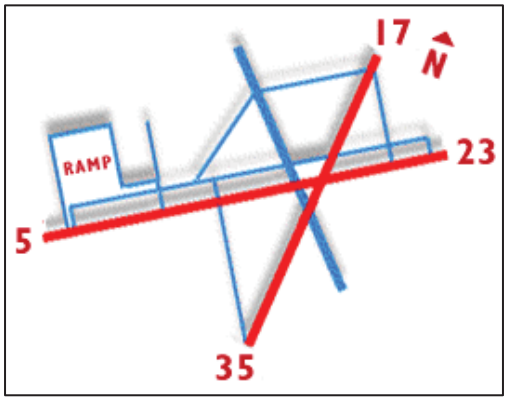
SECTION 2 – AIRPORT INVENTORY

2.0 INTRODUCTION



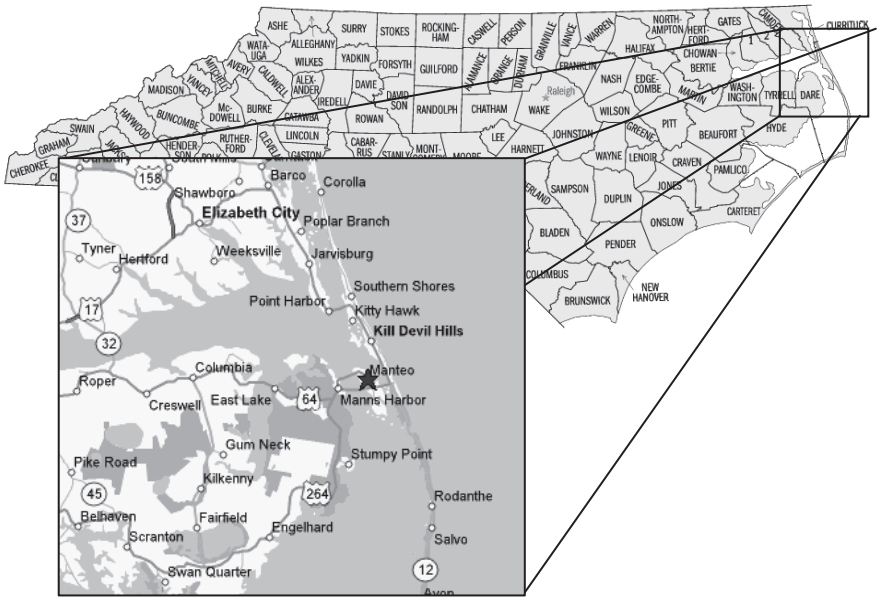
The inventory is a systematic data collection that provides an understanding of past and present aviation factors and community trends. A comprehensive inventory forms the basis for airport recommendations throughout the Dare County Regional Airport Master Plan Update (AMP).

An on-site inspection was conducted by the consultant in January 2005 to note the physical condition of key airport facilities, equipment and services, confirm on-and off-airport land uses, interview key County/Airport constituents, and review Airport activity logs and records.

2.1 MQI AIRPORT LOCATION

Exhibit 2-1 depicts the Airport's location and vicinity. Dare County is located in northeastern North Carolina, on the outer banks of the Atlantic coastline.

EXHIBIT 2-1
AIRPORT VICINITY & LOCATION MAP



The Airport is situated in the northeastern portion of the County on Roanoke Island. The Town of Manteo is the Airport's associated city, located 1 mile southeast of the Airport.

2.2 MQI AIRPORT ROLE

The Dare County Regional Airport is identified by the FAA *National Plan of Integrated Airspace* Systems (NPIAS) as a General Aviation (GA) facility designated 16894A. The North Carolina Department of Transportation (NCDOT) *2004 North Carolina Airport Development Plan (NCADP)* lists the Airport as a "red-code" facility. The current Airport Layout Plan (ALP) drawing notes the Airport has an FAA Airport Reference Code (ARC) of B-II.

2.3 MQI SUMMARY OF AIRPORT ACTIVITY (2004-2005)

As of November, 2004, there are 62 based aircraft at the Airport, including 49 single-engine, 12 multi-engine, and 1 turbine helicopter. The Airport experiences approximately 46,000 civilian aircraft operations (takeoffs and landings) and an additional 700 military operations per year.

2.4 MQI AIRPORT OWNERSHIP AND MANAGEMENT STRUCTURE

The Dare County Regional Airport is a publicly-owned and operated facility governed by the Dare County Airport Authority. The following briefly describes the current Airport ownership and management structure:

Dare County: Dare County is the Airport Sponsor, participating with the oversight of Airport developments and providing financial support for Airport operations and capital improvements, at the discretion of the County Board of Commissioners. The Airport staff is employed by the County and the Airport is managed as an administrative unit within the County.

Airport Authority: The Dare County Regional Airport Authority is the governing entity responsible for operating, maintaining and improving Airport facilities in accordance with NCDOT, Division of Aviation and FAA grant assurance agreements.

Airport Management/Operations: A full-time airport manager and supporting staff are employed by Dare County to oversee the day-to-day administrative operations of the Airport. The Airport Director serves at the discretion of the Airport Authority, and has the responsibility to provide FBO-related line services to pilots, patrons and the general public, and administer the maintenance and upkeep of Airport facilities and equipment in a safe manner.

2.5 FIXED BASE OPERATOR / SPECIAL AVIATION SERVICE ORGANIZATION

The Airport Authority serves as the primary full-service Fixed Base Operator (FBO), managing and providing the following services:

- Aircraft Fueling (Jet-A and 100LL)
- Aircraft Ramp Parking & Tie-Down
- Pilot & Passenger Equipment

Dillon's Aviation (since replaced by Barrier Island Aviation, Ltd.) is a special aviation service organization (SASO) offering the following services:

- Aircraft charter
- Flight training
- Recreational flights
- Aircraft maintenance and repair


New SASO Common Hangar

Aerial advertising and banner towing are provided by multiple based operators, both on a permanent and seasonal basis.

Multiple car rental companies offer service at the Airport. At present, none of the rental car companies occupy terminal building space or have personnel located at the Airport.

2.6 MQI AIRPORT DEVELOPMENT HISTORY / PLANNING STUDIES

The Dare County Regional Airport was initially constructed as a U.S. Navy training facility during World War II; originally constructed in 1941 with a three-runway system and subsequent improvements through 1945. After World War II, the airfield was declared "surplus" and the facility transferred to Dare County on August 11, 1947. The Instrument of Transfer requires Dare County to operate and maintain the facility for public airport purposes, and only such purposes.

The Airport was managed by the Dare County Board of Commissioners from 1947 until 1971, with assistance from various business constituents. In 1971, the State Legislature approved the establishment of the Dare County Regional Airport Authority. In response to the needs of a full-service Fixed-Base Operator (FBO), the Airport Authority assumed direct management and supervision of FBO-related services in 1983. During this time, the Airport Authority hired a full-time manager to oversee the planning and coordination of Airport facilities and FBO-related services. This arrangement is currently in effect.

The initial Dare County Regional Airport Master Plan was completed in 1980. Subsequent planning studies include the:

- *1989 Airport Master Plan/ALP Update*
- *2003 Airport Terminal Area Study*

The Appendix contains a detailed chronology of Airport developments accomplished with federal and state grant assistance since 1992. As reported by NCDOA, funding for Airport projects during this period totaled nearly $9.9 million.

2.7 MQI AIRFIELD FACILITIES AND CONDITION

Exhibit 2-2 depicts the Airport's runway and taxiway configuration. Runway 5-23 is the 'primary' runway and Runway 17-35 the 'crosswind', intersecting near the midfield. A full-length parallel taxiway serves the west side of Runway 5-23, and a modified partial-parallel taxiway system for Runway 17-35. The Airport has two separate terminal areas, including the primary public-use terminal core located on the northwest (westside) of the field, and more proprietary terminal facilities located on the southeast (eastside) of the field.

EXHIBIT 2-2
AIRPORT LAYOUT & FACILITY DEPICTION

Source: NCDOT, 2005 Airport Facility Directory

Airfield Layout / Runway Configuration

The Airport property totals ±488 acres (Dare County GIS Tax Assessment Data), including Authority and County interests. The FAA-published Airport elevation is 14' mean sea level (surveyed) with an Airport Reference Point coordinate of 35°55'08.360"N/ 75°41'43.940"W (NAD83). The magnetic variation is 10°43'W.

Throughout the inventory, a condition rating is assigned to facilities in order to gauge the magnitude of future maintenance/repair obligations, primarily for facility requirement and cost purposes. The condition rating is:

Good — Physically, functionally and economically secure, requiring only minor maintenance upkeep or repair during the planning period.

Fair — Physical deterioration evident, requiring moderate maintenance repairs or rehabilitation during the intermediate to long-term planning period.

Poor — Major structural deterioration or economically deficient (obsolete), requiring reconstruction or replacement within the immediate planning future.

2.7.1 MQI Pavement Condition Index (PCI)

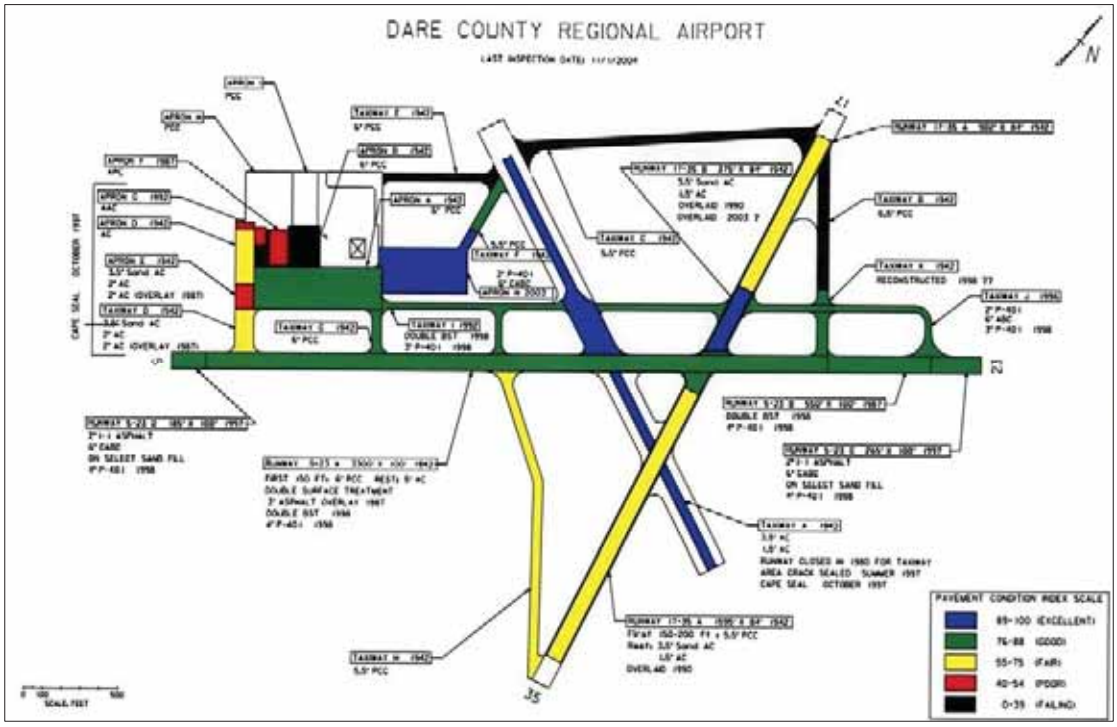
The North Carolina Department of Transportation (NCDOT) prepared a Pavement Condition Index Report for Dare County Regional Airport in February, 2005 based on a site analysis conducted in November, 2004. The following is a summary of average pavement conditions broken-down for the runway, taxiway and apron surfaces; totaling 38.6 acres of pavement. On average, the overall score for MQI pavements is 67 out of 100 points, a "Fair" rating; which indicates that the airfield pavement currently requires 'preventative maintenance'.

Dare County PCI Report	
Section	Average Rating
Runway Surfaces (677,800 SF: 15.6 Acres)	82 out of 100 (Good)
Taxiway Surfaces (479,000 SF: 11.0 Acres)	65 out of 100 (Fair)
Apron Surfaces (441,300 SF: 10.1 Acres)	59 out of 100 (Fair)
Taxilane Surfaces (84,600 SF: 1.9 Acres)	40 out of 100 (Poor)
Average Total (1.682,600 SF: 38.6 Acres)	67 out of 100 (Fair)

NCDOT, Division of Aviation PCI Thresholds:

75 Points and Greater – No Action Necessary
55 to 75 Points – Preventative Maintenance Needed
55 Points and Lower – Repair / Rehabilitation

EXHIBIT 2-3
AIRPORT PAVEMENT CONDITION (2004)



2.7.2 MQI AIRFIELD SYSTEM

Table 2-1 describes the major airfield facilities and equipment along with a corresponding assessment of physical condition based on a January, 2005 site investigation by the consultant.

Although constructed as displacements, all four runway ends have displaced thresholds, with nearly 25% of runway system restricted by land and takeoff declared distances. Below are the published displaced lengths for each runway end, and the purpose for the displacement:

Runway 5 End 300' - Runway Safety Area (RSA) dimension (Croatan Sound)
Runway 23 End 300' - Runway Safety Area (RSA) dimension (road/structures)
Runway 17 End 300' - Tree Heights (Threshold Siting Surface)
Runway 35 End 1,000' - Tree Heights (Threshold Siting Surface)
Total Displaced 1,900' (7,603' Total Runway ÷ 1,900' Displaced = 25%)

Table 2-1: Airport Facilities and Conditions

Airport Item	Description and Size	Condition
RUNWAY 5-23		
Runway Dimension	4,300' x 100' (asphalt)	Good
Displaced Threshold	Rwy 5 End: 300' ■ Rwy 23 End: 300'	
Pavement Strength	48,000 lbs.[4]	
True Bearing	38.04°- 218.05° true bearing	
Runway Lighting	Medium Runway Lighting (MIRL) - CTAF[1]	
Pavement Markings	Non-Precision Approach – Runway 5 & 23 End	
Visual Aids	PAPI (2L) – Runway 5 / PAPI (2L) – Runway 23[2]	Poor
	REIL – Runway 5	Good
Taxiway System	Full-parallel @ 300' separation - 4 exit taxiways[3]	Fair
Taxiway Lighting	Medium Intensity Taxiway Lighting (MITL)	Good
RUNWAY 17-35		
Runway Dimension	3303' x 75' (asphalt)	Good
Displaced Threshold	Rwy 17 End: 300' ■ Rwy 35 End: 1,000'	
Pavement Strength	20,000 lbs. (single wheel gear)	Good
True Bearing	158.01°- 338.01° true bearing	Good
Runway Lighting	Medium Runway Lighting (MIRL) - CTAF[1]	
Pavement Markings	Non-Precision Approach – Runway 17 End	
Visual Aids	None	
Taxiway System	Crossover entrance taxiways	
	2 midfield exit taxiways[4]	Fair
Taxiway Lighting	Medium Intensity Taxiway Lighting (MITL)	Good

[1] Runway MIRL operated by common frequency.
[2] Runway 23 PAPI out of service – indefinitely
[3] Parallel taxiway has numerous areas of spalling, may have bumps and depressions
[4] FAA 5010 Form indicates 48,000 lbs. (single wheel gear planes) – it is assumed this should be 48,000 lbs. (dual wheel gear planes).

Source: Dare County Regional Airport FAA Published Airport Data (FAA 5010 Form / A/F Directory).

2.7.3 MQI TAXIWAY & TAXILANE SYSTEM

Table 2-2 summarizes taxiway information. The taxiway system totals ±10,740 linear feet, and about 4,800 SY. The full-length parallel to Runway 5-23 has a 300' runway-to-taxiway centerline separation. None of the taxiways extend to the displaced runway thresholds. Taxiways are both concrete and asphalt, with pavement strengths estimated to be nearly the same as the associated runway.

Table 2-2: Taxiway Designations

Taxiway Designator (per ALP)	Taxiway Type / Location	Dimension	Pavement Condition (2004 PCI)
Twy A (L)	Parallel Taxiway – Runway 5 & 23	3,900' x 35'	Good
Twy B	Rwy 17 Entrance – Hangar Connector	1,650' x 50'	Failing
Twy C (PL)	Rwy 5-23 Exit – Rwy 17 Entrance	900' x 50'	Failing
Twy D (PL)	Crossover Exit (Abandoned Runway)	2,550' x 40'	Excellent
Twy E (PL)	Connecting to Rwy 35 End	1,700' x 35'	Fair
Twy F	Connector Between Apron A & Twy B	450' x 50'	Fair to Good
Twy G (L)	Rwy 5-23 Exit to Parallel Taxiway A	200' x 55'	Good
Twy H (L)	Rwy 5 Entry Taxiway	200' x 100'	Fair
Taxilanes	Taxilanes serving the hangar area(s) range in width from 20' to 75' wide.	Various	Poor
TOTAL		11,550 LF 4,900 SY	

(L) Lighted Taxiway - MITL / (PL) Partially Lighted Taxiway - MITL

Note: Typical pavement thickness is 5" to 6" (Geotechnologies Study, 2005).
Note: Pavement condition rating conducted in 2004.

Source: TBI Project Layout and Safety Plan, Aug. 2002.

2.7.4 MQI AIRFIELD COMPLIANCE ISSUES

The following components have been identified as compliance or geometric deviations as identified by published FAA/NCDOT documentation, and/or as reference to current FAA airport planning/design standards. These include:

Runway 5: Per the FAA 5010 Form, a 15' drop-off exists approximately 40' from the displaced Runway 5 end. The drop-off encroaches the Runway Safety Area (RSA) for Design Group II standards[1] (RSA 150' wide x 300' beyond). Options for conforming to standards include additional earthwork/grading.

FAR Part 77 Obstructions: Per the FAA 5010 Form, multiple trees exist in the vicinity of the airport that penetrate FAR Part 77 approach and transitional surfaces. These obstructions should be removed/topped to meet compliance.

2.8 MQI TERMINAL AREA FACILITIES

The Airport has two separate terminal areas. The primary terminal area is located near the Runway 5 end (Westside), and the other near the Runway 35 end (Eastside). The following are major components of the terminal area as further described in this section:

- Terminal building
- Apron / tie-down areas
- Public auto access & vehicular parking
- Aircraft fuel facility / storage
- Aircraft utilities (power, water and sewer)

The current terminal areas occupy about 37 acres. The Westside terminal area complex is about 28.5 acres, with auto access along Airport Road (SR 1116). The Eastside terminal/hangar area is about 8.0 acres with auto access from Driftwood Drive. The Westside terminal area is physically constrained by the Runway 5-23 building restriction line (BRL), proximity to primary airport navigation facilities, County parceled property (40-acre area northeast of terminal area), Croatan Sound, and the North Carolina Marine Aquarium. The Eastside terminal area is constrained by property boundaries, public roadway, and the building restriction line (BRL) to Runway 5-23 and 17-35.

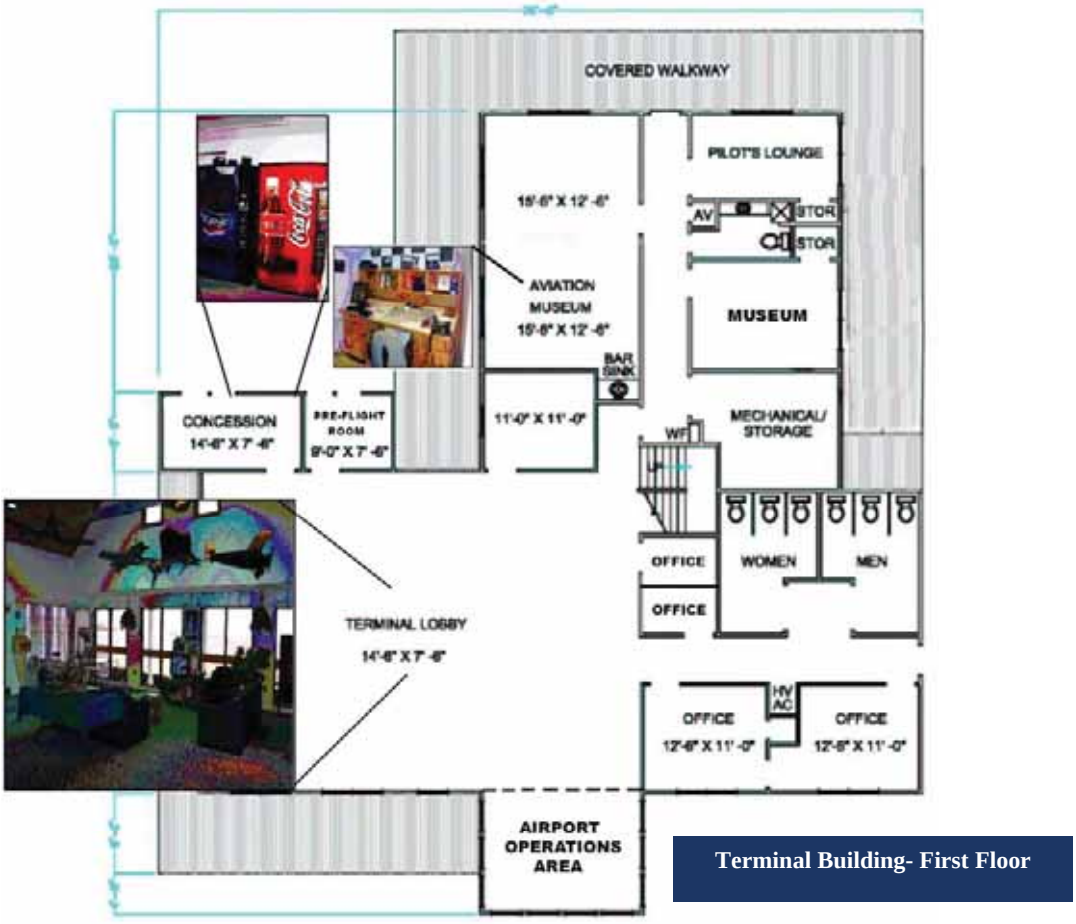
Overall, the present demand for terminal facilities (hangars) has outpaced the suitable, or available space for development.

[1] For the first 200' of the RSA, the longitudinal grade is between 0% and 3%, with any slope being downward from the runway end. For the remainder of the RSA, the maximum longitudinal grade is such that no part of the RSA penetrates the approach surface or clearway plane. The maximum allowable negative grade is 5%.

2.8.1 MQI TERMINAL BUILDING

The 2-story ±5,700 square foot terminal building was constructed in the early 1980's, and is reported to be in good condition with handicap access, and no major structural or mechanical issues. During the busy-months, the building is crowded for Airport users. Overall, the building has an informal atmosphere, including various aviation displays, museum exhibits and covered outdoor seating, however, additional first-floor office area was recently provided. The building is open-to-the-public during FBO operating hours, with no after-hour access to restrooms. The first-floor is used for public-use amenities, and the second floor mainly for Airport administrative functions. Below is a depiction of the first-story floorplan, which includes: 1) FBO service desk and operations area, 2) public foyer area, 3) pilot lounge, 4) pre-flight planning room, 5) aviation museum rooms, 6) rental car counter, 7) vending area, storage/supply room, 8) restrooms, 9) mechanical & electrical room.

EXHIBIT 2-4
TERMINAL BUILDING LAYOUT (FIRST FLOOR)



Terminal Building- First Floor

2.8.2 MQI AIRCRAFT APRON

The Westside public-use terminal area apron occupies nearly 440,000 square feet. The Eastside does not have a dedicated public-use parking or tie-down area. The Airport recognizes apron areas by Section A, B and C, as described below:

Apron Sections	Apron Size (SF)	Strength (lbs.) **	Tie-Downs*	Condition
Apron A (West of Term. Bldg)	276,300 SF	12,500 to 48,000	16 to 30	Fair to Poor
Apron B (East of Term. Bldg)	112,500 SF	12,500	26 to 32	Good
Apron C (South of Term. Bldg)	52,500 SF	12,500 to 48,000	6 to 10	Good to Fair
TOTAL	441,300 SF (10.1 Acres)	- -	48 to 72 (60 Avg.)	- -

* Number of tie-downs dependent on size of aircraft (small, medium and large cabin)
** Pavement strength estimated.

TBI Terminal Area Study, Oct. 2003.

The Westside apron reaches nearly 100% capacity during a busy-day of the peak seasonal months. At present, there are no designated or segregated aircraft tie-down parking areas for larger versus small itinerant airplanes – as airplanes are parked at pilot discretion or as directed by FBO based on space availability. In 2003, Hurricane Isabel resulted in the removal of 17 nested T-hangar units along the north portion of Apron A, which provided additional parking space on Apron A.

2.8.3 MQI HANGARS

Table 2-3 lists hangar information. Dare County's coastal climate creates a strong need for hangar storage. The on-going hangar waiting list of 25 to 27 planes, with 22 additional based aircraft. While most of the hangars accommodate smaller 4 to 8-seat piston aircraft, recent hangar construction has trended towards larger clearspan hangars from 8,000 to 12,000 SF, plus other enclosed office or maintenance space. MQI hangar space totals 73,325 SF, and is comprised of:

* T-Hangars 51,300 SF (70%)
* Common Hangars 22,025 SF (30%)

Table 2-3: Hangar Facilities

Hangar Type	Hangar Dimension (FT)	Hangar Area (SF)	Plane Spaces*	Height (±)	Condition
T-Hangar	130' x 45'	5,850	± 3	± 28'	Good
Nested T-Hangar	310' x 55'	17,050	±14	± 23'	Good
Nested T-Hangar	110' x 65'	7,150	± 2	± 28'	Good
Box Hangar	65' x 55'	3,575	± 1	± 15'	Good
Box Hangar	50' x 40'	2,000	± 1	± 16'	Good
Box Hangar	55' x 40'	2,200	± 1	± 16'	Fair
Box Hangar	50' x 45'	2,250	± 1	± 16'	Fair
T-Hangar	190' x 55'	10,450	± 6	± 25	Fair
T-Hangar	270' x 40'	10,800	8	± 25'	Fair
Box Hangar	120' x 100'	12,000	± 4	± 28'	Good
TOTAL	- -	73,325	± 41	- -	- -

Note: * Hangar capacity determined by size of aircraft stored.
Note: Hangar dimensions calculated using TBI Terminal area plan (Nov, 2003).
Note: Storage capacity is estimated from ALP drawing information.

Source: TBI Airport Inventory Inspection, January 2005.

2.8.4 MQI AIRCRAFT FUEL FACILITIES

The Airport dispenses Jet-A and 100LL fuel. The Jet-A and 100LL fuel storage tanks (15,000 gallons each) are located northeast of the terminal building on the western end of Taxiway D, next to the automated 100LL self-fuel dispensing pump. The fuel tanks have secondary containment and are enclosed with a retention wall and 6' security fence. The Airport operates two leased fuel trucks, one 2,300 gallon Jet-A truck and a 1,025 gallon 100LL truck. The fuel trucks park immediately east of the terminal building.

Both tanks were replaced in 2005, with upgrades to 15,000 gallon storage capacity each.

Service Trucks and Fuel Farm

Self-Serve Fuel Facilities

2.8.5 MQI AUTO ACCESS

Airport Road is a is 2-lane paved roadway providing single-point access to the Westside terminal area, accessed via US Highway 64/264. The same road also provides access to the NC Aquarium and other residential areas. Ethridge Road and Driftwood Drive provide access to the circumference of the Airport property and access to hangars and the UPS facility on the eastside. The following provides information on surrounding roadways:

Airport Road

Surrounding Roadways			
Road Name	Width	ROW	Condition
Airport Road	18’	± 60’	Good
US Highway 64/264	24’	±100’	Good
Ethridge Road	16’	± 60’	Good
Driftwood Drive	18’	± 60’	Good

Source: Feb. 2005 telephone interview with North Carolina DOT

EXHIBIT 2-5
AIRPORT AUTO ACCESS

2.8.6 MQI AIRPORT AUTO PARKING

The auto parking lot in front of the terminal building totals 45,000 square feet with 128 spaces. During the average day of the peak month the parking lot reaches 50% to 70% capacity, and during special airport events at the Airport or NC Aquarium the parking lot reaches near capacity.

2.8.7 MQI AIRPORT UTILITIES

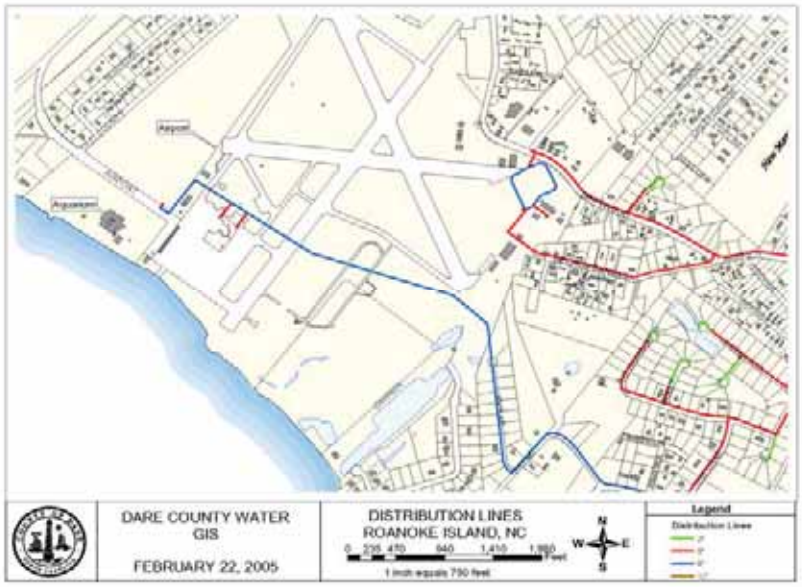
Table 2-4 lists utility information and recorded utility easements on the Airport.

Table 2-4: Airport Utilities/Providers/Conditions

Utility Type (Provider)	Capacity	Utility Information / Easements
Water (Town of Manteo)	± 5500 GPM	The Town of Manteo water main supplies 5,500 GPM to the airport.
Electric Supply (Dominion Electric)	Single Phase	Multiple lines extend to the Airport.
Electric Vault	122-40 single phase 225 amp electric	Problems experienced with automated CTAF usage of runway light clicks.
Phone (Sprint)	- -	30' ROW easement co-located with NC DOT easement along all state roadways.
Waste Sewer	Multiple Septic	No significant utility or capacity issues.
Solid Waste (County)	- -	Transfer stations located near Airport. Adequate capacity and pickup.

TBI Airport Inventory, June 2004 / Certified Airport Land Parcel Maps (2003 – 2004).

EXHIBIT 2-6
COUNTY GIS UTILITY MAPPING (AIRPORT VICINITY)



2.8.8 AIRPORT SECURITY / FENCING / GATE ACCESS

Airport perimeter fencing consists primarily of 6' chain link fence with barb-wire top. Perimeter fencing is provided for most of the airfield, and all of the terminal area. Vehicle access from the terminal area to the airfield is gained through gated access points; one for the Westside and Eastside terminal areas. The gates are operated by a mechanical key code systems (issues reported about codes). A closed-circuit video system observes multiple security points as displayed on monitors mounted in the terminal building.

Westside Auto Gate Access

Eastside Auto Gate Access

2.9 NCDOT, AIRPORT DEVELOPMENT PLAN CRITERIA

In 2003, the NCDOT-Division of Aviation (NCDOA) implemented planning requirements for public-use general aviation airports statewide as part of the North Carolina Airport Development Plan (NCADP). The Dare County Regional Airport is designated a 'Red' group facility, which is the most sophisticated category of general aviation airports. For planning purposes, design concepts should meet, or exceed the 'minimum' design standards for 'Red Group' airports. See Table 2-5 below.

Table 2-5: NCDOT, Airport Development Plan (Red Group Criteria)

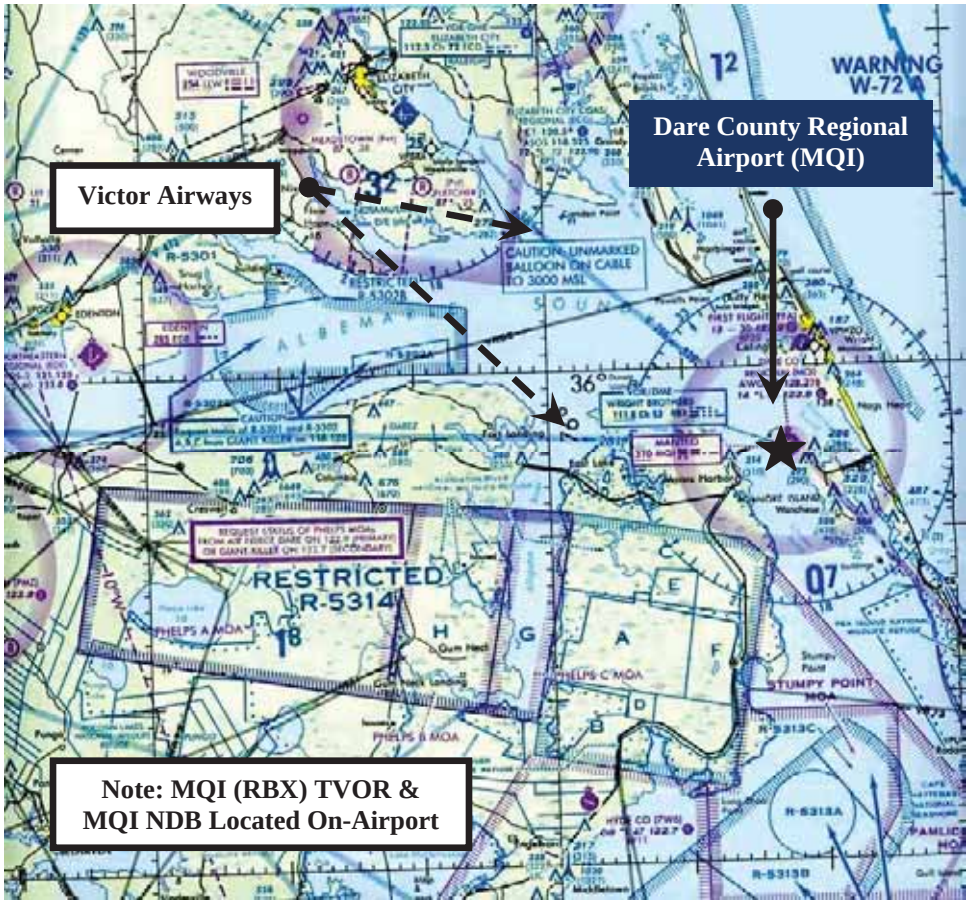
Airport Design Item	NCADP Standards	Met
Aircraft Apron (#12)	Minimum: A paved aircraft parking area capable of parking 25 based aircraft and five itinerant aircraft. Of the 30 tie-downs, allotment for 3 multi-engine aircraft is required. Tie downs should be provided for all parking spaces. Spaces between aircraft and for taxilanes should meet FAA guidelines. Pavement strength for the itinerant parking area should match the runway pavement strength.	Yes
Terminal Building (#13)	Minimum: Must include designated FBO/Operational area, designated flight planning room, public meeting room, and public restrooms.	Yes
Taxiway & Apron Edge Lighting (#14)	Minimum: Medium intensity taxiway lights (MITL)	No
Aircraft Rescue & Fire Fighting Equipment (#18)	Minimum: At least 1 fully-charged fire extinguisher available and easily accessible 24 hours a day for use around the main apron area. Fire extinguishers at Sponsor cost.	Yes
Airfield Equipment & Storage Building (#19)	Minimum: Airfield maintenance equipment (approved tractor and attachments) and an approved building to store equipment. Request considered every ten years.	No

2.10 MQI AIRSPACE SYSTEM

Exhibit 2-7 depicts the 'visual' aeronautical chart for the Dare County Regional Airport vicinity. As shown, the Wright Brothers TVOR located on the Airport provides two victor airway routes (V-189 and V-266) used for civilian traffic to-and-from the Airport. The limitation of only two victor routes concentrates ascending, descending and transitioning traffic within narrow corridors. This decreases horizontal and vertical separation, and diminishes airspace throughput capacity for inbound and outbound instrument (IFR) and/or visual (VFR) traffic.

The complexity of airspace surrounding the Airport results from Special Use Airspace (SUA) operated for Department of Defense flight operations. Various branches of the armed services use the SUA per memorandums between the FAA (controlling agency) and Department of Defense (using agency).

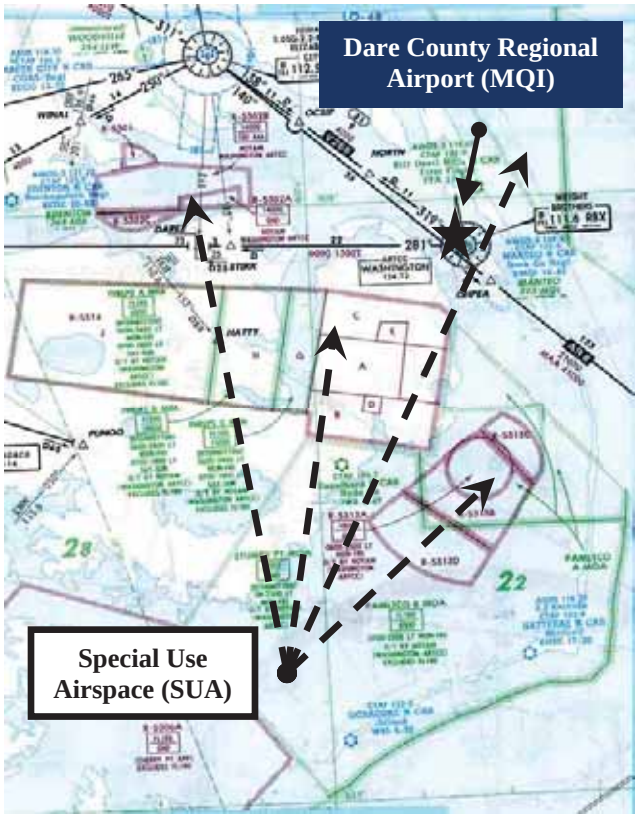
EXHIBIT 2-7
VISUAL AERONAUTICAL CHART
(DARE COUNTY REGIONAL AIRPORT)



There are no military airways or special use airspace directly overlaying the Airport; however, there are a number of restricted areas in close proximity. All but the northwest quadrant is impacted by SUA and wildlife areas. When the military airspace is active ('hot'), non-participating civilian aircraft are prohibited from entering. As such, the stratified-overlapping SUA present unique challenges to VFR and IFR navigation to-and-from the Airport. Heightened pilot vigilance is required, even though SUA is displayed on aeronautical charts and sometimes depicted by cockpit navigational instruments.

Exhibit 2-8 depicts the 'instrument' airspace system surrounding the Airport. Controlled 'Class E' airspace extends from 18,000 mean se level (MIS) down to 700' above ground level (AGL) within an approximate 5-mile radius of the Airport, as a transition for instrument flight rule (IFR) operations in controlled airspace while transitioning between the terminal and en-route environments. It should be noted that only one IFR aircraft is allowed within 'Class E' airspace when conducting an instrument procedure to an uncontrolled non-towered field.

EXHIBIT 2-8
INSTRUMENT AERONAUTICAL CHART
(DARE COUNTY REGIONAL AIRPORT)



The SUA military airspace involves:

SUA - Restricted Areas (R): The Restricted Area confines or segregate military activities hazardous to non-participating civilian aircraft, including bombing, aerial gunnery, artillery firing and missiles (denoted by the prefix "R" on aeronautical charts). Civilian flight, while not entirely prohibited, is subject to restriction. Non-participating civilian traffic operating under IFR are typically routed around active Restricted Areas, and VFR traffic is required to remain clear. Joint-use of Restricted Areas between participating and non-participating aircraft is approved, only, when the Restricted Area(s) are inactive and the Using Agency reverts the airspace back to the Controlling Agency (Washington Center).

Restricted Areas pertaining to the Dare County Regional Airport include R-5301, R-5302, R-5313 and R-5314. The Dare County Bomb Range R-5314 D and E are used primarily by Air Force Dare (R-5314D) and some by Navy Dare (R-5314E) for low-altitude bombing and strafe exercises, as scheduled on alternating days. Nearly 90% of military traffic using R-5314 is based at Seymour Johnson, NC and Oceanic, VA, while the remaining 10% are other various military users. The R-5314 area contains one or more observation towers used by the Range Controller to monitor and report the status of military exercises. R-5314 A, B, C, F, G, H, and J are used for setting-up bombing run sequences to target acquisitions, as no actual bombing is conducted outside of R-5314 D and E. Washington Center indicates that R-5314 is declared active nearly 100% of the time. Since a portion of the two instrument approach procedures to Runway 5 penetrate R-5314 (intermediate segment, final segment and/or procedure turn), it prohibits instrument approaches to Runway 5 when R-5314 A, B, C, D, E and/or F are active. The northern border of R-5313 is located approximately 20 statute miles south of the Airport, and although no published instrument approach procedures penetrate R-5313, this airspace hampers the north-south flow of general aviation traffic navigating along the eastern coast of North Carolina.

SUA - Military Operations Areas (MOA's): A Military Operations Area is airspace designated to separate or segregate certain non-hazardous military activities from IFR traffic, and advise VFR traffic where these activities are being conducted (denoted as 'MOA' on aeronautical charts). MOA activities generally involve, but are not limited to, air combat maneuvers, air intercepts and low altitude tactics. The MOA's pertinent to Dare County Regional Airport are the Phelps MOA and the Stumpy Point MOA. Both are located to the south-southwest of the Airport. Civilian IFR traffic may be cleared through an active MOA if IFR separation can be provided by ATC. Otherwise non-participating civilian IFR aircraft are routed around active MOA's. Civilian pilots operating under VFR can be authorized to enter an active MOA, but should exercise extreme caution and contact the Controlling Agency prior to entering to obtain traffic advisories. MOA's pertaining to the Dare County Regional Airport include Phelps A MOA (R-5314 J), Phelps B MOA (R-5314 H), Phelps C MOA (R-5314 G), and Pamlico A MOA. The Phelps MOA's have the same lateral boundaries as R-5314 J, H, and G, but begin at 6,000' in R-5314J; 10,000' in R-5314H; and 15,000' in R-5314G. Each has a top of 18,000'. The Phelps MOA's are often used as a transition to R-5314, an area typically used for checking weapon ordnance. While the Phelps MOA can be scheduled independently of R-5314, they are often scheduled concurrently (ie, if a bombing exercise is to be conducted below 6,000' the MOA would probably not be needed, but would be needed if the exercise involved high-altitude bombing above 6,000').

SUA - Warning Areas (W): A Warning Area is airspace extending 3 nautical miles outward from the coast of the United States, designated to contain activity that may be hazardous to non-participating aircraft (denoted as a "W" on aeronautical charts). The purpose of this area is to warn non-participating pilots of the potential danger from military activities. Aircraft operating under IFR are routed around active Warning Areas, and aircraft operating under VFR are required to remain clear.

Joint-use of Warning Areas between participating and non-participating aircraft is approved when the area is inactive and the Controlling Agency reverts the airspace to civilian air traffic control. Warning Areas pertinent to Dare County Regional Airport are W-72 and W-122. Although the initial approach fix for the Runway 23 RNAV approach penetrates W-77A, there are no restrictions on the use of this approach procedure when W-77A is active.

Summary of SUA Findings:

The status of SUA coordinated between the Using Agency and the Controlling Agency requires timely communication. A dedicated phone line once in-place between Range Control and Washington Center no longer exists, making the instantaneous status of SUA now more difficult. In fact, Washington Center acknowledges that coordinating the entry and exit of military traffic from SUA, is in itself, an involved task. Therefore, Washington Center is cautious, and regards SUA as being 'active' unless otherwise specifically notified. Currently, an agreement between Air Force Dare and Washington ARTCC states that Air Force Dare will maintain control of the restricted areas unless closed for periods of more than two hours, at which time Washington ARTCC takes control of the airspace and instrument approaches to Runway 5 at the Dare County Airport.

Typically, most civilian aircraft do not request or attempt to transition through the SUA, in which case Washington Center/Norfolk Approach Control almost always vectors civilian traffic around R-5314 and the Phelps MOA. Civilian aircraft on an IFR flight plan desiring to enter into or transition through SUA have their IFR flight plan cancelled by Washington Center, then handed-off to the Range Control to coordinate positive control through SUA. In fact, due to the complexity of picking-up clearances at the Dare County Regional Airport, on occasion the Airport FBO attempts to assist departing IFR aircraft by relaying the status of clearances as reported by Washington Center or FAA Flight Service Station, as coordinated through Range Control.

Pea Island National Wildlife Refuge

This wildlife area, as identified on the aeronautical maps, is located south of the Oregon Inlet, along the Cape Hatteras National Seashore. FAA regulations advise a 2,000' overflight of national refuge/wildlife areas by aircraft. The populations of birds that migrate and congregate seasonally can be a significant potential hazard to aircraft, further constricting usable airspace south of the Airport.

Table 2-6 lists each Special Use Airspace (SUA), including altitude restrictions, published time of active use and the Using Agency (military user). For all, the Controlling Agency is Washington Center.

Table 2-6: Military Special Use Airspace (SUA)

Number	Altitude	Time of Use	Using Agency
R-5301	Ground to 14,000'	Intermittent By NOTAM	Giant Killer
R-5302 A R-5302 B R-5302 C	A: Ground to 14,000'' B: 100' AGL to 14,000' C: 100' AGL to 3,000'	Intermittent By NOTAM	Giant Killer
R-5313 A	Up to 18,000'	0800-2300 Mon-Fri (✈ 24 Hours)	Giant Killer
R-5313 B, C	100' AGL to 13,000'	By NOTAM (✈ 24 Hours)	Giant Killer
R-5313 D	500' AGL to 13,000'	By NOTAM (✈ 24 Hours)	Giant Killer
R-5314 A R-5314 D R-5314 E	Up to Flight Level 20,500'	Intermittent (✈ 6 Hours) 0600-2400 Mon-Fri 0700-1800 Sat-Sun	Air Force / Navy Dare
R-5314 B R-5314C R-5314 F	500' AGL to Flight Level 20,500'	Intermittent (✈ 6 Hours) 0600-2400 Mon-Fri 0700-1800 Sat-Sun	Air Force / Navy Dare
R-5314 G	200' AGL to 15,000'	Intermittent (✈ 6 Hours) 0600-2400 Mon-Fri 0700-1800 Sat-Sun	Air Force / Navy Dare
R-5314 H	500' AGL to 10,000'	Intermittent (✈ 6 Hours) 0600-2400 Mon-Fri 0700-1800 Sat-Sun	Air Force / Navy Dare
R-5314 J	1,000' AGL to 6,000'	Intermittent (✈ 6 Hours) 0600-2400 Mon-Fri 0700-1800 Sat-Sun	Air Force / Navy Dare
Phelps A MOA	6,000' AGL to 18,000'	Not published	Air Force / Navy Dare
Phelps B MOA	10,000' AGL to 18,000'	Not published	Air Force / Navy Dare
Phelps C MOA	15,000' AGL to 18,000'	Not published	Air Force / Navy Dare

Note: SUA usage noted as 'local' time.

Note: "TO" means "To and Including ■ Mon-Fri" indicates Monday through Friday

Note: AGL means 'Above Ground Level' ■ MSL means 'Mean Sea Level'

Note: ✈means SUA reservation must be scheduled.

Source: North Carolina Aeronautical Chart 2004.

2.10.1 AIR TRAFFIC CONTROL

The following describes the system and authority of civilian and military control of

airspace in the vicinity of the Airport:

Air Route Traffic Control Center (ARTCC): The Airport is within the Washington ARTCC (ZDC) airspace domain. The ARTCC provides vectoring, spacing and separation services to civilian and military aircraft operating under instrument flight rules (IFR), and when controller workload permits, provides 'advisory' services to VFR aircraft. ARTCC is the primary source for reporting the status of Special Use Airspace to civilian aircraft, and is responsible for vectoring civilian traffic in order to stay clear of active SUA areas.

Terminal Radar Control: Washington Center (ZDC) and Norfolk Approach Control both provide terminal area radar for positive control of arriving and departing civilian traffic at the Dare County Regional Airport. It is reported by ZDC that radar coverage is provided reliably to about 2,000 AGL within the Airport vicinity. Radio communication coverage is provided to the ground within the Airport vicinity. There have been recent discussions about installing a military radar facility in the region, which might also support civilian use.

Range Control: Range Control is the military entity coordinating Special Use Airspace (SUA) operations. Their duties include monitoring the entry and exit of military aircraft within SUA, disseminating the status of SUA (active or inactive) to FAA facilities and other military users, monitoring assigned frequencies, and providing range status information to civilian pilots requesting information. Range Control does not have civilian or military air traffic control authority, or any authority beyond the SUA. When not scheduled or declared active, Range Control is charged with contacting and handing-over SUA to Washington Center. A Range Control Officer is stationed at a controlling point (tower) within R-5314 to visually observe military exercises (bombing training), coordinate military maneuvers, and report the status of military activity operating in SUA to Range Control. Air Force Dare and Giant Killer are the Range Control agencies involved SUA operations-exercises surrounding the Airport. Physically located at Seymour Johnson Air Force Base, 'Air Force Dare' and 'Navy Dare' share R-5314 airspace and radio frequencies, and in communicating the status of SUA to Washington Center (ZDC). Physically located at Naval Air Station Oceana, 'Giant Killer' is the Range Control agency that monitors R-5301, R-5302, and W-122, which are primarily used by US Navy and Marine aircraft. For R-5314, Air Force Dare is primary Range Control, and Giant Killer is secondary. Generally, if the SUA is scheduled inactive for periods less than 2-hours, Washington Center does not typically take control of the SUA airspace.

FAA Flight Service Station (FSS): The Raleigh Flight Service Station provides coverage for the Airport, as contacted by discrete frequency or over a VOR/VORTAC station. The FSS provides weather reports, flight plan filing, airport advisories, as well as status of Special Use Airspace (SUA).

2.10.2 MQI AIRPORT TRAFFIC PATTERN

The Airport has a standard 'left-hand' visual approach and departure traffic pattern, as noted by the segmented circle located south of the terminal area (traffic pattern per FAA Order 7400.2E). A dedicated 'right-hand' traffic pattern is established for banner towing operators, typically using Runway 5-23.

There are no pre-assigned published traffic pattern altitudes, and the Airport does not impose special traffic patterns/regulations for noise abatement procedures. The following describes the communications available to the Airport:

2.10.3 NAVIGATIONAL (NAVAIDS) / COMMUNICATIONS / WEATHER AIDS

Common Traffic Advisory Frequency (CTAF): The UNICOM provides air-to-ground communications on a frequency of 122.8.

Automated Weather Observing System (AWOS): The MQI AWOS-3 is located about 700' east of the terminal building, and is reported in good-fair condition. The AWOS-3 provides minute-by-minute weather observations generating routine aviation weather reports (METAR). The MQI AWOS-3 information is received by VHF radio frequency (128.27), or local telephone. The AWOS site typically has a cleared buffer radius of 500' to 1,000'.

Remote Communications Outlet (RCO): The MQI RCO antenna is located off-Airport, on Roanoke Island. The RCO provides ground communications with Washington Center approach/departure on a frequency of 124.725.

NAVAID facilities are located at or near the Airport, providing point-to-point reference throughout the national airspace system by means of ground-based and satellite instrumentation. The following describes NAVAIDs available for enroute and terminal procedures at the Airport:

Very High Frequency Omni-Directional Radio Range with Distance Measuring Equipment (VOR-DME): The Wright Brothers Terminal VOR-DME (RBX) provides magnetic course and slant distance information using electronic radials to-and-from the station, including en-route navigation and non-precision instrument approach capabilities (VOR/DME). The TVOR was refurbished/upgraded in 2003, and now has a 1,000' radius buffer restricting nearly all types of structures.

Global Positioning System (GPS/RNAV): The GPS is an accurate satellite-based navigational system which encodes transmissions from airborne receivers, providing bearing, heading, track, speed, and distance information for equipped aircraft. RNAV(GPS) provides for enroute navigation and non-precision instrument approaches at the Airport.

Non-Directional Beacon (NDB): The NDB is a low frequency radio beacon providing relative bearing information to-and-from the radio beacon station. The MQI NDB equipment is owned and operated by the Airport, located approximately 1,500' southeast of the terminal building. The MQI NDB supports a non-precision instrument approach to Runway 5 and 17, and is reported to be in good condition (antenna replaced in 2005).

NAVAID	MQI Identifier	Equipment Location
RNAV (GPS)	- -	Satellite Constellation
TVOR/DME	RBX (L)	On Airfield - 1,500' NE of Terminal Building
NDB	MQI (MHW)	On Airfield - 1,500' SE of Terminal Building

2.10.4 MQI Instrument Approach Procedures

Table 2-7 lists the Airport's instrument approach procedures, which allow arrivals during inclement meteorological conditions. There are currently six published "straight-in" instrument approach procedures to three runway ends (Rwy 5, Rwy 23, Rwy 17). The procedure(s) for RWY 5 transition through Restricted Area R-5314, and are not authorized when R-5314 A,B,C,D,E and/or F are active.

Table 2-7: MQI Instrument Approaches

Runway	Approach Type	Visibility Minimums (Aircraft Category-CAT)	Lowest Minimum Descent Altitude (MDA)
RWY 5 *	RNAV (GPS)	1-Mile (A, B) / 1¼ Mile (C)	440' MSL
RWY 5 *	NDB	1-Mile (A, B) / 1¾-Mile (C)	640' MSL
RWY 17	RNAV (GPS)	1-Mile (A, B) / 1¼-Mile (C)	440' MSL
RWY 17	NDB	1-Mile (A, B) / 1¾-Mile (C)	680' MSL
RWY 17	VOR	1-Mile (A, B) / 1¼ Mile (C)	440' MSL (1,100' – No DME)
RWY 23	RNAV (GPS)	1-Mile (A, B) / 1¼ Mile (C)	440' MSL

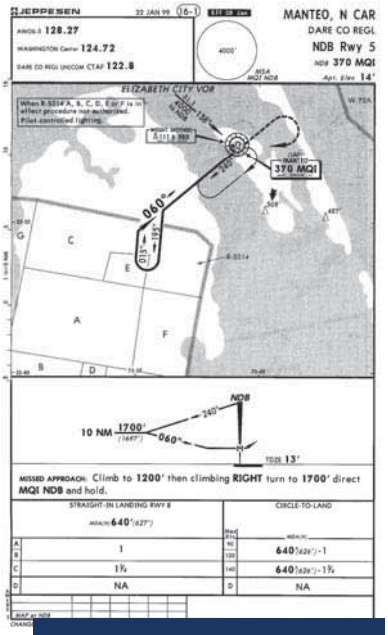
* Instrument approach procedure restricted by Special Use Airspace (SUA).

Terms: (MSL) – Mean Sea Level; (NDB) – Non Directional Beacon; (GPS) – Global Positioning System; (DME) – Distance Measuring Equipment; (VOR/VORTAC) – Very High Frequency Omni-Direction Radio Range.

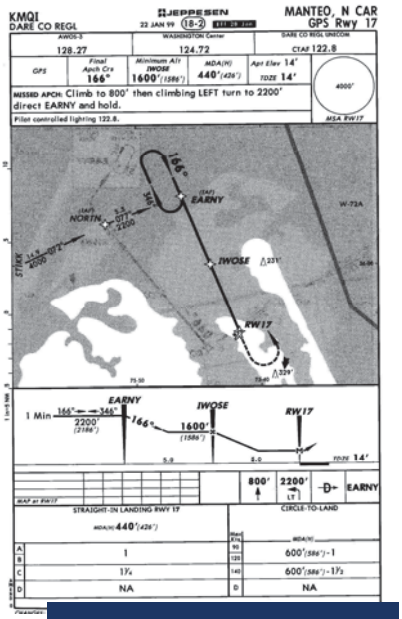
Source: Jeppesen Instrument Approach Plates, North Carolina (November, 2004).

Below is each of the Dare County Regional Airport instrument procedures.

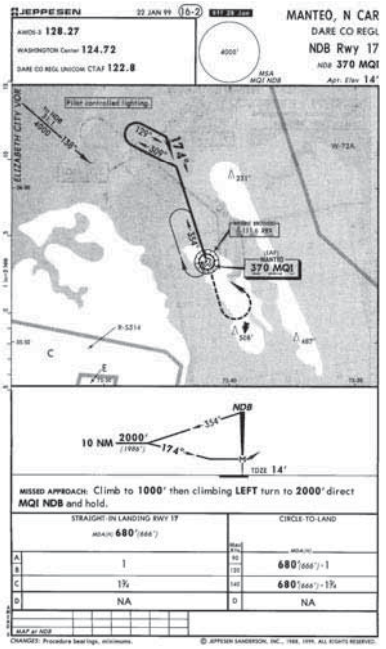
RWY 5 RNAV



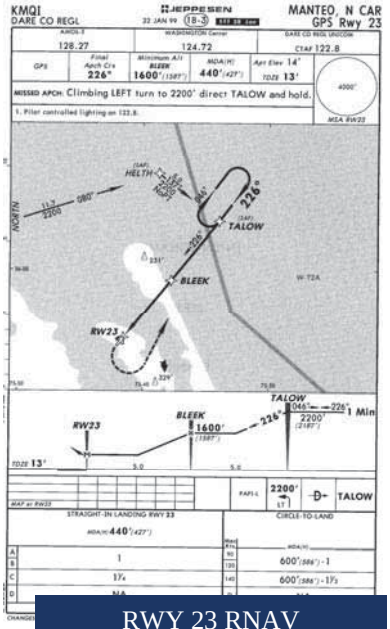
RWY 5 NDB



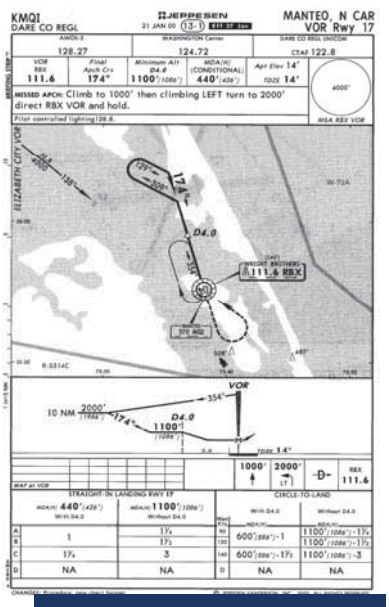
RWY 17 RNAV



RWY 17 NDB



RWY 23 RNAV



RWY 17 VOR

2.11 REGIONAL CLIMATIC CONDITIONS

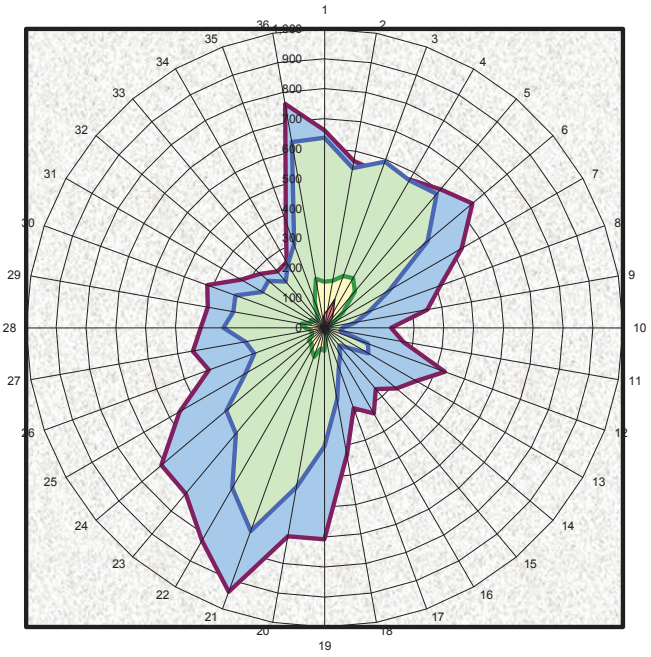
Climatic conditions have an influence on aircraft performance, and consequently, airport geometrics. The most significant factors are precipitation occurrences, high temperatures, crosswind components, and ceiling & visibility characteristics. For planning purposes, the intensity of precipitation events indicates when "wet & slippery" conditions should be applied in determining FAA recommended runway lengths – as a matter of viscous and dynamic hydroplaning effects for landing turbojet aircraft[2].

Climatic Conditions	
'Maximum' Temperature During Hottest Month	96°F (July)
'Mean Maximum' Temperature of Hottest Month	88°F (July)
Annual Days with 0.01 Inch of Rain During 24-Hour Period	146 Days

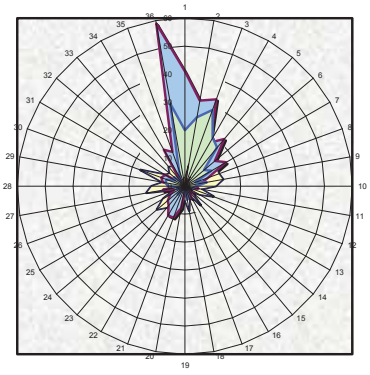
Source: Elizabeth City Regional Airport (NOAA Data Station)

The following charts depict the all-weather and instrument windrose, with the strongest winds occurring as peaks indicated by the percent of observations.

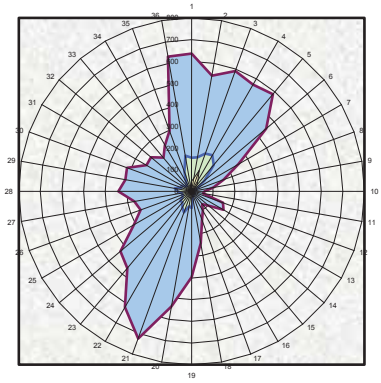
ALL WEATHER WIND DISPERSION



INSTRUMENT WIND DISPERSION (400' / 1-MILE)



STRONG ALL-WEATHER WIND DISPERSION (11+ KNOTS)



[2] Annual rainfall events totaling more than 0.10" over a 24-hour period occur in excess of 55 days a year, the threshold for using "wet & slippery" runway length computations.

Table 2-8 tabulates crosswind conditions for the Airport region. Crosswind coverage, expressed as a percent of time below an acceptable velocity defined by FAA, is the component of wind speed and relative direction acting at right angles to the runway. The desirable wind coverage is 95% for the primary runway, and is computed on the basis of the crosswind component not exceeding 10.5-knots for small ARC A and B category aircraft; 13.0-knots for large ARC A and B aircraft; and 16-knots for ARC C and D general aviation aircraft.

Table 2-8: Crosswind Coverage & Conditions

Runway Alignment (True Bearing)	Crosswind Component Wind Speed & Corresponding ARC	All-Weather	IFR/IMC (1-mile/400')
Runway 5-23 (38.04°/218.05°)	10.5 knots (A-I and B-I) 13.0 knots (A-II and B-II) 16.0 knots (A-III to D-II)	92.1% 95.7% 98.7%	93.0% 96.2% 98.5%
Runway 17-35 (158.01°/338.01°)	10.5 knots (A-I and B-I) 13.0 knots (A-II and B-II) 16.0 knots (A-III to D-II)	85.1% 91.7% 97.2%	86.8% 92.3% 96.6%
Combined Runways	10.5 knots (A-I and B-I) 13.0 knots (A-II and B-II) 16.0 knots (A-III to D-II)	97.4% 99.1% 99.7%	97.3% 99.0% 99.6%
Note: The percentage (%) indicates the percent of time wind coverage is provided for a particular velocity. The greater the percent, the more desirable the wind coverage.			

Source: Closest First-Order Station: National Oceanic & Atmospheric Administration (NOAA) & Federal Aviation Administration (FAA) – ECG Regional Airport, North Carolina, 1992-2001 (10-Year Period).

Individually, neither Runway 5-23 or Runway 17-35 achieves 95% crosswind coverage at 10.5-knots; by design, supporting the need for a 'crosswind' runway. Combined, crosswind coverage is readily obtained with Runway 5-23 *and* Runway 17-35.

2.11.1 MQI Runway Usage – Regional Wind Conditions

As shown below, based solely on predominate wind patterns in the region, the arrival and departure flow substantially favors Runway 5-23 for all-weather, instrument *and* strong wind conditions.

MQI Runway Usage (Wind Conditions)		
Wind Characteristic	Runway 5-23	Runway 17-35
All-Weather Winds	64.5%	35.5%
Instrument Winds (1-mile / 400')	60.8%	39.2%
Strong Winds (10.5 Knots and Greater)	70.4%	29.6%
Average – Annual Runway Utilization	±65 %	±35 %

Source: Elizabeth City Regional Airport (NOAA Data Station)

Table 2-9 shows the average of annual visibility and ceiling occurrences experienced at the Dare County Regional Airport. On average, instrument meteorological conditions (IMC) persist about 12.5% of the time (about 45 days) throughout a typical 24-hour period. The Airport's current IFR capabilities (440') precludes arrivals from landing between 2.5% and 3.5% of the time (about 12 days) as the result of ceiling and/or visibility – and about 3.4% (about 12 days) for aircraft not equipped with a certified GPS receiver. Take-off minimums for Runways 5, 17, and 35 (1 mile / 300') restrict departures about 1.5% of the time (about 6 days).

Table 2-9: Visibility and Ceiling Occurrences

VFR / IFR (Approach Type and Minimum Descent)	Cloud Ceiling Height (AGL)	Forward Visibility Distance (statute miles)			
		2-Mile	1-½ Mile	1-Mile	¾-Mile
VFR	> 3,000' / 5 Miles	19.5%	--	--	--
MVFR	< 3,000' / 5 Miles > 1,000' / 3 Miles	12.5%	--	--	--
IFR	900'	4.3%	4.2%	3.8%	3.7%
IFR	800'	3.7%	3.6%	3.1%	3.0%
IFR MQI NDB: 640'	700'	3.4%	3.2%	2.8%	2.6%
IFR	600'	3.0%	2.9%	2.4%	2.2%
IFR MQI RNAV: 440'	500'	2.6%	2.4%	1.9%	1.7%
IFR (GPS/RNAV)	400'	2.5%	2.3%	1.7%	1.5%
IFR (LOC)	300'	2.4%	2.2%	*1.5%*	1.3%
IFR (ILS)	200'	2.3%	2.1%	1.4%	1.1%

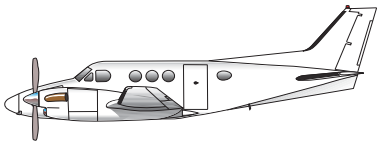
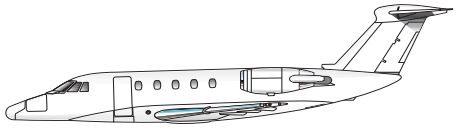
VFR – Visual Flight Rules / IFR – Instrument Flight Rules
Note: % shown indicates time of year with less than stated visibility and/or ceiling height.

Source: NOAA, Norfolk International Airport – First Order Weather Station.

2.12 MQI AIRPORT ACTIVITY

Table 2-10 summarizes the current 'snapshot' of based aircraft and annual operations at Dare County Regional Airport.

Table 2-10: Existing Airport Activity

Based Airworthy Aircraft		Annual Aircraft Operations	
Single Engine Twin Piston Turboprop Helicopter Total Based Aircraft	49 (79%) 8 (13%) 4 (6%) 1 (2%) 62	Local Operations Itinerant Operations Total Operations Turboprop Operations Jet Operations	23,000(50%) 23,000 50%) 46,000 3,500 Ops 700 Ops
Largest MQI Based Aircraft (ARC B-II) Beechcraft King Air			
Existing MQI Critical Aircraft (ARC B-II) Citation 560			

Based Aircraft (Defined) – An actively registered general aviation airplane stationed at a select airport, which regularly uses the airport as the primary "home-base" for filing flight plans, frequently uses available airport amenities, and/or maintains a formal commitment for long-term parking/storage.

Aircraft Operation (Defined) – An aircraft operation is one take off and/or landing of an aircraft (i.e., a touch & go consists of 2 operations). Aircraft operations are identified as local and itinerant. Local operations consist of those within 25-mile radius of the Airport vicinity. Itinerant operations include flights having a terminus of flight from another Airport at least 25 miles away.

"Large" Aircraft Operation (Defined) – Aircraft weighing greater than 12,500 pounds (maximum gross weight) – indicative of "turbine-powered" aircraft with a turbo-propeller or turbofan gearbox using Jet-A (kerosene) fuel.

Critical Aircraft (Defined) - The largest aircraft within a family of FAA Airport Reference Code (ARC) that conducts at least 500 annual itinerant operations per year at the Airport. The FAA establishes airport design criteria in accordance with the Airport's ARC designation, which provides minimum safety standards with respect to the performance characteristics of the family of aircraft represented by the Airport's critical aircraft.

Note: Ultra lights, sailplanes, and gyrocopters not counted as based aircraft.
Note: Military operations not counted towards airport operations.

Source: TBI Onsite Airport Inventory (January, 2005) / FAA Form 5010 Report.

2004-2005 Based Aircraft: Based aircraft as reported by the Airport total 62 active airplanes; including 8 twin-piston, 4 turbropropellers and 1 helicopter (does not include 2 additional helicopters based in early 2005). The largest based aircraft is a King Air B-100 (FAA ARC B-II).

Based Aircraft Comparisons					
Year	Single-Piston	Twin-Piston	Turboprop	Helicopter	Total Aircraft
1960	6	0	0	0	6
1965	5	0	0	0	5
1970	8	0	0	0	8
1975	9	1	0	0	10
1980	18	1	0	1	20
1985	28	1	0	1	30
1988	37	5	-	3	45
2005	49	8	4	1	62

Note: N/A – record of based aircraft not reported/retained by Airport or NCDOT.

Source: Dare County Airport Master Plan Update Sept. 1989
Source: Talbert & Bright Airport Information Survey, Jan. 2005

Dare County FAA registered aircraft owners total 73 fixed-wing aircraft, in which 61 (84%) of these aircraft are based at the Dare County Regional Airport. This suggests there is based aircraft leakage to other airports beyond Dare County, which is consistent with historical market share. The on-going hangar waiting list is 25 to 27 planes, and comprises of:

* Additional based planes (20 singles and 2 twin-piston) 20 to 22 planes
* Existing based planes currently tied-down (single engine) 5 to 7 planes

Dare County Registered Aircraft (June, 2004)	
Single-Engine	65
Multi-Engine	6
Turboprop	1
Glider / Balloon / Other	1
Helicopter	1
Total Registered County Aircraft	74
Total Fixed-Wing Aircraft	73

2004 Annual Aircraft Operations: The number of 'civilian' aircraft operations (landings and takeoffs) performed at the Dare County Regional Airport per year is estimated at 46,000. While military activity is shown in the following table, is has been excluded from planning consideration as part of this Airport Master Plan study.

Activity Source	Local (%)	Other Itinerant (%)	Military (%)	Fractional/ Air Taxi (%)	Total
FAA 5010 Form (2005)	16,000 (36%)	28,000 (60%)	700 (1%)	2,000 (3%)	±46,700
Airport Manager (2005)	23,000 (49%)	13,000 (28%)	700 (1%)	10,000 (21%)	±46,700
* Preferred * Civilian Operations (2005)	23,000 (50%)	13,000 (28%)	N/A	10,000 (22%)	±46,000

Note: Fractional "Air Taxi" considered charter.

The local versus itinerant operations was estimated by the airport manager and depicts a more accurate representation than the FAA 5010 form.

Local Versus Itinerant Operations (Civilian)					
Source (2004)	% Local	Local Operations	% Itinerant	Itinerant Operations	Total Annual Operations
Airport Activity	50%	23,000	50%	23,000	46,000

The level of instrument activity at the Airport was estimated by using the percentage of annual IFR days multiplied by the total annual operations and divided by two.

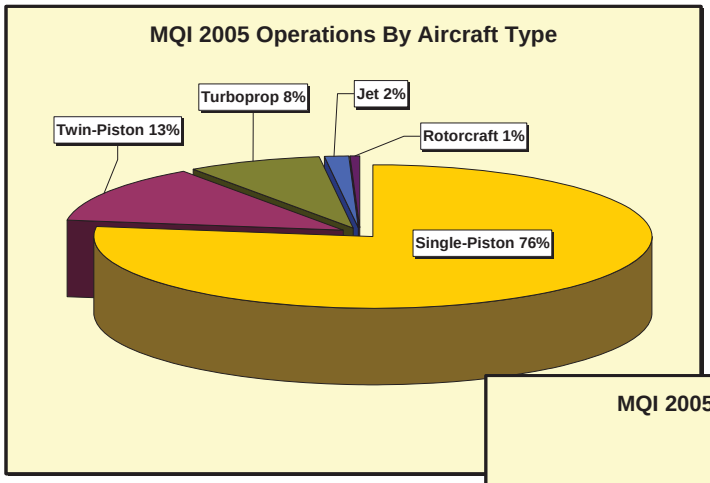
Annual Instrument Approaches		
User Category	Total Annual Operations	Total Instrument Approaches
Transient Itinerant Aircraft	13,000	1,430
Air Taxi / On-Demand Charter	10,000	1,100
Local Training & Proficiency	21,400	1,070
Flight Tours/Banners	1,600	0
Total Operations	± 46,000	± 3,600 (8%)

Note: Percent of based aircraft equipped with IFR estimated at 50%.
Note: The FBO does not have a dedicated aircraft for charter service. At least 2 aircraft on the field are certificated under FAR Part 135.

The following is annual operations conducted per runway end, by fleet mix and percent of operations conducted for touch & go, evening/nighttime and instrument operations. The percent of operations by aircraft fleet mix (single, twin, turboprop and jet) was reported from information obtained by the Airport Manager/FBO, subivided per runway end using predominate wind characteristics.

Operational Type	Total Annual Operations	% of Total	Operations Per Runway End			
			RWY 5	RWY 23	RWY 17	RWY 35
Single-Piston	35,500	77%	10,650	12,425	6,035	6,390
Twin-Piston	6,000	13%	1,740	2,030	986	1,044
Turboprop	3,500	8%	1,050	1,225	595	630
Jet	700	1.5%	285	305	60	75
Rotorcraft	230	.5%	96	112	54	60
Total Airport Operations	46,000	100%	30%	35%	17%	18%
Aircraft User / Flight Condition (Annual Operations)						
Charter	5,000	11%	595	695	335	375
Local Training	16,000	35%	4,758	5,560	2,683	2,998
Evening/Night	11,500	25%	3,420	3,996	1,929	2,155
Instrument	1,380	3%	414	483	235	248

Note: Percent of based aircraft equipped with IFR estimated at 50%.
Note: The FBO does not have a dedicated aircraft for charter service. At least 2 aircraft on the field are certificated under FAR Part 135. These aircraft are operated by SASOs.



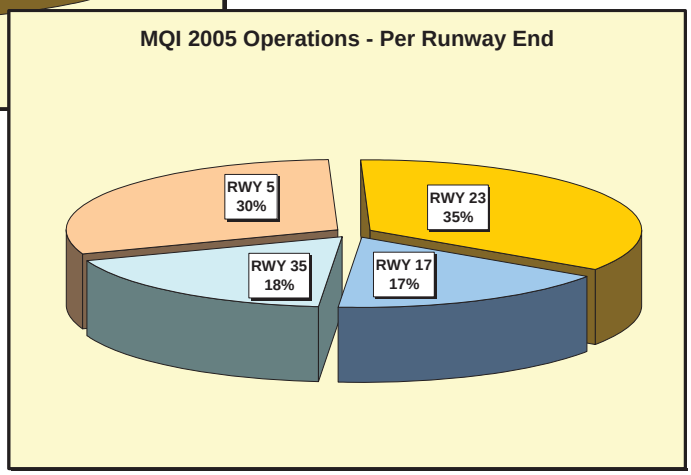


Table 2-11 summarizes current users of the Dare County Regional Airport, including the type of aircraft and an estimate of total annual usage. This information was collected from the Airport Manager, and follow-up interviews. Key airport users are consequently identified to provide a method to estimate future activity levels.

Table 2.11: Key Based Airport Users

Business / Organization	Type of Aircraft	Annual MQI Operations
United Parcel Service	Cessna Caravan	700
Dillon's Aviation (Since replaced by Barrier Island Aviation, Ltd.)	Cessna 172, King Air 200, Piper Lance, Baron 58	1,500
Outer Banks Airways	Cessna 172 (3)	4,200
Flight Line Aviation	Piper Navajo, Piper Cherokee 6; Navion	4,200
Van Wagner Aerial Media	Piper Cubs (3)	800
Island Aerial Ads	Cessna 150; Bellanca Scout	800
Fractional Ownership	Citation, Lear, Falcon	150
Note: To be considered a 'based aviation business' at MQI, the company must have a local phone number, and have based operations/aircraft year-around.		

Sources: Dare County Regional Airport Phone Interviews.

The following describes the major business users of the Dare County Regional Airport. This information is important for understanding user needs and priorities, including future changes in the frequency of activity and aircraft performance requirements.

Dillon's Aviation (since replaced by Barrier Island Aviation, Ltd.): offers aircraft rental, flight instruction, charter services, maintenance, and air tours. There are five dedicated single-engine aircraft and a twin piston used for flight instruction. Charter services utilize multi-engine aircraft based in Greenville, NC.

Charter Service - Flight Line Aviation: Flight Line Aviation is an on-demand charter company offering charter and aviation services from Dare County Regional Airport and Elizabeth City. Flight Line operates a variety of light aircraft, including Cessna 150s and a Piper PA-28. According to airport management, Flight Line was recently acquired by Southern Aviation Technologies, Inc.

Island Aerial Ads: A locally-owned aerial advertising company that is based out of Dare County Regional Airport.

NC Division of Forestry: The North Carolina Division of Forestry maintains the Dare County office on the Airport grounds. The Division of Forestry has no based aircraft at the Airport; however, fire fighting aircraft often use the fuel services provided by the Airport during the fire season.

Outer Banks Airways (Charter Service): Outer Banks Airways provides on-demand charter services to and from Dare County Regional Airport using light piston aircraft.

United Parcel Service (UPS): UPS operates, under contract with AirNow, using single-turbine Cessna Caravans, with two daily flights from Monday to Friday, and a single flight on Saturday.

Van Wagner Aerial Media: Van Wagner is an international advertising firm specializing in outdoor advertising. The Aerial Media division operates out of Airport year-around.

Fractional Ownership: Three fractional aircraft corporations regularly access the Dare County Regional Airport. Flexjets, Citationshares, and FlightOptions provide clients with the use of business jets in the form of fractional ownership.

2.12.1 MQI Turbine Activity

Nearly 4,500 'turbine' operations occur at MQI annually – including single and twin-engine turbo-propeller, business jets and helicopters that burn Jet-A fuel. Turbine activity is important to quantify since these users typically are the most demanding on Airport services and facilities. As evidenced by Jet-A sales, the majority of turbine traffic occurs during peak summer months, also coinciding with the peak tourist season.

MQI Business Jet Activity

From July, 2003 to December, 2004 the Dare County FBO logged jet activity during normal business hours. During the 12-month period from November, 2003 to October, 2004, 478 business jet operations were logged, including dates, aircraft model, and fuel quantity purchased. While this captured a significant portion of jet traffic, it did not include all jet traffic. Of the 478 logged jet operations, an adjusted 12-month was estimated for:

- Jet Traffic Not Logged – Services Not Used: Not all jet pilots use FBO services or take-on fuel, and therefore were not noticed by the FBO. The FBO acknowledges that during busy periods, some jet traffic was missed, and not entered into the log. The Airport Director estimated that 10% to 15% of the jet traffic was missed for this reason.

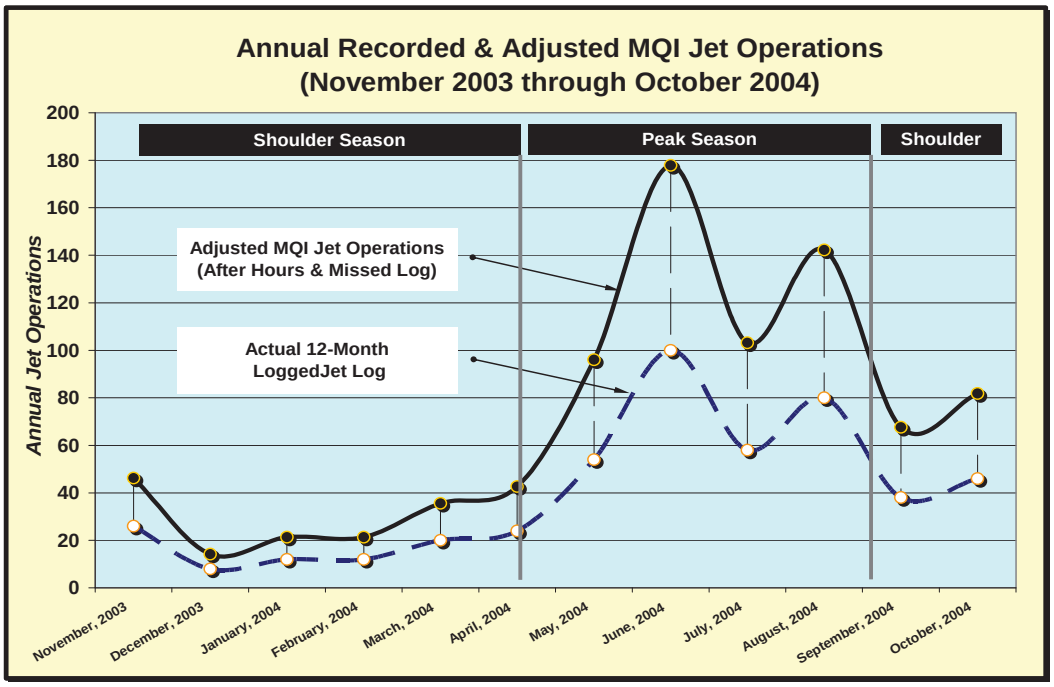
- Jet Traffic Not Logged – After Hours: Jet traffic land and depart when the FBO is not open for business. This is especially true for jets departing in early morning or late evening to take advantage of better lift-off performance during hot summer months. Airport management estimates this accounts for about 20%-25% of turboprop traffic.

The adjusted number of total jet traffic in 2004 is 700 operations:

Logged Jet Traffic:	70% =	478 Operations
Not Logged – Services Not Used:	13% =	95 Operations
Not Logged – After Hours:	17% =	120 Operations

Annual Adjusted MQI Jet Traffic: ± 700 Operations

The 2005 business jet demand estimated for Dare County, discounting the existing 'constrained' runway length factors impacting Category B, C & D business jets is 2,400 jet operations per year (also see Sections 3.4 and 5.1 for constrained vs. unconstrained runway impacts and FAA business jet fleet details).



MQI Turboprop Activity

Turboprop activity was estimated by application of general aviation industry turbine utilization rates reported by the FAA and NBAA applied to both based turboprops and itinerant turboprop traffic. There are four turboprop aircraft based at the MQI, of which these aircraft account for nearly 1,170 operations as calculated using the following:

Turboprop Operations – Based Turboprops	
Based MQI Turboprop Aircraft	4
Est. Average Flight time	1.2 Hours
Est. Average Hours Per Year	350 Hours Per
Flights Per Year	292
Operations Per Year	584
50% of Operations Conducted @ MQI	292
MQI Based Turboprop Operations	±1,200

Source: Talbert & Bright, Inc., 2005 / FAA & NBAA Factbooks.

Itinerant turboprop traffic was calculated relying on 2004 Jet-A fuel sales. The following breaks-down total 2004 Jet-A fuel sales per turboprops and business jets:

2004 MQI Jet-A Fuel Sales		
Business Jets	55,000 gallons	26%
Turboprops	145,000 gallons	74%
TOTAL JET-A SALES	200,000 gallons	100%

Source: MQI Airport Management Records.

The next step in analyzing turboprop activity is to calculate the average fuel sale per aircraft. A representative fleet of turboprop aircraft was developed for this purpose:

Turboprop Fleet Fuel Use			
Aircraft Type	Fuel Capacity (Gallons)	MQI Fuel Load	Gallons Fueled Per Sale
King Air C-90	350	50%	175
King Air B-200	650	50%	325
King Air 300	540	50%	270
Piper Cheyenne 400	625	50%	313
MU-2B	400	50%	200
Cessna Caravan	330	50%	175
Average Fuel Sale Per Aircraft			240

Source: Talbert & Bright, Inc., 2005

The following shows the methodology for estimating itinerant turboprop traffic:

Itinerant Turboprop Operations	
Turboprop Fuel Sales (Gallons)	145,435
Average Fuel Sale (Gallons)	240
Flights That Fuel	410
Turboprop Fuel Ops. (x2)	820
% of Aircraft Not Fueling *	50%
Estimated Operations During Business Hours	1,634
Unrecorded Turboprops (25%)	410
Turboprops Operating from 1900 to 0800	196
Total Itinerant Turboprops	±2,250

Source: Talbert & Bright, Inc., 2005

Total turboprop activity was calculated by adding the based turboprop use and estimated itinerant turboprop traffic. Total turboprop activity is estimated at ±3,500 operations per year.

Itinerant Turboprop Traffic: 65% = ±2,240 Ops.
Local/Based Turboprop Traffic: 35% = ±1,170 Ops.

Annual Adjusted MQI Turboprop Traffic: ± 3,500 Operations

2.12.2 Turbine Payload / Runway Length

Analysis of MQI Jet-A fuel sales provides important insight about jet users and runway length requirements. The Airport During the 12-month period in 2004, 60,000 gallons of Jet-A were sold to 220 logged jets. Of the jet aircraft logged, 20% to 30% did not purchase any fuel. Of the aircraft that fueled, the average sale was 280 to 300 gallons per jet fueling event.

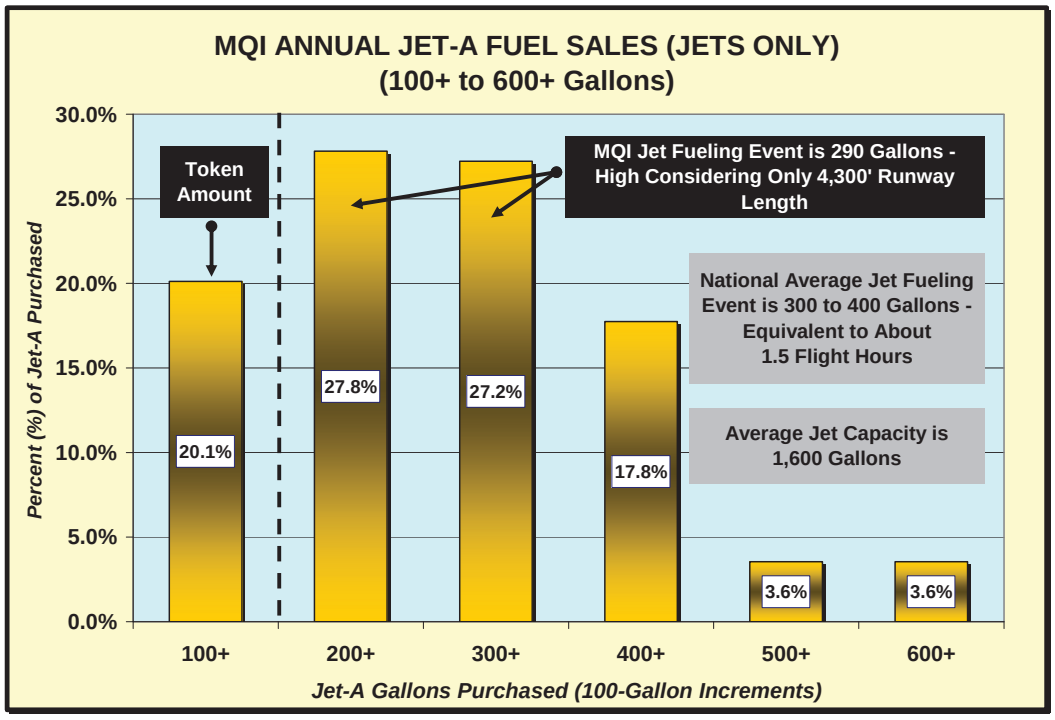
A tabulation of MQI Jet-A sales exceeding 100 gallons per fueling event was used to assess the more demanding jet users. In total, 35% of logged jets either did not purchase fuel or took-on less than 100 gallons – which tends to be a token-fueling as a courtesy for using the Airport. As evidence, this token amount is less than the hourly burn rate for an average sized business jet (250 gallons per hour) and is far less than needed for an average 1.2 to 1.5 hour jet flight, plus taxiing and IFR reserves.

The trend of Jet-A sales and gallons purchased per fueling event is a MQI pattern attributable to one or more of the following: 1) MQI runway (take-off) length, 2) payload restrictions (fuel), 3) stage-lengths, 4) FAA regulations/company policy, 5) insurance requirements, and 6) home-based fuel contract incentives.

The following is a sample of small, medium and large-cabin business jets, arranged by FAA ARC category, showing fuel capacities and hourly burn rates:

Business Jet Model	ARC	Fuel Capacity	Hourly Fuel Burn
Beechcraft Beechjet 400	ARC B-II	780 Gallons	185 GPH
Cessna Citation II (550)	ARC B-II	800 Gallons	175 GPH
Cessna Citation VII (650)	ARC B-II	1,100 Gallons	225 GPH
Dassault Falcon 20	ARC B-II	1,400 Gallons	285 GPH
I.A.I Westwind II	ARC C-I	1,400 Gallons	250 GPH
Raytheon / Hawker 125	ARC C-I	1,500 Gallons	215 GPH
Challenger, 601	ARC C-II	2,500 Gallons	250 GPH
Learjet 36	ARC D-I	1,100 Gallons	200 GPH
Gulfstream IV	ARC D-II	4,400 Gallons	475 GPH
AVERAGE CAPACITY / BURN RATE:		**1,600 Gallons**	**250 GPH**

As shown by the following exhibit, there is a fairly significant decline in Jet-A fueling over 200+ gallons. This further suggests the current 4,300' runway length provides inadequate takeoff distance for many of the medium-to-large business jets operating at Dare County Regional Airport - that otherwise cannot afford to sacrifice payload (fuel) for needed runway length performance at Dare County.



2.13 AIRPORT SERVICE AREA

Exhibit 2-9 depicts the 'Airport Service Area' for the Dare County Regional Airport, which is a geographic area served by a select airport that elicits user demand as a function of facilities and services offered at the Airport and vehicular ground access (distance/time). It should be noted that the service area does not necessarily conform to geographical or political boundaries, but rather, is determined by application of the following:

NPIAS Service Area: Defined per FAA Order 5090.B, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) by means of 30-minute (25-mile) ground access to the originating airport. Under this scenario, other public-use airports and several privately owned airports fall within this boundary, which excludes the NPIAS criteria from realistically defining the entire service area.

Primary Service Area: This service area takes into consideration a proportionate boundary as defined by the *service level role* of surrounding civilian public-use airports in relation to *ground travel distance* (access time) amongst population centers.

The following shows population for the Dare County Regional Airport Primary and NPIAS Service Areas, shown for existing and State of North Carolina projected population levels. Overall, the service area population is expected to grow at 1.9% per year.

Dare County Regional Airport Service Area Populations

Service Area	Population (2003)*	Population (2005)**	Population (2025)**
Primary Service Area (Red)	33,116	34,598	47,419
NPIAS Service Area (Blue)	23,116	24,598	34,419
Service Area Population (Persons)	33,100	34,600	47,400

** Population from 2000 Census Estimates*
*** Population projections per NC Census Estimates*

Table 2-12 lists service area information on surrounding public-use airports. Surrounding airports have varying degrees of influence on the service area with respect to competing services (flight training, charters, fuel, maintenance, courtesy car, security, etc.), facilities and equipment, navigational aids, accessibility from population centers and programmed expansion projects. Significant service area factors for each airport are noted by advantages (+) and disadvantages (-).

EXHIBIT 2-9
MQI GENERAL AVIATION AIRPORT SERVICE AREA

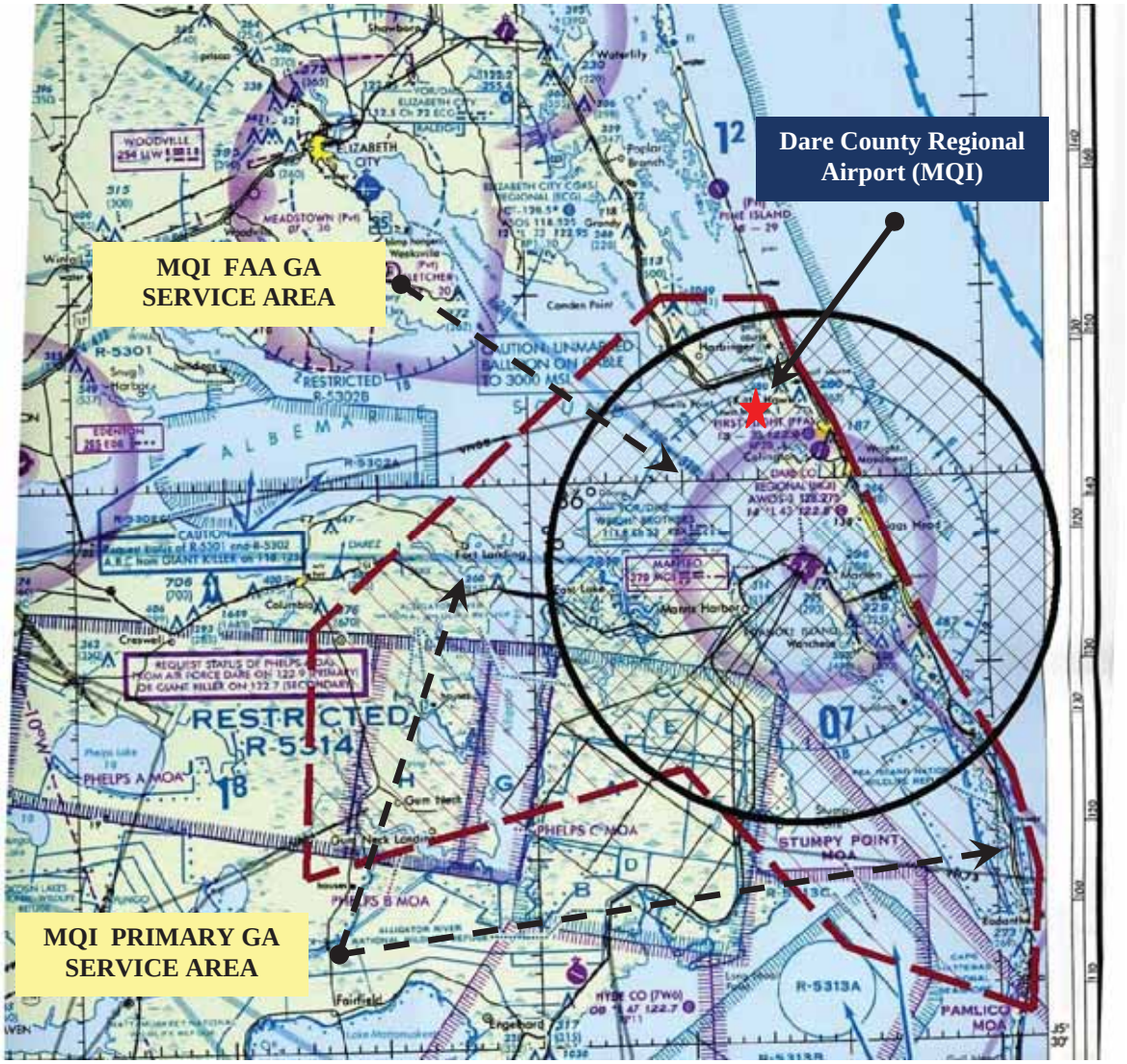


TABLE 2-12: SURROUNDING PUBLIC-USE AIRPORTS

Airport Name / Sponsor (NCDOT Color Code)	Runway/Airport Characteristics	Airport Activity (Aircraft / Operations)
Elizabeth City (ECG) - County - NCDOT - Blue Code 35 miles NW (1.9 Hrs.)	Runway 10-28: 7,219' x 150' (100 Single Wheel - 200 Dual Wheel) Runway 01-19: 4519' x 150' (20SW) Service Area Factors: + ATC Tower + Crosswind Runway + ILS Precision Approach planned	26 based aircraft (25 SE / 1 ME / 0 J) 30,000 Annual Operations (Civilian)
First Flight Airport Kill Devil Hills (FFA) NCDOT – *NPS Airport* 6 Miles N (.35 Hrs.)	Runway 2-20: 3,000' x 60' (10SW) Service Area Factors: - No services.	0 based aircraft 38,000 Annual Operations
Currituck County (9W7) - State - NCDOT – Blue Code 33 miles NW (1.5 Hrs.)	Runway 4-22: 5,500' x 150' (20S / 35 DW) Service Area Factors: +Full-Service FBO-Major/Minor Service + 24 hr self- service fuel + AWOS	18 based aircraft (16 SE / 2 ME/ 0 J) 35,000 Annual Operations
Billy Mitchell (HSE) NCDOT – *NPS Airport* 41 miles S (1.5 Hrs.)	Runway 3-21: 3,000' x 75' (30SW) Service Area Factors: No services.	1 based aircraft (1 SE / 0 ME / 0 J) 9,200 Annual Operations
Hyde County (7W6) -County- NCDOT - Green Code 25 miles S (1 .4 Hrs.)	Runway 11-29: 4,700' x 100' (30SW / 43 DW) Service Area Factors: - No airport services	0 based aircraft 4,050 Annual Operations
Privately-Owned Airports:	From a planning standpoint, privately-owned landing strips commonly lack viable land use controls to prevent actions compensated by public-use facilities. These landing strips accommodate a limited or specialized aspect of aeronautical demand.	

Note: Symbols: (F)- fuel, (Minor/Major)- Maintenance, (S)- Single, (T)- Twin-engine, (J)- Jet
Note: Private airports are not considered in this study.
Note: Red, Blue and Green NCDOT code applies only to General Aviation Airports.
Note: Drive time from MapQuest web site.

Source: NOAA-FAA Sectional Aeronautical Chart, 2004
Most recent FAA 5010 Inspection Data Sheets.

2.14 AIRPORT PROPERTY & LAND USE/DEVELOPMENT

The following describes key property interests and land uses for existing and planned development in the vicinity of the Airport.

2.14.1 MQI AIRPORT PROPERTY

The Airport property, including both Airport Authority and Dare County interests, totals ±488 acres. The initial Airport property was acquired through condemnation by the US Government in 1943 as a Naval Auxiliary Station. In 1947, all land acquired by for airport development was deeded to Dare County. In 1972, a portion of the Airport property was leased from Dare County to the Airport Authority.

Airport Property - Coastal Studies Institute (CSI)

The University of North Carolina is coordinating development of a new Coastal Studies Institute (CSI) in Dare County, in which Roanoke Island has been identified as a preferred location for the Institute. In April of 2004, the Dare County Task Force on Higher Education recommended conveyance of approximately 40 acres of land to the Institute for development as a research campus. Of the ±40 acres identified for conveyance, approximately 50% was previously identified in a 2003 MQI Airport Terminal Area Study as the preferred location for future airport-related development; including additional new aircraft hangars, taxiway/taxilane system and auto access to meet future demand.

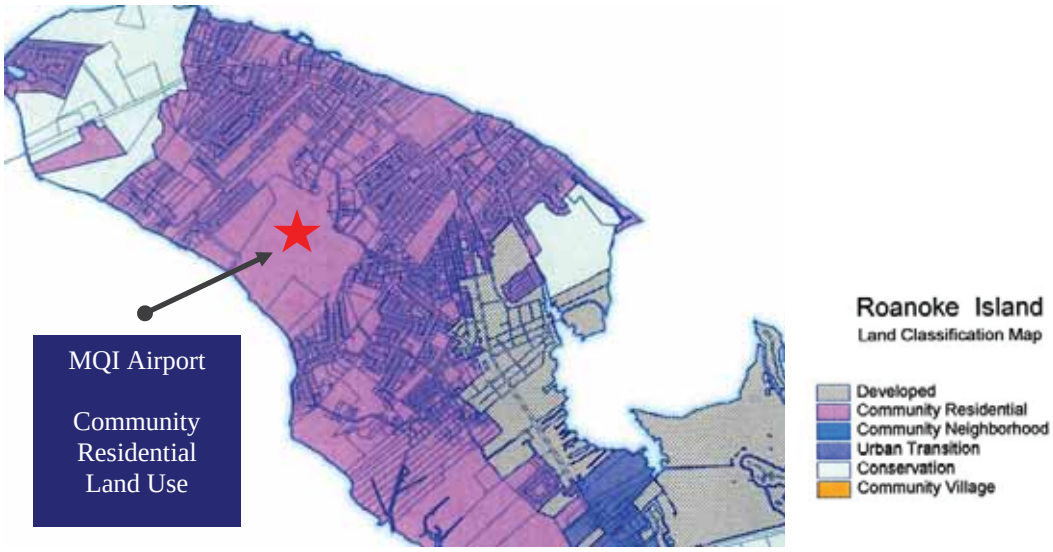
A Stakeholder Input and Concept Facilitation Study (CSI Study) was developed in 2004 to evaluate the feasibility of the CSI concept. The Dare County Task Force recommended the 40-acre site because its size, accessibility to infrastructure, and public ownership. Proximity to Croatan Sound, the Dare County Regional Airport, and North Carolina Aquarium were also viewed as beneficial attributes. CSI cited proximity to the Airport as a positive factor because some of its research involves airborne measurement and survey. The report recommended development of aircraft storage and movement areas to support the mission of CSI. The CSI Study identified approximately 2.6 acres of building development, excluding vehicle parking and maneuvering, pedestrian walkways, stormwater management and zoning compliance. The Study did not identify requisite land acreage required for the entire development concept, or a specific location.

2.14.2 SURROUNDING AIRPORT LAND USE(S)

Exhibit 2-10 depicts County land use classifications for unincorporated areas of Roanoke Island per the *2003 Dare County Land Use Plan*. The majority of Airport is identified as 'Limited Transition' within the 'Community Residential' land use sub-class. The Community Residential applies "to the area of Roanoke Island generally known as the north end or the unincorporated land north of the Town of Manteo…"

The purpose of Community Residential is to "identify an area where low density residential dwellings, small businesses, governmental services, educational services, and passive recreational activities occur in the midst of a number of important natural, cultural, and historic resources." Central water is supported in this land use; however, central wastewater is not. In addition, land disturbing activities such as alteration or destruction of existing natural vegetation, drainage, topography, and sand hills are not considered compatible.

EXHIBIT 2-10
DARE COUNTY LAND USE MAP – AIRPORT VICINITY



Dare County GIS mapping identifies property descriptions for individual parcels. The following are the parcel descriptions identified for existing Airport property interests:

- Community Village - Primary and Undeveloped Acreage
- Undeveloped Acreage
- Community Other - Waterfront

2.14.3 COUNTY ZONED DEVELOPMENT

Dare County exercises zoning regulations for unincorporated areas, excluding the Mainland and Wanchese. The Airport is zoned as I-1 Industrial District. The follow describes zoning districts surrounding the Airport:

> *Airport Industrial District*: is established to provide for the development of commercial and industrial facilities to better furnish a broad range of services and commodities to serve the entire community. Institutional uses include the Dare County Public Works & Sanitation Department and County

Detention Center, which border Airport property to the southeast.

Commercial/Business District: accommodates a wide variety of commercial, wholesale, and retail businesses in areas best located and suited for such uses. The maximum building height is 35 feet.

R-1 Low Density Residential District: is intended to encourage the development of permanent low-density residential neighborhoods. These districts are located primarily in areas susceptible to environmental damage from more intensive uses of the land.

R-2 Medium Density Residential District: is intended to encourage the development of moderate density neighborhoods, with a mix of permanent and short term seasonal residents, and to serve as a transition zone between the low density area and more intensely developed areas. The maximum density shall not exceed six dwelling units per acre.

R-3 High Density Residential District: is established as an area in which the principal use of the land is for high density residential purposes, not to exceed ten dwelling units per acre. The district also provides for the development of less intensive residential uses, as well as compatible supporting uses.

C-PR Conservation-Public Recreation District: is established to provide restricted usage of property located in areas conducive to and appropriate for destination style camping facilities, recreational opportunities and low-density residential development.

The Dare County Public Works & Sanitation Department is located immediately east of the Runway 35 end. The Department processes solid waste for transport to landfills on the mainland. Unfortunately, this activity can attract birds and waterfowl in the vicinity of the Airport, increasing the risk of wildlife-aircraft strikes.

2.14.3 REGIONAL/LOCAL TRANSPORTATION PLANNING

A draft of the Roanoke Island Transportation Plan was provided for comment during the Airport Master Plan. Following a cursory review, Option 3B was viewed as favorable as part of the proposed improvements to the network of roadways surrounding the Airport.

2.14.5 AIRPORT ORDINANCES

The County adopted the *Dare County Regional Airport Height Overlay District Ordinance* as updated in April, 2005. The ordinance regulates the height of structures in the vicinity of the Airport, as developed in accordance with FAA/NCDOA guidelines.

The Airport Authority has adopted, as amended in 2005, *Airport Rules & Regulations* and *Airport Minimum Standards* used to regulate the conduct of Airport users and specify uniform thresholds for an operator engaged in commercial aeronautical activities.

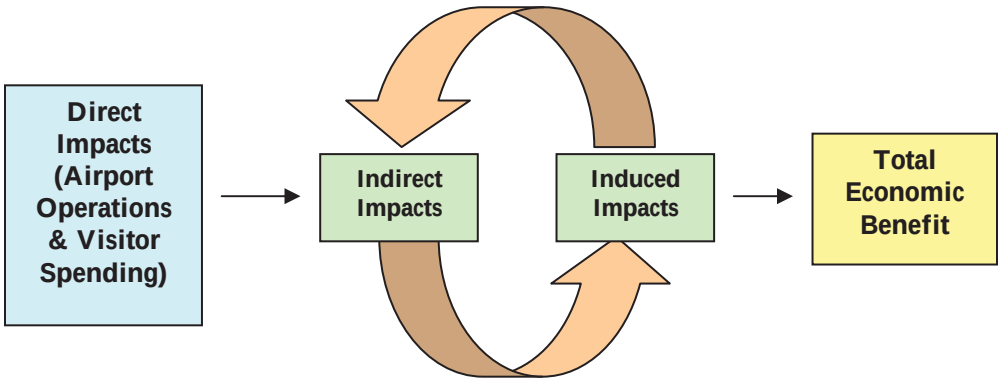
2.15 AIRPORT ECONOMIC SIGNIFICANCE

An analysis of the Airport's annual economic significance within the community was quantified based on FAA modeling techniques. At general aviation airports, economic impacts accrue both directly and indirectly as measured in the form of jobs (employment) and monetary benefits (labor earnings and output). These impacts are generated by-way of assessed Airport fees, charges and rentals, employment, business-related transactions, and pilot and passenger visitor spending.

Overview of Modeling Approach & Process

The economic significance is based on the Airport being an 'industrial' enterprise, and quantifies annual impacts that occur at the Airport, or spin-offs as a result of Airport activity. These impacts are realized in three ways: 1) direct, 2) indirect, and 3) induced (indirect and induced combined are termed 'secondary' impacts). Combined, the three impacts yield the 'total' economic impact of the Airport, measure in dollars ($) and job employment. The indirect and induced economic impacts are developed using the widely-accepted economic modeling software IMPLAN - Impact Analysis for Planning.

Total Airport Economic Impact = Direct + Indirect + Induced



The following are key components of direct, indirect and induced impacts:

Direct: The generation of employment (jobs), income and output as a first-round, or immediate consequence of on-airport aviation-related service providers, business tenants and Airport users and travelers.

Indirect: Benefits in employment (jobs), income and sales output related primarily to 'off-site' businesses supporting the Airport, or economic activities attributable to the Airport.

Induced: Induced impacts are measured by the local change in employment and value of income created by successive rounds of spending in the community.

The number of fulltime-equivalent Airport employees is entered into IMPLAN to derive induced and indirect final demand impacts resulting from payroll and spending. In 2004-2005, there were 8 employers based on the Airport, with the equivalent of 32 full-time employees. On-airport companies reported individual wages exceeding $47,000, with the average annual wage of $28,800 – as used for IMPLAN.

Surveyed Airport Employment Impact	
On-Airport Businesses (Companies)	8
Employees Reported	32
Average On-Airport Employee Wage	$28,800

Source: Airport Management Survey, 2004

The on-airport employment in 2004-2005 totaled 32 employees as reported for the following 8 on-airport companies. Employment is categorized into one of two IMPLAN sectors; either 391 or 397.

Airport Tenants	Equivalent Full-Time Employees	IMPLAN Sector
Dare County Regional Airport	9	397
Outer Banks Aero Tours	5	391
Fly Wright Aviation	1	391
Island Aerial Ads	4	391
Barrier Island Aviation Ltd. (Dillon's Aviation)	7	397
UPS	1	391
Emergency Medical Service (Medflight)	4	391
Flight Line Aviation	1	397
TOTAL	32 Employees	- -

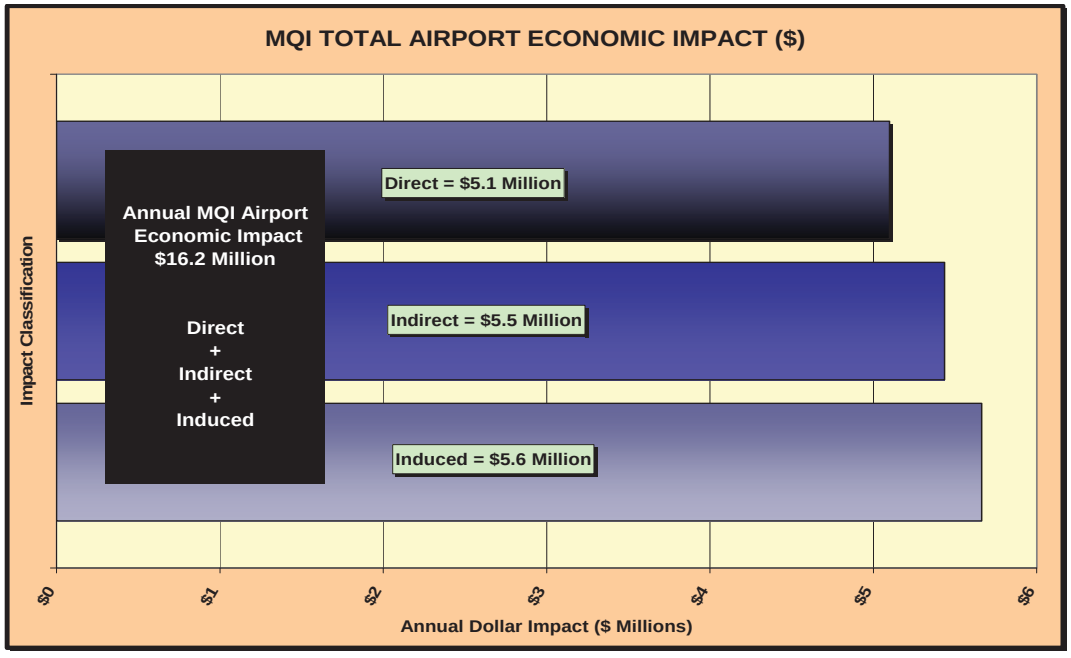
Source: Airport Manager Records / TBI inquiry – 2005, IMPLAN Model.

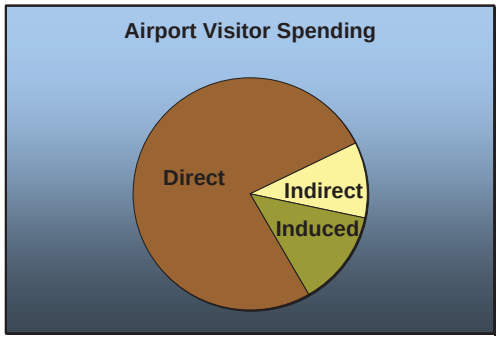
Table 2-13 lists the breakdown of economic impacts resulting from existing activities and operational levels at the Dare County Regional Airport. The total economic significance, measured in dollars, is approximately $16.2 million per year.

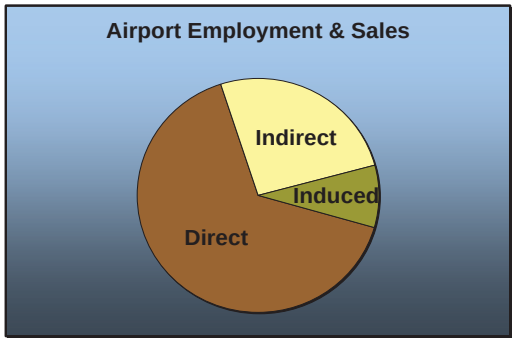
Table 2-13: Summary of Airport Impacts ($ Millions)

Source	Direct	Indirect	Induced	Total
Airport Employment & Sales	$3,390,000	$1,340,000	$450,000	$5,170,000
On-Airport Visitor Spending	$1,720,000	$240,000	$300,000	$2,260,000
Off-Airport Visitor Spending	$0	$3,870,000	$4,920,000	$8,790,000
TOTAL	$5,110,000	$5,450,000	$5,670,000	$16,220,000

Source: IMPLAN Modeling (May, 2005).







2.16.1 SOCIOECONOMIC PATTERNS

A review of the fundamental Dare County and regional socio-economic conditions provides an understanding of underlying community trends and patterns, and linkages between community growth and Airport activity.

2.16.2 MAJOR ECONOMIC SECTORS & INFLUENCES

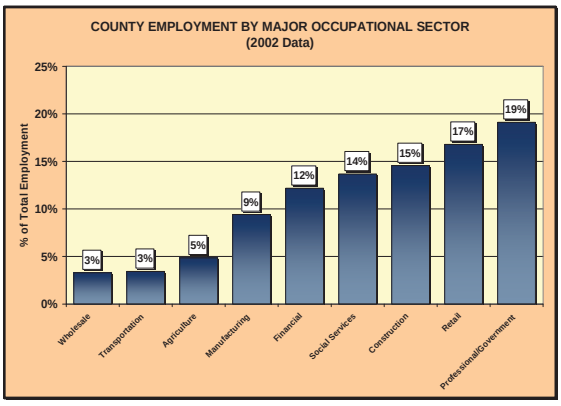
Since the 1970's, Dare County has evolved into a premier vacation destination, resort, recreation area and retirement community. According to the *2003 Dare County Land Use Plan* the County's economy is substantially based on travel, tourism and related service industries; which includes nearly 4,000 hotel room, 14,000 rental units, and 275 food service establishments. The following shows the growth in tourism, quantified by dollar impact:

Dare County Tourism Economic Impacts ($ millions)	
Year	Annual Impact
2003	$ 597 million ↑ 3.1%
2002	$ 585 million ↑ 13.9%
2001	$ 514 million ↑ 3.7%
2000	$ 499 million ↑ 3.6%
Source: North Carolina Department of Commerce, 2003. Dare County Statistics, 2003	

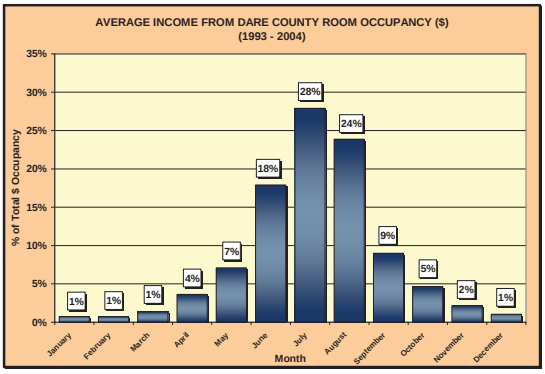
The top-three tourist attractions in North Carolina are in Dare County (NC Department of Commerce). With the Wright Brothers National Memorial, 'aviation' a major tourist draw. The Airport, as published by the Outer Banks Visitors Bureau, is itself a visitor attraction because of the various air tour flight operators and the aviation museum located in the terminal building.

In recent years, residential and commercial building permits have been at record levels. This rapid development has evolved into the growth of financial and medical services. As an indicator, real estate values and property tax base is growing in the order of 30% annually. And, Dare County per capita retail sales are the highest of any county in North Carolina. The demand for new housing matched with limited developable areas is placing a premium on real-estate. The escalation of these patterns tends to mirror the types clientele reliant on general aviation, in particular those using larger high-performance aircraft.

However, while the dominant industry is tourism, seasonality peaking and vulnerability to weather conditions, such as hurricanes, have caused the County to seek economic diversification. Still, Dare County continues to evaluate the potential for environmentally-friendly industrial land development and public-private partnerships.



The *2003 Dare County Land Use Plan* states that the area is not suited for traditional large-scale industrial development due to scarcity of appropriately-zoned large real-estate parcels, extensive public-land domains, and prevalent environmental features; including wetlands, soil characteristics, water/air quality. Over 80% of usable land in Dare County is under publicly-ownership. For this reason, tourism is favored as a relatively environmentally-clean industry. Apart from travel and tourism, the prominent industries remain inter-connected with the area's natural resources; such as commercial fishing and boat building.

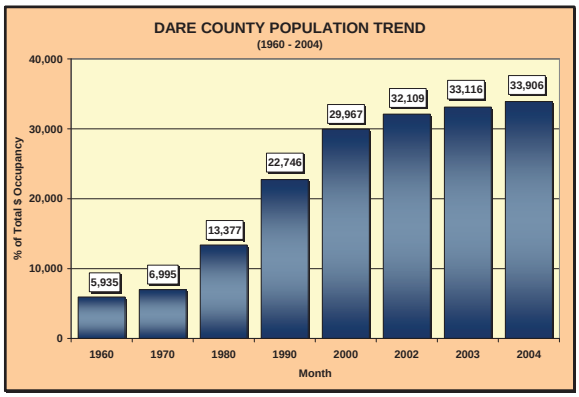


About 70% of the 15,600 Dare County jobs are attributable to tourism, and tourism-alone contributes nearly $152 million in annual payroll. Annual revenues in Dare County from tourism generates $597 million, a 7.8% annual increase in the 10 years since 1993. One important measure of tourist impacts is gauged by revenues collected through lodging occupancy. Evident of this above graph, the Outer Banks visitor tourism season peaks during the summer months of June through July – which is also the peak period of Airport activity.

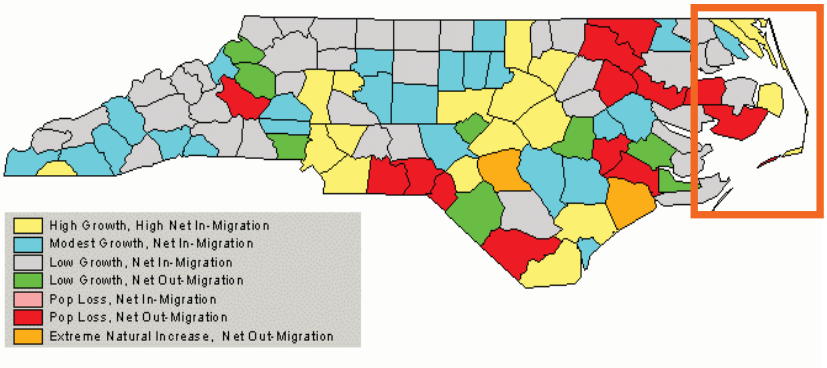
2.16.3 Population & Per Capita Income

Historically, the following socioeconomic indicators have corresponded with the level of activity at general aviation airports. The following shows the increase in the 'permanent' Dare County resident population, which continues to grow at about 2.5% to 3.5% annually. The Dare County population has doubled since 1980. During the traditional peak-season period, visitors exceeds 250,000 per day, 650% over the permanent population. By 2010, the Dare and Currituck County population is projected to grow a total of 25% to 30% (Outer Banks Chamber of Commerce).

Dare County Population (Permanent)		
Year	County Population	Annual % Change
1960	5,935	
1970	6,995	1.7%
1980	13,377	6.7%
1990	22,746	5.5%
2000	29,967	2.8%
2002 [1]	32,109	3.5%
2003 [2]	33,116	3.1%
2004 [3]	33,906	2.4%



The counties of Dare, Currituck, Hyde and Carteret comprise the Outer Banks region. Of these counties, Dare, Currituck, and Carteret are forecast to experience relatively high growth through 2030. The following graphic shows expected growth throughout North Carolina:

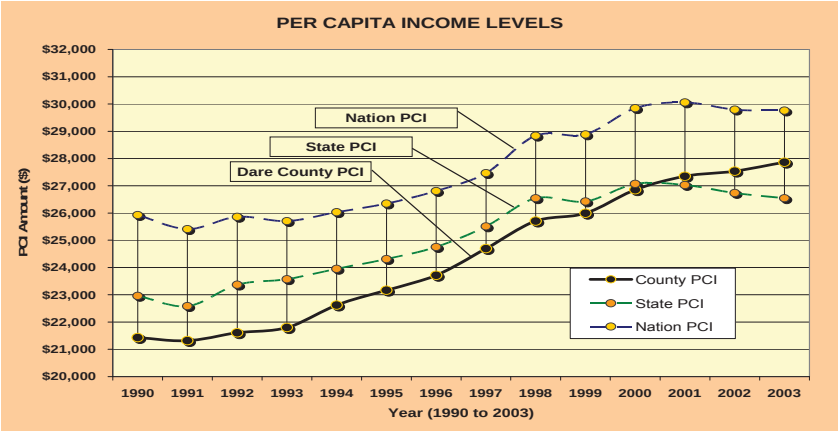


Source: North Carolina State Demographics

Per Capita Income (PCI) is a broad indicator as to the relative income generated by the resident population. In the 10-years since 1994, the Dare County PCI has increased about 2.6% annually. Historically, the Dare County PCI has outpaced the North Carolina PCI, and tracks just under the US PCI rate, suggesting the Airport service area population is capable of participating in general aviation to the extend predicted by the NCDOT, Division of Aviation and FAA. Income levels indicate that approximately 70% of the county population earns an annual income of over $35,000, an earnings threshold generally considered capable of participating in general aviation activities and ownership.

Dare County Per Capita Income (1994 – 2003)			
Year	Dare County	North Carolina	United States
Percent Annual Growth	2.6%	1.4%	1.7%

[1]- Bureau of Economic Analysis



2.16.4 TOURISM TRANSPORTATION PATTERNS

The growth in tourism places an increasing level of automobile traffic on the linear-type ground transportation routes common throughout the Outer Banks. This not only affects local traffic patterns for residents, but is also connected to the primary routes commonly used by visitors.

As identified by the Outer Banks Visitors Bureau, the heaviest tourism period occurs during the summer months, between Memorial Day and Labor Day. The average travel party is 6 adults and 2 children. The average duration of visitor trip is 1 week, but longer for 'repeat' visitors (SM&RI: pg. 21). Although there has been a decline since 2000 in first-time visitors, the prospective pool of 'repeat' visitors remains a substantial market, as their visits extend further into the fall season, and about 17% of 'repeat' visitors make more than 1 visit to the Outer Banks per year. Also, 'repeat visitors' exceed 'past', 'potential' and 'first-time' as the largest segment of travelers to the Outer Banks.

The following is an analysis of tourism trends and markets with respect to the business jet users at the Dare County Regional Airport:

Nearly 50% of the 9,500 business jets registered in the United States are based in the 'primary' and 'emerging' Dare County visitor markets. The average flight range of a small-cabin business jet is about 1,000 nautical miles. Under normal operating conditions, small-cabin jets are able to fly from nearly all locations within the 'primary' traveler markets, however, about 30% of these jets are unable to fly to-and-from locations within the 'emerging' markets. The average range of a medium-cabin business jet is about 2,300 nautical miles. While the medium-cabin business jets have a range capable of reaching nearly all destinations within the 'primary' and 'emerging' markets, the existing 4,300' runway length clearly restricts passenger and/or fuel payload for these medium-cabin jets.

Jets Based in Primary & Emerging Outer Banks Visitor Markets

Outer Banks Visitor Origination Markets	Jets Based in Primary & Emerging Dare County Visitor Market States	Total Registered US Business Jets (50 States)	Visitor States Impacted by MQI Business Jet Flight Range
Total Primary & Emerging	4,668	9,500	OH, FL, IL, IN, TN, KY, AL

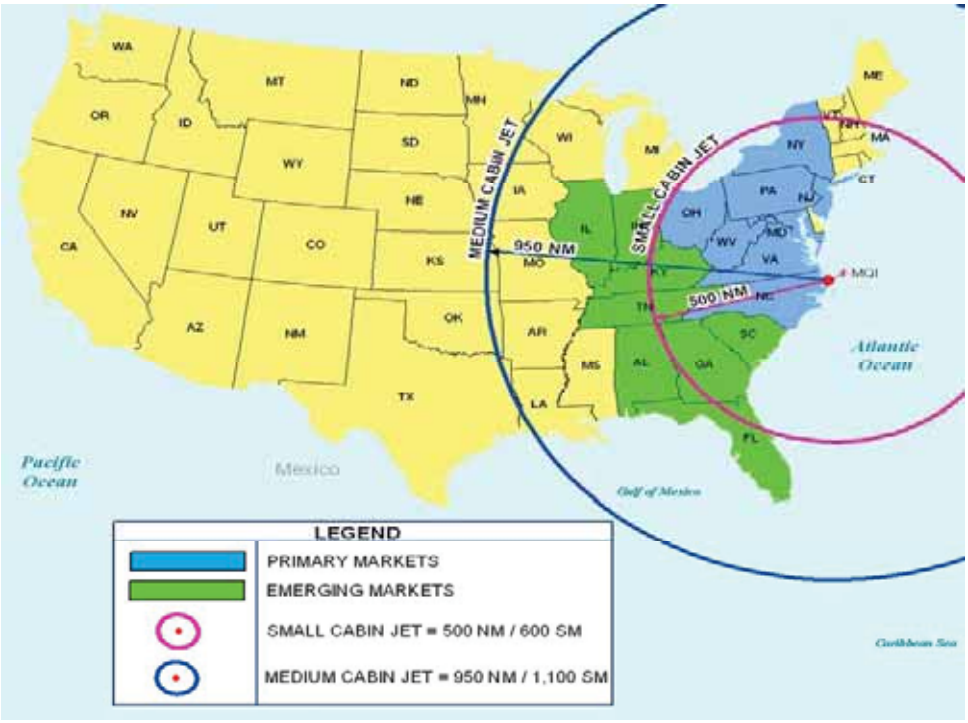
The following is a break-down of the business jet fleet by cabin size:

Small-cabin business jet fleet:	48%
Medium-Cabin business jet fleet:	30%
Large & Ultra-Large Cabin business jet fleet:	22%

Note: Range includes round trip between origin airport and MQI.

With the 4,300' runway, small jets lack sufficient range to blanket the visitor markets, while larger jets are payload-restricted which sacrifices flight range/duration to blanket the visitor markets – especially during the hotter months (May to September). The average business jet range (nautical miles) for the 'primary' and 'emerging' visitor markets, and United States are shown below:

BUSINESS JET RANGE
PRIMARY & EMERGING DARE COUNTY TOURIST MARKET (STATES)



First-time visitors are more likely to fly to the Outer Banks. Also, first-time visitors are traveling from greater distances within the outer tier of 'emerging' tourist origination markets. Therefore, as the visitor profile broadens and emerging markets unfold, air travel is becoming an increasingly more important mode of transportation for cultivating the 'emerging' market. As surveyed, nearly 9% of first-time visitors arrive by plane, and 5% by repeat visitors. As a comparison, nationwide, plane transport accounts for about 5% of inter-city traveler; therefore the 200,000 Outer Banks visitors has a greater propensity to fly – albeit most travelers are using commercial aviation. This clearly suggests there will be a growing and more frequent population of 'repeat' visitors, coming from further-and-further locations. This will have two effects on the Airport; 1) it will put greater reliance on being able to reliably accommodate turbine aircraft users, and 2) will raise the non-peak, or shoulder visitor season, which translates in-step with a similar pattern for the Airport.

2.17.1 MARKET FOR SCHEDULED COMMERCIAL AIR PASSENGER SERVICE

Background of Regional Passenger Service

Historically, scheduled air service was offered at the Dare County Regional Airport. In 1999, Cape Air operated a 7-passneger Cessna 402 pressurized twin-piston airplane between Manteo and Norfolk International Airport (ORF), Virginia.


Cessna Grand Caravan

At present, the closest scheduled passenger service is Sea Air, a seasonal shuttle service owned by Turnpike Properties -- a real estate development company with significant holdings on Pine Island in the Outer Banks. Sea Air has scheduled service between Norfolk International Airport (ORF) and Corolla (7NC2), which is a private airstrip approximately 40 miles north of Manteo on the Outer Banks. Sea Air conducts approximately 900 annual flights from May to September using Cessna Grand Caravans; which holds eight passengers and up to two crew. As published, fares for the 2005 season are $125 per passenger one-way for scheduled flights (www.flyseaair.com, 1/26/05). Sea Air does not have code-sharing or marketing arrangements with other carriers operating at Norfolk International Airport (ORF), therefore passenger ticketing, connections and baggage are not inter-lined with any other carrier.

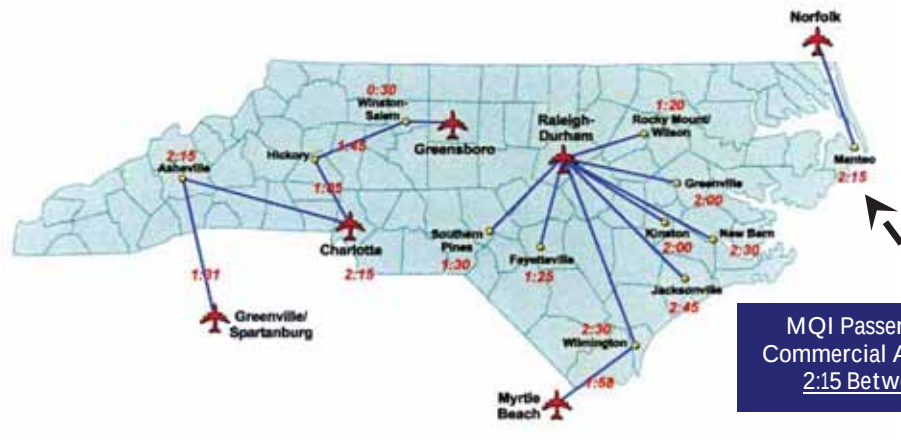
Airport Service Area Study Findings

The NCDOT, Division of Aviation has sponsored air service studies evaluating Dare County/Outer Banks air passenger demand, market factors and level-of-service characteristics, most recently including:

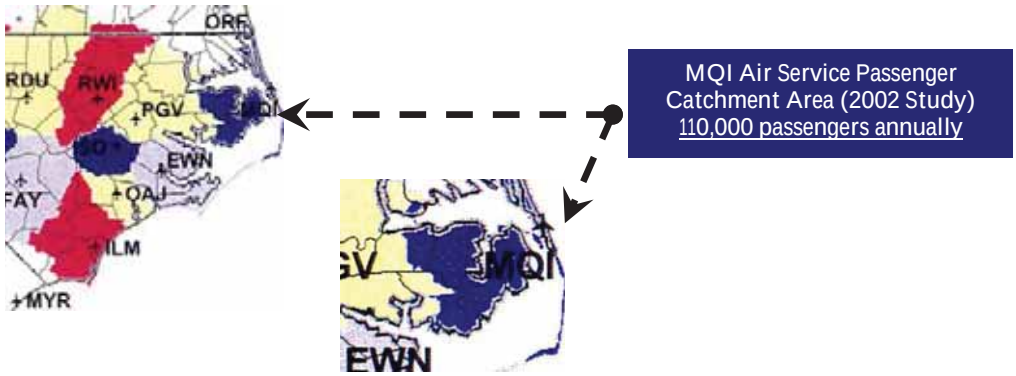
- *2002 Statewide Commercial Air Service Study* (focus on NC hubs RDU, CLT, GSO)
- *1996 Air Service Study for Dare County/ Outer Banks*

The *2002 Study* estimated that Dare County contributes about 34,000 annual passenger boardings (enplanements) at RDU, CLT and GSO -- not including leakage to out-of-state commercial service airports; primarily Norfolk (ORF). Generally, between 25% and 60% of the passenger traffic at North Carolina non-hub commercial airports is generated by 'local' airport passengers. On average, these non-hub airports capture 20% to 50% of their 'local' passengers market – conversely, 50% to 80% 'leak' to surrounding hub airports (RDU, CLT, GSO, ORF). Of these 60% are leisure travelers.

The *2002 Study* indicated that the Dare County/Outer Banks Region is served primarily by the Norfolk International Airport (ORF), a 2:15 minute drive time from Manteo – clearly the shortest drive-time of any alternative (see exhibit below). The *1996 Study* reported that 92% of Outer Bank passengers book flights through ORF, versus RDU, CLT or GSO.



The *2002 Study* identified a passenger catchment boundary for the Dare County/Outer Banks air service market, defined by drive-times to competing commercial service airports. The area includes a six-county region: 1) Dare, 2) Tyrrell, 3) Washington, 4) Hyde and 5) Beaufort Counties (see exhibit below), which supports a permanent population of 54,000 persons; and several million visitors per year.



The *1996 Study* reported the Dare County/Outer Banks market could generate 110,000 total passengers a year – 90,000 by 'visitor passengers' and 20,000 by 'local passengers (55,000 enplaned passengers = 110,000 ÷ 2). This passenger level would reasonably support 11 peak-season daily departures and 3 non-peak season daily departures, operating 37-seat turboprop aircraft at 22 passengers per flight assuming a 60% passenger load factor. It should be noted that these projections were made during a peak period of passenger traffic; before American Airlines suspended hub service at RDU. However, since 1996, the Outer Banks visitor industry has continued to grow 3% to 5% annually.

US Regional/Commuter Aircraft

The following lists the most common commuter/regional aircraft in the regional airline service fleet. Again, the regional jets are quickly gaining market share over the older, slower and less comfortable turboprop fleet.

Top Regional Aircraft Fleet (CY 2003)
Arranged by Total Available Seats

Aircraft Rank	Model	Type	Max Seats	Aircraft In Service	Total Industry Seats	% of Seats
#1	RJ-100/200	Jet	50	465	23,190	27.7%
#2	ERJ-140/145	Jet	50	361	17,666	21.1%
#3	Saab 340 *	Turboprop	34	169	5,734	6.8%
#4	Dash 8 100/200 *	Turboprop	37	134	4,958	5.9%
#5	ATR-72	Turboprop	72	62	4,014	4.8%
#6	146/RJ85	Jet	55	51	3,883	4.6%
#7	Brasilia *	Turboprop	30	109	3,270	3.9%
#8	RJ-700	Jet	70	70	3,254	3.9%
#9	Beech-1900 *	Turboprop	19	154	2,926	3.5%
#10	ERJ-135	Jet	37	71	2,627	3.1%

Shaded Rows: viable commuter/regional aircraft based on estimated passenger demand.
Source: 2003 AvStat Associates for the Regional Airline Association

The *2002 Study* identified the viable types of commuter/regional aircraft to serve the Dare County / Outer Banks annual passenger demand, based on the expected frequency of daily flights. As shown below, the aircraft best suited to accommodate this size of market include the 19-seat turboprop (ex. Embraer Brasilia) or 37-seat regional jet (ex. ERJ-135):

Viable Regional/Commuter Aircraft for MQI Air Service Market

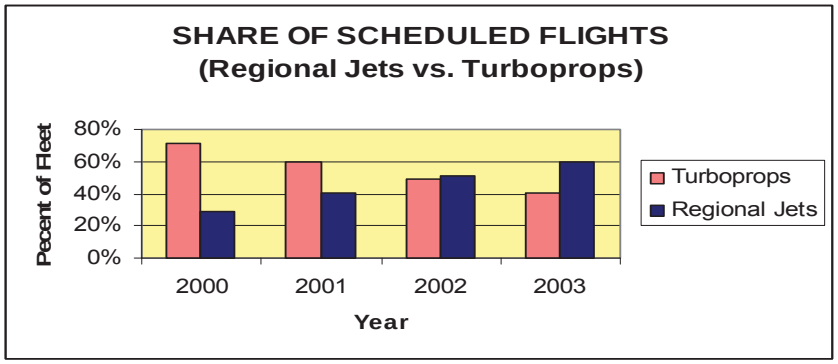
Aircraft Type:	Passengers With 2 Daily Roundtrips	Passengers With 3 Daily Roundtrips
19-Seat Turboprop Aircraft	16,300 *	24,500 *
37-Seat Regional Jet Aircraft	31,800 *	47,600 (N/A)
50-Seat Regional Jet (Not Viable)	42,900 (N/A)	64,400 (N/A)
117-Seat Jet (Not Viable)	100,400 (N/A)	150,700 (N/A)
162-Seat Jet (Not Viable)	139,000 (N/A)	208,600 (N/A)

* Aircraft viable for MQI passenger market level / (N/A) Aircraft not viable.
Note: Assumes daily service, 98% flight completion factor, and 60% load factor

Source: North Carolina Commercial Air Service Study, September, 2002.

US Regional (Commuter) Airline Market

The regional airline jet fleet, as reported by the FAA from 1997 to 2003, has grown from 108 to over 1,300 aircraft, and projected to grow to over 2,800 aircraft by the year 2015. As reported by the Regional Airline Association (RAA), there will be a wholesale transition away from turbopropeller aircraft to regional jets over the next 10 years (by 2015). This transition is profound, as regional jets now constitute one-quarter of all scheduled airline departures in the United States. Conversely, since December 2000, flights by turboprops have dropped nearly 41%. The FAA published load factor (revenues seats to available seats) for the regional jet industry is about 65%, and expected to increase to about 67% by the year 2015.



North Carolina Regional (Commuter) Airline Market

The most viable connecting hub with service to Dare County / Outer Banks is largely dependent upon a continued regional/commuter presence by US Airways at CLT, the potential for emerging regional service at RDU; both compared against the ground travel preference already provided by Norfolk.

In most markets, the net gain resulting from a loss of turboprop and/or mainline service has been offset by regional jet flights. Through consumer preference, the regional jet offers an economical means for replacing turboprop flights in smaller longer-haul markets, while being able to enter markets currently awaiting resumption or recovery for larger mainline jets. However, this trend has negatively impacted commercial service in North Carolina, including Hickory, Rocky Mount, Winston-Salem and Moore County – all lost air service during this period.

The following shows runway takeoff length requirements for 32 to 50-passenger regional jets currently operating in the regional airline fleet. The average takeoff distance of the 32 to 37-passenger regional jet is 5,100', 800' greater than what is now available at the Dare County Regional Airport. The *2002 Study* identified Dare County Regional Airport as the only potential commercial service market unable to support regional jets.

35 to 70 Seat Regional Jet Takeoff Performance Data		
Regional Jet	Passenger Seats	Takeoff Length (See Note)
Dornier 328-300	32	4,600'
Embraer ERJ-135 ER	37	5,200'
Embraer ERJ-135 LR *	37	5,500'
AVERAGE OF TOTALS	32 to 37 Seats	5,100'

Note: Assumes maximum takeoff weight – manufacturer data (ISO 59ºF conditions)
* Long Range (LR) regional jet versions not anticipated for MQI market.

Sources: Regional Air Service Initiative (RASI) http://www.regionalairservice.org/aircraft/index.php: Evaluation of Regional Jet Operating Patterns in the Continental United States, May 2004 (http://icat-server.mit.edu/Library/Download/217_alexm-thesis.pdf).

2004-2005 Dare County / Outer Banks Air Carrier Passenger Potential

Table 2.14 shows the number of annual Dare County tourist/visitors relying on air travel. According to the Outer Banks Visitor Bureau (*2002 Conversion Research:* June, 2003), 8.8% of 'First-Time' visitors and 4.8% of 'Repeat' travelers use air transport, totaling 13.6%. With an estimated 4.8 million Outer Bank visitors annually, and 250,000 visitors during the average peak-day season, air passengers reach 60,0000 during the peak-month(s).

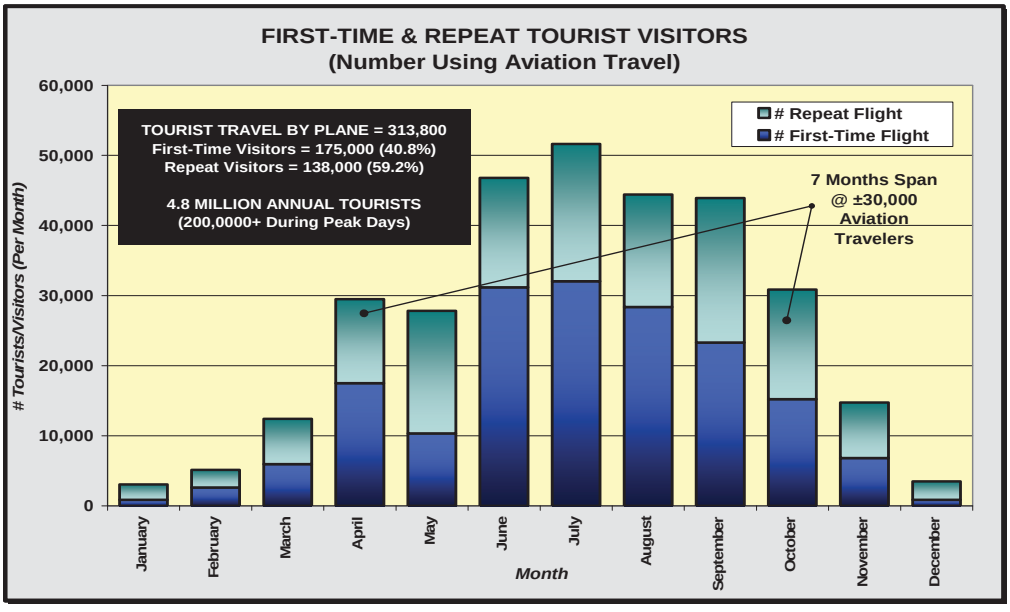


Table 2.14: Dare County Tourists Using Air Transport

Month Tourist Activity	# First-Time Visitors (40.8 %) Flight (8.8%)	# Repeat Visitors (59.2%) Flight (4.8%)	# Tourist/ Visitors Using Air Travel
January	876	2,187	3,063
February	2,627	2,500	5,126
March	5,954	6,457	12,411
April	17,513	11,977	29,490
May	10,333	17,497	27,829
June	31,173	15,622	46,795
July	32,049	19,580	51,628
August	28,371	16,039	44,409
September	23,292	20,621	43,913
October	15,236	15,622	30,858
November	6,830	7,915	14,745
December	876	2,604	3,479
TOTAL AIR TRAVELERS	± 175,100	± 138,600	± 313,700
Daily Tourists/Visitors During Peak Summer Day:			250,000
Estimated Annual Tourists/Visitors Dare County:			4,878,000
Visitor Accommodations	First-Time Visitors	Repeat Visitors	Average
# of Nights Spent	5.8	6.4	6.1
# of Days Spent	6.0	6.7	6.4
Avg. Number of People Per Party	6.0	6.4	6.2
Avg. Number of Children Per Party	2.3	1.7	2.0
Note: Annual Dare County Tourist/Visitors estimated per percent of monthly visitors based on Outer Banks Visitor Bureau - 2002 Conversion Research (June, 2003), pg. 21 - Strategic Marketing & Research, Inc. and Room Occupancy Revenues (Average of 1993 to 2005).			

Source: NC Department of Commerce & Dare County Outer Banks Visitor Bureau.

MQI Scheduled Air Carrier Service Findings:

While scheduled air service is economically viable, particularly during the peak-season months, the Dare County Regional Airport necessitates improvements to reliably secure or accommodate scheduled service; including runway length to accommodate the smaller regional jets and a precision approach (ILS).

2.18 INVENTORY SUMMARY

The Inventory provides the foundation upon which the remaining elements of the AMP Update are formulated. The following inventory findings are significant to future development of the Dare County Regional Airport:

- The Airport provides convenient access to the surrounding region, but is physically constrained by terrain, roadways and property ownership.

- The Airport paved areas (runways, taxiways and aprons) total nearly 38 acres; in which the average pavement condition scores 67 out of 100 points, indicating near-term rehabilitation.

- The 4,300' runway length, and certainly the 3,303' length, are inadequate to accommodate the majority of general aviation business jets. As such, jets often land and take-off during cooler early morning and evening periods when aircraft performance is optimized. Jet-A fuel sales and profits suffer as a consequence.

- At present, several geometric airfield and airspace design standards are not in conformance with FAA/NCDOA standards, and should be resolved or mitigated as separate projects, or as part of future airport improvement/expansion projects.

- The Airport continues to experience growth, as evidence of based aircraft, annual operations by piston, turboprop and jets, and fuel sale trends. As an indicator, since 2001, fuel sales have increased nearly 11% per year, with Jet-A growing at 16% per year.

- Precision instrument approach capabilities would improve Airport reliability as a point of final destination and as an IFR alternate; particularly for business-class aircraft. However, the establishment of a traditional precision instrument landing system (ILS) with localizer and glideslope is exacerbated by antenna siting constraints and surrounding special use airspace for military activity.

- Without being able to develop into the 40-acre tract north of the terminal area, the Airport lacks available space for future hangars, including the larger 6,000 to 12,000 square foot hangars used to accommodate high-performance business aircraft.

- The TVOR occupies valuable terminal expansion area.

- The Dare County/Outer Banks region has the potential for 110,000 total passenger – 55,000 annual passenger boardings. However, the Airport's existing 4,300' runway length is insufficient to accommodate the trend towards regional jets serving this size market, and lacks the reliability of a precision instrument approach procedure (ILS).

END OF SECTION #2