AICUZ Update

Final

Marine Corps Air Station
Cherry Point, NC

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
2 NAVY ANNEX
WASHINGTON, DC 20380-1775

IN REPLY REFER TO:
11011
LFL-3
03 MAY 2002

From: Commandant of the Marine Corps
To: Commanding Officer, Atlantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511-2699

Subj: MARINE CORPS AIR STATION, CHERRY POINT, NORTH CAROLINA AIR INSTALLATIONS COMPATIBLE USE ZONES (AICUZ) STUDY UPDATE

Ref: (a) Atlantic Division AICUZ Update, MCAS Cherry Point, North Carolina of December 2001

1. The reference, Air Installations Compatible Use Zones (AICUZ) Update for Marine Corps Air Station, Cherry Point, is approved for implementation.

2. This study is a result of extensive analyses to ensure that development of surrounding lands will be compatible with the noise levels and accident potential zones associated with airfield operations and to protect the public's safety, health, and welfare while minimizing the degradation of the operational capability of the military air installation.

3. It is envisioned that through wide public distribution of this document and a continuing dialogue between the Commanding General, Marine Corps Air Station Cherry Point and local government officials, these land use recommendations can be adopted.

G. S. MCKISSOCK
DEPUTY COMMANDANT
INSTALLATIONS AND LOGISTICS

Copy to:
COMMARFORLANT NORFOLK VA
COMCABEAST CHERRY PT NC
MCAS CHERRY PT NC
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Final

AICUZ Requirements Update

MARINE CORPS AIR STATION

Cherry Point, North Carolina

18 December 2001

ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND / THE ONYX GROUP

This Study was produced by the Onyx Group of Alexandria, VA
Under the Direction of the
Atlantic Division, Naval Facilities Engineering Command

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EXECUTIVE SUMMARY

Background

In accordance with the *Department of Defense (DOD) Instruction 4165.57* and *Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36A*, an Air Installations Compatible Use Zone (AICUZ) Study was prepared in 1975 for the Marine Corps Air Station (MCAS) Cherry Point, NC. The AICUZ analysis for Marine Corps Auxiliary Landing Field (MCALF) Bogue and Marine Corps Out Lying Field (MCOLF) Atlantic were also done during the same period. The intent of the AICUZ Study was to guide compatible land use development there by mitigating the effects of aircraft noise and accident potential. The 1975 AICUZ Studies for MCAS Cherry Point and MCALF Bogue were updated as part of the Master Plan Update for the Cherry Point Complex in 1980/1981. The most recently approved AICUZ for MCALF Bogue was contained in the 1980/1981 Master Plan. The 1981 AICUZ for MCAS Cherry Point was updated as part of the Master Plan Update prepared in 1988 and approved by Headquarters Marine Corps (LFL) on 8 September 1988. The operations at MCALF Bogue were not seen as sufficiently different from those outlined in 1981 to warrant an update in 1988. This Study updates and revises, as necessary, the AICUZ data published in 1981 and 1988, using noise contours and flight track information published as part of the F/A-18 Realignment EIS in 1998 for MCAS Cherry Point and MCALF Bogue. Since operational levels at MCOLF Atlantic are so infrequent it was not included in this update. The data used in this Study reflect operational use of AV-8B, KC-130, EA-6B fixed wing and helicopter aircraft based at MCAS Cherry Point in the late 1990s, as well as forecasted steady state operational conditions at MCAS Cherry Point and MCALF Bogue in the foreseeable future. Transient fixed-wing and helicopter aircraft using these airports were also considered.

Noise

The noise environment around an air station is typically described using a measure of cumulative noise exposure that results from aircraft operations. These operations generally include flight activity in the immediate vicinity of the installation, plus stationary in-frame and/or out-of-frame engine run-ups associated with aircraft maintenance operations. The noise environment is described in terms of Day Night Sound Level (DNL) and shown as contours of equal noise exposure with the label Ldn. Three general noise zones are defined: areas with a Ldn of *less than 65*; areas with a Ldn *between 65 and 75*; and areas with a Ldn of *75 or greater*. These three areas are defined as Noise Zones 1, 2 and 3, respectively. Noise Zone 1 is essentially an area with low or no impact. Noise Zone 2 is an area of moderate impact where some land use controls are needed. Noise Zone 3 is the most severely impacted area and requires the greatest degree of compatible use controls.

The aircraft and operational levels used in the noise modeling was based on a detailed airfield and airspace (NASMOD) study published in February 1998 as part of the base closure and realignment studies related to aircraft relocating from NAS Cecil Field, FL. Although other aircraft use MCAS Cherry Point, due to the insignificant contribution to the noise environment at this airfield, only those listed in this Study were used in the noise modeling. While future events could result in changes in operational levels at these airfields, the predicted annual operations

levels of approximately 116,000 at Cherry Point and 17,000 at Bogue appear to represent a reasonable forecast of flight operations for the foreseeable future and were used as the basis for the AICUZ. The noise data used for the Harrier in the noise model for this study was updated to reflect the F402-RR-406 and RR 408 engines installed on the AV 8B, as well as the impact of vectored thrust in flight operations.

Safety

In addition to community noise exposure, the potential for aircraft accidents near military airfields is an important consideration of the AICUZ Program. Although it is impossible to predict an aircraft accident, a rational thought process has been applied in developing the AICUZ program to establish geographic Accident Potential Zones (APZ). The accident potential concept outlines the probable impact area if an accident were to occur, not the probability of an accident happening. Accident Potential Zones (APZ) are based on historical accident and operations data throughout the military, and the application of margins of safety within those areas (which have been determined to be probable impact areas, if an accident were to occur). The APZs are based upon criteria found in *OPNAVINST 11010.36A*. The APZs at MCAS Cherry Point are adjusted to reflect the runway and flight path usage as reflected in the 1998 Noise Study.

Aircraft operations are always constrained by the surrounding natural terrain and man-made features such as buildings, towers, poles, and other potential vertical obstructions to navigation. Acceptable limitations to heights of man-made or natural growth is dictated through the application of "imaginary surfaces criteria" specified in applicable FAA and Navy orders. These zones radiate at variable, increasing heights from an airfield runway. In general, no above ground structures are permitted in the primary surface and Clear Zone areas. The height of structures should be controlled to prevent penetration of the transitional surfaces and approach departure surfaces. These height restrictions limit the height of structures as the distance from the runway surface decreases. As one approaches the runway surface and its corresponding flight path, more stringent height limitations are imposed. Imaginary surfaces zoning controls do not fully exist in areas surrounding MCAS Cherry Point and MCALF Bogue at this time.

A Bird Aircraft Strike Hazard (BASH) program due to resident and migratory bird species exists at MCAS Cherry Point, MCALF Bogue and the vicinity of the airfields. Daily and seasonal bird movements can create various hazardous conditions.

Land Use

Existing land uses in the vicinity of MCAS Cherry Point and Bogue reflect increased development since the original AICUZ Study. While much of the land areas impacted by the updated AICUZ footprints are over water, undeveloped land or forest, noise impacts over the City of Havelock and the Town of Emerald Isle remain. Much of these areas are developed at this time.

AICUZ Impact

Changes in flight profiles, aircraft mix and current operations result in changes to the shape of the noise and accident potential zone footprints at MCAS Cherry Point. The AICUZ areas impacted on and off base at MCAS Cherry Point (APZ and noise above 65 Ldn) have increased

at Cherry Point. However, there has been a significant reduction in the noise areas at MCALF Bogue since the last AICUZ study.

APZs reflect updated flight track and current operations level information, and in the case of Bogue application of 1988 Navy APZ criteria. Some zoning controls exist to help prevent incompatible development in the future, but they do not cover all of the areas affected by AICUZ and imaginary surfaces. The AICUZ itself is delineated by a series of Zones representing impact areas and noise exposures. The finite placement of these AICUZ boundaries does not mean that negative impacts do not extend beyond those limits; nor do they imply that all impacts within the boundaries are wholly negative or intolerable.

Recommendations

1. Work with local communities to update to the existing zoning in the MCAS Cherry Point and MCALF Bogue environs to achieve compatible land use in future development within the AICUZ footprints.

2. Examine the BASH situation at these airfields and update BASH Plans for both airports, as appropriate.

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A. INTRODUCTION

1. Purpose and Scope

The purpose of the Air Installations Compatible Use Zones (AICUZ) Program is to promote a pattern of development, both on and off the station, which is compatible with the noise and safety impacts created by aircraft operations, and to protect the operational integrity and investment in the airfield.

AICUZ is a Department of Defense Planning Program that began in 1973. Sixty-nine Navy and Marine Corps flying installations throughout the United States have been active in this Program. As part of the AICUZ process, these installations publish reports that describe the planning considerations associated with airfield operations. The key to the Program's success, however, is found in on-going intergovernmental coordination, which occurs once the reports are published and released to the public. It is essential that local commands actively work with local communities to prevent incompatible development adjacent to military airfields to ensure the Program's success.

Incompatible development, a form of encroachment, has become commonplace on privately owned lands contiguous to military air installations. The Department of the Navy is particularly susceptible to such encroachment, with many of its installations located in high growth urban and coastal areas.

The AICUZ process involves four basic steps:

(a) Develop, and periodically update, an AICUZ for each air installation to quantify aircraft noise zones and accident potential areas; develop a noise reduction strategy for impacted lands, both on and off the station; prepare a compatible land use plan for the installation and surrounding areas; and develop a strategy to promote compatible development on land within these areas.

(b) Include in the AICUZ analysis a discussion of the potential impact of known future missions on AICUZ implementation.

(c) Implement the AICUZ Plan for the installation including coordination with federal, state and local officials to maintain public awareness of AICUZ; and

(d) Identify and program property rights acquisition and sound suppression projects in critical areas when appropriate.

The data used in this study reflects operational use of AV-8B, EA-6B; KC-130 fixed wing aircraft; and helicopter aircraft based at MCAS Cherry Point for flight training during the late 1990s, as well as projected steady state operational conditions at MCAS Cherry Point and MCALF Bogue in the foreseeable future. Transient fixed-wing and helicopter aircraft using these airports were also considered.

2. Authority & Summary

In accordance with the *Department of Defense (DOD) Instruction 4165.57* and the joint *Commandant of the Marine Corps Order and Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36A*, an initial AICUZ Study was prepared for the MCAS Cherry Point in 1975. The intent of this Study was to guide compatible land use development by mitigating the effects of aircraft noise and accident potential. Studies were also conducted for MCALF Bogue and MCOLF Atlantic in the late 1970s. The 1975 AICUZ Studies for MCAS Cherry Point and MCALF Bogue were updated as part of the Master Plan Update for the Cherry Point Complex in 1980/1981. The most recently approved AICUZ for MCALF Bogue was contained in the 1980/1981 Master Plan. The 1981 AICUZ for MCAS Cherry Point was updated as part of the Master Plan Update prepared in 1988 and approved by Headquarters Marine Corps (LFL) on 8 September 1988. The operations at MCALF Bogue were not seen as sufficiently different from those outlined in 1981 to warrant an update in 1988. Operational levels at MCOLF Atlantic are so infrequent that the AICUZ for this location was not updated in either Master Plan.

A review of the operations of the fixed-wing and helicopter aircraft for flight training at MCAS Cherry Point and MCALF Bogue was contained in the in-depth airfield and airspace study published by the ATAC Corporation in February 1998 as part of the F/A-18 BRAC Realignment Analysis. An associated noise analysis by Wyle Laboratories was also published in February 1998. The potential impact resulting from the introduction of the V-22 to the 2nd MAW was included in a noise study by Wyle in April 1999. The noise contours in these earlier studies were rerun to reflect updated AV-8B noise data in September 2001.

This Study updates and revises, as necessary, the AICUZ data published in 1988 for MCAS Cherry Point and 1981 AICUZ information published for MCALF Bogue, based upon operational data, flight track information, and noise contours, published in the 1998, 1999 and 2001 Wyle noise reports. Since operational levels at MCOLF Atlantic continued to be infrequent it was not included in the scope of this study.

The earlier AICUZ data were compared with aircraft loading, flight track descriptions, and runway usage to verify consistency with present operations reflected in the Wyle analysis. The operations staff at MCAS Cherry Point also confirmed that this data currently reflects the projected steady state operational condition forecast through the year 2005. The existing land use survey information contained in the earlier Studies was updated to identify land uses within the AICUZ footprint and the general vicinity of MCAS Cherry Point and MCALF Bogue. The mitigation of land use incompatibilities, as well as potential incompatibilities, is addressed with recommended courses of action.

3. Location

MCAS Cherry Point is located on the south bank of the Neuse River, and is an annexed part of the City of Havelock, in Craven County North Carolina. The airport is about 20 miles inland from the Atlantic Ocean. MCALF Bogue is located approximately 20 miles from Cherry Point, on Bogue Sound in Carteret County. The Croatan National Forest occupies large areas of land in these Counties. Ranges and facilities associated with MCAS Cherry Point but not part of this AICUZ update include the Mid-Atlantic Electronic Warfare Range (MAEWR), air-to-ground bombing ranges on Piney Island (BT-11), located in the northeastern corner of Carteret County

approximately twenty-eight miles from Cherry Point, and BT-9 (a partly submerged ship hulk) located in Pamlico Sound, some thirty miles from the Air Station. These facilities, coupled with associated Special Use Airspace available for military use, provide excellent areas for military aviation training and operations in eastern North Carolina.

The North Carolina Coastal Plain historically was an area of sparse settlement shaped by farmers and fisherman. Since the 1940s the military has been a major factor in the region's economy. As roads and supporting services improved, outsiders moved here to work in military and military-related jobs. As the region opened up, additional people became aware of the scenic attractions, mild climate, and recreational potential. The region now supports a growing tourist industry and increasing numbers of people relocating into the area for retirement living. The regional settling for the Study area is shown on Figure A-1.

4. Mission

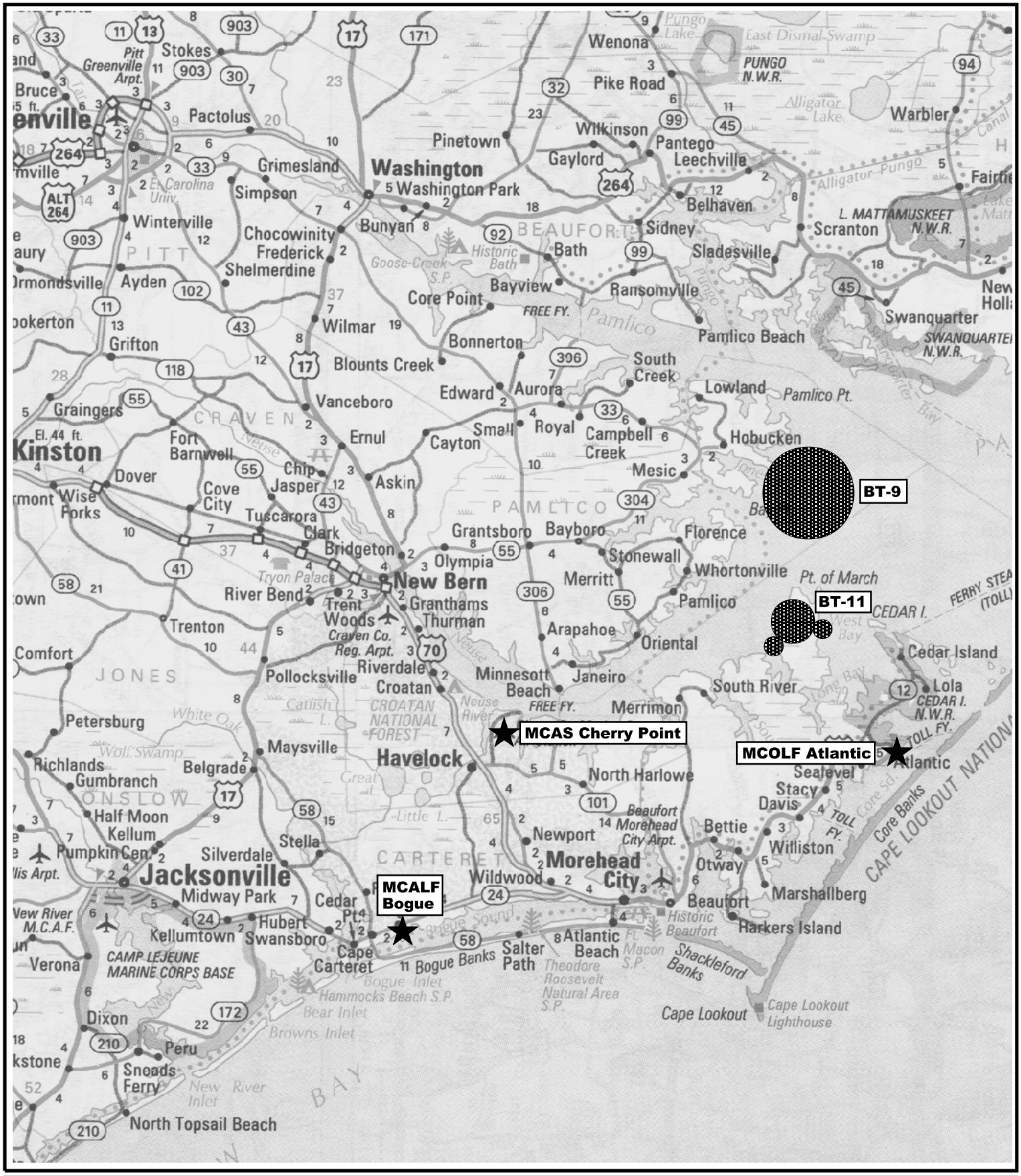
The mission of MCAS Cherry Point is to maintain and operate facilities and provide services and material to support operations of a Marine Air Wing (MAW), or units there of, and other activities and units as designated by the Commandant of the Marine Corps (CMC) in coordination with the Chief of Naval Operations (CNO). The Station provides facilities for the training of the Fleet Marine Force Atlantic aviation units. It also is host to a Naval Aviation Depot. To carry out its mission, the Air Station operates an air-to-ground bombing target complex, is assigned Special Use Airspace, operates air-related ranges in the region, and outlying areas of MCALF Bogue and MCOLF Atlantic. The Station is under the command of Commander, Marine Corps Air Bases East (COMCABEAST) located at Cherry Point. There are several major tenants that conduct flight operations from Cherry Point. These tenants include the 2nd Marine Air Wing (MAW) and its subordinate unit Marine Air group MAG 14 flying the four-engine KC-130, and high performance jets such as the AV-8B and EA-6B.

5. Airfield Facilities

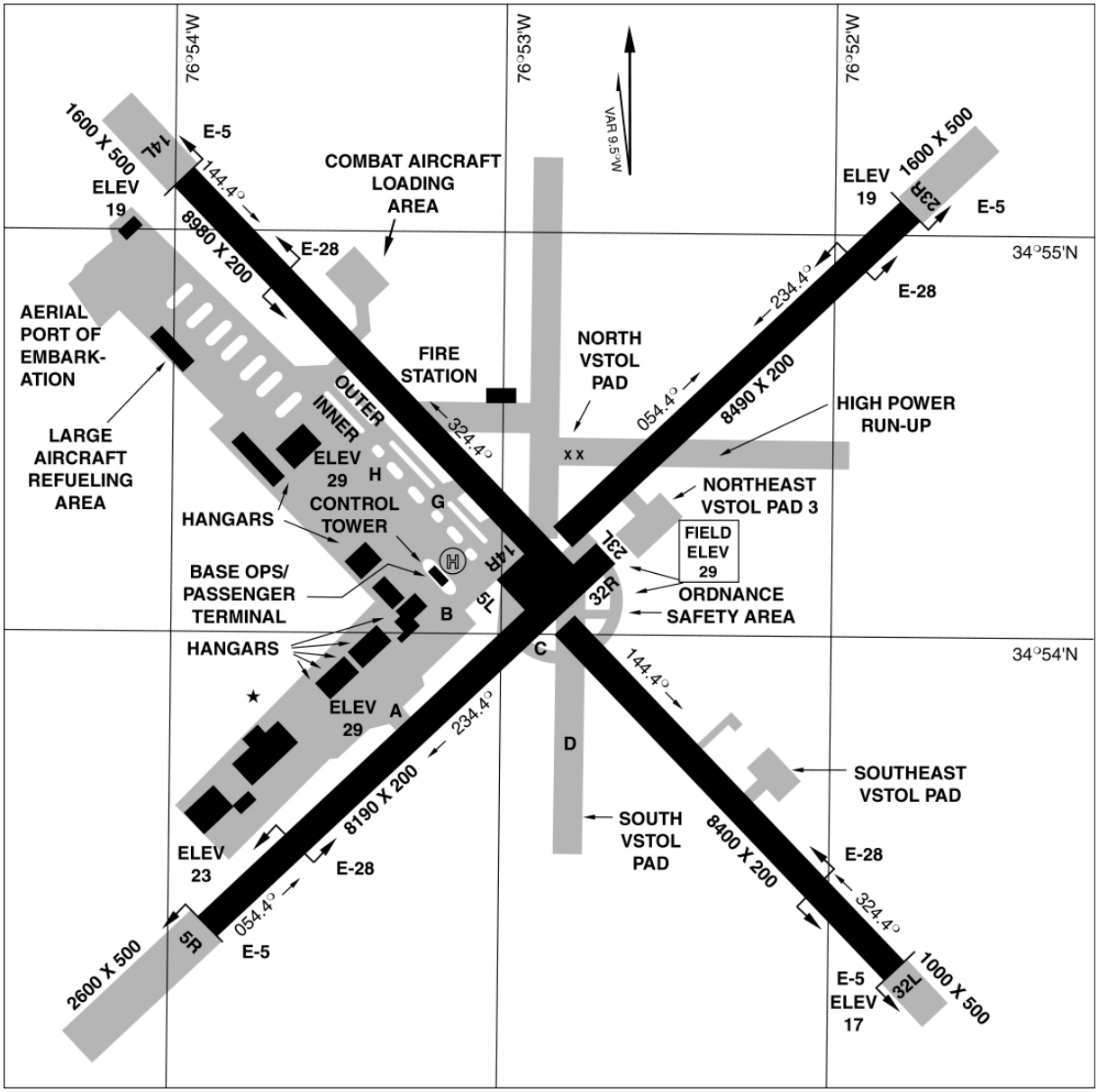
MCAS Cherry Point contains approximately 13,144 acres in fee and 1,262 acres in easements. MCALF Bogue contains approximately 837 acres in fee. There are numerous easements and right-of-way permits into and through the Station. Between 1987 and 1992 approximately 1,300 acres in AICUZ easements and 291 acres in fee were acquired to prevent encroachment in Accident Potential Zones (APZs) and high noise areas off the end of Runway 32 between NC 101 and NC 306.

5.1 MCAS Cherry Point.

The MCAS Cherry Point airport (NKT) is named Cunningham field in honor of Alfred A. Cunningham, the first Marine Aviator. The airport operates 24 hours a day, 7 days a week, except for holidays. Normal flight operations are conducted between the hours of 0700-2300 hours, with reduced operations between 2300 and 0700 hours. There are four active runways (32L/14R; 32R/14L; 23R/05L; 23L/05R). These runways range in length from 8,190 feet for Runway 23L/05R to 8,980 feet for Runway 32R/14L. Each runway is offset to form a common center mat area in the center of the field. All runways have an effective width of 200 feet. Normally, takeoffs originate from the center of the airfield and landings are made toward the center of the airfield terminating at the central


BT-9
BT-11
MCAS Cherry Point
MCOLF Atlantic
MCALF Bogue
Washington
New Bern
Havelock
Jacksonville
Morehead City
Kinston
Greenville
Washington Park
Bunyan
Bath
Belhaven
Sidney
Sladesville
Ransomville
Pamlico Beach
Swanquarter
Scranton
Warbler
Fairfield
Wenona
Pike Road
Pantego
Leechville
Wilkinson
Gaylord
Pinetown
Grimesland
Simpson
Chocowinity
Frederick
Shelmerdine
Winterville
Ayden
Grifton
Wilmar
Bonnerton
Blounts Creek
Core Point
Bayview
Vanceboro
Edward
Aurora
South Creek
Lowland
Hobucken
Mesic
Small
Royal
Campbell Creek
Cayton
Ernul
Askin
Graingers
Fort Barnwell
Chip
Jasper
Dover
Cove City
Wise Forks
Tuscarora
Clark
Bridgeton
Olympia
Grantsboro
Bayboro
Florence
Stonewall
Whortonville
Merritt
Pamlico
River Bend
Trent Woods
Granthams
Thurman
Trenton
Arapahoe
Oriental
Riverdale
Pollocksville
Croatan
Minnesott Beach
Janeiro
South River
Merrimon
Cedar Island
Lola
Petersburg
Maysville
Belgrade
Richlands
Gumbranch
Half Moon
Kellum
Pumpkin Cen.
Silverdale
Stella
Newport
Wildwood
North Harlowe
Beaufort
Morehead City Arpt.
Bettie
Otway
Williston
Davis
Stacy
Sealevel
Atlantic
Marshallberg
Harkers Island
Midway Park
Cedar Pt.
Hubert
Swansboro
Kellumtown
Cape Carteret
Salter Path
Atlantic Beach
Verona
Dixon
Peru
Sneads Ferry
North Topsail Beach
Cape Lookout
Cape Lookout Lighthouse
Shackleford Banks
Core Banks
CAPE LOOKOUT NATIONAL
CAMP LEJEUNE MARINE CORPS BASE
CRAVEN
PITT
BEAUFORT
PAMLICO
JONES
ONSLOW
CARTERET
CROATAN NATIONAL FOREST
Pungo Lake
East Dismal Swamp
PUNGO N.W.R.
Alligator Lake
Alligator-Pungo Canal
L. MATTAMUSKEET N.W.R.
SWANQUARTER N.W.R.
Pamlico Pt.
Pt. of March
CEDAR I.
CEDAR I. N.W.R.
FERRY STEAMER (TOLL)
TOLL FY.
FREE FY.
Pitt Greenville Arpt.
E. Carolina Univ.
Tryon Palace
Craven Co. Reg. Arpt.
Goose Creek S.P.
Historic Bath
Neuse River
Pamlico River
Core Sd.
Bogue Sound
Bogue Banks
Bogue Inlet
Hammocks Beach S.P.
Bear Inlet
Browns Inlet
New River Inlet
Theodore Roosevelt Natural Area S.P.
Fort Macon S.P.
Historic Beaufort
Catfish L.
White Oak
Wolf Swamp
Great L.
Little L.
New River M.C.A.F.
Pungo
Alligator
Swanquarter Bay
Core Sound
Lone Bay
West Bay
Neuse
Pamlico
Tar
Pungo
Canal
El. 44 ft.
El. 15 ft.
Bruce
Stokes
Pactolus
Ormondsville
Comfort
Petersburg
Verona
Kinston
Jacksonville
Greenville
Washington
New Bern
Havelock
Morehead City
Beaufort
Atlantic
Swanquarter
Cape Lookout
Cape Lookout Lighthouse
Shackleford Banks
Core Banks
CAPE LOOKOUT NATIONAL
CAMP LEJEUNE MARINE CORPS BASE
Marine Corps Air Station
Cherry Point, NC
AICUZ Update
Legend
Bombing Targets
Source: Rand McNally Road Atlas, 1999
MCAS Cherry Point
Regional Vicinity Map
No Scale
Figure
A-1

mat area. In addition to the active runways, there are four (4) Harrier vertical/short take off and landing (VSTOL) pads designated by their position relative to the center mat: North, Northeast; Southeast, and South. Figure A-2 is a map of the airport provided for general reference.



Source: FLIP Terminal High Altitude US October 1999

Figure A-2 - Airport Diagram MCAS Cherry Point

The MCAS Cherry Point field elevation is 29 feet above Mean Sea Level (MSL), and the current magnetic declination is 9.3 degrees west. E-5 emergency chain abort gear is located off the departure end of all runways. Also bi-directional E-28 arresting gear is located on all active runways. Carrier deck lighting for Field Carrier Landing Practice (FCLPs) is available on runway 23R only.

Although there is some development in other areas of the installation, the majority of building development is located in the core area east of Roosevelt Boulevard between runways 5 and 14.

5.2 MCALF Bogue

MCALF Bogue Field (NJM) is the site of the Short Airfield for Tactical Support (SATS). Air operations primarily involve the AV-8B. Normal operating hours are from 0800 to 1600 hours Monday through Thursday, and 0800 through 1200 hours on Friday. All other times are by publication in standard notice to airmen (NOTAM). The airport is normally closed on Saturdays, Sundays and holidays. Operational requirements often dictate operating hours beyond the norm.

It is the main outlying practice field for AV-8B aircraft based at MCAS Cherry Point, NC and is occasionally used by helicopters and other transient fixed-wing aircraft. It is used extensively for field carrier landing practice (FCLP) operations. MCALF Bogue has one runway 5/23 that is 4,010 feet long by 96 feet wide AM-2 aluminum matting laid over a 4000 foot by 150 foot asphalt strip. A Fresnel Lens Optical Landing System is located approximately 850 feet from the approach end of the duty runway, and is associated with M-21 arresting gear. The Field elevation is 22 feet above MSL.

6. Goals & Objectives

The specific goals and objectives of the AICUZ Program at MCAS Cherry Point and MCALF Bogue are directed at encouraging land use compatibility between the military air facilities and local communities; while maintaining the operational integrity of the airport. The specific objectives of the AICUZ Update Program are to:

- Protect the health, safety, and welfare of the civilian and military communities by discouraging land uses, which are incompatible with aircraft operations.
- Reduce noise caused by aircraft operations while meeting operational, training, and flight safety requirements both on and in the vicinity of the Marine Corps Installations.
- Encourage continued liaison between the Marine Corps and the communities and inform the general public about the AICUZ Program. Seek cooperative efforts from local communities to help minimize noise impacts and accident potential impacts in the vicinity of MCAS Cherry Point and MCALF Bogue.
- Protect DOD investment and operational capabilities of MCAS Cherry Point and MCALF Bogue.

7. Responsibility for Compatible Land Use

Military installations and local government agencies with planning and zoning authority share the responsibility for preserving land use compatibility near the military installation. Cooperative action by both parties is essential to prevent land use incompatibility and encroachment. If local governments choose not to implement land development controls within the airfield environment, or are incapable of doing so, the Marine Corps is often left with the less desirable alternative of acquiring property rights to protect its operational integrity. However, this alternative is seldom exercised in already developed areas due to budget limitations and the challenges this option places on local governments when large tracks of land are taken off the tax roles.

MCAS Cherry Point has a two-fold responsibility within the AICUZ Program. First, there is the responsibility to reduce aircraft noise, to the extent feasible, through operational guidance and procedures. Second, it is the responsibility of the Air Installation Commander to actively work with state and local planning officials to implement the objectives of the AICUZ Program and to strive to educate and inform the local civilian community of the mutual benefit of an effective AICUZ Program. Local governments, including the City of Havelock, and in the areas surrounding these airports in Craven County, Carteret County, and Pamlico County have the responsibility to protect the health, safety, and welfare of their respective residents.

8. City and County Authority

Governmental regulation of land use in North Carolina has traditionally been a responsibility of local municipal governments. This includes the local cities and towns and the unincorporated areas of counties that surround MCAS Cherry Point and MCALF Bogue. Land use regulation and controls such as zoning ordinances, comprehensive plans, subdivision regulation promulgation and enforcement, building code adoption and enforcement are all within the authority of the local municipality or county. However, with the exception of limited areas that are zoned in some counties, the enforcement authority normally is vested in the local municipality.

B. AIRSPACE

1. Vicinity Airspace

As can be seen in Figure B-1, the airfields are located in an area with complex airspace. The MCAS Cherry Point Radar Air Traffic Control Facility (RATCF) provides radar air traffic control services for airports within Alert Area 530 (A-530) at or below FL180, the Restricted Area 5306 complex (R-5306A, C, D, and E), as well as R-5303 and R-5304 (A, B, and C); Hatteras/Foxtrot military operating area (MOA) and portions of Warning Area 122 (W-122H) at or below 17,999 feet, and in other areas where altitudes and airspace structures are specified by Letters Of Agreement (LOA). This includes air traffic using MCAS New River; MCAS Cherry Point; MCALF Bogue; MCOLF Atlantic; Craven County Regional Airport (New Bern), Michael J. Smith Field (Beaufort).

2. Airport CDSA and Flight Procedures

MCAS Cherry Point (NKT) is a FAA Category D airport. The MCAS Cherry Point assigned airspace is a Class Delta Surface Area (CDSA), which extends upward from the surface to and including 2,500 feet AGL within a five statute mile radius of NKT. All aircraft operating within the Cherry Point Class "D" airspace are required to have two-way radio communications and will be under the control of NKT Air Traffic Control (ATC) personnel. Use of restricted area R5306A, northeast of Cherry Point, surface to 17,999 feet MSL, and R5306C, southwest of Cherry Point, 1,200 AGL to 17,999 feet MSL and the Hatteras/Foxtrot MOA, SW of Cherry Point, 3000 AGL to 10,000 MSL are scheduled by Cherry Point under a Letter Of Agreement with Washington ARTCC. Scheduling authority for R-5306 (D&E), R-5303 (A, B, and C) and R-5304 (A, B, and C) are sub-delegated to C.G. MCB Camp Lejuene, NC by C.G. MCAS Cherry Point, NC. The Cherry Point RATCF clears military and civil air traffic through or near the boundaries of these restricted areas when these sub-delegated areas are enacted or when necessary coordination is completed.

MCALF Bogue (NJM) CDSA is the airspace within a five (5) statute mile radius of the airport, extending upward to, and including, 2,500 feet AGL. The CDSA is in effect during the hours that the airport is open. The control tower has control of all aircraft operating within the CDSA, all taxing aircraft, and vehicle movement on the taxiways and runway.

3. Flight Operational Procedures

Within the airspace controlled by Cherry Point and Bogue procedures have been established, which must be adhered to by military pilots. Table B-1 provides a summary of these Flight Procedures and course rules for approach, departure, and airport patterns associated with the MCAS Cherry Point and MCALF Bogue airfields.

Table B-1

AIRPORT FLIGHT OPERATIONAL PROCEDURES and COURSE RULES

Flight Operation	Operational Procedures
MCAS Cherry Point, NC	
Straight-In Landing:	Aircraft approach the runways at a:
IFR	3.0 glide slope
VFR	1000' at 3 miles
FCLP	600' pattern (1,000' at night) Not Authorized on 5R
Takeoff	Position is concrete center mat; AV-8B on runway. Only from VSTOL Pads for vertical takeoffs and landings.
VFR	Maintain 500' until clear of VFR traffic pattern
Pattern Altitudes	1,000 feet AGL standard left; except 32L which is right hand
Overhead	Initial at 2,000', descend to reach break at 1500', descending on downwind to 1000' prior to turning base leg.
MCALF Bogue	
Pattern Altitude	1,200 feet MSL
FCLP pattern (left hand)	600-1000'-1 mile abeam on 23; 1 ½ mile on runway 5

Source: MCAS Cherry Point

Marine Corps Air Station Cherry Point, NC

AICUZ Update

Regional Airspace

— MCAS Cherry Point —

Sources:
1. National Oceanic & Atmospheric Administration
Charlotte Sectional 1:500,000

N

Not to Scale

Figure
B-1

C. BACKGROUND

1. Changes Requiring AICUZ Update

Under the AICUZ Program, the AICUZ Study for each installation must be tailored to the specific characteristics of that installation's air operations. Numerous variables are included in the calculations for determining the noise contours, including aircraft type, mix of aircraft, flight patterns, power settings, and time of day of noise-generating activities. Considerable change to any of these variables could impact the Activity's noise contours. Other characteristics, such as a change in training mission, can influence total air operations within a given flight path and, therefore, further impact the configuration of APZs.

Naval aviator jet training has been conducted at MCAS Cherry Point, NC and Bogue Field since the 1940s. Aircraft based at Cherry Point including both fleet squadrons and fleet replenishment squadrons (FRS) are shown below in Table C-1. While other aircraft occasionally use these airports they are grouped for various purposes as transient aircraft, and normally do not contribute significantly to the noise environment. The transient aircraft are not listed in Table C-1 below. There are no aircraft based at Bogue Field.

TABLE C-1

AIRCRAFT MIX MCAS CHERRY POINT, NC

	Aircraft Type	1975	1988	1998	2005
Marines					
Fleet	**AV-8**	56	65	60	60
FRS	**AV-8**	*	*	14	14
FRS	**TAV-8B**	*	2	14	14
	A-6	64	30	0	0
Fleet	**EA-6B**	*	18	20	20
Fleet	**KC-130**	12	18	14	14
FRS	**KC-130**	*	*	7	9
	A-4	34	13	0	0
	T-39	3	3	0	0
	C-9	2	2	2	2
	HH-46	2	3	3	3
	C-117	6	0	0	0
	C-12	0	0	2	2
	TUAV	0	0	0	6
Totals		179	154	136	144

* Not separately listed.

This AICUZ document examines the mix of aircraft operations by type and frequency, the changes at MCAS Cherry Point and Bogue Field since the last AICUZ Study, and includes changes projected for the foreseeable future.

2. Performance Characteristics

Air activity at Cherry Point and Bogue Field includes operations to, from, and in the vicinity of the airports. Over 60% of the operations at Cherry Point and almost 90% of the operations at Bogue Field involve the AV-8B Harrier (fleet and FRS squadron) based at Cherry Point. Other aircraft using Cherry Point include EA-6B Prowler, KC-130 Hercules (based at Cherry Point), as well as a variety of transient fixed-wing and helicopter aircraft.

For noise modeling purposes, flight activities are grouped in terms of "an acoustic day" (0700-2200) and "an acoustic night" (2200-0700), since noise during the "night" period are seen as more intrusive. Operational events for fixed-wing and helicopter arrivals, departures, and patterns (including touch-and-go, straight-in approaches, break approaches, and practice ground controlled approach), were used in the analysis. The specific data regarding flight activity at both fields as well as, maintenance procedures at MCAS Cherry Point was collected and interviews conducted as part of the 1998 Wyle Noise Survey. The data gathered included aircraft power settings, altitudes, airspeeds, run-ups and climatological data, as well as, daily operations classified by runways, aircraft, flight track, and day/night period at MCAS Cherry Point and MCALF Bogue, which were entered into a series of computer programs used in the preparation of the noise contours.

The first (OMEGA 10) was used to generate the Sound Exposure Levels (SELs) of the individual aircraft at different distances from the aircraft and at different engine power settings and airspeeds, (each of which impact the loudness and duration of the event). The second program (OMEGA 11) was used to generate SELs for run-ups for the modeled aircraft, taking into account engine thrust settings, appropriate to run-up operations. This data is used together with noise information from a standard military database (NOISEFILE 6.4), which provides the noise data for each specific aircraft operation modeled at a given air installation. The noise exposure levels for the AV 8B used in this study were updated to reflect the F402-RR 406 / RR 408 engines as well as the impact of vectored thrust in flight operations. NOISEMAP 6.5 was then used to calculate the overall daily sound levels at many points on the ground around the airport for fixed-wing aircraft.

Equal values in output data of predicted daily sound levels at points on the ground from NOISEMAP are then connected using NMPLOT to create contours of equal daily sound level for overlay into land use maps.

3. Aircraft Operations

Data for runway usage can be evaluated based on total annual operations by runway as well as average busy day operations. For the purposes of noise assessment, the average busy day figure, which is higher than the annualized daily average, is sometimes used as an indicator of probable community reaction to aircraft noise. A busy day occurs when a day's total operations are at least 50% of the annual average daily operations.

An in-depth study of airspace and airfields impacted by the relocation of F/A-18 squadrons from Cecil Field, FL as part of the 1995 Base Realignment and Closure actions (BRAC) was conducted by ATAC during 1997 and 1998. The squadrons (currently based at MCAS Cherry Point) and their training operations (at Cherry Point and at MCALF Bogue Field) were analyzed and modeled using a diverse set of variables and characteristics. These include the number and type of units expected to reside at Cherry Point in the future, definition of deployment and training cycles

each unit follows, and the descriptions of the types of missions and number of activities and operations performed during the defined training cycles. This analysis projected as a reasonable steady state forecast of operational levels of 116,254 annual operations for Cherry Point and 17,337 annual operations for MCALF Bogue Field. This data was used as the basis for a detailed noise study conducted by Wyle Laboratories published in February 1998. The 1998 Noise Study, adjusted for the updated noise values for the AV 8B, provided the basis for the noise analysis presented in this report. Sections 3.1 through 3.1.5 below, describe aircraft modeled, runway usage, flight tracks, and modeled operations by flight track and maintenance run-ups for MCAS Cherry Point. Sections 3.2. through 3.2.3 describe runway usage, flight tracks, and modeled operations by flight track for MCALF Bogue Field.

3.1 MCAS Cherry Point Aircraft Operations

Table C-2 provides historical data for annual operations from prior years for MCAS Cherry Point. The historical operations per year have ranged from 60,000 to over 110,000 operations per year over the past twelve years. A review of table C-2 indicates the fluctuations in operations that can occur on an annual basis. These variations can occur for a variety of reasons and do not necessarily reflect a long-range trend. Since AICUZ is concerned with long-range compatible land use planning, use of a short-term, annual snapshot of operations in any single year may not provide the best reflection of the impacts in areas of critical concern. The projected operational level of approximately 116,000 operations per year, used in the Noise Study, appears consistent with the historical range in operational levels and appears to be a reasonable basis for noise projections. While changes in these operational levels are possible on an annual basis because of various reasons, these operational levels reflect the Marine Corp's current projection of steady state annual operational levels in the foreseeable future for AICUZ purposes.

3.1.1 Aircraft Modeled for MCAS Cherry Point.

The majority (64%) of the 116,000 annual operations are generated by the AV-8B Harrier II. The KC-130 and EA-6B aircraft account for an additional 21% of these operations. The remaining 15% of the projected steady state annual operations consists of transient aircraft (Transient Jet, Transient Propeller, Transient Heavy, Transient Large, and Transient Helicopter). The nighttime (2200–0700 hours) utilization is approximately 3%**.**

Flight operations of the KC-130 FRS and Fleet, Transient Propeller, and Transient Helicopter aircraft were not modeled for noise contour purposes, since their contribution to the noise environment is insignificant compared with the contribution of the modeled aircraft. The categories of Transient Large and Transient Heavy included primarily C-141, C-5, KC-10, and C-9 aircraft, which were modeled as C-141 aircraft in the noise model. The Transient Jet category included a variety of military jets such as the F-15, F-16, and F/A-18, which were modeled as F/A-18 in the noise model. This approach was consistent with prior noise studies at Cherry Point.

Table C-2

TOTAL ANNUAL AIRFIELD OPERATIONS at MCAS CHERRY POINT

Calendar Year	Annual Aircraft Operations [1]				Totals
	Military[2]		Civilian		
	Navy/Marine	Other	Air Carrier	General Aviation	
1987	79,368	6,992	307	2,216	88,883
1988	81,206	6,317	306	2,036	89,865
1989	72,017	6,214	271	2,083	80,585
1990	70,433	4,882	393	2,427	78,135
1991	86,815	5,109	390	1,520	93,834
1992	102,284	6,195	394	1,516	110,389
1993	93,646	9,879	281	69	103,875
1994	77,055	5,213	73	46	82,387
1995	53,023	5,526	230	1,360	60,139
1996	66,589	7,132	269	1,237	75,227
1997	73,895	2,585	84	365	76,929
1998	66,028	2,359	316	272	68,975
1999	71,172	2,604	324	280	74,380
2000	83,659	3,355	321	2,946	90,281
2001	97,394	4,871	240	3,033	105,538

1 Source: Air Traffic Operations Reports MCAS Cherry Point. 2. Patterns counted as two operations

3.1.2 Runway Usage MCAS Cherry Point.

Duty runway usage is weighted to Runway 32 with 43% usage followed by Runway 23 with 33% usage. Tables C-3 below is a comparison of runway utilization indicated in the Studies conducted in the past, as well as that used in the current AICUZ Study. Many operation types have multiple tracks on some runways. The AV-8B aircraft have multiple flight profiles on most flight tracks.

Table C-3

COMPARISON OF RUNWAY UTILIZATION MCAS CHERRY POINT

(Percent of Operations per runway used in prior noise studies)

	R/W 5	R/W 14	R/W 23	R/W 32
1975	20%	5%	10%	65%
1988	13%	7%	26%	54%
1993	13.6%	6.4%	30.4%	49.2%
1998	15%	9%	33%	43%

3.1.3 Flight Tracks MCAS Cherry Point.

Frequency of runway usage impacts both the noise model for determining noise zones and the delineation of APZs along a given flight track. The majority of the most heavily used flight tracks are similar to those used for the 1988 AICUZ, although the utilization levels are different. While these single lines illustrate a specific flight path along the ground, the ground track is a typical flight track developed through discussion with Air Traffic Control (ATC) personnel. Depending on the ability of an individual pilot, the weather, the type of maneuver, or the number of aircraft in the pattern, the aircraft will deviate from this typical track. Nonetheless, these typical flight tracks represent the best approximation to a median and were used to model flight operations at MCAS Cherry Point in the Noise Study. Considerable dispersion of flights to either side of the track may be expected (especially on touch-and-go). Flight tracks that are infrequently used and do not contribute significantly to the overall average noise levels are not shown.

Figures C-1 through C-11, indicate the major flight tracks for approach, departure, AV-8B full circuit, touch-and-go, and GCA patterns, used to model operations for MCAS Cherry Point. While the flight tracks used in many ways are similar to those used in the past, modifications to the flight tracks were made in the Wyle Noise Study based on discussions with ATC and squadron operators to more accurately reflect current operations.

3.1.4. Modeled Operations by Flight Track MCAS Cherry Point.

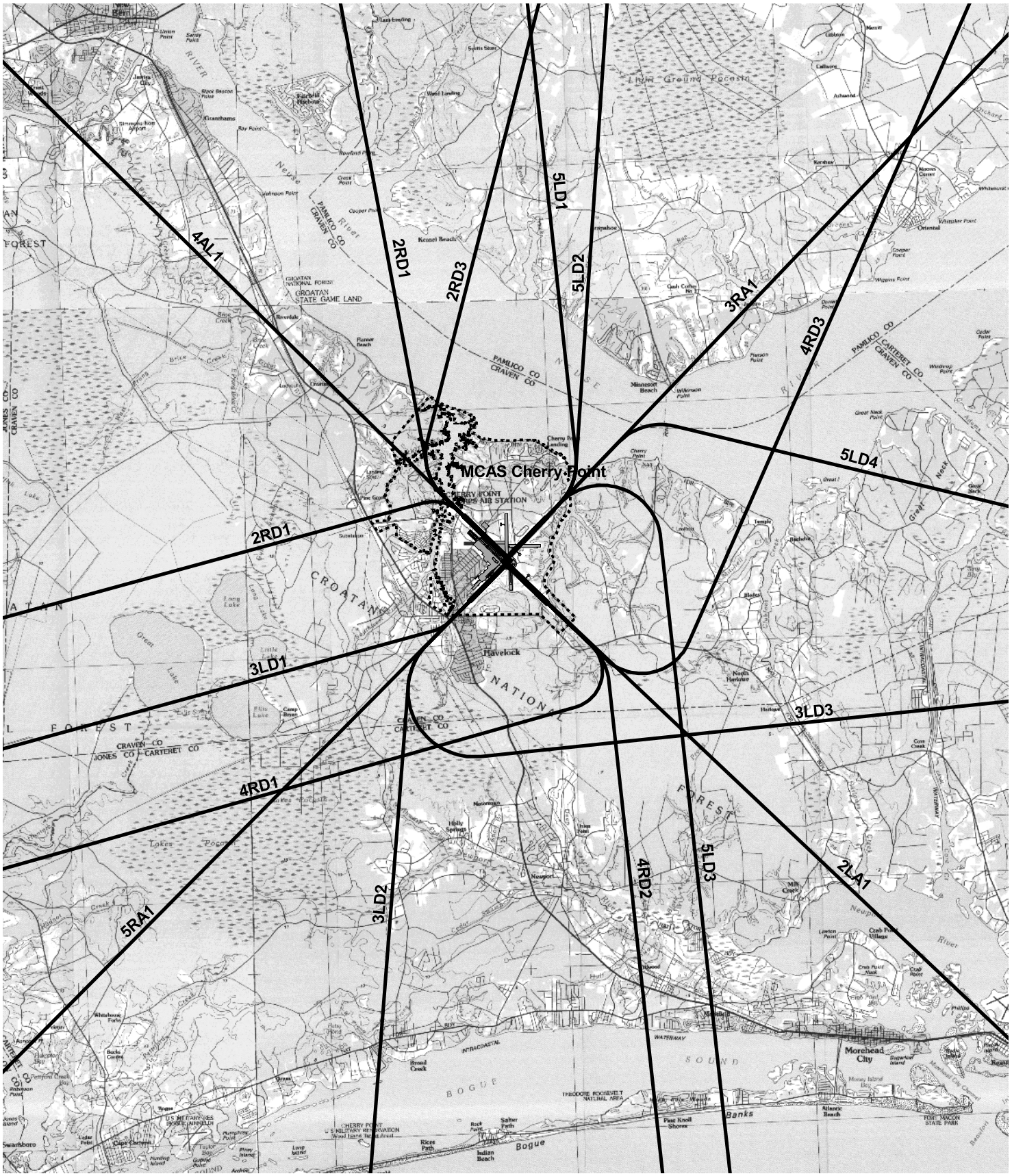
Table C-4 outlines Modeled Operations by Flight Track used in the noise analysis for Cherry Point. Annual day/night flight operations by operation type (e.g. departure, straight in arrival, overhead break arrival, ground controlled approach (GCA) box pattern, touch-and-go (T&G) are multiplied by runway utilization percentages and then divided by 365 days with pattern operations divided by two to obtain the annual average operations shown in these tables. Flight profiles consisting of aircraft power settings, altitudes above the ground and

airspeeds along each flight track are used along with the utilization by each aircraft of each flight track to project the noise level at points on the ground. Each circuit of a touch-and-go, and GCA box pattern is counted as one operation for noise modeling purposes. Night, for noise modeling purposes, is between 2200 and 0700 hours.

Since weather is an important factor in the propagation of noise, NOISEMAP requires the input of daily average temperatures and relative humidity for each month to acoustically represent the year. The Wyle noise study used 62 degrees Fahrenheit and 65% relative humidity.

3.1.5. Modeled Pre-Flight and Maintenance Run-Ups MCAS Cherry Point.

Several types of maintenance run-ups conducted at MCAS Cherry Point are listed in Table C-5, at the locations shown on Figure C-12. Pre-flight run-ups were modeled for all AV-8B and EA-6B departures. The AV-8B and EA-6B squadrons conduct low power in-frame run-ups on the flight lines, about half during nighttime hours. The high-power AV-8B and EA-6B maintenance run-ups are conducted either at the high-power pad (location HIPD) or in the test cells (locations CELN and CELS). Only approximately 10% of the squadron high-power run-ups are during the nighttime, all of which are conducted in a test cell. The NADEP performs maintenance on a variety of aircraft. Outdoor run-ups (at locations TC37 & TC91) are conducted about 15% of the time at night. AV-8B aircraft perform press-up (e.g. a short vertical ascent and a vertical decent to the ground) operations at the pads. These operations were modeled as quad-directional run-ups at the pad.



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

Flight Track

5LD3 **Flight Track Identification**

MCAS Cherry Point Boundary

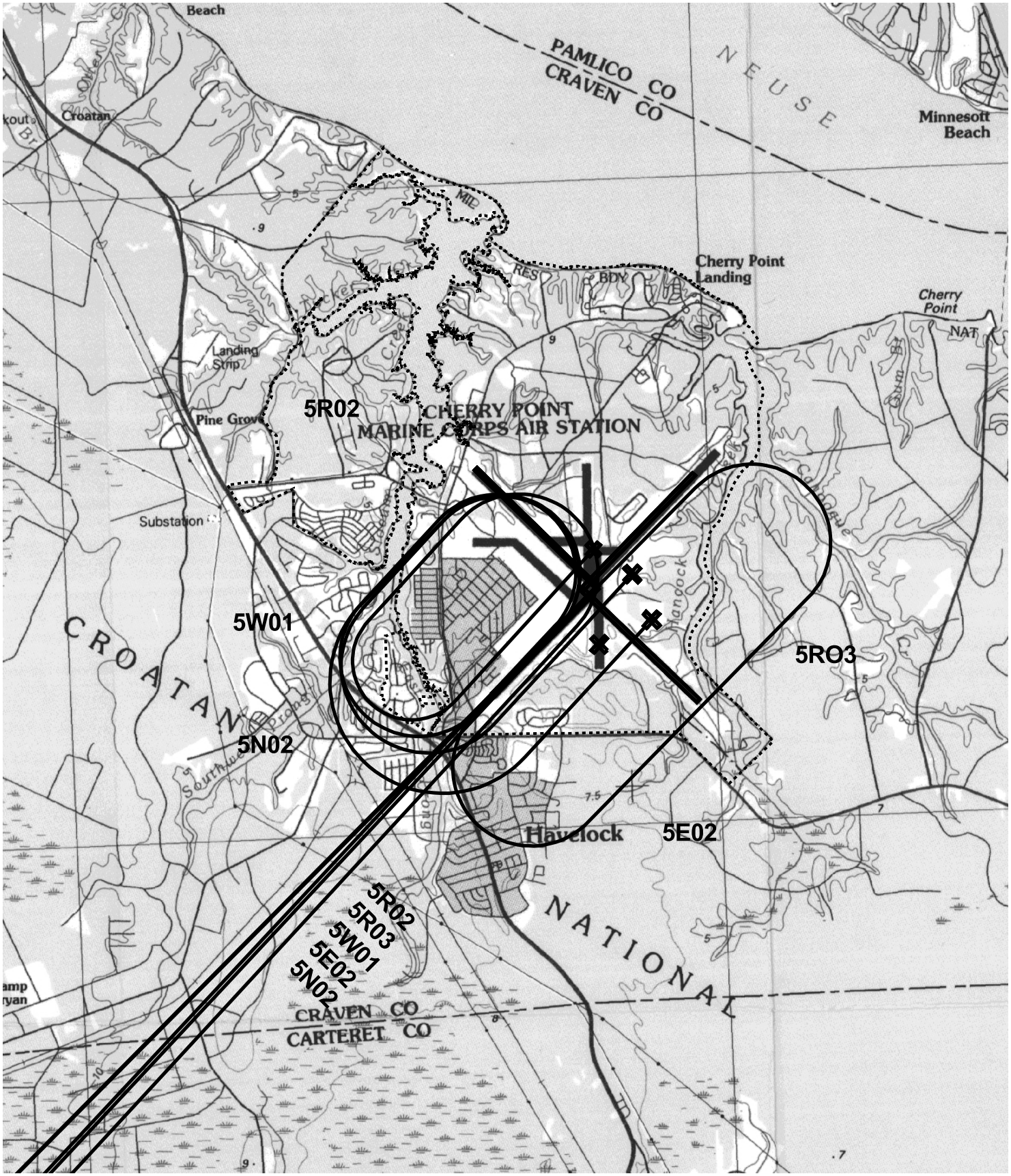
— MCAS Cherry Point —

Arrivals & Departures Flight Tracks

0 6000 12000 18000 Feet

Figure

C-1



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

Flight Track

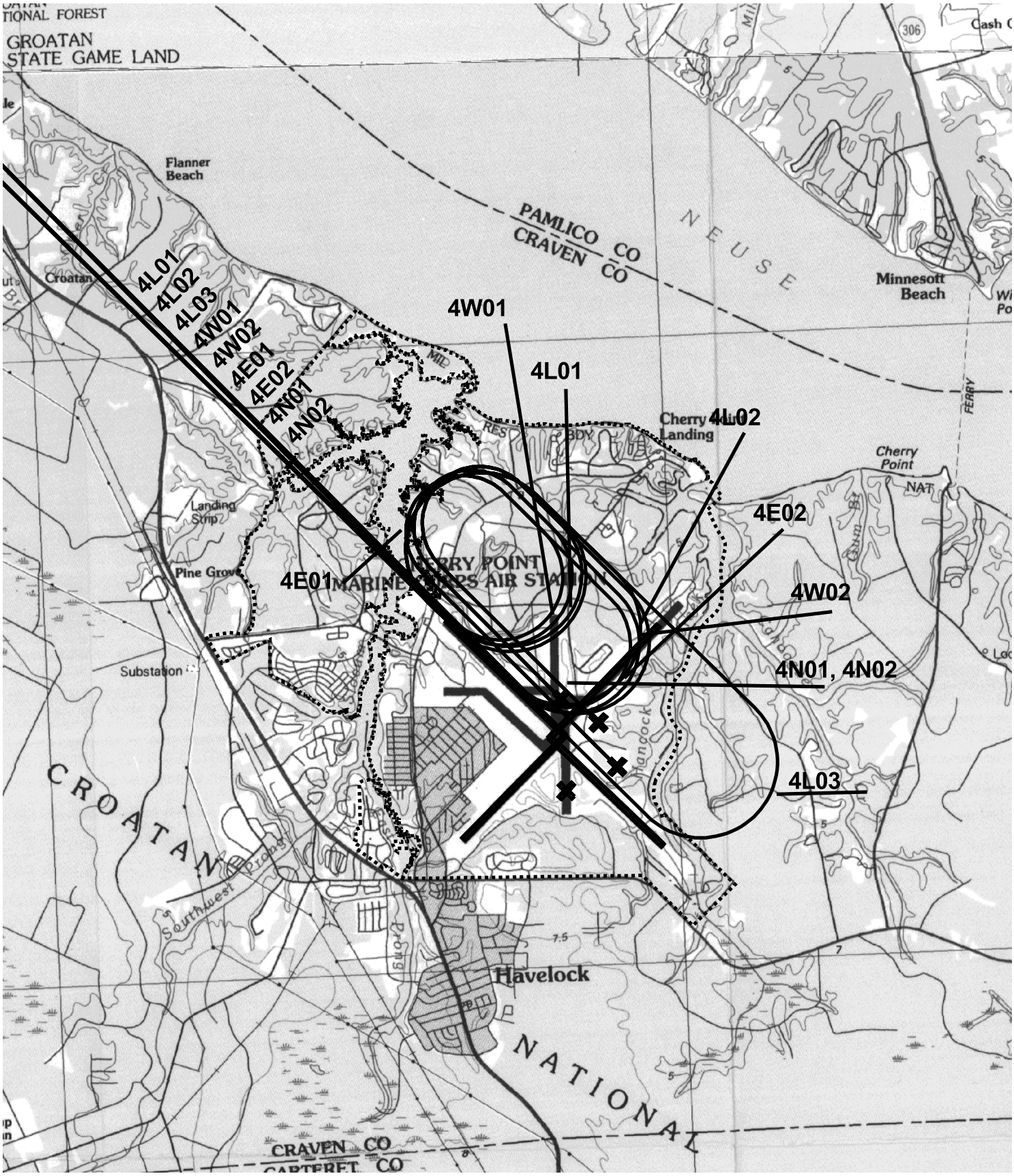
5LD3 **Flight Track Identification**

MCAS Cherry Point Boundary

— MCAS Cherry Point —
Overhead Arrival Flight Tracks Runway 05 Active

0 3000 6000 Feet

Figure
C-2



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

Flight Track

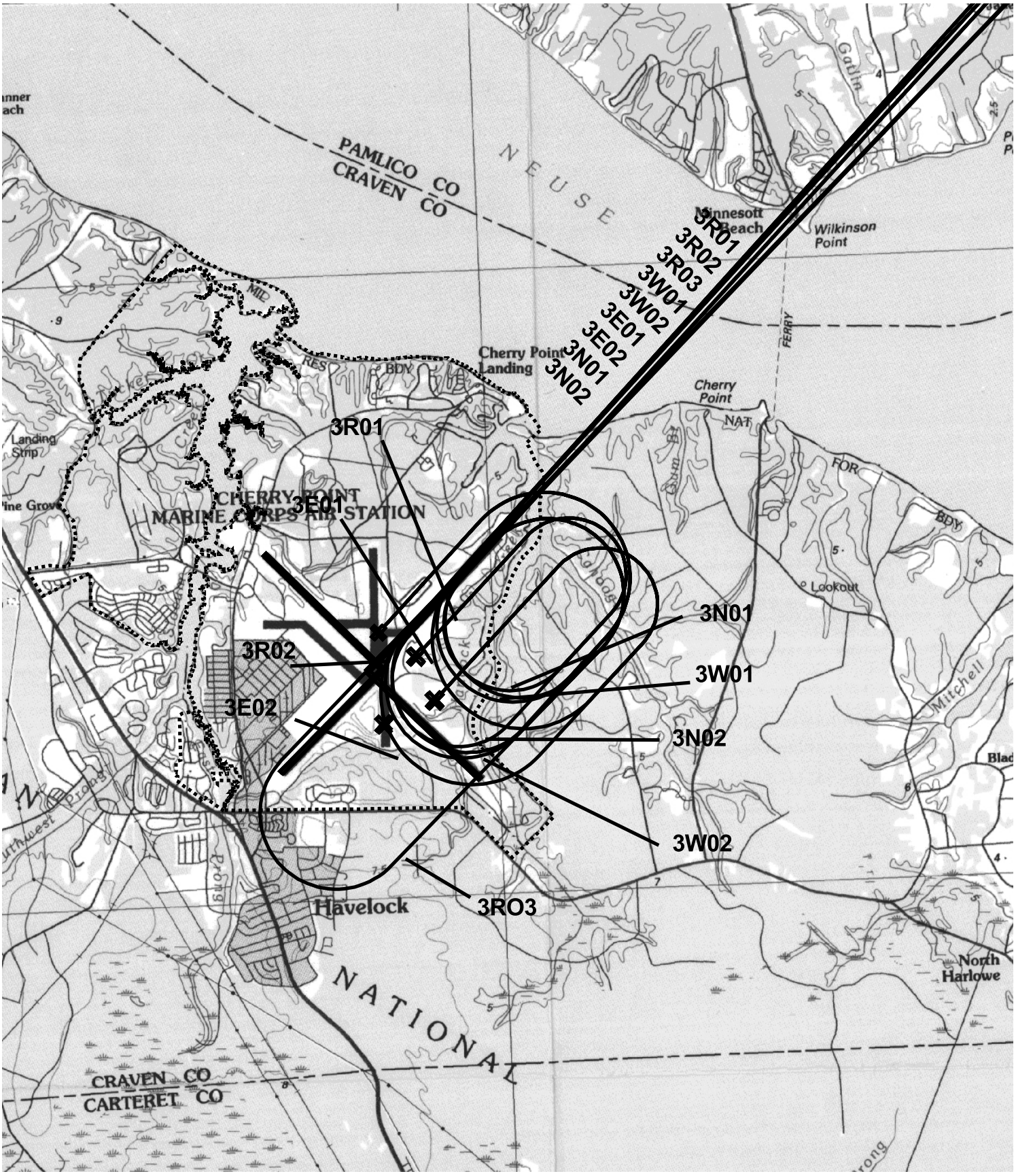
5LD3 **Flight Track Identification**

MCAS Cherry Point Boundary

— MCAS Cherry Point —
Overhead Arrival Flight Tracks Runway 14 Active

0 3000 6000 Feet

Figure
C-3



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

Flight Track

5LD3 Flight Track Identification

MCAS Cherry Point Boundary

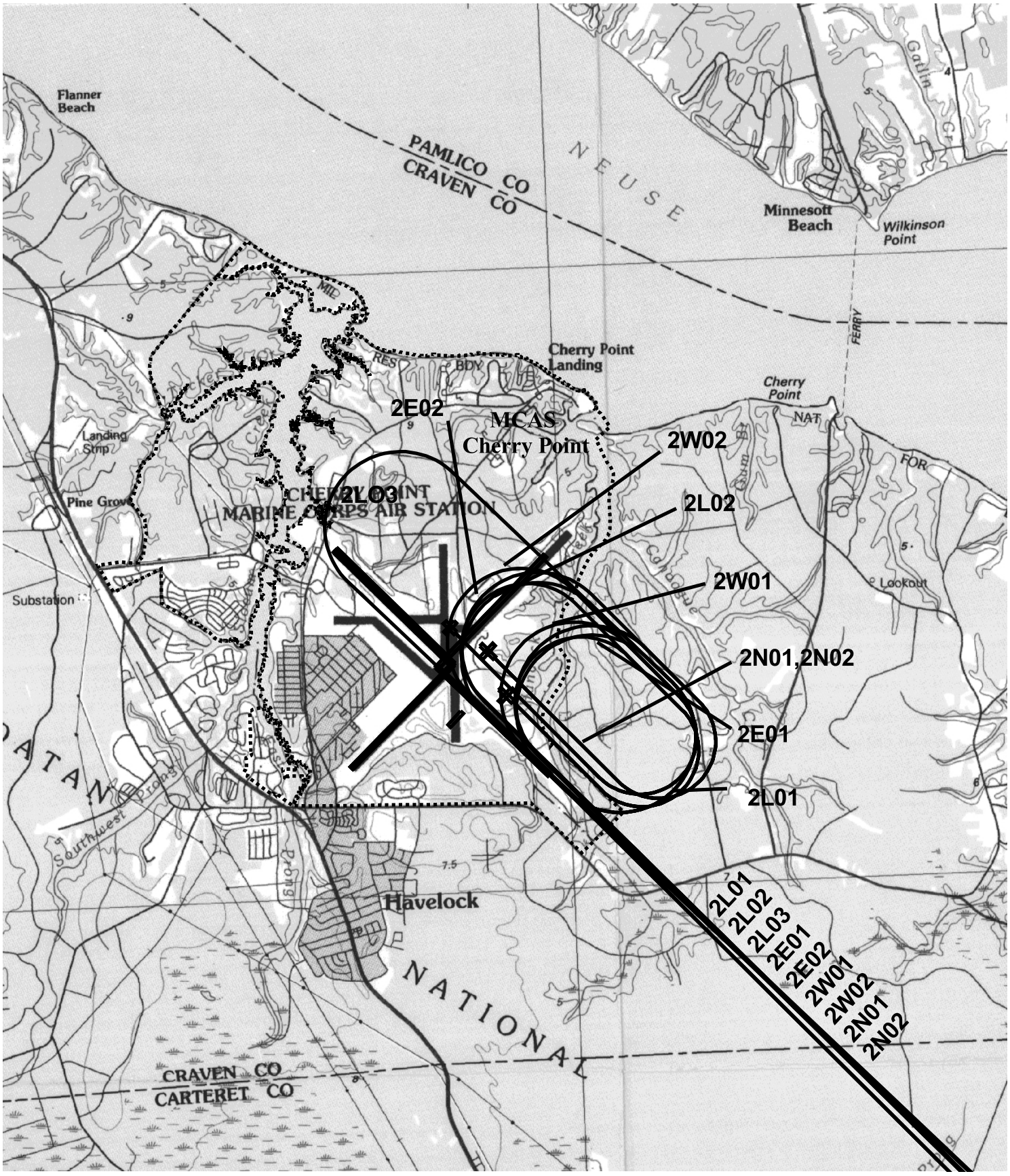
— MCAS Cherry Point —

Overhead Arrival Flight Tracks Runway 23 Active

0 3000 6000 Feet

Figure

C-4



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

Flight Track

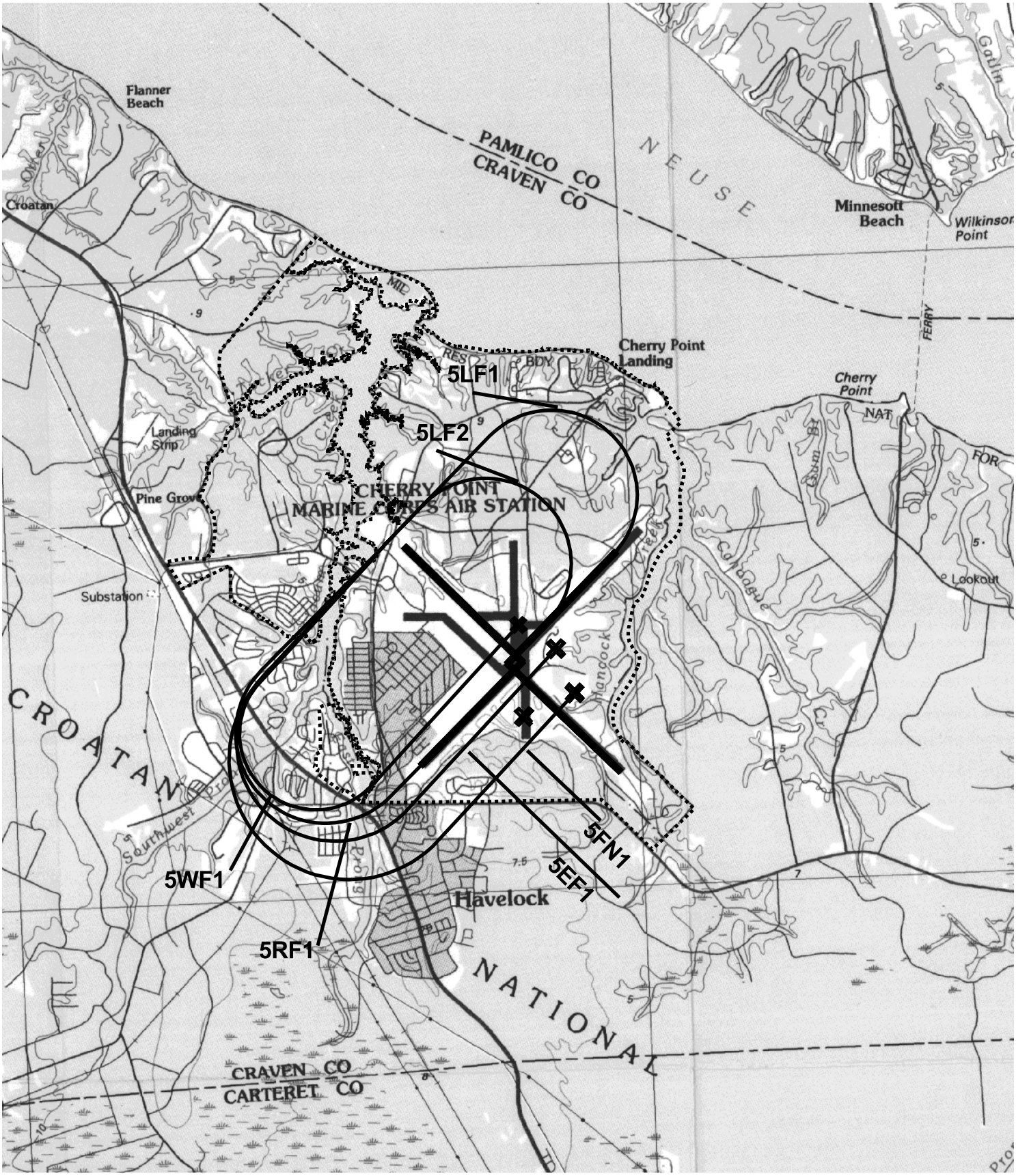
5LD3 Flight Track Identification

MCAS Cherry Point Boundary

— MCAS Cherry Point —
Overhead Arrival Flight Tracks Runway 32 Active

0 3000 6000 Feet

Figure
C-5



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

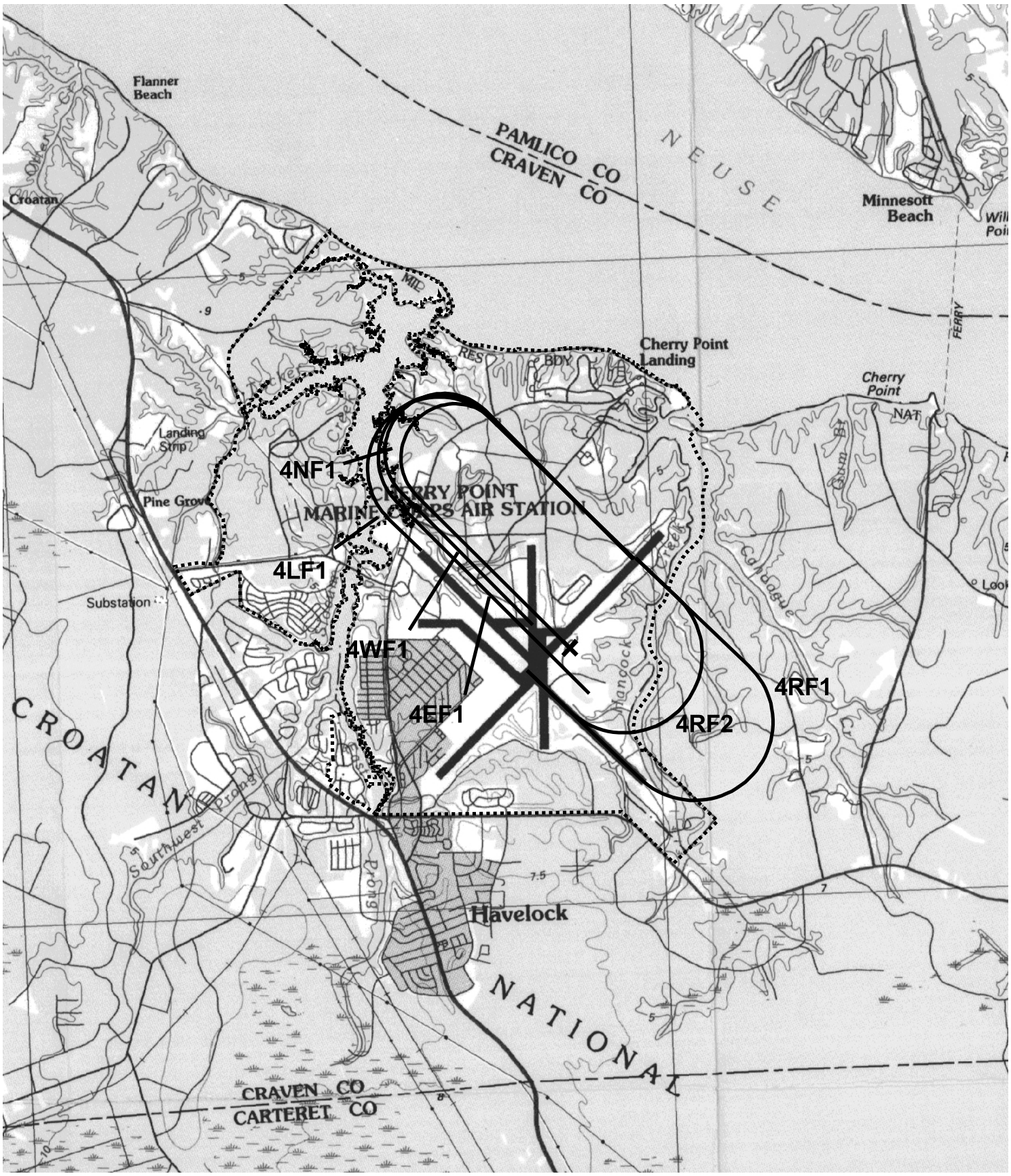
- Flight Track
- 5LD3 Flight Track Identification
- MCAS Cherry Point Boundary

— MCAS Cherry Point —

AV-8 Full Circuit Flight Tracks Runway 05 Active

0 3000 6000 Feet

Figure C-6



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

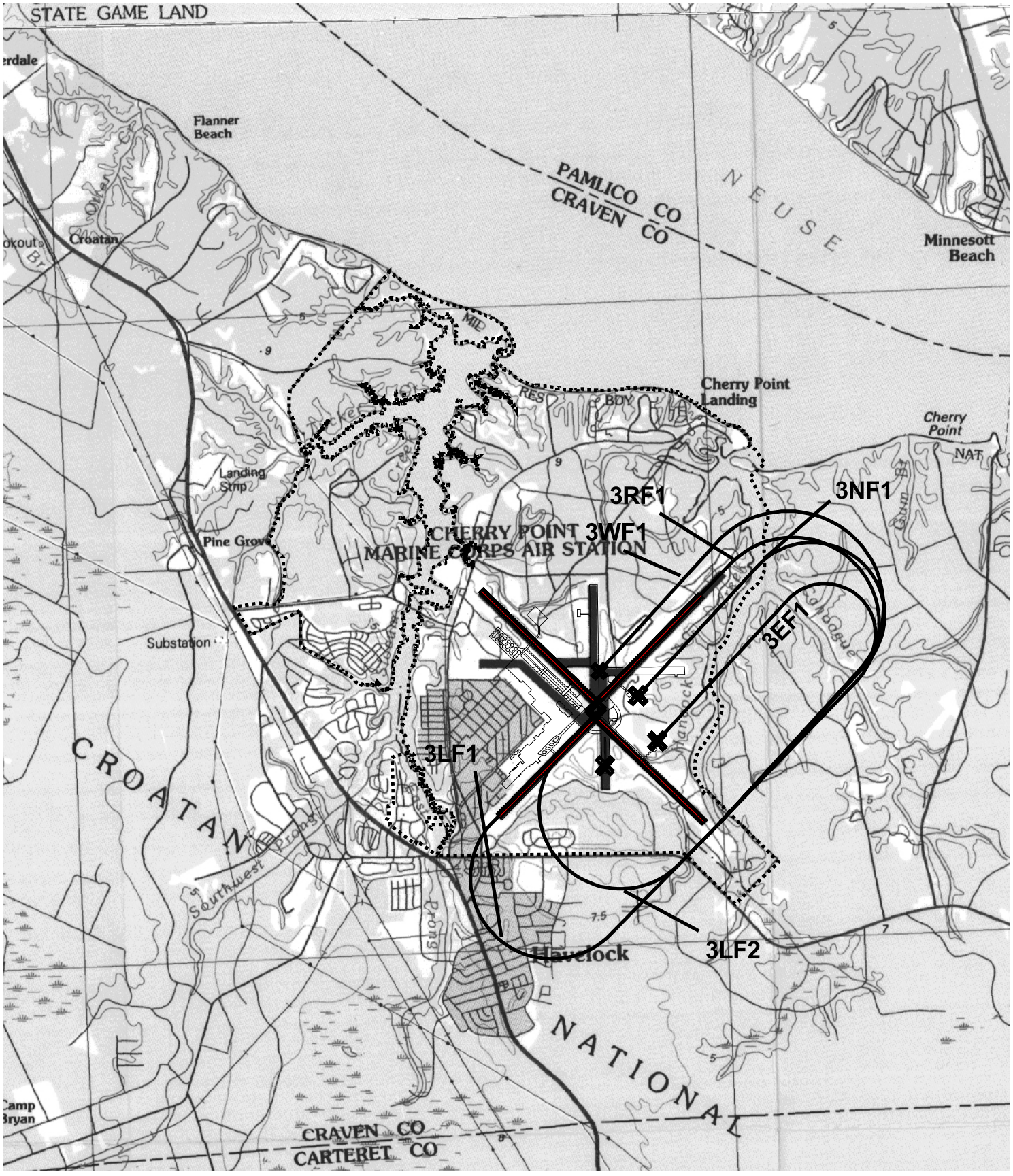
Legend

- Flight Track
- 5LD3 Flight Track Identification
- MCAS Cherry Point Boundary

— MCAS Cherry Point —
AV-8 Full Circuit Flight Tracks Runway 14 Active

N
0 3000 6000 Feet

Figure
C-7



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

- Flight Track
- 5LD3 Flight Track Identification
- MCAS Cherry Point Boundary

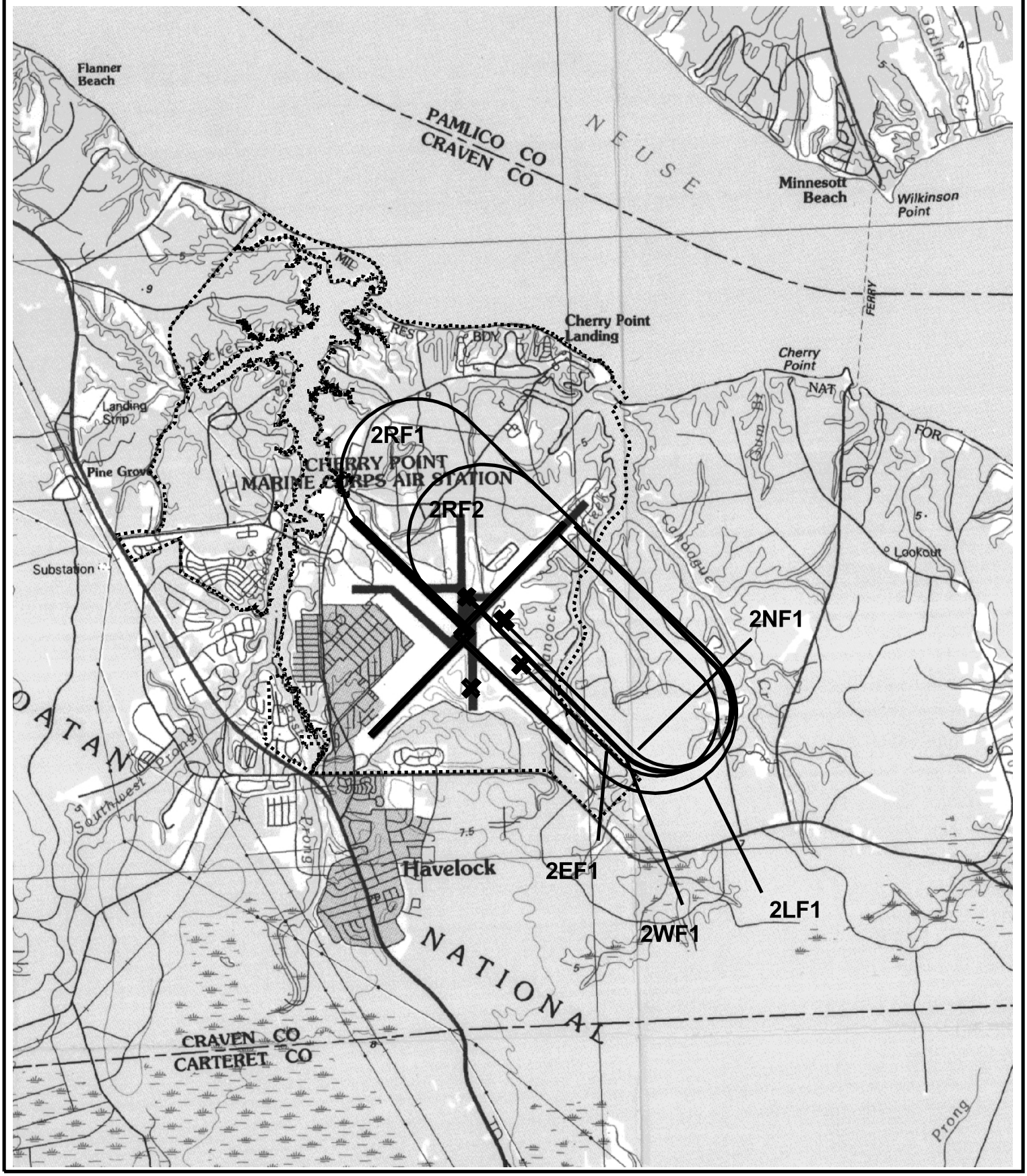
— MCAS Cherry Point —

AV-8 Full Circuit Flight Tracks Runway 23 Active

0 3000 6000 Feet

Figure

C-8



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

- Flight Track
- 5LD3 Flight Track Identification
- MCAS Cherry Point Boundary

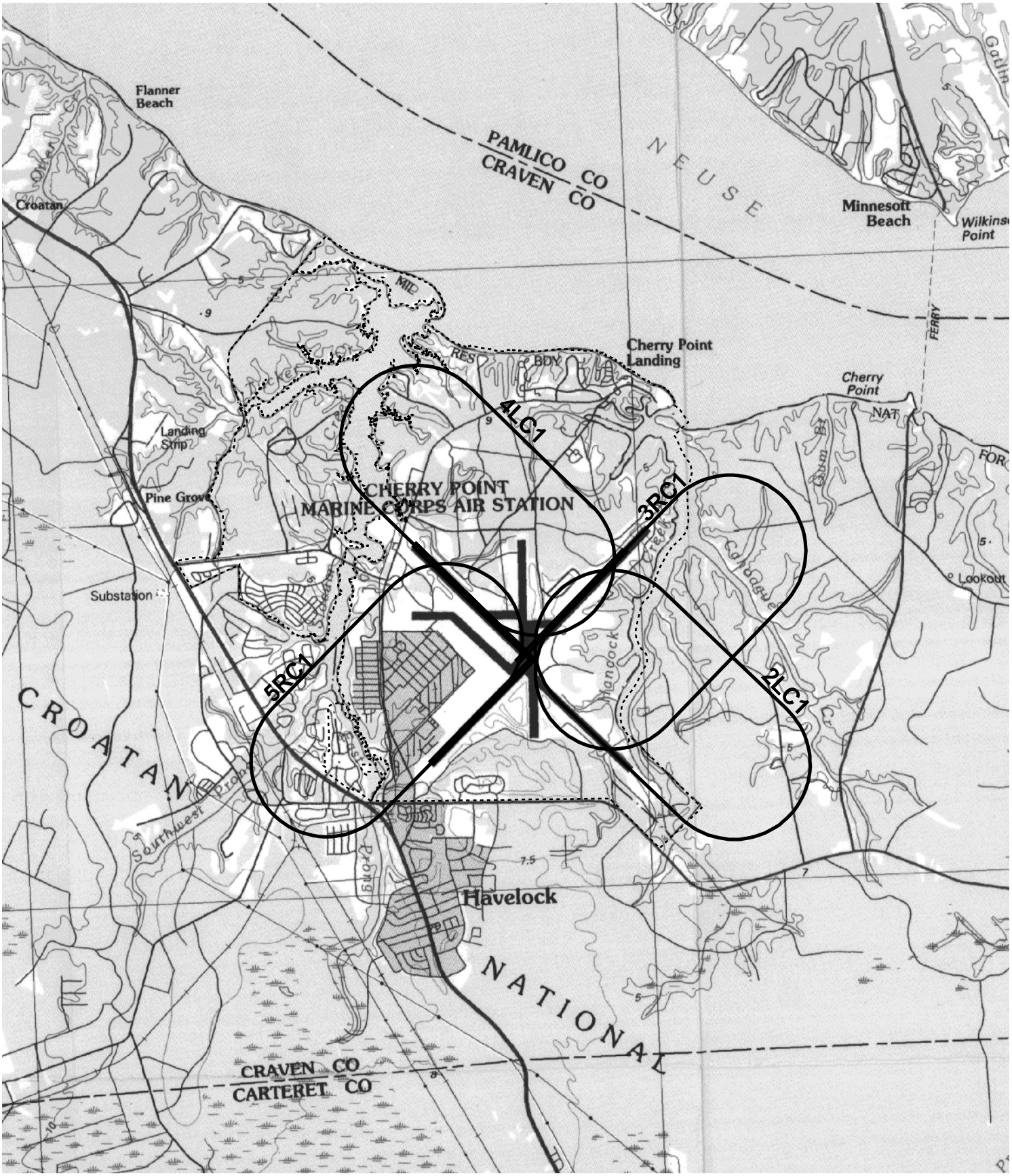
— MCAS Cherry Point —

AV-8 Full Circuit Flight Tracks Runway 32 Active

0 3000 6000 Feet

Figure

C-9



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

- **Flight Track**
- **5LD3** **Flight Track Identification**
- **MCAS Cherry Point Boundary**

— MCAS Cherry Point —

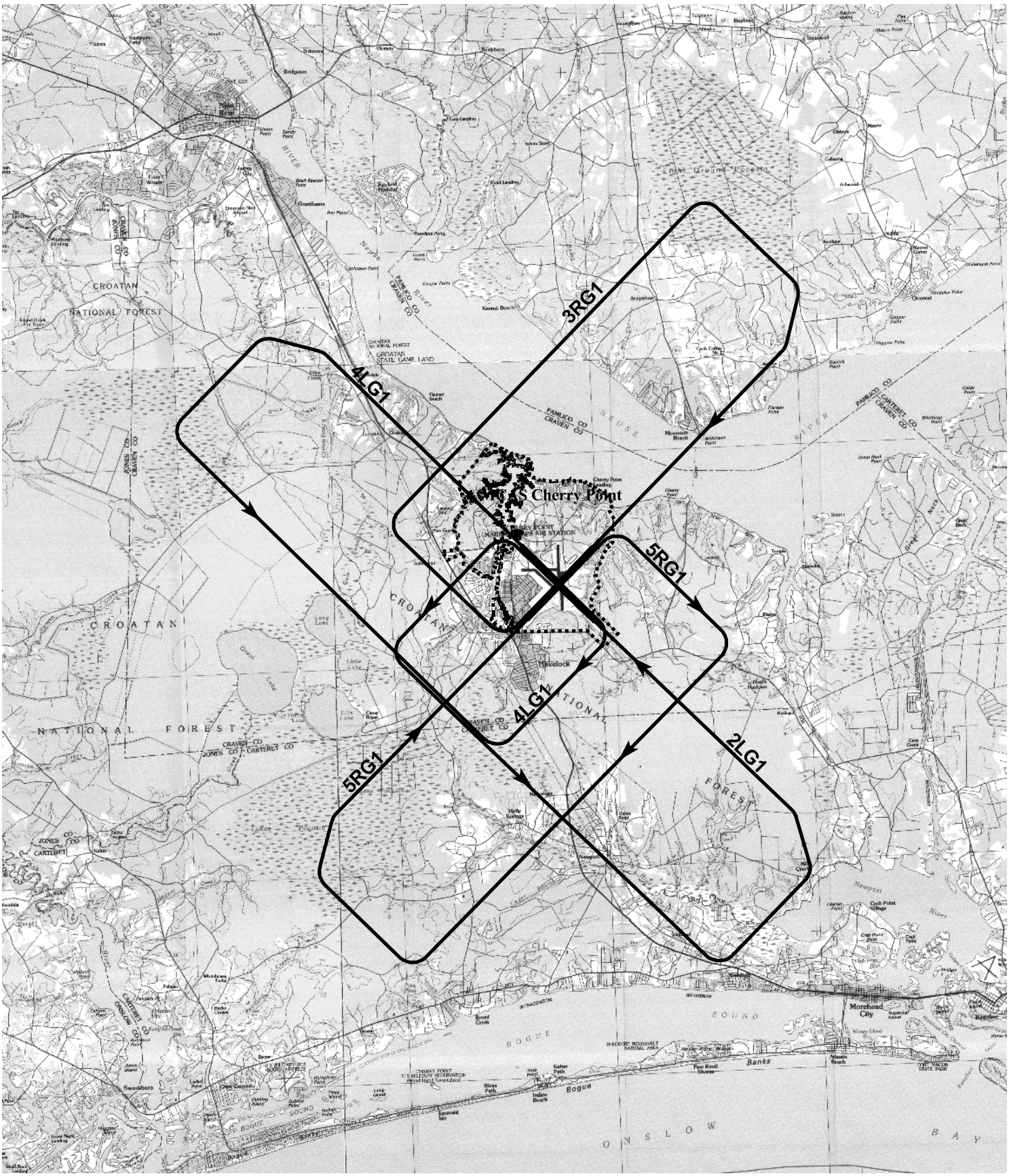
Touch and Go Patterns

N

0 3000 6000 Feet

Figure

C-10



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

- **Flight Track**
- **5LD3** Flight Track Identification
- MCAS Cherry Point Boundary

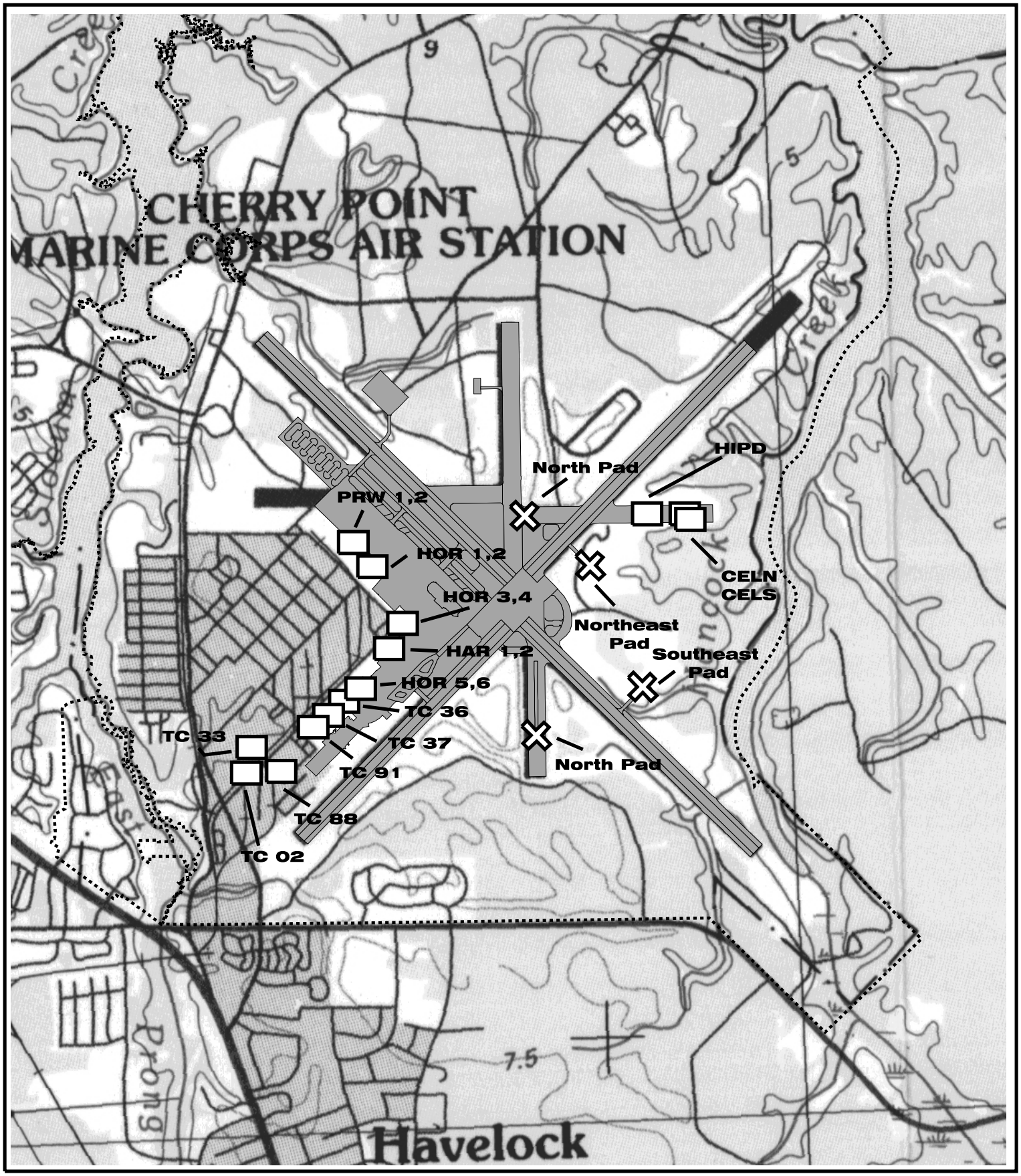
— MCAS Cherry Point —

GCA Box Patterns

0 6000 12000 18000 Feet

Figure

C-11



Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

- Maintenance Run-Up Locations
- Harrier Pads
- MCAS Cherry Point Boundary

— MCAS Cherry Point —

Maintenance Run-Up Locations

0 1000 2000 Feet

Figure

C-12

TABLE C-4.

MODELED AVERAGE ANNUAL DAY OPERATIONS BY FLIGHT TRACK

MCAS CHERRY POINT

(Source: Wyle February 1998)

Event Type	Runway	Flight Track		Events		
		ID	Description	Day	Night	Total
Departure	05L	5LD1	50° turn to north	0.83	0.01	0.84
		5LD2	40° turn to the north	2.51	0.04	2.55
		5LD3	to south	0.83	0.01	0.84
		5LD4	to west over river	2.51	0.04	2.55
	14R	4RD1	to west	0.51	0.01	0.52
		4RD2	to south	0.51	0.01	0.52
		4RD3	to northeast	3.00	0.05	3.05
	23L	3LD1	to west	1.83	0.04	1.87
		3LD2	to south	1.83	0.04	1.87
		3LD3	to east	10.99	0.20	11.19
	32R	2RD1	to west	2.38	0.04	2.42
		2RD2	35° turn to north	2.38	0.04	2.42
		2RD3	60° turn to north	14.32	0.27	14.59
Straight-In Arrival[1]	05R	5RA1		2.26	0.09	2.35
	14L	4LA1		1.36	0.04	1.40
	23R	3RA1		4.97	0.21	5.18
	32L	2LA1		6.48	0.26	6.74
Overhead Arrival (to Runway)[2]	05R	5RO2	center mat, LH	3.49	0.08	3.57
		5RO3	upwind #, RH	0.30	0.01	0.31
	14L	4LO1	downwind #, LH	0.85	0.02	0.87
		4LO2	center mat, LH	1.42	0.03	1.45
		4LO3	upwind #, LH	0.02		0.02
	23R	3RO1	downwind #, LH	5.40	0.13	5.53
		3RO2	center mat, LH	2.87	0.07	2.94
		3RO3	upwind #, LH	0.08		0.08
	32L	2LO1	downwind #, RH	6.10	0.16	6.26
		2LO2	center mat, RH	4.67	0.10	4.77
		2LO3	upwind #, RH	0.10		0.10
Overhead Arrival to Pad[2]	05N	5WO1	center mat, LH	0.37		0.37
	5NE	5NO2	center mat, LH	0.13		0.13
	5SE	5EO3	center mat, LH	0.05		0.05
	14N	4WO1	downwind #, LH	0.08		0.08
		4WO2	center mat, LH	0.17		0.17
	4NE	4NO1	downwind #, LH			
		4NO2	center mat, LH	0.01		0.01
	4SE	4EO1	downwind #, LH	0.02		0.02
		4EO2	center mat, LH	0.04		0.04
	23N	3WO1	downwind #, LH	0.52		0.52
		3WO2	center mat, LH	0.25		0.25
	3NE	3NO1	downwind #, LH	0.27		0.27
		3NO2	center mat, LH	0.14		0.14
	3SE	3EO1	downwind #, LH	0.02		0.02
		3EO2	center mat, LH	0.01		0.01
	32N	2WO1	downwind #, RH	0.56		0.56
		2WO2	center mat, RH	0.27		0.27
	2NE	2NO1	downwind #, RH	0.12		0.12
		2NO2	center mat, RH	0.06		0.06
	2SE	2EO1	downwind #, RH	0.40		0.40
		2EO2	center mat, RH	0.19		0.19

TABLE C-4.(CONTINUED)

MODELED AVERAGE ANNUAL DAY OPERATIONS BY FLIGHT TRACK
MCAS CHERRY POINT
(Source: Wyle February 1998)

Event Type	Runway	Flight Track		Events		
		ID	Description	Day	Night	Total
Full Circuit from Runway to Runway and to Pad (Takeoff Portion)[3,4]	05L	5LF1	upwind #, LH	2.83		2.83
		5LF2	mid-runway, LH	2.83		2.83
	14R	4RF1	upwind #, LH	1.70		1.70
		4RF2	mid-runway, LH	1.70		1.70
	23L	3LF1	upwind #, LH	6.25		6.25
		3LF2	mid-runway, LH	6.25		6.25
	32R	2RF1	upwind #, RH	8.13		8.13
		2RF2	mid-runway, RH	8.13		8.13
Full Circuit to Runway (Approach Portion)[3,4]	05R	5RF1		4.93	0.19	5.12
	14L	4LF1		2.95	0.12	3.07
	23R	3RF1		10.84	0.42	11.26
	32L	2LF1		14.12	0.55	14.67
Full Circuit to Pad (Approach Portion)[3,4]	05N	5WF1		1.22	0.06	1.28
	5NE	5NF1		0.44	0.02	0.46
	5SE	5EF1		0.19		0.19
	14N	4WF1		0.87	0.04	0.91
	4NE	4NF1		0.03		0.03
	4SE	4EF1		0.21	0.01	0.22
	23N	3WF1		2.56	0.13	2.69
	3NE	3NF1		1.38	0.07	1.45
	3SE	3EF1		0.12		0.12
	32N	2WF1		2.76	0.13	2.89
	2NE	2NF1		0.58	0.03	0.61
	2SE	2EF1		1.96	0.09	2.05
Touch-and-Go[3,4]	05R	5RC1	LH pattern	1.64	0.13	1.77
	14L	4LC1	LH pattern	0.98	0.08	1.06
	23R	3RC1	LH pattern	3.61	0.28	3.89
	32L	2LC1	RH pattern	4.71	0.36	5.07
GCA Box[4]	05R	5RG1	RH pattern	1.35	0.01	1.36
	14L	4LG1	RH pattern	0.81	0.01	0.82
	23R	3RG1	RH pattern	2.96	0.03	2.99
	32L	2LG1	LH pattern	3.86	0.05	3.91
FCLP[4]	14L	4LP1	LH pattern			
	23R	3RP1	LH pattern			
	32L	2LP2	LH pattern			
Departure				44.43	0.80	45.23
Straight-In Arrival[1]				15.07	0.60	15.67
Overhead Arrival (to Runway)[2]				25.30	0.60	25.90
Overhead Arrival to Pad[2]				3.68		3.68
Full Circuit to Runway[3,4]				32.84	1.28	34.12
Full Circuit to Pad[3,4]				12.32	0.58	12.90
Touch-and-Go[3,4]				10.94	0.85	11.79
GCA Box[4]				8.98	0.10	9.08
FCLP[4]						
GRAND TOTAL				153.56	4.81	158.37

[1] Includes Interfacility Departure to Cherry Point (w/ straight-in approach)

[2] Includes Interfacility Departure to Cherry Point (w/ overhead approach)

[3] Includes visual Touch-and gos and Depart and Reenter to Overhead for Runway Operations: Includes Pad Vertical Take-Off to Pad Landing Circuit for Pad Operations.

[4] Counted as one event.

TABLE C-5.

MODELED SINGLE ENGINE MAINTENANCE RUN-UP OPERATIONS AT MCAS CHERRY POINT

(Source: Wyle February 1998)

Aircraft	Location Name	Location I.D.	Magnetic Heading (deg)	Operations Annual[1] Events	Annual[1] Day % (0700-2200)	Annual[1] Night % (2200-0700)	Average Daily[2] Day (0700-2200)	Average Daily[2] Night (2200-0700)	Reported Power Setting	Duration (minutes)	Modeled Power Setting (if different than Reported)[3]
AV-8	Flight Line/Low Power	HAR1	54	5475	50%	50%	7.50	7.50	Idle Power (26%)	10	27%
	In-Frame	HAR2	234	5475	50%	50%	7.50	7.50	Idle Power (26%)	10	27%
	High Power/In-Frame	HIPD	180	520	100%		1.42		Mil Power (95-100%)	20	98%
	Outdoor/Out-of-Frame Test Cell[4]	CELN	360	72	90%	10%	0.18	0.02	100%	90	98%
EA-6B	Flight Line/Low Power	PRW1	144	1460	75%	25%	3.00	1.00	Idle Power (50%)	10	60%
	In-Frame	PRW2	324	1460	75%	25%	3.00	1.00	Idle Power (50%)	10	60%
	High Power/In-Frame	HIPD	180	104	100%		0.28		Mil Power	12.5	99%
	Test Cell/Out-of-Frame	CELS	180	78	100%		0.21		Mil Power	37.5	99%
	Engine Test[4]	CELN	360	78	100%		0.21		Mil Power	37.5	99%
NADEP H46	Test Cell 1, Bldg. 133 & Test Cell 3, Bldg. 133 Out-of Frame/Indoor[5]	TC33	135	179	85%	15%	0.42	0.07	Idle 75%Q-BPA Mil.	57 74 49	15%Q-BPA 75%Q-BPA IGE LITE 18%Q-BPA GND MAX
	Run-Up, Behind Bldg. 137 In-Frame/Outdoor[5]	TC37	225	112	85%	15%	0.26	0.05	Idle 0.75 Mil.	39 55 26	15%Q-BPA 75%Q-BPA IGE LITE 18%Q-BPA GND MAX
NADEP H1	Test Cell 2, Bldg. 133 & Test Cell 6, Bldg. 133 Out-of Frame/Indoor[6]	TC33	135	47	85%	15%	0.11	0.02	Idle 75% Mil.	47 62 41	IGE LITE OGE LITE OGE LITE
NADEP AV-8	F-402 Test Cell, Bldg. 4188 Out-of-Frame/Indoor[7]	TC88	225	68	85%	15%	0.16	0.03	Idle 75% Mil.	50 85 75	70% . 100%
	Hush House, Bldg. 4036 In-Frame/Indoor[8]	TC36	225	182	85%	15%	0.42	0.07	Idle 75% Mil.	5 24 16	65% . 99%
NADEP F-4	F-402 Test Cell, Bldg.4188 Out-of Frame/Indoor[9]	TC88	225	9	85%	15%	0.02		Idle 75% Mil. AB	33 96 43 8	85% 85% 100% 100% Mil.
	Shelter, Bldg. 3891 In-Frame/Outdoor	TC91	315	80	85%	15%	0.19	0.03	Idle 75% Mil. AB	33 96 43 8	
NADEP H53	T-64 Test Cell, Bldg. 3402 Out-of Frame/Indoor[10]	TC02	225	91	85%	15%	0.21	0.04	Idle 75%Q-BPA Max	30 93 67	7%Q-BPA 75%Q-BPA IGE LITE 21%Q-BPA GND MAX
	Run-Up, Behind Bldg. 137 In-Frame/Outdoor	TC37	225	82	85%	15%	0.19	0.03	Idle 75%Q-BPA Max	45 108 37	7%Q-BPA 75%Q-BPA IGE LITE 21%Q-BPA GND MAX

[1] Accounts for deployment
[2] 350 days per year used for averaging time
[3] All power units are (%RPM) unless otherwise specified
[4] Modeled as outdoor High-Power Out-of-Frame run-up
[5] Modeled as outdoor in-frame (CH-46E)
[6] Modeled as outdoor in-frame AH-1G
[7] Modeled as TEST CELL
[8] Modeled as an F-4 aircraft in a HUSH HOUSE
[9] Modeled as J79-GE-15 engine in a HUSH HOUSE
[10] Modeled as outdoor in-frame (CH-53E)

3.2 MCALF Bogue Field Aircraft Operations

Table C-6 provides historical data for annual operations from prior years for MCALF Bogue Field. The historical operations per year have ranged from about 9,000 to over 19,000 operations per year for the period 1991-2001. A review of this table indicates the fluctuations in operations that can occur on an annual basis. These variations can occur for a variety of reasons and do not necessarily reflect a long-range trend. Since AICUZ is concerned with long-range compatible land use planning, use of a short-term, annual snapshot of operations in any single year may not provide the best reflection of the impacts in areas of critical concern. The projected operational level of approximately 17,000 operations per year, used in the Noise Study, appears consistent with the historical range in operational levels. While changes in these operational levels are possible on an annual basis because of various reasons, these operational levels reflect the Marine Corps' current projection of steady state annual operation levels in the foreseeable future for AICUZ purposes. The tempo of existing and projected operations at MCALF Bogue Field is best suited for noise modeling using the average busy day method. Based on analysis of the operation the noise environment was modeled using 130 average busy days per year, which is consistent with 124 average busy days used in the last noise survey.

Table C-6

TOTAL ANNUAL AIRFIELD OPERATIONS at MCALF BOGUE FIELD

Type	***1991***	***1992***	***1993***	***1994***	***1995***	***1996***	***1997***	***1998***	***1999***	***2000***	***2001***
Total	*12,653*	*13,581*	*12,407*	*19,390*	*11,828*	*12,405*	*13,352*	*10,076*	*8,935*	*9,300*	*8,410*
GCA	*147*	*405*	*266*	*378*	*62*	*137*	*199*	*129*	*15*	*157*	*129*
CCA	*1,453*	*382*	*484*	*51*	*38*	*28*	*0*	*0*	*0*	*0*	*0*
FCLP	*3,888*	*4,542*	*4,417*	*7,573*	*4,691*	*4,807*	*4,740*	*2,723*	*3,551*	*6,612*	*6,805*

Source: MCAS-2 Cherry Point, NC

3.2.1 Aircraft Modeled for MCALF Bogue Field.

The major user of MCALF Bogue Field generating over 90% of the 17,000 annual operations are the AV-8B Fleet and FRS Squadrons based at Cherry Point. The balance of the operations includes the MCAS New River based H-46; H-53, and H-1 helicopters as well as the forecast use of the new V-22 aircraft. Additionally, a variety of other service helicopters, and a few operations by a mix of transient fixed-wing aircraft also use MCALF Bogue Field. The nighttime (2200–0700 hours) utilization is approximately 1%. Multiplying the annual operations (adjusted for one operation in lieu of two for patterns) by the utilization percentages for aircraft and flight tract, dividing by 130 busy days allows calculation of the busy day average day and nighttime operations per flight track shown in Table C-7 below.

3.2.2 Flight Tracks for MCALF Bogue Field.

MCALF Bogue Field duty runway is heavily weighted to Runway 23 that is used 95% of the time, with Runway 05 accounting for the remaining 5%. FCLP operations on Runway 23 have two typical flight tracks. The ATC personnel estimated that 60% of the FCLP operations used the longer pattern (Flight Track 23F2) whereas 40% use the shorter pattern (Flight Track 23F3). Figures C-13 and C-14 outline the Flight Track use in the Noise Study. Flight tracks that are infrequently used or that do not contribute significantly to the average noise levels are not shown.

TABLE C-7.

MODELED AVERAGE BUSY DAY OPERATIONS BY FLIGHT TRACK

MCALF BOGUE FIELD

(Source: Wyle February 1998)

Event Type	Duty R/W	R/W %	Flight Track			AV-8			EA-6B			All		
			ID	Description	%	Day	Night	Total	Day	N.	Total	Day	N.	Total
Straight in Arrival	05	5%	05A1			0.26		0.26				0.26		0.26
	23	95%	23A1			4.85		4.85	0.04		0.04	4.89		4.89
FCLP [1,2]	05	5%	05F2	RH Pattern		2.67		2.67				2.67		2.67
	23	95%	23F2	LH Pat. long	60	30.44		30.44	0.05		0.05	30.49		30.49
	23		23F3	LH Pat. short	40	20.30		20.30	0.04		0.04	20.34		20.34
Departure	05	5%	05D1	Straight		0.26		0.26				0.26		0.26
	23	95%	23D1	Straight		4.85		4.85	0.04		0.04	4.89		4.89
Departure						5.11		5.11	0.04		0.04	5.15		5.15
Straight-in Arrival						5.11		5.11	0.04		0.04	5.15		5.15
FCLP [1,2]						53.41		53.41	0.09		0.09	53.50		53.50
Grand Totals						63.63		63.63	0.17		0.17	63.80		63.80

1. Counted as one event.
2. Includes FBO Operations and Expeditionary Airfield Operations.

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Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

- Flight Track
- 5LD3 Flight Track Identification
- MCALF Bogue Boundary

— MCALF Bogue —

Arrivals & Departures

0 3000 6000 Feet

Figure
C-13

Marine Corps Air Station
Cherry Point, NC

AICUZ Update

Legend

Flight Track

5LD3 **Flight Track Identification**

MCALF Bogue Boundary

MCALF Bogue

FCLP Flight Tracks

0 2000 4000 6000 Feet

Figure

C-14