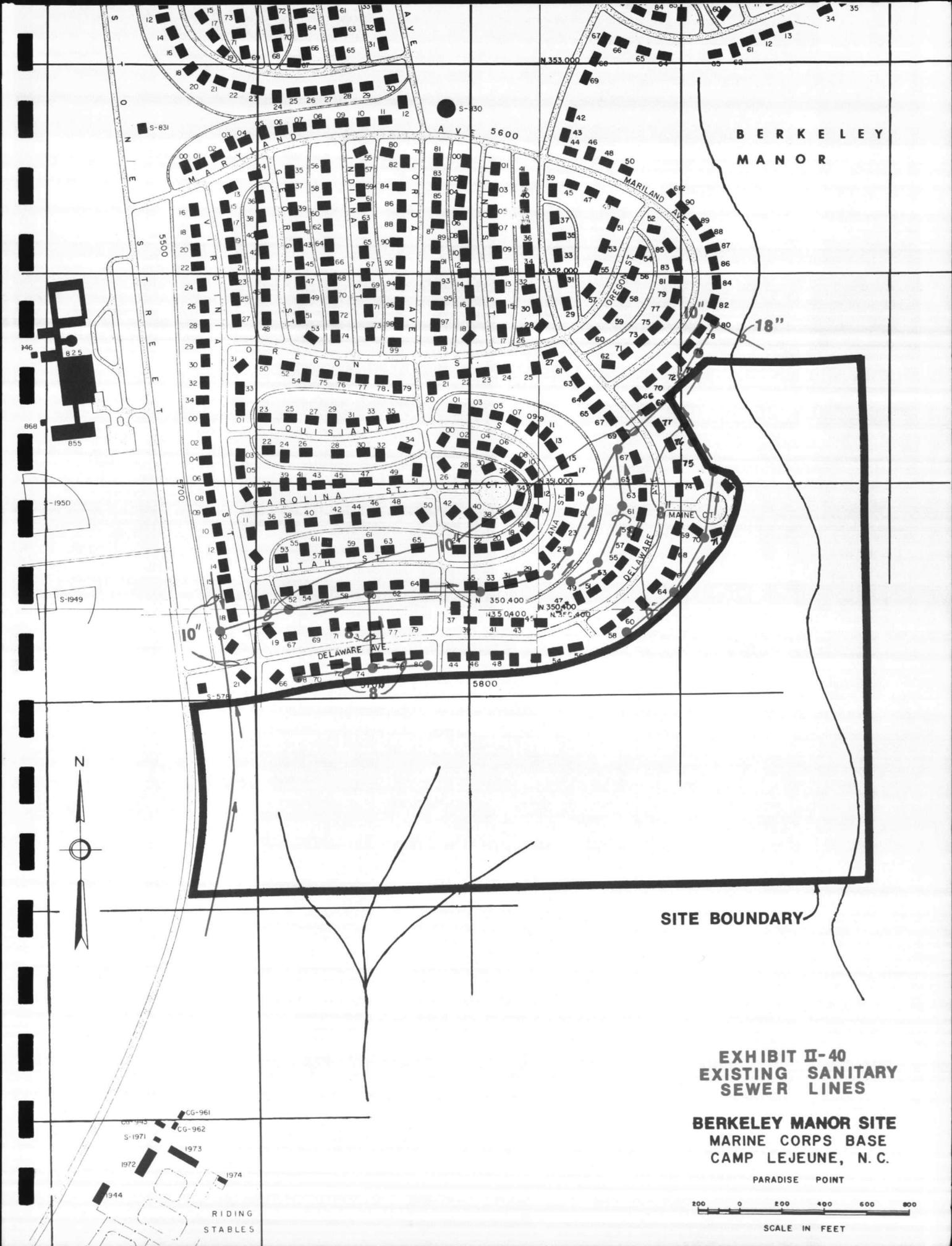
**PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.**

PARADISE POINT









BERKELEY
MANOR

SITE BOUNDARY

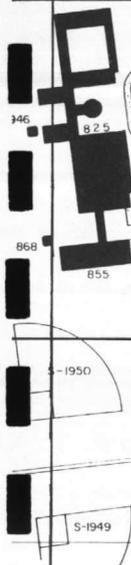
**EXHIBIT II-40
EXISTING SANITARY
SEWER LINES**

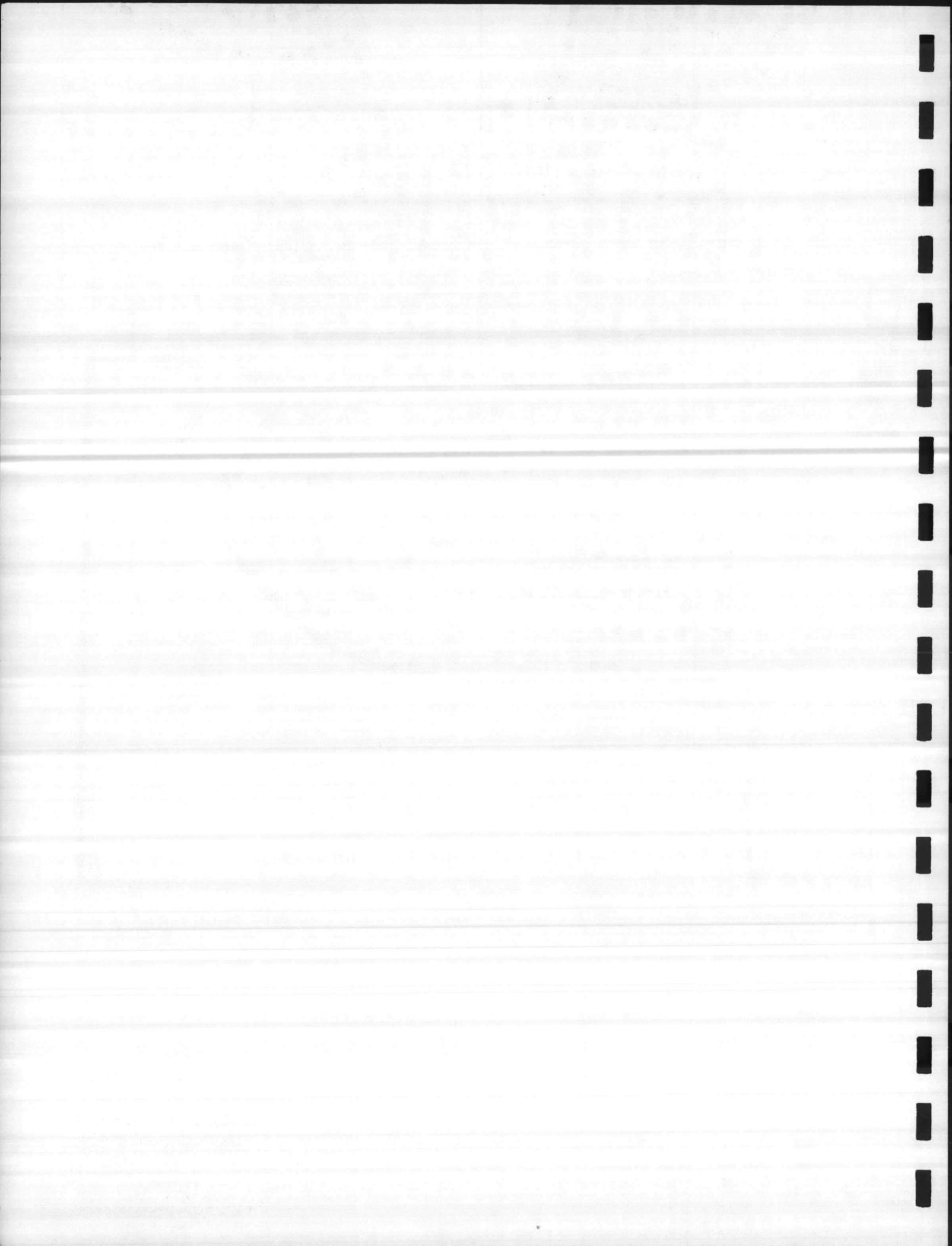
**BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.**

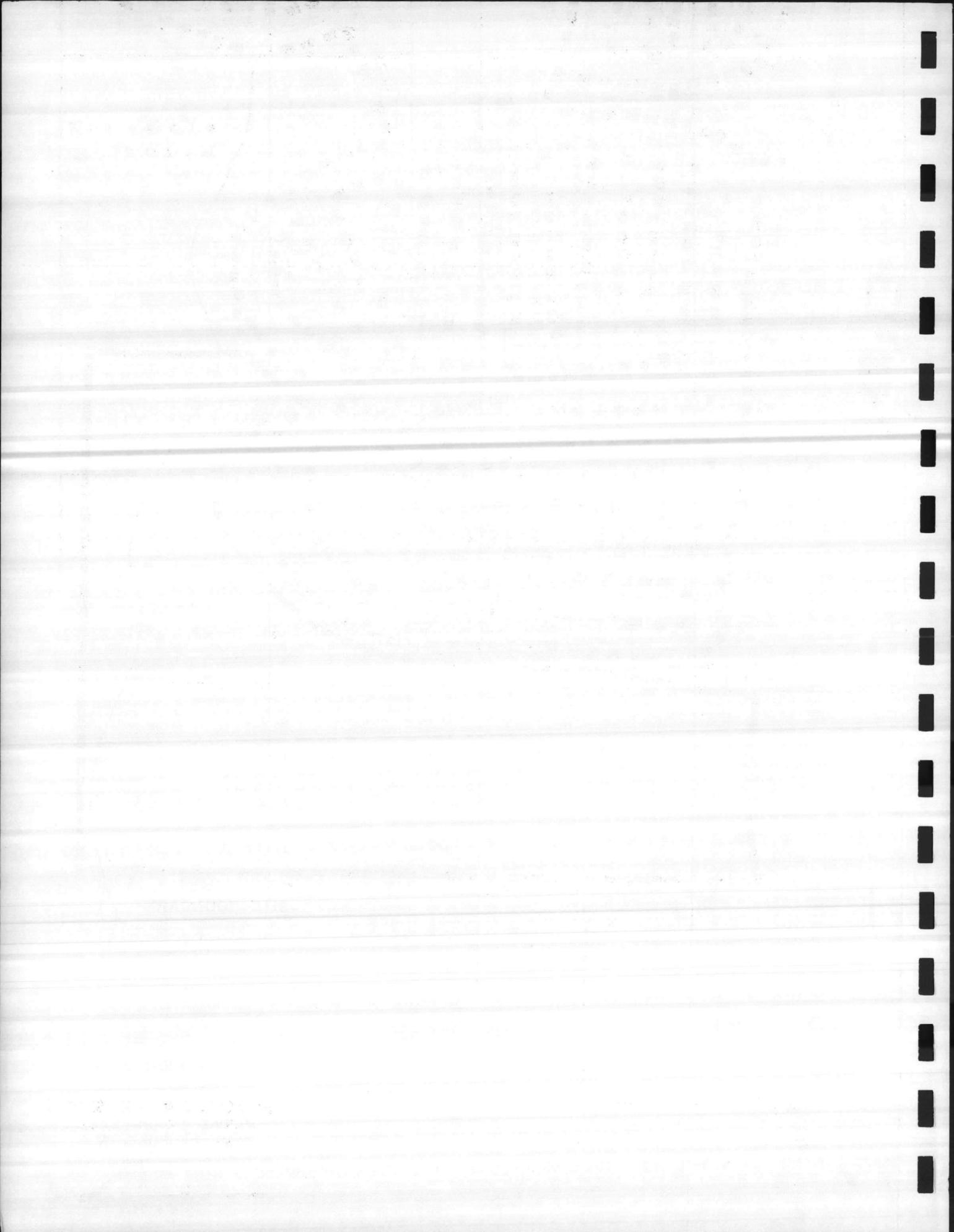
PARADISE POINT



SCALE IN FEET







N. ECOLOGICAL CONSIDERATIONS

N. ECOLOGICAL CONSIDERATIONS

1. Effects on Existing Ecosystems.

The effects of housing development upon the existing ecosystems can best be evaluated by enumerating the several "insults" and the several "targets" involved. "Targets" include the proposed housing sites, ecosystems immediately surrounding the proposed sites, ecosystems from which construction materials are obtained, ecosystems in the vicinity of industrial facilities which manufacture building materials from natural resources, natural ecosystems along transportation routes used to deliver building materials, and finally ecosystems affected by energy production necessary to provide energy for natural resource harvest, manufacture of materials, transportation, and site construction. Environmental "insults" include clearing the housing site, disposal of site waste, disposal of construction waste, destruction of natural resources to be used as construction materials, effluent emitted into air and water resources, increased traffic and human activity in the vicinity of the project.

Of the several combinations of environmental stresses and target resources the ones of most reasonable concern are the direct effects upon the proposed housing sites. Ecosystems of a different type will undoubtedly recolonize the sites but existing systems will be destroyed. The relevant question is not if they will be destroyed, that is obvious and certain! The relevant questions are, "is it worth the loss", or, "can

appropriate trade offers compensate for the loss?" Ecosystems surrounding the housing sites will also be disrupted by increased human activity. However, if this impact is anticipated, surrounding forests can be managed in a way that the ecosystems may be used for light density recreation but will not be totally destroyed. Impacts upon the several additional ecosystems enumerated can not be evaluated without additional information. None the less it is important to be conscious of these impacts in order that a realistic cost-benefit analysis or total impact analysis be calculated. It is imperative that offsite as well as onsite effects, and long term as well as immediate effects, be considered.

2. Site Characteristics

The ecosystems at each site are pine-hardwood forests characteristic of previously cut or otherwise disturbed sites throughout the coastal plain of North Carolina (Quarterman & Keever, 1962).

(a) Climate

The mild climate of the region is characterized by hot humid summers, mild wet winters and prolonged dry periods throughout the fall. Total annual precipitation averages 52 inches and the growing season persists for 230 days. Growth of natural ecosystems is most often limited by nutrient deficiencies, poor moisture availability, fire and human disturbance deficiencies, poor moisture availability, fire and human disturbance in order of decreasing significance. None of these limits

to growth are directly climatic. Precipitation is more than adequate but due to soil characteristics and temperature adequate moisture is not readily available. While fire frequency is influenced by temperature and moisture it is not a direct climatic influence. In summary, climate is not a first order limiting factor to ecological growth at Camp Lejeune.

The forests of the proposed housing sites are typical of developmental ecosystems for the region and the climate. Increased soil fertility, fire, or human disturbance are more likely to evoke ecological changes at these sites than are minor climatic changes. It is important to understand that climate refers to a composite of those physical factors related to energy and water balances over large regions for long periods of time. Climate is not to be confused with local short term weather, nor with environment which is an organism oriented term. While climate is not of major importance to this analysis, environmental perturbations are extremely significant.

(b) Soils

The coastal plain topography of Camp Lejeune ranges from sea level to 70 feet. Twenty-one (21) soil formations are found in the gently rolling terrain. These range from deep organic sediments in salt marshes to coarse sandy ridges and dunes. A 1965 Soil Conservation Service survey of Camp Lejeune included the three proposed housing sites. All three sites occur on deep sandy soils. Of the proposed sites the Berkeley Manor

sites is on the most productive soil. This soil is characterized by thick (18-30 inches) fairly loamy fine sand surface and a loamy subsoil (Exhibit II-47). The Tarawa Terrace Site is on less productive poorly drained soil characterized by a firm clay subsoil underlying a sandy loam surface soil. (Exhibit II-43). Paradise Point is on less stratified deep, poorly drained sandy soils (Exhibit II-45). The well drained sandy soils of Berkeley Manor typically suffer from nutrient depletion as precipitation percolates through the substrate. Poorly drained soils typical of Paradise Point suffer from lack of aeration and lack the structurally desirable loam fraction. If site selection were to be based strictly of soil quality it would be best to keep the well drained loam soils of Berkeley Manor in forest and sacrifice the less productive soils characteristic of Paradise Point.

(c) Hydrology

Hydrologic features appear to be insignificant as far as ecological effects of the proposed housing construction is concerned. A man made drainage ditch transverses the Berkeley Manor site but no natural streams drain any of the three sites. As an alternative to totally eliminating the existing forests on the proposed housing sites as well as the current forests management practices which are reducing the diversity of habitats and species in favor of pine monocultures it would be desirable to create several small impoundments in "buffer areas" surrounding the housing sites.

3. Ecosystem Composition

All three sites are similar in terms of ecosystem type, composition, disturbance, production, and stability and stage of development. As illustrated in Exhibits II-42, II-44, and II-47, all sites support loblolly pine forests of sufficient maturity to be harvested for saw timber.

Paradise Point also includes a significant area of loblolly pine-hardwood forest. In fact, all three sites include a few mature hardwoods scattered throughout the canopy and a dense hardwood understory. This composition and structure is characteristic of previously disturbed, usually cut over, forest of the region.

The following descriptions are taken from an excellent and relevant publication by Quarterman and Keever, (1962).

"Extensive stands of pines occurring on the Coastal Plain are comprised in large part of three species, Pinus palustris (longleaf), Pinus caribaea (slash), and Pinus taeda (loblolly). Pine forests occur on many kinds of sites, but most commonly on wet flatwoods and on rolling uplands. Plant geographers have named the region for this apparently dominant vegetation, e.g., Southeastern Evergreen Forest Region, of the Eastern Deciduous Forest (Braun, 1950), Harshberger (1911) called the southern portion of the Atlantic Gulf Coast Region the Carolinian and Gulf Pine Barren-Strand Districts, although he described some "mixed forest" and "river bluff" formations as well as pine barrens. Weaver and Clements

(1938) classified the vegetation of this region as a fire subclimax within the Decisuous Forest region."

The 1974 Conservation Report of Marine Corps Base Camp Lejeune, North Carolina description of vegetation on the base clearly identifies the forests as belonging to the plant associations described by Quarterman and Keever as being typical of the region. The report states, "Vegetation on the Base is typical of the southeastern coastal plain. Extensive tracts of both pure pine and pine-hardwood mixtures dominate the landscape. Pines consist of loblolly and longleaf; while the hardwoods are represented by southern red oak, white oak, turnkey oak, willow oak, red gum, tupelo gum, hickory, etc. The upland swamps, commonly referred to as pocosins, are overgrown with fetter bush, cyrilla, pond pine, and greenbrier.

Several unique carnivorous plants including the venus flytrap, sundew, bladderwort, and several species of pitcher plants commonly are found on poorly drained sites having infertile, acid soils.

Types of acreage under management at Camp Lejeune are listed in Table II-12.

TABLE II-12

ACREAGE UNDER MANAGEMENT

<u>Management</u>	<u>Acres / Miles</u>
Forestry	60,552 acres
Fish and Wildlife	95,000 acres
Soil and Water	110,877 acres
Improved Land	3,650 acres
Fresh Water	
Ponds	33 acres
Streams	14-1/2 miles
Salt Water (New River, Intracoastal Waterway, and ocean beach)	41 miles
Hunting Authorized	64,000 acres
Fishing Authorized	
Ponds	30 acres
Streams (New River, Intracoastal Waterway, and ocean beach)	46 miles
Fishing acreage to be opened in 1974	3 acres

Source: From 1974 Conservation Report, Camp Lejeune.

KEY TO SOILS MAPS

Soil Type

Onslow, 0-3% slope
Baymeade, 1-6% slope
Leon, 0-5% slope
Bibb, 0-2% slope
Craven, 0-12% slope

Soil Descriptions

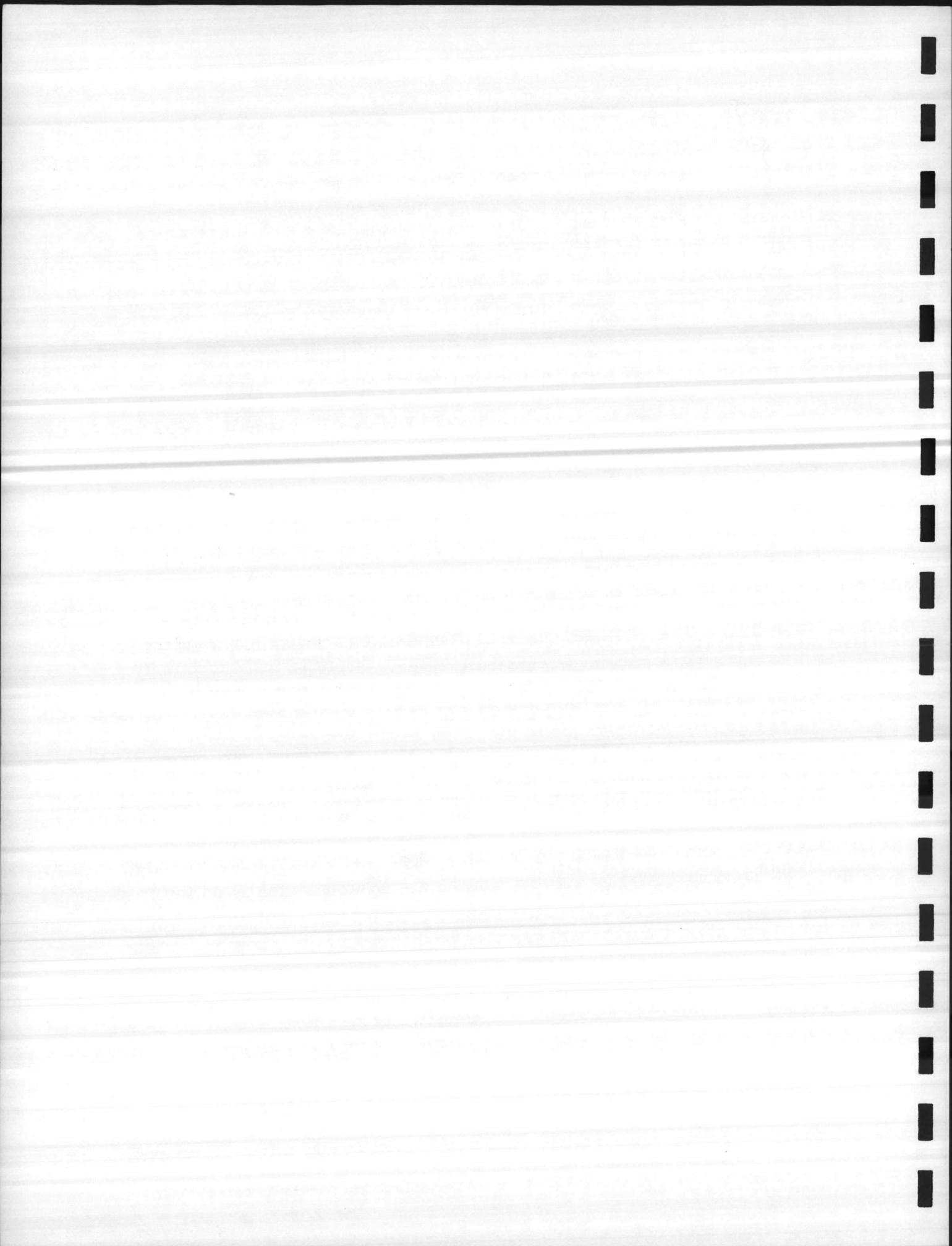
Onslow - Moderately well and somewhat poorly drained acid soils on broad smooth interstream divides in the lower coastal plain. Solum thickness is more than 60 inches. Seasonal high water table app. 18in. of the surface 2-4 months annually.

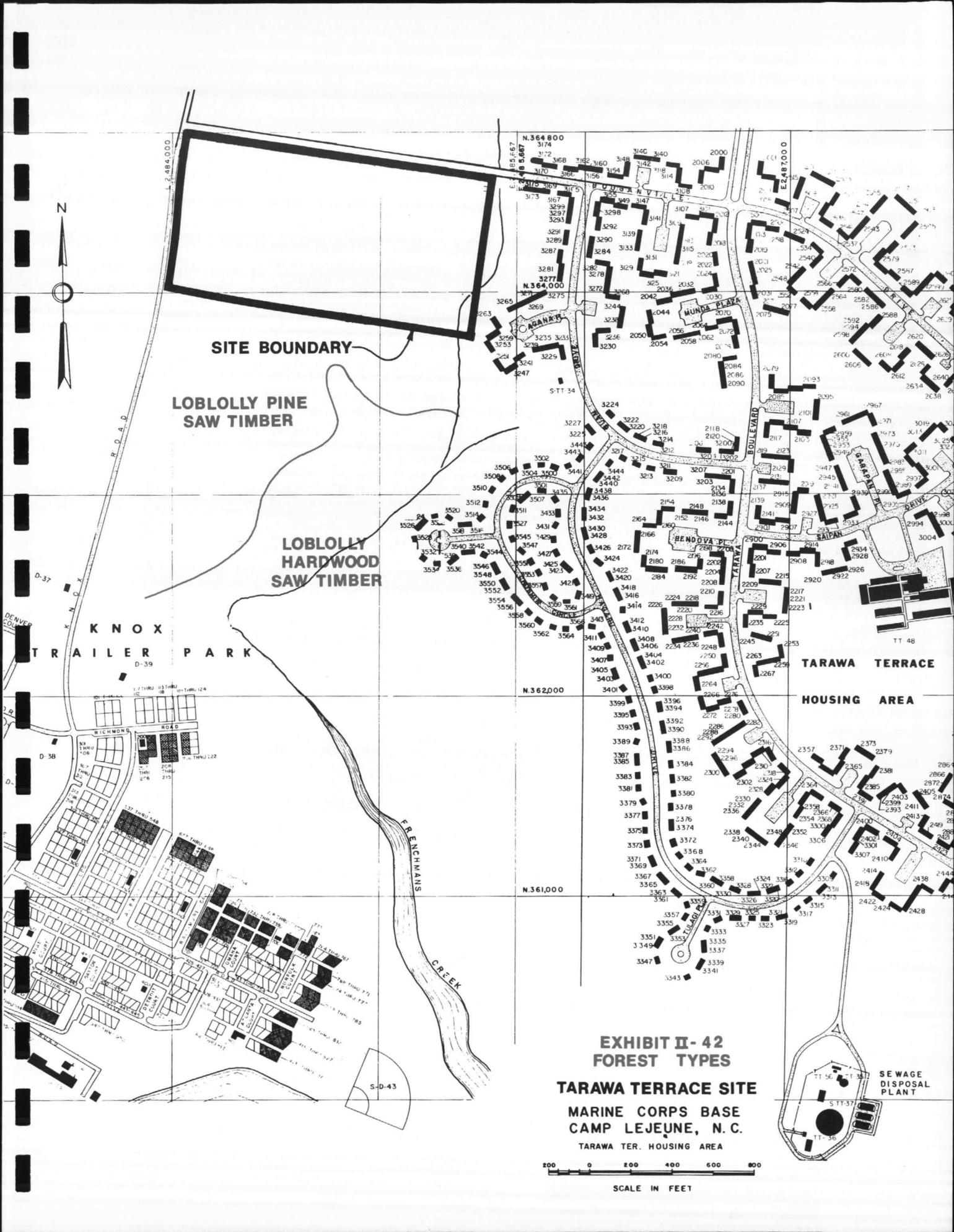
Baymeade - Somewhat excessively drained soils with thick sandy surface horizons that have irregular intermittent Bh bodies. Solum is 46-60 inches thick. Water table is below 5 feet.

Leon - Poorly drained, sandy soil with a weakly cemented, organic stained layer within 30 inches deep. They have a thin sandy surface layer and a light grey sand substrate layer. Depth is to 72 inches or more. Water table is 10-40 inches deep for more than 6 months annually.

Bibb - Consists of poorly drained, level to nearly level flood plain soils subject to frequent overflow. Depth to 60 inches. The water table is within 8 inches of the surface from 8-11 months annually.

Craven - Moderately well drained soils on nearly level to sloping Coastal Plain uplands. Depths to 65 inches. The seasonal water high table is within 30 inches of the surface 2-6 months annually on the nearly level phases.





SITE BOUNDARY

**LOBLOLLY PINE
SAW TIMBER**

**LOBLOLLY
HARDWOOD
SAW TIMBER**

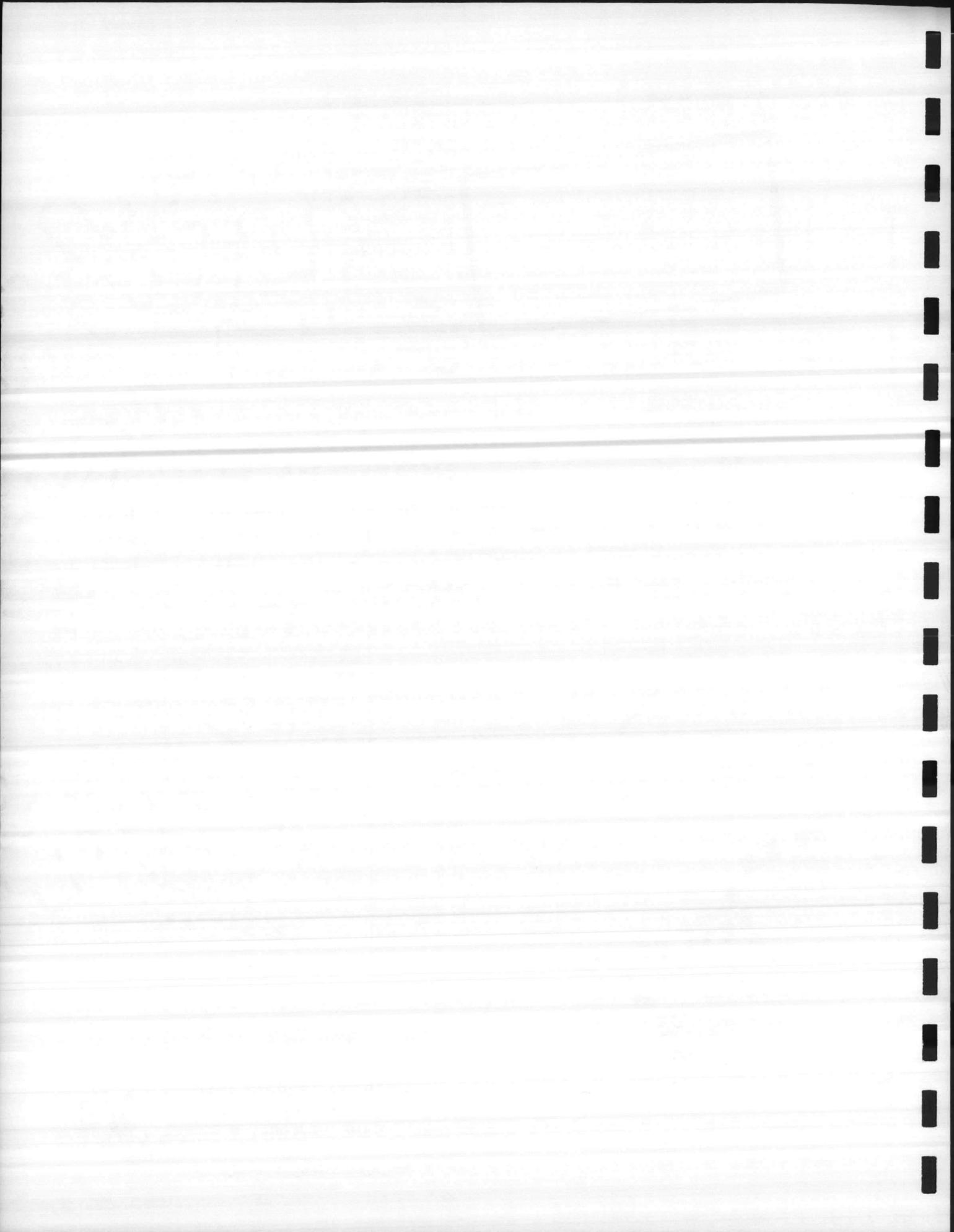
**KNOX
TRAILER PARK**

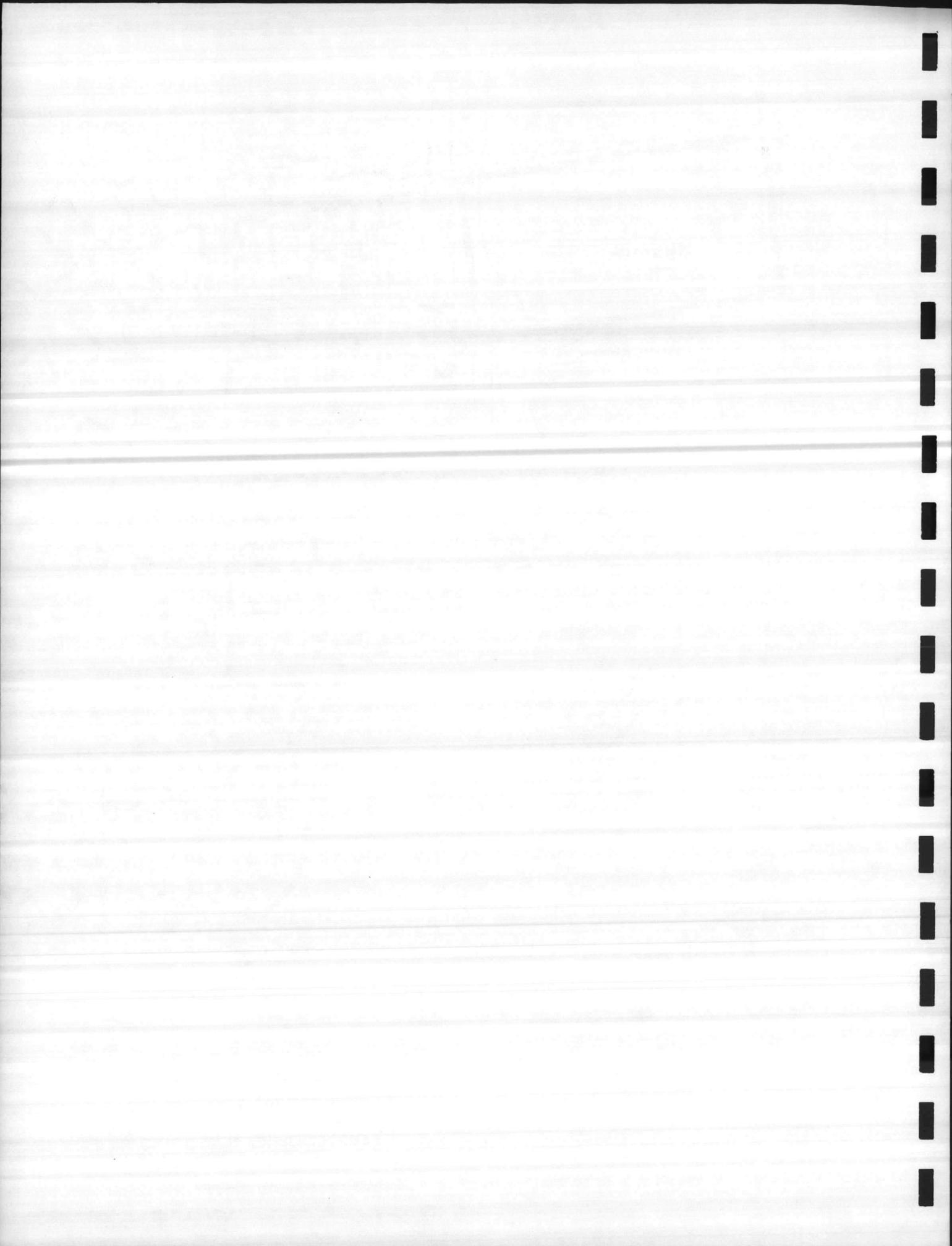
**EXHIBIT II- 42
FOREST TYPES**

**TARAWA TERRACE SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
TARAWA TER. HOUSING AREA**



SCALE IN FEET





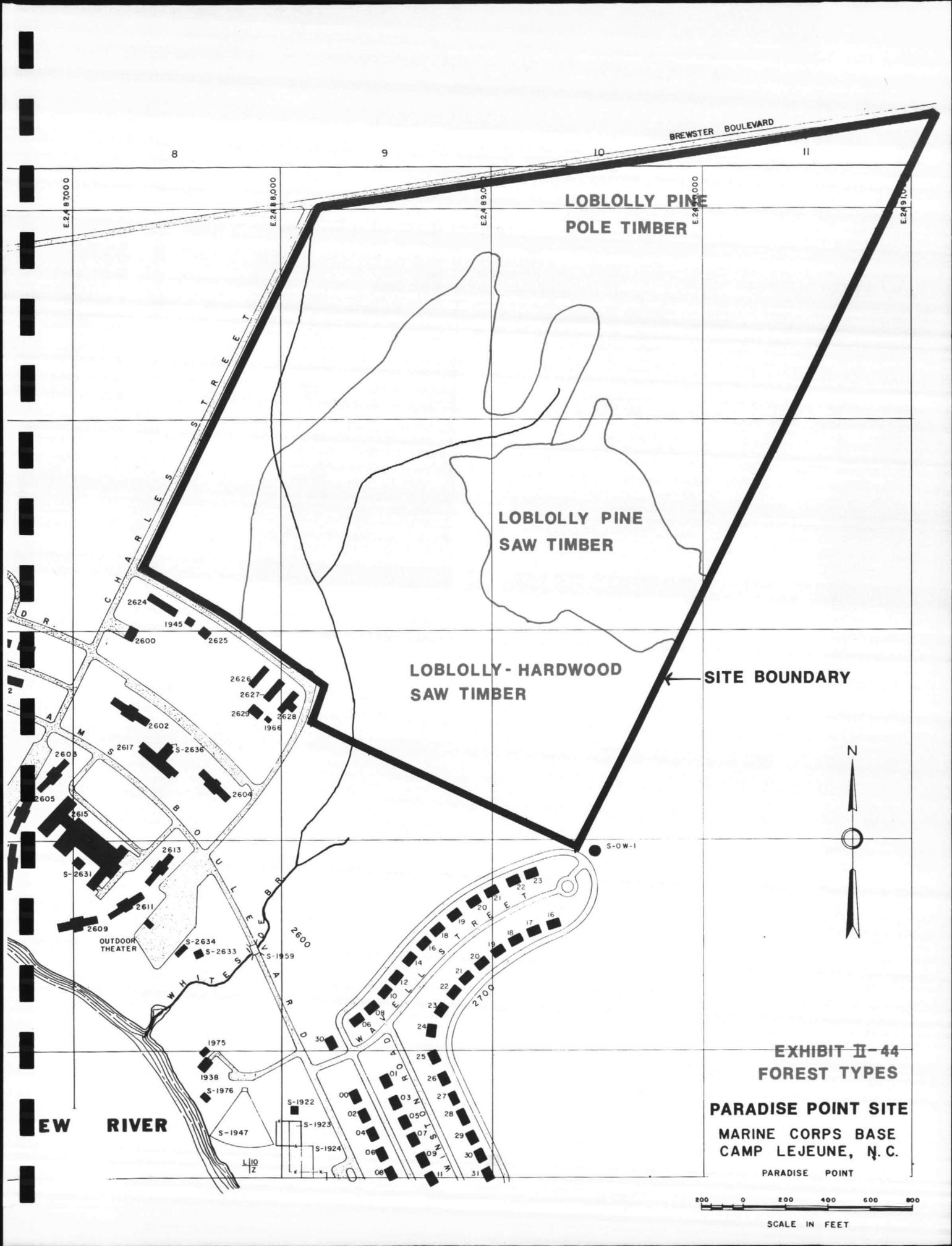
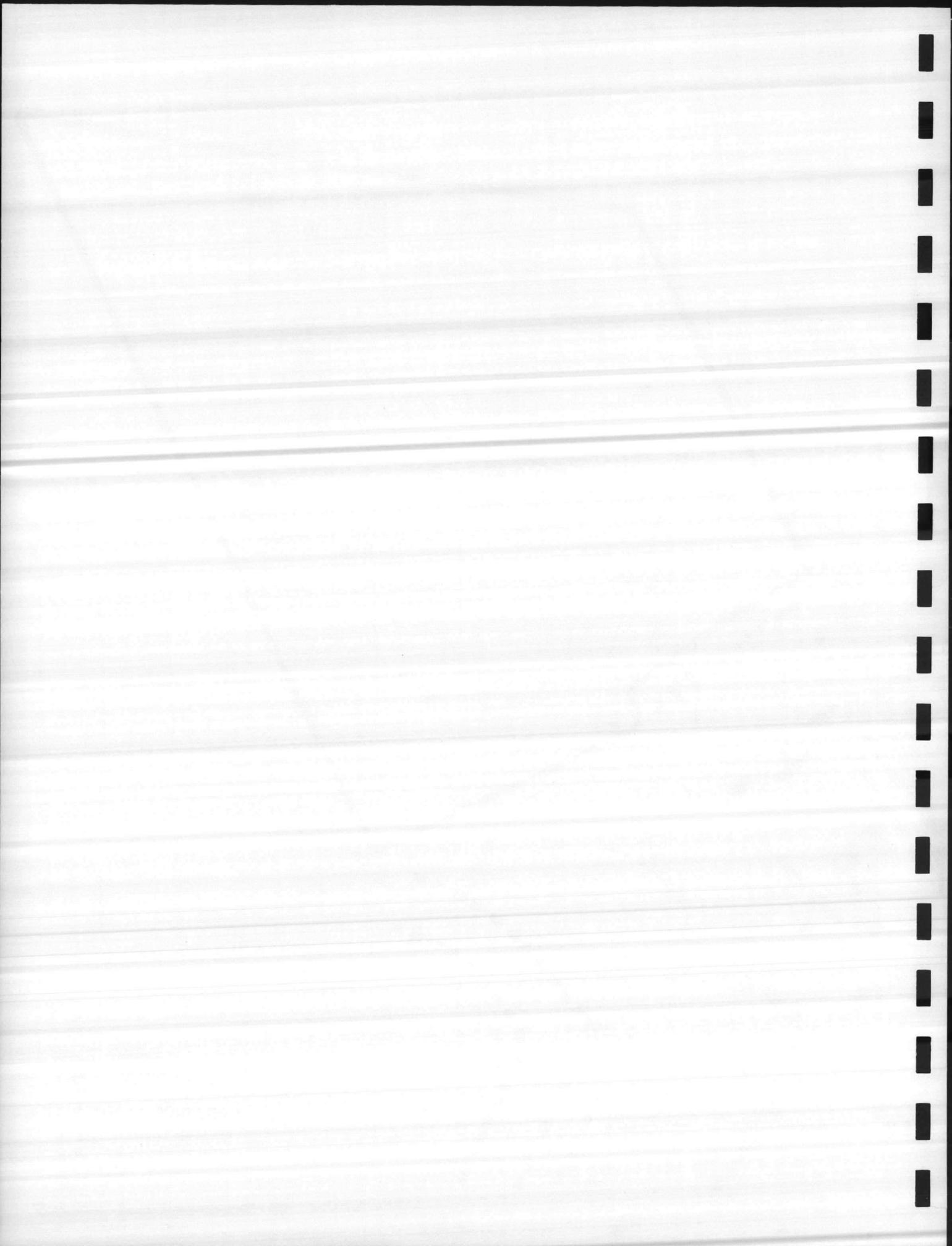
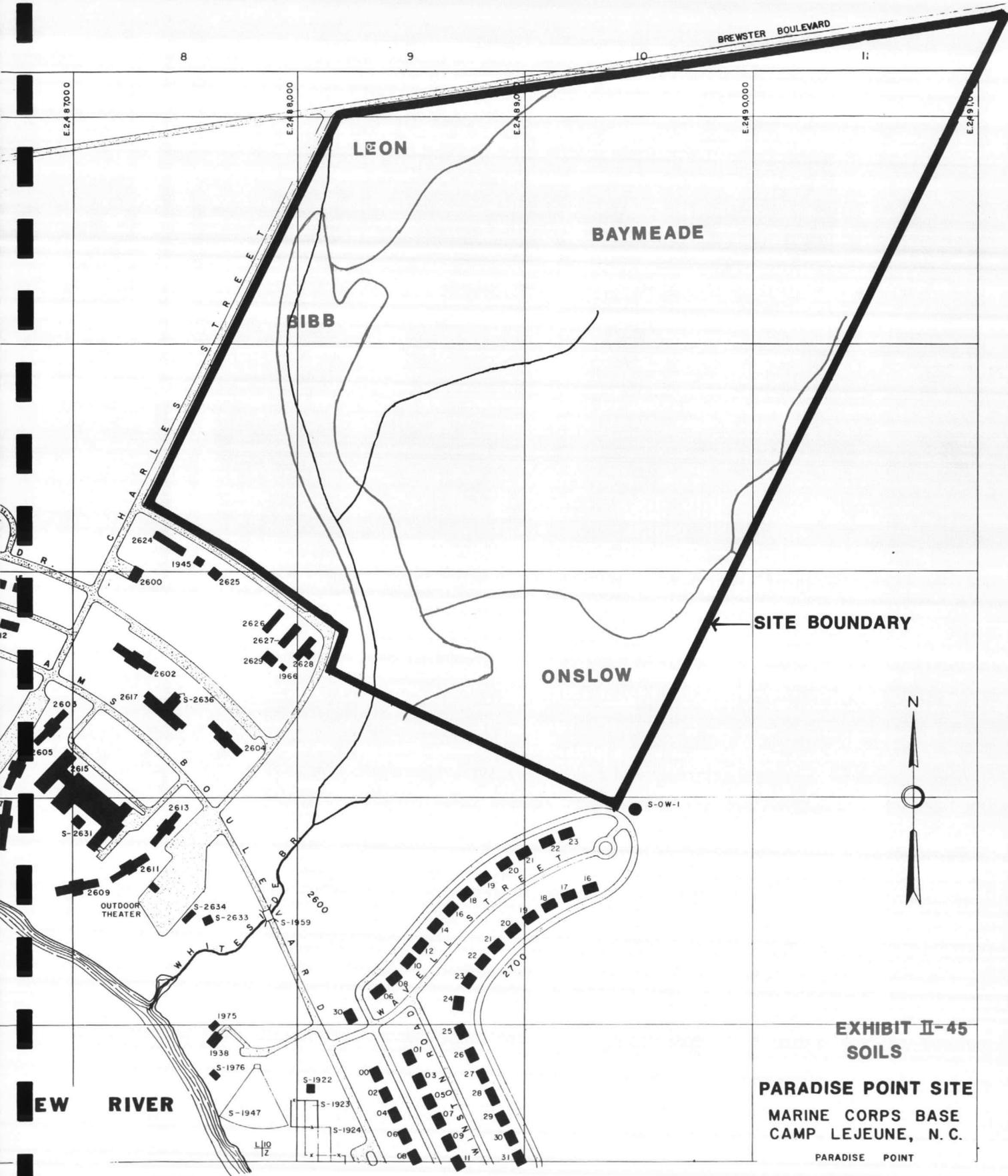


EXHIBIT II-44
FOREST TYPES
PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.
 PARADISE POINT

200 0 200 400 600 800
 SCALE IN FEET





← SITE BOUNDARY



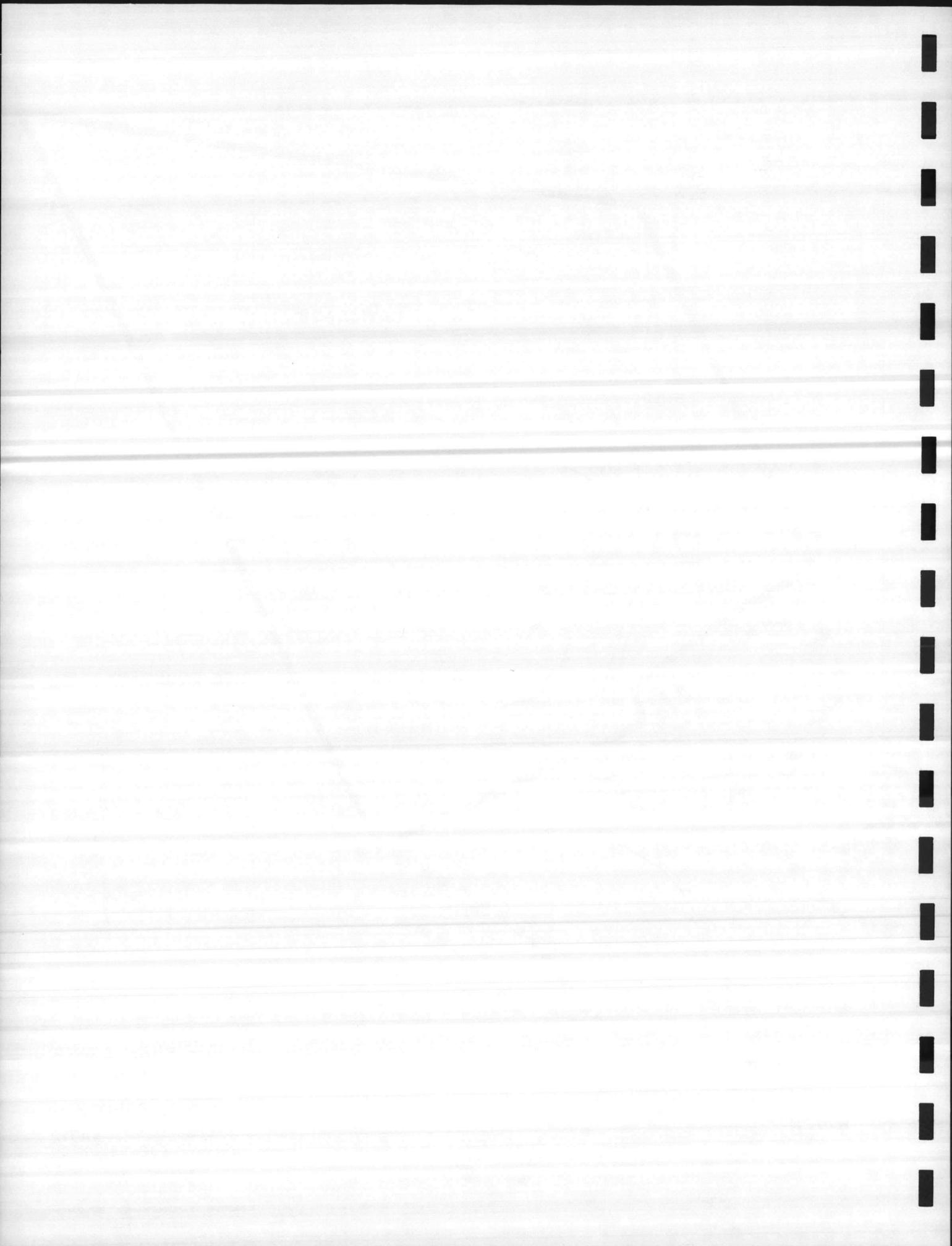
**EXHIBIT II-45
SOILS**

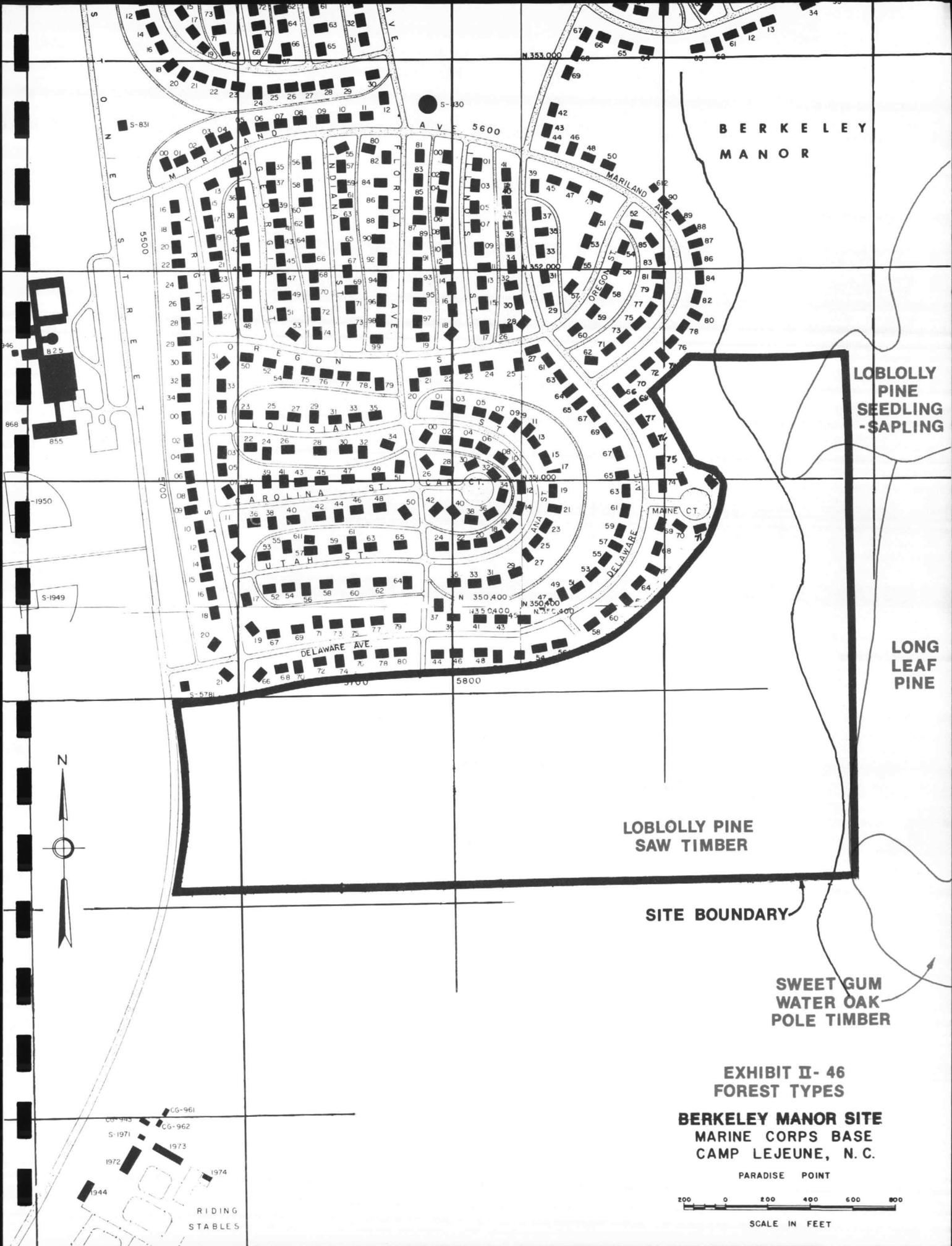
**PARADISE POINT SITE
MARINE CORPS BASE
CAMP LEJEUNE, N.C.**

PARADISE POINT



SCALE IN FEET





BERKELEY
MANOR

LOBLOLLY
PINE
SEEDLING
-SAPLING

LONG
LEAF
PINE

LOBLOLLY PINE
SAW TIMBER

SITE BOUNDARY

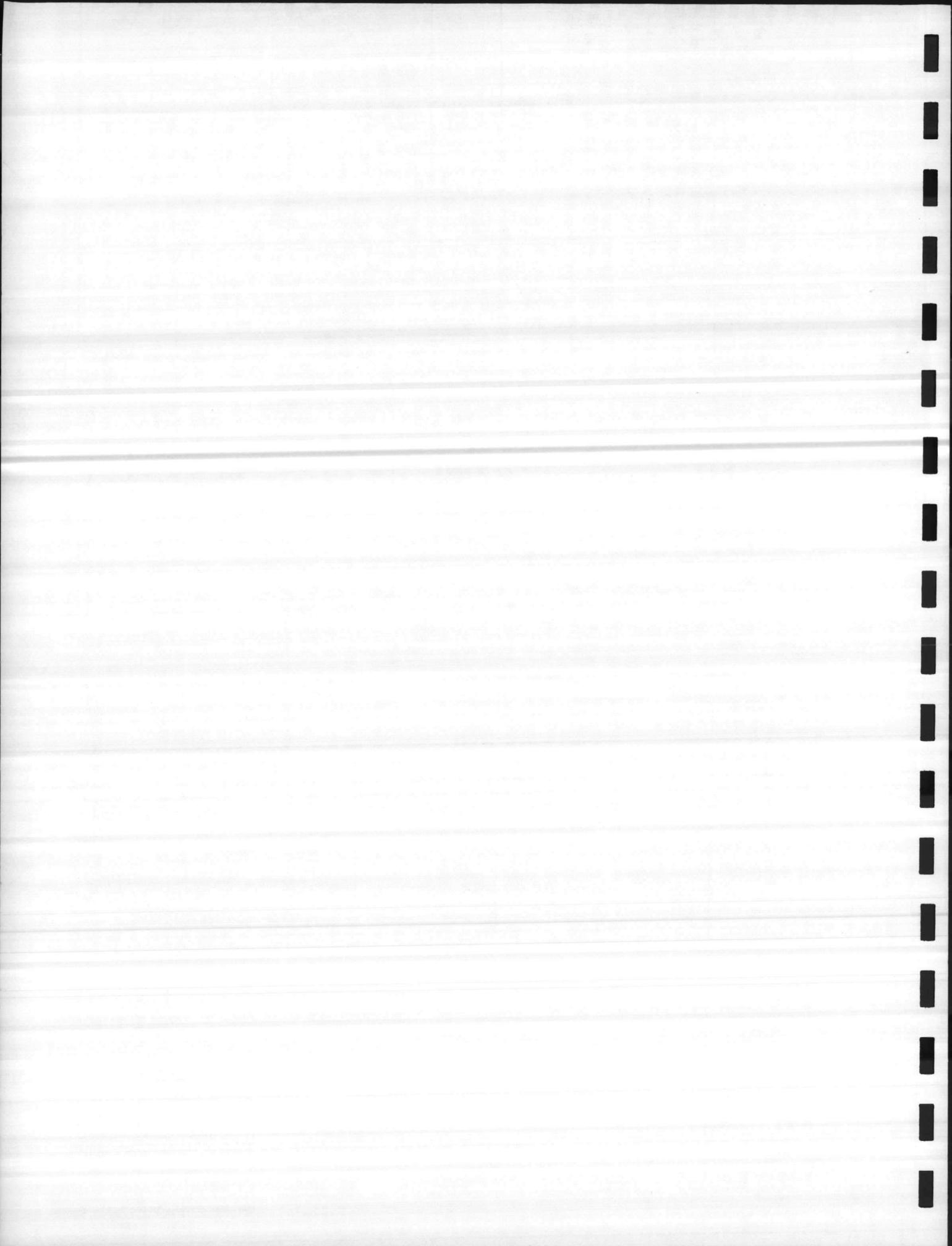
SWEET GUM
WATER OAK
POLE TIMBER

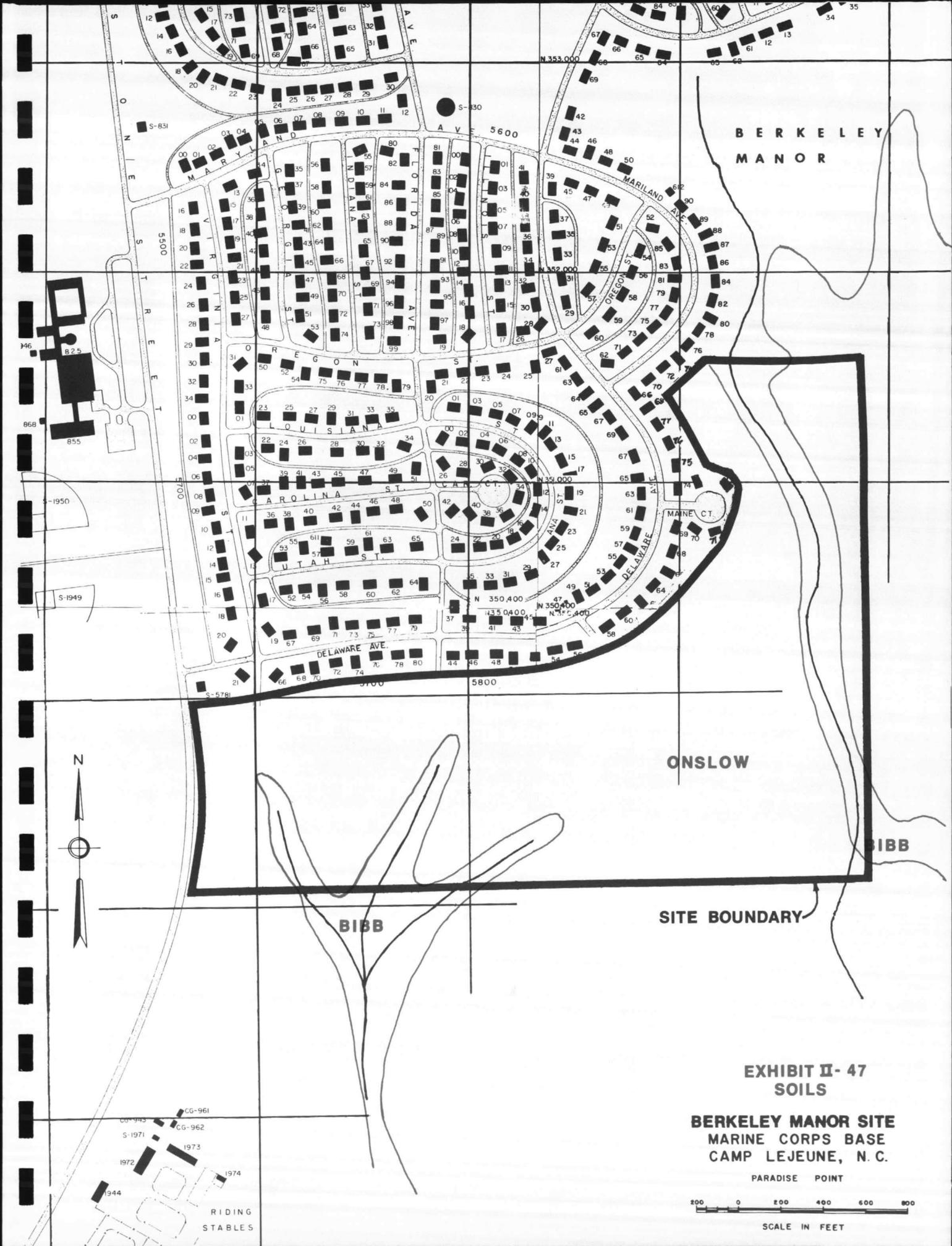
EXHIBIT II- 46
FOREST TYPES
BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

PARADISE POINT



SCALE IN FEET





BERKELEY
MANOR

ONslow

BIBB

BIBB

SITE BOUNDARY

**EXHIBIT II- 47
SOILS**

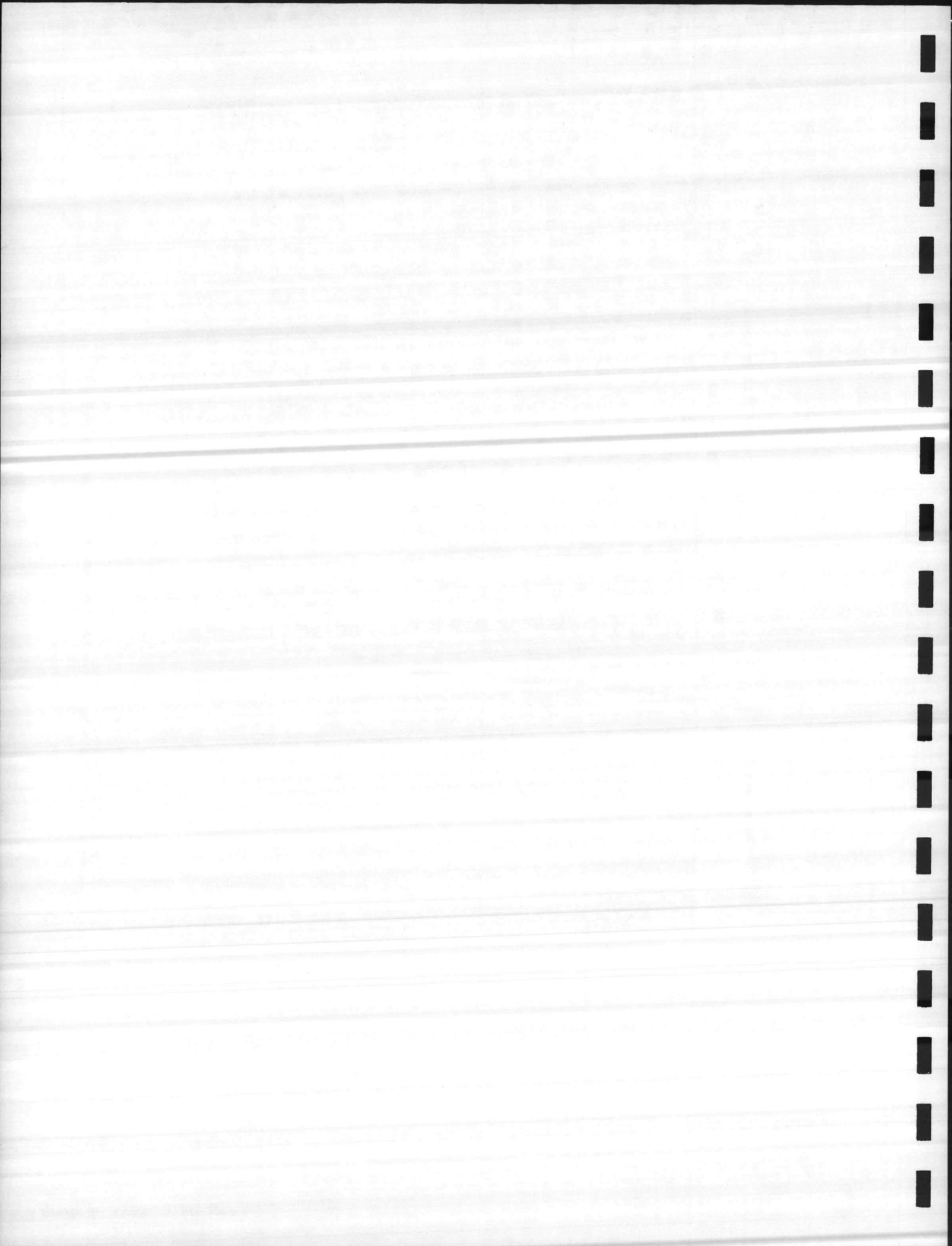
**BERKELEY MANOR SITE
MARINE CORPS BASE
CAMP LEJEUNE, N. C.**

PARADISE POINT



SCALE IN FEET

CG-961
CG-962
S-1971
1972
1973
1974
1944
RIDING
STABLES



The land of Camp Lejeune was privately owned prior to 1941. Approximately 6,000 acres were cleared with most of the woodland having been cut and denuded of timber (1974 Conservation Report). Observations of forests at the specific sites proposed for development and the classification of the forests as "saw timber" both establish the age of the forests to be 25 - 40 years. Quarterman and Keever (1962) state that in this region, "Pine dominated stands have a well developed understory of hardwood species by the time they are 30 to 40 years of age". This is true of the sites proposed for development. The presence of a few scattered hardwoods throughout the pine canopy and the currently non-random distribution of pines indicates that the the time Camp Lejeune was established the sites in question were covered by a few scattered hardwoods. These cut over areas were rapidly invaded by pine from surrounding seed sources. Quarterman and Keever (1962) identified hardwood species typical of these pine dominated forests. On the basis of samples from nearly 100 forest stands the species were calssified according to their percent presence and their potential as understory canopy species.

It is reasonable to accept this list of forest composition as being representative of forest composition in the pine dominated stands at the three proposed housing sites. These detailed descriptions coincide with descriptions of vegetation in the 1974 Conservation Report of Camp Lejeune. If these forests are not disturbed, in time loblolly

pine will be replaced by hardwoods. Past soil fertility and moisture will influence the precise composition. However, Quarterman and Keever (1962) propose fourteen species as being important in the pine and pine-hardwood stands of the entire region. In decreasing order of importance, the potential overstory hardwood species are: *Fagus grandifolia*, *Quercus laurifolia*, *Magnolia grandiflora*, *Quercus alba*, *Liquidambar styraciflua*, *Carya tomentosa*, *Quercus nigra*, *Quercus falcata*, *Carya glabra*, *Nyssa sylvatica* var. *dilatata*, and *Ilex opaca*.

4. Ecosystem Development

Pine dominated forests in this region are developmental stages in a successional process which terminates in a "Southern Mixed Hardwood Forest" as described by Quarterman and Keever (1962). The process of succession is one of the most thoroughly described of ecological processes and it is particularly well understood, although incompletely understood, in the Southeastern United States (Odum, 1959; Smith, 1974). Hardwood species which will replace loblolly pine are identified in Table II-13. This process will take approximately a half century, the rate of development and ultimate composition being dependent primarily upon human disturbance, fire, epidemic, soil fertility and moisture. In addition to changes in ecosystem composition, related changes in structural - functional relationships take place. As succession proceeds toward a stable equilibrium species diversity also increases.

Diversity is a measure of the variety of species in the system and the equibility of their distributions within the ecosystem (October 1969). It is hypothesized that increased species diversity is linearly related to ecosystem stability. However, existing evidence does not warrant acceptance of this hypothesis as a general principle. One value of mature "Climax" ecosystems is their relative stability and high diversity, two characteristics of especial concern at a time when human activity is directly and indirectly reducing diversity and stability on a global basis. Table II-14 from Odum (1969) summarizes ecological trends during succession. The central column identified as "Development states" is representative of the sites proposed for housing development at Camp Lejeune.

TABLE II-13

Species found in more than 20% (classes II to V) of the 93 stands. Species in each class are listed in descending order of per cent Presence. Group I, II, or III indicated for each tree species.

<u>Presence Class</u>	<u>Potential Overstory Species</u>	<u>Potential Under-Story Species</u>	<u>Shrubs and Vines</u>
Class V 81-100%	Liquidambar styraciflua I Ilex opaca I Fagus grandifolia I Quercus alba I Nyssa sylvatica var. dilatata I Magnolia grandiflora I	Cornus florida I	Callicarpa americana Vitis rotundifolia Smilax spp.
Class IV 61-80%	Quercus laurifolia I Q. nigra I Pinus taeda I	Morus rubra III	Rhus toxicodendron + R. radicans Parthenocissus quinquefolia Hamamelis virginiana
Class III 41-60%	Carya glabra I Quercus falcata I Carya Tomentosa I Fraxinus americana II Pinus glabra II	Prunus serotina III Ostrya virginiana II Vaccinium arboreum I Acer rubrum var. trilobum III Carpinus caroliniana III Diospyros virginiana III Sassafras albidum III	Gelsemium sempervirens Bignonia capreolata Ascyrum hypericoides Aralia spinosa Symplocos tinctoria Vaccinium spp. Passiflora lutea

<u>Presence Class</u>	<u>Potential Overstory Species</u>	<u>Potential Under-Story Species</u>	<u>Shrubs and Vines</u>
Class II 21-40%	Quercus michauxii II Acer barbatum II Tilia spp. II Juniperus virginiana III Quercus stellata III Q. velutina III Ulmus alata III	Halesia spp. Cercis canadensis II Celtis tenui- folia var. georgiana III Oxydendrum arboreum II Prunus caroliniana III Amelanchier sp. III	Asimina parviflora Chionanthus virginicus Myrica cerifera Vitis aestivalis Viburnum dentatum Ilex spp. (excl. I. opaca) Berchemia scandens Rhododendron sp. Rhus copallina Aesculus pavia Styrax grandiflora Euonymus americana
Class I 1-20%	34 others	13 others	74 others

TABLE II-14

A tabular model of ecological succession: trends to be expected in the development of ecosystems.

<u>Ecosystem attributes</u>	<u>Developmental stages</u>	<u>Mature Stages</u>
<u>Community energetics</u>		
Gross production/ community respiration (P/R ratio)	Greater or less than 1	Approaches 1
Gross production/standing crop biomass (P/B ratio)	High	Low
Biomass supported/unit energy flow (B/E ratio)	Low	High
Net community production (yield)	High	Low
Food chains	Linear, predom- inantly grazing	Weblike, pre- dominantly detritus
<u>Community structure</u>		
Total organic matter	Small	Large
Inorganic nutrients	Extrabiotic	Intrabiotic
Species diversity - variety component	Low	High
Species diversity - equitability component	Low	High
Biochemical diversity	Low	High
Stratification and spatial heterogeneity (pattern diversity)	Poorly organized	Well-organized

<u>Ecosystem attributes</u>	<u>Developmental Stages</u>	<u>Mature Stages</u>
<u>Life History</u>		
Niche specialization	Broad	Narrow
Size of organism	Small	Large
Life cycles	Short, simple	Long, complex
<u>Nutrient cycling</u>		
Mineral cycles	Open	Closed
Nutrient exchange rate, between organisms and environment	Rapid	Slow
Role of detritus in nutrient regeneration	Unimportant	Important
<u>Selection Pressure</u>		
Growth form	For rapid growth ("r-selection")	For feedback control ("K-selection")
Production	Quantity	Quality
<u>Overall Homeostasis</u>		
Internal symbiosis	Undeveloped	Developed
Nutrient conservation	Poor	Good
Stability (resistance to external perturbations)	Poor	Good
Entropy	High	Low
Information	Low	High

5. Ecosystem Productivity

The productivity of the 25 - 40 year old pine forests on the sites in question is the greatest of any stage in ecosystem development.

Figure II-1 illustrates the high gross production, high net production and rapid increase in biomass accumulation during this stage of development.

Forest productivity is greatly influenced by forest management. A description of forest management taken directly from the 1974 Conservation Report, Marine Corps Base Camp Lejeune, North Carolina, is included in the appendix.

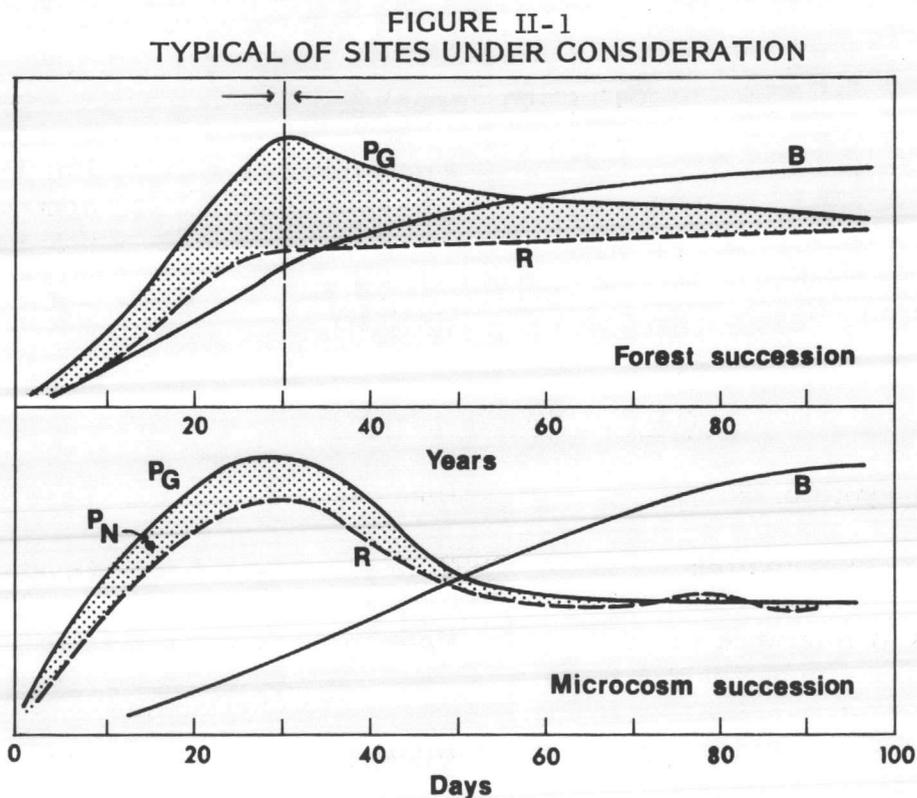


Fig. II-1. Comparison of the energetics of succession in a forest and a laboratory microcosm. P_G , gross production; P_N , net production; R , total community respiration; B , total biomass.

The following tables (Table II-15 and II-16) was provided by Mr. C. F. Russell, Director, Natural Resources and Environmental Affairs, a division of the Base Maintenance Office. This table from the forest management plan of previous years, describes the total acreage in loblolly and loblolly - hardwood forests, and estimated annual net growth. These figures further reflect forest productivity. Comparisons of productivity and average (but highly variable) timber sales prices reveal that the sites being evaluated are worth at least \$500.00 per acre if used for nothing but timber production.

Under the multiple use-sustained yield policy of natural resource management at Camp Lejeune, Wildlife Management is coupled with Forest Management practices. Accordingly an extract from the 1974 Conservation Report is included in the appendix.

Inventories of game and non-game species were provided by the Camp Lejeune Division of Natural Resources and Environmental Affairs.

(See Inventories I and II)

TABLE II-15

Acreage by Forest Type

Acres by Size and Class

<u>Forest Type</u>	<u>Saw-timber</u>	<u>Pole-timber</u>	<u>Seedling & Sapling</u>	<u>Non-stocked</u>	<u>Total</u>
Longleaf pine	1,275	6,428	1,773	102	9,578
Slash pine	--	22	--	--	22
Loblolly pine	18,862	9,775	4,934	150	33,721
Pone Pine	897	2,470	3,501	72	6,940
Loblolly pine -hdw.	1,840	40	123	304	2,307
Pone pine - hdw.	173	--	118	--	291
Sweet gum-water oak	913	684	62	--	1,659
White oak-red Oak, etc.	264	1,130	83	--	1,477
Cypress-Tupelo	--	17	--	--	17
Sweet bay-swamp black gum-Red Maple	<u>3,466</u>	<u>1,333</u>	<u>66</u>	<u>--</u>	<u>4,865</u>
Total	27,690	21,899	10,660	628	60,877

TABLE II-16

Growth by Products and Species Groups

The average annual net growth as determined by
projected growth and ingrowth is shown in the
table below:

Average Annual Net Growth

	<u>Cu. Ft.</u>	<u>Cords 1/</u>	<u>MBM</u>
Trees growing into poletimber size	per acre 26.36 total 1,604,718	0.356 21,672.2	
Poletimber trees that do not grow into sawtimber size	per acre 10.10 total 614,858 per acre 36.46	0.136 8,279.3 0.492	
Sub-total	total 2,219,576	29,951.5	
Poletimber trees that grow into sawtimber size	per acre total		.115 7,000.855
Sawtimber	per acre total		.230 14,001.710
Sub-total	per acre total		.345 21,002.565

1/Cu. ft. to cords (12% cu. ft.) converting factor - 74.1

(6) Controlling Factors

Quarterman and Keever (1962) describe several factors as having significant influence upon differences in forest composition, and rate of ecosystem development throughout the Southeastern coastal plain. Chief among these are soil type, fire, disturbance, and previous treatment. It is the conclusion of these authors that, "Past treatment, including kind and degree of disturbance and length of intervals between disturbance, appears to have a greater effect upon composition and structure of the forest than do any other factors". They go on to state that, "Disturbance of many kinds have been so general and so frequent in the Coastal Plain that one must assume all forests, whether of pine or hardwood, to be second growth. Heyward (1939) doubts that even one acre of longleaf pine in the Coastal Plain has completely escaped fire during its development. In this study, no forests were found that failed to exhibit evidence of some form of disturbance". They go on to conclude elsewhere that, "Once a hardwood community is established, it may survive a considerable degree of disturbance". This persistence is one measure of ecological stability, the latter being an important justification for preservation at a time when environmental changes and direct human activity are reducing biological diversity and stability. If certain portions of the landscape are to be converted from productive natural forests to housing areas, it would be desirable to manage surrounding areas in such a way as to optimize for hardwood forests.

In recent years the southern pine beetle has decimated extensive areas of southern pine forests. Timber losses are in the millions of dollars. The forest management report cited earlier discusses efforts to control this epidemic at Camp Lejeune. The pine beetle epidemic is encouraged by present trends toward monoculture and by human disturbance. A recent M. S. degree thesis submitted to the Department of Environmental Sciences and Engineering, School of Public Health, The University of North Carolina, Chapel Hill, North Carolina, reviews the factors influencing pine beetle infestation and control. (J. Shapiro, 1974).

The sites proposed for housing development exhibited evidence of recent cutting.

(7) Endangered, Threatened, and Rare Species

Identification of rare and endangered species and their habitats in North Carolina has progressed rapidly and recently to a level of understanding which is extremely useful to this analysis. The Division of Natural Resources and Environmental Affairs at Camp Lejeune has initiated an Endangered Species Program which is described in their 1974 Conservation Report. Several important species as identified in the report are:

Red Cockaded Woodpecker

The red cockaded woodpecker is present within pine forests of the area. This small woodpecker subsists on insects which attack pine trees and is very important in controlling these tree predators. Nesting cavities utilized by these birds are always in over mature pine trees with red heart disease.

Alligator

Alligators are present within wetland areas and have increased in number as poaching has decreased. Local protection to prohibit the taking of alligators began in 1958. Wetland areas are receiving protection from drainage and channelization which will insure favorable habitat for the alligator.

Osprey

The osprey is a fairly common summer visitor to the area. Thirty-two active nests were observed during the spring of 1973. Eight artificial nesting platforms were established in 1973 to provide nesting sites to replace nesting trees that had been previously blown down by strong winds.

Bald Eagle

A depleted species. Occasional sightings have been made during the last several years. These sightings are thought to be those of two known nesting pairs in a nearby National Forest.

Carolina Cougar

A depleted species which formerly was very common. Very rare and infrequent sightings have been made in the past five years. The retention of pocosins, bays, and inaccessible swamps provide acceptable habitat for this large predator.

Dusky Seaside Sparrow

The bird is a regular migrant along coastal salt marshes during the winter. Some birds probably over-winter in the salt marshes during winters of milder temperatures. The salt marsh habitat of these birds has been protected from drainage and channelization.

In addition to the above listed species, the Logger Head Sea Turtle is also being studied.

Dr. C. R. Bell, Professor of Botany and Director of the North Carolina Botanical Garden at The University of North Carolina prepared the list of endangered plant species in North Carolina. They are set forth in Table II-17.

A comprehensive list of approximately 2,500 endangered and threatened plant species of the United States has been prepared by the Smithsonian Institution. This list includes approximately 57 species of which many occur in both North and South Carolina. This list is not yet available to the public. In addition to inventories of rare and

endangered species, the North Carolina Land Policy Council in its' report of July 1974 entitled "Criteria For The Identification of Areas of Environmental Concern" has defined rare or endangered animal species habitat.

In summary, inventory lists of rare and endangered plant and animal species are available. The Natural Resources and Environmental Affairs Department of Base Maintenance has already initiated an endangered species program. In addition to the Division Director, the Division includes one forester, one assistant forester, four forest technicians, a fish and wildlife manager, one wildlife technician and a base ecologist. The inventories established programs and staff appear to be sufficient to insure protection of rare and endangered species.

Very few of the species are present or restricted to the loblolly pine forests which dominate the proposed building sites. These few which may occur there are not seriously threatened if comparable areas of similar forests are reserved for preservation or low density recreation activity. This forest type is a developmental stage, which is itself inherently unstable. It persists for less than one half century. Proper forest management can insure reoccurrence of this habitat and continuance of populations of the species which comprise these successional forests.

TABLE II-17

ENDANGERED SPECIES IN NORTH CAROLINA

<u>Scientific Name</u>	<u>Common Name</u>
<i>Aconitum uncinatum</i>	Monkshood
<i>Aconitum reclinatum</i>	Wolfsband
<i>Adiantum pedatum</i>	Maidenhair Fern
<i>Amsonia tabernaemontana</i>	Blue Dogbane
	Blue Star
<i>Aquilegia canadensis</i>	Wild Columbine
<i>Arethusa bulbosa</i>	Bog Rose
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit
<i>Asplenium rhizophyllum</i>	Walking Fern
<i>Calapogon pulchellus</i>	Grass Pink
<i>Cercis canadensis</i>	Redbud, Judas Tree
<i>Cleistis divaricata</i>	Rosebud Orchid
<i>Cypripedium acaule</i>	Pink Moccasin Flower
<i>Cypripedium calceolus</i> var. <i>pubescens</i>	Yellow Lady Slipper
<i>Cypripedium reginae</i>	Showy Lady Slipper
<i>Chionanthus virginicus</i>	Fringe Tree Graybeard
<i>Cornus florida</i>	Flowering Dogwood
<i>Dicentra cucullaria</i>	Dutchman's Breeches
<i>Dionaea muscipula</i>	Venus' Flytrap
<i>Dodecatheon meadia</i>	Shooting Star
<i>Epigaea repens</i>	Trailing Arbutus Mayflower
<i>Gentiana crinita</i>	Fringed Gentian
<i>Gentiana quinquefolia</i>	Ague-weed Stiff Gentian
<i>Gentiana villosa</i>	Sampson's Snake root
<i>Gentiana saponaria</i>	Soapwort Gentian
<i>Goodyera pubescens</i>	Rattlesnake Plantain
<i>Habenaria lacera</i>	Green Fringed Orchid
<i>Habenaria psycodes</i>	Small Purple Fringed Orchid
<i>Habenaria peramoena</i>	Purple Fringless Orchid
<i>Habenaria blephariglottis</i>	White Fringed Orchid
<i>Habenaria ciliaris</i>	Yellow Fringed Orchid
<i>Hepatica acutiloba</i>	Liverwort
<i>Hepatica americana</i>	Liverwort
<i>Ilex opaca</i>	American Holly
<i>Isotria verticillata</i>	Large Whorled Pogonia

Scientific NameCommon Name

<i>Kalmia latifolia</i>	Mt. Laurel Calico Bush
<i>Leiophyllum buxifolium</i>	Sand Myrtle
<i>Lilium grayi</i>	Orange Bell Lily
<i>Lilium canadense</i>	Canada Lily
	Meadow Lily
<i>Lilium superbum</i>	Turk's Cap Lily
<i>Lilium michauxii</i>	Michaux's Lily
	Carolina Lily
<i>Liparis lilifolia</i>	Lily-leaved Twayblade
<i>Listera smalli</i>	Kidney-Leaf Twayblade
<i>Lobelia cardinalis</i>	Cardinal Flower
<i>Lupinus perennis</i>	Lupine
<i>Lycopodium clavatum</i>	Running Clubmoss
<i>Lycopodium obscurum</i>	Groundpine
<i>Mertensia virginica</i>	Va. Bluebells
<i>Orchis spectabilis</i>	Showy Orchis
<i>Panax quinquefolius</i>	Ginseng
<i>Podophyllum peltatum</i>	Mayapple
<i>Pogonia ophioglossoides</i>	Rose-crested Orchid
<i>Polygonatum biflorum</i>	Solomon's Seal
<i>Pyxidantha barbulate</i>	Pixie Moss
<i>Rhododendron maximum</i>	Rosebay Great Laurel
<i>Rhododendron catawbiense</i>	Purple Laurel
<i>Rhododendron vaseyi</i>	Pinkshell Azalea
<i>Rhododendron calendulaceum</i>	Flame Azalea
<i>Rhododendron nudiflorum</i>	Pinxter-flower
<i>Rhododendron atlanticum</i>	Dwarf Azalea
<i>Rhododendron viscosum</i>	Clammy Honeysuckle
<i>Sanguinaria canadensis</i>	Bloodroot
<i>Sarracenia flava</i>	Yellow Pitcher Plant
<i>Sarracenia rubra</i>	Sweet Pitcher Plant
<i>Sarracenia minor</i>	Hooded Pitcher Plant
<i>Sarracenia purpurea</i>	Flytrap, Pitcher Plant
<i>Shortia galacifolia</i>	Oconee Bells
<i>Spiranthes cernua</i>	Nodding Ladies' Tresses
<i>Stewartia malacodendron</i>	Silky Camellia
<i>Thermopsis vollisa</i>	Aaron's Rod Bush Pea
<i>Tipularia discolor</i>	Crane-fly Orchid
<i>Trillium cuneatum</i>	Trillium
<i>Trillium discolor</i>	Trillium
<i>Trillium cernuum</i>	Nodding Trillium

Scientific Name

Common Name

Trillium catesbaei	Catesby's Trillium
Trillium erectum	Wake Robin
Trillium vaseyi	Wake Robin
Trillium undulatum	Painted Trillium
Trillium grandiflorum	Large Flowered Trillium
Triphora trianthophora	Three Birds Orchid
Uniola paniculata	Sea Oats
Viola pedata	Bird-foot Violet
Leucothoe axillaris	Fetterbush
Leucothoe recurva	Leucothoe
Leucothoe racemosa	Fetterbush
Juniperus virginiana	Red Cedar
Pinus strobus	White Pine
Tsuga canadensis	Eastern Hemlock
Tsuga caroliniana	Carolina Hemlock

INVENTORY I

Inventory of Present Nongame Species at Camp Lejeune

Nongame wildlife species comprizes the largest amount of valuable wildlife resources. They receive less interest from the general public. However, their great involvement in the physical well being of the total environment is of no less importance than that of game species. Management, care, and protection of these valuable nongame resources is planned now and for the future.

MAMMALS

(Other than game and fur bearers)

	<u>Number of Species</u>
Shrews	3
Moles	2
Bats	10
Flying Squirrel	1
Harvest Mice	1
White Footed Mice	1
Wood Rat	1
Rice Rat	1
Cotton Rat	1
Lemmings	1
Voies	1
Old World Rats	2
Jumping Mice	1
Armadillo	1

BIRDS

	<u>Number of Species</u>
Loons	2
Grebes	3
Shearwaters and Fulmars	4
Storm Petrels	2
Tropic - Birds	1
Pelicans	1
Gannets	1
Cormorants	1
Darters	1
Hérons and Bitterns	8
Swans	1
Geese	1
Vultures	2
Short-winged Hawks	2
Buteos	4
Eagles	1
Harriers	1
Ospreys	1
Falcons	2
Oyster - Catchers	1
Plovers and Turnstones	6
Sandpipers	16
Phalarope	2
Jaegers	2
Gulls	5
Terns	8
Skimmers	1
Owls	4
Goatsuckers	3
Swifts	1
Humming Birds	1
Kingfishers	1
Woodpeckers	7
Flycatchers	5
Larks	1
Swallows	5
Crows and Jays	4
Titmice	2
Nuthatches	2
Wrens	4

BIRDS

	<u>Number of Species</u>
Mockingbirds and Thrashers	3
Thrushes, Robins, Bluebirds	6
Gnatcatchers and Kinglets	2
Pipits	1
Waxwings	1
Shrikes	1
Starlings	1
Vireos	6
Wood Warblers	24
Weaver Finches	1
Meadowlarks, Blackbirds, and Orioles	9
Tanagers	1
Grosbeaks, Finches, Sparrows, and Buntings	24

INVENTORY II

Inventory of Present Game Species at Camp Lejeune

A forest-wide inventory of present game species was conducted in FY 73. Fourteen wildlife units were established for the purpose of formulating management area designation for featuring game species.

Each wildlife unit was inventoried and this data was recorded.

1. Big Game Animals

Black Bear
White-Tailed Deer

2. Upland Game Birds

Bobwhite Quail
Morning Dove
Wild Turkey

3. Upland Game Mannals

Cotton-Tailed Rabbit
Marsh Rabbit
Grey Squirrel
Fox Squirrel

4. Shorebirds and Marsh Birds

Wilson's Snipe
Clapper Rail
Coots
Gallinule
Woodcock

5. Waterfowl

Ducks, Geese, and Mergansers

Baldpate

Black Duck

Bufflehead

Canvasback

Goldeneye

Mallard

Pintail

Redhead

Ring-necked Duck

Ruddy Duck

Lesser Scaup

American Scoter

Surf Scoter

Green-winged Teal

Wood Duck

Hooded Merganser

Red-breasted Merganser

6. Furbearers and Predators

Raccoon

Opossum

Striped Skunk

Mink

Weasel

River Otter

Muskrat

Grey Fox

Red Fox

Bobcat

O. ENVIRONMENTAL SAFETY

1. Existing Ambient Noise

The primary sources of noise which effect the three housing sites are motor vehicles, aircraft and trains. Since all three sites are presently undeveloped there is no noise source within the site boundaries.

There have been no actual measurements made at the three sites to determine the existing noise levels, however all of the sites have been evaluated using the U. S. Department of Housing and Urban Development's Noise Assessment Guidelines, August 1971.

The HUD Guidelines states that in order to evaluate a site's exposure to aircraft noise, all airports within 15 miles should be considered.

There are two airports in the Jacksonville area: the Albert J. Ellis County Airport and the Marine Corps Air Station, New River (Helicopter). The County Airport is just beyond the 15 mile radius and therefore does not affect the sites. The New River Air Station is approximately 19,000 feet from the Tarawa Terrace Site, 18,000 feet from the Paradise Point Site, and 26,000 feet from the Berkeley Manor Site. The Navy Design Manual (DM-35) for family housing states that any site under 4,500 feet from a runway requires submission of detailed justification to NAVFAC HQ. These sites are clearly not affected by this requirement. They are however, affected by the regulation in DM-35 which states "Based on the procedures in Land Use Planning With Respect to Aircraft Noises

NAVFAC P-98, all family housing shall be sited in Zone No. 1 unless a waiver is obtained from NAVFAC HQ. "

Exhibit II-48 illustrates the flight pattern for the MCAS and Exhibit II-49 illustrates the Composite Noise Zones. The Composite Noise Zones were prepared for LANTDIV by acoustical consultants Bolt Baranek and Newman, the same consultants that prepared the HUD Guidelines. As illustrated, the sites are all within Zone 1.

The guidelines require that sites within 3000 feet of a railroad line be evaluated for exposure to railway noise. The Tarawa Terrace Site is 600 feet from the Camp Lejeune Railroad, a spur of the Seaboard Coast Line Railroad and the Berkeley Manor site is approximately 2500 feet from the same spur. There are only two or three trains on this spur a week which bring supplies to the Base. These are all during the day.

The Guideline indicate that the nighttime (10:00 PM - 7:00 AM) operations are the controlling factors which determine site acceptability. Because there are no nighttime operations on these spurs and because both sites are "shielded" from exposure to railroad noise by dense woods, both sites fall within the "Clearly Acceptable" category as outlined in the HUD manual.

Using the same guidelines mentioned before all three sites were investigated for external traffic noise. All major roads within 1000 feet

of the boundary lines were investigated. Using the projected traffic figures shown on Exhibit II-31 and in Section II-L and the formulas given in the HUD guidelines and assuming that no dwelling unit will be built within 150 feet of the centerline of the street, all of the sites fall within the "Clearly Acceptable" or "Normally Acceptable" categories. See Appendix VII for graphical evaluation of each street.

*TABLE II-18

SITE EXPOSURE TO RAILWAY NOISE

Distance from Site to Right-of-Way
(Possibly adjusted for number of nighttime operations)

Line-of-Sight Exposure	Shielded Exposure	Acceptability Category
More than 3000 feet	More than 500 feet	Clearly Acceptable
Between 601 and 3000 feet	Between 101 and 500 feet	Normally Acceptable
Between 101 and 600 feet	Between 51 and 100 feet	Normally Unacceptable
Less than 100 feet	Less than 50 feet	Cearly Unacceptable

EVALUATION OF SITE EXPOSURE TO RAILWAY NOISE

The distances in Table II-18 were arrived at with the assumption that there are 10 or more nighttime (10:00p. m. - 7:00a. m.) railway operations.

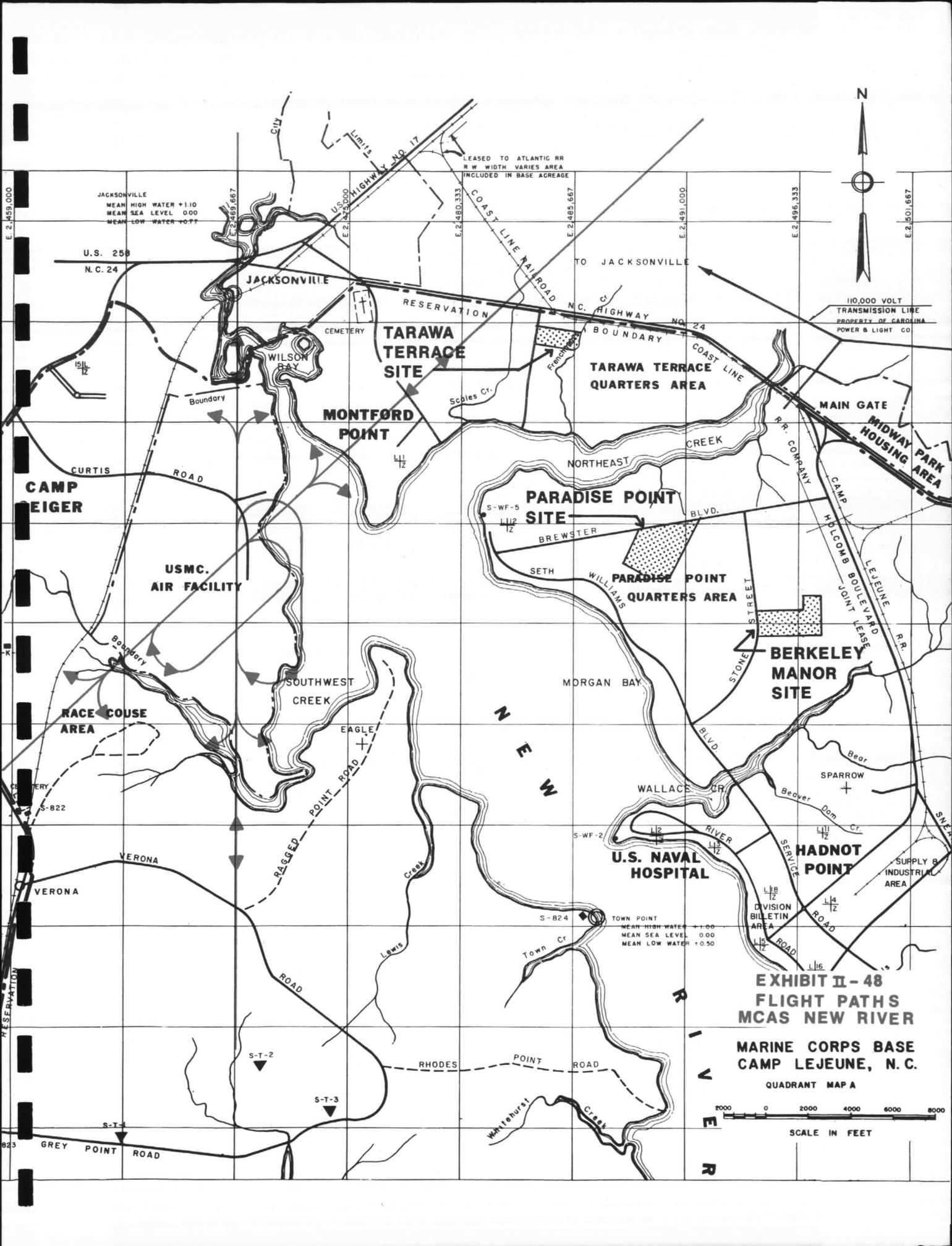
If the railway has 10 or more nighttime operations, proceed to Table II-18 for an immediate evaluation of the site's exposure to noise from that railway.

BUT

if a railway has fewer than 10 nighttime operations, multiply the distance from the site to that railway by the appropriate adjustment factor; then proceed to Table II-18

Number of Nighttime Railway Operations	Adjustment Factor
1 - 2 operations	3.3
3 - 5 operations	1.7
6 - 9 operations	1.2

*Source: U. S. Department of Housing and Urban Development "Noise Assessment Guidelines, Aug. 1971."



JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.77

LEASED TO ATLANTIC RR
 R W WIDTH VARIES AREA
 INCLUDED IN BASE ACREAGE

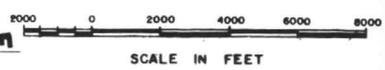
110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO

TOWN POINT
 MEAN HIGH WATER +1.00
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.50

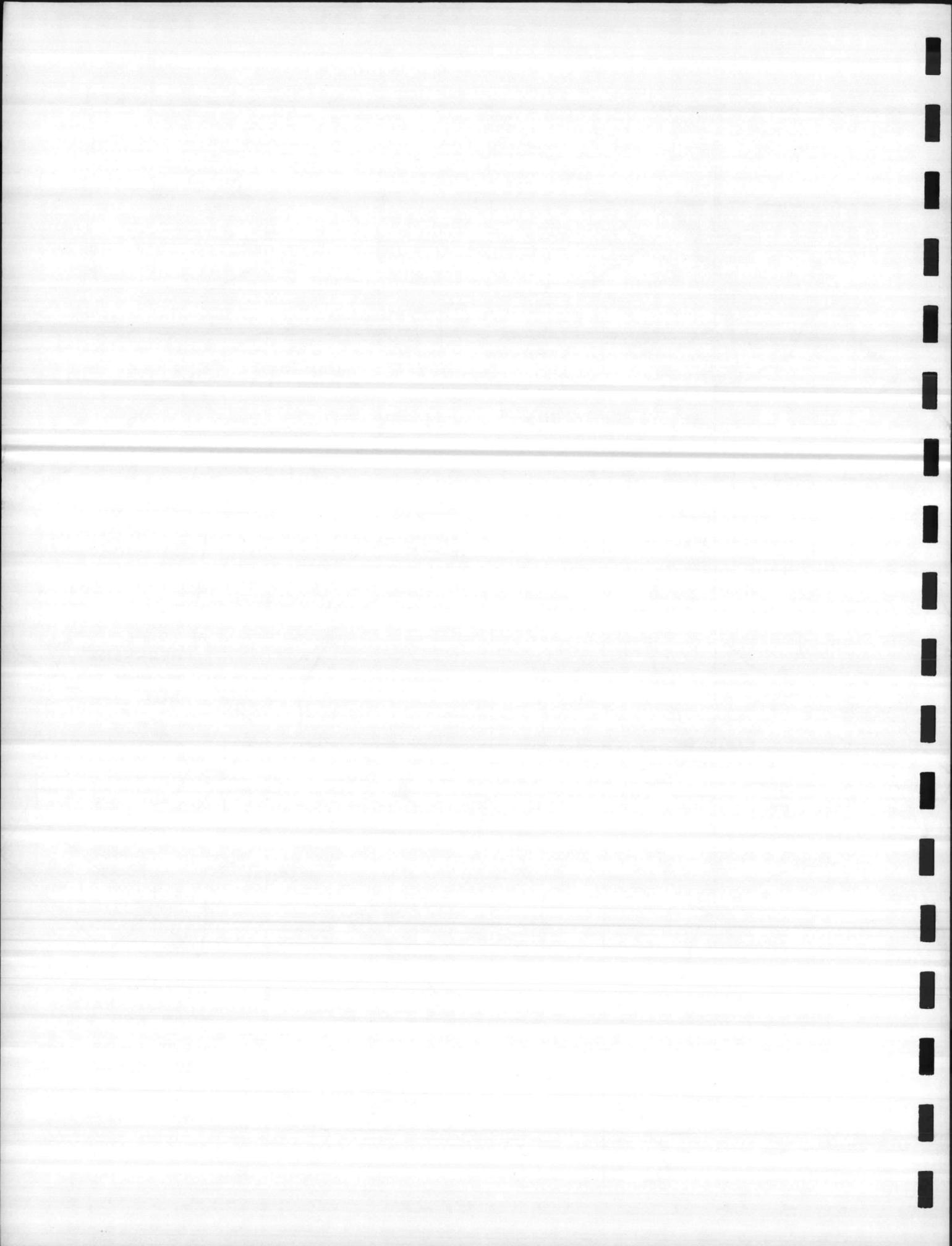
EXHIBIT II - 48
FLIGHT PATHS
MCAS NEW RIVER

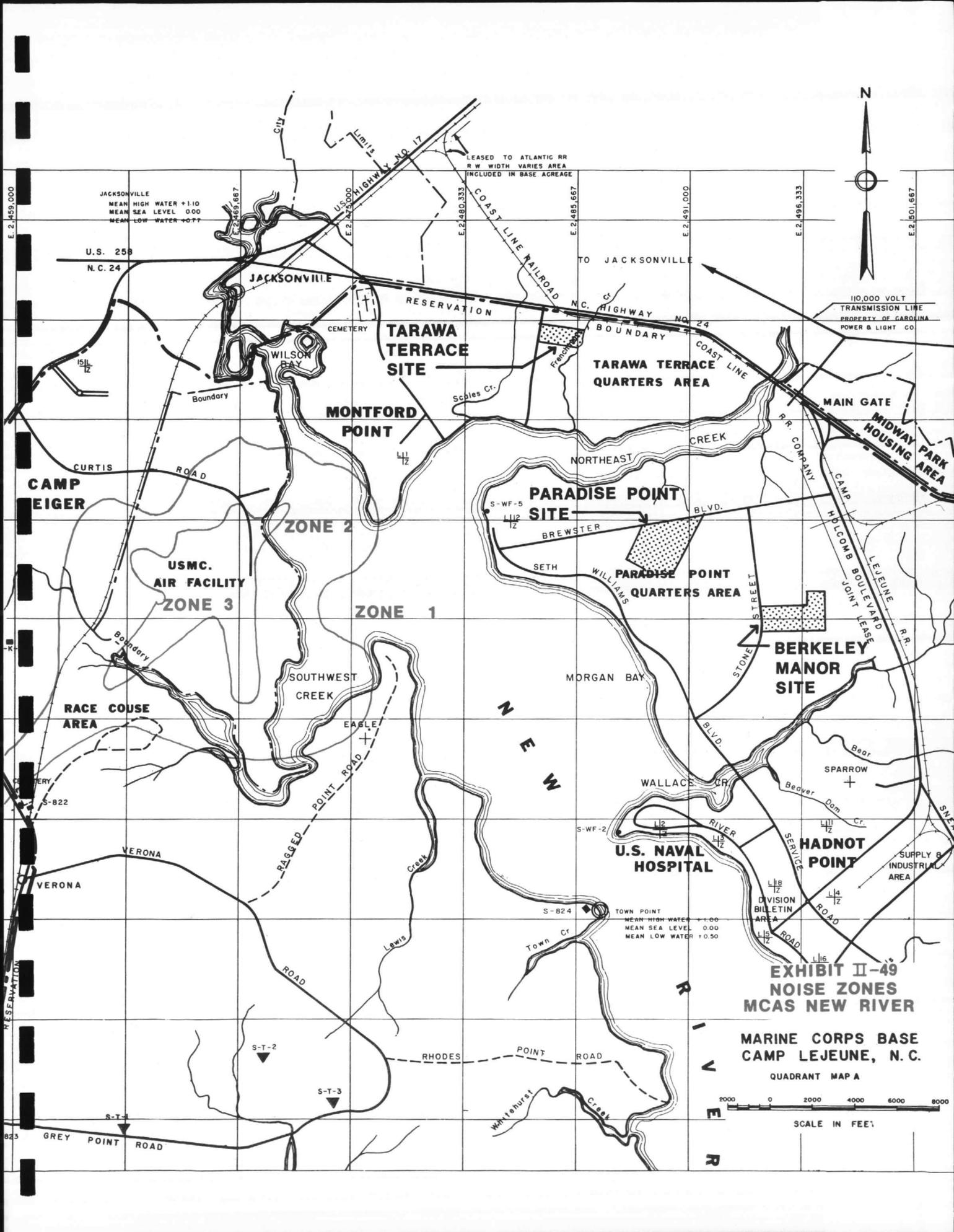
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

QUADRANT MAP A



SCALE IN FEET





JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.77

LEASED TO ATLANTIC RR
 R.W. WIDTH VARIES AREA
 INCLUDED IN BASE ACREAGE

110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO.

U.S. 258
 N.C. 24

JACKSONVILLE

TARAWA
 TERRACE
 SITE

TARAWA TERRACE
 QUARTERS AREA

MONTFORD
 POINT

PARADISE POINT
 SITE

PARADISE POINT
 QUARTERS AREA

BERKELEY
 MANOR
 SITE

USMC.
 AIR FACILITY
 ZONE 3

ZONE 2

ZONE 1

RACE COUSE
 AREA

U.S. NAVAL
 HOSPITAL

HADNOT
 POINT

EXHIBIT II-49
 NOISE ZONES
 MCAS NEW RIVER

MARINE CORPS BASE
 CAMP LEJEUNE, N.C.

QUADRANT MAP A

SCALE IN FEET
 0 2000 4000 6000 8000

VERONA

VERONA

N
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R
 I
 V
 E
 R

S-T-2

S-T-3

S-T-4

S-WF-5

S-WF-2

S-B24

TOWN POINT
 MEAN HIGH WATER +1.00
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.50

GREY POINT ROAD

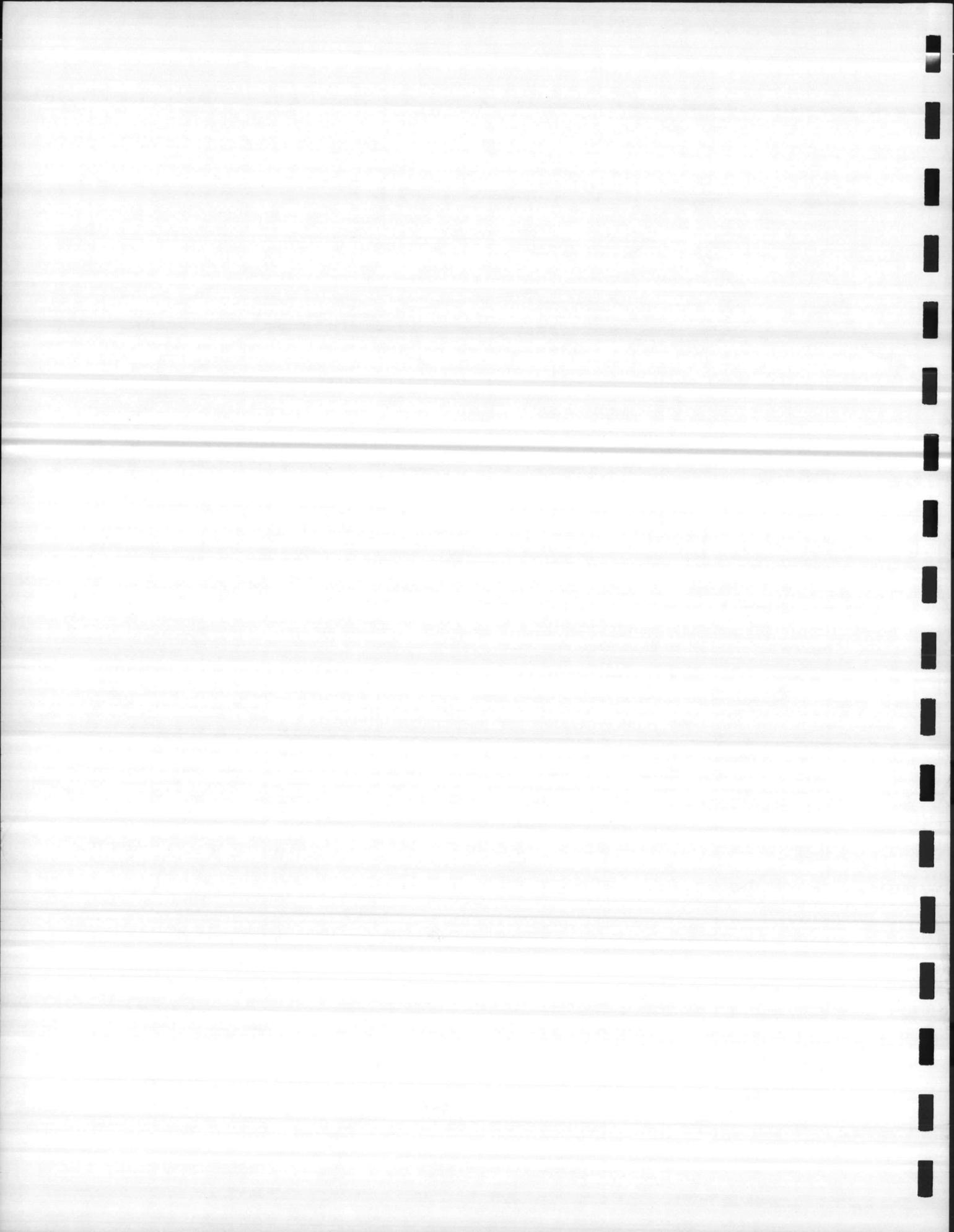
RHODES POINT ROAD

Whitewater Creek

SERVICE ROAD

DIVISION BULLETIN AREA

ROAD



2. Existing Explosive Hazards

Explosives are generally brought to Camp Lejeune by truck, arriving by various routes. The closest ammunition storage to the proposed housing site is the Field Ammo Dump (FAD) on Piney Green Road. This FAD consists of 14 fuse and detonator magazines and a central open storage yard. It is closest to the Berkeley Manor housing site, a distance of approximately 8,000 feet.

All the ammunition stored in the FAD magazines is of the "non-sympathetic" type, that is, explosion of one magazine will not set off an explosion in another magazine. The largest magazine holds 10,000 pounds of high explosives (HE) and there are generally 600 pounds of HE in the open yard.

Using the Navy document, OP-5, Volume 1, Fourth Revision, 15 October 1974, Table 5-8 for Class 7, high explosives, the minimum safe distance between a magazine with 10,000 pounds HE and an inhabited building is 865 feet. This is known as the Explosives Safety Quantity Distance (ESQD) arc. From magazine number S-FD-5, located at the northwest corner of the FAD, the arc extends a distance of 865 feet. The ESQD arc, therefore, is approximately 7,135 feet away from the proposed housing site.

P. AIR RESOURCES

1 Existing Micrometeorology

Data for this report is taken from information compiled at the meteorological station at the Marine Corp Air Station - New River. The air Station is located about approximately 4 miles west of the housing sites.

The Jacksonville area has averaged about 2400 degree days of heating in winter (based on 65°F) and approximately 1500 cooling hours in summer.

The average winter temperature is about 54. Jacksonville has a ground elevation 24 feet and latitude of 34°5'. The median of annual extreme temperature is 17° and 97 1/2% of the time it is 25°. During the summer, a high of 94°F occurs 1% of the time.

Camp Lejeune's geographic position with respect to the principal storm tracks is especially favorable, being south of the average path of storms originating in higher latitudes and north of the usual track of hurricanes and other tropical storms.

The prevailing primary wind is from southwest.

2. Existing Air Resources and Quality

There are no air quality sampling stations at Camp Lejeune. The only two stations in the area are in Jacksonville. They are monitored by the North Carolina Division of Environmental Management. The station located at Jacksonville City Hall measures only particulates and the station located at the sewage treatment plant measures particulates, SO_x and NO_x .

The mean arithmetic, geometric and maximum readings, as shown in Table II-19, reveal measurements well under the standards as set by EPA. Air pollution standards showing primary and secondary levels are shown in Table II-20.

Some pollutants originate from natural sources and include salt nuclei in water vapor drifts from the Atlantic Ocean, organic vapors from marshlands and forests, and dusts of wilderness origin. Man-made sources such as automobiles and helicopters produce pollutants composed of suspended particulates (SP), hydrocarbons (HC), nitrogen oxides (NO_x) and carbon monoxide (CO).

The ten steam generating plants at Camp Lejeune burn coal 50% of the time and No. 6 fuel oil 50% of the time. These are the major sources of air pollution on the Base. When burning coal, the power plant is the largest contributor of SO_x and NO_x and particulates emissions. However,

the prevailing wind from the Southwest takes the emissions away from the proposed housing sites. Also plans are currently underway for adding electrostatic precipitators to the exhaust stacks of the steam plant and thus reduce the emissions.

The direct, immediate and local effects upon air pollution are insignificant relative to current activities in the immediate area. Each of the proposed sites is located adjacent to high density family housing.

Incremental increases in air borne effluent during clearing construction and occupation of the housing are small relative to the total effluent produced by normal activities of the 30,000 employees within the 170 square mile military base. Since the proposed housing is replacement housing and will have improved insulation over that of "inadequate housing", a reduction in air pollutants will most probably result. All open air burning has been banned since 1972; therefore, land clearing and construction activity should not create air pollution problems.

Herbicide and pesticide sprays are not used indiscriminately. Applications of least persistent approved herbicides and pesticides are based upon insect counts in specific areas and are applied via a new ultra low volume sprayer.

All seven sewage treatment plants on the base provide secondary treatment and operate at an efficiency of approximately 90%. There is no reason to believe that the proposed housing project will result in a re-

duction in standards. All sewage plants on base operate under National Pollutant Discharge Elimination System permits and airborne pollutants and odors meet the requirements of this system.

TABLE II-19

EXISTING AIR QUALITY

JACKSONVILLE CITY HALL RECORDING STATION

PARTICULATE:	Arithmetic Mean	58 ug/M ³
	Geometric Mean	53
	Max. Reading, 24 hr.	137

SEWAGE TREATMENT PLANT RECORDING STATION

PARTICULATE:	Arithmetic Mean	46 ug/M ³
	Geometric Mean	41
	Max. Reading, 24 hr.	145
SO _x	Arithmetic Mean	5.05 ug/M ³
	Geometric Mean	5.04
	Max. Reading, 24 hr.	8.0
NO _x	Arithmetic Mean	12.7 ug/M ³
	Geometric Mean	12.1
	Max. Reading, 24 hr.	29.0

TABLE II-20 - NATIONAL AIR QUALITY STANDARDS (3) APRIL 30, 1971

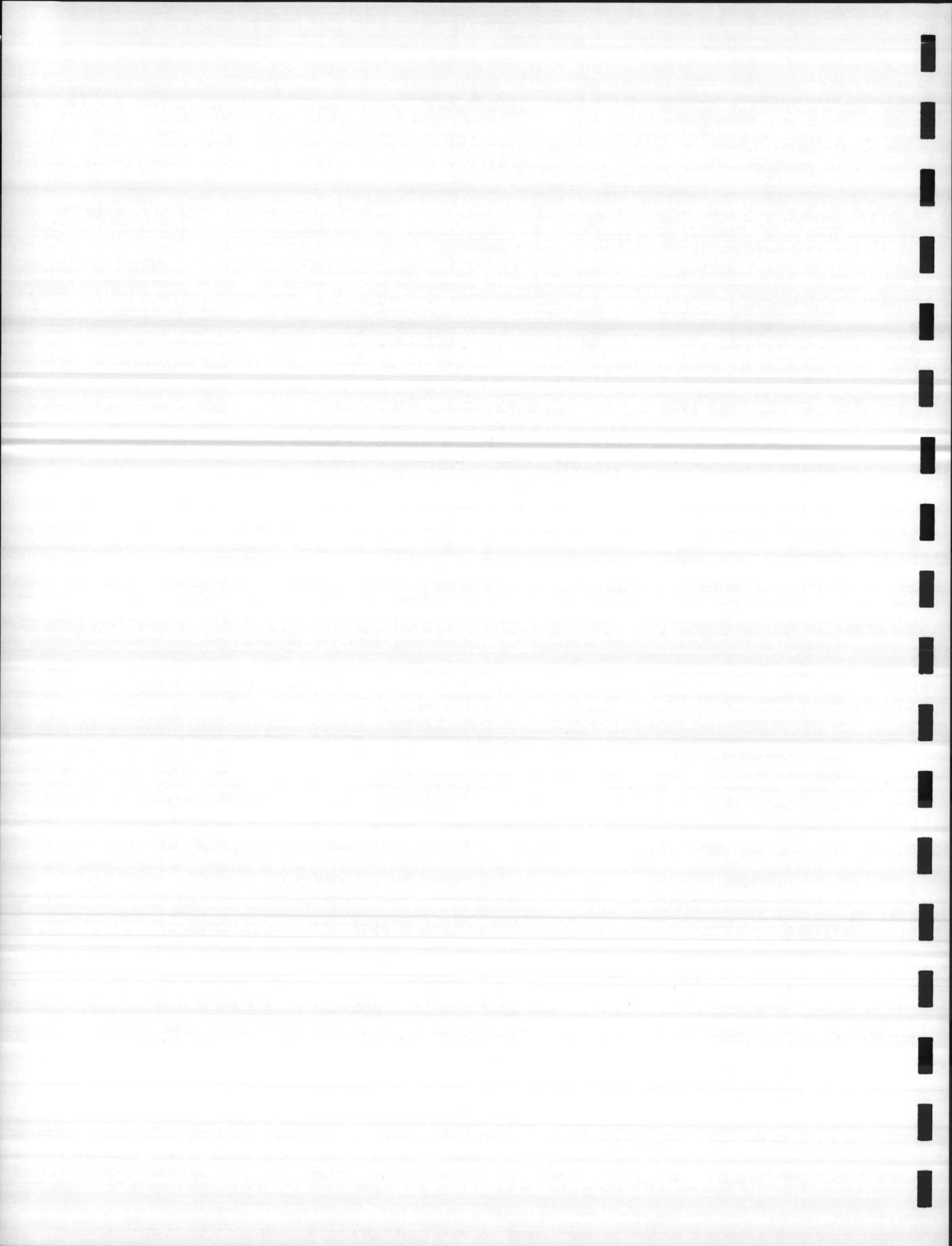
Primary standards protect the public health, secondary standards protect the public welfare.

POLLUTANT	PRIMARY CONCENTRATION ug/M ³ ; P. P. M.	SECONDARY CONCENTRATION ug/M ³ ; P. P. M.	TYPE OF MEASUREMENT
SO _X	80; 0.03 365; 0.14	60; 0.02 260; 0.1 1300; 0.5	ANNUAL ARITHMETIC MEAN MAXIMUM 24 HR. CONCENTRATION MAXIMUM 3 HR. CONCENTRATION
PARTICULATE	75; -- 260; --	60; -- 150; --	ANNUAL GEOMETRIC MEAN MAXIMUM 24 HR. CONCENTRATION
CO	10,000; 9 40,000; 35	SAME AS PRIMARY	MAXIMUM 8 HR. CONCENTRATION MAXIMUM 1 HR. CONCENTRATION
PHOTOCHEMICAL OXIDANTS	160; 0.08	SAME AS PRIMARY	MAXIMUM 1 HR. CONCENTRATION
NO _X	100; 0.05	SAME AS PRIMARY	ANNUAL ARITHMETIC MEAN
HC	160; 0.24	SAME AS PRIMARY	MAXIMUM 3 HR. CONCENTRATION (6 to 9 A.M.)



III.

RELATIONSHIP OF PROPOSED ACTION
TO LAND USE PLANS AND POLICIES
OF THE AFFECTED AREA



RELATIONSHIP OF PROPOSED ACTION TO LAND USE PLANS AND
POLICIES OF THE AFFECTED AREA

A. Relationship to Policies of County and Regional Organizations

Onslow County does not have an overall land use plan or a master plan. Discussions with the county manager and county planner indicate that basically there are no county ordinances which affect any type of development within the boundaries of Camp Lejeune. For the most part, the county takes a hands-off policy regarding any camp developments unless directly requested to participate or unless a proposed action requires coordination with one of its agencies.

Under the North Carolina Coastal Area Management Act of 1974, Onslow County and the City of Jacksonville are required to develop a land use plan for the entire county and it must be adopted and submitted to the Coastal Resources Commission on or before November 23, 1975.

Created by the Management Act, a 15-member Coastal Resources Commission will oversee the implementation of mandated coastal land use planning in all twenty coastal counties and the implementation of a permit procedure for any development on lands designated as Areas of Environmental Concern. Required land use planning for Onslow County and the City of Jacksonville has been initiated. The standards and policies to be followed in the use of land and water in the coastal area will be developed by the Coastal Resources Commission and incorporated

in the Onslow County Plan.

Interim Areas of Environmental Concern have already been mapped. The New River, Northeast Creek, and the outer banks and coastal wetlands along the entire coast of Onslow County have been so designated. The designation of "Interim Areas" requires that development within these areas prior to initiation of the permit system requires notification to the Commission 60 days prior to construction. Inquiries of the Commission have indicated that at the present time there is no specific position formulated which would cover projects within Camp Lejeune. They do expect, however, that any development be consistent with state management plans.

Because the proposed project is apparently not within the Interim Areas of concern there appears to be no conflict with any of these regulations.

Camp Lejeune is located within the jurisdiction of the Neuse River Council of Governments (COG), Region P. The purpose of the COG is to promote intergovernmental planning and cooperation. Within the COG there are nine county governments and thirty-five municipal governments.

The COG has issued a Regional Development Guide, updated in June, 1974, which is to serve as an interim step in the preparation of a comprehensive plan for the area served. It basically describes existing

conditions and proposed goals and objectives for the area.

The proposed action at Camp Lejeune does not affect or conflict with any policies or objectives of the COG as set forth in the development guide.

B. Relationship to City Policies

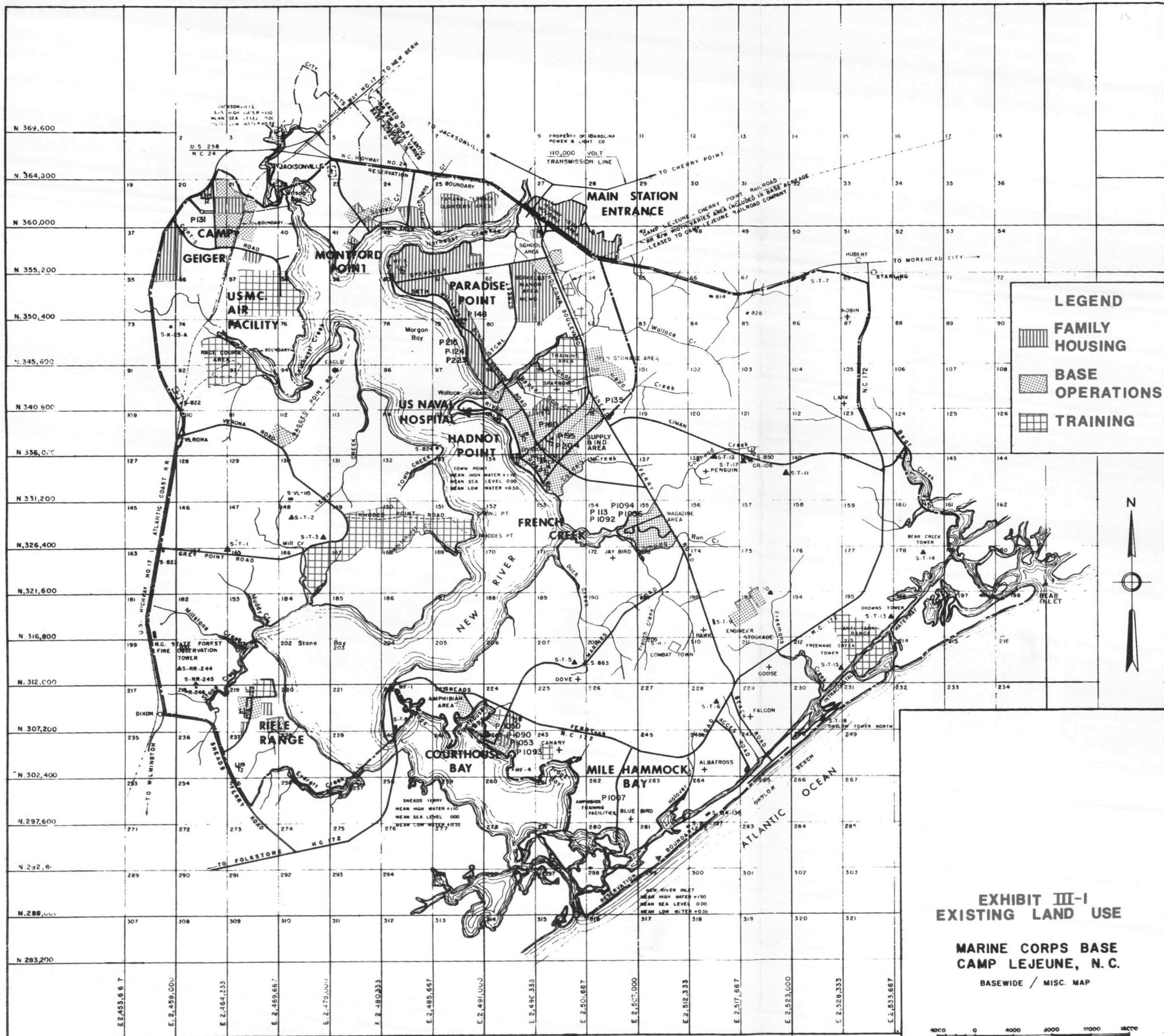
The City of Jacksonville has a Zoning Ordinance and a Subdivision Ordinance. They also have a Thoroughfare Plan prepared for them by the North Carolina Department of Transportation. The proposed housing for Camp Lejeune does not fall within the jurisdiction of any of these ordinances.

A 201 Facilities Study sponsored by the Environmental Protection Agency and the North Carolina Department of Environmental Management is now being made. This study for Jacksonville and surrounding area is to assess the existing waste water treatment facilities and to make recommendations for improvements to be made over the next 20 years. Camp Lejeune does not fall within the study area.

There is no Proposed Land Use Plan, Master Plan, or other planning document in Jacksonville which would affect the proposed action.

C. Relationship to Base Policy

There is a Master Plan for Camp Lejeune dated March, 1970, which is presently being updated. The scope of the existing plan encompasses all of the facilities at the Base with the exception of the Marine Corps Air Station, New River, and Family Housing. While the Master Plan therefore does not address itself to the family housing situation on the base, the mapping portion of the plan does indicate the family housing areas. The Existing Land Use map (Exhibit III-1) shows where the existing units are located and the Proposed Land Use map (Exhibit III-2) indicates the total area proposed for family housing. The area proposed for family housing is Paradise Point from Wallace Creek to Northeast Creek and Holcombe Boulevard to the New River; the Tarawa Terrace and Knox Trailer Park; and the Midway Park Housing Area. All of the sites under consideration are located within these areas.



LEGEND

-  FAMILY HOUSING
-  BASE OPERATIONS
-  TRAINING

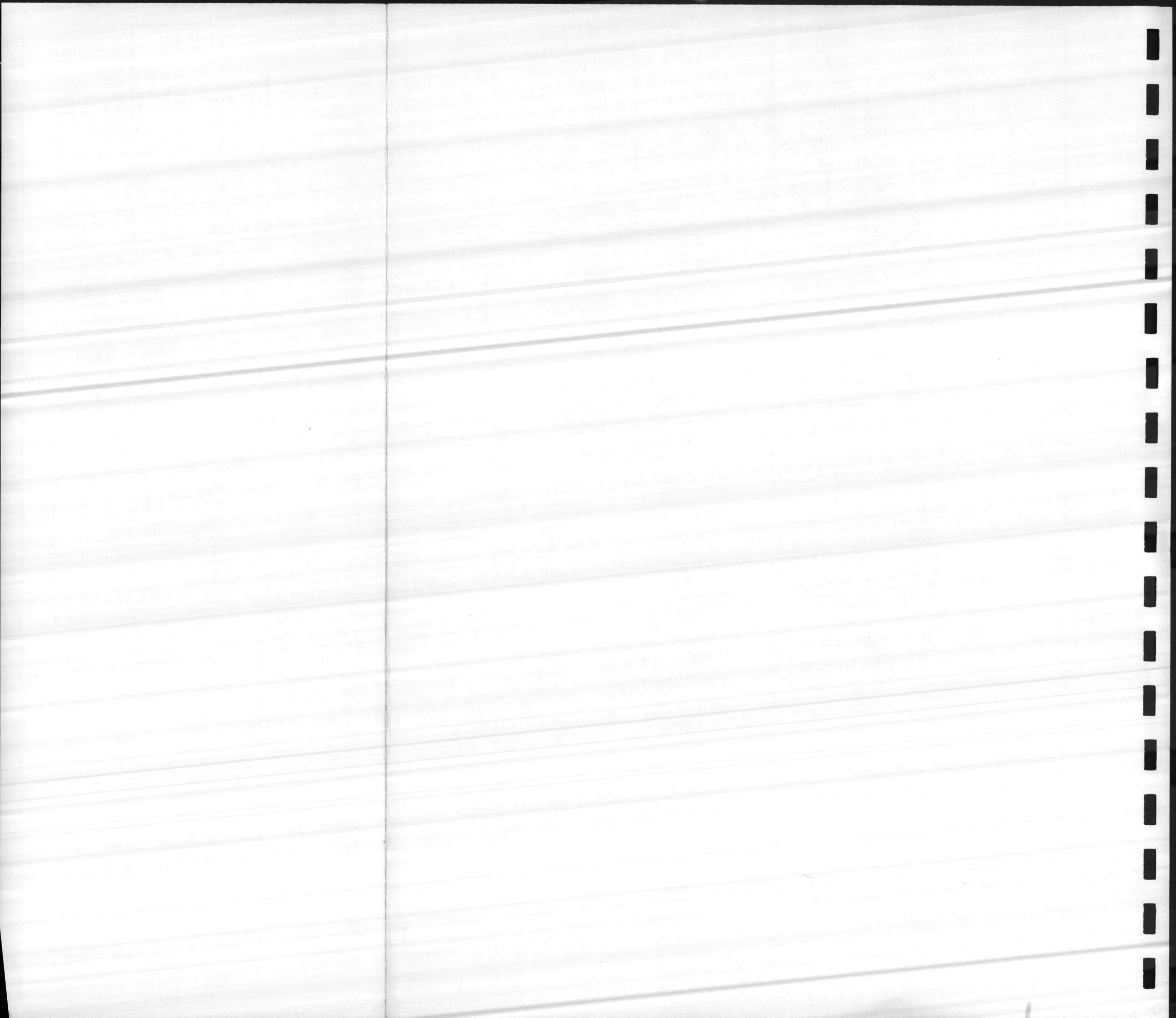
EXHIBIT III-I
EXISTING LAND USE

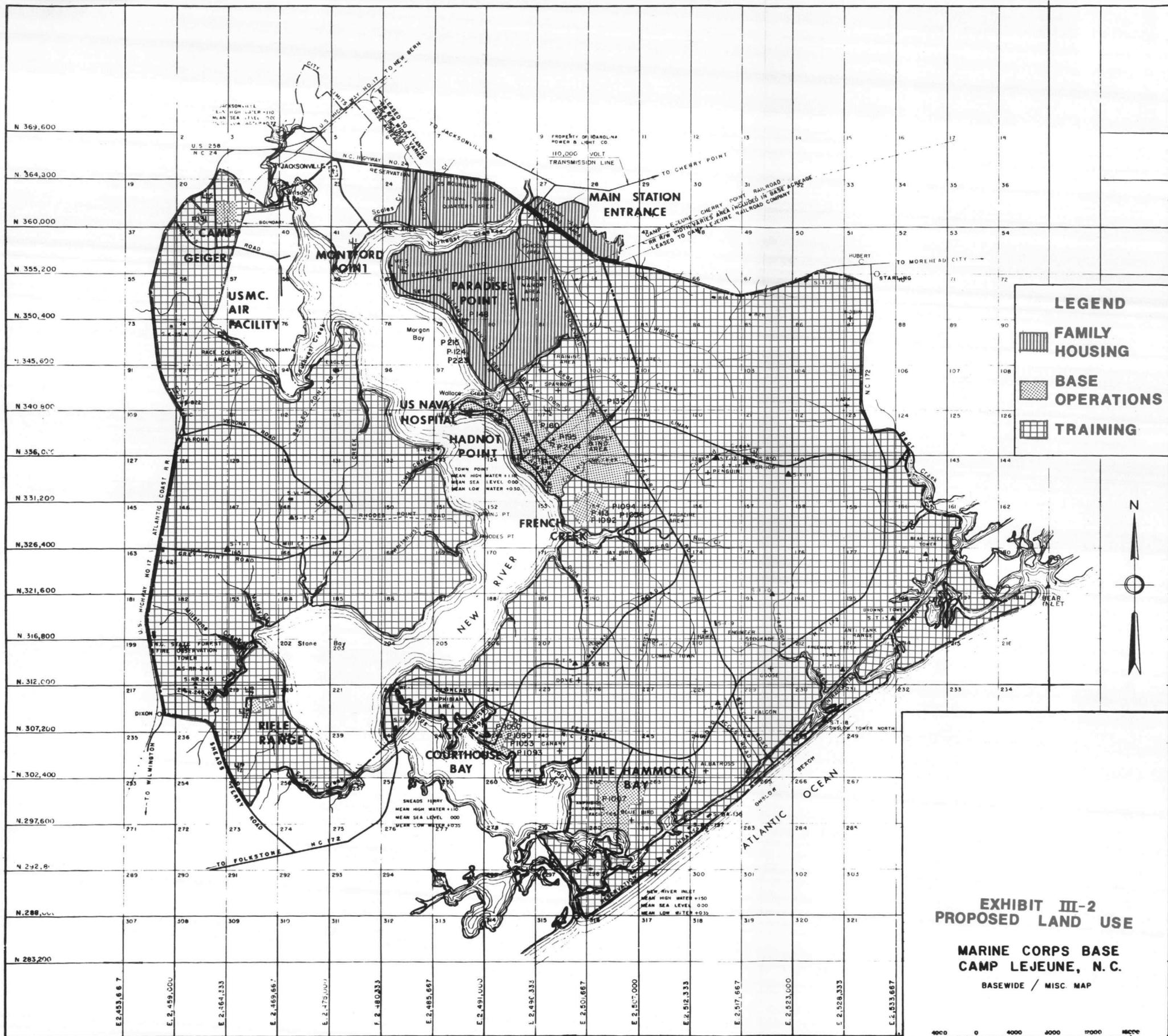
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

BASEWIDE / MISC. MAP



SCALE IN FEET

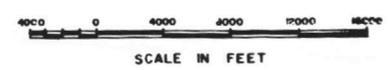




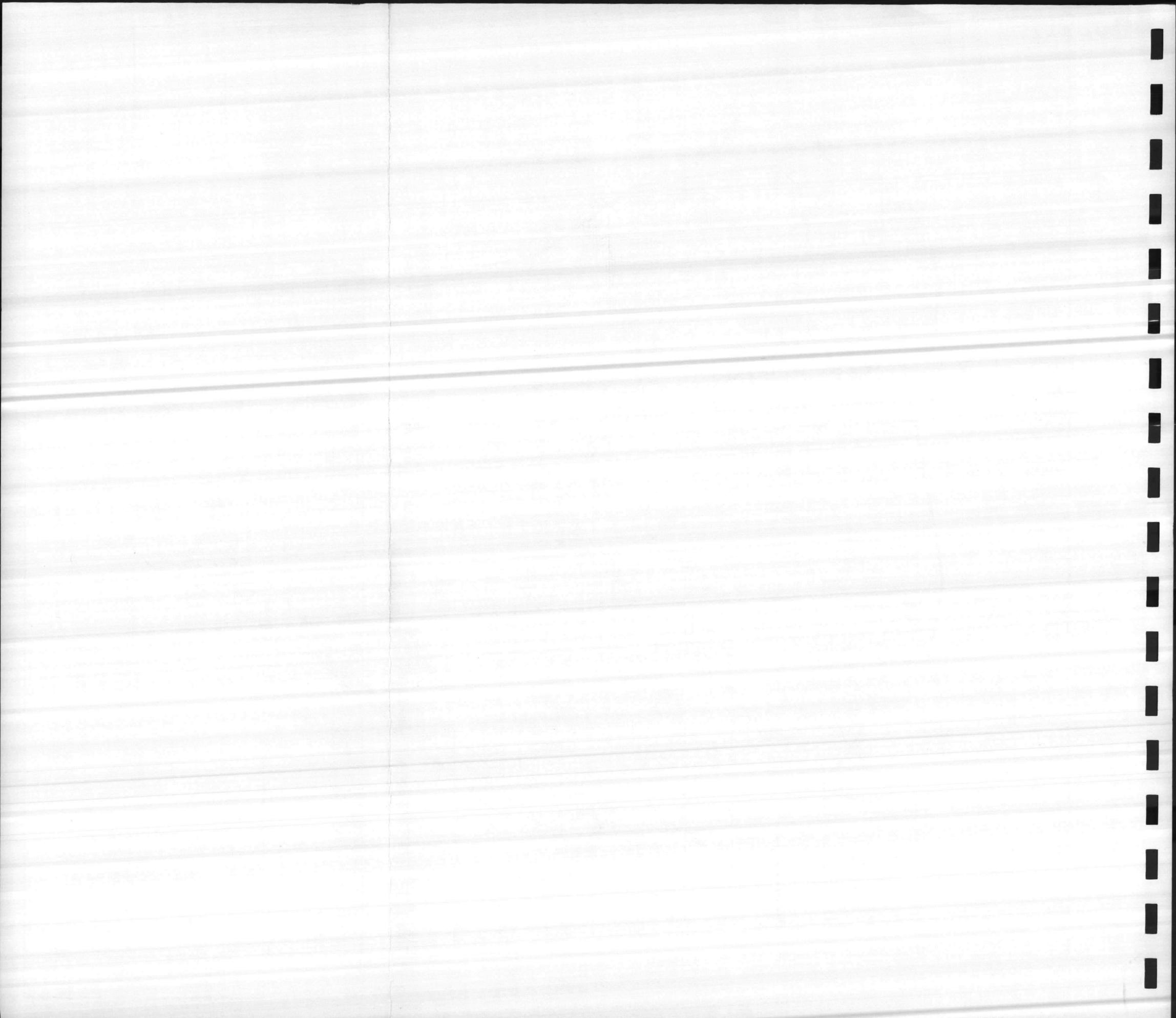
**EXHIBIT III-2
PROPOSED LAND USE**

**MARINE CORPS BASE
CAMP LEJEUNE, N.C.**

BASEWIDE / MISC. MAP

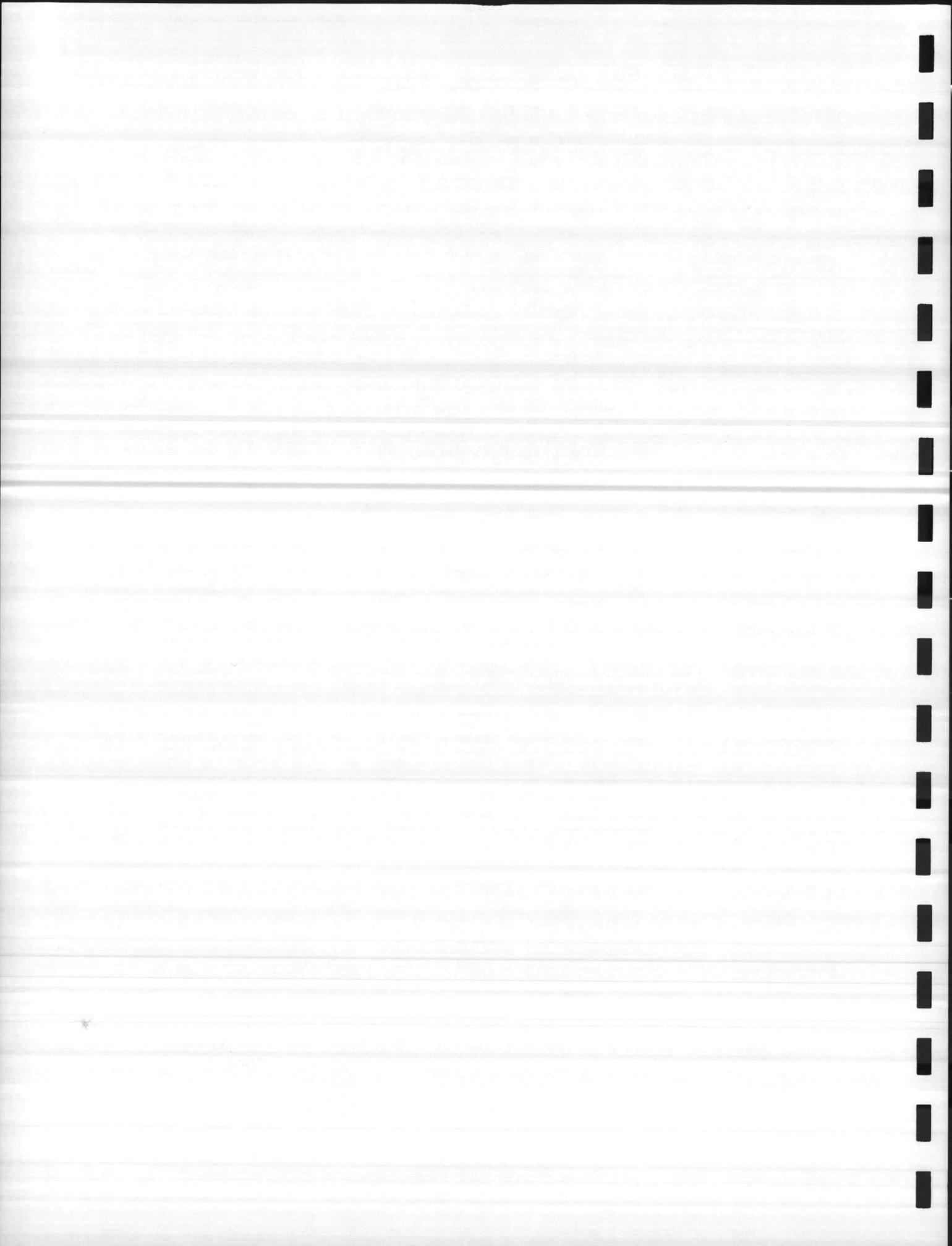


SCALE IN FEET



IV.

PROBABLE IMPACT OF THE PROPOSED ACTION
ON THE ENVIRONMENT



A. PROBABLE IMPACT ON THE COMMUNITY

The proposed action is designated by the Naval Facilities Engineering Command as replacement housing. In practice this requires the one for one demolition of inadequate units. Because of this demolition, the total military population of the area should not change nor will the on-base population change significantly. The local area housing inventory or planned construction will not be significantly impacted and neither should those community services which serve a significant number of military families, such as the Community College.

The project does impact, however, in a number of ways, but in no way which is both significant and adverse to the community. These impacts are summarized below.

Economic

Camp Lejeune is the single largest employer and industry within Onslow County. The annual payroll exceeds 250 million dollars, and the base employs 4,500 civilian workers. Onslow County has a healthy construction industry in comparison to the generally depressed industry today, and this proposed housing represents development costs of approximately \$11,500,000. This estimate is based on known construction costs and regulations which limit the average cost of all units constructed within the United States to \$27,500 per unit (1975 FY Congressional Authorization

Act). This cost includes design fees, site preparation, utilities, and other support.

The impact of this investment in housing to the local economy is obvious as it is expected that the bulk of these dollars will be spent locally. This is a positive impact for those sectors of the local economy affected: construction, building material suppliers, and home furnishings.

Business leaders in the community, represented through the Chamber of Commerce, would like to see new housing units built off-base where it would add to the tax base and help pay the costs of providing urban community services. This alternative would result in even greater economic impact on the community, but a negative impact on the Camp Lejeune mission.

Relative to the economic input then the project has a substantial positive short term impact on the environment and a slight positive long term impact. Conversely, the impact of the local economy on the project is insignificant.

Political

The only political controversy associated with the proposed action is the aforementioned attempt by the local Chamber of Commerce to alert Norfolk and Washington, D. C. decision-makers as to their preferences of building the proposed units off base.

The Chamber of Commerce also has a Military Affairs Committee.

Onslow County, which provides basic health, education and welfare social services to those requiring these services, would like to see more awareness by military leaders of the social problems and resultant services provided to military personnel.

Local leadership interviewed for input to the CEIS were universally appreciative of the opportunity to express their viewpoints on the subject.

Relative to any political controversies, the project has a slight negative short term impact on the environment but a slight positive long term impact. Conversely, the impact on the project is considered to be insignificant.

Social

Whereas the services of fire, police, water, sewer, schools, health and recreation are fully provided on-base, the services of social services, mental health, Veterans Affairs Office, community colleges, jails and courts are Onslow County responsibilities which are impacted by military personnel and their dependents. The proposed action will not significantly increase the use or need for these facilities; however, the support and cooperation of base officials in administering these services to military personnel has been described as lacking.

An obvious positive impact results from better morale of marine families occupying new and adequate quarters. The fact that on-base housing is a true value to marine families, with less cost and more amenities than similar off-base housing units is not enhanced by this action as the total number of units remain constant.

There are social advantages for both the military and civilian family in closer relationships. The local population is enhanced by the large number of stable, well-traveled middle income military families that do participate and try to improve the quality of their environment. The military population gains a real opportunity to be active and effective in community affairs where decisions made are not mandated by military missions. The proposed on-base housing does not significantly impact in this area, but the large number of military families that voluntarily live off-base in order to participate in community life is positive.

Relative to the social impact the project has a slight positive short term impact on the environment and a slight positive long term impact.

B. PROBABLE IMPACT ON BASE POPULATION

Because the proposed action is replacement housing there is definitely no impact on the total number of housing units on base. The impact, of course, is that by eliminating the unsuitable units the net housing deficit, as revealed in the annual housing survey, will be reduced.

Relative to base population then, the project will have an insignificant short term impact on the environment and a slight negative long term impact. Conversely, the impact of the base population on the project is insignificant.

C. PROBABLE IMPACT ON HISTORIC AND CULTURAL SITES

No known historical sites, structures or districts are affected by the proposed action. The Paradise Point family housing area sites are presently unused woodland and with the exception of a timber production program these sites have never been disturbed.

Relative to cultural resources ~~area~~, the project has no significant impact on the environment.

D. PROBABLE IMPACT ON RELATED FEDERAL ACTIVITIES

The proposed action, being limited to an exchange of housing units (500 constructed, 500 demolished) within existing on-base housing areas, creates no adverse impact on any known related federal activity. On a broader scale, the maintenance of the Onslow County economy is dependent upon maintaining its largest single generator of income--Camp Lejeune. Any significant reduction in personnel or mission would impact immediately and adversely in the local economy.

E. PROBABLE IMPACT ON SCHOOL SYSTEM

The impact of the proposed action to the Camp Lejeune Dependents School System could be significant. The proposed bedroom mix and location of the replacement units may add to the total school enrollment an estimated 240 pupils.

The additional 138 pupils in grades K-6 will be concentrated in the Berkeley Manor area. The Berkeley Manor school will not have the capacity to absorb all these pupils which requires either classroom construction or increased busing. If these pupils are bused, the school plant can easily absorb the increase as designed capacity in grade schools exceeds current enrollment by 584 spaces.

The Lejeune High School is presently operating at the designed capacity of 750 pupils but considered overcrowded by school administrators. Two additional classrooms would be required by the projected additional 57 pupils or arrangements could be made to handle the increase in the Junior High School where presently the enrollment is below designed capacity. Available projections state that total enrollment will remain stable for the next several years unless additional replacement or new housing units are added. The addition of any further students to the High School would definitely require expansion or the renovation and activation of the Midway Elementary School with appropriate shifts to relieve the pressures at Brewster Junior High and Lejeune High.

The existing crowding at the Tarawa Terrace I elementary school, which is now operating at 118% of capacity, would not change, whereas the Tarawa Terrace II elementary school which currently operates at 65% of capacity would probably lose additional students. Additional busing could balance enrollment between the two Tarawa Terrace schools.

Relative to school funding and school size, the proposed housing could have a slightly negative long-term impact and with regard to school busing it could have a slightly negative short-term and long-term impact. Because of the quality of the system, it will have a slightly positive short and long-term impact on the project.

F. COMMUNITY FACILITIES

1. Potential Impact on Fire Protection

Impact upon the fire protection facilities from the proposed 500 housing units will not be significant. All of the fire stations involved are situated on principal roadways with direct access to the sites from one or more directions. The close proximity of at least one of the stations makes initial response to an alarm almost immediate.

Fire company officials stated that there would be no anticipated requirement for additional equipment. There is normally some degree of difficulty in maintaining a full force of firemen; however, with the fire company at full strength no additional personnel would be required.

Water supply for fire protection, from the base water plants, is available at all three sites, and it is in ample supply.

Relative to fire protection then, the project has no significant impact on the environment. The impact of the available fire protection facilities on the project is, however, slightly beneficial.

2. Potential Impact on Police Protection

Because police protection is provided by the base Military Police, there will be no impact in-so-far-as added cost for personnel or equipment is concerned. Patrols in the housing areas are now a part of the routine

protection plan; therefore, only a minor revision to patrol routes will be required. The fact that the proposed units will be in a smaller area than if they were single family detached units also means less area to cover by the patrols.

While there may be some basis for the contention that the complaint rate is higher in multi-family type dwelling units than in detached units, the anticipated increase in complaints is expected to be minimum.

The fact that the proposed housing is replacement housing also means that a like number of units will be demolished. The net effect, therefore is that no additional families will be protected, only a change in location of the protected area.

Relative to police protection, the project has no significant impact on the environment. The impact of the fire protection facilities on the project is, however, slightly beneficial both for the short and the long term.

3. Probable Impact on Recreation Facilities

There would be a significant impact on those recreational facilities located within the Paradise Point area. An estimated 1150 persons will live in the proposed Paradise Point units.

The existing golf course, marina, riding stables and tennis center will be more convenient to more families. Although the total usage of these facilities should increase only slightly, the frequency of use on holidays and weekends could increase significantly. This is a positive impact in that the use of these facilities can be expanded which contributes to the health and emotional well being of marine families.

Additional pre-school play lots will be required within the housing project site. Current regulations, NAVFAC Manual DM-35 and P-383, require that appropriate pre-school active and passive recreation areas be provided during construction, if funding permits.

The facilities available at Tarawa Terrace, the community center and play fields, should decrease in usage. Other previously discussed facilities at Hadnot Point should not be significantly impacted as only a very small overall increase in the on-base population is projected.

Relative to library and recreation facilities then, the project has no impact on the environment. The short and long-term impact of the existing facilities on the project is substantially beneficial.

4. Potential Impact on Health Facilities

The net impact of the proposed housing on health facilities is neutral as the demand on health facilities would not increase. The increase of

approximately 1150 persons in the Berkeley Manor area merely brings the patient load somewhat closer to the hospital, dispensary and dental clinic.

Relative to health facilities, the project has no impact on the environment. The short and long-term impact of the health facilities on the project is, however, considered slightly beneficial.

5. Probable Impact on Shopping Facilities

The proposed on-base, replacement housing is not expected to impact significantly on either local or on-base shopping facilities. The great majority of marine families use the complete and lower cost base shopping facilities. As all the units to be replaced are at Tarawa Terrace and one-half the replacement units are in Berkeley Manor area, they would be some measurable increase at Hadnot Point shopping facilities.

Relative to shopping facilities then, the project has no impact on the environment. The short and long-term impact of the environment on the project is considered slightly beneficial.

G. TRANSPORTATION

1. Potential Impacts on Arterial Traffic

a. Tarawa Terrace

It is anticipated that a maximum of 200 units with an average occupancy of 3.6 persons per family will occupy the proposed site. This translates to approximately 1440 daily vehicle trips or a peak hour volume (PHV) of 111 vehicles. (See Table II-11) Seventy-five percent of this volume will probably use Knox Road and 25% should use Bouganville Drive. The total daily vehicle trips on Knox Road should be 2700 and the PHV, including the existing PHV of 125 vehicles, will be approximately 208. On Bouganville Drive the total daily vehicle trips will be approximately 360 and the PHV, 53 vehicles. See Table IV-1.

Because the 500 units to be demolished (as part of the housing replacement program) are located in Tarawa Terrace, there will be a net reduction in the number of vehicles using Tarawa Boulevard. Assuming a net reduction of 300 housing units in the Tarawa Terrace area, the total daily traffic should approximate 5040 vehicles on Tarawa Boulevard and the PHV should be 389 vehicles. (28 vehicles from proposed site and 361 from remaining 650 dwelling units in Tarawa Terrace II) See Table IV-1.

b. Berkeley Manor

Assuming 200 of the 500 proposed units could be located in the Tarawa Terrace site, for the purposes of this investigation, the remaining 300 units will be split between the other two sites.

The 150 units thus located on the Berkeley Manor site will generate a PHV of 96 vehicles. (Table II-11) Assuming a 50-50 split on Stone Street in direction of traffic from the site, the total PHV on Stone Street in each direction will be 279 vehicles. See Table IV-1.

The validity of these assumptions would, of course, depend upon the design of the entrances to the proposed housing project along Stone Street.

c. Paradise Point

The 150 units which could be located on the Paradise Point site will generate 1160 vehicle trips per day or a PHV of 89 vehicles. (Table II-11) Assuming that the principle entrance to the site will be on Charles Street, the total daily vehicle load on Charles Street will be approximately 1960 or a PHV of 151 vehicles in both directions.

Brewster Boulevard adjacent to the site presently carries approximately 1000 daily vehicles or a PHV of 77. If half of the traffic generated by the proposed development enters Brewster Boulevard by way of Charles Street, the estimated daily traffic on Brewster Boulevard

should be approximately 1980 vehicles or a PHV of 153 vehicles.

This volume of traffic can be accommodated without any adverse effects upon the existing traffic flow around the proposed site area.

As can readily be seen from Table IV-1, all of the roads adjacent to the three proposed sites are adequate to carry the anticipated volumes. The actual numbers and direction of travel of the vehicles will, of course, be dependent upon the actual site development layout. The capacities of the roads are so much greater than the anticipated volumes that any minor variations in the assumptions made will not affect the impact of the project on the roadway system.

Relative to impacts on arterial traffic then, the project will have no significant effect on the environment but the adequacy of the arterial system will have a slightly beneficial long and short term affect on the project.

TABLE IV-1

Arterial Traffic Adjacent to Sites

<u>Road</u>	<u>No. of Lanes</u>	<u>(1) (2) Assumed Capacity</u>	<u>(1) Existing Volume</u>	<u>(1) Projected Volume</u>	<u>Total Projected PHV on Roadway (Both Directions)</u>
N. C. #24	4	1500	1388	1362	5448
Bouganville Drive	2	1200	25	53	106
Tarawa Boulevard	2	1200	524	389	778
Knox Road	2	1100	125	208	416
Stone Boulevard	2	1200	231	279	558
Brewster Boulevard	2	1200	77	153	306
Charles Street	2	1200	31	76	152

(1) Figures are vehicles per lane at peak hour volume.

(2) Based upon visual observation, cross sectional dimensions, and physical characteristics.

2. Impact of the Proposed Housing on Public Transportation

Although the exact number of dwelling units to be located on each site is not yet known, it is possible to make some determination of the impact imposed upon the bus system.

Because all of the proposed units are to be replacement housing and because it has been determined that the units to be demolished will be in the Tarawa Terrace II housing area, there will be no additional units in this area. The demand for bus transportation in the Tarawa Terrace area should remain the same as exists now.

Within the Paradise Point and Berkeley Manor the proposed housing will increase the area population; and, therefore, an increase in the number of bus passengers can be expected. There are approximately 1200 family dwelling units in Paradise Point and several hundred bachelor officer quarters. If it is assumed that at least 300 new units will be added to this area where there are approximately 1500 existing units, the percent of increase in units will be on the order of 20. The demand for bus transportation should increase by approximately 20%. Because the existing schedule is not running at capacity, it is expected that the increase can be accommodated within the existing schedule. If the demand increased beyond the capacity of the buses on the existing schedule, it would only be necessary to add more trips to meet the demand. It was

indicated that this would only be a relatively minor problem of rescheduling.

Relative to public transportation then the project has no impact on the environment. The short and long-term impact of public transportation on the project is slightly beneficial.

H. UTILITIES

1. Potential Impact on Water Resources

(a). Tarawa Terrace Site

The impact of the development of the new Tarawa Terrace Housing upon the existing water system will be insignificant in that the new housing is replacement housing and the net increase in total housing served by the Tarawa Terrace system will be zero. There exists at present, however, a need unrelated to this proposed housing for additional treatment facilities at the Tarawa Terrace plant and the plant should be expanded within the very near future to accommodate the present peak demands.

An alternative means of supplying additional water to the Tarawa Terrace area would be to increase the output of the Montford Point plant. This could be accomplished by increasing the water supply to the plant. Required would be additional supply wells and new water lines for transporting the water from the wells to the plant.

(b). Paradise Point and Berkeley Manor

Paradise Point and Berkeley Manor are served by the water plants located on Holcombe Boulevard and Hadnot Point. The increase in the number of housing units in this area will add approximately 250,000 gallons per day demand upon these two plants. Since both plants are operating considerably below their design capacities the impact of the additional housing on the water system will be inconsequential. The

additional demand will bring the plants closer to their design capacity but there will still be reserve capacity to handle additional development within the service area of the two plants.

Relative to water resources then, the project has a slight adverse short term impact on the environment and an insignificant long term impact. Conversely, the short term impact of the water resources on the project is slightly beneficial and the long term impact is insignificant.

2. Electricity

At Tarawa Terrace II, C. P. & L. should have no problem, whatever, in providing power to 200 replacement units requiring only lead time to order material to make pole, transformer, and cable changes.

C. P. & L. should also not have any difficulty in providing power for 200 additional units even if none of the existing units are removed.

A typical housing unit would utilize approximately 7 kw of electrical energy; therefore, the addition of 300 units at Berkeley and Paradise Point would increase power consumption by approximately 2000 kw. Present high voltage lines are adequate to handle the increases; and the proposed modifications to the Camp Lejeune distribution system from C. P. & L. will readily handle the copper requirements of the addition.

The additional units at Camp Lejeune represent a relocation of housing facilities from elsewhere in the general area. Since the new housing units will be air conditioned, the overall effect is one of a slight increase in area power consumption and should have minimal effect on C. P. & L.'s generation and overall system. New high's will be reached, however, in the Base Demand Load when the new air conditioning load is at its peak. This could and will result in higher electrical costs per kw.hr. for the Base during the air conditioning months only.

Telephones

Carolina Telephone and Telegraph should have no difficulty in their ability to handle the rearrangement of facilities and possible cable changes, given sufficient lead time to obtain materials under present-day procurement schedules.

Relative to electric utilities then, the project has a slight negative short term impact on the environment and an insignificant long term impact. Conversely, the short term impact of the environment on the project is slightly positive and the long term impact is insignificant.

3. Fuels

Liquidified Petroleum Gas

It is probable that further economic analysis will indicate that oil is

preferred over petroleum gas because of the cost of correcting extensive deterioration of the present pipe lines. However, should petroleum gas prove to be economically feasible, a further analysis should be undertaken in regard to adequate supply and future cost escalation of this fuel.

Fuel Oil

It is probable that the new housing will use fuel oil as the heating energy source. Since the new housing is replacement housing and some replacement will be of housing presently heated with petroleum gas, the net result will be a small but indeterminate increase in fuel oil consumption for the Base facilities. It is anticipated that this increase will not overtax the present facilities.

Relative to fuel oil then, the project has a slight negative short term impact on the environment and a slight negative long term impact. Conversely, the fuel oil situation does not impact significantly on the project.

4. Impact on Solid Waste Disposal

If the proposed housing units were not replacement units they would add approximately 12,000 cu. yds. of solid waste to the sanitary land fill area per year. This is approximately 1% of the amount deposited each year at the fill area. The proposed units are replacement units and

therefore no anticipated increase in solid waste is expected. Either way, the impact on the land fill area is not significant from this standpoint.

The debris from the 500 units to be demolished is estimated at 120,000 cu. yds. and is significant. It is approximately 13% of the yearly fill deposited on-base.

Because the county may not be agreeable to accepting such a large quantity of solid waste and because the closest landfill area that could even handle such a large quantity is so far from the base, consideration should be given to disposing of this debris at the Sneeds Ferry Land Fill Area.

If the waste is disposed of on-base the life of the land fill area would only be reduced by 1 to 2 months, which, in terms of the anticipated life of 40 to 60 years, is insignificant.

5. Potential Impacts on Sewer, Pumping and Treatment

(a). Tarawa Terrace

The average sewage flow due to the new Tarawa Terrace housing will be insignificant since the new housing is replacement housing and the net amount of housing in the area will be unchanged.

Initial planning indicates that the wastes from the new housing will flow by gravity to a sewage lift station (S-E-23) at Montford Point. This sewage lift station has sufficient pumping capacity to handle the load from this development without modifications. The construction of 5200 feet of outfall will be required to transport waste from the site to the pumping stations. The Montford Point plant has a design capacity of one mgd and operates at 0.4 - 0.5 mgd.

(b). Paradise Point and Berkeley Manor

The average total sewage flows from the new Paradise Point and Berkeley Manor sites are estimated to be approximately 260,000 mgd. The sewage would be typically domestic in character.

There will be no problems in serving the new sites. The sanitary sewer lines adjoining each site are of adequate size to carry the added loads.

Since the main treatment plant is operating well below capacity the added load will have very little impact on the operation of this plant. Impact, from a sanitary sewerage aspect, will be very insignificant.

Relative to sanitary sewage (sewer mains, pumping stations, treatment plants) then, the project has no significant impact on the environment. Conversely, the long term impact of the environment on the project is considered slightly beneficial.

6. Potential Impacts on Drainage and Flood Control

(a). Tarawa Terrace

After completion of construction at the Tarawa Terrace site the runoff would increase to roughly 115 cfs - a 20 percent increase for the drainage area. The overall runoff would be increased due to changes in the site grades, more impervious surface coverage, and changes in the hydraulic characteristics of surfaces. The groundwater recharge rate in the area would consequently be reduced and the water table elevation lowered

More runoff at an increase in velocity would tend to cause some additional downstream erosion but not of a serious nature. Proper erosion and sediment control will prevent any major problems from occurring during the construction phase or after completion of the project.

A storm drainage collection system will be required for development

of the Tarawa Terrace site due to the site's relative flatness. The existing channel which will carry the storm water from the site will require cleaning. Logs have been allowed to block the entrances to the pipe culverts which drain into the channel along the site and considerable weed and bush growth has been allowed to develop in the channel bottom.

(b). Berkeley Manor

After completion of the Berkeley Manor housing project the runoff would increase to roughly 813 cfs - a 5 percent increase for the drainage area. The overall runoff would be increased due to changes in the site grades, more impervious surface coverage, and hydraulic characteristics of surfaces. The groundwater recharge rate and water table would consequently be reduced.

The increase in runoff and resultant increase in velocity may cause some downstream erosion but not of a significant nature. Proper erosion and sediment control will prevent any major problems from occurring during construction phase of the project.

A storm drainage collection system will have to be considered for the development of the Berkeley Manor site due to the relative flatness of the site.

(c). Paradise Point

After completion of the Paradise Point housing project the runoff

would increase to roughly 215 cfs - a 14 percent increase for the drainage area. The overall runoff would be increased due to changes in the site grades more impervious surface coverage, and hydraulic characteristics of surfaces. The groundwater recharge and water table would consequently be reduced.

The increase in runoff and resultant increase in velocity may tend to cause some downstream erosion but would be minimal. Proper erosion and sediment control will prevent any major problems from occurring during the construction phase of the project.

Relative to storm water runoff then, the project has a substantial negative short term impact on the environment and a slight negative long term impact. Conversely, the short term impact of this environmental factor on the project is slightly positive and the long term impact is also considered slightly positive.

I. ECOLOGY

1. Environmental Perturbations of Ecological Significance

Forests ecosystems on the proposed housing sites will be destroyed. Natural resources required for the manufacture of building materials will be irretrievably committed to this purpose. Road construction on the housing site will create an impact which will persist for centuries. Energy consumption during site preparation, construction, transportation of materials, and by the resultant residences is another irretrievable loss of resources.

Surrounding forest ecosystems will suffer at least mild disruption of a magnitude rendering them vulnerable to southern pine beetle infestations or alternations in species composition. Good resource management can circumvent this.

Air and Water pollution should not present significant problems because of existing standards and regulations.

Since the forest types at the sites are extremely common to the area, and since few if any rare or endangered species are found there, there is no serious threat to individual species.

Since no ecosystem in the region is unaffected by human activity, the proposed projects represent additional, intense, localized perturbations superimposed upon ecosystems already under man's direct or indirect influence.

Additional perturbations in the form resource management could be employed to partially compensate for are the deleterious effects of construction.

On an ecological basis high density clustered housing should be developed within tracts of forest larger than the area occupied by housing.

These surrounding forests should be managed to encourage hardwood species. Topography should be designed so that ponding of runoff water does not occur, thereby eliminating possible breeding areas for insects.

If all sites are not needed, the one most valuable ecologically may be the Berkeley Manor site. However, more information is needed in order to make such a decision if the opportunity develops.

The impact of the proposed housing will be minimized if the planning and construction includes cooperation with the Division of Natural Resources and Environmental Affairs of the Base Maintenance Office. The excellent record of this division and regulations and practices resulting from their efforts have created a most favorable situation for minimizing the environmental impacts which will result from the proposed action.

2. Environmental Controversies

There should be no environmental controversy concerning the direct effects of the proposed construction. There should be some controversy concerning the necessity to further deplete natural resources and to

further consume energy in order to provide replacement housing. The adequacy of housing is a relative, not absolute, judgement and therefore lends the judgement to challenge and controversy. As far as the sites concerned, and the ecosystems existing there, there should be no controversy relating to alternative sites or ecosystems. There are no rare or endangered species unique to these sites which could not be preserved by planned management of similar forests at nearby sites. In summary the greatest point of controversy is the assumption that continued development is justified, especially at the expense of energy consumption and natural resource depletion.

Relative to forests and vegetation the project has a slight adverse short term impact on the environment and a substantial negative long term impact. Conversely, the short term impact of the environment on the project is insignificant and the long term impact is considered substantially positive.

Relative to wildlife the project has a slight negative short term impact on the environment and a slight negative long term impact. The short term impact of the environment on the project is insignificant and the long term impact is considered slightly beneficial.

Relative to soils the project has a slight adverse short term impact on the environment and an insignificant long term impact. Conversely, the environment does not significantly impact on the project.

J. ENVIRONMENTAL SAFETY

1. Potential Impacts Upon Ambient Noise

The future ambient noise levels at the three sites should be relatively unchanged from the existing levels. It is anticipated that they will be well within the acceptable range as set by the U. S. Department of Housing and Urban Development.

The noise levels due to aircraft are within the Zone 1 rating. As stated in the consultants analysis, the expected public response would be essentially that there would be no complaints but that the noise may interfere occasionally with certain activities of the residents.

The noise levels due to traffic and railroads are well within the HUD acceptable limits. They are:

Clearly Acceptable - The noise exposure is such that both the indoor and outdoor environments are pleasant.

Normally Acceptable - The noise exposure is great enough to be of some concern but common building construction will make the indoor environment acceptable, even for sleeping quarters, and the outdoor environment will be reasonably pleasant for recreation and play.

Relative to noise pollution the project has a slight negative short term impact on the environment and a no significant long term impact.

Conversely, the impact of the environment on the project is not significant.

2. Potential Impact of Explosion Hazard

Because the sites are so far removed from the closest ammunition storage there is no potential hazard to the proposed action from explosion.

Relative to explosives hazards the project does not have any significant impact.

K. AIR RESOURCES

1. Potential Micrometeorological Impacts

The proposed housing development could modify the local climate in microscale. More paved or covered surfaces, e. g. roadways, parking lots and buildings, would tend to encourage differential heating between the site and the neighboring waterways, and more temperature differential between day and night.

A microscale heat island might be an irreversable result due to escaped thermal radiation, such as from home heating, exhaust from automobiles, and waste heat ejected from air conditioners. The possible change of precipitation amount and frequency due to this modification cannot be assessed.

During construction of the proposed housing dust and powder materials, especially toxic ones like asbestos fibers, could be stirred up and become airborne by wind action and construction activities. This would increase the level of suspended particulates. CO, NOx and HC would be likely to increase from tools and machines using internal combustion engines.

2. Potential Air Quality Impact

Since the proposed housing is replacement housing and not additional, the number of automobiles will not change appreciably; therefore, the air quality from auto emissions should remain virtually constant. It is assumed, also, that the technological decrease of automobile emissions will occur faster than the increase in traffic volume thereby producing a net decrease in auto emission pollution.

If all of the replacement housing uses fuel oil for heating purposes, there will be a very slight increase in atmospheric pollution as some of the existing units now heat with less noxious propane gas. The increase in pollution will not be significant.

The slight increase in electrical consumption (primarily due to air conditioning) will increase C. P. & L.'s generating requirement. This increase will be minute in comparison with their present generating load and cannot be considered significant.

Perhaps the most serious ecological effects of the proposed projects upon air and water quality are indirect and offsite. These environmental impacts result from the destruction of natural resources, manufacturing processes used to convert these resources into building materials, and transportation of these resources to the site of construction. In order to estimate the magnitude of indirect offsite impacts, it is

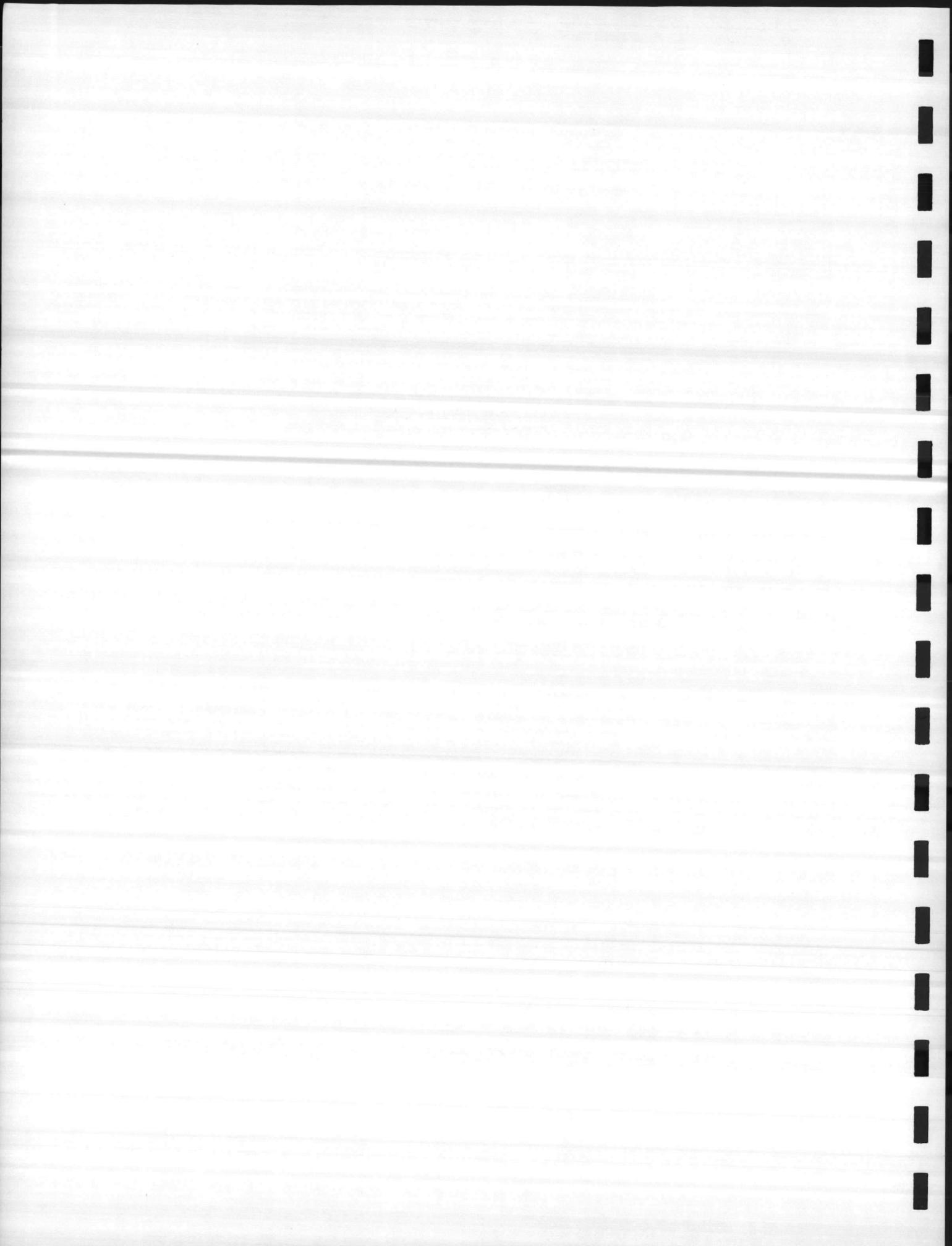
imperative to know the origin, quantity, and types of building materials, manufacturing processes, and transportation routes and mode of transport.

A final consideration of air pollution is increased CO₂ production and reduced O₂ production as a result of converting rapidly growing forests to residential areas. These important imbalances may be partially compensated by the maintenance of surrounding forests for aesthetic purposes like recreation. If surrounding areas are managed to favor hardwood production rather than pine, the consequential reduction in turpines may result in improved air quality.

Relative to air resources (ambient quality, Particulate and SO₂ pollution, CO and other pollution) the project has a slight adverse short term impact on the environment and a neutral or insignificant long term impact. Conversely, this aspect of the environment does not impact on the project.

V.

ALTERNATIVES



V. ALTERNATIVES

Introduction

Several known aspects of the proposed housing project have repeatedly dictated to possible conclusions in each section of this Candidate Environmental Impact Statement. Alternative actions and locations are also shaped and limited by these same several aspects that are repeated here for clarity: First, the housing is definitely to be located within Camp Lejeune, in or immediately adjacent to existing family housing areas. Secondly, this housing is justified and scheduled as replacement housing, notwithstanding a need for some additional units. One unit will be demolished for every unit that is constructed and essentially within the same time frame of one to two years. Finally, the design, bedroom mix and occupancy by grade of the proposed housing is firmly established. Existing and traditional housing areas for officers, senior and junior enlisted personnel, should be respected. Within these known aspects the following alternatives were considered.

A. The No-Action Alternative

The alternative of not providing the proposed housing would impact negatively on Marine Corps morale and the existing on-base housing maintenance programs. The lack of adequate on-base housing units is an adverse impact on Marine family income in that off-base housing costs more and has fewer amenities. (See Section II-B). Living on base literally

means more spendable income to the Marine family and is preferred by the majority of families. As the Maximum Allowable Housing Cost (MAHC) presently used by the Marine Corps to determine suitability, exceeds substantially the Basic Allowance for Quarters (BAQ), forfeited when living on-base, the on-base family has additional spendable income. Further, the present MAHC's for enlisted personnel are being exceeded in the local market in a range of \$6 to \$52 per month.

Morale, and thereby job effectiveness, would also be negatively impacted by the continuation of significant numbers of involuntarily separated families (570) who are apart for lengthy periods of time while adequate quarters are being located either on-base or in the private marketplace. The average separation is from two to six months.

Whether or not additional adequate units are available within the private housing marketplace is not material to this alternative as the total local population will not change. Nor will the existing commuting problems for the approximately 6000 military families living off-base change significantly as the same number of on-base families will result from the construction/demolition process. The problems, however, of separating families for considerable periods and living in inadequate units are serious and not in the best interests of the all-volunteer Marine Corps.

Maintenance costs are not available but are judged excessive in the Tarawa Terrace area by base officials. To determine if such expenses are prohibitive, a detailed cost benefit analysis is required. However, knowing that replacement of inadequate units is now a question of Congressional and Executive Branch priorities and is apparently to be funded starting in July, 1975, and continuing for several years, base officials are not scheduling more than minimum maintenance for these units. The cumulative impact of minimum maintenance will only accentuate the basic condition.

The overall impact of the no-action alternative is to both lower the quality of living standards for Marine families and to significantly raise housing maintenance costs.

The one positive impact of the no-action alternative would seem to be the spending of the available funds in some area where housing conditions are more critical. Such a determination, however, could only be made in the planning section of NAVFAC and is beyond the scope of this CEIS.

B. Postpone Construction or Build Fewer Units

Postponement of the proposed family housing construction is an alternative that has but one potential positive impact, the possible better use of the funds elsewhere. Otherwise, postponement merely compounds maintenance problems and will result in higher unit costs later.

The April, 1973, Family Housing Feasibility Study concluded that renovation to military standards for the majority of the units studied would equal 90-95 percent of replacement costs. Large scale renovations, therefore, are uneconomical. Continuing the virtual 100 percent occupancy of inadequate units can only increase the maintenance costs and compound the need. The impact of postponement then is slightly negative in the short term and significantly negative in the long term.

Building fewer units would certainly save some present commitment of natural resources, but this alternative would merely postpone the eventual replacement of these inadequate units. Aging inventories of inadequate units will require more maintenance. Additionally, construction costs per unit will increase due to inability to commit to mass purchases of building materials and equipment. Again, morale is adversely affected as the 1,650 Marine families not suitably housed will be reduced by less than the proposed 30 percent reduction inherent in the proposed number of new units.

C. Change the Proposed Housing Type

Although presently required by Navy regulations, the proposed town-house construction could conceivably be altered. This alternative, however, would not have any positive impacts. The suggested design involving clustered buildings, averaging six units per building and

7-8 units per gross acre in density, is perhaps the most environmentally protective design and the least expensive to build. Maximum usable green space is achieved on the site along with the economies of less building materials and less paving for streets and drives. The existing inadequate units in Tarawa Terrace which are single family detached units, duplexes and triplexes consume much more land than will the proposed townhouse and, therefore, impact more negatively on eco-systems than the proposed townhouse design. From an ecological point of view the higher density of 7-8 units is immeasurably preferred over the existing densities which range from 1.5-4.5 units per acre for all base housing.

Open spaces afforded by clustered development, however, must be managed to insure maximum wildlife protection. Maximum benefits will result by encouraging hardwood species in the forested areas and adding water habitat wherever possible.

D. Alternate Sites

As mentioned earlier some 272 acres are contained within the three proposed sites, and only approximately 67 acres are required for the proposed housing. Each of the three on-base sites analyzed differed significantly in a variety of ways which are generally described as follows:

Insignificant or neutral impacts for all three sites were recorded

under the following aspects: impact of the City of Jacksonville and Onslow County facilities; historic preservation; housing design; housing appearance; school size and busing; on-base services of fire, police, and health; recreational and shopping facilities; site accessibility; solid waste disposal; and noise pollution and explosive hazards.

At least one or more sites recorded significant but slight adverse impacts in the following aspects: storm runoff and flood hazard, traffic, school funding, sanitary sewage, forest and wildlife management, soils, military-civilian relations, use of fuel oils, and air quality.

Slight positive impacts were recorded for all sites in the following aspects: land use patterns, housing densities, busing and car pools, school busing, and public transportation.

Some areas of the environment were substantially impacted. The negative aspects were: sewage (pumping stations and treatment plants), storm runoff, and the loss of forests and grasslands. The positive substantial impacts were: improvement to the economy and to the quality/stability of family life.

Each site had some associated negative impacts, but each was also a good location for the intended units.

1. Alternate Site in Tarawa Terrace

The possibility of using the area in Tarawa Terrace presently occupied by the units to be demolished as an alternate site for the 250 units of enlisted personnel housing to be constructed in FY 77 should be considered as a feasible and very realistic alternative.

In a directive from the Commanding General of Camp Lejeune to the Commodant of the Marine Corps dated 27 August, 1974, it is stated "...the first increment of housing will be constructed at Paradise Point. The demolition of Tarawa Terrace housing will follow completion of each increment of replacement housing". If 250 units are constructed in the Paradise Point area in FY 76 and a like number are then demolished in Tarawa Terrace, an area of approximately 50 acres will be left vacant.

Determination of exactly where in Tarawa Terrace II this will take place should be based upon factors such as quality of existing units, adequacy of utility lines in the area, and overall potential for redevelopment. The general area from which this alternate site could be selected is shown in Exhibits V-1 and V-2.

It would appear even without a detailed investigation of the specific site, that reuse of an existing housing area offers many advantages over development of a new site.

The alternate site selected, being fully developed at present has already damaged the environment in a number of ways. If redeveloped with clustered townhouse units, a substantial improvement to environmental quality could result. Additionally, leaving the existing proposed 20-acre site undeveloped would greatly reduce the existing negative impacts of the developed areas. Further, the anticipated partial utilization of existing street systems and utility systems could possibly lower per unit development costs. Better land planning and more energy-efficient heating and cooling systems could be employed in the reuse of the area.

Given the close proximity to the proposed Tarawa Terrace site which was fully analyzed, the alternate site would not involve any additional negative impacts to the environment not already specifically identified in this CEIS. To the contrary, the alternate site would improve the land resources, busing and car pools, and land use pattern aspects of the environment.

Most importantly, those negative impacts associated with the ecology of the original proposed site would be eliminated because the site would be left in its natural state. Improvements could be made to the selected alternate site through the reforestation and reseeding of areas not used for actual construction.

The use of an alternate site within the present developed area would further significantly reduce walking and driving distances from the proposed housing to the school, shopping center and other community facilities in the Tarawa Terrace area. Existing automobile and pedestrian traffic patterns would be maintained as well as schedules and routes for public transportation, police, and fire protection, and other services.

It therefore appears that this alternative offers a much more environmentally acceptable solution for the proposed housing site than does use of the original site investigated.

Because there are significant advantages in construction upon sites where existing housing has been demolished, it is recommended that further consideration be given to constructing only the first phase of the replacement housing program independent of demolition of existing units. Once the first phase was completed and occupants of existing housing were moved into the new units or elsewhere, the housing thus vacated could be demolished and additional replacement housing could be constructed upon the cleared sites. Housing thus constructed would take advantage of the significant cost savings and improved land utilization previously mentioned. It would certainly minimize the environmental impacts upon the entire area as well as preserve the undeveloped areas in their present natural state.

It will, of course, be necessary to analyze each increment of the replacement program individually to ascertain the desirability and suitability of locating that particular phase upon the vacated area. As an overall objective however, this approach to the replacement housing program would appear to generate the least impact upon the environment.

2. Alternate Site in Paradise Point

The detailed analysis of the 175 acre site in Paradise Point indicated that the area was completely suitable for family housing from all of the aspects investigated. It must be noted, however, that construction on this site will be in close proximity to housing occupied entirely by officers. In light of the fact that the proposed housing is only for enlisted family quarters and in consideration of the long established and traditional use of this section of Paradise Point for officer housing only, the intended use would be inappropriate.

The Berkeley Manor site analyzed herein is ideally suited to the intended use for enlisted family housing as would be any site in the immediate vicinity. Use of the eastern portion of this site does present several adverse effects which would be mitigated if this entire site were not used. As indicated by the boundaries of the existing Berkeley Manor site, the eastern portion intrudes into the wide and hopefully permanent forest barrier between the Berkeley Manor

Housing Area and Holcomb Boulevard, the principal vehicle carrier within Camp Lejeune. Additionally, the eastern portion of this site is traversed by a large drainage ditch which would add to the possible site development costs. It is suggested therefore, that only the western portion of this site be developed at this time.

Almost any site adjacent to Stone Street and abutting the existing Berkeley Manor site of 677 units or the Lejeune High School property will be easily and efficiently served by water, sewer, school, community facilities, fire and police protection, arterial streets, drainage, and available bus transportation.

The area west of Stone Street and north of the school as indicated on Exhibit V-1 and V-3 has been suggested as an alternate site. It is far enough removed from the existing officer housing and in close enough proximity to the enlisted family housing so as to make it appropriate from the standpoint of the traditional separation of housing by grade. With regard to the suitability of the alternate area as compared to the Paradise Point Site, a most favorable comparison can be made. Only a small difference in micro environment exists. Elements such as topography and drainage would vary only slightly. The alternate site is wooded just like the original site and the ecological factors are identical on both areas. Because the original and alternate sites are side by side very little difference exists with regard to most of the other

factors analyzed such as **public** transportation, community facilities, fire and police protection, **schools** or utilities. Other conditions regarding project requirements and proposed site development apply equally as well to the **alternate** site.

It can be concluded **therefore**, that the alternate site in Berkeley Manor is as well if not better **suited** to development of family housing as is the original site selected in **Paradise** Point.

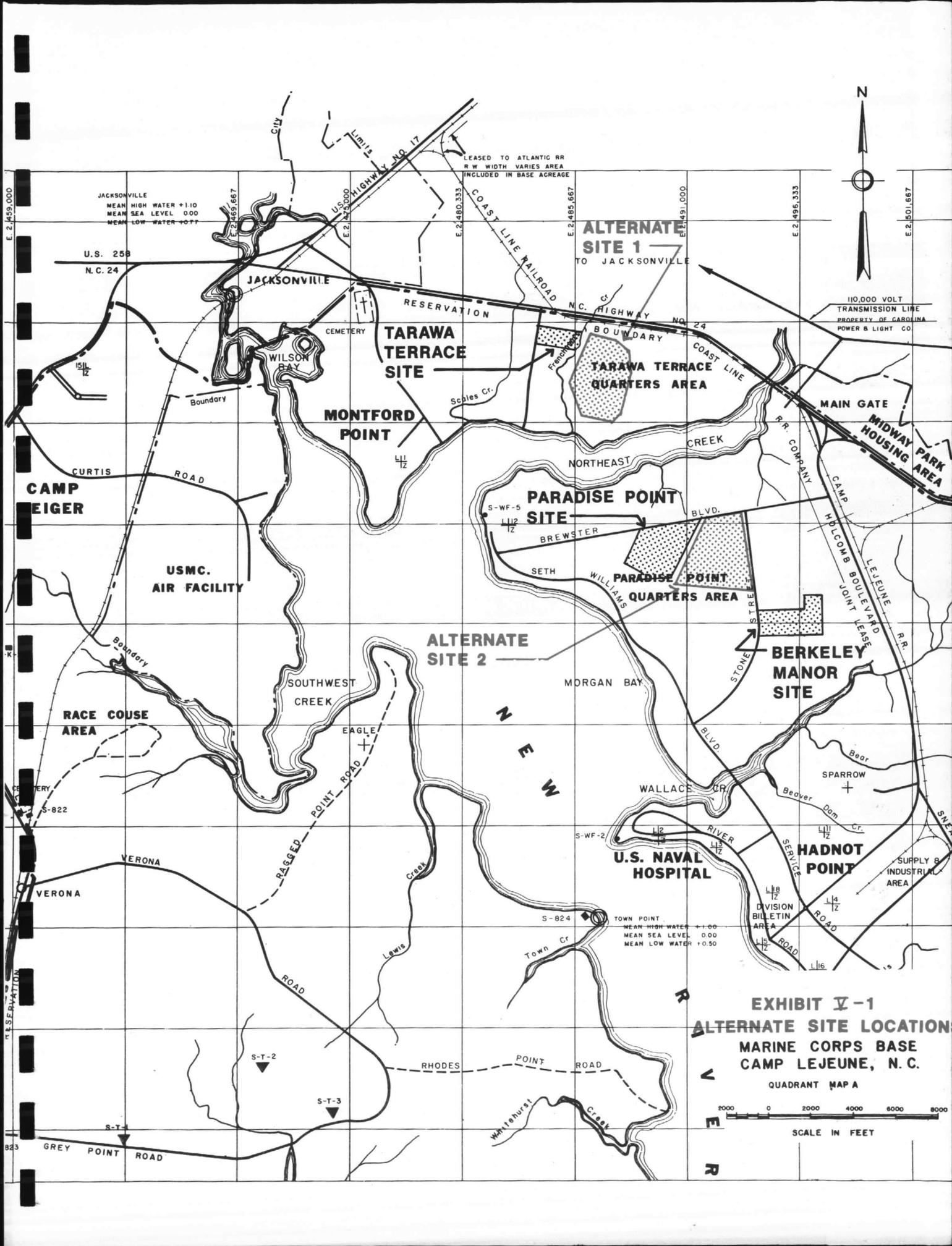


EXHIBIT V-1
ALTERNATE SITE LOCATION
MARINE CORPS BASE
CAMP LEJEUNE, N.C.

QUADRANT MAP A
 2000 0 2000 4000 6000 8000
 SCALE IN FEET

JACKSONVILLE
 MEAN HIGH WATER +1.10
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER -0.77

LEASED TO ATLANTIC RR
 R W WIDTH VARIES AREA
 INCLUDED IN BASE ACREAGE

110,000 VOLT
 TRANSMISSION LINE
 PROPERTY OF CAROLINA
 POWER & LIGHT CO.

ALTERNATE SITE 1
 TO JACKSONVILLE

TARAWA TERRACE SITE

TARAWA TERRACE QUARTERS AREA

MONTFORD POINT

PARADISE POINT SITE

PARADISE POINT QUARTERS AREA

BERKELEY MANOR SITE

U.S. NAVAL HOSPITAL

HADNOT POINT

CAMP EIGER

USMC AIR FACILITY

RACE COUSE AREA

ALTERNATE SITE 2

NEW

SERVICE DIVISION BILLETIN AREA

SUPPLY & INDUSTRIAL AREA

VERONA

VERONA

S-T-2

S-T-3

S-T-1

S-WF-2

S-824

TOWN POINT
 MEAN HIGH WATER +1.00
 MEAN SEA LEVEL 0.00
 MEAN LOW WATER +0.50

U.S. 258
 N.C. 24

U.S. HIGHWAY NO. 17

N.C. HIGHWAY NO. 24

MAIN GATE
 MIDWAY HOUSING AREA

CAMP HILCOMB BOULEVARD LEASE
 LEJUNE R.R.

STONE STREET

BREWSTER BLVD.

WILLIAMS

SETH

MORGAN BAY

WALLACE CR.

RIVER

BEAVER DAM CR.

SPARROW

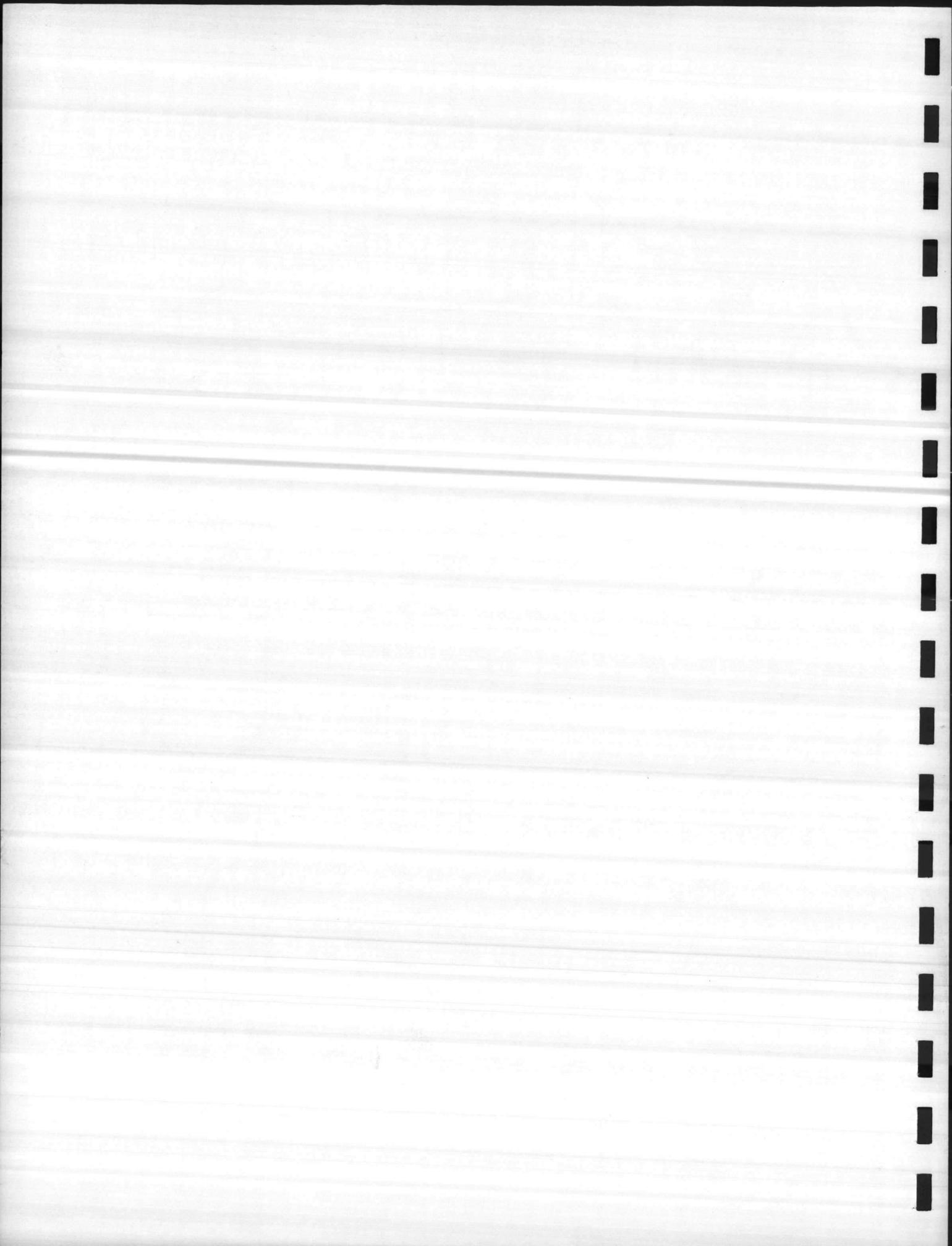
BEAR

BLVD.

ROAD

RESERVATION

BOUNDARY



5-6-73

N12BI

MCB

173

212



PROJECT BOUNDARY

N.C. 24

R.R.

KNOX RD

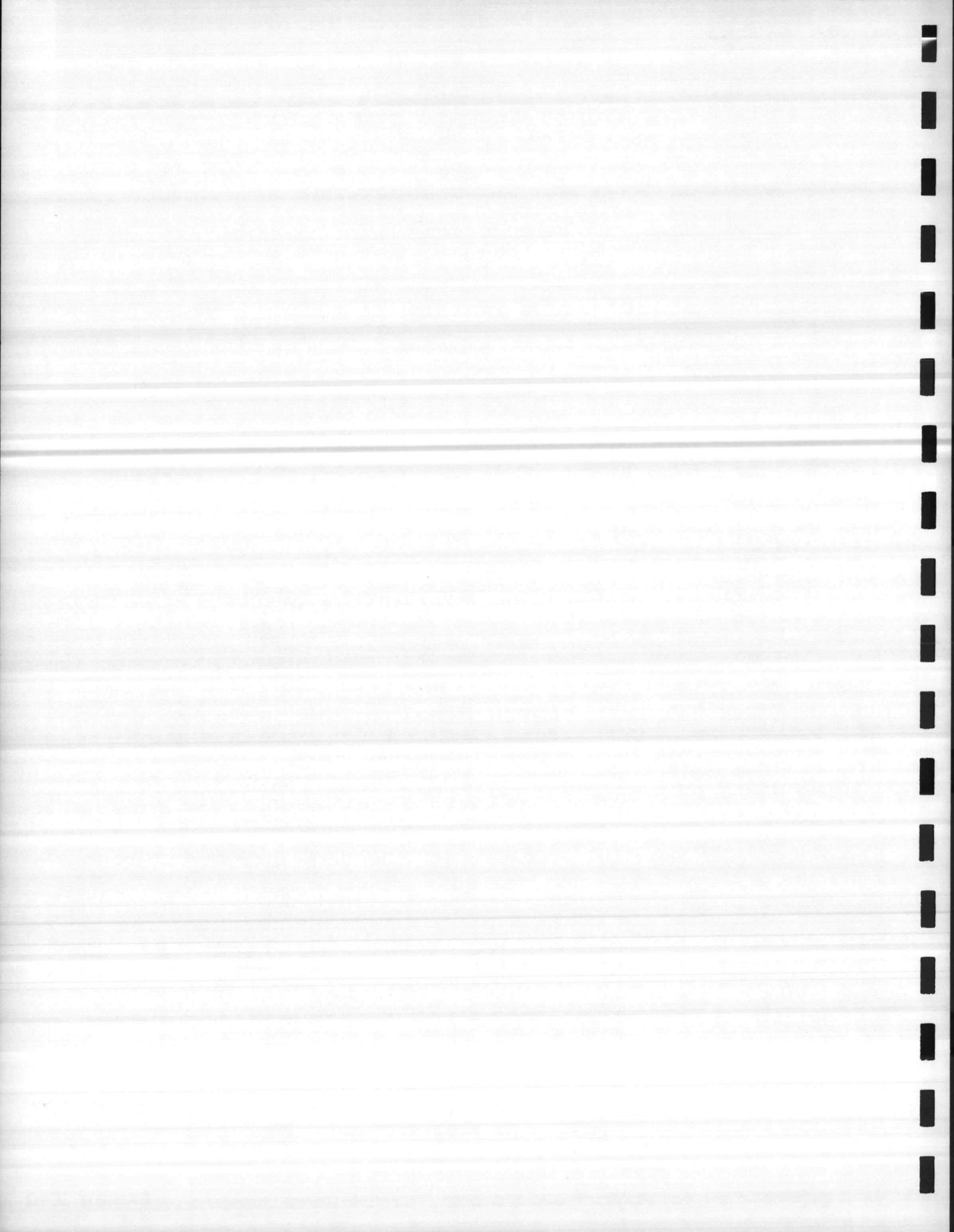
TRAILER PARK

TARAWA TERRACE II

ELEMENTARY SCHOOL

SHOPPING CENTER

AERIAL PHOTOGRAPH OF ALTERNATE TARAWA TERRACE SITE



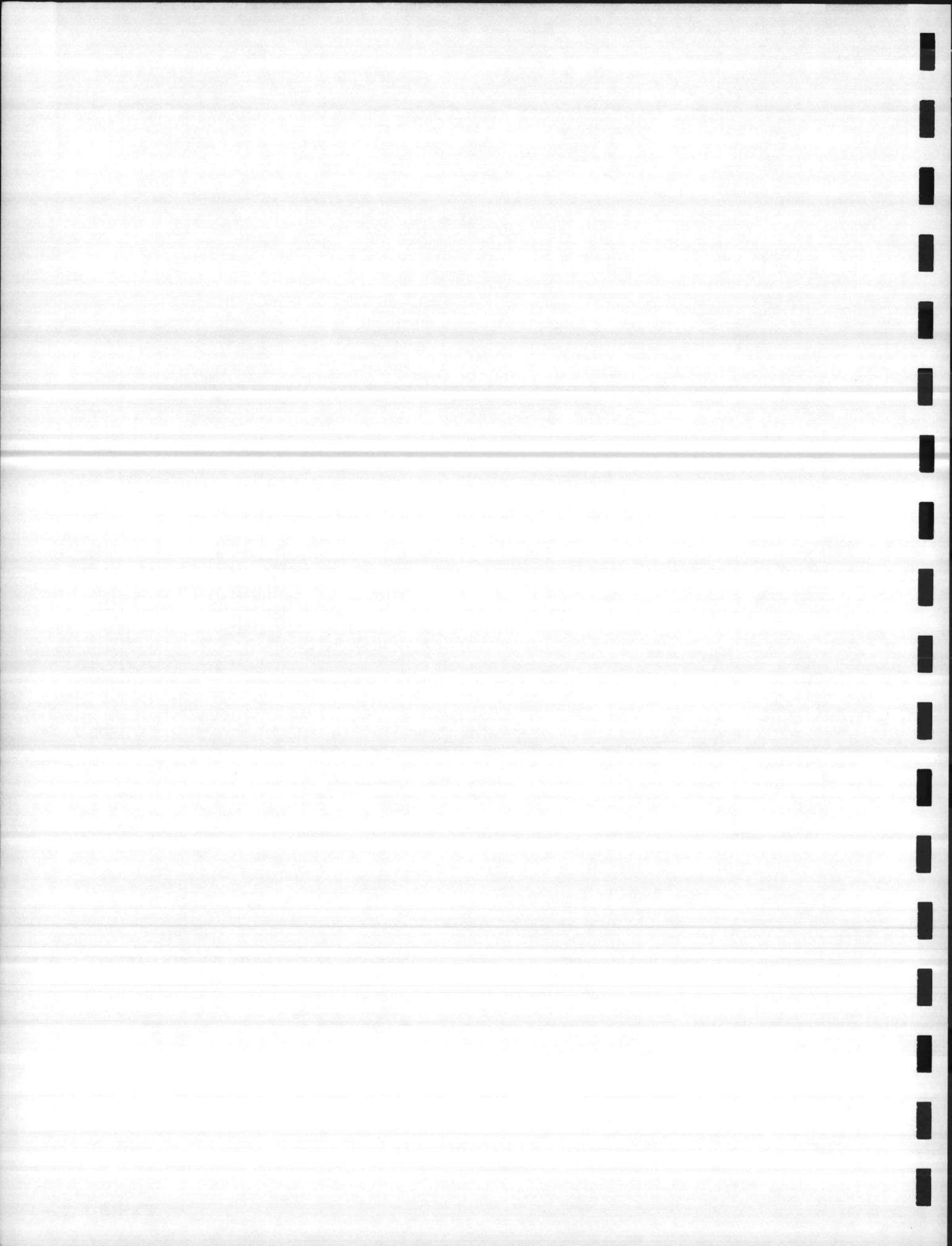
6-73

N12B1

MCB

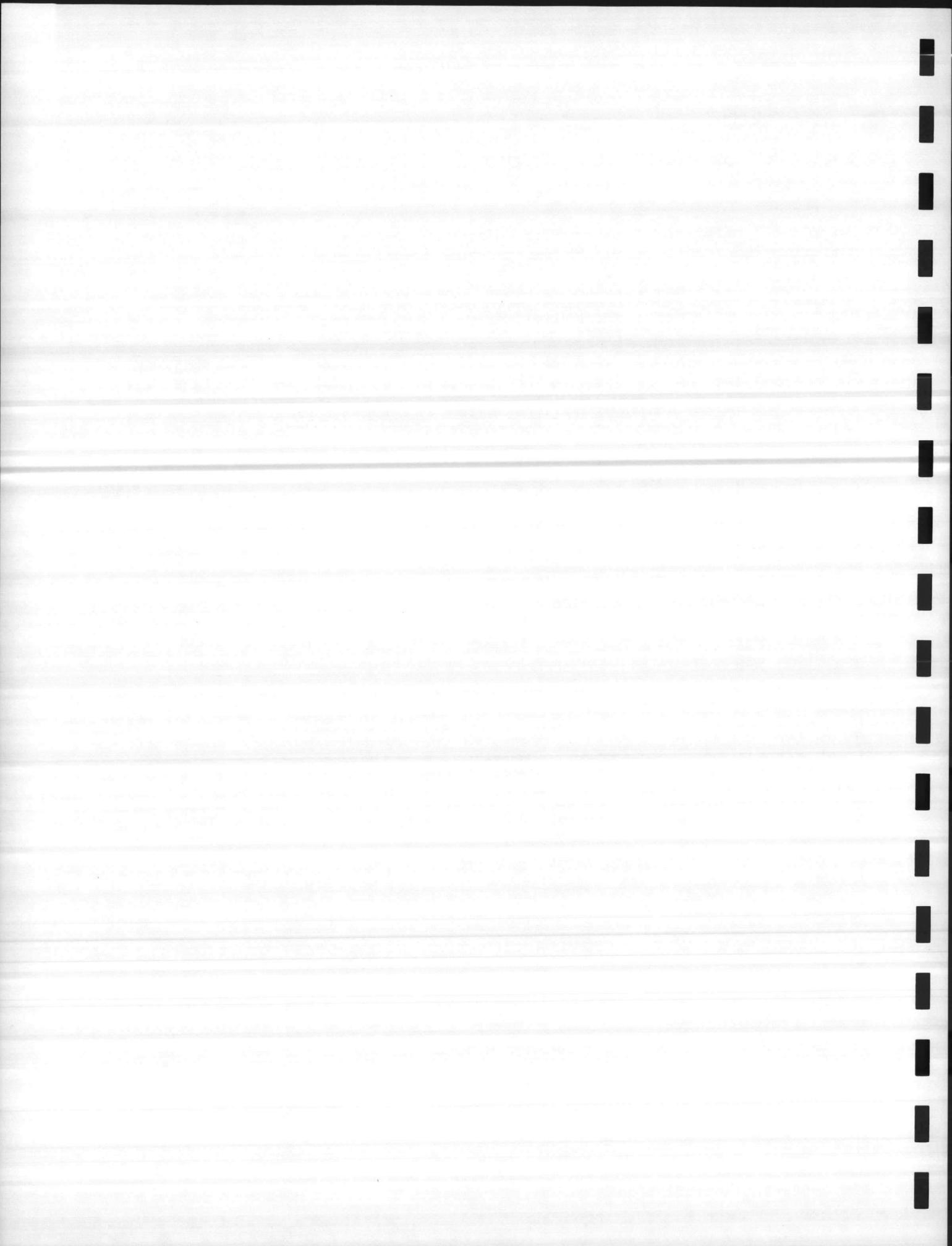


AERIAL PHOTOGRAPH OF ALTERNATE BERKELEY MANOR SITE



VI.

UNAVOIDABLE ADVERSE EFFECTS



VI. UNAVOIDABLE ADVERSE EFFECTS

Significant long-term unavoidable adverse effects on land resources and ecological systems are limited. The immediate and most adverse effect of the proposed housing will be to completely destroy approximately 100 acres of relatively productive pine forests. Surrounding areas of a somewhat lesser acreage will be disturbed by increased human activity. However if managed wisely, man's activity in these surrounding areas can be compatible with ecological stability.

The proposed action will not contribute significantly to soil erosion or the populations of rare and endangered species. Abutting all three sites are large undeveloped tracts which are not projected for development at this time.

Indirect effects of this project upon natural resources required as construction materials and the effluent produced during manufacture and transport of these materials, must be included in any true cost analysis of the total project. Such indirect effects are beyond the scope of this CEIS.

While more severe effects might be expected to land resources in a large housing project, they are of limited concern in this case because of the presence of a well-staffed and well-organized Department of Natural Resources and Environmental Affairs within the Camp Lejeune

Base Maintenance Division. This department has received two commendations in recent years for their performance in natural resource management and conservation. The 1974 Conservation Yearbook and the 1974 Environmental Protection Report prepared by that department were extremely helpful in compiling this environmental impact statement.

Related to construction is the unavoidable adverse effect on storm runoff. The many impervious surfaces (roofs, drives, streets, walls) will increase storm runoff from the housing area. Increased runoff is unavoidable; however, all sites considered drain well and no direct damage is anticipated. Runoff can be ameliorated thru sound design and construction practices. The maximum green space allowed should be designed into the project to reduce impervious surfaces and increase natural recharge of water table. Parking areas should be kept to a minimum.

The 100 year flood level is 9' and indicates there should not be any serious flood threat for the useful economic life of the proposed structures. Measures to insure against flood potential beyond the 100 year storm levels would be cost unfeasible. More detailed hydrological studies of the selected sites will determine exact location and first floor levels of proposed structures.

A slight, long-term adverse effect caused by the addition of these units to the Paradise Point and Berkeley Manor sites is the increased traffic

to the arterial street system. See Section IV. Increased traffic on Holcombe Boulevard via Brewster and Piney Roads is the most significant factor. This impact can be minimized if the mitigating measures outlined in Section IX are implemented.

Short-term, slight adverse effects on local military-civilian relations might result from the local effort to have all new military housing constructed off-base. This effect, however, can be reduced to insignificance if the Base continues to support the good work of the Military-Civilian Council and to work with local officials on those problems of mutual concern.

Unavoidable adverse effects on the utilities of water, electricity, solid waste, and conservation of energy resources are not anticipated except for the unavoidable depletion of fossil fuel inherent in heating the new units with fuel oil.

No significant unavoidable adverse effects are anticipated in relation to economy, community facilities, land use patterns, historic preservation, housing density and appearance, public transportation, air quality, water supply and quality, soils, noise, or explosive hazards.

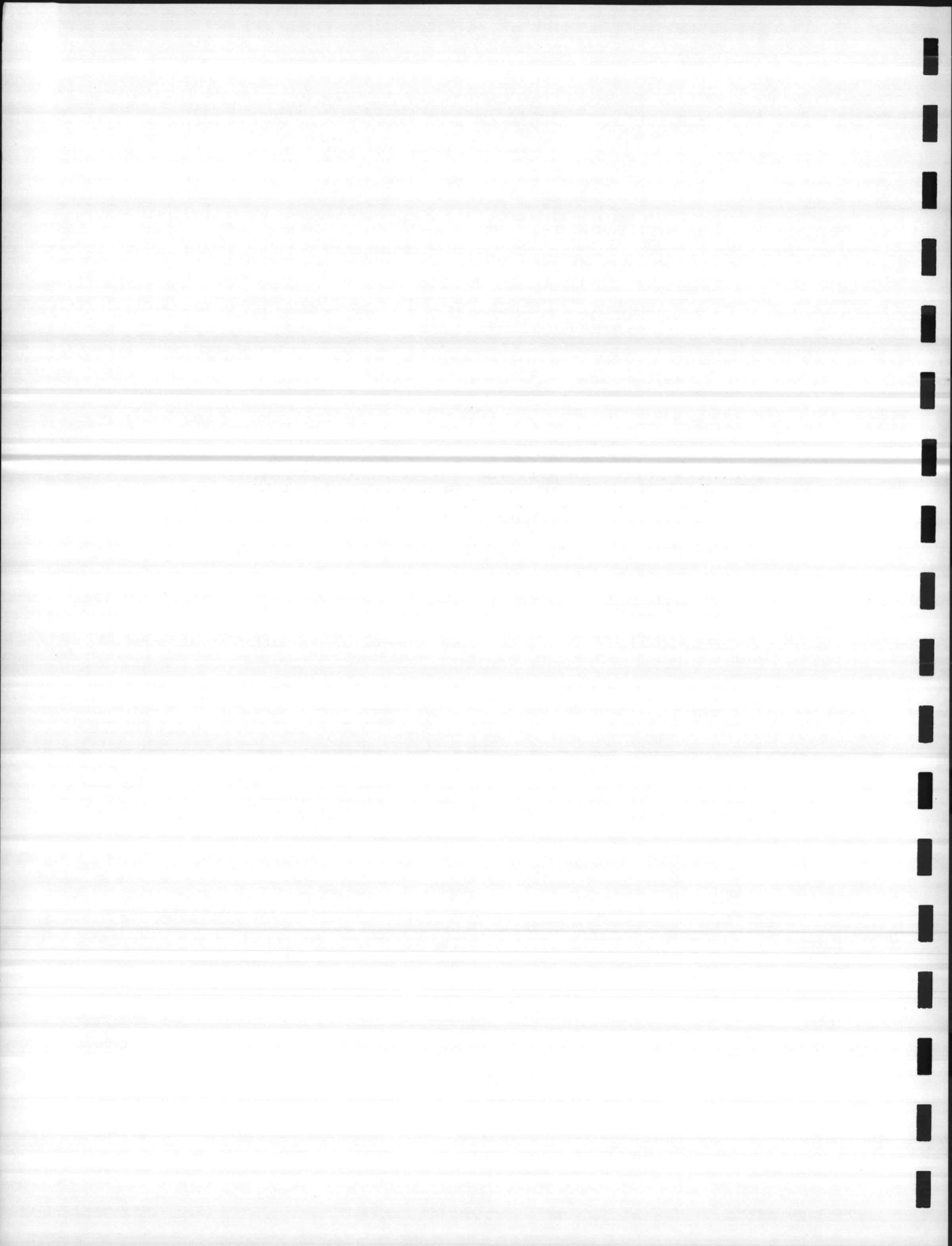
Short-term, adverse effects during the construction period that involve unsightliness and disruption of eco-systems in adjacent lands can be readily controlled on the proposed sites if recommendations outlined

in Section IX are insured by contract.

The addition of 240 children to the base school system which is at capacity in grades 10-12 will cause slight unavoidable adverse effect to school size, funding, and busing. The additional unused capacity of the school system, however, along with the quality achieved by the excellent staff nad management will minimize this impact.

VII.

THE RELATIONSHIP BETWEEN TOTAL
SHORT-TERM USE OF MAN'S ENVIRONMENT AND
THE MAINTENANCE AND ENHANCEMENT OF LONG TERM
PRODUCTIVITY



VII THE RELATIONSHIP BETWEEN TOTAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The relatively local, short-term use of the environment required to construct and occupy the proposed housing project, in pursuit of adequate shelter for Marine families, effects the maintenance and enhancement of long term environmental productivity. Survival of the environment is in no way effected but environmental quality and biological stability could be effected.

1. The project will result in total destruction of the forests in question if housing units similar to those previously constructed are built on these sites. Long term improvement in environmental quality can be maximized if equivalent areas are managed so as to promote growth of hardwood species and so as to increase habitat diversity. This can be achieved by high density clustered housing on existing sites or preservation of additional sites in adjacent area. Development of aquatic habitats as well as management favoring hardwood forests will increase habitat diversity. Greater diversity of available habitats and consequential increased species diversity should contribute to a long term increase in ecosystem stability as well as provide aesthetic and recreational improvements.

2. The consumption of irreplaceable fossil fuels inherent in the proposed fuel oil heating systems (although the total number of dwelling units will not change) will contribute to the worldwide problem. Energy efficient

heating systems and individual conservation measures can substantially negate the slight additional consumption resulting from larger units and conversion of a small percentage to fuel oil heating systems.

VIII.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS
OF RESOURCES



VIII IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed housing project as is the case in any significant constructive project, involves some irreversible and irretrievable commitments of resources and thereby irreversibly curtails the range of potential uses of the environment. The Camp Lejeune housing project while supplying the basic ingredient to quality living, adequate shelter, necessitates the loss and destruction of several resources.

1. The destruction of approximately 100 acres of productive forest is an irretrievable commitment. The existing timber will be harvested and milled.
2. The commitment of land is not irreversible.
3. No known cultural resources are committed with this project.
4. Materials used to construct the proposed townhouses are, for all practical purposes, lost.
5. Energy consumed in the construction process and that used to produce the required building materials represents the loss of gasoline, fuel oil and coal.
6. Man hours consumed in the development process are irreversibly committed.

7. Fossil fuels or water consumed in the long term support of the project are not significantly affected as the total population is not increased by this action.

8. Capital of approximately twelve million dollars will be committed and spend during the one to two year construction/demolition process. This represents an irreversible committment only in time and location. Other locations benefiting from similar projects will be partially supported by the tax base generated by the local construction industry.

IX.

CONSIDERATIONS THAT OFFSET THE ADVERSE
ENVIRONMENTAL EFFECTS



IX CONSIDERATION THAT OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS

1. Community

The impact of this project on community relations, or the planning cooperation between Camp Lejeune and local government officials, is not significantly adverse. However there appears to be growing need for Onslow County services serving military personnel and this is an area where communications can be strengthened. Also, the work of the new Coastal Resources Commission in eliminating pollution in the New River and insuring the long term viability of coastal zones for fishing, recreation, boating and marine harvest will require the cooperation of base officials. Staff from the excellent Department of Natural Resources and Environmental Affairs should become formally affiliated with any Onslow County and State of North Carolina environment protection programs.

2. Historic Preservation

Before the initiation of construction a specific and qualified inspection should be made of each site selected to determine the possibility of any archeological finds.

3. Camp Lejeune Dependents' School System

Projected additional enrollment will place additional pressure on Lejeune High School and probably necessitate some additional busing. No action relative to renovation or new construction is suggested herein, however

as the base school system has overall capacity and enrollment has dropped slightly in recent years. Condition of existing structures was not considered in this CEIS. Future enrollment projections should be made now to insure that the slight impact from this action does not accumulate into significant impact within the next 3 - 5 years.

4. Design

Schematic site plans and typical dwelling unit designs contained herein are suggestive only. The Marine Corps when evaluating planning and design proposals for the proposed housing from Turnkey developers should consider the following:

The development of small lakes adjacent to the proposed housing. Additional long term beneficial effects would be realized. Eco-systems would be strengthened and diversified storm runoff could be fully controlled and the visual amenity would be significant.

Units should be designed with minimum roof area and pavement and oriented to sun and wind to insure maximum efficiency of heating/colling systems. The mild Camp Lejeune climate will allow design to feature outdoor living.

Open space areas should be maximized and original woods left wherever possible as screening from other units and parking areas. Parking areas need to be reduced to minimum size, divided into several smaller areas

and landscaped to minimize runoff and to create a family-housing environment.

Short term negative impacts on the environment as a result of construction can be ameliorated by specifying accelerated excavation and grading, maximum retention of existing vegetation and grades, immediate and mandatory re-vegetation, limiting the operating area of heavy construction equipment.

5. Traffic

The increased arterial traffic in the Paradise Point housing area will add slightly to the existing congestion on Holcombe Boulevard during peak traffic periods. The points of entry are at Brewster Boulevard and Main Service Road. Recommendations contained within the Reconnaissance Traffic Engineering Study for Camp Lejeune, May, 1973 for the improvement of the Brewster-Holcombe intersection are adequate and need to be implemented.

Further the mini-bus transit system proposed in the Master Plan for the Hadnot Point area which would be designed to alleviate parking requirements and reduce private vehicle use should be investigated. Certainly the effective use of car pooling or special purpose vans between the housing area and Hadnot Point areas must be implemented.

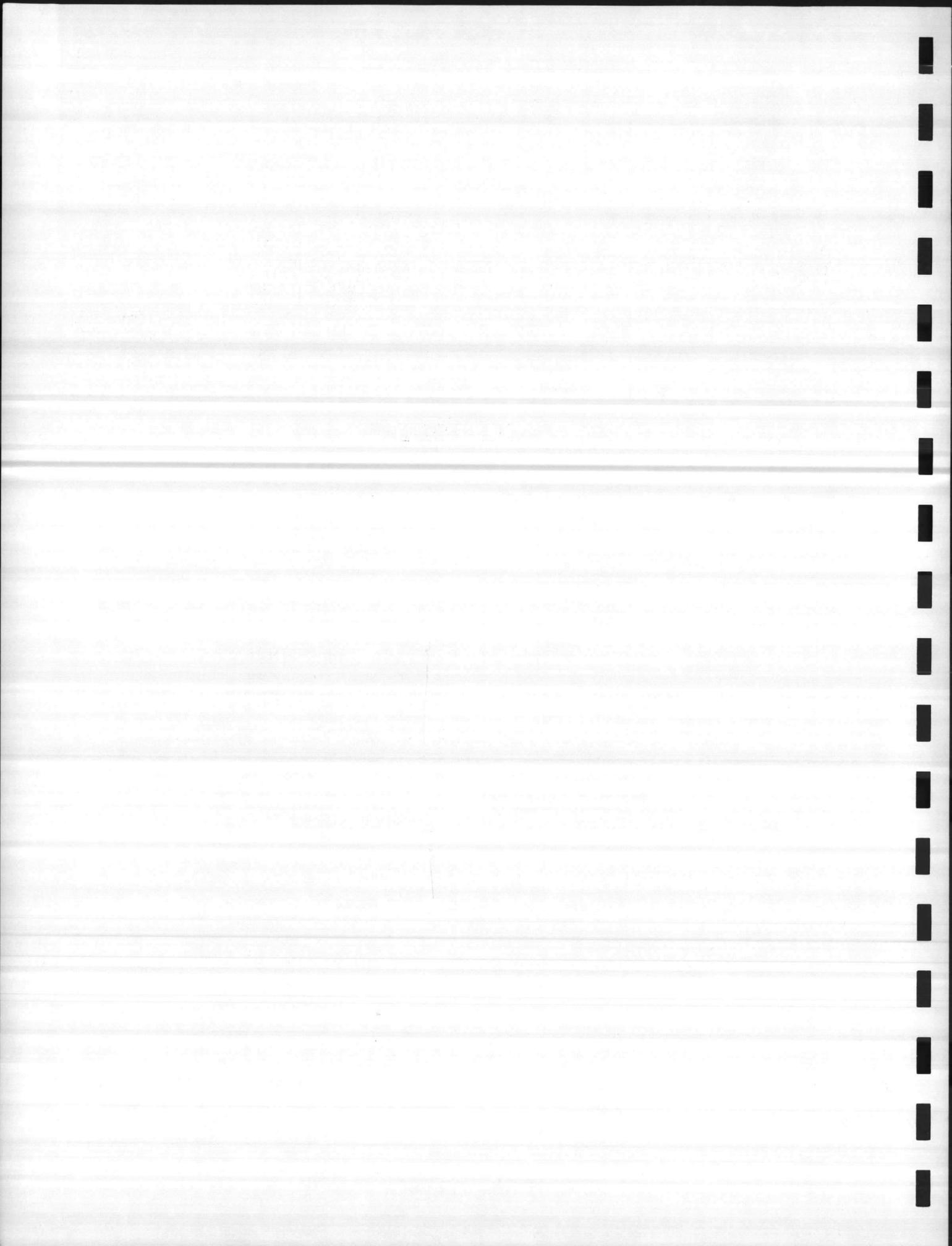
6. Land Resources

The design of this proposed housing should cluster proposed units at high densities within forested tracts with minimum disruption of existing forest stands. All three sites will accommodate such design, however, if not required, the Berkeley Manor site should be retained naturally as it is perhaps the most valuable ecologically.

Design should be coordinated with the Camp Lejeune Department of Natural Resources and Environmental Affairs and the technical staff of the Coastal Resources Commission.

X.

APPENDICES



APPENDIX I

FOREST MANAGEMENT

Introduction

It is the policy of this command to maintain a sustain-yield multiple-use forest management program that is commensurate with military training requirements. This program correlates timber management with the best wildlife habitat possible; base recreational and natural study areas; and the ever expected value of our forests. The following narration will express this policy.

Analysis of Forested Areas Under Modified Management

Timber producing areas are under even-aged management with the exception of areas along major streams and swamplands. These areas are under a modified even-age management system so that maximum coordination and benefits may be given to wildlife management and erosion control. Also included within this modified management system are roadside zones parallel to major transportation arteries running through the Base; Base Archery Range; Special Services bridle trails; Camp Lejeune Boy Scout area; areas surrounding Special Services recreation camp sites; and forested areas parallel and surrounding building complexes throughout the Base. Smaller areas are managed for enhancement of "endangered" wildlife species particularly the red-cockaded woodpecker and osprey.

Management Techniques

Approximately 60,552 acres are under management at Camp Lejeune. Timber management methods and techniques are similar to those used on other large acreages in the surrounding areas. Wherever practical, natural regeneration is utilized. This process occurs mainly through seed tree cuttings in blocks of 125 acres or less. Artificial reforestation is used on clear-cut areas in blocks not exceeding 50 acres and on areas being converted into timber producing lands after other nonproductive uses. Management practices include mixtures of pine-hardwood with ratios of 70% pine minimum on pine producing sites, and a maintenance of 90% - plus hardwood in hardwood producing sites. During site preparation operations in seed tree and clear-cut areas, scattered clumps of mast producing and fruiting hardwoods are left unharmed to produce food for wildlife. Older stands are thinned to provide ample sunlight for increased vegetative growth.

The forest at Camp Lejeune is divided into 60 compartments, and each compartment into stands; six compartments receive annual silvicultural treatments. A prescription for each compartment, modifying the long range management plan, is prepared by a professional forester. These prescriptions take into consideration the following multiple-use factors:

- a. Military training
- b. Timber production
- c. Wildlife habitat and production; possible fish pond sites
- d. Recreation and enhancement of natural beauty
- e. Soil erosion and stream pollution
- f. Site preparation needed after treatment (including prescribed burning)
- g. Protection of endangered wildlife species

After completion of prescription work, timber stands requiring treatment are marked, and products are placed for public bid. Other stand treatments occur in compartments which are closed following the sales.

Reforestation

Reforestation is increasing yearly to keep abreast with the even-age management plan and to keep every acre under fiber production where possible. Reforestation is carried out in two distinct methods - natural and artificial. Future plans are to have more natural regeneration through seed tree cuttings.

Natural Reforestation

Natural reforestation (or natural regeneration) is the method of seeding a prepared area through seeds cast from surrounding trees, particularly the Pinus species, or from trees left scattered over cut areas. Seed trees usually are located 60' x 60', 12 per acre. Approximately 643 acres were prescribed for natural regeneration over the past three years. (Equipment used in preparing the areas is described later in the report.)

Artificial Reforestation

Artificial reforestation is the method whereby seedlings are actually planted in clear-cut, bare, or nonproductive areas. Seedlings, normally of one-year old stock purchased from a local N. C. State Forestry Nursery, are transplanted in the prepared areas by a tractor-towed planting machine. In areas where the planting machine cannot be utilized, hand planting with dibbles is done. Seedlings are transplanted in rows spacing 8' x 8', 680 per acre. Approximately 518 acres were prescribed over the past three years.

Timber Stand Improvement

Improvement in even-aged timber stands is accomplished by sanitation and salvage thinnings so that weakened trees are removed while yet harvestable. Major stand improvement work is accomplished by heavy equipment subsequent to clear-cuttings and seed tree cuttings. Undesirable debris such as logging slash, undergrowth, and unwanted species is removed from the sites by use of a KG blade. This debris is wind-rowed and either burned or allowed to decay. Occasionally, an 8,000-pound tandem disk is used in conjunction with the KG blade. Areas which are sparsely covered with debris may be single or double disked for seed bed/planting preparation. Planting experience has proved that the better the soil is prepared, the more vigorous the seedling growth is, for the first few years. A total of 1,161 acres of site improvement was prescribed in the past three years. In coordination with wildlife management, several clumps of mast and berry producing hardwoods are left scattered throughout the area during site preparation. In some instances, strips extending across the complete length of a prepared site are left for wildlife purposes. These clumps or strips produce game food annually, thus providing wildlife usage while reforestation needs on the same site are being met. The strips also provide cover while the large openings provide excellent bugging and dusting for wild game birds and browse for deer.

Timber Harvest

The Forestry Branch, Natural Resources and Environmental Affairs Division, is a self-sustaining unit and provides a large excess in profits used in support of other Department of the Navy forestry programs.

TIMBER HARVEST FOR CALENDAR YEARS
1971 - 1973

1971

<u>Product</u>	<u>Volume</u>	<u>Gross Income</u>
Pine sawtimber	4,355,087 MBF	\$209,596
Pine pulpwood	6,890 Cds	42,939
Hardwood sawtimber	266,654 MBF	6,668
Hardwood pulpwood	1,210 Cds	1,879
		<u>\$261,082</u>

1972

Pine sawtimber	2,723,763 MBF	\$151,763
Pine pulpwood	4,925 Cds	41,997
Hardwood sawtimber	471,390 MBF	18,856
Hardwood pulpwood	1,595 Cds	4,299
		<u>\$216,915</u>

1973

Pine sawtimber	3,628,515 MBF	\$484,286
Pine pulpwood	4,492 Cds	84,123
Hardwood sawtimber	187,697 MBF	13,403
Hardwood pulpwood	844 Cds	9,524
		<u>\$591,336</u>

Grand Total 1971 - 1973: \$1,069,333

Since the value of this timber as an end product is about \$8,000,000 approximately \$1,500,000 was injected into the local economy by contracting timber companies. All income was generated and planned work was accomplished on a budget of \$325,801, including salaries and equipment costs. Acreage involved in timber sales totaled approximately 5,683 acres.

Erosion Control

An area previously utilized as a heavy equipment compound was released recently from further use and was placed under forest management. Approximately 15 of the total 56 acres had been affected by a slow erosion problem. Slash and longleaf pine seedlings were planted over the area for erosion control and site stabilization. The longleaf seedling area will be replanted later for better erosion prevention.

Prescribe Burning

Prescribe burning, contrary to much adverse public opinion, has proven to be a very effectual and cheap silvicultural tool. Approximately 17,000 acres were prescribed and treated during the winters of 1971 and 1973. This burning is done as part of the multiple-use management system. Benefits derived: reduction of rough buildup; control of undesirable species that clutter the understory of the forest; control of brown spot disease in beginning natural longleaf pine stands; provision

for better seed beds for natural regeneration of pine; stimulation of new shrub sproutings and grasses in spring and summer months; and opening of the understory for better game and bird utilization.

Access Roads

Approximately five miles of access roads were constructed over the past three years for timber accessibility. After sale closure, these roads eventually will be disked and sown with a perennial grass such as Bahia for wildlife use and erosion control. Access roads are used readily for military training, wildlife feeding, openings for bugging and dusting, hunter access, and fire breaks.

3-P Forest Inventory

During the period October - December 1972, a timber inventory was conducted of the 60,552 acres under management. This inventory, normally occurring at 10-year intervals, furnishes vital information in sustain-yield forest management. The 3-P sampling system is new to forest managers, but is a much faster, a more accurate, and a money-saving method. Two hundred established continuous forest inventory (CFI) plots were selected by random sampling for application of this system. Accumulated field plot data was forwarded to computers which randomly selected a certain number of trees on these field plots to be measured by a dendrometer. The final phase of accumulating field data by using the dendrometer was accomplished in the early

spring and winter of 1973. Upon compilation of the work sheets, the information was forwarded to the U. S. Forest Service, State and Private Division, Atlanta, Georgia, for final computation of total volume of timber on the Base as to size, class, and forest type.

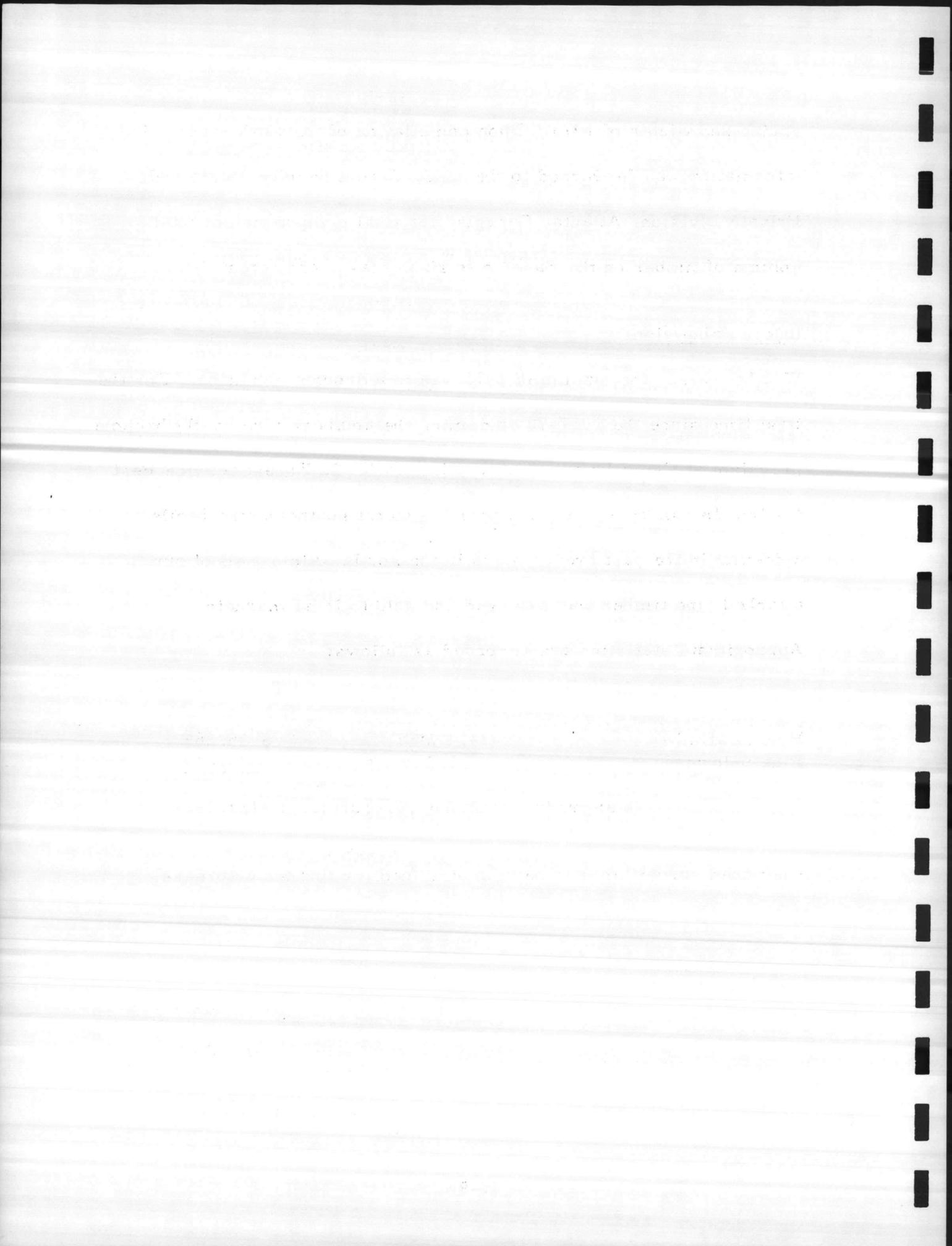
Insect Protection

Weather-wise, the autumn of 1973 was in a drought condition. For the first time since the 1967-70 epidemic, the southern pine beetle became prevalent at Camp Lejeune. According to N. C. Forest Service Pest Control Newsletters, this has been the worst southern pine beetle epidemic in the past twenty years in the south. Almost all of our attacked pine timber was salvaged and sold to local markets.

Approximate statistics are recorded as follows:

Pine sawtimber	714.4 MBF	\$ 96,265
Pine pulpwood	1,589.0 Cds	<u>26,417</u>
Total products income.....		\$122,682

Continued surveillance is being maintained for further outbreaks.



APPENDIX II
WILDLIFE MANAGEMENT

General

Camp Lejeune's Wildlife Management Program is designed to provide optimum environmental conditions for the wide variety of fauna that inhabit the Base. Extensive habitat management programs, such as the proper harvest of timber lands, prescribed burning, creation of food plots, maintenance of wildlife openings, and the preservation of habitat occupied by unique species have resulted in abundant, healthy populations of wildlife available for both consumption and nonconsumption use.

Wildlife Resources

A listing of the wildlife species most common to Camp Lejeune, their scientific name, relative abundance, and condition of their habitat is found in Appendix D. Relative abundance ranges from common to very abundant. Population estimates were derived through sight counts, track counts, sample area counts, and harvest estimate methods of inventory.

Wildlife Management Plan

The initial wildlife management plan for Camp Lejeune was formulated during fiscal year 1968 and has been updated each year with an annual increment for enhancing wildlife species. A new ten-year plan was

formulated during fiscal year 1973 for the purpose of improving management of all fish and wildlife. The new plan will be updated annually with an annual operational plan.

Under the new plan, the Base has been divided into fourteen wildlife units featuring a particular game species within a wildlife unit with management emphasis being directed toward improving the habitat for that particular species. All other game and nongame species also will be considered within the wildlife unit.

Progressive improvements is expected to be realized under the plan since it is adjusted to meet the increasing needs of the public using the local fish and wildlife resources. The plan is compatible with the forest management plan and with other land use of the Base.

Management Practices

Local emphasis is directed primarily toward management of a variety of forest game species. Forest game populations are dependent upon timberlands which provide food and cover throughout the year and successful conservation of these populations depends upon sound management of timberlands from the commercial viewpoint.

The Base Forester and Base Wildlife Manager enter these timberlands together in prescribing plans for timber stands which best fit the multiple-use concept. Site plans are prepared for future roadway plantings for

wildlife, new food plots, natural openings, clear cuts, seed tree cuts, and thinning operations. This management procedure is necessary to ensure compatibility of the two programs and continuous progress in the future.

Wildlife Food Plots

Fifty-four food plots totaling 250 acres have been established to supplement the natural food supply, provide edge effects, and enhance natural brood range. One half of each plot is planted autumnally in improved varieties of rye and wheat to provide winter grazing. The remaining half of the plot is left fallow for invasion by grasses and succulent herbs. The food plots are seeded with millets and other annuals during the spring season.

Small Game Management Area

An area was maintained as an annual work project to provide additional recreational quail hunting and further enhance the wildlife resources program. The area covers a 1300-acre continuous tract of pine-hardwood stands which generally are open enough to provide excellent quail hunting.

Forty-eight strips were seeded in annual mixtures furnished by the State Wildlife Resources Commission. Perennials, such as sericea lespedeza, were maintained in six previously cleared strips. Each of the fifty-four strips in the management area is approximately one-fourth acre in size.

Sawtimber in the south portion of the area was thinned through timber operations during fiscal year 1972. Firebreaks were cut to divide the area into small units which are prescribed burned on 2-year rotations. Management techniques are implemented to improve food sources, nesting, and escape cover. The area was prescribed burned in fiscal year 1973 to improve the quail habitat of the area.

Forest Access Road Plantings

Three miles of forest access roads were planted in perennial grasses such as rye and fescue. Bahia grass of the Wilmington variety was seeded on an additional one-fourth mile of access roads as an experimental planting, which appears to be successful at the present.

Perennial plantings on forest access roads aid in prevention of wild-fires, provide supplemental food sources for forest game, reduce road maintenance costs, and improve the aesthetic quality of the area.

Wildlife Openings

Small openings within timberlands that are well distributed are very important for enhancing the needs of forest wildlife. There are thirty-five of these openings ranging from 1/2 to 3/4 of an acre in size.

Edge effects are maintained as an annual work project through trimming, project placement of brush for escape cover, and slight alterations in forest management practices. Long range maintenance consists of mowing the clearings at 3-year intervals which promotes grasses and prevents woody succession. The accompanying map of Wallace Creek Wildlife Management Area provides an example of the dispersal of the openings.

A comprehensive survey prior to establishment of the area and a survey conducted in fiscal year 1972 indicate a 30 percent increase in the wild turkey population of the area due to intense management. This is an instance which substantiates the importance of quality wildlife management at the local level.

Experimental Woody Stock and Perennial Plantings

Woody stock plantings were made in cooperation with the N. C. Wildlife Commission and the Soil Conservation Service of the Department of Agriculture. Plant materials were distributed through the Soil Conservation Plant Nursery, Albany, Georgia.

Plantings of Wilmington bahia grass were established at five locations in cooperation with the Soil Conservation Service. Bahia grass provides a permanent food source throughout the year for quail, wild turkey, and deer. Present plantings look very promising and may greatly enhance local wildlife populations in the future.

Dove Management Areas

Five management areas for mourning dove were established as annual work projects to provide site locations for the successful harvesting of dove during the hunting season. Strips of millet were planted adjacent to strips of winter grain to provide food sources for the dove throughout the year. The strip planting method keeps breeding populations and young dove in the management areas.

Waterfowl Impoundments

Continued management of the Town Creek Green-tree Impoundment established in fiscal year 1968 is producing satisfactory results.

Twelve wood duck nesting boxes were erected within the impoundment and are maintained each year. Eighteen broods of wood duck were hatched within the nesting boxes during this reporting period. Annual maintenance consists of flooding the impoundment in September and draining in March. Nesting boxes are inspected for nests in early spring and nesting material is replaced in December.

Salliers Bay Impoundment, five acres in size, was established in fiscal year 1972. Marine Corps Reserve engineers constructed a road through a highland swamp in 1969 during an extended drought and, afterwards, normal rainfall flooding of the adjoining area created what appeared to be excellent potential for waterfowl. A culvert positioned in the roadway by wildlife management personnel maintains the desired water level and prevents roadway destruction adjacent to the impoundment. The impoundment is being managed as a permanently flooded area for black duck, mallard, wood duck, and green winged teal. Six nesting boxes for wood duck were established in fiscal year 1973.

Turkey Gobbler Counts

Turkey gobbler counts are conducted each spring to determine year-to-year abundance. Accompanying charts indicate the established routes (10 miles) traversing typical wild turkey habitat. Each route was driven three times during the reporting period (16-21 April) during weather not rainy or windy enough to interfere with hearing. Counts began 30 minutes before sunrise with stops spaced one mile apart. Count stops lasted for three minutes and all gobblers heard were recorded. Count data from fiscal year 1973 revealed the gobbling incidence at Camp Lejeune to be higher than any other route conducted in North Carolina.

Wild Turkey Stocking Program

Enhancement of the wild turkey restoration project effort in North Carolina continued at Camp Lejeune. Forty-five wild turkeys were live-trapped during the winters of 1971 and 1972; ten of which were banded and released at locations where the trapping occurred. Twenty turkeys were removed from Camp Lejeune and released on the Green River Game Lands in western North Carolina. These transplants have taken very well to the Green River area where a high population now exists and is reported to be one of the best populated areas in the state. A very important and fine example of cooperative assistance in helping to restore this magnificent game bird in North Carolina is revealed through the wild turkey stocking program. Future plans have been made

to live-trap additional birds during late winter of fiscal year 1974, some of which will be released in Croatan National Forest adjacent to Cherry Point Marine Corps Air Station.

Wild Honeybee Project

The honeybee, a very beneficial and important insect found at Camp Lejeune, unknowingly performs an invaluable service to nature in cross pollinating flowers while collecting nectar and pollen for food. The continued existence of many wild flowers which are aesthetically pleasing and numerous other plants which derive their beauty from colorful fruits, nuts, or berries is dependent upon pollinating insects such as the honeybee. These fruits, nuts, and berries, in turn, provide valuable food for many species of wildlife.

Honeybee colonies require some form of protective housing such as hollow trees for survival. During logging operations in which many hollow trees are destroyed, those trees containing honeybee colonies are marked to avoid accidental cutting during future timber harvests. Thusly, the continued existence of the honeybee at Camp Lejeune is ensured.

Two wild honeybee colonies were saved from destruction during the summer of 1973 by removing them to a standard beehive and then transporting the hive to a safe place in a forested area where they were pro-

tected from animal predators such as black bear. The first colony was removed from a fallen tree and the second was removed from a training building where the bees were annoying troops. Future plans are to further protect and preserve any colonies that might be so endangered.

Purple Martin

The purple martin, termed by some conservationists as America's most wanted bird because of its voracious appetite for flying insects, is found at Camp Lejeune. This bird will eat as many as 2,000 mosquitoes per day and can be attracted to any area by erecting good housing. Gourds suspended from a high pole provide good nesting sites, and future plans call for the erection of additional gourds and martin houses at Camp Lejeune.

Raccoon Trapping Program

The first trapping season for controlling raccoon populations was established in 1973. Trapping was not permitted prior to 1973 and, consequently, a very dense population of these animals occurred, as evidenced by the increasing number of raccoon visits to the housing areas in search of food. Large die-offs occurred through the years when populations reached critical densities. At present, the valuable raccoon resource is being retained from loss to the environment by trappers utilizing small leg-hold traps and live-trapping methods. Fifty-six raccoons have been made available to the North Carolina Wildlife Commission for further transporting to the mountains and release in improving populations there.

Endangered Species Program

The Endangered Species Act of 1966 directed the Departments of Interior, Agriculture, and Defense to protect endangered species and their habitats on lands which they administer when such actions are consistent with the mission of the area. Base regulations provide legal protection for endangered species and all nongame animals.

Recently, a program was initiated that does more than just protect these creatures. Surveys are being conducted to determine the number of animals present, whether the species is increasing or declining, and habitat requirements.

A brief discussion of the animals included in the Base's endangered species program follows:

The red-cockaded woodpecker's range is confined to the coastal plains of the southeastern states. An overaged pine infected with red-heart is required for a nesting site. Its decline is due to forest management practices that call for removal of all overaged pine trees.

Management practices at Camp Lejeune have been modified to leave suitable nesting trees wherever found. Seventeen nesting trees have been located and marked to ensure nonremoval during future timber operations. Base forestry personnel are trained in the identification of nest trees and assist in locating new sites.

The Camp Lejeune area of North Carolina is near the northern boundary of the alligator's range. Several alligator sightings aboard Base are reported each year and, apparently, the population is on the increase. The habitat best suited for the alligator is on the upper reaches of the salt water creeks and the tributaries of New River where there is deep and brackish water. A nesting site was discovered near Freeman Creek which probably has been used for several years.

Other endangered species which might visit the Base include the brown pelican, southern bald eagle, dusky seaside sparrow, ivorybilled woodpecker, and Carolina panther. It is interesting to note that a cougar was

seen at Camp Lejeune on 11 October 1972 by Charles D. Peterson, Base Wildlife Manager.

Several other species inhabit Camp Lejeune that are not considered endangered but require special management considerations. This category of animals has been entitled "Species in Need of Help".

Camp Lejeune's representatives are the osprey, eastern bluebird, and black bear. To date, approximately forty osprey nests have been located and plotted on a map with recorded observations concerning breeding, nesting, feeding, etc. More detailed information concerning the number of young per nest will be obtained this spring by use of a helicopter. Data previously collected has been forwarded to the North Carolina Fish and Wildlife Service to aid in their bald eagle/osprey survey.

The eastern bluebird is also on the "Species in Need of Help" list. In order to enhance nesting facilities, twenty-five 6-foot juniper posts were established in open areas. Nesting cavities were drilled into the posts in preference to "bluebird houses" due to their natural appearance.

Another animal requiring special management consideration is the black bear. During the past several years, a steady decline has been noted in the number of bears taken by hunters. Several areas throughout North Carolina have been designated as bear sanctuaries. Camp

Lejeune added the black bear to its list of protected animals in 1969.

In order to gain information on the number of bears inhabiting the Base, with the assistance of North Carolina Wildlife Resources Commission and Naval Medical Field Research Laboratory, natural resources personnel conducted a bear-tagging program during fiscal year 1973. Eight bears were trapped, tagged, weighed, aged, and released. The first bear trapped (May 1973) was equipped with a radio transmitter in a telemetry study to determine movement and home range. Telemetry data indicated an approximate home range of nine square miles (May-September). The last attempt to make radio contact with this bear from aircraft produced negative results (December 1973). Technical assistance for this study was provided by the North Carolina Wildlife Commission.

APPENDIX III
FISH MANAGEMENT

Objectives

Fish management practices are programmed to produce optimum yields and ensure continued harvest of desirable fish species for the sports fisherman.

Fish Resources

A wide variety of fresh and salt water species inhabit the fresh water ponds, streams, salt water bays, and the Atlantic Ocean adjoining the Base. Principle freshwater game species are largemouth bass, bluegill, robin, redear sunfish, warmouth, pumpkinseed, yellow perch, redbfin pickerel, jack pickerel, and channel catfish. Appendix D contains names of fresh water fish common to the Base and Appendix E contains management records for fiscal year 1972. Salt water species include flounder, weakfish, bluefish, spot, croaker, whiting, drum, mackeral, tarpon, marlin, and sailfish.

Management Techniques

Eleven freshwater ponds totaling 33 acres are currently under management. Eight of these were natural ponds which were of very poor quality when first reclaimed, but are now providing quality sports fishing.

Ponds under management:

<u>Name</u>	<u>Acreage</u>	<u>Productivity</u>	<u>Fishing Use</u>
Hickory	4.5	Average	Heavy
Henderson	14.0	Average	Heavy
New pond (unnamed)	3.0	Above Average	Open fiscal year 1974
Prince	1.0	Average	Medium
Hogpen	1.0	Above Average	Light
Oak	.5	Below Average	Light
Mile Hammock	1.5	Average	Heavy
Cedar Point	2.0	Above Average	Intense
Ward	1.5	Average	Medium
Powerline	2.0	Above Average	Medium
Courthouse Bay	1.5	Average	Light

Pond Fertilization

Commercial pond fertilizers are applied at the rate of 40 pounds per surface acre to produce a "bloom" of plankton algae that prevents the development of filamentous algae and shades out submerged aquatic vegetation. The microscopic "bloom" consists of organisms that are eaten by insect larvae which is the main food supply for small fish.

Feeding Fish

Channel catfish are stocked in some ponds which have no other species present and are fed commercial foods. Floating commercial catfish pellets are used exclusively to eliminate feeding problems which are associated with the use of the sinking pellets. Floating pellets provide a visible indicator of over-feeding and of the physical well-being of the fish. Pellets are broadcast inside 2-inch plastic feeding rings eight feet in diameter which float in approximately two feet of water. Feeding rings permit the floating pellets to remain in the prescribed area until

completely utilized by the channel catfish.

Stocking

Initial stocking in fresh water ponds was at the rate of 400 bass and 1,500 bluegill-redear sunfish per surface acre. Initial stocking of channel catfish was 2,000 fingerlings per surface acre when on a feeding schedule. Channel catfish stocking is at the rate of 200 per surface acre as necessary in ponds stocked with other game fish.

Additional stocking rates are determined by seine and creel samples.

Fishing and Boating Access

Fishing and boating access areas are maintained as necessary. Trash disposal containers were provided at several sites where littering has become a problem. Boat launching facilities available to the public include Marshden Landing, Maple Creek Landing, and Onslow Beach Bridge Landing.

Shoreline Development

Shoreline maintenance of the Base ponds consists of chemical spraying and mechanical removal of brush to permit access for fishermen and management work. Littering continues to be a problem but noticeable improvement was noted during 1973.

Seine Sample Analysis

Hand seines and gill nets are used to determine fish weights, reproduction data, and size. Population controls are regulated periodically to reduce population density difficulties before they arise.

FISH STOCKING PROGRAM - 1973

<u>Species</u>	<u>Number Stocked</u>	<u>Source</u>
Channel Catfish	1,000	Fish and Wildlife Service
Largemouth Bass	4,800	Fish and Wildlife Service
Largemouth Bass	1,400	N. C. Wildlife Commission
Bluegill	10,000	N. C. Wildlife Commission

Water Chemistry Studies

All ponds are sampled periodically to determine pH, dissolved oxygen and carbon dioxide content, as well as total hardness. Applications of lime and fertilizer are made when necessary to maintain fertility and productivity at the desired level.

Aquatic Weed Control

Local aquatic weed pests are controlled through proper application of aquatic herbicides to provide optimum productivity of present fish species.

APPENDIX IV

RECREATIONAL USE OF FISH AND WILDLIFE

Fishing

Approximately 50,000 man-days of fishing for fresh water species was provided during fiscal year 1972. It is estimated that salt water fishermen spent 100,000 man-days fishing in Camp Lejeune waters.

With continued extensive management of fresh water ponds and the addition of fresh water pond acreage, this outdoor activity should increase in the future.

Hunting

Hunters enjoy a wide variety of game birds and animals which offer many hours of sporting opportunities at Camp Lejeune. There was much participation in hunting by civilian guests, civilian employees, and military personnel. Wild turkey and raccoon are species which are underharvested and programs will be initiated to increase harvesting of these species.

Adequate harvest of deer is essential to keep the herd within carrying capacity of the Base. Examination of key browse species (cyrilla and yaupon) indicates present hunting techniques have been successful in controlling the population. Antlerless deer are usually harvested every other year.

Other Utilization of Resources

Most wildlife species are protected and are never hunted in any manner. These species occupy important places in the environment and serve many useful purposes. Nature study, bird watching, conservation education, and individual well-being are enhanced by the preservation of wildlife. Students from Camp Lejeune Schools, Girl and Boy Scouts, and students of Coastal Carolina Community College enjoyed field trips for observing numerous species present in the area.

Cooperation with State and Federal Conservation Organizations

Management specialists from the N. C. Wildlife Resources Commission, the Bureau of Sport Fisheries and Wildlife, and the U. S. Soil Conservation Service made numerous visits to the Base during fiscal year 1973.

The State Small Game Biologist provided 750 pounds of annual seed mixtures and 5,000 shrub lespedeza seedlings for planting.

The wild turkey restoration project leader provided valuable management assistance for the wild turkey program. The endangered species program was also planned with the assistance of these specialists. Soil Conservation Service personnel in North Carolina provided seedlings and grass seed for wild turkey and assistance in planting. Fish and wildlife specialists from the Bureau of Sport Fisheries and Wildlife provided assistance through on-site inspections.

APPENDIX V

WILDLIFE LAW ENFORCEMENT

The Base Game Protector position, formerly within the Base Provost Marshal office, has been transferred to the Fish and Wildlife Branch, Natural Resources and Environmental Affairs Division, Base Maintenance Department. Personnel include a gunnery sergeant, sergeant, and twelve volunteer deputies. Citations totaling 221 (hunting - 154/ fishing - 67) were issued during 1973. Aside from law enforcement, duties consist of administering hunting license tests, issuing fishing and hunting licenses, and disposing of road-killed deer.

During the hunting season, each hunter must obtain a permit for the specific area in which he wishes to hunt. This permit, which is issued by the Base Game Protector, must be returned by one hour after sunset on the same day issued. This method has several advantages: collection of harvest data through completion of forms listing the number of each species taken and number of hours spent hunting; deer kills are weighed and the lower jawbone removed for aging; and, from a safety standpoint, the number of hunters per acre can be regulated allowing immediate action to be taken in locating any hunter failing to return his permit.

Wildlife Law Enforcement program was improved during fiscal year 1972 through establishment of a Base Conservation Board with the accompanying issuance of punishment guidelines for disposition of infractions of State, Federal, and Base regulations.

APENDIX VI

DEMOLITION OF TARAWA TERRACE II, FY77¹

Demolish 495+ dwelling units and remove 3,176,088 C.F. =	\$218,826
Utilities	25,875
Miscellaneous	<u>6,000</u>
SUB-TOTAL	250,701
OVERHEAD = 10%	25,070
INS., TAXES, ETC. - 12% LABOR	<u>29,619</u>
SUB-TOTAL	305,390
BOND - 1%	<u>3,054</u>
SUB-TOTAL	308,444
CONTINGENCIES AND INFLATION - 40%	<u>123,378</u>
TOTAL	\$431,822

¹Data from Navy Cost Estimating Form, 21 Aug. 1974

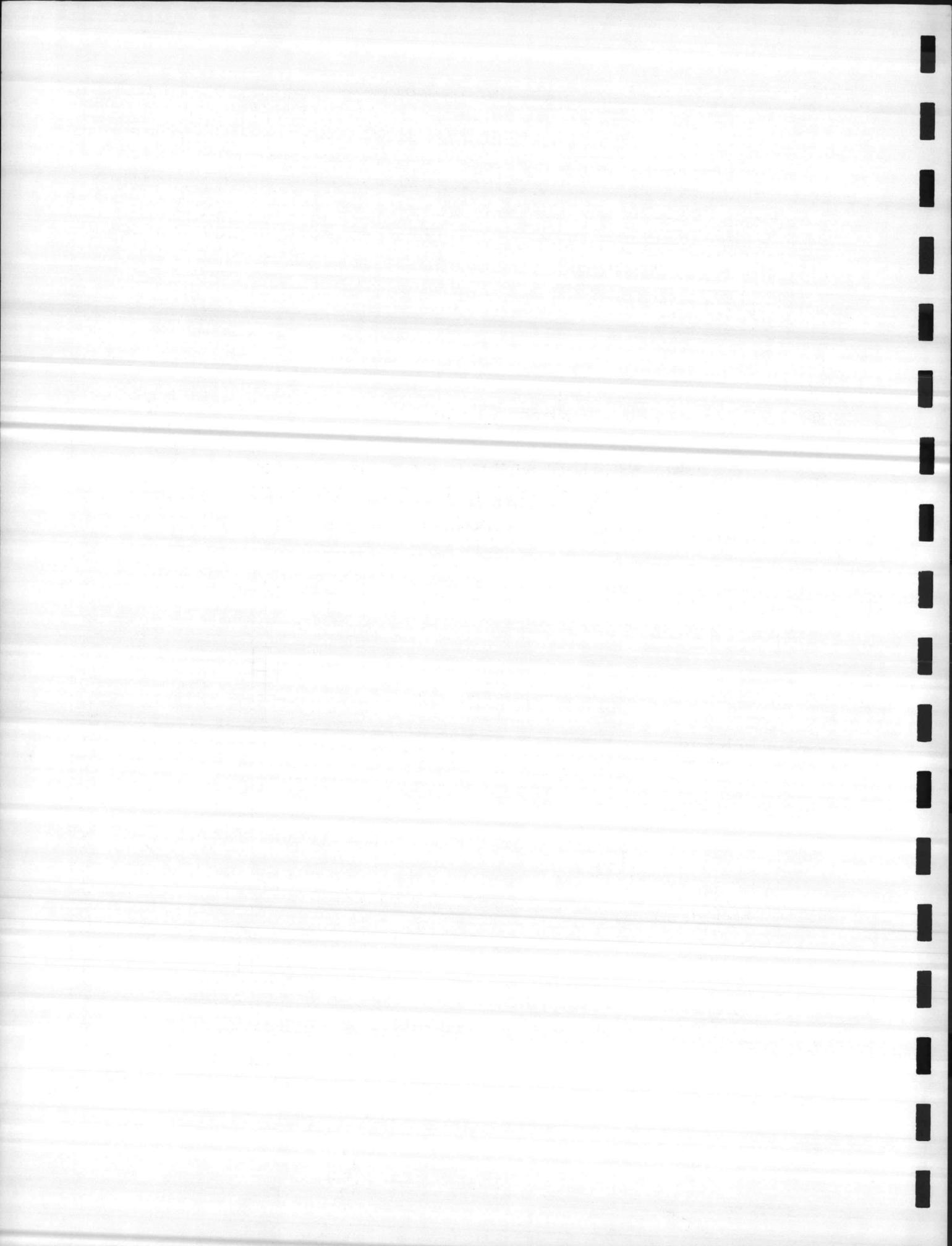
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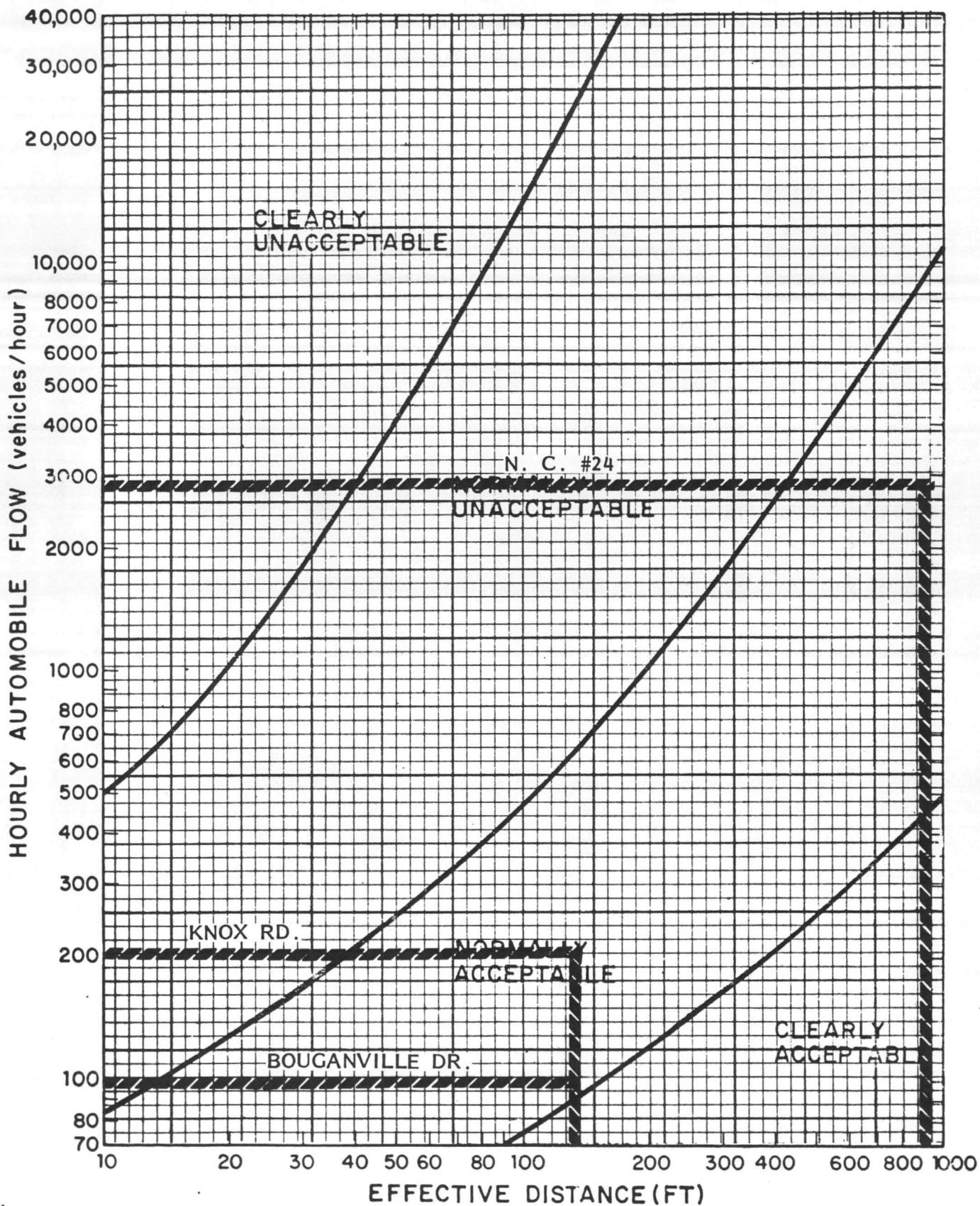
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COUNTY OF [illegible]

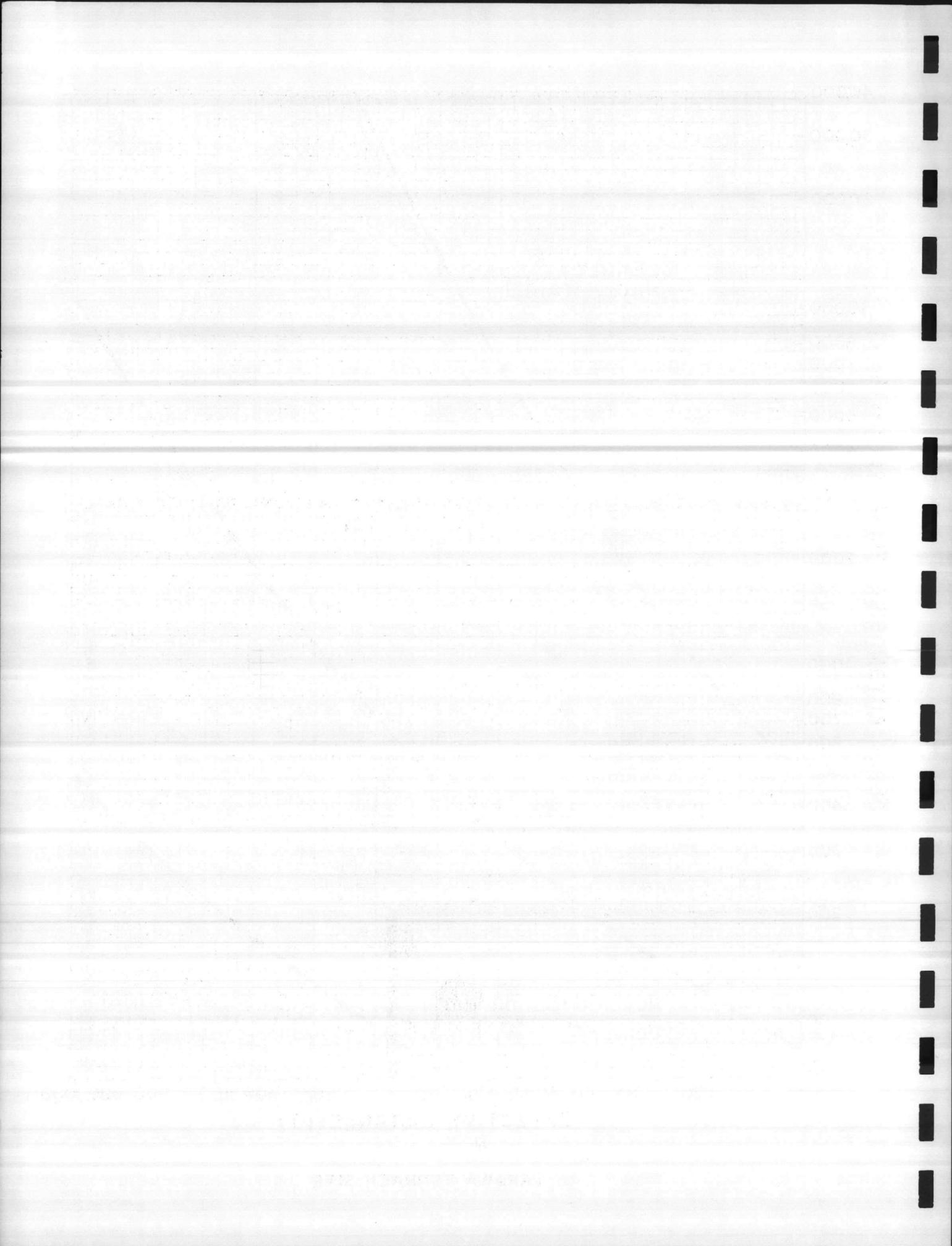
APPENDIX VII

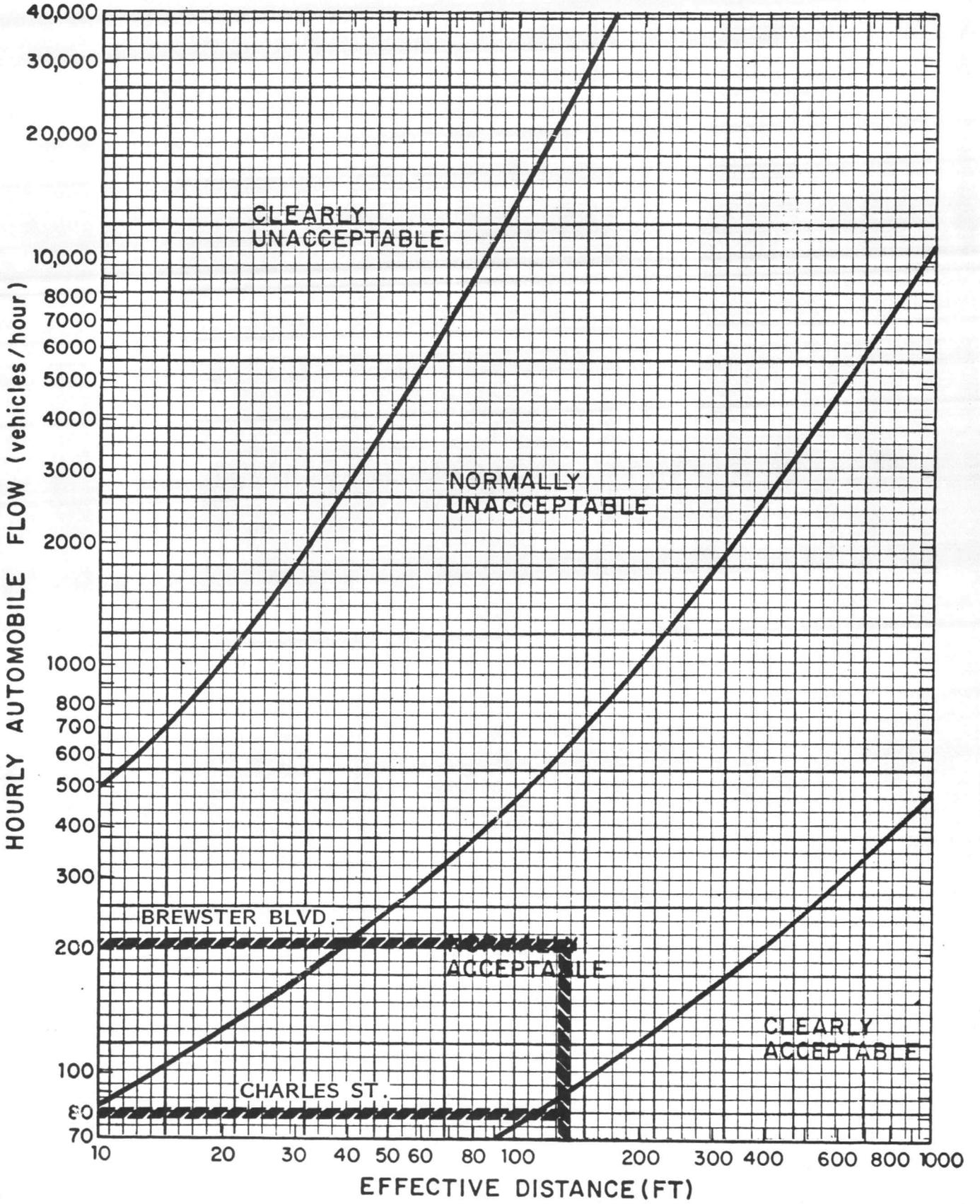
GRAPHICAL EVALUATION OF AUTO NOISE
LEVELS ON STREETS ADJACENT TO SITES



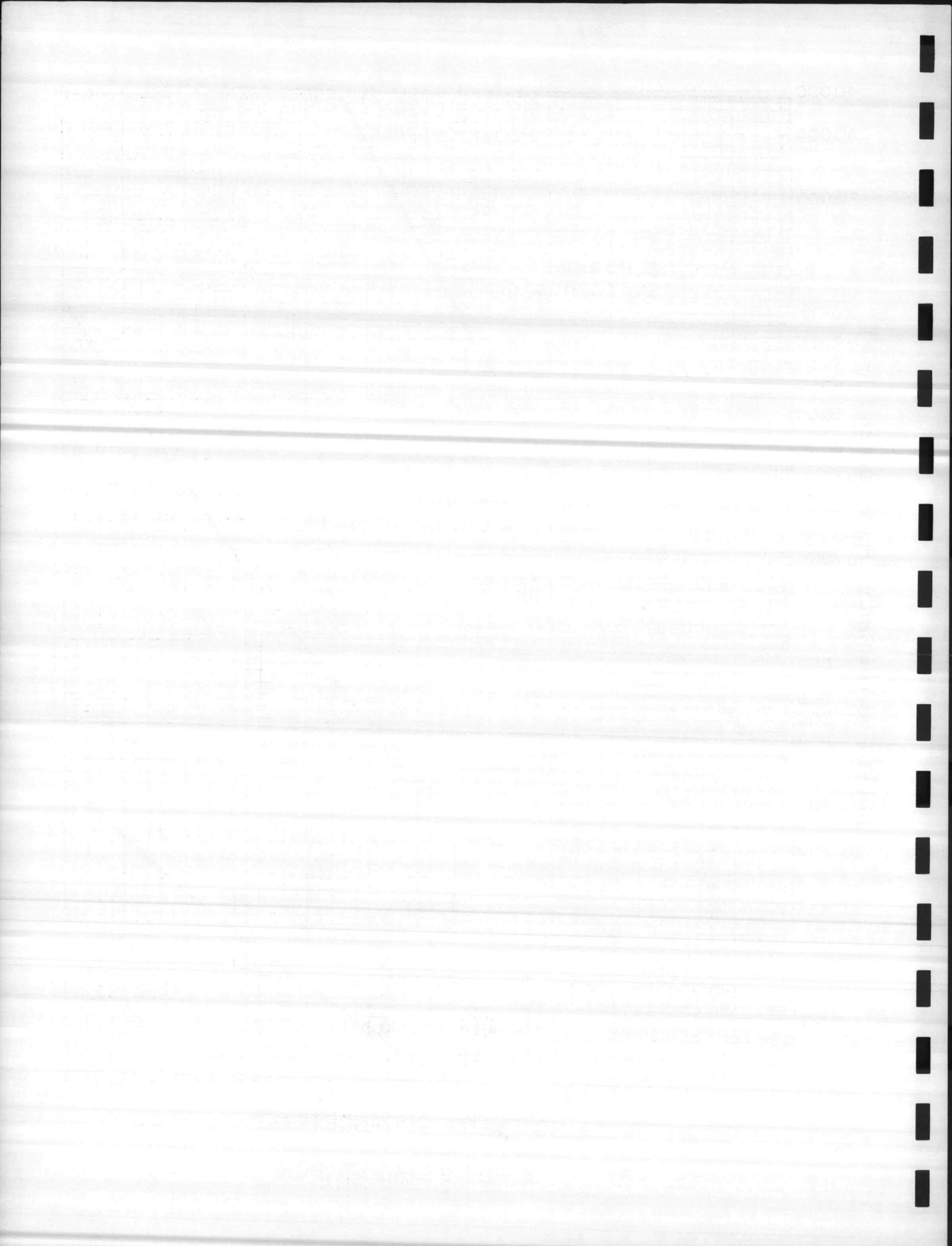


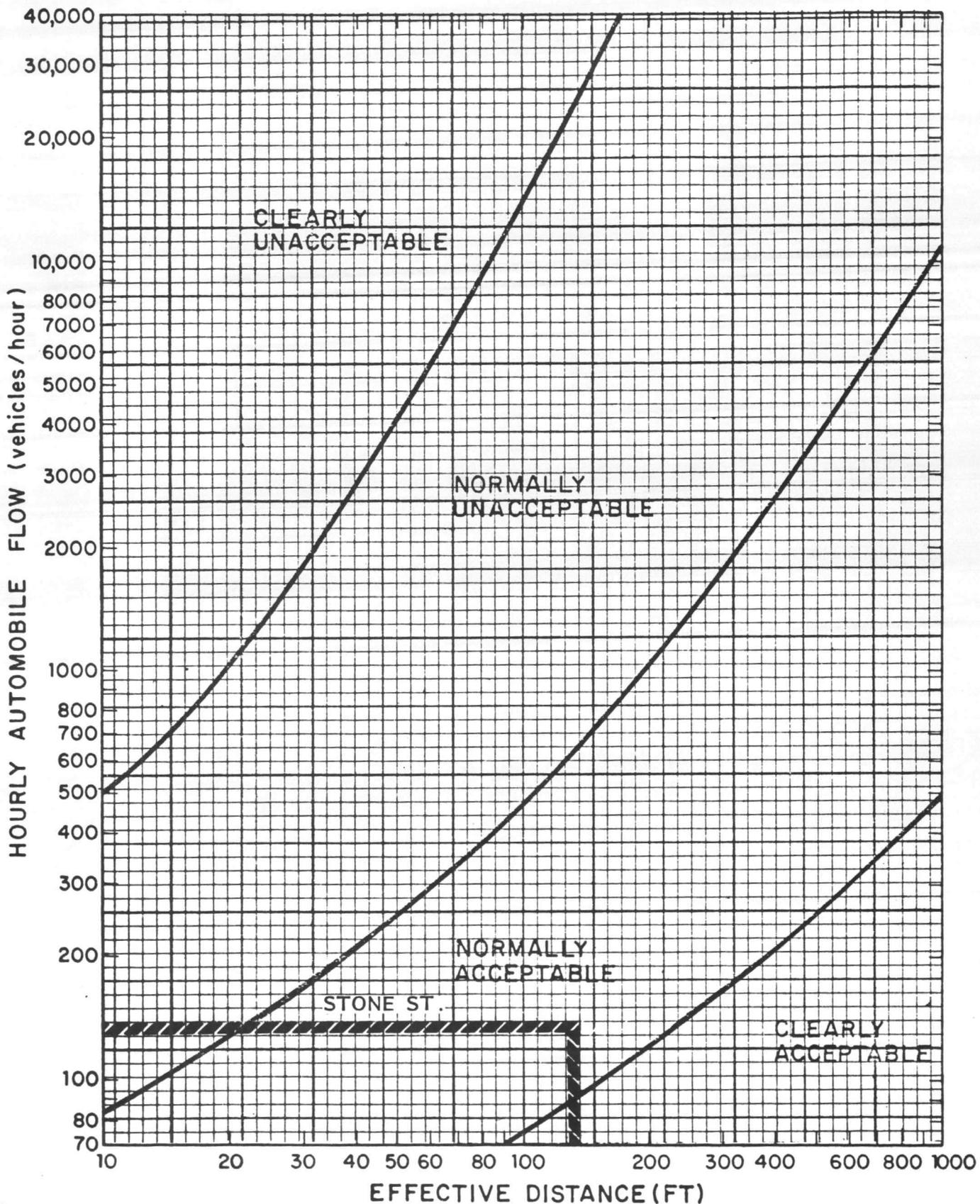
TARAWA TERRACE SITE



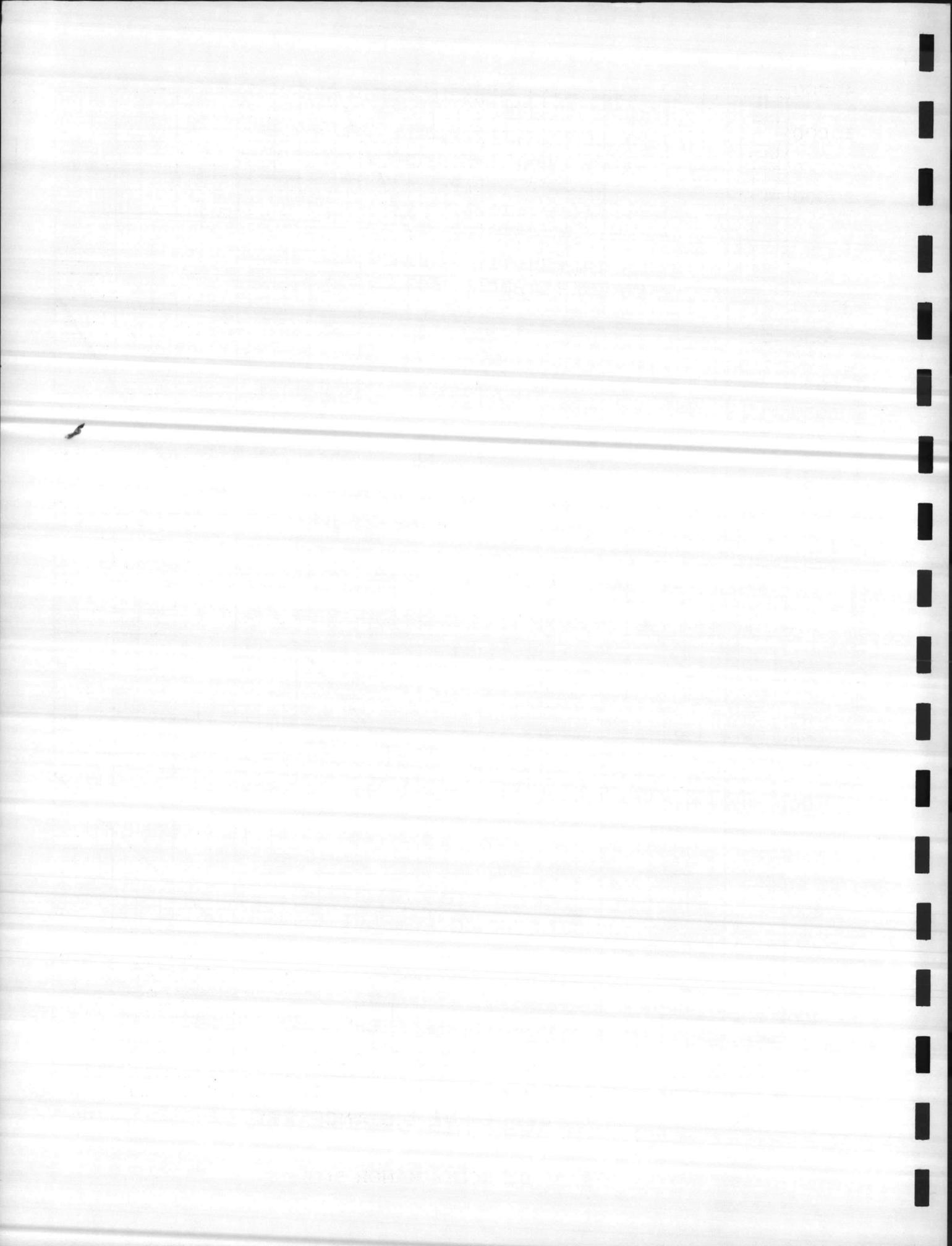


PARADISE POINT SITE





BERKELEY MANOR SITE



APPENDIX VIII

TYPICAL RENTALS AND COSTS, JACKSONVILLE URBAN AREA

APARTMENTS	BR SIZE	FURN	RENTAL PRICE PER MONTH	SECURITY DEPOSIT	ELECT INSTALL	TOTAL*
Azalea Garden (90 Units)	1	Yes	\$130-135	\$ 75	\$2	\$257-262
	2	No	\$160	\$100	\$2	\$327
Beacham #1 (252 Units)	1	Yes	\$145	\$ 75	N/A	\$220
	2	Yes	\$140-155-165	\$ 75	N/A	\$215-230-240
Beacham #2 (235 Units)	1	Yes	\$155	\$100**	N/A	\$255
	1	No	\$145	\$100**	N/A	\$245
	2	Yes	\$165-175	\$100**	N/A	\$265-275
	2	No	\$155-165	\$100**	N/A	\$255-265
Brookview (60 Units)	2	Yes	\$170	\$100	\$2	\$352
	2	No	\$140	\$100	\$2	\$322
Brynn Marr Village	2	No	\$175	\$ 75	\$2	\$292
	3	No	\$200	\$ 75	\$2	\$327
Canterbury Hills (54 Units)	1	Yes	\$135	\$100**	N/A	\$235
	2	Yes	\$175	\$100**	N/A	\$275
	2	No	\$160	\$100**	N/A	\$260
	3	No	\$180	\$100**	N/A	\$280
Cardinal Village (134 Units)	1	Yes	\$177.50-187.50	\$ 78	\$2	\$307.50-317.50
	1	No	\$145-155	\$ 78	\$2	\$275-285
	2	Yes	\$194-204	\$ 78	\$2	\$339-349
	2	No	\$155-165	\$ 78	\$2	\$300-310
	3	No	\$185-195	\$ 78	\$2	\$345-355
Hinson Arms (60 Units)	2	Yes	\$175	\$100	\$2	\$342
	2	No	\$145	\$100	\$2	\$312
Lauradale (170 Units)	2	No	\$150	\$100	\$2	\$302

APARTMENTS	BR SIZE	FURN	RENTAL PRICE PER MONTH	SECURITY DEPOSIT	ELECT INSTALL	TOTAL*
New River Management Co. (744 Units)	1	No	\$ 78.50	\$ 75	\$2	\$245.50
	2	Yes	\$108	\$ 90	\$2	\$305
	2	No	\$ 86-88	\$ 75	\$2	\$268-270
	3	No	\$ 98.50	\$ 75	\$2	\$295.50
	2	No	\$115	\$125	\$2	\$372
	3	No	\$128	\$125	\$2	\$400
Onslow Garden (286 Units)	1	No	\$160	\$ 75	\$2	\$287
	2	No	\$190	\$100	\$2	\$357
<u>Mobile Homes</u>						
Holiday Mobile Home City	1	Yes	\$110	\$100***	N/A	\$210
	2	Yes	\$135	\$100***	N/A	\$235

X-38

- * Total Includes All Utility Deposits
- ** Includes Electric Deposit
- *** Includes Gas and Electric Deposit

APPENDIX IX

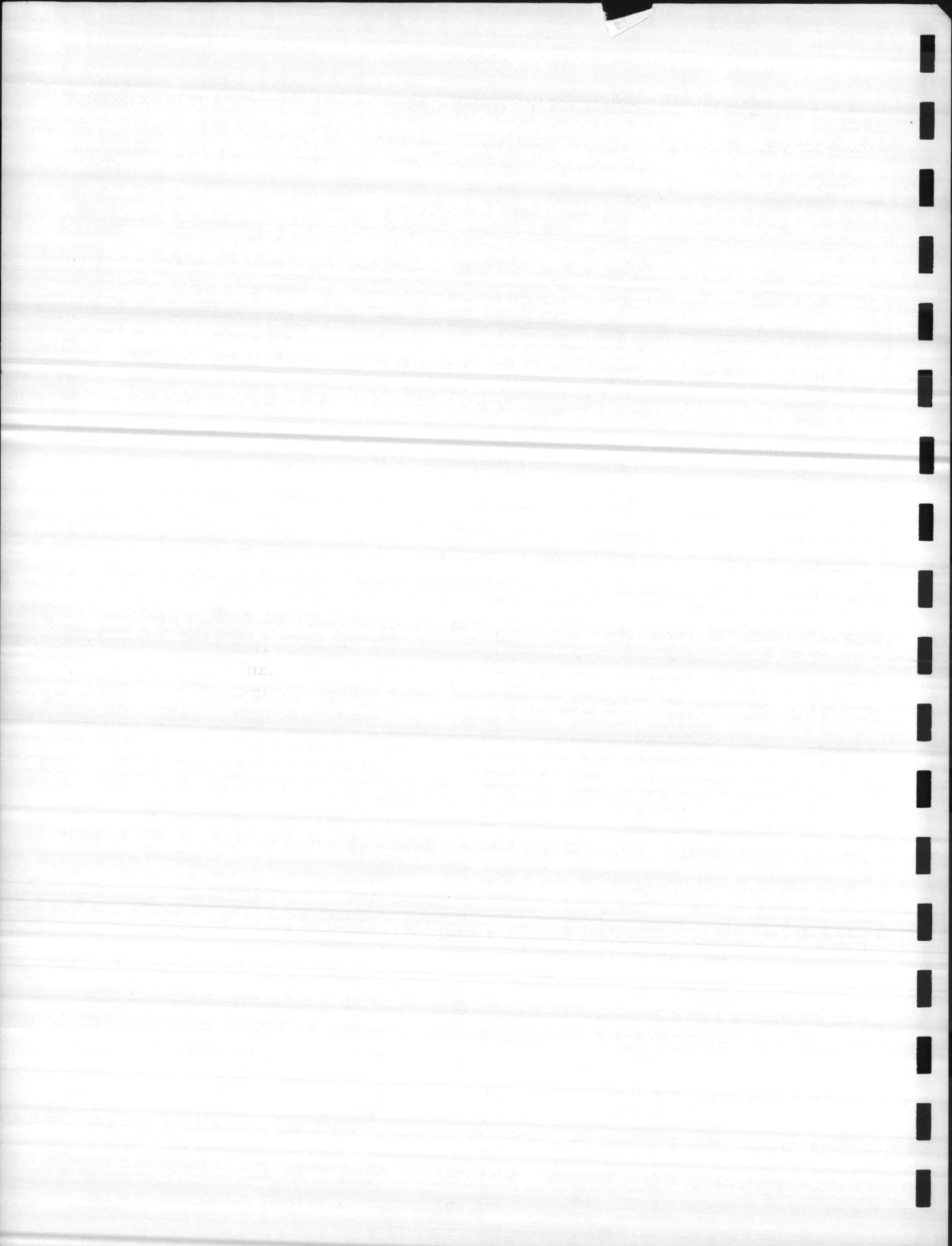
11101/19 - QUARTERS AND HOUSING WAITING LIST INFORMATION

12 November 1974

(REV 8-74)

TYPE QUARTERS

		NO. UNITS	WAITING LIST		VACATE NOTICES	VACANT	
						MAINT	AVAILABLE
PARADISE POINT							
PARADISE POINT	W/MR&G	(180)	Sr Gr 2 Fld Gr 22		0	0	0
	W/O MR&G	(40)		7	0	0	0
	<u>3300 Block</u>						
	1 - Story	(43)		195	3	0	0
	2 - Story	(24)		195	0	0	0
	Fld Gr CH (3BR)	(33)		18	0	0	0
	Fld Gr CH (4BR)	(15)		1	0	0	0
	Co Gr CH (3BR)	(53)		202	0	0	0
	Co Gr CH (4BR)	(22)		15	2	0	0
COURTHOUSE BAY	W/MR&G	(8)		0	0	0	0
RIFLE RANGE	W/MR&G	(5)		0	0	0	0
BERKELEY	3 BR MEMQ	(473)		175	10	5	0
(Capehart)	4 BR MEMQ	(204)		59	2	1	0
TARAWA TERRACE	2 BR MEMQ (Adeq.)	(527)		247	9	12	0
I	3 BR MEMQ (Adeq.)	(245)		10	5	4	0
	3/2 BR MEMQ (Adeq.)	(124)		5	1	2	0
TARAWA TERRACE	1 BR MOQ (Inad)	(35)		0	2	1	3
II	2 BR MOQ (Inad)	(103)		0	3	3	5
	3 BR MOQ (Inad)	(35)		2	0	0	0
	1 & 2 BR MEMQ (Inad)	(112)		249	3	1	0
	3 BR MEMQ (Inad)	(42)		15	0	2	0
	3/2 BR MEMQ (Inad)	(21)		6	1	0	0
INELIGIBLES	1 & 2 BR (MP & TTII)	(966)		824	10	12	0
	3 BR (MP & TTII)	(336)		3	10	5	0
TRAILER SPACES	50' & Under			0	0	0	5
	51' - 55'			0	0	0	3
	56' - 60'			0	0	0	3
	61' & Over			3	1	0	0
MCAS(H)	Fld Gr (3BR)	(18)		5	0	0	0
	Fld Gr (4BR)	(4)		3	0	0	0
	Co Gr (2/3BR)	(73)		61	1	2	0
	Co Gr (4BR)	(12)		5	0	0	0
	2/3 BR MEMQ	(277)		29	3	6	0
	4 BR MEMQ	(48)		2	1	0	0



APPENDIX X

PERSONS INTERVIEWED, CEIS, CAMP LEJEUNE FAMILY HOUSING

<u>Name</u>	<u>Agency</u>
Mr. Jack Powell	Public Works Director, Camp Lejeune
Mr. William Barnes	Planning Section, Camp Lejeune
Mr. Al Austin	Planning Section, Camp Lejeune
Mr. A. P. Olmstead	Housing Office, Camp Lejeune
Mr. Grover Barden	Housing Office, Camp Lejeune
Mrs. Joan Ross	Housing Office, Camp Lejeune
Dr. P. Talmadge Lancaster	Camp Lejeune Dependent's Schools
Mr. Luther Norriss	Electrical Designer, Camp Lejeune
Col. E. A. VomOrde, Jr.	Maintenance Officer, Camp Lejeune
Mr. W. F. Miller	Maintenance Office, Camp Lejeune
Mr. Carol Russell	Dept. of Environmental Affairs and Natural Resources, Camp Lejeune
Mr. J. E. Herndon	Utilities Division, Camp Lejeune
Mr. J. B. Smith	Maintenance and Repair, Camp Lejeune
Mr. H. S. Grisson	Electrical Division, Camp Lejeune
Mr. Best Carter	Carolina Power and Light Company
Mr. Hugh Plowden	Maintenance Office, Camp Lejeune
Mr. Robert Wilson	Civil Engineering, Camp Lejeune
Mr. Wooten	Pollution Control, Camp Lejeune
Mr. Whitley	Onslow County Soil Conservation Service
Capt. Quin	Motor Transport, Camp Lejeune
Mrs. Sylvia Perkins	Housing Office, Camp Lejeune
Mr. Tim Wood	Onslow County Manager
Mr. Carol Maxwell	Onslow County Planning Department
Mr. William Antonori	Onslow County Planning Department
Mr. Everett Waters	Onslow County School Superintendent
Mr. William Haggert	Jacksonville Public Works Director
Mr. Bruce Teachy	Mayor of Jacksonville
Mr. Phil Rieg	Jacksonville Chamber of Commerce
Mr. R. F. Gusganus	Forestry Division, Camp Lejeune
Dr. C. R. Bell	University of North Carolina Botanical Garden
Mrs. La Rue Hambrick	Champion Builders, Inc.
Mr. Stan Hecker	N.C. Coastal Resources Commission
Mr. William Raney, Jr.	N.C. Attorney Generals' Office
Mr. Bizzell	Safety Officer, Camp Lejeune
Mr. Glen Ross	N.C. Division of Environmental Management
Mr. Kenneth Knight	N.C. Division of Environmental Management
Col. N.J. Kapetan	Marine Corps Air Station, New River
Mr. A. Bryant	Naval Facilities Engineering Command, Norfolk, Virginia

<u>Name</u>	<u>Agency</u>
Mr. Jim McCalman	N. C. Division of Environmental Management
Mr. Carl P. Swenson	N. C. Department of Administration
Mr. Ron Baker	Onslow County Economic Development Commission
Navy Corpsman Cook	Naval Hospital, Camp Lejeune
Mr. Price	Utilities Division, Camp Lejeune
Mr. Telfer	Hearing Conservation Center, Camp Lejeune
Chief, De Paola	Fire Department, Camp Lejeune
Mr. Walt Moncrief	Naval Facilities Engineering Command, Norfolk, Virginia
Mr. Ronald Clapp	Neuse River Council of Governments
Mr. Whit Morrow	N. C. Dept. of Natural and Economic Resources, Camp Lejeune
Mr. Bob Creel	Maintenance Division, Camp Lejeune
Mr. Conrad Sloan	Camp Lejeune Dependent's School
Mr. Jere Fowler	H.U.D. Greensboro Area Office

APPENDIX XI

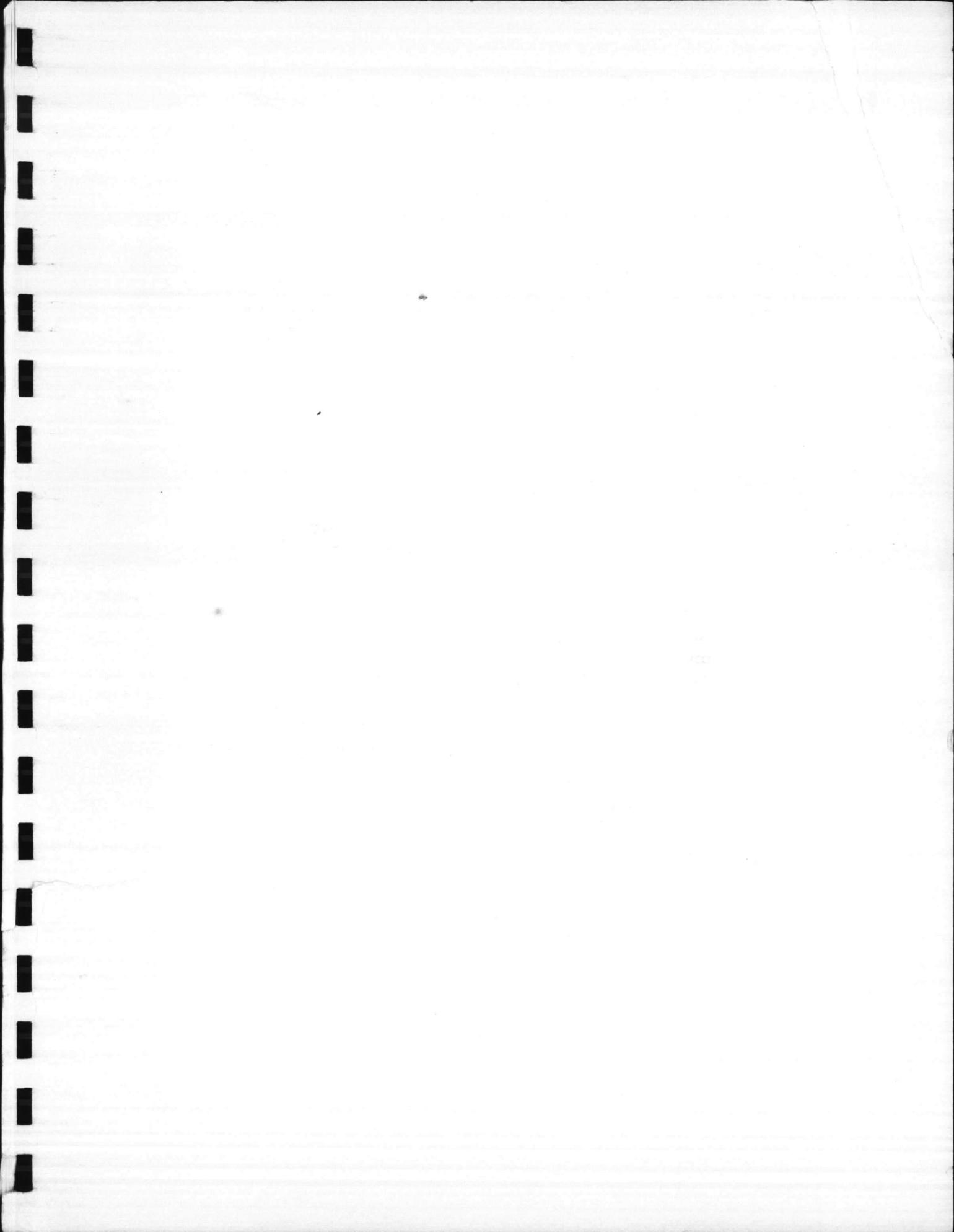
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