

SPECIAL TRAINING ANALYSIS

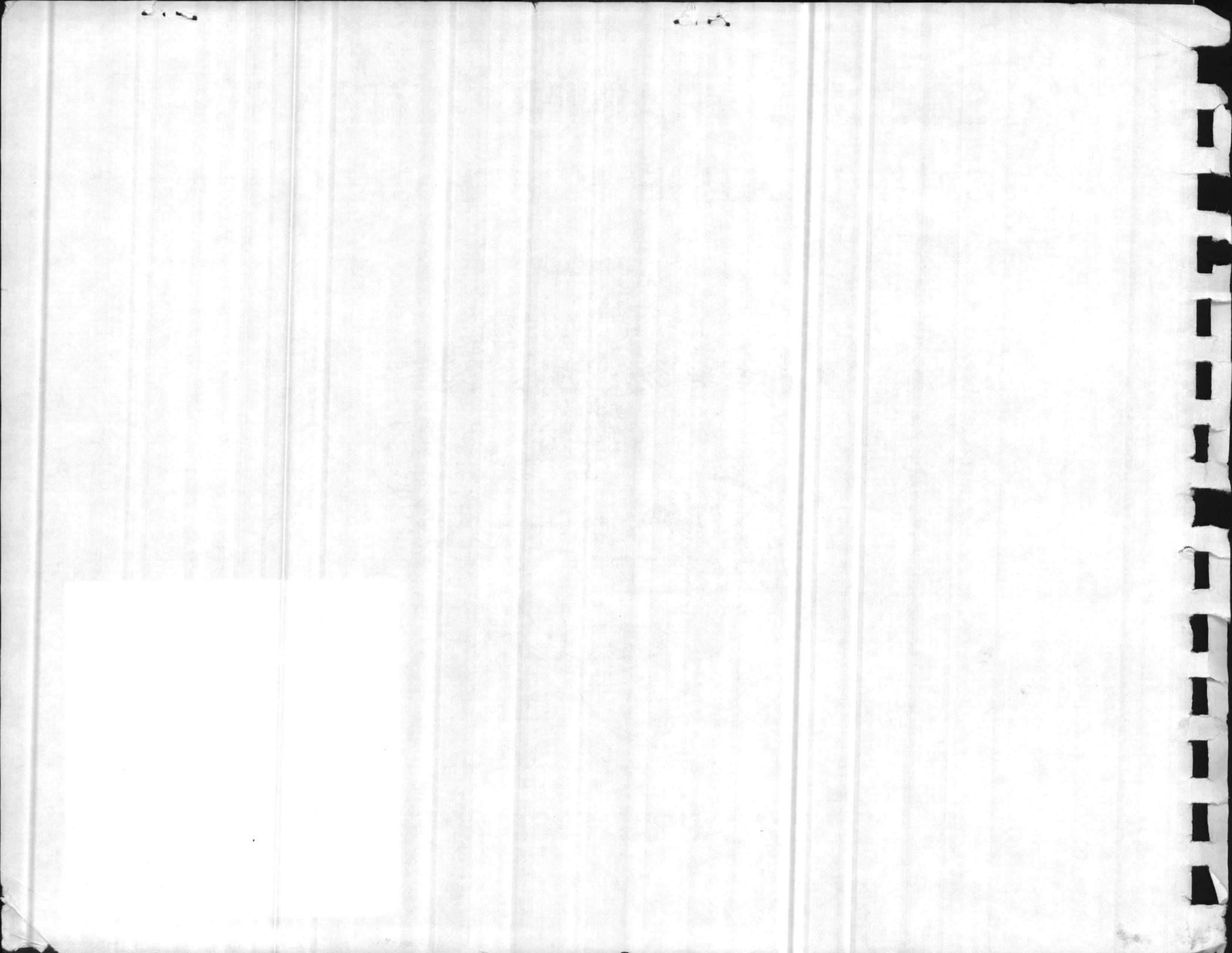
CAMP LEJEUNE, NORTH CAROLINA



APRIL 1986

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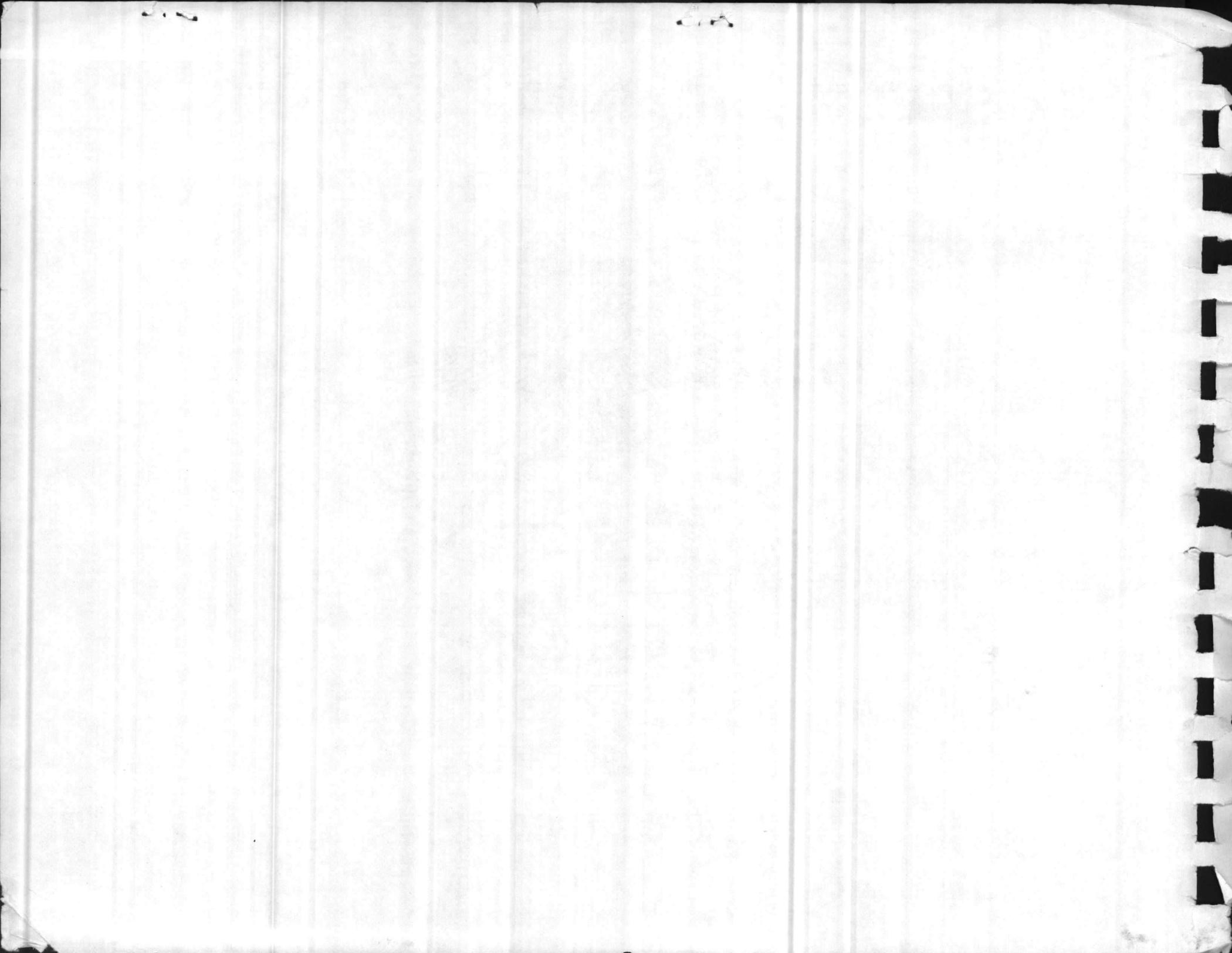


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CAMP LEJEUNE, NORTH CAROLINA



APRIL 1986





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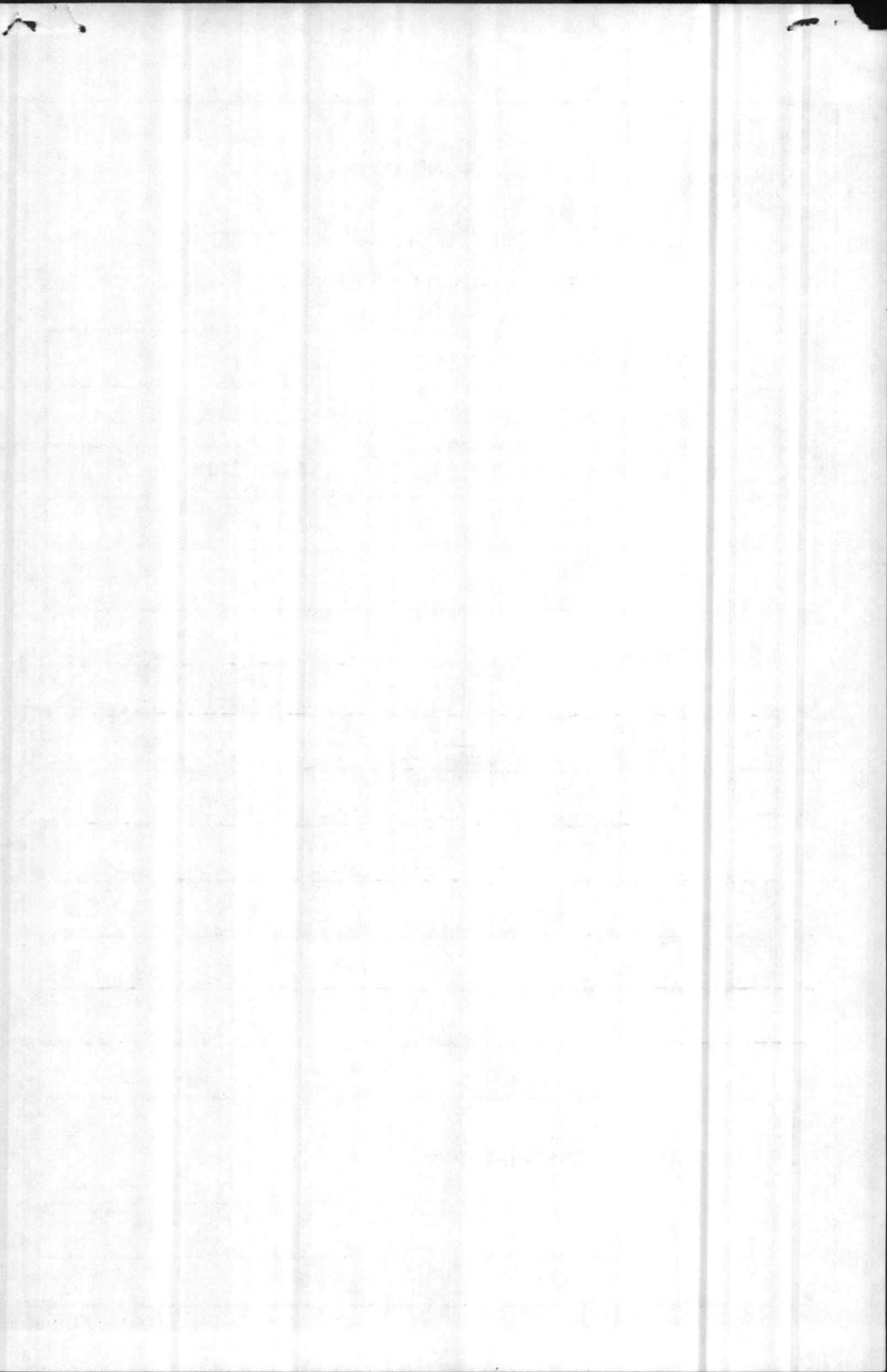
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These are your personal copies of the Harland Bartholomew Associates 1986 study and BDM's Phase I Final Report. Hope these will help you. I was unable to get you a separate assessment of the two studies because I have one man out sick. He has my copy of this assessment.

ADDITIONAL DISTRIBUTION



SPECIAL TRAINING ANALYSIS
Camp Lejeune, North Carolina

Prepared For
Commander, Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia

Prepared By
Harland Bartholomew & Associates, Inc.
Memphis, Tennessee

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April, 1986

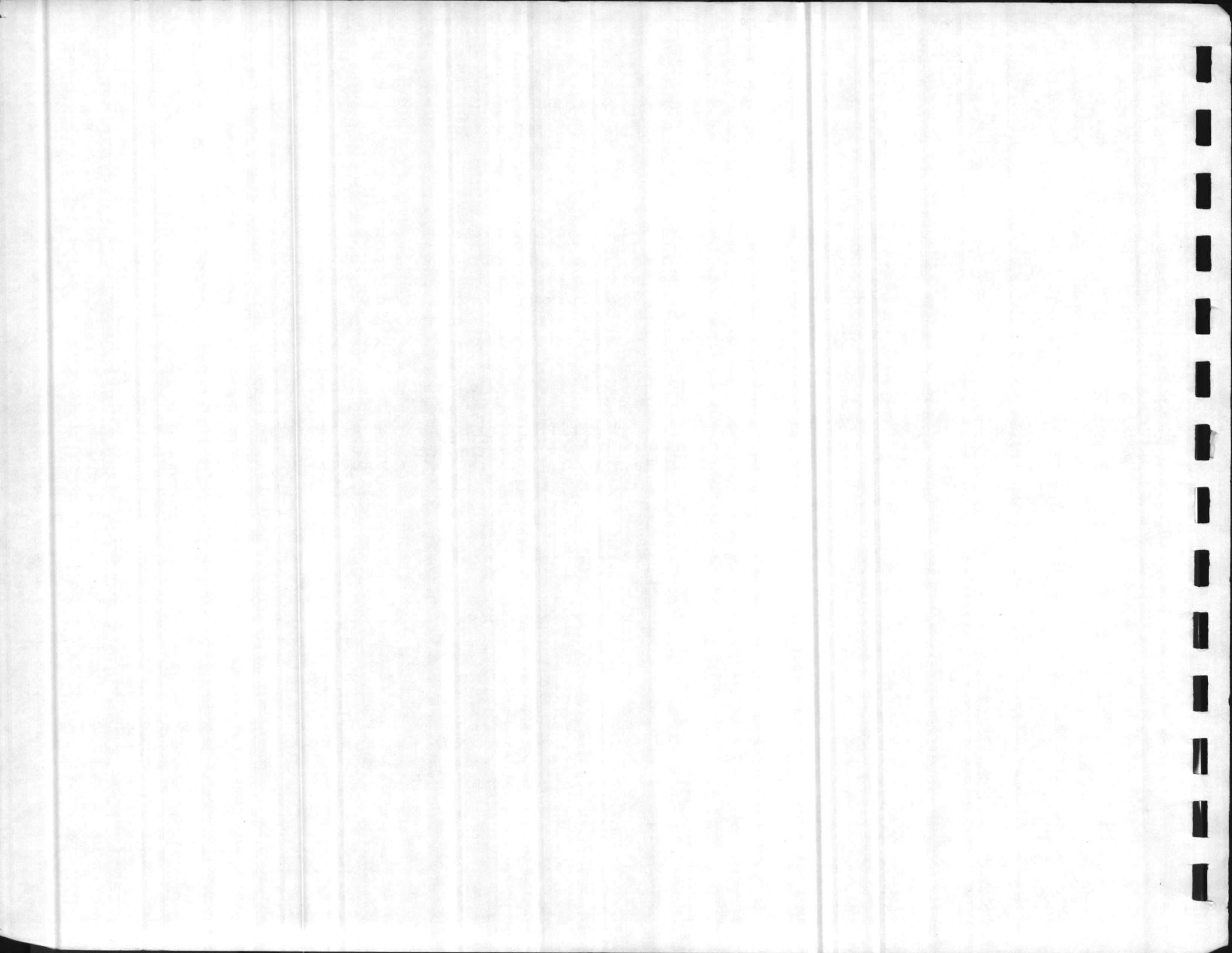


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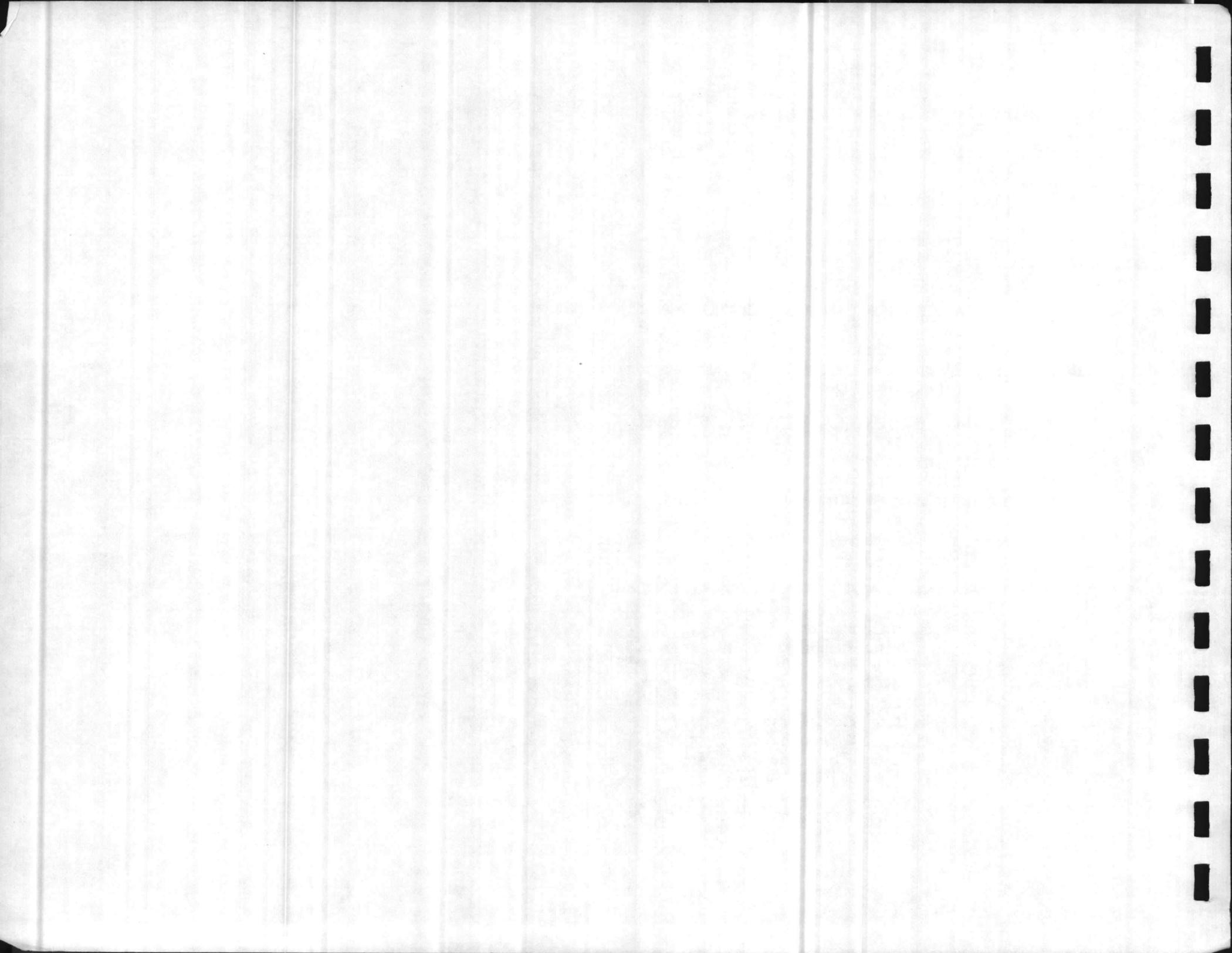
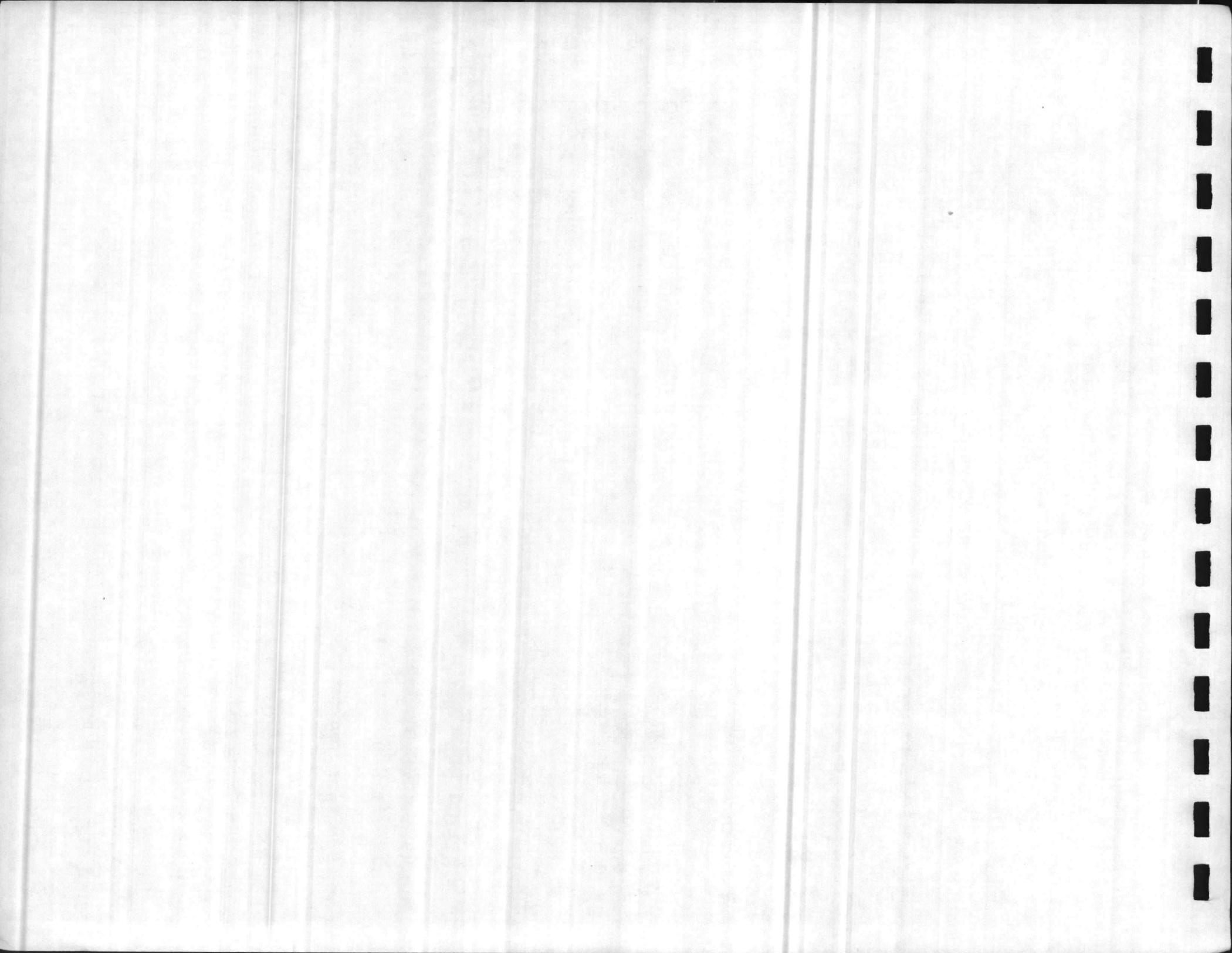


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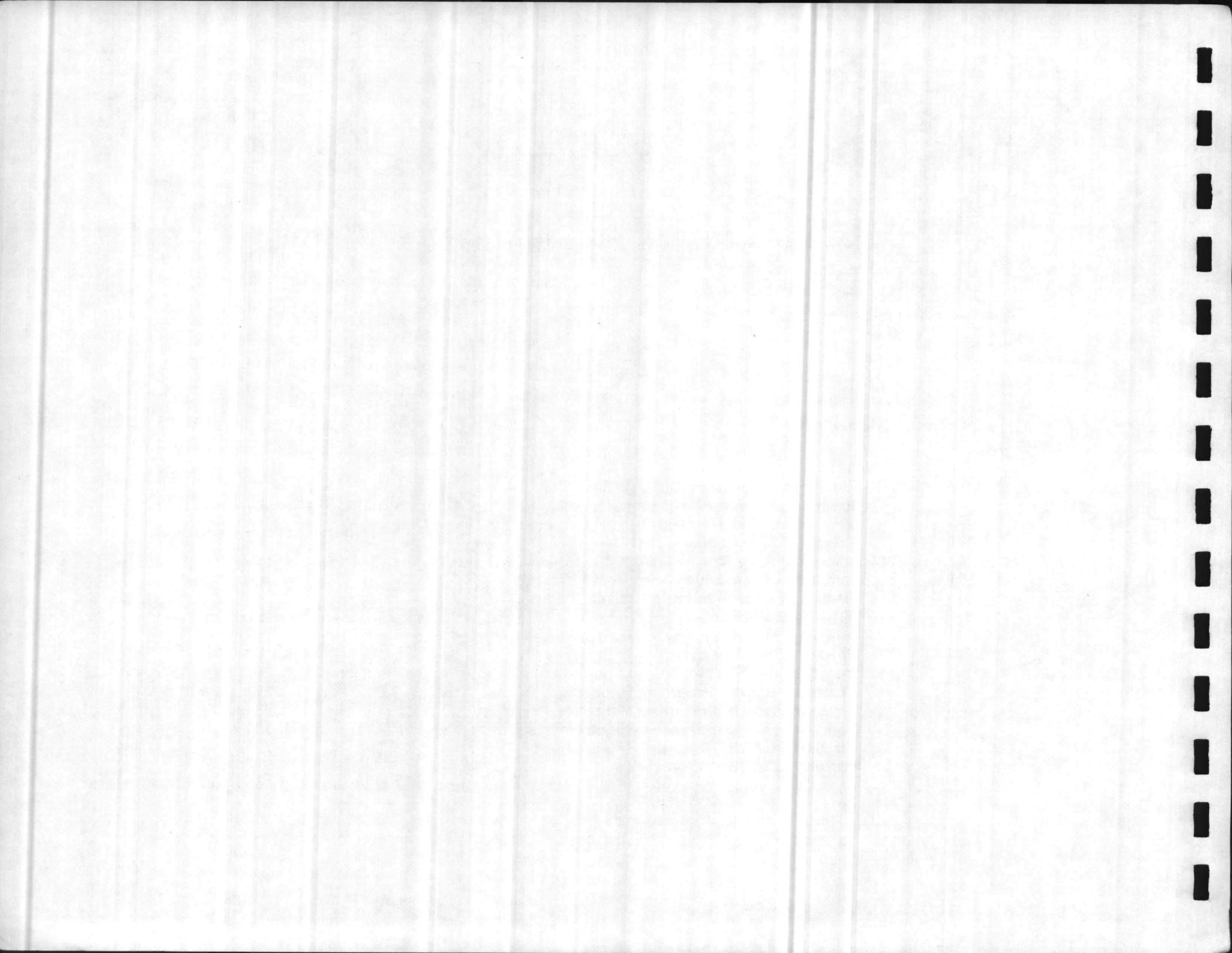


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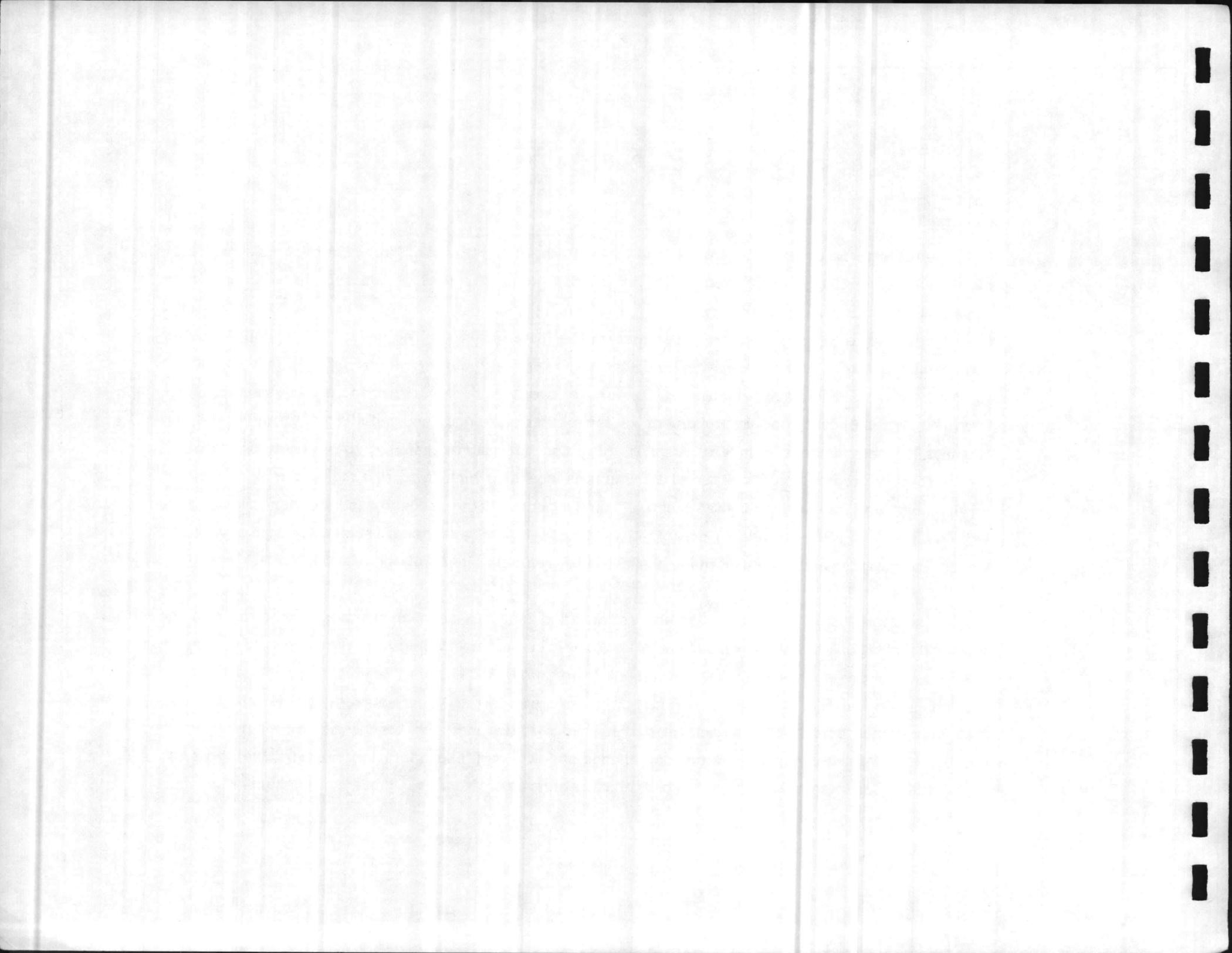


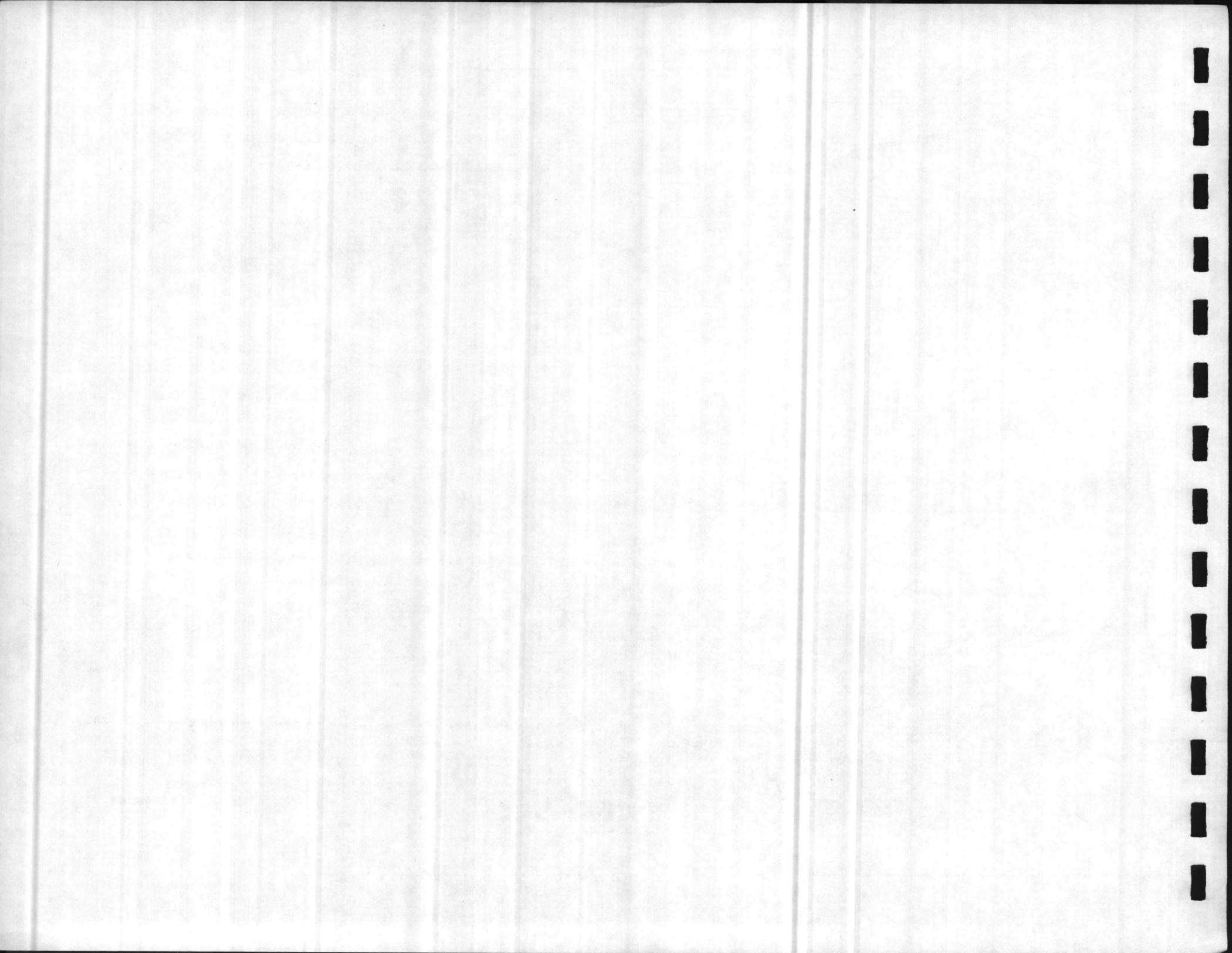
INTRODUCTION

General

The military reservation of the Marine Corps Base, Camp Lejeune, North Carolina (see Figure 1), has remained virtually unchanged since its establishment in 1941; however, the Marine Corps' organization, mission, doctrine, and equipment have continuously evolved with the passage of time. Changes in the structure of the units assigned to the installation and the development of new tactics for the conduct of warfare have increased the firepower and mobility required of the modern Marine fighting unit. These requirements in turn have created demand for additional training land. Furthermore, the continued improvement in the ballistics, range, and mobility of modern weapons requires larger land areas for safe range training and operations. Finally, the current philosophy - that effective preparation for war and the maintenance of a high level of readiness require training under conditions that reflect those of actual combat - has further accentuated the need for suitable training areas. Future trends in organization, doctrine, and weapons clearly will require new and larger firing ranges and expanded maneuver areas for realistic field training of troop units.

Coincident with the growing demand for training land has been an increase in the number and types of limitations that may render some land unavailable for training use. The growing awareness of the need to protect the earth's environment from damage has altered earlier judgments concerning the manner in which training exercises can be conducted. In particular, current legislation requiring the maintenance of suitable habitat for endangered wildlife on Federal lands may either restrict the availability of some lands for training or change the way training operations in sensitive areas are conducted. Increased awareness of the effect training operations may have on neighboring civilian





communities may also inhibit or restrict the means by which a unit's training mission is accomplished. Finally, other natural and man-made constraints may impose limitations on training that are equally as restrictive, if not more so, than those mandated by legislation or administrative ruling. Collectively, these limitations effectively reduce the supply of land that is suitable for conducting military training.

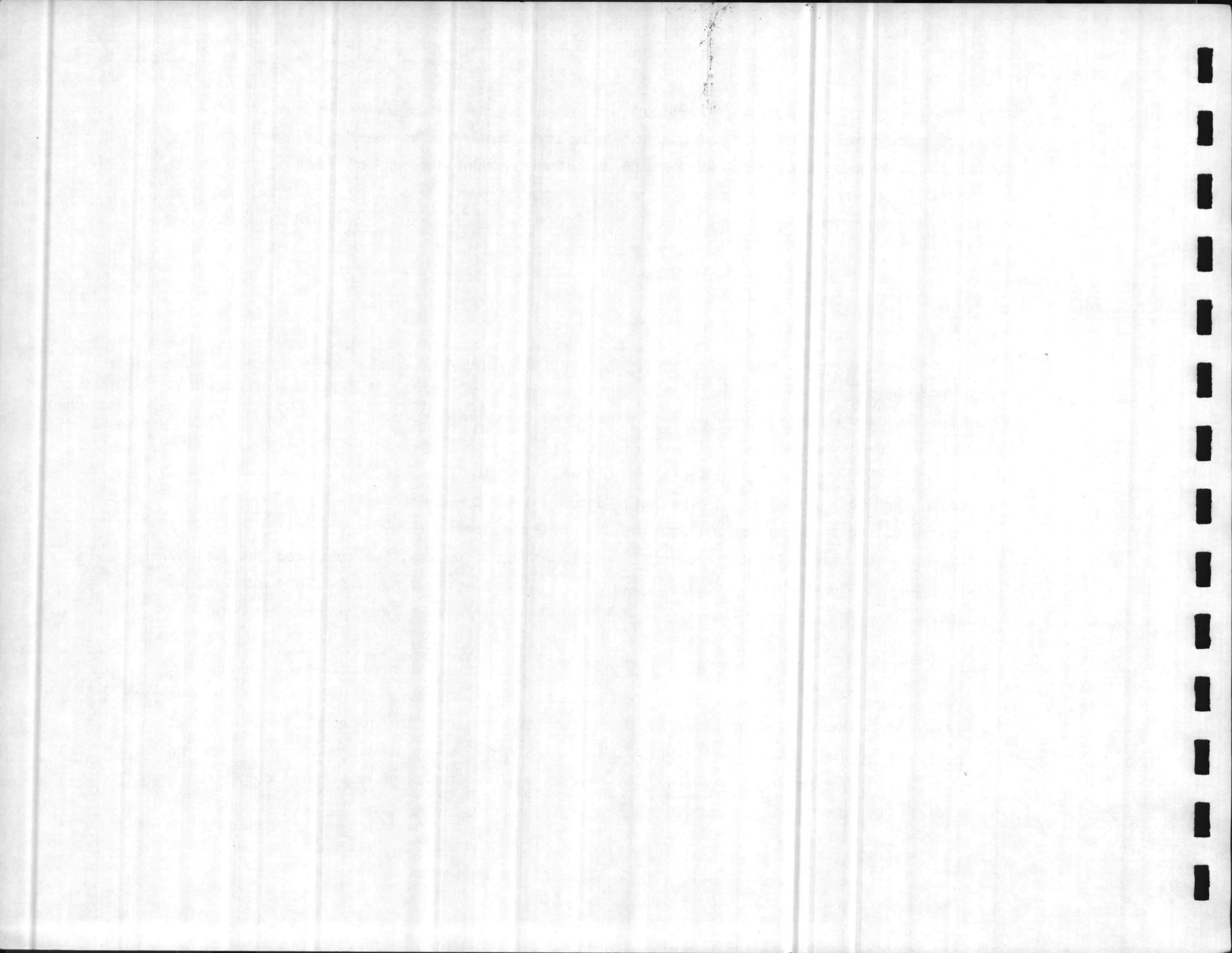
Purpose

This report presents the results of a Special Training Analysis conducted at Camp Lejeune, North Carolina. The purpose of the analysis was threefold. First, we wanted to determine the area of maneuver land and the number and type of firing ranges required to support the training missions of the Marine Corps units stationed at Camp Lejeune. In this manner, an estimate of the total demand for training facilities generated by the units was obtained for the Base. Secondly, our purpose was to assess the supply of training land and ranges to determine whether there were suitable and adequate facilities available at Camp Lejeune to fulfill the units' training needs. Finally, our purpose was to develop concept plans designed to correct any deficiencies in training facilities identified in the previous stages of the analysis.

*sounds like
LAIAN
to me.*

Scope

This study addresses unit maneuver and range land requirements for units conducting training at Camp Lejeune. Because the analysis was limited to those firing ranges and maneuver areas required for field training Marine Corps personnel, the adequacy of classroom, shop, and other indoor training areas was not considered.

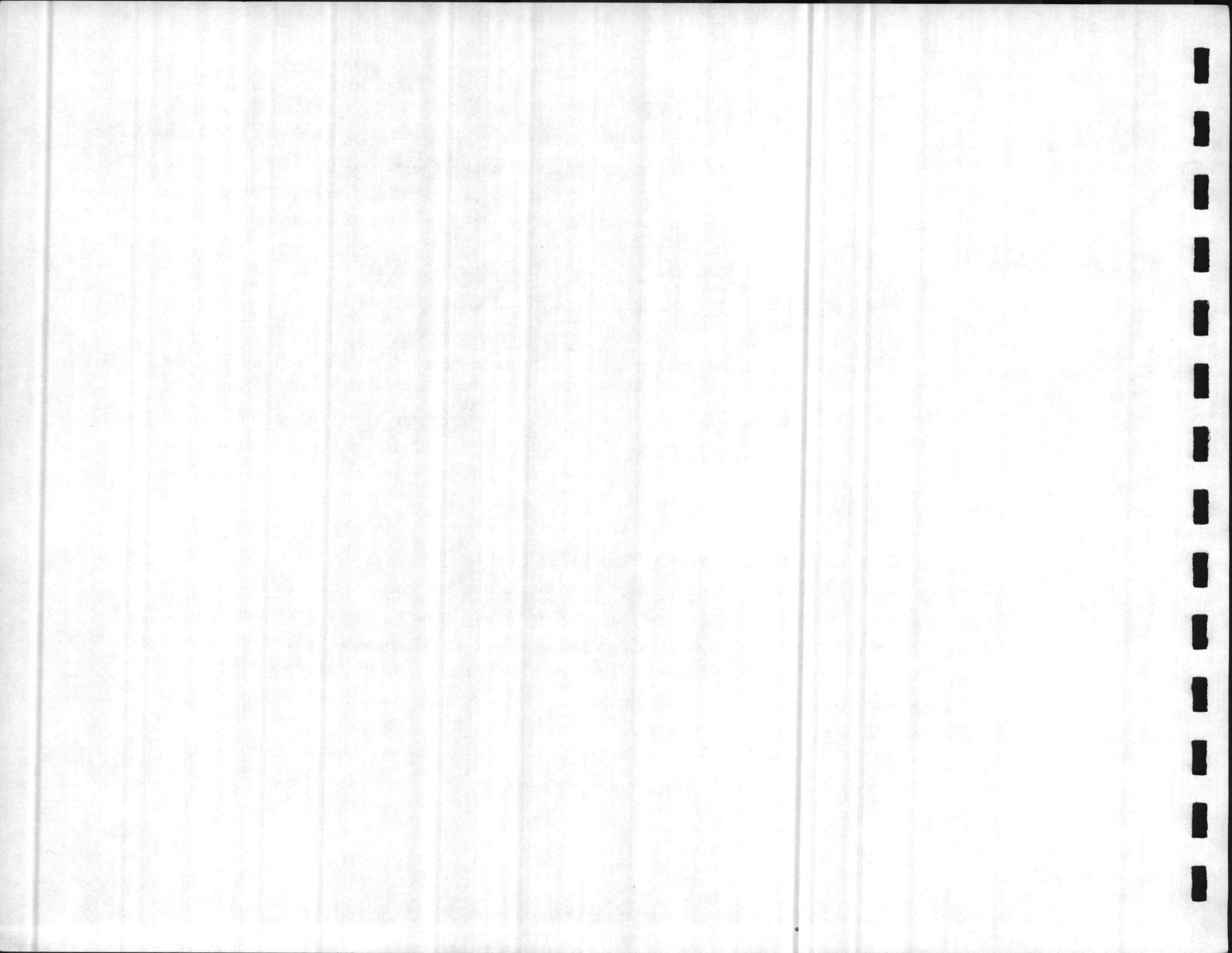


The analysis does include the following:

- Identification of units to be trained and their training mission. ✓
- Identification of those training facilities required for units to meet their training mission.
- Determination of required versus available training time.
- Computation and evaluation of any excess or deficiency.
- Development of concepts, conclusions, and recommendations.

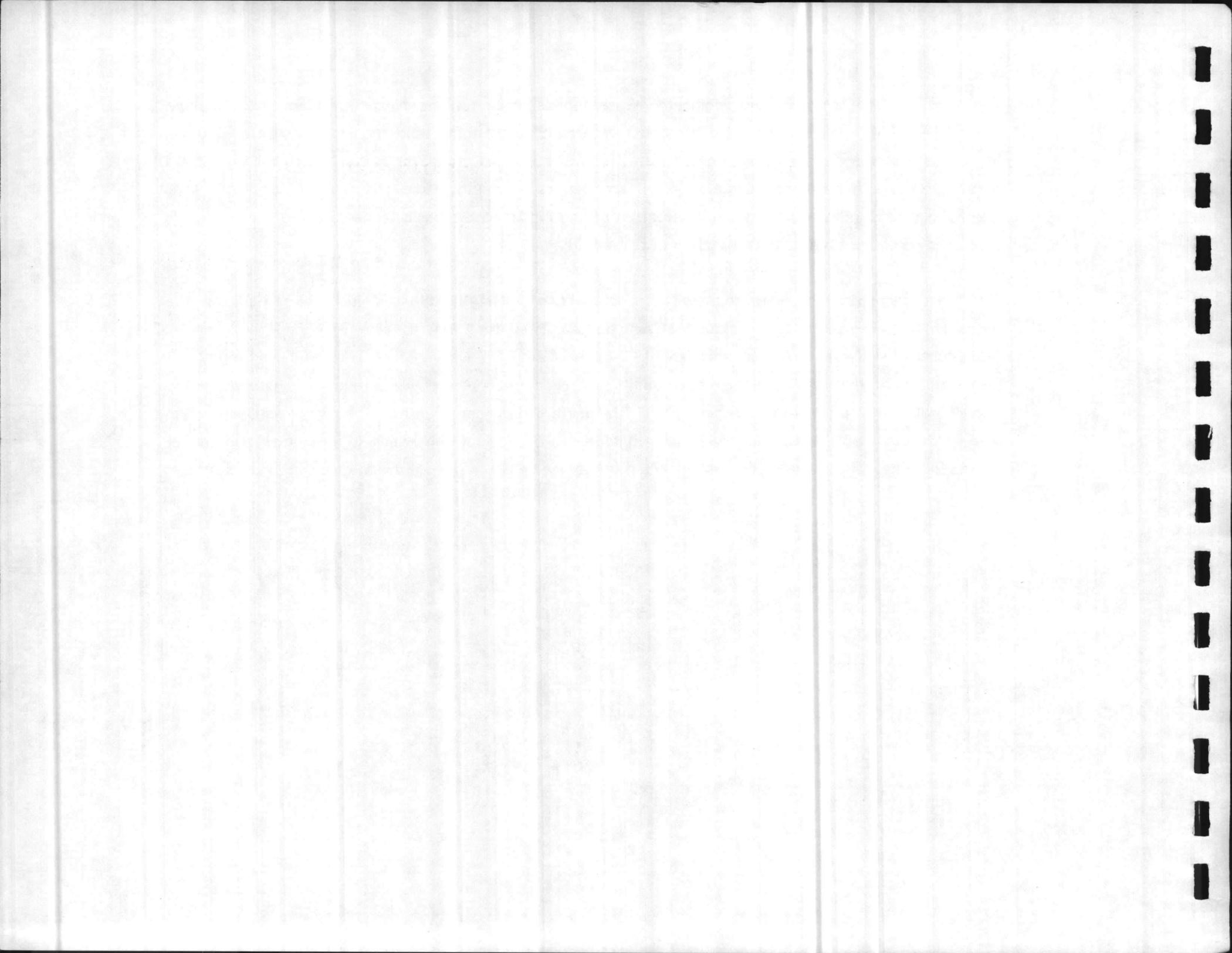
Approach

In order to determine the training capacity of Camp Lejeune, we evaluated the training requirements of each assigned military unit against the number and type of facilities available for training at Camp Lejeune. Existing and projected range and maneuver area requirements were obtained by means of personal interviews with training representatives from the Base and tenant units. The data collected were verified in subsequent discussions with the Base Training Officer (G-3), representatives from the Office of the Deputy Chief of Staff, Readiness (2nd Marine Division) and Marine Corps Headquarters.



The verified training land requirements served as input for the Army Training Land Analysis Model (ATLAM). The ATLAM is a method for calculating training land requirements as part of an effort to determine the adequacy of an installation's range and maneuver areas. Using the model, we calculated and then compared the required and available training time at Camp Lejeune. We then used the results obtained from the application of the model as the basis for developing concept plans designed to correct identified shortfalls in training land.

Four concept plans were designed with the aim of satisfying the training requirements of the units to the greatest extent possible. Each concept plan then was presented to and reviewed by representatives from the Base and tenant units at Camp Lejeune. After a careful review of the proposals contained in each concept, additional recommendations were made and subsequently incorporated into a preferred concept plan. The preferred concept contains the recommendations and future development objectives that were concluded to best meet the needs of the units training at Camp Lejeune. All of the plans are described in further detail in the following chapters of this report.



ORGANIZATION STRUCTURE AND TRAINING MISSION

General

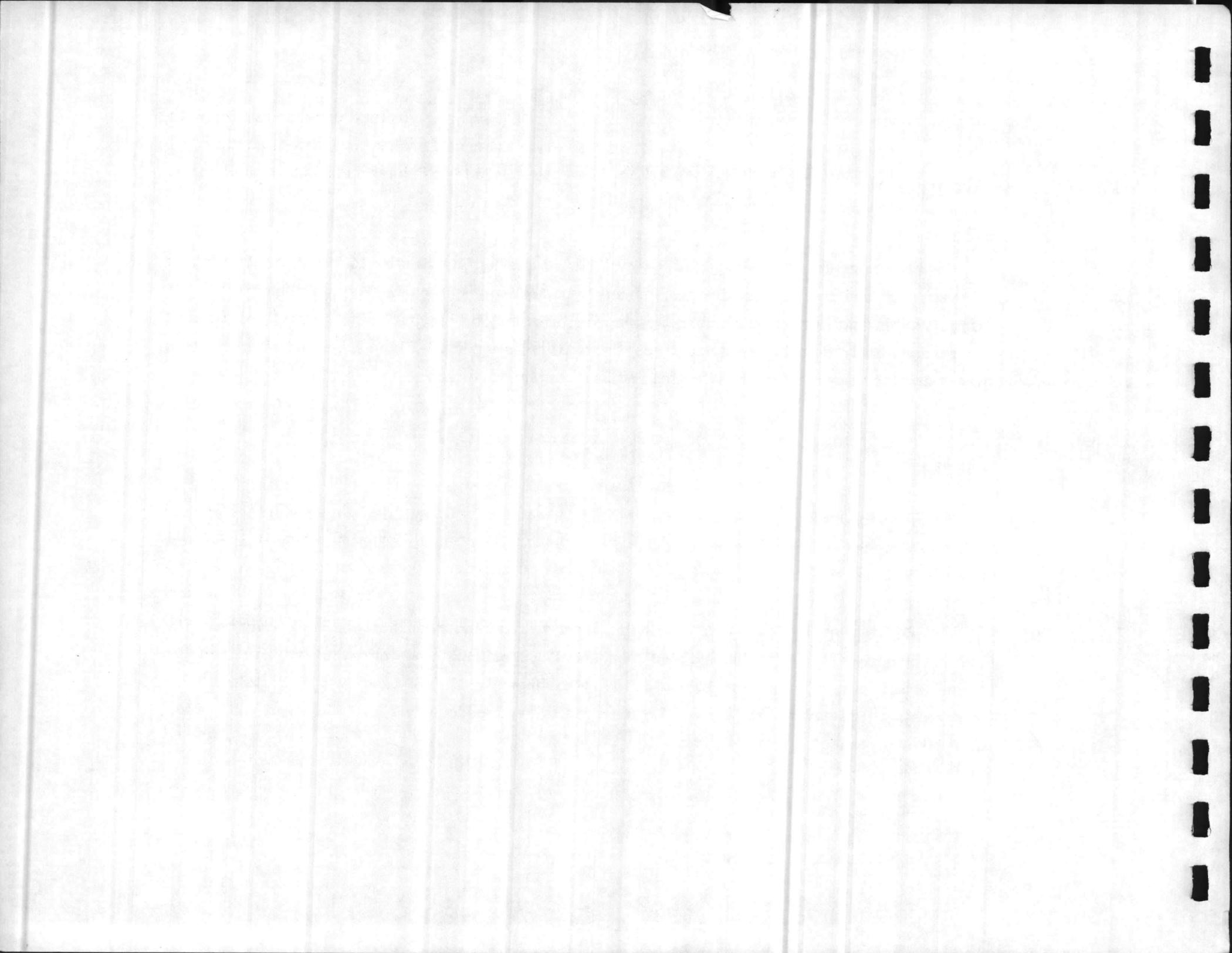
The requirements for training facilities at an installation are related to the types of military units assigned and their respective training missions. When the organization or mission of a unit changes, some modification to existing training facilities may be required. The following sections of this report briefly describe the structure of the units assigned to Camp Lejeune, their training mission and future developments affecting required training facilities.

Organization

The need for training areas at Camp Lejeune arises primarily from the activities undertaken by the units assigned to the three major commands: 2nd Marine Division, 2nd Force Service Support Group (FSSG), and the Marine Corps Base.

The 2nd Marine Division is the principal user of training facilities at Camp Lejeune. The Division comprises about 16,000 enlisted men and 1,000 officers who form the 2nd, 6th, and 8th Marine Regiments (infantry); 10th Marine Regiment (artillery); 2nd Tank Battalion, 2nd Reconnaissance Battalion, 2nd Combat Engineer Battalion, Headquarters Battalion, and 2nd Assault Amphibious Battalion.

LAV



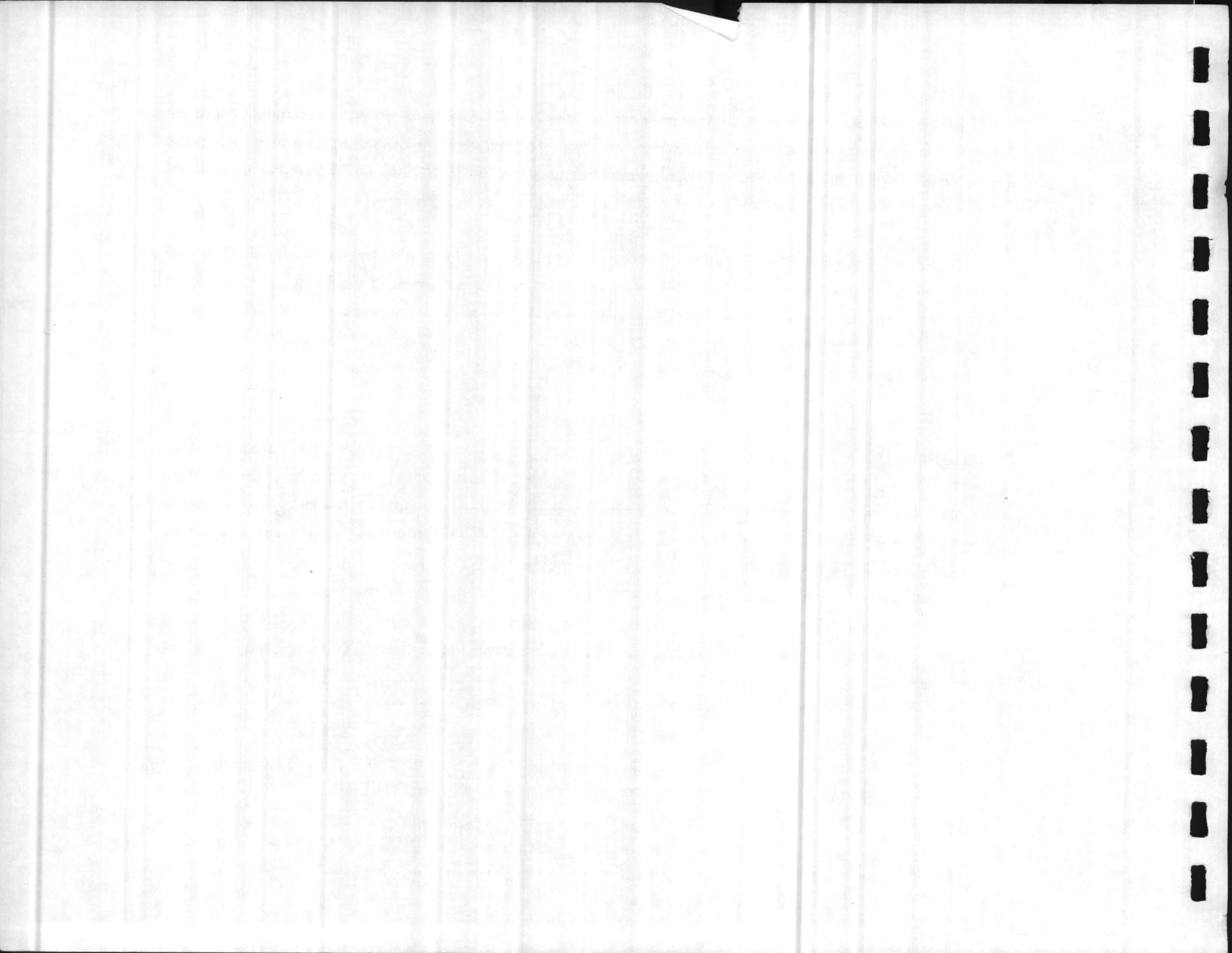
The 2nd FSSG provides logistical support to the 2nd Division and other commands. Separate battalions are organized to provide such services as motor transport, engineering, dental and medical services, communications, and landing support. Because the 2nd FSSG has no combat arms element, their training land requirements are generally less than those of the 2nd Division.

The Marine Corps Base provides supporting facilities for both the 2nd Division and the 2nd FSSG. The Base host command is functionally arranged with separate staffs overseeing each major aspect of Base operations. In addition, Camp Lejeune is the home of various formal Marine Corps schools including engineer, supply, motor transport, and infantry training. There is also a Navy medical and dental school at the Base training personnel for duty with Fleet Marine Force units.

Mission

The Marine Corps Base (MCB) organization is charged with the task of operating, "the world's most complete amphibious training base." As part of this responsibility, the Base hosts two Fleet Marine Force Atlantic (FMFLANT) tenants, the 2nd Marine Division and the 2nd Force Service Support Group. As the host command, the MCB's mission is to provide the training facilities and logistical and administrative support for both the tenant units and other units assigned to Camp Lejeune as well as to conduct specialized schools and other training activities as directed by higher headquarters.

The 2nd Marine Division is a combat-ready infantry division composed primarily of individual Marine infantrymen whose basic mission is "... to locate, close with and destroy the enemy by fire and maneuver, or to repel his assault by fire and close combat." At a divisional level, the mission of the



2nd Division is to execute amphibious assaults or other operations, as directed, with support from Marine Aviation and Force Service Support units. In conjunction with the Marine Air Wing, the Division serves with the Fleet Marine Force to attack or defend advanced naval bases or to conduct land attacks in support of a naval campaign.

The 2nd FSSG is a highly mobile, logistic support group. Its mission is to provide combat service and technical support for FMFLANT missions as required by Headquarters, FMFLANT.

Future Developments

The Marine infantry battalion (the basic, tactical unit of ground combat power in the Marine Corps) is currently undergoing an evolutionary reorganization designed to enhance its maneuverability and ability to survive an attack. The new infantry battalion will operate with 10 percent fewer personnel; however, the firepower available to the battalion will be increased 25 percent with the acquisition of more and new crew-served weapons. The following table illustrates the new weapons and equipment of the reorganized infantry battalion.

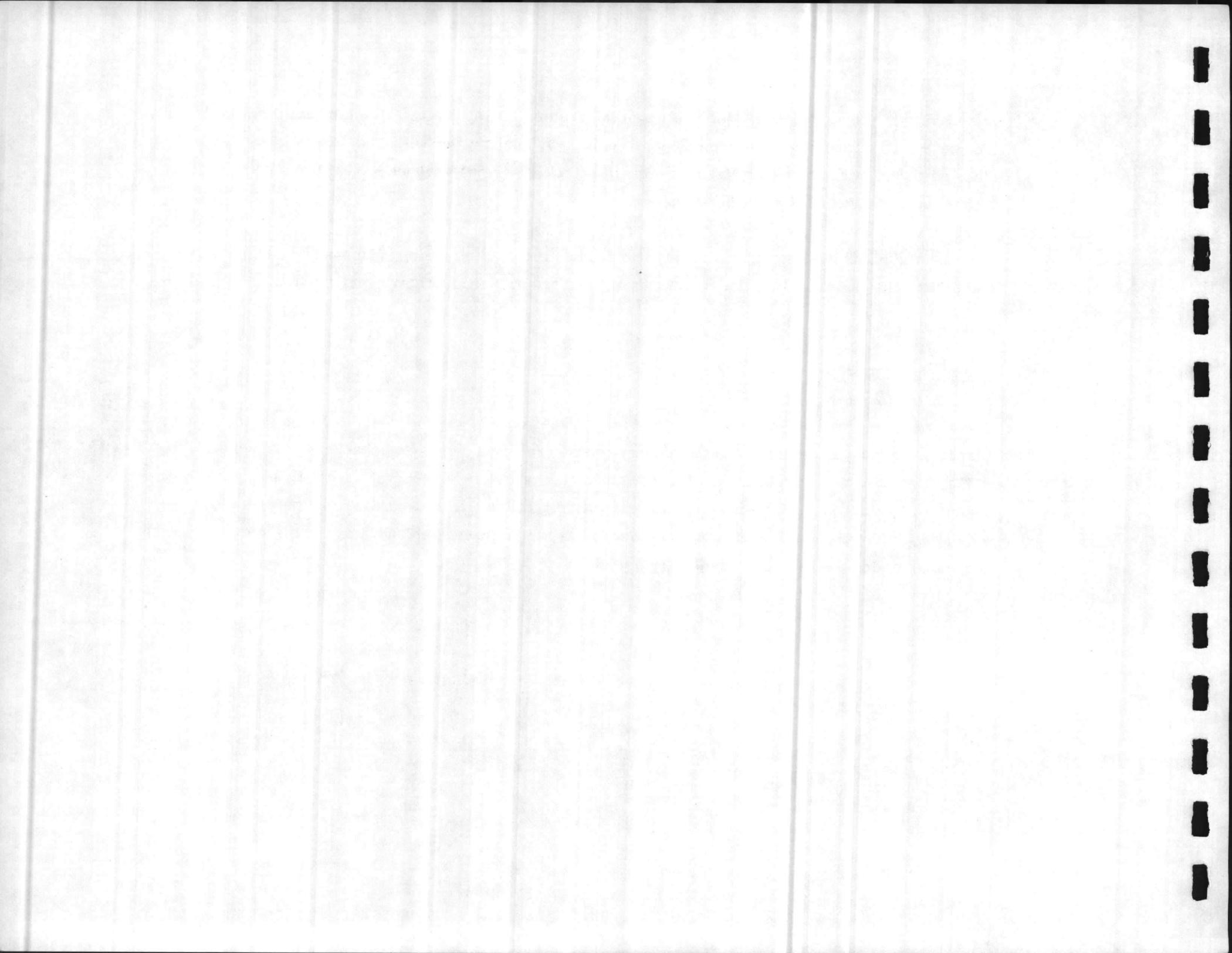


TABLE 1

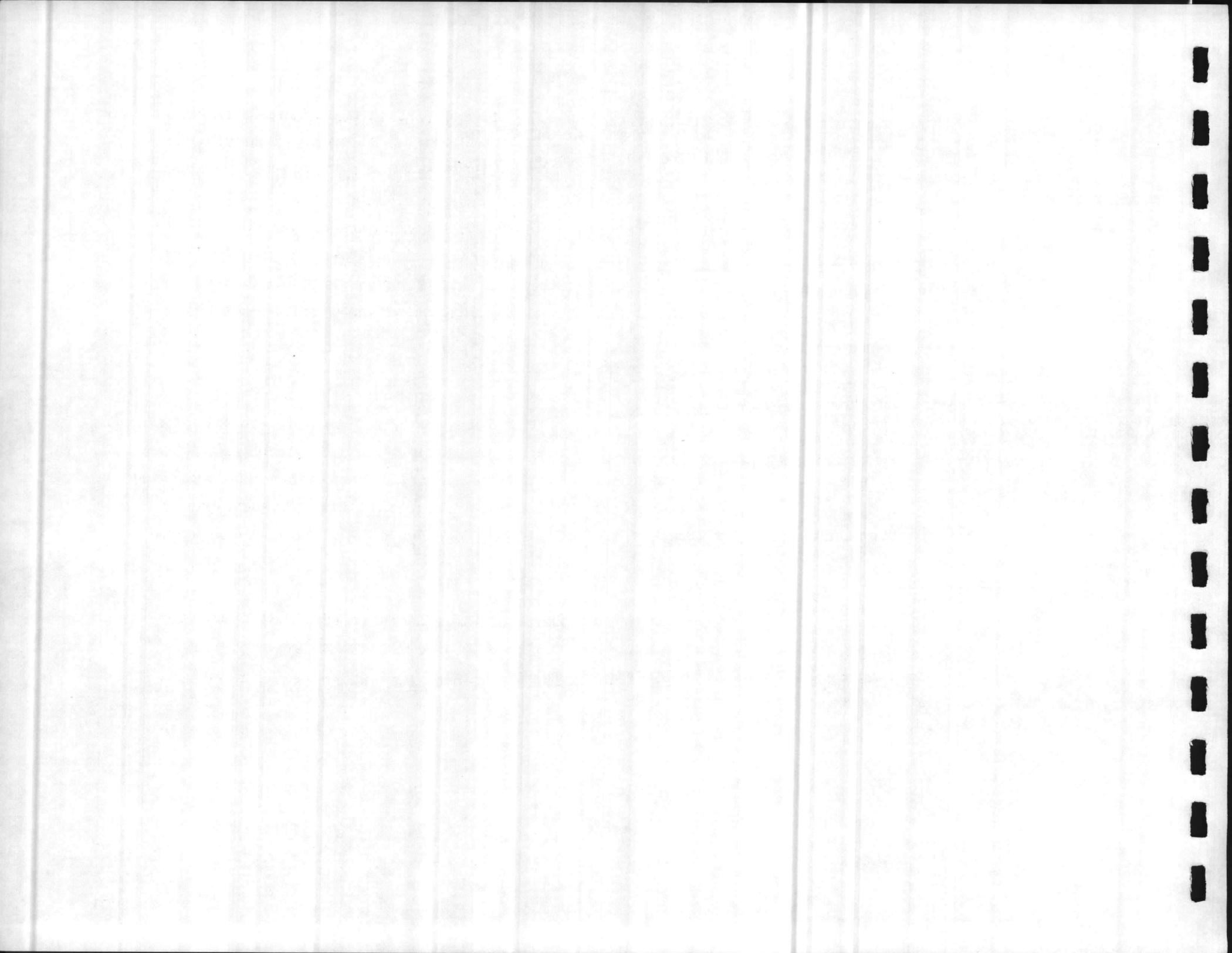
NEW WEAPONS AND EQUIPMENT
REORGANIZED INFANTRY BATTALION

Equipment	Number	
	Old	New
M-16A2 Improved Rifle		
M-203 Grenade Launcher	722	593
M-249 Squad Automation Weapon	110	134
M-60 Machine Gun	0	54
M-2 .50 Caliber Machine Gun	29	29
MK-19 40 mm Machine Gun	0	8
SMAW Shoulder-Launched, Multi-Purpose, Assault Weapon	0	12
	0	18
M-47 Dragon		
AN/TAS-S Night Tracker, Dragon	24	32
M-220 TOW Missile	0	32 *
M-224 60 mm Mortar	0	24 **
M- 81 mm Mortar	9	9
HMMWV High Mobility, Multi-Purpose Wheeled Vehicle	8	8
	0	39

Notes: * 32 total day and night trackers.
 ** TOW platoon added to Battalion Headquarters Company.

Source: Standard Operating Procedure for the Reorganized Infantry Battalions, Division Order P3130.1, 29 April 1983.

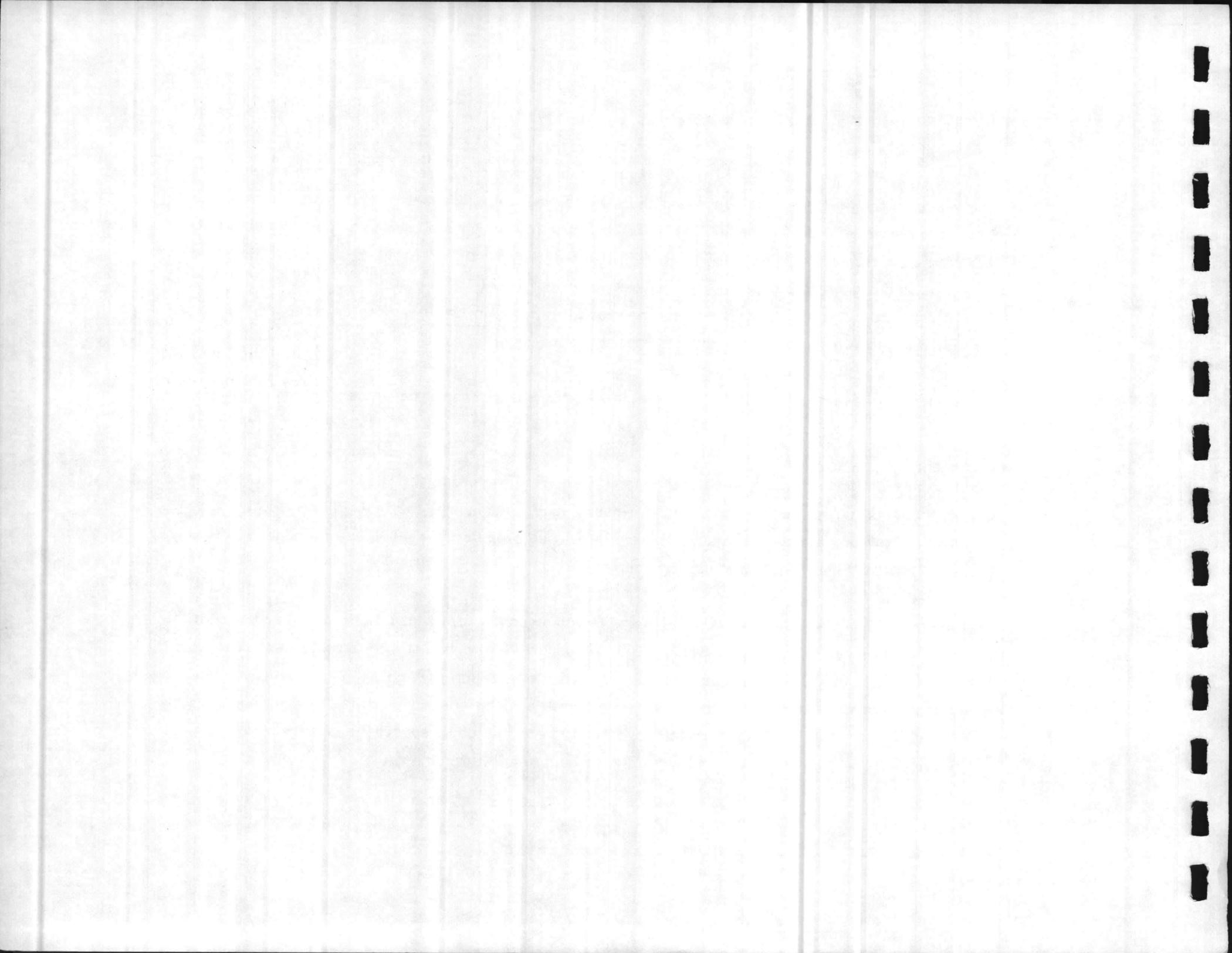
Wrong - It's Regt



The addition of new weapons such as the MK-19, M-2, and TOW to the infantry battalion's arsenal affects training land requirements in two ways. The first effect is due to the extended range of these weapons and the area of the Surface Danger Zones (SDZ) required for safe range training. For example, the M-2 has a maximum range of approximately 6,800 meters and consumes 11.5 square kilometers (km²) of land for its SDZ. The TOW II missile, though designed to engage targets at about 3,000 meters, has a range of 5,150 meters and requires an SDZ of about 23.4 km². The MK-19's projectile is designed to pierce an armored personnel carrier at 2,200 meters and requires 3.3 km² for its SDZ. In short, more land will be required to safely train in the use of these weapons due to the continued improvement in their range and thus, the area required for their SDZ.

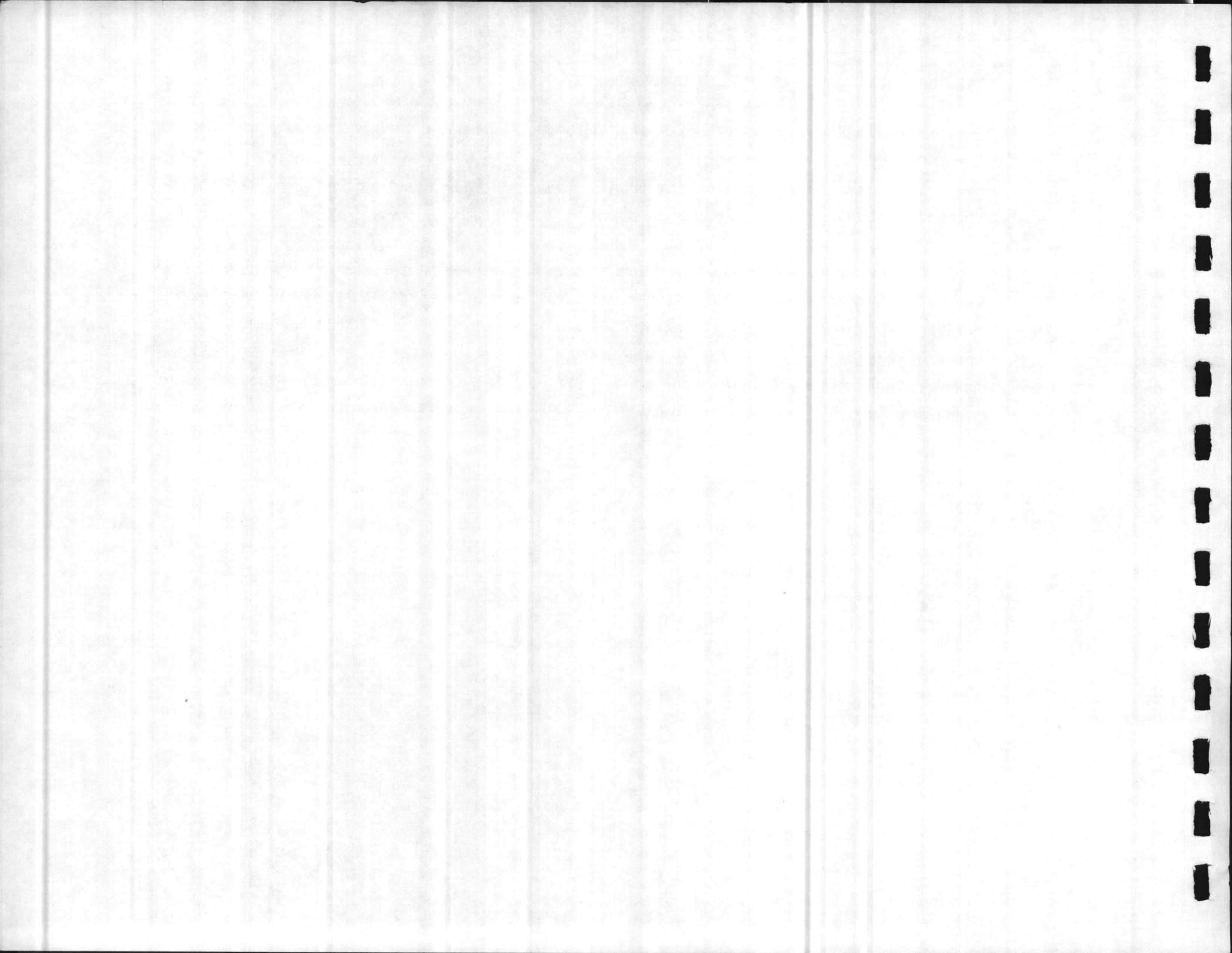
A second effect on training land requirements stems from the increased mobility of the reorganized infantry battalion. The new table of equipment adds 39 HMMWVs to the infantry battalion, a change that should result in an increase in driver training requirements. Additionally, the increase in mobility will have an effect on land navigation requirements. Larger areas will be needed to teach navigation for vehicle-mounted Marines. Finally, additional tactical driving training may be required as new techniques of engagement are developed based on the mobility of Weapons Company, in particular, the Heavy Machine Gun Section.

Improvements and additions to the Marine Corps arsenal will affect other units in addition to the infantry battalions. Most significantly, the introduction into the force structure of the Light Armored Vehicle (LAV) will provide the Division with a battalion of highly mobile, armored vehicles capable of speeds to 50 miles per hour and armed with a 25 mm cannon. While the doctrine, tactics, and techniques for the LAV organization have yet to be finalized, it appears that current ranges were not designed for and do not have the layout and targets required for the LAV.



Another highly significant new weapon under development is the M-1 main battle tank, which will eventually replace the current stock of M-60 tanks. Because of the higher muzzle velocity and correspondingly flatter trajectory of the main gun, an M-1 tank can engage targets over a wide spread of ranges without changing battle sights; however, the new round requires more land for the safe conduct of firing than those currently in use.

Significant changes in equipment are also underway in the regimental artillery organization. For example, the 155 mm howitzer (M-114AZ) and the 105 mm howitzer (M-101A1) will be replaced by the 155 mm howitzer (M-198), a weapon with a maximum range of 30,000 meters. Another improvement to the current artillery force will be the acquisition of an integrated fire and air support system designed to improve command, control and fire direction. An artillery rocket system is planned for use in a general support battalion of the regular artillery regiments.



ARMY TRAINING LAND ANALYSIS MODEL

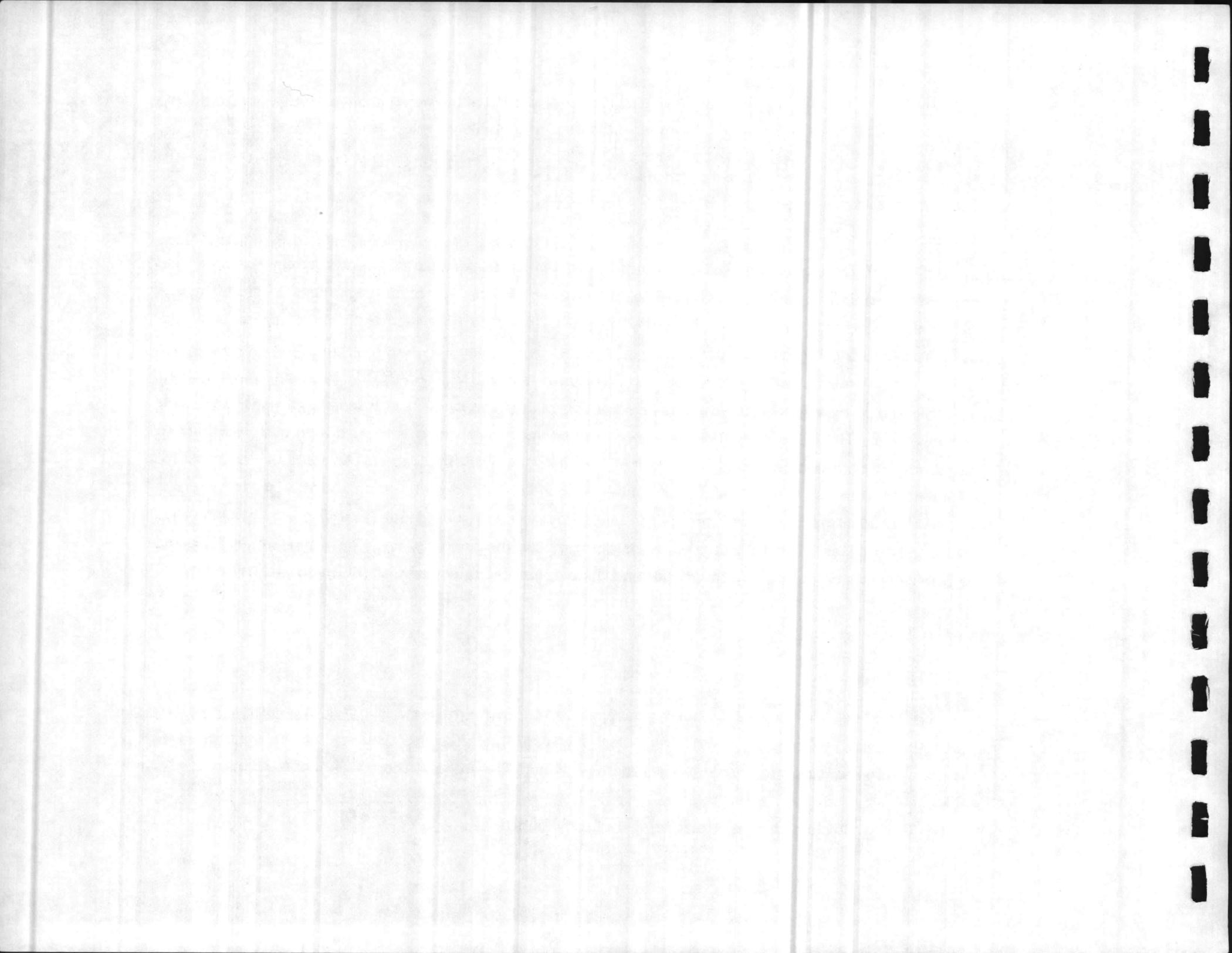
General

The Army Training Land Analysis Model (ATLAM) is a means of determining the area of land needed for training at an installation. The model uses the concept of area per unit of time (in this case, a square kilometer per day (km²-day) in the calculation of maneuver area requirements. The base for computing the number of km²-days required is the training requirements established by the Army in the Army Training and Evaluation Program (ARTEP). The ARTEP defines those tasks or exercises a unit must practice to achieve combat readiness as well as the land area needed for this training. The ATLAM uses the land area required to accomplish an exercise, the number of times an exercise must be practiced to attain proficiency, and the time required to complete the exercise to estimate the total land area over time that is demanded by the units at an installation for training purposes. This estimate is then used as the basis for assessing the adequacy of an installation's range and maneuver areas. The following sections describe the methodology and limitations of the ATLAM, the requirements calculated by the model and the current capability of Camp Lejeune for training.

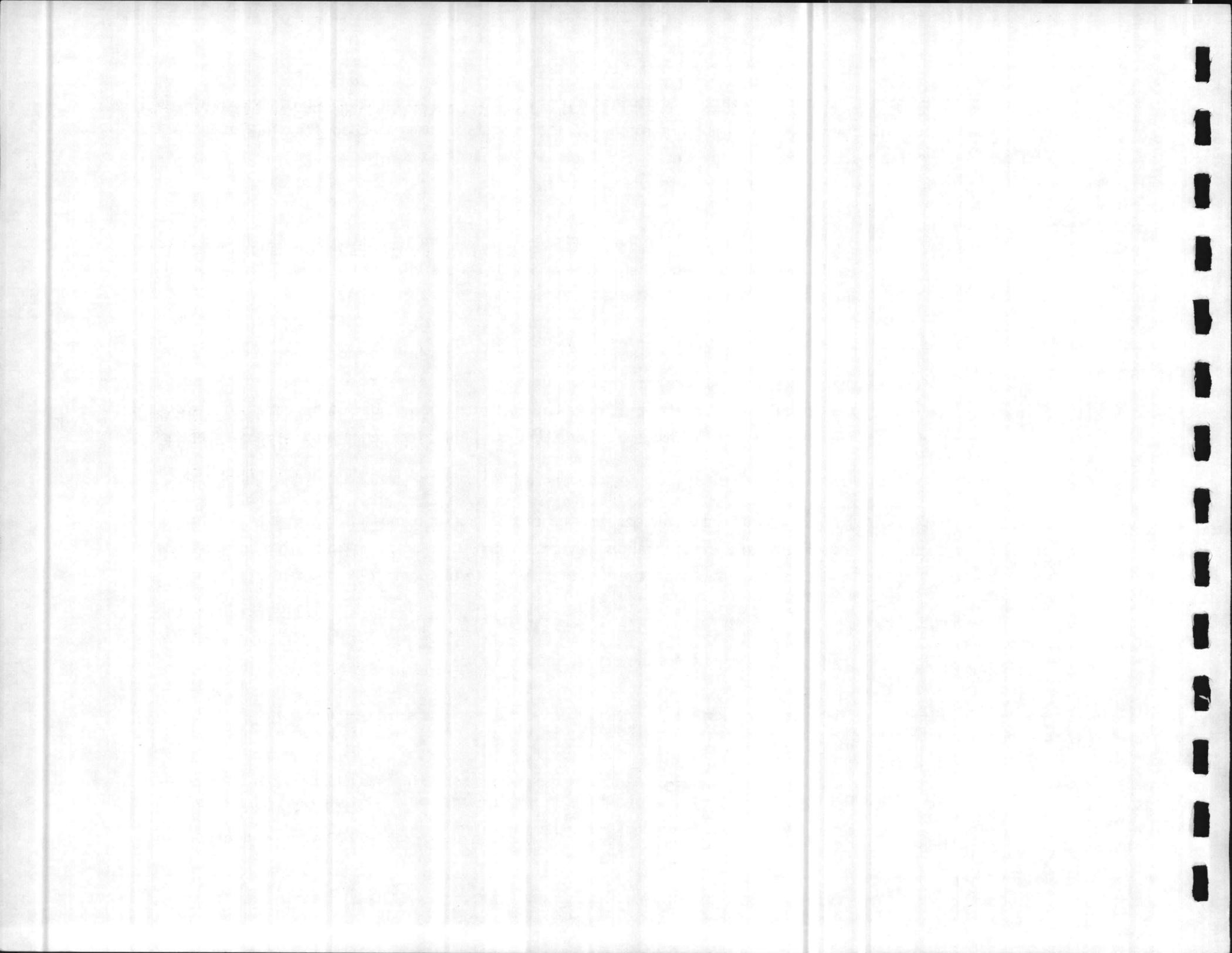
Methodology

The ATLAM consists of 13 steps as outlined in the Army manual, TC 25-1, Training Land. The model provides a procedure by which the adequacy of an installation's training land may be assessed and the action necessary to correct shortfalls identified. The steps of the ATLAM are as follows:

STEP 1. A Land Use and Requirements Study is initiated.



- STEP 2. The training event at the installation with the largest maneuver area requirement is identified and the dimensions of the maneuver area needed for that event are identified. Concurrently, the type and number of ranges needed to fire all the weapons at the installation are identified.
- STEP 3. The number of acres needed to schedule all of the maneuver training in the time available is computed. Then, the number of square kilometers needed for range and impact areas are computed.
- STEP 4. The total number of square kilometers that are both suitable and available for maneuver training is computed. Next, the available maneuver area is multiplied by the annual maneuver training days to determine the number of maneuver km²-days. Then the number of square kilometers available for range and impact areas is computed.
- STEP 5. The amount of maneuver area at the installation is compared to the area needed for the largest maneuver training event. When this is completed, the area of the available range and impact areas is compared to the computed requirements.
- STEP 6. An analysis is made to determine whether the existing maneuver area is adequately configured to handle the largest training event.
- STEP 7. The maneuver km²-days are compared to the needs of the units assigned to the installation.
- STEP 8. If there is enough training land at the installation, the ATLAM is stopped. If there is a shortfall of land, the model continues with Step 9.



- STEP 9. Concepts are developed to address the shortfall of training land. Included is a review of land management practices and current usage.
- STEP 10. The revised total acreage is compared to the original total.
- STEP 11. The shortfall of training land is calculated and the shortfall's effect on readiness is estimated.

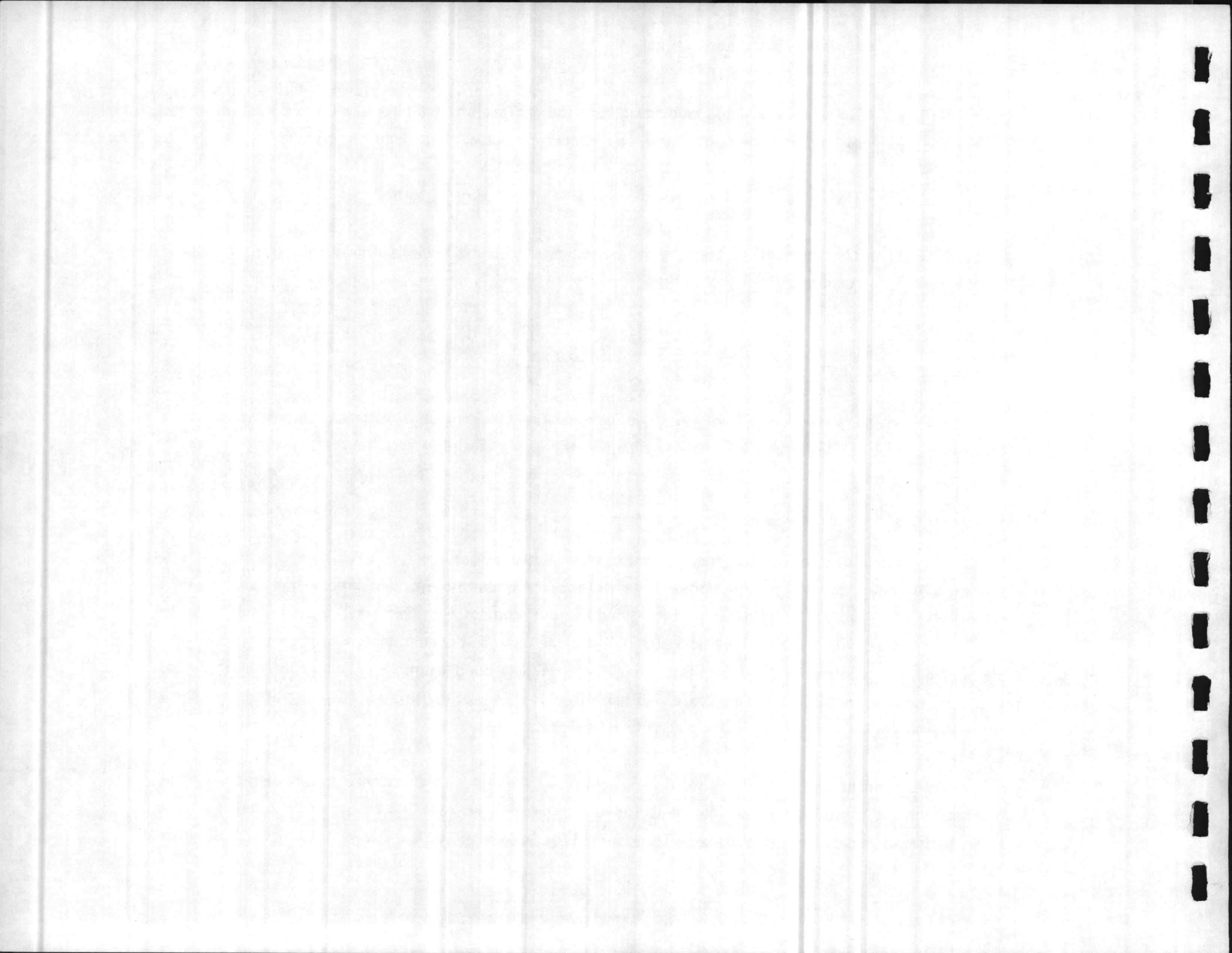
Limitations of Model

The Army Training Land Analysis Model was designed to provide installation commanders with a relatively simple means of estimating range and maneuver training requirements. It is important, however, to realize that the model has certain inherent limitations in its design and applicability to Marine Corps training.

For example, the use of the kilometer-day measure assumes that units can schedule and complete training events with complete efficiency. Furthermore, it assumes that land is used exclusively by one unit with no double scheduling of compatible exercises. Finally, because the ATLAM is a quantitative model, it does not provide any guidance concerning the quality of the training land available. On this point, Camp Lejeune is a good example. While approximately 243 square kilometers of training land are available in total, in reality, this land is separated into three distinct areas, each of which is qualitatively different.

Other limitations are related to the application of the model to Marine Corps rather than Army training. Unlike the Army, the Marine Corps has no established ARTEPs for which training land area requirements have been established. Therefore, land area requirements were based on a unit-level

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perception of needs rather than a published Marine Corps standard. If such a standard were available, it might include area requirements that reflect the task organization of larger Marine units such as the Marine Air-Ground Task Forces (MAGTF).

Training Requirements

The range and maneuver requirements for Camp Lejeune were developed by interviewing the primary users of training facilities at the Base to determine the adequacy of the training land available at Camp Lejeune. Both maneuver and range requirements are described below.

Range Requirements. Unit range requirements were collected during the interviews and tabulated using the form shown in Figure 2. As indicated by this example of the range requirements for the AAV Battalion, the total amount of range time required (days/year) was calculated by range type. In order to standardize the time required on the ranges, a 10-hour training day was assumed. Note that range type includes individual, crew served and crew served/vehicle mounted weapons. Also included are requirements for new weapons currently being introduced into the Marine Corps arsenal. Finally, as a supplement to the quantitative data, unit representatives were asked to comment on current deficiencies, suggest improvements, and provide other qualitative information concerning range training at Camp Lejeune. Appendix A contains the separate range requirements forms for each Marine unit.

In order to compute total range time required, the individual range requirements were summed for all units, as shown in Figure 3, "Summary of Range Requirements." In total, 9,476 range days per year were calculated to be demanded by the units interviewed at Camp Lejeune.

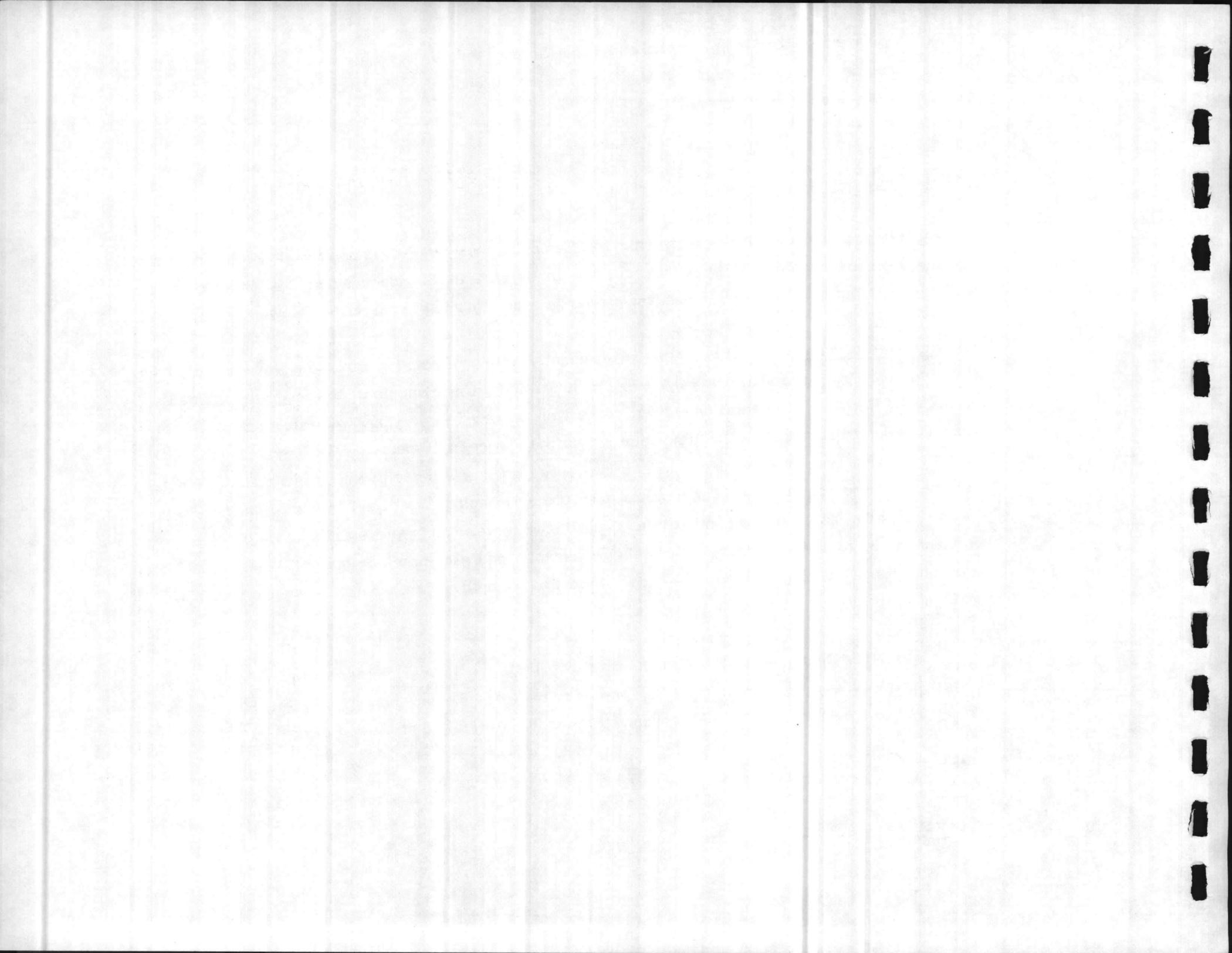


FIGURE 2

RANGE REQUIREMENTS FOR AAV BATTALION

<u>RANGE TYPE</u>	<u>RANGE EXERCISE</u>	<u>UNIT SIZE</u>	<u>NO. OF UNITS</u>	<u>TIME ON RANGE (DAYS)</u>	<u>ITERATIONS (TIMES/YEAR)</u>	<u>TOTAL TIME (DAYS/YEAR)</u>
<u>INDIVIDUAL</u>						
RIFLE RANGE	QUAL.	BN	1	5	1	5
COMBAT RIFLE	PROF.	PLT	26	.5	1	13
PISTOL FAM.	FAM.	DTL(210PN)	1	.2	.5	1.4
RIFLE FAM.	FAM.	PLT	26	.2	1	5.2
PISTOL QUAL.(1)	QUAL.	DTL(14PN)	1	5	.5	2.5
M203 40mm	QUAL.	CO	5	.5	2	5
HAND GRENADE	FAM.	PLT	26	.5	1	13
SAW(2)	QUAL.	SQD	6	.5	4	12
<u>CREW-SERVED</u>						
M60 A1 MG	GUN DRILL/QUAL.	SQD	6	1	2	12
Mk 19 40mm MG	GUN DRILL/QUAL.	SQD	6	1	2	12
<u>CREW-SERVED VEH.</u>						
M85 50 cal MG	STA./STA.	PLT	17	.5	2	17
	STA./MOVING	PLT	17	.5	2	17
	MOVING/STA.	SEC	55	.3	2	33
	MOVING/MOVING	SEC	55	.3	2	33
	ANTI-AIR GUNNERY	PLT	17	.5	2	17
M257 Smoke	SYSTEM CHECKS	PLT	17	.5	1	8.5
M60D MG	STA./STA.	SECT	20	.3	2	12
	STA./MOVING	SECT	20	.3	2	12
Mk 19 40mm MG (3)	STA./STA.	SECT	17	.3	4	20.4
	STA./MOVING	SECT	17	.3	4	20.4

NOTES

- (1) USE I-1 RANGE, 15 FIRING POINTS
- (2) FUTURE REQUIREMENT
- (3) FUTURE REQUIREMENT

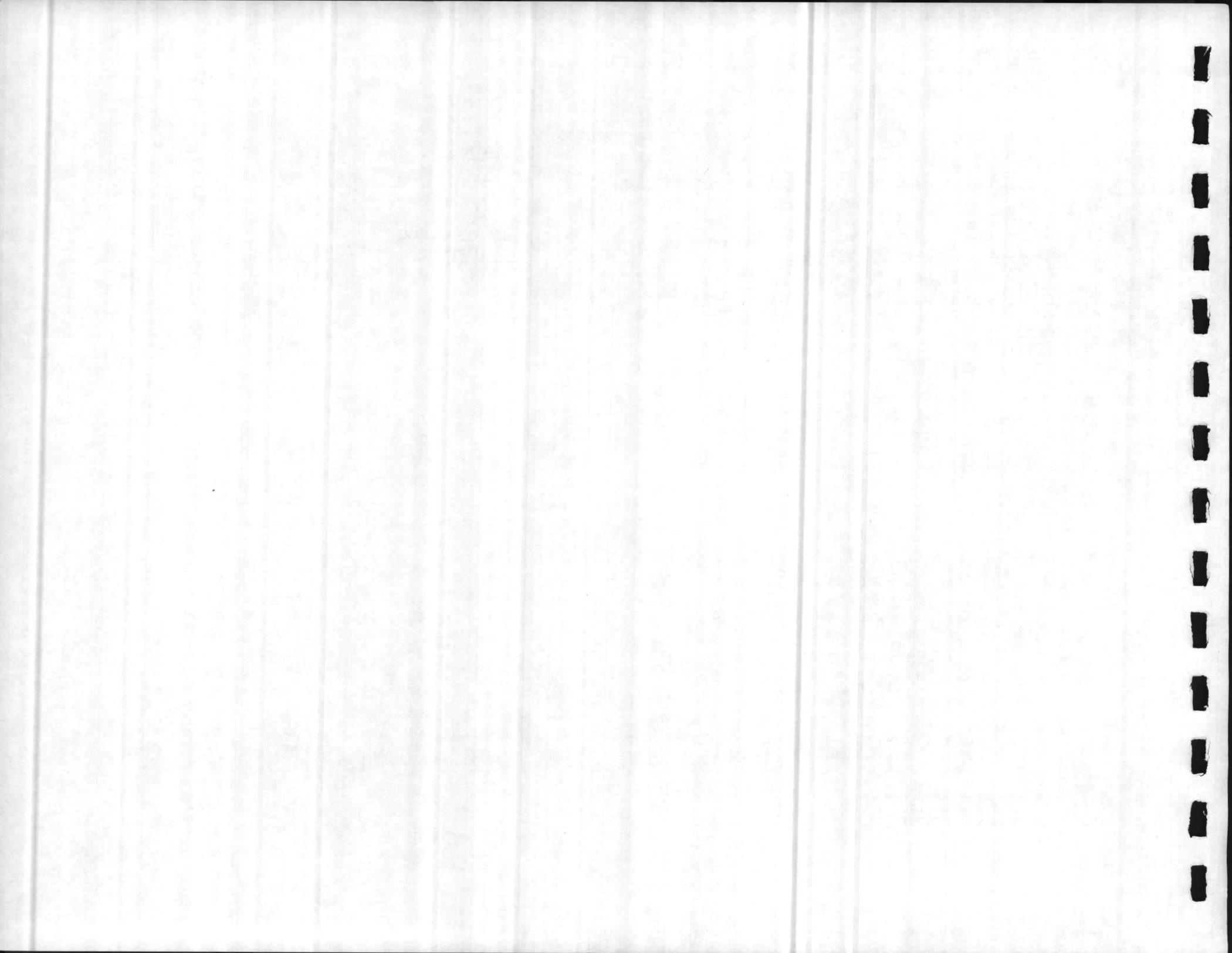
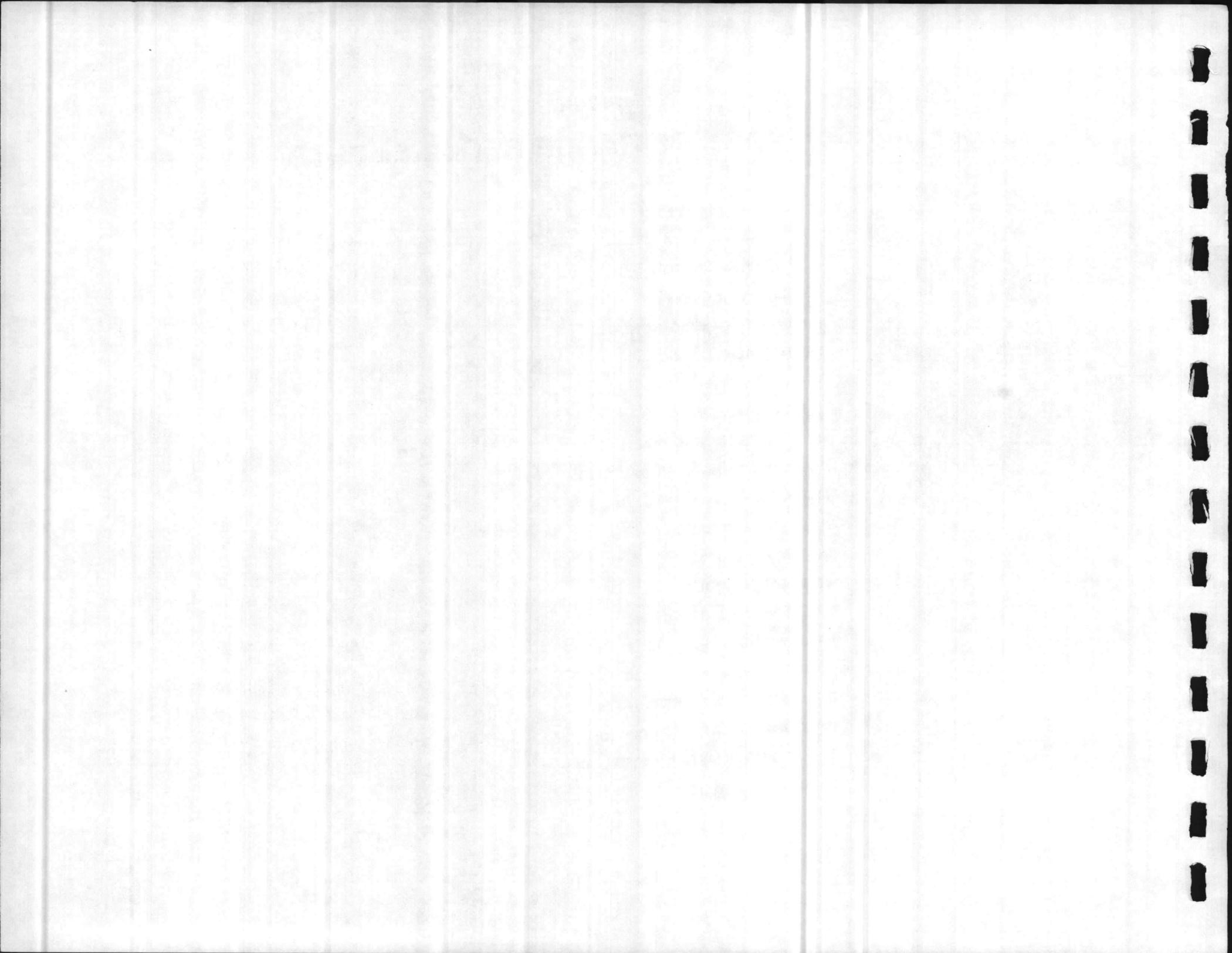


FIGURE 3
SUMMARY OF RANGE REQUIREMENTS

<u>MILITARY UNIT</u>	<u>RANGE TIME (DAYS/YEAR)</u>
INFANTRY REGIMENTS	3526
ARTILLERY REGIMENT	1877
INFANTRY TRAINING SCHOOL	804
LAV BATTALION	688
AAV BATTALION	274
TANK BATTALION	113
RECONAISSANCE BATTALION	120
2D COMBAT ENGINEER BATTALION	229
MARINE AIR WING	241
8th ENGINEER BATTALION	186
2D SUPPLY BATTALION	122
DIVISION SCHOOLS	94
H&S COMPANY, 2D FSSG	66
FIELD MEDICAL SCHOOL	17
2D MAINTENANCE BATTALION	15
8th MOTOR TRANSPORT BATTALION	26
8th COMMUNICATION BATTALION	26
2D LANDING SUPPORT BATTALION	26
2D RADIO BATTALION	26
TOTAL	8476



By tabulating range time by type of range (see Figure 4) and dividing by 242 training days per year (365 days less holidays and weekends), an estimate of the number of required ranges was obtained. In total, 55 ranges would be needed to accommodate the level and type of range training required by the units.

If a comparison is made between the total number of range days available (55 ranges x 242 days) and the total range time required (8,476 days), it appears that the availability of time on the ranges is not critical. Rather, it is the type of range and the existing constraints to range operations that are of concern. Specifically, the eight types of ranges shown in Figure 5, though required, do not currently exist at Camp Lejeune. Realistically, some of these weapons could be fired on existing ranges (such as the SAW on an M60 range); however, ranges with target arrays specifically designed for these weapons would be preferable.

agree
agree

Maneuver Requirements. As shown by Figure 6, unit maneuver requirements were collected and tabulated in a manner similar to that used for ranges. Using a measure of area per unit time, the square kilometer-day, maneuver requirements were developed for all exercises carried out at each level of unit organization. Again, a 10-hour training day was assumed to standardize the number of days required per exercise. Additional qualitative information concerning the use and improvement of the maneuver areas at Camp Lejeune was also collected from the units. The separate maneuver requirements forms for each unit are contained in Appendix B.

Summing individual requirements for all units yields a total maneuver area requirement of 110,348 square kilometer-days (see Figure 7). As expected, the presence of three infantry regiments at the Base generated a large maneuver area requirement due to the number of exercises to be practiced and units to be trained. The Artillery Regiment also required substantial land area to

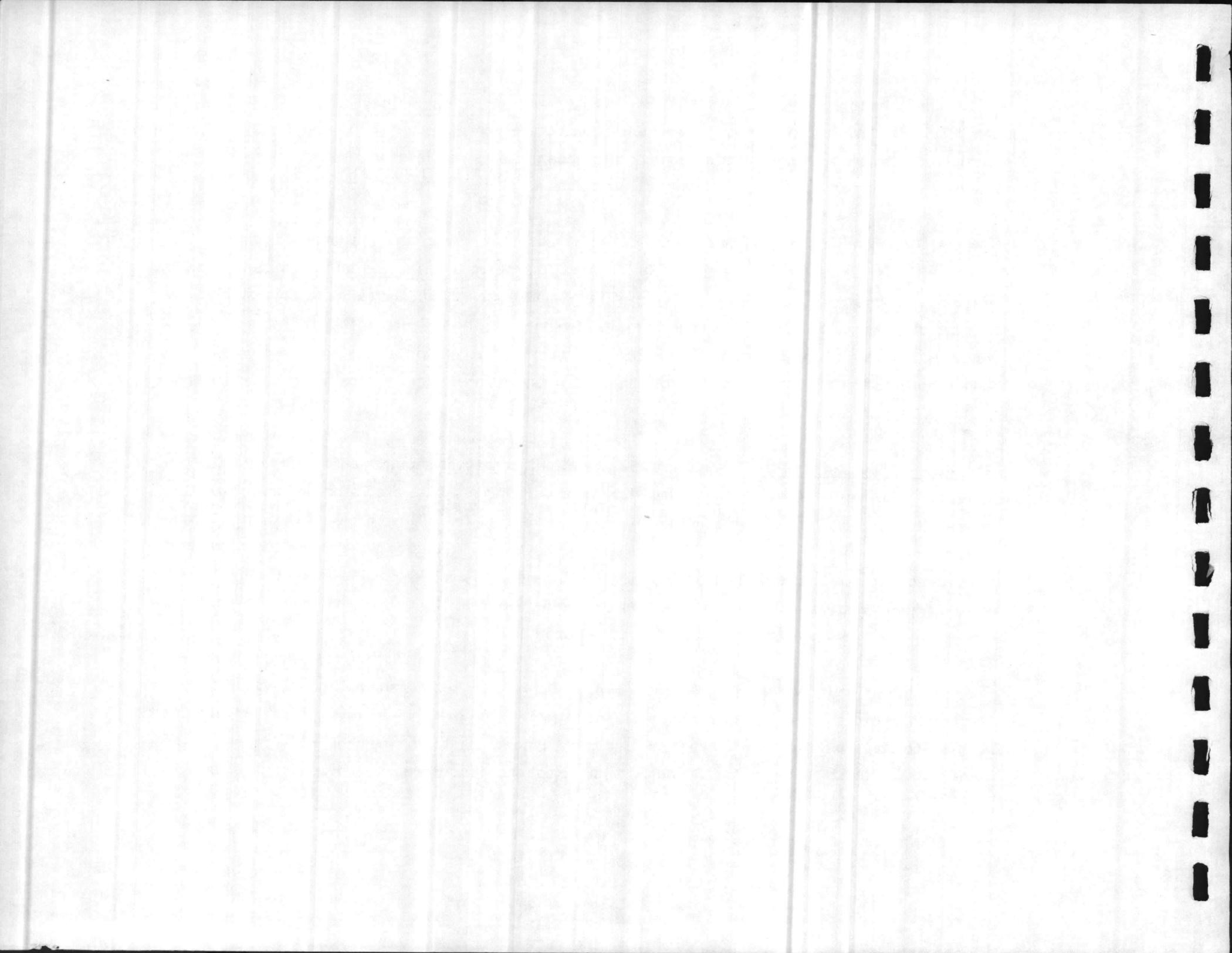


FIGURE 4

SUMMARY OF EXISTING AND REQUIRED ADDITIONAL RANGES
BY TYPE OF RANGE

Camp Lejeune, North Carolina

<u>Range Type</u>	<u>Range Time (Days/Yr.)</u>	<u>Number Existing Ranges</u>	<u>Number Required Ranges</u>
Rifle Qualification	171	3	0
Close Combat Range	18	1	0
Transition Range	15	1	0
Fire Control Range	27	1	0
Fire and Movement Range	27	1	0
B-Zero Range	14	1	0
Moving Target Range	18	1	0
Rifle Familiarization	69	1	0
Field Fire Range	115	1	0
Pistol Fam/Qualification	230	2	0
M203 Grenade Launcher	261	2	0
Hand Grenade	173	1	0
Squad Automatic Weapon	172	0	1
Demolitions	356	2	0
M60 Familiarization	145	1	0
M60 Transition	5	1	0
M60 Gun Drill/Qualification	324	2	0
M60 Field Fire Range	30	1	0
M60 Search and Traverse	15	1	0
M2 Machine Gun	395	0	2
12 Gauge Shotgun	31	1	0
M40A1 Sniper Rifle	75	0	1
SMAW	801	0	4
60 MM Mortar	627	2	0
81 MM Mortar	247	2	0

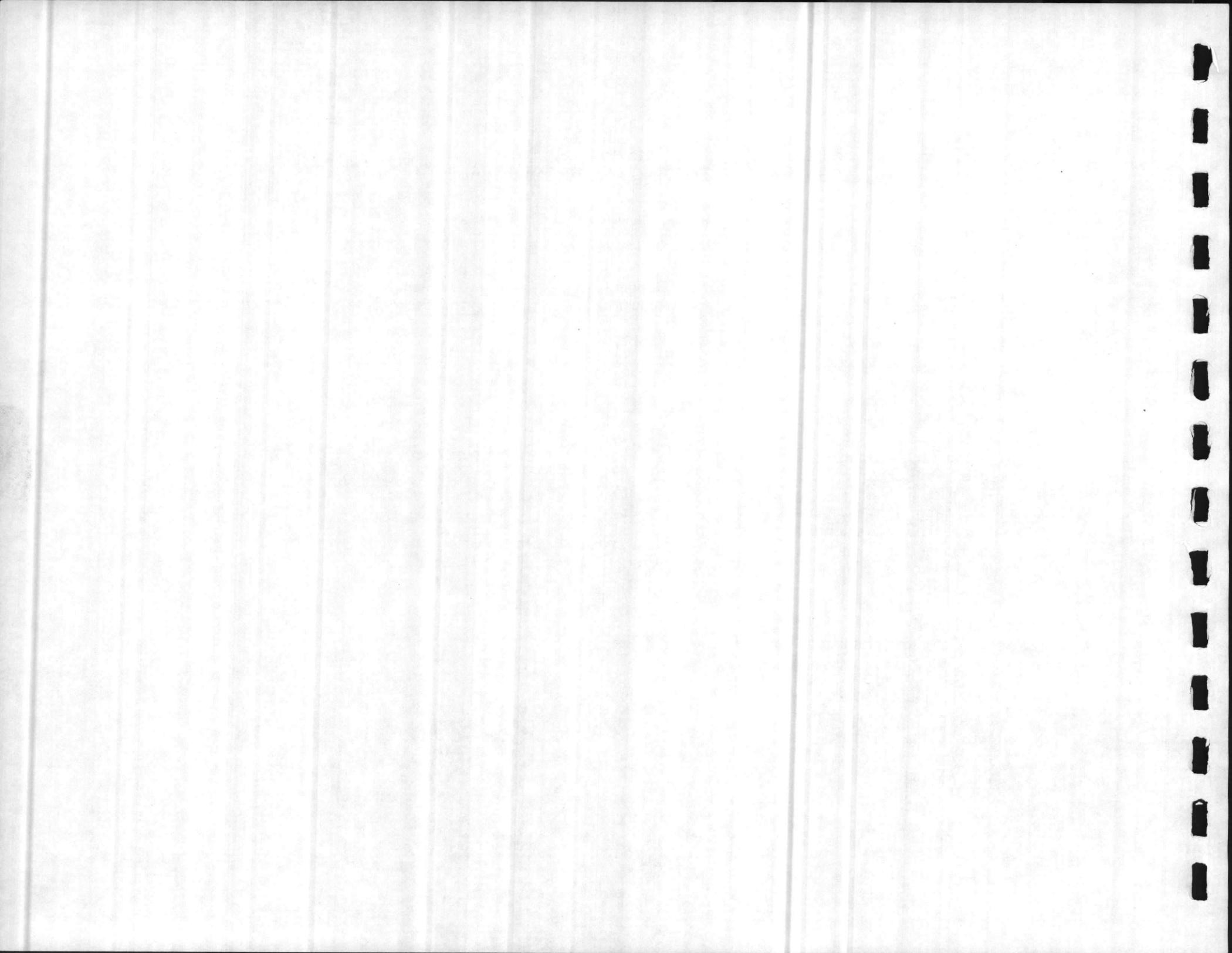


FIGURE 4 (Cont'd)

SUMMARY OF EXISTING AND REQUIRED ADDITIONAL RANGES
BY TYPE OF RANGE

Camp Lejeune, North Carolina

<u>Range Type</u>	<u>Range Time (Days/Yr.)</u>	<u>Number Existing Ranges</u>	<u>Number Required Ranges</u>
Dragon	182	1	0
Tow Missile	107	1	0
LAAW	133	1	0
LAAW Subcaliber	97	1	0
Live Fire Assault	636	3	0
Tank Tables I-VP	204	1	0
Tank Tables IV-XII	220	1	0
Tank Tables VIII-IX	294	1	1
M257 Smoke	16	1	0
MK19 Machine Gun	73	1	1
Anti-Aircraft	33	0	1
Aerial Gunnery (FW)	113	1	0
Aerial Gunnery (RW)	61	1	0
Sam Missile Range	32	1	0
Mout Assault	132	0	1
Artillery	1,758	*	*

* Artillery uses firing points and impact areas.

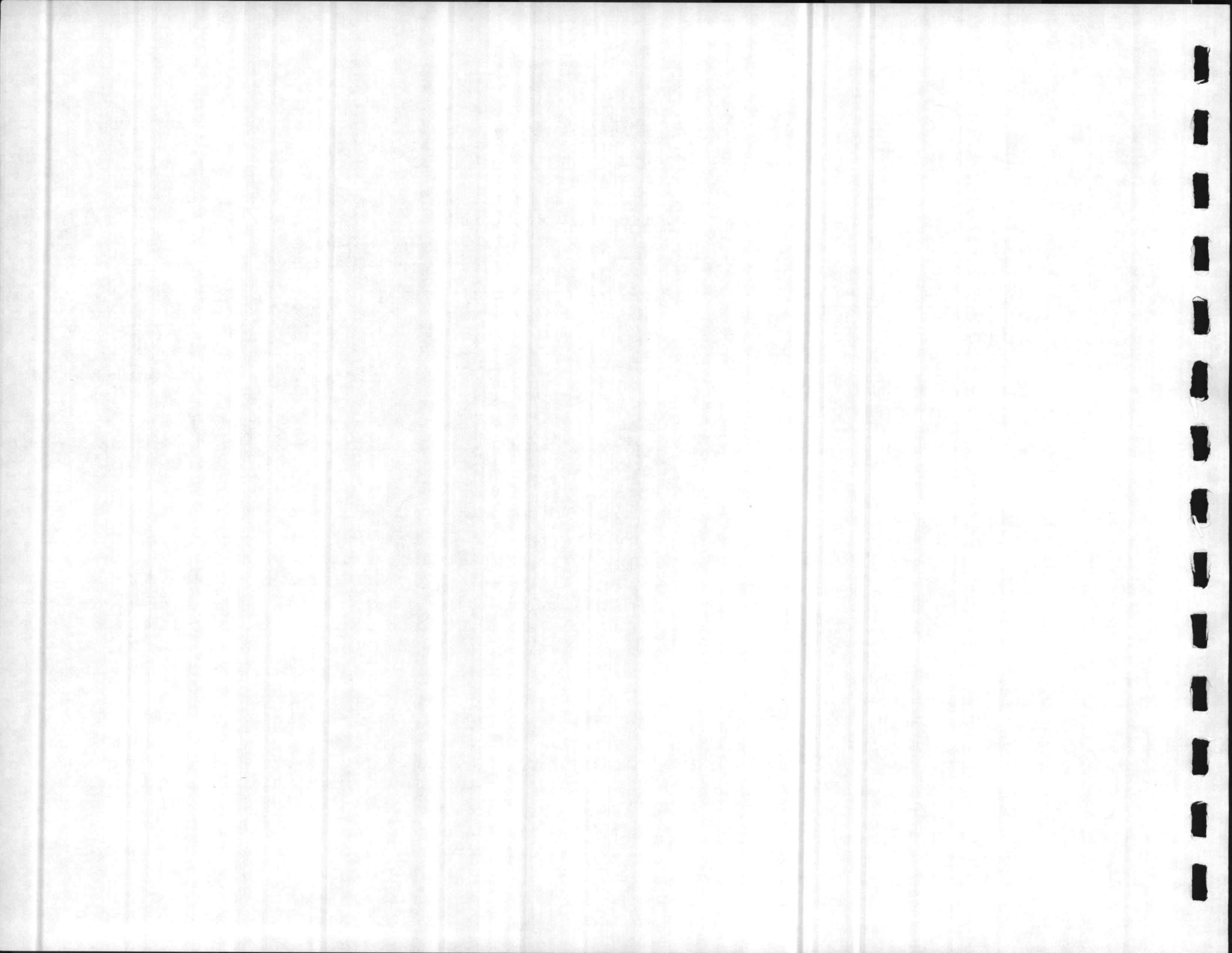


FIGURE 5
RANGES - REQUIRED ADDITIONAL

<u>RANGE TYPE</u>	<u>NUMBER REQUIRED</u>
SQUAD AUTOMATIC WEAPON (SAW)	1
M2, 50 caliber MACHINE GUN	2
M40A1 SNIPER RIFLE	1
SHOULDER-LAUNCHED MULTI-PURPOSE ASSAULT WEAPON (SMAW)	4
MOUT ASSAULT COURSE	1
MK-19, 40mm MACHINE GUN	1
TANK-LAV MOVING TARGET RANGE	1
PLATOON DEFENSE AGAINST AIRCRAFT	1
TOTAL	<hr/> 12

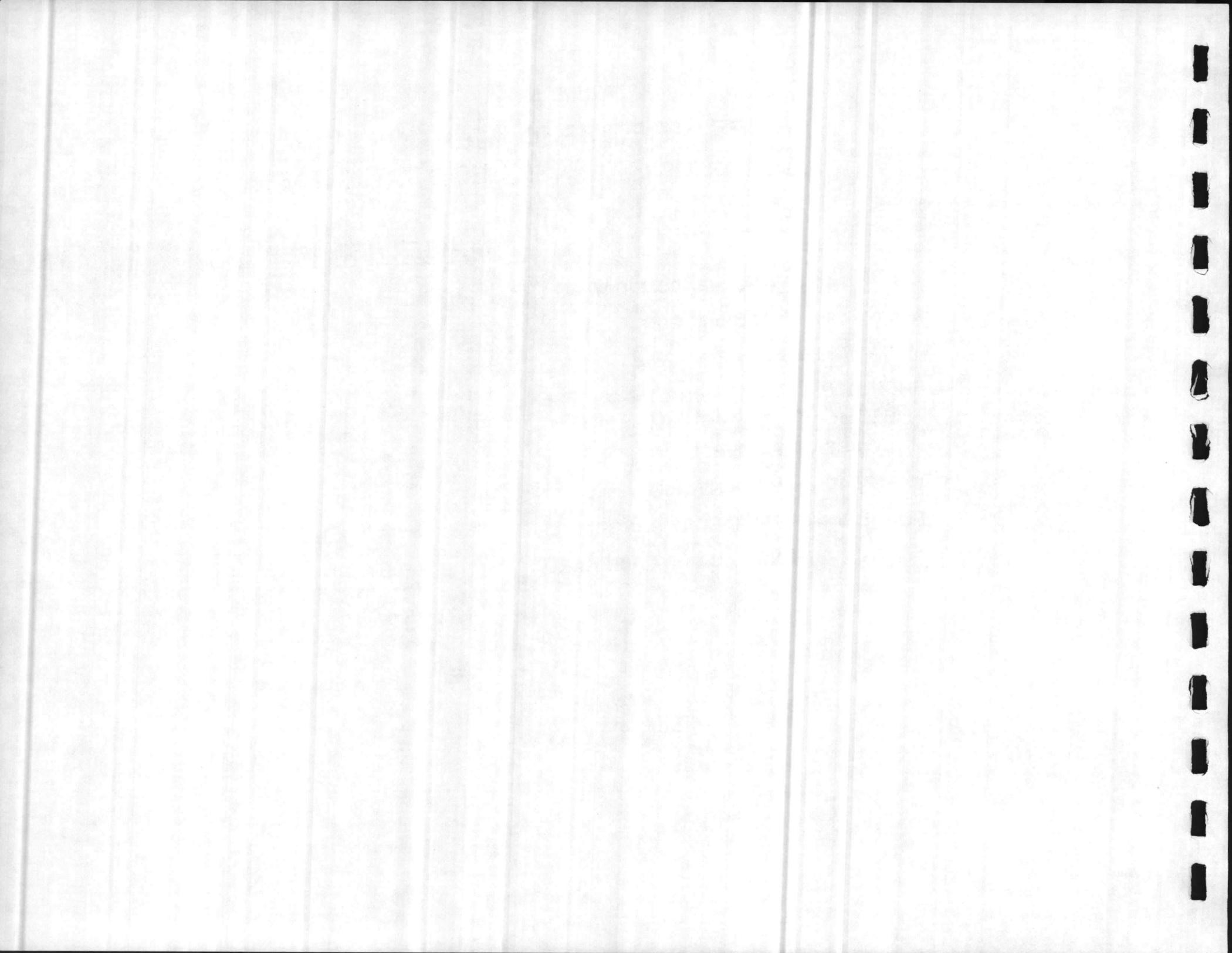
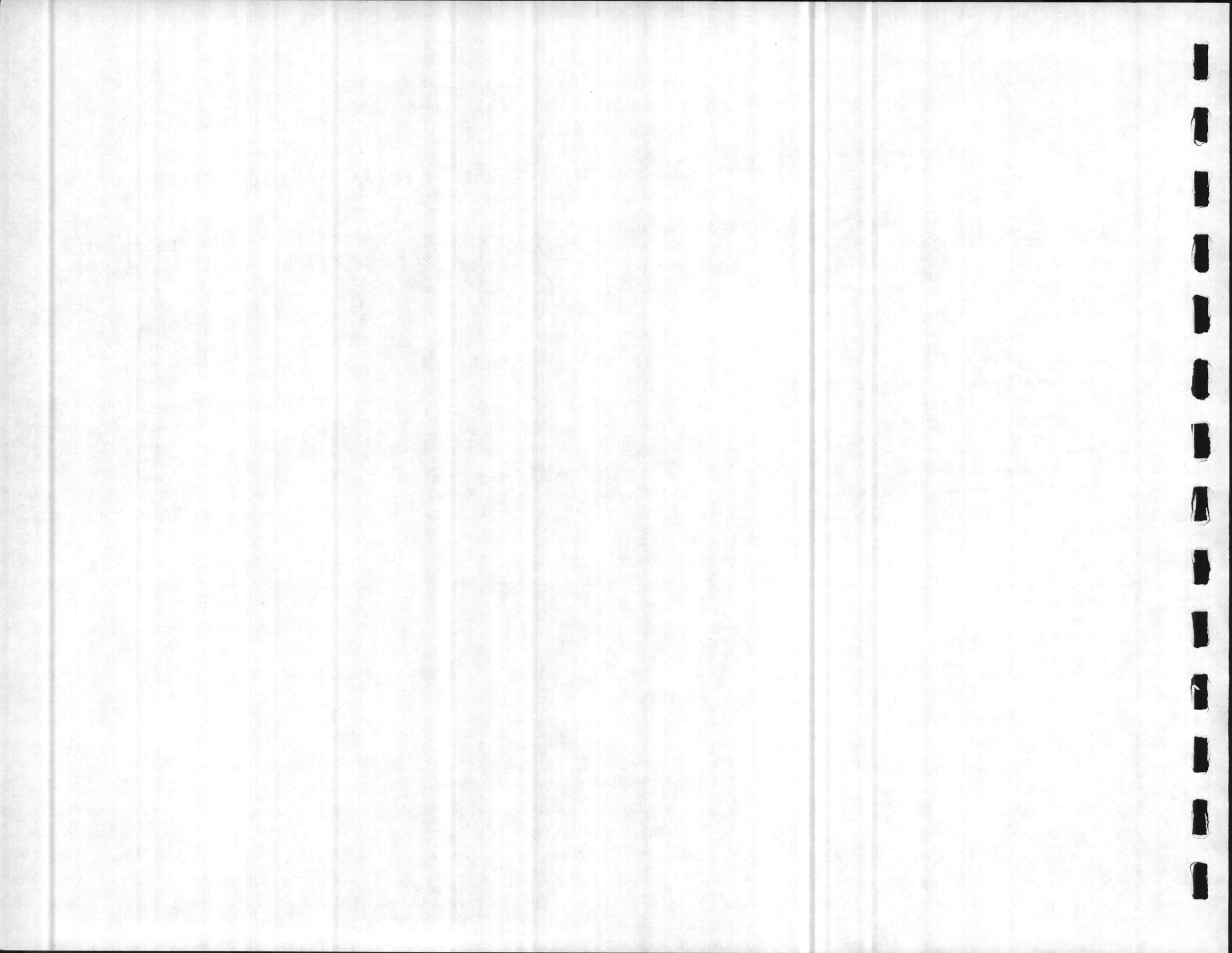


FIGURE 6
MANEUVER AREA REQUIREMENTS FOR TANK BATTALION

<u>MILITARY UNIT/EXERCISE</u>	<u>NO. OF UNITS</u>	<u>LAND AREA REQUIRED (km²)</u>	<u>DAYS REQUIRED</u>	<u>ITERATIONS REQUIRED PER YEAR</u>	<u>REQUIRED LAND AREA PER TASK (km²-days)</u>
TANK PLATOON					
Movement to Contact	12	5	1		
Hasty Attack	12	2	1	4	240
Active Defense	12	10	1	4	96
Defense of Built Up Area	12	1	1	4	480
				4	48
TANK COMPANY					
Movement to Contact	4	16	1		
Hasty Attack	4	8	1	4	256
Deliberate Attack	4	18	1	4	128
Active Defense	4	8	1	4	288
Delay	4	8	1	4	128
Prepare Strong Point	4	8	1	4	128
Defense of Built Up Area	4	1	1	4	128
Breaching Mine Field	4	4	1	4	16
				4	64
TANK BATTALION					
Movement to Contact	1	72	1		
Hasty Attack	1	21	1	2	144
Deliberate Attack	1	36	1	2	42
Active Defense	1	65	1	2	72
Delay	1	90	1	2	130
Defense of Built Up Area	1	9	1	2	180
				2	18

71
203

12 23475
+ 235
25825



tactically deploy its weapons during training. If the assumption of a 242-day training year is used, the total maneuver requirement is approximately 456 square kilometers of land. Of the separate exercises, the Tank Battalion in the Delay is the largest single training task, requiring 90 square kilometers.

Current Capability

When Camp Lejeune was first developed in 1941, its planners certainly must have thought that the size of the Base would be large enough to conduct all of the maneuver training required, both then and in the future. Therefore, they no doubt would be astonished to realize how the net available maneuver area has shrunk due to development, natural constraints and modern range requirements.

To assess the supply of land at Camp Lejeune that is both suitable and available for training, all non-maneuverable land and water areas must be subtracted from the total area of the Base. As shown in Figure 8, these non-maneuverable areas include waterbodies, cantonment areas, wildlife habitats, impact areas and other unuseable land.

Waterbodies are quite prevalent at Camp Lejeune. The New River, which divides the Base in half, is the most significant water feature. Counting the New River, tidal inlets and the major creeks on the installation, approximately 102 km² or 23 percent of the reservation is covered with water.

The cantonment areas at Camp Lejeune have expanded continuously to keep pace with growing population of the Base. The cantonment area includes those sites used by the military for housing and recreation as well as those used by the military and civilian workforce for maintenance, medical care, welfare and administration. The primary housing and recreation areas require 10 km² of land. The industrial complex covers 24 km², yielding a total cantonment area of 34 km².

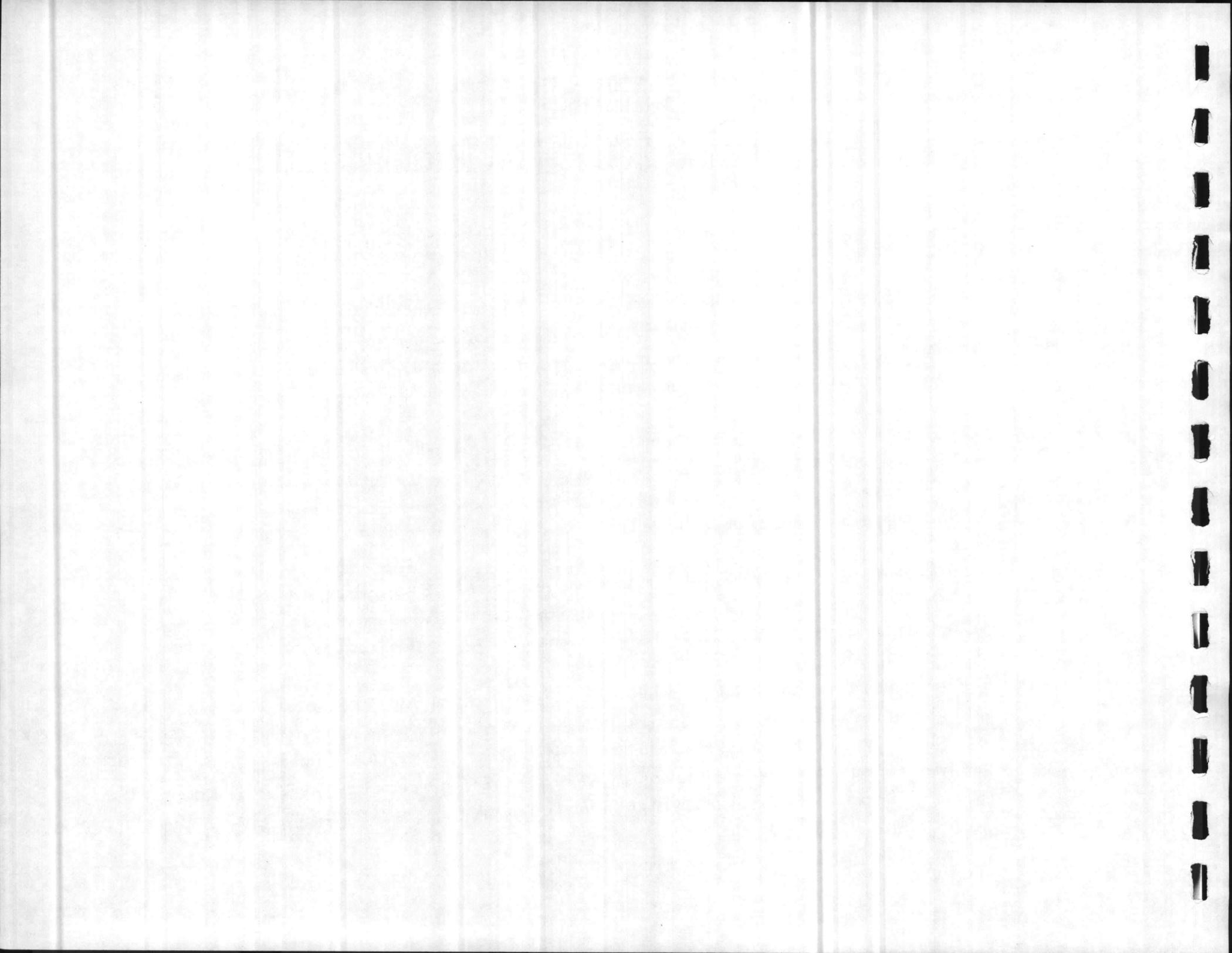


FIGURE 7

SUMMARY OF MANEUVER AREA REQUIREMENTS

<u>MILITARY UNIT</u>	<u>MANEUVER TIME (km²-DAYS/YEAR)</u>
INFANTRY REGIMENTS	42,666
ARTILLERY REGIMENT	46,078
TANK BATTALION	2,586
LAV BATTALION	1,714
AAV BATTALION	2,280
MARINE AIR WING	905
MCSSS	123
FIELD MEDICAL SCHOOL	856
2D COMBAT ENGINEER BATTALION	1,768
INFANTRY TRAINING SCHOOL	3,046
8th ENGINEER SUPPORT BATTALION	876
8th MOTOR TRANSPORT BATTALION	2,355
2D LANDING SUPPORT BATTALION	3,636
2D RADIO BATTALION	540
INFANTRY TRAINING SCHOOL	919
TOTAL	110,348

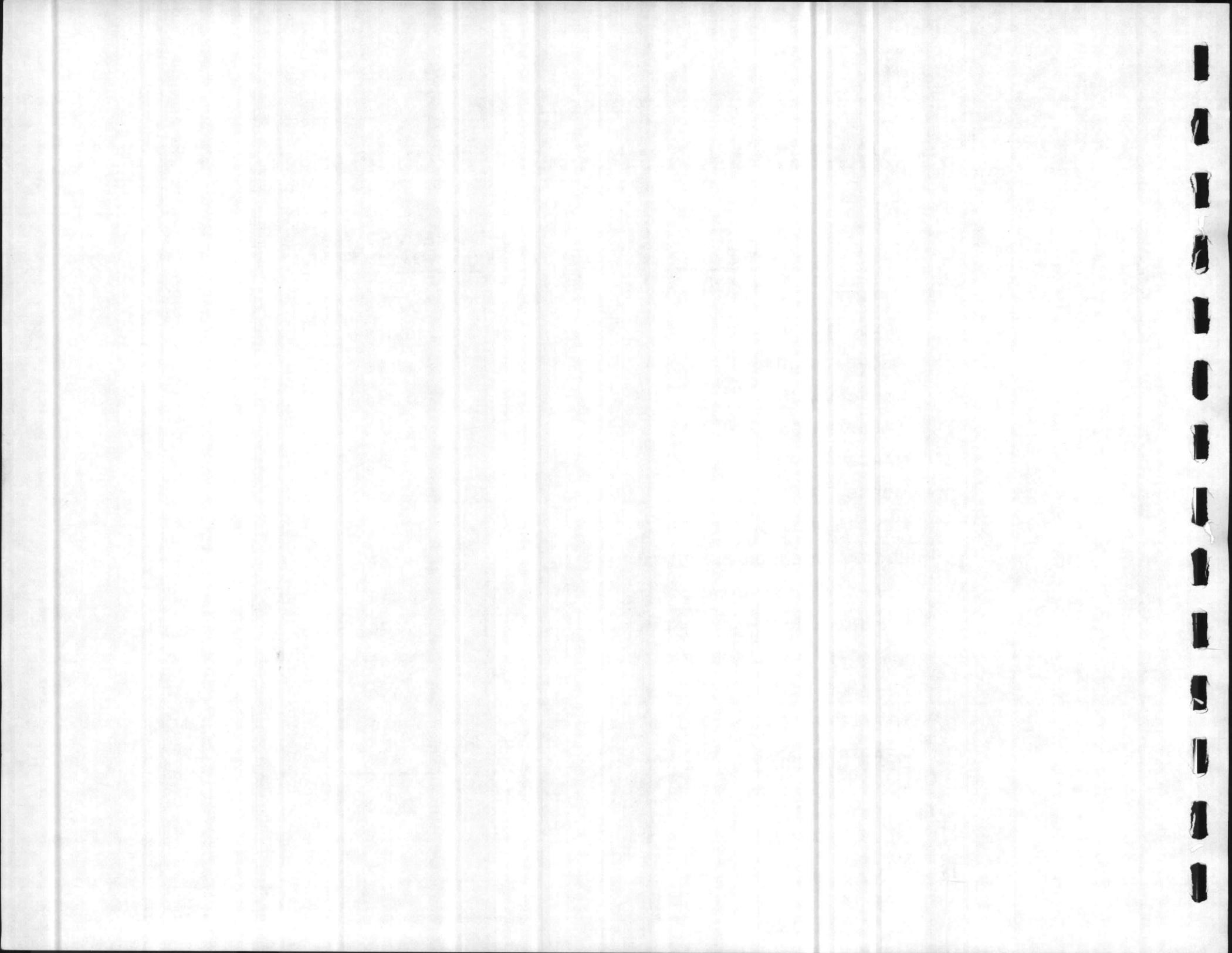
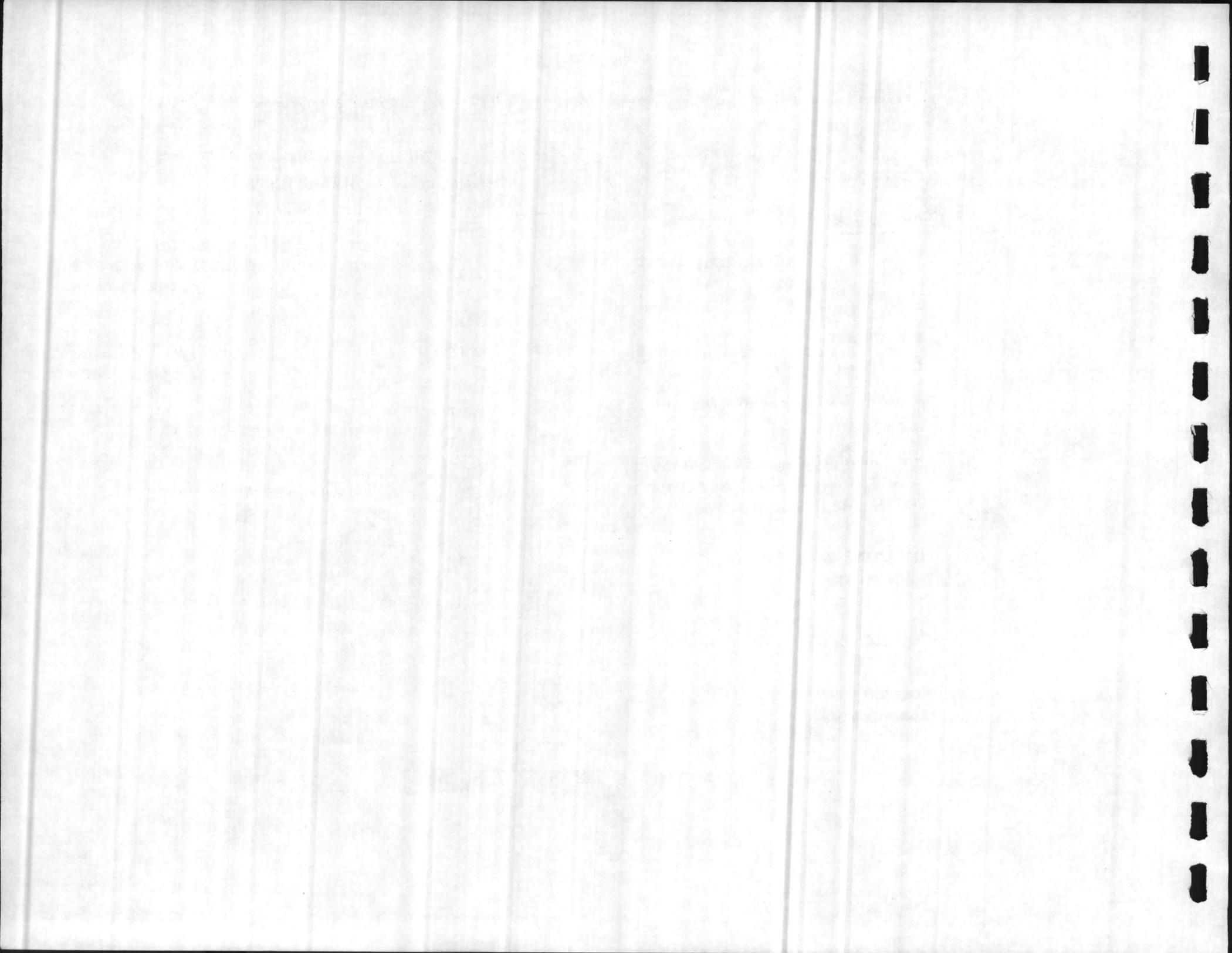


FIGURE 8

MANEUVER AREA—AVAILABLE vs. REQUIRED

<u>AVAILABLE</u>	<u>LAND AREA</u>		<u>ANNUAL MANEUVER TIME</u>
	(KM ²)	(ACRES)	(KM ² -DAYS)
TOTAL AREA CAMP LEJEUNE	450	111,200	
LESS:			
WATER AREA	-102	25,200	
CANTONMENT AREA	- 34	8,400	
WOODPECKER , SEA TURTLE HABITAT	- 11	2,700	
IMPACT AREAS	- 45	11,100	
MISCELLANEOUS (CLEARED RANGES, ROADS, BORROW PITS, WILDLIFE FOOD PLOTS, FRESHWATER PONDS)	- 11	2,700	
POTENTIAL MANEUVER AREA/ TRAINING TIME	247	61,100	59,774
		50662	
<u>REQUIRED</u>			
REQUIRED MANEUVER AREA/ TRAINING TIME	456	112,700	110,348
SHORTFALL	209	51,600	50,604

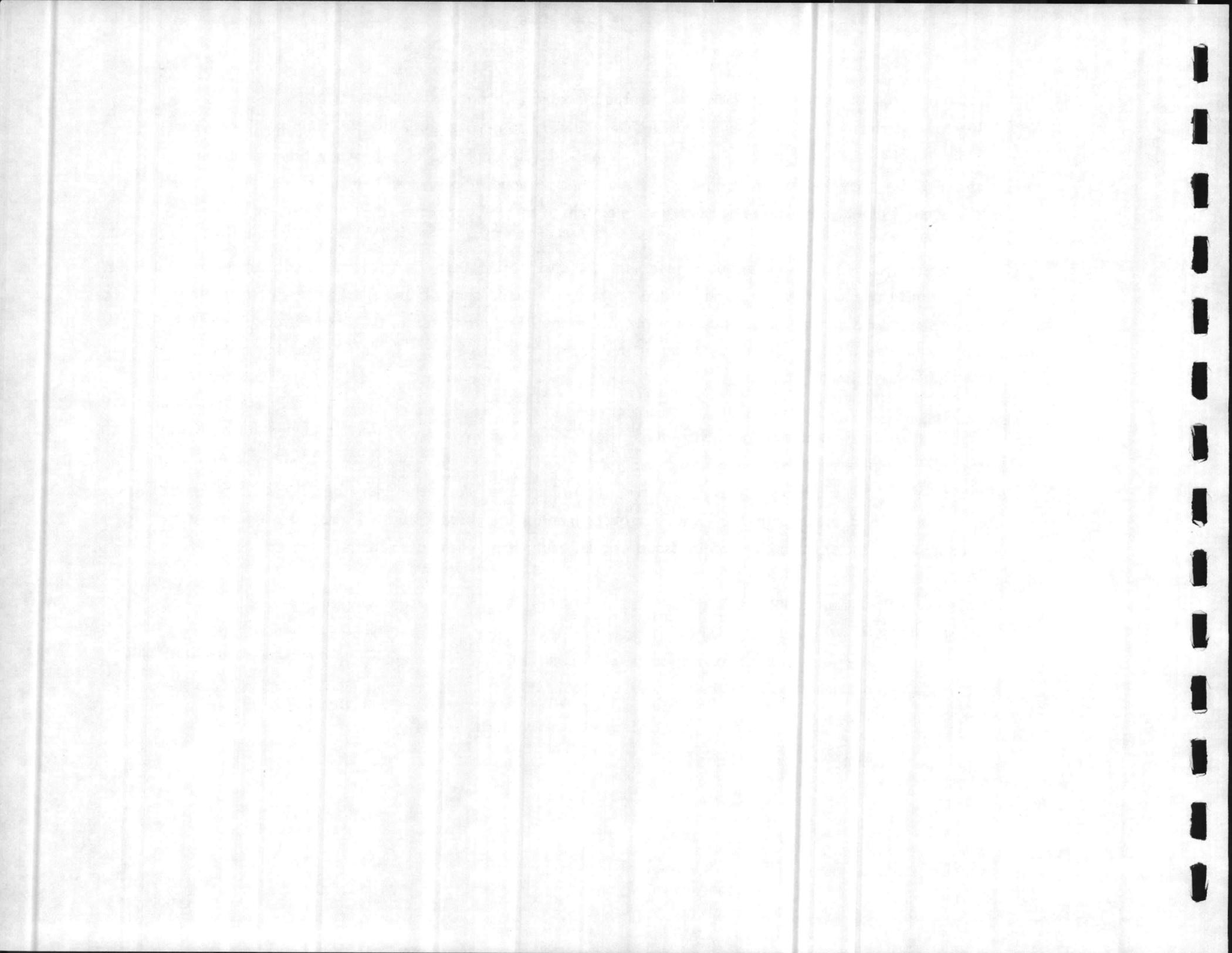


Camp Lejeune is the home of two protected species, the red-cockaded woodpecker and the Atlantic loggerhead turtle. Although current Base Orders do permit some limited training to occur in and around the designated habitats of these animals, for the purpose of this study these areas were assumed to be unavailable for training. Active red-cockaded woodpecker habitat at Camp Lejeune totals about 10 km². The turtle nesting area is a strip of beach approximately 1 km² in area.

Camp Lejeune has three impact areas that are used for artillery fire and close air support and are off-limits due to contamination by dud ordnance. The largest of these is G-10, which together with its secondary danger zone, covers 26 km². The smallest impact area, BT-3, is a swampy stretch of coastline about 5 km² in area. Because the Base is effectively cut in half by the New River, a third impact area, K-2, is required. The K-2 impact area is about 14 km² in size.

The other lands that must be subtracted to obtain net maneuver area are selected semi-improved grounds. Examples of these areas are those portions of ranges that have been cleared to establish fields of fire, the engineers' heavy equipment training area, road shoulders on Highway 172 and Sneads Ferry Road, utility rights-of-way, borrow pits and wildlife food plots. These areas account for approximately 11 km² of land. Also included in this total were .3 km² of freshwater ponds.

If the non-maneuverable areas described above are subtracted from the total area of Camp Lejeune, the land available for training is reduced to 247 square kilometers. As shown in Figure 7, the total maneuver requirement for the units is 110,348 km²-days or, dividing by 242 days, 456 km². Therefore, a shortfall of approximately 209 km² (52,000 acres) of training land was calculated to exist at Camp Lejeune.



TRAINING LIMITATIONS AND DEFICIENCIES

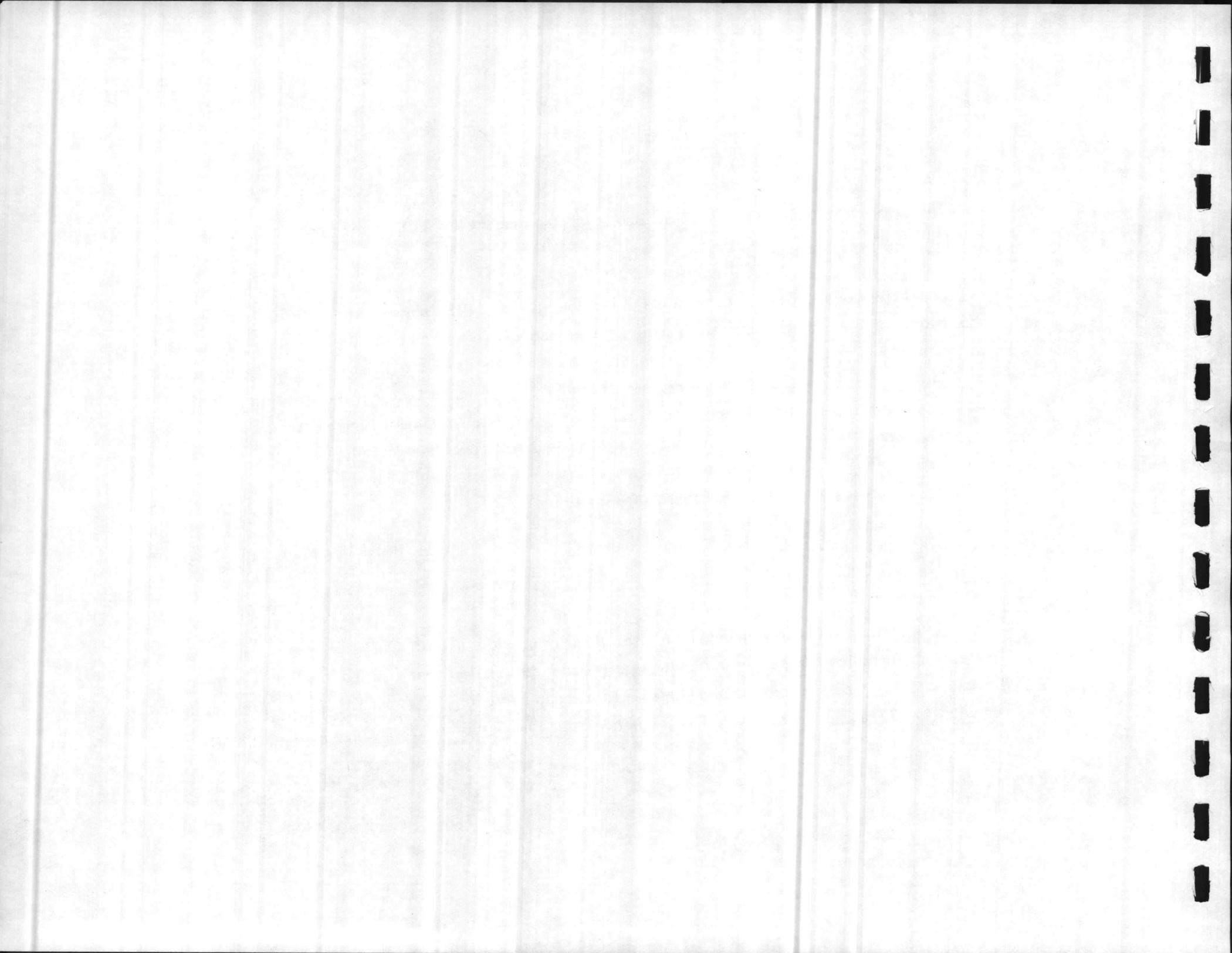
General

This section examines the land available for training at Camp Lejeune and the limitations or constraints on its use.

Generally, two types of constraints limit the use of land: physical or natural features and operational or man-made features. Terrain, for example, is a physical feature that can affect land use, unless the ground is altered by man. Laws and regulations, the location of a highway or an ammunition quantity-safety distance arc are examples of man-made features that may influence land use. Following is a list and description of these two types of development constraints as they exist at Camp Lejeune. Also included is a summary of other existing range and training deficiencies at Camp Lejeune as noted by the unit representatives who were interviewed. Many of these constraints are illustrated graphically in Figure 9, Existing Constraints.

Physical Limitations

The location of Camp Lejeune was carefully chosen after an exhaustive search for a site well suited for amphibious training. Ironically, the ocean-side location that seemed ideal for amphibious landings, today presents several impediments to mechanized training. Among these are the presence of wildlife habitats, poor soils, water bodies, and designated natural areas.



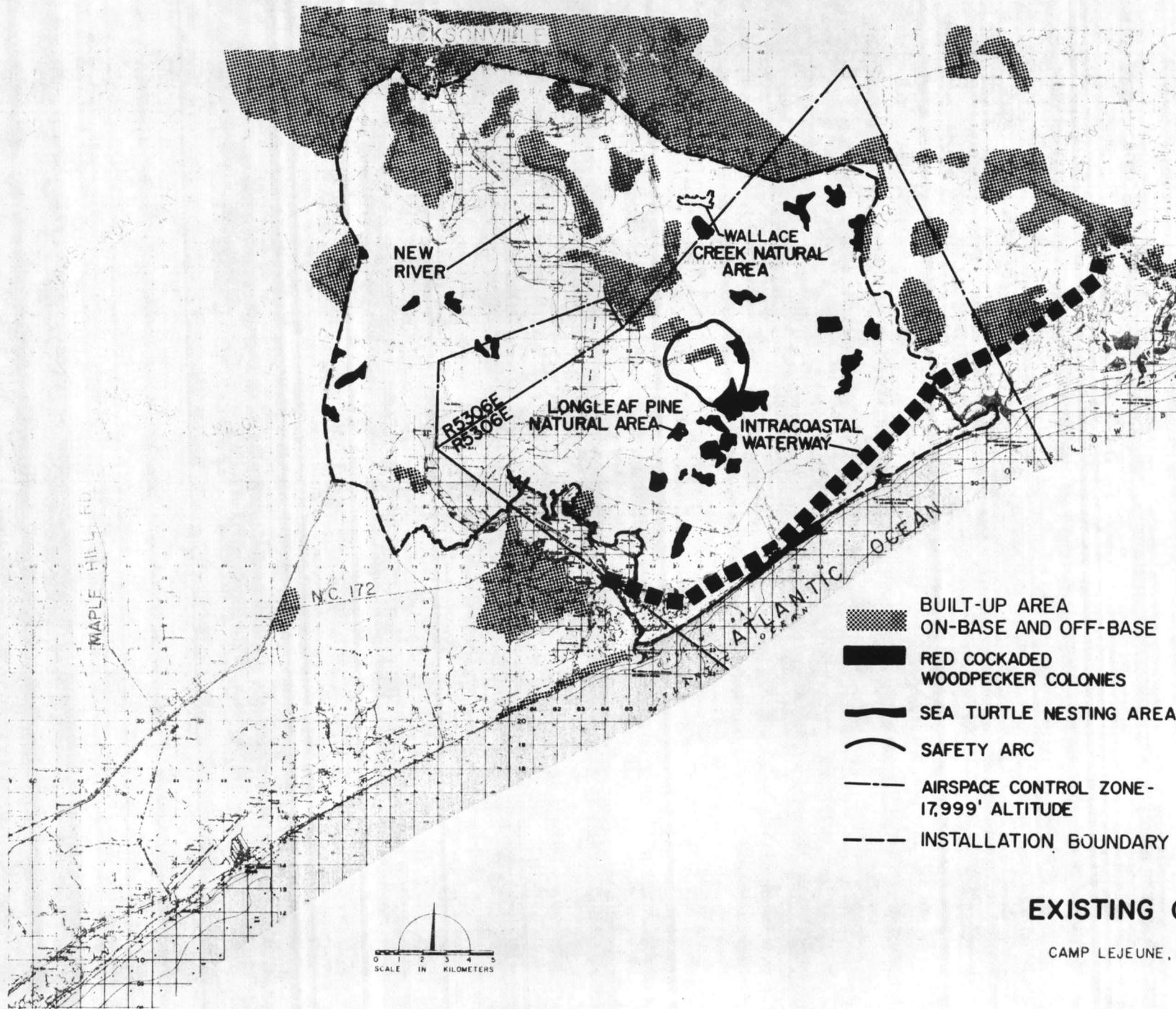
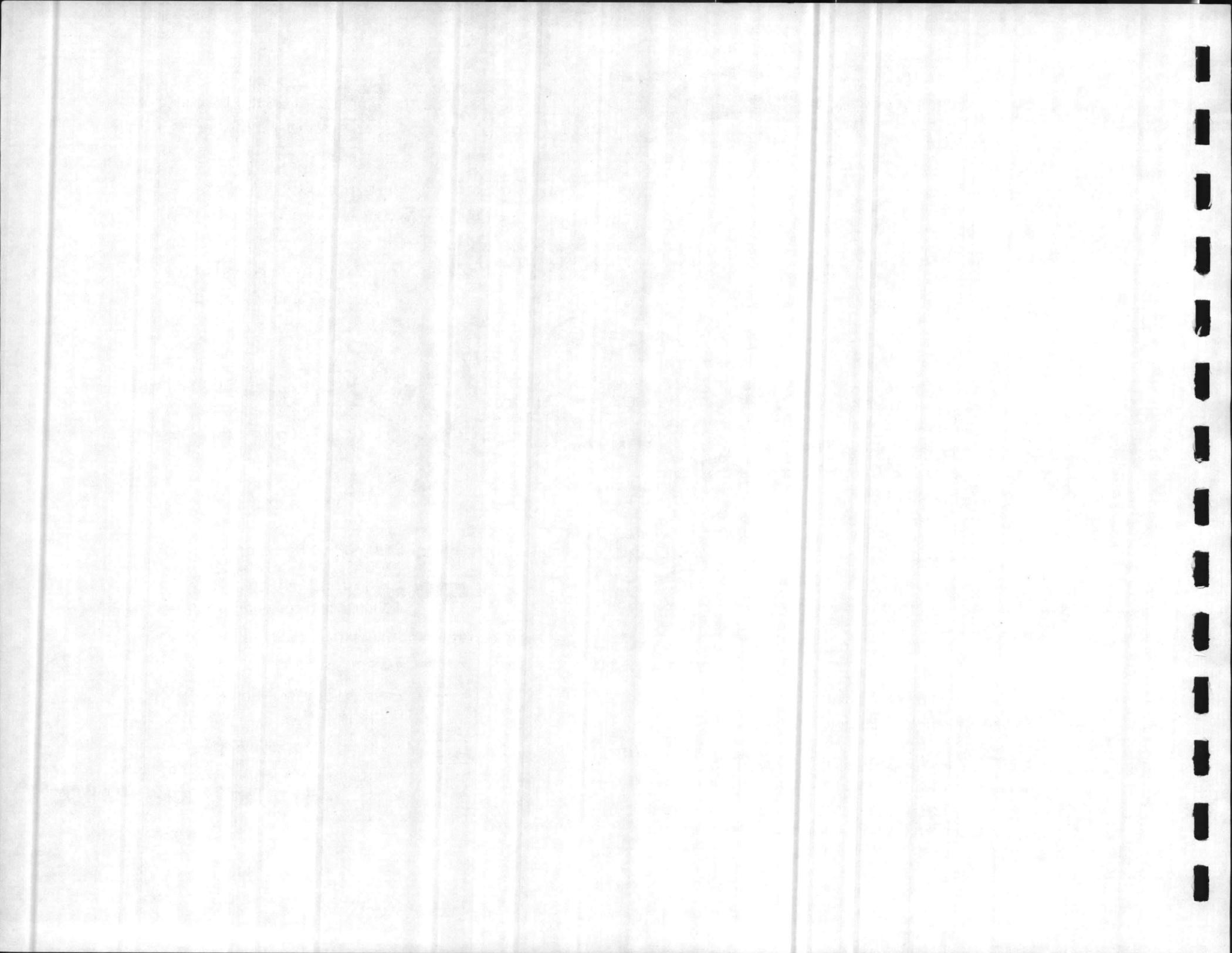


FIGURE 9

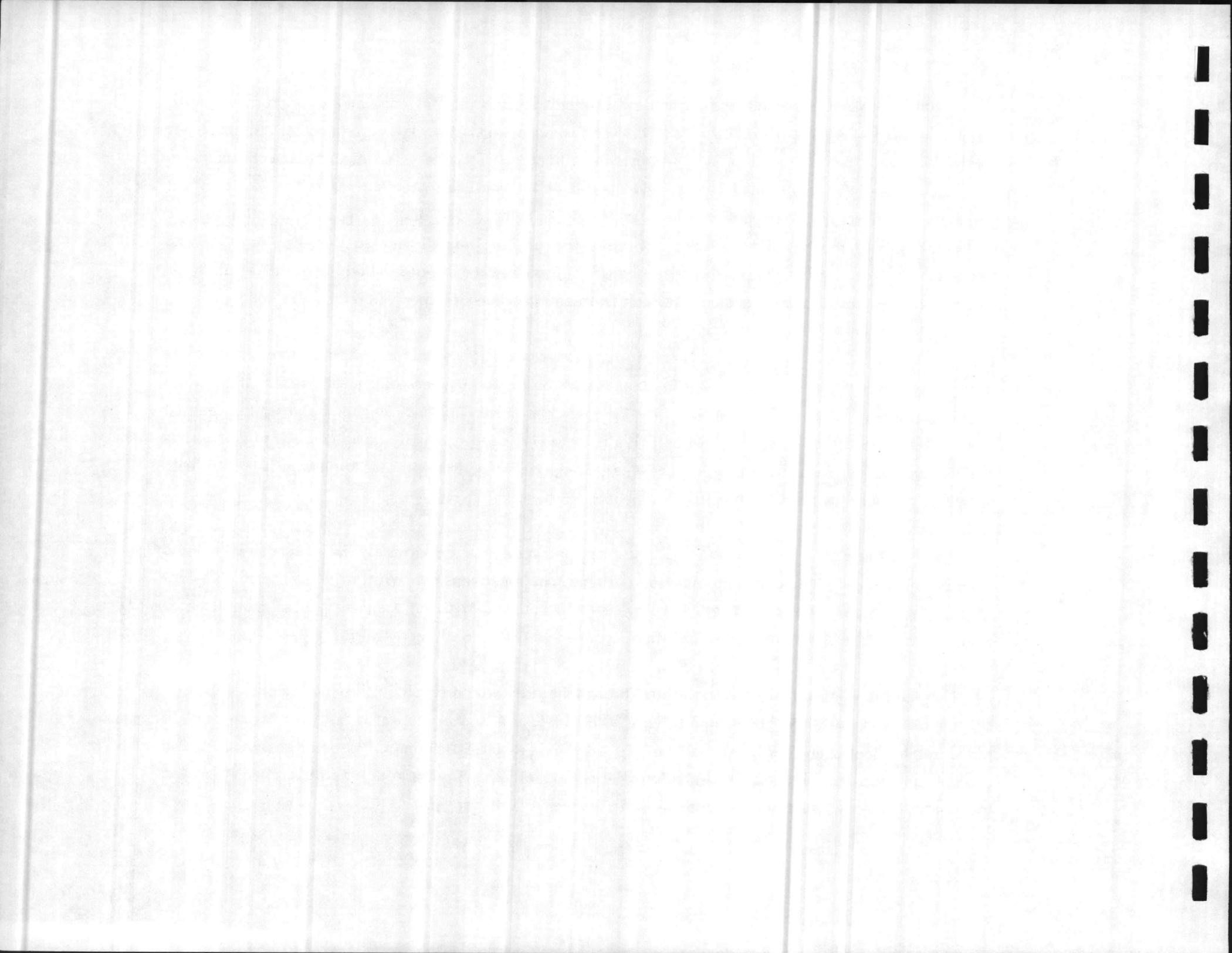


Wildlife Habitat. The endangered and threatened species that may have an effect on the training mission at Camp Lejeune include the red-cockaded woodpecker, Atlantic loggerhead turtle, green sea turtle, Eastern brown pelican and American alligator. Of these species, the red-cockaded woodpecker and the loggerhead turtle (endangered and threatened species, respectively) are most common. Because the woodpecker is a year-round resident at the Base, as opposed to the turtle's periodic visits to the beach for nesting, it poses the greater impediment to the training at Camp Lejeune. The restrictions due to the presence of the woodpecker are based both to the location of his colony sites and to the conditions under which training in and around these sites must be conducted.

The red-cockaded woodpecker's habitat is mature southern pine forests containing some trees having red heart disease. Normally, pine trees must be 60 to 80 years old before red heart disease begins to occur. Because commercial forestry practices dictate a much earlier harvest, between 40 and 60 years, the habitat for the bird on private lands has been gradually destroyed. Ironically, it is the Federal lands, in particular such areas as Camp Lejeune, that possess the majority of forests providing suitable habitat for the bird.

The Mechanized Training Area at Camp Lejeune contains approximately 3,251 acres of land and consists of longleaf pine ridges interspersed with swamps and pocosins. Within the area are 334 acres of mature longleaf pine trees that contain about 30 percent of Camp Lejeune's total population of woodpeckers. It is within this area that maneuvers are most severely constrained.

Early on it was realized that unlimited use of the area would result in the certain destruction of the habitat and thus, the birds themselves. Therefore, reasonable limits initially were imposed to protect the species and its habitat while still allowing realistic training. These limitations included prohibitions against bivouacking in colony sites and digging in marked habitat areas, improved marking of colony sites and increased surveillance of habitat areas. Later, these efforts were



reinforced by guidelines prohibiting any activities that would alter or degrade the bird's habitat or cause damage to trees larger than saplings. In addition, all vehicles were restricted to existing road and trails.

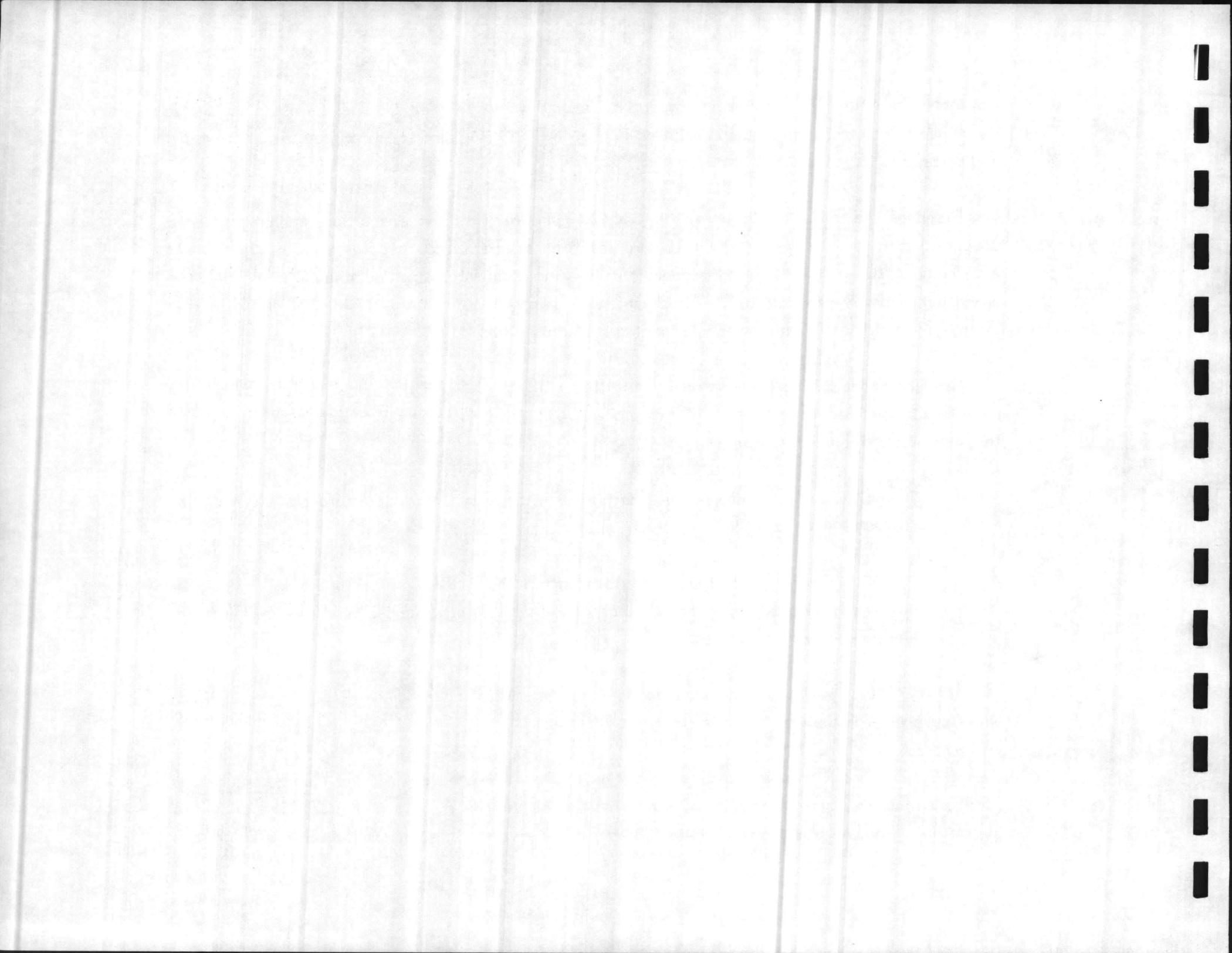
Based on the recommendation of the U.S. Fish and Wildlife Service, the Base implemented two additional requirements. First, at least 100 acres of contiguous forest that was at least 40 years old and included the colony site and support stands, were delineated and maintained. Secondly, the operation of heavy wheeled and tracked vehicles was prohibited within 400 feet of any nest tree during the nesting and brood rearing period, March through July.

On September 13, 1978, formal consultation with the U.S. Fish and Wildlife service was requested by the Base. As a result of this process, additional guidelines were imposed on the use of the area. These included the following:

- Prohibition of all major training activities in the area from March through July including firing from gun positions near colony sites.
- Prohibition of field training activities within the marked areas to include cutting or destroying vegetation, digging holes, trenches or pits, laying underground lines or bivouacking within the area.

In 1979, the various restrictions and guidelines were codified as Base Order 11015.6, Red-Cockaded Woodpecker Protection Program/Measures.

Soils. The Soil Conservation Service has extensively surveyed the soils at Camp Lejeune and rated them according to the degree of limitation for, or damage from, a given use. The degree of limitation or damage is expressed as slight, moderate or severe. Slight means the soil characteristics



are generally favorable and limitations or damages to the soil are minor and easily overcome or repaired. Moderate means some characteristics are restrictive and the resulting damage can be minimized by careful planning, design or maintenance. Severe means that soil characteristics are unfavorable and that damage can be offset only by costly soil reclamation, special design, or intensive maintenance.

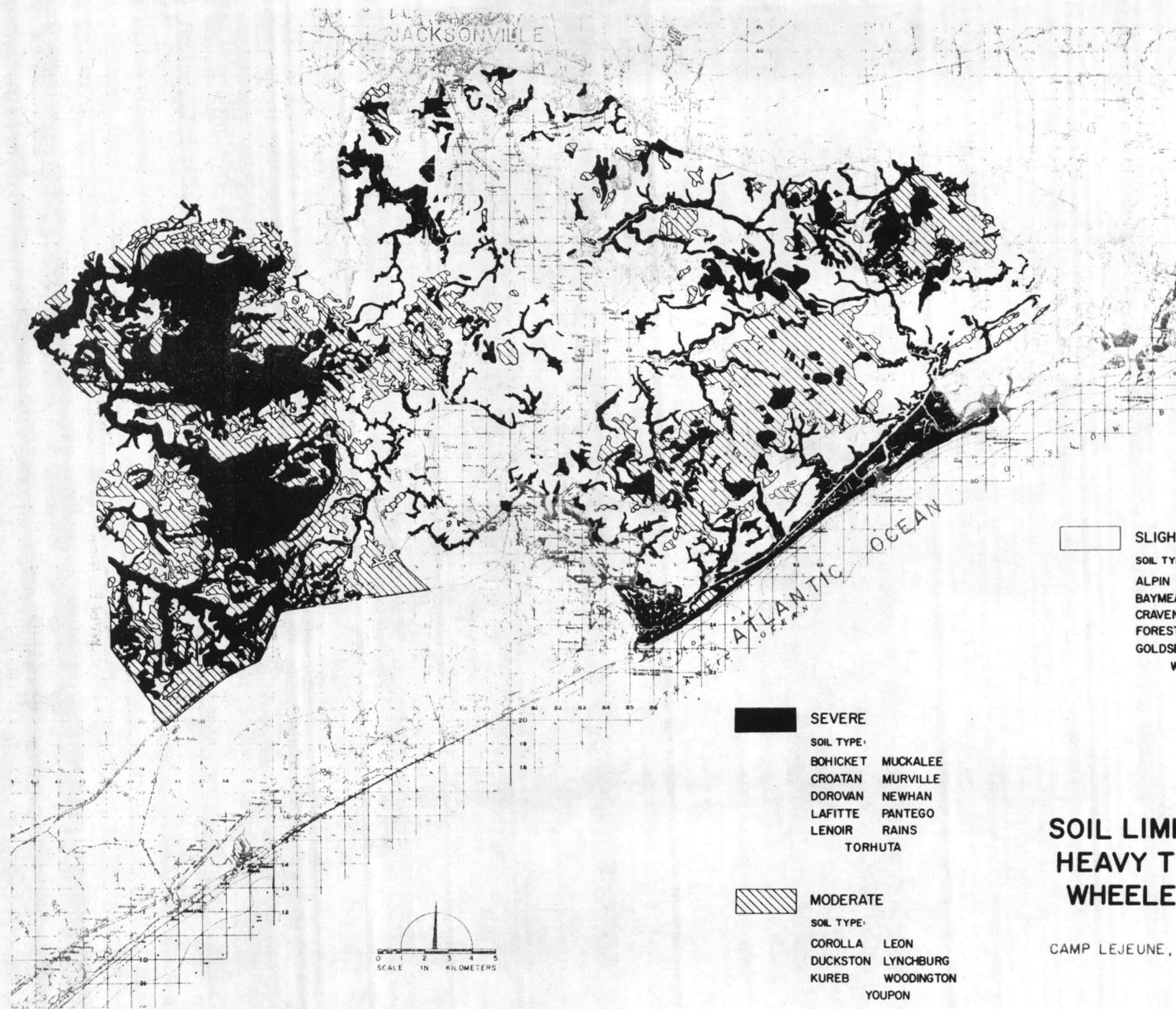
When the suitability of the soils at Camp Lejeune for off-road maneuvering by heavy tracked and wheeled vehicles is assessed (see Figure 10), it is clear that a large majority of the Base has moderate to severe limitations for this training. Generally, the limitations are related to such characteristics as wetness, low strength, high water table, excess humus, low bearing strength and excessive sand. When trafficked by heavy vehicles, the restricted areas are highly susceptible to ruts, gulleying, accelerated erosion, and standing water. These problems in turn necessitate constant maintenance and upkeep of trails to allow their repeated use and to minimize damage to surrounding areas.

The severely limited soils generally occur along the beaches and creeks and low-lying areas with some isolated patches in the eastern half of the Base. Moderately limited soils occur at higher elevations and are well distributed across the G-10 impact area and the Mechanized Training Area. Portions of K-2, Starretts Meadow and the area south of French's Creek have only slight limitations for mechanized training.

Rivers and Waterbodies. As an amphibious training center, Camp Lejeune naturally has an abundance of waterbodies. What is not as obvious is that these waterbodies create both opportunities and constraints for training.

The New River is a large, tidal river dissecting the Base into two halves. In some maneuver scenarios, it provides the opportunity for troops to practice organized river crossings; yet it also serves as a barrier to training. For example, mechanized units wanting to use the Verona Loop





SLIGHT
 SOIL TYPE:
 ALPIN MARVYN
 BAYMEADE NORFOLK
 CRAVEN ONSLOW
 FORESTON PACTOLUS
 GOLDSBORO STALLINGS
 WANDO

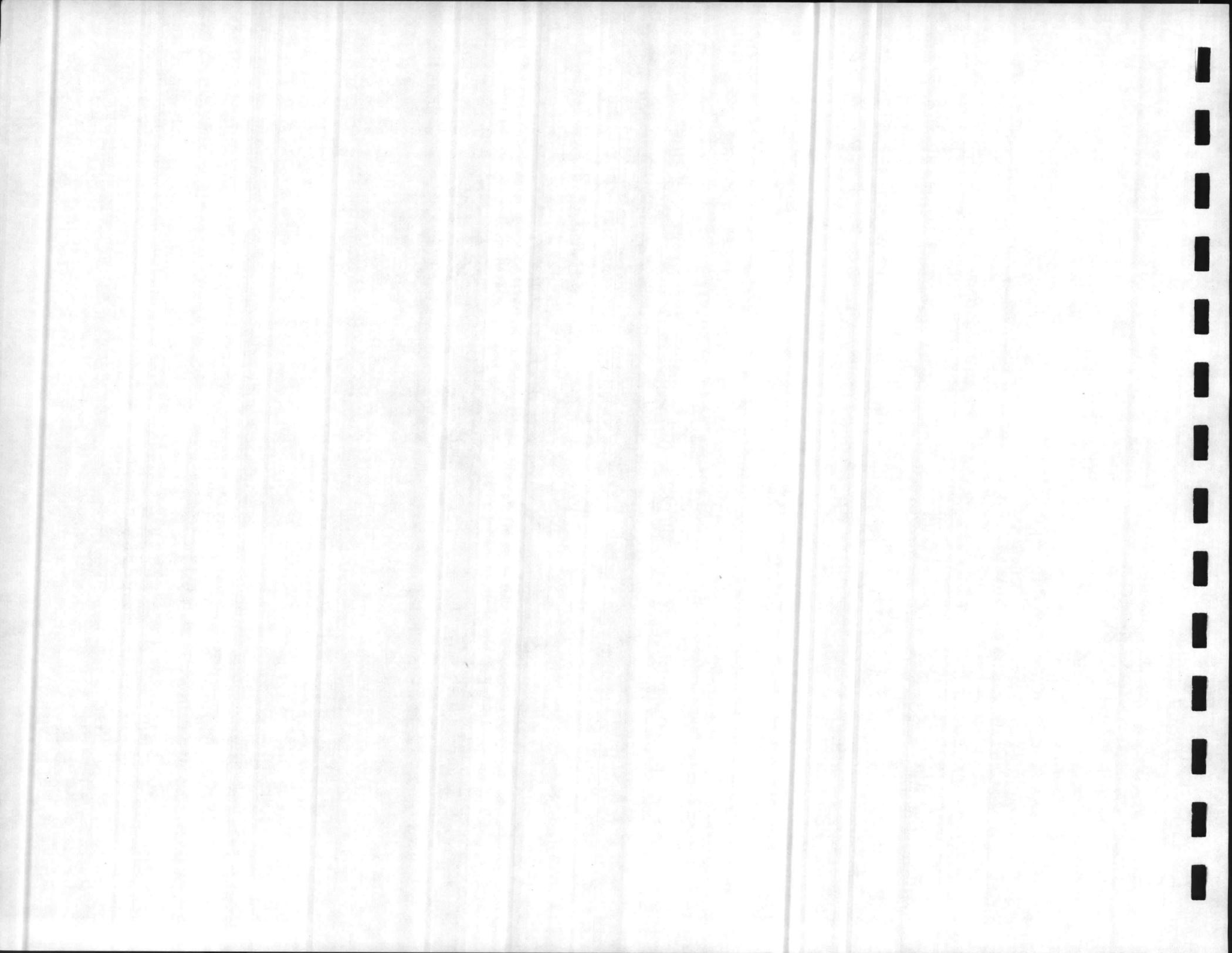
SEVERE
 SOIL TYPE:
 BOHICKET MUCKALEE
 CROATAN MURVILLE
 DOROVAN NEWHAN
 LAFITTE PANTEGO
 LENOIR RAINS
 TORHUTA

MODERATE
 SOIL TYPE:
 COROLLA LEON
 DUCKSTON LYNCHBURG
 KUREB WOODINGTON
 YOUNG

**SOIL LIMITATIONS FOR
HEAVY TRACKED AND
WHEELED VEHICLES**

CAMP LEJEUNE, NORTH CAROLINA

FIGURE 10

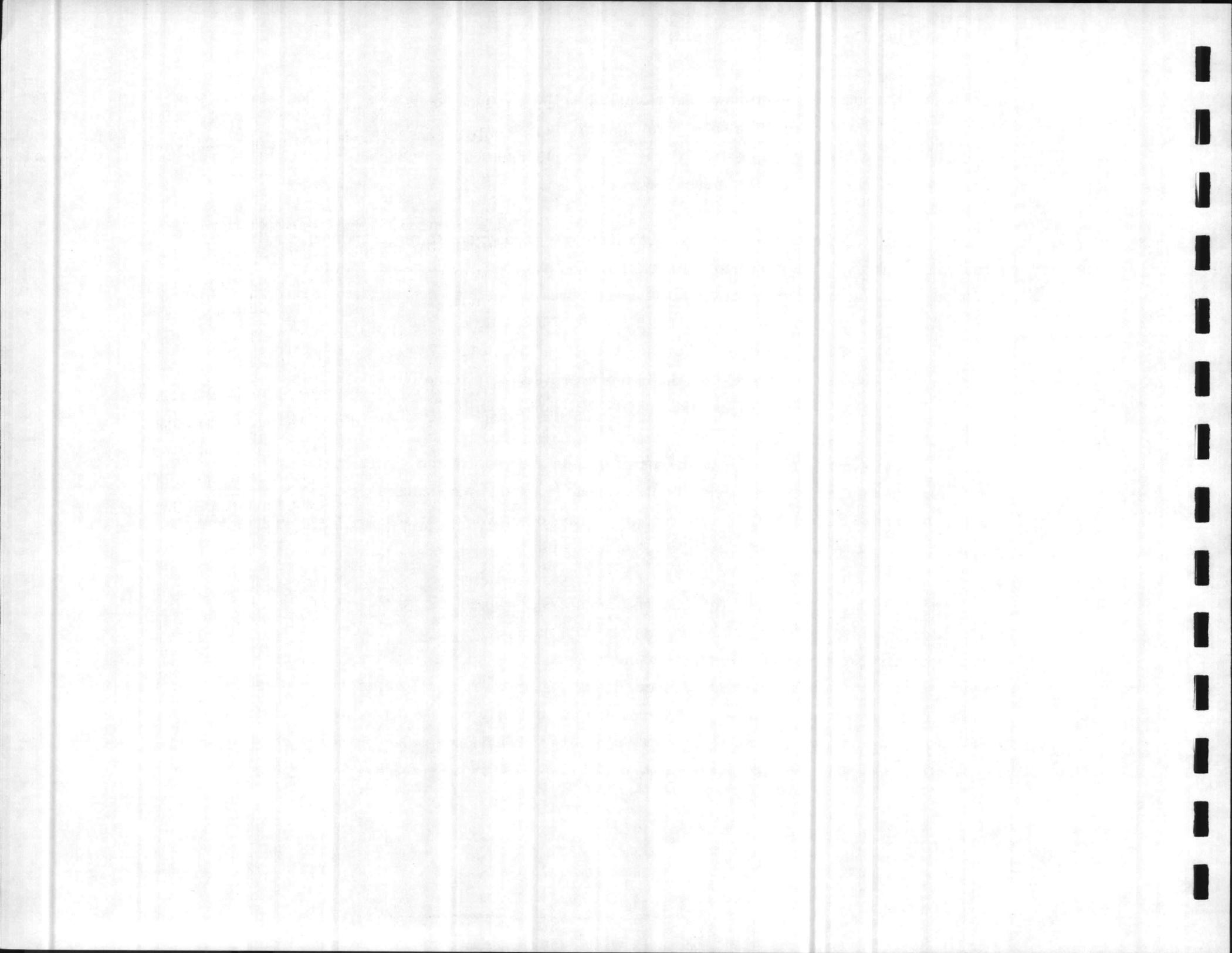


area must either go overland through Jacksonville, as the bridge at Sneads Ferry is not reinforced, or via the LCM-8 landing craft, also a time consuming process. In addition, because the River is navigable and not under Base control, frequent visual and helicopter sweeps are required when firing on ranges whose safety fans extend over the water.

The Intracoastal Waterway is another serious impediment to range training, particularly for large-caliber weapons firing out to impact areas BT-3 and N-1. Unless the waterway is closed, the traffic on the Waterway requires frequent check fires as well as constant monitoring. As it now stands, the Waterway can be closed for one hour after which time it must be reopened for one hour. Although current efforts are directed toward extending the closure from one to four hours, it is yet unclear if this request will be approved. If not approved, an alternative solution would be to push back the firing lines of those ranges whose safety fans now cross the Waterway.

To a lesser extent, the numerous creeks on the reservation hinder movement across the Base. For example, French's Creek limits access from the Mechanized Training Area north to Starrets Meadow. Because of the low topographic relief prevalent at the Base, swampy areas also dictate the extent to which some training land may be used.

Natural Areas. In a sense, the two natural areas shown in Figure 9 are not as much of an obstacle to training as they are opportunities to preserve and protect unique natural features. Because of this preservation effort, these areas need to be carefully avoided by units conducting training operations. The proposed Wallace Creek Natural Area is located in the Creek's upper reaches, a low area largely unsuitable for traverse by foot or vehicle-mounted troops. The Longleaf Pine Natural Area is wholly contained within a designated woodpecker habitat and most likely would need no further restrictions other than those already imposed in such areas.

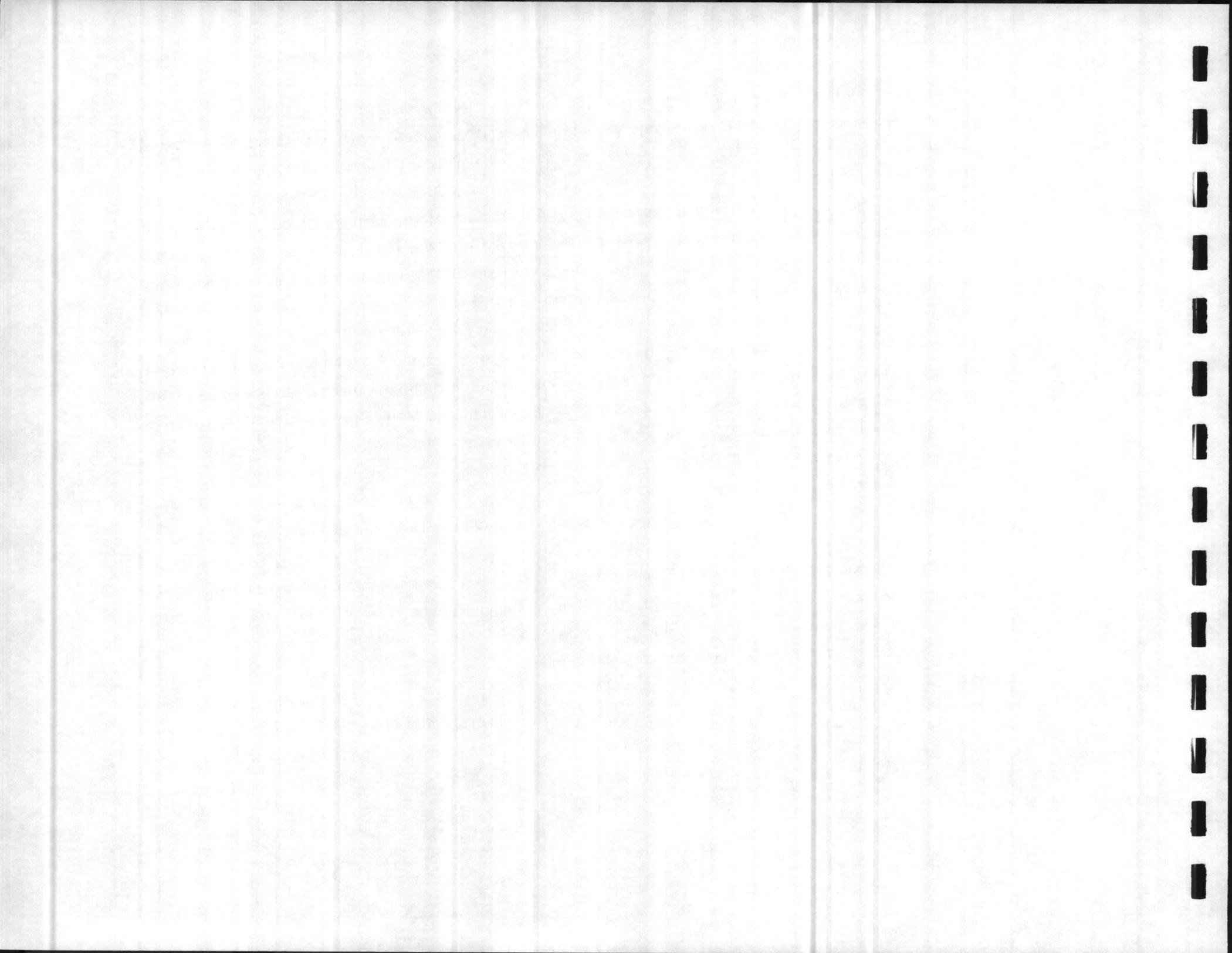


Operational Constraints

Operational or man-made constraints at Camp Lejeune include urban development, safety clearance zones, highway rights-of-way and airspace control zones. Each constraint is discussed below.

Urban Development. As Camp Lejeune's population has grown, so have those of the City of Jacksonville and Onslow County. The City of Jacksonville and the commercial development along North Carolina Highway 24 permanently block any expansion of the Base to the north. Furthermore, the use of the ranges in the "F" area is constrained due to noise complaints and vandalism. To the east of the installation, development is currently low-density residential with some well established communities, such as Willis Landing. The City of Swansboro is gradually expanding to the northwest along Highway 24. This growth may in turn create additional development pressure in the Bear Creek and Queen Creek areas. Already, 500-pound bombs cannot be dropped on Brown's Island due to noise from the explosions disturbing these residents. Southwest of the installation is the established community of Sneads Ferry. South of Sneads Ferry on the Atlantic beachfront, much development of vacation homes and condominiums is now occurring. Although neither development hinders training per se, their presence does not allow for expansion of the installation to the southwest.

The western portion of the Base's perimeter is the sole area not currently developed. Aside from the community of Verona, the land to the west of Camp Lejeune is largely uninhibited. In part, this is because much of the land is held by a single owner for commercial timber production. Also, the soils in the area are largely unsuitable for farming.



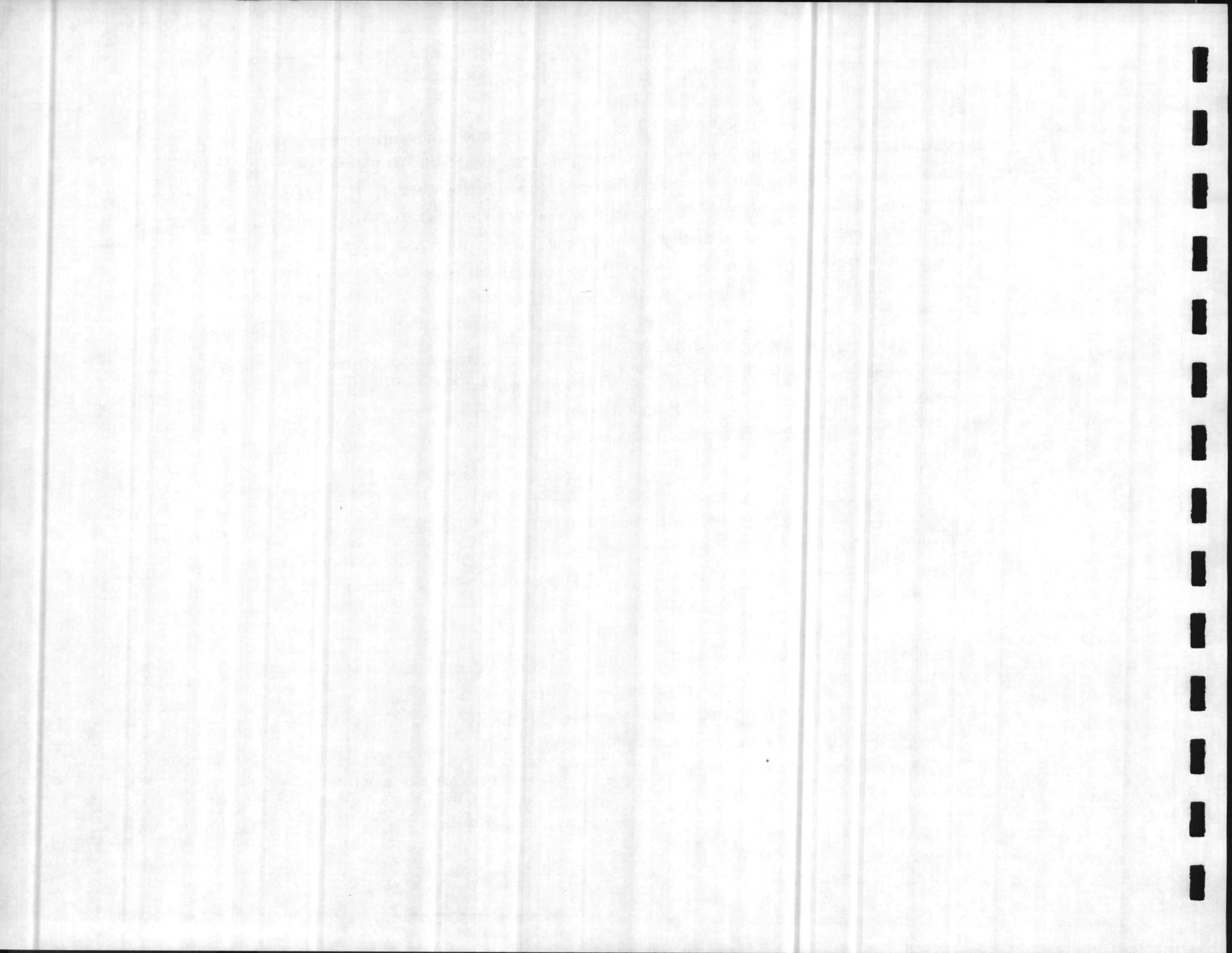
Safety Clearance Zones. Ammunition storage and range safety clearance zones are prescribed by regulation and constrain training as well as land use.

The quantity safety distance arc surrounding the ammunition supply point (ASP) is an imaginary line within which no inhabited buildings may be sited. While the arc's presence makes expansion of the cantonment area around French's Creek difficult, it does not hinder training. On the other hand, the location of the ASP adjacent to the G-10 impact area does restrict artillery firing from approximately two-thirds of the gun positions west of the New River. It is possible to petition for a waiver of this restriction, however, the relocation of the ASP would be more advantageous from the standpoint of training and the future development of the Base.

Overlapping range surface danger zones (SDZ) prevent the efficient use of ranges and maneuver land at Camp Lejeune. For example, in addition to the previously cited instances of interference with waterbodies, the configuration of the SDZs of the "F" ranges prevents their optimal use. The layout of the "F" ranges also closes off a large area that potentially could be used for maneuvers.

Highway Rights-of-Way. The location of North Carolina Highway 172 hinders the use of the G-7 tank range. The Highway must be closed and monitored whenever firing exercises are conducted on this range. In the future, the location of the Highway between impact areas G-10 and N-1 restricts the possible expansion of the impact areas.

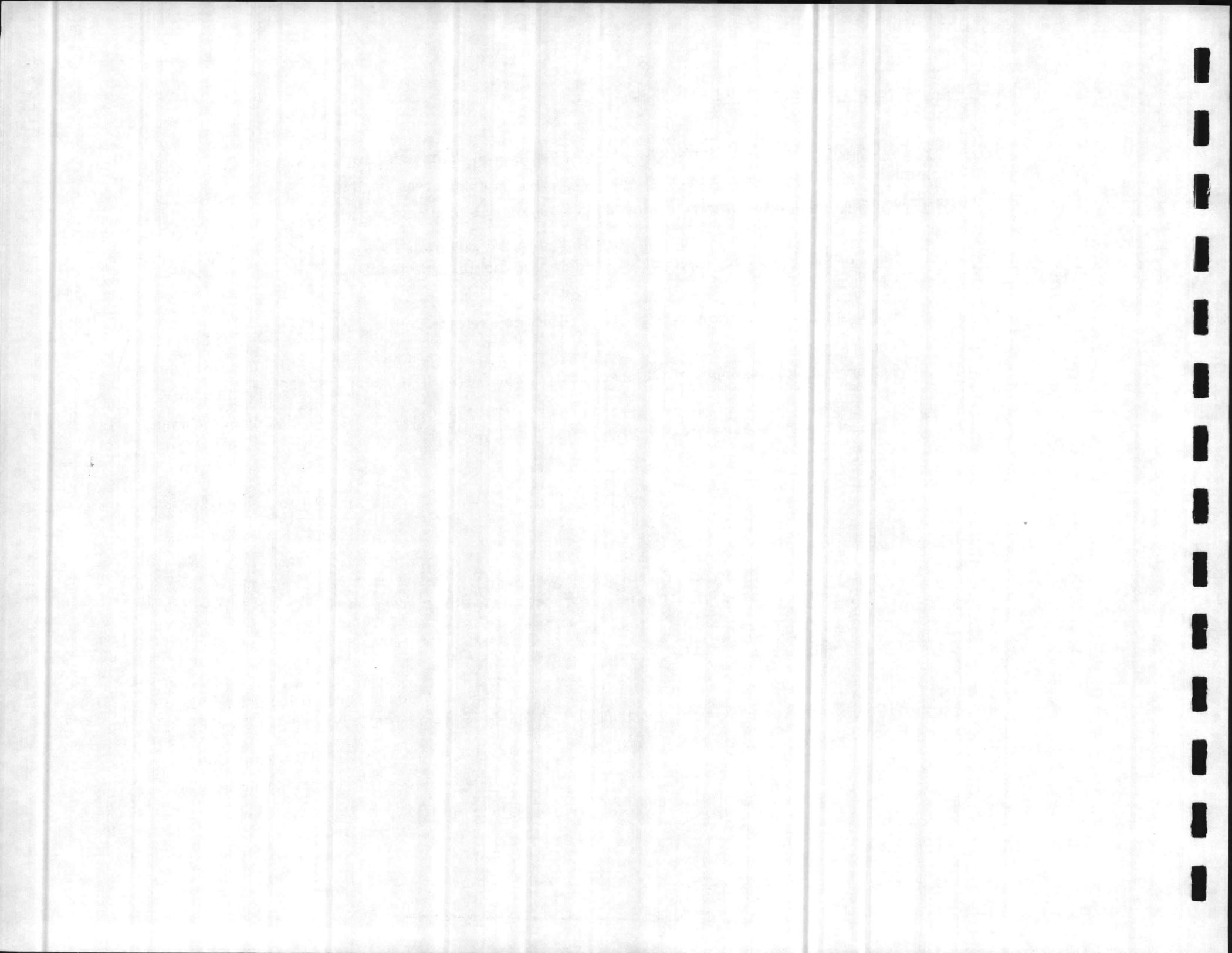
Airspace. Camp Lejeune now has operational control of the airspace over most of the Base up to an altitude of 17,999 feet. At this altitude, the artillery regiment is limited in the elevation of the gun barrel that can be used during firing exercises. Furthermore, the airspace must be clear 1,000 meters on either side of the target line-of-sight. Increasing the altitude and the area of the airspace over which the Base has control would allow the artillery to train more productively at Camp Lejeune.



Other Range and Training Area Deficiencies

During the interviews to collect data for this study, unit representatives were asked to provide their opinions on existing problems with the range and training areas at the Base. Some of these deficiencies have been stated above. Following is a summary of the comments received:

- . Lack of available training land due to increased mobility of vehicles and range of weapons.
- . G-10 impact area is too small for the artillery to exercise their guns' full capabilities.
- . Armored vehicles do not have a large cleared area for realistic, tactical maneuvers.
- . Duplicate range are needed on both sides of the New River.
- . Only one range, G-3, can fire the TOW missile.
- . No live fire is allowed at Combat Town.
- . Aircraft may not cross impact areas, hot ranges, or built-up areas enroute to clear zones.
- . Laser targeting can't be used by artillery due to tree buffer.
- . Travel costs for training away from Camp Lejeune are high and training time is difficult to schedule.



CONCEPT PLANS

General

The purpose of a concept plan is to provide a broad statement of future development objectives designed to accomplish a specific goal. In the case of Camp Lejeune, the overall goal is to satisfy the training requirements of the units to the greatest extent possible. The means by which this goal is accomplished may vary and this variation is expressed in the different features of each concept plan. These differences are summarized in Figure 11, Concept Comparison.

Each concept was reviewed by representatives of the Base and the units that use training land at Camp Lejeune. After a careful review of the merits of each concept plan, a preferred concept plan was developed. This preferred concept plan incorporates those development objectives which most reasonably satisfy their training requirements and alleviate existing training deficiencies at Camp Lejeune.

The following sections will first present a description of an illustrative, ideal range and training land model followed by a summary of the development features of each alternative concept plan. Finally, the preferred concept plan will be presented.

Ideal Division Post Model

The Ideal Division Post Model depicts the textbook arrangement of the three principal features of an installation; cantonment area, maneuver area, and range and impact area (see Figure 12). The space allowance for each area are based on the requirements for a mechanized infantry division set forth in TC 25-1, Training Land. Under this plan, the cantonment, maneuver and range areas were allotted approximately 40, 450, and 180 square kilometers, respectively.

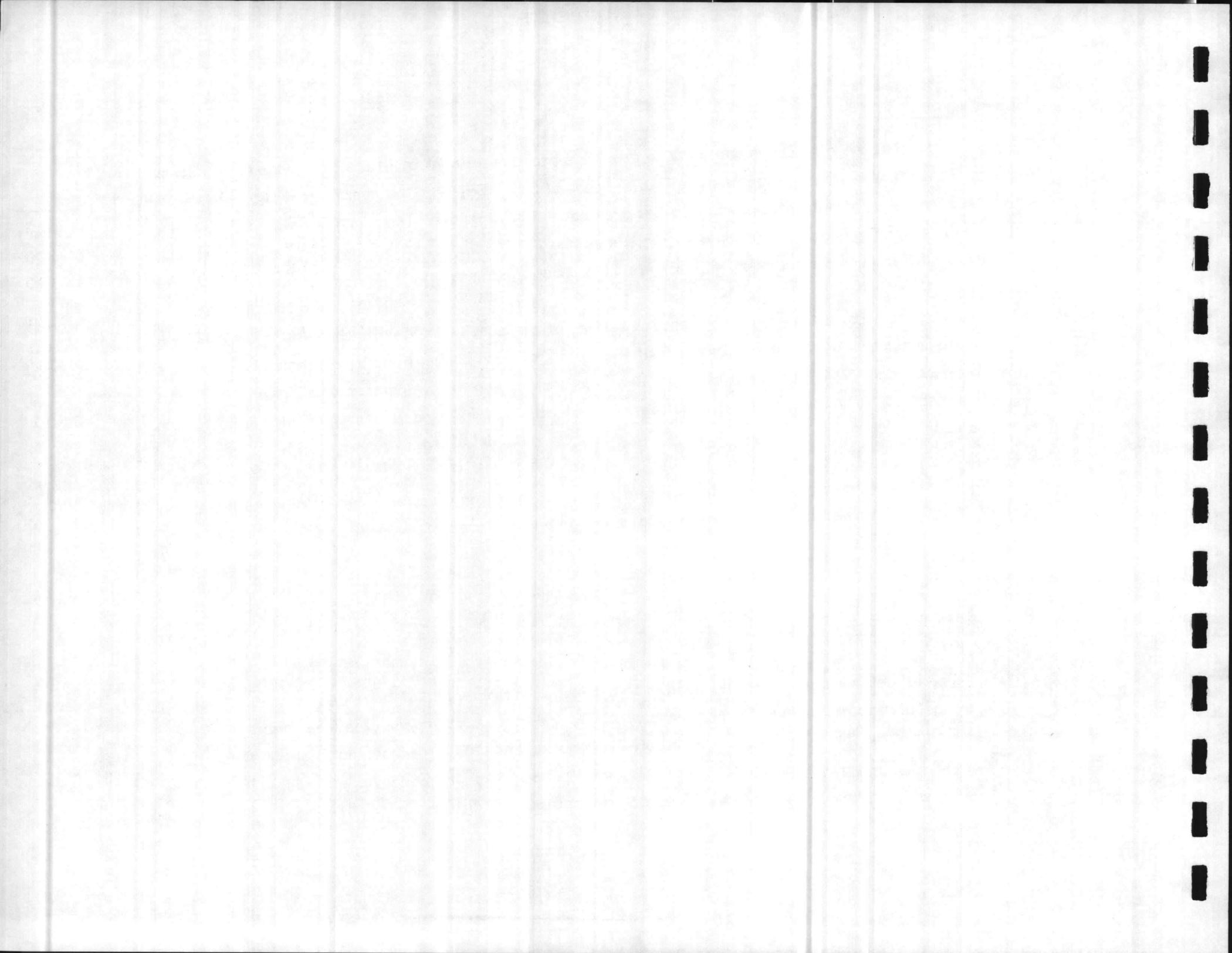
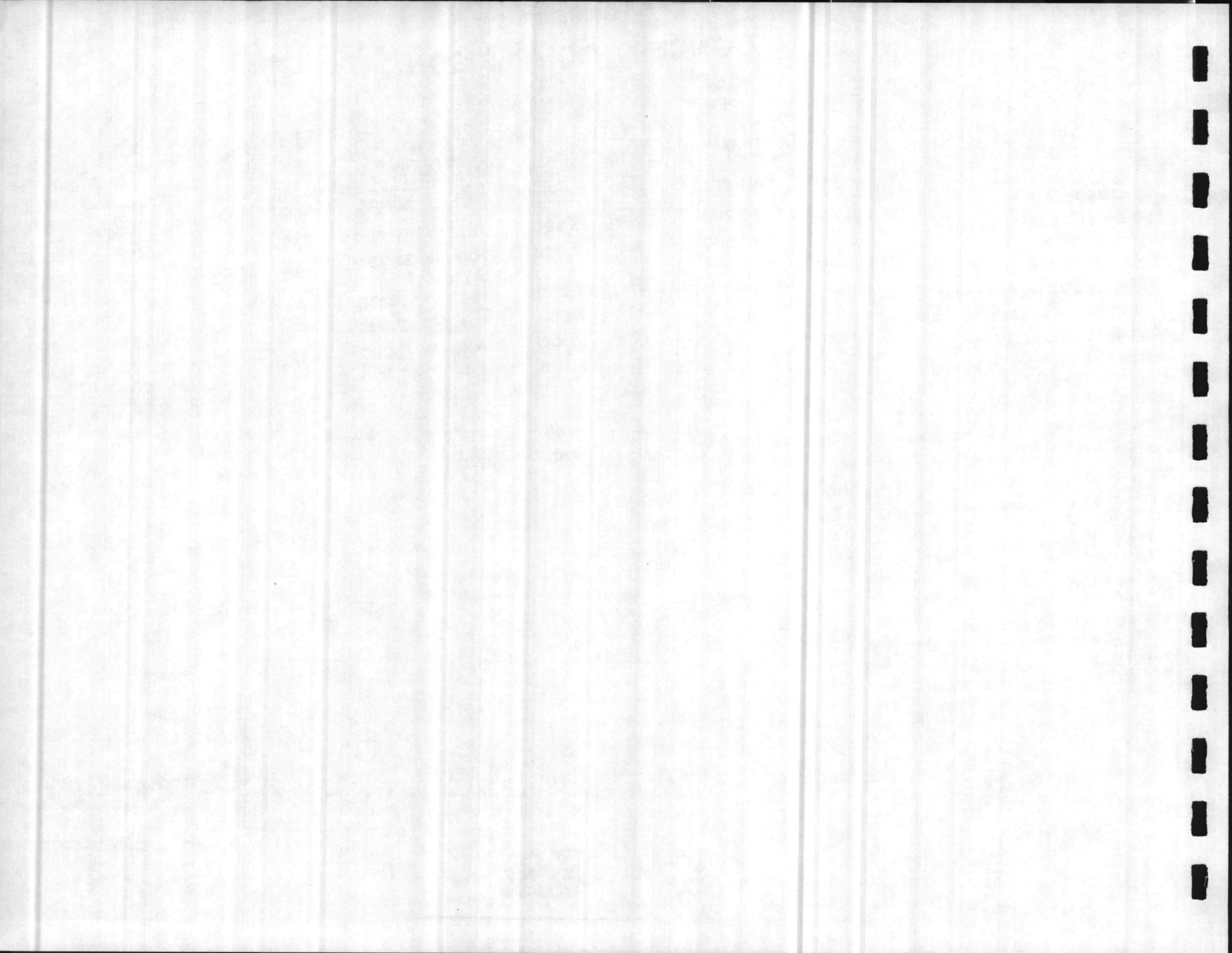
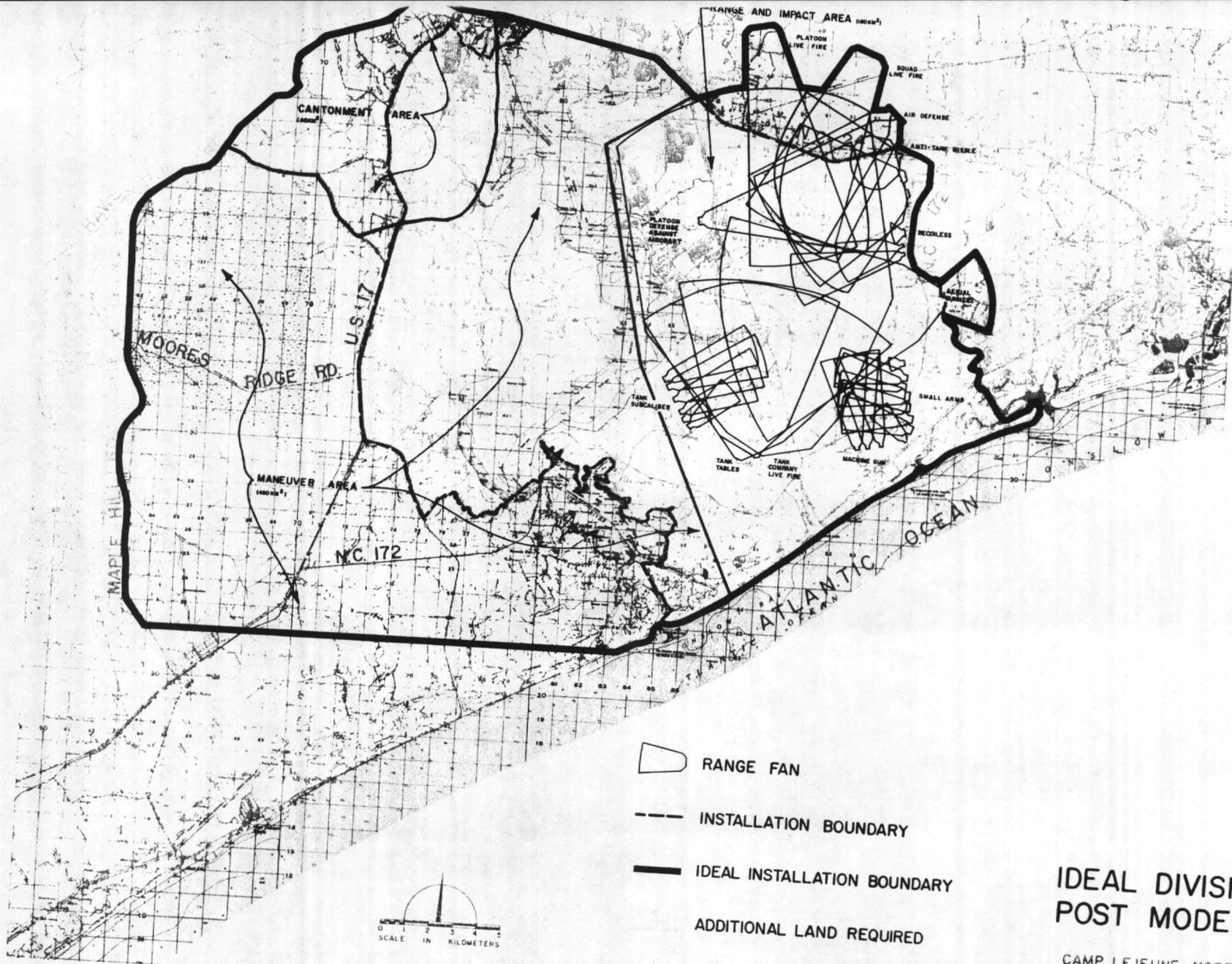


FIGURE 11

CONCEPT COMPARISON

	EXISTING CONDITION		A MAXIMIZE RANGE/IMPACT		B MAXIMIZE MANEUVER		C BAL. REQ. I		D BAL. REQ. II	
	km2	ACRES	km2	ACRES	km2	ACRES	km2	ACRES	km2	ACRES
MANEUVER AREA (km2)	247	135,200	225	55,600	456	112,700	238	58,800	242	59,800
PERCENT OF REQUIRED MANEUVER AREA PROVIDED	54	13,300	49	12,100	100	24,700	52	12,800	53	13,100
IMPACT AREA (km2)	45	11,100	90	22,200	54	13,300	64	15,800	49	12,100
NUMBER OF RELOCATED RANGES	—		29	7,200	8	2,000	21	5,200	11	2,700
NUMBER OF NEW RANGES	—		12	3,000	12	3,000	12	3,000	12	3,000
ADDITIONAL LAND ACQUISITION (km2)	0		22	5,400	209	51,600	0		0	
EXISTING IMPACT AREA REQUIRING CLEARANCE (km2)	0		0		0		0		0	
NUMBER OF LANDING ZONES DISPLACED	0		4	988	1	247	4	988	14	3,500
WOODPECKER HABITAT DISPLACED (km2)	0		3.0	740	2.9	716	2.6	642	0	
REMOVES INTRACOASTAL CONFLICT	NO		YES		NO		NO		1.8	445
REMOVES HWY. 172 CONFLICT	NO		YES		NO		NO		NO	
DISPLACES EXISTING AMMO STORAGE AREA	NO		NO		NO		NO		YES	
PROVIDES ADDITIONAL MANEUVER SCENARIO	NO		NO		YES		NO		YES	
PROVIDES GREATER DEFLECTION FOR ARTILLERY	YES		YES		NO		YES		YES	
PROVIDES ADDITIONAL MECHANIZED MANEUVER AREA-RELOCATE F RANGES	NO		NO		YES		YES		YES	
ESTIMATED COST OF CONSTRUCTION AND LAND ACQUISITION (MILLION \$)	—		27		60		11		20	

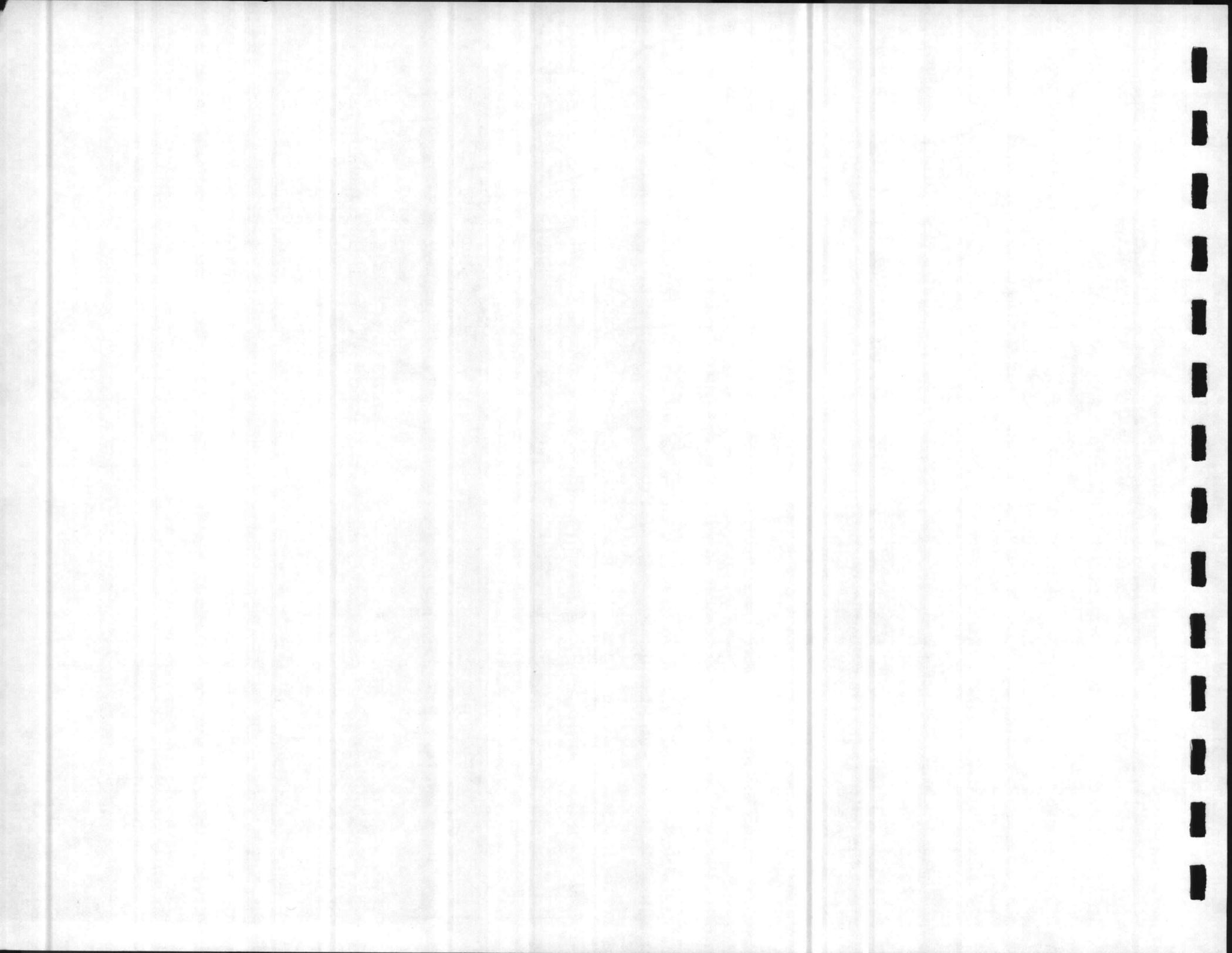




**IDEAL DIVISION
POST MODEL**

CAMP LEJEUNE, NORTH CAROLINA

FIGURE 12

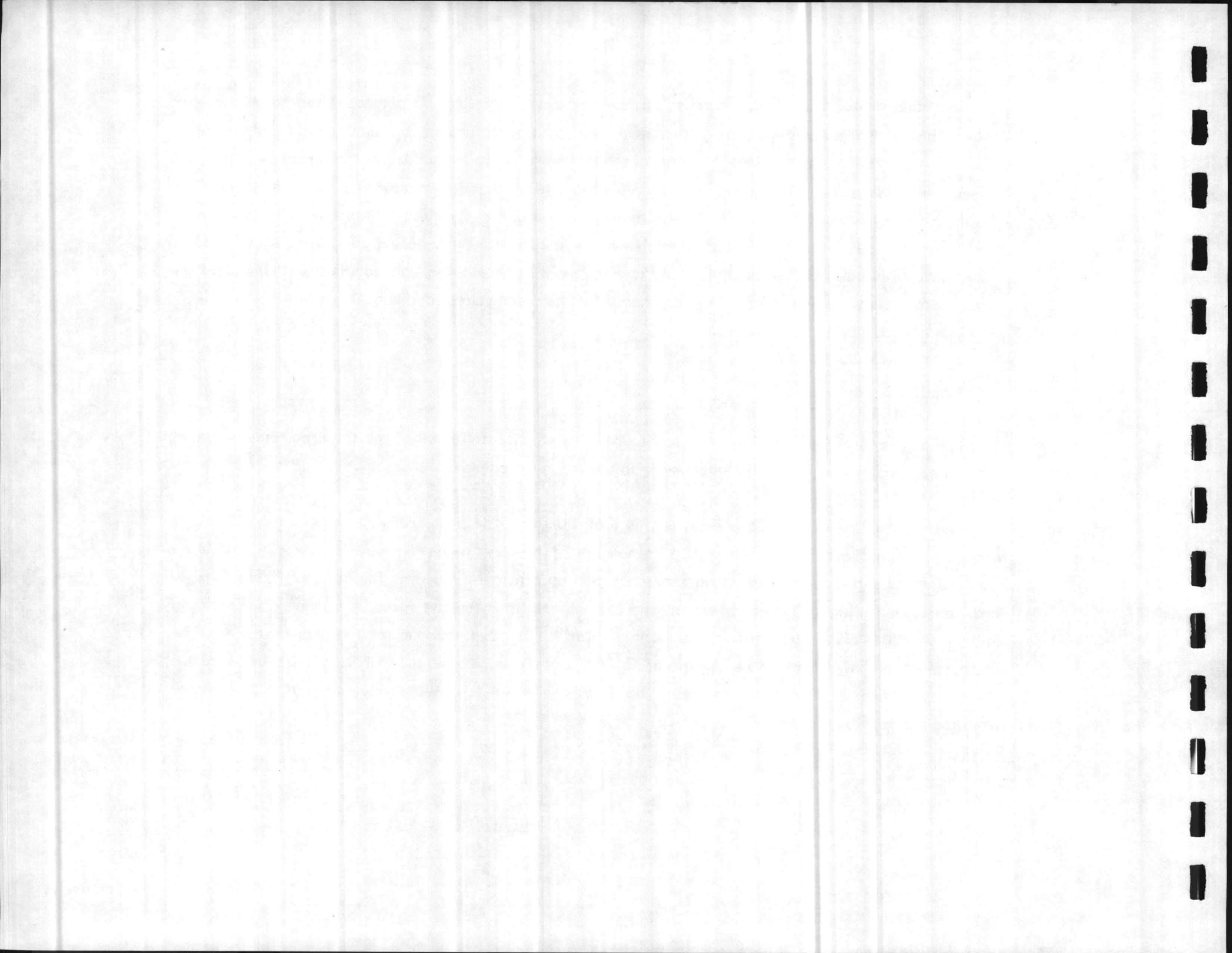


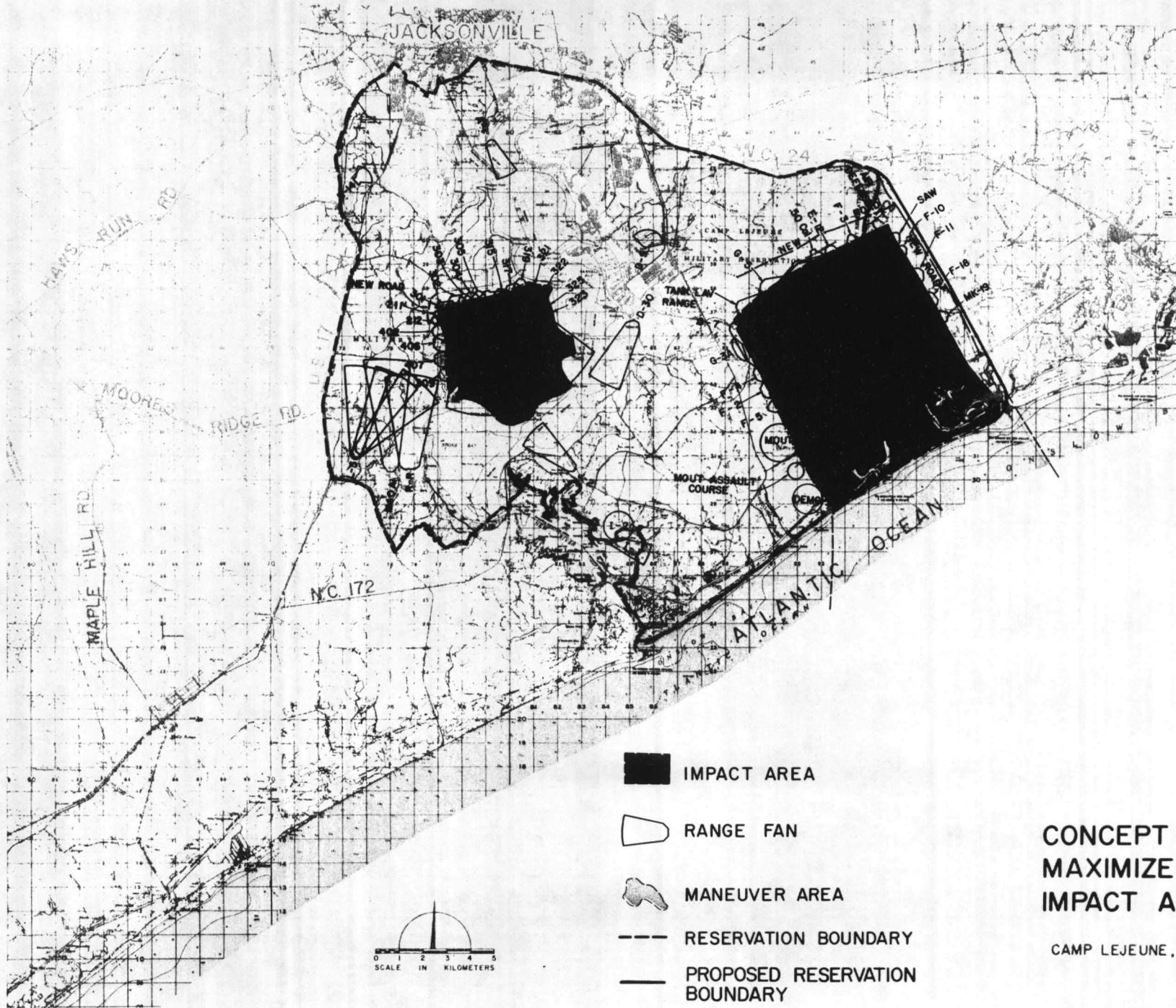
The ideal model illustrates a number of development principles that promote the efficient use of training areas. For example, the required ranges are configured around a single common impact area with no overlapping safety fans to hinder range operations. In addition, the area reserved for maneuvers is essentially contiguous, thereby allowing the largest single maneuver (delay mission, 12 x 29 km) to be readily accomplished. Furthermore, the cantonment area is isolated away from training areas to minimize interference and possible safety conflicts. By superimposing the layout of the model over the map of Camp Lejeune, it is also possible to see the additional land that would be required to satisfy the ARTEP land requirements for the mechanized division.

Concept Plan A

The purposes of Concept Plan A (see Figure 13) were to provide all of the required ranges needed for training and to maximize the amount of land devoted to ranges and impact areas.

The central feature of Concept A is the consolidation of impact areas G-10, N-1, and BT-3 into one large impact area. The subsequent relocation of the "F" ranges around the new impact area would eliminate the overlap of range fans and open up Starrett's Meadow for maneuver training. In addition to providing sufficient space around the impact area for the required ranges, the enlarged impact area also gives the artillery regiment greater flexibility in conducting live fire exercises. The increase in size also eliminates the potential for interference due to traffic on the Intracoastal Waterway. With 7,000 meters between the firing lines and the Waterway, even the .50 caliber machine gun may be fired safely.

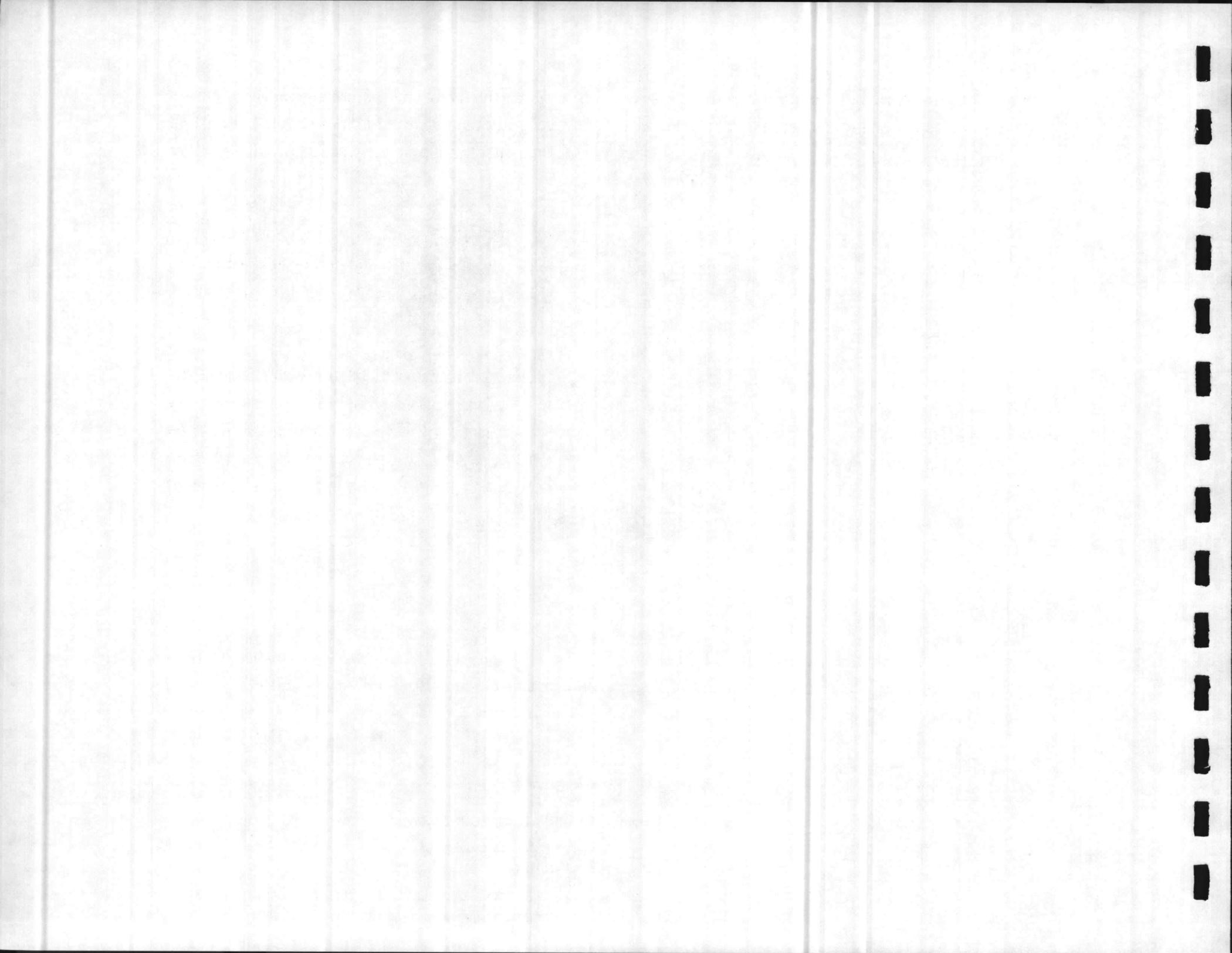




**CONCEPT A
MAXIMIZE RANGES AND
IMPACT AREAS**

CAMP LEJEUNE, NORTH CAROLINA

FIGURE 13



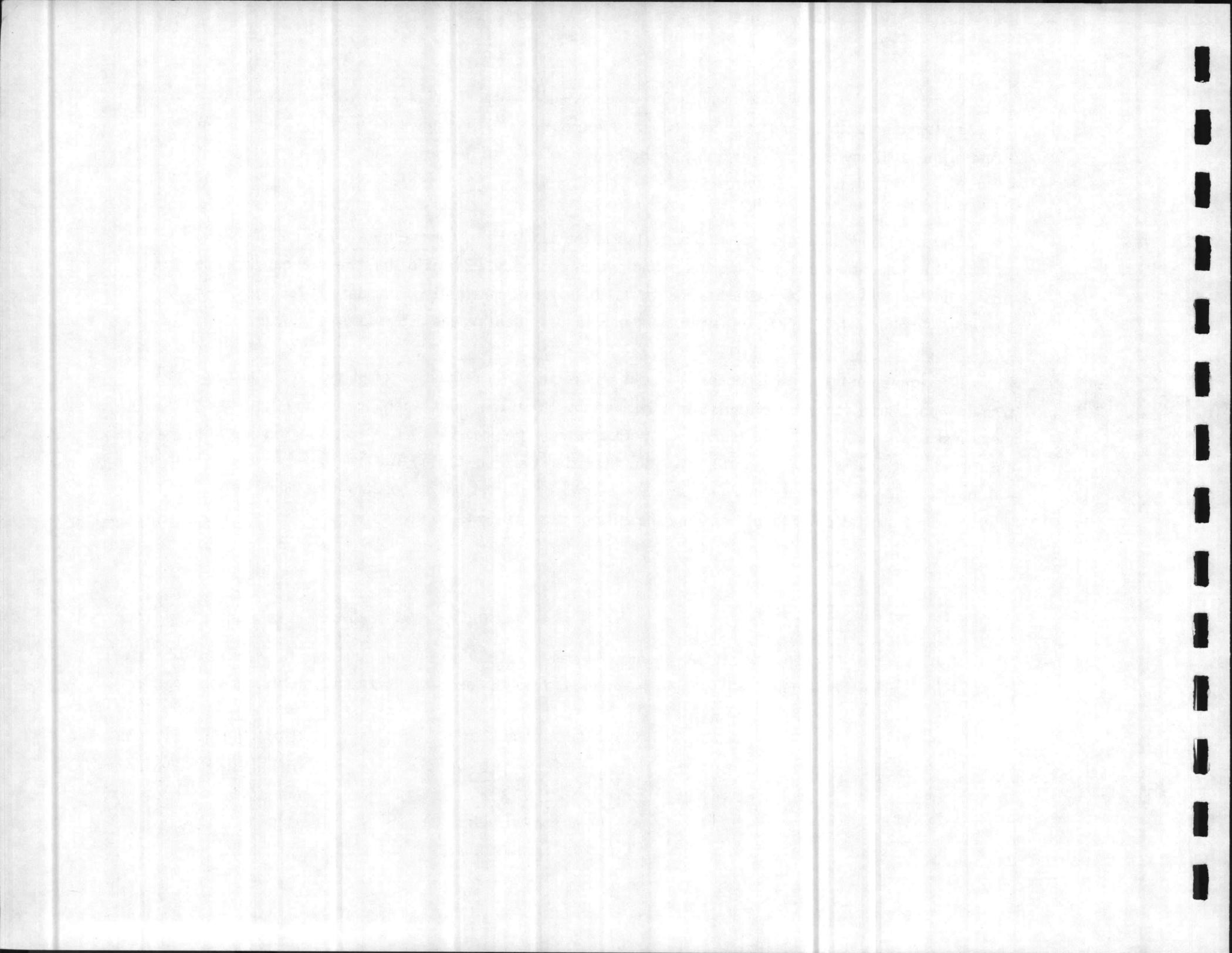
Concept A also allows dual ranges for weapons such as the TOW and .50 caliber machine gun to be developed on both sides of the New River by increasing the land devoted to the K-2 Impact Area. Again, the artillery regiment's training would be enhanced with the larger target area provided within K-2.

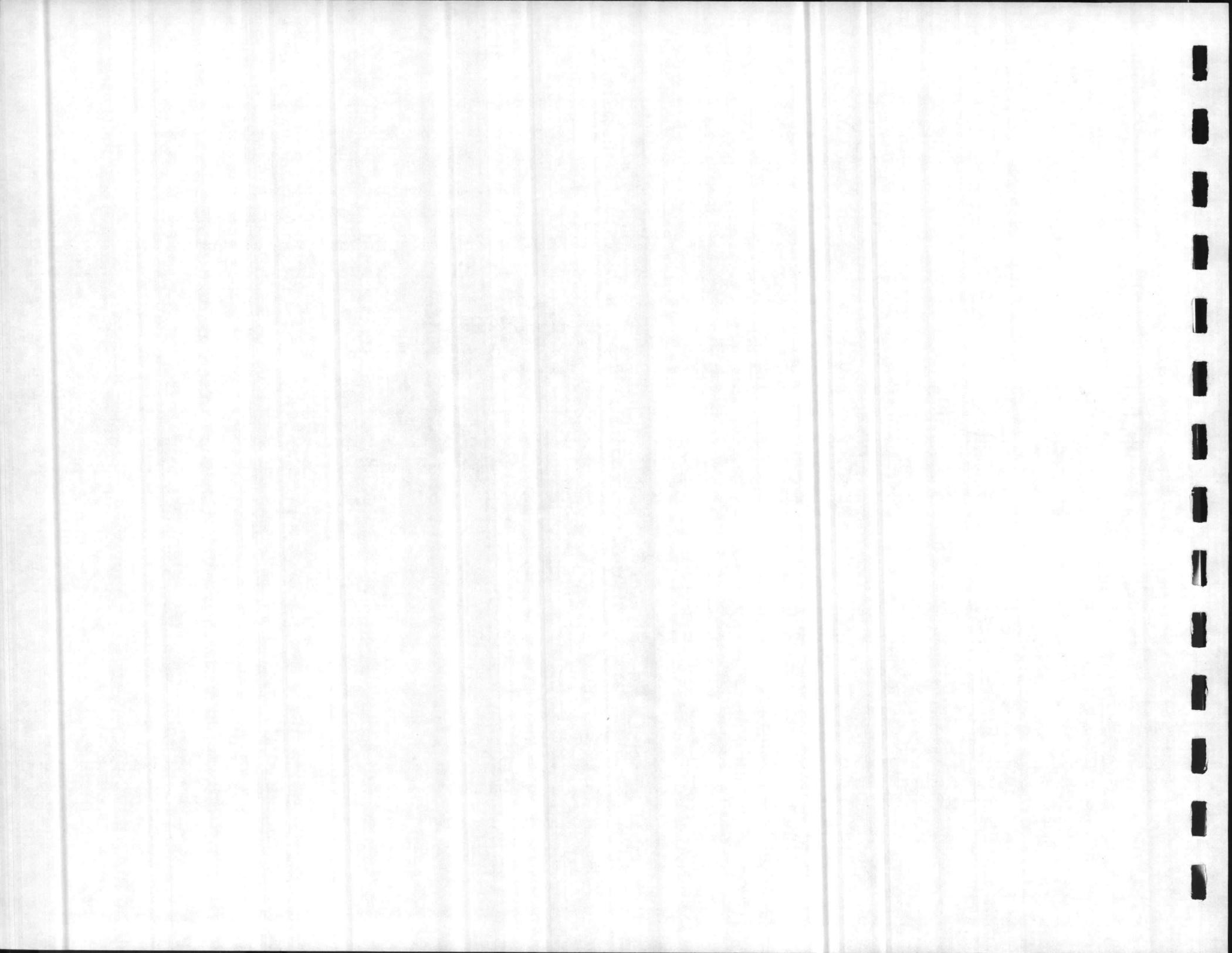
The most obvious limitation to Concept A is the sacrifice of approximately 23 km² of maneuver land. This amount would be even greater had not an additional 22 km² of land been acquired to serve as a buffer between the eastern edge of G-10 and the reservation boundary. Concept A does, however, make better use of existing maneuver area by relocating the "F" ranges.

The implementation of Concept A would also require the relocation of Highway 172 around the new impact area, thereby eliminating the need to close the road when conducting tank gunnery exercises. In addition to the Highway, Tactical Landing Zones (TLZ) Lark and Cardinal would be displaced. Also displaced would be the Administrative Landing Zones (ALZ) at Squad Leader's Tent Camp No. 23 and Verona Loop No. 20. As a final consideration, it appears that some 3 km² of woodpecker habitat could be affected by the enlargement of the G-10 impact area as shown.

Concept Plan B

The intent of Concept Plan B (see Figure 14) was to satisfy all of the maneuver requirements of the units training at Camp Lejeune and to maximize the amount of land available for maneuver training.



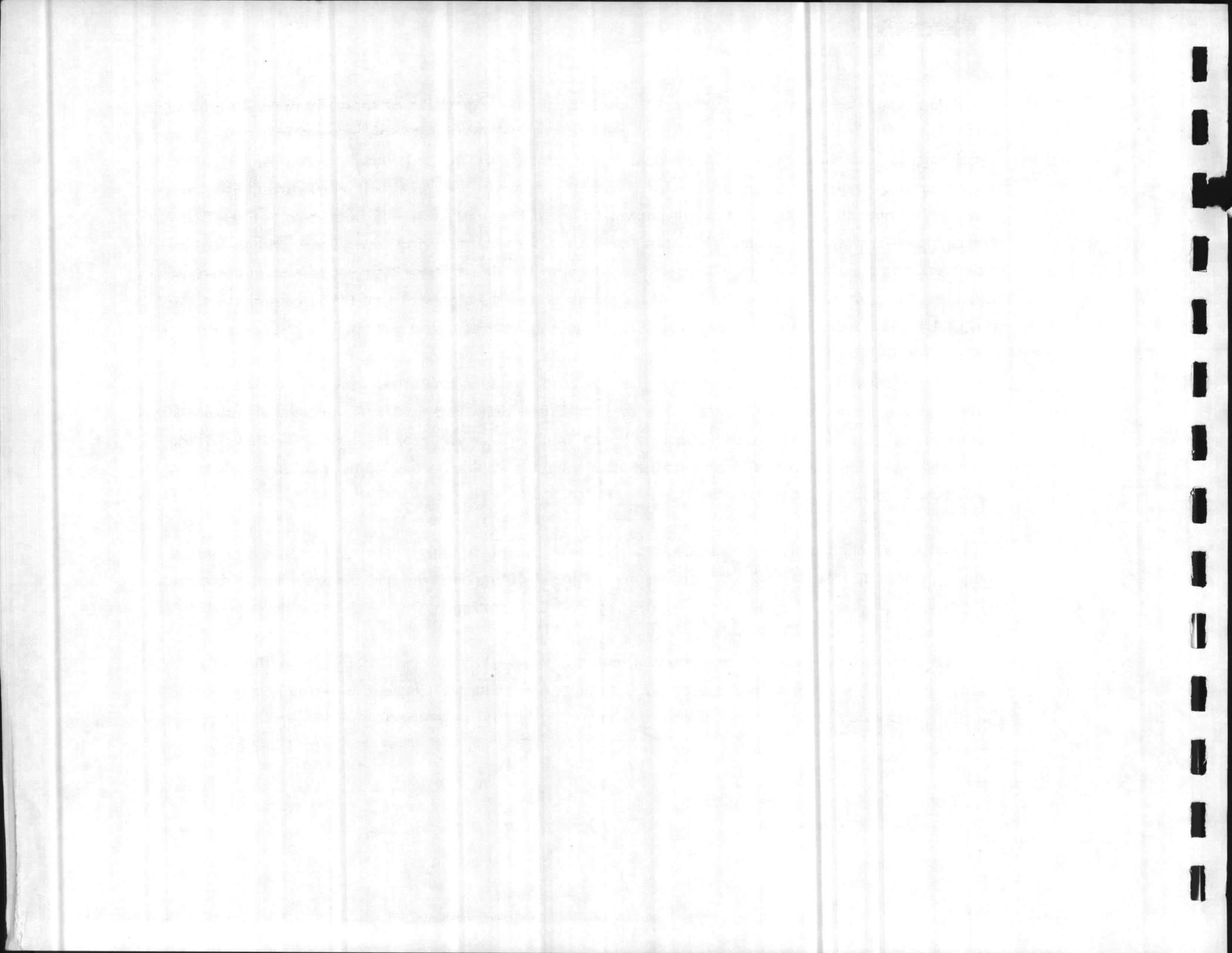


The primary development objective of Concept B is the acquisition of approximately 209 km² of land adjacent to Camp Lejeune, the amount necessary to meet the stated unit maneuver requirements. As shown earlier on the analyses of constraints and soils, however, the opportunities for contiguous expansion are limited by urban development and poor soil conditions. The only reasonable opportunity for expansion appeared to be to the west, where a large tract of relatively undeveloped land was available. This area has the advantages of having few owners and no mature pine trees to provide habitat for woodpeckers. Because the Great Sandy Run Pocosin covers much of this area, the plan shows the acquisition of a corridor across the higher ground that would connect the installation with more suitable training land to the south and west of the swamp.

The principal advantage of Concept B is that enough land would be available to satisfy the largest single maneuver requirement, the tank battalion delay (90 km²). An additional maneuver scenario could be developed, to include a beach landing, a river crossing and an attack of the relocated MOUT. Access to the area for armored vehicles would continue to be a constraint without additional transportation improvements.

Additional opportunities available with Concept B include the creation of more mechanized maneuver area by relocating the "F" ranges around the G-10 impact area and the provision of greater deflection in artillery firing by enlargement of the N-1 impact area.

The principal constraint to implementation of Concept B is the cost of acquiring the required additional land, estimated to be about \$50 million. In addition, Concept B would displace TLZ Bluebird and place approximately 2.9 km² of woodpecker habitat in jeopardy.



Concept Plan C

Concept Plan C (see Figure 15) attempts to balance the competing demands for range and maneuver land by providing all required ranges and by improving the existing maneuver area.

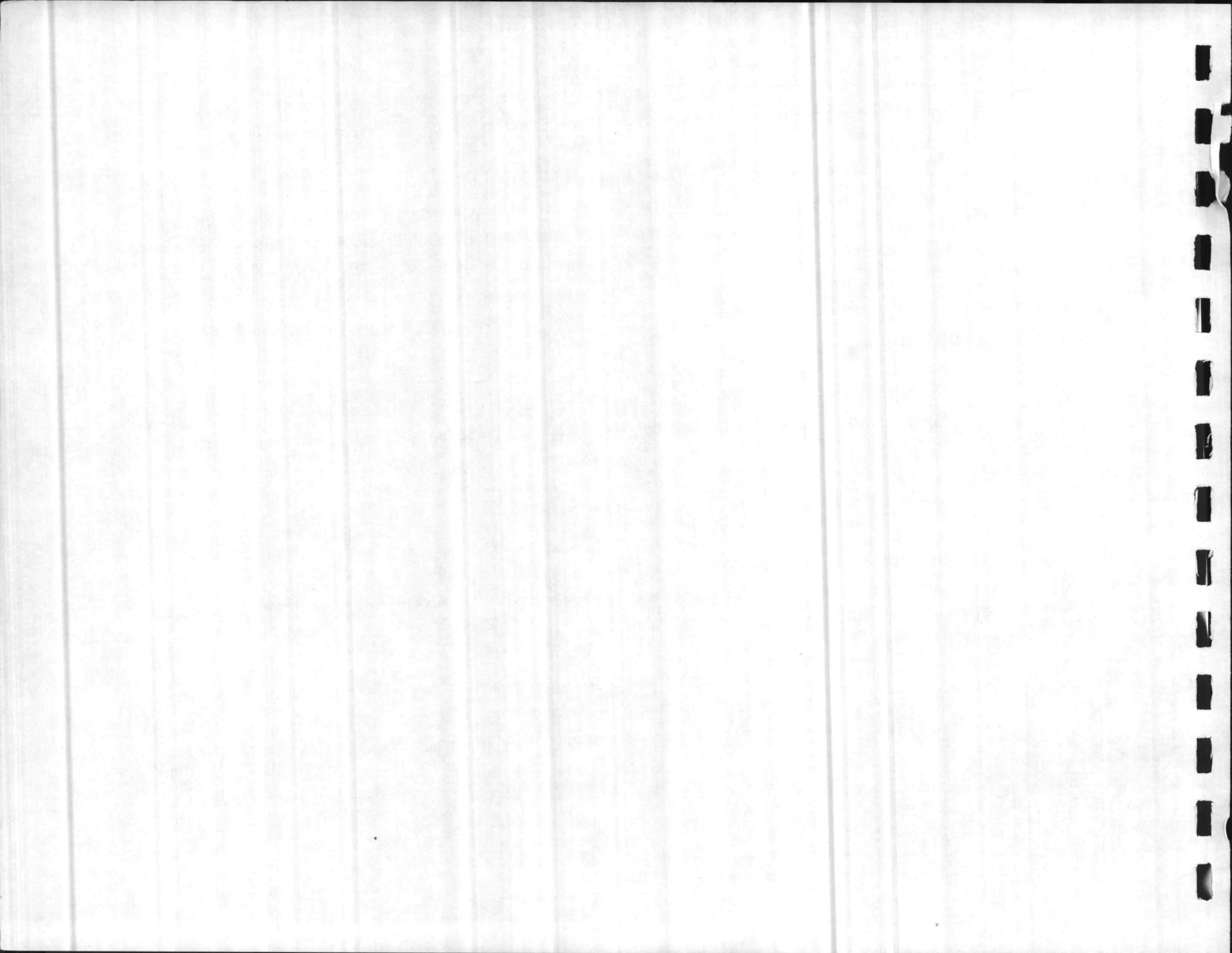
The primary development objective contained in Concept C is the enlargement of the K-2 impact area to allow the firing of the TOW and the .50 caliber machine gun on the west side of the New River. The increase in the size of K-2 would also allow greater flexibility in firing artillery from east to west. The N-1 impact area has also been expanded for improved use by artillery and to allow firing from the proposed tank and LAV moving target range. As in previous concepts, the "F" ranges have been relocated around the G-10 impact area, however, the size of the area has not been increased.

Concept C would require the relocation of four helicopter landing zones; Bluebird, Cardinal, OP2 No. 7 and Verona Loop No. 20. In addition, some 2.6 km² of woodpecker habitat would be affected.

Concept Plan D

The purpose of Concept Plan D (see Figure 16) is similar to that of Concept C because it also attempts to balance the need for ranges and maneuver land. The difference between the two plans is the manner in which this goal is accomplished.

The primary feature of Concept Plan D is the provision of an additional maneuver corridor designed to link the Mechanized Training Area with a new maneuver area located in Starretts Meadow. The creation of such a corridor would allow a maneuver scenario incorporating a



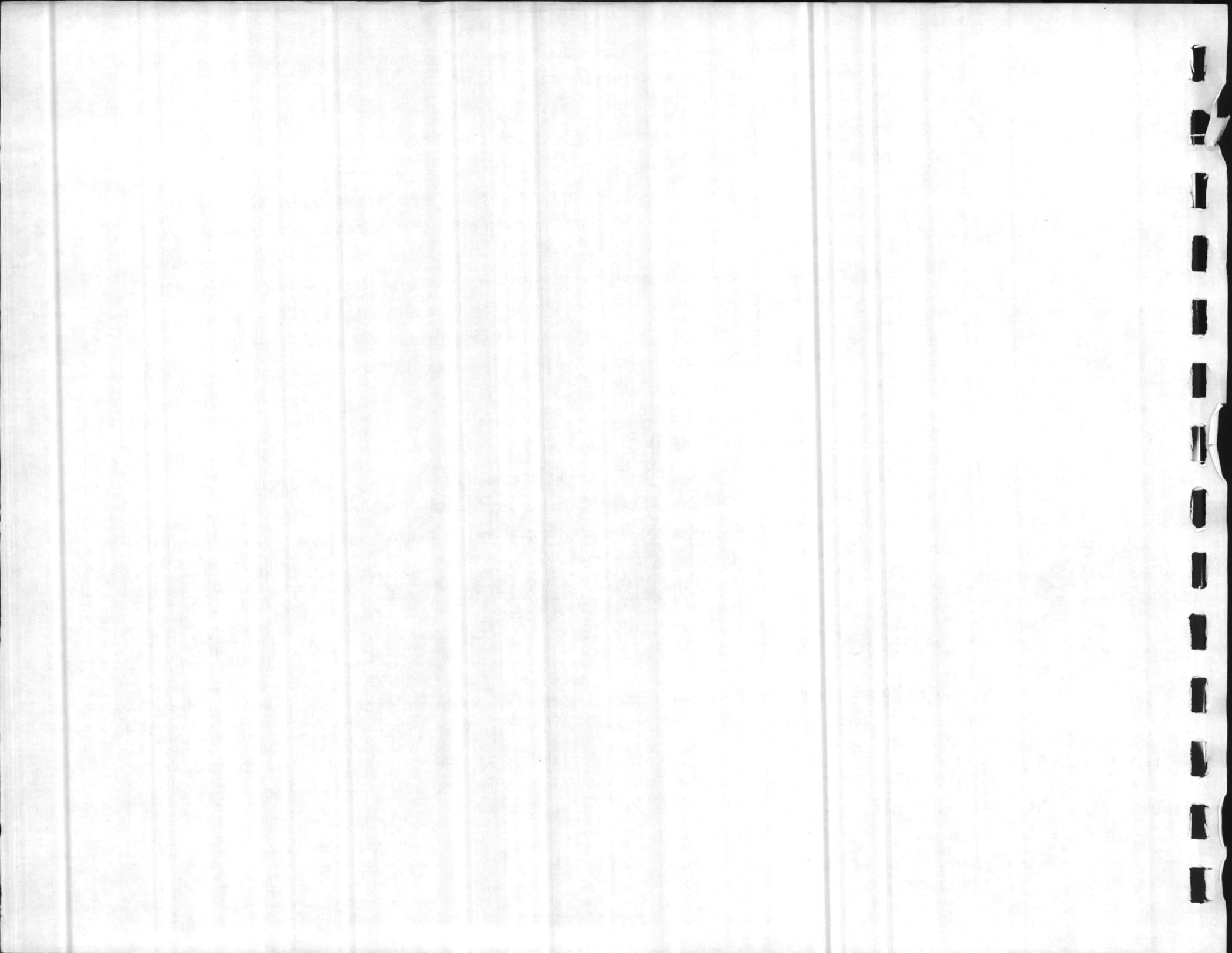
beach landing, a movement to contact through the Mechanized Training Area, and an assault of the new MOUNT, culminating with live firing into the G-10 impact area.

A corridor approximately two kilometers wide could be established by relocating the ammunition supply point (ASP) and clearing duds from a portion of the G-10 impact area. In addition to helping create a new maneuver corridor, the relocation of the ASP would also alleviate the current restriction on artillery firing into G-10 and allow for some additional cantonment area development near French's Creek. By consolidating G-10 and N-1 into a single impact area, there would be a slight net gain in the amount of impact area available despite the clearing of about 14 km² of G-10. The consolidation of the impact areas would also eliminate the conflict with Highway 172, which would be relocated to the north of the impact area, and allow greater deflection for artillery firing from the western half of the Base. Concept D also provides sufficient impact areas to develop all of the required ranges needed for unit training.

The implementation of Concept D could affect about 1.8 km² of woodpecker habitat, particularly the colony located immediately east of the current site of the ASP. Also, the Intracoastal Waterway would continue to restrict range use for large caliber weapons. Finally, while no additional land would be acquired, the cost and feasibility of clearing G-10 is a limitation to the implementation of this concept.

Preferred Concept Plan

The Preferred Concept Plan (see Figure 17) depicts a synthesis of the development features contained in Concept Plans B and D. The purpose of the Plan is to collectively present those future development objectives that most reasonably satisfy training requirements and correct the existing training deficiencies at Camp Lejeune. The intent of the Plan is to address both the qualitative and



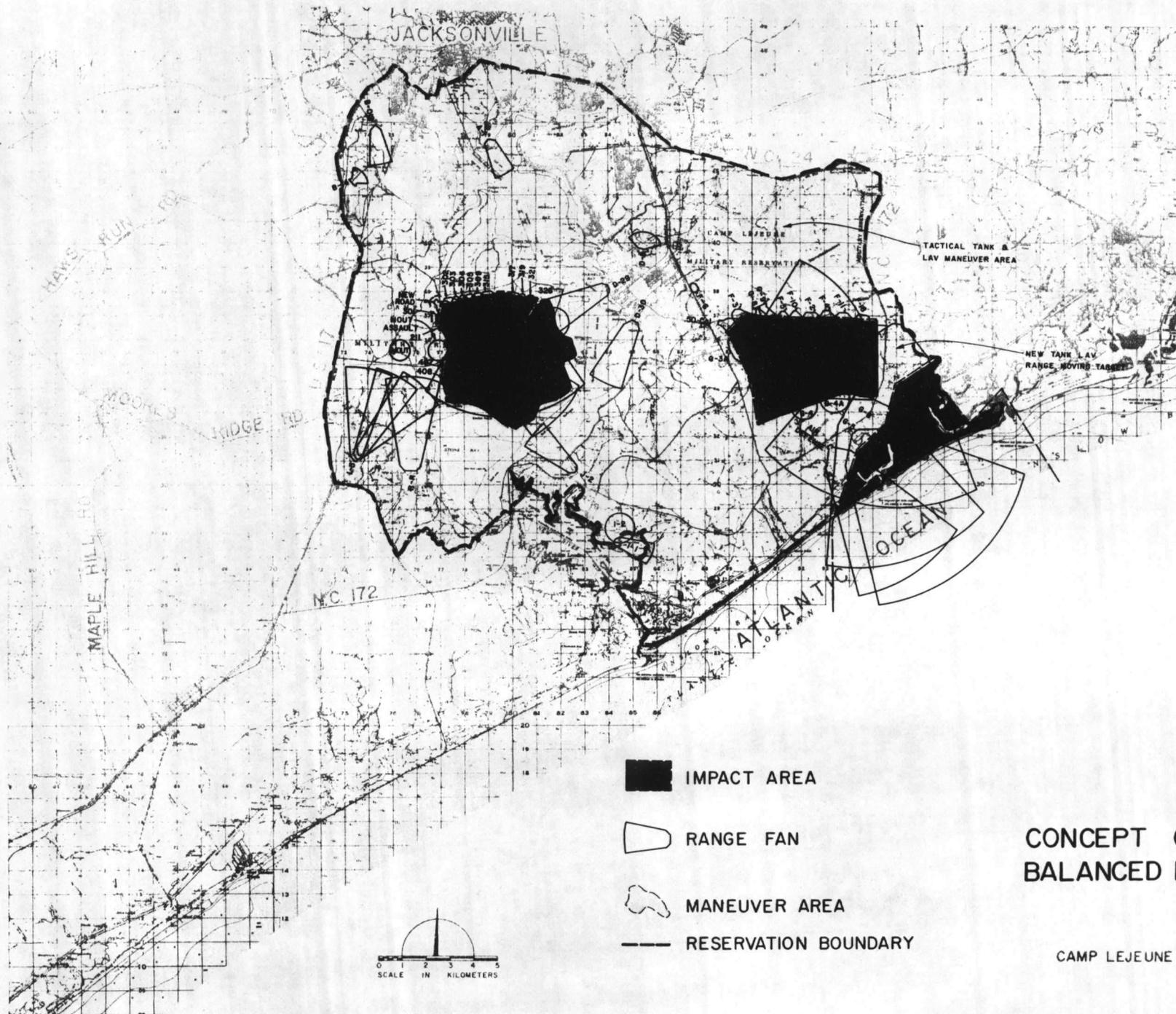
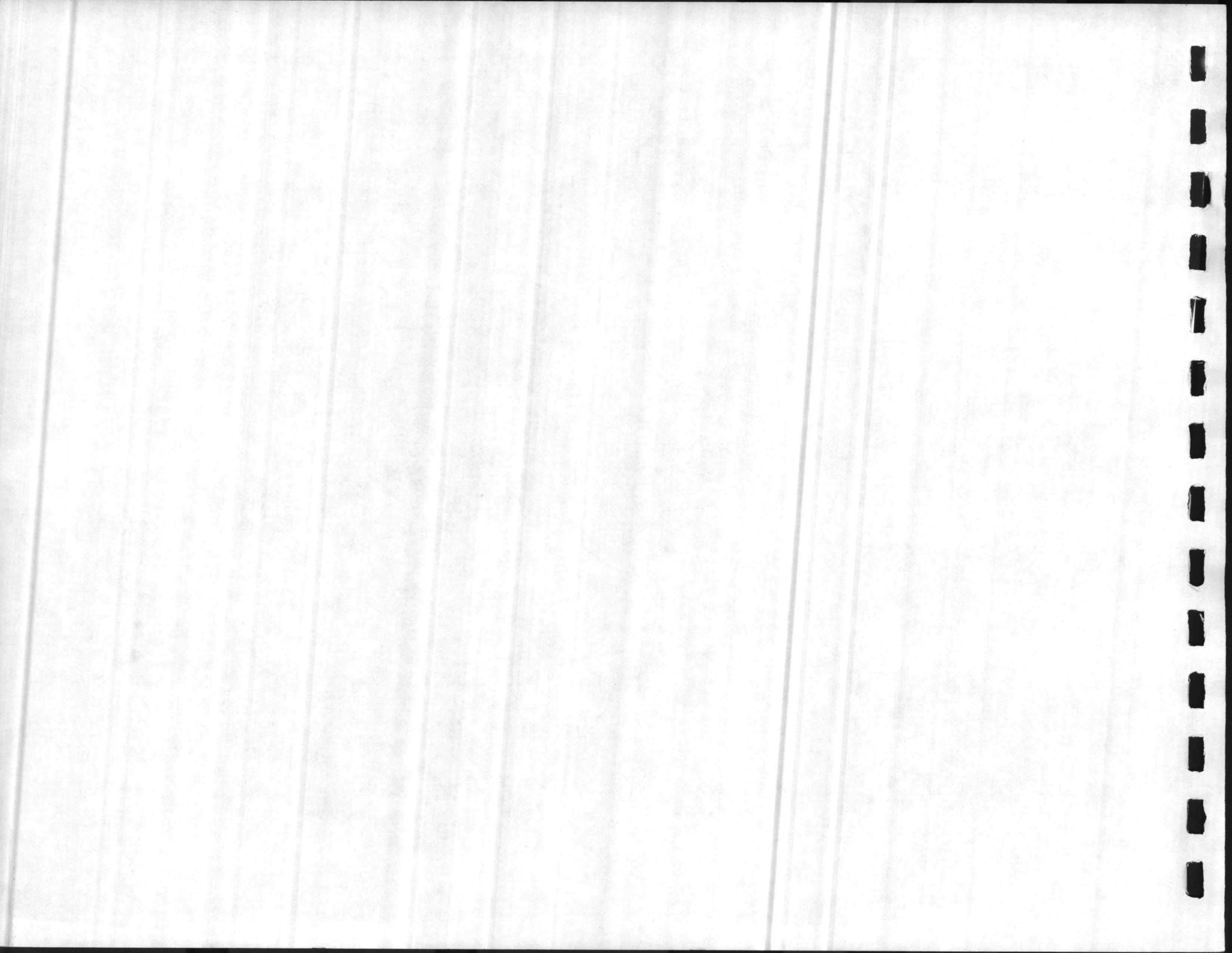
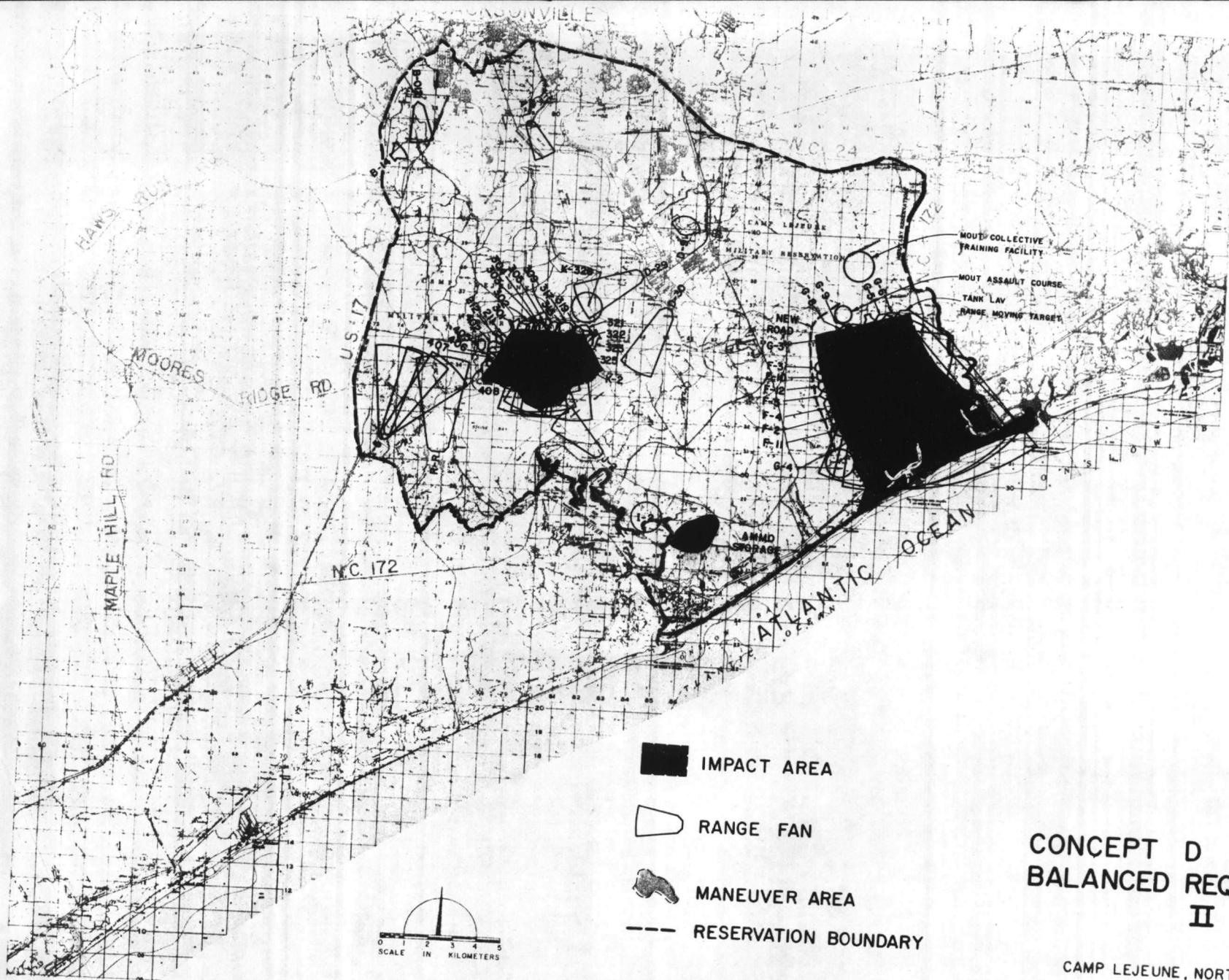


FIGURE 15

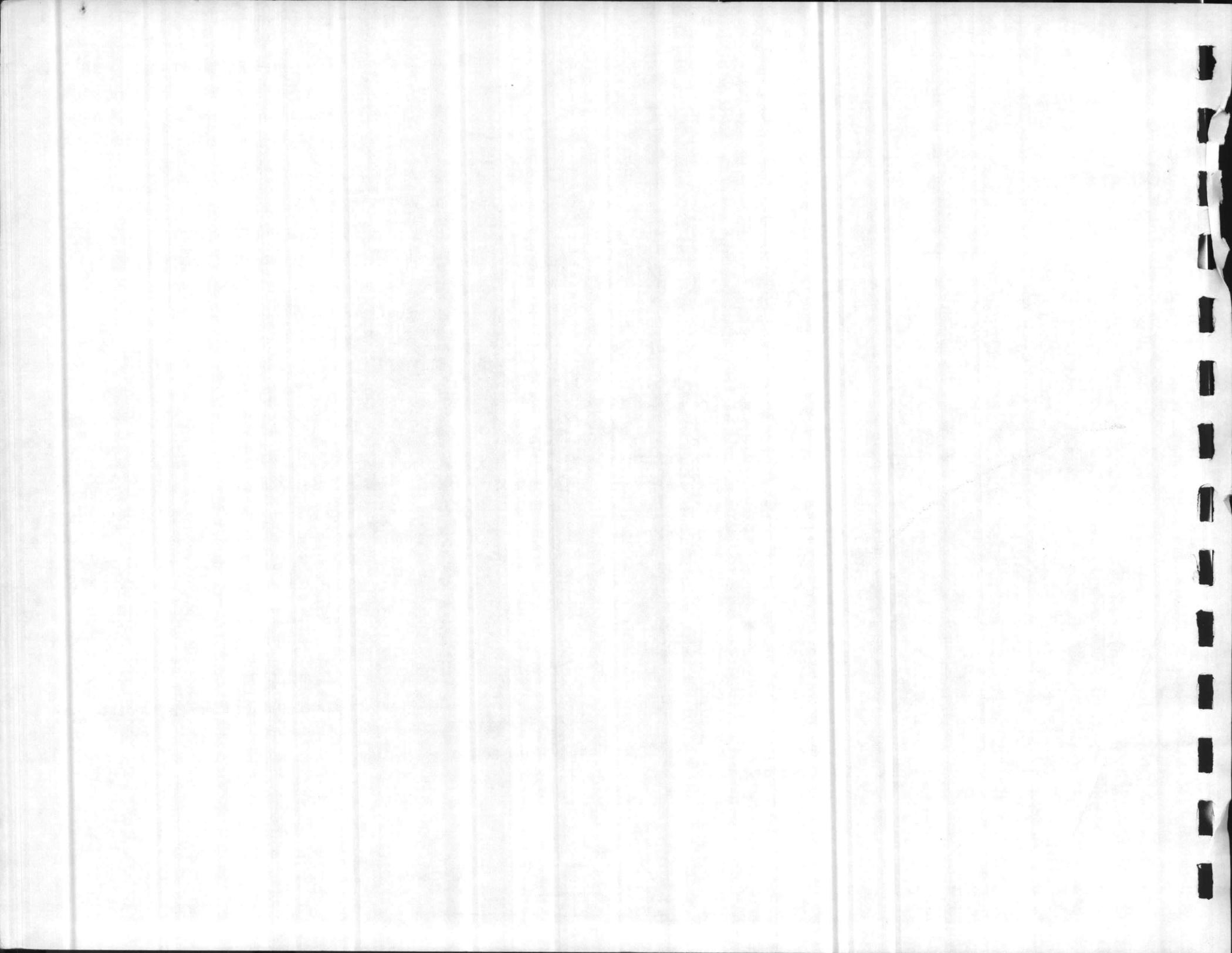


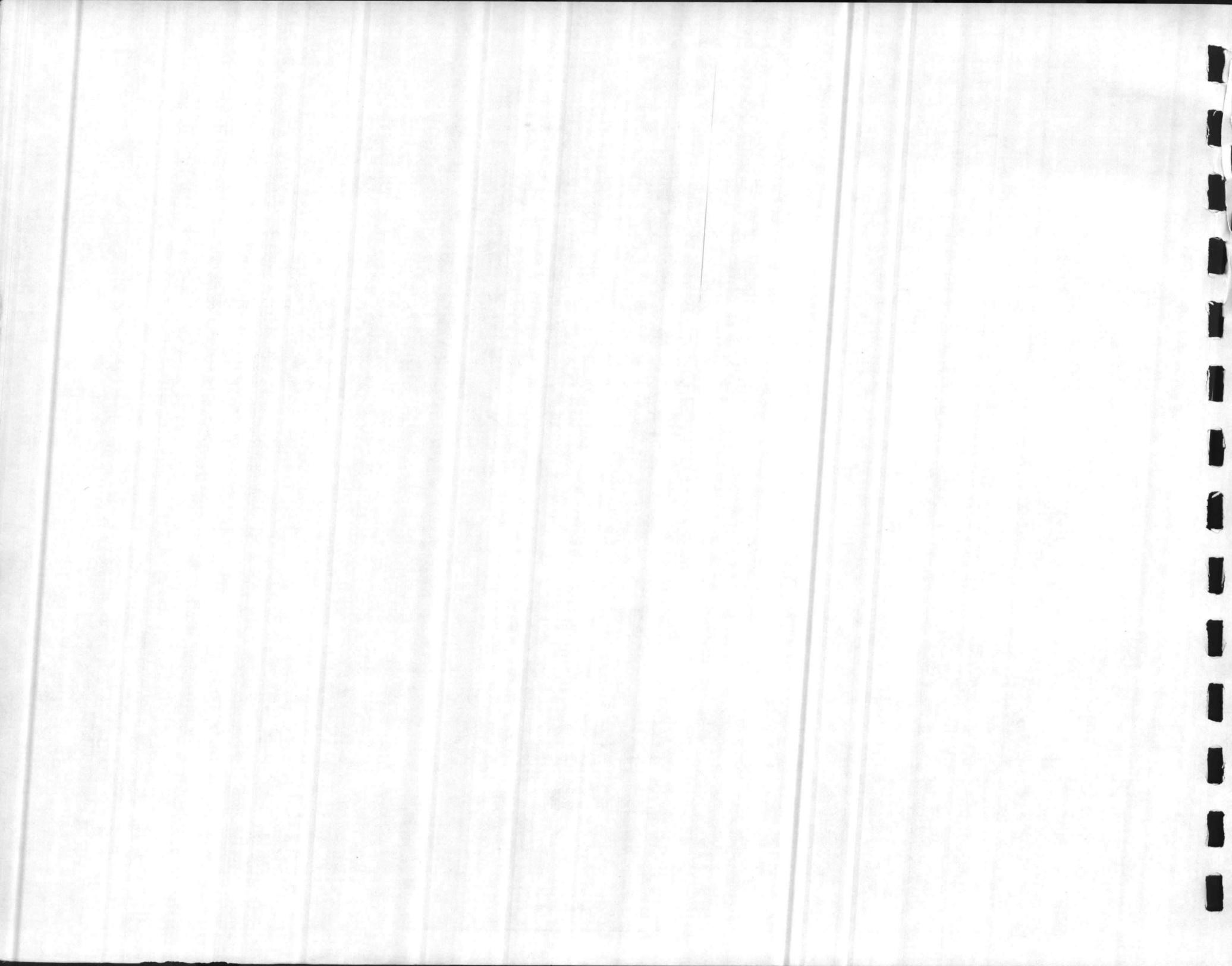


**CONCEPT D
 BALANCED REQUIREMENTS
 II**

CAMP LEJEUNE, NORTH CAROLINA

FIGURE 16





quantitative deficiencies at the Base. In the short run, efforts will be made to improve existing facilities so they may be used more efficiently. In the long run, the Plan reflects the need to increase the quantity of training land at Camp Lejeune by the acquisition of a contiguous parcel adjacent to the Base that is large enough to satisfy the calculated training land deficiency of 209 square kilometers (51,644 acres).

The single most important aspect of the Plan is the acquisition of approximately 52,000 acres of land in a contiguous parcel west of the Base. This area would alleviate the calculated training land shortfall and be large enough to handle the largest single maneuver event. The "K" ranges now located at Verona Loop would be relocated in the northern portion of the new parcel, thereby allowing the future development of new ranges for weapons such as the .50 caliber machine gun and the TOW missile that cannot now be fired west of the New River. Equally important, this move would allow the high ground in the Verona Loop to be used with the newly acquired land for tactical maneuvers. A new maneuver scenario could be developed that would begin with a beach landing, progress westward crossing the New River, move through Verona Loop and end with the capture of an objective located west of U.S. Highway 17.

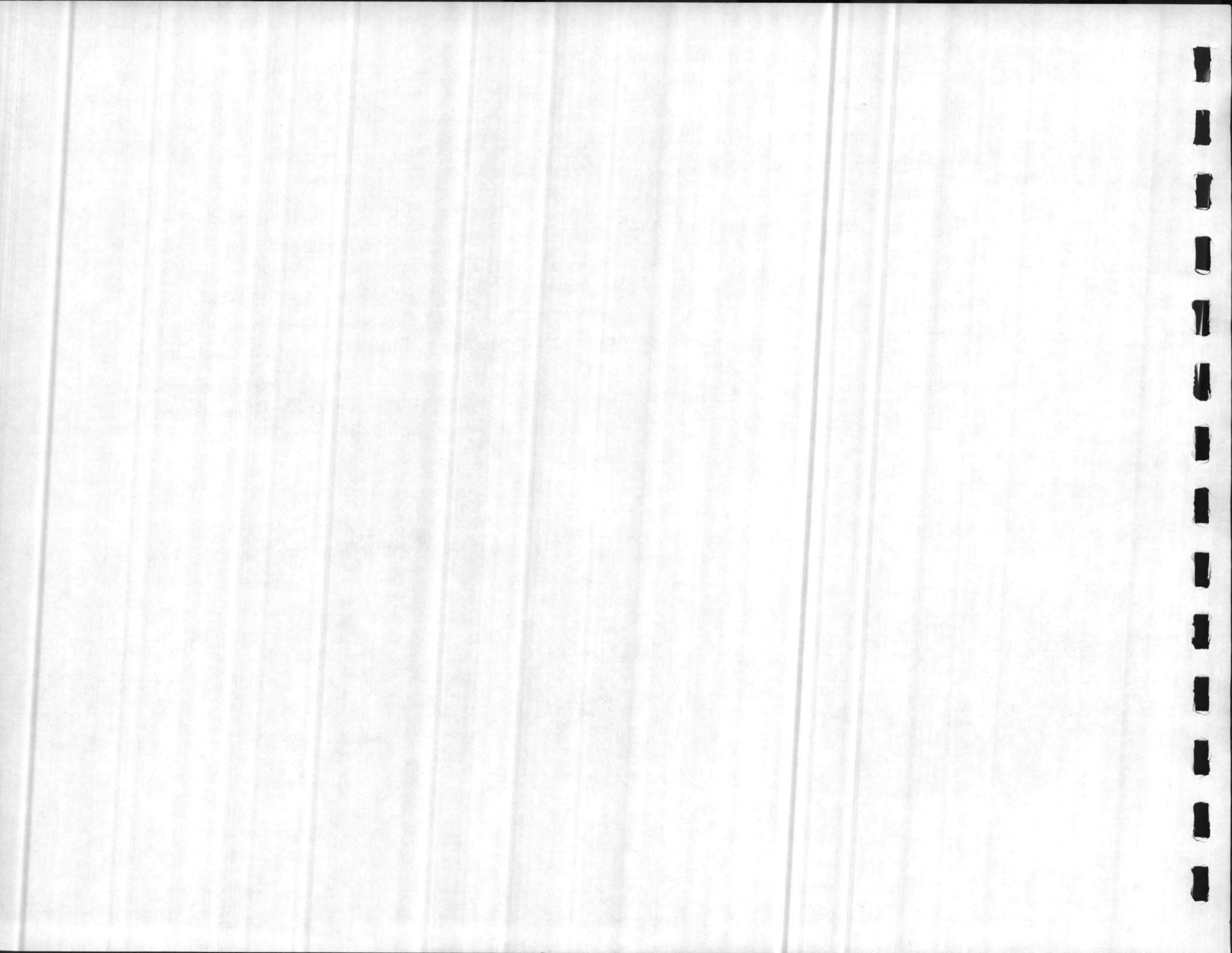
The Plan indicates the expansion of the G-10 impact area to the south within the boundaries of Sneads Ferry Road and Highway 172. A slight expansion to the north and east is shown to the limits imposed by existing roadways. While at this time the closing of Highway 172 is not felt by Base officials to be feasible, ultimately the segment between Sneads Ferry and the Triangle Outpost should be permanently closed to allow the unrestricted use of the G-10 ranges and the eventual consolidation and enlargement of the impact areas. The alternate route shown for Highway 172 shown in the Plan use Lyman Road as the connector between Sneads Ferry and Highway 172.

Several existing and new firing ranges have been located around the perimeter of the G-10 impact area. Specifically, four of the "F" ranges (F-2, F-4, F-12, and F-18) have been relocated along the northern border of G-10 to allow a portion of the Starrets Meadow area to be used for training.



Additionally, ranges F-9 and F-10 have been eliminated. Ranges F-11 and F-3 will remain in their current locations. The new MOUT facility will be developed so that it may be used for live fire exercises in conjunction with F-3. Ranges for new weapons have been sited along the western and southern periphery of G-10. These include ranges for the squad automatic weapon (SAW), M40A1 sniper rifle, shoulder-mounted assault weapon (SMAW), MK19 machine gun and the TOW missile. The G-4 demolition range has been relocated to allow the development of a new company/platoon live fire assault course at the southwest corner of G-10.

Large caliber weapons such as the .50 caliber machine gun will continue to be accommodated on ranges G-5, G-6, and G-7; however, local improvement to G-5 and G-7 need to be made to allow simultaneous use by two units. One of these ranges should also be modified to accommodate both the .50 caliber and the MK19 40 mm machine gun since both weapons will be fielded on the assault amphibious vehicles (AAV). An additional modification is shown on range G-6 were the firing line has been pushed back to compensate for the increased range and maneuverability of the new M-1 tank.

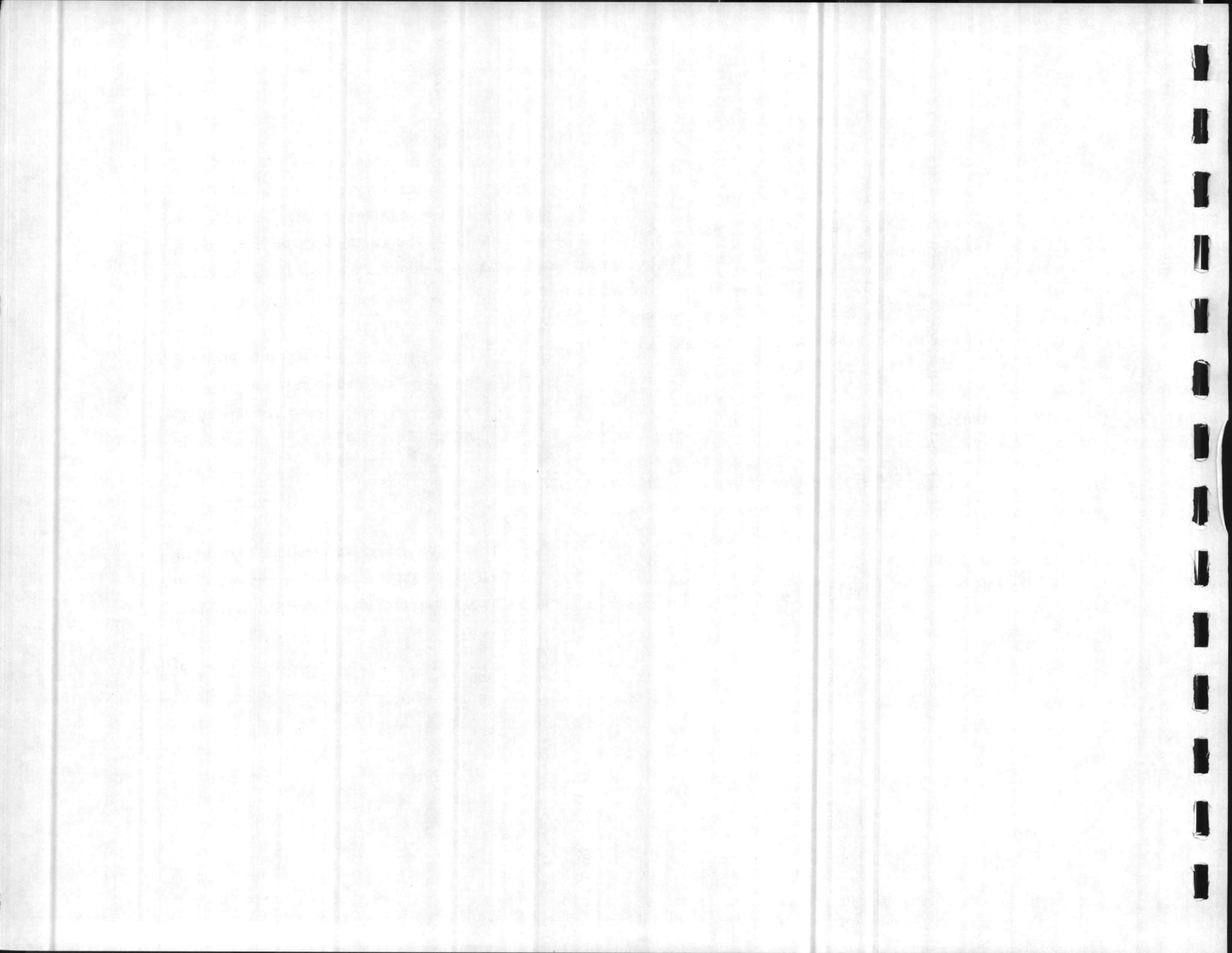


CONCLUSIONS AND RECOMMENDATIONS

General

If training is to be effective, it should reflect the conditions of actual combat. During training, commanders should be able to deploy their units as they would on the battlefields of the next war. This dictum requires that combat units be able to move, shoot, and communicate while confronting an opposing force over actual distances in realistic time. Currently, the amount of training land needed to accomplish these tasks is in limited supply. As time passes, this supply will be reduced as the rapid technological advances in fire power and mobility outpace the ability of the armed services to acquire additional training land. Maintaining combat readiness in the face of the dwindling supply of training land will be a challenge that requiring^{ing} both innovative ideas and deliberate action from all training personnel.

When the training requirements of the Marine units at Camp Lejeune are examined, it should be in light of the circumstances just described. As the home of a combat ready, Marine infantry division, it is only logical that the training facilities at Camp Lejeune should be adequate to support a high level of readiness, both now and in the future. The conclusions and recommendations presented below are designed to help keep Camp Lejeune, "the world's most complete amphibious training base."



Conclusion

The primary conclusion of the Special Training Analysis was that the requirements for firing ranges, impact areas and other restrictions leave an inadequate amount of maneuver and training acreage available at Camp Lejeune. Using the maneuver land requirements provided by the Marine units interviewed during the study, the shortfall of training land was estimated to be 209 square kilometers or about 52,000 acres. Furthermore, based on current trends in organization, doctrine, tactics and equipment, these training land requirements are expected to increase in the future.

It was further concluded that the best means of satisfying the calculated deficiency in training land is the acquisition of approximately 52,000 acres of additional land in a contiguous parcel west of the Base. Based on on-site investigations, this land was found to be generally suited for use as an impact area and for maneuver training. The purchase of this land will eliminate the shortfall in training land, create new opportunities for maneuver training and enhance the quality of range and training areas at Camp Lejeune.

In addition to the measurable lack of training land, it was concluded that there are numerous constraints which prevent the most efficient use of the maneuver land at Camp Lejeune. The presence of red-cockaded woodpecker colonies in the Mechanized Training Area and the attendant restrictions on training have rendered this area unsuitable for conducting realistic training with mechanized vehicles. Furthermore, the location of the ammunition supply point, the configuration of the G-10 impact area and the layout of the "F" ranges prevent the use of approximately 40 square kilometers of training land in the Starretts Meadow area.



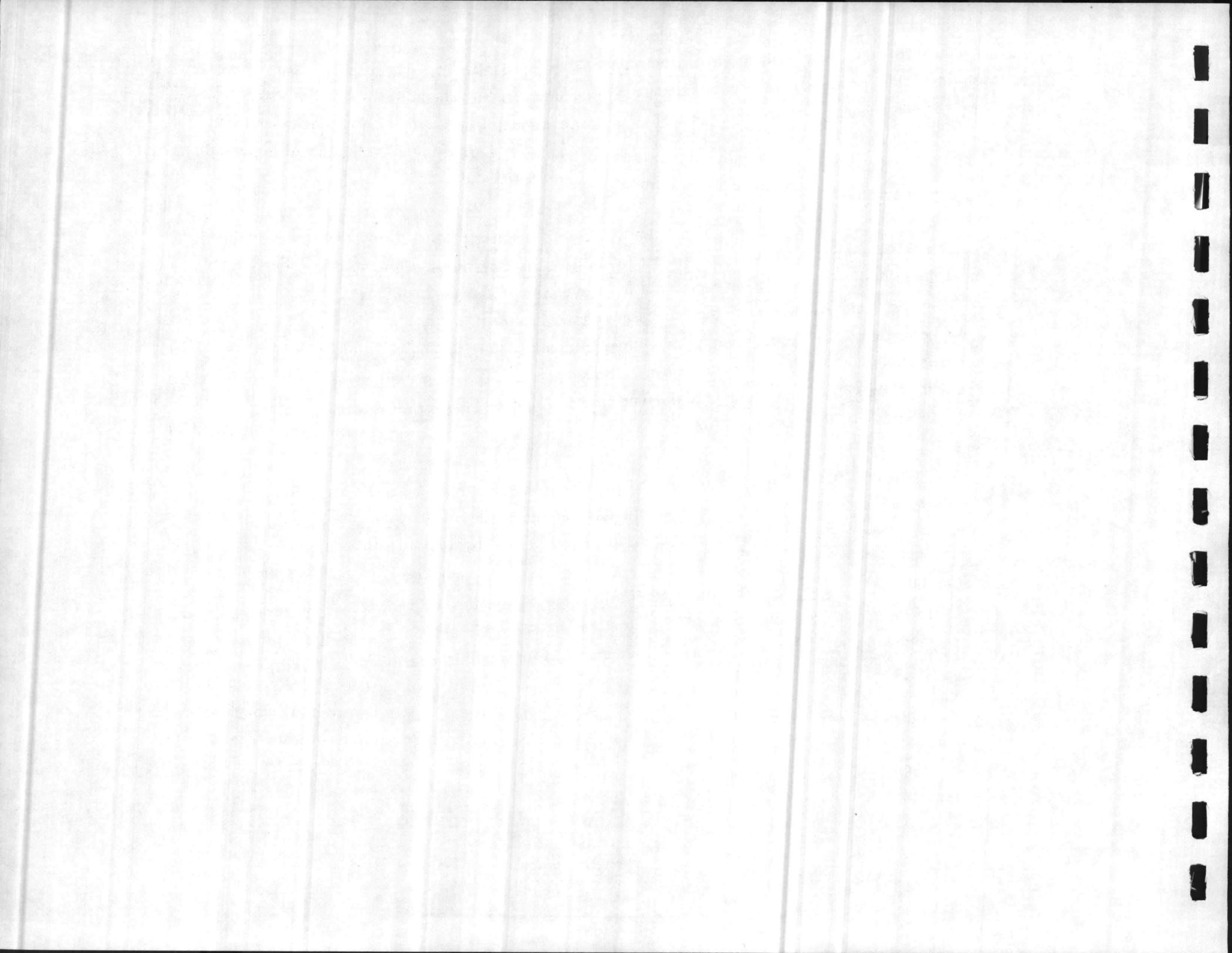
When firing range and impact areas were analyzed, it was found that the Base requires additional ranges to support training with new weapons being added to the arsenal. The more serious deficiencies, however, were concluded to be the poor layout and restrictions on the use of existing ranges and the size and configuration of the impact areas.

Recommendations

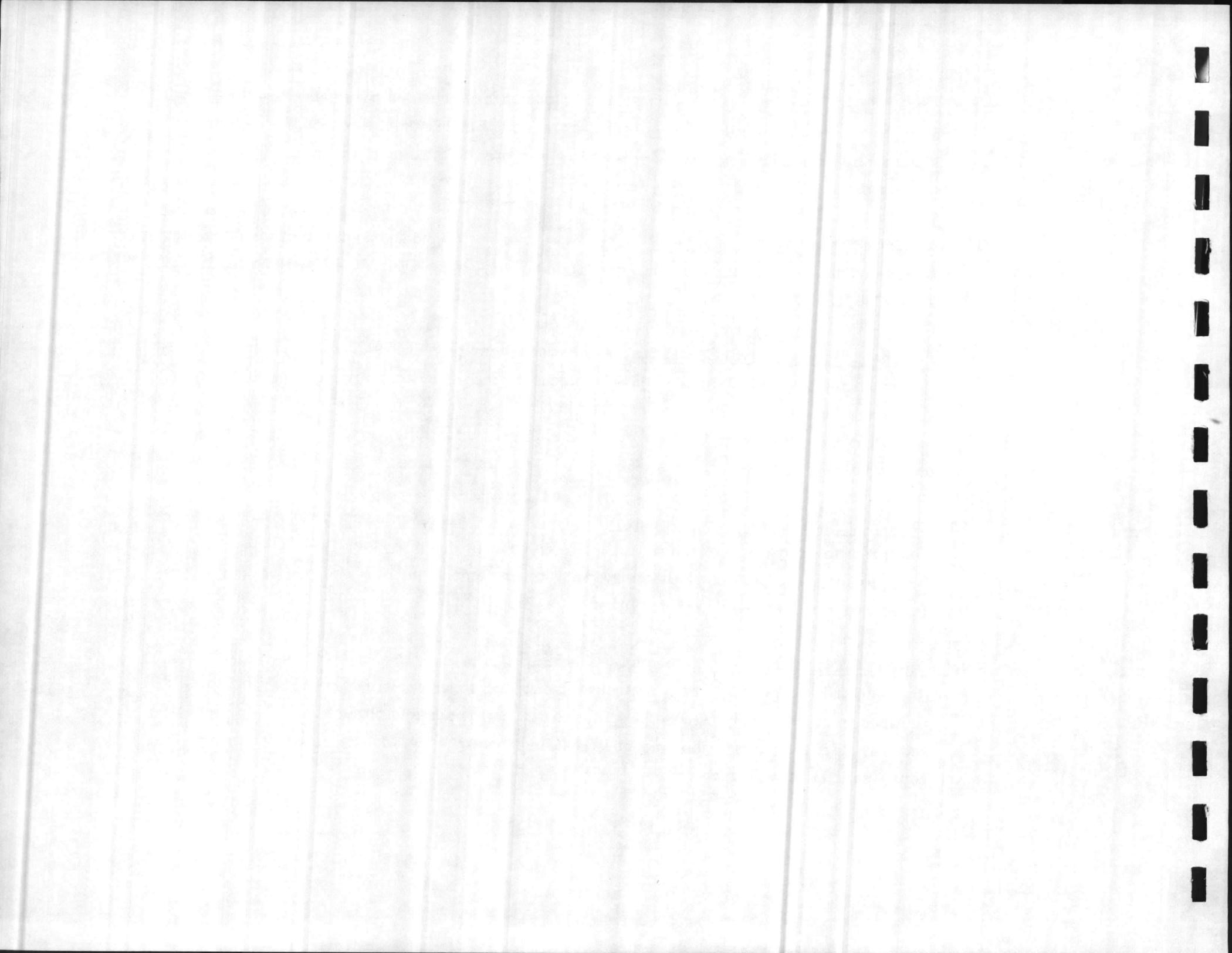
The primary recommendation of the Plan is that the Base acquire the additional land required to meet Camp Lejeune's needs for range and maneuver land. The acquisition process can begin now by initiating a title search and the necessary environmental analysis. It is recognized that the implementation of this recommendation will require the support and approval of Marine Headquarters and, realistically, will have a high cost in both money and time. Despite these constraints, this course of action should be vigorously pursued now in order to assure that the needs of the Marines at Camp Lejeune will be met in the future.

In addition to the long-range objectives of purchasing the necessary land, there are other recommended actions that can be implemented to alleviate other problems that confront units training at Camp Lejeune. These recommended actions are as follows:

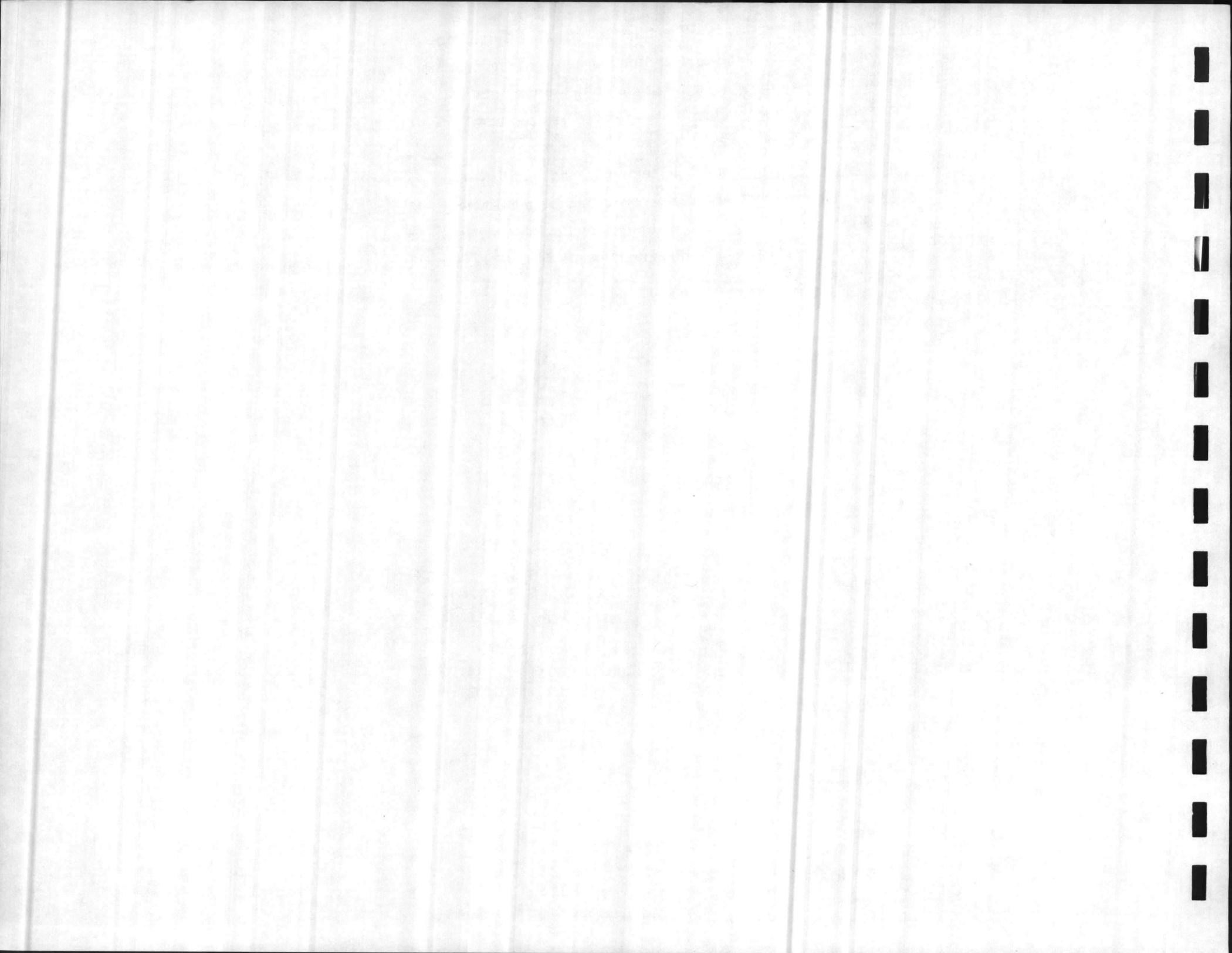
- Prioritize Range and Maneuver Requests. Due to the limited availability of training areas, requests for scheduling should be prioritized by the Assistant Chief of Staff, Training. Units not receiving high priority would be rescheduled for another location or training time.



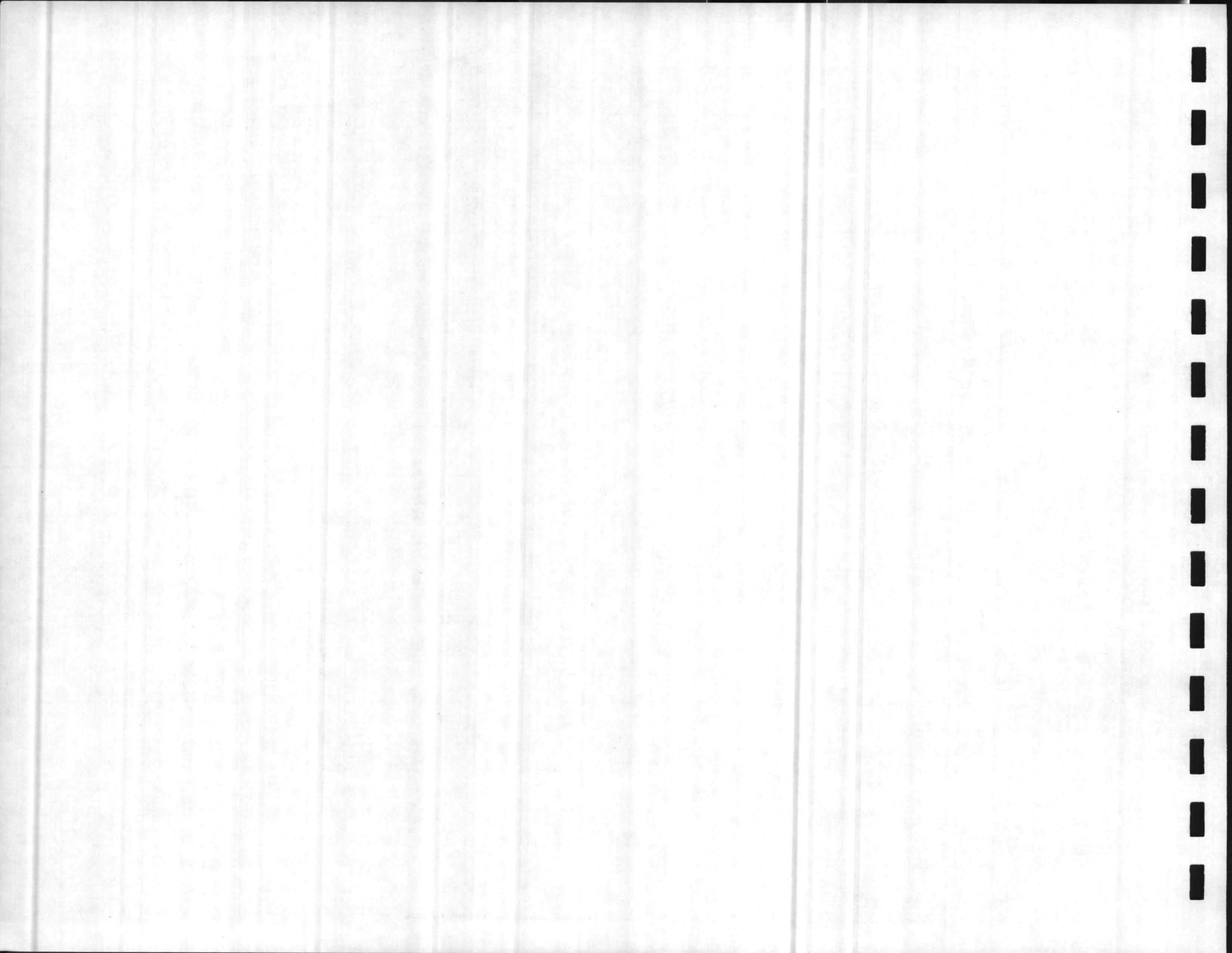
- Joint Use of Training Areas. Compatible units can be scheduled to use the same training areas to maximize the use of a given piece of ground. For example, a reconnaissance unit and a transportation unit might share the same training area to maximize the use of a given piece of ground with little potential for interference or hazard.
- Multiple Scheduling of Training Areas. The same training area can be scheduled to accommodate several units during one training day, i.e., Unit A, 0700-1000; Unit B, 1030-1330; Unit C, 1400-1700.
- Automatic Range Control Operations. A microcomputer-based scheduling and record keeping system should be implemented. The advantages of such a system include faster and more accurate scheduling, improved record keeping and the ability to produce timely reports on utilization, overscheduling, etc., for management use. Potentially, remote terminals could be used by unit S-3's to query the availability of desired training areas.
- Civilian Management of Range Control. Currently, the rapid turnover of range officers is a detriment to long-range planning and development of training facilities. Civilian range management would provide needed continuity to implement policies and develop long-range projects to improve the training facilities at the Base.
- Combat Encroachment and Constraints. Current efforts to close the Intracoastal Waterway for up to four hours and to gain control over airspace up to an altitude of 29,999 feet should continue to be vigorously pursued. Begin research on the possible closure and realignment of Highway 172 away from the impact areas as a contingency for the future expansion or consolidation of these areas.



- Interservice Agreements. Establish a formal, interservice agreement with the Army for use of those specific range and training areas that are currently unavailable at Camp Lejeune. Negotiate a multi-year agreement that would establish a set calendar of training events including the ranges and training areas to be used and the units to be trained.
- Land Area Requirements. Document and publish the amount of land required for all established maneuver exercises conducted by each type of Marine unit. These requirements should incorporate future tactics and deployment of new weapons such as the M-1 tank and the LAV. Specifically, the document would follow the format used for the Army ARTEPS as shown in TC 25-1, Training Land.

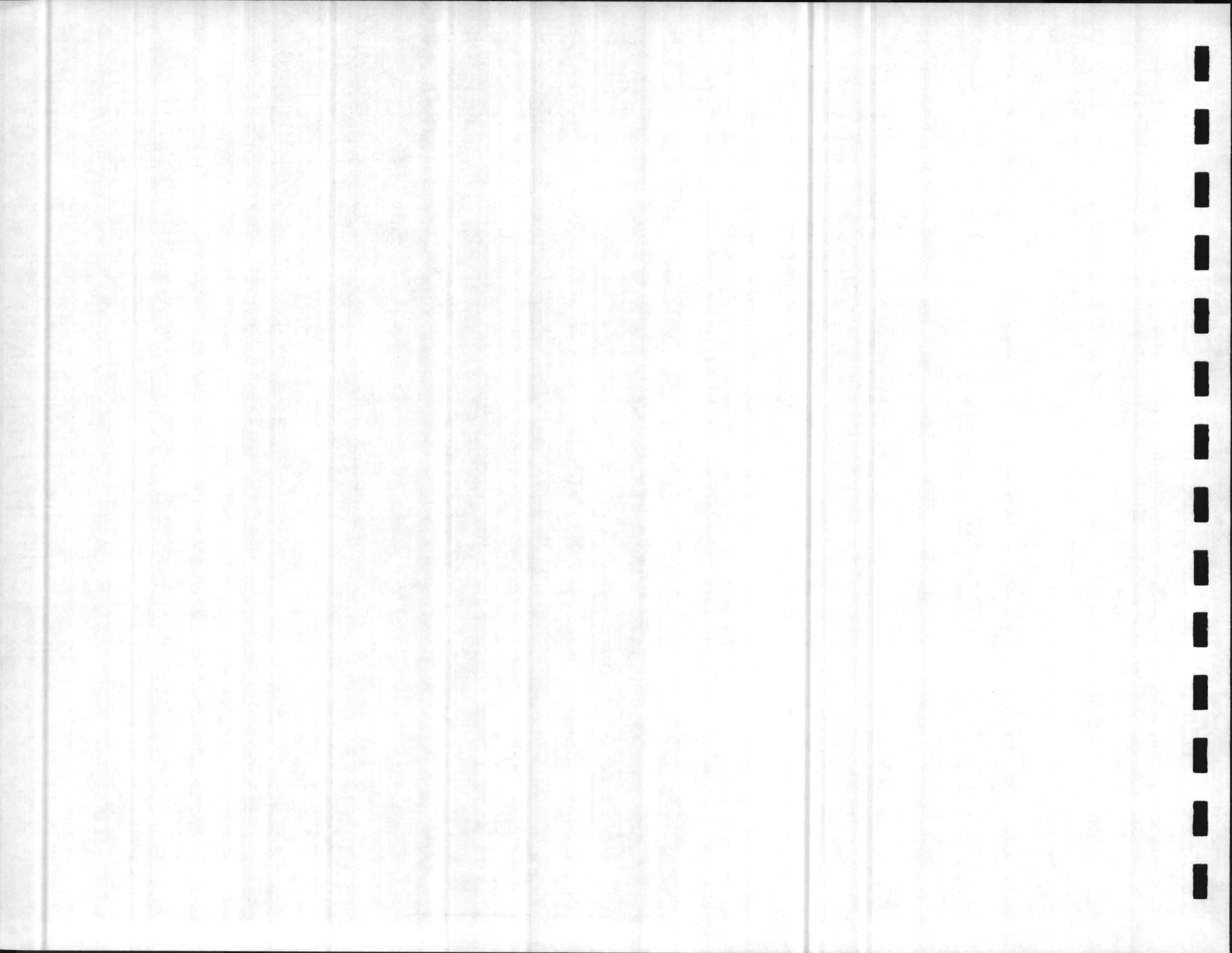


APPENDIX A
RANGE REQUIREMENTS FORMS



RANGE REQUIREMENTS FOR INFANTRY REGIMENTS
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
INDIVIDUAL							
RIFLE RANGE	Qualification	*	EN	11	5		
COMBAT RIFLE	Proficiency	*	CO	55	1	1	55
PISTOL FAM.	Familiarization	*	CO	55	.2	1	55
RIFLE FAM.	Familiarization	*	CO	55	.5	1	11
PISTOL QUAL.	Qualification	*	CO	55	3	.5	27.5
M203 40mm	Qualification	*	DTL (36)	55	1	4	82.5
HAND GRENADE	Familiarization	*	CO	55	1	1	220
SAW	Qualification (2)	*	PLT	18	1	4	55
DEMOLITIONS	Block Training	*	CO	55	2	4	72
CREW-SERVED							
M60 A1 MG	Gun Drill/Qualification	*	CO	55	1	4	220
M85 50 cal MG	Vehicle/Stationary	*	SECT	11	1	4	44
	Vehicle/Moving	*	SECT	11	1	4	44
	Stationary/Stationary	*	SECT	11	1	4	44
	Stationary/Moving	*	SECT	11	1	4	44
	Familiarization	*	CO	55	.5	4	44
12 GAUGE SHOTGUN		*	TM	44	.4	.1	27.5
M40A1 SNIPER RIFLE		*	CRW	198	1	4	70.4
SMAW		*	SECT	33	3	4	792
60 mm MORTAR		*	PLT	11	5	4	396
81 mm MORTAR		*	SECT	11	1	4	220
DRAGON		*	PLT	3	1	2	22
TOW		*	CO	55	.4	4	12
LAAW		*	CO	55	.4	4	88
LAAW SUBCALIBER		*	SQD	297	1	4	88
SQUAD IN ATTACK		*	CO	33	0	2	594
MOUT		*	CO	33	0	2	132



RANGE REQUIREMENTS FOR ARTILLERY REGIMENT
Camp Lejeune, North Carolina

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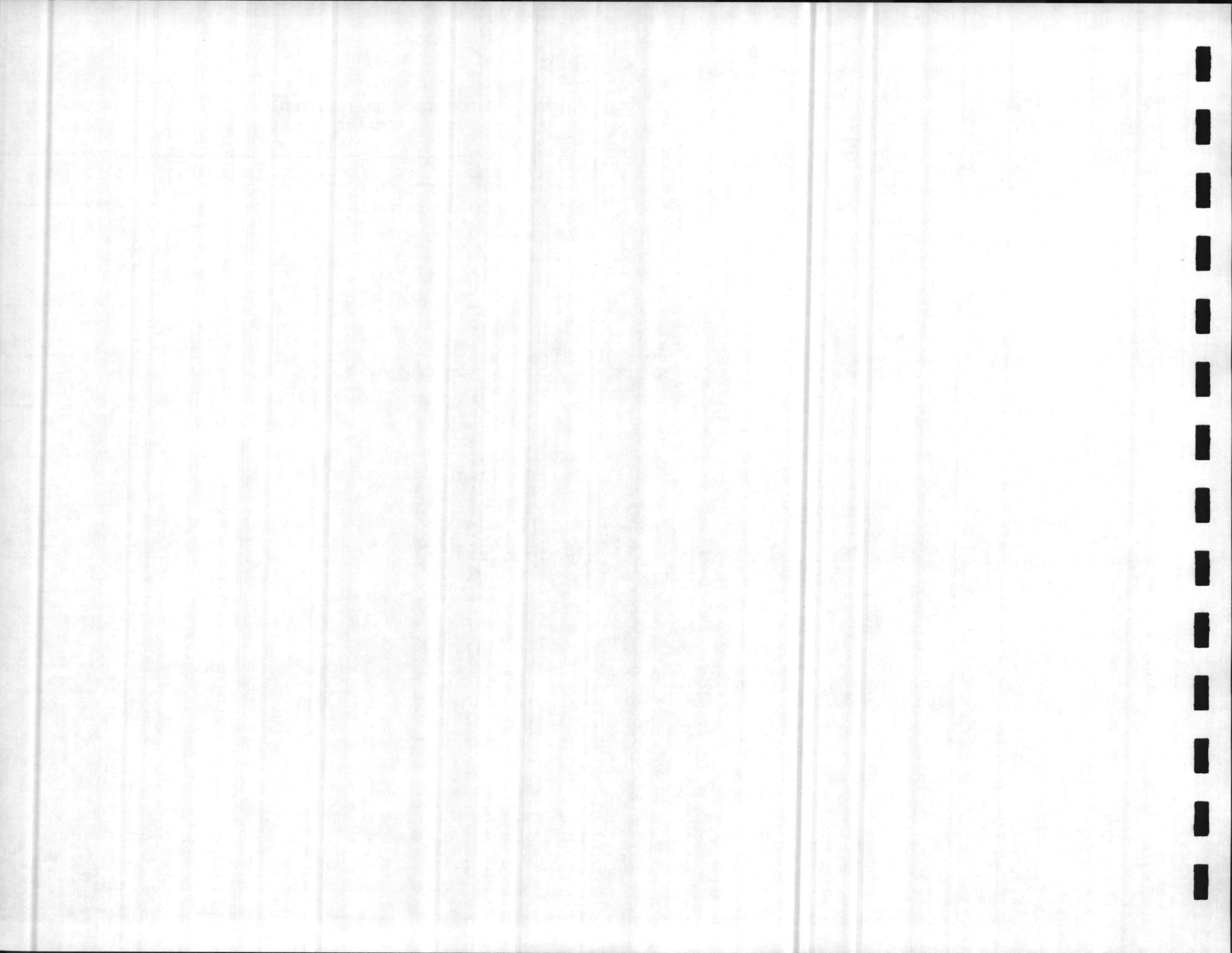
RANGE TYPE	RANGE EXERCISE	LIVE *	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME (DAYS/YR)
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BATTERY EXERCISES

FIREX DS 155	*	BTY	9	1	96	864
FIREX GS 155	*	BTY	3	1	96	288
FIREX 155 SP	*	BTY	3	1	96	288
FIREX 8" SP	*	BTY	3	1	96	288

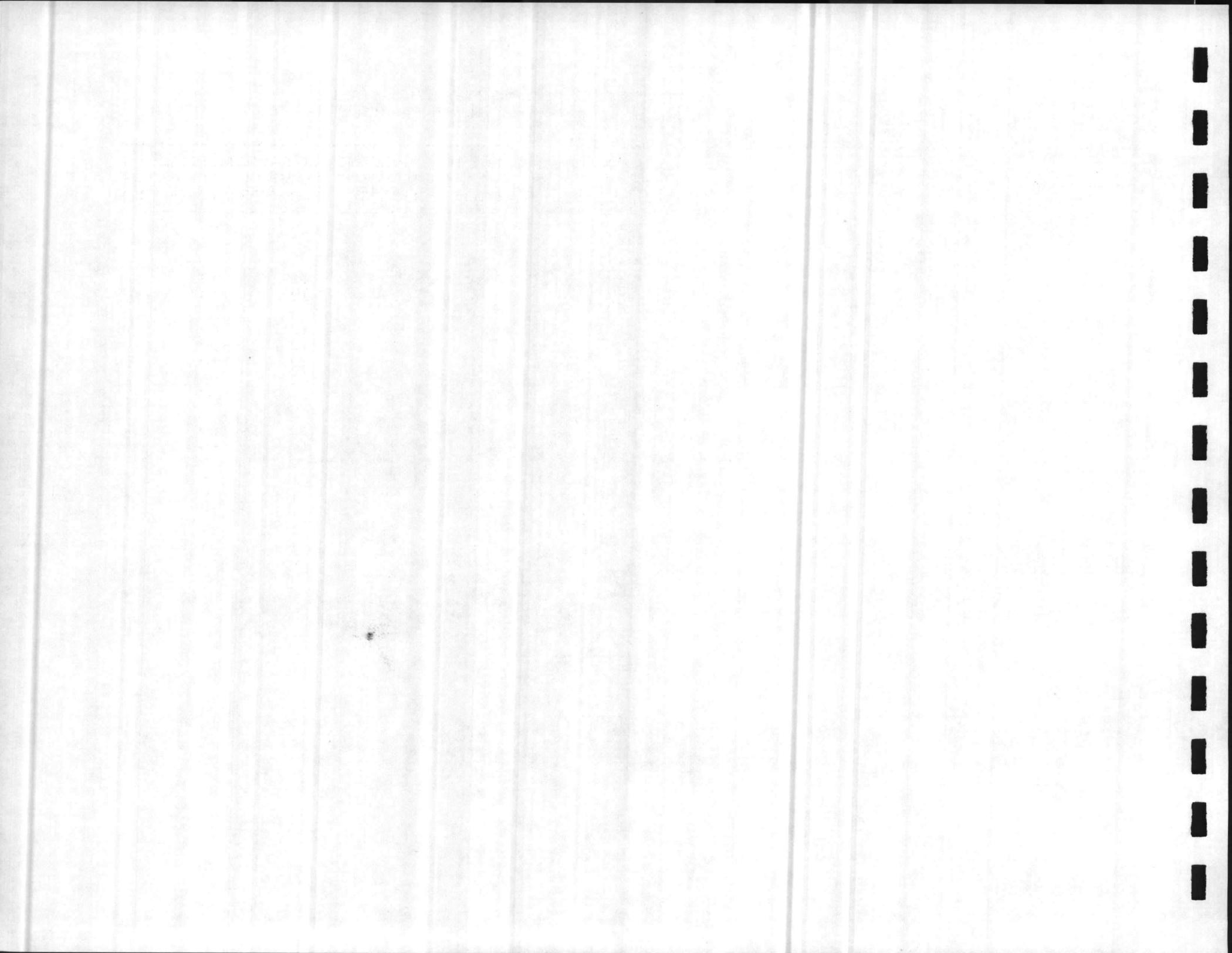
BATTALION EXERCISES

FIREX DS	*	BN	3	1	6	18
FIREX GSR	*	BN	1	1	6	6
FIREX GS	*	BN	1	1	6	6



RANGE REQUIREMENTS FOR TANK BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
TANK SUBCALIBER 5.56							
	Tank Table I	*	CO	4	1	2	8
	Tank Table II	*	CO	4	1	2	8
	Tank Table III	*	CO	4	1	2	8
	Tank Table IV	*	CO	4	1	2	8
TANK MAIN GUN							
	Tank Table VI	*	CO	4	2	2	16
	Tank Table VII	*	CO	4	2	2	16
	Tank Table VIII	*	CO	4	2	2	16
	Platoon Battle Run IX	*	PLT	12	.4	2	9.6
RIFLE RANGE							
	Rifle Qualification	*	DTL	4	.7	1	2.8
PISTOL							
	Pistol Qualification	*	PN	20	.4	1	8
HAND GRENADE							
	Hand Grenade Training	*	PN	600	.0033	1	1.98
	Hand Grenade Training	*	PN	600	.0033	1	1.98
ANTI-TANK (TOW)							
	Anti-tank Training	*	CRW	72	.05	2	7.2
MACHINE GUN RANGE							
	M-60 Training	*	CRW	24	.05	2	2.4
	50 cal. Training	*	CRW	17	.05	2	1.7



RANGE REQUIREMENTS FOR LAV BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME (DAYS/YR)
PLT BATTLE COURSE	7.62 Coaxial Training 25mm Chain Gun Trng	*	PLT	20	.2	52	208
ANTI-AIRCRAFT		*	PLT	5	.2	12	12
ANTI-TANK (TOW)		*	PLT	5	.4	12	24
TANK SUBCAL	TANK TABLE I	*	PLT	20	.25	12	60
	TANK TABLE II	*	PLT	20	.25	12	60
	TANK TABLE III	*	PLT	20	.25	12	60
	TANK TABLE IV	*	PLT	20	.25	12	60
TANK MAIN GUN	TANK TABLE VI	*	PLT	20	.25	12	60
	TANK TABLE VII	*	PLT	20	.25	12	60
	TANK TABLE VIII	*	PLT	20	.25	12	60
MORTARS		*	DTL (50)	1	2	1	2
PISTOLS		*	DTL (500)	1	5	1	5
RIFLES		*	DTL (500)	1	5	1	5
HAND GRENADES		*	PN	500	.0033	1	1.65
50 cal MACHINE GUN		*	DTL (200)	1	1	1	1
M60 MACHINE GUN		*	DTL (200)	1	1	1	1
SMOKE GRENADE		*	PLT	20	.1	4	8

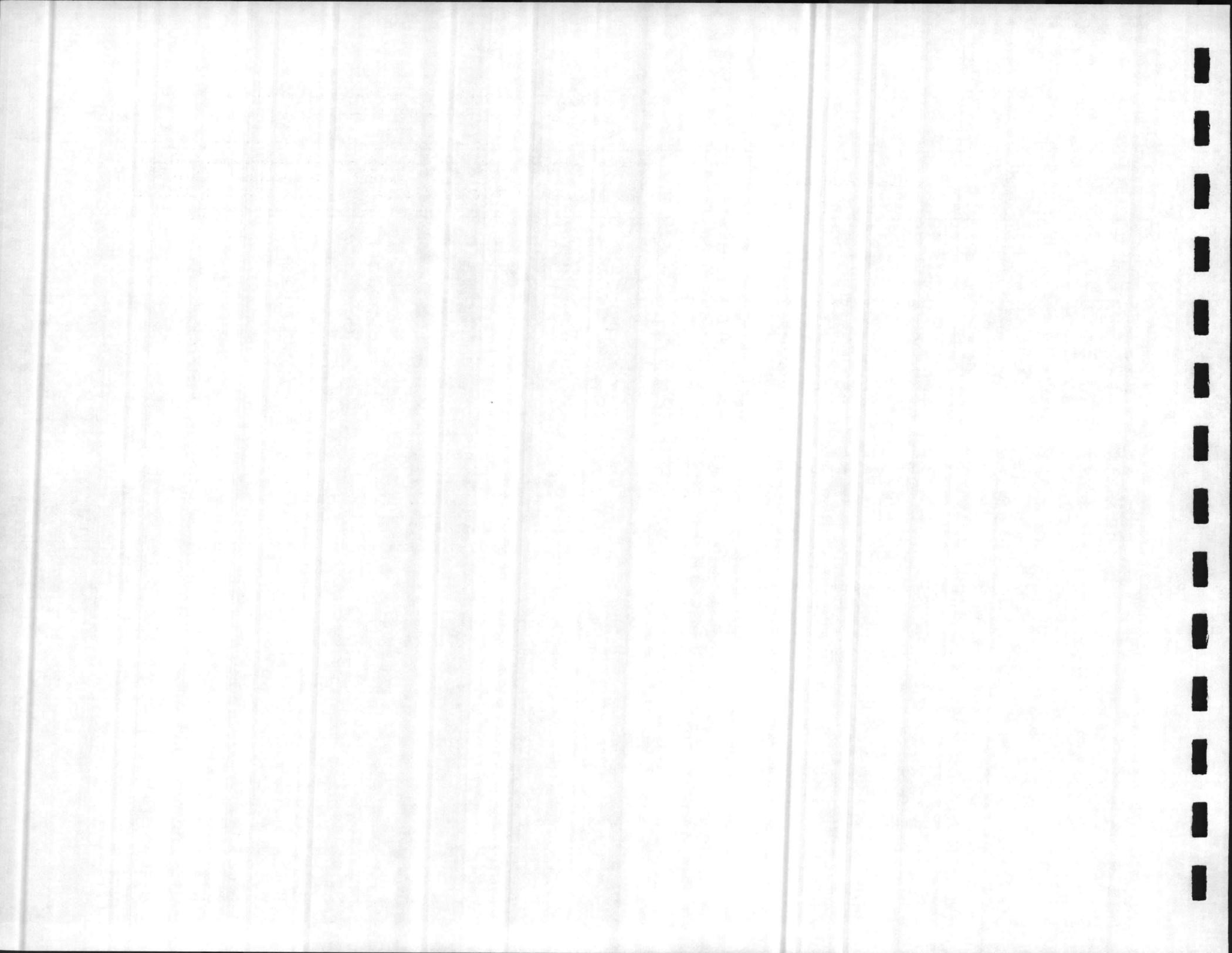


RANGE REQUIREMENTS FOR AAV BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
INDIVIDUAL							
RIFLE RANGE	Qualification	*	DTL (850)	1	5	1	5
COMBAT RIFLE	Proficiency	*	PLT	26	.5	1	13
PISTOL FAM.	Familiarization	*	DTL (15)	14	.2	.5	1.4
RIFLE FAM.	Familiarization	*	PLT	26	.2	1	5.2
PISTOL QUAL.	Qualification (1)	*	DTL (14)	1	5	.5	2.5
M203 40mm	Qualification	*	CO	5	.5	2	5
HAND GRENADE	Familiarization	*	PLT	26	.5	1	13
SAW	Qualification (2)	*	SQD	6	.5	4	12
CREW-SERVED							
M60 A1 MG	Gun Drill/Qualification	*	SQD	6	1	2	12
Mk 19 40mm MG	Gun Drill/Qualification	*	SQD	6	1	2	12
CREW-SERVED VEH.							
M85 50 cal MG							
	Stationary/Stationary	*	PLT	17	.5	2	17
	Stationary/Moving	*	PLT	17	.5	2	17
	Moving/Stationary	*	SEC	55	.3	2	33
	Moving/Moving	*	SEC	55	.3	2	33
	Anti-air Gunnery	*	PLT	17	.5	2	17
M257 Smoke	System Checks	*	PLT	17	.5	1	8.5
M60D MG	Stationary/Stationary	*	SECT	20	.3	2	12
	Stationary/Moving	*	SECT	20	.3	2	12
Mk 19 40mm MG (3)							
	Stationary/Stationary	*	SECT	17	.3	4	20.4
	Stationary/Moving	*	SECT	17	.3	4	20.4

NOTES

- (1) Use I-1 range, 15 firing points
- (2) Future requirement
- (3) Future requirement

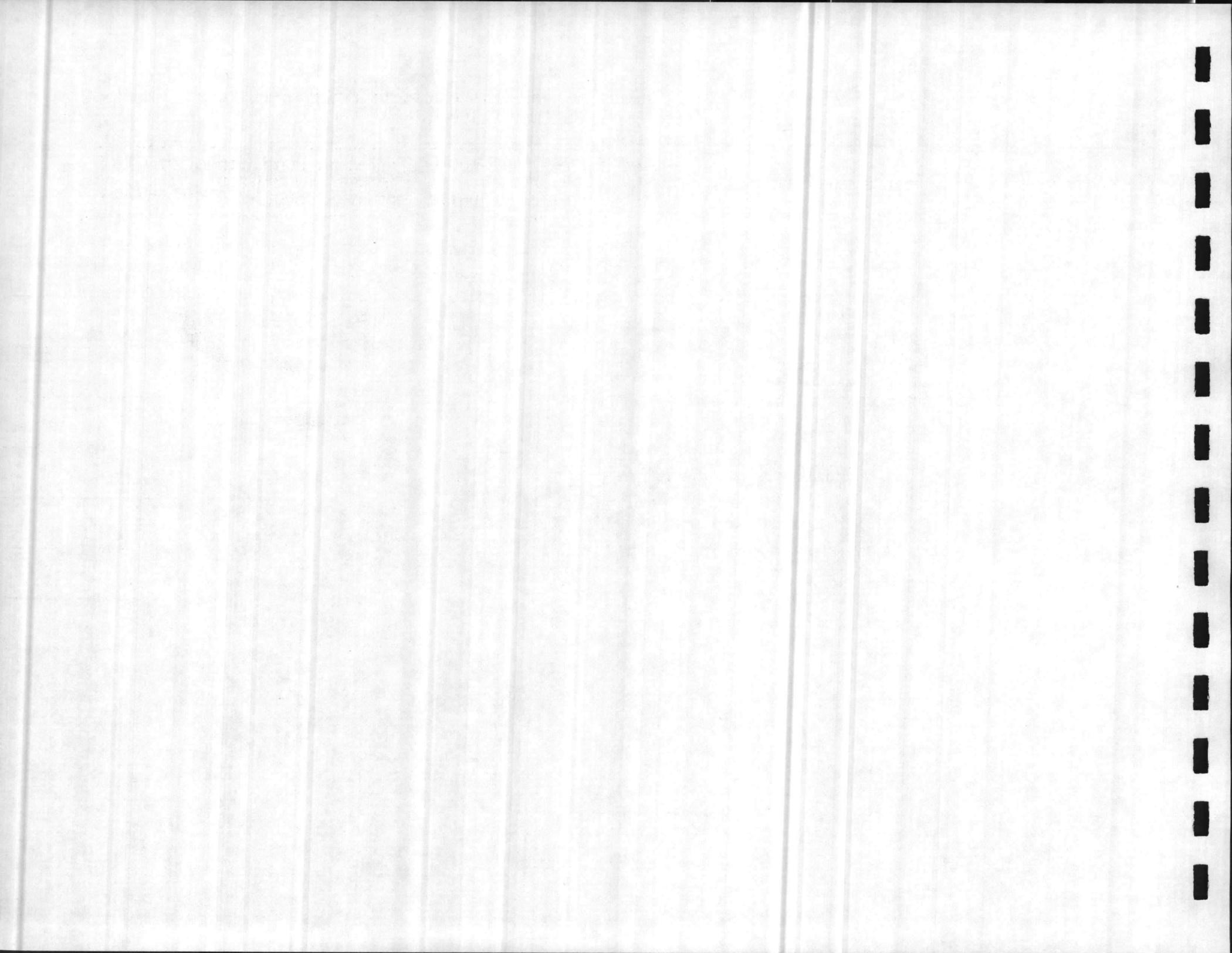


RANGE REQUIREMENTS FOR RECONNAISSANCE BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
INDIVIDUAL							
RIFLE RANGE	Qualification	*	DTL (400)	1	5	1	5
COMBAT RIFLE	Proficiency (*)	*	PLT	9	.5	1	4.5
PISTOL FAM.	Familiarization	*	DTL (15)	14	1	.5	7
RIFLE FAM	Familiarization	*	PLT	9	1	1	9
PISTOL QUAL.	Qualification	*	DTL (15)	3	5	.5	7.5
M203 40mm	Qualification (*)	*	PLT	9	.5	2	9
HAND GRENADE	Familiarization	*	PLT	9	1	1	9
SAW	Qualification (*)	*	PLT	9	1	2	18
LAW	Proficiency (*)	*	PLT	9	.5	1	4.5
CREW SERVED							
M60 A1 MG	Gun Drill/Qualificat'n	*	PLT	9	.5	2	9
M2 50cal MG	Gun Drill/Qualificat'n	*	CO	1	1	1	1
TEAM ASSAULT COURSE (*)			PLT	9	1	4	36

NOTES

(*) Day and night.

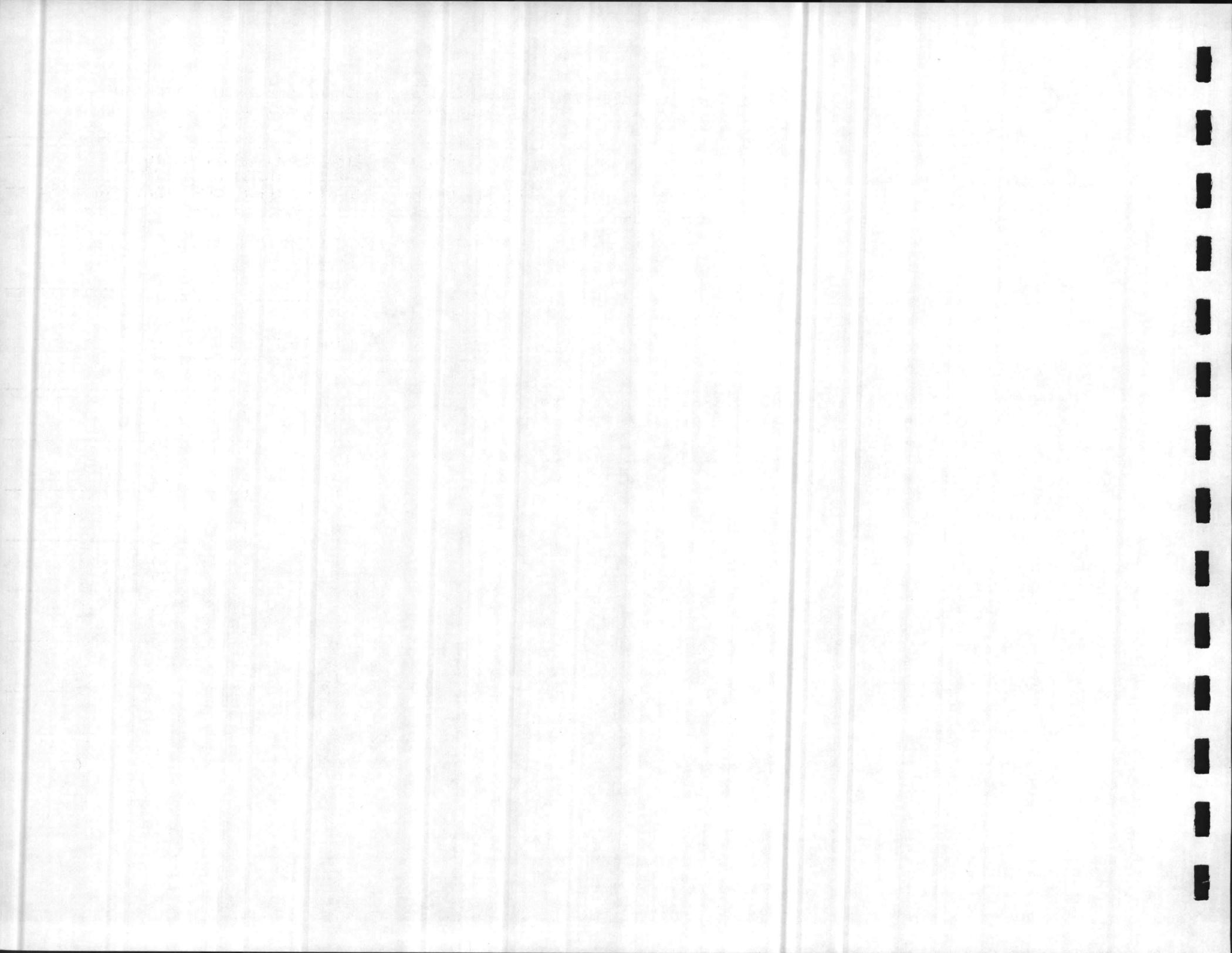


RANGE REQUIREMENTS FOR FIELD MEDICAL SCHOOL
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
PISTOL	Fam Fire (MMART, MDO)	*	45 PN	6	.3	1	1.8
	Fam Fire (Basic)	*	150 PN	7	.3	1	2.1
RIFLE	Fam Fire (Basic)	*	150 PN	7	.4	1	2.8
	Qual Fire (Staff)	*	15 PN	1	5	1	5
NBC	NBC Training	*	150 PN	7	.7	1	4.9

NOTES

May have 200 PN classes in the future.
Would require additional time on the ranges.



RANGE REQUIREMENTS FOR 2D COMBAT ENGINEER BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
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RANGE 6

EXISTING RANGE REQUIREMENTS FOR 2d COMBAT ENGINEER
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	RANGE ACCEPT'L	ACCEPT'L	ACCEPT'L
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PISTOL

	Fam Fire	*	DTL (100)	1	5	1	5
	Qual Fire	*	DTL (50)	2	5	5	5

RIFLE

	Fam Fire	*	DTL (700)	1	10	1	10
	Qual Fire	*	DTL (700)	1	10	1	10

NBC

	NBC Training	*	CO	5	3	1	15
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HAND GRENADE

		*	CO	5	1	1	5
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MACHINE GUN

	M-60	*	CO	5	1	4	20
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	50 cal	*	CO	1	1	4	4
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LAAW

		*	CO	5	1	1	5
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SAW

		*	CO	5	1	4	20
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DEMOLITION

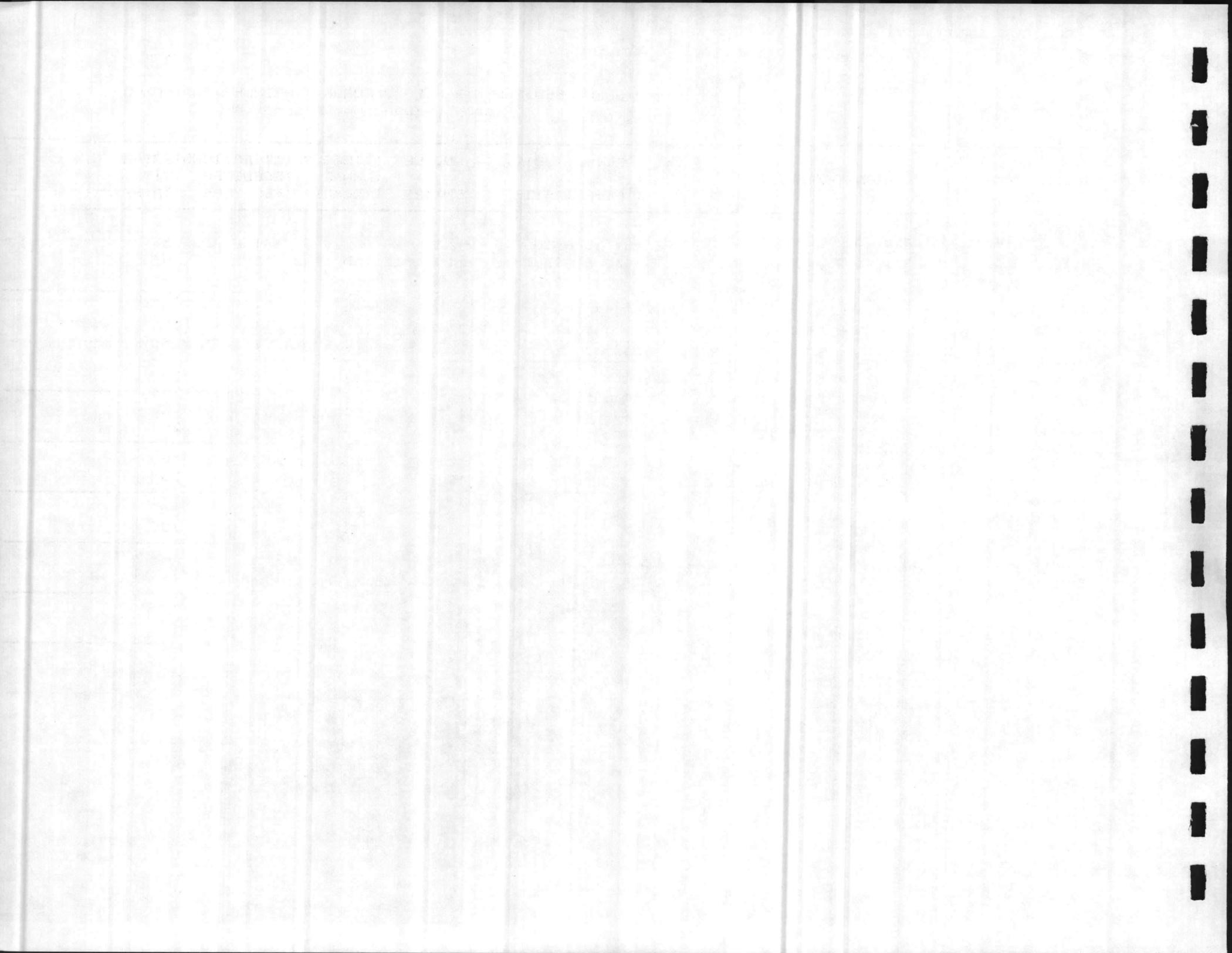
	Basic Demolition	*	CO	5	3	2	30
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	Adv. Demolition	*	CO	5	5	2	50
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	Line Charges	*	CO	5	1	2	10
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	Land Mines	*	CO	5	3	2	30
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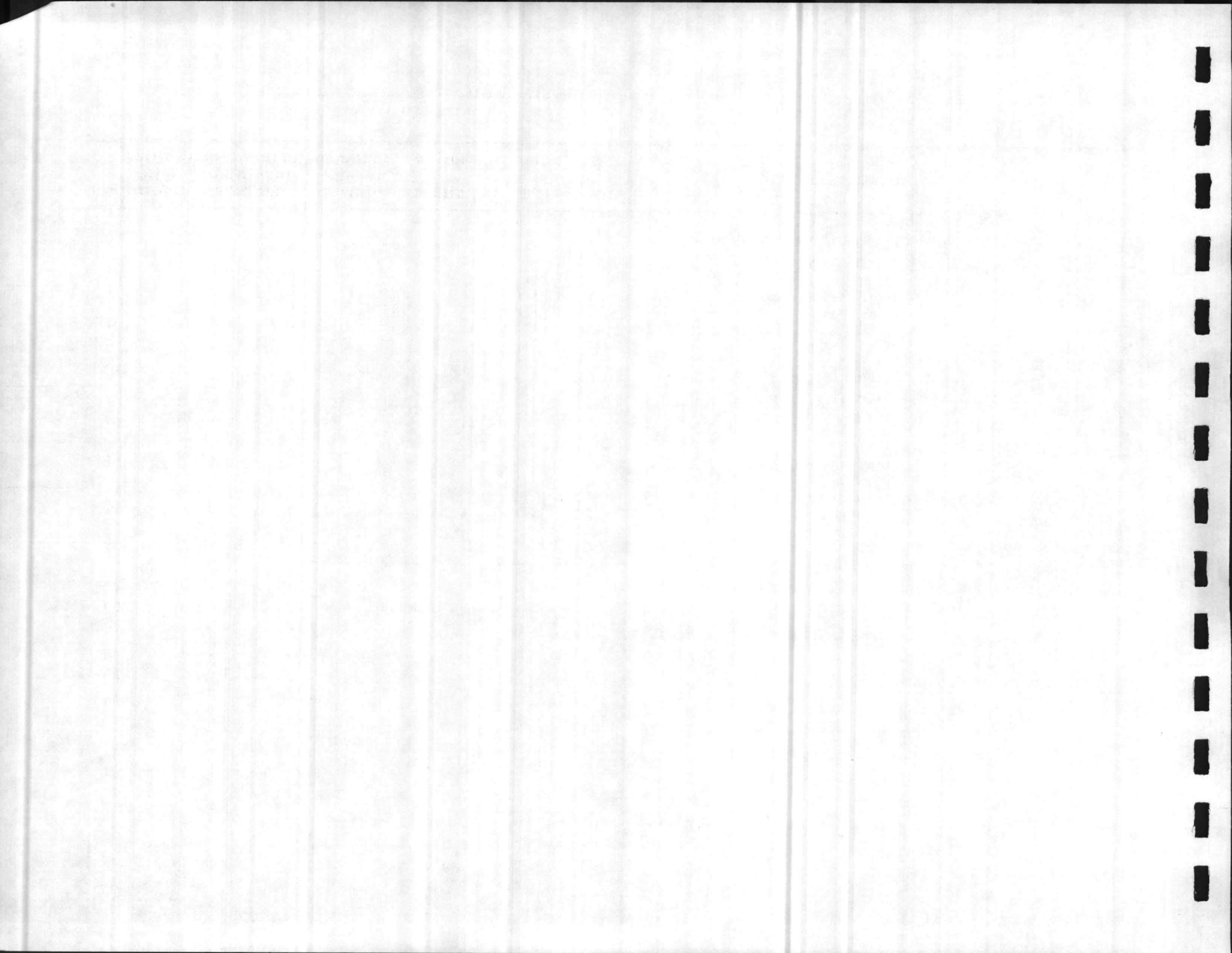
	Fld Fortification	*	CO	5	1	2	10
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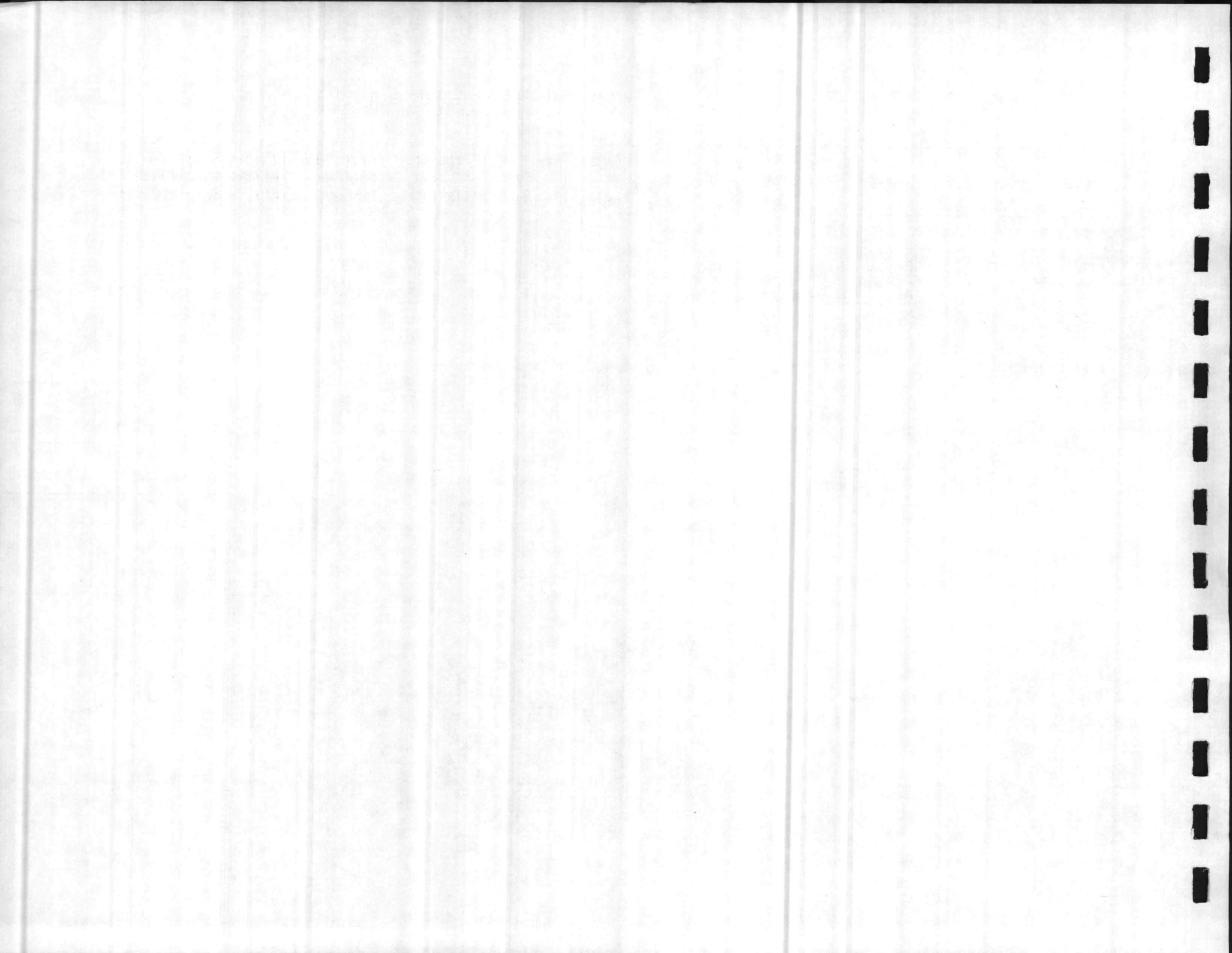
RANGE REQUIREMENTS FOR 2D COMBAT ENGINEER BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
PISTOL	Fam Fire	*	DTL (100)	1	5	1	5
	Qual Fire	*	DTL (50)	2	5	.5	5
RIFLE	Fam Fire	*	DTL (700)	1	10	1	10
	Qual Fire	*	DTL (700)	1	10	1	10
NBC HAND GRENADE	NBC Training	*	CO	5	3	1	15
		*	CO	5	1	1	5
MACHINE GUN	M-60	*	CO	5	1	4	20
	50 cal	*	CO	1	1	4	4
LAAW SAW		*	CO	5	1	1	5
		*	CO	5	1	4	20
DEMOLITION	Basic Demolition	*	CO	5	3	2	30
	Adv. Demolition	*	CO	5	5	2	50
	Line Charges	*	CO	5	1	2	10
	Land Mines	*	CO	5	3	2	30
	Fld Fortification	*	CO	5	1	2	10



RANGE REQUIREMENTS FOR MARINE AIR WING
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE *	UNIT 	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
FIXED WING							
AERIAL GUNNERY RANGE							
	Beacon Bombing (1 A-6)	*	Pilots	90	.1	590	59
	Bombing (2 A/C)	*	Pilots	188	.1	338	34
	Guns (2 A/C)	*	Pilots	113	.1	100	10
	Rockets (2 A/C)	*	Pilots	113	.1	102	10
ROTARY WING							
AERIAL GUNNERY RANGE							
	Cobra Guns	*	Crew	20	.1	120	12
	Helo Guns	*	Crew	200	.1	400	40
HARMONIZATION RANGE							
	Cobra Guns	*	Crew	20	.15	60	9
	Helo Guns	*	Crew				
FIRE SUPP COORD RANGE							
	HAWK MISSILE	*	Mixed	1	2	12	24
	REDEYE/STINGER	*	Bn	1	2	1	2
		*	FAAD Btry	1	3	2	6
INDIVIDUAL							
RIFLE	Qualification	*	DTL (800)	2	5	1	10
PISTOL	Qualification	*	DTL (250)	1	5	1	5
MACHINE GUN							
50 caliber	Qualification	*	Gp (200)	2	5	1	10
M60 MG	Qualification	*	Gp (200)	2	5	1	10

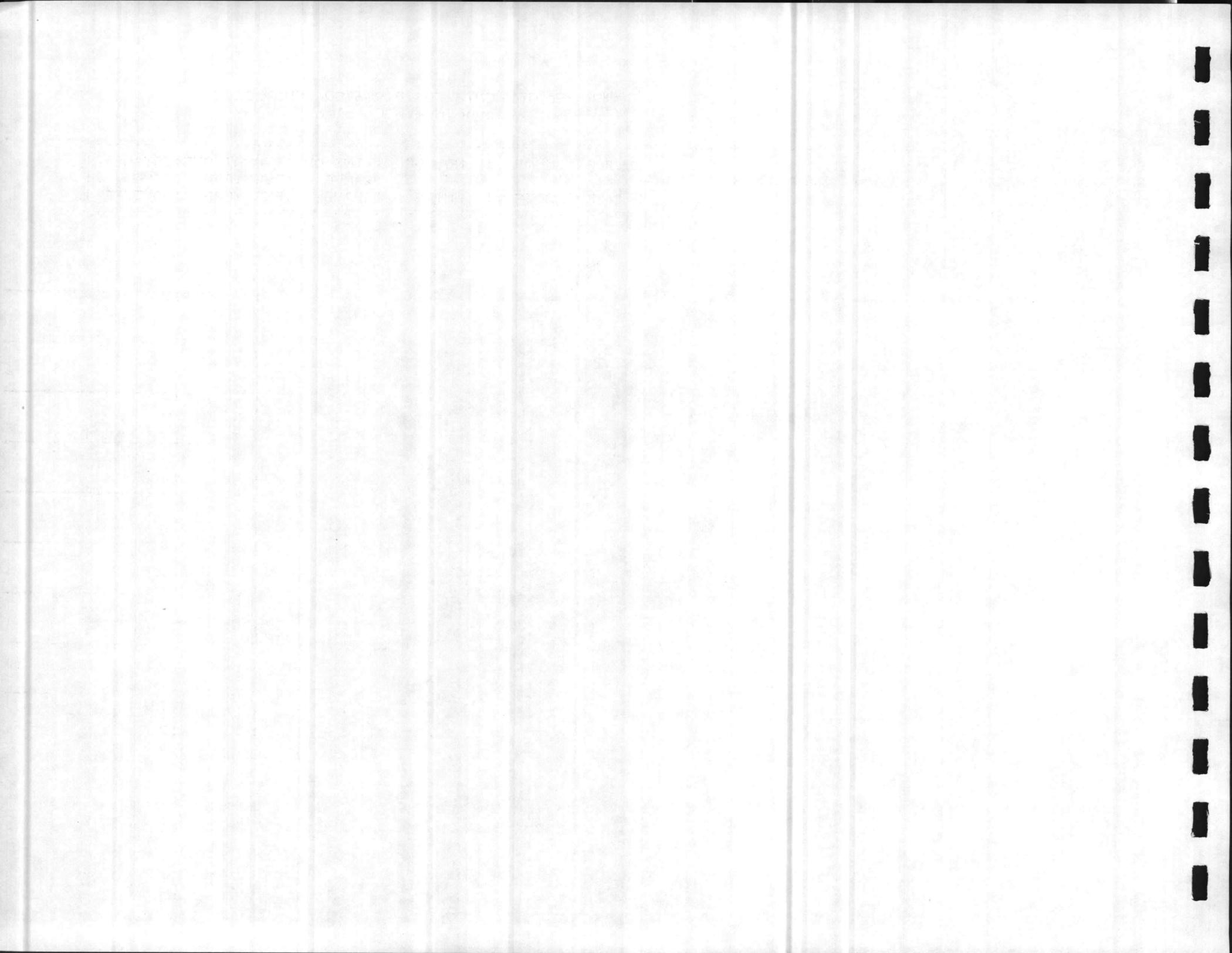


RANGE REQUIREMENTS FOR 6TH MAB
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
PISTOL (1)	Fam and Qual	*	Detail	15	4	1	60
RIFLE (1)	Fam and Qual	*	Detail	15	4	1	60
M60 MG (2)	Fam	*	Detail	10	1	1	10
50 cal MG (2)	Fam	*	Detail	10	1	1	10
SHOTGUN (3)	Fam	*	Detail	5	.5	1	2.5
SNIPER RIFLE (3)	Fam	*	Detail	1	.4	1	.4

NOTES

- (1) 15 man detail
- (2) 5 man detail; 1 day/1 night
- (3) 5 man detail

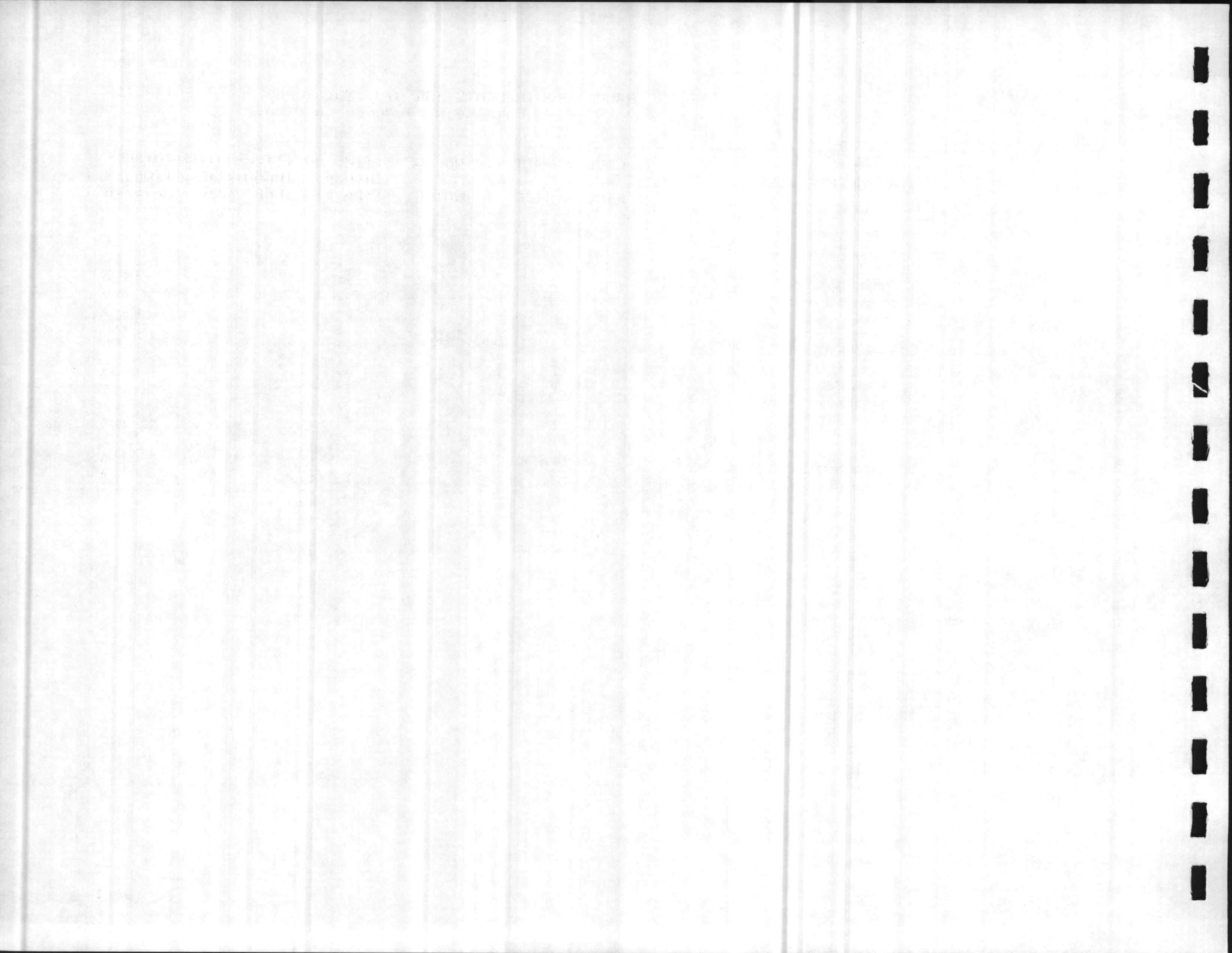


RANGE REQUIREMENTS FOR DIVISION SCHOOLS
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
SQUAD LEADER COURSE							
	Rifle	*					
	M203	*					
	81mm Mortar	*					
	M-60 MG (1)	*	Class	6	2	1	12
	LAAW	*					
	Demo	*					
	SAW (FUTURE)	*					
	SMAW (FUTURE)	*					
	Grenade	*	Class	6	1	1	6
	Demolition	*	Class	6	2	1	12
	Squad in Attack (2)	*	Class	6	1	1	6
MORTAR							
	81mm Mortar	*					
	60mm Mortar (3)	*	Class	4	6	1	24
SCOUT SNIPER							
	M40 Sniper Rifle	*	Class	5	1	1	5
	M16	*	Class	5	1	1	5
PLATOON SGT COURSE							
	Rifle	*					
	M203	*					
	81mm Mortar	*					
	M-60 MG	*	Class	6	1	1	6
	LAAW	*					
	Demo	*					
	SAW	*					
	SMAW	*					
	Grenade	*	Class	6	1	1	6
	Demolition	*	Class	6	2	1	12

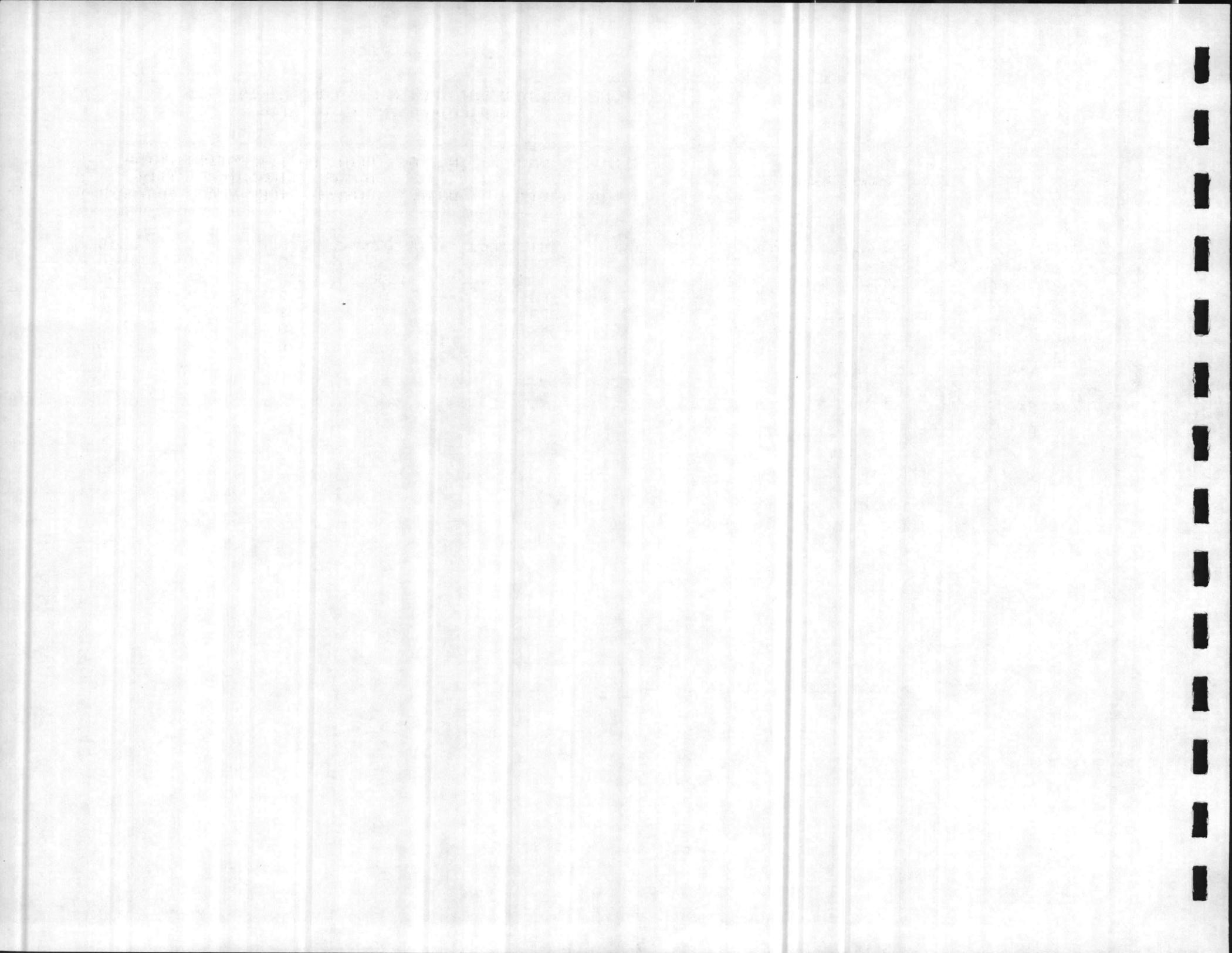
NOTES

- (1) One range w/200 meter firing line
- (2) Using L-5 range
- (3) 6 days, 5 nights



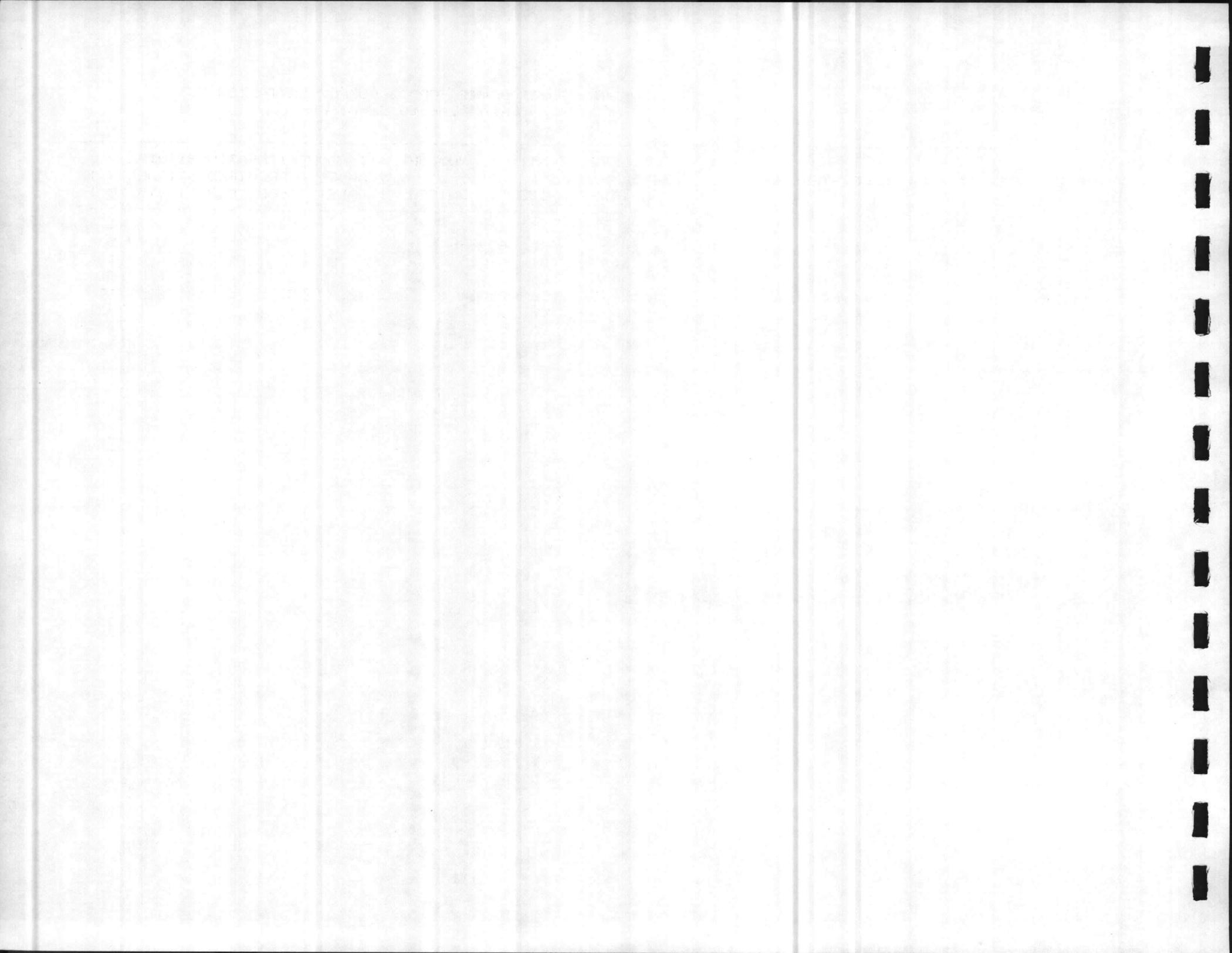
RANGE REQUIREMENTS FOR 8TH ENGINEER SUPPORT BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	: LIVE : : * : : FIRE :	: UNIT : : : : SIZE :	: NO. OF : : : : UNITS :	: TIME ON : : RANGE : : (DAYS) :	: ITERATIONS : : REQUIRED : : PER YEAR :	: TOTAL : : TIME : : DAYS/YR :
RIFLE	Familiarization	*	PLT	29	.2	1	5.8
	Qualification	*	DTL (800)	2	.5	1	10
COMBAT RIFLE	Proficiency	*	PLT	29	.5	1	14.5
PISTOL	Familiarization	*	DTL (15)	14	.2	1	2.8
	Qualification	*	DTL (200)	1	.5	.5	2.5
HAND GRENADE DEMOLITION	Familiarization	*	PLT	29	.5	1	14.5
	Familiarization	*	CO	8	.4	2	64
M-60 MG M2 50 CAL	Gun Drill/Fam	*	SQD	22	1	2	44
	Gun Drill/Fam	*	SQD	6	1	2	12
M2 50 CAL	Station/Station	*	SEC	2	.5	4	4
	Station/Moving	*	SEC	2	.5	4	4
	Moving/Moving	*	SEC	2	.5	4	4
	Anti-air	*	SEC	2	.5	4	4



RANGE REQUIREMENTS FOR H & S COMPANY 2D FSSG
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
PISTOL	Qualification	*	DTL (600)	2	5	1	10
RIFLE	Qualification	*	DTL (600)	2	5	1	10
HAND GRENADE	Proficiency	*	FN	1200	.0033	2	7.92
M203	Proficiency	*	CO	1	2	2	4
SHOTGUN	Proficiency	*	CO	1	1	2	2
M2 50 CAL	Proficiency/Qual	*	TM(15)	1	8	2	16
M-60 MG	Proficiency/Qual	*	TM(15)	1	8	2	16

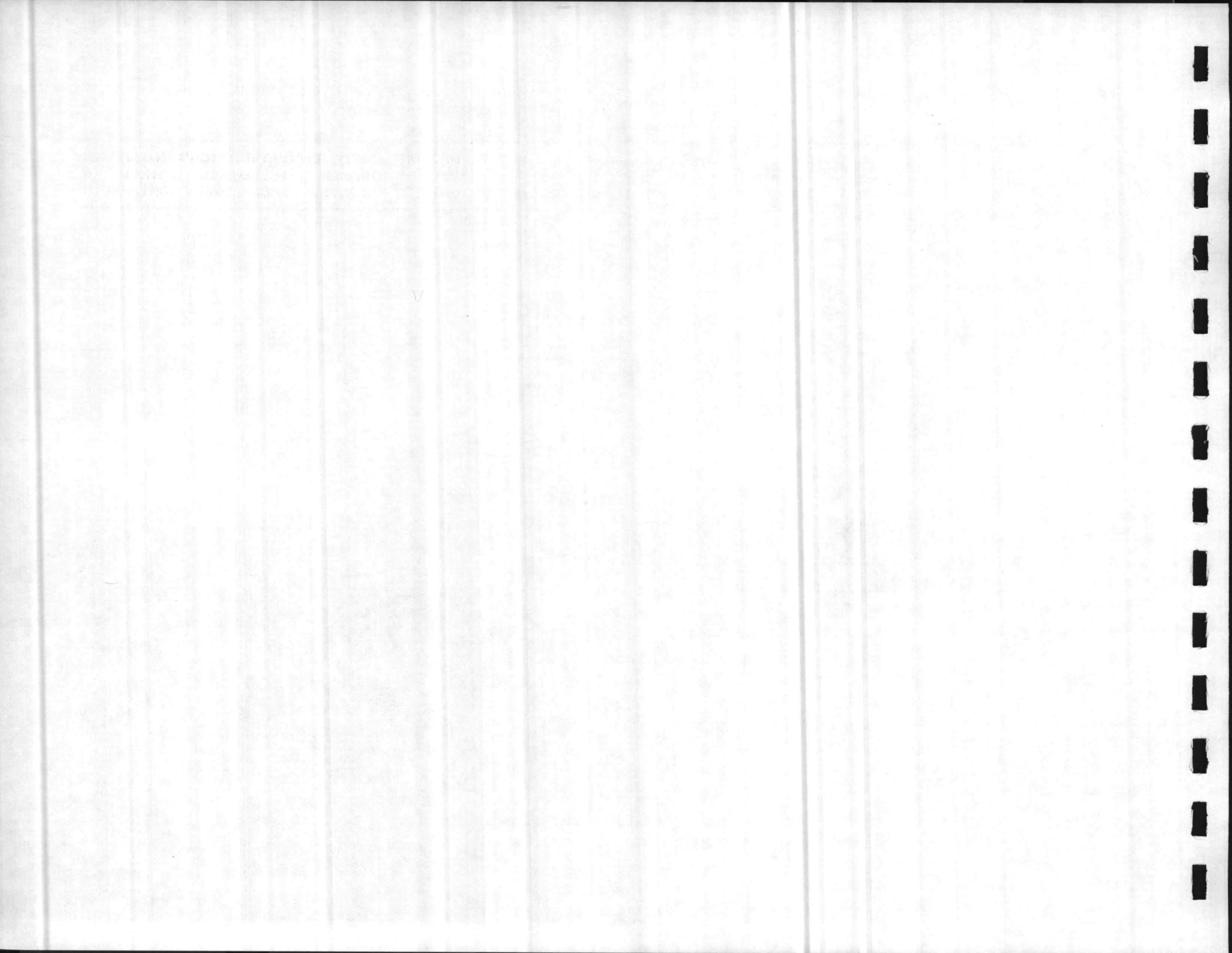


RANGE REQUIREMENTS FOR 2D SUPPLY BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE *	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
RIFLE	Qualification (1)	*	DTL (800)	1	5	1	5
	Familiarization	*	DTL (50)	2	.5	1	1
PISTOL	Qualification	*	DTL (200)	1	5	1	5
	Familiarization	*	DTL (50)	2	.5	1	1
M60 A1 MG	Gun Drill/Fam	*	TM	37	1	2	74
M2 50 CAL MG	Gun Drill/Fam	*	TM	18	1	2	36

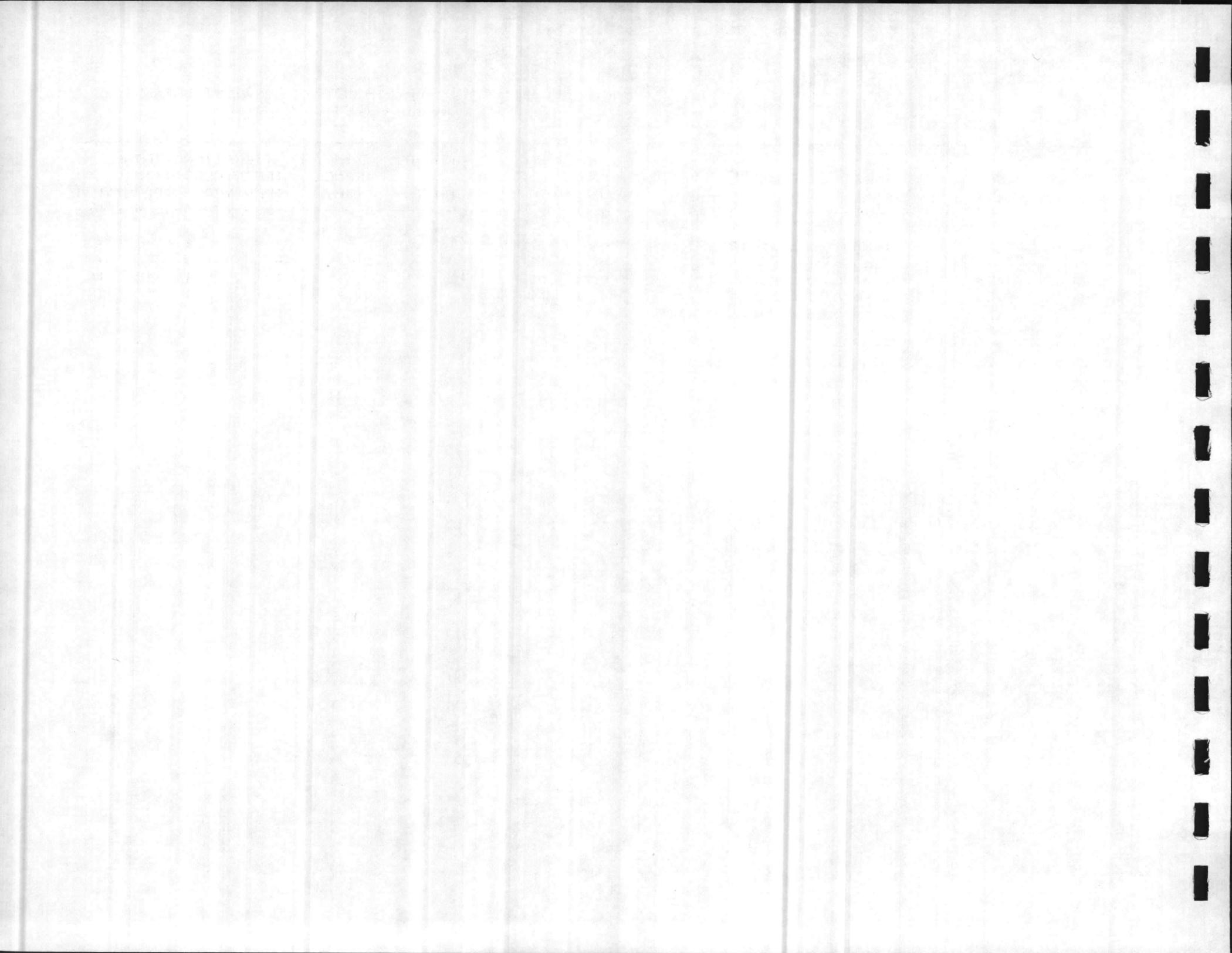
NOTES

(1) All training requirements are existing and future.



RANGE REQUIREMENTS FOR 2D MAINTENANCE BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
RIFLE	Qualification	*	CO (900)	1	5	1	5
	Familiarization	*	PLT	12	.5	1	6
PISTOL	Familiarization	*	PLT	12	.2	1	2.4
M60 MG	Station/Station	*	DTL (40)	1	.5	2	1
M2 MG	Station/Station	*	DTL (40)	1	.5	2	1

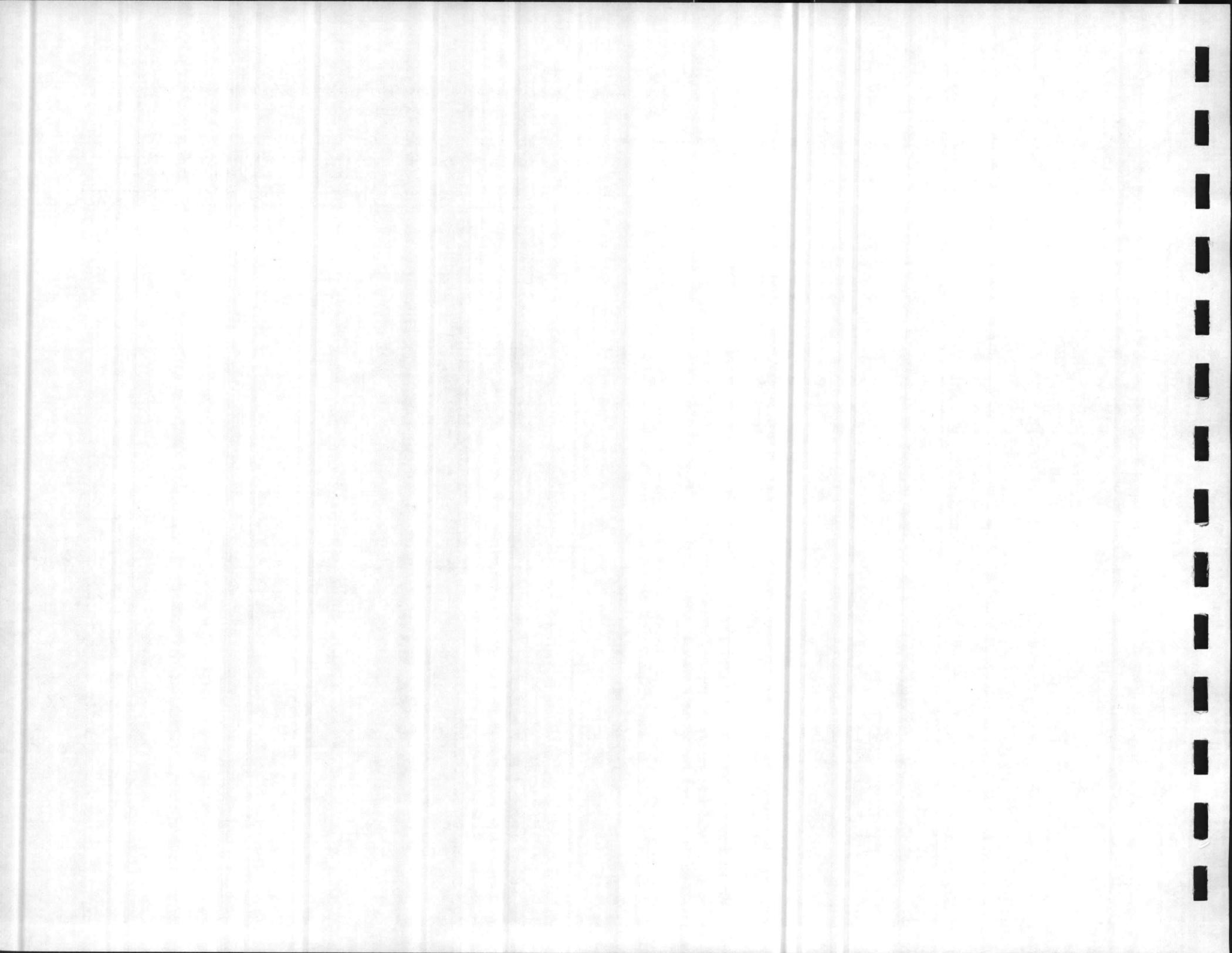


RANGE REQUIREMENTS FOR 8TH MOTOR TRANSPORT BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	: LIVE : * : FIRE	: UNIT : : SIZE	: NO. OF : : UNITS	: TIME ON : RANGE : (DAYS)	: ITERATIONS : REQUIRED : PER YEAR	: TOTAL : TIME : DAYS/YR
RIFLE	Qualification (1)	*	BN		1	4	1 4
PISTOL	Qualification (2,3)	*	BN		1	4	1 4
HAND GRENADE	Familiarization (3)	*	PLT		8	1	1 8
M2 50 CAL MG	Moving/Stationary	*	PLT		8	1	1 8

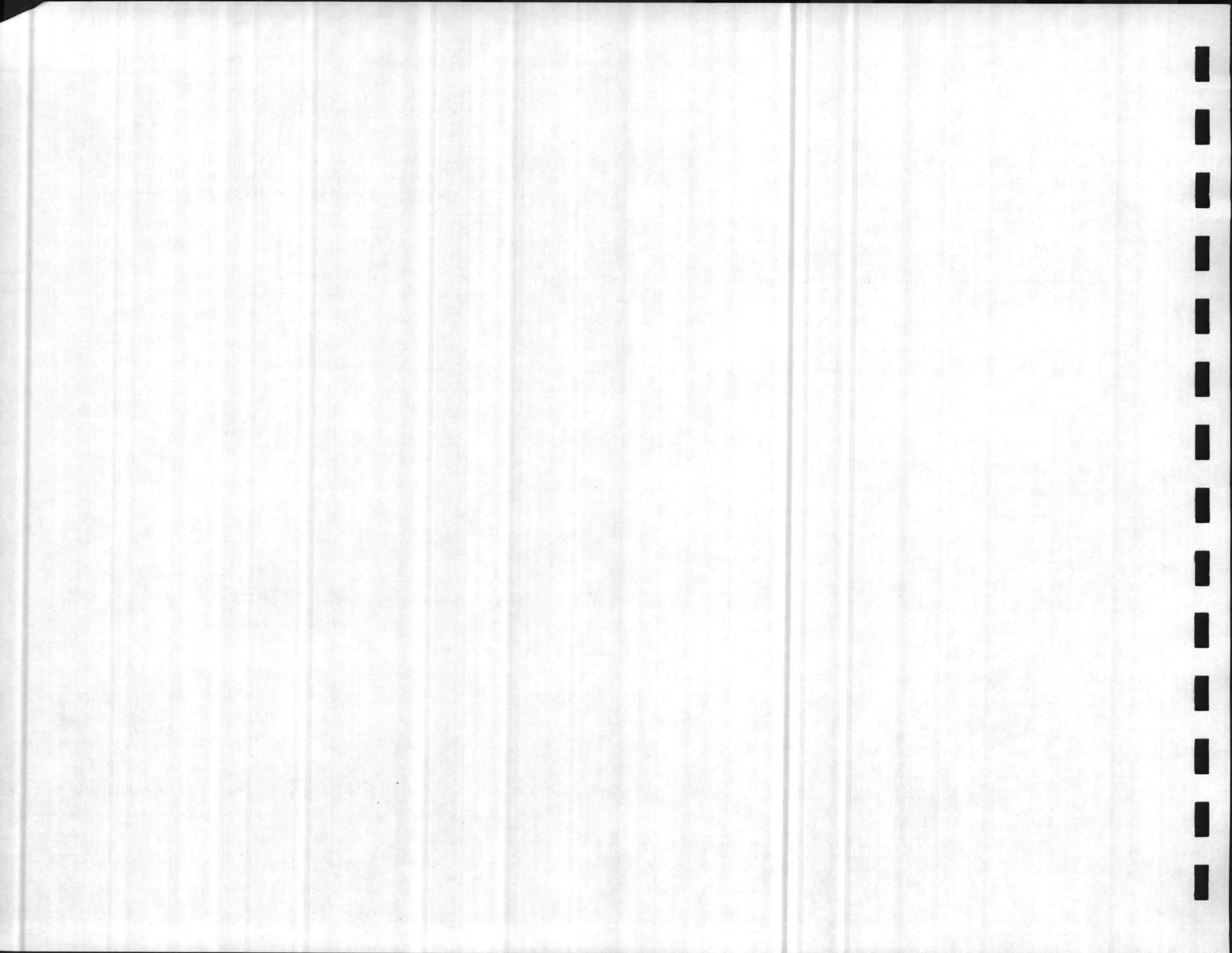
NOTES

- (1) Use 1 range 30 firing points 6 hours per day for 4 days.
- (2) Use 1 range 5 firing points 6 hours per day for 4 days.
- (3) Future requirement.



RANGE REQUIREMENTS FOR 8TH COMMUNICATION BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE *	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
RIFLE	Qualification	*	BN		1	5	5
PISTOL	Qual/Fam	*	DTL (80)		1	5	5
HAND GRENADE	Familiarization	*	CO		4	2	8
CREW SERVED	Familiarization	*	SECT		4	2	8

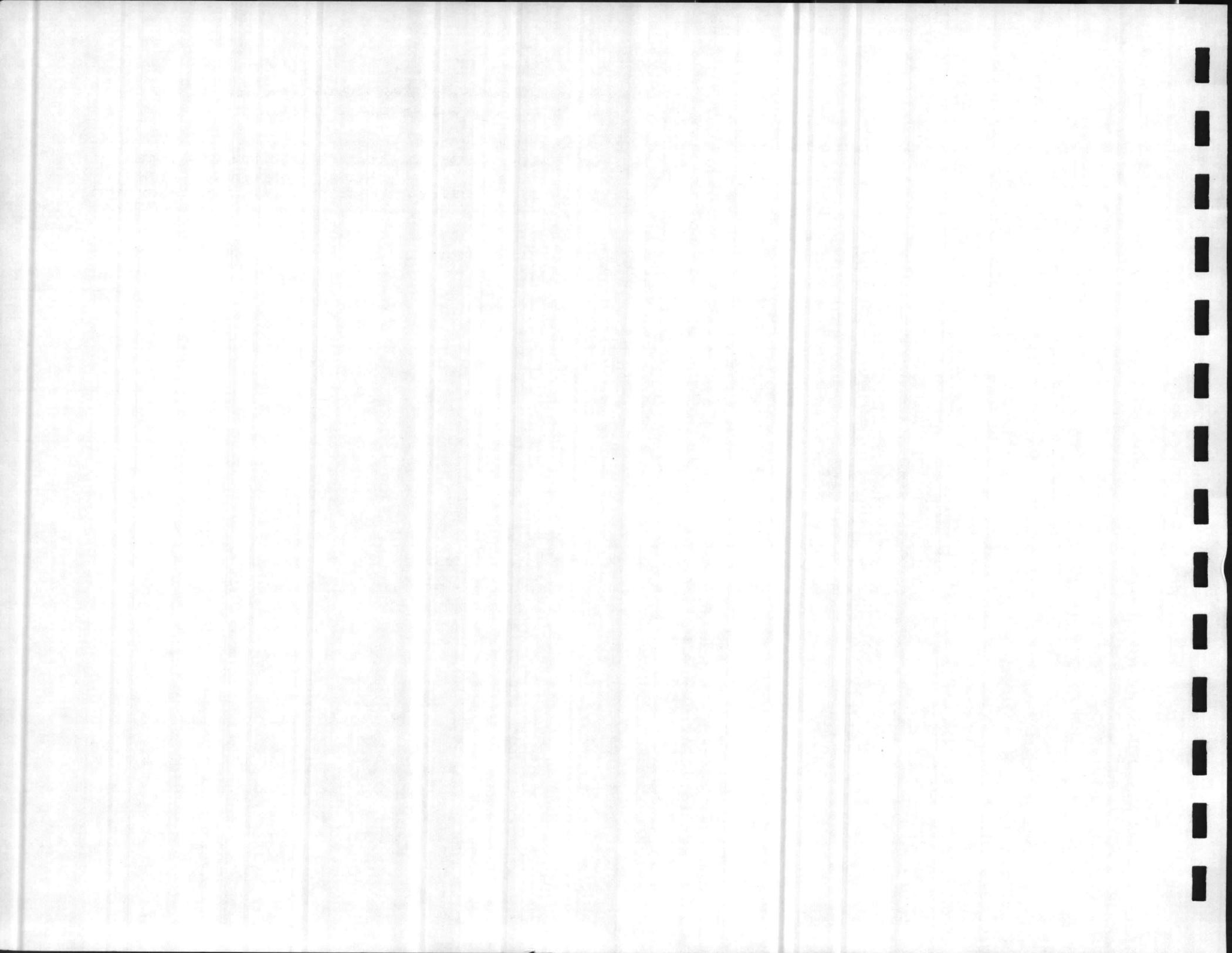


RANGE REQUIREMENTS FOR 2D LANDING SUPPORT BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE *	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
RIFLE	Qualification (1)	*	BN		1	4	4
PISTOL	Qualification (2,3)	*	DTL		1	4	4
HAND GRENADE	Familiarization (3)	*	PLT		8	1	8
M2 50 CAL MG	Moving/Stationary	*	PLT		8	1	8

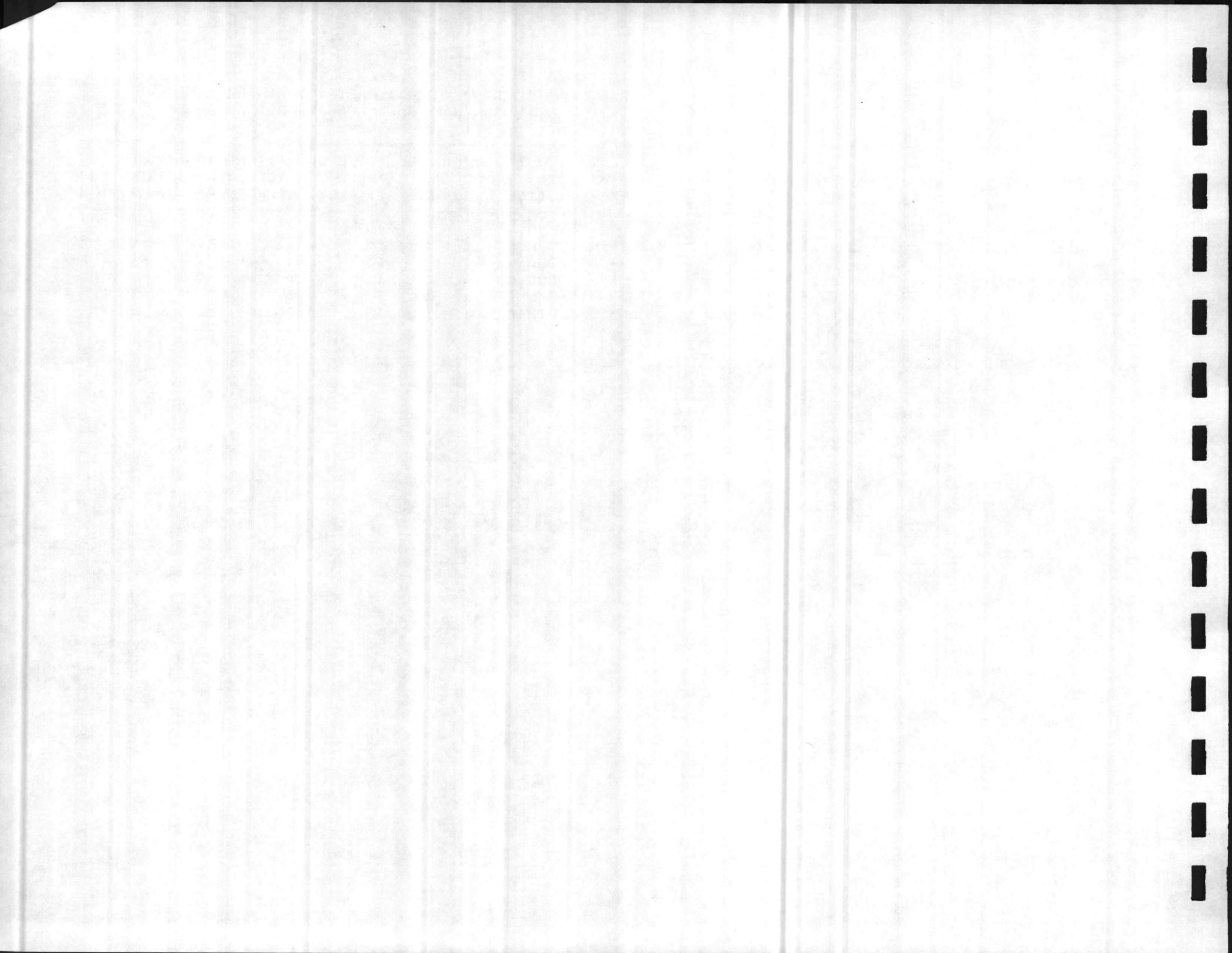
NOTES

- (1) Use 1 range 30 firing points 6 hours per day for 4 days.
- (2) Use 1 range 5 firing points 6 hours per day for 4 days.
- (3) Future requirement.



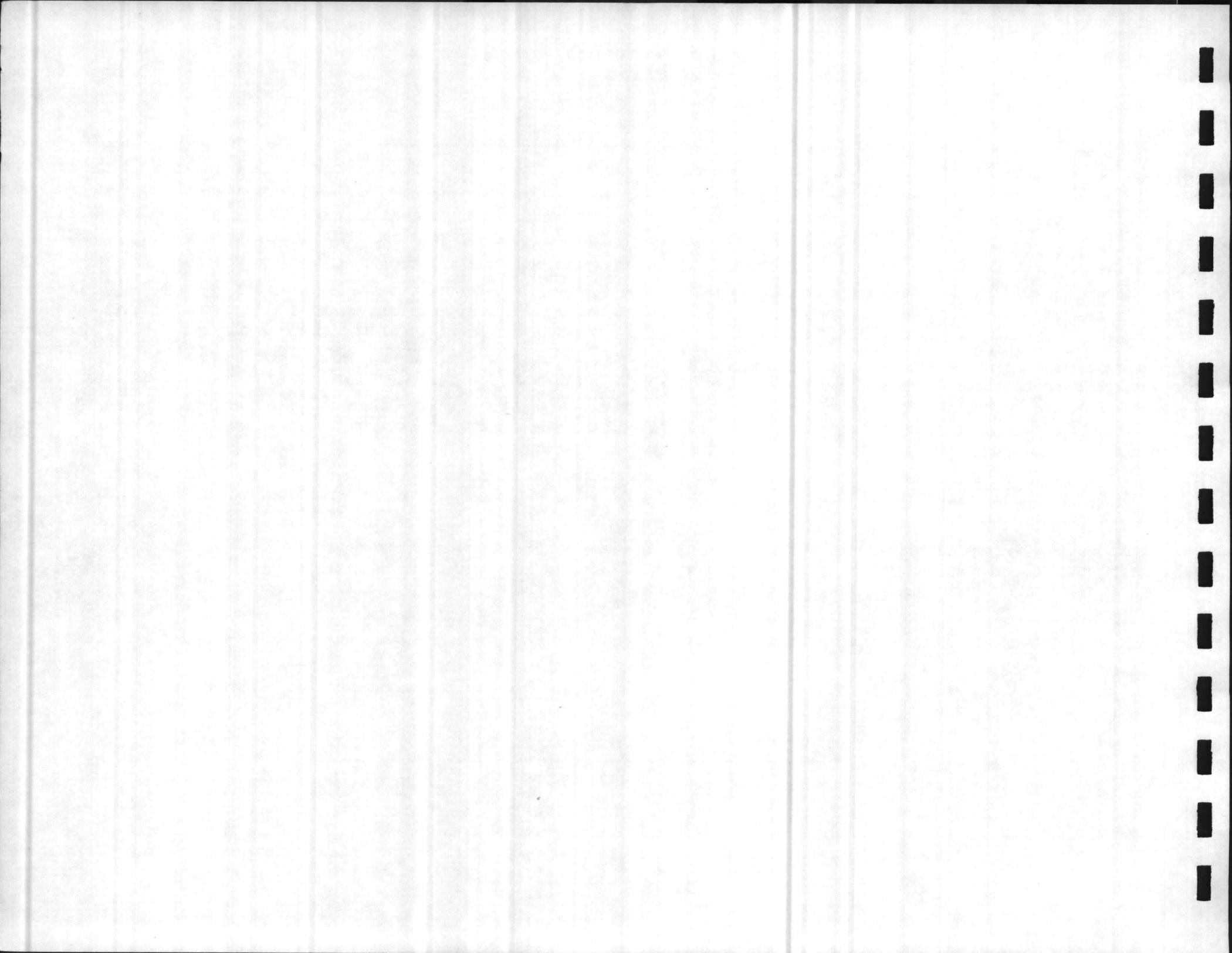
RANGE REQUIREMENTS FOR 2D RADIO BATTALION
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
RIFLE	Qualification	*	SQD		3	5	15
PISTOL	Qualification	*	SQD		3	3	9
HAND GRENADE	Familiarization	*	SQD		3	1	6
COMBAT	Proficiency	*	SQD		3	1	6
EXPLOSIVES	Proficiency	*	SQD		3	1	6

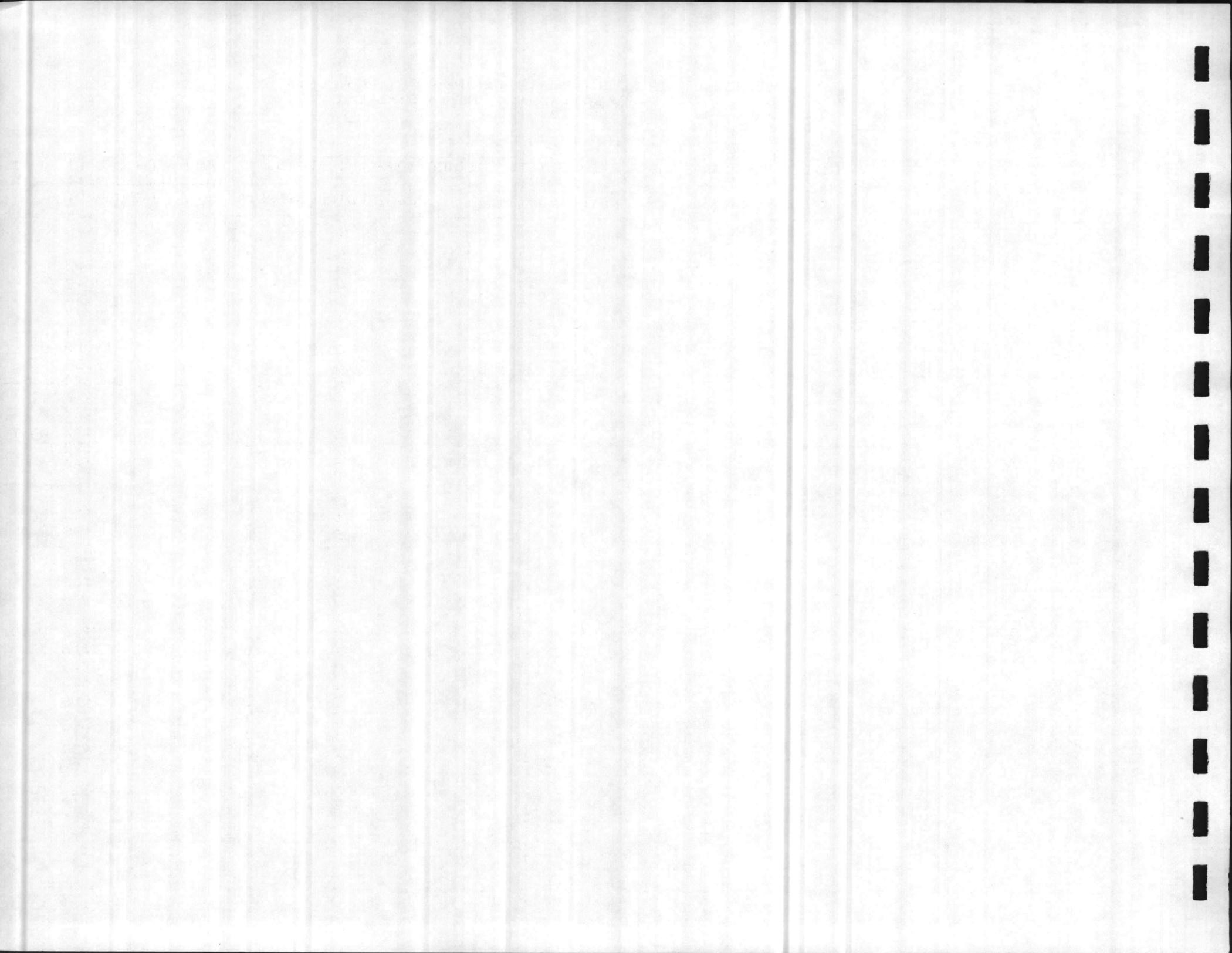


RANGE REQUIREMENTS FOR INFANTRY TRAINING SCHOOL
Camp Lejeune, North Carolina

RANGE TYPE	RANGE EXERCISE	LIVE * FIRE	UNIT SIZE	NO. OF UNITS	TIME ON RANGE (DAYS)	ITERATIONS REQUIRED PER YEAR	TOTAL TIME DAYS/YR
M16A2		*	PN	22.5	.05	24	27
M16A2		*	PN	37.5	.017	24	15.3
SAW		*	PN	15	.033	24	11.88
SAW & BZERO		*	PN	15	.05	24	18
SAW		*	PN	20	.017	24	8.16
SAW		*	PN	15	.033	24	11.88
RIFLES (BLANK FIRE)			PN	22.5	.05	24	27
RIFLES (LIVE FIRE)		*	PN	22.5	.05	24	27
ALL INFANTRY WEAPONS		*	PN	12	.075	24	21.6
M16A2 & BZERO		*	PN	12	.05	24	14.4
M203 GRENADE LAUNCHER		*	PN	12.5	.075	24	22.5
M60 MACHINE GUN		*	PN	4.375	.075	24	7.875
M60 MACHINE GUN		*	PN	11.66667	.017	24	4.760000
M60 MACHINE GUN		*	PN	7	.075	24	12.6
M60 MACHINE GUN		*	PN	8.75	.075	24	15.75
M60 MACHINE GUN		*	PN	5.833333	.017	24	2.38
M60 MACHINE GUN		*	PN	8.75	.025	24	5.25
M60 MACHINE GUN		*	PN	5.833333	.075	24	10.5
M60 MACHINE GUN		*	PN	22.5	.017	24	9.18
M29 81 MM MORTAR		*	PN	5.625	.2	24	27
M224 60 MM MORTAR		*	PN	5.625	.2	24	27
M224 60 MM MORTAR		*	PN	225	.033	24	178.2
DRAGON (LET)			PN	30	.2	24	144
M47 DRAGON		*	PN	40	.017	24	16.32
M73 LAAW		*	PN	7.5	.05	24	9
M72 & M73 LAAW		*	PN	30	.05	24	36
DEMOLITION		*	PN	12	.05	24	14.4
DEMOLITION		*	PN	3	.1	24	7.2
83MM SMAW		*	PN	20	.008	24	3.84
83 MM SMAW		*	PN	6.666667	.033	24	5.28
M70 TOW II		*	PN	7.5	.2	24	36
TOW II		*	PN	30	.008	24	5.76
MK19 40 MM MACHINE GUN		*					19.8

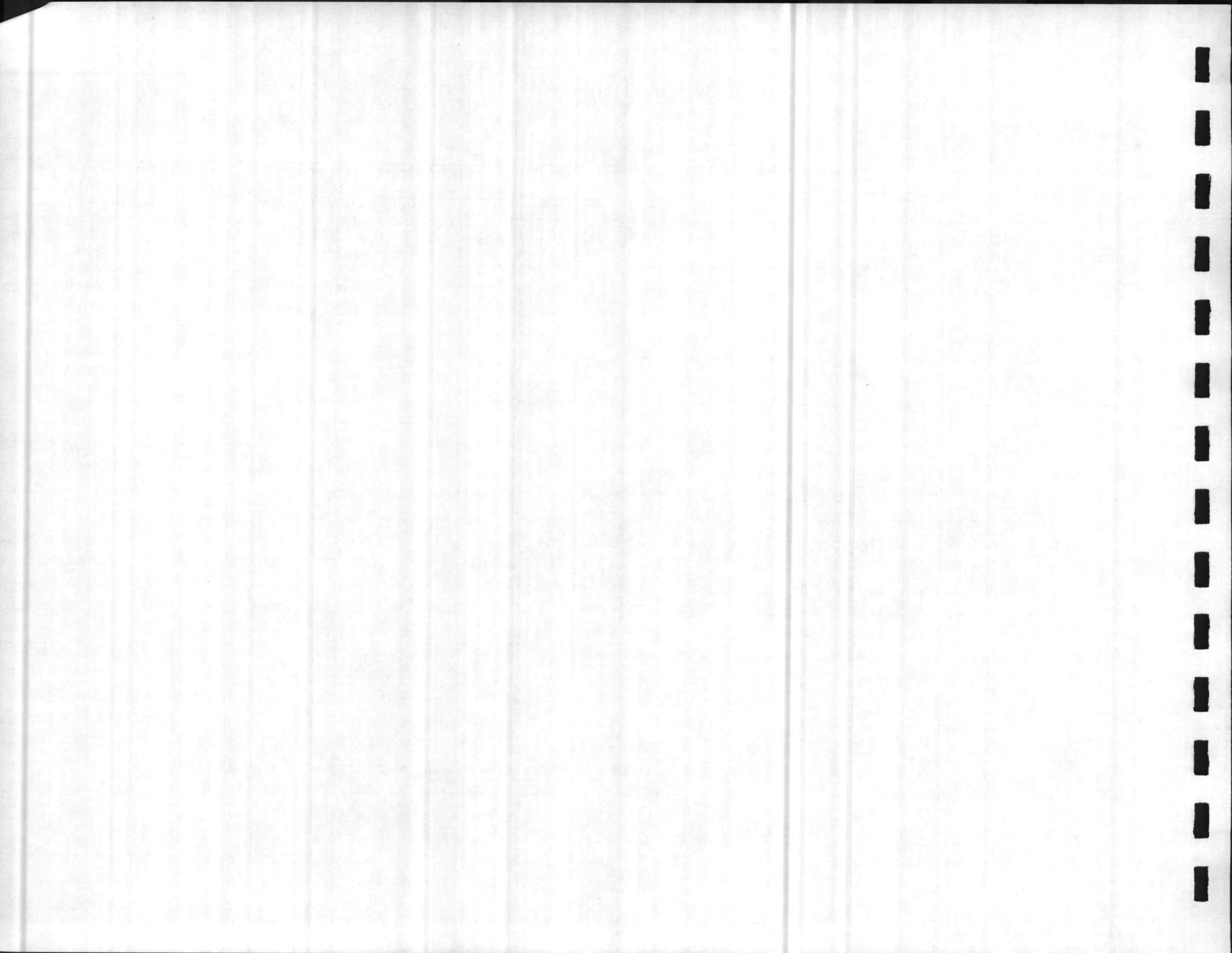


APPENDIX B
MANEUVER REQUIREMENTS FORMS



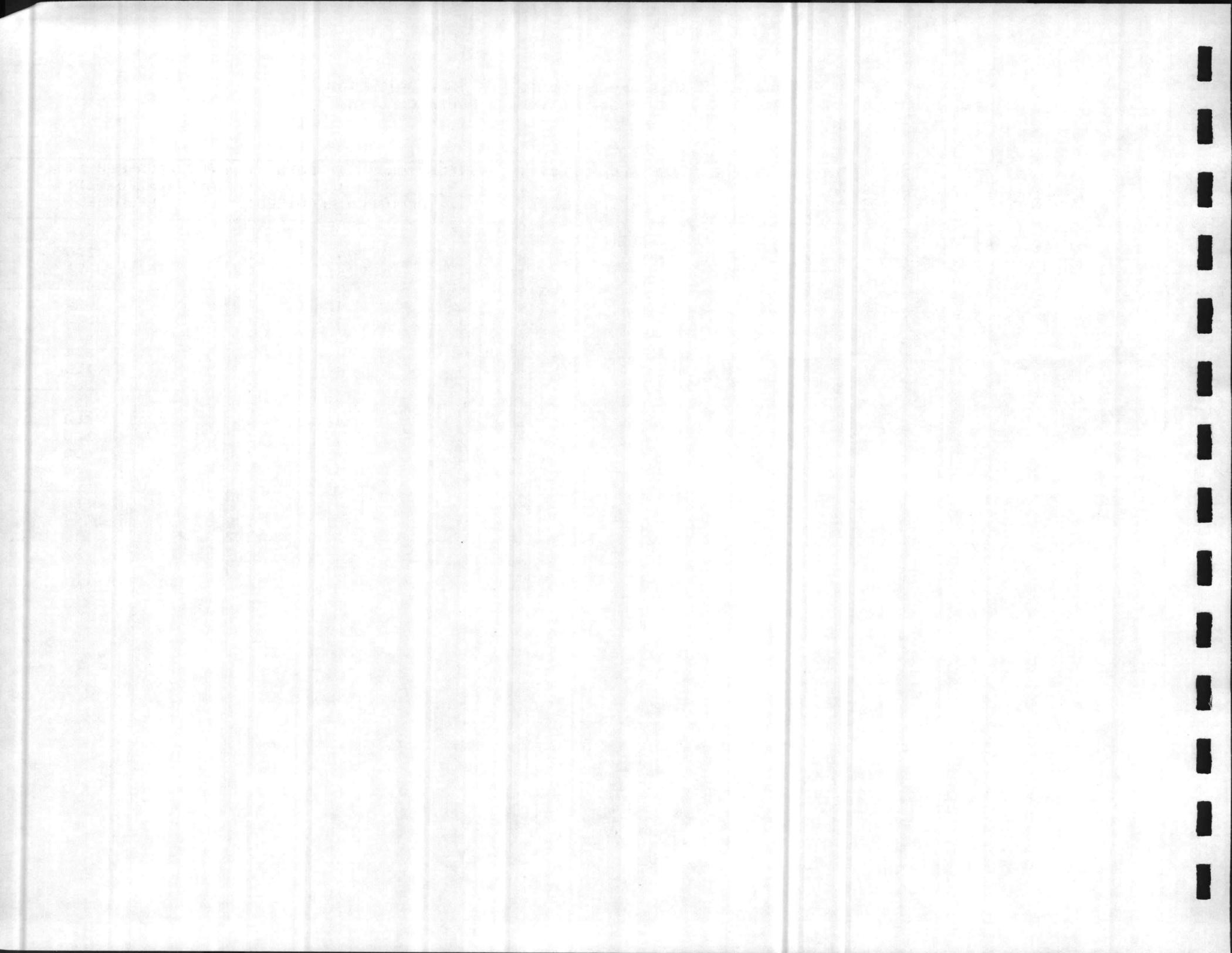
MANEUVER AREA REQUIREMENTS FOR INFANTRY REGIMENTS
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
Compass Course		160	4		1	640
Patrolling		154	4		6	18480
Movement to Contact		154	4		6	1108.8
Envelopment Attack		154	4		6	1108.8
Defense		154	4		6	3696
Airmobile Raid		154	.5		1	77
Amphibious Raid		154	.5		2	154
Frontal Assault		154	4		6	11088
Obstacle Course		160	.005		26	6.24
Day Movement		160	.0088		6	2.5344
COMPANY MANEUVERS						
Movement to Contact		33	10		2	198
Envelopment Attack		33	10		2	198
Defense		33	10		2	660
Helio-borne Assault		33	2		1	66
Surface Assault		33	2		1	66
MOUT		33	1		1	33
Frontal Attack		33	10		2	198
Mechanized Operations		33	9		1	297
NBC Training		55	1		1	55
Retrograde Operation		33	10		1	165
BATTALION MANEUVERS						
Movement to Contact		11	36		2	237.6
Day Attack		11	36		2	237.6
Defense		11	36		2	237.6
Mechanized Operations		11	48		1	1056
Amphibious Operations		11	48		1	1056
Helicopter Attack		11	36		1	396
MOUT		11	4		1	44
Retrograde Operation		11	48		2	528
REGIMENT MANEUVERS (2 BNs)						
Regimental Landing Team Ops		3	64		1	576



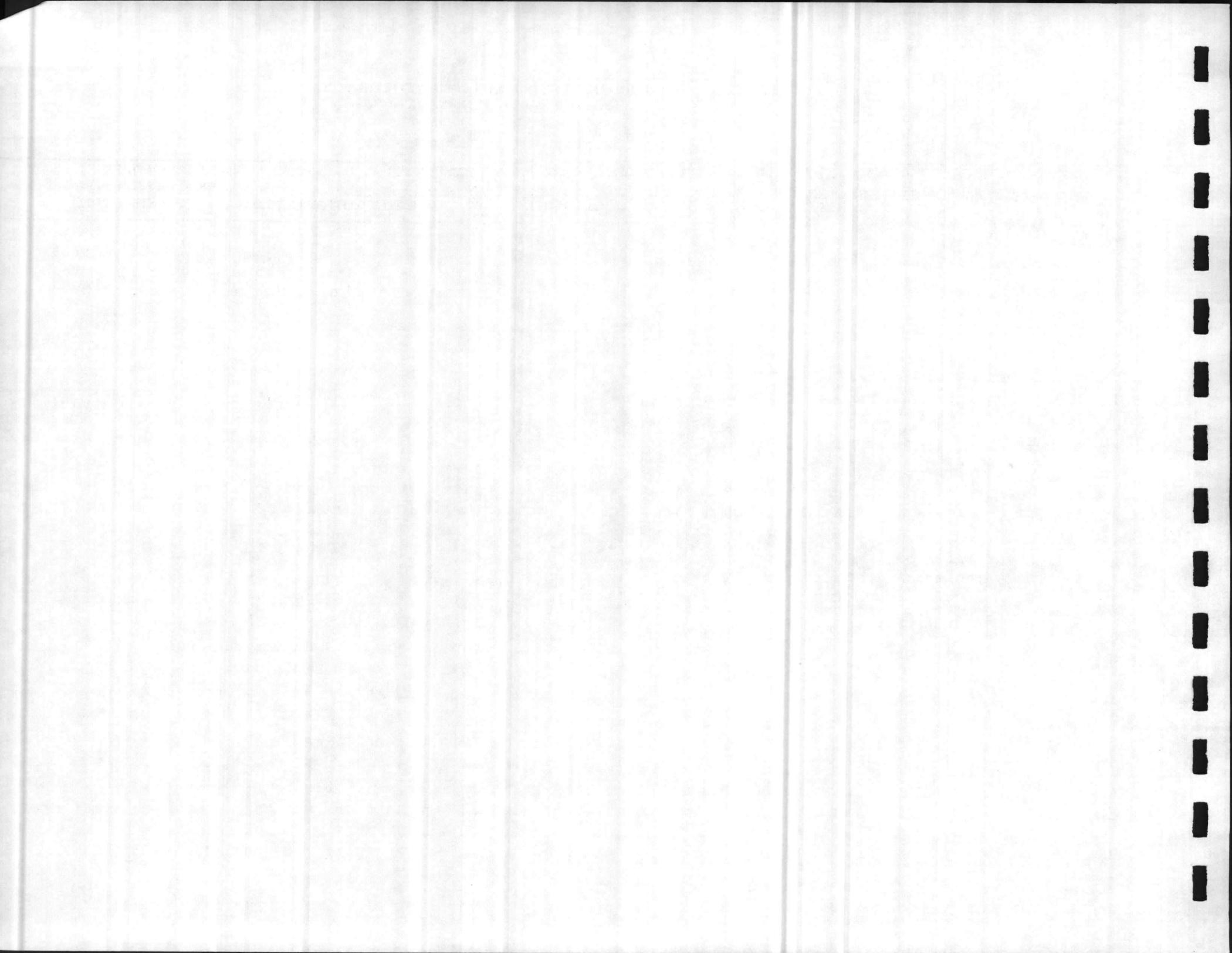
MANEUVER AREA REQUIREMENTS FOR ARTILLERY REGIMENT
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
BATTERY EXERCISES						
Fire Exercise DS 155	*	9	9	96	1	7776
Fire Exercise GS 155	*	3	6.4	96	1	1843.2
Fire Exercise 155 SP	*	3	6.4	96	1	1843.2
Fire Exercise 8" SP	*	3	7.6	96	1	2188.8
RSOP DS155		9	18	96	1	15552
RSOP GS 155		3	12.8	96	1	3686.4
RSOP 155 SP		3	12.8	96	1	3686.4
RSOP 8" SP		3	15.2	96	1	4377.6
BATTALION EXERCISES						
Fire Exercise DS	*	3	36	8	1	864
Fire Exercise GSR	*	1	25	8	1	200
Fire Exercise GS	*	1	50	8	1	400
REGIMENTAL EXERCISE						
Fire Exercise	*	1	183	2	10	3660



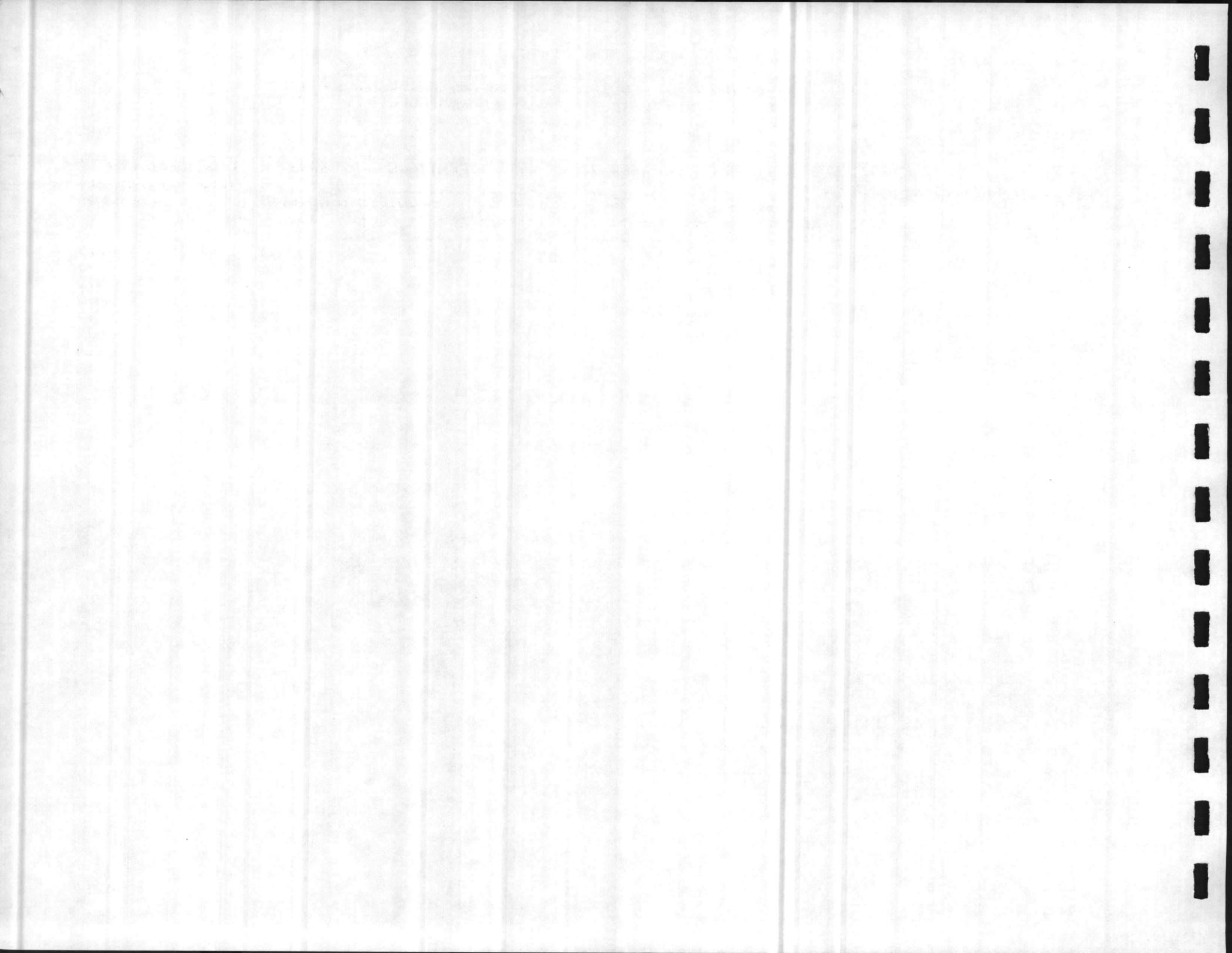
MANEUVER AREA REQUIREMENTS FOR TANK BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
TANK PLATOON						
Movement to Contact		12	5	4	1	240
Hasty Attack		12	2	4	1	96
Active Defense		12	10	4	1	480
Defense of Built Up Area		12	1	4	1	48
TANK COMPANY						
Movement to Contact		4	16	4	1	256
Hasty Attack		4	8	4	1	128
Deliberate Attack		4	18	4	1	288
Active Defense		4	8	4	1	128
Delay		4	8	4	1	128
Prepare Strong Point		4	8	4	1	128
Defense of a Built Up Area		4	1	4	1	16
Breaching Mine Field		4	4	4	1	64
TANK BATTALION						
Movement to Contact		1	72	2	1	144
Hasty Attack		1	21	2	1	42
Deliberate Attack		1	36	2	1	72
Active Defense		1	65	2	1	130
Delay		1	90	2	1	180
Defense of a Built Up Area		1	9	2	1	18



MANEUVER AREA REQUIREMENTS FOR LAV BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
LAV COMPANY						
Driving and Maneuver		5	4	4	14	1120
Hard Surface Driving		5	0	4	.5	0
Night Driving		5	4	4	4.2	336
Bound and Overwatch		5	4	4	1	80
Raid		5	4	4	1	80
Recovery		5	1	4	1	20
Helicopter Lift		5	1	12	1	60
LAV BATTALION						
Raid		1	9	2	1	18

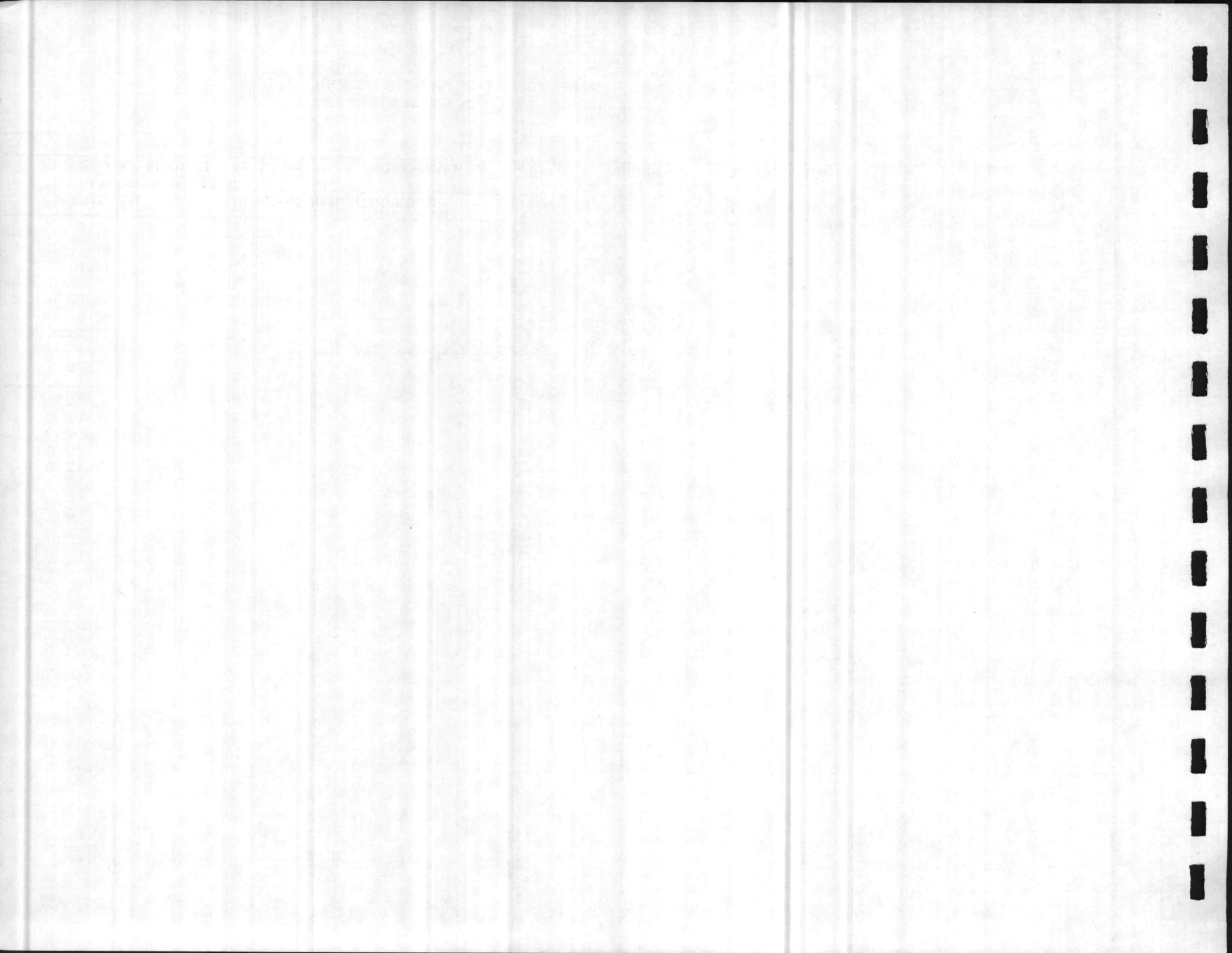


MANEUVER AREA REQUIREMENTS FOR RECONNAISSANCE BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
RECON TEAM						
Bridge Rep		36	.5	12	.2	43.2
HLZ Rep		36	.5	12	.2	43.2
DZ Rep		36	.5	12	.2	43.2
Route Rep		36	.5	12	.2	43.2
Conbe Rep		36	.5	12	.2	43.2
Comex (1)		36	.5	12	2	432
Tactical Beach Crossing (2)		36	2	12	1	864
Patrolling (3)		36	9	12	3	11664
Riverine Ops (4)		36	4	12	2	3456
Raid (4a)		3	25	2	7	1050
RECON SQUAD						
Patrolling (5)		18	80	6	5	43200
RECON PLATOON						
Land Navigation (6)		9	8	2	.5	72
RECON BATTALION						
Field Exercise (8)		1	1xMCB	1	5	0

NOTES

- (1) 2 days, 2 nights
- (2) 1 day, 1 night
- (3) 3 days, 3 nights
- (4) 2 days, 2 nights
- (4a) 7 days, 7 nights
- (5) 5 days, 5 nights
- (6) 5 hrs day, 5 hrs night
- (7) 2 hrs day, 2 hrs night
- (8) 5 days, 5 nights

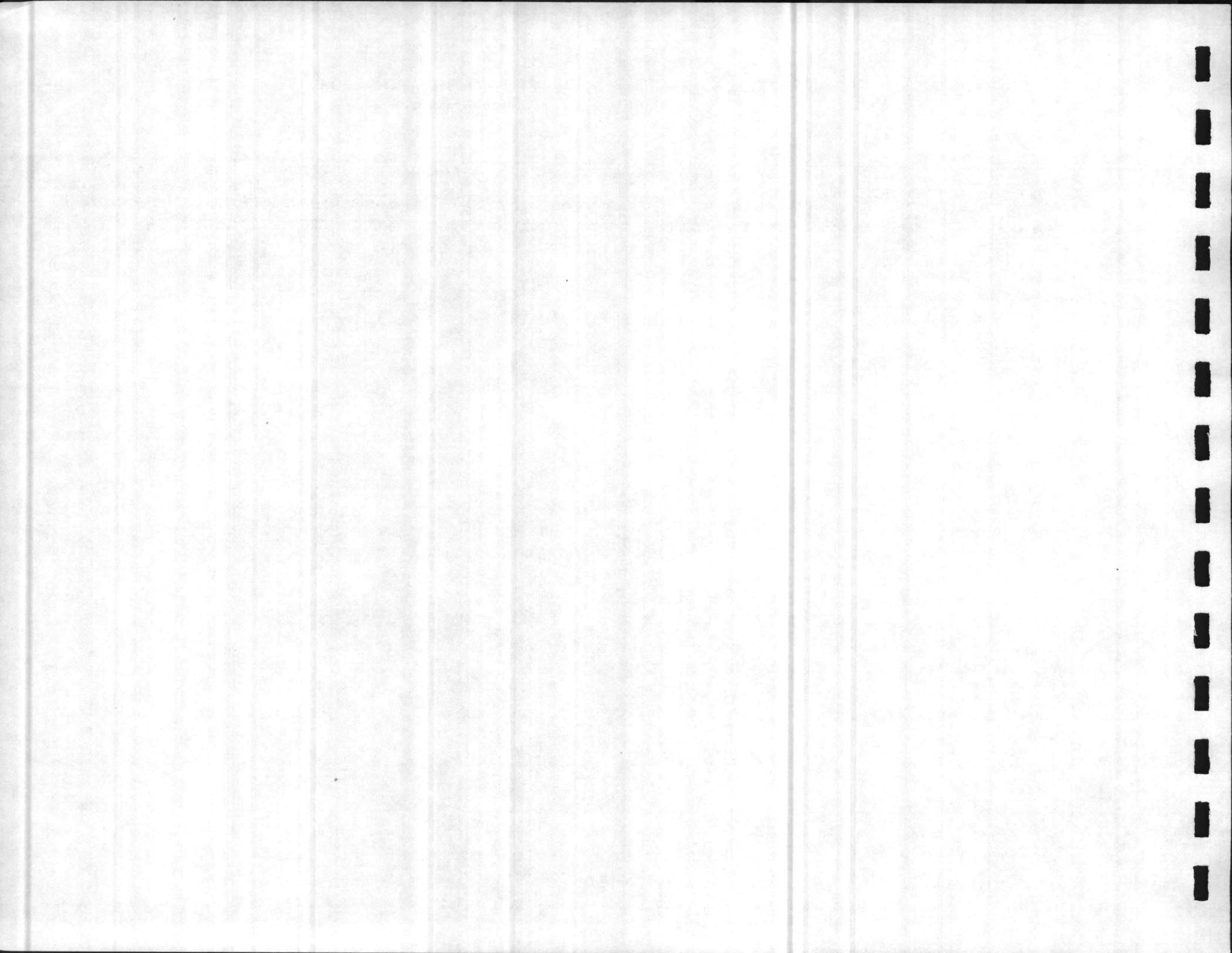


MANEUVER AREA REQUIREMENTS FOR AAV BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
AAV PLATOON						
Movement to Contact		17	5		4	.3
Hasty Attack		17	2		4	.3
Active Defense		17	10		4	.3
Defense of Built Up Area		17	1		4	.3
River Crossing						
Land		17	12		12	.3
Amphibious Landing						
Land		17	1		24	.8
AAV COMPANY						
Movement to Contact		4	16		1	.4
Hasty Attack		4	8		1	.4
Deliberate Attack		4	18		1	.4
Active Defense		4	8		2	.4
Delay		4	8		1	.4
Prepare Strong Point		4	8		2	.4
Breaching Mine Field		4	4		2	.2
River Crossing (1)						
Land		4	36		2	.3
Amphibious Landing (2)						
Land		4	2		4	.3
Hard Surface Driving (3)		4	0		4	.4
AAV BATTALION						
Movement to Contact		1	72		1	.6
Hasty Attack		1	21		1	.6
Deliberate Attack		1	36		1	.6
Active Defense		1	65		2	.6
Delay		1	90		1	.6
River Crossing (4)						
Land		1	72		4	.5
Amphibious Landing (5)						
Land		1	6		2	.5

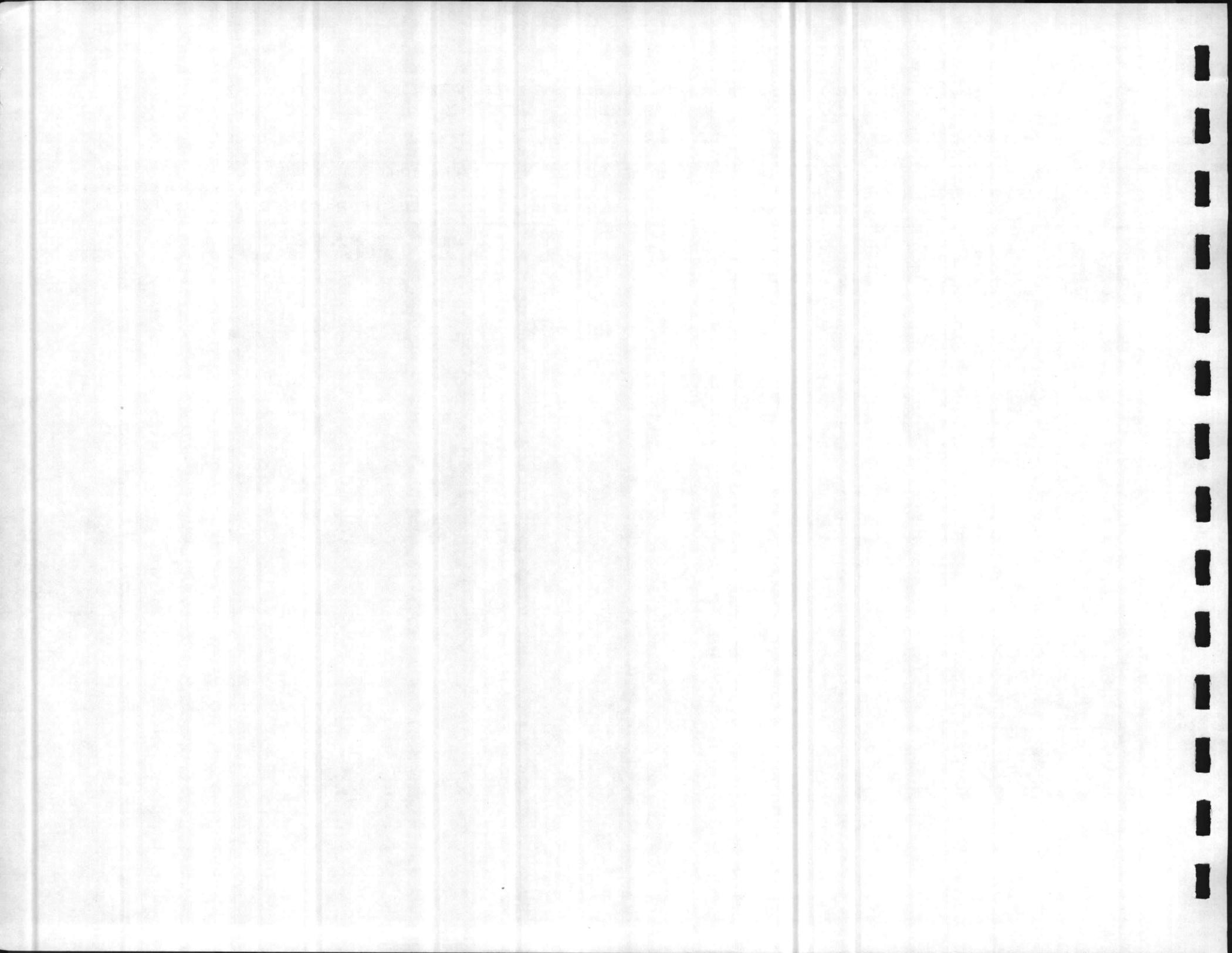
NOTES

- (1) 1 of 2 crossings at night
- (2) 1 of 3 landings at night
- (3) 4 day, 4 night
- (4) 4 day, 4 night
- (5) 2 day, 2 night



MANEUVER AREA REQUIREMENTS FOR MARINE AIR WING
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km ²) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km ² /days) REQUIRED
External Lift		1	9	1000	.15	1350
Confined Area Landing		1	9	670	.15	904.5
Bluebird-Other Demo		1	.2	15	.1	.3

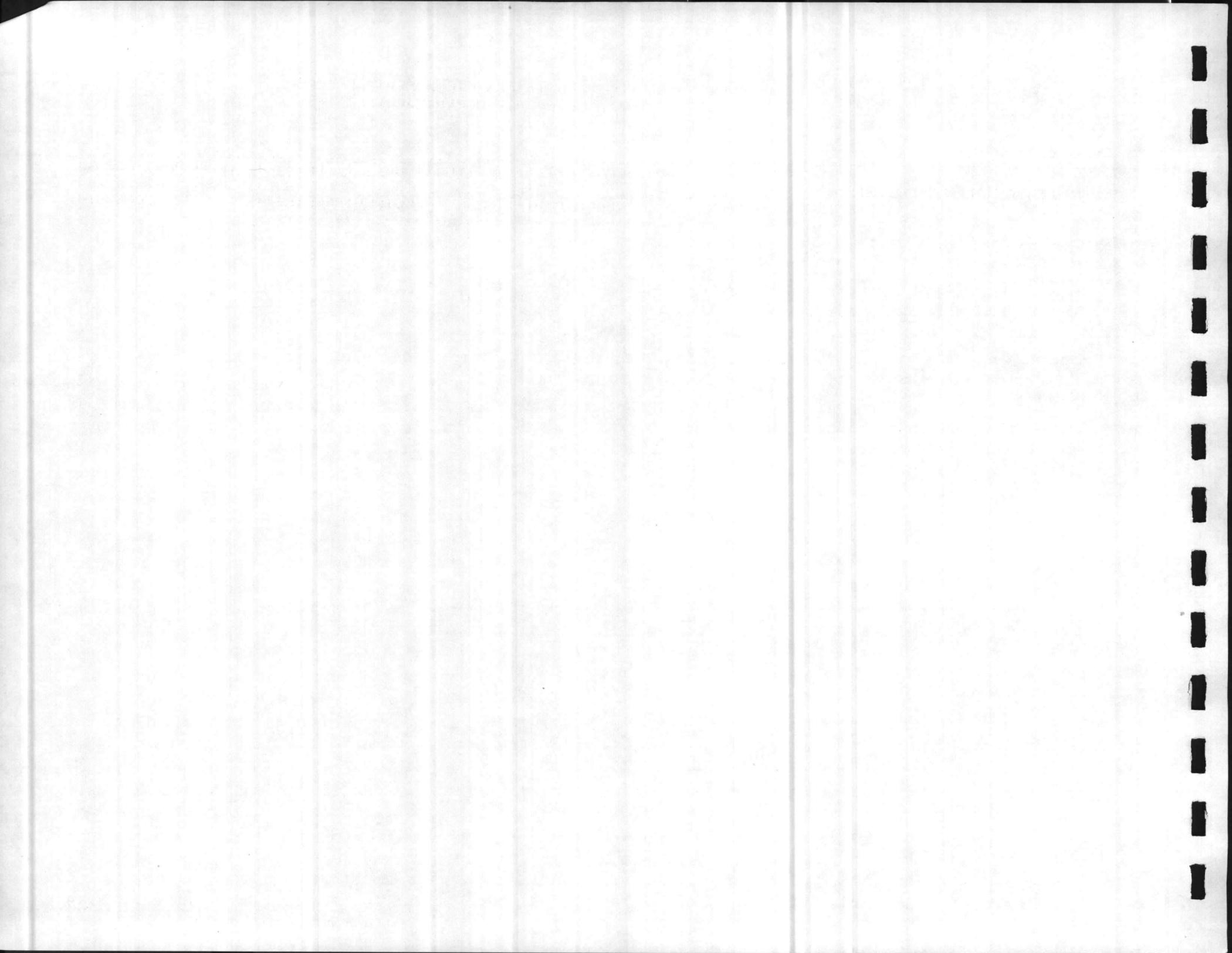


MANEUVER AREA REQUIREMENTS FOR MCSSS
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
MOTOR VEHICLE OPERATORS COURSE						
M151 (1)		1	1	17	.4	6.8
M1008 (1)		1	1	17	.4	6.8
M998 (1)		1	1	17	.4	6.8
M59A26 (1)		1	1	17	.4	6.8
MB13(1)		1	1	17	.4	6.8
M900 (1)		1	1	17	.4	6.8
LVS (1)		1	1	17	1.6	27.2
TACTICAL CONVOY (1)		1	16	6	.4	38.4
FIELD MESSING (2)		1	1	17	1	17

NOTES

- (1) 4 hrs day, 4 hrs night
- (2) 1 day, 1 night

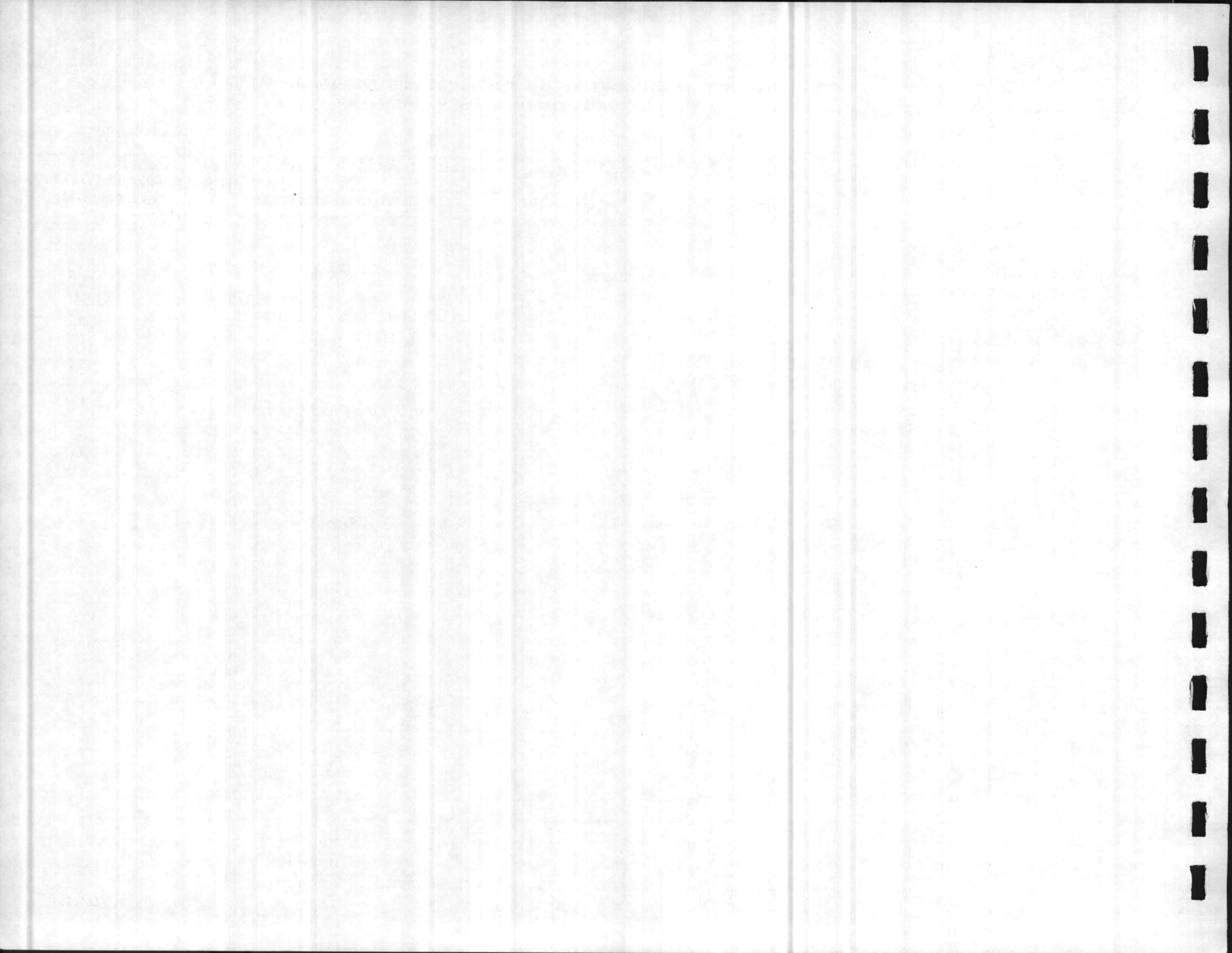


MANEUVER AREA REQUIREMENTS FOR FIELD MEDICAL SCHOOL
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE * :	NO. OF UNITS :	LAND AREA (km2) :	ITERATIONS :	DAYS :	LAND AREA PER TASK (km2/days) :			
:	FIRE :	:	REQUIRED:	REQUIRED:	REQUIRED:	REQUIRED:			
MEDICAL FIELD EXERCISE (1) Map and Compass (Land Nav) Infiltration Medical Overload		1	4	2	7	5	140	70	
RAPID DEPLOY. HOSPITAL EX (2)		1	9	6	2	2	12	216	144

NOTES

- (1) 5 days/5 nights
- (2) 12 days/12 nights

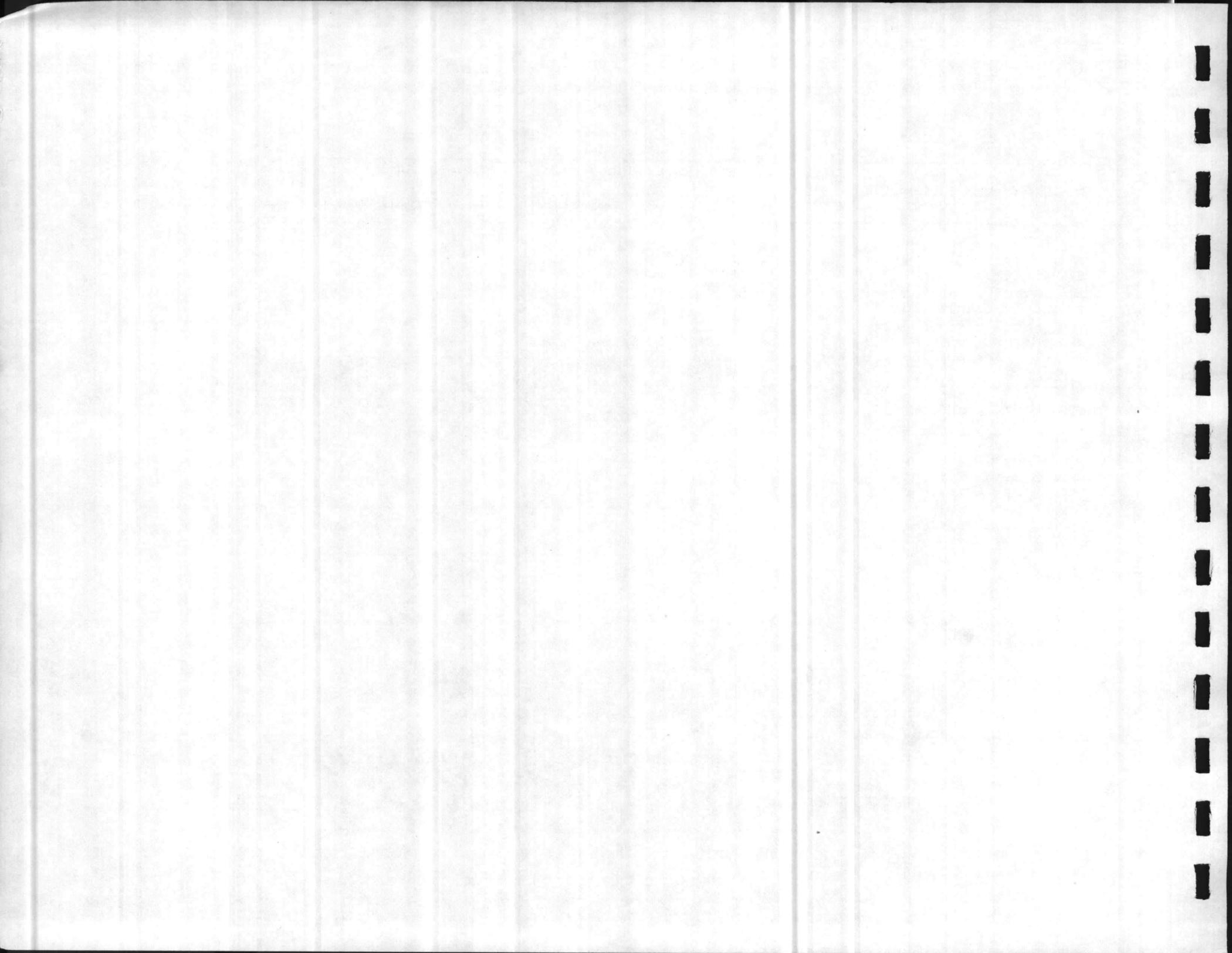


MANEUVER AREA REQUIREMENTS FOR 2D COMBAT ENGINEER BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
ENGINEER PLATOON						
Land Navigation (1)		9	1	1	3	27
Infantry Tactics (2)		9	1	1	5	45
Engineer Recon (3)		9	10	1	5	450
Field Fortification		9	1	1	3	27
Rigging		9	1	1	3	27
Night Infiltration (4)		9	.5	1	1	4.5
Obstacle Const./Breaching (5)		9	2	2	5	180
Bridging		9	1	1	3	27
ENGINEER FIELD EXERCISE (6)	*	1	49	2	10	980

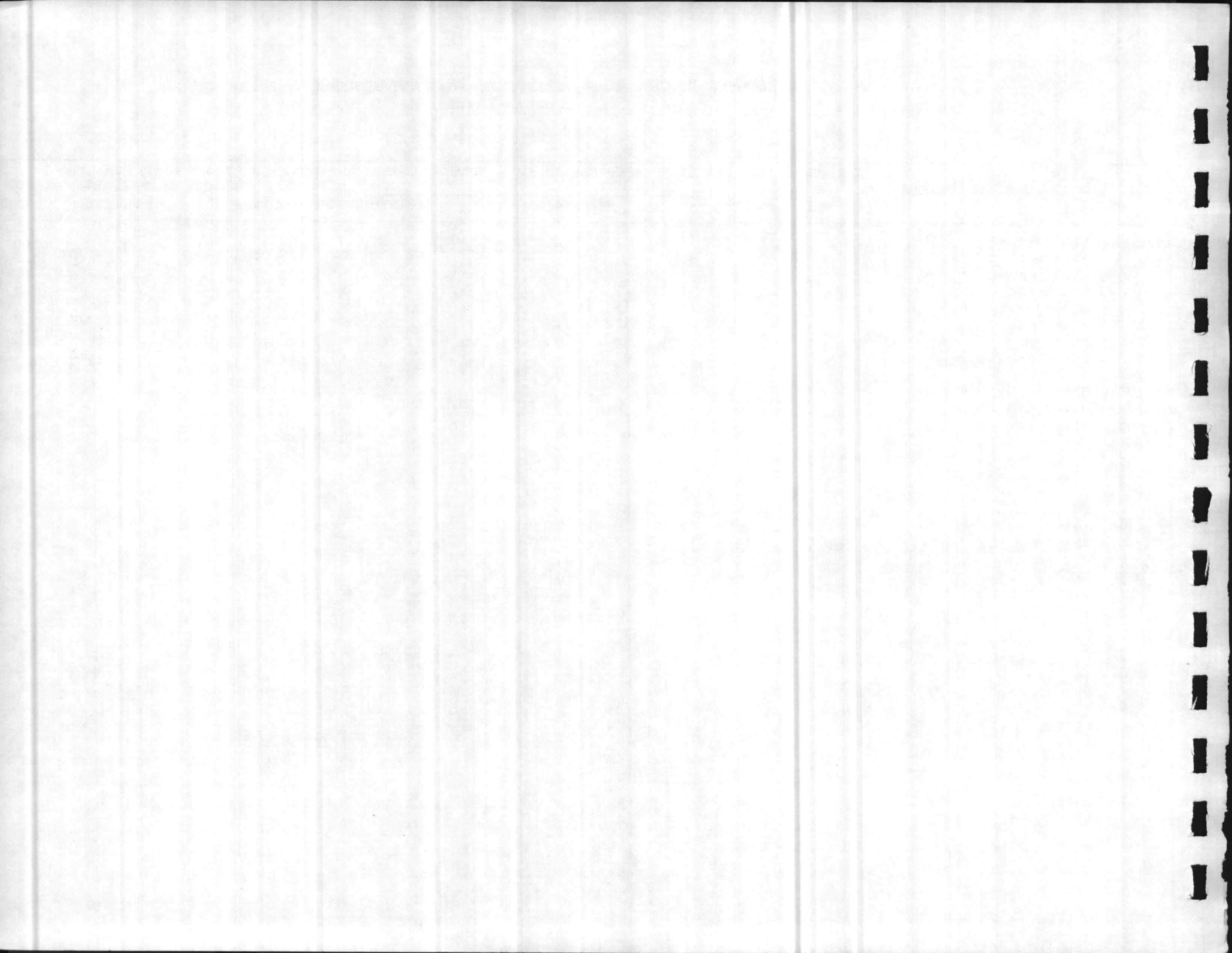
NOTES

- (1) 3 days/3 nights
- (2) 5 days/5 nights
- (3) 5 days/5 nights
- (4) 4 hrs night
- (5) 5 days/5 nights
- (6) 10 days/10 nights



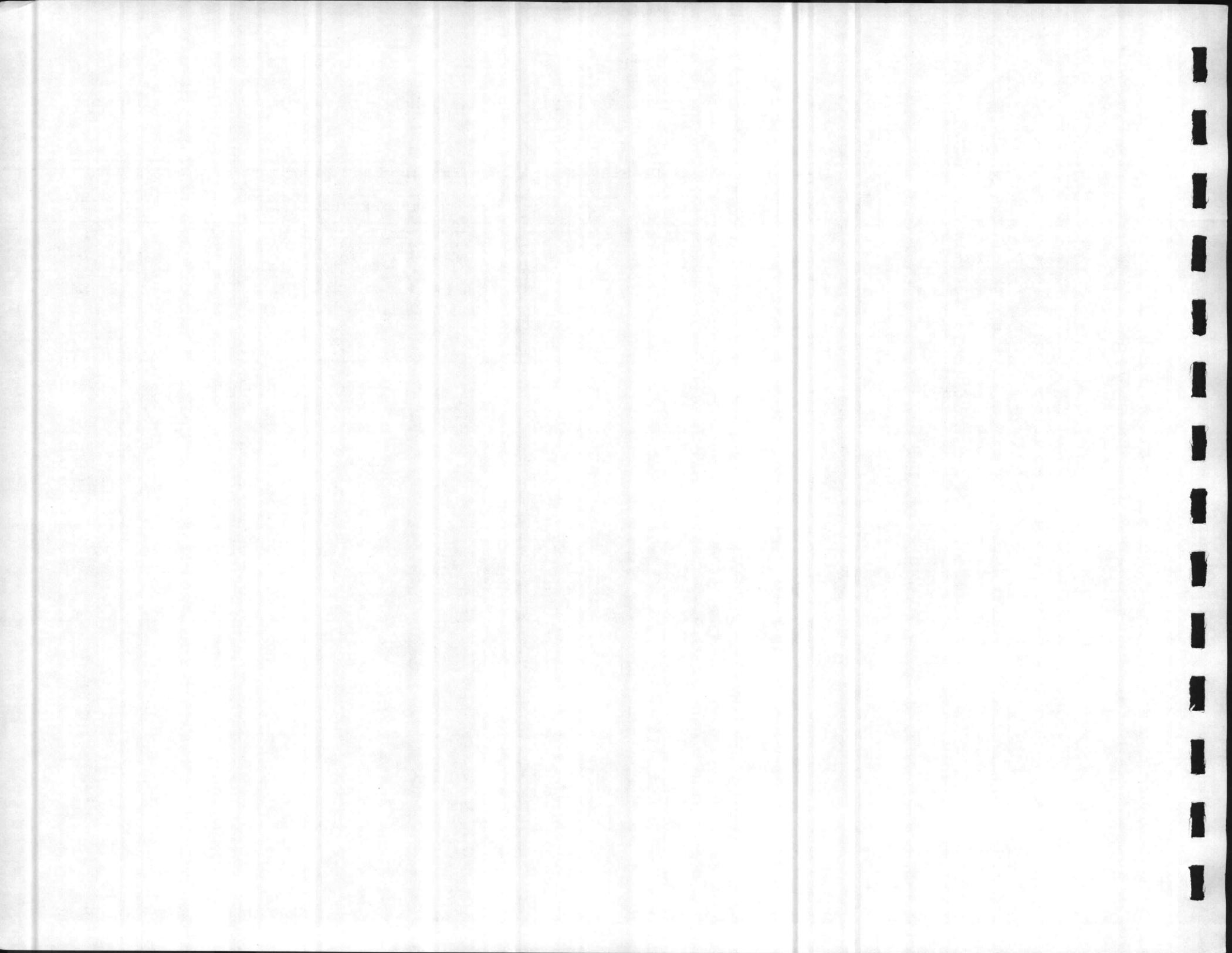
MANEUVER AREA REQUIREMENTS FOR DIVISION SCHOOLS
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
SQUAD LEADER COURSE						
Patrolling (1)		1	25	6	5	750
Land Nav (2)		1	25	6	1	150
Movement		1	1	6	1	6
Helo Operations (3)		1	4	6	1.7	40.8
Raid (4)		1	14	6	2	168
Mech Operations		1	4	6	1.2	28.8
Off/Defen operations (5)		1	2	6	1	12
NCO LEADERSHIP						
Land Nav (6)		1	25	9	1	225
SCOUT/SNIPER						
Land Nav (7)		1	25	5	1	125
Concealment (8)		1	5	5	2.4	60
Stalk (9)		1	15	5	2.4	180
Hide/Constr (10)		1	6	5	1	30
Urban Sniping (11)		1	6	5	1.8	54
Mission (12)		1	20	5	1	100
PLATOON SGT COURSE						
Patrolling (13)		1	25	6	5	750
Land Nav (14)		1	25	6	1	150
Movement (15)		1	1	6	.4	2.4
Helo Operations (16)		1	4	6	1	24
Raid (17)		1	14	6	2	168
Mech Operations (18)		1	4	6	.4	9.6
Off/Defen operations (19)		1	2	6	1	12



MANEUVER AREA REQUIREMENTS FOR 8TH ENGINEER SUPPORT BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
BRIDGE PLATOON						
River Crossing		3	2	10	5	300
ALL PLATOONS						
Perimeter Defense		29	1	1	2	58
BRIDGE COMPANY						
River Crossing		1	3	4	4	48
BULK FUEL COMPANY						
Bulk Fuel Ops		2	5	1	7	70
ENGINEER COMPANY						
Engineer Company		4	3	1	10	120
ENGINEER BATTALION						
Engineer Ops		1	20	1	14	280

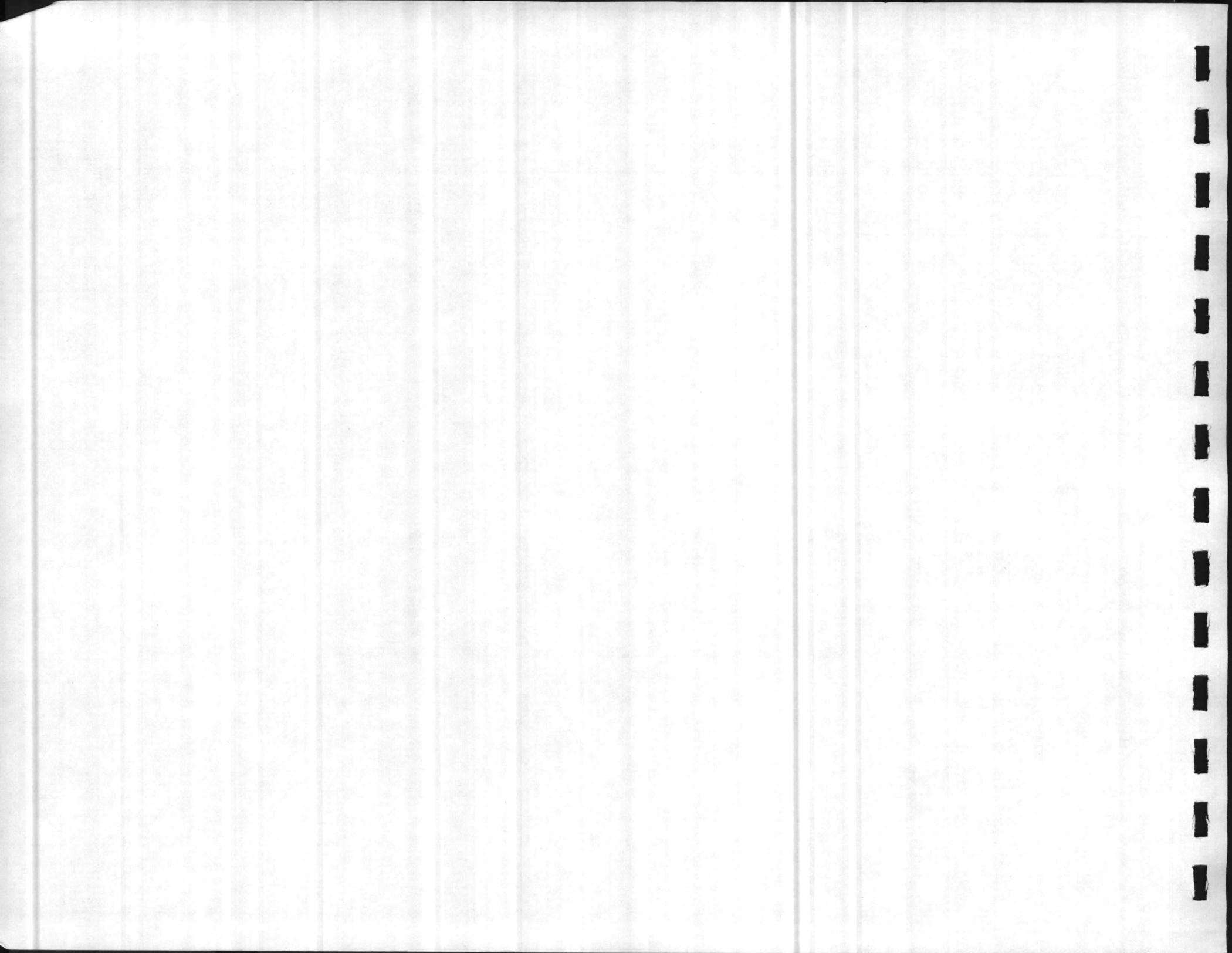


MANEUVER AREA REQUIREMENTS FOR 8TH MOTOR TRANSPORT BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km ²) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km ² /days) REQUIRED
TRUCK PLATOON						
Convoy Operation (1,3,4)		6	16	6	.5	288
Active Defense (1,3,4)		6	16	6	.5	288
Rough Terrain Driving (1,2,3,4)		6	16	6	.6	345.6
TRUCK COMPANY						
Convoy Operations (1,3,4)		1	12	3	.5	18
Active Defense (1,3,4)		1	12	3	.5	18
Rough Terrain Driving (1,3,4)		1	12	3	.6	21.6
TRANSPORT PLATOON						
Convoy Operation (1,3,4)		3	12	6	.5	108
Active Defense (1,3,4)		3	12	6	.5	1080
Rough Terrain (1,3,4)		3	12	6	.6	129.6
TRANSPORT COMPANY						
Convoy Operation (1,3,4)		1	12	3	.5	18
Active Defense (1,3,4)		1	12	3	.5	18
Rough Terrain (1,3,4)		1	12	3	.6	21.6

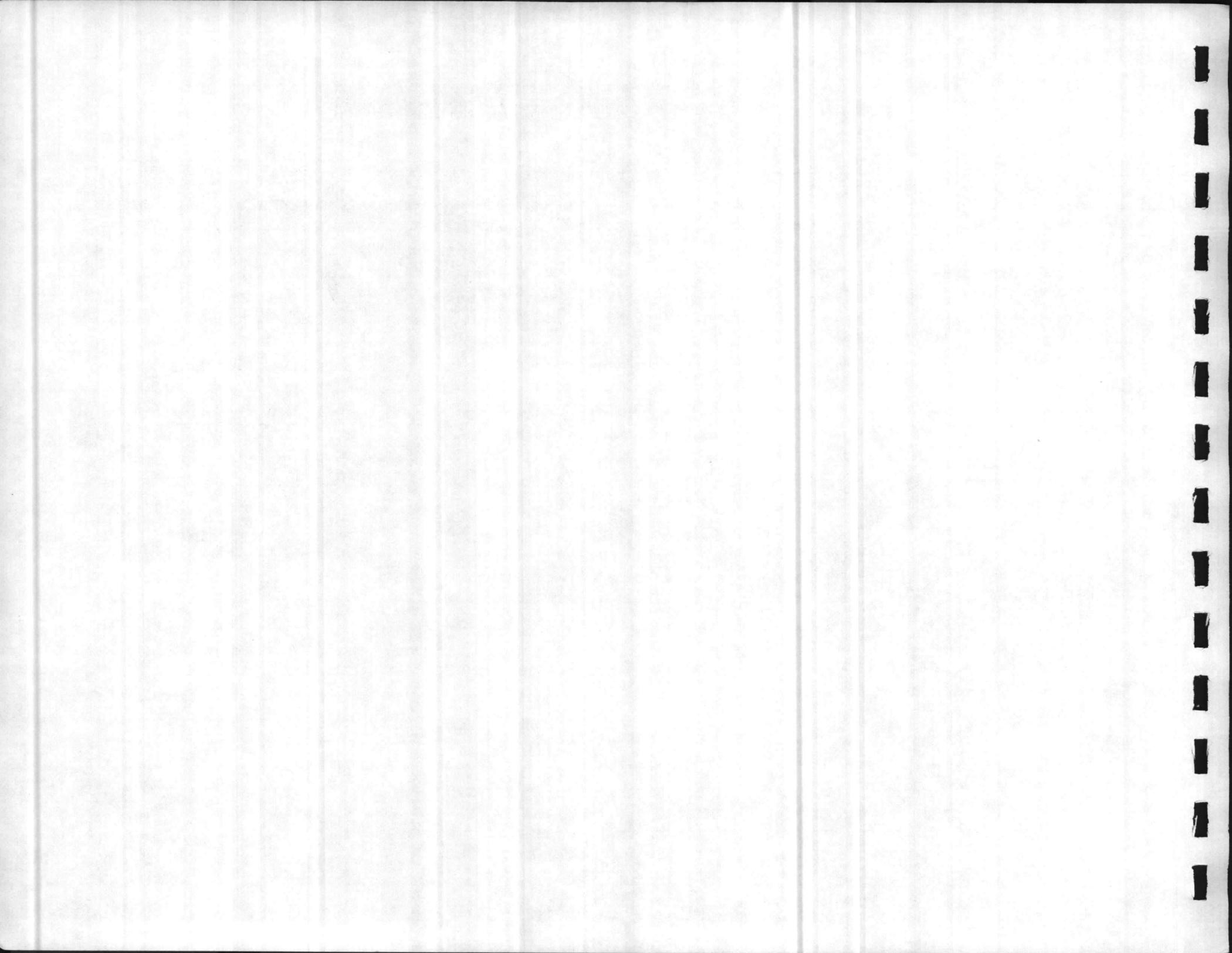
NOTES:

- (1) Future Requirements
- (2) Night Hours
- (3) If extensive road network exists, area requirements will be less.
- (4) Require hardsurface or improved dirt road.



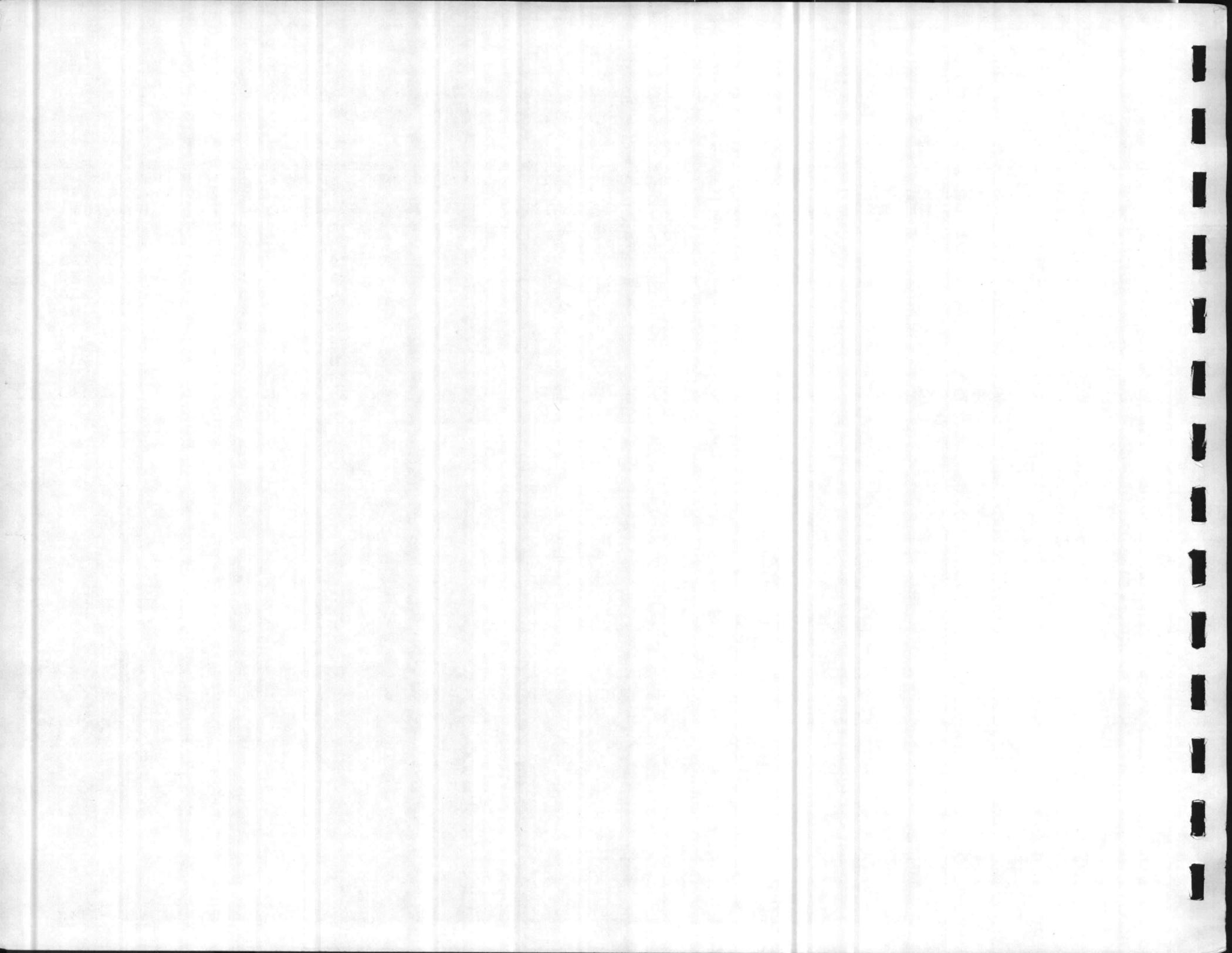
MANEUVER AREA REQUIREMENTS FOR 2D LANDING SUPPORT BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
PLATOON						
Compass Movements		12	16	6	1	1152
Combat Town		12	25	8	1	2400
COMPANY						
CPX		3	4	3	1	36
Combat Town		3	2	6	1	36
BATTALION						
CPX		1	4	3	1	12



MANEUVER AREA REQUIREMENTS FOR 2D RADIO BATTALION
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
RADIO RECON SQUAD						
Patrolling		3	9	6	14	162
SERE		3	9	2	7	54
River Crossing		3	9	6	2	162
Harbor Site		3	9	6	14	162



MANEUVER AREA REQUIREMENTS FOR INFANTRY TRAINING SCHOOL
Camp Lejeune , North Carolina

MILITARY UNIT/EXERCISE:	LIVE * FIRE	NO. OF UNITS	LAND AREA (km2) REQUIRED	ITERATIONS REQUIRED	DAYS REQUIRED	LAND AREA PER TASK (km2/days) REQUIRED
ATTACK FORTIFIED POSITION		1	.0375	24	1	.9
MOUT		1	1	24	1	.24
DEFENSIVE COMBAT		1	2	24	1	48
OFFENSIVE TACTICS		1	1	24	1.5	36
ADVANCED INFANTRY TACTICS		1	9	24	1	216
PATROL TECHNIQUES		1	9	24	1.5	324
COMBAT FIGHTING POSITIONS		1	.1	24	1	2.4
LAND NAVIGATION		1	9	24	1	216
HQ ASSAULT COURSE		1	.09	24	.5	1.08
MOVEMENT/REACTION TO FIRE		1	2	24	1.06	50.88

