MARYLAND AVIATION ADMINISTRATION
METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

REGIONAL HELICOPTER SYSTEM PLAN

For the Maryland and Metropolitan Washington Area

JUNE 2005 – FINAL REPORT

Police and Fire

Government Agencies

Military

Air Ambulance

Commercial Operators

EDWARDS AND KELCEY
In Association With
KM Chang Environmental
HNTB Corporation
ARP, Inc.

FINAL REPORT

REGIONAL HELICOPTER SYSTEM PLAN

Maryland Aviation Administration
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COG-02-024

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1. SUMMARY

1.1 Introduction

Throughout the State of Maryland and within the Metropolitan Washington Region, helicopters are used on a daily basis – by both public and private agencies – to perform a variety of missions. In order to document these current helicopter operations as well as to determine both the ways in which they are affecting the region today and may do so in the future, the Maryland Aviation Administration (MAA) and the Metropolitan Washington Council of Governments (COG) each sponsored a Helicopter System Plan study for their respective areas. This report presents the findings of both studies.

Why was this study conducted?

While the existence of current helicopter activity in the study area is apparent to many residents and visitors, the needs of helicopter users and the impact of that activity in terms of social costs and benefits have not been systematically evaluated in recent years. This Study captures up-to-date information on helicopter activity, examines the costs and benefits of this activity on the community, identifies future system needs and recommendations, and provides a plan to implement the study recommendations.

Who uses helicopters and for what reasons?

Helicopters are operated by a wide variety of public and private agencies. These public entities include local police and fire departments, as well as a number of federal agencies responsible for law enforcement, homeland security, and public safety. Among them are the Federal Bureau of Investigation, the Drug Enforcement Administration, the Coast Guard, and the Customs Service, for example. The different branches of the U. S. military, such as the Army, Navy, Air Force, and Marine Corps also frequently utilize helicopters. Private entities employing helicopters in their regular activities may include hospitals, the media (traffic and news reports), commercial operators and others.

The missions performed by these operators are diverse. In general, however, helicopter missions fall into the following broad categories:

- Emergency medical evacuation and rescue (air ambulance)
- Disaster response/relief
- Search and rescue
- Military surveillance, support, and security
- Military liaison/VIP transportation
- Government (civilian) liaison/VIP transportation

- Law enforcement (federal, metropolitan, state and park police)
- Fire fighting
- Corporate/business transportation (both private and for hire charter/air taxi)
- Media (news and traffic reporting)
- Aerial filming/photography
- Utility/construction (high-rise construction/power line surveys/etc.)
- Agricultural/seeding/insect control
- Forestry/wildlife monitoring
- Flight training
- Sightseeing
- Personal/discretionary

1.2 Existing Heliport Facilities (including airports)

There are currently 50 officially listed active heliports in the State of Maryland, as well as 32 public-use airports and 4 military airports that support helicopter operations. The current heliports within Maryland, excluding airports, vary by type and use as described in Table 1-1. Medical use/hospital landing facilities make up the largest share with 54 percent (27 out of 50) of the total heliports. Private (or corporate) heliports represent 30 percent (15 out of 50), while government and military facilities make up 16 percent (8 out of 50) of the heliport facilities. There are no public-use or transport heliports in the State of Maryland, although a number of airports, such as BWI and Martin State, essentially serve the role of public-use heliports.

Table 1-1 Maryland Heliports and Airports by Type (2002)

Facility	Private/Corp	Government	Military	Medical	Public-Use	Total
Heliport	15	5	3	27	0	50
Airport*	0	0	4	0	32	36
Total	15	5	7	27	32	86

Source: Edwards and Kelcey, Inc.
* Includes only those airports with active helicopter activity

The Metropolitan Washington Region currently has 48 active heliports, as well as 14 public-use airports and two military airports that support helicopter operations. These facilities are listed in Table 1-2 and vary by type and use. Medical use landing facilities make up the largest share of heliports with 46 percent (22 out of 48). Private and corporate heliports make up 25 percent (12 out of 48), while government and military facilities make up 27 percent (13 out of 48) of heliport

facilities. There is one public-use heliport located in the District of Columbia (South Capitol Street), but it has been unavailable to non-military and non-police operations since September 11, 2001.

Table 1-2 Metropolitan Washington Heliports By Type (2002)

Facility	Private/Corp	Government	Military	Medical	Public-Use	Total
Heliport	12	10	3	22	1	48
Airport*	0	0	2	0	14	16
Total	12	10	5	22	15	64

Source: Edwards and Kelcey, Inc.
* Includes only those airports with active helicopter activity

1.3 Existing Helicopter Activity

The number of helicopters based in the study area in 2002 are listed in Table 1-3 and Table 1-4. The estimated number of helicopter operations in the study area are listed in Table 1-5 and Table 1-6.

Table 1-3 Helicopters Based in Maryland (2002)

Type of Helicopter	Number	Percent
Civilian	43	61.8%
Military	26	38.2%
Total	69	100%
Piston	9	13.2%
Single Turbine	29	42.6%
Twin Turbine	31	44.1%
Total	69	100%

Source: Edwards and Kelcey, Inc.

Table 1-4 Helicopters Based in Metropolitan Washington (2002)

Type of Helicopter	Number	Percent
Civilian	19	27%
Military	52	73%
Total	71	100%
Piston	2	3%
Single Turbine	14	20%
Twin Turbine	55	77%
Total	71	100%

Source: Edwards and Kelcey, Inc.

Table 1-5 Activity by Maryland Based Helicopters (2002)

	Based Helicopters	Annual Hours Flown	Annual Operations
Piston	9	1,783	10,692
Single Turbine	29	10,936	65,598
Twin Turbine	31	15,791	94,674
Total	69	28,510	170,964

Source: Edwards and Kelcey, Inc.

Table 1-6 Activity by Metropolitan Washington Based Helicopters (2002)

	Based Helicopters	Annual Hours Flown	Annual Operations
Piston	2	396	2,376
Single Turbine	16	5,278	31,668
Twin Turbine	53	27,995	167,970
Total	71	33,669	202,014

Source: Edwards and Kelcey, Inc.

1.4 Current Helicopter Missions

The missions flown by helicopters are very diverse, but generally fall into the following broad categories shown in Table 1-7 and Table 1-8.

Table 1-7 Helicopter Missions in State of Maryland

Mission	Percent of Operations
Emergency Medical Services (EMS)	32.3%
Law Enforcement	18.9%
Military/Security	16.2%
Electronic News Gathering (ENG)	4.2%
Personal/Recreational	1.3%
Flight Training	9.6%
Corporate/Air Taxi	4.6%
Filming/Aerial Photography	3.1%
Utility	0.3%
Agriculture/Seeding/Insect Control	3.3%
Wildlife Management	1.0%
Other	5.2%
Total	100%

Source: Edwards and Kelcey, Inc

Table 1-8 Helicopter Missions in Metropolitan Washington

Mission	Percent of Operations
Emergency Medical Services (EMS)	15.9%
Law Enforcement	13.8%
Military/Security	51.2%
Electronic News Gathering (ENG)	1.8%
Personal/Recreational	0.4%
Flight Training	6.4%
Corporate/Air Taxi	6.1%
Filming/Aerial Photography	2.3%
Utility	0%
Agriculture/Seeding/Insect Control	0%
Wildlife Management	0.2%
Other	1.9%
Total	100%

Source: Edwards and Kelcey, Inc

1.5 Economic and Social Benefits of Helicopter Activity

Helicopters perform a level of community service that is often unrecognized, and this service is a vital utility that is one of the many key infrastructure elements that improves the quality of life through increased safety, security, and access to business. These benefits can be measured in terms of their economic impact and social benefits.

Economic impacts measured include employment, payroll, and expenditures attributable to the presence of helicopter operations. It was estimated that helicopter operations created the following annual direct economic impacts:

Table 1-9 Direct Annual Economic Impacts of Helicopter Activity (2002)

	Metropolitan Washington	Maryland
Jobs	158	252
Payroll	$5,530,000	$8,820,000
Local Expenditures	$1,382,500	$2,205,000
Total Direct Impacts	$6,912,500	$11,025,000

Source: Edwards and Kelcey, Inc

The direct impact estimates are based on typical expenditures by helicopter type (i.e. twin engine, piston, etc.) and standard personnel requirements to operate a helicopter. Personnel requirements are also based on operation types. For example, medevac operations will include paramedic personnel as well as pilots, maintenance, and administrative personnel.[1]

Induced impacts are estimated through the use of a multiplier. Any direct expenditure into the local economy by helicopter operators will be re-spent by the recipients of these initial expenditures, creating additional economic activity. This process continues as the second recipient of the "initial" expenditure spends money in the local economy. The "multiplier" is a measure of the total economic impact of all stages of the initial expenditure. The FAA uses multipliers based upon a region's population. As both Maryland's and Metropolitan Washington's population exceeds 3 million, a multiplier of 1.0 is used per the FAA. Thus, the total induced impacts are equal to 1.0

[1] Economic impact assumptions for each helicopter type were obtained from the interviews with operators and the "heliport and helicopter Master Plan for the City of New York". Commercial fleet mix data from Report No. 1 was used to aggregate economic impacts.

times the direct impacts. Total impacts are the sum of both direct and induced estimates as shown in Table 1-10.

Table 1-10 Total Annual Economic Impacts of Helicopter Activity (Direct & Induced)

	Metropolitan Washington	Maryland
Direct Impacts	$6,912,500	$11,025,000
Induced Impacts (x1.0)	$6,912,500	$11,025,000
Total Economic Impacts	$13,825,000	$22,050,000

Source: Edwards and Kelcey, Inc

Non-traditional and intangible benefits, such as enhanced law enforcement, improved access to medical facilities, and other benefits resulting from the availability rather than the activity of helicopter services provide a significant social benefit. For example, helicopters provide:

- Disaster relief – services in response to both natural (hurricanes, floods, earthquakes, etc.) and man-made disasters (high-rise fires, terrorist activities, etc.)
- Airborne law enforcement – police patrol and surveillance
- Aerial observation – monitoring pipelines and power lines, geotechnical survey, etc.
- Corporate/business/air taxi – business executive/VIP transportation
- Construction work – install rooftop HVAC equipment and antennas, erect pre-assembled electric power transmission towers, and move heavy equipment
- Agricultural and forestry operations – spread seeds, fertilizer, weed killers, and insecticides, monitor forest conditions, assist logging operations
- Emergency medical services (EMS) – serve as flying ambulances, transporting medical supplies, personnel, and by rushing the injured to hospitals
- Electronic news coverage/gathering (ENG) – monitor traffic congestion and report on breaking news events
- Flight training

1.6 Forecast of Future Activity

Helicopters serve a wide variety of missions and are operated by both private companies and public agencies, civilian and military. As a result, helicopter operators do not respond in the same way to a single factor or issue, such as the economy, insurance, airspace, etc. Public agency helicopters such as law enforcement, certain emergency medical operators and military operators, are not directly affected by the state or federal economy, whereas corporate/air taxi, training, personal, and utility helicopter operators are directly affected by the state or federal economy.

According to the operator's survey conducted for this Study, approximately 57 percent of the helicopter activity in Maryland is performed by public agencies, and approximately 43 percent by private operators. In the Metropolitan Washington Region, public agencies (including the military) perform approximately 70 percent of all helicopter operations, while private companies perform approximately 30 percent.

Although civilian helicopter activity in the District has been significantly constrained since September 11, 2001, a number of recent national and local developments indicate the potential for growing utilization of helicopters throughout Maryland and the Metropolitan Washington Region. These include:

- Increased demand for airborne law enforcement and emergency medical services;
- Increased need for security for high level government officials and business executives;
- Continued development of new technologies used by a number of regional operators (such as police departments, for example) including communications and navigation, forward looking infrared radar (FLIR), improved flight management systems, heads-up-displays (HUD), etc.;
- Increased traffic congestion throughout the region; and
- Predicted increase of corporate/business use due to the introduction of new and more efficient models of civil helicopters[2].

Two forecast methodologies were used to forecast future activity within Maryland and the Metropolitan Washington Region. These include a Status Quo Forecast Scenario and an

[2] A 1998 survey conducted by AlliedSignal Aerospace of nearly 1,000 flight departments concluded that the demand for new helicopters will remain high for the next four years, with the fleet of civil helicopters expected to grow at 3% per year, and deliveries of new helicopters exceeding 2,300 units between 1999-2003. The most popular helicopter will be light single-engine turbines, such as the Bell 206B3, Bell 407, Eurocopter EC-120, and MD Helicopters (MD-500/600 series). The market for light twin turbines is also strong, particularly for the Bell 427, Bell 430, EC 135, and the Agusta A-109.

Unconstrained Forecast Scenario. The Status Quo Scenario assumes that current trends will remain the same throughout the forecast period, while the Unconstrained Scenario assumes that the current barriers to growth, such as the current airspace restrictions, will be removed. The potential growth for both scenarios within the combined study area are listed in Table 1-9 and Table 1-10.

Table 1-11 Forecasts of Total Based Helicopters in Combined Study Area

	2002	2005	2010	2020
Based Helicopters (Status Quo Scenario)	140	139	137	135
Based Helicopters (Unconstrained Scenario)	140	143	150	164

Source: Edwards and Kelcey, Inc

Table 1-12 Forecasts of Total Helicopter Operations in Combined Study Area

	2002	2005	2010	2020
Helicopter Operations (Status Quo Scenario)	372,978	370,200	365,700	357,000
Helicopter Operations (Unconstrained Scenario)	372,978	382,800	400,600	437,900

Source: Edwards and Kelcey, Inc

1.7 System Goals

Helicopters will continue to play an important transportation and public service role in Maryland and the Metropolitan Washington Region well into the future. However, the framework and goals of the helicopter system in Maryland and the system for Metropolitan Washington differ due to varying geopolitical, socioeconomic, community, governmental, and transportation needs.

The goals of the Maryland system are to provide the framework for a system of public-use helistops and heliports as needed to meet current and future demand, to establish land use and permitting guidelines for helistops/heliports, and to ensure that current airspace structure, limitations, and restrictions meet user needs.

The goals of the Metropolitan Washington Helicopter System Plan are to ensure that the current helicopter system meets the region's transportation and public services needs, to better manage the system to help reduce community noise impacts, to establish land use and permitting guidelines for helistops/heliports, and to document the relationship between the transportation and public service benefits of helicopter operations and the economic well-being of the metropolitan area.

1.8 Heliport Facility Recommendations

Several common needs for both the Maryland and Metropolitan Washington Helicopter Systems were identified. For example, all hospitals providing trauma and critical care facilities should be equipped with an established helistop. Additionally, EMS, charter/air taxi, and to some extent the corporate operators, would benefit from a small network of helistops strategically located along major transportation routes. These helistops would provide established landing areas for the quick loading and unloading of injured persons or passengers. Finally, both the corporate and charter/air taxi operators would benefit from established heliports in centrally located areas in downtown Baltimore and Washington, DC. To meet these needs, three types of facilities were identified including:

Private Use Hospital Heliports: All hospitals providing trauma and critical care services should be equipped with an established heliport. Hospital heliports are privately owned facilities providing a unique service to the public by facilitating the fast and safe transfer of patients.

- Annual activity levels would range from over 2,000 operations at the large trauma centers to 150 operations at the smaller hospitals.
- Minimal facilities would be provided, including a cleared and paved landing and takeoff area, markings, and edge lighting.
- Clear approaches capable of supporting a GPS instrument approach procedure.

Public-Use Helistops: EMS, public service, charter/air taxi, and corporate operators would all benefit from a small network of helistops strategically located and easily accessible along major transportation routes. These helistops would provide established landing areas for the efficient loading and unloading of injured persons or passengers as well as provide a landing site with Instrument Approach Procedures (IAP) for use during periods of low visibility.

- Annual activity levels would range between 100 and 250 operations.
- Minimal facilities would be provided including a cleared and stabilized landing and takeoff area, either paved or turf, markings, and edge lighting.

- Clear approaches capable of supporting a GPS instrument approach procedure.
- Located at or near an existing transportation related facility that is well marked, conveniently located, and easily accessible by ground and air (such as a park and ride, commuter rail station, or highway rest area).
- Located an acceptable distance away from noise sensitive areas and facilities.

Public-Use Downtown Heliports: Charter and corporate operators in the region would both benefit greatly from established heliports in centrally located downtown Baltimore and Washington, DC. These heliports would provide a small terminal building, hangar facilities, refueling capabilities, and would also be part of a larger system of heliports connecting the Mid Atlantic Region and beyond.

- Annual activity levels would range between 3,500 and 13,500 operations.
- Facilities would including a paved landing and takeoff area, at least two aircraft parking areas, markings, edge lighting, area lighting, a small terminal building and pilot's lounge, security fencing, and fire suppression systems.
- Clear approaches capable of supporting GPS instrument approaches.
- Centrally located within the central business district and easily identifiable and accessible by ground and air.
- Located an acceptable distance away from noise sensitive areas.

The actual sighting, approval, and construction of each helistop or heliport will be driven by market demands. Market demands could include increased helicopter activity levels (Status Quo or Unconstrained Forecast), economic development opportunities, or specific user needs. Therefore, the impetus to support and implement the system recommendations will depend greatly on an effective private/public partnership and cooperation among the various stakeholders.

Private users and industry groups will also need to partner with public agencies such as the MAA and COG to educate communities as to the value, safety, and need for helicopter facilities, and to minimize or reduce the impacts of helicopter operations. Re-establishing and continuing a helicopter working group to educate both the public and helicopter users is key to the successful implementation of the system recommendations.

1.9 Environmental Issues and Recommendations

A goal of this study was to identify ways to better manage the helicopter system to reduce noise impacts. A noise analysis was completed and it was concluded that the majority of the noise impacts were caused primarily by three types of operations. These include: Medevac (EMS) operations into the Level I Trauma Centers located near densely populated areas; police, military, and government operations over densely populated areas; and helicopters that are transitioning through the Washington, DC area, particularly along the Potomac River and over South Arlington.

Three recommendations were identified to address the noise impacts. The first recommendation is to create a system to collect actual helicopter activity data within the metropolitan area. This system would help identify where and at what frequency helicopters are operating within the region. Without this information, a true picture of helicopter activity and the level of noise impacts to specific areas will not be known. Such a program could be a collaborative effort between the MAA, COG, Metropolitan Washington Airports Authority (MWAA), and the FAA.

Second, it is recommended that a Helicopter Working Group be established specifically to review and recommend revisions to helicopter routes, airspace, and noise impacts as needed on a periodic basis. Representatives from government, military, police, EMS, private helicopter operators, citizen groups, COG, MAA, MWAA, and FAA should participate as part of this group.

The third recommendation is to create a centralized and formal system or process to address noise complaints. Such a system would allow citizens the opportunity to voice their concerns and to receive feedback on potential resolutions to their situation. This process must be coordinated with the Helicopter Working Group and the system to collect actual helicopter data.

1.10 Airspace Issues and Recommendations

A goal of this study was to ensure that current airspace structure, limitations, and restrictions meet user needs and future demand. The airspace recommendations were categorized into recommendations to revise the airspace to reduce the noise impacts and airspace improvements needed to implement the heliport facility recommendations.

Noise mitigation options for private use hospital heliports are limited, given that helicopters would be on arrival and departure paths, and therefore at lower altitudes. However, the effect of helicopter operations on nearby noise sensitive land uses could be considered in the design and layout (including altitude) of the typical approach and departure paths for the heliport, to the extent possible for safety and operating requirements. Additionally, pilots would be encouraged to use

techniques that reduce noise exposure, such as higher altitudes, management of blade/power settings, and avoiding noise sensitive areas when practical.

Noise mitigation could also be considered in an update to the Helicopter Route Chart by selecting higher altitudes for routes when possible. Today, most of the altitudes assigned to helicopter routes were established because of arrival, departure, and transit routes for fixed-wing aircraft that are traveling above the helicopter routes. These altitudes are needed to ensure aircraft separation given the heavy and increasing volume of air traffic in the metropolitan area. In re-assessing the Helicopter Route Chart, higher altitudes could be identified for segments of some routes with coordination with ATC and FAA. Alternatively, pilots could request ATC clearance for higher altitudes for noise purposes when there are no conflicts with other air traffic (this would be more common at night due to the reduced number of nighttime operations).

Several recommendations were identified to improve airspace issues at existing and potential helistop and heliport facilities. These include implementing non-precision GPS approaches to new and existing helistop and heliport facilities, continuing advocacy of new GPS and precision approach procedures by FAA, coordinating proposed sites with current Class B and ADIZ restrictions, particularly in terms of new route development, and continuing use of special transponder codes.

1.11 Policy and Program Recommendations

Several formal policy and informal program recommendations were identified to assist both the MAA and COG to better manage their respective helicopter systems. Some recommendations can be accomplished jointly between the two agencies while others would be implemented separately. For example, the existing Maryland aviation regulations could be improved by clarifying and providing direct reference to heliports and helistops where applicable. Specific reference to heliports is currently limited to inclusion by definition of a “designated land area” and the minimum standards are defined as those contained in the FAA Heliport Design Advisory Circular. Likewise, existing COG transportation policies should be extended to formally include helistops, heliports, and helicopter operations within the region.

Environmental impacts, such as noise, should continue to be studied though existing COG boards and committees. The Committee on Noise and Aviation at National and Dulles Airports (CONAANDA) should continue to study helicopter noise and established helicopter routes.

The MAA and COG should both help facilitate the implementation of land use regulatory controls by local planning and zoning boards, as less than half of the communities in Maryland have regulations that address aircraft-landing facilities of any kind, including airports. A similar situation

exists in some COG jurisdictions. Both the MAA and COG should also implement an education program to continue to promote the benefits of helicopters and heliports. This could be done through existing outreach programs administered by both agencies. In particular, emphasis should be placed on enhancing intermodalism to support regional transportation needs.

Obtaining funding for new helistop or heliport facilities is difficult through private sources without financial support from public sources. One way to approach public funding is to promote helistops and heliports through economic development initiatives. Heliports, by their size and operating needs, can be incorporated into economic development initiatives to revitalize, grow, or create economic development within communities. Public funding for privately owned facilities that are available for public use should also be supported by the MAA and COG.

1.12 Facility Development

Developing the recommended system of helistops and heliports will require a phased approach. It is anticipated that the proposed facilities will be developed by private operators or public agencies as demand dictates over the twenty-year planning period. The MAA and COG are not expected to construct or operate any heliport facilities. However, multiple local, state and, federal agencies can participate in the funding and development of such facilities.

Given that private and possibly public service agencies will build the system of helistops and heliports, market demands must drive the development of the system infrastructure. However, existing airspace restrictions will prohibit the development of most heliport facilities within the 15 nautical mile radius “no-fly” zone over Washington, DC. As such, development of public-use heliport facilities within 15 nautical miles of Washington, DC will take many years to implement.

Building the two downtown heliport facilities will also be dictated by market demands and community acceptance. In downtown Baltimore, for example, there have been several attempts in the past to build a heliport in the Central Business District. However, these attempts were not realized due to community opposition. Although there is demand for such a facility, the community support for a downtown facility still has not surfaced. Therefore, the construction of a downtown Baltimore heliport may be many years in the future.

In Washington, DC, on the other hand, there is currently a full service privately owned public use heliport located on South Capitol Street. However, current airspace restrictions prohibit public use of this facility. Furthermore, redevelopment of the riverfront will eventually require the relocation of the heliport to another site. The District of Columbia is studying options to relocate the facility, however no specific plans have been prepared. The ultimate success of the relocation of the South Capitol Street Heliport will depend on community acceptance and the easing of the current airspace restrictions. Therefore, the timing of a new facility is uncertain.

2. SYSTEM INVENTORY

2.1 Historical Background

Almost 400 years of design, testing, and evaluation led to the first successful helicopter flight by the German Focke FW 61 in 1936, followed shortly thereafter by Igor Sikorsky in 1939 in his VS-300. A historic timeline of helicopter development is presented in Figure 2-1 and Figure 2-2. Dating as far back as Leonardo da Vinci, the practical value of vertical takeoff and landing (VTOL) was recognized. However, it was also discovered that achieving VTOL capability was more difficult than fixed-wing flight due to more complex aerodynamics and control requirements. In fact, by the time the first helicopters flew in the late 1930s, jet engines had been developed and fixed-wing aircraft were flying at 400 mph. Although helicopters were used in World War II, their limited stability, range, payload, and speed severely constrained their utility.

It was not until the late 1940s, and subsequently the Korean War in the early 1950s, that helicopter technology had advanced to the point that performance and reliability were sufficiently advanced to meet both military and civilian operational needs. The first civilian helicopter was certified in 1947 by the Bell Aircraft Corporation (subsequently Bell Helicopter Textron). Military versions of the Model 47 were used extensively by the Army for search and rescue missions, medical evacuation (medevac), and liaison during the Korean War. The U.S. Air Force and Navy also used helicopters during that war for similar missions, and 50 years later all of the branches of the military continue to use helicopters for essentially the same missions. The Vietnam War in the 1960s and 1970s saw the most extensive use of helicopters in any single theatre of operations, before or since, which also led to numerous technology developments that significantly enhanced their performance and utility. Increasingly the military has also been using helicopters as front-line combat aircraft for close air support – most notably the AH-1 Cobra, AH-64 Apache, and the RAH-66 Comanche (under development).

In general, military utilization of helicopters played a major role in rotorcraft development, and a number of advanced technologies developed for and by the military were subsequently adapted for civilian rotorcraft use, including turbine engines, stability augmentation systems, instrument flight capability, electronic flight instruments, and external lift capabilities, among others. That trend continues today with the development of the military V-22 Osprey tilt-rotor.

Figure 2-1 History of Helicopter Development

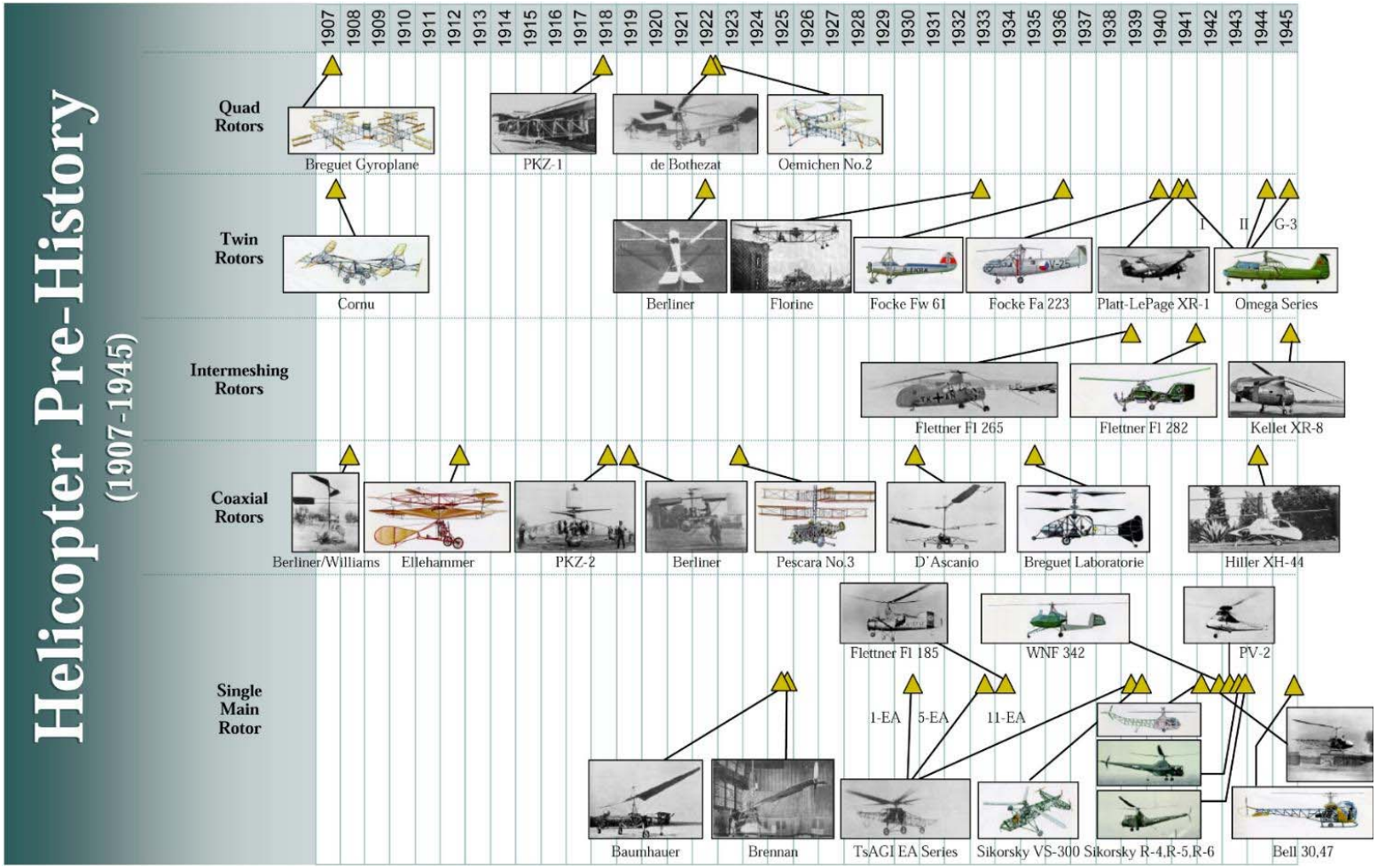
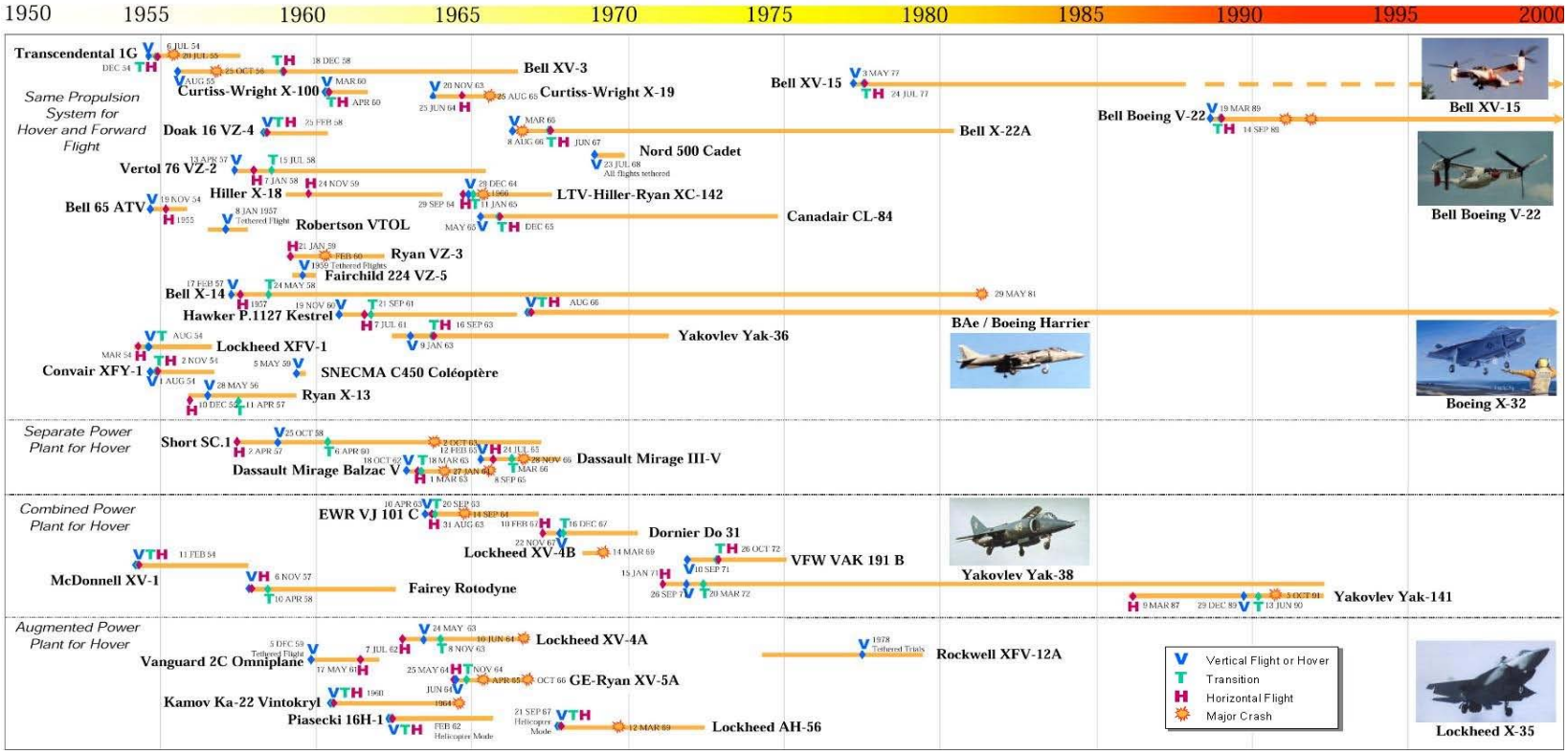


Figure 2-2 History of Helicopter Development



The military-to-civilian technology transfer process greatly enhanced reliability and performance, to the point that civilian helicopters effectively serve markets such as emergency medical services (EMS), law enforcement, corporate/air taxi transportation, as well as off-shore energy exploration. Another key role played by the military was in training large numbers of helicopter pilots and technicians, who subsequently flew and maintained most of the civilian helicopters flown by private, corporate, and government operators.

Due to aerodynamic limitations, helicopters can rarely fly faster than 200 mph (most typically cruise at 140 knots or less), and have average ranges of less than 400 miles. Although helicopters cannot fly as far or as fast as fixed-wing aircraft, or carry as much payload, and even though they cost more on a per-mile basis than almost any other form of transportation, their ability to land and takeoff vertically, to hover, and to use relatively small unprepared landing sites allows helicopters to serve unique markets that no other vehicle can serve as effectively. Consequently, helicopters need access to landing sites (either heliports or unprepared landing sites) very close to the operator's origin and destination in order to maximize their key operational advantage – VTOL capability.

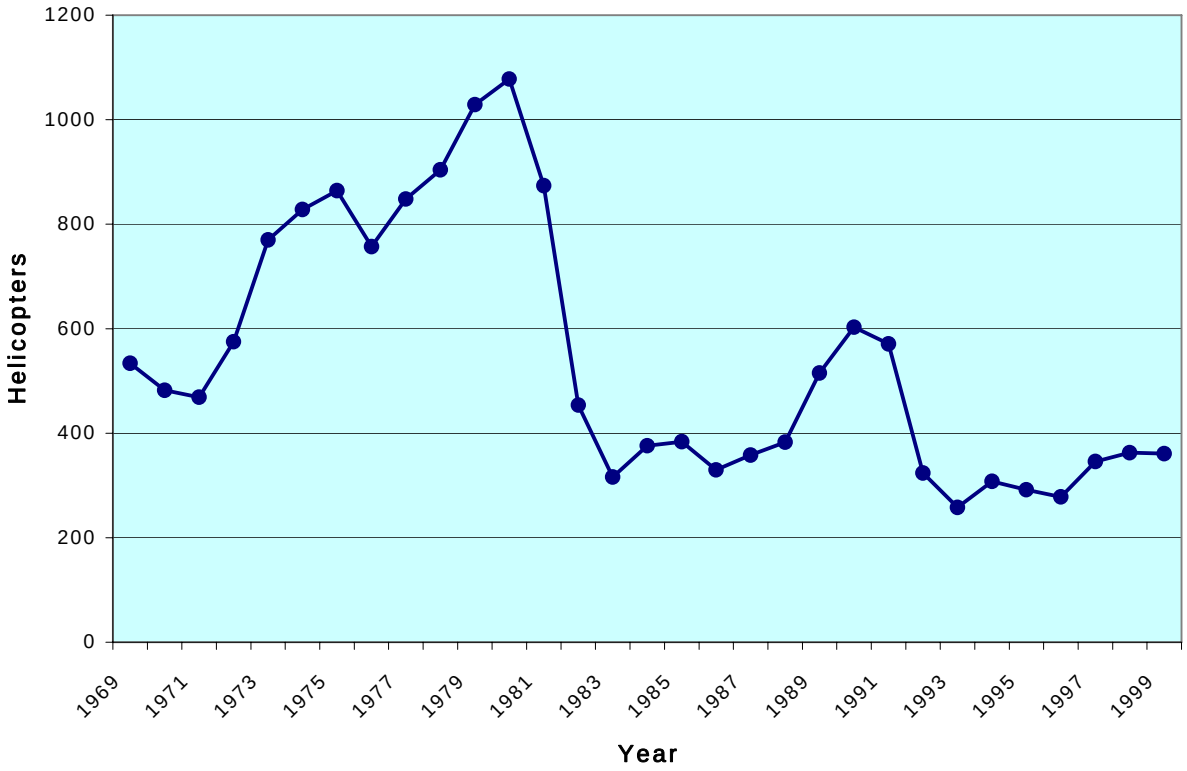
However, even with the advances made in rotorcraft technology, capability, and reliability, helicopters are still very complex vehicles, which is one reason that they are among the most expensive in terms of costs per-seat-mile. Although the terms helicopters and rotorcraft are used almost interchangeably, they have different meanings. Rotorcraft is a broad category that includes all "heavier-than-air aircraft that depend principally for support in flight on the lift generated by one of more rotors."

The term rotorcraft, therefore, includes both helicopters and gyroplanes, although there are few gyroplanes in operation. Other types of vertical takeoff and landing aircraft, such as tilt-rotors, and military airplanes such as the Marine Corps AV-8B Harrier, are classified as powered-lift aircraft by the FAA and require separate aircraft and airman certification before they could enter civilian operation.

In the late 1940s and through the 1950s, civilian helicopters served primarily as utility vehicles, and their missions included search and rescue, emergency medical services, law enforcement, construction support/external lift, pipeline patrol, aerial photography, agricultural spraying and herd control, as well as off-shore energy exploration support. It was in that last role that helicopters saw their fastest growth in the civilian market, particularly in the Gulf Coast region (Texas and Louisiana), Alaska, as well as in the North Sea (from Norway and Scotland).

In terms of growth in civilian helicopters, deliveries of helicopters fluctuated in a very similar manner with the overall general aviation (GA) aircraft market, as shown in Figure 2-3. Similar to the general aviation fleet as a whole, helicopter deliveries peaked in the late 1970s (almost 1,100 units delivered in 1980), and then declined rapidly in the early 1980s. After another peak was experienced in the early 1990s, helicopter deliveries have remained relatively steady since 1992, averaging between 250 - 350 units per year (source: FAA Statistical Handbook of Aviation).

Figure 2-3 Civil Helicopter Deliveries (U.S.)

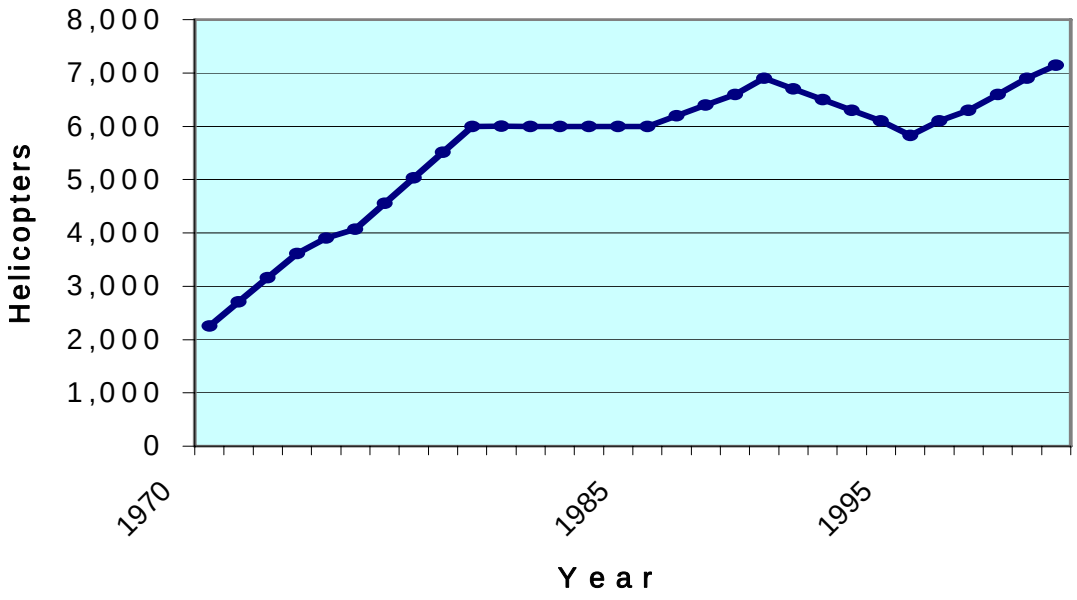


Since 1980, the ratio of helicopters to the general aviation fleet in the U.S. has fluctuated within a narrow range, averaging approximately 3 percent of the GA fleet (see Table 2-1). The total number of active helicopters has fluctuated between 6,000 and 7,000 units since 1986 (see Figure 2-4), although the last six years have seen an increase in active helicopters in the U.S., in part stimulated by the rapidly expanding economy.

Table 2-1 Percentage of Helicopters to Total General Aviation Fleet

Year	1980	1985	1990	1995	2000
Percent	2.8%	3.0%	3.5%	3.1%	3.3%

Figure 2-4 Active Civil Helicopters (U.S.)



2.2 Landing Sites And Support Facilities

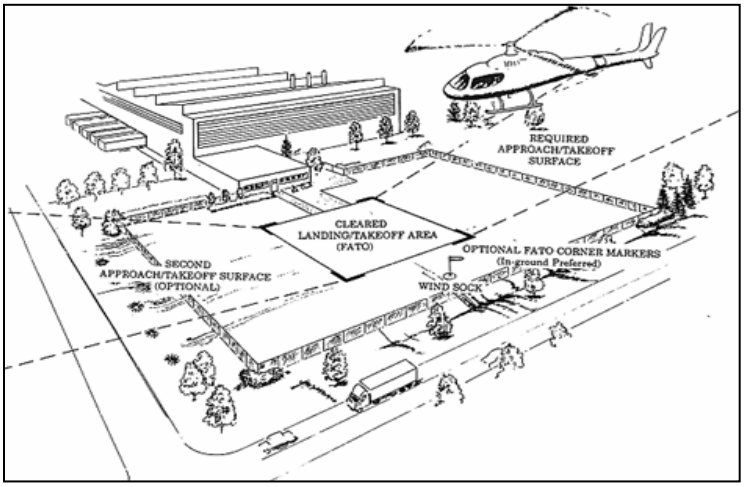
A key feature of their versatility, helicopters can land in virtually any open space, both ground level and rooftop, on unprepared sites, airports, and heliports. Federal Aviation Regulation (FAR) Part 157 requires all persons to notify the FAA at least 90 days before any construction, alteration, activation, deactivation, or change to the status or use of a civil or joint-use (civil/military) airport (the term "airport" also means any landing or takeoff area such as airport, heliport, helistop, vertiport, glider port, seaplane base, etc.). Notification is provided by submitting FAA Form 7480-1, *Notice of Landing Area Proposal*. Notification of FAA is not required for the establishment of a temporary airport (or heliport) at which operations will be conducted under visual flight rules (VFR), and which will be used for less than 30 days with no more than 10 operations per day. Notice is also not required for the intermittent use of a site that is not an established heliport, which is used for less than one year and at which flight operations will be conducted only under VFR. Intermittent

use means the use of the site for no more than 3 days in any one-week and for no more than 10 operations per day.

FAA defined four different types of landing sites for helicopters in Advisory Circular (AC) 150/5390-2B, as summarized below. The heliport figures are also presented in FAA AC 150/5390-2B.

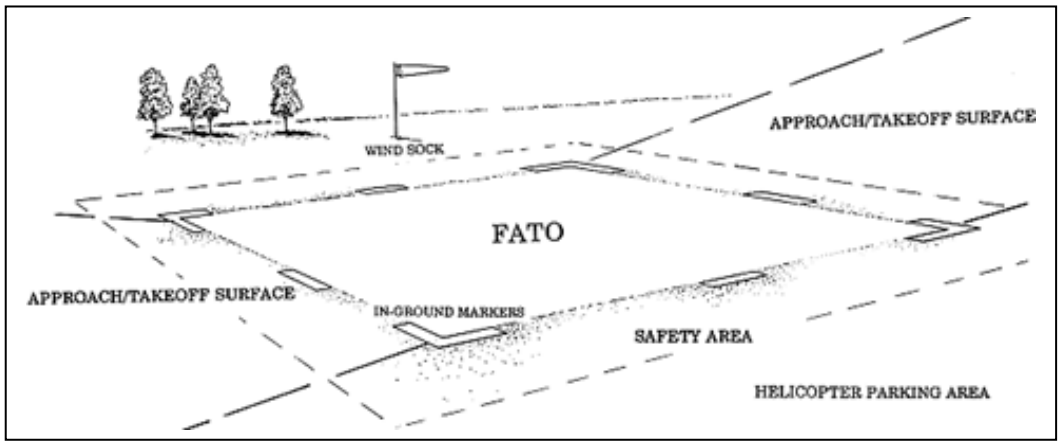
Private-use heliports are owned by individuals, corporations, and government agencies that can control heliport access. Generally, a private-use heliport is used by a single pilot, or a small number of pilots, who are familiar with the heliport and any physical or operating limitations (by definition, "private-use" means that access to the heliport is limited to the owner and only those who are allowed to operate there on a prior permission basis). For this reason, private-use heliports can be designed to more flexible standards. An example of a private use heliport is provided in Figure 2-5.

Figure 2-5 Private-Use Heliport Located at an Office Park



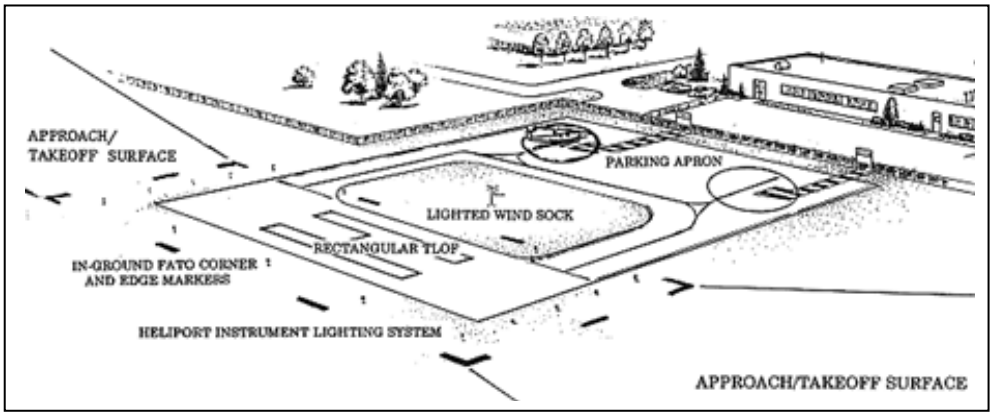
Public-use general aviation helistops/heliports are normally publicly owned, although they can also be privately-owned. As public-use facilities, they can be used by any qualified pilot (without prior permission). Therefore, the recommended dimensions and clearances are more demanding than for private-use heliports. Figure 2-6 presents an example of a public-use helistop/heliport.

Figure 2-6 Public-Use Helistop/Heliport



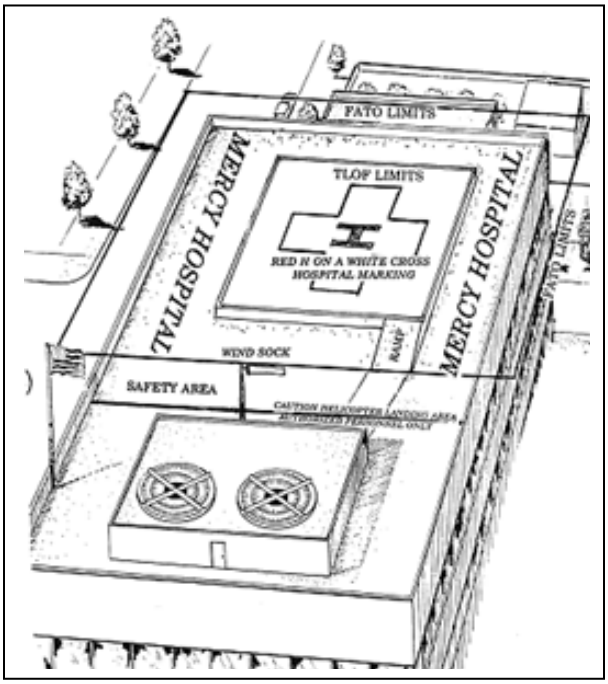
Transport heliports are developed to provide the community with a full range of vertical flight services including scheduled service by air carriers (airlines) using helicopters. Figure 2-7 presents an example of a transport heliport. When the heliport serves any scheduled or unscheduled passenger operation of an air carrier that is conducted with an aircraft having a seating capacity of more than 19 passengers, the heliport is required to be certificated by the FAA in accordance with Federal Aviation Regulation Part 139, Certification and Operations: Land Airports Serving Certain Air Carriers. A transport heliport would also accommodate corporate users and local air taxi operators. This broad spectrum of activities frequently requires a more extensive airside and landside infrastructure with the potential capability to operate in instrument meteorological conditions. Not withstanding these requirements, a community's investment in a heliport may be substantially less than the investment required for an airport providing comparable services.

Figure 2-7 Transport Public-Use Heliport



Hospital heliports are typically treated as "special cases" of private-use facilities by the FAA because they provide a unique public service. Most states require hospitals to have helipads in order to obtain certification as a Level 1 trauma facility. The helipad is normally located in proximity to the hospital emergency room, and can be either rooftop or ground level. Figure 2-8 shows an example of a hospital heliport.

Figure 2-8 Hospital Heliport/Helipad (Rooftop Facility)



The existing heliports in the study area are generally small (100' x 100' or less), some of which are paved and some turf, some ground level and some on rooftops, although most have few services or facilities available (such as terminal buildings, fuel, lighting for night operations, etc.), and are usually unattended. As a result, airports typically provide support services and facilities for helicopters such as fuel, maintenance, hangar storage, terminal building, etc. that are not found at most heliports.

2.2.1 Landing Sites in Maryland

A review of FAA, MAA, and Helicopter Association International (HAI) records of approved helicopter landing facilities revealed several discrepancies. Telephone interviews and surveys were used to address the discrepancies between the three sources. It was determined that the State of Maryland had 50 officially listed active heliports in 2002, as well as 33 public-use airports

that also support rotorcraft operations. Figure 2-9 and Figure 2-10 show these facilities as well as those within Metropolitan Washington.

The current landing facilities, excluding airports, vary by type and use as described in Table 2-2. Medical use/hospital landing facilities make up the largest share with 54 percent (27 out of 50) of total heliports. Private (or corporate) heliports represent 30 percent (15 out of 50), while government and military facilities make up 16 percent (8 out of 50) of heliport facilities. There are no public-use or transport heliports in the State of Maryland, although a number of airports, such as Baltimore/Washington International (BWI) and Martin State, essentially serve the role as transport heliports.

Table 2-2 Maryland Heliports and Airports by Type (2002)

Facility	Private/Corp	Government	Military	Medical	Public-Use	Total
Heliport	15	5	3	27	0	50
Airport	0	0	4	0	32*	36
Total	15	5	7	27	32	86

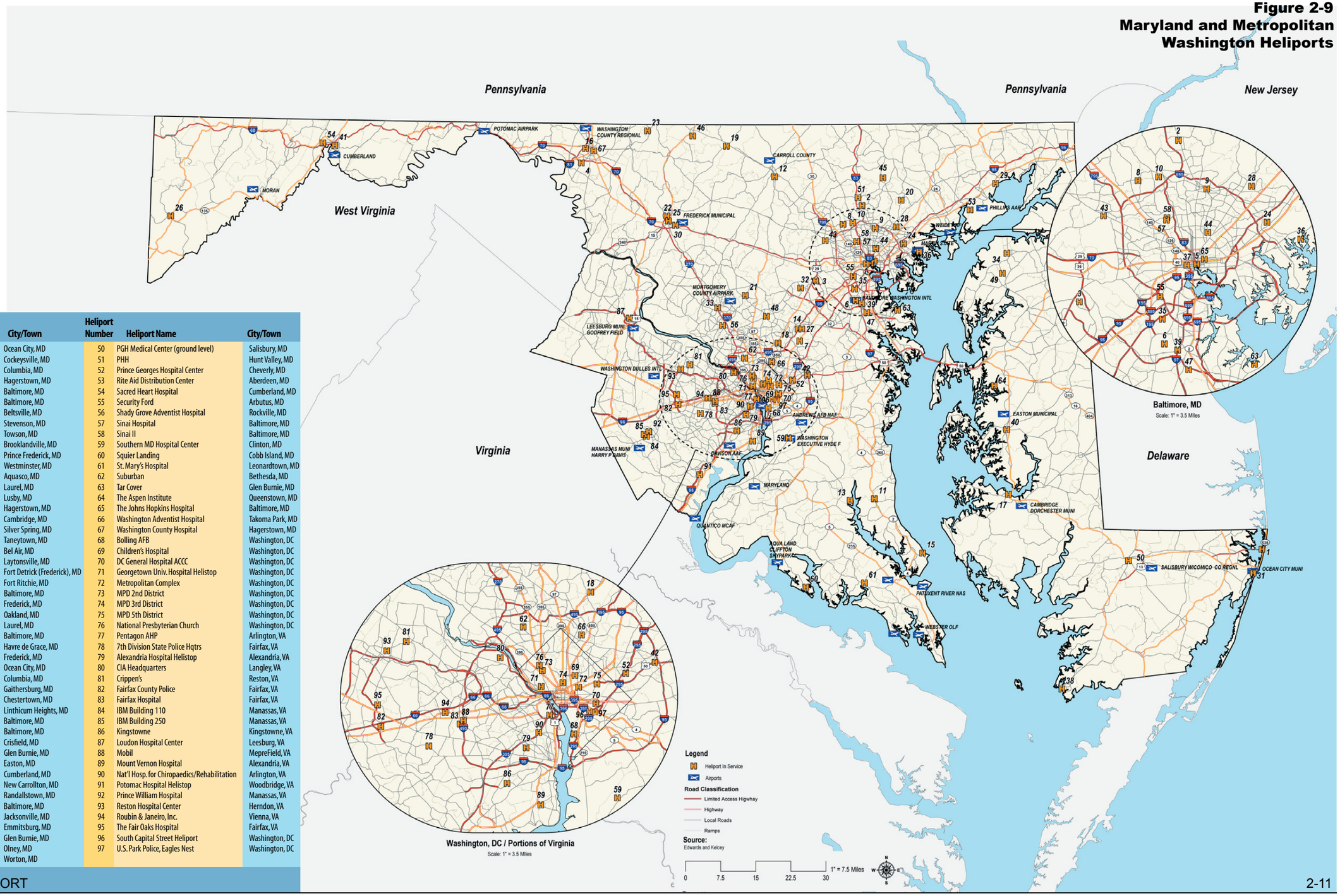
Source: EK Analysis of FAA, MAA, and HAI records
* Excludes Essex Airpark

The Code of Maryland Regulations (COMAR), Title 11 *Department of Transportation*, Subtitle 03 *Maryland Aviation Administration*, Chapter 04 *Aeronautical Regulations*, prescribes the State's requirements for airport and heliport registration and design standards. Under paragraph .07 *Airports: License*, I. *Minimum Standards: Public-Use or Commercial-Use Heliport*, it states: "To promote uniform heliport standards, every licensed heliport shall substantially comply with the appropriate recommendations in the "Heliport Design FAA Advisory Circular 150/5390-2B."

Paragraph .04 *Aircraft Operation* notes that aircraft (including helicopters) may not be operated commercially (such as air taxi/charter flights conducted under FAR Part 135, for example) from any public property owned or controlled by the State unless the landing area has been approved by the MAA. With regards to non-commercial operations (i.e. conducted under FAR Part 91), aircraft may not operate from state land unless prior approval is obtained from the MAA. In addition, non-commercial operations from any other publicly-owned property requires prior approval from the political subdivision owning or controlling the land.

Figure 2-9
Maryland and Metropolitan Washington Heliports

Heliport Number	Heliport Name	City/Town
1	65th Street	Ocean City, MD
2	AAI	Cockeysville, MD
3	Aerospace Tech Center	Columbia, MD
4	Allegheny Power-HGR Corp. Center	Hagerstown, MD
5	Baltimore Police Department	Baltimore, MD
6	Baltimore/Washington Intl. Airport	Baltimore, MD
7	Beltsville Shop	Beltsville, MD
8	Berg's Field	Stevenson, MD
9	Black & Decker-parking lot 2	Towson, MD
10	Brooklandville	Brooklandville, MD
11	Calvert Memorial Hospital	Prince Frederick, MD
12	Carroll County General Hospital	Westminster, MD
13	Chalk Point Generating Station	Aquasco, MD
14	Citizens Bank Headquarters	Laurel, MD
15	Clng Cove Point	Lusby, MD
16	Craig Company	Hagerstown, MD
17	Dorchester General Hospital	Cambridge, MD
18	Dow Jones & Co.	Silver Spring, MD
19	Evapco	Taneytown, MD
20	Fallston General Hospital	Bel Air, MD
21	Federal Support Center	Laytonsville, MD
22	Fort Detrick Helipad	Fort Detrick (Frederick), MD
23	Fort Ritchie	Fort Ritchie, MD
24	Franklin Square Hospital Center	Baltimore, MD
25	Frederick Memorial Hospital	Frederick, MD
26	Garrett County Memorial Hospital	Oakland, MD
27	Greater Laurel Beltsville Hospital	Laurel, MD
28	Green Terrace	Baltimore, MD
29	Gregory May	Havre de Grace, MD
30	Grimes Properties	Frederick, MD
31	Hoopers	Ocean City, MD
32	Howard County General Hospital	Columbia, MD
33	IBM	Gaithersburg, MD
34	Kent & Queen Anne's Hospital	Chestertown, MD
35	Maritime Institute	Linthicum Heights, MD
36	Martin State Airport	Baltimore, MD
37	Maryland Institute for Emergency Medical	Baltimore, MD
38	McCready Memorial Hospital	Crisfield, MD
39	MD State Police Barracks (Glen Burnie)	Glen Burnie, MD
40	Memorial Hospital	Easton, MD
41	Memorial Hospital of Cumberland	Cumberland, MD
42	Metroplex	New Carrollton, MD
43	Mitchell	Randallstown, MD
44	Montebello Filtration Plant	Baltimore, MD
45	Mrs. Bozman	Jacksonville, MD
46	National Emergency Training Center	Emmitsburg, MD
47	North Arundel Hospital	Glen Burnie, MD
48	Norwood	Olney, MD
49	Nuodex, Inc.	Worton, MD
50	PGH Medical Center (ground level)	Salisbury, MD
51	PHH	Hunt Valley, MD
52	Prince Georges Hospital Center	Cheverly, MD
53	Rite Aid Distribution Center	Aberdeen, MD
54	Sacred Heart Hospital	Cumberland, MD
55	Security Ford	Arbutus, MD
56	Shady Grove Adventist Hospital	Rockville, MD
57	Sinai Hospital	Baltimore, MD
58	Sinai II	Baltimore, MD
59	Southern MD Hospital Center	Clinton, MD
60	Squier Landing	Cobb Island, MD
61	St. Mary's Hospital	Leonardtown, MD
62	Suburban	Bethesda, MD
63	Tar Cover	Glen Burnie, MD
64	The Aspen Institute	Queenstown, MD
65	The Johns Hopkins Hospital	Baltimore, MD
66	Washington Adventist Hospital	Takoma Park, MD
67	Washington County Hospital	Hagerstown, MD
68	Bolling AFB	Washington, DC
69	Children's Hospital	Washington, DC
70	DC General Hospital ACCC	Washington, DC
71	Georgetown Univ. Hospital Helistop	Washington, DC
72	Metropolitan Complex	Washington, DC
73	MPD 2nd District	Washington, DC
74	MPD 3rd District	Washington, DC
75	MPD 5th District	Washington, DC
76	National Presbyterian Church	Washington, DC
77	Pentagon AHP	Arlington, VA
78	7th Division State Police Hqtrs	Fairfax, VA
79	Alexandria Hospital Helistop	Alexandria, VA
80	CIA Headquarters	Langley, VA
81	Crippen's	Reston, VA
82	Fairfax County Police	Fairfax, VA
83	Fairfax Hospital	Fairfax, VA
84	IBM Building 110	Manassas, VA
85	IBM Building 250	Manassas, VA
86	Kingstowne	Kingstowne, VA
87	Loudon Hospital Center	Leesburg, VA
88	Mobil	MepreField, VA
89	Mount Vernon Hospital	Alexandria, VA
90	Nat'l Hosp. for Chiropaedics/Rehabilitation	Arlington, VA
91	Potomac Hospital Helistop	Woodbridge, VA
92	Prince William Hospital	Manassas, VA
93	Reston Hospital Center	Herndon, VA
94	Roubin & Janeiro, Inc.	Vienna, VA
95	The Fair Oaks Hospital	Fairfax, VA
96	South Capital Street Heliport	Washington, DC
97	U.S. Park Police, Eagles Nest	Washington, DC



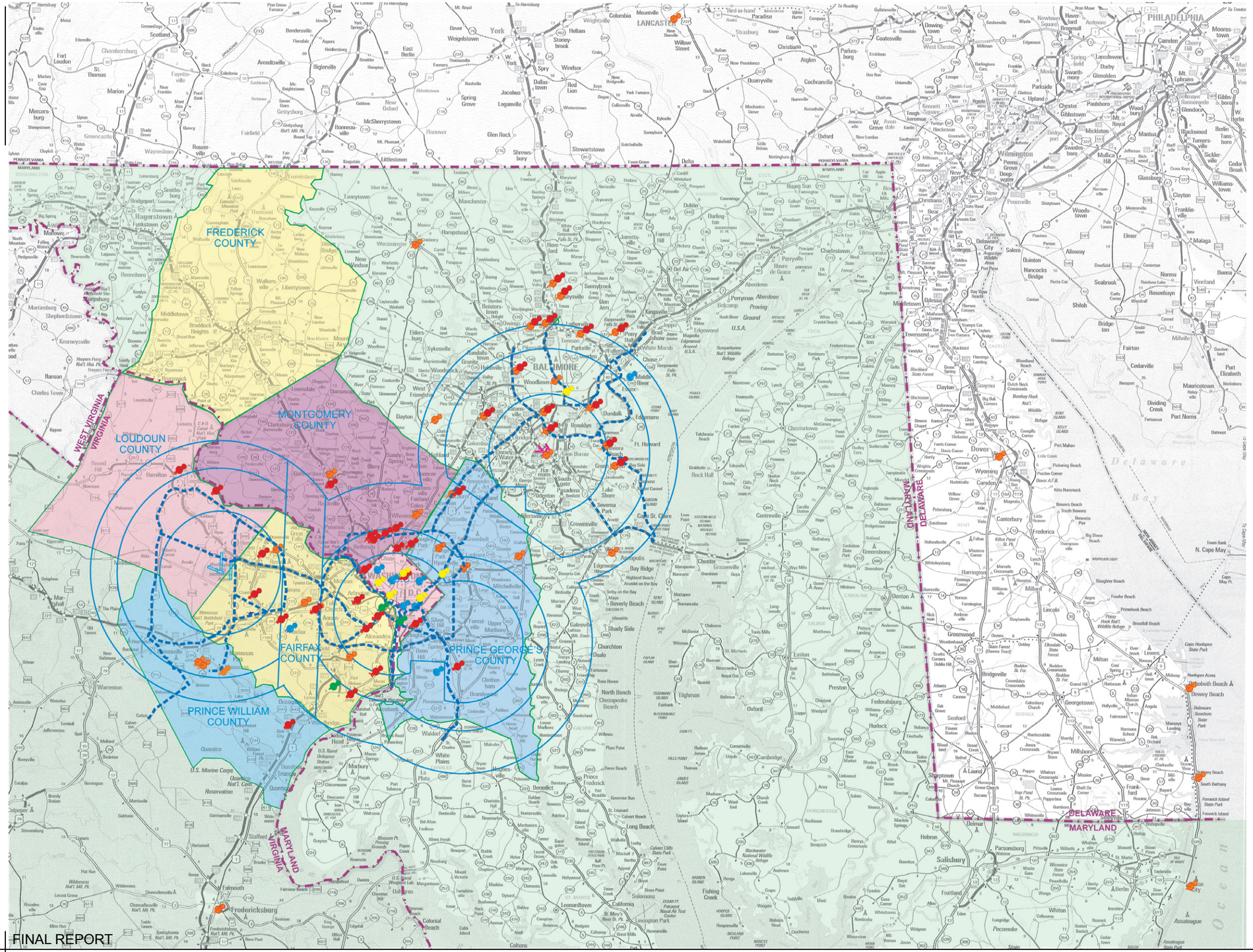


Figure 2-10
Existing Helicopter and Major Helicopter Routes

Legend

- Helicopter Route
- State Boundary
- County Boundary

Heliport Identifiers

- Corporate
- Law Enforcement
- Hospital
- Trauma Center
- Military

Source: Edwards and Kelcey

Paragraph .06 *Airport* states "A person may not operate an airport (including a licensed heliport) without land use approval from the local governing body if that body has an airport (heliport) zoning ordinance." In addition, an airport (heliport) may not be licensed or registered without airspace approval by the FAA.

Public-use is defined as having access to a facility without the need for prior permission. As noted above, the large majority of heliports in Maryland are privately-owned/private-use facilities, and are not available without prior permission, which is consistent with the high percentage of medical, military, and government heliports in the State. However, at least four owners of private facilities indicated that they would allow "public-use" of their heliports with prior permission. Typically, private heliport owners require other users to have minimum insurance limits, hold the heliport owner harmless from any claims in case of an accident, and demonstrate that the transient users are familiar with the ingress and egress routes and operating procedures.

As a result, there are a number of heliports that are not registered with either the FAA or MAA. Because of their VTOL capability, helicopters can use unprepared landing sites (such as open fields, for example) or locations such as parking lots, etc. Emergency medical service (EMS) helicopters often need access to unprepared landing sites to pick up accident victims.

Interviews conducted with helicopter operators throughout the State indicated that they are "proactive" in finding landing sites to meet the needs of their customers. When no convenient heliport or airport is available where the operator would like to land and take off, the operators will identify open areas, and then contact the property owners and request permission to land. One helicopter operator indicated that up to 35 percent of all of their operations use such unofficial landing sites. However, some communities restrict and even prohibit landing and taking off from unlicensed sites, which can be stipulated in their zoning ordinance.

2.2.2 Helicopter Operators in Maryland

Helicopter operators fall into three broad categories: public agencies, private companies, and individuals. Almost all operators in the State of Maryland are divided between public agencies and private companies, with public agencies operating the majority of helicopters in the region. The largest public agency operators include several branches of the military (U.S. Air Force, Army, and Navy), as well as the Maryland State Police (MSP). In addition, there are a number of municipal, county, and federal police agencies in the region that also operate helicopters.

Existing helicopter operators in Maryland include:

- Maryland Army National Guard, Edgewood Army Airfield
- Maryland State Police, Martin State Airport
- America Rising/Glenwood Aviation, Tipton Airport
- CVC Helicopters, Inc., Darlington
- Helicopter High, Inc., Martin State Airport
- Baltimore County Police Aviation, Martin State Airport
- Advanced Helicopters, Frederick Airport
- Anne Arundel County Police, Tipton Airport
- Prince George's County Police Department, Washington Executive
- Stat Medevac, Martin State Airport
- Baltimore City Police, Martin State Airport
- Whirlwind Aviation, Inc., Frederick Airport
- MedStar Aviation, Easton, Fredrick, Indian Head, and Tipton Airports

As noted previously, the military have operated helicopters in the region since their earliest development, and they continue to maintain a strong presence in the study area. The U.S. Air Force 89th Air Lift Wing at Andrews Air Force Base, the Maryland Army National Guard's 29th Aviation Brigade at the Aberdeen Proving Grounds, and the Patuxent River Naval Air Station (Naval Air Warfare Center – Aircraft Division, and the Air Test and Evaluation Squadron One (VX-1) all operate helicopters in the study area.

Among the larger private companies that operate helicopters in the region are America Rising/Glenwood Aviation, Advanced Helicopters, and Helicopter High. Most of the private operators provide a variety of helicopter services such as charter/air taxi, flight training, aerial observation/ photography/filming, power line/pipeline patrol, etc. Some operators have FAR Part 135 certificates from FAA to provide on-demand air taxi services, as well as FAR Part 141 certificates for flight training. There are very few individual/private helicopter operators in the study area.

America Rising has announced plans to start a scheduled shuttle service between Washington, DC (South Capitol Street Heliport) and New York City (Manhattan) using EH-101 helicopters in the near future. Pending appropriate government approvals, the service will provide 12 round trips daily between the two cities, and will become the only scheduled helicopter airline in the U.S.

The Maryland State Police operates a fleet of 12 specially equipped EC-365N turbine-powered helicopters that serve a variety of missions including law enforcement, medevac, and search and

rescue. The MSP program has served as a model for a number of other states, counties, and large municipalities with respect to setting up a public-service helicopter network. The MSP operates from eight bases throughout the state (see Table 2-3), and they also work closely with the United States Park Police, which maintains two helicopters based at the "Eagles Nest" at Anacostia Park in Washington, DC.

Table 2-3 Maryland State Police (MSP) Helicopter Hangar/Facilities

MSP Aviation Section	Hangar Location
1. Baltimore	Martin State Airport (Baltimore County)
2. Washington	Andrews AFB (Prince George's County)
3. Frederick	Frederick City Airport (Frederick County)
4. Salisbury	Salisbury-Ocean City Airport (Wicomico County)
5. Cumberland	Cumberland Regional Airport (Mineral County, WV)
6. Centerville	MSP Barrack "S" (Queen Anne's County)
7. South Maryland	St. Mary's Airport (St. Mary's County)
8. Norwood	Next to Montgomery County Park Police Special Operations Headquarters (Norwood Road and Ednor Road)

In terms of emergency medical evacuations (medevac), MSP typically transports patients to one of ten trauma-receiving facilities. MSP's web site noted:

> "The hospital to which we transport is generally dictated by our protocol. We will typically transport patients to the closest hospital that is appropriate for their injuries. For example, pediatric trauma patients are usually transported to either Johns Hopkins Hospital or Children's National Medical Center, head injuries are generally transported to Shock Trauma, and burns are typically treated at Johns Hopkins Bayview Medical Center or MedStar."

- University of Maryland Shock Trauma Center (Baltimore City)
- Children's National Medical Center (Washington, DC)
- Cumberland Memorial Hospital (Cumberland, Allegany County)
- Johns Hopkins Bayview Medical Center (Baltimore City)
- Johns Hopkins Hospital (Baltimore City)

- Peninsula Regional Medical Center (Salisbury, Wicomico County)
- Prince George's General Hospital (Cheverly, Prince George's County)
- Suburban Hospital (Bethesda, Montgomery County)
- Washington County Hospital (Hagerstown, Washington County)
- Washington Hospital Center - MedStar (Washington, DC)

2.2.3 Landing Sites In Metropolitan Washington

The Metropolitan Washington Council of Governments (COG) Region currently has 48 active heliports, as well as 14 public-use airports and two military airports that support rotorcraft operations. The heliports are listed in Appendix B and are shown on Figure 2-9 and Figure 2-10. The initial heliport information was gathered from the FAA Airport Master Record Form 5010 and HAI records. In order to verify the data, a survey form was mailed out, and 14 completed questionnaires were returned. Information was also collected from other heliport owners by phone and site visits.

The heliports in the region vary by type and use. Medical use landing facilities make up the largest share of heliports with 46 percent (22 out of 48). Private and corporate heliports make up 25 percent (12 out of 48), while government and military facilities make up 27 percent (13 out of 48) of heliport facilities.

One public-use heliport is located in the District of Columbia (South Capitol Street), but has been unavailable to non-military and non-police operations since September 11, 2001. The South Capitol Street Heliport is a public-use facility operated by Air Pegasus, located at 1724 South Capitol Street SE, near the Anacostia River in the Buzzard Point section of South East Washington DC, between the Metropolitan Police Department 1st District repair station and the U.S. Coast Guard Headquarters. It is also close to the U.S. Park Police heliport located on the River. Public-use at the South Capitol Street heliport has been severely limited due to the flight restrictions imposed over the District.

The number of facilities presented in Table 2-4 is not an exhaustive list of all landing sites. As noted in Section 2.2.3, survey results and interviews indicated that helicopter operators are very proactive in finding landing sites to meet the needs of their customers, and will utilize “open areas” if available, although utilization of unprepared landing sites does not appear to be as common within the District of Columbia as it is in less urbanized parts of the study area.

Although the military do not operate a large number of heliports in the region, in part because they operate from airports such as Davison Airfield and Andrews Air Force Base, they do generate a large percentage of total helicopter operations in the area.

Table 2-4 Metropolitan Washington Heliports by Type (2002)

Facility	Private/Corp	Government	Military	Medical	Public-Use	Total
Heliport	12	10	3	22	1	48
Airport	0	0	2	0	14	16
Total	12	10	5	22	15	64

Most of the heliports in the Metropolitan Washington Region are private-use facilities and are not available to the public, which is consistent with the high percentage of medical, military, and government-owned facilities. However, private and corporate facilities offer some limited opportunities for public-use, and three of the facility owners surveyed indicated that they would allow public-use of their heliport on a prior-permission basis.

With the implementation of the temporary flight restrictions (TFR) since September 11, 2001, almost all corporate, electronic news, aerial filming, and utility helicopter activity has been restricted from operating in the District of Columbia, as well as from using Reagan Washington National Airport. All current civilian helicopter activity over the District (including police and emergency medical services) requires prior permission from FAA and the appropriate security agencies.

The existing heliports in Metropolitan Washington are shown on Figure 2-9 and Figure 2-10.

In the previous COG study: “Helicopter System Inventory and Vertiport Feasibility Study for Metropolitan Washington”, published in July, 1992, the report concluded that there were approximately 35 helicopter operators in the region. Four of the five largest operators were military units. In addition, there were approximately 140 helicopters based in the region, 60 percent of which were military, 29 percent private/corporate, and 11 percent public service.

Helicopter activity in the region has not increased as fast as projected, and as of 2002 it is estimated that there are 15 helicopter operators with 41 based helicopters in the region, almost 50 percent of which are operated by the military. It is estimated that the 41 helicopters generated almost 109,000 annual operations (takeoffs and landings), which is considerably less than was originally projected for this time period.

2.2.4 Helicopter Operators in Metropolitan Washington

The Metropolitan Washington Region also has a wide variety of helicopter operators. As with Maryland, the operators range from private corporations to public agencies.

The major helicopter operators in the Metropolitan Washington Region are listed below. As noted previously, government agencies (the military and various police departments in particular) are the largest helicopter operators in the Metropolitan Washington Region. Among the largest helicopter operator is the 89th Air Lift Wing at Andrews Air Force Base.

Existing helicopters operators in Metropolitan Washington include:

- CVC Helicopter Inc., Darlington MD
- Helicopter High
- U.S. Park Police, District of Columbia
- Metropolitan Police Department, South Capitol Street Heliport
- HeloAir, Sandston VA
- US Air Force - 89th Airlift Wing, Andrews AFB
- Anne Arundel County Police, Tipton Airport
- Prince George's County Police Department, Washington Executive Airport
- Bechtel Nevada, Andrews AFB
- Inova Hospital, Fairfax County Hospital
- AOL/Time Warner, Dulles International Airport
- Fairfax County Police Department, Fairfax VA
- Capitol Helicopter, Fairfax Heliport
- U.S. Army 12th Aviation Battalion
- WASHINGTON, DC National Guard

As noted in the web site for Andrews Air Force Base: “The Wing traces its roots to October 1, 1948, when the 1254th Air Transport Wing was established at Washington National Airport.” However, special mission or VIP flying began even earlier. The first truly "special mission" aircraft were specifically designated to transport high-ranking government officials in 1936 with the activation of the 1st and 2nd Staff Squadrons at Bolling AFB, WASHINGTON, DC

In 1961, the 1254th Air Transport Wing was moved from Washington National Airport to Andrews AFB where it was discontinued in January 1966. In its place, the 89th Military Airlift Wing Special Missions was activated and assigned to Andrews AFB until the wing became a group on September 30, 1977. In December, 1980, the unit was once again re-designated the 89 MAW. On

July 12, 1991, the 89 MAW merged with the 1776th Air Base Wing to become the 89th Airlift Wing. The airlift wing is an Air Mobility Command asset directly assigned to 21st Air Force, headquartered at McGuire AFB, N.J. In addition to the fixed-wing aircraft (such as the B-747 and the B-757) that they operate, the Wing also operates 20 Bell UH-1N helicopters.

In addition, the Army National Guard and the Navy also operate from Andrews Air Force Base. Marine One, the Presidential helicopter, is operated by Helicopter Marine Squadron One (HMX-1), which is based at Quantico Marine Station. HMX-1 was established in December 1947 as an experimental unit to test and evaluate helicopters and tactics. The squadron provides all helicopter transportation for the President, both overseas and within the continental United States. In addition, HMX-1 provides helicopter transportation for the Vice President, members of the President's Cabinet, and foreign dignitaries as directed by the White House Military Office. HMX-1 also provides helicopter emergency evacuation and other support as directed by the Commandant of the Marine Corps. Marine One is the call sign used when the President is on board of one of the HMX-1 Marine helicopters. The primary presidential helicopter is the Sikorsky VH-3D (Sea King). HMX-1 is also tasked with the Operational Test and Evaluation of U.S. Marine Corps assault helicopters and related equipment.

Davison Army Airfield is 15 miles southwest of Washington at Fort Belvoir, Virginia. It was named in honor of Brig. Gen. Donald A. Davison, noted aviation engineer during World War II. It became part of Fort Belvoir's Engineer School on September 2, 1952. Less than two years later, Aug. 1, 1954, it was reassigned to the U.S. Army Military District of Washington (MDW). It has remained a subordinate installation of MDW ever since.

From 1957 to 1976, Davison provided presidential helicopter support, with the command's Executive Flight Detachment flying missions supporting Presidents Eisenhower, Kennedy, Johnson, Nixon and Ford. This mission was transferred entirely to the Marine Corps in July 1976.

MDW's aviation-support unit, the 12th Aviation Battalion is stationed at Davison Airfield. It is made up of three helicopter companies, a helicopter-maintenance company, base operations and Headquarters Company. The battalion operates UH60 helicopters in support of training and contingencies for the 3rd U.S. Infantry (The Old Guard) and other MDW units. It also provides airlift to the highest level of the Army and DoD.

District of Columbia Army National Guard Aviation Unit is also based at Davison Airfield providing a variety of helicopter missions, including the 148th Medical Detachment (provides aeromedical evacuation and support); the 132nd AVN (performing command, control, and communications

flights and limited air movement flights); and RAID (providing drug interdiction and aerial reconnaissance support).

In addition to the military, several police departments base and fly helicopters in the area, including the Metropolitan Police Department, the U.S. Park Police, Fairfax County Police, Prince George's County Police Department, and the Anne Arundel County Police Department. Combined, the police departments operate a total of eight helicopters.

2.3 Existing Based Helicopters and Activity

There is no single source of data for based helicopters or helicopter operations (takeoffs and landings). Even at towered airports, air traffic control personnel count helicopter operations as "general aviation," so there is no database of helicopter activity (operations) on a local or statewide level. Although owners are required to register their helicopters with the FAA, registration data only shows the owner's address, not where the helicopter is actually based and operating. Therefore, a survey was developed to estimate the number of based helicopters and operations occurring in Maryland and the Metropolitan Washington Region. Sixteen of the 18 surveys mailed out (89 percent) were completed and returned. In addition, follow-up phone calls were made and meetings were held with various operators and with the Helicopter Association International based in Virginia.

2.3.1 Based Helicopters in Maryland

Although airports in Maryland are required by state law to "maintain a roster of all aircraft based at that airport," a number of sources were used to collect data, including a survey of helicopter operators. A mail and telephone survey of rotorcraft operators was conducted to identify how many and what type of helicopters are operated in Maryland (see Table 2-5). In addition, data maintained by HAI, as well as MAA and FAA, were reviewed to supplement the survey results. The existing helicopter operators in Maryland are listed in Table 2-6.

Table 2-5 Helicopters Based in Maryland (2002)

Type of Helicopter	Number	Percent
Civilian	43	62%
Military	26	38%
Total	69	100%
Piston	9	13%
Single Turbine	29	42%
Twin Turbine	31	45%
Total	69	100%

Source: Edwards and Kelcey, Inc.

Table 2-6 Helicopter Operators - Maryland

Operator	Base	Helicopter	Number
Advanced Helicopters	Frederick Municipal Airport	R-22, Bell Jet Ranger	7
Anne Arundel County Police	Tipton Airport	Bell OH-58	2
Baltimore City Police	Martin State Airport	EC-120	1
Baltimore County Police Aviation	Martin State Airport	Bell 206	3
America Rising/Glenwood Aviation	Tipton Airport	A-109, B-206	5
Helicopter High Inc.	Martin State Airport	R-22, R-24, B-206	5
MedStar Aviation	Easton, Fredrick, Indian Head & Tipton Airports	EC 135 (3) BK-117	4
MANG - 29th Aviation Brigade	Edgewood	UH-1H, UH-60, OH-58	26
Maryland State Police (MSP)	Martin State Airport	AS-365N II	12
Stat Medevac	Martin State Airport	BK-117	1
Whirlwind Aviation Inc.	Frederick Municipal Airport	AS-365, S-76	3
		Total	69

Source: Edwards and Kelcey, Inc.

By comparison, FAA's Airport Master Record Form 5010 lists 61 military and civilian helicopters based in Maryland. The data, however, does not breakdown the total number by type, and is based largely on registration data, not current surveys of operators. According to FAA data, there

are 21 helicopters (34 percent) based at Martin State Airport, 13 helicopters (21 percent) at Capt. W.F. Duke Regional Airport in Leonardtown, 12 helicopters (20 percent) at Frederick Airport, and 11 helicopters (18 percent) at Hagerstown Regional Airport. Ninety three percent of the helicopters based in Maryland are based at these four airports.

2.3.2 Based Helicopters in Metropolitan Washington

Based on a variety of sources, including the mail-out survey conducted for this study, the number of helicopters operated in the Metropolitan Washington Region, and their type, are shown in Table 2-7.

Table 2-7 Helicopters Based in Metropolitan Washington (2002)

Type of Helicopter	Number	Percent
Civilian	19	27%
Military	52	73%
Total	71	100%
Piston	2	3%
Single Turbine	14	20%
Twin Turbine	55	77%
Total	71	100%

Source: Edwards and Kelcey, Inc.

Existing helicopter operators based within the Metropolitan Washington Region are listed below. As noted previously, some operators are also based in Maryland as listed in the previous section. Table 2-8 lists the current helicopter operators in Metropolitan Washington.

Table 2-8 Helicopter Operators - Metropolitan Washington

Operator	Base	Helicopters	Number
AOL/Time Warner	Dulles Int'l Airport	SK-76, Bell 430 & 407	3
Bechtel Nevada	Andrews AFB	Bell 412	1
Capitol Helicopter	Fairfax Heliport	Bell 407	2
CVC Helicopter Inc.	Darlington, MD	Schweizer 300C	1
Fairfax County Police Dept.	Fairfax, VA	Bell 407	1
HeloAir	Sandston VA	Bell 206 & 407, S-300C	5
Inova Hospital	Fairfax County Hospital	Bell 407	1
Metropolitan Police Dept.	South Capitol Street	AS 350 B3	1
Prince George's County Police	Wash. Executive Airport	MD 520N	2
US Air Force - 89th Airlift Wing	Andrews AFB	UH-1N	20
U.S. Park Police	District of Columbia	Bell 407	2
12th Aviation Battalion	Davison Airfield	UH-60	18
DC National Guard	Davison Airfield	UH-1H, UH-60, OH-58	14
		Total	71

Source: Edwards and Kelcey, Inc.

2.3.3 Helicopter Activity in Maryland and Metropolitan Washington

As noted previously, there is no single source of rotorcraft activity data available. Most helicopter activity occurs at uncontrolled heliports and non-towered airports, and even at airports with control towers (such as Martin State and BWI), helicopters are not counted separately. As a result, two sources of data are used to calculate levels of helicopter activity in the study area: FAA's national survey of general aviation pilots and the regional helicopter operator survey.

FAA conducts surveys of general aviation pilots every two years, and the results consistently indicate that helicopters have a high annual utilization rate (hours flown per year), particularly compared to most fixed-wing aircraft (see Table 2-9). High utilization is consistent with the need to amortize the relatively high cost of operating helicopters, and the survey results indicate that helicopters conduct a large number of takeoffs and landings (operations) within a limited region/radius of operation.

Table 2-9 Annual Utilization Rates

Helicopter/Aircraft Type	Average Hours Flown Per Year
Piston Helicopter	198
Single-Turbine Helicopter	377
Twin-Turbine Helicopter	509
All Turbine Helicopter	397
All Helicopters	322
Fixed-Wing Piston Aircraft	130
Fixed-Wing Turboprop Aircraft	352
All Fixed-Wing Aircraft	147

Source: FAA, General Aviation and Air Taxi Activity Survey, 2000

Although helicopters represent 3.3 percent of the total general aviation fleet, they generate 7.6 percent of the hours flown (see Table 2-10).

Table 2-10 U.S. General Aviation Aircraft

Aircraft Type	No. Aircraft	% of Total GA Aircraft	Hours Flown (millions)	% of Total GA
Helicopter Piston	2,700	1.2%	0.5	1.7%
Helicopter Turbine	4,450	2.1%	1.7	5.9%
Total Helicopters	7,150	3.3%	2.2	7.6%
Fixed-Wing Piston	169,000	78.2%	20.5	70.7%
Fixed-Wing Turbine	12,900	6.0%	4.7	16.2%
Total Fixed-Wing	181,900	84.2%	25.2	86.9%
Total GA Aircraft *	216,150	100%	29.0	100%

Source: FAA General Aviation and Air Taxi Activity Survey, 2000. *Includes experimental, balloons, and 'other' aircraft.

The annual hours flown by helicopters in the study area were calculated based on average utilization rates (hours flown per year) by type of helicopter. Annual operations were calculated based on an average of six takeoffs and landings (i.e., six operations, the equivalent of three trips) per flight hour, as noted in FAA's survey of general aviation pilots. The number of operations per hour is consistent with the short-haul trip characteristics of helicopters. Compared to fixed-wing

aircraft, helicopters conduct almost double the average number of operations (takeoffs and landings) per hour.

Estimates of current helicopter activity levels for Maryland and the Metropolitan Washington Region were calculated using these averages and the number of based helicopters in each area (Table 2-9 and Table 2-10). The helicopter operator survey results for Maryland correspond very closely to the results shown in Table 2-11.

Because of the high percentage of military helicopters in the Metropolitan Washington Region, it is difficult to accurately estimate the total level of helicopter activity conducted in the area (see Table 2-12). In addition, military helicopter activity can fluctuate within a large range depending on the missions being conducted and the priority assigned to those missions by the Department of Defense (DOD).

Table 2-11 Activity by Maryland Based Helicopters (2002)

	Based Helicopters	Annual Hours Flown	Annual Operations
Piston	9	1,782	10,692
Single Turbine	29	10,933	65,598
Twin Turbine	31	15,779	94,674
Total	69	28,494	170,964

Source: Edwards and Kelcey, Inc.

Table 2-12 Activity by Metropolitan Washington Based Helicopters (2002)

	Based Helicopters	Annual Hours Flown	Annual Operations
Piston	2	396	2,376
Single Turbine	14	5,278	31,668
Twin Turbine	55	27,995	167,970
Total	71	33,669	202,014

Source: Edwards and Kelcey, Inc.

In addition to the operators based in the study area described above, there are also out-of-state helicopter operators that generate traffic in the study area. As discussed in more detail below, helicopter operators based within 250-300 miles of the study area occasionally fly into the region. A telephone and mail survey of out-of-state operators indicated that the majority of activity conducted by out-of-state operators was for corporate/business purposes, and that their level of activity declined by 20 percent as a result of restrictions that were imposed after September 11, 2001, including the lack of access to Reagan Washington National Airport.

2.4 Primary Uses of Helicopters

The HAI and FAA have identified a variety of civilian helicopter missions:

- Emergency medical services – includes emergency pick-up as well as inter-hospital transfers*
- Disaster relief response and support*
- Search and rescue (SAR)*
- Aerial applications (agricultural spraying and insect control)*
- Logging
- Bank paper/small package transport
- Large cargo transport
- Flight training*
- Electronic news gathering (ENG)*
- Environmental pollution/wildlife monitoring*
- Fire-fighting/control/support (as shown on the right)*
- Helicopter tours/sightseeing
- Industrial and commercial construction* - including FAR Part 133 - Rotorcraft External Load Operations
- Law enforcement (local/state/federal) – including drug surveillance and interdiction*
- Offshore energy exploration
- Private/recreational uses*
- Scheduled airline/commuter service (Parts 135 and 121)
- Utility line survey and maintenance*
- Livestock herding/ranching
- Aerial photography/filming*
- Corporate/air taxi/charter[3]* - includes government official transportation
- Business*

[3] FAA defines 'corporate' as professionally flown aircraft, and 'business' as owner-flown aircraft. Air taxi and charters operate under Federal Aviation Regulation Part 135, and are primarily professionally flown.

- Traffic watch/reporting*
- Heli-skiing/mountain climbing support

* Missions conducted in study area.

A single helicopter operator often serves multiple missions, and both civilian and military helicopters can provide similar services, such as emergency medical and disaster relief. The helicopter operator surveys provided an estimate of the missions flown. These estimates are shown in Table 2-13 and Table 2-14.

Table 2-13 Helicopter Missions in State of Maryland

Mission	Percent of Operations
Emergency Medical Services (EMS)	32.3%
Law Enforcement	18.9%
Military/Security	16.2%
Electronic News Gathering (ENG)	4.2%
Personal/Recreational	1.3%
Flight Training	9.6%
Corporate/Air Taxi	4.6%
Filming/Aerial Photography	3.1%
Utility	0.3%
Agriculture/Seeding/Insect Control	3.3%
Wildlife Management	1.0%
Other	5.2%
Total	100%

Source: Edwards and Kelcey, Inc. Helicopter Operators Survey, 2002

Table 2-14 Helicopter Missions in Metropolitan Washington

Mission	Percent of Operations
Emergency Medical Services (EMS)	15.9%
Law Enforcement	13.8%
Military/Security	51.2%
Electronic News Gathering (ENG)	1.8%
Personal/Recreational	0.4%
Flight Training	6.4%
Corporate/Air Taxi	6.1%
Filming/Aerial Photography	2.3%
Utility	0%
Agriculture/Seeding/Insect Control	0%
Wildlife Management	0.2%
Other	1.9%
Total	100%

Source: Edwards and Kelcey, Inc. Helicopter Operators Survey, 2002

Because helicopters serve a very wide variety of missions, the level of helicopter activity responds to an equally wide variety of factors. For example, corporate/business/air taxi use of helicopters is affected by corporate profits, stock prices, and the state of the economy. Helicopters owned by public agencies such as the Maryland State Police, on the other hand, are not dependent on the performance of the economy, but rather on state budgets as well as public and political support for their services.

FAA's survey of general aviation pilots compiles activity levels by primary use; however, the use categories are different then those in previous tables. FAA, for example, includes law enforcement, wildlife management, military/defense, or filming/aerial photos as part of "aerial observation" and "other" categories (see Table 2-15).

Table 2-15 Missions by U.S. General Aviation Aircraft

	Percent of Operations	
Mission	Helicopters	Fixed-Wing Aircraft
Emergency Medical Services (EMS)	8.0%	0.2%
Law Enforcement	NA	NA
Aerial patrol/observation	23.7%	1.8%
Military/defense	NA	NA
Electronic news gathering (ENG)	NA	NA
Personal	17.7%	66.8%
Flight Training/instructional	10.1%	7.3%
Corporate/business/air taxi	18.8%	20.7%
Filming/aerial photography	NA	NA
Agriculture/spraying/app.	7.2%	2.0%
Wildlife management	NA	NA
Other	7.5%	1.0%
External load (utility)	3.1%	0.0%
Sightseeing/Air Tours	3.9%	0.2%
Total	100%	100%

Source: Federal Aviation Administration, General Aviation Pilot Survey, 2000

In general, fixed-wing aircraft conduct a much higher percentage of personal/recreational flying than helicopters (66.8 percent compared to 17.7 percent), which is due primarily to the higher cost and complexity of helicopters compared to fixed-wing aircraft. On the other hand, helicopters have much higher utilization in support of aerial observation, emergency medical services, utility/external load, and sightseeing/aerial tours than do fixed-wing aircraft.

2.5 Definition of Catchment Area

Helicopter activity in the State of Maryland and the Metropolitan Washington Region is generated by two sources of traffic: helicopters based in the study area (described previously) and by those helicopters based outside of the region. The catchment area is defined as the geographic boundary of the region that generates the most helicopter activity in the study area, and that

boundary is determined by the operating characteristics of helicopters. For the purposes of this analysis, helicopters are grouped into three broad categories: piston engine, single turbine, and twin turbine as presented in Table 2-16.

Table 2-16 Helicopter Specifications

Make/Model	Cruise Speed (kts)	Max Range (nm)	Gross Weight (lbs)	Crew/Pass.
		Piston		
Schweizer 300C	83	232	2,050	1/2
Robinson R44	115	365	2,400	1/3
Enstrom F28F	97	241	2,600	1/2
		Single Turbine		
Bell Jet Ranger-III	115	374	3,200	1/4
EC AS350 B3	132	357	4,960	1/5
Boeing MD 530F	134	370	3,100	1/4
		Twin Turbine		
EC BK 117 C1	133	292	7,385	1/10
EC 135	139	340	6,000	1/7
Bell 430	139	353	9,300	1/9
EC AS355N	120	390	5,600	1/5
Agusta 109E	156	506	6,284	1/7
Sikorsky S-76C+	145	439	11,700	1/13

Source: Helicopter Association International

The number of active helicopters located in each state within the catchment area was calculated based on data from FAA's General Aviation and Air Taxi Activity Survey, 2001. This information is shown in Table 2-17.

Table 2-17 Active Helicopters in Catchment Area

Catchment Area	Active Aircraft	Active Helicopters
Delaware	2,068	68
New Jersey	3,791	125
New York	6,082	201
Pennsylvania	5,648	186
West Virginia	1,075	35
Virginia (including Metropolitan Washington Region)	3,354	111
Total	*22,018*	*726*

Source: Edwards and Kelcey, Inc.

Some of the helicopter operators based in the catchment area are listed in Table 2-18.

Table 2-18 Helicopter Operations in Catchment Area

Helicopter Operators		
R&Y Helicopters	Hornell Brewing	Bristol-Myers Squibb
MBNA Corporation	Lynton Aviation	Onondaga Co. Sheriff
Horizon Helicopters	Merck & Company	Niagara Mohawk Power
Liberty Helicopters.	Reliance Insurance	Warnaco, Inc.
AT&T	Warner Lambert	American Express
Allied Signal	Public Service Electric	NY State police
Jet Aviation	Port Authority of NY & NJ	EMS Air Service of NY
Sony Aviation	Summit Jet Corporation	Ventura Air Service
Gannett Co.	Mobil Business Resource	CSX Corporation
CNG Transmission Corp.	Mountain Helicopters	W.V. DEP
TAG Aviation	Keystone Helicopter Corp.	Citi Group

Source: Edwards and Kelcey, Inc.

There are a relatively large number of corporate operators, particularly in New Jersey and New York, compared to Maryland and Metropolitan Washington Region. Based on average utilization rates, helicopters in the catchment area fly a total of approximately 30,000 hours per year and conduct approximately 180,000 takeoffs and landings annually. However, only a small portion of that activity occurs in Maryland and the Metropolitan Washington Region. The out-of-state survey results were not comprehensive, but indications are that these out-of-state operators conducted about 1 percent of their total activity in Maryland and the Metropolitan Washington Region. These

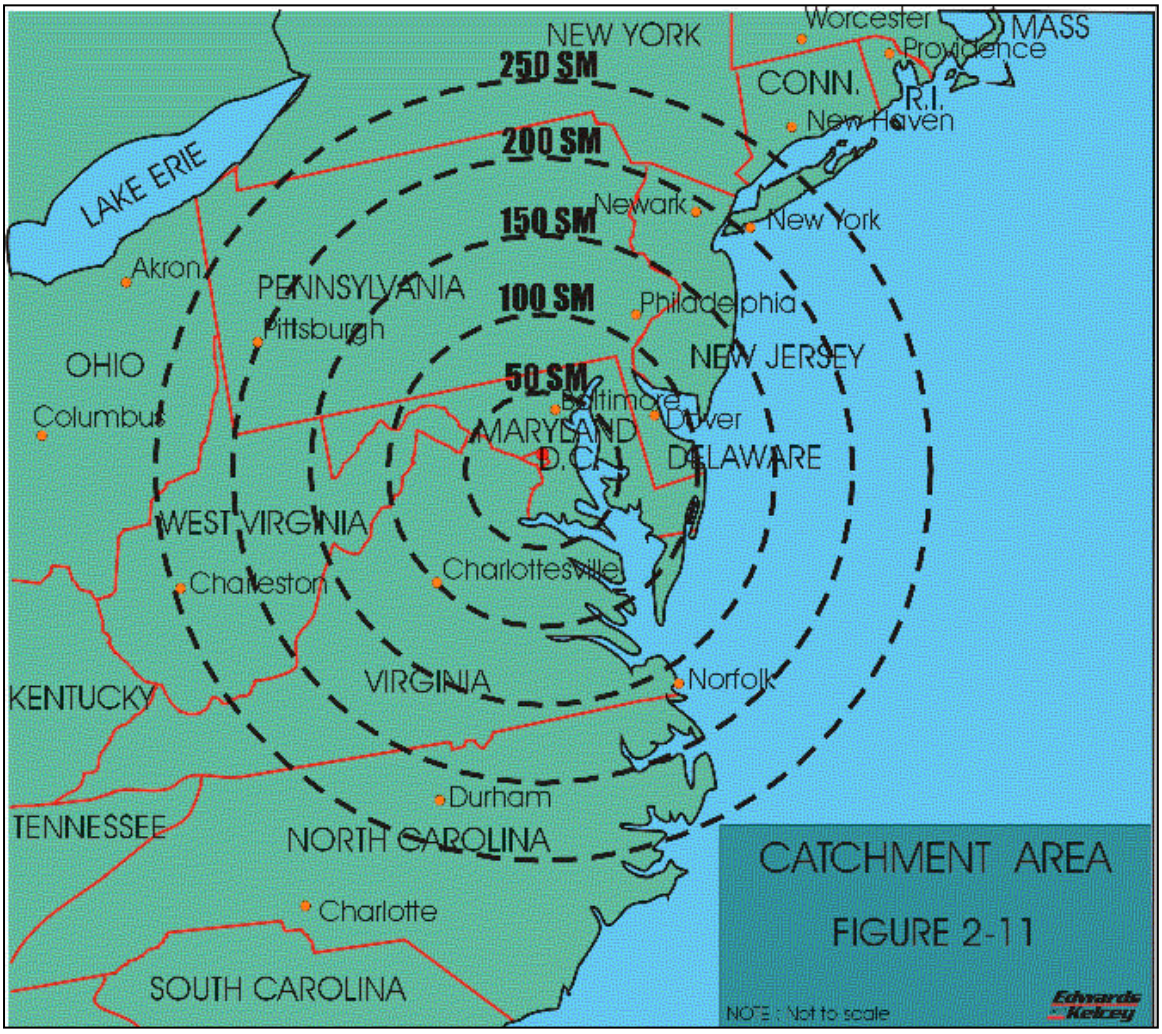
operators indicated that they would increase the number of operations if there were a public-use heliport in Washington, DC and downtown Baltimore, if they had access to Regan National Airport, and if the temporary flight restrictions were lifted.

Their primary destinations in the study area were the South Capitol Street Heliport and Reagan Washington National Airport, both of which are no longer accessible, as well as BWI Airport. As noted previously, operators based outside of the study area indicated that their level of activity in Maryland and the Metropolitan Washington Region declined by 20 percent after September 11, 2001 in response to the flight restrictions imposed and the closing of the South Capitol Street heliport. Most of their activity in the study area was for corporate/business related operations.

Public service helicopters (police and fire departments, for example) do not fly out-of-state as often as corporate/air taxi operators. Since September 11th, out-of-state helicopters flying into the Metropolitan Washington Region and Maryland use primarily airports, private helipads (owners prior permission required), and unprepared landing sites. When operators are limited to using airports, then fixed-wing aircraft can be used at a lower cost than helicopters.

Military helicopters such as the UH-60 Black Hawk, CH-47 Chinook, and AH-1 Cobra are heavier than the civilian helicopters listed above, but have similar speed and range characteristics. The large majority of the civilian helicopter fleet has a maximum range of less than 400 nautical miles. In addition, the average helicopter flight is less than one hour in duration with an average cruise speed of less than 140 knots. As a result, the catchment area for helicopters operating in Metropolitan Washington and Maryland lies within a radius of approximately 250 - 300 miles, which encompasses Virginia, West Virginia, Delaware, New Jersey, Pennsylvania, and portions of New York (see Figure 2-11). Air travel beyond 300 miles is conducted predominantly by fixed-wing aircraft, including both airlines and corporate aircraft.

Figure 2-11 Heliport Catchment Area



2.6 Airspace, Air Traffic Control, and Navigation Aids

The existing airspace structure and air traffic control (ATC) procedures in the Greater Baltimore-Washington area directly impact helicopter activity in the study area. The purpose of this Section is to describe existing helicopter routes and procedures within and near the Baltimore-Washington Class B airspace in order to better understand the operational environment of helicopters. Both military and civilian helicopters operate in the area, and both operate in controlled and uncontrolled airspace, as described below.

Adding to the complexity of the airspace structure are numerous national security, military, and other sensitive sites classified as Special Use Airspace in the Greater Baltimore-Washington area.

Special use airspace is classified as prohibited and restricted. Prohibited areas exist in the District of Columbia over the Naval Observatory, the White House, and the Capitol Building. Flights are prohibited in these areas at all times. Restricted airspace is designated near Camp David, Quantico Marine Corps Base, and Patuxent Naval Air Station. Flight operations are restricted in this airspace during specified times, typically when the areas are being used for military training, testing, and/or operational activities. In addition, as discussed in more detail below, temporary flight restrictions and special federal aviation regulations (SFARs) have also been imposed in the area, further constraining civilian aircraft access to the District of Columbia and Reagan Washington National Airport.

2.6.1 National Airspace System Overview

Information on flights rules, weather conditions, and the structure of the National Airspace System (NAS) is presented in this Section. This information is useful for understanding how helicopters and fixed-wing aircraft interact with each other and Air Traffic Control, and the rationale for the procedures currently in place in the Baltimore-Washington area.

2.6.2 Flight Rules and Weather Conditions

Weather is a significant factor in aircraft operations. Weather conditions determine the flight rules under which aircraft can operate, and can also affect aircraft separation (physical distance between aircraft). Pilots and Air Traffic Controllers are the primary elements that separate aircraft from each other to ensure safety of flight. Required separation varies depending on aircraft type, weather, and flight rules. Aircraft separation requirements can increase during poor weather conditions, as it is more difficult for a pilot to see and avoid other aircraft.

Aircraft operate under two broad categories: visual flight rules and instrument flight rules (IFR). These flight rules are linked to the two categories of weather conditions: visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). VMC exist during generally fair to good weather, and IMC exist during times of rain, low clouds, or reduced visibility. IMC typically exists whenever visibility falls below 3 statute miles (SM) or the ceiling drops below 1,000 feet above ground level (AGL). The ceiling is the distance from the ground to the bottom of a cloud layer that covers more than 50-percent of the sky.

During VMC, aircraft may operate under VFR, and the pilot is primarily responsible for seeing other aircraft and maintaining safe separation. Aircraft operating under VFR navigate by orientation to geographic points and other visual references, although they also use radio navigation aids as well.

The large majority of flights by helicopters are conducted under VFR. Federal Aviation Regulation Part 91 notes that helicopters may operate under VFR with lower weather conditions than fixed-wing aircraft, as low as one-mile visibility and clear of clouds. Although military helicopters were flying under IFR as early as the 1950s and 1960s, civilian helicopters did not routinely fly under IFR until the late 1960s and early 1970s. Larger and often former military helicopters, such as the S-61, were certified for IFR operations, but smaller civilian helicopters typically were not. The advent of turbine engines, stability augmentation systems, and more reliable radios in the civilian fleet led rotorcraft manufacturers to certify increasing numbers of helicopters to operate under IFR.

During IMC aircraft are required to file flight plans, receive a clearance from ATC, and operate under IFR. ATC exercises control (i.e., separation of all air traffic within designated airspace) over all aircraft operating under IFR in controlled airspace, and is primarily responsible for aircraft separation. Aircraft operating under IFR must meet minimum radio and flight equipment requirements, as well as pilot qualifications. Aircraft operating IFR fly assigned routes and altitudes, and use a combination of radio navigation aids (NAVAIDS) and vectors from ATC to navigate.

Aircraft may elect to operate under IFR in VMC, however, when weather conditions are VMC the pilot still makes use visual senses to avoid other aircraft. The majority of fixed-wing commercial air traffic (including all air carrier traffic), regardless of weather, operates under IFR. ATC can allow IFR aircraft to maintain visual separation in VMC during the initial climb after takeoff, and final approach to landing. Since visual separation requirements allow for less spacing between aircraft compared to operations under IMC, both airspace and airport capacity are increased under visual conditions. This is particularly apparent at air carrier airports when comparing air traffic flows and delays between visual and instrument conditions.

Helicopters also frequently operate under Special VFR (SVFR), which allows operation of aircraft in less than VMC without filing an IFR flight plan. SVFR is typically used to allow an aircraft to operate at an airport that has locally poor weather conditions, and then transition to normal VFR upon reaching VMC. Accordingly, SVFR is especially useful for aircraft not equipped for IFR flight. Due to the relatively low speed capabilities of helicopters, SVFR operations are permitted even with a visibility of less than one mile so long as the helicopter can remain clear of clouds. As a result, helicopters may operate in the same airspace under VFR while fixed-wing aircraft are operating under IFR.

2.6.3 FAA Classification of Airspace

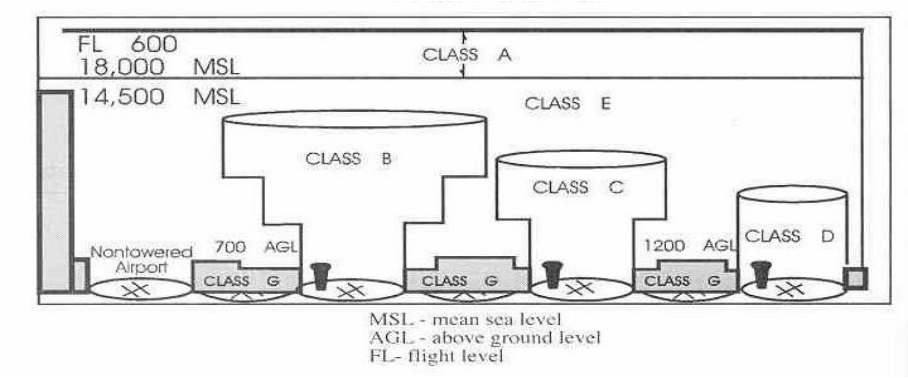
FAA was given sole jurisdiction over airspace management and operation by the U.S. Congress, and is thus responsible for its development. In the early days of aviation, aircraft only flew during

VMC, during which the pilot maintained orientation (up/down, turning, etc.) by reference to the horizon and visual ground references. Flight through clouds (i.e., IMC) was not feasible until the early 1930s, as the aircraft instruments of the time did not provide orientation information, and thus a pilot could easily lose control of the aircraft. In a visual-only airspace environment, it was also possible to see other aircraft and avoid collisions – and thus maintain aircraft separation.

Flight through clouds became possible with the use of gyroscopic flight instruments. Because it is not possible to see other aircraft in the clouds, ATC was established to coordinate aircraft positions and maintain safe separation between aircraft. In fact, the first ATC system was created and operated by the airlines, also in the early 1930s, and eventually turned over to the government. Today, maintaining separation between IFR air traffic is still the fundamental mission of ATC, and the evolution of the National Airspace System and existing ATC procedures can be directly tied to this requirement.

The FAA has designated six classes of airspace in accordance with International Civil Aviation Organization (ICAO) airspace classifications. Figure 2-12 identifies the airspace classifications and terminology. Airspace is broadly classified as either controlled or uncontrolled.

Figure 2-12 FAA Airspace Classifications



Airspace designated as Class A, B, C, D, or E is controlled airspace. Class F airspace is not used in the United States, and Class G is uncontrolled airspace. Class A, B, C, and D airspace require ATC clearance to operate in regardless of weather conditions, while Class E airspace only becomes controlled when weather conditions are below visual flight rules minimums (see Table 2-19).

Table 2-19 Airspace Classification

Airspace Class	Description
A	Class A airspace exists within the United States from 18,000 feet MSL up to and including 60,000 feet MSL. Class A encompasses the en route high-altitude environment used by high-performance aircraft to transit from one area of the country to another. All aircraft in Class A must operate under IFR with an ATC clearance.
B	All aircraft, both IFR and VFR, in Class B airspace are subject to positive control from ATC. Class B airspace exists at 29 high-density airports in the United States as a means of managing air traffic activity (primarily air carrier) around the airport. It is designed to regulate the flow of air traffic above, around, and below the arrival and departure routes used by air carrier aircraft at major airports. Class B airspace generally includes all airspace from an airport's established elevation up to 12,000 feet MSL, and, at varying altitudes, out to a distance of about 30 nautical miles from the center of the airport. Aircraft operating in Class B airspace must have specific radio and navigation equipment, including an altitude encoding transponder, and must obtain ATC clearance.
C	Class C airspace is defined around airports with airport traffic control towers and radar approach control. It normally has two concentric circular areas with a diameter of 10 and 20 nautical miles. Variations in the shape are often made to accommodate other airports or terrain. The top of Class C airspace is normally set at 4,000 feet AGL. The FAA had established Class C airspace at 120 airports around the country. Aircraft operating in Class C airspace must have specific radio and navigation equipment, including an altitude encoding transponder, and must obtain ATC clearance. VFR aircraft are only separated from IFR aircraft in Class C airspace (i.e., ATC does not separate VFR aircraft from other VFR aircraft, as this is the respective pilot's responsibility).
D	Class D airspace is under the jurisdiction of a local Air Traffic Control Tower (ATCT). The purpose of an ATCT is to sequence arriving and departing aircraft and direct aircraft on the ground; the purpose of Class D airspace is to provide airspace within which the ATCT can manage aircraft in and around the immediate vicinity of an airport. Aircraft operating within this area are required to maintain radio communication with the ATCT. No separation services are provided to VFR aircraft. The configuration of each Class D airspace area is unique. Class D airspace is normally a circular area with a radius of five miles around the primary airport. This controlled airspace extends upward from the surface to about 2,500 feet AGL. When instrument approaches are used at an airport, the airspace is normally designed to encompass these procedures.
E	Class E airspace is a general category of controlled that is intended to provide air traffic service and adequate separation for IFR aircraft from other aircraft. Although Class E is controlled airspace, VFR aircraft are not required to maintain contact with ATC, but are only permitted to operate in VMC. In the eastern United States, Class E airspace generally exists from 700/1200 feet AGL to the bottom of Class A airspace at 18,000 feet MSL. It generally fills in the gaps between Class B, C, and D airspace at altitudes below 18,000 feet MSL. Federal Airways, including Victor Airways, below 18,000 feet MSL are classified as Class E airspace.
F	Not Applicable within United States
G	Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, Class G, airspace. ATC does not have the authority or responsibility to manage of air traffic within this airspace. In the Eastern U.S., Class G airspace lies between the surface and 700/1,200 feet AGL.

Source: FAA, Airman's Information Manual.

Class B Airspace was specifically designed for high-density terminal areas such as Baltimore and Washington, DC. In the Northeast, Class B Airspace is also designated around Philadelphia, New York, and Boston, for example, as well as other large hub airports throughout the country. FAA air traffic control can allow VFR aircraft to enter Class B Airspace on a workload-permitting basis. In other words, if controllers are busy handling existing traffic in their airspace, they do not have to issue clearances to VFR aircraft (including helicopters) requesting to operate in Class B Airspace. If such clearances are denied to VFR aircraft, pilots have two choices; they can wait outside of the

controlled airspace until a clearance is issued (controllers can tell pilots when such a clearance might be issued), or pilots can select an alternate route and fly around/outside (over or under) the Class B Airspace.

In addition to workload, controllers also consider such factors as the proposed route and altitude that the VFR aircraft requested, and if it will interfere with existing arriving and departing traffic flows, particularly airliners and military traffic. In addition, they consider whether the pilot is landing/departing at an airport/heliport actually located in controlled airspace, or if it is just transiting through the area.

2.6.4 Navigation Aids

Aircraft, especially those operating under instrument flight rules, use both ground- and satellite-based navigation aids. NAVAIDS are critical for aircraft operating under IFR and at high altitude, and they are also used by ATC to manage traffic flows and separate aircraft. VFR aircraft use the same NAVAIDS, but do not necessarily rely on them for primary navigation. NAVAIDS essentially allow an aircraft to determine its existing position and the heading needed to reach the next point on its route. Ground-based NAVAID reception (such as VHF omni-directional radio range (VORs) and non-directional beacons (NDBs)) can be impaired at the low altitudes at which helicopters often operate. As a result, helicopters depend heavily on visual landmarks for navigation, as well as global positioning system (GPS).

Aircraft navigate via a point-to- point network. The points are known as fixes. A fix is a radio navigation point denoted by a single five-letter name. The location of a fix is defined by latitude/longitude coordinates and by a combination of ground and satellite-based NAVAIDS. The location of a fix is known to both ATC and pilots, and is identified on aeronautical charts. An IFR flight is assigned a sequence of fixes in its flight plan; the sequence of fixes establishes the route that an aircraft will use to navigate from one airport to another. ATC will sometimes change an aircraft's route while in flight, due to weather, separation, or other factors. ATC navigation guidance is known as vectoring.

The most common and frequently used ground-based NAVAID, especially for fixed-wing aircraft, is the VHF omni-directional radio range station. The VOR is a ground-based NAVAID that transmits high frequency radio signals (known as radials) 360 degrees in azimuth from the station. A pilot can select a specific radial from a VOR, and use this to fly to or from another point. A pilot can also use distance-measuring equipment (DME) to measure an aircraft's distance from a DME-equipped VOR. Some VORs are also co-located with TACAN (tactical air navigation equipment), which is

used by the military. These installations are known as VORTACs, and operate in the same way as VOR stations.

Intersecting radials from two VORs, or DME and a specific radial, can be used to define a fix. The location of a VOR station can also be used as a fix. Certain radials associated with VORs are used as a federal airway, which includes both low altitude (Victor) and high altitude (jet route) airways. In the Baltimore-Washington area, VORs are located at Andrews AFB (ADW), Baltimore/ Washington International Airport (BWI), Washington National Airport (DCA), and Dulles International Airport (IAD). Other VORs are located near Frederick, Nottingham, and Westminster in Maryland, and Warrenton and Fredericksburg in Virginia. Most VOR signals have an effective range of 40 miles; although they are dependent on line-of-sight, and the signals can be blocked by buildings and terrain.

A non-directional beacon is a low-frequency radio beacon that transmits a non-directional signal. An aircraft equipped with direction finding equipment can determine a bearing to or from the radio beacon, and use this to navigate. The location of a NDB station can also be used as a fix.

Ground-based NAVAIDS such as VORs and NDBs, however, have a number of limitations. Their range is limited to the power output of each individual station, reception of VOR signals is limited by line-of-sight requirements, and certain weather conditions can interfere with NDB signals. In addition, they are fixed points on the ground and are often not located at the aircraft's point of origin or destination.

Area navigation (RNAV) is a hybrid navigation system that uses multiple ground-based (e.g. VOR, Loran C) and/or satellite NAVAIDS to triangulate an aircraft's position. Use of ground-based NAVAIDS typically requires an aircraft to fly from one NAVAID to another; RNAV allows an aircraft to fly directly between any two points (fixes, waypoints, or airports) determined by the pilot. RNAV databases typically contain the name and location of fixes used in the NAS.

The Global Positioning System is an RNAV satellite-based navigation system that provides precise three-dimensional location, speed, and time information to aircraft. The system is compromised of 24 satellites that are operated by the U.S. Department of Defense. GPS receivers installed in aircraft use signals from at least 4 satellites to determine aircraft position. An internal database in the receiver is used to plot the aircraft's position relative to fixes, airports, and waypoints, and to plot courses to the aircraft destination. GPS has improved reliability, usability, accuracy, and reduced cost, as compared to many ground-based NAVAIDS.

Two systems, the Wide Area Augmentation System (WAAS) and the Local Area Augmentation System (LAAS) are being developed and deployed to augment the accuracy of GPS signals for use with precision instrument approach procedures. The use of GPS is increasing rapidly among all aircraft operators, including helicopter users. The FAA envisions that GPS will be the primary navigation system used in the United States in the future; in fact, GPS will eventually lead to the phase-out of existing ground-based NAVAIDS.

NAVAIDS are also used to guide an aircraft for landing at an airport during the arrival portion of the flight. The procedures used with these NAVAIDS are known as Instrument Approach Procedures (IAP), and are used to guide aircraft to a specific runway, or the airport, for landing in IMC. An IAP that uses VORs and NDBs as the primary NAVAID are known as non-precision approaches because they only provide horizontal guidance. As a result, the minimum approach altitude is higher than for a precision approach (typically 400 or 500 feet above the airport and 1 mile visibility). An Instrument Landing System (ILS) is known as a precision approach because it provides both horizontal and vertical guidance to aircraft as they approach the runway. ILS minimums can be as low as 200 feet and ½ mile, and even lower for Category II and III ILS approaches. Such approaches increase service reliability. There are multiple precision and non-precision IAPs at many airports in the greater Baltimore-Washington area.

FAA has implemented an aggressive program to certify GPS IAPs throughout the country. GPS approaches offer all the advantages of satellite navigation, as well as not needing to install ground-based NAVAIDS (with the exception of WAAS and LAAS, discussed above). Almost all of the GPS IAPs certified to date have been non-precision procedures, although FAA has published criteria for non-precision approaches with vertical guidance, as well as precision GPS approaches. GPS IAPs offer new opportunities for helicopter-only IAPs to heliports, helipads, airports, and even point-in-space approaches, as was done previously using VOR-based RNAV.

2.6.5 Helicopter Routes and Procedures

Nearly all helicopter operations (approximately 99-percent according to ATC personnel) in the Baltimore-Washington area are conducted under VFR. The missions flown by many helicopters – such as electronic-news-gathering, traffic reporting, emergency medical services, law enforcement, and short-haul charter flights – are flown under VFR in order to see events/landmarks on the ground, and also to allow maximum flexibility. Due to the operational requirements of these missions, including taking off and landing at off-airport locations, hovering, slow flight, etc., helicopters often operate outside the control of ATC, which is also preferable to ATC because it reduces their workload and reduces interference with fixed-wing (particularly airline) traffic flows.

The airspace in the Baltimore-Washington area is dominated by a large Class B airspace that encompasses ADW, BWI, DCA, and IAD. All aircraft are required to obtain ATC clearance prior to operating in Class B airspace. The Class B airspace extends at varying altitudes approximately 20 nautical mile radius from each major airport. Within approximately seven nautical mile radius of each major airport the Class B airspace exists from ground level to 10,000 feet MSL. Beyond the seven nautical mile radius, the "floor" of the Class B airspace gradually rises with increasing distance from the airports.

For example, the "floor" of the Class B airspace centered on DCA is 1,500 feet MSL within 10 nautical miles, 2,500 feet MSL within 15 nautical miles, and 3,500 feet MSL within 20 nautical miles. The gradual rising of the Class B airspace floor allows aircraft to operate under controlled airspace without having to contact ATC, thereby decreasing controller workload and allowing flexibility for VFR aircraft. The ceiling of the Class B airspace is constant at 10,000 feet MSL, and VFR aircraft may fly above the top of the airspace if they elect to do so. The *Baltimore-Washington VFR Terminal Area Chart*, published by FAA, is useful in understanding the area's airspace structure.

Figure 2-13 and Figure 2-14 show actual routes used by IFR aircraft (primarily air carriers, and in the case of ADW, military aircraft) flying to and from ADW, BWI, DCA, and IAD in a south/east and north/west flow, respectively. The flight tracks were recorded by FAA air traffic control radar, and while individual routes are hard to distinguish, the figures clearly indicate that air carrier and military aircraft fly over a large part of the Metropolitan Washington Region. As a result, there is very little airspace left in which helicopters can be assigned higher altitudes without interfering with air carrier and military traffic flows.

The establishment of the Class B airspace in the Baltimore-Washington area is a reflection of the high number of fixed-wing air carrier operations at ADW, BWI, DCA, and IAD. The tiered floor of the Class B airspace allows ATC to protect the arrival and departure paths of fixed-wing aircraft to the major airports, without unnecessarily managing low-altitude airspace further from the airports that is frequently used by general aviation operations.

In order to safely and efficiently separate and route both fixed-wing and helicopter traffic, ATC and operators have developed procedures for helicopter operations in the Baltimore-Washington area.

Figure 2-13 Existing South/East Approach and Departure Routes and Reagan Washington National (DCA)

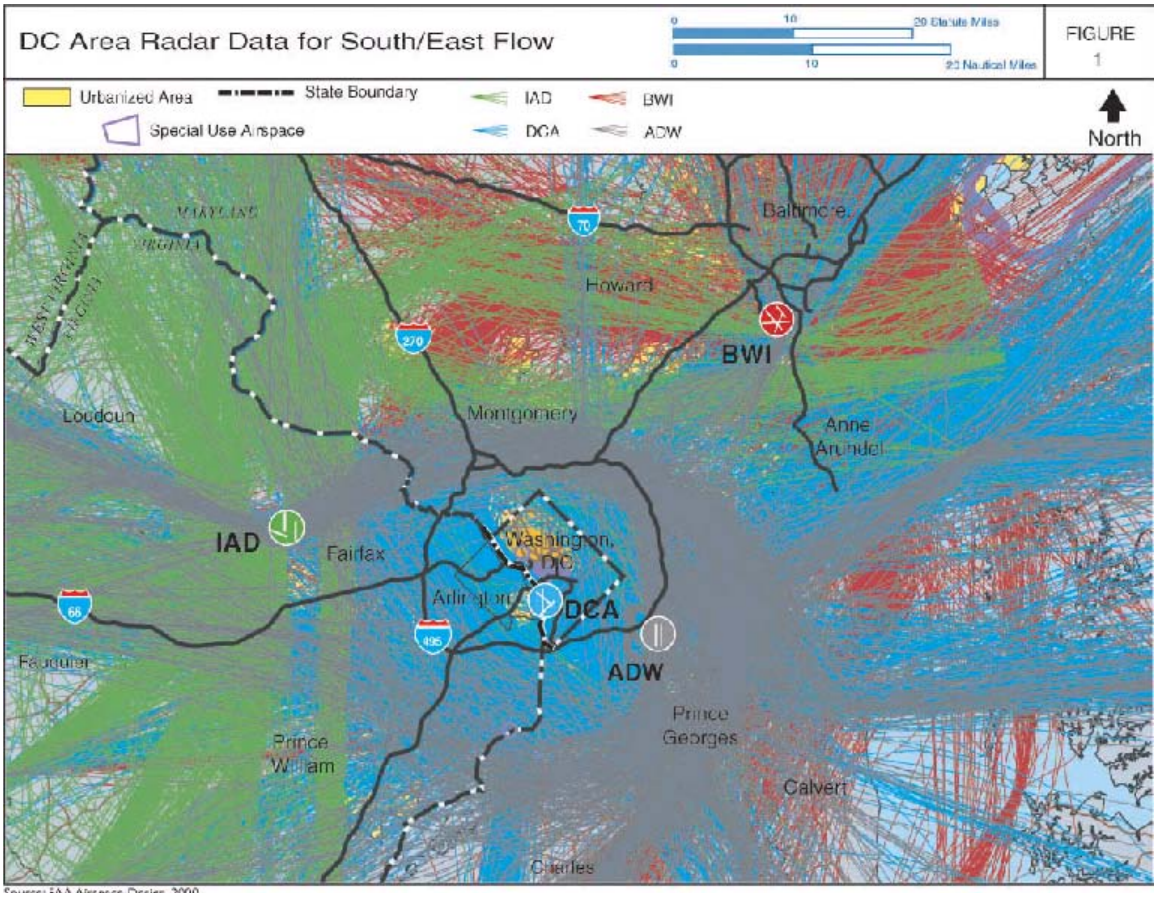
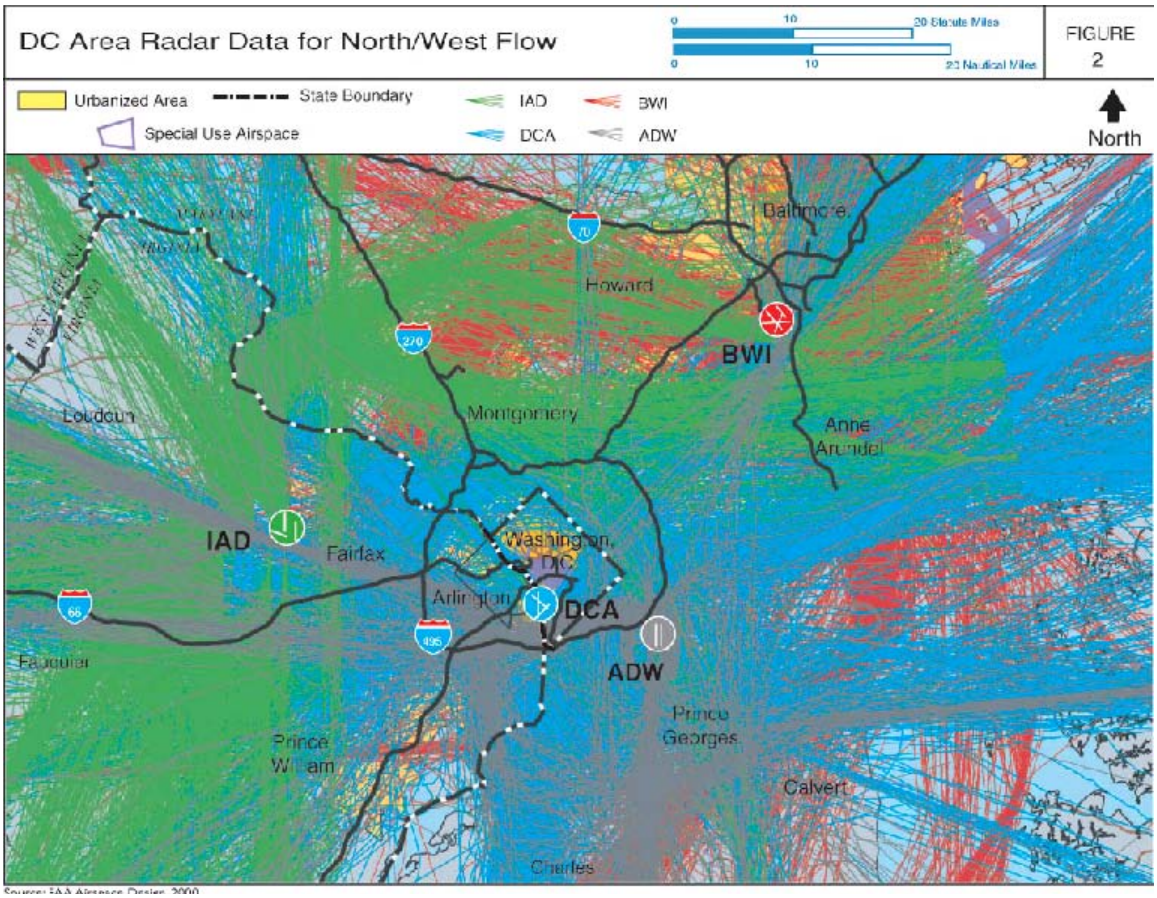


Figure 2-14 Existing North/West Approach and Departure Routes at Reagan Washington National (DCA)



2.6.6 September 11, 2001 Airspace/ATC Impacts

Following the terrorist events of September 11, 2001, the FAA implemented several emergency measures to give ATC greater control over aircraft flying near major cities, including Washington, DC. The emergency measures were intended to increase the security of the NAS.

Enhanced Class B airspace was established shortly after September 11, 2001. This measure redefined Class B airspace as the area existing within the lateral limits of charted Class B airspace, from the ground to the Class B ceiling. As discussed in the previous section, the Class B airspace area in the Baltimore-Washington area generally extends 20 nautical miles out from DCA, IAD, and BWI, up to an altitude of 10,000 feet MSL. Previously, Class E airspace existed under some portions of the overlying Class B airspace, which allowed VFR traffic to traverse such areas without contacting ATC. With the establishment of Enhanced Class B, all air traffic within the lateral Class B limits was subject to positive control by ATC.

In addition, VFR traffic was initially prohibited within the Enhance Class B airspace. This prevented VFR operations from most airports within 20 nautical miles of DCA, IAD, or BWI. Since the vast majority of helicopter operations are conducted under VFR, the Enhanced Class B airspace precluded nearly all non-military helicopter operations. Only IFR traffic was permitted to operate in the Enhanced Class B airspace.

Additionally, a Temporary Flight Restriction (TFR) was established that prohibits aircraft operations, except by military and scheduled air carrier aircraft, within (for the current version of the TFR) 15 nautical miles of DCA up to an altitude of 18,000 feet MSL. The TFR restricts both IFR and VFR general aviation and charter operations, including helicopters, from operating within this airspace and at DCA.

On October 15, 2001, FAA began to allow VFR operations in some Enhanced Class B airspace areas around the United States, excluding the Washington-Baltimore area. On December 19, 2001, FAA removed the Enhanced Class B airspace provisions, and reestablished the previous Class B vertical limits. This change occurred nationwide, however, in the Baltimore-Washington area the TFR continues in force, and no general aviation or charter operations may be conducted within 15 nautical miles of DCA without a waiver from the FAA. Specialty operations, such as news and traffic reporting, police, and emergency medical services are permitted to operate within the TFR-restricted airspace with prior permission from the FAA and ATC.

As of early 2003, two significant changes have occurred regarding security procedures and airspace issues over Washington, DC. First, the U.S. Customs Service has taken a much larger role in overseeing the security of the region's airspace with the implementation of the National Capitol Region Coordination Center (NCRCC). The U.S. Customs Service Air and Marine Interdiction Coordination Center (AMICC) in Riverside, CA, is monitoring the airspace over the United States.

The Center was established to "coordinate the anti-terrorism efforts of federal, state and local law enforcement agencies, and facilitate the exchange of crucial information among the various agencies." (source: The Washington Times, January 26, 2003). NCRCC participants include, in addition to the Customs Service, the FAA, TSA, U.S. Secret Service, DoD, U.S. Park Police, FEMA, U.S. Capitol Police, and local law enforcement agencies. The Customs Service Air and Marine Interdiction Division have begun patrols over the District of Columbia using three UH-60 Blackhawk helicopters, as well as three Cessna Citations (C-550) and one Cessna 210 fixed-wing aircraft. The Division's expanded role, and the NCRCC, will remain in place for the foreseeable future.

In addition to the establishment of the NCRCC noted above, the FAA has recently created an air defense identification zone (ADIZ) that essentially covers the footprint of the Washington Tri-Area Class B airspace, along with an extension to the south that begins at the surface and extends to 18,000 feet MSL over Baltimore and Washington, DC (see Figure 2-15). The ADIZ became effective on Monday, February 10, 2003, and will continue indefinitely. The ADIZ requires pilots to be on active flight plans, use discrete transponder codes, and be in communication with controllers. The 15-nm "no fly" TFR over Washington, DC, remains in place. The ADIZ was established in reaction to the national "code orange" security status.

Discussions and surveys with helicopter operators indicate that the restrictions are significantly impacting helicopter operations in the Class B airspace, even those that may be eligible for special permission to operate. Operators have indicated that it is difficult to receive permission, and even when they do there have been instances when not all ATC controllers were aware that they had permission to operate there, and implemented security procedures to identify the operator and escort them outside of the airspace.

Figure 2-15 Air Defense Identification Zone (ADIZ)

General aviation aircraft have not been allowed into Washington National Airport since September 11, 2001, and there are no indications that FAA or TSA will lift the restriction in the near future. Lack of access to DCA has had a significant impact on corporate aircraft operations in the area, both fixed-wing and helicopter. The National Business Aircraft Association (NBAA) and Helicopter Association International, as well as the Aircraft Owners and Pilots Association (AOPA), have been actively lobbying both FAA and TSA to allow even limited GA access to DCA, to date with no success.

Additional security procedures were implemented on February 14, 2002, to allow operations at College Park, Potomac, and Hyde Field airports in Maryland, which lie inside the TFR. Pre-approved (screened) pilots with aircraft based at these three airports are permitted to operate in the TFR-restricted airspace, but only for the purposes of departing and arriving at these airports. The pilots must take direct routes between the airports and non-TFR restricted airspace. On May 17, 2002, the FAA again closed the airspace at Hyde Field, due to recurring violations of security

procedures, and as of Fall 2002 the airport has not reopened. FAA also continues to change the size of P-40, the prohibited area over Camp David, Maryland, which affects traffic arriving and departing Frederick Airport, as well as transient traffic in the area.

Operations at the South Capitol Street Heliport (09W), the only public-use heliport in the District of Columbia, were greatly impacted by the post-September 11, 2001 airspace restrictions. The heliport was located approximately one mile south of the Capitol building on the Anacostia River near the South Capitol Street Bridge. The TFR-restricted airspace allowed only police and specialty operations to use the heliport, while general aviation traffic could operate with a waiver from the FAA to enter the TFR-restricted airspace, which were rarely issued. Air Pegasus, the former fixed-based operator at the heliport, ceased operations at the heliport in July 2002. Additional changes to the airspace procedures in the Baltimore-Washington area are likely as security procedures are further refined.

2.6.7 Baltimore-Washington Helicopter Route Chart

The *Baltimore-Washington Helicopter Route Chart*, last published by FAA in April 2005, depicts the major helicopter routes in the metropolitan area. The routes depicted on the chart are intended for VFR operations, and typically route helicopters over highways and other landmarks such as the Potomac River (see Figure 2-16, Figure 2-17, Figure 2-18, and Figure 2-19). The landmarks provide convenient navigation points. Furthermore, by concentrating the primary routes along highway corridors, overflight of noise-sensitive land uses such as residential development are minimized. Figure 2-18 also shows the special notes to pilots flying into the Pentagon and over South Arlington.

Helicopter routes are shown graphically on the chart, along with a written description of the route and maximum altitudes for each route segment. The maximum route altitudes are used to safely separate helicopters from fixed-wing aircraft that typically operate at higher altitudes. Most routes have recommended altitudes at or below 1,000 or 1,300 feet MSL. The routes over the Potomac River have lower recommended altitudes, down to 200 feet MSL, in order to avoid conflicts with the fixed-wing approach and departure paths at DCA.

Figure 2-16 Existing District of Columbia Helicopter Routes

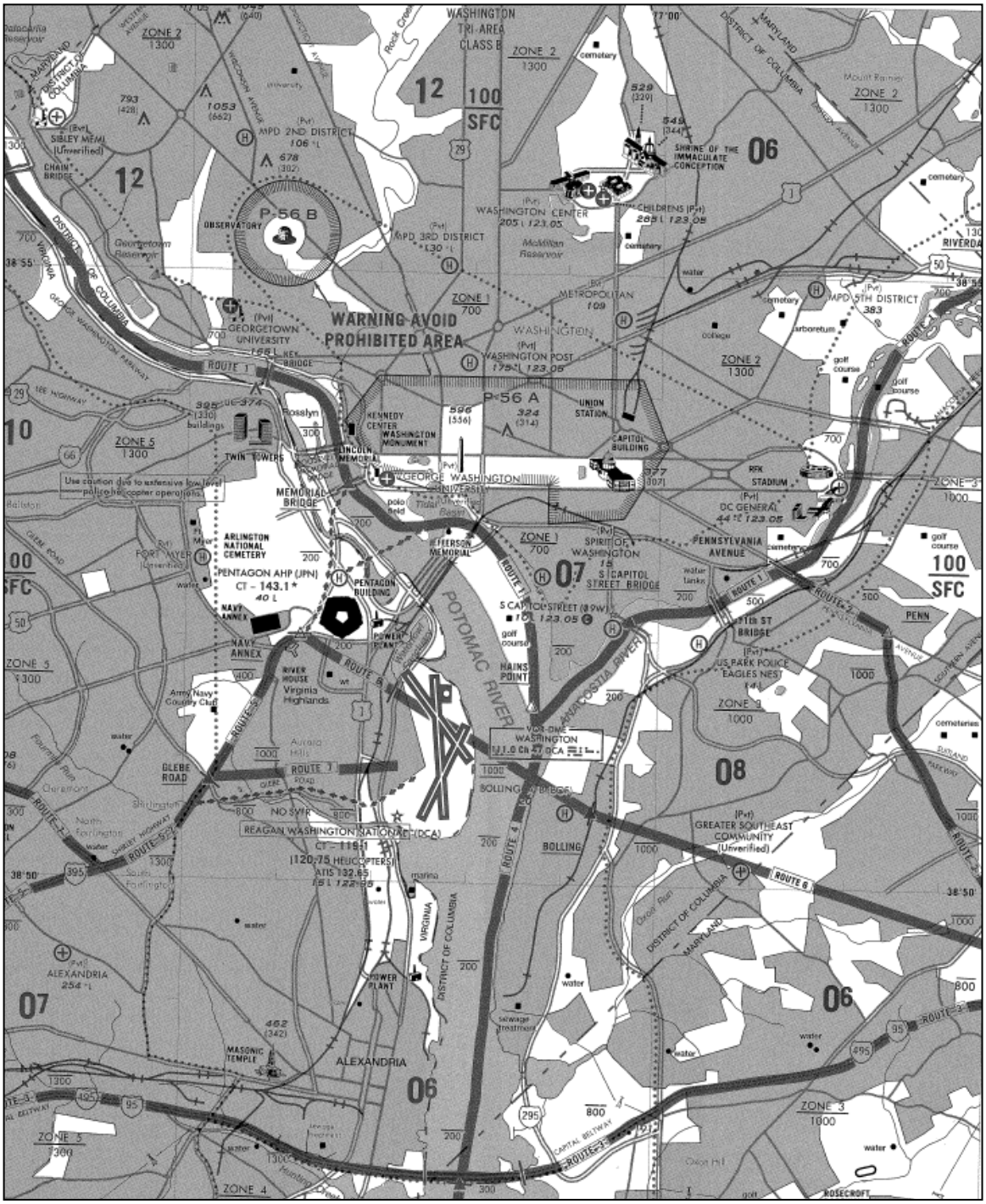


Figure 2-17 Existing Greater Baltimore Helicopter Routes

Figure 2-18 Existing Greater Washington, DC Helicopter Routes

PENTAGON ARMY HELIPORT TRANSITION ROUTES

ARRIVAL/DEPARTURE TRAFFIC FLOW WILL NORMALLY CONFORM TO THE TRAFFIC FLOW IN EFFECT AT REAGAN WASHINGTON NATIONAL AIRPORT (NORTH/OR/SOUTH OPERATIONS) UNLESS OTHERWISE APPROVED BY WASHINGTON TOWER.

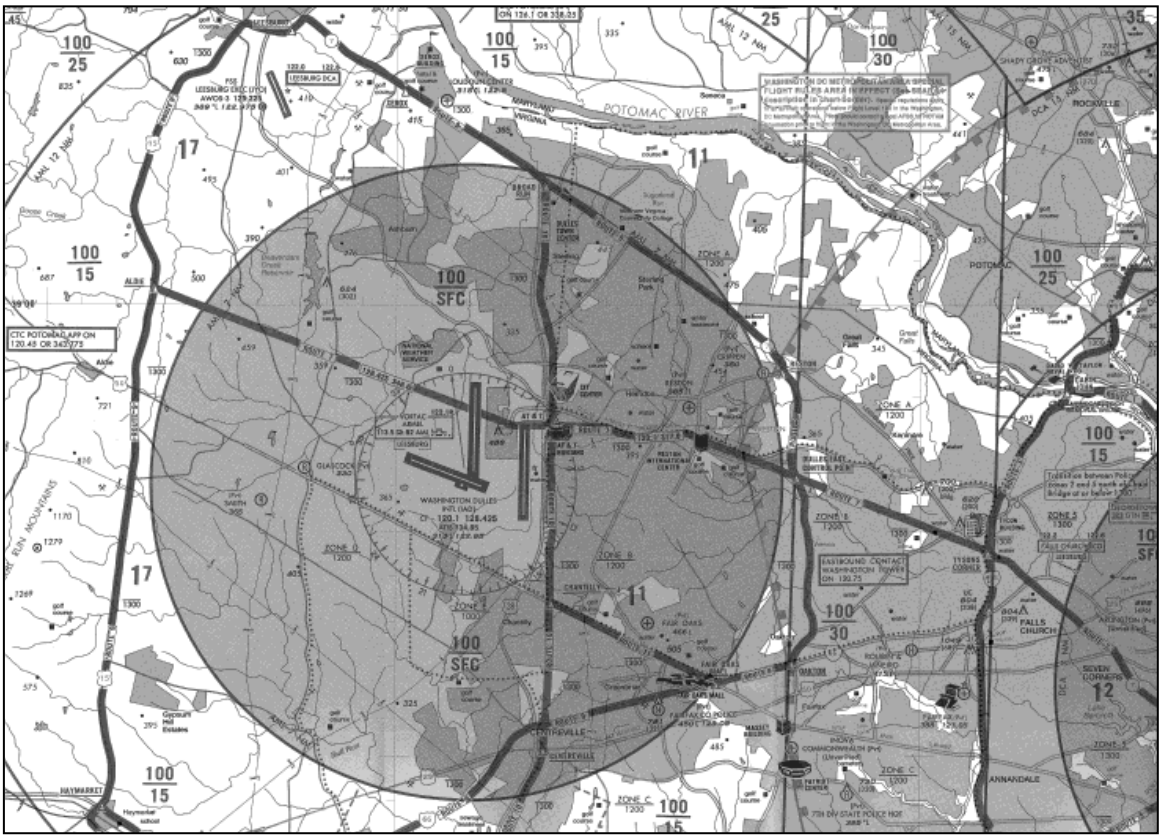
DO NOT OVERFLY ARLINGTON NATIONAL CEMETERY, AURORA HILLS, VIRGINIA HIGHLANDS OR APARTMENT BUILDINGS.

MILITARY USERS CONSULT DOD FLIP FOR PARTICULARS PERTINENT TO OPERATION OF HELICOPTERS TO THE PENTAGON ARMY HELIPORT AND ON THESE SPECIAL HELICOPTER ROUTES CONNECTING WITH THE PENTAGON AHP TRANSITION ROUTE.

ALL AIRCRAFT ARRIVING/DEPARTING OR TRANSITING THE SOUTH ARLINGTON AREA SHALL NOT OVERFLY ARLINGTON NATIONAL CEMETERY, AURORA HILLS, VIRGINIA HIGHLANDS, FAIRLINGTON, SHIRLINGTON, CLAREMONT, OR APARTMENT BUILDINGS.

OPERATIONS OUTSIDE OF POLICE ZONES ARE AUTHORIZED ONLY ON ESTABLISHED ROUTES OR TRANSITION AREAS WITHIN THE DCA SURFACE AREA

Figure 2-19 Existing Helicopter Routes in the Vicinity of Dulles International Airport



There are 18 routes shown on the Baltimore-Washington Helicopter Route Chart; Table 2-20 describes each of these routes. Route 3, for example, overlies the Washington, DC Beltway (Interstate 495), while Route 1 traverses the Baltimore–Washington Parkway inside the Beltway, the Anacostia River, and the Potomac River northwest of DCA. Note that the routes are defined by reference to prominent visual landmarks, such as roads, rivers, and buildings. Although the routes are typically described as going from point to point in a single direction, travel in either direction is possible unless otherwise noted.

Table 2-20 Published Helicopter Routes in Baltimore/Washington Area

Route Number	Route Description	Altitudes
1	American Legion Bridge over Potomac River, East of Roosevelt Island to the Tidal Basin. Over Washington Channel to Anacostia River. Northeast over Anacostia River to Riverdale and via Baltimore-Washington Parkway to Greenbelt.	American Legion Bridge at or below 700 feet MSL, Key Bridge at or Below 200 feet MSL, not above 200 feet MSL to South Capitol Street Bridge. East Capitol Street Bridge at or below 700 feet MSL. Riverdale and northeast at or below 1,300 feet MSL. Helicopters crossing Potomac River to or from Pentagon shall be at or below 200 feet MSL.
2	Woods Corner via Branch Avenue, Direct to Marlow Heights, Direct to Pennsylvania Avenue, Direct to Intercept Helicopter Route 1 at Anacostia River.	Woods Corner at or below 1,000 feet MSL. At Pennsylvania Avenue begin descend to be at or below 500 feet MSL over Anacostia River.
3	Capitol Beltway (Interstate 495 and 95), except from the northwest ADW water tower, to Forestville Mall, to west side of the three green water tanks (unlighted), to Addison Metro Station, to west side of lighted warehouse, turn northeast along railroad tracks to Beltway. Left to continue route.	At or below 1,300 feet MSL, except between Greenbelt and Woods Corner at or below 1,000 feet MSL. From Woods Corner to Wilson Bridge at or below 800 feet MSL. Cross Potomac River at or below 300 feet MSL on south side of Wilson Bridge.
4	Fort Washington over Potomac River to Wilson Bridge. Then via east bank of Potomac River to Anacostia River. Intercept Helicopter Route 1 at Anacostia River.	At or below 1,000 feet MSL at Fort Washington, Descend to 600 feet MSL to Wilson Bridge. Begin Descent from 600 feet MSL to arrive at 300 feet MSL over Wilson Bridge. Then at or below 200 feet MSL north of Wilson Bridge.
5	Springfield via Interstate 395 (Shirley Highway) to abeam Navy Annex. Direct to Pentagon.	At or below 1,300 feet MSL to Glebe Road at or below 400 feet MSL abeam Navy Annex. Descend to land at the Pentagon.
6	Woods Corner Direct to Bolling Heliport. Direct to Navy Annex.	At or below 1,000 feet MSL to Bolling. Maintain 1,000 feet MSL until past DCA. Descend to 200 feet MSL at Navy Annex.
7	DCA direct to Glebe Road at Shirley Highway then to Virginia Highway Route 7 then to Tyson's Corner. Then direct to Washington Dulles East Control Point along Washington Dulles Access Road to Reston Town Center. Then Direct to AT&T Building and to the Approach end of Runway 19L. Then to south end of Beaverdam Creek Reservoir. Then northeast to U.S. Highway Route 15.	At 1,000 feet MSL to Glebe Road, then at or below 1,300 feet MSL to Tyson's Corner, then to U.S. Highway Route 15.
8	Waldorf MD via Route 5 to Brandywine Road to Junkyard to Jenkins Corner to Woods Corner.	At or below 1,000 feet MSL unless otherwise authorized by ADW ATCT.
9	Virginia Highway Route 7 between Reston and Leesburg, then to U.S. Highway Route 15 between Leesburg and Haymarket, to Interstate 66 between Haymarket and Oakton, to Virginia Highway Route 674 between Oakton and Reston.	At or below 1,300 feet MSL.

Route Number	Route Description	Altitudes
10	East side of Virginia Highway Route 28 from Broad Run to Virginia Highway Route 7 and then to the Town of Manassas. Then south over Virginia Highway Route 28 to intersect the Norfolk and Southern Railroad, then west to Tracks fix.	At or below 1,300 feet MSL.
11	U.S. Highway Route 50 between Interstate 66 and Chantilly.	At or below 1,300 feet MSL.
12	Interstate 95 from the Capitol Beltway (I-495) northwest to the Baltimore Beltway (I-695). Then northeast through Baltimore City via the Fort McHenry Tunnel. Then northeast to a point abeam Baltimore Airpark.	At or below 1,000 feet MSL.
13	Baltimore Beltway (I-695) from Intersection with I-795 southbound and counterclockwise to the I-95 intersection northeast of Baltimore City.	At or below 1,400 feet MSL from Social Security Office Complex to Wilkins Avenue. At or below 1,000 feet MSL from Wilkins Avenue to I-95 northwest of Baltimore City.
14	Interstate 83 (Jones Falls Expressway) from the intersection with I-695 north of Baltimore City, south to the expressway termination, thence direct to Inner Harbor, Direct to I-95 to intersect Helicopter Route 12.	At or below 1,400 feet MSL from I-695 to North Avenue. At or below 1,000 feet MSL from North Avenue to I-95.
15	From the Chesapeake Bay Bridge (U.S. Highway Route 50/301), along the western shore of the Chesapeake Bay and Patapsco River, to the west end of Key Bridge (I-695)	At or below 1,000 feet MSL.
16	BWI arrival traffic only. From the Chesapeake Bay Bridge (U.S. Highway Route 50/301), west along the highway to Ritchie Highway (Maryland Highway Route 2). Then via Route 2 to Pasadena. Further instructions from ATC.	At or below 1,000 feet MSL.
17	BWI arrival traffic only. Baltimore-Washington Parkway from the Capitol Beltway (I-95/495) to the Maryland Highway Route 32 Interchange. Further instructions from ATC.	At or below 1,000 feet MSL.
18	BWI arrival traffic only. From the intersection of I-95 and the Baltimore-Washington Parkway, via the Parkway south to the I-695 intersection. Further instructions from ATC. Aircraft are advised not to over fly school building one mile north of BWI.	At or below 1,000 feet MSL.

Source: Baltimore-Washington Helicopter Route Chart, January 2000

It is important to note that use of the helicopter routes is recommended by FAA, but not mandatory. Helicopters inside the lateral and vertical limits of the Class B airspace are typically assigned to the routes by ATC; however, ATC may direct helicopters to follow alternate routes due to safety, weather, traffic flows, and/or efficiency. Use of the routes outside the vertical and lateral limits of the Class B airspace is entirely discretionary, and of relatively low frequency according to ATC personnel. In addition, helicopters often need to travel to points not on a designated Helicopter Route Chart, necessitating off-route travel for all, or part of a trip. This is especially true for emergency-medical and police operations.

2.6.8 Police Zones

Special Police Zones are also used throughout the Baltimore-Washington area. The zones allow police helicopters to patrol an area with minimal interaction with ATC, which permits the police helicopters to operate with increased flexibility and mobility, without increasing ATC workload. Police helicopters contact ATC upon entering the zone, and are then permitted to operate freely in the zone up to the zone's maximum altitude. The Baltimore-Washington area is divided into multiple zones, as shown on the Helicopter Route Chart. For example, Zone 2 covers most of Northwest and Northeast portions of the District of Columbia, from the surface to an altitude of 1,300 feet MSL. Zone E covers most of downtown Baltimore, from the surface to an altitude of 500 feet MSL.

2.6.9 Transponder Codes

All aircraft within 30 NM of ADW, BWI, DCA, or IAD are required to use a transponder with Mode C altitude-reporting capabilities. A transponder is an electronic device in the aircraft that receives signals from ATC radar, and then "responds" with information about the aircraft's position, altitude, and identification in the form of a unique 4-digit code, which is shown on the controller's radar screen. VFR aircraft operating in Class E and G airspace use a standard transponder code of 1200, which indicates that the aircraft is not being handled by ATC. VFR aircraft within the Class B airspace, and all IFR aircraft, are assigned discrete (unique) transponder codes.

In high-density areas, certain transponder codes may be assigned to certain operators in order to facilitate ATC-pilot communications. In addition, certain codes indicate to controllers that a particular flight is high-priority (e.g. EMS, law enforcement, etc.). Helicopters are assigned the transponder codes shown in Table 2-21, and the transponders allow ATC to more accurately track an aircraft's position, altitude, and identification, and thus provide safe and efficient separation between aircraft.

Table 2-21 Helicopter Transponder Codes

	Washington Area	Baltimore Area
Police	5266	5114
Civilian	5274	5113
Military	5275	5112
MEDIVAC (Priority)	5261	N/A

Source: Baltimore-Washington Helicopter Route Chart, January 2000

2.6.10 Special Use Airspace

The airspace within the Washington and Baltimore Metropolitan areas includes special use airspace that restricts the airspace over specific areas. For example, two special uses were developed because of the September 11, 2001 attack. These include the restricted area within 15 miles of the Capitol (Washington TFR) and the Air Defense Identification Zone (ADIZ). The airspace also includes two prohibited areas: P-56A over the Capitol Mall area and P-73 over Mount Vernon. There is also a restricted are over Quantico, Virginia and several Military Operations Areas (MOA).

The helicopter route chart also includes three Transition Routes to limit impacts on operations at Reagan Washington National Airport and to reduce noise impacts to certain areas. The three routes include the Reagan Washington National Airport Glebe Transition Route, the Pentagon Army Heliport Transition Route, and the South Arlington Transition Area. The Pentagon and the South Arlington routes are intended as noise mitigation measures to reduce noise impacts to the Aurora Hills, Virginia Highlands, Fairlington, Shirlington, and Claremont areas. The Pentagon Transition Route includes the language “Do not over fly Arlington National Cemetery, Aurora Hills, Virginia Highlands, or apartment buildings.” The South Arlington Transition Route include similar language “All aircraft arriving/departing or transiting the South Arlington area shall not over fly Arlington National Cemetery, Aurora Hills, Virginia Highlands, Fairlington, Shirlington, Claremont, or apartment buildings.” The Transition Routes, like all of the established helicopter routes, are voluntary.

2.6.11 Helicopter Operations at Primary Airports

Many helicopter flights originate and terminate at public-use airports in the Baltimore-Washington area, including BWI, DCA, and IAD. Due to the unique operating characteristics of helicopters, including the vertical takeoff and landing capabilities, Air Traffic Control Towers have established procedures for managing helicopters in their airspace.

Since helicopters operate at lower airspeeds and different flight profiles than fixed-wing aircraft, they are usually assigned to routes away from fixed-wing arrival and departure flows. This prevents slow-flying helicopters from unnecessarily delaying faster fixed-wing aircraft, and thus enhances both airport and airspace capacity. For example at DCA, helicopter traffic is often routed via the Glebe Transition Route. Arriving helicopters fly over Glebe Road and Four Mile Run, to approach DCA from the west and thus away from the fixed-wing arrival and departure flows to the north and south. Departing helicopters use the Glebe Transition Route in the opposite direction and travel west over Glebe Road. Fixed-wing and helicopter traffic on a similar route can also be separated by altitude when necessary.

During poor weather conditions (instrument meteorological conditions), helicopters can utilize Special VFR clearances, as described above, to conduct visual approaches to airports, even when most fixed-wing aircraft are executing Instrument Approach Procedures (IAP). This is due to the low-airspeed and low-altitude capabilities of helicopters. Special VFR allows helicopters to remain out of the flow of fixed-wing aircraft; however, special VFR operations are not permitted at Reagan Washington National Airport.

During very poor weather conditions, IFR-certified helicopters can execute the same IAPs as fixed-wing aircraft, including use of Instrument Landing System. The impact of IFR helicopter traffic on airport and airspace capacity is relatively minor since there are relatively few helicopter operations conducted under IFR.

Special Helicopter only IAPs that have lower minimum approach altitudes than the IAPs for fixed-wing aircraft have also been developed by FAA. DCA is the only airport in the region with a Helicopter ILS IAP Runway 01. The Helicopter ILS 007-degree IAP permits helicopters to descend to a minimum approach altitude of 115 feet MSL and requires a visibility of at least 1,600 feet; the comparable fixed-wing IAP has a minimum altitude of 215 feet MSL and visibility of 1,800 feet. A lower minimum altitude and visibility allows an aircraft to safely land at an airport in progressively poorer weather conditions; thus improving the usability of that IAP. Note however that DCA ATCT reports that the military had been the sole user of the Helicopter ILS 007-degree IAP, and due to lack of use, the procedure is scheduled to be de-published.

DCA is the only airport in the region with a separate ATCT position for helicopters. Fixed-wing aircraft contact the ATCT on a frequency of 119.1 MHz, while helicopters use a frequency of 120.75 MHz. Although separate positions exist for helicopter and fixed-wing traffic, they are often managed by the same controller, especially during non-peak operating periods when air traffic volume is relatively low. According to ATCT, the helicopter position is staffed by an individual

controller about 20-percent of the time. This occurs during peak operating periods at DCA when it is necessary to reduce radio communication congestion.

Transient helicopter operations that fly in the vicinity of BWI, DCA, and IAD are typically in contact and managed by the local ATCT at each airport. According to ATC, transient helicopter operations are usually assigned to the VFR Helicopter Routes in order to safely and efficiently separate them from fixed-wing aircraft.

Helicopter operations at non-towered airports and heliports generally follow local traffic patterns and procedures. Many helicopter operators, including corporations, civilian users, military, and police, have standing Letters of Agreement (LOAs) with the local ATCTs. The LOAs document typical procedures and routes used by the individual helicopter operators during VFR, SVFR, and IFR. The LOAs allow ATC and helicopter operators to meet mutual requirements for safe flight and efficient operations.

2.6.12 Northeast CORRIDOR IFR Routes

In addition to the primary VFR routes shown on the Helicopter Route Chart, IFR helicopter routes exist between Washington DC, Philadelphia, New York City, and Boston. The routes are collectively known as the Northeast Helicopter Routes. According to ATC, the routes are used relatively infrequently, due to the low number of helicopters certified to conduct IFR operations. Flight in IMC during the winter months often results in icing conditions due to the low altitudes at which helicopters typically operate. Since there are no helicopters that are certified for flight into known-icing conditions, this constraint also reduces use of the IFR routes.

However, the Northeast Helicopter Association, which manages the routes as a benefit to members, is currently in the process of re-checking and re-publishing the IFR routes. When filing flight plans, ATC has requested that pilots define the route from fix to fix, rather than describing the route by an assigned name.

Additional GPS-based helicopter routes have been proposed for several airports between Richmond and Boston, including IAD. As discussed in Section 2.6.4, GPS is a satellite based navigation system that permits improved position accuracy and direct navigation between airports (as opposed to the intermediate point-to-point navigation required by current ground-based radio navigation systems). The GPS structure is being developed by private contract in the interest of corporate helicopter flight departments that desire an improved route structure. GPS also permits the development of additional instrument departure and approach routes, which would help to more efficiently separate helicopter and fixed-wing aircraft, especially during IMC.

2.6.13 Potomac Airspace Redesign

The Potomac Consolidated Terminal Radar Approach Control (TRACON) Airspace Redesign Project is an on-going FAA effort to more efficiently route IFR aircraft in the Baltimore-Washington area.

TRACONs are ATC facilities that have responsibility for the orderly flow of air traffic arriving and departing from major airports. They manage air traffic between the enroute, high-altitude and low-altitude airspace and the local ATCT airspace. These facilities provide radar vectoring, sequencing, and separation of IFR aircraft. They also provide air traffic service to aircraft operating from smaller airports within the TRACON boundaries, and traffic advisories for VFR aircraft operating in the area. TRACONs use radar to track and guide aircraft, and therefore do not have to be located at an airport.

Until recently, each of the four major airports in the Baltimore-Washington area (ADW, BWI, DCA, and IAD) had its own TRACON. These TRACONs, and the Richmond TRACON, have been consolidated into a new, modern facility located at Vint Hill in Fauquier County, Virginia. The new TRACON is now called the Potomac Consolidated TRACON.

In order to take advantage of the improved coordination and communication capabilities of a consolidated facility, and to address the inefficiencies of the existing airspace structure, the FAA undertook redesigned the airspace Potomac Airspace. The FAA began implementing the redesigned airspace in 2003. Because the airspace redesign is focused on improved efficiency for IFR traffic, including air carrier operations, the impact of the project on helicopter operations will be minimal.

2.6.14 Airspace/ATC Summary

The airspace structure in the Baltimore-Washington area serves to safely separate and route air traffic from one point to another. The existing airspace procedures are designed primarily to accommodate airline traffic. Accordingly, the procedures are also meant to separate higher altitude fixed-wing IFR traffic from helicopters. Since helicopters nearly always operate under VFR at relatively low-altitudes, and use visual landmarks to navigate through the metropolitan area, the system serves the basic needs of ATC and helicopter operators. However, ATC flexibility regarding helicopter routing and altitudes is relatively constrained, especially near major airports during high-demand periods. The increasing use of GPS in the NAS offers the potential for improved flexibility and coordination of helicopter routes. This potential, and other system

constraints and recommendations, will be discussed under upcoming tasks of the System Plan Study.

2.7 Land Use, Zoning Ordinances, & Permitting Procedures

Information concerning regulations and permitting procedures for helicopter landing facilities throughout the Maryland and the Metropolitan Washington Region was collected and analyzed. This information will serve as the basis for the development of policy recommendations to address the future siting of helipads, helistops, heliports and vertiports throughout the region as part of the System Plan, as well as compatible land use planning. The following summary presents an overview of the general land use policies and permitting requirements as well as any issues or concerns of particular jurisdictions concerning helicopter operations.

2.7.1 Methodology

A master list of municipalities with zoning and planning authority was compiled for this effort. A single point of contact was identified for each jurisdiction. Through a combination of phone interviews and municipal code and ordinance analysis, a questionnaire was completed for each jurisdiction. A matrix table, organized by jurisdiction and population size, was created to summarize the results of the data collected (Table 2-22). This table provides for quick reference comparisons and easily discernable trends. Copies of each questionnaire and relevant sections of ordinances or municipal codes have been included in Appendix C (Appendix C is provided under separate cover due to its size).

Beginning with the largest jurisdictions, over 100 interviews were conducted with planners, city managers, zoning administrators and other available staff. As the attached matrix illustrates, many of the smaller jurisdictions with populations with fewer than 2500 people did not have any applicable zoning regulations. Given this trend, for those jurisdictions with a population of fewer than 500 people, interviews were not conducted.

2.7.2 Findings

Generally speaking, the regulation of heliports does not seem to be a concern for most jurisdictions. Less than half of the jurisdictions in the state of Maryland have regulations that address aircraft landing facilities of any kind, including airports. Of those jurisdictions with regulations, the larger, more densely developed jurisdictions tend to have regulations whereas the

smaller, less densely developed areas do not. For the Metropolitan Washington jurisdictions, all but two have some form of regulations related to helicopter landing facilities.

For those jurisdictions without any applicable regulations (i.e. the use is not mentioned in the ordinance) permitting procedures can vary. In some jurisdictions, the ordinance language clearly states that if a use is not expressly permitted, then it is prohibited. Others are less specific and the procedures for creating a "landing zone" would vary on a case-by-case basis. In some instances, permitting a new use could require an amendment to the zoning ordinance or municipal code.

For those jurisdictions that have applicable regulations, most helicopter-landing facilities are permitted as a Special Exception (SE) or Special Use Permit (SUP), used most commonly in industrial and rural residential/agricultural zones. The requirements for obtaining a SE or SUP typically involves a formal application and review by the Planning Commission or Board of Zoning Appeals. Many jurisdictions that specifically regulate heliports, helistops and helipads identified conditions of use or performance standards that need to be met in order to grant a SE or SUP. These dealt with a range of issues including noise, setback requirements, hours of operation, number of aircraft on site, frequency of use, public vs. private use, maintenance facilities, lighting, screening, etc. Many also identify that the design of such facilities must comply with applicable FAA regulations. A small amount of jurisdictions (14 in the State of Maryland) do allow heliports By Right or as a Principal Permitted Use in limited zones. The majority of those allowed By Right are permitted in industrial zones.

Several jurisdictions have definitions that distinguish between helistops and heliports. The definitions vary but the distinguishing factors typically deal with private vs. commercial operations, intensity of use, and whether or not support facilities are on site. Most jurisdictions also indicated that they allow emergency helicopter landings as needed but do not specifically address this in their regulations. For these purposes, some jurisdictions have designated landing areas, while others simply utilize large public open spaces such as athletic playing fields. Some jurisdictions also see hospital helipads as "customary and reasonable" uses and do not regulate them separately. It should also be noted that in most jurisdictions public-uses (as defined by said jurisdiction) are not typically subject to zoning regulations. Therefore, if a heliport were deemed to be a public-use, it could potentially be located anywhere in the jurisdiction.

Very few jurisdictions have established heliports or helipads. Those that do are typically associated with police operations, hospitals or with a nearby airport. Some of the larger jurisdictions did express an interest in increasing helicopter commuting regionally between airports and major downtowns. Some of the smaller, rural jurisdictions mentioned that private use by individuals was typical and did not see this as a problem.

Only a handful of formal applications for helipads, heliports or helistops have been filed in recent years. Most of those interviewed did not feel that helicopter operations were a problem or a concern for their respective municipalities, yet over half of the individuals interviewed would like to see the results of this study and any model ordinance language that is developed.

Table 2-22 and Figure 2-20 summarize the findings of the land use questionnaire.

Table 2-22
Land Use, Zoning Permitting Questionnaire

JURISDICTION	Interview Conducted	Would like study results	Recent applications	Mentioned in Plan	Permitted	By Right	commercial	industrial	rural/residential	other	By Special Exception or Special Use Permit	commercial	industrial	rural/residential	other	By Conditional Use	commercial	industrial	rural/residential	other	Accessory Use	commercial	industrial	rural/residential	other	Not Permitted	No Applicable Regulations	Regulated same as airports	County Regulations Apply	Distinction between heliport, helistop or helipad	
Summary Count	100	65	6	2	38	14	2	9	3		26	12	17	19		6	3	5	6		2	1	1	1		7	59	8	8	9	Notes
Maryland Counties																															
Allegany County, MD	▲	▲			▲	▲			▲																			▲			No distinction for helicopter facilities. Treated under same conditions as airports and landing strips.
Anne Arundel County, MD	▲	▲			▲	▲		▲			▲			▲							▲				▲						SE in low density and marine oriented districts; Accessory uses in higher density residential districts.
City of Baltimore	▲	▲	▲		▲											▲	▲	▲	▲											▲	Helistops allowed in ALL districts as conditional use; Heliports only allowed in Business & Industrial as conditional use.
Baltimore County, MD	▲				▲	▲	▲	▲		▲	▲	▲	▲		▲															▲	Major distinction between heliports and helipads and where they are allowed. See ordinance
Calvert County, MD	▲	▲			▲						▲	▲	▲	▲																	
Caroline County, MD	▲	▲			▲	▲				▲	▲	▲	▲	▲														▲			Regulated same as airports and landing field use; Other: permitted as part of site plan approval in PUD & Mixed Use Floating districts; by right in floodplain overlay districts.
Carroll County	▲	▲	▲		▲	▲		▲																							Concerns with Regional Airport Expansion and potential noise impacts
Cecil County, MD	▲	▲			▲						▲	▲		▲																	
Charles County, MD	▲	▲			▲						▲	▲	▲	▲		▲	▲	▲	▲											▲	Distinguishes between Heliport and Helistops based on frequency of use.
Dorchester County, MD	▲	▲	▲		▲						▲			▲																	Recent private heliports have met with citizen opposition. See questionnaire.
Frederick County, MD	▲	▲	▲		▲						▲		▲	▲																	Recent SE given in Ag zone with conditions regarding size of helicopter, number on site, and flight patterns.
Garrett County, MD	▲	▲																									▲				Not regulated in the County - majority of the County is unzoned. See individual jurisdictions for specific regs.
Harford County, MD	▲				▲						▲	▲	▲	▲																	Regulated as "private aircraft landing facility." Addresses both airfields and heliport design.
Kent County	▲	▲	▲		▲	▲		▲								▲			▲	▲											Currently updating zoning ordinance which will change it from a conditional use to special exception use in similar zoning districts. Also permitted in Marine districts. By right with site plan approval in industrial districts.
Montgomery County, MD	▲	▲			▲						▲	▲	▲	▲																▲	The primary criterion for approval is a day/night average sound level. Commercial, Industrial, and Office are considered "noise compatible," while there are different noise thresholds for rural, suburban, and urban residential areas.
Prince George's County, MD	▲	▲		▲	▲	▲		▲		▲	▲	▲	▲	▲																▲	Heliports are generally equated with airports, while helistops are equated with airstrips. Heliports are also permitted by right in some mixed use districts. Permitted uses vary between heliport and helistops - see ordinance.
Queen Anne's County, MD	▲	▲			▲											▲		▲	▲	▲										▲	Private landing strips and private heliports permitted by conditional use in the Countryside District. Not permitted anywhere else. Public heliports and airports are permitted as a conditional use in the Agricultural, Suburban Industrial and Light Industrial Highway Service districts.
St. Mary's County, MD	▲	▲		▲	▲											▲		▲	▲	▲											Other - Special Air Installations and Airport Environs Overlay District located near the Navy base and one around the airport.
Somerset County, MD	▲	▲			▲	▲				▲	▲		▲	▲														▲			Regulated as an airport. Permitted by right in Airport District
Talbot County, MD	▲	▲			▲						▲			▲																	Permitted as SE in rural agricultural conservation district.
Washington County, MD	▲	▲			▲	▲		▲		▲				▲																	Also permitted by right in Airport District. Landing fields are allowed by SE in Agricultural Districts.
Wicomico County, MD	▲	▲			▲	▲			▲		▲			▲														▲			Considered same as airport. Public facility allowed by Right in A-1; Private facility would require a special exception.
Worcester County, MD	▲	▲			▲						▲	▲	▲	▲																	Distinguishes between police/emergency and public/private heliports. Only emergency/police heliports allowed in commercial by SE.
Cities & Towns population = > 30,000																															
Annapolis, MD	▲				▲						▲		▲	▲														▲			Regulated under airport category. No definition of heliport/helistop.
Bowie, MD																													▲		Prince George's County zoning applies to this jurisdiction
Frederick, MD	▲	▲			▲						▲	▲	▲																	▲	SE in commercial requires special conditions.
Gaithersburg, MD	▲	▲																							▲						Not permitted at the present time. Could be permitted as a public use if appropriate.
Hagerstown, MD	▲	▲																								▲					Neither airports or heliports addressed in Code.
Rockville, MD	▲	▲			▲	▲	▲		▲		▲	▲		▲																▲	Private heliports and helistops are regulated differently based on intensity of use - see questionnaire.

Source: HNTB Corporation

Maryland Aviation Administration

Metropolitan Washington Council of Governments

Table 2-22
Land Use, Zoning Permitting Questionnaire

JURISDICTION	Interview Conducted	Would like study results	Recent applications	Mentioned in Plan	Permitted	By Right	commercial	industrial	rural/residential	other	By Special Exception or Special Use Permit	commercial	industrial	rural/residential	other	By Conditional Use	commercial	industrial	rural/residential	other	Accessory Use	commercial	industrial	rural/residential	other	Not Permitted	No Applicable Regulations	Regulated same as airports	County Regulations Apply	Distinction between heliport, helistop or helipad	
Cities& Towns population = 10,000 - 30,000																														
Aberdeen, MD	▲	▲			▲	▲		▲																			▲				Interviewee indicated that it would be a permitted use in industrial zones.
Cambridge, MD	▲	▲																									▲				
College Park, MD																													▲		Prince George's County zoning applies to this jurisdiction
Cumberland, MD	▲																									▲	▲				
Greenbelt, MD																													▲		Prince George's County zoning applies to this jurisdiction
Laurel, MD	▲	▲			▲						▲				▲																Permitted only in Research and Technology Park Zone
Salisbury, MD	▲																										▲		▲		City ordinance does not address. County allows as SE in Agricultural Districts
Tacoma Park, MD	▲																									▲					Montgomery County zoning applies to this jurisdiction. No zones that permit helicopter landing facilities apply to the City.
Westminster, MD	▲	▲			▲	▲		▲																							
Cities & Towns population = 2,500 - 10,000																														
Bel Air, MD	▲		▲																								▲				Recent application from hospital - was permitted as an accessory use.
Berlin, MD	▲	▲																									▲				
Brunswick, MD	▲	▲																									▲		▲		
Chestertown, MD	▲				▲											▲	▲	▲	▲	▲											Not allowed as conditional use in residential except for hospitals and public safety
Crisfield, MD	▲	▲																									▲				
Denton, MD	▲	▲			▲						▲		▲															▲			No definition for heliports
Easton, MD	▲	▲			▲																▲	▲	▲	▲	▲						Permitted ONLY as accessory use to airports, hospitals, police or other public facilities in any zone.
Elkton, MD	▲				▲						▲		▲																		
Frostburg, MD	▲	▲																									▲				
Fruitland, MD	▲	▲																									▲				
Hampstead, MD	▲																									▲					Use is not expressly permitted; therefore it is prohibited per ordinance language
Havre De Grace, MD	▲	▲			▲						▲		▲																		
Indian Head, MD	▲	▲																											▲		Charles County Regulations Apply
La Plata, MD	▲	▲																									▲				
Manchester, MD	▲	▲																									▲				
Mount Airy, MD	▲	▲																									▲				No language in ordinance. Interviewee indicated that it would likely be treated as a Special Exception
Ocean City, MD	▲	▲																								▲	▲				Prohibited use. Major concern with safety issues pertaining to site-seeing tours.
Pocomoke City, MD	▲																										▲				
Poolesville, MD	▲				▲						▲	▲		▲																▲	
Taneytown, MD	▲	▲																									▲				Currently updating ordinance and would like to address heliports. If study results the development model ordinances, City would like copy
Thurmont, MD	▲																									▲	▲				Use is not expressly permitted; therefore it is prohibited per ordinance language
Walkersville, MD	▲	▲			▲						▲		▲																		Only permits helipads - not "aircraft landing and storage areas."

Source: HNTB Corporation

Table 2-22
Land Use, Zoning
Permitting Questionnaire

JURISDICTION	Interview Conducted	Would like study results	Recent applications	Mentioned in Plan	Permitted	By Right	commercial	industrial	rural/residential	other	By Special Exception or Special Use Permit	commercial	industrial	rural/residential	other	By Conditional Use	commercial	industrial	rural/residential	other	Accessory Use	commercial	industrial	rural/residential	other	Not Permitted	No Applicable Regulations	Regulated same as airports	County Regulations Apply	Distinction between heliport, helistop or helipad	
Cities & Towns population = 1,000 - 2,500																														
Boonsboro, MD	▲	▲																									▲				Interviewee indicated that it would likely be considered as a special exception
Centreville, MD	▲	▲																									▲				
Chesapeake Beach, MD	▲																										▲				
Delmar, MD	▲																										▲				
Emmitsburg, MD	▲																										▲				
Federalsburg, MD	▲																										▲				
Funkstown, MD	▲																										▲				
Greensboro, MD	▲				▲						▲		▲															▲				No mention of helicopter facilities - would be regulated same as general aviation facilities.
Hancock, MD	▲	▲																									▲				
Hurlock, MD	▲	▲																								▲	▲				Use is not expressly permitted; therefore it is prohibited per ordinance language
Leonardtown, MD	▲																										▲				
Lonaconing, MD	▲	▲																									▲				
Middletown, MD	▲																										▲				
Mountain Lake Park, MD	▲	▲																									▲				
North Beach, MD	▲	▲																									▲				
North East, MD	▲																										▲				
Oakland, MD	▲	▲																									▲				
Perryville, MD	▲																										▲				
Princess Anne, MD	▲	▲																									▲				
Ridgely, MD	▲	▲																									▲				
Rising Sun, MD	▲	▲																									▲				
Rock Hall, MD																															City contact was not able to be reached
Smithsburg, MD	▲																										▲				
Snow Hill, MD	▲																										▲				
St. Michaels, MD	▲	▲			▲						▲			▲														▲				
Sykesville, MD	▲				▲	▲		▲																								Only one parcel is zoned industrial in the entire town.
Westernport, MD	▲	▲																									▲				
Williamsport, MD	▲	▲																									▲				

Source: HNTB Corporation

Maryland Aviation Administration

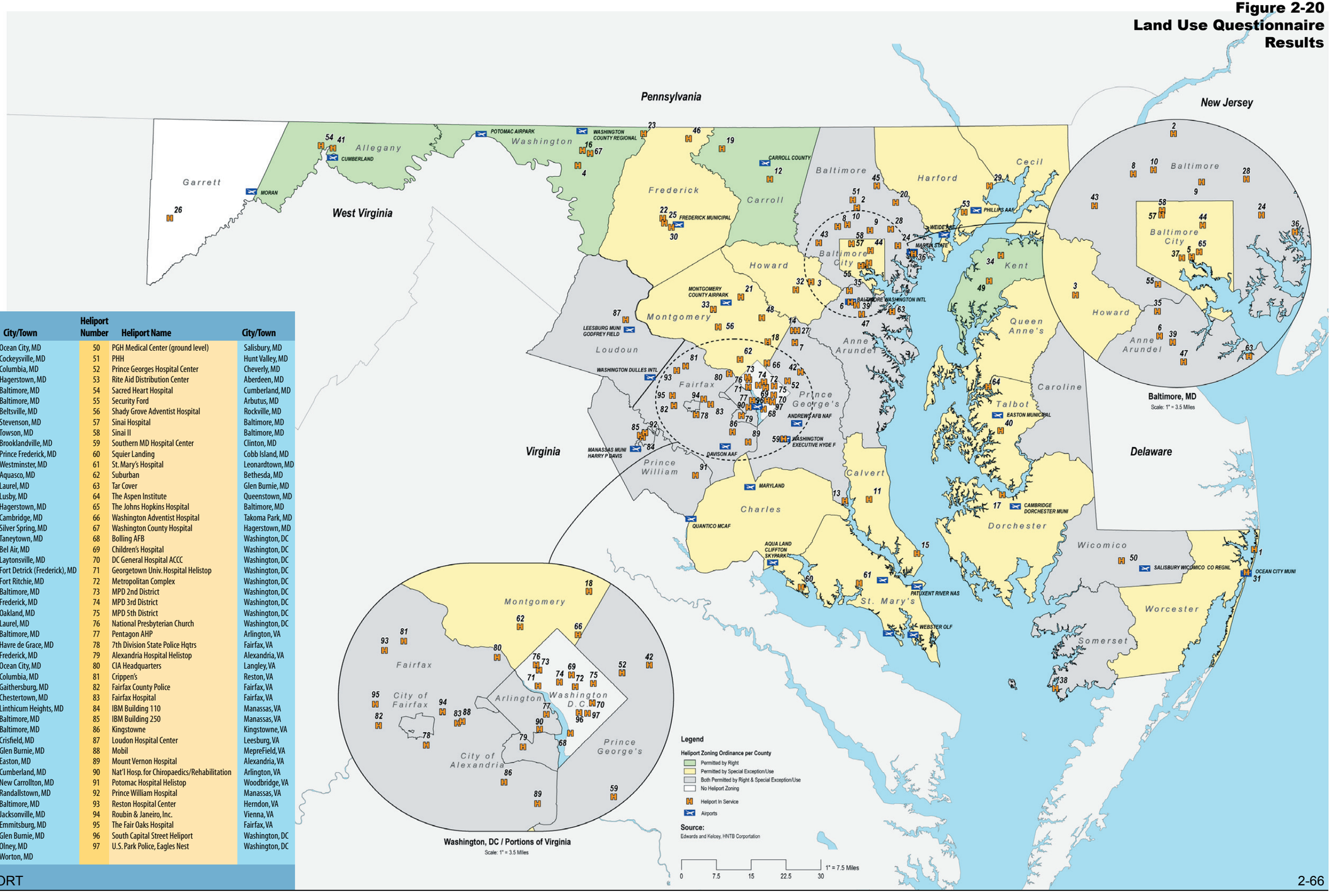
Metropolitan Washington Council of Governments

Table 2-22
Land Use, Zoning Permitting Questionnaire

JURISDICTION	Interview Conducted	Would like study results	Recent applications	Mentioned in Plan	Permitted	By Right	commercial	industrial	rural/residential	other	By Special Exception or Special Use Permit	commercial	industrial	rural/residential	other	By Conditional Use	commercial	industrial	rural/residential	other	Accessory Use	commercial	industrial	rural/residential	other	Not Permitted	No Applicable Regulations	Regulated same as airports	County Regulations Apply	Distinction between heliport, helistop or helipad	
Cities & Towns population = 500 - 1,000																														
Barton, MD	▲																										▲				
Charlestown, MD	▲																										▲				
Chesapeake City, MD	▲	▲																									▲				One of the seven restaurants in town has a helipad and has started to use it for 30-minute tours. It is located very near a residential area, which has complained. City wants to do something about it.
Friendsville, MD	▲																										▲		▲		Zoning administered by Garrett County
Grantsville, MD	▲																										▲		▲		Zoning administered by Garrett County
Hebron, MD	▲	▲																									▲				
Midland, MD																															City contact was not able to be reached
New Windsor, MD	▲																										▲				
Oxford, MD	▲																										▲				
Pittsville, MD	▲	▲																									▲				
Port Deposit, MD	▲	▲																									▲				
Secretary, MD	▲	▲																									▲				
Sharpsburg, MD	▲																										▲				
Sharptown, MD	▲	▲																									▲				
Trappe, MD	▲																										▲				
Union Bridge, MD	▲	▲																									▲				
Willards, MD																															City contact was not able to be reached
Woodsboro, MD	▲																										▲				

Source: HNTB Corporation

Figure 2-20
Land Use Questionnaire Results



Heliport Number	Heliport Name	City/Town
1	65th Street	Ocean City, MD
2	AAI	Cockeysville, MD
3	Aerospace Tech Center	Columbia, MD
4	Allegheny Power-HGR Corp. Center	Hagerstown, MD
5	Baltimore Police Department	Baltimore, MD
6	Baltimore/Washington Intl. Airport	Baltimore, MD
7	Beltsville Shop	Beltsville, MD
8	Berg's Field	Stevenson, MD
9	Black & Decker-parking lot 2	Towson, MD
10	Brooklandville	Brooklandville, MD
11	Calvert Memorial Hospital	Prince Frederick, MD
12	Carroll County General Hospital	Westminster, MD
13	Chalk Point Generating Station	Aquasco, MD
14	Citizens Bank Headquarters	Laurel, MD
15	Clng Cove Point	Lusby, MD
16	Craig Company	Hagerstown, MD
17	Dorchester General Hospital	Cambridge, MD
18	Dow Jones & Co.	Silver Spring, MD
19	Evapco	Taneytown, MD
20	Fallston General Hospital	Bel Air, MD
21	Federal Support Center	Laytonsville, MD
22	Fort Detrick Helipad	Fort Detrick (Frederick), MD
23	Fort Ritchie	Fort Ritchie, MD
24	Franklin Square Hospital Center	Baltimore, MD
25	Frederick Memorial Hospital	Frederick, MD
26	Garrett County Memorial Hospital	Oakland, MD
27	Greater Laurel Beltsville Hospital	Laurel, MD
28	Green Terrace	Baltimore, MD
29	Gregory May	Havre de Grace, MD
30	Grimes Properties	Frederick, MD
31	Hoopers	Ocean City, MD
32	Howard County General Hospital	Columbia, MD
33	IBM	Gaithersburg, MD
34	Kent & Queen Anne's Hospital	Chestertown, MD
35	Maritime Institute	Linthicum Heights, MD
36	Martin State Airport	Baltimore, MD
37	Maryland Institute for Emergency Medical	Baltimore, MD
38	McCready Memorial Hospital	Crisfield, MD
39	MD State Police Barracks (Glen Burnie)	Glen Burnie, MD
40	Memorial Hospital	Easton, MD
41	Memorial Hospital of Cumberland	Cumberland, MD
42	Metroplex	New Carrollton, MD
43	Mitchell	Randallstown, MD
44	Montebello Filtration Plant	Baltimore, MD
45	Mrs. Bozman	Jacksonville, MD
46	National Emergency Training Center	Emmitsburg, MD
47	North Arundel Hospital	Glen Burnie, MD
48	Norwood	Olney, MD
49	Nuodex, Inc.	Worton, MD
50	PGH Medical Center (ground level)	Salisbury, MD
51	PHH	Hunt Valley, MD
52	Prince Georges Hospital Center	Cheverly, MD
53	Rite Aid Distribution Center	Aberdeen, MD
54	Sacred Heart Hospital	Cumberland, MD
55	Security Ford	Arbutus, MD
56	Shady Grove Adventist Hospital	Rockville, MD
57	Sinai Hospital	Baltimore, MD
58	Sinai II	Baltimore, MD
59	Southern MD Hospital Center	Clinton, MD
60	Squier Landing	Cobb Island, MD
61	St. Mary's Hospital	Leonardtown, MD
62	Suburban	Bethesda, MD
63	Tar Cover	Glen Burnie, MD
64	The Aspen Institute	Queenstown, MD
65	The Johns Hopkins Hospital	Baltimore, MD
66	Washington Adventist Hospital	Takoma Park, MD
67	Washington County Hospital	Hagerstown, MD
68	Bolling AFB	Washington, DC
69	Children's Hospital	Washington, DC
70	DC General Hospital ACCC	Washington, DC
71	Georgetown Univ. Hospital Helistop	Washington, DC
72	Metropolitan Complex	Washington, DC
73	MPD 2nd District	Washington, DC
74	MPD 3rd District	Washington, DC
75	MPD 5th District	Washington, DC
76	National Presbyterian Church	Washington, DC
77	Pentagon AHP	Arlington, VA
78	7th Division State Police Hqtrs	Fairfax, VA
79	Alexandria Hospital Helistop	Alexandria, VA
80	CIA Headquarters	Langley, VA
81	Crippen's	Reston, VA
82	Fairfax County Police	Fairfax, VA
83	Fairfax Hospital	Fairfax, VA
84	IBM Building 110	Manassas, VA
85	IBM Building 250	Manassas, VA
86	Kingstowne	Kingstowne, VA
87	Loudon Hospital Center	Leesburg, VA
88	Mobil	MepreField, VA
89	Mount Vernon Hospital	Alexandria, VA
90	Nat'l Hosp. for Chiropaedics/Rehabilitation	Arlington, VA
91	Potomac Hospital Helistop	Woodbridge, VA
92	Prince William Hospital	Manassas, VA
93	Reston Hospital Center	Herndon, VA
94	Roubin & Janeiro, Inc.	Vienna, VA
95	The Fair Oaks Hospital	Fairfax, VA
96	South Capital Street Heliport	Washington, DC
97	U.S. Park Police, Eagles Nest	Washington, DC

3. FORECASTS OF DEMAND

3.1 Background

Forecasting helicopter activity on a local and statewide level has several inherent limitations. First, the size of the regional helicopter fleet is relatively small (140 based helicopters), particularly compared to any other mode of transportation such as general aviation aircraft (3,588 aircraft in Maryland and the District of Columbia[4]). Due to the small size of the helicopter fleet, forecast tools such as statistical correlation and regression analysis are not accurate, and even small changes in the helicopter fleet result in relatively large percentage differences.

Second, the helicopter fleet in the study area serves a wide variety of missions, and therefore does not respond uniformly to changes in the region's economy, the availability and cost of insurance, or even to changes in airspace regulations. For example, a large segment of the helicopter fleet in the region (78 helicopters, 56 percent of the total fleet) are owned and operated by the military. In addition, local, county, and federal government agencies also operate a large portion of the remaining fleet and are less sensitive to changes in the regional economy than are private operators.

Third, although a large proportion of helicopter operations nationwide are conducted by general aviation aircraft, many are also conducted by military, government, and public safety aircraft. Thus, helicopters respond to different factors than fixed-wing aircraft and do not necessarily follow the growth trends of the general aviation fleet as a whole. For example, the majority of piston-engine fixed-wing general aviation flight hours (67 percent) are conducted for personal/recreational purposes, and are therefore relatively sensitive to factors such as per capita income and the rising cost of aircraft ownership and operation. By contrast, only 17.7 percent of all helicopter activity nationwide and only 5.3 percent of turbine helicopter activity is conducted for personal purposes.

There are three forecast periods for this study: the short-term period covers the years 2003 through 2005; the intermediate-term the years 2006 through 2010; and the long-range period the years 2011 through 2020. The base year of the forecasts will be 2002, which was the most recent data available. The reliability of forecasts in general decreases as they progress further into the future, and long-range forecasts must be considered as an outlook, as opposed to detailed projections.

[4] Source: FAA General Aviation and Air Taxi Activity Survey, 2000

Any number of unforeseen circumstances, such as a sharp increase in the price of fuel, or more extensive airspace and airport access restrictions that are difficult to predict could significantly impact future helicopter activity in the region.

FAA's national forecast of helicopter activity indicates that the industry will continue to grow through 2013 (see Table 3-1) even though the total number of active helicopters will increase relatively slowly over the 12-year period. Helicopter utilization as measured by hours flown, however, is projected to increase at a higher rate.

Table 3-1 FAA National Forecast of Helicopter Activity (2003-2013)

Active Helicopters			Hours Flown		
Piston	Turbine	Total	Piston	Turbine	Total
8.9%	2.7%	5.0%	11%	7.8%	8.5%

Source: FAA Aerospace Forecasts Fiscal Years 2002-2013

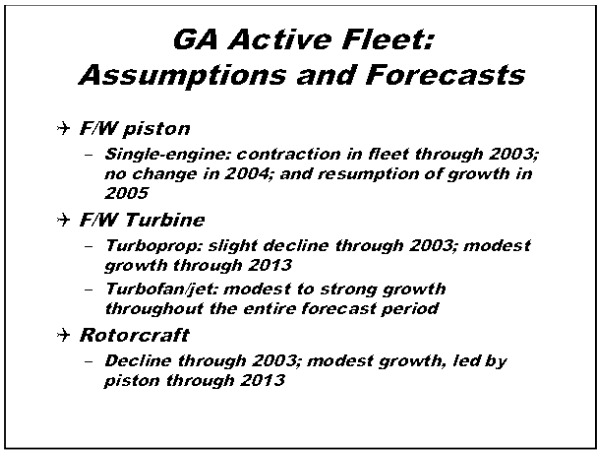
By comparison, turbine fixed-wing aircraft, particularly turbojets, are projected to grow much faster than every other segment of the general aviation market (including helicopters) over the same period (see Table 3-2). With the success of programs such as fractional ownership, and the changes in the airline industry (greater security, rising fares, decreasing service levels and amenities, etc.), demand for corporate aircraft has increased dramatically since September 11, 2001.

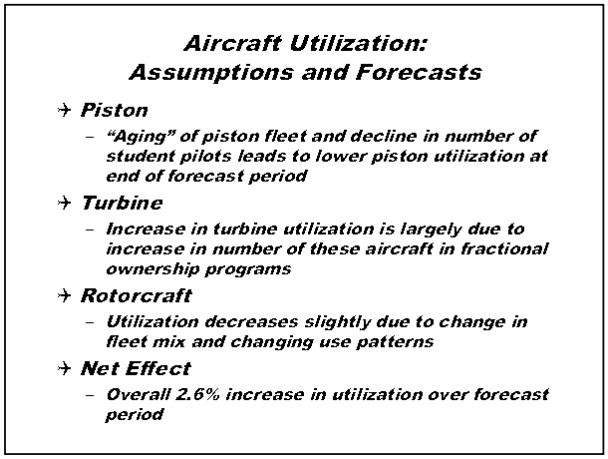
Table 3-2 FAA National Forecast of Fixed Wing General Aviation Aircraft Growth (2003-2013)

Fixed Wing Aircraft			Hours Flown		
Piston	Turbine	Total	Piston	Turbine	Total
2.2%	30.2%	4.2%	8.7	37.5%	14.1%

Source: FAA Aerospace Forecasts Fiscal Years 2002-2013

As noted by George Stamas, FAA, in his presentation at FAA's General Aviation Forecast Conference held on April 23, 2002, the FAA used the following assumptions in developing their general aviation forecasts. While the overall outlook for helicopter activity is positive, there are also a number of potential constraints to future growth as well.





Source: George Stamas, FAA, presentation at the conference: FAA GENERAL AVIATION FORECASTS: 2002-2013, April 23, 2002

At that same conference, the Helicopter Association International (HAI) noted that the helicopter community believes that FAA has under-counted the number of helicopters in the U.S. Based on data from the Transportation Research Board (TRB), HAI believes that there are 55 percent more helicopters (11,100 units vs. 7,150) than FAA has reported in the U.S.

Future demand for helicopter services in Maryland and the Metropolitan Washington Region will be impacted by the factors outlined previously, as well as the region's economic performance. However, the single greatest impact on future helicopter activity in the study region will be the continuation of the flight restrictions over the District, and the lack of access to Reagan Washington National Airport.

While states such as Maryland are currently facing budget deficits, other factors point to continued growth in the region's economy throughout the forecast period, which will continue to generate demand for transportation services, including helicopter access. The State of Maryland has summarized its economic situation as follows:

> "Maryland is the center of the Boston-Atlanta Corridor on the Atlantic seaboard. The State borders on Washington, DC, the nation's Capitol. Among the 50 states, Maryland ranks 42nd in size and 19th in population. Its per capita income is the 5th highest among the states. Approximately 90 percent of Maryland's 5.3 million residents live in the Maryland portion of the Washington-Baltimore Consolidated Metropolitan Statistical Area (CMSA). The entire Washington-Baltimore CMSA represents the nation's fifth largest retail market.
>
> The State's diversified economy is rooted in high technology, biosciences and services, as well as revitalized manufacturing and international trade. Its transportation resources include the interstate highway network, the Port of Baltimore and the Baltimore/Washington International Airport. Of Maryland's population age 25 and over, 31.5 percent hold a bachelor's degree or higher, which is the 4th highest percentage among the states. Professional and technical workers constitute 25 percent of the State's work force—the highest concentration among states in the nation.
>
> Maryland's 145,200 businesses employ 1.97 million workers with an annual payroll of $70 billion. Of these businesses, 3,200 have 100 or more workers. Major employers include the U.S. military, the National Security Administration, Black & Decker, Computer Sciences Corp., General Motors, Hughes Network Systems, Johns Hopkins Institutions, Lockheed Martin, Marriott, McCormick & Co., Northrop Grumman ES3, and Verizon. Significant technology companies include Acterna, Aether Systems, Ciena,

Corvis, Gene Logic, Human Genome Sciences, Manugistics, MedImmune, Peak Technologies Group and Visual Networks.

Maryland has three Foreign Trade Zones, 34 State Enterprise Zones and a Federal Empowerment Zone."

Source: Maryland Department of Business and Economic Development

Senior executives of large companies, such as those previously mentioned, are the primary users of corporate and air taxi helicopter services.

Both the Maryland and Metropolitan Washington Regions have experienced significant growth in population and employment throughout the 1990s, although in the last year the region has also experienced an economic slow-down very similar to other states around the country. Long-term demographic projections for population, employment, and per capita income indicate steady growth in all categories through 2030. In addition, municipalities and the counties are actively marketing private companies to locate their headquarters and facilities in the area, which will generate additional employment.

A number of other factors will impact future helicopter activity in the area:

Region-wide highway congestion and delays: Large segments of the region's highway system have moderate to severe highway congestion, particularly around the District of Columbia and the greater Baltimore Metropolitan Area, which often rank among the most congested urban areas in the country. As former Governor Parris N. Glendening remarked at the Smart Growth/Smart Transportation Conference held at the University of Maryland on December 9, 1999: "Yet it has become increasingly clear that we cannot afford to build our way out of our highway congestion problems. Our development patterns have become so dispersed, that the costs are simply too high – both financially and environmentally." Increasing congestion and delays on the state's highway network, particularly in and around the major central business districts of Washington and Baltimore, stimulate the use of helicopters to by-pass the congestion and delays.

Availability of off-airport landing sites: As noted above, helicopters use airports, heliports, and unprepared landing sites to serve their customers and meet their mission requirements. If local zoning ordinances restrict future private heliport development, and on landing on unprepared sites, helicopter activity will not increase in the future, and in fact may decline.

Continued airspace and airport access restrictions: Temporary Fight Restrictions (TFR) and Special Federal Aviation Regulations (SFAR) have impacted aircraft operations in the greater Washington Metropolitan Area more than any other region of the country. FAA imposed significant restrictions on the airspace over the Washington Metropolitan Area following the attacks on September 11, 2001, which closed three general aviation airports in Maryland, prohibited general aviation access to Reagan Washington National Airport, and continues to impose new restrictions on an as-needed basis. Some of the flight restrictions have been codified into SFARs, which means that they are no longer temporary, but long-term restrictions. These restrictions have prevented, for example, news, aerial photo, and some emergency medical and corporate helicopters from using the airspace over parts of the Washington Metropolitan Area. In fact, all but officially approved (with special civilian authorization) helicopter activity has been severely restricted within much of the Washington Metropolitan Area. If commercial aviation activity is to reach pre 9/11 levels, there seems to be a need for a security system to enable pilots to gain access to the Washington Metropolitan Area airspace similar to the system used for DC-3 airports.

Availability and cost of aviation insurance (both liability and hull): In part in response to the attacks on September 11, 2001, the insurance industry as a whole has been in severe financial difficulty. In order to offset their losses, the industry has been raising insurance premiums by 100 percent and more, and for some commercial operators, insurance is not even available. In fact, declining aviation insurance availability and rising costs had been issues for two years before the September 11th attacks, and has become an even more severe problem since 2001. Further exacerbating the insurance problem has been the dramatic decline in equity values traded on the various stock exchanges, which had served as a large source of financing available to insurance companies. One direct consequence of this on-going situation has been an increase in the operating cost of all aircraft, including helicopters, and indications are that this will be a long-term problem.

Helicopters serve a wide variety of missions and are operated by private companies, public agencies, civilian, and military operators. As a result, helicopter operators do not respond in the same way to a single factor or issue, such as the economy, insurance, airspace, etc. Public agency helicopters such as law enforcement, certain emergency medical operators and military operators, are not directly affected by the state or federal economy, whereas corporate/air taxi, training, personal, and utility helicopter operators are directly affected by the state or federal economy.

According to the operator's survey conducted for this study, approximately 57 percent of the helicopter activity in Maryland is performed by public agencies, and approximately 43 percent by private operators. In the Metropolitan Washington Region, public agencies (including the military)

perform approximately 70 percent of all helicopter operations, while private companies perform approximately 30 percent. Although some public agencies (such as county police departments, for example) lease helicopters from private companies as opposed to owning the aircraft, they are still considered to be public agency helicopters.

Because of the difficulty in predicting future events such as those described above, two forecast scenarios have been identified for this study: Status Quo and Unconstrained. The two scenarios were developed to analyze the impact of possible circumstances on future helicopter activity in the region.

3.2 Status Quo Forecast Scenario

The Status Quo scenario is based on the following assumptions:

- Airspace restrictions will remain in place throughout much of the forecast period, including no general aviation access to Reagan Washington National Airport. Helicopter flights within 15 miles of the Capitol Building will be restricted to officially approved operations, and many missions, such as electronic news, aerial filming, utility, most corporate and air taxi flights, will continue to be significantly restricted.

- General aviation airports within 15 miles of the Capitol Building and White House will have restricted operational use.

- No new public-use heliports will be constructed in Maryland or Metropolitan Washington Region.

- Insurance rates will continue to increase and availability will continue to decrease.

- Security rules will be enacted that require general aviation to adhere to similar screening procedures that are in place for scheduled commercial service (FAR Part 135 and 139) airports and the airlines.

- The cost of helicopter ownership and operation will continue to increase faster than the overall rate of inflation.

If all, or most, of these factors remain in place for the next five to ten years, the helicopter activity in the region will not increase, and may even decline over that time; particularly missions such as corporate/air taxi, electronic news, flight training, aerial filming, etc. Military activity is not

anticipated to decrease in the region. The total number of active helicopters is projected to decline by less than 6 percent over the 18-year period. Because the majority of missions are flown by public agencies, they are not as sensitive to cost pressures as corporate/air taxi, flight training, and other private operations. As a result, it is not anticipated that there would be a significant decline in helicopter activity (hours flown or operations) even if all of the factors described above were in place, and activity is projected to decline over the forecast period by approximately 1 percent. As noted previously, the long-range forecasts are primarily outlooks as opposed to detailed forecasts. Table 3-3, Table 3-4, and Table 3-5 present the status quo forecast scenario of based helicopters.

Table 3-3 Status Quo Forecast of based Helicopters in Maryland

Type	2002	2005	2010	2020
Total Helicopters	69	69	67	67
Piston	9	9	9	9
Single Turbine	29	29	28	28
Twin Turbine	31	31	30	30

Table 3-4 Status Quo Forecast of Based Helicopters in Metropolitan Washington Region

Total Helicopters	71	70	70	68
Piston	2	2	2	2
Single Turbine	14	14	14	13
Twin Turbine	55	54	54	53

Table 3-5 Status Quo Forecast of Total Based Helicopters in Study Area

Type	2002	2005	2010	2020
Total Helicopters	140	139	137	135
Piston	11	11	11	11
Single Turbine	43	43	42	41
Twin Turbine	86	85	84	83

Helicopter operations were forecasted as a function of active helicopters, and therefore reflect a similar decline in activity. However, as noted by FAA, it is also possible that helicopters will increase their utilization (hours flown per year), which would result in very little, if any, decline in helicopter activity (operations) even if the number of active helicopters were to drop slightly.

Table 3-6, Table 3-7, and Table 3-8 present the status quo forecast scenario of helicopter operations. Helicopter operations were estimated based on the national average hours flown per aircraft type (198 hours per piston helicopter, 377 hours per single-turbine helicopter, and 509 hours per twin-turbine helicopter) multiplied by a national average of six operations per hour flown, as described in Section 2.3.3.

Table 3-6 Status Quo Forecast of Helicopter Operations in Maryland

Type	2002	2005	2010	2020
Total Operations	170,964	169,700	167,600	163,400
Piston	10,692	10,600	10,500	10,200
Single Turbine	65,598	65,100	64,300	62,700
Twin Turbine	94,697	94,000	92,800	90,500

Table 3-7 Status Quo Forecast of Helicopter Operations in Metropolitan Washington Region

Type	2002	2005	2010	2020
Total Operations	202,014	200,500	198,100	193,300
Piston	2,376	2,400	2,400	2,400
Single Turbine	31,668	31,400	31,000	30,300
Twin Turbine	167,970	166,700	164,700	160,600

Table 3-8 Status Quo Forecast of Total Helicopter Operations in Study Area

Type	2002	2005	2010	2020
Total Operations	372,978	370,200	365,700	356,700
Piston	13,068	13,000	12,900	12,600
Single Turbine	97,266	96,500	95,300	93,000
Twin Turbine	262,667	260,700	257,500	251,100

3.3 Unconstrained Forecast Scenario

By contrast, the Unconstrained Scenario assumes that a number of factors will occur that will stimulate helicopter activity in the region, including:

- Decreasing or eliminating the airspace and airport access restrictions imposed by FAA and TSA.
- No additional restrictions on the development of private heliports or use of unprepared sites for helicopter takeoffs and landings.
- The construction and operation of a public-use heliport in the Baltimore central business district, particularly near the Inner Harbor.
- The construction and operation of a public-use heliport in downtown Washington, DC.
- Stability in the aviation insurance markets, with modest increases in premiums and availability of insurance to all qualified operators.
- Continued growth of the region's economy.
- Continued regional highway congestion and recurring delays.

Of all of the factors listed above, the first two (lifting airspace/airport restrictions, and no additional restrictions on private heliports and unprepared landing sites), would likely have the greatest impact on regional helicopter activity. If some or all of the factors listed above occur, then

helicopter activity will increase at least at the rate projected by FAA nationally. However, different segments of the helicopter market will respond differently to each of the factors listed above, so the rate of growth will not be uniform across the statewide fleet. The number of based helicopters will increase by almost 18 percent over the 18-year period. Table 3-9, Table 3-10, and Table 3-11 show the unconstrained forecast scenario of based helicopters.

Table 3-9 Unconstrained Forecast of Based Helicopters in Maryland

Type	2002	2005	2010	2020
Total Helicopters	69	71	74	81
Piston	9	9	10	11
Single Turbine	29	30	31	34
Twin Turbine	31	32	33	36

Table 3-10 Unconstrained Forecast of Based Helicopters in Metropolitan Washington Region

Type	2002	2005	2010	2020
Total Helicopters	71	72	76	83
Piston	2	2	2	2
Single Turbine	14	14	15	16
Twin Turbine	55	56	59	65

Table 3-11 Unconstrained Forecast of Total Based Helicopters in Study Area

Type	2002	2005	2010	2020
Total Helicopters	140	143	150	164
Piston	11	11	12	13
Single Turbine	43	44	46	50
Twin Turbine	86	88	92	101

Table 3-12, Table 3-13, and Table 3-14 present the unconstrained forecast scenario of annual helicopter operations.

Table 3-12 Unconstrained Forecast of Helicopter Operations in Maryland

Type	2002	2005	2010	2020
Total Operations	170,964	175,400	183,700	200,900
Piston	10,692	10,700	11,500	12,600
Single Turbine	65,598	67,400	70,500	77,100
Twin Turbine	94,674	97,300	101,700	111,200

Table 3-13 Unconstrained Forecast of Helicopter Operations in Metropolitan Washington Region

Type	2002	2005	2010	2020
Total Operations	202,014	207,400	216,900	237,000
Piston	2,376	2,400	2,400	2,400
Single Turbine	31,688	32,500	34,000	37,200
Twin Turbine	167,970	172,500	180,500	197,400

Table 3-14 Unconstrained Forecast of Total Helicopter Operations in Study Area

Type	2002	2005	2010	2020
Total Operations	372,978	382,800	400,600	437,900
Piston	13,068	13,100	13,900	15,000
Single Turbine	97,286	99,900	104,500	114,300
Twin Turbine	262,644	269,800	282,200	308,600

Out of state helicopter operators: As noted previously, out-of-state operators conduct a small percentage of their operations in the Maryland and Metropolitan Washington Region for several reasons: the lack of public-use heliports in Washington, DC and Baltimore; the lack of access to

Reagan Washington National Airport; and the significant airspace restrictions. Activity by out-of-state operators dropped by 20 percent after September 11, 2001, and is not likely to rebound until those issues are resolved. In part due to the relatively low level of out-of-state activity, combined with the fact that the operators based inside the study area conduct some of their activity outside of the region, the net increase in helicopter activity generated by out-of-state operators is felt to be negligible, and was not projected as a separate element.

4. ECONOMIC AND SOCIAL BENEFITS OF HELICOPTER ACTIVITY

4.1 Introduction

The purpose of this analysis is to examine the economic impact of helicopter activity within the study area – the State of Maryland and the Metropolitan Washington Region – also referred to as the study area.

Helicopters perform a level of community service that is often unrecognized, and this service is a vital utility that is one of the many key infrastructure elements that improves the quality of life through increased safety, security, and access to business.

Traditional economic benefit approaches are unlikely to identify significant benefits because of the small scale of helicopter activity and the relatively few numbers of employees associated with those operations. Given the unusual dynamics of the nation's Capitol and operating constraints that are equally unique, the measurement of direct and indirect/multiplier benefits will capture only a portion of the overall future impact.

Therefore, this study takes into consideration non-traditional and intangible benefits, such as enhanced law enforcement, improved access to medical facilities, and other benefits resulting from the availability rather than the activity of helicopter services. This review will be based on academic and industry literature, and will provide a comprehensive picture of helicopter benefits now and in the years ahead.

4.2 Helicopter Activity in the Study Area

There are a number of reasons why both private and public agencies operate helicopters in the catchment area. However, uses of helicopters specifically in the Metropolitan Washington Region including neighboring Maryland counties, particularly corporate/business/air taxi, air tours, utility/ construction, aerial filming and photography, have all declined dramatically in the past two years due to airspace and access restrictions that are still in effect following the attacks of September 11, 2001. Conversely, military and police helicopter operations have grown to become an even more significant portion of activity in Metropolitan Washington, accounting for more than 66 percent of all helicopter activity, while in Maryland, EMS, police, and military flights comprise over 56 percent of activity. Although the U.S. military generates significant economic benefits to the region, military helicopter operations were not analyzed in this report because they are just one part of the much

larger military presence in the region, and specific data concerning the amount of money spent on military helicopters in the area is not available. EMS and police activity were not included in the traditional economic impact model but the benefits of these services to the community are discussed in qualitative and non-economic based quantitative analyses.

The economic, transportation, and community benefits of the following types of civilian helicopter activities in the region were analyzed. As noted above, many of these activities have been severely curtailed within Metropolitan Washington since September 11, 2001, and there is no indication of when the restrictions will be lifted.

- Disaster relief – services in response to both natural (hurricanes, floods, earthquakes, etc.) and man-made disasters (high-rise fires, terrorist activities, etc.)
- Airborne law enforcement – police patrol and surveillance
- Aerial observation – monitoring pipelines and power lines, geotechnical survey, etc.
- Corporate/business/air taxi – business executive/VIP transportation
- Construction work – install rooftop HVAC equipment and antennas, erect pre-assembled electric power transmission towers, and move heavy equipment
- Agricultural and forestry operations – spread seeds, fertilizer, weed killers, and insecticides, monitor forest conditions, assist logging operations
- Emergency medical service (EMS) – serve as flying ambulances, transporting medical supplies, personnel and by rushing the injured to hospitals
- Electronic news coverage/gathering (ENG) – monitor traffic congestion and report on breaking news events
- Flight training

4.3 Traditional Economic Impacts of Helicopter Activity

Traditional economic impact (regional input-output) studies evaluate and measure two primary categories of economic impact:

- Direct impacts – economic transactions that occur as a direct result of the service and/or entity

- Induced impacts – the multiplier effect that occurs as money circulates through the economy as a result of the initial expenditures from the direct impacts

Economic impacts measured include employment, payroll, and expenditures attributable to the presence of helicopter operations. It was estimated that helicopter operations created the following annual direct economic impacts (see Table 4-1):

Table 4-1 Direct Annual Economic Impacts of Helicopter Activity In 2002

	Metropolitan Washington	Maryland
Jobs	158	252
Payroll	$5,530,000	$8,820,000
Local Expenditures	$1,382,500	$2,205,000
Total Direct Impacts	$6,912,500	$11,025,000

The direct impact estimates are based on typical expenditures by helicopter type (i.e. twin engine, piston, etc.) and standard personnel requirements to operate a helicopter. Personnel requirements are also based on operation types. For example, medevac operations will include paramedic personnel as well as pilots, maintenance, and administrative personnel.[5]

Induced impacts are estimated through the use of a multiplier. Any direct expenditure into the local economy by helicopter operators will be re-spent by the recipients of these initial expenditures, creating additional economic activity. This process continues as the second recipient of the "initial" expenditure spends money in the local economy. At each stage the amount of initial expenditure declines as the money departs the local economy. The "multiplier" is a measure of the total economic impact of all stages of the initial expenditure. The FAA uses multipliers based upon a region's population. As both Maryland's and Metropolitan Washington's population exceeds 3 million, a multiplier of 1.0 is used per the FAA. Thus, the total induced impacts are equal to 1.0 times the direct impacts. Total impacts are the sum of both direct and induced estimates as shown in Table 4-2.

[5] Economic impact assumptions for each helicopter type were obtained from the interviews with operators and the "heliport and helicopter Master Plan for the City of New York". Commercial fleet mix data from Report No. 1 was used to aggregate economic impacts.

Table 4-2 Total Annual Economic Impacts of Helicopter Activity (Direct & Induced)

	Metropolitan Washington	Maryland
Direct Impacts	$6,912,500	$11,025,000
Induced Impacts (x1.0)	$6,912,500	$11,025,000
Total Economic Impacts	$13,825,000	$22,050,000

4.4 Helicopters and the Regional Economy

Before outlining the categories of non-traditional economic benefits of helicopter operations, it is important to provide an overview of the study area's economy, discuss major types of helicopter users, and identify top local companies that use helicopters within the region.

The true economic benefit of helicopter activity results from more than the number of jobs created or the expenditures generated. Helicopter activity generates economic benefits in terms of financial gains and social benefits. In other words, what does the "helicopter consumer" gain from the use of a helicopter, be it the general public or individuals?

The economic benefits of helicopter activity within the catchment area were identified through surveys and interviews with helicopter operators and users. The surveys and interviews revealed that companies using helicopters often "perceive" the benefits of time saved, but did not necessarily quantify the actual value of time saved and compare it to the cost of using helicopter services. In fact, none of the companies or organizations contacted for this study had prepared a formal helicopter cost/benefit analysis, even though helicopters are a very high cost mode of transportation.

For example, two of the most popular helicopters used by companies are the Bell 206L and Sikorsky S-76C. Charter rates for a Bell 206L Long Ranger (1-6 passengers, cruise speed 110 knots, range 320 nm) average between $900 and $1,000 per hour. A Sikorsky S-76, by comparison, can seat up to 10 passengers (typically 6 in corporate configuration), cruise at 155 knots, has a range of 600 nm, and typically charters for between $2,500 - $3,000 per hour.

The use of aircraft for corporate and business-related travel is typically listed as an overhead expense by accounting departments, and is not directly reimbursable by the customer. As a result, companies support the use of business aircraft (as with other overhead expenses) with cash flow

generated by corporate profits and rising stock prices. When corporate profits and stock prices decline however, companies often reduce overhead expenses, including use of company aircraft.

Three major types of users in the region were surveyed in 2002:

- Companies that utilize helicopters to support their business operations
- Companies and municipalities that provide a public service (including police/law enforcement and medical/emergency activities)
- Heliport/helistop owners (although they are often the same companies and individuals that own helicopters)

In order to document the benefits of helicopter activity in the region, the balance of this Chapter contains an overview of the regional economy and a description of how helicopter activity relates to the economy.

4.4.1 Overview of the Maryland and Washington Metropolitan Economies

The Maryland economy is gradually transforming from a manufacturing and trade based economy to a major technological center. A key factor in this growth has been its location adjacent to the nation's Capitol. The presence of several federal agencies and research centers including NIH, FDA, NSA, FCC, NASA, the Universities of Maryland, and John Hopkins has created an environment of innovation and cutting edge commercial opportunities in the telecommunications, IT, and biotechnology industries. The state boasts the highest concentration of professional and technical workers in the country.

However, transportation and manufacturing still play an important role in the economy. Over 180,000 persons are employed in manufacturing. The state's port, railroad, and highway infrastructure, as well as BWI Airport are vital in the distribution of goods and products nation and worldwide.

Since the late 1990s, the economy in and around Metropolitan Washington has experienced a boom that was largely attributable to growth in the technology sector. However, the current economic recession, evident since March 2001, has largely reversed this positive growth trend, and currently Maryland, Virginia, and many municipalities in the area are facing growing budget deficits.

Between 1996 and 2001, the high-tech and biotechnology sectors combined generated more than 100,000 jobs, and saw annual growth rates of 5 to 6 percent. The rapid expansion of these two industries, which employed a large number of executives, managers, and senior scientists, stimulated the demand for corporate/air taxi helicopter services in the region. Due to severe traffic congestion throughout the region, schedule-driven senior managers needed timesaving, effective short-haul transportation to commute to business meetings. Added concerns about the safety and security of top officials further emphasized the benefit of helicopter use.

Table 4-3 summarizes the profiles of leading corporations that use helicopters in the catchment area. In response to the survey, these companies indicated various benefits that were derived from helicopter use in the catchment area.

Table 4-3 Top Local Companies Using Helicopters in the Catchment Area

Company	Annual Sales	Employees Total/Local	CEO Salary	HQ/Local Office
AOL Time Warner	$37 B	15,000	$77,374,633	Dulles, VA
AT&T	$59.1 B	177,373/2,560	$17,227,004	Basking Ridge, NJ Beltsville, MD
American Express (Tax and business services)	$22.5 B	270/2,800	$10,400,000	New York, NY
Baltimore Gas & Electric	$3.8 B	3,800/3,800	$767,000	Baltimore, MD
Cigna Corporation	$19.1 B	N/A	$2,200,000	Philadelphia, PA
Gannett Corporation	$6.2 B	53,400/1,906	$12,221,827	Arlington, VA
Philip Morris Management Corporation	$72.9 B	N/A	$7,681,701	New York, NY
Rouse Company	$1.06 B	3,700/3,700	$2,600,000	Columbia, MD

Sources: Fortune 500; AFL-CIO Pay Watch

Starting around March 2000, the composition of the area economy began a shift from technology to defense and financial services. The eleven largest defense contractors in the nation employ more than 48,000 people in the Greater Washington Metropolitan Region. Following the events of

September 11, 2001, the creation of new federal agencies such as the Transportation Security Administration (TSA) and the Department of Homeland Security have resulted in additional demand for goods and services related to national defense. Therefore, for those companies utilizing helicopters in the Maryland and Virginia areas, demand is forecasted to increase. For those companies that must attend meetings in Washington, DC, airspace restrictions remain an impediment to this very quick and efficient mode of transporting employees. A detailed summary of the airspace restrictions affecting the region is provided in Chapter 2. A combination of factors, including shifts in the region's leading industrial sectors, a faltering economy, and airspace restrictions most severely impacting Washington, DC, have contributed to a decline in demand for corporate helicopter services within the catchment area.

4.4.2 Summary of Heliport Activity

Within the Maryland and Metropolitan Washington Regions there are a total of fifty and forty-eight heliports, respectively. Of these, only one heliport is designed for public-use, South Capitol Street, with the remaining identified as private use facilities. In addition, public-use airports such as Tipton, Martin State, and Manassas Regional are also important helicopter facilities in the system.

Because of South Capitol Street's unique situation as the area's only public-use heliport, a more detailed analysis of activity at this facility was conducted. The South Capitol Street Heliport was formerly operated by Air Pegasus, and now operated by America Rising/Glenwood Aviation. It is located at 1724 South Capitol Street SE, near the Anacostia River in the Buzzard Point section of South East Washington DC, between the Metropolitan Police Department 1st District repair station and the U.S. Coast Guard Headquarters. It is also close to the U.S. Park Police heliport located on the River. This heliport has been in operation for over six years, providing a variety of services to support helicopter operations including fuel, helicopter parking and hangar facilities, pilot lounge, auto parking, etc.

Prior to September 11, 2001, the heliport handled approximately 2,300 operations annually. Of that total, about 1,200 operations (52 percent) were conducted by corporate/business/commercial helicopters, and about 1,100 operations (48 percent) were conducted by law enforcement helicopters. Commercial operations included electronic news coverage, construction, tourism/sightseeing, medevac, aerial photo/filming, and small package delivery. Law enforcement missions included aerial surveillance, crowd control, criminal pursuits, and backup for ground patrol officers.

Prior to September 11, 2001, operations at South Capitol Street heliport had been increasing from year to year. It was forecast that activity at South Capitol Street heliport would continue to grow at

a rate of about 13 percent over the next five years. However, since September 11, 2001 helicopter operations have declined by over 90 percent from the previous year's activity. For the year ending December 2002, there were 100 police/law enforcement, 24 corporate, 18 military, and 6 filming operations recorded at the heliport. This drop in activity has resulted in an estimated loss of about $2 million in direct revenue in 2002.

The future recovery of activity at the South Capitol Street heliport remains severely hampered by post-September 11, 2001 airspace and access restrictions. Furthermore, Reagan Washington National Airport remains closed to all general aviation traffic. However, in spite of those restrictions, America Rising/Glenwood Aviation has announced plans to initiate scheduled helicopter service between the Capitol Street Heliport to downtown Manhattan, NY in the near future. If this service is initiated and it generates sufficient traffic to support the operation, it would result in a significant increase in utilization, revenue generation, and economic impacts within the catchment area.

The Temporary Flight Restrictions (TFR) in and around the nation's Capitol are now in effect indefinitely, armed personnel are required to accompany certain helicopter flights within the TFR, and the Secret Service must pre-approve all helicopter flights. In addition, heliports operating in the restricted areas must obtain approval for their Ground Safety Plans, which includes a pre-screening of a limited number of pilots who are allowed to access the restricted airspace.

Within the District, helicopter users have shifted primarily to government agencies, including federal security agencies, as well as federal, municipal, and county police departments. Corporations have shifted operations to the region's airports, including Dulles International and Leesburg in Virginia, Martin State, Cumberland, Salisbury, Frederick, and St. Mary in Maryland. While helicopter traffic is shifting to other facilities within the catchment area, the convenience of using the downtown South Capitol facility has been lost. When Air Pegasus closed its office in July 2002, America Rising reestablished operations at the heliport with very limited commercial helicopter activity. The District of Columbia's aviation unit continues to maintain its office at South Capitol Street.

4.5 Benefits of Helicopter Use

The benefits of helicopter use within the catchment area can be segmented into six primary sectors: air medical services, corporate/air taxi, public service/police, forestry, electronic news, and business/economic development, based on the compilation of data gathered for this study. Figure 4-1 and Figure 4-2 show annual helicopter trip operations in 2002, according to the purpose of the missions flown.

Figure 4-1 2002 Annual Operations by Purpose for Maryland

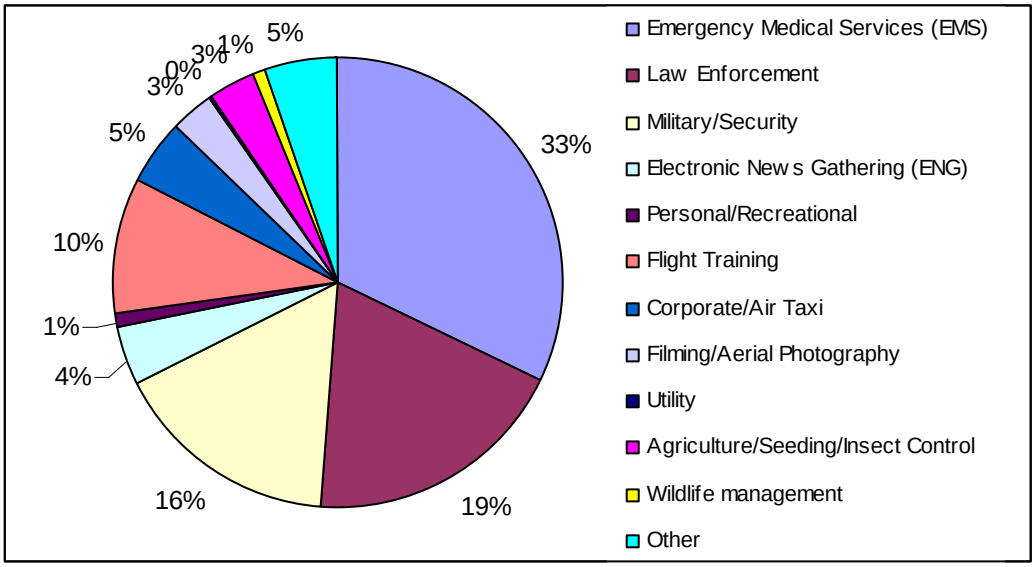
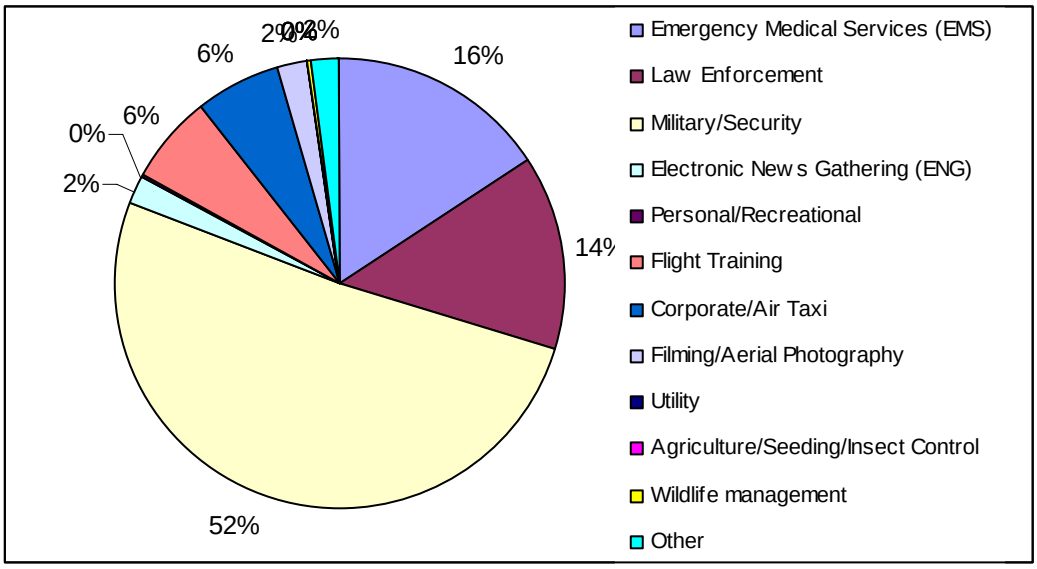


Figure 4-2 2002 Annual Operations by Purpose for COG



4.5.1 Air Medical Services

Air medical services have become an important supplement to the Emergency Medical Service (EMS) system in both emergency scene response and inter-hospital transportation. In 2002, the greatest use for helicopters in Maryland was for EMS and medical transfers, accounting for 12,917 and 6,254 annual trips, or 21.8 percent and 10.5 percent respectively. In the Metropolitan Washington catchment area in 2002, EMS trips accounted for 3,289 operations (5.7 percent) and there were 5,889 (10.2 percent) medical transfers flown.

Helicopters and fixed-wing airplanes are a growing and critical part of the EMS, providing high-speed inter-hospital transfers of critically ill or injured patients needing immediate and definitive care. Based on research compiled by the Association of Air Medical Services (AAMS), air medical service helps to:

- Reduce morbidity and mortality by decreasing transport time;
- Transport specialized care teams and/or equipment to a patient;
- Lower the likelihood of a disability through the timely transport of a patient to the hospital;
- Lower a patient's total health care costs; and
- Timely transport an organ transplant team and/or donor organ.

There are numerous advantages to utilizing air medical transport over land-based medical transport. Circumstances prompting the use of medical transport via helicopter, include:

- Time can impact the chances of a patient surviving. Inefficient transport times expose patients to an environment where the ability to respond to life-threatening complications is seriously hampered. Air medical services can significantly reduce the time in delivering critical or high-risk patients to definitive care.
- Patients require critical care life support (monitoring, personnel, medications or specific equipment) during transport that is not generally available from the local ground ambulance services.
- The patient's clinical condition requires that the time spent out of the hospital environment be as short as possible.

- Ground transport delays, e.g. road obstacles and traffic, have the potential to worsen the patient's clinical status.
- The patient is located in an area that is not accessible to regular ground traffic.
- The use of a local ground transport team would leave the local area without adequate EMS coverage.

The Association of Air Medical Services (AAMS) produces the *Annual Transport Statistics & Fees Survey* (the "Survey") that presents statistics on the use of hospital-based helicopter transport. The AAMS segments the United States into ten regions, in which the District of Columbia and Maryland are located in Region IV. The 2000 Annual Survey, the most recent year available, reported the following data for Region IV:

1. Characteristics of patients transported by hospital-based helicopter programs were:
   - 42 percent adult medical
   - 41 percent adult trauma
   - 11 percent pediatric medical
   - 6 percent pediatric trauma
2. Scene mission locations
   - 8 percent urban/suburban
   - 88 percent rural
   - 4 percent wilderness

In Maryland, the aviation division is spread over eight bases, strategically placed throughout the state, with headquarters at Martin State Airport in Baltimore. Statewide, the operation employs 150 people. This division is the sole provider of scene-to-hospital air medical transportation throughout Maryland, serving a population of more than 5 million people. The invaluable benefit to the regional population is the high survival rate of EMS patients, reflecting the service's ability to match a patient with the appropriate medical facility. Within the District and northern Virginia, a number of private EMS operators provide this service.

Benchmarking and Life Saving Impact: In a 2003 study that reviewed and contrasted approximately 25 studies from around the world in addition to its own research, a final report to the U.K. Department of Health produced some wide-ranging observations. The report, "A Review of the Costs and Benefits of Helicopter Emergency Ambulance Services in England and Wales" (produced by the Medical Care Research Unit of the University of Sheffield, March 2003) blended the findings and analysis of many studies in an attempt to produce tangible results.

One key conclusion was as follows: "The estimated number of lives saved by HEAS (Helicopter Emergency Ambulance Services) is approximately 2-3 patients per 100 patients transported."

Using these statistics, the impact on our study region would be as follows:

Maryland EMS Trips (2002)	12,917	
Metro Wash EMS Trips	3,289	
Total Study Area Trips	16,206	
Round Trips (One Half of Total)	8,103	
Estimated Ratio of Lives Saved	2.5%	(using 2-3 from above study)
Estimated Lives Saved in Study Area	203 Lives	

Regardless of attempts to quantify the value of life-saving medical services, the human element cannot be ignored. An air ambulance operator received the following note:

> *" I am so grateful to everyone who helped us! The doctors were fantastic. After talking to the neurologists at Hopkins I now know that the doctors literally saved her life. … I really can't thank you enough but, as a parent, I think that you can understand my deep, deep gratitude. I hope you realize your job is very, very worthwhile and families like ours will be eternally grateful!"*
> (Letter quotation on air ambulance web site)

4.5.2 Corporate/Air Taxi Service

On average, Americans spend 14.5 million hours everyday stuck in traffic, generally as a result of the daily work commute, attending a business meeting, or supplying goods and services to consumers. The Texas Transportation Institute (the "Institute") produces the *Urban Mobility Report* that tracks the costs of such traffic immobility. In the 2002 report, the Institute concluded that congestion cost approximately $68 billion in the 75 urban areas in 2000. The report segments the information based on four urban area categories: Very Large, Large, Medium and Small. Table 4-4 illustrates the cost of congestion for Baltimore and Washington metro regions and other Very Large urban areas.

Table 4-4 Cost of Congestion for Baltimore and Washington Metro Areas (2000)

Annual Cost Due to Congestion ($ Millions)				Per Peak Road Traveler		Per Person	
Urban Areas	Delay	Fuel	Rank	$ Millions	Rank	$ Millions	Rank
Los Angeles, CA	12,585	2,050	1	2,510	1	1,155	1
New York, NY	6,645	1,015	2	1,400	7	450	21
Chicago, IL	3,575	520	3	1,235	13	505	17
San Francisco-Oakland	2,745	465	4	1,770	2	795	2
Dallas-Fort Worth	2,320	320	5	1,390	8	695	3
Washington, DC	2,020	305	6	1,595	4	655	6
Houston, TX	2,005	280	7	1,410	6	675	4
Detroit, MI	1,675	230	8	1,030	20	475	20
Baltimore, MD	745	115	19	965	22	395	25

Source: 2002 Urban Mobility Report, Texas Transportation Institute

The Washington DC metro area ranks sixth for annual congestion costs, totaling $2.325 billion (delay and fuel), while Baltimore ranks 19th with annual congestion costs totaling $860 million. The ranking for Washington, DC increases to fourth per peak road traveler with an average cost of $1,595 annually to travel on the roadway system during peak hours while Baltimore's rank decreases to 22 with an average cost of $965 annually. The mobility data for the Washington, DC metro area reported that there are 9.6 hours during the day when the roadway system is congested and 8 hours in Baltimore. Furthermore, total annual delay in person-hours in Washington, DC and Baltimore is reported at 123.2 million and 44.4 million, respectively.

Based on the cost of congestion and delays, surveys were administered to corporations located in the catchment area that utilize helicopters for daily business operations. The surveys revealed that, on average, corporations located in the area saved over $20,000 (direct dollar savings only) each per year through the utilization of the helicopters for transportation. In addition, the companies surveyed revealed the following:

- The primary users of the company's helicopter services are generally top level executives, i.e. President/CEO, Vice President, and Chief Financial Officer.
- The top factors that contributed to the company's decision to utilize helicopters included savings in travel time, reduced travel expenses, convenience and importance of business meetings.
- Helicopters are utilized for transportation, generally, in excess of 12 times during a month.

Table 4-5 lists companies in the catchment area that responded to a 1995 survey conducted for South Capitol Street Heliport, Table 4-6 list companies that responded to the 2002 survey conducted for this study, and Table 4-7 lists large companies based outside of the catchment area that operate helicopters into and out of Metro Washington and Baltimore.

Table 4-5 Companies Responding to 1995 South Capitol Street Survey

Company	Company	Company
1. Air Pegasus	8. Express Marine	15. IBM Flight Ops
2. American Express	9. Florida Aviation	16. Jet
3. Aviation Business Jets	10. Gannett Co.	17. Liberty Helicopters
4. Bell Helicopter	11. GTC	18. Lyn Star Aviation
5. Cigna Corporation	12. Horizon Helicopters, Inc.	19. Merck Flight
6. Consol, Inc.	13. HTS, Inc.	20. Phillip Morris Management Company
7. DOC, Inc.	14. Textron	

Table 4-6 Companies Responding to 2002 Survey

Company	Company	Company
1. AOL Time Warner	6. Fairfax County Police	10. Fox 5 WTTG
2. AT&T Aviation	7. Maryland State Police	11. USDA Forest Service
3. MedStar Transport	8. Glenwood Aviation	12. Maryland Department of Natural Resources
4. Advanced Helicopter Concepts	9. Helinet Aviation	13. South Capitol Street Heliport
5. Baltimore County Police		

Table 4-7 Helicopter Operators/Companies Based Outside of the Catchment Area

Name	City	State
1. Horizon Helicopters	Newark	DE
2. MBNA Corporation	New Castle	DE
3. Agrotors	Gettysburg	PA
4. Aventis Pharmaceuticals	Allentown	PA
5. CJ Systems Aviation Group	West Mifflin	PA
6. Carson Services Inc.	Perkasie	PA
7. EmergyCare Inc.	Erie	PA
8. Haverfield Corporation	Carroll Valley	PA
9. Hawk Flight Inc.	Lititz	PA
10. Keystone Helicopter Corporation	West Chester	PA
11. LIFE LION Aeromedical Service	Hershey	PA
12. Lehigh Valley Helicopter Inc.	Allentown	PA
13. Liberty Bell Helicopter Inc.	New Hope	PA
14. New World Aviation Inc.	Allentown	PA
15. Press-Enterprises	Bloomsburg	PA
16. RiteAid Corp.	Middletown	PA
17. STAT Medevac	West Mifflin	PA
18. Sterling Helicopter	Philadelphia	PA
19. WNEP-TV	Moosic	PA
20. Cecil I. Walker Machinery Co.	Charleston	WV

Name	City	State
21. International Industries Inc.	Gilbert	WV
22. West Virginia Department of Environmental Protection	Nitro	WV
23. AT&T Aviation Division	Morristown	NJ
24. American International Aviation Corp. Inc.	Teterboro	NJ
25. Analar Corporation	Princeton	NJ
26. Avaya	Morristown	NJ
27. ExcelAire Service Inc.	Farmingdale	NJ
28. Express Marine	Camden	NJ
29. FL Aviation Corp.	Morristown	NJ
30. Helicopter Resources, LLC	Rumson	NJ
31. Herlihy Helicopters Inc.	Medford	NJ
32. Honeywell Inc. - Aviation Department	Morristown	NJ
33. Hornell Brewing Co. Inc.	Morristown	NJ
34. J. Fletcher Creamer & Son Inc.	Hackensack	NJ
35. Jet Aviation Business Jets Inc.	Teterboro	NJ
36. Johnson & Johnson	W. Trenton	NJ
37. Liberty Helicopters	Linden	NJ
38. Lucent Technologies	Morristown	NJ
39. M.G. Aviation	Teterboro	NJ
40. Metromedia Company	Teterboro	NJ
41. Pfizer Inc.	West Trenton	NJ
42. Port Authority of New York and New Jersey	Teterboro	NJ
43. Public Service Electric and Gas Company	Newark	NJ
44. R.O.P. Aviation Inc.	Teterboro	NJ
45. Schering-Plough Corporation	Morristown	NJ
46. Schiavone Construction Co.	Teterboro	NJ
47. Sony Aviation	Teterboro	NJ
48. Unisys Corporation	W. Trenton	NJ
49. Weatherstone Air Inc.	Teterboro	NJ

Business and corporations that use helicopters as part of their transportation mix are attempting to address the challenges found in other modes of travel. Among the benefits seen from helicopters are the following:

Time savings: As pointed out, primary users of these services are key company executives, whose time is most valued by their respective firms. Given other alternatives, time savings can be found in travel to/from heliports versus commercial airports, security clearances, check in and processing, luggage check and retrieval, and actual transit time en route.

Travel flexibility: Busy executives using helicopter services do not have the same constraints regarding travel time, seat availability, and other accommodations. The transportation itself becomes less of a burden to accomplishing business missions and allows corporate leaders to concentrate on the job ahead.

Enhanced working environment and productivity: These business leaders have recognized the disruption and level of distractions involved in using other modes of transportation, while helicopter services provide better conditions that are conducive to productive work during transit.

Reliability of operations and on time performance: Business leaders regularly discuss the pitfalls of commercial aviation, particularly given constraints within the aviation/airport systems and the impact of weather and other unforeseen factors. Ground transit, too, can be very unstable and unreliable, particularly as the aforementioned gridlock congests our metro areas and makes lead-time planning more and more difficult. Helicopter operations, like other forms of corporate aviation, offer the ability to plan with precision not available via other modes of travel.

Sample benefits: In a study conducted jointly by the National Business Aircraft Association and the General Aviation Manufacturers' Association (cited on NBAA.org/public/news), the time savings element of these benefits was found to be as follows for the use of executive aircraft:

1. Trip distance of under 500 miles	Round trip savings of 3 hours, 56 minutes
2. Trip of 500 – 1,500 miles	Total savings of 4 hours, 26 minutes
3. Trip of over 1,500 miles	Total round trip savings of 5 hrs, 26 minutes

Based on the research conducted, the study concluded that, like the time value of money commonly analyzed in financial calculations, it was also appropriate to address the time value of executive and middle-management time. Findings concluded that multipliers in the range from 3.8 to 5.7 were appropriate for professional employees and senior executives, respectively.

In simple terms, a $100 per hour business executive, traveling by helicopter the 12 times per month cited in the corporate survey, and saving approximately four hours for each journey, would create the following economic benefit to the company represented:

$400 value of time per hour
Average of 4 hours saved per trip
Average economic savings/trip of $1,600

With a bit of extrapolation, these benefits can add up quickly in their total impact of helicopter services:

Average economic savings per trip	$	1,600
Number of estimated annual round trips in study area		2,450 (2002 data)
Total annual impact in study area		$3.9 million

In short, the benefits of helicopter operations to corporations are very real. However, it is this extended economic impact that highlights the true benefits, yet often remains hidden using traditional input-output modeling approaches. Dollars saved by the use of corporate executive helicopter transit can be reallocated to R&D, additional employment, and other business uses that create value within the regional economy.

4.5.3 Public Service

Police resources are significantly enhanced by the use of airborne (helicopter) law enforcement. Police rely on helicopters to assist many daily functions including crowd control during celebratory events, routine patrol of national monuments, escorting government officials and dignitaries, capturing criminals, and transportation to crime scenes.

In 2002, the sniper attacks in the Washington, DC-Virginia-Maryland area resulted in an unprecedented combination of local, multi-state and federal law enforcement resources, including helicopter support provided by the Customs Service. As the nation's capitol, Washington, DC has also had an excessive resource drain on law enforcement resources. The coverage required during the International Monetary Fund (IMF) demonstrations in September of 2002 required 1,500 DC police officers and 1,700 officers from other jurisdictions around the country to manage the crowd of 2,000 protestors that met across the city.

With the development of national, regional and city-specific homeland security plans, including the heightened concern for countering terrorism, the use of helicopters in law enforcement has become

increasingly critical. In 2002, Maryland flew 6,087 police/fire patrol missions and 5,067 law enforcement missions, representing a combined 18.9 percent of overall operations activity in the state. In the Washington Metro catchment area, there were 8,808 patrol missions flown and 10,330 law enforcement trips flown, representing a combined operations activity of 19,138. The types of missions used by aerial law enforcement include: criminal searches, vehicle and foot chase assistance, rooftop checks, recovery of stolen autos, aerial surveillance, aerial support, lost person searches, critical mission person search, suicidal persons search, and warrant services/SWAT deployment.

The Maryland State Police Aviation Division has one of the largest state police helicopter fleets in the country. The division is unique among its law enforcement counterparts, because it uses a single pool of cross-trained personnel in a single airframe family for three different missions: EMS, SAR and police work. The Virginia State Police cover the Eastern corridor and patrol the entire state performing search and rescue, EMS, law enforcement and hoist work.

The benefits of utilizing helicopters for law enforcement include the ability to:

- Cover an area fifteen times faster than a ground patrol unit. Another way to describe this benefit is to note that the aerial advantage gives the helicopter approximately 15 times the surveillance capacity of a ground unit, referring to square mileage as well as time.

- Perform the same level of observation and tactical support as ten to twelve officers. Other figures from Department of Justice studies indicate that in perimeter containment and search situations, one helicopter can be as effective as 23 officers on the ground in terms of observation ability.

    - Police and Patrol Officers had a median wage of over $48,000 in the Washington metro region, according to the Bureau of Labor Statistics. With benefits, training, and other overhead expenses reaching as high as 30-40 percent of wages, the impact of efficiencies achieved by helicopter operations is significant.

- Sample Benefits: Efficiencies gained by as few as four (4) helicopter units, performing the support of 40 officers (only using a ratio of 10 officers per one helicopter), would yield approximately $2.5 million annually.

- Improve response times and arrest rates due to its ability to contain and reach an area faster compared to ground units. By providing visual coverage during pursuit that is superior to ground forces, helicopter units communicate to law enforcement vehicles with details of the case as it takes place.

- Remain immune to vehicle and pedestrian traffic thereby having greater mobility and enhanced operational flexibility often required for successful completion of the mission.

- Increased safety of law enforcement officers. By providing back up, support, and rapid coverage of on-scene activities, criminals are deterred from assaulting ground patrol officers.

- Enhance public safety and effectiveness during the pursuit of fleeing criminals.

  - Given the visibility of helicopter pursuits, the suspects can easily be made aware of the helicopter's presence with the hope that the suspect will cease fleeing.

  - A helicopter pursuit operation study was conducted by the National Institute of Justice; research on two study sites (Baltimore City and Miami-Dade County) an 83-91 percent success rate as measured by arrests per the number of pursuits in the sampled cases.

The demands on law enforcement agencies continues to increase, as local and global events conspire to pressure our officials to protect and defend our citizens. Even as this Regional Helicopter System Plan is being conducted, an increase in the alert status has created the need for Capitol-area road blocks and vehicle inspections and searches of vehicles and buses. Such

demands on police further perpetuate the need for the back-up and support of aerial teams and their helicopter operations in this region.

4.5.4 Agriculture/Forestry/Wildlife Preservation

Helicopters provide a benefit to the agricultural and forestry industries through the advantages of aerial observations and for land and water management activities. In Maryland, there are 146,776 acres protected by land trusts (42 total public and non-profit land trusts). In 2000, there were 8,114 square miles of rural land area, of which 17.5 percent is deemed as "urban land area." Helicopter patrols are a vital part of natural land surveillance and protection efforts.

Approximately 22 percent of the District of Columbia is comprised of National Park Service property, which coordinates its law enforcement efforts closely with the Metropolitan Police. The U.S. Park Police Aviation Unit performs criminal searches, surveillance, medevac, and search and rescue – especially on the Potomac and Anacostia Rivers.

It was estimated in a census conducted in 1997 by the Maryland Department of Agriculture that the sales crop value for the state was $458,719,000. The state of Maryland in 2002 reported that agriculture-related trips accounted for more than 3 percent of helicopter trips, or 1,966 missions. There was no activity for this purpose in the Washington Metropolitan Area. The primary areas of use for agriculture-related trips were:

- Aerial planting – the replanting and reseeding of fields and forests;
- Aerial fertilizer applications – fertilization by air allows the treatment of vast land areas in response to short-term microclimatic changes and soil conditions;
- Land and water management – aerial surveying to identify water and irrigation needs, and for detecting signs of insect damage or erosion;
- Animal food drops and rescues – early winter storms may necessitate airborne food drops, and sick animals are treated with airborne veterinary assistance or used for animal evacuations; and
- Forestry firefighting – airborne firefighting and rescue missions, when ground access is difficult or prohibited.

4.5.5 Electronic/News Media

The use of helicopters to monitor traffic congestion and report on news events has increased in importance due to roadway congestion, crime, and other news related events. In 2002, Maryland reported 2,507 trips flown while the Washington Metro area had 1,051 trips flown for this purpose. WTTG/Fox 5, headquartered in Washington, DC, is the local station that features traffic reporting as part of its program services. Its news program ranked fourth in its time period in the November 2002 sweeps. In the Baltimore news market, station WJZ also provides helicopter news coverage. Both stations use Helinet Aviation to offer this programming feature.

The Radio-Television News Directors Association (RTNDA), with a membership of 3,200 news executives, has issued guidelines for appropriate use of "helicopter coverage", to discourage its use to drive up ratings during sweep periods. Public service oriented electronic news benefits include:

- In areas that are geographically large with congested traffic, helicopters can be the fastest and often only means of investigating an accident or other situation that affects the security of a community.
- Law enforcement agencies often ask news helicopters to assist in search and rescue missions.

RTNDA has been lobbying to remove the Federal Aviation Administration's airspace restrictions on news and traffic helicopters that were imposed following September 11, which immediately affected 30 of the largest U.S. cities.

4.5.6 Regional Economic Development

Recruitment of new companies is an activity in which a large number of communities aggressively engage, and transportation advantages have long been an important element in that business development process. From a small company to a large, multi-national corporation, decisions regarding the placement of facilities and the ensuing dedication of resources are carefully analyzed and often used as leverage to create increased competition between prospective cities.

Costs of living and doing business, access to a strong labor pool at reasonable rates, availability of land and facilities on which to locate, and a wide variety of other factors are part of the decision. As these factors are weighed, cities and states often offer lucrative incentives in the form of

financing, tax deferrals, exemptions from fees, and other means of making their own offer more attractive.

In the context of this Regional Helicopter System Plan, however, the Maryland-Washington Metro study area is unique in many ways, and a relatively non-quantitative discussion of potential economic benefits of helicopter/heliport operations should include a review of these issues. Outlined briefly below are some ways in which our region can be compared and contrasted with others across the nation, with the differences highlighting how strong, robust helicopter operations may ultimately help overcome our challenges and actually enhance our competitive advantage when competing with other regions for business and economic growth.

Economic Development and Business Recruitment: Communities around the globe conduct aggressive economic development programs for the same direct and induced impacts outlined in this heliport study. These cities clearly identify and recognize the benefits derived from an increased infusion of business and labor and the multiplier impact that naturally follows.

The City of Atlanta, for example, posts a list of 10 categories of business incentives on its development web site atlantadowntown.com:

- Business Improvement Loan Fund
- Development Impact Fee Exemptions
- Urban Enterprise Zone
- Tax Increment Financing
- The Phoenix Fund
- Atlanta Neighborhood Development Partnership
- Land Bank Authority
- Atlanta Renewal Community
- Low Income Housing Tax Credits
- Urban Residential Finance Authority

The local incentives are then followed by a longer list of “State and Federal” incentive programs, further highlighting established programs used to keep and attract businesses and their employees.

Unique Characteristics and Challenges of the Maryland-Washington Metro Study Area: Unlike the majority of cities, however, the Washington area has its own unique characteristics, as briefly discussed below.

1. Highly visible ground transportation challenges. The challenges of working in Washington, DC itself has become the subject of increasing discussion, to the extent that transportation policy issues and alternatives are being actively debated to relieve congestion and reduce both stress on employees and overall transit time.

2. Need for access to government agencies and decision makers. The Bureau of Labor Statistics lists over 600,000 government employees in the Washington MSA alone, not including key contractors, suppliers, and other firms that do business with the government agencies. To businesses located in the rest of the nation or in other countries, it is often a necessity to at least maintain contact with the government or the related contractors.

3. Costs of living and doing business. It is understood that the costs of living in major metropolitan areas are often high, but the Washington area creates its own barriers. Based on cost of living relocation estimates provided by Bankrate.com, moving to the Washington area would require a 25 percent increase in income to maintain the same standard of living if coming from Minneapolis, 37 percent from St. Louis, and 44-45 percent if relocating from Birmingham or Charlotte.

   Further evidence of these pressures comes from nearby counties that house those who work in the region. Montgomery County officials have released statements (April 20, 2004) that "Montgomery County is in an affordable housing crisis. The median price for a new single-family detached home is over half a million dollars." The report goes on to point out that it is no wonder that so many people must commute to their jobs from Frederick, MD, West Virginia, and even Pennsylvania – "making our traffic nightmare worse and creating havoc in the lives of the commuters."

4. Population distribution and trends. In a survey of sixteen states that can generally be characterized as having one predominant city or metro area, it was found that in comparing 2003 data to that of 1998, the primary cities grew slightly faster than the out-state communities. In fact, those cities represented 47 percent of their states' collective populations in the 1998 data, and had increased to 48 percent by 2003 (41 million people out of a total of approximately 85 million collectively in those states). In the study area, however, the outlying regions of Maryland and Virginia have been shown to experience higher growth rates than the core metro areas. Noteworthy among those higher-growth areas are Frederick, MD and Fredericksburg, VA.

Implications: Helicopter services offer some unique opportunities to play a role in the economic development process, but the uniqueness of the Washington area may suggest that those benefits will continue to emerge from out-state migration and population build-up. As companies seek to balance their need to have people "on the ground" in Washington yet avoid the increasing challenges of ground transportation, long commutes, and high costs of living, projections indicate that communities such as Fredericksburg, VA and Frederick, MD will continue to witness growth as outposts of the region. Although helicopter shuttles will continue to be reserved for key business leaders within such companies, it may be the only form of realistic transportation to and from the Washington core area for those who need access and can establish more formal operations in less expensive, less congested outlying communities.

To understand the impact of the business retention and recruitment process, using an example of jobs lost may prove to be a good indicator. The Sacramento Regional Research Institute published the following analysis of the losses from the closure of a Hewlett-Packard facility:

Direct job losses (Hewlett-Packard)	517
Additional jobs lost as a result	1,135
Annual economic output per employee	$184,778
Total Economic Impact	$302.1 million in annual output losses

As an example, as the benefits of helicopter service become an integral part of the study region's economic development advantages, it is very likely that smaller and mid-sized firms can continue to establish operations in cities such as Frederick and Fredericksburg and still maintain the access and presence required in the Washington market. If a 100-person firm were used to estimate the impact, the results would be as follows:

New jobs/employment	100
Additional/related employment	100 (using only a 1.0 multiplier, not the 2.3 that Sacramento found)
Average economic output per job	$150,000 (also less than Sacramento)
Total annual impact	$30 million

4.6 Conclusion

Helicopter operations are a cornerstone of the public service and law enforcement sectors. This type of air service is particularly important in densely populated cities such as Washington, DC and Baltimore. Because of the unique performance characteristics of a helicopter, compared to other air service vehicles, it remains beneficial in emergency medical situations where accessing a

heliport, or even a helistop, may not be an option. In addition, flight missions may require take-offs and landings in small confined areas. As the demands of the military, state and federal areas of government require more complex and sophisticated homeland defense and anti-terrorism plans, helicopter use is likely to increase. Needs could range from emergency, rapid response efforts, aerial surveillance in support of mass evacuations or routine anti-terrorist monitoring of national landmarks, to the need for expedited transportation of key personnel and equipment if roadways and other modes of transportation are congested or inoperable.

With the anticipated growth of roadway congestion, the use of helicopters by police and EMS operators is likely to remain the largest use category benefiting the catchment area population. Support for this conclusion takes into account the continuing increase in the region's population, expected to increase by approximately 4.3 percent between 2000 and 2005 in Maryland alone.

Helicopter operations for commercial and corporate uses in the catchment area, on the other hand, have been severely impacted by a combination of highly inhibiting factors. Corporate use of helicopters for top-level management is considered a sound expenditure for minimizing travel time for key employees. However, due to the recent recession, numerous workforce downsizing, and revelations of corporate financial scandals putting the focus on auditing practices, it may not be viewed as "politically correct" to use this high-cost transportation mode. While the benefits remain sound and viable, the justification may be considered inappropriate in the current economic climate. These economic factors, combined with the impact of homeland security airspace restrictions will likely inhibit the use of helicopters for commercial or corporate purposes within the Washington Metro area in the near term. Furthermore, the airspace restrictions will continue to inhibit electronic news media, filming/aerial photography, and tourism-related helicopter operations.

In summary, the true economic benefits and impact of this region's helicopter services are not limited to those traditionally identified by direct and induced values. Although those estimates are critical to the understanding of heliport operations, many other quantifiable and non-quantifiable elements must be considered. The economic and social benefits are summarized in Table 4-8.

Table 4-8 Summary of Economic and Social Benefits

Category	Source of Benefit	Value (2002 dollars)
MD Direct Impact	Payroll, Local Expenditures	$11,025,000
MD Indirect Impact	Add'l Economic Activity	$11,025,000
MW Direct Impact	Payroll, Local Expenditures	$6,912,500
MW Indirect Impact	Add'l Economic Activity	$6,912,500
Air Medical Services	Emergency and Life Saving	203 Lives Saved
Corporate Travel	Executive Efficiencies and Reinvestment of Funds	$3,900,000
Law Enforcement	Police Unit Efficiencies	$2,500,000
Agriculture/Forestry	Reseeding, Land & Water Management, Firefighting	Community Benefits, Not Directly Quantifiable
Electronic/News Media	News and Traffic Reporting, Assistance to Law Enforcement	Community Benefits, Not Directly Quantifiable
Regional Economic Development	Job Creation via Outlying Access to Washington	Community Benefits, Not Directly Quantifiable

Finally, there are a number of services that can only be provided by helicopters. A partial list includes the following items:

- Rapid response to remote medical emergency sites
- Transfer of trauma cases to specialty medical facilities
- Aerial coverage of congested roadway situations
- Night search missions with high intensity lighting
- Ability to follow any fleeing vehicle and radio to ground units
- Aerial surveying to identify emergency land and property damage
- Wide ranging searches for missing persons and lost children
- Aerial evacuations when land-based options are not viable
- Ability to quickly provide on-site support for surrounding jurisdictions (as well as receive support when needed)

Maintaining and supporting helicopter operations requires modest investment, but it does need the recognition it deserves for the unique benefits provided. Traditional economic impact values only identify a very small portion of the overall picture, and this long and growing list of helicopter activities highlights the role helicopters play as a vital component of our regional infrastructure.

5. HELIPORT FACILITY RECOMMENDATIONS

5.1 Synopsis

Emergency medical services, law enforcement, government needs, corporate and business travel, aerial observation, disaster relief, news coverage, and other important uses are examples of how helicopters help support the daily lives of the people who live and work in this region. Helicopters will continue to serve an important transportation and public service role in Maryland and the Metropolitan Washington Region well into the future.

A goal of this study was to ensure that the current helicopter system meets the region's transportation and public services needs. The conclusions are that an improved system of public-use helistops and heliports is needed to meet current and future demand. The heliport facility recommendations were identified through discussions and surveys with existing helicopter operators and the Study Advisory Group formed for this project. The improved system would include the following:

1. All hospitals providing trauma and critical care services should be equipped with an established heliport. Hospital heliports are privately owned facilities providing a unique service to the public by facilitating the fast and safe transfer of patients.

2. Public-use helistops in various geographical areas throughout the study area are needed, particularly in the Metropolitan Washington and Baltimore areas. The helistops would provide an improved system for the drop-off and pickup of helicopter passengers. The current system of airports, which provides the primary public-use drop-off and pickup locations, are not located near business centers and other land-based transportation facilities where most of the passengers are generated. A system of public-use helistops would also provide quick access for emergency medical and police helicopters responding to accidents.

3. The need for a downtown heliport in Washington, DC and Baltimore were also identified. The downtown heliports would primarily benefit corporate, charter/air taxi operators, and perhaps scheduled commercial helicopter operations. Other operators would also use the downtown heliports such as government and public service agencies.

Recent airspace and operational restrictions as well as new security and governmental issues have significantly changed helicopter operations within the study area. Therefore, it is important that

adequate facilities are in place to address these changes and to meet the long-term transportation and public service needs.

5.2 Characteristics of the Existing Heliport System

Helistops, heliports, and airports provide the landing sites for the various helicopter operators in the region, which include corporate, medical, police, military, and private owners. The majority of these operators are based at airports in Maryland and Virginia, with only a few located directly at a heliport facility. These facilities constitute the existing heliport system. Each type of operator, however, uses the existing system of heliports differently. A list of the major operators within the study area is provided in Table 5-1.

Table 5-1 Major Helicopter Operators in Catchement Area

Operators in Maryland	Base	Operator Type
Advanced Helicopters	Frederick Airport	Public-Use
Anne Arundel County Police Dept. *	Tipton Airport	Police
Baltimore City Police	Martin State Airport	Police
Baltimore County Police	Martin State Airport	Police
America Rising/Glenwood Aviation	Tipton Airport	Public-Use
CVC Helicopters, Inc. *	Darlington	Corporate
Helicopter High, Inc.	Martin State Airport	Public-Use
MedStar Aviation	Easton, Fredrick, Indian Head & Tipton Airports	Medical
Maryland Army National Guard – 29th Aviation Brigade	Edgewood	Military
Maryland State Police	Martin State Airport	Police
Prince George's County Police *	Wash. Executive Airport	Police
Stat Medevac	Martin State Airport	Medical
Whirlwind Aviation Inc.	Frederick Airport	Public-Use
Operators in Metropolitan Washington		
Anne Arundel County Police Dept. *	Tipton Airport	Police
AOL/Time Warner	Dulles Int. Airport	Corporate
Bechtel Nevada	Andrews AFB	Corporate
Capitol Helicopter	Fairfax Heliport	Public-Use
CVC Helicopter Inc.	Darlington, MD	Corporate
Fairfax County Police Dept.	Fairfax, VA	Police
HeloAir	Sandston VA	Public-Use
Inova Hospital	Fairfax County Hospital	Medical
Metropolitan Police Dept.	South Capitol Street	Police
Prince George's County Police Dept. *	Wash. Executive Airport	Police
US Air Force - 89th Airlift Wing	Andrews AFB	Military
U.S. Park Police	District of Columbia	Government
12th Aviation Battalion	Davison Airfield	Military
DC National Guard	Davison Airfield	Military

* Operators Common to Each Region

Source: Edwards and Kelcey, Inc.

5.2.1 Existing Heliport Facilities

There are 50 helistops/heliports within Maryland. All of these are private facilities that are not open to the public. Additionally, there are 36 airports in Maryland that permit helicopter use, most of which are open to the public.

In the Metropolitan Washington Region, there are 48 designated helistops/heliports with an additional 16 airports. All but one of the helistops/heliports are private use facilities. South Capitol Street heliport is privately owned, but is available for public-use. However, the use of South Capitol Street heliport has been severely impaired due to the current airspace restrictions imposed in the Washington, DC area. The only helicopters currently operating at the South Capitol Street heliport are police, medical, and government aircraft.

Table 5-2 summarizes the current facilities in both regions. The Metropolitan Washington Region includes counties within Maryland, thus the table notes which facilities are in both areas. The current facilities generally fall into three categories: hospital heliports, general use helistops, and public-use full service heliports.

Table 5-2 Heliports, Helistops, and Airports by Type (2002)

Facility	Private/Corp	Government	Military	Medical	Public Use	Total
Maryland						
Heliport	15	5	3	27	0	50
Airport	0	0	4	0	32	36
Total	15	5	7	27	32	86
Metropolitan Washington						
Heliport	12	10	3	22	1	48[1]
Airport	0	0	2	0	14	16[2]
Total	12	10	5	22	15	64

Source: Edwards and Kelcey, Inc.

5.2.1.1 Hospital Heliports

Hospital heliports are typically treated as "special cases" of private-use facilities because they provide a unique public service. Most states require hospitals to have heliports in order to obtain certification as a Level 1 trauma facility. There are currently 27 hospital helistops in Maryland and 22 in Metropolitan Washington. The heliport is normally located in close proximity to the hospital emergency room, and can be either rooftop or ground level.

5.2.1.2 General Use Helistop Facility

A general use helistop facility can be either privately or publicly owned and open to the public or limited to private use. A public-use facility is available for use by the general public without prior approval of the owner or operator. A private facility is generally restricted to use by the owner or operator, but some allow others to use it with prior permission. A helistop will generally include only the basic facilities and may be paved or turf. It typically accommodates helicopters used by individuals, corporations, air taxi services, EMS operators, as well as public service and government agencies. There are currently 15 private use helistops in Maryland and 12 in Metropolitan Washington. There are also a number or private government facilities within the region as well. There are currently no public-use helistops in either Maryland or Washington, DC.

The configuration of a general use helistop can vary, depending upon the types and level of operations that are expected. A basic facility incorporates a single landing area with typically two approach paths in and out of the facility. The facility may have lights for night operations and an instrument approach for poor weather operations.

5.2.1.3 Public-Use Heliport Facility

A public-use heliport is available for use by the general public without prior approval of the owner or operator. A heliport may be privately or publicly owned and operated. It also accommodates helicopters used by individuals, corporations, air taxi services, and EMS operators. Larger and busier heliport facilities may have multiple landing areas, parking for several helicopters, and a small terminal building. The facility should have lights for night operations and an instrument approach for poor weather operations. There is currently only one public-use heliport in the study area, the South Capitol Street heliport.

5.3 Forecast Demand

A number of factors will impact future helicopter activity in the study area. The most recent FAA Helicopter Forecasts (2003/2004) estimates that there will be a continued growth in the active U.S. helicopter fleet, helicopter utilization, and hours flown through the year 2015. The U.S. helicopter fleet is forecast to grow at about 0.6 percent annually, utilization is forecast to grow on average at 0.3 percent annually, and hours flown is forecast to grow at 0.9 percent annually. National market factors that are forecast to increase the demand for helicopters include economic growth, the aging of the fleet, and the availability of new more efficient models. New models stimulate demand due to improvements in performance and cost of operation. Factors that may slow the demand for new products include lower levels of petroleum extraction in the United States (one of the primary uses of helicopter services) – at least in the short-term – and limitations relating to supporting infrastructure. Growth is expected in the next several years for the corporate/private fleet and the law enforcement fleets. The air medical market for helicopters is currently maturing, but is expected to grow in the long term.

In addition to the national trends, local and regional factors will also influence helicopter activity in the study area. These include:

Region-wide highway congestion and delays: Large segments of the region's highway system have moderate to severe highway congestion, particularly around the Washington, DC and Baltimore Metropolitan Region, which often rank among the most congested urban areas in the country. Increasing congestion and delays on the state's highway network will stimulate the use of helicopters to by-pass the congestion and delays.

Availability of off-airport landing sites: Helicopters use airports, heliports, and unprepared landing sites to serve their customers and to meet their mission requirements. If local zoning ordinances restrict future private heliport development, and landing on unprepared sites, helicopter activity will not increase in the future, and in fact may decline.

Continued airspace and airport access restrictions: The Temporary Flight Restrictions (TFR) and Special Federal Aviation Regulations (SFAR) have impacted aircraft operations in the greater Washington metro area more than any other region of the country. FAA imposed significant restrictions on the airspace around Washington, DC following the attacks on September 11, 2001, which prohibited general aviation access to Reagan Washington National Airport, and continues to impose new temporary restrictions on an as-needed basis. Some of the temporary flight restrictions have been codified into SFARs, which means that they are no longer temporary, but long-term restrictions. These

restrictions have prevented, for example, news, aerial photography, some emergency medical, and corporate helicopters from using the airspace over Washington, DC.

Availability and cost of aviation insurance (both liability and hull): The industry has been raising some aircraft insurance premiums by 100 percent or more in recent years, and for some commercial operators, insurance is not even available. In fact, declining aviation insurance availability and rising costs have been issues for many years, and is becoming an even more severe problem since 2001. One direct consequence of this on-going situation has been an increase in the operating cost of all aircraft, including helicopters.

Helicopters serve a wide variety of missions and are operated by both private companies and public agencies, civilian and military. As a result, helicopter operators do not respond in the same way to a single factor or issue, such as the economy, insurance, airspace, etc. Public agency helicopters such as law enforcement, certain emergency medical operators and military operators, are not directly affected by the state or federal economy, whereas corporate/air taxi, training, personal, and utility helicopter operators are directly affected by the economy.

According to the operator's survey conducted for this Study, approximately 57 percent of the helicopter activity in Maryland is performed by public agencies, and approximately 43 percent by private operators. In the Metropolitan Washington Region, public agencies (including the military) perform approximately 70 percent of all helicopter operations, while private companies perform approximately 30 percent.

Because of the difficulty in predicting future events such as those described above, two forecast scenarios were identified for this study: Status Quo and Unconstrained. The two scenarios were developed to analyze the impact of possible circumstances on future helicopter activity in the region.

The Status Quo scenario is based on the following assumptions:

- Airspace restrictions will remain in place throughout much of the forecast period, including no general aviation access to Reagan Washington National Airport. Helicopter flights within 15 miles of the Capitol Building will be restricted to officially approved operations, and many missions, such as electronic news, aerial filming, utility, most corporate and air taxi flights, will continue to be significantly restricted.

- General aviation airports within 15 miles of the Capitol Building will have restricted operational use.

- No new public-use heliports will be constructed in either Maryland or Washington, DC.
- Insurance rates will continue to increase and availability will continue to decrease.
- Security rules will be enacted that require general aviation to adhere to similar screening procedures that are in place for scheduled commercial service (FAR Part 135 and 139) airports and the airlines.
- The cost of helicopter ownership and operation will continue to increase faster than the overall rate of inflation.

If all, or most, of these factors remain in place for the next five to ten years, the helicopter activity in the region will not increase, and may even decline over that time; particularly missions such as corporate/air taxi, electronic news, flight training, aerial filming, etc. Military and government helicopter activity, on the other hand, is expected to increase. Because the majority of missions are flown by public agencies, they are not as sensitive to cost pressures as corporate/air taxi, flight training, and other private operations. As a result, it is not anticipated that there would be a significant decline in helicopter activity (hours flown or operations) even if all of the factors described above were in place, and activity is projected to decline over the forecast period by approximately 1percent.

By contrast, the Unconstrained Scenario assumes that a number of factors will occur that will stimulate helicopter activity in the region, including:

- Decreasing or eliminating the airspace and airport access restrictions imposed by FAA and TSA, as well as the special procedures required of operations within 15 TFR of the Capitol Building.
- No additional restrictions on the development of private heliports or use of unprepared sites for helicopter takeoffs and landings.
- The construction and operation of a public-use heliport in the Baltimore central business district, particularly in the vicinity of the Inner Harbor.
- The operation of a public-use heliport in downtown Washington, DC.

- Stability in the aviation insurance markets, with modest increases in premiums and availability of insurance to all qualified operators.

- Continued growth of the region's economy.

- Continued regional highway congestion and recurring delays.

Of all of the factors listed above, the first two (lifting airspace/airport restrictions, and no additional restrictions on private heliports and unprepared landing sites), would likely have the greatest impact on regional helicopter activity. If some or all of the factors listed above occur, then helicopter activity will increase at least at the rate projected by FAA nationally. However, different segments of the helicopter market will respond differently to each of the factors listed above, so the rate of growth will not be uniform.

Out-of-state operators conduct a small percentage of their operations in the Metropolitan Washington Region and Maryland for several reasons: the lack of public-use heliports in Washington, DC and Baltimore; the lack of access to Reagan Washington National Airport; and the DC area airspace restrictions. Activity by out-of-state operators dropped by 20 percent after September 11, 2001, and is not likely to rebound until those issues are resolved. In part due to the relatively low level of out-of-state activity, combined with the fact that the operators based inside the study area conduct some of their activity outside of the region, the net increase in helicopter activity generated by out-of-state operators is felt to be negligible.

5.4 The Recommended Heliport System

The demand for aviation facilities is typically measured against the number of operations or passengers expected to use the facility or system versus the capacity of the facility or system to accommodate the activity. For example, if an airport has an annual capacity of 100,000 operations but 150,000 annual operations are forecast, additional capacity will be needed. The additional capacity can be added, for example, by adding a new runway at the same airport or by building a new runway and airport at a new location. However, the design capacity of a heliport or helistop rarely ever exceeds its capacity. Furthermore, helicopters operate significantly different from fixed wing aircraft. Helicopter operators and users typically want to get as close to the scene or destination as possible. Therefore, the number of helistops or heliports as compared to the number of helicopter operations is significantly greater than with airports. Therefore, a typical demand capacity analysis will not work for this study.

5.4.1 Operator and Market Needs

The ability of the current system of helistops, heliports, and airports to meet the needs of the helicopter users was determined, in large part, from interviews and surveys with helicopter operators in Maryland and the Metropolitan Washington Region. The helicopter users who were contacted for this assessment included military, police, EMS, corporate, and public charter operators. The following system needs were identified:

Military and Government Operators: The military and government helicopter operators almost exclusively utilize military and other government airfield facilities in Maryland and the Metropolitan Washington Region. These operators generally do not use non-government helistops, heliports, or airports except during special situations. They tend to operate near their base or to other government facilities in the region. Thus, they do not anticipate the need for additional facilities within the study area.

EMS Operators: There are several EMS helicopter operators serving Maryland and the Metropolitan Washington Region, including both government and private operators. These operators are primarily based at general aviation airports in Maryland and Virginia. The EMS operators tend to fly between their base and the various hospitals in the region, and in some cases, directly to accident sites. Thus, the EMS operators do not see a need for additional heliports. However, it would be beneficial to their operation to provide helistops at existing transportation facilities and sites along major highways or other easily identifiable and accessible sites. These helistops would be of value in cases of low visibility and when time is of significant concern. These facilities should have lights and an established instrument approach. By having such facilities, the EMS helicopters could meet an ambulance at the helistop to transfer patients quickly without the need to close down roads and to assess landing sites upon arrival to an accident scene.

Law Enforcement Operators: Law enforcement helicopters typically operate from their current base. The Maryland State Police, for example, base a number of helicopters at several airports and police barracks around the State. The Fairfax County Police, on the other hand, have their own heliport. If fuel or other services are needed, these operators typically return to their base of operation or go to an accessible airport. Like the EMS operators however, the Law Enforcement operators would also benefit from helistops at existing transportation facilities and sites along major highways or other easily identifiable and accessible sites.

Corporate Operators: There are many corporate helicopters operating in the region. Corporate operators typically use private helistops or other suitable facilities, such as a parking lot or open field next to their intended destination. They may also operate at public-use airports. The

corporate operators do not require additional helistop facilities, but would benefit from a centrally located public-use heliport in downtown Baltimore and Washington, DC.

Charter/Air Taxi Operators – Charter/air taxi operators generally fly from their base of operations, which is typically a general aviation airport, to a customer's pickup and drop-off location. The pickup and drop-off locations vary from corporate, commercial, and industrial facilities to residential properties as well as tourist destinations. Very few sight-seeing flights are currently being conducted given the airspace restrictions in the Washington, DC area. Charter/air taxi flights can also include aerial observation for commercial and business purposes.

The value of the service offered by the charter/air taxi operators is based on the ability to travel from point-to-point as directly as possible. Federal regulations permit helicopters to land and takeoff from unprepared locations provided certain safety requirements are met and permission from the property owner is granted. In other words, helicopters do not have to use designated helistops or heliports to drop off and pick up passengers. Therefore, a vast network of prepared helistops or heliport throughout Maryland and Metropolitan Washington Region are not needed to service the charter/air taxi operators.

However, a smaller network of designated helistops in key geographic areas near corporate business parks, commercial, and industrial areas that are easily identifiable and accessible from both the air and ground would benefit the charter/air taxi operators. Ideally, the helistops should be located near a major highway or route, away from noise sensitive areas, have clear approaches with an established instrument procedure, and have edge lights as well. The helistops could be located at state or government owned park and rides or land adjacent to major highways, and at transportation facilities such as train stations.

Furthermore, much like the corporate operators, the charter/air taxi operators would also benefit from a centrally located full-sized heliport in the downtown Baltimore and Washington, DC areas.

5.4.2 Facility Requirements

The operators revealed several common needs for both the Maryland and Metropolitan Washington Helicopter Systems. First, all hospitals providing trauma and critical care facilities should be equipped with an established helistop.

Private-Use Hospital Heliports: Trauma centers and other hospitals should have established helistops to facilitate the quick and safe transfer of patients. The hospital helistops would have the following characteristics:

- Annual activity levels would range from over 2,000 operations at the large trauma centers to 150 operations at the smaller hospitals.
- Minimal facilities would be provided, including a cleared and paved landing and takeoff area, markings, and edge lighting.
- Clear approaches capable of supporting a GPS instrument approach procedure.
- Located as close to the hospital as possible, keeping in mind safety and other design considerations.

Second, the charter/air taxi, the EMS, police, and to some extent, the corporate operators would benefit from a small network of helistops strategically located along major transportation routes. These helistops would provide established landing areas for the quick loading and unloading of injured persons or passengers.

Public-Use Helistops: A small network of helistops is needed around the Baltimore/Washington Metropolitan area to provide established locations to quickly pickup and drop off charter/air taxi passengers, corporate users, and emergency medical victims. The helistops would have the following characteristics:

- Annual activity levels would range between 100 and 250 operations.
- Minimal facilities would be provided including a cleared and stabilized landing and takeoff area, either paved or turf, markings, and edge lighting.
- Clear approaches capable of supporting a GPS instrument approach procedure.
- Located on existing state or government owned property.
- Located at an existing transportation related facility that is well marked, is conveniently located, and easily accessible by ground and air (such as a park and ride, commuter rail station, or highway rest area for example).
- Located an acceptable distance away from noise sensitive areas and facilities.

Third, the corporate and charter/air taxi operators would also both benefit from established heliports in centrally located areas in downtown Baltimore and Washington, DC.

Public-Use Downtown Heliports: A public-use heliport is needed at a centrally located site within downtown Baltimore and Washington, DC. The facility could be either publicly- or privately-owned and would include both a landing and takeoff area as well as an aircraft parking area. Primarily charter/air taxi and corporate operators would use these heliports. Police and other public service/government operators would also likely use such a facility. The heliports would have the following characteristics:

- Annual activity levels would range between 3,500 and 13,500 operations.
- Facilities would including a paved landing and takeoff area, at least two aircraft parking areas, markings, edge lighting, area lighting, a small terminal building and pilot's lounge, security fencing, and fire suppression systems.
- Clear approaches capable of supporting a GPS instrument approach procedure.
- Located on private or publicly owned land.
- Centrally located within the central business district and is easily identifiable and accessible by ground and air.
- Located an acceptable distance away from noise sensitive areas and facilities.

5.5 Helistop and Heliport Design Standards

The Federal Aviation Administration Advisory Circular 150/5390-2B, *Heliport Design*, outlines the design criteria for several types of heliports including private, hospital, public, and transport heliports. The helistop/heliport includes three basic design elements: the landing area, the approach and departure airspace, and the support facilities. The design standards for these facilities are as follows:

5.5.1 Landing Area

The primary facility associated with the heliport is the landing area (sometimes referred to as the helipad). The landing area is made up of three elements:

1. Touchdown and Lift-off Area (TLOF) – The touchdown and lift-off area is a defined, square, load bearing area capable of supporting the heaviest helicopter expected to use the heliport. The TLOF can be either paved or turf. The landing area is marked with an "H" on paved surfaces. The size of the TLOF should not be less than the rotor diameter of the design helicopter.

2. Final Approach and Takeoff Area (FATO) – The FATO includes the TLOF (or multiple TLOFs) and is intended to provide an area that is clear of objects beyond the TLOF. The dimension of the FATO is not less than 1.5 times the overall length of the design helicopter and is also square in shape.

3. Safety Area – The safety area surrounds the FATO and is intended to keep the area immediately beyond the FATO clear of objects that could affect helicopter operations such as fences, other helicopters, and other such objects. The size of the safety area is equal to 1/3 the rotor diameter of the design helicopter, but not less than 10' in width.

The size of the helistop/heliport landing area is based upon the design helicopter. The design helicopter could be a number of different aircraft depending on the facility and its intended use. The largest helicopter that regularly uses the Maryland and Metropolitan Washington systems is the Bell 412. Using the Bell 412 as the design aircraft, for example, would generate the landing area dimensions shown in Table 5-3.

Table 5-3 Landing Area Dimensions

Facility	Design Standard *	Dimensions
TLOF	Rotor diameter of design helicopter (46')	46' x 46'
FATO	1.5 times the overall length (56.2')	84' x 84'
Safety Area	1/3 the rotor diameter, but not less than 20' (46')	20'

* The Bell 412 is the design helicopter in this example.

5.5.2 Airspace

Equally, if not more important, than the landing area is the airspace surrounding the landing area. The landing area must have a clear approach and departure path. Ideally, there would be at least two approach/departure paths with at least one suitable for a GPS instrument approach. The airspace surrounding the landing area is defined by Federal Aviation Regulation Part 77, *Objects Affecting Navigable Airspace.*

FAR Part 77 defines a set of imaginary surfaces that are used to provide clear approach and departure paths for airports and heliports. If penetrations exist to these surfaces, they must be

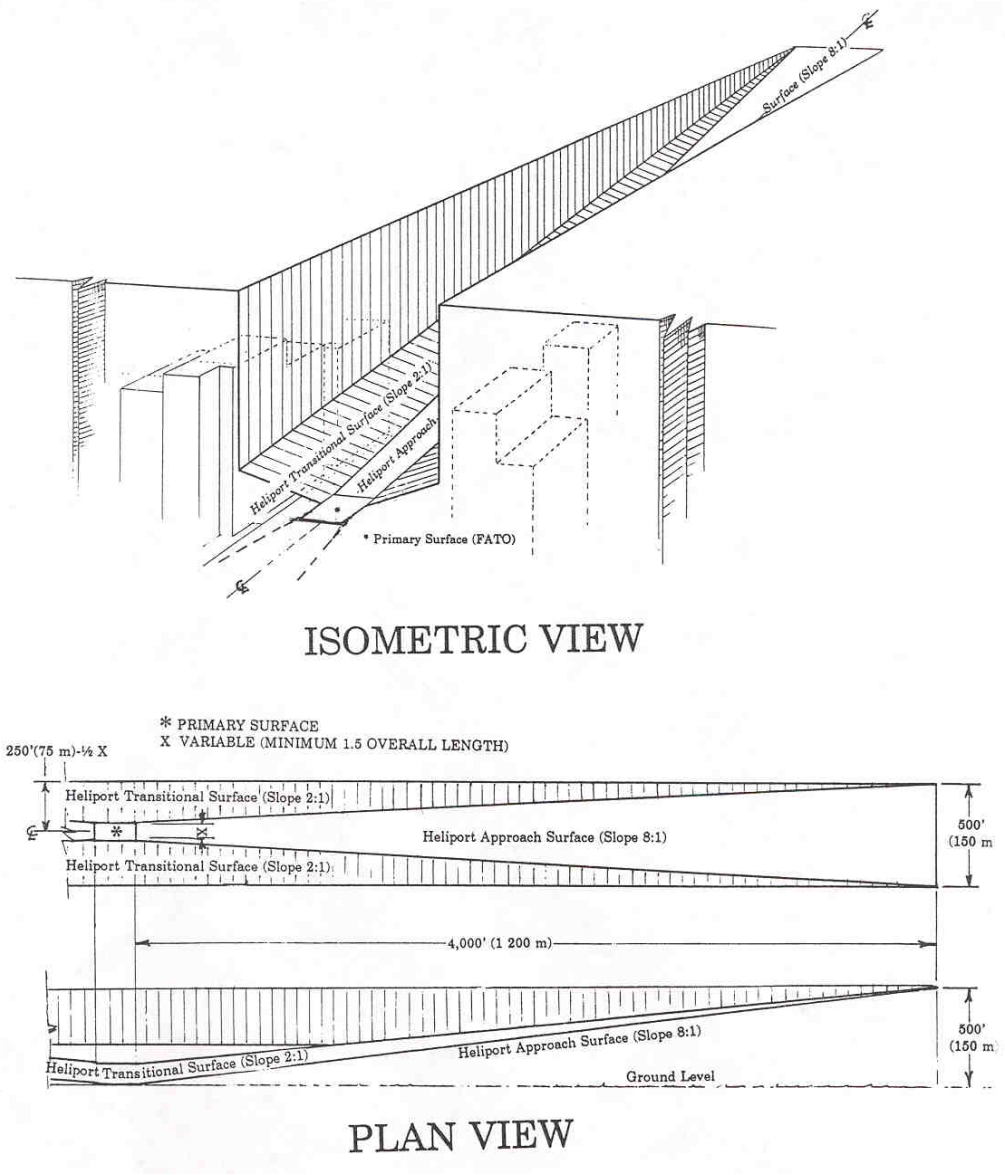
removed or mitigated such that it will not affect the approach and departure to the airport or heliport.

There are three surfaces that define the approach and departure paths for helistops/heliports. These include the primary surface, the approach surface, and the transitional surface. These surfaces are described below. Figure 5-1 shows these surfaces for a visual approach.

1. Primary Surface – The primary surface overlies the FATO and is at the elevation of the FATO.
2. Approach Surface – The approach surface is a trapezoidal surface beginning at the primary surface and extending out 4,000' from this surface. The inner width is the width of the primary surface and the outer width is 500'. The approach surface has a slope of 8:1 (1 foot up for every 8 feet out).
3. Transitional Surface – This surface rises up and out from the primary and transitional surface at a slope of 2:1 and extends upward and terminates at 500' above the primary surface elevation.

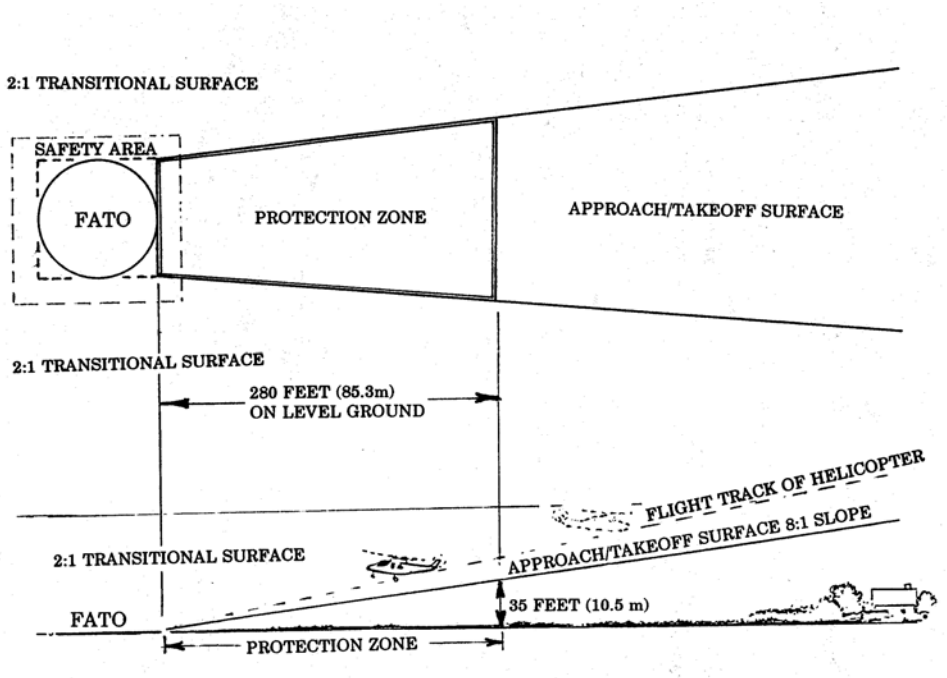
Associated with, but not part of the FAR Part 77 surfaces, is the protection zone. The function of the protection zone is to keep the inner portion of the approach surface clear. The Heliport Design AC stipulates that the heliport owner should own this area. The protection zone extends outwards from the FATO to a point where the approach surface is 35' above the heliport elevation and underlies the approach surface. As such, the shape of the protection zone is trapezoidal and extends outwards from the FATO 280'. This area must be clear of all objects that could affect helicopter operations and that would penetrate the FAR Part 77 Approach Surface. There would be one protection zone per approach. Figure 5-2 shows the protection zone in relation to the FATO and approach surface.

Figure 5-1 FAR Part 77 Surfaces – Visual Approaches



Source: AC 150/5390-2B, *Heliport Design*

Figure 5-2 Protection Zone



Source: AC 150/5390-2B, *Heliport Design*

5.5.3 Support Facilities and Aids

In addition to the landing area, protection zone, and airspace requirements, many helistops or heliports also have support facilities and aids that provide additional operational flexibility. These facilities and aids may include some or all of the following:

1. Lighting for night operations
2. Lighted wind cone
3. Visual glide path indicator
4. Rotating beacon
5. Small parking lot for automobiles
6. Sheltered waiting area for passengers
7. Floodlights for entire facility
8. Security fencing
9. Fire suppression system

10. Fueling
11. Terminal building and pilot's lounge

The need for support facilities and aids will depend on the specific helistop or heliport under consideration. More information on the required support facilities and aids will be discussed in subsequent sections of this report.

5.5.4 Land Requirements

Using the Bell 412 as an example of the design aircraft, the total area for both a helistop and heliport can be estimated. The area required for a basic helistop would be about 104' x 104', or about 0.3 acres. (84' plus the 20' for the safety area). The helistop includes a landing area only. The area required for a full-sized heliport on the other hand, when adding in the protection zones and other support facilities, could increase to about 2 acres of land.

5.6 Private-Use Hospital Heliport Recommendations

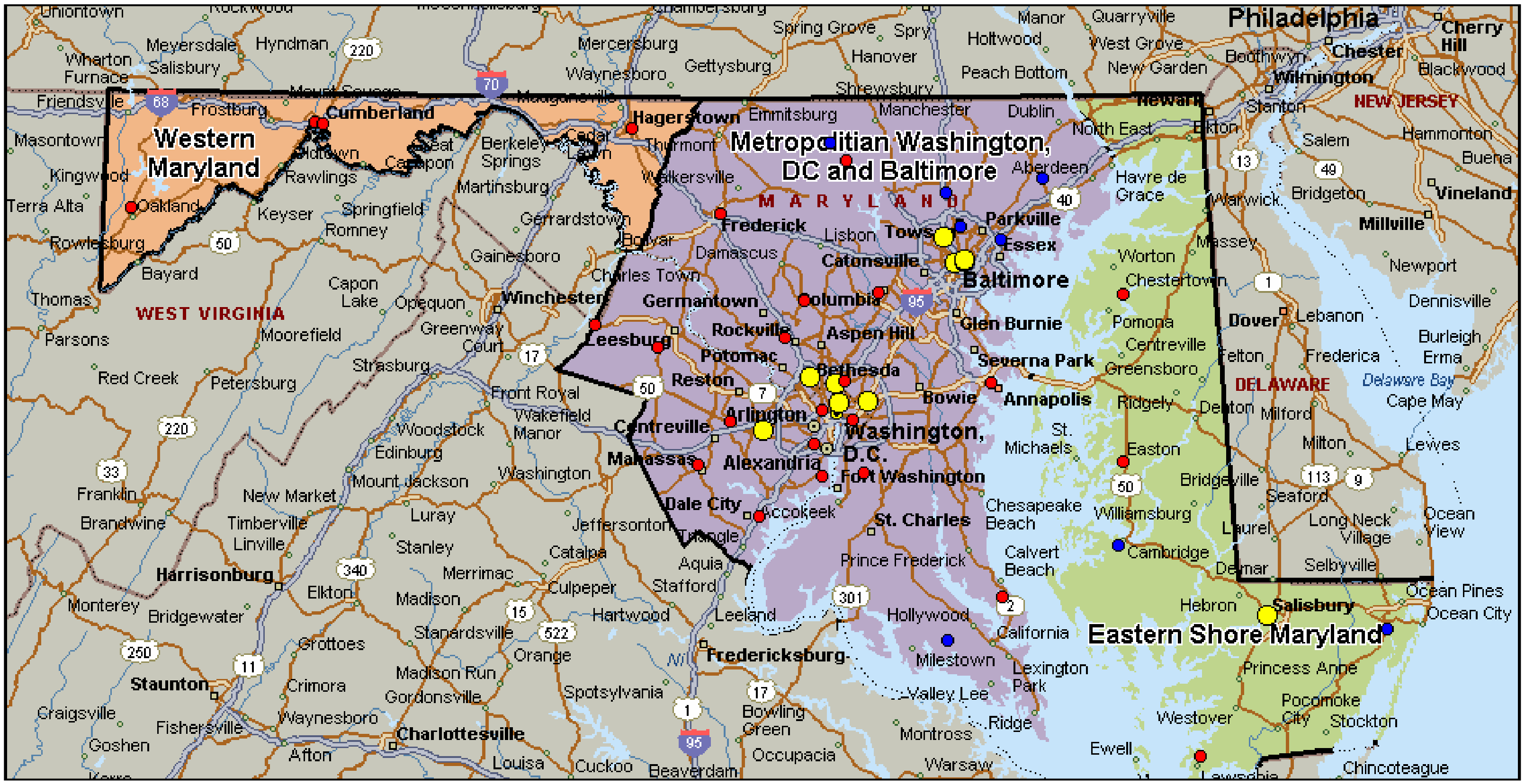
Hospital heliports are generally private use facilities not open to the public and used exclusively for the transfer of medical patents. Operators using these facilities include emergency medical services airlift and intra-hospital transfers, as well as a variety of local, state, and federal law enforcement missions. Public service EMS operators include the Maryland State Police and private EMS operators such as Med Star.

5.6.1 Existing System of Private-Use Hospital Heliports

EMS helicopter operators are typically based at airports throughout the study area and use existing hospital heliports on an as-needed basis. Typically, patients airlifted from an accident scene are transported to the nearest Trauma Level I or II facility most capable of treating the injuries specific to that case. The different levels of trauma facilities are defined below. Figure 5-3 illustrates the existing system of private-use hospital heliports.

1. Trauma Level I and II Hospitals: Level I and II facilities are the highest-level trauma hospitals that are capable of providing the full scope of medical procedures with surgeons and specialists on call 24-hours a day. There are a total of 8 Trauma Level I and II hospitals in the study area and all, with the exception of Peninsula Regional Medical Center in Salisbury, MD, are located within the Baltimore and Washington Metropolitan Region.

Figure 5-3 Existing System of Private Use Hospital Heliports



Trauma Level III, IV and V Hospitals 2

General Care Hospitals

Trauma Level III, IV and V Hospitals

Trauma Level I and II Hospitals

2. Regional Trauma Level III, IV, and V Hospitals: These hospitals have general surgery capability and include regular emergency departments. These hospitals generally serve to stabilize the most severely injured patients and then transfer them to a higher-level Trauma Center in Baltimore or Washington. Each county in the study area has at least one Trauma Level III, IV, or V hospital.

3. General Care Hospitals: These hospitals have emergency rooms suitable of treating patients with non life-threatening injuries as well as providing long-term patient care. Occasionally these facilities are required to receive or transport airlifted patients.

5.6.2 Private-Use Hospital Heliport Siting Criteria

The location of a hospital heliport is somewhat fixed by function. That is, the heliport must be located as close to the emergency room as possible. Consideration should be given to potential airspace obstructions to ensure a clear visual and, if possible, instrument approach. Consideration should be given to noise sensitive facilities and developments in the area.

5.6.3 Recommended System of Private-Use Hospital Heliports

The Metropolitan Baltimore and Washington Regions are served by existing Level I and II Trauma Centers. However, in May of 2002 Washington County Hospital in Hagerstown, Maryland, a Level II Trauma Center, suspended operations. Due to this closure, Western Maryland lost its highest-level trauma center. Therefore, severely injured patients in Western Maryland are most often airlifted directly to a high-level trauma center in the Baltimore and Washington Metropolitan Regions. Patients with non-life threatening injuries may be airlifted to a closer, Level III, IV, or V Trauma Center where the patient can be stabilized and airlifted to a Level I or II Trauma Center if necessary. It is recommended that all trauma centers have a hospital heliport suitable to their trauma center designation.

5.6.4 Hospital Heliport Facility Requirements

The system of hospital heliports is envisioned to be a specialized helipad capable of accommodating one or two helicopters and providing basic security. As these facilities are located at existing trauma centers, the landing area is likely on a roof top or at ground level, providing at least two unobstructed approach and departure paths to the facility.

Consideration should be given to standardize hospital heliports. Such considerations should include:

Helipad: The helipad should be an asphalt or concrete pad with appropriate helipad markings. Roof top heliports should be constructed of wood, metal, or concrete and be clear of roof top features such as elevator penthouses, cooling towers, and exhaust/fresh air vents that may affect helicopter operations. The size of the pad will be based upon the largest helicopter expected to use the facility. Based on survey data, the largest helicopter expected to use any facility within the region is the Bell 412.

The helipad area should include the Touchdown and Liftoff Area, the Final Approach and Takeoff Area, and the Safety Area. Using the Bell 412 as the design helicopter, the size of the landing area is listed in Table 5-4.

Table 5-4 Public-Use Heliport Landing Area Dimensions

Facility	Design Standard *	Dimensions
TLOF	Rotor diameter of design helicopter (46')	46' x 46'
FATO	1.5 times the overall length (56.2')	84' x 84'
Safety Area	1/3 the rotor diameter, but not less than 20' (46')	20'

* The design standards are based upon AC 150/5390-2B, *Heliport Design* guidelines for public heliports and the design helicopter which is the Bell 412

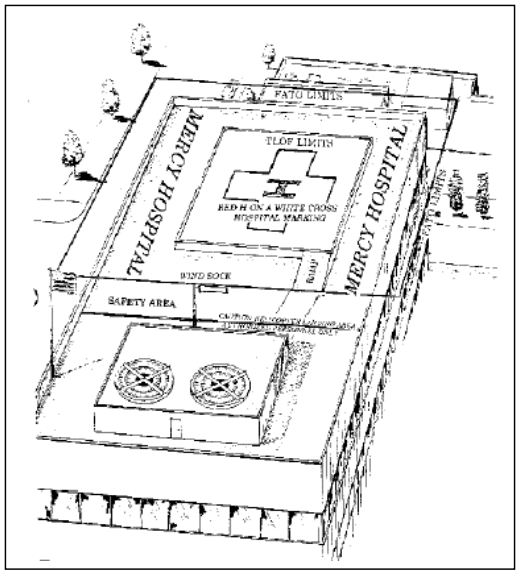
The total area of the helipad will be 104' by 104' based on the information above.

Approaches: There should be two approach and departure routes to the helipad. These approach and departure routes should be clear of obstructions and meet Federal Aviation Regulation Part 77 imaginary surface standards. At least one of these approaches should be capable of a non-precision instrument approach.

Additional Requirements: Because of the simplicity of the helistop, the only other items required for the facility include a UNICOM radio for pilot communications, windsock, security fencing and a combination gate to provide restricted access to the helipad area.

An example of such a facility is provided in Table 5-4.

Figure 5-4 Typical Hospital Heliport



5.7 Public-Use Helistop Recommendations

Helicopters offer an efficient and effective way to transport people and products between destinations when all other methods of transportation would be a misuse of valuable time. The versatility of helicopters is recognized in their ability to operate from minimal real estate with minimal facilities the majority of the time. Based on survey data and discussions with helicopter operators within the study area, a network of public-use general aviation helistops with Instrument Approach Procedures would provide a public benefit. These helistops would provide convenient locations for the efficient pickup and drop off of emergency medical victims, police, charter/air taxi passengers, and corporate users.

This Section contains recommendations and standards for a system of public-use general aviation helistops within the study area. The helistops would be available for use by the general public without prior permission from the owner or operator and would be designed to accommodate a number of different users, including individuals, corporations, air taxi/charter and medical transport helicopters. The helistops would consist of a simple helipad, wind cone, and lighting, and would not provide facilities for passengers or aircraft servicing.

5.7.1 Existing System of Public-Use Helistops

There is only one existing public-use heliport in the study area, plus several airports with heliport facilities. South Capitol Street Heliport is the only dedicated public-use heliport. However, due to current flight restrictions in the DC area, general aviation aircraft cannot operate into or out of South Capitol Street at this time. Figure 5-5 shows the existing public-use heliport facilities.

5.7.2 Public-Use Helistop Siting Criteria

Consideration should be given to three primary siting criteria: (1) accessibility; (2) airspace; and (3) land use. Good accessibility to the site is important in terms of both ground access (i.e., can the site be easily identified and accessed from the ground) and air access (i.e., can the site be easily identified and accessed from the air). The ability to provide good visual and instrument approaches to the site will also be very important. Finally, land use issues such as zoning, property ownership, and potential noise and safety impacts will also influence the siting of the public-use helistops.

Accessibility: The goal is for the helistop to be easily accessible from both the ground and air. To accomplish this, the helistop should be located along a major transportation corridor such as an interstate highway or main road artery. These transportation corridors are easily identifiable from the air and are currently used as the main helicopter routes through the metropolitan area. In addition, the interstate highways and main arteries can be easily identified and accessed from the ground.

Airspace: The goal is to provide an environment that will enable good visual and instrument approaches to the helistop. To accomplish this, the helistop should be located in an area that does not have significant man-made or natural obstructions surrounding the facility. The helistop should have two good approach and departure paths.

Land Use: The goal is to locate the helistops in an area that has compatible land use, does not require additional land purchase, and minimizes noise and safety impacts to the surrounding area. To accomplish this, the new helistops should be located in a suitable area for a heliport considering existing zoning and land use restrictions, located on land that is already publicly owned as a transportation facility or that is privately owned and is suitable for a heliport, and is a sufficient distance from noise sensitive developments.

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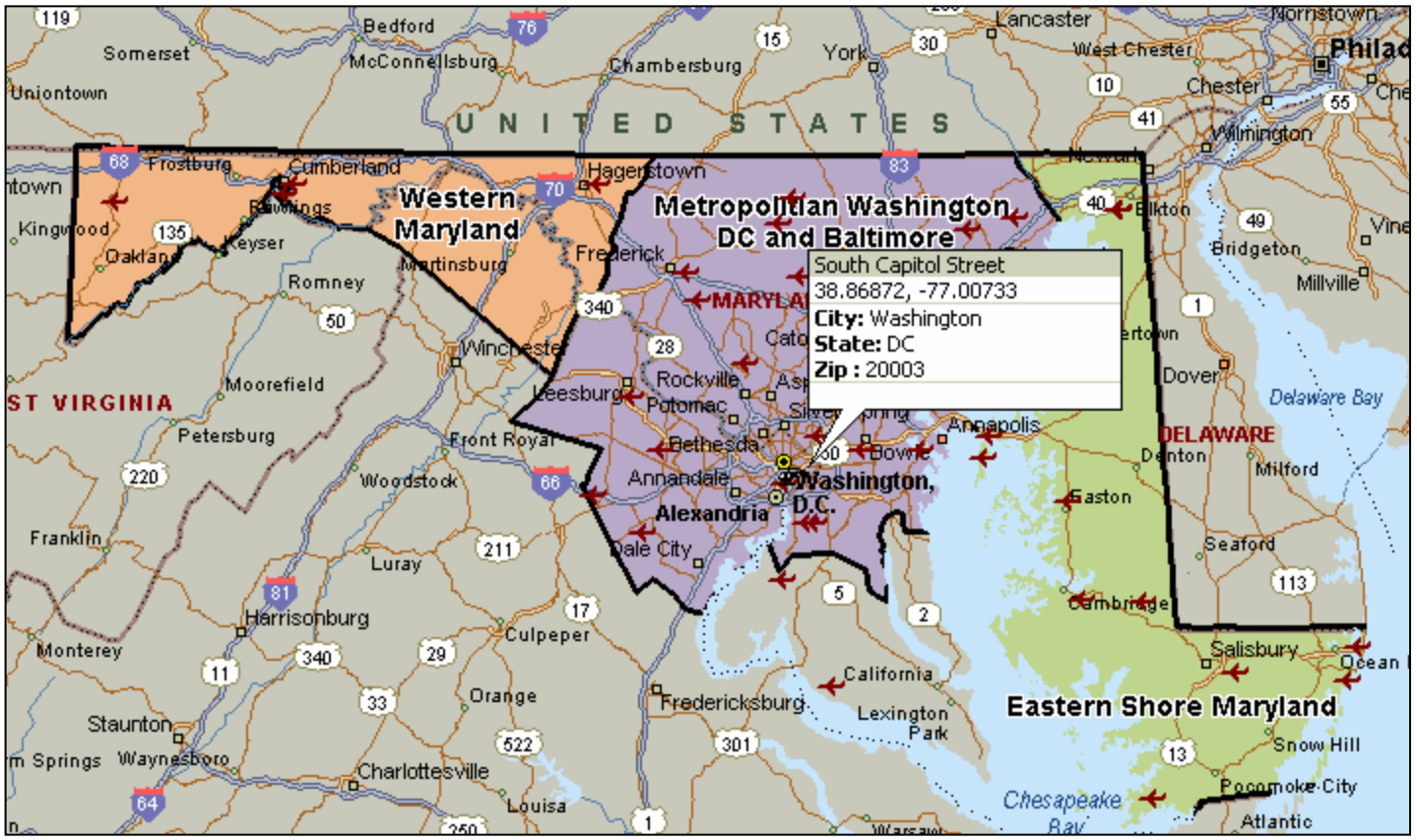
Figure 5-5 Existing Public-Use Facilities



5.7.3 Recommended System of Public-Use Helistops

A system of conveniently located helistops (helipad, wind cone, and lighting), each with its own instrument approach, is recommended for the Metropolitan Washington and Baltimore Region. Some additional helistops outside of the immediate metro area, but within specific economic centers, such as Frederick or Harford County, Maryland should also be included in the system.

The helistops should be located in areas along existing transportation corridors and incorporated into existing transportation facilities such as transit facilities, park and rides, or within existing business or commercial developments. Besides the benefits of these known and easily identifiable locations, these sites also offer a potential for masking helicopter noise by flying routes over existing highway corridors. Some of these helistops could be new facilities and others may consist of private facilities newly opened for public-use.

Two different methodologies were considered to identify an "order-of-magnitude" number of facilities needed to meet demand and the general geographical areas in which to locate them. These include ground access time and flight time between facilities. The actual number of facilities would be based on user or market demand and the number of proponents "willing" to build a facility at a specific location. It is not envisioned that one public or private entity would own/operate such a system of helistops. It is more likely that a combination of public and private owners/operators will evolve over time.

The key ground access considerations include areas that can be easily accessed and identified on the ground and that are within a reasonable driving distance of each other. The key air considerations include access along easily identifiable transportation corridors and locations within a reasonable flight time of each other.

5.7.3.1 Ground Access Considerations

Ground access time between facilities was one method used to estimate the general geographical locations and the approximate number of new facilities. A 15-minute drive time between facilities was used for initial estimating purposes. That is, someone on the ground could theoretically drive to a helistop within 15-minutes. It was assumed that driving distances greater than 15 minutes would be insufficient for most medical, police, VIP, and charter operations. It was estimated that a 15-minute drive time could be accomplished within a 6-mile radius, without consideration of traffic congestion or other ground related constraints.

Using this methodology, it was estimated that there would need to be at least 34 helistops located within the Baltimore and Washington Metropolitan Area (including a few in more rural areas of Maryland). Two factors would make the implementation of such a large system of helistops impractical. First, the demand for the helistops was based on the needs of existing helicopter operators that would benefit from easily identifiable helistops, from the air, with reliable instrument approaches. Ground access between helistops was less of a concern. Second, it would be very difficult to find proponents to own/operate such a large number of helistops. Therefore, using ground access time between facilities as the methodology to estimate the number of helistops is not recommended.

5.7.3.2 Air Access Considerations

A second methodology was also used to estimate the general geographical and approximate number of new facilities. This methodology considered air access issues. The two key air access issues include locating the helistops within a reasonable flying time of each other and along existing transportation corridors. A 10-mile radius, based on a 5-minute flight time at a 100-knot ground speed, was used for this initial estimating purpose.

A 10-mile radius was considered a reasonable sized area between facilities for an operator to locate a landing site from the air to drop-off or pick up passengers. The actual distance between facilities will vary depending on the need, the availability of a suitable landing site, and local land use and zoning considerations. For example, a facility could be located at the outer edge of the 10-mile radius and the next closest facility may be located at the far edge of the adjoining radius resulting in a 20 mile separation between the two. The 10-mile radius provides a good starting point for planning purposes. The 10-mile radius methodology reveals that up to 18 public-use helistops could be needed within the study area (see Figure 5-6).

Overlaying the existing private heliports and transportation facilities, such as commuter rail stations, park and rides, and rest areas over the 10-mile radii reveals that there are already many heliports and other transportation facilities within these areas (see Figure 5-7 and Figure 5-8). Thus, using existing transportation related facilities and perhaps some existing private facilities could provide a very accessible system of about 18 public-use helistops around the metropolitan and key economic development areas.

An initial system of up to 18 public-use helistops is recommended for future planning and implementation purposes. The initial 18 helistops would include 12 in the Baltimore-Washington Metropolitan Region, 2 in Western Maryland, and 4 on Maryland's Eastern Shore. The general geographic areas for the facilities are listed in Table 5-5 and shown on Figure 5-9.

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Figure 5-6 Geographic Areas using 10-Mile Radius Methodology

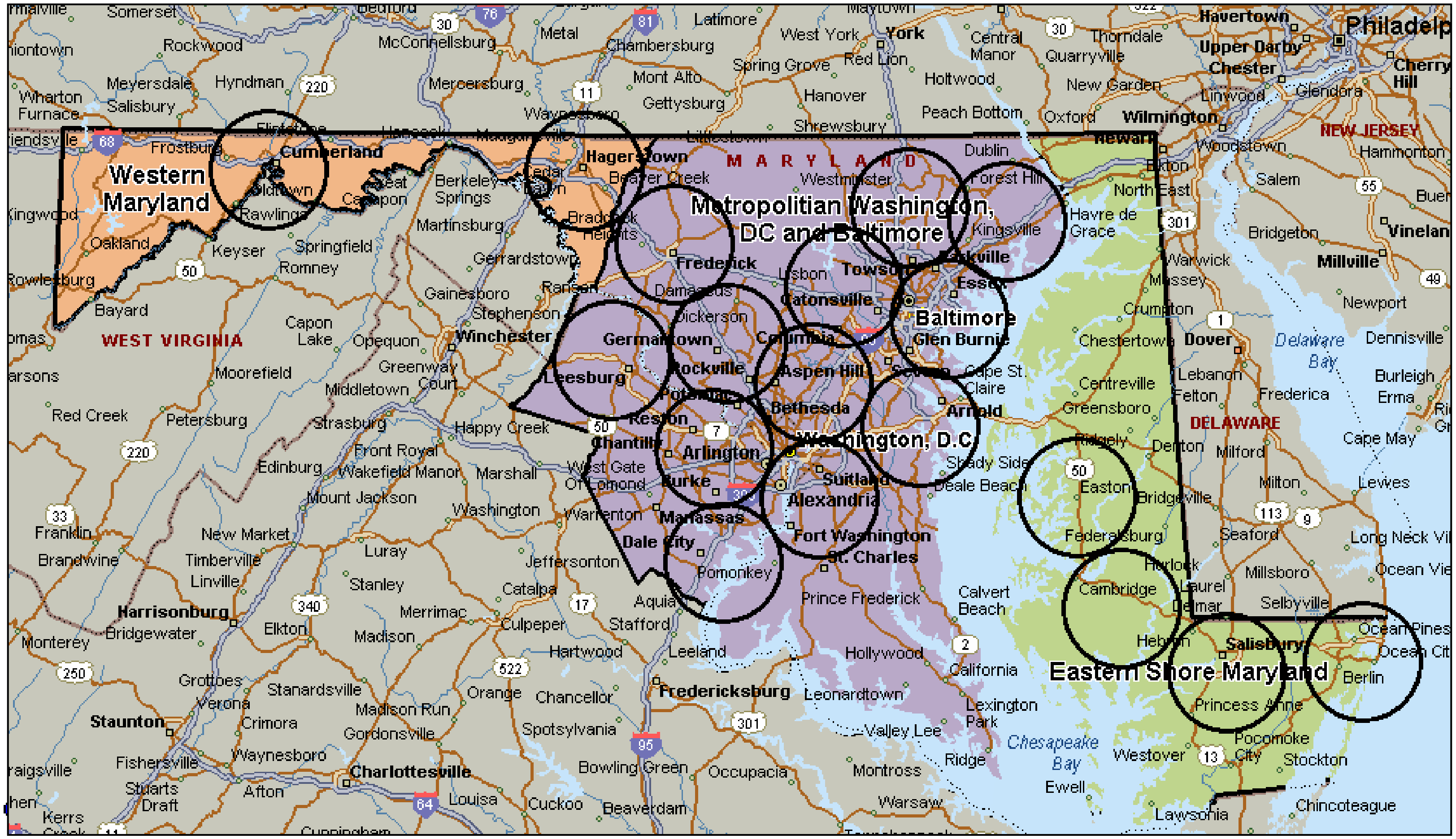

Figure 5-7 Existing Private Heliports within 10-Mile Radius Geographic Areas

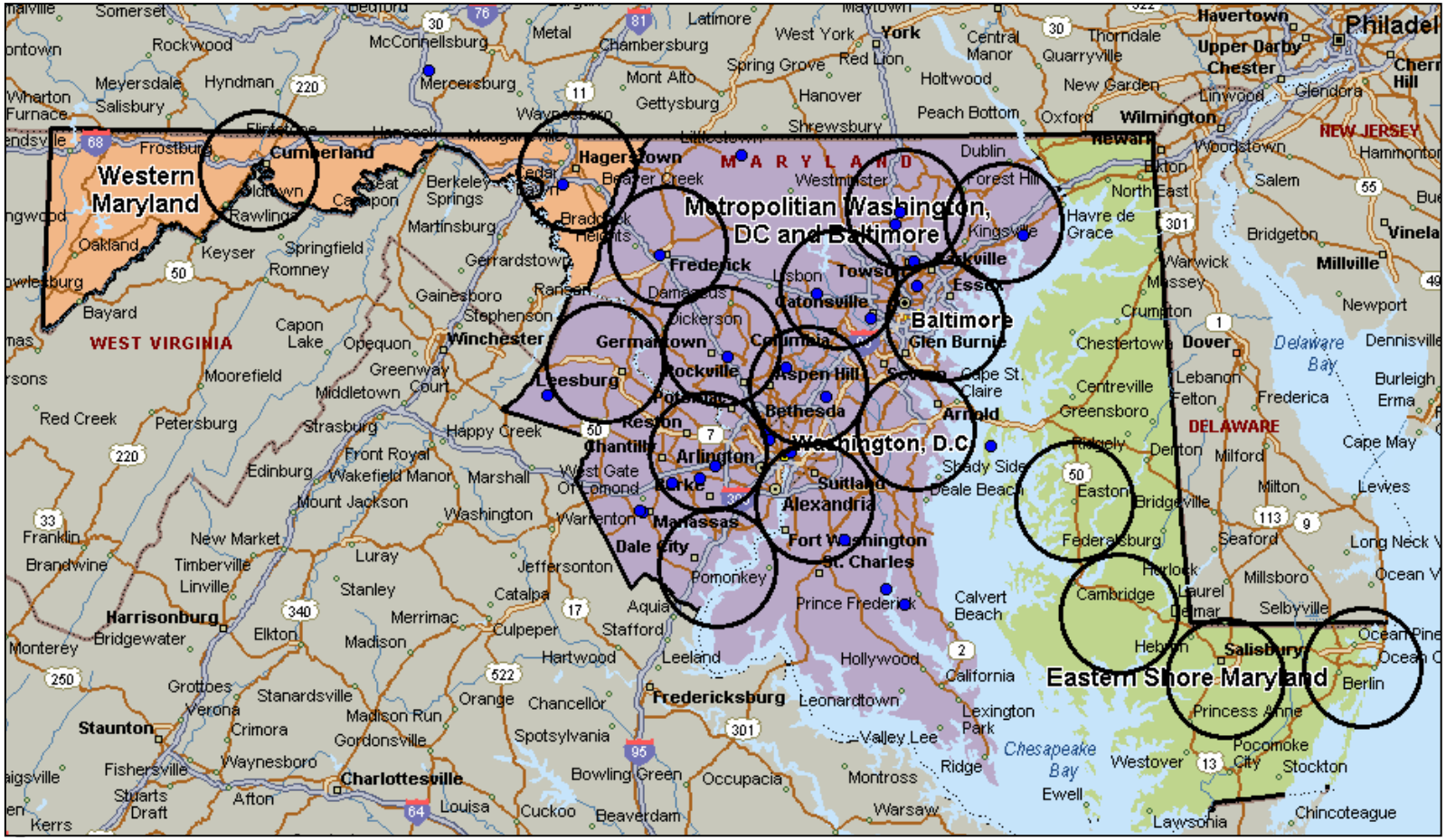

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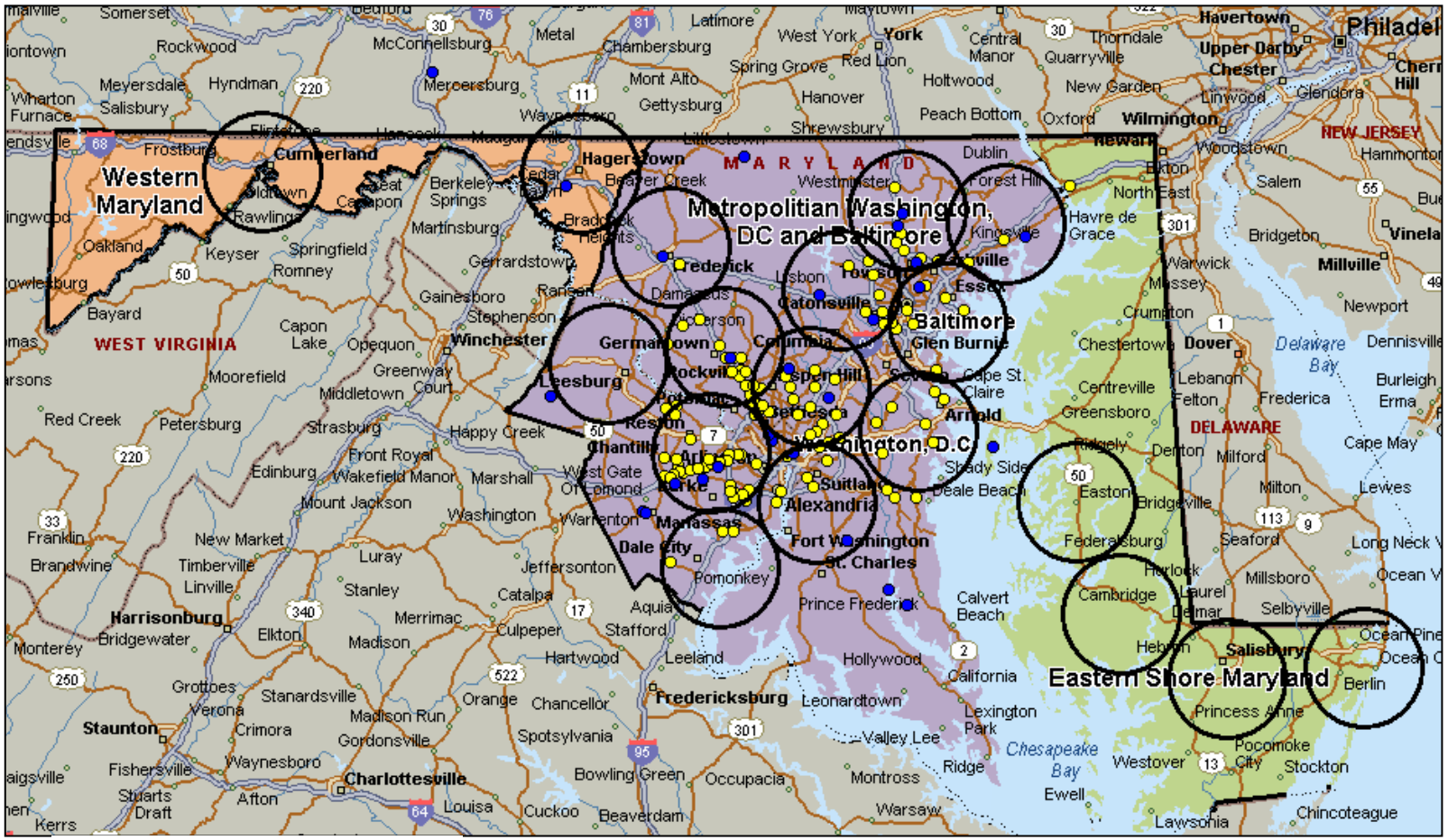
Figure 5-8 Existing Private Heliports, Park & Rides, Rest Stops, and Rail Stations within 10-Mile Radius Geographic Areas



- Rest Stops/Park and Rides
- Private Use Helistops

The helistops should be located along the major transportation corridors within each geographic area when possible. The actual sighting, approval, and construction of each helistop should be driven by market demand (such as increased helicopter activity levels, economic development opportunities, or specific user needs), local land use and zoning considerations, and community acceptance.

Table 5-5 Potential Geographic Areas for Helistops

ID	Geographic Area
Metropolitan Washington and Baltimore	
1	I-83 Corridor, Baltimore County, Maryland
2	I-95 Corridor, Harford County, Maryland
3	I-695 Corridor (East), Baltimore County, Maryland
4	I-97/Route 50 Corridors, Anne Arundel County, Maryland
5	I-495 Corridor (Southeast), Prince George's County, Maryland
6	I-95 Corridor (South), Prince William County, Virginia
7	I-495/I-66 Corridors, Fairfax County, Virginia
8	I-270 Corridor, Montgomery County, Maryland
9	I-70 Corridor, Howard County, Maryland
10	I-495/I-95 Corridor, Howard, Montgomery, Prince George's Counties, Maryland
11	I-270/I-70 Corridors, Frederick County, Maryland
12	Route 7 Corridor, Loudoun County Virginia
Western Maryland	
13	I-70/I-81 Corridors, Washington County, Maryland
14	I-68 Corridor, Allegany County, Maryland
Eastern Shore Maryland	
15	Route 50 Corridor, Talbot County, Maryland
16	Route 50 Corridor, Dorchester County, Maryland
17	Route 50 Corridor, Wicomico County, Maryland
18	Route 50 Corridor, Worcester County, Maryland

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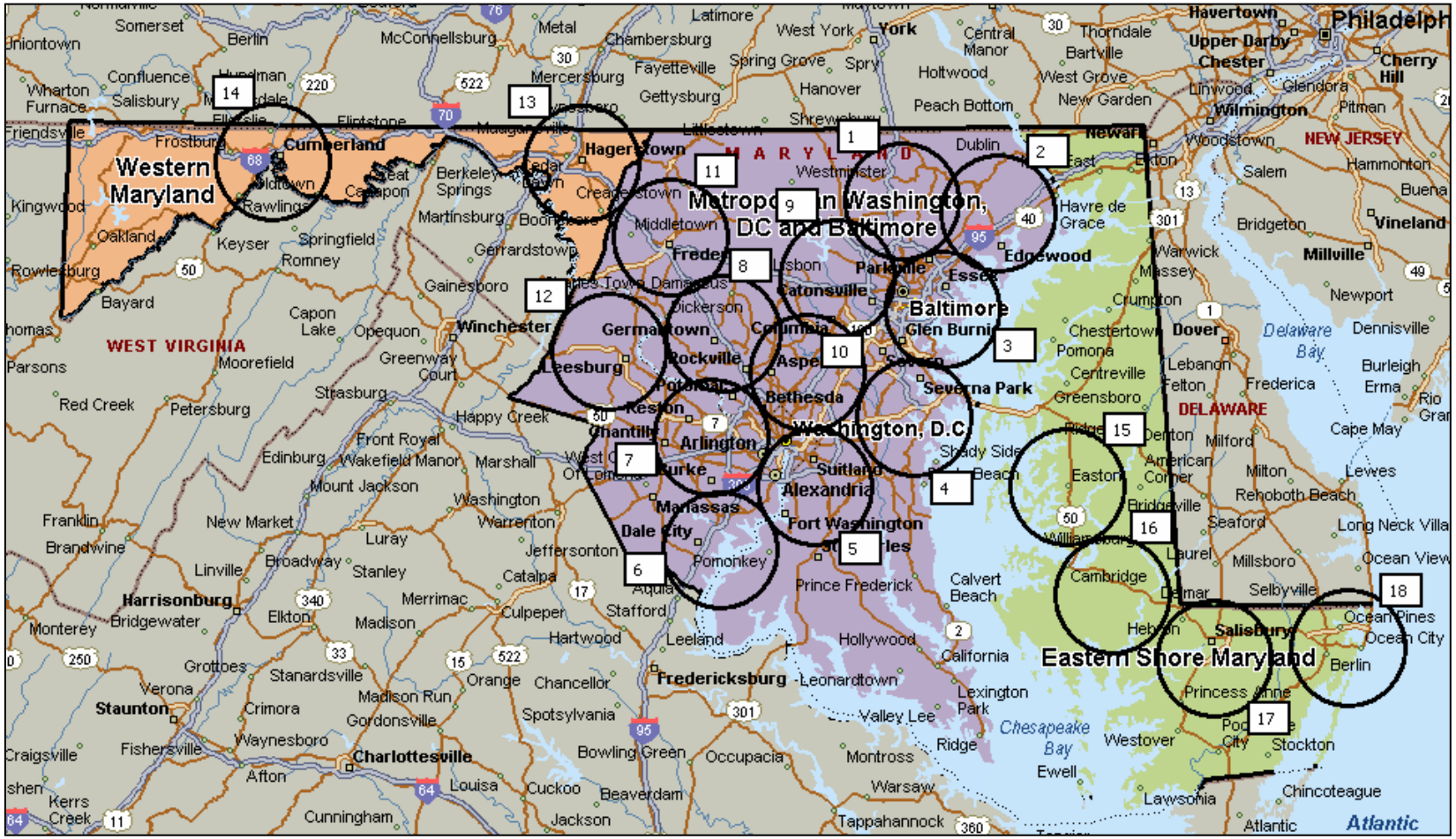
Figure 5-9 Initial System of Public-Use Helistops



5.7.4 Public-Use Helistop Facility Requirements

The system of helistops recommended in the previous section is envisioned to be a basic helipad capable of accommodating one helicopter and providing basic security and passenger amenities. As these facilities are proposed to be located at existing transportation facilities around the beltways, the landing areas will likely be ground level facilities located adjacent to automobile parking areas or other relatively flat areas, providing at least two unobstructed approach and departure paths to the facility.

The recommended facility would include the following elements:

Helipad: The helipad would be an asphalt or concrete pad with appropriate helipad markings. The size of the pad will be based upon the largest helicopter expected to use the facility. In this case, survey data indicated that the largest helicopter expected to use any facility within the region was the Bell 412.

The helipad area is made up of the Touchdown and Liftoff Area (TLOF), the Final Approach and Takeoff Area (FATO), and the Safety Area. Using the Bell 412 as the design helicopter, the size of the landing area is shown in Table 5-6.

Table 5-6 Hospital Heliport Landing Area Dimensions

Facility	Design Standard *	Dimensions
TLOF	Rotor diameter of design helicopter (46')	46' x 46'
FATO	1.5 times the overall length (56.2')	84' x 84'
Safety Area	1/3 the rotor diameter, but not less than 20' (46')	20'

* The design standards are based upon AC 150/5390-2B, *Heliport Design* guidelines for public heliports and the design helicopter which is the Bell 412

The total area of the helipad will be 104' by 104' based on the information above.

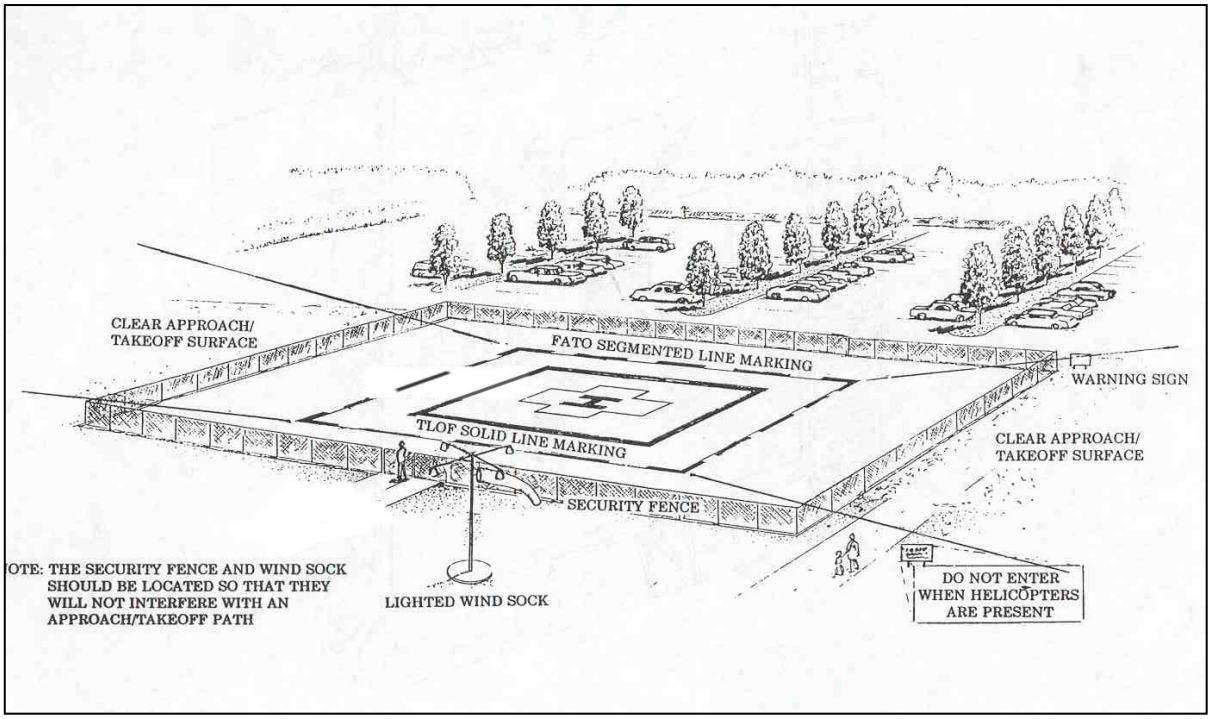
Approaches: There should be two approach and departure routes to the helipad. These approach and departure routes should be clear of obstructions and meet Federal Aviation Regulation Part 77 imaginary surface standards. At least one of these approaches should be capable of a non-precision instrument approach with the potential for a precision instrument approach.

Additional Requirements: Because of the simplicity of the helistop, the only other items required for the facility include a UNICOM radio for pilot communications, wind sock, security fencing and a

combination gate to provide limited access to the helipad area, a small bus shelter type enclosure to protect passengers, and a small automobile parking area.

An example of such a facility is provided in Figure 5-10.

Figure 5-10 Example Helistop



5.8 Public-Use Downtown Heliport Recommendations

Helicopters perform a level of community service that is often unrecognized, and this service is a vital utility that is one of the many key infrastructure elements that improves the quality of life through increased safety, security, and access to business. The true economic benefit of helicopter activity, however, results from more than the number of jobs created or the expenditures generated. Helicopter activity generates economic benefits in terms of social benefits as well.

The social benefits of helicopter activity within the study area can be categorized into six primary sectors: air medical services, corporate/air taxi, public service/police, forestry, electronic news and business/economic development based on the compilation of data gathered for this study (see Chapter 4). The importance of these social benefits have been recognized by other metropolitan

areas resulting in the development of downtown heliports in cities such as, Philadelphia, New York, Indianapolis, Detroit, Boston, Houston, Dallas, and Washington, DC to name a few.

The economic benefits of these heliports vary depending on the level of activity and other factors. For example, it was estimated in the Pennsylvania State Aviation System Plan that the Penn's Landing Heliport in downtown Philadelphia contributed about $6.7M to the local economy in 1999, with about 12,000 annual operations.

The social and economic benefits of a downtown heliport in Washington, DC and Baltimore was recognized by corporate, charter, and public service operators responding to surveys conducted for this study. These respondents indicated that a public-use heliport system is needed for Washington and Baltimore. This is additionally supported by the fact that activity at the South Capitol Street Heliport had been growing rapidly prior to September 11, 2001. Activity at South Capitol Street reached a peak in the year 2000 with about 3,000 annual operations. It was forecast that activity at South Capitol Street heliport would continue to grow at a rate of about 13 percent over the next five years. However, since September 11, 2001, helicopter operations have declined by over 90 percent from the previous year's activity. For the year ending December 2002, there were 100 police/law enforcement, 24 corporate, 18 military, and 6 filming operations recorded at the heliport. This drop in activity has resulted in an estimated loss of about $2 million in direct revenue in 2002. The direct cause of this decline in activity is a result of the current airspace restrictions for general aviation aircraft over downtown Washington. *For purposes of this study, the current airspace restrictions were not considered as a permanent limiting factor of helicopter activity in downtown Washington. It was assumed that general aviation or commercial helicopter activity would again be allowed within the downtown area at some point in the future.*

5.8.1 Existing System of Downtown Public-Use Heliports

In Maryland, there are no public-use heliports available to helicopter operators. In the Metropolitan Washington Region, there is a public-use heliport located at South Capitol Street. However, due to the airspace restrictions imposed since September 11, 2001, the heliport is effectively limited to EMS and police helicopter activity.

5.8.2 Public-Use Downtown Heliport Siting Criteria

Consideration should be given to three primary siting criteria: (1) accessibility; (2) airspace; and (3) land use. Good accessibility to the site is important in terms of both ground access (i.e. can the site be easily identified and accessed from the ground) and air access (i.e. can the site be easily identified and accessed from the air). The ability to provide good visual and instrument

approaches to the site will also be very important. Finally, land use issues such as zoning, property ownership, and potential noise and safety impacts will also influence the siting of the public-use downtown heliports.

Accessibility: The goal is for the downtown heliports to be easily accessible from both the ground and air. To accomplish this, the heliport should be located near a major transportation corridor, such as an interstate highway, main road artery, railroad tracks, or waterway. Most downtown heliports in other large cities are located near such facilities, as these sites tend to provide good air and ground access.

Airspace: The goal is to provide an environment that will enable good visual and instrument approaches to the downtown heliports. To accomplish this, the heliports should be located in an area that does not have significant man-made or natural obstructions surrounding the facility. The heliport should have two good approach and departure paths.

Land Use: The goal is to locate the downtown heliports in an area that has compatible land use and that minimizes noise and safety impacts to the surrounding area. To accomplish this, the downtown heliports should be located in a suitable area for a heliport, considering existing zoning and land use restrictions, and is a sufficient distance from noise sensitive developments. .

5.8.3 Recommended System of Public-Use Downtown Heliports

The recommended system of full service heliports would consist of two facilities located within the Central Business District (CBD) of the City of Baltimore and Washington, DC. A facility in Baltimore should be located in the downtown area that would provide quick access to many of the businesses within the CBD. This facility could also be integrated with the current public transportation system in order to provide further transportation options for passengers using the facility.

In Washington, DC, it was noted that the South Capitol Street heliport is currently the only public-use heliport within the metropolitan area. It is located on the Anacostia River, several miles south of the Capitol. There are current plans to redevelop the industrial area along the river where the South Capitol Street heliport is located. Therefore, it is likely that a new site for a public-use heliport will be needed in the near future (3-10 years). The new facility should be located in the downtown area that would provide quick access to the CBD and government facilities.

The actual sighting, approval, and construction of the downtown heliports should be driven by market demands. Market demands could include increased helicopter activity levels (status quo or unconstrained forecast), economic development opportunities, or specific user needs.

5.8.4 Recommended Public-Use Heliport Facility Requirements

The facility recommended for this study is to be a simple heliport facility. Based on discussions with the various operators, there is a need for a full service heliport that would include hangars and a Fixed Based Operator (FBO). The facility would simply include a landing pad, several helicopter parking spaces, and a small terminal building to shelter passengers and pilots.

The recommended facility is described as follows:

Landing/Takeoff Area: The landing and takeoff area would include a single helipad (for landing and takeoff) the same size as identified for the helistop in Section 5.5.4. There should be two clear approaches to the helipad with non-precision or precision instrument capabilities to operate in poor weather conditions.

Taxiway and Apron Area: A taxiway should be provided from the helipad to the helicopter apron area. The apron should be capable of accommodating a minimum of two helicopter parking positions. Based on discussions with various operators, the facility would be used primarily by charter and business helicopters. America Rising, a local helicopter operator, is developing scheduled helicopter service within the region and to destinations as far north as New York City. If such a service were to commence, consideration should be given to provide up to three parking spots in order to account for temporary parking (several hours) for a scheduled service helicopter.

Terminal Building: The terminal building should be a simple facility providing a seating area for passengers, a pilot lounge area that would include a flight planning area, counter space for potential vendors such as car rental companies, and restrooms. Security measures such as passenger screening, as discussed in Chapter 8, may be necessary depending upon how the terminal will be regulated by the Transportation Security Administration (TSA) and the Federal Aviation Administration. If screening is necessary, then an area must be included for the necessary screening machines, cueing space, and other required space.

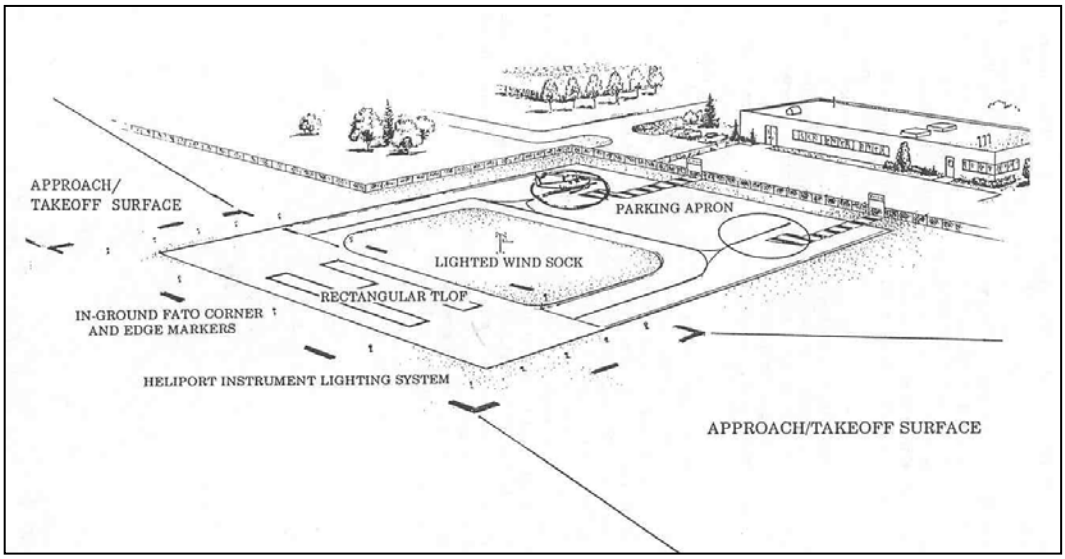
Facility Security: The primary security needs for the facility will be security fencing around the helipad and helicopter apron areas. Access to and from the apron area will be primarily through the terminal building, which should have a secure door accessing the apron area. In addition, if

there will be other gates along the fence line accessing the aviation area, those gates should be secure using combination locks or card access readers to operate the gates.

Other Facility Needs: The remaining needs for the heliport should include a UNICOM radio for pilot communications, wind sock, and an automobile parking area. The size of the parking area will be defined by the size of the ultimate terminal facility.

An example of a heliport is shown in Figure 5-11.

Figure 5-11 Example Heliport



6. ENVIRONMENTAL ISSUES AND RECOMMENDATIONS

6.1 Synopsis

Helicopters will continue to operate within the study area regardless of the number of heliports or helistops, or even considering the current airspace restrictions. Some of these operations will generate noise impacts. A goal of this study was to identify ways to better manage the helicopter system to reduce these impacts, as helicopter noise continues to be an issue within the Baltimore and Washington Metropolitan Region. Improvements to better manage the current system are needed, particularly in terms of knowing who is flying, where they are flying, and for what purpose. Furthermore, it is important to manage to the extent possible the routes being used and the flight procedures being followed.

A noise analysis and an overview of other potential environmental issues associated with the heliport facility recommendations are presented in this Chapter. It was concluded that the majority of the noise impacts were caused primarily by three types of operations. These are:

1. Medevac (EMS) operations into the Level I Trauma Centers located near densely populated areas, particularly near Inova Fairfax Hospital, Suburban Hospital, Prince George's Hospital Center, Children's Hospital, and Sinai and Johns Hopkins Hospital in Baltimore.

2. Police, military, and government operations over densely populated areas.

3. Helicopter operations that are transitioning through the Washington, DC area, particularly along the Potomac River and over the Aurora Hills, Virginia Highlands, Fairlington, Shirlington, Claremont, and South Arlington areas.

It was concluded that little could be done to address the EMS operations as these are a necessity and are fixed in location due to the location of the area's trauma centers. However, the pilots operating into these facilities need to practice "fly neighborly" techniques when practical. Continuing to educate pilots as to noise sensitive areas near the hospitals and on noise reduction techniques will help.

Likewise, little can be done to reduce the noise impacts from most police and security related operations, as these are also a necessity and are fixed in location due to the location of a particular

event. As with the EMS operations, however, the pilots operating the police and security aircraft need to practice "fly neighborly" techniques when practical. Continuing to educate pilots as to noise sensitive areas within their districts and on noise reduction techniques will help.

The enroute operations can be improved by routing certain helicopter operations away from the Potomac River and South Arlington areas when possible. It is suspected that some flights over these areas may be by aircraft transitioning to points north or south of the District and may not need to flyover these areas at all. Likewise, some flights could be operated at higher altitudes when the airspace permits. A continuous review of helicopter operations over the low flying routes around the District, particularly along the Potomac and South Arlington areas, should be conducted and pilots must be continuously educated about noise sensitive areas and on noise reduction techniques.

Three specific programs were identified that would help reduce noise impacts. These are:

1. Create a program to collect helicopter activity data: Today, there is very little actual data on historical or existing helicopter activity. As a result, helicopter activity and its related noise impacts is not fully understood. A program is needed to generate activity statistics for use in understanding current and future helicopter use within the region. This system would also help identify where and at what frequency helicopters are operating within the region. Without this information, a true picture of helicopter activity and the level of noise impacts to specific areas will not be known. Such a program could be a collaborative effort between MAA, COG, Metropolitan Washington Airports Authority (MWAA), and the FAA. The program should collect and maintain statistics on helicopter activity from control towers at the major airports and through the Potomac Terminal Area Control facility, which monitors aviation activity within the region.

2. Establish a Helicopter Working Group: The Helicopter Working Group must include government, military, police and EMS, private users, and citizen groups. The group should periodically review and recommend revisions to helicopter routes, airspace, and noise impacts as needed.

3. Create a program to address noise complaints: A centralized and formal process to address noise complaints is needed to improve the management of the system. Currently, there is no centralized or formal process to report and resolve helicopter noise complaints within the Baltimore-Washington Region, where the vast majority of noise complaints are generated. Developing a noise complaint program that allows residents of the region the

opportunity to voice their concern and be offered some resolution would be very valuable. It will be vital for this process to be coordinated with the Helicopter Working Group.

The heliport facility recommendations include the potential for the development of public-use helistops/heliport. If these public-use helistops/heliports are developed, environmental documentation and analysis, and permits will be required prior to construction. If the potential to build the entire system exists, it may be prudent to develop a programmatic environmental document to address the impacts of the entire system. The benefit of completing a programmatic environment document is elimination of repetition. Each heliport could be tiered off the programmatic document and include limited analysis based on the information in the programmatic document. This option could be further explored with the FAA.

However, if only a couple of the helistops are to be constructed, it may be easier to complete environmental documentation for each helistop. Because of the low likelihood of significant environmental impacts due to construction and operation of a helistop, completion of a concise Environmental Assessment (EA) may be most efficient in terms of time and cost. The EA should address NEPA (National Environmental Policy Act) requirements (if required), and state/local environmental concerns. If a programmatic document were not developed, the heliports would be assessed individually in an EA or Environmental Impact Study (EIS) depending on the level of impacts.

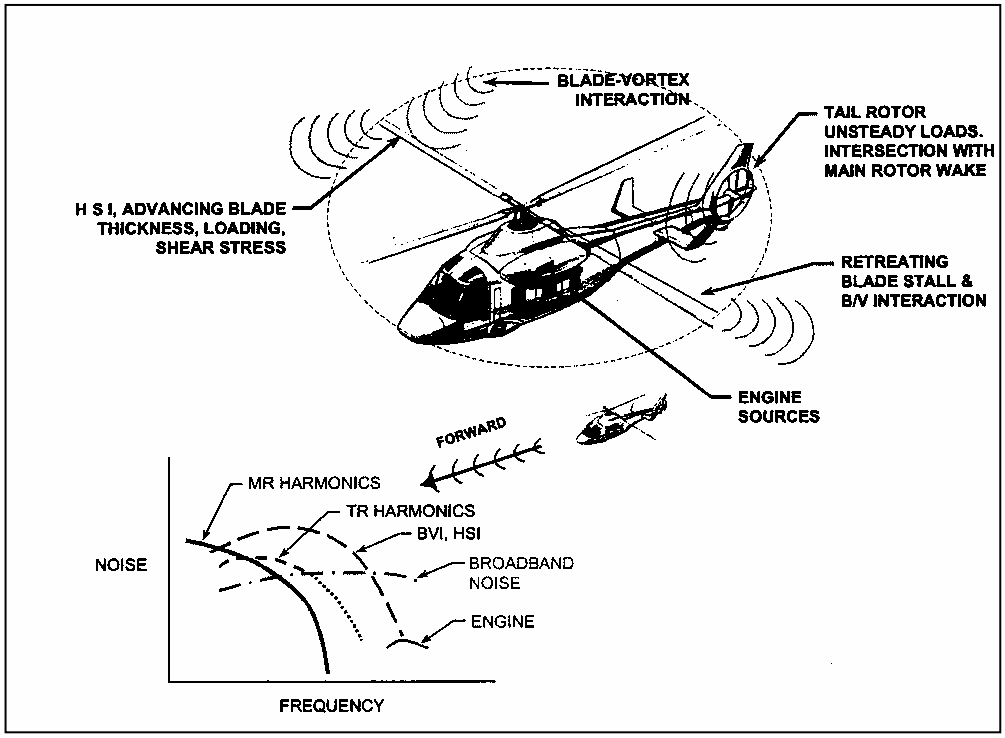
6.2 Noise Analysis

This Section evaluates the potential noise effects created by helicopter operations at the proposed heliport/helistop facilities proposed in Chapter 5, as well as noise effects generated by helicopter overflights. As such, the noise analysis focused on two elements of helicopter operations. The first element involves noise generated by helicopter operations at the various types of helistops/helistops. The second element involves noise generated by helicopter overflights along established helicopter routes within the region.

6.2.1 Helicopter Noise Sources

Three fundamental systems contribute to the generation of near-field and far-field helicopter noise. In order of significance, these noise sources are the main rotor, the tail rotor, and the engine. The main and tail rotors emit unique and recognizable sounds due to their highly individualized operating conditions. Engine noise is typically of secondary significance. Figure 6-1 illustrates the three noise sources and their associated generating mechanisms.

Figure 6-1 Helicopter Noise Sources and Spectral Content



The noise of these individual sources can be quite variable under different operating conditions. At low air speeds or during hover, the helicopter needs a higher power setting than at intermediate speeds. Likewise, at high air speeds increased power is needed. Thus, helicopters generally produce a minimum noise level at some intermediate airspeed, with higher noise levels at lower and higher air speeds.

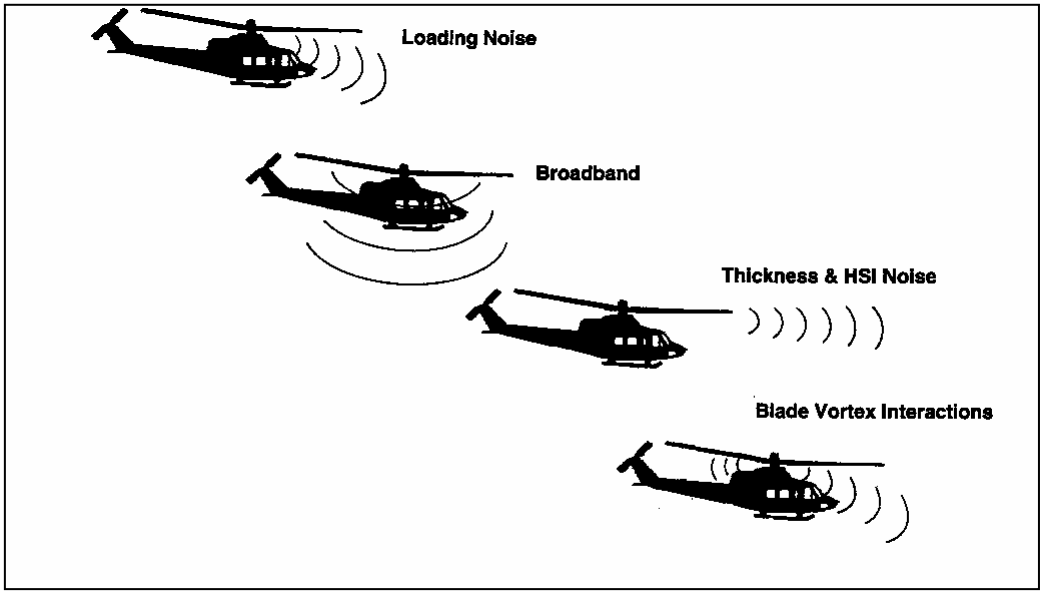
A helicopter main rotor generates primarily low frequency noise and, in certain operating modes, high amplitude low-to-mid-frequency noise modulated at the blade passage frequency. The low frequency rotor noise is made up of basic loading noise and broadband turbulence noise, each a function of lift and rotational speed. These sources are present in any lifting rotor. Additional sources, such as blade slap noise, becomes dominant in specific operating modes, namely in descents and at high forward airspeeds, respectively.

Blade slap (or BVI – blade vortex interaction) noise can be the most significant contributor, because it occurs during a helicopter's approach to the helistop/heliport area. If the helistop/heliport is located in areas of high population density, the community will experience increased noise exposure. Blade slap noise is the sound emitted when one of the rotor blades passes through the wake created by another blade, especially on descent. The intensity of the

blade slap decreases with the increase in the number of blades, and the intensity of the noise is directly proportional to the pitch of the rotor blade. A different acoustic interaction mechanism generates blade slap in high-speed forward flight. The advancing side of the rotor combined with the flight speed causes the blade to become transonic. This is often perceived as a buzzing sound that can be heard well before the helicopter passes overhead. During takeoff, the interaction creating blade slap does not occur, and takeoff noise is similar to level flight noise. However, the total noise from the engines and rotors is much louder during takeoff due to the increased power requirements of the engines.

Each main rotor noise source mechanism has a distinct directivity pattern, as illustrated in Figure 6-2. Basic loading noise during hover is generally dominant in a conical region directed 30 to 40 degrees from the rotor plane, while broad-band noise radiates mostly out of the plane of the rotor. High-speed interaction (or HSI) noise, which is an extreme case of blade thickness noise, occurs on the advancing side and propagates strongly forward, but manifests itself primarily in the rotor disk plane. Blade slap noise also occurs on the advancing side of the rotor disk and has a strong component below and ahead of the rotor.

Figure 6-2 Main Rotor Noise Directivity



Controlling the noise from the main rotor noise is traditionally accomplished by the configuration of the rotor blade and the blade's rotational tip speed. Airfoils, blade thickness, and tip shapes can mitigate the effects of high-speed noise and blade slap noise. For a given helicopter design gross

weight, increasing the blade chord and changing the number of rotor blades are means of reaching an acoustically desirable rotational tip speed. Changing the number of blades also changes the frequency distribution of the sound generated.

The most direct method of controlling blade slap noise is by reducing or diffusing the tip vortex. Changes in blade tip shapes have been shown to produce a measurable reduction in blade slap noise by modifying the vortex structure. Blade slap noise can also be mitigated by on-board controls that change the physical distance between blade and shed vortices or varying the effective blade angle-of-attack. Another means of reducing rotor noise is that of modulated blade spacing, i.e., spacing the blades unevenly. Equal blade spacing causes the fundamental frequency and its harmonics to each reinforce one another, and thus adversely affect the perceived noise. Uneven or modulated blade spacing skews the acoustic energy into several fundamental frequencies, with the harmonics of each being similarly skewed.

Other noise mitigation measures include changes in the design of the gearbox that has reduced the whine from helicopter transmissions and engines. Tail rotors can be shrouded to reduce the noise caused by the interaction of the tail rotor with the vortices generated from the main rotor. Improved approach and departure procedures have reduced the noise footprint near helistops/heliports located in sensitive areas.

6.2.1.1 Noise Comparison

A comparison of helicopter noise to "everyday" sounds that are familiar to people can provide a better comprehension of helicopter noise. The Helicopter Association International (HAI) developed the Fly Neighborly program, which provides helicopter operators with relevant information on how to operate helicopters and addressing community concerns regarding helicopter noise and operations.

The Fly Neighborly program provides useful graphics that describe helicopter noise in a tabular and graphic format. The tabular format provides a comparison of noise, expressed in a dB(A)[6] scale from 0 to 130, experienced outdoors, indoors, and how this noise is perceived by humans. The tabular format is effective in providing a comparison of familiar sounds known to most people. This is shown as Figure 6-3. Figure 6-4 provides a "thermometer" chart that relates aircraft noise as a scale.

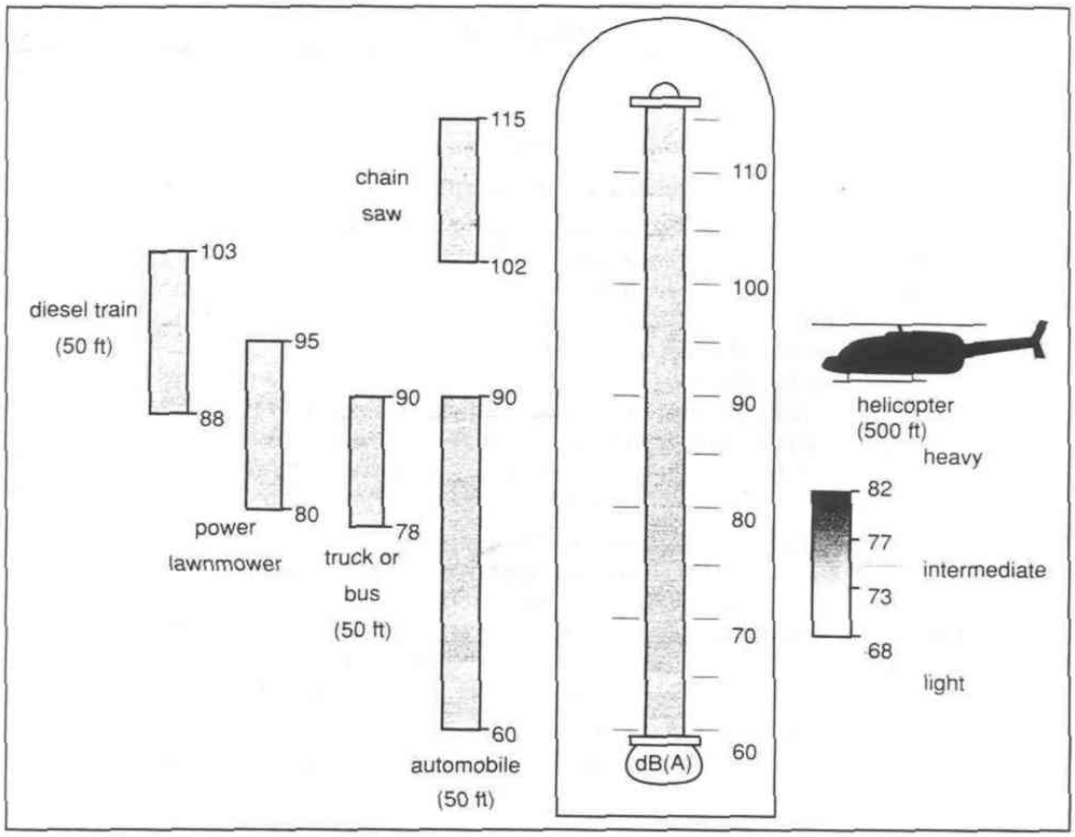
[6] The dB(A) scale was used for this analysis as this scale is used in the approved FAA noise models. However, it is suggested by reviewers of this report that other scales may be better able to measure the low frequency energy content generated by helicopters, such as the dB(C) scale.

Figure 6-3 Tabular Noise Comparison Chart

dB(A)	Overall Level	Community (Outdoor)	Home or Industry (Indoor)	Human Judgment of Loudness
130	uncomfortably loud	military jet aircraft takeoff from aircraft carrier at 50 ft (130)		
120			oxygen torch(121)	120 dB(A) 32 times as loud
110	very loud	turbofan aircraft at takeoff power at 200 ft (118)	riveting machine (110) rock-and-roll band (108-114)	110 dB(A) 16 times as loud
100		jet flyover at 1000 ft (103)		100 dB(A) 8 times as loud
90		power mower (95) motorcycle at 25 ft (90)	newspaper press (97)	90 dB(A) 4 times as loud
80	moderately loud	car wash at 20 ft (89) diesel truck at 40 mph at 50 ft (84) high urban ambient sound (80)	food blender (88) milling machine (85) garbage disposal (80)	80 dB(A) twice as loud
70		passenger car at 65 mph at 25 ft (77)	living room music (76) TV audio, vacuum cleaner (70)	***Reference*** 70 dB(A)
60		air conditioning unit at 100 ft (60)	electric typewriter at 10 ft (64) dishwasher (rinse) at 10 ft (60) conversation (60)	60 dB(A) 1/2 as loud
50	quiet	large transformers at 100 ft (50)		50 dB(A) 1/4 as loud
40		bird calls (44) lower limit of urban ambient sound (40)		40 dB(A) 1/8 as loud
10	just audible	dB(A) scale interrupted		
0	threshold of hearing			

Source: HAI Fly Neighborly Guide

Figure 6-4 Graphical Noise Comparison Chart



Source: HAI Fly Neighborly Guide

6.2.2 Modeling Helicopter Noise

This Section discusses how helicopter noise was modeled for this analysis. The FAA's Integrated Noise Model (INM) and the Heliport Noise Model (HNM) were used to model noise at various heliport facilities as well as along the helicopter routes within the region.

The INM version 6.1 noise model was used to examine the impact of helicopter overflights in the Washington, DC/Maryland area. Although the INM noise model was originally developed to evaluate noise from fixed-wing aircraft, the current version of the INM also includes helicopters as well. The INM noise model database includes sixteen different helicopters that range in size from the Robinson R22 with a takeoff gross weight of 1,300 pounds to the military's large twin rotor Boeing Vertol CH-47D with a takeoff gross weight of 48,500 pounds. The INM helicopter noise database contains noise levels for helicopter takeoff, landing, and level flight operations.

The INM can generate DNL contours with the input of daytime and nighttime operations by helicopter type, and the flight tracks used for departures and arrivals. In addition, the INM noise model can also be used to develop Lmax noise contours from single event helicopter operations.

DNL Noise Metric

The yearly day-night average sound level, or DNL, is a cumulative noise exposure metric that has been adopted by most federal agencies, including the Federal Aviation Administration, as the appropriate descriptor for assessing noise exposure in residential areas such as the communities surrounding an airport. Based on research data obtained during many community noise surveys, the DNL noise metric has been found to correlate well with community annoyance due to long term exposure to noise, as measured in terms of the percentage of people exposed to noise and that are "highly annoyed".

The DNL noise exposure level is the accepted noise metric for land use compatibility studies. In accordance with other federal and FAA guidelines, residential land uses are generally compatible with a DNL noise exposure level of 65 dBA or less. The DNL noise metric takes into account the magnitude of the sound levels of all individual aircraft events that occur over a 24-hour period, the number of aircraft events, and an increased sensitivity to noise during the nighttime hours when people are trying to sleep. The DNL noise metric includes a 10-dB nighttime penalty during the hours between 10 PM and 7 AM that reflects the potential for added annoyance during the hours when people are trying to sleep.

Lmax Single Event Noise Metric

The single event maximum sound level metric, or Lmax, is simply the highest A-weighted sound level that occurs during a single aircraft flyover event. Although the Lmax noise level for a single flyover event is easily understood, it is useful only for analyzing short-term responses to noise, that is, what a person would hear during the helicopter flyover. It provides no information concerning the duration of the event or the total amount of sound energy of the event.

The FAA's Helicopter Noise Model (HNM) was developed to assess heliport noise prior to the addition of helicopters into the INM database. The original helicopter noise database was developed for the HNM noise model. However, in addition to noise level data for takeoff, landing, and level flight, the HNM noise model also includes helicopter noise level data for hover in ground effect (taxi operations) and hover out-of-ground effect (hover at altitude). These features are not

available in the INM noise model. The HNM, on the other hand, can generate DNL noise contours around heliports. Fortunately, the DNL noise contours from the two noise models can be combined into one contour. However, the current version of the HNM noise model cannot be used to generate Lmax noise contours for single event helicopter operations.

6.2.2.1 Noise Measurement Program

In addition to the results generated by the two noise models, actual helicopter noise measurements were obtained in the Washington, DC area to help validate and adjust the models.

6.2.3 Noise Analysis

This Section provides the noise analysis conducted for both the helistop/heliport facilities and along established helicopter routes within the study area. Potential mitigation options are discussed separately in the next section.

6.2.3.1 Helistop and Heliport Noise

Three types of helistop/heliport facilities were included in the recommended system. These are as follows:

1. Private Use Hospital Heliports
2. Public-Use Helistops
3. Public-Use Downtown Heliports

Activity levels for the three different types of facilities were estimated based on discussions with facility owners and helicopter operators within the study area. It was determined that there were generally three activity levels experienced at facilities within the area. These are as follows:

- Low use facility. Examples include a public-use helistop or a low use hospital heliport.
- Moderate use facility. Examples include a cardiac or trauma hospital heliport or a police heliport
- High use facility. This is generally a full service downtown heliport facility.

Two primary inputs were used to model the noise at these three types of facilities, helicopter activity levels and types of helicopter. A third input variable was also that addressed daytime (7

AM to 10 PM) and nighttime (10 PM to 7 AM) operations. The day night split was also derived from the facility owners and helicopter operators. Table 6-1 lists the input variables used to generate the DNL noise contours for each of the three facility categories, assuming a straight in/straight out approach and departure path.

Table 6-1 Heliport Activity Input

Heliport	Weekly Operations	Annual Operations	Day/Night Split	Helicopter Types	INM Equiv.
Low-Use Facility	6 ops/wk	312	100% day	Bell 407, 430 S-76	B206L (50%) S76 (50%)
Moderate-Use Facility	50 ops/wk	2,600	90%/10%	OH-58, Bell 407, AS 350, BK117	B 206L (42%) SA 365 (43%) BK117 (15%)
High-Use Facility	250 ops/wk	13,000	90%/10%	Bell 407, 430 AS 350, S-76, A 109	B206L (33%) S76 (33%) A-109 (33%)

Figure 6-5, Figure 6-6, and Figure 6-7 present the noise contours for the low, moderate, and high-use helistop/heliport facilities using the input variables listed in Table 6-1. The 65 DNL contour was used to define a noise impact for the purposes of this analysis. The FAA and other federal agencies, such as the Department of Housing and Urban Development (HUD), use the 65 DNL contour to define a significant noise impact upon the community.

Figure 6-5 Low-Use Helistop/Heliport Noise Contours

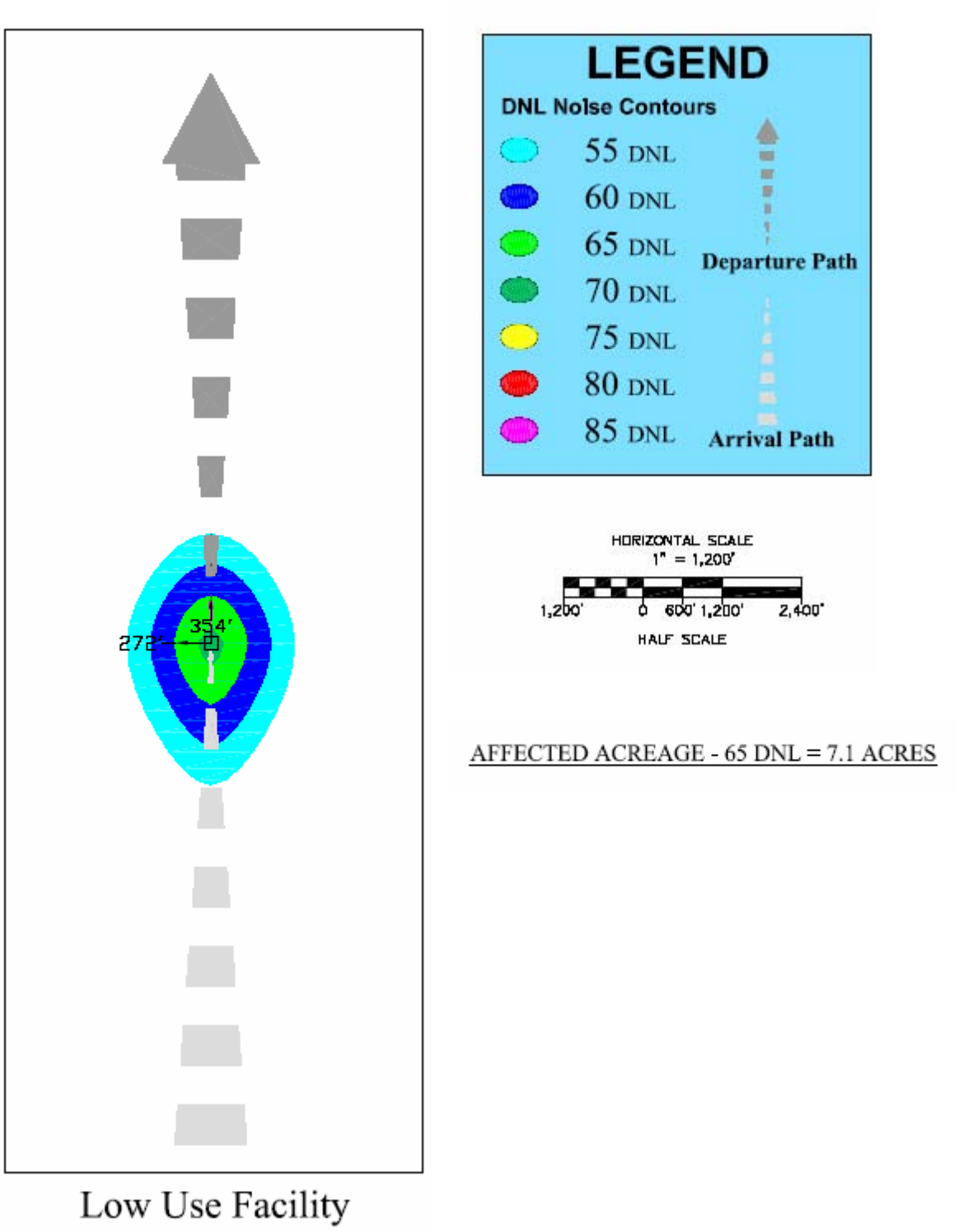


Figure 6-6 Moderate-Use Helistop/Heliport Noise Contours

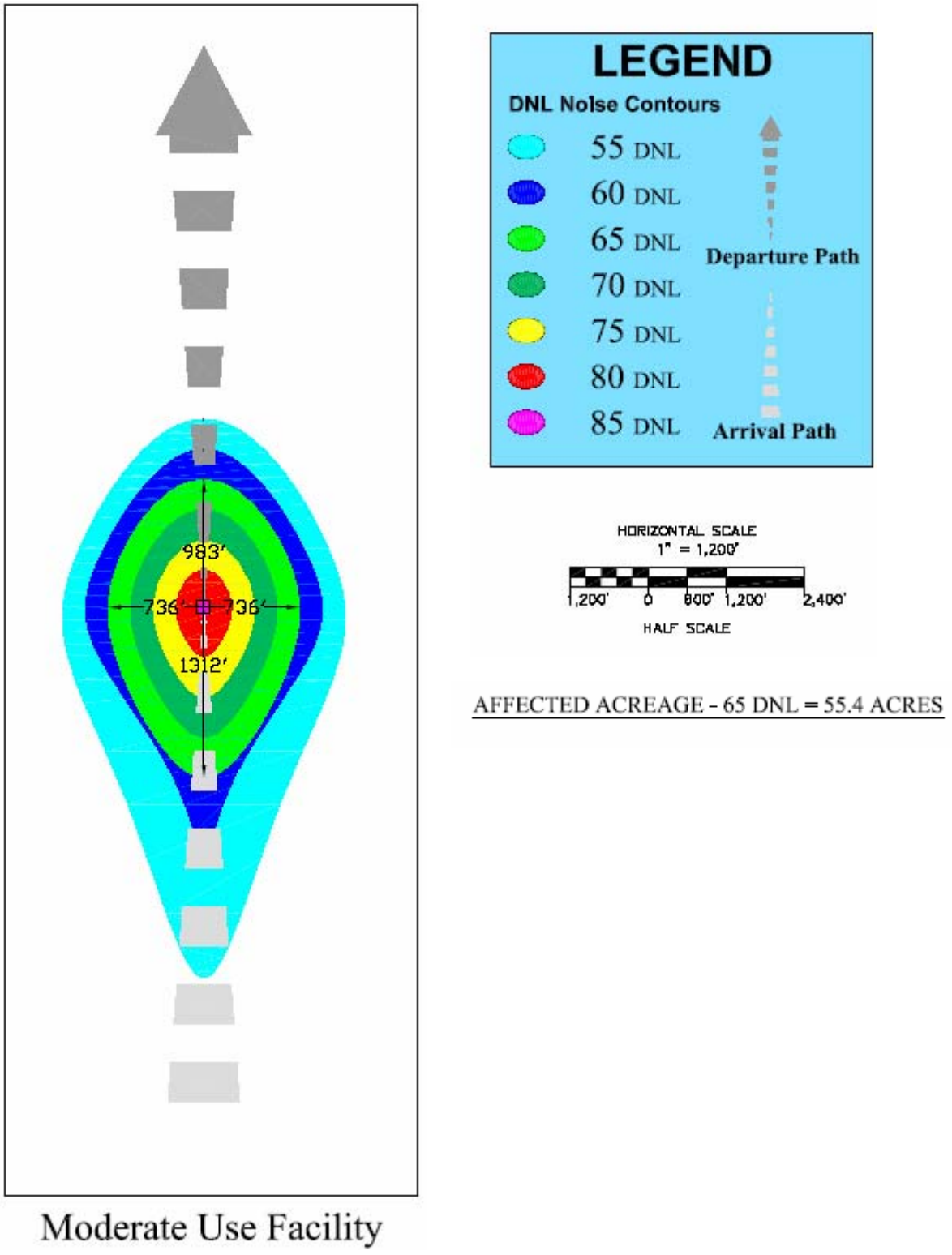
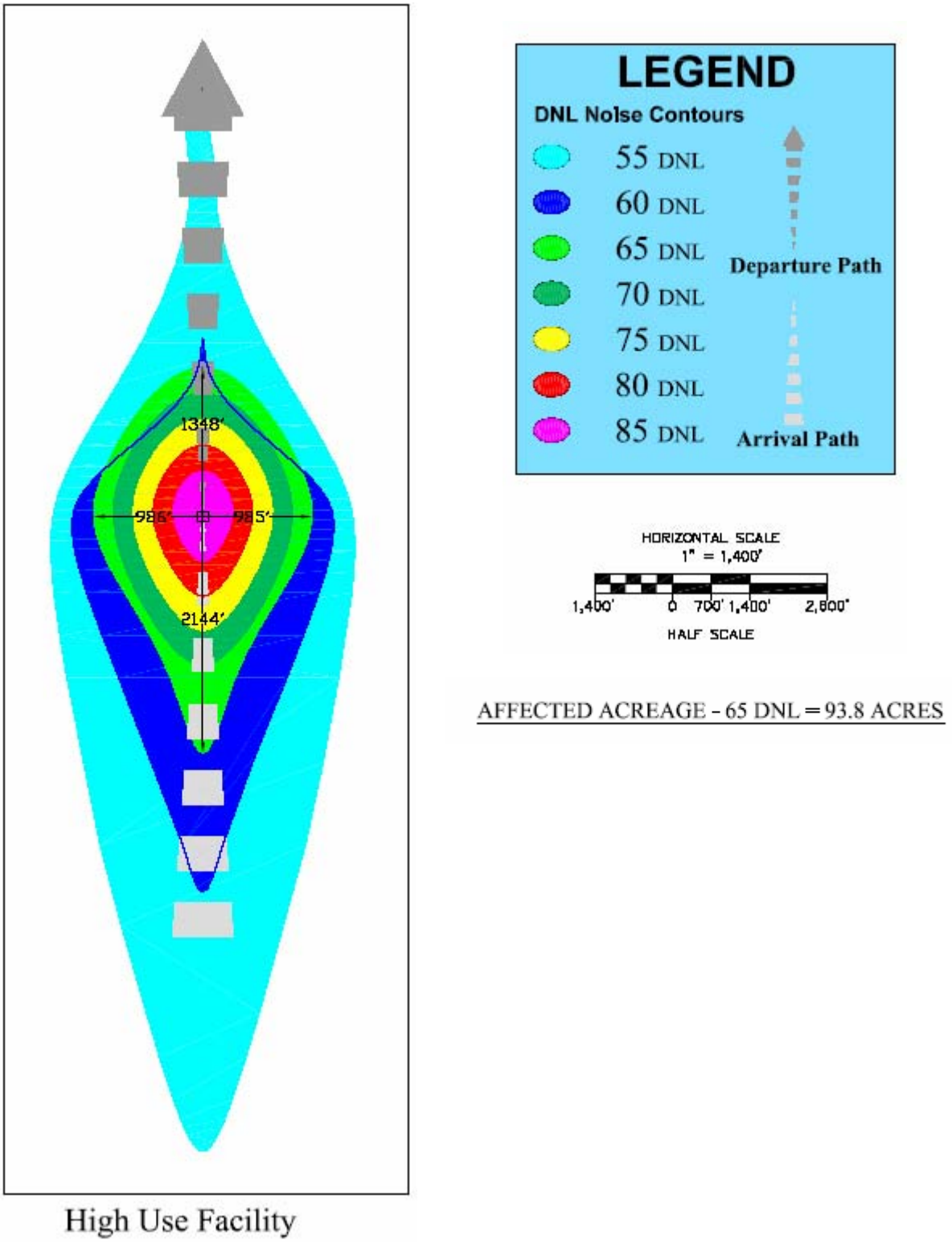


Figure 6-7 High-Use Helistop/Heliport Facility Noise Contours



High Use Facility

As shown in the above figures, the low use facility generates a very small 65 DNL contour that would generally stay within the boundaries of the facility itself. As activity increases, however, the contours also increase in size and are slightly elongated along the straight-in/straight-out approach and departure path. In the moderate use facility, the 65 DNL contour goes beyond the 100'x100' heliport dimensions while the 60 and 55 DNL contour along the straight-in/straight-out approach and departure route extend beyond 300' under the approach to the heliport and almost 200' beyond the heliport under the departure route. The reason for the elongated approach path is due to the higher power and slower speeds used on approach. During takeoffs, however, the power can be varied and a steeper departure profile used, allowing the helicopter to climb faster, and thus reducing the noise exposure during takeoff. As would be expected, the high use facility extends well beyond the heliport facility and has the greatest noise impact.

6.2.3.2 Helicopter Noise Generated Along Established Routes

Established helicopter routes are provided within the study area. They are concentrated within the Washington, DC area and extend west to Dulles International Airport, north to Metropolitan Baltimore, east to Andrews Air Force Base and south to Virginia. The purpose for these helicopter routes is to provide a defined route for helicopters to transit the busy airspace around the three large airports and Andrews. For this analysis, two noise levels were evaluated, the Lmax noise level, which provides a measure of flyover noise in terms of time and sound pressure, and DNL contours, which provide a day-night average of helicopter noise as presented in the previous section.

Helicopter Routes

In this study, the Lmax noise levels from several different helicopter types representative of government, military, police, and medevac helicopter operations likely to be found in the Washington, DC area were evaluated to show typical Lmax noise contours along the various helicopter flight routes. Due to the flight restrictions imposed after 9/11, there is little or no commercial helicopter activity within the I- 495 Beltway surrounding Washington, DC. Eight total helicopter flight corridors were examined in the DC area, with overflights varying between 200 and 1300 feet in altitude. For each of these corridors, helicopter Lmax noise levels were computed using the INM noise model and displayed as noise contours in 5-dBA increments from 60 dBA to 90 dBA. These noise contours show the extent to which helicopter noise levels affect the surrounding areas along each of the flight corridors.

Maryland Aviation Administration

Metropolitan Washington Council of Governments

The helicopter flight corridors around and within the 495 Beltway surrounding the Washington, DC area are shown in Figure 6-8 and Figure 6-9.

Figure 6-8 Helicopter Routes in Greater Baltimore Area

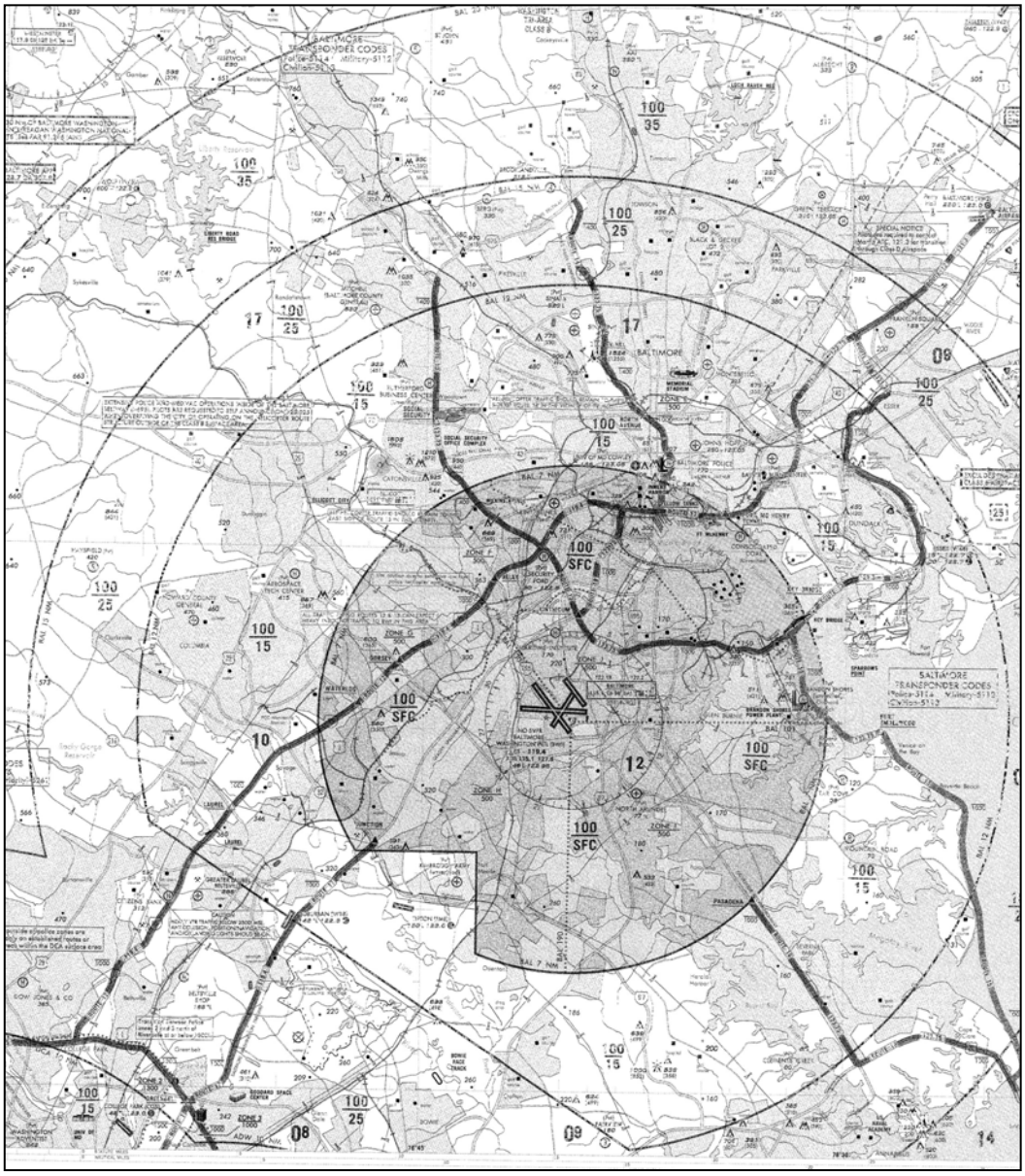


Figure 6-9 Helicopter Routes in Greater Washington, DC Area

The primary routes within the Greater Baltimore and Washington, DC areas are as follows:

- Route 1, runs down the east side of the Potomac River from Tyson's Corner, across the tidal basin, up the Anacostia River, and along the Baltimore-Washington Parkway;
- Route 2 consists of flights along Pennsylvania Avenue and the Suitland Parkway;
- Route 3 consists of flights around the Washington, DC Beltway;
- Route 4 consisted of flights straight up the middle of the Potomac River from Fort Washington to Washington Reagan Washington National Airport where it ends and intersects with Route 1;
- Route 5 consisted of flights up Route I-395 from the Beltway to Washington National Airport;
- Route 6 consisted of flights from Washington Reagan Washington National Airport to Bolling Air Force Base, and then straight over to Woods Corner;
- Route 7 consisted of flights from Tyson's Corner down Virginia Highway Route 7 to I-395, up along Route 5 over I-395, and then a cut over to Washington Reagan Washington National Airport;
- Route 8 consisted of a southern continuation of Routes 2 and 6 from Woods Corner down Branch Avenue and Brandywine Road, and then south on U.S. Route 301.

There are additional routes to the west of Washington, DC around Dulles International Airport as well as to the north towards Baltimore. In total, there area 17 routes in the Greater Washington, DC area and 9 in Baltimore. Some routes share the same number as the extend from Baltimore to Washington, DC.

Maximum flight altitudes varied from corridor to corridor, depending on the location of various military and government heliports, requirements for flying below the air traffic at Reagan Washington National Airport, and minimizing noise disruption along each flight route. Along Route 1, the flight path elevation started at 1300 feet near Cabin John Parkway, dropped to 700 feet down near McLean, down to 300 feet near the Washington Monument, to 200 feet across the tidal basin and lower Anacostia River, back up to 500 feet and then up to 700 feet along the Anacostia River, and then back up to 1300 feet above the Baltimore Washington Parkway. Along Route 2, the elevations started at 500 feet along the Anacostia River, and then climbed to and stayed at 1000 feet along the Suitland Parkway. Elevations along Route 3, the beltway route, were a constant 1300 feet from the Woodrow Wilson Bridge clockwise around 495 to the junction with the

Baltimore-Washington Parkway, and down to 1000 feet to the Woodrow Wilson Bridge. Elevations on Route 4 descended from 1000 feet at Fort Washington to 300 feet at the Woodrow Wilson Bridge and 200 feet at the junction of Route 1 and the Anacostia River. Elevations on Route 5 over I-395 started at 1300 feet south of Virginia Highway 7, and then descended to 200 feet at Washington Reagan Washington National Airport. Elevations on Route 6 were a constant 1000 feet. Elevations on Route 7 were 1300 feet from Tyson's Corner to I-395 along Virginia Route 7, and then descended to 1000 feet on the cutover to National Airport. Elevations along Route 8 were a constant 1000 feet.

Lmax Noise Contours

Lmax noise levels were computed along each of these eight corridors using the INM noise model as an example of the noise impact created by an individual helicopter flight. The helicopters evaluated in this study included the Bell 206L Jet Ranger, the Augusta A-109, the Aerospatiale SA-365N, and the Sikorsky S-76. The results are shown as a set of noise contours on a TIGER Line census map of the Washington, DC area. These contours show that typical helicopter noise levels vary with helicopter size, altitude, and distance from the flight corridor. A typical larger helicopter, such as the Sikorsky S-76, affected a wider area than a smaller helicopter such as the Bell 206L, and generates higher overall noise levels.

Figure 6-10 shows the Lmax noise contours for the Bell 206L helicopter, Figure 6-11 shows the Lmax noise contours for the Agusta A-109 helicopter, Figure 6-12 shows the Lmax noise contours for the Aerospatiale SA-365N; and Figure 6-13 shows the Lmax noise contours for the Sikorsky S-76. The noise generated at the different altitudes along these routes would also be applicable to others routes of the same altitude. For example, the noise contours generated along the west side of the Beltway at 1,300' would be the same as the noise contours generated on routes around Dulles International Airport, which are also at 1,300'.

In the regions where helicopters flew at the higher altitudes of 1000 to 1300 feet, the Lmax noise levels ranged from 70 to 75 dBA directly under the flight track. At the lower altitudes of 200 to 300 feet near Reagan Washington National Airport, the Lmax noise levels ranged from about 80 dBA for the smaller helicopters such as the Bell 206L, to over 85 dBA for the larger Sikorsky S-76 helicopter. Restricting the helicopters to flight corridors over the Potomac River and Anacostia River reduces expected noise levels along the adjacent river shorelines to slightly less than 5 dBA lower than would occur for the case of direct helicopter overflight by increasing the distance from the helicopter to the residential receptors. This same condition exists for flight corridors over existing highways with the additional benefit of higher masking noise levels from highway traffic in the residential area adjacent to the highway.

Figure 6-10 Lmax Noise Contours for Bell 206L Helicopter

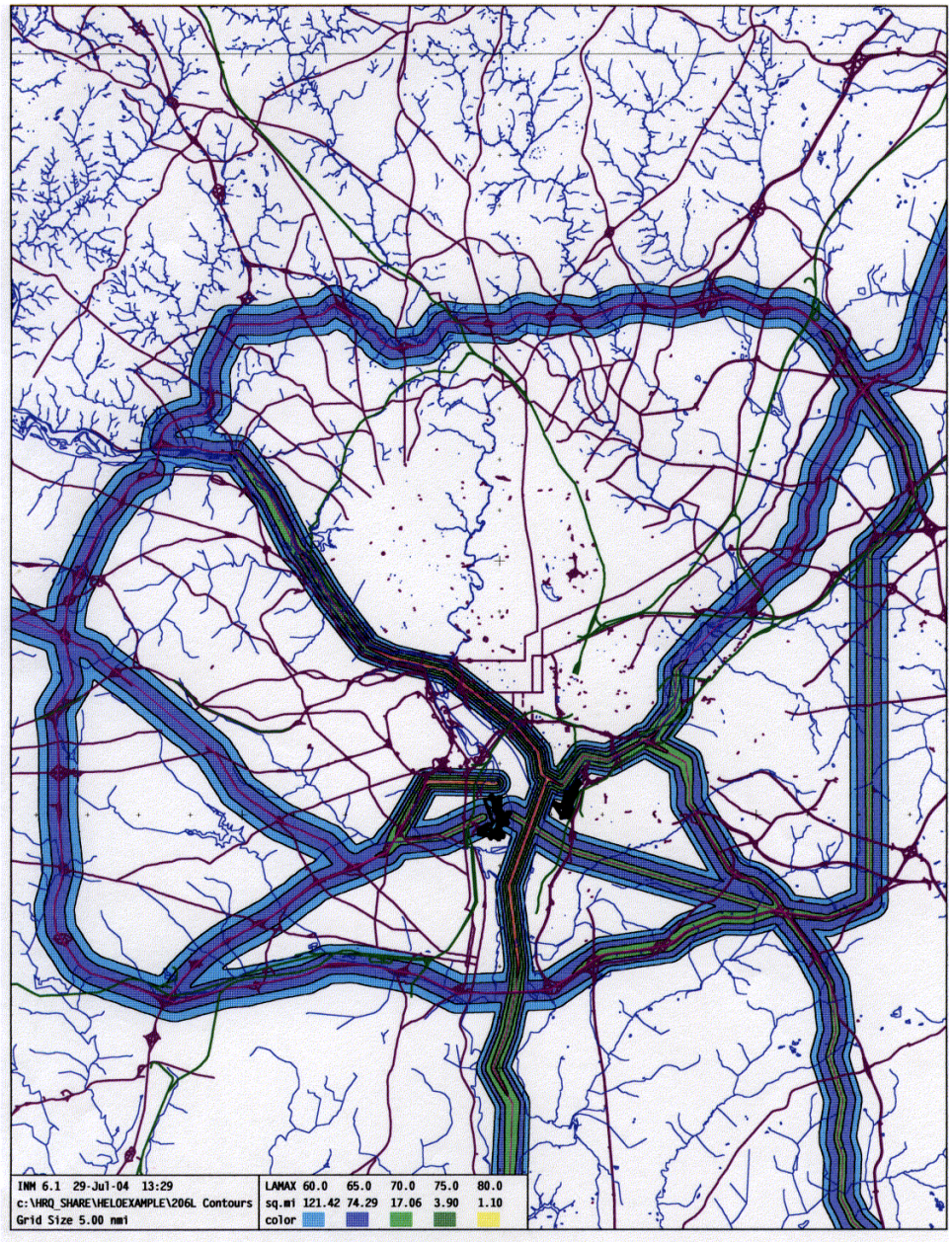


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Figure 6-11 Lmax Noise Contours for Agusta A-109 Helicopter

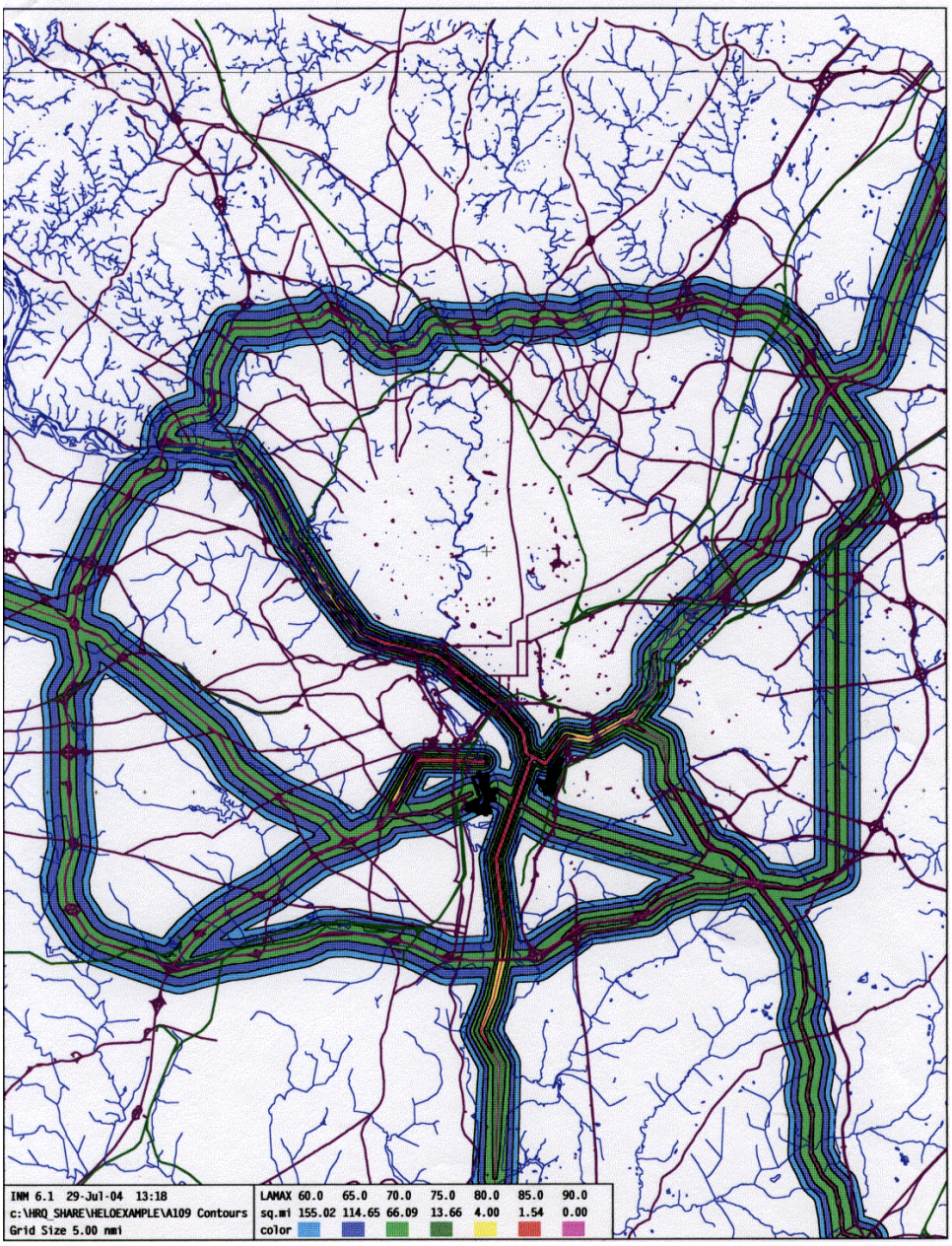


Figure 6-12 Lmax Noise Contours for Aerospatiale SA-365N

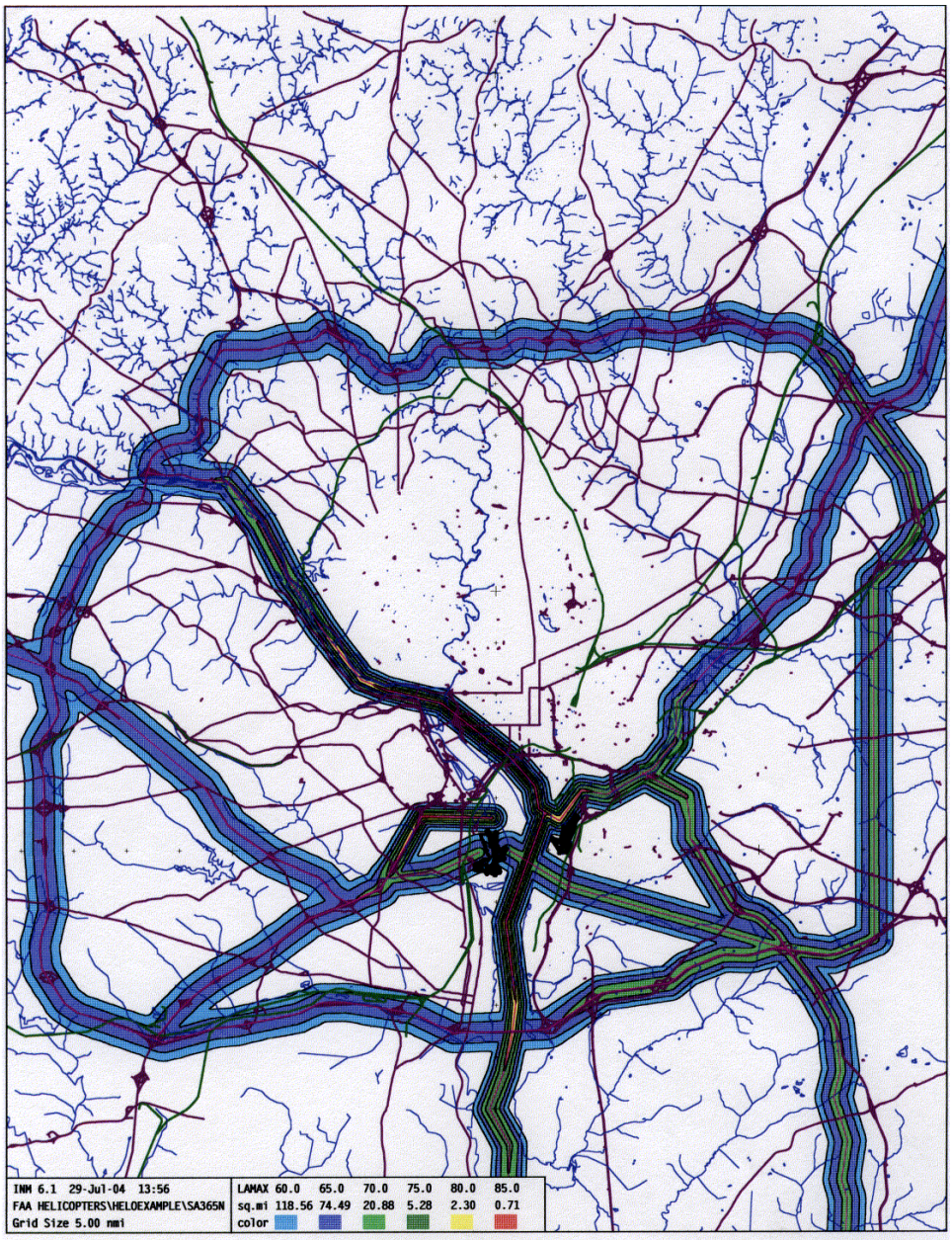
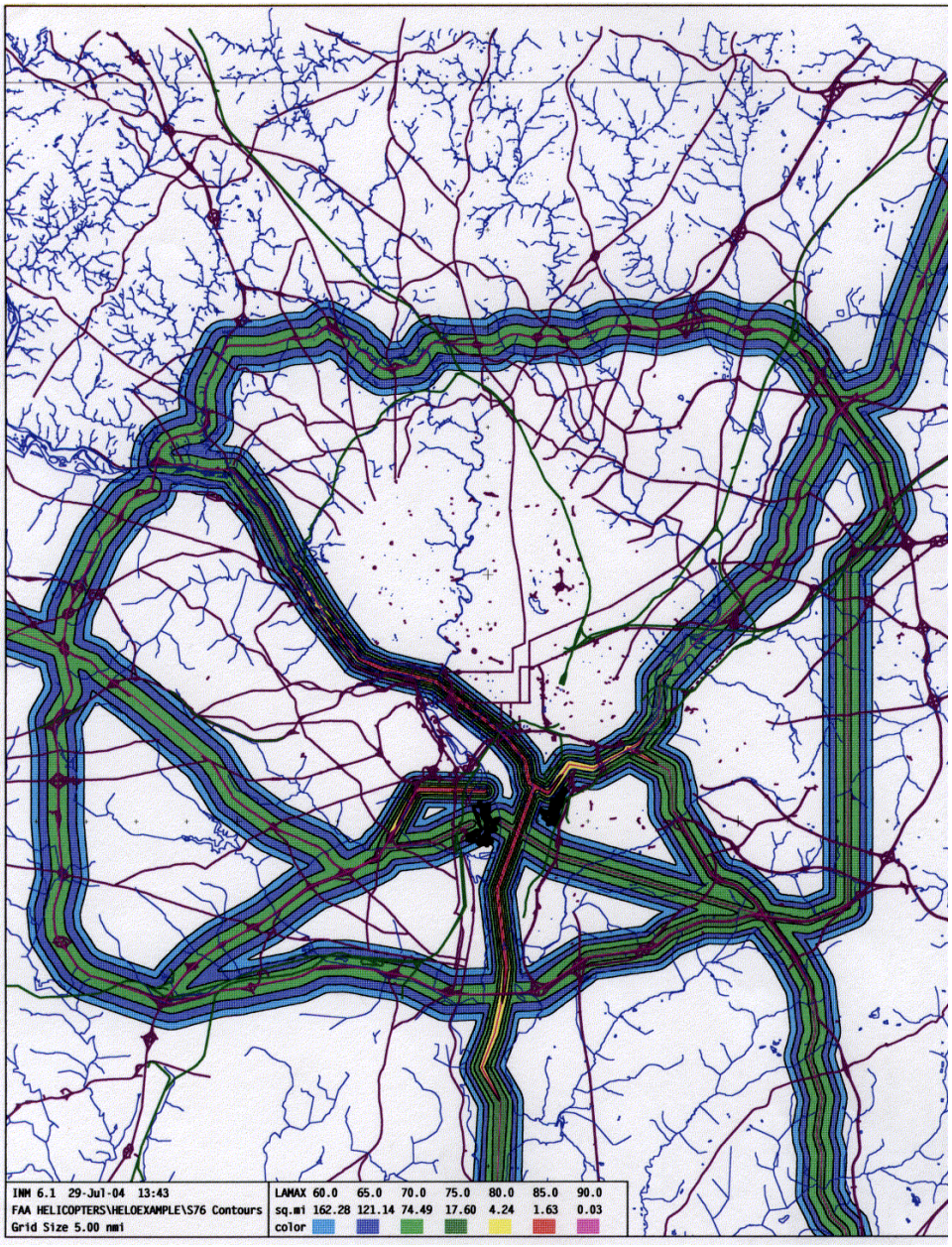


Figure 6-13 Lmax Noise Contours for Sikorsky S-76



In addition, due to the lateral sound attenuation adjustment algorithm used in the INM noise model, the noise contours generated by the helicopters flying at higher altitudes (1000 to 1300 feet) are noticeably wider than the noise contours generated at lower altitudes (200 to 300 feet). Although the noise levels directly under the flight track are higher at lower altitudes, along the sideline of the flight track, ground attenuation due to the noise propagation path being close to the ground results in lower noise levels at similar slant distances from the flight track. At higher altitudes and directly under the flight track there is no ground attenuation because the direct noise propagation path is air-to-ground. For elevation angles (the angle between the ground observation point and the altitude of the helicopter flight path) equal to or less than 60 degrees, the INM noise model uses the ground-to-ground lateral attenuation adjustment algorithm. For elevation angles greater than 60 degrees, the INM noise model uses the air-to-ground lateral attenuation adjustment algorithm. As a result, the width of the 60, 65, and 70 dBA Lmax noise contours shown in Figures 8-8 through 8-11 are smaller for helicopter flyovers at lower altitudes than at higher altitudes.

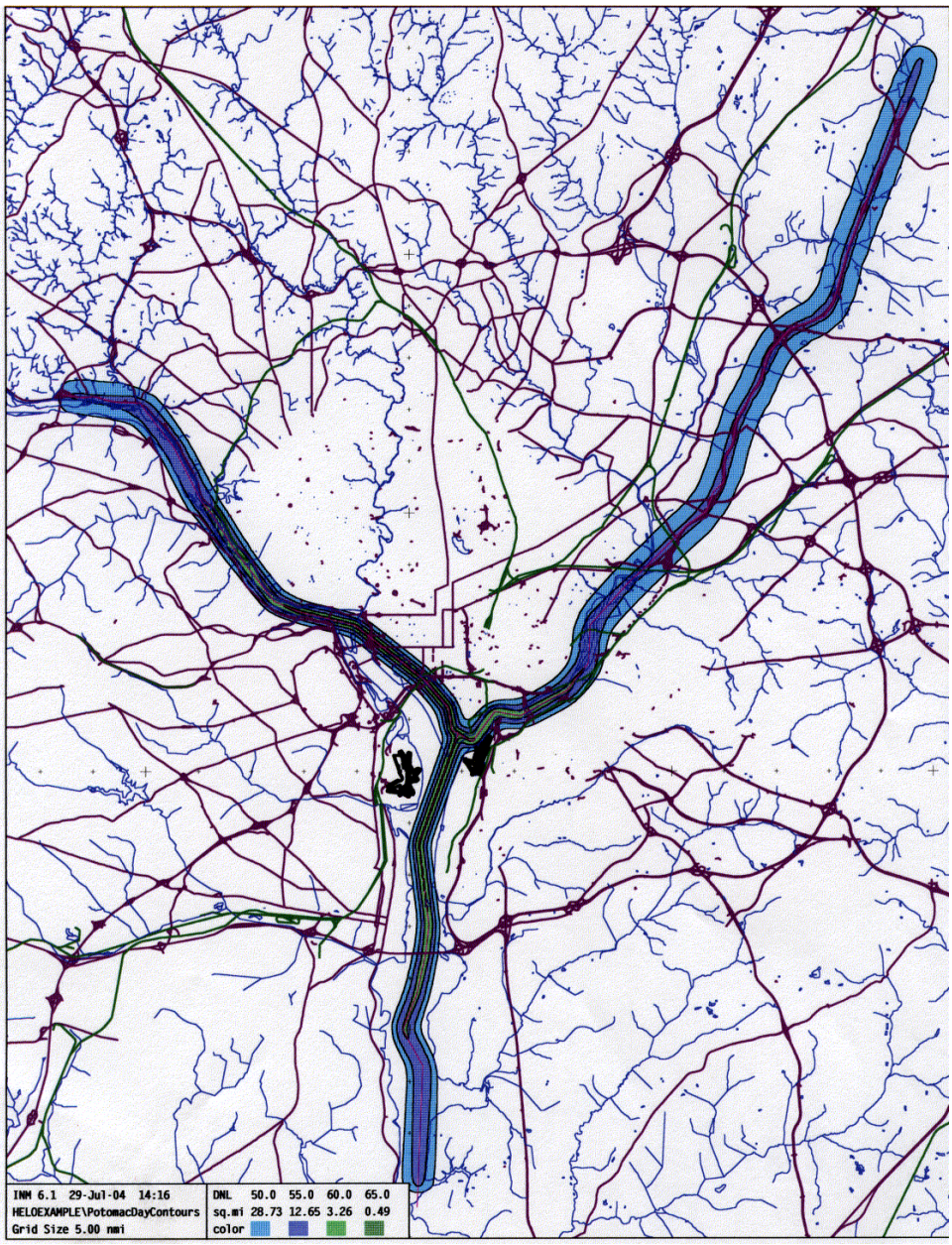
DNL Noise Contours

In addition to the Lmax noise contours, the INM noise model was also used to develop DNL noise contours over a 24-hour period based on flight strip data obtained from the FAA Tower at Reagan Washington National Airport. The DNL noise metric is a statistical descriptor of noise over a 24-hour period that takes into account people's sensitivity to noise during the nighttime hours by adding a 10-dBA penalty to the hourly Leq noise levels that occur between 10:00 PM and 7:00 AM. Based on the helicopter operations data obtained from the FAA for the 24-hour period on Tuesday, June 29, 2004, the helicopter fleet-mix and operations data shown in Table 6-2 were used to generate the DNL noise contours shown in Figure 6-14.

Table 6-2 Daily Helicopter Operations on June 29, 2004

Helicopter Use	Helicopter Type	Daytime Operations	Nighttime Operations
Medivac	SA 365N	36	4
Military	Bell 212 (UH-1N Huey)	19	0
	Sikorsky S-70 (UH-60A Blackhawk)	19	0
Police	Bell 206L	22	3
Customs	Sikorsky S-61	6	0
Totals		102	7

Figure 6-14 DNL Noise Contours Along the Potomac and Anacostia River Routes



The DNL noise modeling analysis used the same flight track corridors and altitudes reflected in the Lmax noise contours. Although there were several other military helicopter types that operated in the Washington, DC area (not all of which are in the INM helicopter database), to simplify the noise modeling analysis, only the two more predominant helicopter types were used to model the military helicopter operations. Another assumption made in the modeling analysis was that all of the helicopter operations identified in the FAA flight strips operated on both the Potomac River and Anacostia River flight corridors.

The DNL noise contours shown in Figure 6-14 for these two routes indicate that daily noise exposure levels are well below the FAA's residential noise impact level of 65 dBA for almost all helicopter operations in the Washington, DC area. Most DNL noise levels directly below the helicopter flight paths where the helicopter altitude is above 500 feet will be in the 50-60 dBA range. Along the areas where helicopter operations are below 500 feet, such as near Reagan Washington National Airport, the DNL levels exceed 60 dBA. However, almost all of the areas, where the DNL levels are above 60 dBA, are over water. Only in a very narrow band over the Tidal Basin, the West Potomac Park, and the Potomac River at an elevation of 200 feet will the DNL levels exceed 65 dBA. However, because of the aircraft takeoff and landing operations at Reagan Washington National Airport, typical DNL noise levels along this area of the Potomac River are already at 60 to 65 dBA. For comparison purposes, typical background DNL noise levels in rural areas range from 45 to 55 dBA; in suburban residential areas from 55 to 60 dBA; in "quiet" urban residential areas from 60 to 65 dBA; in "very noisy" urban residential areas from 65 to 70 dBA; and in downtown city areas from 70 to 80 dBA. For residential areas near major highways, typical DNL noise levels range from 65 dBA within 200 feet of a highway, to 60 dBA within 400 feet of a highway.

Helicopter Lmax Noise Levels During Hover Operations

Another helicopter activity that generates significant noise is hover operations. There are essentially two types of helicopter hover operations: hover "in ground effect" (IGE) such as during taxi operations; and hover "out of ground effect" (OGE) such as during police surveillance operations. When a helicopter is operating in ground effect, the helicopter is close enough to the ground to experience "up-wash" on the rotor system which results in higher lift, and lower induced drag on the rotor blades. The net effect is a reduction in the power required to maintain flight. When a helicopter is not assisted in achieving lift by ground up-wash, then it is said to be operating out of ground effect. Since it requires more energy to hover out of ground effect, helicopter noise levels are generally 3-dBA higher during this mode of operation. Typical helicopter Lmax noise levels during hover operations both in ground effect and out of ground effect are shown in Table 6-3 for several different helicopters.

Table 6-3 Helicopter Lmax Noise Levels (in dBA) During Hover Operations

Distance (in feet)	Bell 212 (UH-1N)		Bell 206L		Agusta A-109		Sikorsky S-76	
	IGE	OGE	IGE	OGE	IGE	OGE	IGE	OGE
200	93.1	96.1	85.0	88.0	87.1	90.1	85.0	88.0
400	86.3	89.3	78.2	81.2	80.2	83.2	78.3	81.3
600	81.5	84.5	73.5	76.5	75.4	78.4	73.6	76.6
1000	74.1	77.1	66.1	69.1	67.9	70.9	66.4	69.4
2000	64.7	67.7	56.5	59.5	58.3	61.3	57.2	60.2

6.2.4 Mitigation of Helicopter Noise

This Section discusses potential mitigation of noise related issues. The primary purpose of this analysis is to suggest possible options that could be taken to reduce the effects of helicopter noise on the surrounding communities within Maryland and Metropolitan Washington Regions. As there are two types of helicopter noise discussed in this Chapter, the mitigation discussion will focus on noise associated with heliports/helistops and the various helicopter routes over flying the DC metro region.

6.2.4.1 Heliport/Helistop Mitigation Measures

In the evaluation of facility noise, three levels of activity were used to represent noise levels that could be expected based on the level of activity. In this Section, noise mitigation options are discussed for existing and future facilities in order to address facility noise issues and is intended to provide a guide to possible mitigation options available to facility owners and to local municipal jurisdictions.

Existing Facilities

Most of the existing heliport and helistop facilities within both regions are privately owned corporate heliport facilities, hospital heliports, or police heliports. The majority of heliports and helistops fall within the low use facility and the moderate use facility. In general, many of the corporate facilities fall under the low use category while hospital and police heliports vary between low use and moderate use facilities.

As seen in Figures 8-5 through 8-7, as the level of activity increases, so does the noise contour footprint. The shapes of the contours follow the approach and departure paths, and extend further out from the helipad for the approach to the facility than for the departure from the facility. For the purposes of this report, and consistent with FAA guidelines, the 65 DNL contour was used to define a significant noise impact. Individual communities may choose to use a lower noise threshold for permitting and land use controls[7]. Therefore, impacts of the 65 DNL contours can be as small as extending several hundred feet from the helipad for a low use facility, while a high use facility will have a 65 DNL contour extending from 1,200' to 2,400' within the departure and approach paths. Although the extent of the impact varies with the size of the facility, mitigating the noise effects will depend upon a number of issues including ownership of the facility, types of operations, and the use of the facility.

Private Facilities

Mitigating noise effects of the private facilities is difficult as the state does not regulate these facilities nor are these facilities built with federal funding, which would make mitigation a potential option. Thus, mitigation of noise would fall under two options, mitigation implemented by the facility owner, or mitigation implemented through local land use laws. Each option is discussed below:

Facility Owner Mitigation: Although private facilities may not be regulated, many helicopter operators are sensitive to helicopter overflight noise issues. Organizations such as the Helicopter Association International (HAI) are aware of the noise issues and provide their members and the helicopter industry with various programs to address noise issues. Such a program that has been very effective and used as part of federally funded noise studies across the country is HAI's "Fly Neighborly" program. This set of principals outlines for the helicopter operator the basic issues associated with helicopter noise and provides a number of options such as operational modifications of approach and departure profiles, overflight avoidance of residential areas and operating at higher altitudes.

An example of mitigation presented in the Fly Neighborly program suggests the following flight profiles for helicopter operators:

[7] See Section 9.2.4.4 of this report as an example of how Montgomery County uses a lower ambient noise measurement for permitting helicopter landing facilities.

Routes and Airspeeds:

- Fly highest practical altitude
- Routes to heliport/helistop should fly over least populated area
- Follow major thoroughfares or railway beds
- Avoid flying over densely populated areas
- If flying over populated areas, use a 95 knot cruise speed
- Select a final approach route avoiding noise sensitive areas

Approach and Landing:

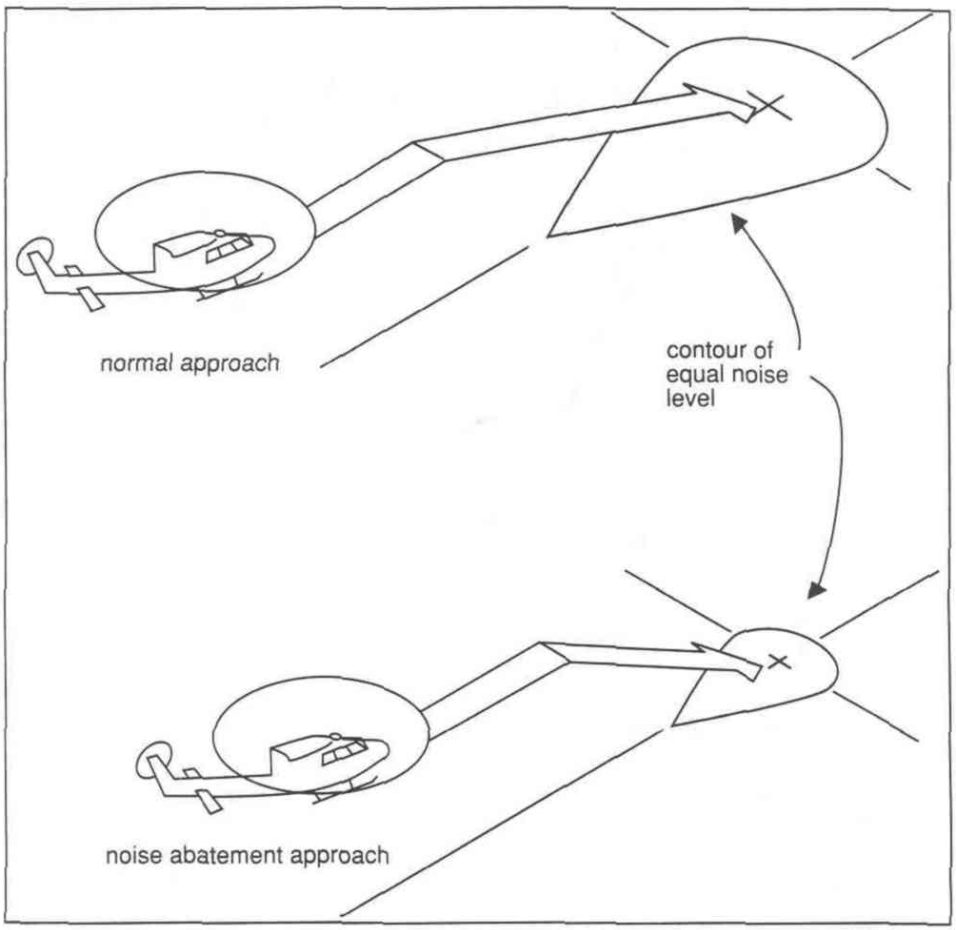
- Use one of two procedures when commencing an approach
    - Establish a 500 foot/minute rate of descent
    - Reduce airspeed and increase descent to 800 feet/minute
- Hold rate of descent to less than 200 feet/minute while reducing airspeed to 57 knots
- Increase rate of descent to 800 feet/minute
- Use convenient airspeed between 50 and 80 knots and an 800 foot/minute descent on glide slope
- Reduce airspeed to 60 knots when approaching the flare
- Execute a normal flare

Takeoff

- Use a higher rate of climb to reduce overall area exposed to noise.

For the landing and takeoff recommendations, the noise exposure can be reduced as shown in Figure 6-15.

Figure 6-15 Reduction in Noise Exposure



Source: HAI Fly Neighborly Guide

Collaboration with State Agencies: Another option would be collaboration between the private owners and the MAA or COG. Such a program would be an educational program using workshops and materials available on the Internet that the MAA or COG could develop to address heliport noise issues. Such a program could develop effective communications between operators and the local municipality or the community. This would be very effective if an operator was experiencing noise complaints from the surrounding community and can be developed with minimal resources and effort.

Zoning Regulations: This particular concept addresses new facilities being built by private entities. As there are no state regulations pertaining to private facilities, one way in which to address future noise issues is to develop specific zoning regulations that address land use compatibility measures

to ensure that a facility being proposed would not significantly impact residential communities within the municipality. Such zoning is discussed in Chapter 9. The suggested zoning would stipulate specific development guidelines that would minimize noise effects by suggesting location considerations, avoidance of over flying residential areas, and incorporating "fly neighborly" programs such as the program developed by HAI. The ordinances could also suggest minimum facility sizes to ensure that certain high noise levels remain within the property, thereby minimizing the noise effects. Additional options could include the use of noise barriers to block the line of sight between the helicopter and a noise receptor, which typically provide a 5-dBA noise reduction and further noise mitigation.

6.2.4.2 Modification of Helicopter Routes

Helicopter overflights are of particular concern for communities within Metropolitan Washington Region, where the majority of helicopter routes are located within the two study areas. The majority of helicopters that fly within this region fly on the various helicopter routes published by the FAA and entitled Helicopter Route Chart for Baltimore-Washington. However, there are a number of helicopter overflights by medevac and police helicopters that do not operate on the routes, but rather within the metro area airspace. Both types of operations are discussed below.

Helicopter Routes

Section 6.2.3.2 presents an analysis of helicopter operations on the various helicopter routes within the Washington, DC area. The findings suggest that noise effects of helicopter overflights at higher altitudes produce less noise than for helicopters flying at lower altitudes. For helicopters flying at between 1,000' and 1,300', noise effects are minimal due to altitude. However, the noise analysis did indicate that helicopters flying at altitudes below 500' have a much more pronounced noise effect. The three helicopter routes in and around Reagan Washington National Airport have the greatest noise effect due to the low altitudes along these routes. This is due to airspace restrictions around Reagan Washington National that requires helicopters to drop from 1,300' down to as low as 200' in close proximity to the airport. The specific routes include Route 1 west and east of Regan National Airport along the Potomac and Anacostia Rivers, respectively, and Route 4 which proceeds south from Reagan Washington National Airport and follows the Potomac south.

The analysis also indicated that the effects of helicopter routes over rivers or major highways had much less noise impacts than those helicopter routes over flying residential area. Most of the helicopter routes within the Metro DC area over fly major highways, which masks the helicopter noise. Other routes over fly major rivers including the Potomac and Anacostia Rivers. The

findings of this analysis produced two options that could be implemented to reduce the effects of helicopter overflight noise.

The first option would be to reroute helicopter traffic around Reagan Washington National Airport if they are transitioning to the east or west. This would shift helicopters onto helicopter routes running along the beltway that are at 1,300' rather than the much lower altitudes associated with Routes 1 and 4 within the vicinity of the airport. Although there would be the potential for more helicopters on these other routes, their altitude and location over major highways would minimize noise effects in the heavily populated areas along the Potomac and Anacostia Rivers.

The second option would be to increase the altitude of various helicopter routes, especially along the periphery of the current route system. By increasing the altitudes, even 100', there would be a corresponding decrease in helicopter noise effects. This could only be done, however, along certain helicopter routes that are not in close proximity to the major airports such as Reagan Washington National and Dulles International Airport. This option would require a high level of coordination between the FAA, the MD and VA Aeronautics Divisions, and helicopter operators.

Medical and Police Helicopters

Medical and police helicopters present a unique problem because of their specific mission profiles. In particular, these helicopters do not operate on the designated routes when performing their missions. For instance, medevac helicopters do not fly the helicopter routes when responding to an accident scene or when they transport a patient from the accident scene to a particular hospital. They will take a direct route to the scene and to the hospital to minimize time, a critical component to the survivability of the patient. While enroute, however, they will try to fly at altitudes of 1,000' when possible to minimize their overflights on communities. Additionally, they will also fly the helicopter routes when they have completed a patient transfer and are returning to their base of operations.

Police helicopters operate under much different conditions. In many cases, police helicopters will fly at the altitudes associated with the particular zones of the helicopter route chart. However, many times their mission requires them to operate at much lower altitudes in order to support ground patrols. These operations generate the most noise complaints because they are typically at night, which is when the ambient noise is low, making the helicopter operations much more pronounced.

There is currently not a centralized or formal process to report and resolve helicopter noise complaints within the Baltimore-Washington Region, where the vast majority of noise complaints

are generated. Noise complaints are currently addressed to a variety of operators, agencies, or facilities. For instance, some complaints are handled by the Helicopter Association International, COG, South Capitol Street Heliport, and MWAA, and others. The noise complaints are not compiled in a single place or assessed together as a formal noise complaint program.

In addition to creating a centralized or formal noise complaint process, there must also be a method in which to track helicopter activity within the region to identify those operations that generate noise complaints. It is important for information provided by a caller to be cross-referenced with the helicopter flight data to identify the helicopter and its operator who generated the noise complaint. Mailings, direct calls, or other methods can be used to notify the operator generating the complaint request and to try to mitigate a complaint in the future.

6.3 Environmental Documentation

If the public-use helistops/heliports are to be developed, environmental documentation and analysis, and permits will be required prior to construction. This Section presents an overview of the types of environmental documentation and analysis, as well as permits, which may be required. This information is not meant to include all environmental analysis and permits required because the helicopter system plan covers a vast area with various State and local regulations. It is rather a guide as to the potential for environmental impacts per NEPA requirements. While consistency with local comprehensive plans is not a condition of NEPA, it should be a significant consideration in any proposal to establish a new helistop. Locally-defined areas of environmental sensitivity must be addressed for specific helistop/heliport locations.

The type of environmental documentation required for a new public-use helistop/heliport is dependent on who regulates and funds the proposed facility. The Federal government does not license or certificate public-use helistops/heliports. However, the Federal government could fund helistop/heliport construction or publish an instrument approach for the helistop/heliport. When the Federal government either funds a helistop/heliport or publishes an instrument approach to a helistop/heliport, documentation must meet the requirements of the National Environmental Policy Act (NEPA). Whether or not a NEPA document is required, State and local environmental documentation requirements must be addressed. Private use hospital heliports would be subject to local land use and permitting regulations, but would generally not be subject to NEPA environmental review. The potential environmental impacts associated with the public-use helistops and heliports are presented below.

6.3.1 Helistops

An environmental overview for the potential system of helistops was developed based on the proposed facility improvements previously defined. The helistops will most likely be sited on publicly owned land near existing transportation facilities and sites along major highways or other easily identifiable and accessible locations. Specifically, potential locations for helistops include publicly owned rest stops, park-and-ride lots, rail stations, or other transportation related facilities. Some use of existing private helistops may also be included.

Each helistop is expected to include a helipad of approximately 104 feet by 104 feet with marking and edge lighting, two approach and departure routes (one approach should be a non-precision instrument approach), a UNICOM radio, wind sock, security fencing, a small bus shelter type enclosure and a small parking lot.

Based on these parameters, it is assumed a NEPA document will be required because an instrument approach will be published by the FAA. In addition, State and local environmental requirements must be addressed because public-use helistops would require a state license and possible local land use approvals. Currently there are no public helistops or heliports in the study area. It is assumed that the State of Maryland, Commonwealth of Virginia or District of Columbia would license a public-use helistop or heliport in a similar manner to non-commercial service (no scheduled air carrier service) public-use airports. Local land use policy and/or regulations would have to allow for the construction of a helistop.

6.3.1.1 Environmental Impact Categories

The following paragraphs include a discussion of each environmental category and its relevance to the construction and operation of a new helistop.

Air Quality

Some analysis of air quality will be required because all areas within the study area are designated non-attainment or maintenance areas for one of the criteria pollutants. In addition, construction of a helistop is not listed as an action in 40 CFR Part 51. Therefore, an inventory of the future emissions will be required. It is unlikely that a General Conformity Determination will be required because of the relatively low number of operations and minimal construction emissions anticipated for these helistops. The increase in emissions is expected to be within the values found in 40 CFR Part 51 and no further analysis will be required.

Coastal Resources

Three types of coastal resource protection programs must be considered: the Coastal Barrier Resources System, the Coastal Zone Management Program and the Chesapeake Bay Program. The Coastal Barrier Resources Act (CBRA) prohibits Federal financial assistance for development within the Coastal Barrier Resources System, which includes undeveloped coastal barriers along the Atlantic coast. The proposed helistops are to be located on publicly owned land near existing transportation facilities and sites along major highways or other easily identifiable and accessible locations. Therefore, it is unlikely that a proposed helistop would be sited within the Coastal Barrier Resources System because it protects undeveloped coastal barriers. (Maps of the CBRA system are available from the U.S. Fish and Wildlife Service.)

The Coastal Zone Management Programs are State programs to protect coastal resources. Both Virginia and Maryland have coastal zone management programs. If the proposed helistop is to be constructed in a coastal zone, additional analysis will be required to determine if the helistop is consistent with the coastal zone management program. The Chesapeake Bay Program is a restoration initiative directed by a partnership that includes the District of Columbia, State of Maryland and Commonwealth of Virginia among others. See local regulations for applicability and requirements of the Chesapeake Bay Program in regard to a particular helistop site.

Construction Impacts

Construction impacts due to the development of a helistop are assumed to be minimal because of the limited facilities to be built. Measures should be taken to minimize potential adverse effects by using best management practices which include sediment and erosion control. Local, State, and Federal construction permits will be required.

Compatible Land Use

The evaluation of land use compatibility considers two key elements; whether the project would require taking lands and converting them to uses that are different than existing or future land uses, and whether effects such as light emissions, noise, or new activities would be incompatible with adjacent land uses. Compatibility should be based on the 40 CFR Part 150 Land Use Compatibility Guidelines as well as a review of the local relevant plans. By locating the proposed

helistops on publicly owned land near existing transportation facilities and sites along major highways or other easily identifiable and accessible locations it is likely the helistop will be compatible with the existing land use policy or regulations. Results of the noise analysis should be used to determine if any non-compatible land use occurs within the existing or planned land uses due to the construction and operation of a helistop.

Department of Transportation Act Sec. 4(f)

In order to identify potential impacts to 4(f) properties, it must be determined whether the proposed helistop requires the use of a publicly owned public park, recreation area, or wildlife or waterfowl refuge, or any land from a historic site of national, state, or local significance. Both direct and indirect (constructive use) adverse effects must be considered. The conversion of a 4(f) property to a helistop is considered a direct use and non-compatible noise levels resulting from the operation of the helistop are considered a constructive use. See Order 1050.1E if the helistop will require the use of a Section 4(f) for guidance on additional analysis.

Farmlands

The Farmland Protection Policy Act protects prime and unique farmland from conversion to non-agricultural use. It is unlikely farmland will be converted to non-agricultural use as a result of the construction of a helistop because the helistops are to be located on publicly owned land near existing transportation facilities and sites along major highways. If farmland is acquired for the purpose of constructing a helistop, coordination with the Natural Resources Conservation Service and submittal of form AD-1006 will be required to determine whether the farmland is considered prime or unique and if there is a significant impact to farmlands.

Fish, Wildlife, and Plants

Impacts to biotic communities in general and impacts to specific listed rare, threatened and endangered species and their habitat will need to be assessed. Significant impacts to biotic communities are not anticipated for two reasons: because of the limited area required for the helistop, and because the proposed helistop locations are near existing transportation facilities and will most likely only impact man-dominated areas. If the proposed helistop will impact a water resource, the U.S. Fish and Wildlife Service, National Marine Fisheries, and State or Tribal Wildlife agencies must be consulted. If their responses indicate that the impacts to the biotic community will be minimal, no further analysis is required unless the helistop is to be located in Maryland. Maryland has additional requirements in regard to biotic communities. The Maryland Forest Conservation Act applies to any project that requires a grading permit or sediment control permit

on areas of 40,000 square feet or more (even if there is not a forest currently on the project site). If the proposed helistop meets these parameters, a Forest Conservation Plan will be required.

Consultation must be initiated with the U.S. Fish and Wildlife Service and other appropriate state and Federal agencies to determine the presence of known populations of state or federally listed rare, threatened and endangered species or supporting habitat near the proposed helistop. A letter including a proposed project description and a graphic showing the proposed helistop location and specific study area should be submitted to the agencies. If the responses from the Federal and State agencies indicate that no rare, threatened or endangered species or supporting habitat are documented in the study area, no further analysis will be required. If the response identifies threatened or endangered species or supporting habitat within the study area, analysis will be required and could include a biological assessment and Section 7 consultation.

Floodplains

In order to identify the potential impact to floodplains, it must be determined whether the helistop is located in or encroaches upon a 100-year floodplain as designated by the Federal Emergency Management Agency (FEMA). Maps may be obtained on-line at http://msc.fema.gov/. If the helistop is located outside of the 100-year floodplain, no further analysis will be required. If the helistop is located in or encroaches upon a 100-year floodplain, additional analysis will be required. Refer to FAA Order 1050.1E for guidance on additional analysis.

Hazardous Materials, Pollution Prevention, and Solid Waste

Since proposed sites for the helistops are on publicly owned land, it is assumed that no additional land will be acquired and therefore an Environmental Due Diligence Audit will not be required. To determine if hazardous materials will be disturbed, any sites within the study area that are either on the National Priorities List established by the EPA or are a Resource Conservation and Recovery Act Solid Waste Management Unit must be identified. If no such sites are found and consultation with the appropriate state agency verifies this finding, no further analysis will be required in regard to disturbing hazardous materials. It is assumed that because of the limited facilities provided at the helistops no hazardous materials will be generated, transported, treated, stored or disposed of due to the proposed helistops. Generation of solid waste should not be a concern because a terminal will not be part of the proposed helistop. Solid waste concerns relate only to the siting of the proposed helistop. Siting of the helistop should be in accordance with FAA AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports.

Historical, Architectural, Archaeological, and Cultural Resources (Historic Resources)

To determine the potential for impacts to historic resources, consultation with the appropriate state historic preservation officer (SHPO) and/or tribal historic preservation officer (THPO) as to the presence of historic properties that are eligible for or on the National Register of Historic Places (NRHP) within the area of potential effect (APE) must be undertaken. The APE for the helistops will be the largest area encompassed by the helistop property and/or the 65 DNL contour or a combination of the two. Sites on the NRHP within or in close proximity to the APE must be identified. Since these helistops are to be located near existing transportation facilities, previous historic property surveys may be available and helpful in identifying historic sites within the APE. If no NRHP sites are within the APE, correspondence stating such, including the project description and a graphical depiction of the APE, should be submitted to the appropriate SHPO/THPO. If the SHPO/THPO approves the APE and confirms that no sites eligible or on the NRHP are within the APE, no further analysis will be required. If there are NRHP properties within the APE, additional analysis as described in FAA Order 1050.1E will be required.

Light Emissions and Visual Impacts

The potential for annoyance from the heliport lighting should be evaluated. The facilities to be provided at the helistops will include edge lighting. The distance from the closest residential property and any screening provided by objects in between will need to be documented. The light emissions from the edge lights are unlikely to have an adverse impact on people. It is likely that the helistop will not contrast with the existing environment because they are to be located near existing transportation facilities. Therefore, visual impacts are not anticipated. However, this should be evaluated on a case by case basis.

Natural Resources and Energy Supply

Minimal changes in energy demands or other natural resource consumption are anticipated from the construction and operation of a helistop. Helistop lighting will not demand substantial energy and no natural resources in short supply will be required. Therefore, no analysis of impacts to natural resources and energy supply should be required for the construction and operation of a helistop.

Noise

A noise analysis will be required for a new helistop. The noise analysis would likely be performed using either the FAA's Integrated Noise Model (INM) or Heliport Noise Model (HNM). All noise

analysis and determination of impact will be completed in accordance with Order 1050.1E, as well as other State or local requirements.

It was estimated that the helistop facilities would receive up to 300 annual operations, or about 6 operations per week. At this level of activity, it was calculated that the 65 DNL contour would generally stay within the boundaries of the facilities itself, or about 354' from the center of the helipad along the approach and departure route, provided the helistop is located a sufficient distance from noise sensitive areas. Hence, the recommendation to locate the helistops at existing transportation related facilities such as park and rides, rest stops, or rail stations.

Because of the low level of activity and resulting low noise exposure, it is anticipated that the noise impacts will not be significant. This assumption is supported by information found in Order 1050.1E. Order 1050.1E states, "No noise analysis is needed for proposals involving existing heliports or airports whose forecast helicopter operation in the period covered by the EA do not exceed 10 annual daily average operations with hover times not exceeding 2 minutes. These numbers of helicopter operations result in DNL 60 dB contours of less than 0.10 (one-tenth) square mile that extend no more than 1,000 feet form the pad. Note that this rule applies to the Sikorsky S-70 with a maximum gross takeoff weight of 20,224 pounds and any other helicopter weighing less or producing equal or less levels." Although a noise analysis is required for a new helistop, this information indicates the noise impacts related to the operation of the helistop are probably not significant provided the helistop is located a sufficient distance away from noise sensitive areas.

Other noise measurement or impact levels, such as the 60 DNL contour, may be used or even required by local jurisdictions. However, federal environmental documentation would use the 65 DNL contour.

Secondary (Induced) Impacts

Secondary impacts are typically associated with major development proposals and are not normally significant except where there are significant impacts to other environmental categories. Examples of secondary impacts include shifts in patterns of population movement and growth and changes in public service demands. A new helistop is not considered a major development project nor are significant impacts to the other environmental categories expected; therefore no secondary impacts are anticipated.

Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks

Socioeconomic impacts are potential effects on the community and economy including whether a project will displace homes or businesses; adversely affect communities and their quality of life; be inconsistent with local land use ordinances or master plans; or cause changes in operations that would have an effect on the local economy.

The only socioeconomic impact requiring analysis in regard to the construction and operation of a helistop is the potential for the helistop to be inconsistent with the local land use ordinances. The local land use plans should be reviewed and the impact of the proposed helistop assessed. Impacts on environmental justice and children's environmental health and safety risks result from disproportionate adverse impacts to minority and low-income populations, and children respectively. Since no significant impacts to any of the environmental categories are anticipated, disproportionate impacts will likely not need to be considered.

Water Quality

Water quality impacts due to the construction and operation of the helistop must be addressed. The helistop does not include a Fixed Base Operator (FBO) facility permit. Helicopter fueling and maintenance are typically provided by FBOs. Therefore, it can be concluded that there will be no impacts to ground water quality, surface water quality and sole source aquifers due to spills or leakage of petroleum or hazardous materials. Development of the helipad and parking area will increase the amount of impervious surfaces. Therefore, storm water management will be required to address both water quantity and quality. State and local permits will be required for storm water management. Construction activities to build a helistop may cause temporary water quality impacts. Therefore, an erosion and sediment control plan must be developed and State and local Best Management Practices should be implemented. If a Section 404 permit for wetland impacts (see Wetlands section) will be required, a water quality certificate in accordance with Section 401 of the Clean Water Act will also be required.

Wetlands

A Section 404 permit is required to place dredged or fill materials in wetlands and a Section 10 permit is required for obstruction or alteration of navigable waters. Since these helistops are to be located near existing transportation facilities, previous wetland surveys may be available and helpful in identifying wetlands in the study area. Otherwise, a wetland delineation should be completed for the study area. Coordination with the local district of the Army Corps of Engineers

(USACE) and the appropriate State and local agencies must be conducted. The helistop facilities should be situated such that no wetlands will be impacted if possible. It should be noted that Maryland and Virginia regulate isolated wetlands whereas the USACE does not. If wetlands are impacted, further analysis and potentially Federal, State and local permits will be required. See FAA Order 1050.1E for additional guidance.

Wild and Scenic Rivers

Since these helistops are to be located near existing transportation facilities, it is unlikely they will impact any Wild and Scenic Rivers. Wild and Scenic Rivers are defined as "rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition". The checklist includes a list of Wild and Scenic Rivers (compiled from the Nationwide Rivers Inventory, Study Rivers, Virginia and Maryland designated wild and scenic rivers) along with the counties in which river sections are considered to be Wild and Scenic. If the helistop is not in any of the counties with Wild and Scenic Rivers, no further analysis will be required. If the helistop is in a county with Wild and Scenic Rivers, verify that the helistop will not impact any of the Wild and Scenic Rivers. Helistops should be sited as to avoid any Wild and Scenic Rivers.

Cumulative Actions

The Council on Environmental Quality (CEQ) Regulations, as do most State and some local regulations, require an assessment of cumulative impacts. CEQ regulations define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions". To address this impact category, other projects near the proposed helistop will need to be discussed. It is not likely that the construction and operation of a helistop will have a significant environmental impact. In addition, it is not expected that the effects of the helistop, when added to the effects of other projects in the vicinity, will cause otherwise insignificant impacts to exceed thresholds of significance. Other projects near the proposed helistops should be disclosed and discussed in terms of the environmental categories likely to be impacted.

Highly Controversial

If the construction and operation of the proposed helistop is likely to be highly controversial due to the effects on the quality of the human environment, an Environmental Impact Statement (EIS)

may be considered along with the appropriate NEPA documentation. High controversy may also trigger other State or local environmental review requirements.

Land Use Plans

Since the recommended location of the helistops is adjacent to existing transportation facilities, it is unlikely there will be a conflict with the objectives of Federal, regional, State, local and Tribal land use plans, policies and controls. Regardless, coordination with Federal, regional, State, local and Tribal entities should be accomplished to address conflicts (if any) with existing land use issues.

6.3.2 Heliports

The environmental overview of the full service public-use heliports was developed based on the proposed locations and facility requirements previously defined. The proposed public-use heliports will be located in the central business districts of Baltimore and Washington, DC. Each heliport will include a helipad of approximately 104 feet by 104 feet with marking and edge lighting, two approach and departure routes (with non-precision or precision instrument approach capabilities), taxiway and apron area, terminal building, security fencing, UNICOM radio, wind sock and a parking lot.

Based on these parameters, it is assumed a NEPA document will be required because an instrument approach will be published by the FAA. In addition, State and local environmental requirements must be addressed because public-use heliports would require a state license and possible local land use approvals. It is assumed that the State of Maryland, Commonwealth of Virginia or District of Columbia would license a public-use heliport in a similar manner to non-commercial service (no scheduled air carrier service) public-use airports. Local land use policy and/or regulations would have to allow for the construction of a heliport.

6.3.2.1 Environmental Impact Categories

The following paragraphs include a discussion of each environmental category and its relevance to the construction and operation of a new full service public-use heliport.

Air Quality

Some analysis of air quality will be required because Washington, DC and Baltimore are in non-attainment or maintenance areas for criteria pollutants. Therefore, an inventory of the future emissions will be required. The increase in emissions will be compared to the values found in. 40

CFR Part 51. If the emissions are less than values, no further analysis will be required. If the emissions exceed the values, a General Conformity Determination will be required. Additional guidance may be found in FAA Order 1050.1E.

Coastal Resources

Three types of coastal resource protection programs must be considered: the Coastal Barrier Resources System, the Coastal Zone Management Program, and the Chesapeake Bay Program. Washington, DC and Baltimore are not within the Coastal Barrier Resources System. Baltimore is however within Maryland's coastal zone. Therefore, analysis will be required to determine if the Baltimore heliport will be consistent with Maryland's Coastal Program. The Chesapeake Bay Program is a restoration initiative directed by a partnership that includes the District of Columbia, State of Maryland and Commonwealth of Virginia among others. See local regulations for applicability and requirements of the Chesapeake Bay Program in regard to a particular heliport site.

Construction Impacts

Construction impacts due to the development of a heliport must be considered including potential air and water quality impacts, and noise impacts. Measures should be taken to minimize potential adverse effects using best management practices which include sediment and erosion control. Local, State, and Federal construction permits will be required including a National Pollutant Discharge Elimination System (NPDES) permit if more than one acre of land is disturbed.

Compatible Land Use

The evaluation of land use compatibility considers two key elements; whether the project would require taking lands and converting them to uses that are different than existing or future land uses, and whether effects such as light emissions, noise, or new activities would be incompatible with adjacent existing land uses. Compatibility should be based on the FAA Part 150 Land Use Compatibility Guidelines as well as a review of the local relevant plans. Results of the noise analysis will be used to determine if any non-compatible land use occurs within existing or planned land uses due to the construction and operation of a heliport.

Department of Transportation Act Sec. 4(f)

It must be determined whether the proposed heliport will require the use of a publicly owned public park, recreation area, wildlife or waterfowl refuge, or any land from a historic site of national, state,

or local significance. Both direct and indirect (constructive use) adverse effects must be considered. The conversion of a 4(f) property to a heliport is considered a direct use and non-compatible noise levels resulting from the operation of the heliport are considered a constructive use. See Order 1050.1E if the heliport will require the use of a Section 4(f) for guidance on additional analysis.

Farmlands

The Farmland Protection Policy Act protects prime and unique farmland from conversion to non-agricultural use. It is unlikely farmland will be converted to non-agricultural use as a result of the construction of a heliport because the heliports are to be located within Washington, DC and Baltimore.

Fish, Wildlife, and Plants

Impacts to biotic communities in general and impacts to specific listed rare, threatened and endangered species or their habitat will need to be assessed. Significant impacts to biotic communities are not anticipated because the proposed heliport will be constructed in man-dominated areas. If the proposed heliport will impact a water resource, the U.S. Fish and Wildlife Service, National Marine Fisheries, and State or Tribal Wildlife agencies must be consulted. If these responses indicate that the impacts to the biotic community will be minimal, no further analysis is required in regard to biotic communities unless the heliport is to be located in Maryland. Maryland has additional requirements beyond NEPA in regard to biotic communities. The Maryland Forest Conservation Act applies to any project that requires a grading permit or sediment control permit on areas of 40,000 square feet or more (even if there is not a forest currently on the project site). If the proposed helistop meets these parameters, a Forest Conservation Plan will be required.

Consultation should be initiated with the U.S. Fish and Wildlife Service and other appropriate State and Federal agencies to determine the presence of known populations of State or Federally listed rare, threatened and endangered species or supporting habitat near the proposed helistop. A letter including a proposed project description and a graphic showing the proposed heliport location and specific study area should be submitted to the agencies. If the responses from the Federal and State agencies indicate that no rare, threatened or endangered species or supporting habitat are documented in the study area, no further analysis will be required. If the response identifies threatened or endangered species or supporting habitat within the study area, analysis will be required and could include a biological assessment and Section 7 consultation.

Floodplains

In order to identify the potential for impacts to floodplains, it must be determined if the heliport is located in or encroaches upon a 100-year floodplain as designated by the Federal Emergency Management Agency (FEMA). Maps may be obtained on-line at http://msc.fema.gov/. If the heliport is located outside of the 100-year floodplain, no further analysis will be required. If the heliport is located in or encroaches upon a 100-year floodplain, additional analysis will be required. Refer to FAA Order 1050.1E for guidance on additional analysis.

Hazardous Materials, Pollution Prevention, and Solid Waste

If land will be acquired to construct the heliport, an Environmental Due Diligence Audit will be required. In addition, to determine if hazardous materials will be disturbed, sites within the study area that are either on the National Priorities List established by the EPA or are a Resource Conservation and Recovery Act Solid Waste Management Unit must be identified. If no such sites are found and consultation with the appropriate Federal and State agencies verifies this finding, no further analysis will be required in regard to disturbing hazardous materials. It is assumed that because of the limited facilities provided at the heliports (i.e., no fueling or maintenance) no hazardous materials will be generated, transported, treated, stored or disposed of due to the proposed heliport. Generation of solid waste should be considered because a terminal will be part of the proposed heliport facilities. In addition, solid waste concerns related to the siting of the proposed heliports should be considered in accordance with FAA AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports.

Historical, Architectural, Archaeological, and Cultural Resources (Historic Resources)

To determine the potential for impact to historic resources, appropriate state historic preservation officer (SHPO) and/or tribal historic preservation officer (THPO) must be consulted as to the presence of historic properties that are eligible for or on the National Register of Historic Places (NRHP) within the area of potential effect (APE). The APE for the heliports will be the largest area encompassed by the heliport property and/or the 65 DNL contour or combination of the two. Any sites on the NRHP within or in close proximity to the APE must be identified. Since these heliports are in developed areas, previous historic property surveys may be available and helpful in identifying historic sites within the APE. If no NRHP sites are within the APE, correspondence stating such, and including the project description and a graphical depiction of the APE should be submitted to the appropriate SHPO/THPO. If the SHPO/THPO approves the APE and confirms that no sites eligible or on the NRHP are within the APE, no further analysis will be required. If

there are NRHP properties within the APE, additional analysis as described in FAA Order 1050.1E will be required.

Light Emissions and Visual Impacts

The facilities to be provided at the heliports will include edge lighting and area lighting. The potential for annoyance from the heliport lighting will need to be evaluated. The distance from the closest residential property and any screening provided by objects in between should be considered. Visual impacts will require analysis because heliports in the proposed location (central business districts of Washington D. C. and Baltimore) have the potential to impact views of historic properties. A viewshed analysis may be required.

Natural Resources and Energy Supply

Some changes in energy demands will result from the construction and operation of a heliport because of the associated lighting and terminal development. Energy suppliers should be contacted to ensure the existing or planned facilities can accommodate the increased demand. No natural resources in short supply should be required to construct or operate the heliport.

Noise

A noise analysis will be required for a new heliport. The noise analysis would likely be performed using either the FAA's Integrated Noise Model (INM) or Heliport Noise Model (HNM). All noise analysis and determination of impact should be completed in accordance with Order 1050.1E as well as other State and local requirements.

It was estimated that the helistop facilities could receive up to 13,000 annual operations, or about 250 operations per week. At this level of activity, it was calculated that the 65 DNL contour would likely extend beyond the boundaries of the facilities itself, or about 2,144' from the center of the helipad along the approach and departure route. Hence, the importance of locating such a facility a sufficient distance from noise sanative areas and developments.

Other noise measurement or impact levels, such as the 60 DNL contour, may be used or even required by local jurisdictions. However, federal environmental documentation would use the 65 DNL contour.

Secondary (Induced) Impacts

Secondary impacts are typically associated with major development proposals and are not normally significant except where there are significant impacts to other environmental categories. Examples of secondary impacts include shifts in patterns of population movement and growth and changes in public service demands. The proposed heliport will be evaluated in regard to secondary impacts if significant impacts are anticipated for any of the other environmental categories.

Socioeconomic Impacts, Environmental Justice,, and Children's Environmental Health and Safety Risks

Socioeconomic impacts are potential effects on the community and economy including whether a project will displace homes or businesses; adversely affect communities and their quality of life; be inconsistent with local land use ordinances or master plans; or cause changes in operations that would have an effect on the local economy. All socioeconomic impacts, including environmental justice and children's environmental health and safety risks related to the construction and operation of a heliport will need to be evaluated.

Water Quality

Impacts to water quality must be considered. The heliport does not include a Fixed Base Operator (FBO) facility. Typically, helicopter fueling and maintenance are provided by FBOs. Therefore, it can be concluded that there will be no impact to ground water quality, surface water quality and sole source aquifers due to spills or leakage of petroleum or hazardous materials. Development of the helipad and parking area will increase the amount of impervious surfaces. Therefore, storm water management will be required to address both storm water quantity and quality. State and local permits will be required for storm water management. Construction activities to build a heliport may cause temporary water quality impacts. Therefore, an erosion and sediment control plan must be developed and State and local Best Management Practices should be implemented. If a Section 404 permit for wetland impacts (see Wetlands section) is required, a water quality certificate in accordance with Section 401 of the Clean Water Act will also be required.

Wetlands

A Section 404 permit is required to place dredged or fill materials in wetlands and a Section 10 permit is required for obstruction or alteration of navigable waters. Since these heliports are to be located in Washington, DC and Baltimore, previous wetland surveys may be available and helpful

in identifying wetlands in the study area. Otherwise, a wetland delineation should be completed for the study area. Coordination with the local district of the Army Corps of Engineers (USACE) and the appropriate state and local agencies must be conducted. The heliport facilities should be situated such that no wetlands will be impacted if possible. It should be noted that Maryland regulates isolated wetlands whereas the USACE does not. If wetlands are impacted, further analysis, and Federal, State and local permits may be required. See FAA Order 1050.1E for additional guidance.

Wild and Scenic Rivers

Since these heliports are to be located in urban areas, it is unlikely they will impact any Wild and Scenic Rivers. Wild and Scenic Rivers are defined as “rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition”. The checklist includes a list of Wild and Scenic Rivers (compiled from the Nationwide Rivers Inventory, Study Rivers, Virginia and Maryland designated wild and scenic rivers). If the heliport is not in the proximity of a Wild and Scenic River, no further analysis will be required.

Cumulative Actions

The Council on Environmental Quality (CEQ) regulations requires the assessment of cumulative impacts in NEPA documents. CEQ regulations define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions". To address this impact category, other projects near the proposed heliports should be disclosed and discussed in terms of the environmental categories likely to be impacted.

Highly Controversial

If the construction and operation of the proposed heliport is likely to be highly controversial due to the effects on the quality of the human environment, an Environmental Impact Statement (EIS) may be considered along with the appropriate NEPA documentation. High controversy may also trigger other State or local environmental review requirements.

Land Use Plans.

Coordination with Federal, regional, State, local and Tribal entities must be accomplished to address conflicts (if any) between the location of the proposed heliport and existing land use issues.

7. AIRSPACE ISSUES AND RECOMMENDATIONS

7.1 Synopsis

A goal of this study was to ensure that current airspace structure, limitations, and restrictions meet current user needs and future demand. The airspace recommendations were categorized into recommendations to revise the airspace to reduce the noise impacts and airspace improvements needed to implement the heliport facility recommendations. The airspace recommendations are:

1. Airspace Related Noise Mitigation for Helistops/Heliports: Noise mitigation options for private use hospital heliports are limited, given that helicopters would be on arrival and departure paths and thus would be at lower altitudes. However, the effect of helicopter operations on nearby noise sensitive land uses could be considered in the design and layout (including altitude) of the typical approach and departure paths for the heliport, to the extent possible for safety and operating requirements. Additionally, pilots would be encouraged to use techniques that reduce noise exposure, such as higher altitudes and management of blade/power settings. Noise mitigation can be most effective as part of land use controls, zoning, and site selection criteria.

2. Airspace Related Noise Mitigation for Enroute Helicopter Operations: Noise mitigation could also be considered in an update to the Helicopter Route Chart by selecting higher altitudes for routes when possible. Today, most of the altitudes assigned to helicopter routes were established because of arrival, departure, and transit routes for fixed-wing aircraft that are traveling above the helicopter routes. The altitudes are needed to ensure aircraft separation given the heavy and increasing volume of air traffic in the metropolitan area. In reassessing the Helicopter Route Chart, higher altitudes could be identified for segments of some routes with coordination with ATC and FAA. Alternatively, pilots could request ATC clearance for higher altitudes for noise purposes when there are no conflicts with other air traffic (note this would be more common at night due to the reduced number of nighttime operations).

3. Airspace Recommendations for Helistop/Heliport Facilities: Several recommendations were identified to improve airspaces issues at existing and potential helistop and heliport facilities. These include:
    - Implement at least one PinS GPS IAP at all private hospital heliports/helistops.
    - Implement at least two departure/arrival paths, with a minimum of one GPS IAP, at all proposed helistops.

- Plan for GPS IAP at new helistops and hospital heliports, especially in terms of adjacent land uses for potential obstructions.
- Continue advocacy of new GPS and precision approach procedures development by FAA.
- Coordinate proposed sites with current Class B and ADIZ restrictions, particularly in terms of new route development.
- Continue negotiation for ADIZ exclusions for users of private hospital heliports.
- Continued use of special transponder codes.
- Plan flexibility for potential for further airspace restrictions imposed (i.e. Enhanced Class B) if circumstances dictate.

4. Airspace Recommendations for Enroute Helicopter Operations: The flexibility required to keep the charting and route development up-to-date requires that organizations work together in common interest, ensuring that the growth as described herein is supported not only in terms of economic development and stakeholder requirements, but from an airspace planning standpoint. A failure in this area will result in a degradation of the system being proposed, for which the single strongest benefit to users is convenience and the alternative it offers to surface transportation.

7.2 Existing Airspace Structure

The airspace in the Greater Baltimore-Washington area is predominantly generated from three commercial facilities (BWI, DCA and IAD) and one military facility (ADW). This is in addition to numerous general aviation airports and private heliports in the region. The airspace in the Greater Baltimore-Washington area is Class B; this area being high-density in nature and dominated by extensive commercial and military activity from these four major airports. Class B airspace extends from ground level to 10,000 mean sea level (MSL) within about seven nautical miles of these airports, and beyond the seven mile radius the minimum altitude gradually increases to a radius of twenty nautical miles around each of the airports. This tiered Class B floor allows for general aviation and helicopter operations activity in the region without impacting the arrival and departure paths of the fixed-wing aircraft utilizing the airports. Otherwise, all aircraft within Class B airspace are required to obtain air traffic control (ATC) clearance; this clearance is granted to aircraft flying under visual flight rules (VFR) (true for 99 percent of helicopter operations in the region) on a workload-permitting basis only. Denial of a clearance request requires the pilot to either hold short of the controlled airspace or proceed outside the airspace via a different route. Overall, the flexibility of the Class B structure in the Baltimore-Washington area is very useful to both ATC as well as helicopter operators.

However, complicating matters somewhat is the existence of Special Use Airspace for sites designated as national security, military and other sensitive areas. Prohibited areas within the District of Columbia include the Naval Observatory, the White House, and the Capitol Building. Restricted airspace exists at Camp David, Quantico Marine Corps Base, and Patuxent Naval Air Station. Temporary flight restrictions (TFR) and special federal aviation regulations (SFARs) also apply. The events of September 11, 2001, resulted in restrictions being put in place to enhance the security of the National Air Space (NAS). This essentially meant the removal of the Class E and G airspace below the Class B floors between seven and twenty nautical miles from the major airports, and conversion of that airspace to Class B. Initially, all VFR activity (and, as a result, all non-military helicopter operations) was restricted from this Enhanced Class B airspace. This was in addition to a TFR that established an Air Defense Identification Zone (ADIZ) near DCA. Effective February 10, 2003, the guidance established positive control for all aircraft operating at elevations between ground level and Flight Level (FL) 180 (18,000 feet), within the Class B airspace area of the Baltimore-Washington area. Hence, all general aviation and charter operations (including helicopters) were prohibited from operating within 15 nautical miles of DCA's very high frequency omnirange (VOR) up to 18,000 feet MSL, without a specific waiver from FAA. Currently, the TFR/ADIZ is still in place, but the Enhanced Class B airspace structure was removed and restored to the original Class B. Such restrictions continue to hamper helicopter operations in the region (evidenced by the South Capitol Street Heliport's struggles and the aforementioned restrictions at DCA).

7.2.1 Defined Helicopter Routes

Helicopters operate most commonly under VFR within this region, for practical as well as ATC efficiency considerations. Visual landmarks, as well as the rapid emergence of global positioning system (GPS) area navigation technology, are the predominant navigational tools for helicopters. The FAA anticipates that GPS will become the predominant en-route navigational tool in the future.

The Baltimore-Washington Helicopter Route Chart (April 2005) is the current depiction of the major helicopter routes in that area. The 18 routes indicated on the chart are for VFR operations. Landmarks such as highways are used for navigational convenience, and serve to keep operations along transportation corridors where land uses are less susceptible to noise impacts. Most routes are below 1,300 feet MSL with the exception of the Potomac River, over which recommended altitudes are 200 feet MSL to avoid DCA traffic. Use of the routes is a recommendation by FAA and not a requirement, especially outside of the limits of Class B airspace. Such travel is at the discretion of the pilot, and is flexible for such missions as emergency medical and police operations. This chart is currently being revised to incorporate TFR restrictions and other updates.

IFR helicopter routes exist between Washington DC, Philadelphia, New York City, and Boston. Known as the Northeast Helicopter Routes, they are infrequently used due to the limited number of instrument flight rules (IFR) certified helicopters. The routes are being revalidated by the Northeast Helicopter Association. Additionally, GPS-based routes are being proposed by private industry for several airports including IAD, for the purpose of improving the overall route structure.

Finally, the Potomac Consolidated Terminal Radar Approach Control (TRACON) Airspace Redesign Project is in the final stages of development, intended to review routing of all IFR aircraft in the area. The Potomac Consolidated TRACON, a new facility, offers improved coordination, which drives a review of the IFR airspace. Due to the limited IFR operations by helicopters, this redesign should have nominal impact to helicopter operations in the present and near future.

Please refer to Chapter 2 of this report for a full description and graphical representation of the currently published routes.

7.2.2 Zones Within the Route Structure

Special Police Zones exist in the Baltimore-Washington area. These are intended to minimize ATC workload for police operations requiring a high degree of flexibility. An initial contact of ATC is required when entering the zone, and after that, free movement within the boundaries of the zone is allowed. Please refer to Chapter 2 of this report for the current helicopter route chart, which depicts the special zones currently in place.

7.2.3 Operating Procedures with BWI/DCA/IAD Towers

As described in Chapter 2 of this report, public-use airports (including BWI, DCA and IAD) use procedures designed to keep helicopters out of the main arrival/departure flow, to enhance capacity and safety. Routes (for example the Glebe Transition Route at DCA) are used by each airport to achieve this separation. Additionally, during inclement weather conditions helicopters are allowed to use special VFR (SVFR) clearances to conduct visual approaches to the airport, a function of their relatively low airspeed and low-altitude operations; however, such special VFR operations are not allowed at DCA. For very poor weather conditions, helicopters with IFR-certification can do instrument approaches, albeit a rare occurrence.

All aircraft operating within 30 nautical miles of ADW, BWI, DCA or IAD are required to use a Mode C transponder. Helicopters in the aforementioned Class B airspace are assigned unique transponder codes for ATC handling, while helicopters in Class E airspace below the Class B floors squawk 1200 as a standard code. It is common for certain operators such as police, military and

medevac to have special transponder codes indicating high priority to ATC. The codes for the Baltimore-Washington area are outlined in Chapter 2.

In terms of Air Traffic Control Tower (ATCT) interface, DCA is the only airport in the area that has a separate helicopter frequency (120.75 MHz) and separate ATCT position. This position has a dedicated controller about 20 percent of the time, particularly during peak periods. Each airport's ATCT manages transient helicopter operations, which normally utilize the VFR Helicopter Routes previously described for safety and air traffic management efficiency. For non-towered airports and heliports, helicopters normally follow local traffic patterns and procedures. Letters of Agreement usually dictate these procedures and routes for frequent users and based aircraft.

7.3 Recommended System Requirements

7.3.1 Overall Airspace Needs

Helicopters essentially live by the same VFR minimums as airplanes, except under SVFR clearance or within Class G airspace. These minimums are depicted in Table 7-1 below.

Table 7-1 Helicopter VFR Minimums

Airspace	Flight Visibility	Distance from Clouds
Class A	N/A	N/A
Class B	3 SM	Clear of clouds
Class C	3 SM	500 feet below 1000 feet above 2000 feet horizontal
Class D	3 SM	500 feet below 1000 feet above 2000 feet horizontal
Class E		
Less than 10,000 feet MSL	3 SM	500 feet below 1000 feet above 2000 feet horizontal
At or above 10,000 feet MSL	5 SM	1000 feet below 1000 feet above 1 SM horizontal
Class G		
1200 feet or less above the surface		
Day, except as provided in Part 91.155(b)	None	Clear of clouds
Night, except as provided in Part 91.1559b)	None	Clear of clouds
More than 1200 feet above the surface but less than 10,000 feet MSL		
Day	1 SM	500 feet below 1000 feet above 2000 feet horizontal
Night	3 SM	500 feet below 1000 feet above 2000 feet horizontal
More than 1200 feet above the surface and at or above 10,000 feet MSL	5 SM	1000 feet below 1000 feet above 1 SM horizontal
B, C, D, E Surface Area Airspace		
SVFR Minimums		
Day	None	Clear of clouds
Night	None	Clear of clouds

Source: Figure C-5, Helicopter Instrument Procedures, 2004 Instrument Procedures Handbook

Note that takeoff minimums vary slightly, depending on whether a pilot is operating under Part 91 or Part 135 (for most Part 91 helicopters this is ½ NM and 100 feet). Part 135 pilots must comply with the instrument approach procedures (IAPs) for the given facility. Also note that requirements for the criteria (for which destination alternates are required to be filed under IFR) differ depending upon Part 91 or 135 status. These are covered in detail in the FAA's 2004 Instruments Procedures Handbook.

While visual approaches are most common for helicopters, FAA is aggressively implementing a program to certify IAPs for heliports across the United States, the special helicopter-specific IAPs having lower approach minimums. These IAPs are depicted in Table 7-2 below. Copter procedures are simply helicopter-specific procedures compliant with Part 91 Section 97.35, for minimums. GPS IAPs have perhaps the most potential for use by the FAA, with the ones certified to date being mostly non-precision. Non-precision approach procedures in general, providing horizontal data only, require specific airspace surfaces and lighting systems to be compliant with Terminal Instrument Procedures (TERPs) requirements, which are described below for each general type of helicopter support facility.

Table 7-2 Helicopter Use of Standard Instrument Approach Procedures

Procedure	Helicopter Visibility Minima	Helicopter Minimum Decent Altitude (MDA)/Decision Altitude (DA)	Maximum Speed Limitations
Conventional (non-Copter)	The greater of: one half the category A visibility minima, ¼ statute mile visibility, or 1200 RVR	As published for Category A	The helicopter may initiate the final approach segment at speeds up to the upper limit of the highest Approach Category authorized by the procedure, but must be slowed to no more than 90 KIAS at the MAP in order to apply the visibility reduction.
Copter Procedures (non-GPS)	As published	As published	90 KIAS when on a published route/track.
GPS Copter Procedures	As published	As published	90 KIAS when on a published route or track, EXCEPT 70 KIAS when on the final approach or missed approach segment and, in holding. Military procedures are limited to 90 KIAS for all segments.

Source: Helicopter Instrument Procedures (Appendix C of 2004 Instrument Procedures Handbook), FAA Order 8260.3

Some heliports do not meet the design standards for IFR but do for VFR. In this case Copter Point in Space (PinS) approaches have been developed to allow pilots to continue use of IFR until the arrival at destination portion of flight. Utilizing conventional NAVAIDS or RNAV systems, the approaches involve a VFR segment from the Missed Approach Point (MAP) to the field. This requires the operator to determine prior to the MAP that visibility is adequate for a visual landing, in which case if ATC is advised, that IFR is cancelled. If not, then the published missed approach procedure applies. Responsibility rests with the pilot to exercise obstacle avoidance and to

maintain minimums during the visual portion of the approach. SVFR clearances may apply if applicable.

Special approach procedures exist for approaches to hospitals and other private facilities. Agreements or operational specifications exist to specifically approve each of these special procedures, dependent upon pilot Part 91 or Part 135 status. Most special approach procedures tend to be PinS and are used to support Emergency Medical Service (EMS) and are for heliport facilities 10,500 feet or less from the MAP. As discussed previously, this is intended to afford the EMS mission the optimal amount of flexibility given the nature of the operation.

Finally, FAA has established some criteria for vertical guidance and for precision GPS approaches by helicopters. Only a few IFR approach procedures exist in the US.

7.3.2 Airspace Structure (Part 77) Around Helistop/Heliport

14 CFR Part 77 (Objects Affecting Navigable Airspace) Section 77.29, as well as AC 150/5390-2B, defines approach, primary, and transitional imaginary surfaces to be obstacle-free for clear approach and departure of helicopters. Additional guidance also suggests the presence of two approach/departure paths with at least one non-precision (GPS) instrument approach. Additionally, prospective heliport operators are required to file an FAA Form 7480-1 (Notice of Landing Area Proposal), from which an FAA-conducted airspace analysis is done per the requirements of 14 CFR Part 157 to assess the site's impact on safe and efficient airspace use.

Primary Surfaces

The Primary Surface overlays the Final Approach and Takeoff Area (FATO) and is at the FATO's elevation. The FATO is the area over which the final phase of landing is completed and a takeoff is commenced.

Approach Surfaces

Visual: The Approach Surface is trapezoidal in nature, beginning at the end of the Primary Surface (FATO) and extending out 4,000' at an 8:1 slope along the approach/takeoff path, with an inner width being the width of the Primary Surface and the outer width being 500'.

Non-Precision: The Approach Surface is trapezoidal in nature, beginning at the end of the Primary Surface (FATO) and extending out 10,000' at a 20:1 slope along the approach/takeoff path, with an inner width being 500' and the outer width being 5,000'.

Precision: The Approach Surface is trapezoidal in nature, beginning at the end of the Primary Surface (FATO) and extending out 25,000' at a 34:1 slope along the approach/takeoff path (for a 3 percent glide slope approach angle), with an inner width being 1000' and the outer width being 6,000'. The slope would be 22.7:1 for a 4.5 degree glide slope approach angle, and 17:1 for a 6 degree glide slope approach angle. The glide slope angle can vary in increments of 1/10 degree in this range, with corresponding slope ratio and landing minimum calculations.

Transitional Surfaces

Visual: The transitional surface rises up and out of the Primary and Approach Surfaces at a slope of 2:1, extending upward and terminating at 500' above the Primary Surface elevation. It extends laterally to 250 feet either side of the centerline of each designated approach/takeoff path.

Non-Precision: The transitional surface rises up and out of the Primary and Approach Surfaces at a slope of 4:1. FATO transitional surfaces terminate 350' horizontally from the edges of the FATO. The approach/takeoff transitional surfaces terminate 600' horizontally from the centerline of the approach/takeoff surface.

Precision: Inner transitional surfaces for the FATO extend on each side. Transitional surfaces are 350' wide and slope upward at 7:1 at right angles to the centerline of the instrument FATO. Transitional surfaces for the approach surface extend from each edge of the precision approach trapezoid. The surface starts 600' wide at the end of the FATO and flares to 1,500' width at the end of the approach trapezoid. Transitional surfaces slope upwards at right angles to the approach centerline at 7:1.

Horizontal Surfaces

For transport facilities, the clear protection zone is the area under the approach/takeoff surfaces out to where the surface is 35 feet above the heliport elevation.

Missed Approach Surfaces

Missed approach procedures are required for all instrument procedures at a given facility. The surface for a missed approach may be in the direction of the approach or require a turn. Specific surfaces require independent analysis of decision height and other criteria, and require case-by-case development. They are specifically not addressed further in this report.

7.3.3 Private Use Hospital Heliports

Private use hospital heliports are used extensively by law enforcement, as well as by EMS operators. Oftentimes, hospital heliports are located in metropolitan areas with much surrounding infrastructure. Recognizing the constraints, AC 150/5390-2B realizes relaxed heliport standards, which amount to little more than recommendations for the hospital to use in the development of the heliport (for example, per the referenced circular "it is recommended that as much of the approach/takeoff surfaces as circumstances permit overlay hospital property"). That said, the circular does require at least one FATO and one approach/takeoff path (two are recommended). 14 CFR Part 77 heliport approach surface guidance is described above in Section A.

Because of the spontaneous nature of law enforcement and EMS activities, the site constraints that many existing facilities have, and the resultant inability of those hospitals to provide the imaginary surface obstacle clearance required for instrument approach, it is logical to assume that the flexibility afforded by VFR would continue to be desired by hospitals and EMS operators, and hence VFR would remain the predominant characterization of many hospital heliports.

But, in recognition of the important public safety aspect of their mission and the impacts that reduced visibility has in helicopter operations, the ability to provide enhanced heliport facilities capable of operating in reduced visibility would allow an optimized level of service, and in times of tight fiscal constraints, may actually provide for expanded emergency service coverage from consolidated or networked hospital facilities. In this instance, the use of non-precision GPS approach offers the greatest opportunity and is consistent with the FAA's desired continued growth of GPS use in US airspace planning, especially for helicopters.

The implications of implementing an instrument approach at a heliport are potentially complicated. As stated, hospitals are usually in urban environments, which means that the necessary real estate needed to provide for the additional approach and transitional surfaces obstacle clearances required to make a facility IFR is not always available. PinS GPS instrument approaches allow IFR operations into VFR facilities as described above. In this manner, EMS helicopters can use an IFR flight plan in inclement weather with a visual segment approach, ensuring a greater number of possible missions. To date, over 100 PinS GPS approaches are in place with others in development. Procedures for departing VFR heliports under IFR conditions are also in development. In summary, PinS GPS instrument approach procedures are a prudent way to plan existing and future hospital helicopter approach procedures. It should be noted that new hospital facilities planning for heliports should have the flexibility of proper land acquisition and programming to incorporate formal GPS IAPs, instead of the slightly more restrictive PinS GPS IAP structure.

In terms of ATC interface for EMS missions, such operators have had and should continue to use a special transponders code indicating high priority to ATC. In this manner, EMS and law enforcement missions continue to receive priority handling in the region's Class B airspace. The continued presence of the ADIZ will continue to have an impact, and may require additional negotiations with FAA and Department of Homeland Security (DHS) on a timely and enhanced EMS and law enforcement exclusion for operations within the ADIZ. What would complicate this process would be the inability of the exclusion to necessarily be limited to specific routes, due to the nature of the mission. This would require positive up-front clearance and monitoring of the aircraft by ATC to comply with ADIZ objectives.

7.3.4 Public-Use Helistops

Much in the same way as private hospital heliports, a network of public-use helistops as proposed (functionally comparable to formal heliports, much in the same way as bus stops are to bus terminals), would provide EMS with a network of landing areas closer to potential accidents to which medevac services are required, thereby enhancing the ability of EMS to respond quicker to such events. The very nature of these types of operations demands a facility that affords easy and convenient access, uncomplicated approach procedures, location suitable to facilitate getting victims to required care as expeditiously as possible, and most importantly, flexibility to adapt to the changing needs of the particular mission flown. Additionally, public-use helistops would afford corporations and businesses the ability to utilize an alternative form of transportation in the daily conduct of business that saves time and money over congested surface transportation modes. Law enforcement would also achieve some benefit from such pads through enhanced operational flexibility and administrative transportation logistical requirements, although not specifically required at this time. Such facilities, given the needs identified above, would be sited as discussed in Section 5.7, but it is anticipated that such stops would be within urban settings. They would be located on publicly owned land near existing transportation facilities and primarily along major highway systems to facilitate modal connections (rest stops, park-and-rides).

These proposed facilities should be designed with two established approach and departure routes, compliant with Part 77 as outlined previously. Additionally, the stop's approaches should be capable of VFR, as well as IFR operations, to afford the maximum usage of the facility by a diverse pool of operators. EMS would benefit the most out of use of VFR and non-precision GPS approach (PinS procedures are most common currently, but with the theoretically more available real estate at these proposed stops, the true value of PinS procedures would not be applicable). Other users with more established itineraries and missions of a less urgent nature would benefit from non-precision approaches (GPS) for the short term, but over the long term would realize

benefit from a formal precision instrument approach for full operational capability during all ranges of visibility restrictions, conveniences offered by commercial and charter air transport. This would require that planning for such stops include provisions for future precision approach procedures. Such precision approach procedures are still, for the most part, in developmental stages and have seen limited application for helicopters in the region to date. Such procedures may come with restrictions that may require new infrastructure and airspace planning criteria.

In terms of the site requirements for non-precision and precision approaches to comply with Part 77 and AC 150/5390-2B, the following requirements for approach and transitional imaginary surfaces for precision approach (which should govern for planning purposes) are described above.

Such helistops will obviously be constrained by the existing airspace structure in the region. The Class B airspace structure affords some flexibility for that itinerant traffic making short jumps, for whom obtaining Class B clearance may not be required, assuming their proximity to BWI, DCA, IAD and ADW is such that it doesn't fall within the tiered Class B floor. As far as the ADIZ is concerned, certainly the siting of such helistop facilities needs to take into account the needs of the anticipated users so that developed routes do not interfere with current restricted airspace (which is not likely to be removed in the foreseeable planning forecast period) to the extent that diversionary tracks make the flight time less competitive to that of existing traditional modes of transportation. Therefore, along with the 15-minute drive time or 5 minute flying time criteria used in this report for potential helistop siting criteria, such an airspace analysis is required as part of the formal helistop facility planning that will be required. Upon preliminary review, it would appear that about three potential locations depicted in Figures 7.5 and 7.6 fall within the ADIZ and would therefore be candidates for future stops, but due to restricted airspace concerns, may not be viable candidates at this time.

All helicopters using these facilities operating within 30 nautical miles of ADW, BWI, DCA or IAD would still be required to use a Mode C transponder, and if operating in the aforementioned Class B airspace, would still be assigned unique transponder codes for ATC handling. Helicopters below Class B (i.e., Class E airspace) would still squawk 1200 as a standard code. EMS, law enforcement and other special users of the facilities would use special transponders code indicating high priority to ATC.

7.3.5 Public-Use Downtown Heliport - Baltimore

As described in Chapter 5, two downtown public-use heliport facilities are recommended for the metropolitan Baltimore/Washington area. The discussion in this Section will center on the proposed facility in Baltimore.

A facility in Baltimore would be downtown to provide for access to businesses and to provide easy integration into the public transportation system. The facility would not be a full-scale heliport but would focus on a landing pad, parking spaces and a terminal facility. The site criteria are discussed in Section 5.4. The site would have two designated approach/takeoff paths, both capable of non-precision GPS instrument approach, with provisions for a precision approach as procedures are developed by FAA. Again, the approach and transitional surfaces for site development would be driven by precision approach criteria described above.

A heliport in the downtown Baltimore area would more than likely be outside the confines of the current ADIZ, and as such would not be subject to those restrictions. However, in planning for the facility the proximity of the ADIZ, with respect to the development of updated helicopter routes that would utilize this facility should be considered. The Class B airspace structure around BWI would impose some restrictions on operators, who would have to operate with ATC clearance while in Class B airspace. All standard protocol for operating in Class B and the Class E and G airspace below would apply.

Of course, all helicopters using this facility, due to the proximity to BWI, would be required to use a Mode C transponder, and if operating in the aforementioned Class B airspace, would still be assigned unique transponder codes for ATC handling. Helicopters below Class B (i.e., Class E airspace) would still squawk 1200 as a standard code.

7.3.6 Public-Use Downtown Heliport – Washington, DC

The only existing public-use heliport facility in the region is the South Capitol Street facility near the Anacostia River, near the Capitol. The heliport has been dramatically impacted by airspace restrictions and resultant diminished traffic, and since September 11, 2001, has been closed to non-military and non-police operations. The likelihood of this facility becoming viable again is uncertain as long as the current airspace restrictions are in place. Furthermore, proposed development along the Anacostia River will likely displace the existing heliport. Therefore, a new site for a downtown public-use heliport facility should be investigated. The new facility would likely include a terminal, landing area and helicopter parking spots, as well as a hangar and other support facilities, similar to the existing South Capitol Street Heliport.

The approach/takeoff paths to the new facility should be aligned with the dominant wind direction. These paths would ideally be capable of non-precision GPS instrument approach. It is assumed that precision approach would be provided for in the future, as soon as it is practical. Hence, similar to the other recommended facilities discussed previously, the approach and transitional

surfaces for site development would be driven by precision approach criteria. It is assumed that a new heliport development would be planned such that adequate land would be secured to protect the imaginary surfaces for future precision instrument approaches.

A downtown heliport would be within the general Class B airspace structure, and would therefore require ATC clearance and appropriate transponder equipment and procedures when operating in that airspace. The ADIZ would be in close proximity and, hence, would need to be planned for in terms of route development and planning.

7.3.7 Helicopter Route Chart

The existing Baltimore-Washington Helicopter Route Chart (April 2005) depicts the 18 VFR routes currently in place in the area. As previously stated, most routes are below 1,300 feet MSL with the exception of the Potomac River, over which recommended altitudes are 200 feet MSL to avoid DCA traffic. These new proposed facilities would be used often enough, according to forecasts, that their inclusion into the published route charting through the development of new routes specifically incorporating the facilities is paramount. Since the use of the routes is currently a recommendation by FAA and not a requirement, especially outside of the limits of Class B airspace, it may become advantageous for these procedures (modified as recommended herein) to become a standard for all non-EMS, law enforcement, and other priority missions. Given the complexity of the current and recently imposed post-September 11 airspace restrictions in the metropolitan area, and the magnitude of commercial and other air traffic simply given the population and civic nature of the area, the importance of adequate, accurate helicopter route charting cannot be over-emphasized. Such charting is essential to keep helicopter traffic operating in Class E and G airspace along common routes of travel so as to not compete with other air traffic. Additionally, maintenance and expansion of the current routes to incorporate additional facilities (hospital heliports, public-use helistops and an additional heliport) is required. As future airspace restrictions remain a possibility given current national security circumstances, it is paramount for the purposes of helping to “influence” these restrictions to have existing traffic routing procedures; it is in the interest of the constituents using helicopters to provide published routes as necessary.

The emergence of additional PinS GPS and GPS Copter procedures for IFR operations (especially given the recommendations made herein), will probably mean a need to expand upon the existing IFR helicopter routes that exist between Washington DC, Philadelphia, New York City, and Boston. As the number of IFR certified helicopters being used increases, these currently underutilized routes will become steadily more popular, especially for corporate activities seeking to utilize alternatives to commercial air service to avoid the current issues associated with that mode of transportation namely in the metropolitan area. In addition, as mentioned above, the Potomac

Maryland Aviation Administration

Metropolitan Washington Council of Governments

Consolidated TRACON Airspace Redesign Project is reviewing routing of all IFR aircraft in the area as part of the new Potomac Consolidated TRACON.

8. SECURITY AND AIRLIFT RECOMMENDATIONS

8.1 Synopsis

Current and proposed security requirements for public-use heliports, airspace restrictions and security requirements, as well as emergency airlift plans are addressed in this Section. Federal Aviation Administration (FAA) and Transportation Security Administration (TSA) guidelines and regulations for public-use airports (both general aviation and air carrier) were the primary sources used to address security issues relating to rotorcraft at public-use facilities.

The findings and recommendations related to helistop and heliport security, as well as emergency disaster airlift are as follows:

1. Public-use helistops and heliports that receive a moderate to high level of activity should install security fencing is to ensure that unauthorized personnel do not enter the air operations area.

2. Security guidelines for general aviation airports provide several key recommendations for general aviation facilities that may be applicable public use heliports. Most only apply to facilities that are staffed with personnel.

3. Helicopter charter operators using aircraft larger than 12,500 pounds will be required to prepare a security plan and provide a level of security equivalent to that of scheduled airlines.

4. Federal, regional, and state agencies in the study area all have disaster airlift plans. However, not all local communities have similar plans. Each community within the study area should have an approved emergency plan that explains how local rescue personnel will respond and interact with other emergency agencies.

The need for security measures at helicopter facilities in the study area and the preparation of disaster airlift plans should be considered on an individual basis, specific to the intended use of helicopter assets. The FAA, TSA, and the Helicopter Association International (HAI) have guidelines to aid communities and heliport operators with the development of appropriate security and emergency management plans. These guidelines are summarized in this Section.

8.2 Heliport Security

Security recommendations for public and private-use heliports within the study area are presented in this Section. FAA Advisory Circular 150-5390-2B, *Heliport Design*, provides general security guidelines for heliport facilities. As aviation security has become a higher priority for airports, however, it is also likely that heliports will be subject to greater security requirements as well. Although heliports are not specifically referred to in the most recent TSA security requirements and guidelines, it was assumed that security at heliports would be similar to either a commercial service or public-use general aviation airport.

Airport facilities throughout the Country have been responding to many new security changes mandated by federal and state agencies due to the terrorist attacks on the World Trade Center in New York City and at the Pentagon in Washington, DC. It is expected that further industry review will ultimately produce new security requirements for the aviation industry that will need to be implement as they are developed.

8.2.1 Background on Aviation Security

An overview of the development and implementation of the current airport security requirements and guidelines will provide a better understanding of how these requirements and guidelines will ultimately impact heliport and helicopter operations. The development of these requirements and guidelines were specific to airports rather than heliports. However, the various types of heliports are comparable to airports. For example, a transport heliport is equivalent to a commercial service airport, while public-use heliports are equivalent to general aviation airports. As such, the security requirements can be interchanged between airports and heliports.

Airports fall into two broad categories, certificated and non-certificated facilities. In the past, the FAA mandated security measures at certificated airports. However, this responsibility has been transferred to the TSA under the Department of Homeland Security (DHS). The responsibility for complying with the security regulations mandated by the TSA rests primarily with the airport operator, however, airlines and charter companies, corporate aircraft operators, and other airport tenants also share in this responsibility.

Previously, security requirements for certificated airports fell under four different regulations: FAR Part 139 Airport Certification, FAR Part 107 Airport Security Regulation, FAR Part 108 Airplane Operator Security, and FAR Part 109 Indirect Air Carrier Security. Recently, FAR Part 107, 108 and 109 were consolidated into 49 CFR Part 1500 under the TSA. It is through these regulations that TSA has implemented the most recent changes to security procedures at commercial service

airports. The TSA is primarily focused on airport and airline security in the terminal and within the airport operations area. Local or state law enforcement have jurisdiction over security in the other public areas of the airport such as terminal roadways, parking lots, and the general aviation side of the facility.

In April 2003, the TSA requested the Aviation Security Advisory Committee (ASAC) establish a Working Group made up of industry stakeholders to develop guidelines for security enhancements at the nation's privately and publicly owned and operated general aviation landing facilities. This listing of recommended guidelines or "best practices" was designed to establish non-regulatory standards for general aviation airport security. Their primary purpose is to help prevent the unauthorized use of a general aviation aircraft in an act of terrorism against the United States.

The Working Group consisted of general aviation industry associations, airport operators, and state and federal government representatives. Members of the Working Group engaged in extensive discussions to review numerous general aviation airport security recommendations and industry best practices. The result of this effort was the “Report of the Aviation Security Advisory Committee Working Group on Aviation Airports Security".

On November 17, 2003, the ASAC formally transmitted the recommendations to TSA. The TSA used this document as a baseline from which to craft an Information Publication (IP) titled, “Security Guidelines for General Aviation Airports", which constitutes a set of federally endorsed guidelines for enhancing airport security at general aviation facilities throughout the nation. It is intended to provide general airport owners, operators, and users with guidelines and recommendations that address aviation security concepts, technology, and enhancements.

8.2.2 Security Recommendations

Helicopters operate from a variety of aviation facilities within the study area, including private-use heliports, a public-use heliport, and public-use airports. The recommended heliport facilities identified the need for additional public-use helistops and heliports within the region. This section addresses the security recommendations for the existing and future public-use helistop or heliport facilities. The recommendations are based on the guidelines outlined in FAA AC 150/5390-2B, *Heliport Design* and TSA IP A-001, *Security Guidelines for General Aviation Airports*.

8.2.2.1 Public-Use Heliports and Helistops

The primary security issue for public-use helistops and heliports that receive a moderate to high level of activity is to ensure that unauthorized personnel do not enter the air operations area. This

can be done by simply installing a perimeter fence around the helipad and to utilize limited access gates with combination locks to maintain a level of security.

The FAA Advisory Circular includes guidelines for security fencing at public-use heliport facilities. These are listed in Table 8-1.

Table 8-1 FAA Security Fencing Guidelines

1. Security fencing should be erected around the helicopter operational area. The fencing should be located outside of the safety area and must not penetrate the primary, approach/departure, and transitional surfaces. This would require the fencing to be located about 100' to 150' from the landing pad.

2. The fencing should be high enough to present a positive deterrent to persons inadvertently entering an operational area and low enough to avoid being a hazard to helicopter operations.

3. Access to the operations area should be controlled through a locked gate and sufficient cautionary signage should be installed on the fence.

The TSA security guidelines for general aviation airports provide several key recommendations for general aviation facilities that may be applicable public use heliports. Most only apply to facilities that are staffed with personnel. Table 8-2 lists these guidelines.

Table 8-2 TSA General Aviation Security Guidelines

Securing Aircraft	• All aircraft doors and ignitions should be locked when not attended by the operators. • All aircraft should be stored in a hangar when not in use.
Vehicle Access	• Consider reasonable vehicle access control to facilities and ramps, which may include signage, fencing, gates or positive control techniques. • Where there is access control, periodically review access authorization including codes, cards, and locks.
Lighting	• Install effective outdoor lighting to help improve security of the aircraft ramp and hangar areas, fuel storage facilities and airport access points.
Hangars	• Secure hangar and personnel doors when unattended.
Signage	• Airports should post appropriate signage to warn against trespassing and unauthorized use of aircraft.
Community Watch Program	• Establish a Community Watch program. • Educate heliport tenants on current security issues. • Establish an identification and communication system.
Security Plan	• Develop a plan of action that is unique to the operations of the specific facility.
Charter Operators	• Charter Flight Security Program- Charter operators using aircraft larger than 12,500 lbs are required to provide a level of security equivalent to that of scheduled airlines (see Table 10-3).

The TSA will require helicopter charter operators using aircraft larger than 12,500 lbs to prepare a security plan and provide a level of security equivalent to that of scheduled airlines. Table 8-3 lists the requirements of this program.

Table 8-3 TSA 12,500 Twelve-Five Program

Airline Private Charter Program Requirements	Twelve-Five Program Requirements
Part 121 and 135 (US aircraft operators) for flights to, from, within, and outside the US.	Part 121 and 135 (US aircraft operators) for flights to, from, within, and outside the US.
Private charter (passenger) operations only.	Private charter (passenger) scheduled passenger and all-cargo operations.
All aircraft for "sterile" (i.e., loading or unloading in certain areas of a commercial airport) operations.	All aircraft for "sterile" (i.e., loading or unloading in certain areas of a commercial airport) operations.
Aircraft weighing 100,300 pounds or more, or that have 61 or more seats for "non-sterile" operations.	Aircraft weighing 100,300 pounds or more, or that have 61 or more seats for "non-sterile" operations.
Passenger identification checks.	Passenger identification checks.
Fingerprint-based CHRC for flight deck crewmembers.	Fingerprint-based CHRC for flight deck crewmembers.
Bomb and hijack notification requirements.	Bomb and hijack notification requirements.
Additional measures protected as Sensitive Security Information.	Additional measures protected as Sensitive Security Information.

It is envisioned that that most public-use helistops and heliports would fall under the guidelines for general aviation airports and that best management practices would be applied.

8.2.2.2 Private-Use Hospital Heliports

Most, if not all, heliports located at hospitals in the study area are used only by private civilian medical evacuation operators (Medevac) or police agencies that are engaged in transport of critically ill passengers. Hospitals are rated by levels of services they provide and each specializes in specific types of health care. The hospitals that are rated as level 1, 2 or 3-trauma centers will receive higher levels of helicopter activity given their specialized trauma capabilities.

Currently, there are three civilian medical operators in the region; Inova is based at Fairfax County Hospital, Stat Medevac is based at Martin State Airport and MedStar has aircraft located at Easton, Frederick, Indian Head, and Tipton Airports. Police helicopter units engaged in Medevac transports are also based at general aviation airports in the region.

The location of hospital heliports varies, they can be found in open grass fields adjacent to the hospital, vehicle parking lots adjacent to the building, or on the rooftops. Location of heliports at hospitals is critical since the landing site needs to be close enough to allow patients to be transported from the aircraft to the emergency room without having to use ground vehicles.

Typical hospital heliports are comprised of a single helipad. Standard operating procedures are to land, drop off the patient and then return to the facility where the helicopter is based. Helicopters spend only a short time on the ground and are not left unattended. Hospitals usually do not have hangar, fueling, or maintenance capabilities located on site.

In the study area, it was found that most level one-trauma centers have installed rooftop-landing pads at the hospitals. These rooftop facilities do not require any additional security measures since there is no public access to the site and security can be controlled by the hospital. It was also found that there are several facilities such as Georgetown and Holy Cross Hospitals that, due to constrained properties, have heliports located away from the building. Patients at these hospitals have to be transported by ground ambulance between the landing site and the facility.

The only hospitals that have fueling capabilities are Washington Center and Fairfax County. The fueling tanks are located adjacent to the landing facilities and are used only as an alternate fueling source to top off aircraft in an emergency. The Washington Center and University of Maryland Shock Trauma Center landing sites are the largest heliports in the region. Each site can park 3-6 helicopters while keeping the landing pad clear.

The hospital heliport section of the Heliport AC does not cover specific security recommendations that are unique to these facilities. This is most likely due to private ownership of the facility or various levels of activity. As previously noted, it has been found that each landing site is configured differently depending on the physical constraints of the property and optimized approach paths to the hospital heliports. The only hospital heliport in the study area with additional security measures is Washington Center, which controls access and has installed security fencing around the heliport.

It is recommended that ground based helistops experiencing moderate to high levels of activity consider the installation of security fencing around the helipad to ensure that unauthorized

personnel do not access the helipad area. However, careful consideration should be provided in that security fencing could hamper quick movement of a patient to or from a helicopter. As such, the recommendation regarding security measures for hospital heliports should be evaluated on a case-by-case basis. Further, it should be noted that these hospital heliports might also be regulated by state aviation requirements for certification or by local zoning laws.

8.2.2.3 Private-Use Corporate and Private Heliports

These heliport-landing sites are very similar to hospital heliports as they are used mainly by private helicopter operators or helicopters that have prior approval from the property owner. The facilities are typically located in remote areas of the property adjacent to the main office complex. However, the pads are close enough that they can be monitored by office personnel in the building. While most of these facilities have limited operations and helicopters are not stored for long periods, it is believed that the FAA Advisory Circular covers all the safety and security items that should be addressed. The primary factor is the use of security fencing to limit unauthorized personnel from accessing the helipad area. It should be noted that private heliports might be regulated by state aviation requirements for certification or by local zoning laws.

8.3 Disaster Airlift Plan

The FAA, COG and the Regional Emergency Management Agencies have developed guidelines for the emergency evacuation of personnel from impacted areas. This Section presents information about existing plans and helicopter assets that could be used to provide emergency evacuation services by air within the Baltimore/Washington Metropolitan area. Interviews were conducted with several emergency management agencies to identify how local, state, and federal assistance could be utilized during a regional emergency and how helicopter assets could be used.

8.3.1 Overview

Each community within the study area should have an approved emergency plan that explains how local rescue personnel will respond and interact with other emergency agencies. These plans typically provide general guidelines and details that are unique to that particular community, as well as information about emergency plans developed on the state and federal levels. The state and federal plans typically address chemical spills, nuclear power plant incidents, major natural disasters such as flooding or hurricanes, and other disasters that can impact large geographic areas.

Discussions with the local emergency response agencies found that most of all the responses to emergencies across the state or district were handled on the local level by police or fire agencies. Rarely are state or federal emergency management agencies activated to assist with an event. In the case of the Maryland Emergency Management Agency (MEMA), they can activate themselves and provide assistance and resources to local rescue units. A declaration from the Governor or the Mayor of Washington, DC on the regional level and the President on the federal level is required to engage state or federal assets to respond to an emergency. The last time MEMA was activated was to provide assistance to the counties on the eastern shore and Chesapeake Bay region during the aftermath of Hurricane Isabel in 2003. During this event, helicopter assets were used only to assess regional property damage. Helicopters were not used to evacuate people.

Only a few communities in the study area have aviation assets (aircraft or helicopters) to provide large-scale evacuation of people. Most of the heliport assets that are used at the local level are being operated by local police departments and are configured for surveillance, not the transportation of people or accident victims. In Maryland, however, the State Police are charged with conducting all Medevac operations within the state. The civilian Medevac operators handle most of the operations in Washington, DC and northern Virginia, with assistance from Fairfax County Police, Virginia State Police and the US Park Police.

8.3.2 State and Regional Disaster Airlift (SARDA)

The FAA has developed Advisory Circular AC-00-7D, *State and Regional Disaster Airlift Planning* dated September 1998, to provide each state with guidance in preparing a disaster airlift plan to access and utilize a broad range of aviation resources, including helicopters and fixed-wing aircraft, in support of civil emergencies. The FAA recommends including all available landing sites, including military bases, air carrier and general aviation airports, as well as heliport facilities in the disaster airlift plan. Typically, this information is presented under the appropriate Transportation and Law Enforcement sections of such a plan. Most state and regional emergency management agencies are aware of available aviation assets, particularly military and National Guard assets.

8.3.3 Emergency Response Federal Level

The Federal Emergency Management Agency (FEMA) is the primary federal agency responding to large-scale natural and man-made disasters. FEMA is activated only when a presidential declaration is given. FEMA involvement enables federal resources and funds to be made available to the impacted communities. A federal declaration of emergency is usually given after a natural disaster has occurred, such as earthquakes, flooding, large snowfalls, or forest fires. A large

geographic area or large numbers of people have to be impacted before FEMA will be called into action.

With the large number of military facilities located in the study area, there is a considerable number of helicopter resources that can be made available if a national disaster is declared. Most of the military assets, however, are not set up to transport Medevac patients. Therefore, these aircraft would have to land at suitable land areas and transport victims that are able to walk. Most of the military assets do not have equipment to undertake an aerial rescue. In addition, the military airlift wing and National Guard aviation brigade within the study area are not active flight wings. Therefore, these assets would take additional time to activate.

8.3.4 Emergency Response Local Level

Most basic emergencies are handled on the local level. Local fire rescue personnel and police have the authority to request helicopter assets to respond to an accident or emergency. Through proper communication channels, personnel can request a Medevac helicopter through the central 911-dispatch center. In Virginia and Washington, DC, such requests are handled through the 911-Center and appropriate civilian Medevac aircraft will be dispatch to the accident site. In the State of Maryland, the dispatch of Medevac helicopters is handled by the Maryland Institute for Emergency Medical Services System (MIEMSS) located in Baltimore. The State Police helicopter unit, which provides the primary helicopter Medevac response, will respond and MIEMSS coordinates the helicopter and ground ambulance assets to enable all areas of the state to be covered at all times.

While the State Police takes the lead in responding to all requests for Medevac transportation in Maryland, the civilian Medevac operators are involved in transporting patients and organ transplants between hospitals. If the State Police cannot respond, then the emergency management 911 center will dispatch civilian operators. In Washington, DC the civilian operators take the lead with the assistance of the US Park Police and Fairfax County Police.

8.3.5 Maryland Institute for Emergency Medical Services System (MIEMSS)

MIEMSS is charged with the coordination of Maryland's EMS system, which includes all EMS training of rescue personnel and dispatch of ground and air Medevac services. Through MIEMSS and the SYSCOM communication system that is located in Baltimore, all ground and air rescue units can be dispatched and tracked across the state. This is to ensure that all parts of the state

have adequate EMT coverage at all times. During all state or regional emergencies, a MIEMSS representative will be in direct contact with MEMA to provide communication and information.

8.3.6 Emergency Response State Level

The Maryland Emergency Management Agency (MEMA) central command center for the State of Maryland is located at Camp Fretterd Military Reservation, Reisterstown, MD. At this facility, the State has constructed a central command center that is staffed with emergency management personnel on a 24-hour basis. This facility has a heliport that can receive members of the management team if local roads are impassable. MEMA is activated when emergencies become too large for a local community to handle or there is a need for resources such as manpower or equipment from state governmental agencies.

The basic emergency response plan was developed by MEMA and covers sixteen different support functions. Depending on the type and severity of the emergency, only certain governmental agencies would be called to the command center. Table 8-4 is an example of how the State of Maryland divides responsibilities between different functions. This format is consistent with the FEMA plan and the other state emergency plans. The plan can be expanded to address issues that may be unique to individual regions or communities. This also enables multiple agencies from multiple jurisdictions to work together and understand the responsibility of each agency.

Table 8-4 Emergency Support Function Teams

EFS	Function	Principal Duty	Primary Agency
Policy	Strategic Decision-Making	Coordinate/Develop Policies	Governor or Authorized Rep.
1	Transportation	Provide Transportation Resources	Transportation
2	Communications	Provide Telecommunication Resources	Budget & Management
3	Public Works & Engineering	Restore Public Facilities	General Services
4	Firefighting	Suppress Fires	Natural Resources
5	Information & Planning	Collect/Share Information and Data	Emergency Management
6	Mass Care & Sheltering	Coordinate Shelter Operations	Human Resources
7	Resource Support	Provide Equipment and Supplies	General Services
8	Health & Medical Services	Coordinate Medical Care	Health & Mental Hygiene
9	Search & Rescue	Coordinate Search Missions	State Police
10	Hazardous Materials	Respond/Assist in Release Incidents	Environment
11	Food	Provide Bulk Food Supplies	Agriculture
12	Energy/Utility	Facilitate Restoration of Services	Energy Adm./Public Service
13	Law Enforcement	Maintain Standard of Public Safety	State Police
14	Debris Management	Coordinate Removal/Disposal	Emergency Management
15	Donation Management	Receive and Distribute Goods	Emergency Management
16	Animal Protection	Coordinate Animal Safety/Sheltering	Agriculture

The MEMA command center is fully staffed and equipped communication with systems capable of contacting all state or regional support agencies. Each agency that is called to the command center provides representatives that are knowledgeable of the emergency plan and have the authority to task subordinate staff and resources to assist with the emergency. Each agency will

have its own emergency plans that may include specific names, contact numbers, and inventory of available equipment and staff expertise.

The Virginia Department of Emergency Management has a similar command center in Richmond. It would assist the northern communities of Fairfax, Alexandria, Arlington, and Prince William's and Loudoun Counties in the event of a large-scale emergency.

8.3.7 Regional Emergency Coordination Plan (RECP)

In September 2002, the Metropolitan Washington Council of Governments (COG) developed a Regional Emergency Coordination Plan (RECP) in an effort to strengthen regional communication and coordination in the event of a regional disaster. The command center is located in the District of Columbia's governmental office complex located on 14th street. Any incident occurring within the Washington, DC area would be the responsibility of District of Columbia Emergency Management Agency. COG's involvement with this plan is providing regional communication between the 17 local government jurisdictions within Maryland, Virginia, and Washington, DC. Part of the command center provides a communications capability called the Regional Incident Communications and Coordination System (RICCS). Local, State, and Federal governmental agencies can be linked and share information within 30 minutes of an emergency. Two additional sites are planned, one in Virginia and one in Maryland.

8.3.8 Regional Emergency Evacuation Transportation Coordination (REETC)

Part of the Regional Emergency Coordination Plan incorporates a specific Annex that covers issues of Regional Emergency Evacuation Transportation Coordination (REETC). REETC addresses impacts to the regional transportation systems with regard to moving people around or out of the area and moving the required resources into the impacted area. This Annex is quite extensive and tries to identify situations and strategies where the majority of people do not have to evacuate the area, but can be sheltered in place to ensure that transportation and roadways are available for those who need it.

A review of published emergency plans and interviews with emergency management personnel revealed that most procedures involve evacuating the local population by ground transportation. Such evacuation procedures include using vehicles, the mass transportation system, or by simply walking out of the impacted area. The REETC Annex also includes aviation assets such Baltimore/Washington, Reagan Washington National, and Dulles Airports in their plan. The plan also includes various agencies that have helicopter resources, although, it may not be practicable

or feasible to move a large number of people by helicopter in the case of a large-scale emergency. The REETC plan does not include a listing of known helicopter landing sites or general aviation airport facilities within the study area.

8.3.9 Medevac Resources for Transporting People

A survey of all Medevac operators in the study area revealed that over 100 helicopters could be made available to assist an emergency evacuation. This takes into account numerous aircraft that are located in Delaware, Pennsylvania, and West Virginia. While these are known helicopter assets, not all aircraft are equipped to transport patients. Furthermore, not all operators and agencies could guarantee that all aircraft would be available to respond to a large-scale emergency. Most helicopter operators in the area have informal verbal agreements to provide assistance to neighboring communities when called. As an example, the Maryland State Police helicopter units primary role is to provide Medevac coverage for the entire State of Maryland. If its Medevac units are not engaged in a transport of a patient, the police unit will provide assistance to neighboring states on a limited basis. Allocating helicopter assets for long periods to a regional emergency would reduce dedicated coverage to other parts of the region.

It was also found that Medevac operators in the study area are ill equipped to respond to nuclear, biological, or chemical emergencies. Currently the helicopter units do not have the required gear to protect the pilots and crew or to detect contaminated areas. Standard operating practices would only allow trained hazardous material (Hazmat) personnel to respond to a contaminated area. A helicopter would only be used when the impacted area was decontaminated.

Table 8-5 lists military, police agencies or Medevac operators who could respond to a large-scale emergency in the study area. There are also several other civilian commercial helicopter operators in the region that could be available for transport, but currently are not part of any regional evacuation plans. Some commercial operators may require compensation to respond to any emergency event.

Table 8-5 Inventory of Public Service Operators

Aircraft Type	Number	Home Base	Medevac	Capacity
Maryland Based Operators				
1. Anne Arundel County Police				
OH58 Jet Rangers	2	Tipton Airport	No	
2. Baltimore City Police Aviation				
American Eurocopter Colibri EC-120	4	Martin State Airport	No	3 pax each
3. Baltimore County Police Aviation				
OH58 & Bell 206A	4	Martin State Airport	No	3 pax each
4. Maryland Natural Resources Police Aviation				
Bell 206B, Schwiezer TH55 & OH58	3	Easton	No	4 pax each
5. Maryland State Police				
EC AS-365N II	12	Martin State, Andrews AFB, Frederick, Salisbury, Cumberland, Centerville, St. Mary's and Norwood Airports	Yes	3 pax, 1-2 Medevac
6. Prince George's County Police Aviation				
MD520N	2	Hyde Field	No	3 pax each
Virginia				
7. Fairfax County Police Aviation				
Bell 407	2	Fairfax Police Barracks	Yes	5 pax, 1 Medevac
8. Virginal State Police Aviation				
Bell 407, BO-105, BK 117	6	Manassas, Lynchburg, Richmond, and Abingdon Airports	Yes	Pax and Medevac
Washington, DC				
9. Metropolitan Police Department Aviation				
American Eurocopter A Star	2	South Capitol Street Helipad	No	3 pax each
10. US Park Police				
Bell 412 & Bell 206	3	Anacostia Park	Yes	2-8 Pax, 1-2 Medevac

Aircraft Type	Number	Home Base	Medevac	Capacity
Civilian Operators				
11. MedStar				
BK-177	4	Easton, Frederick, Indian Head, and Tipton Airports	Yes	1 Medevac
12. Stat Medevac				
BK-117	1	Martin State Airport	Yes	1 Medevac
13. INOVA				
Bell 407	1	Fairfax County Hospital	Yes	1 Medevac
Out of State				
14. Delaware State Police Aviation				
Bell 407	4	Georgetown and Summit Airports	Yes	2-3 pax, 1 Medevac
15. Pennsylvania State Police				
Bell 407, Bell 206L, Bell 206B	7	Reading, Harrisburg and Latrobe Airports	Yes	2-4 pax each
16. West Virginia State Police Aviation				
Hugh 500	2	Charleston	No	2 pax each
Military				
17. Maryland National Guard 29th Aviation Brigade				
UH-1, UH-60A, OH-58	26	Edgewood	Yes	2-5 pax each
18. US Air Force-89th Airlift Wing				
UH-1N	20	Andrews AFB	No	2-5 pax each

8.3.10 Interstate Agreement

In 1986, COG passed a resolution endorsing an interstate agreement for the use of helicopters for emergency medical transport. This agreement was signed by various emergency service agencies that are involved with the transport of medical patients by helicopters. The agreement set general guidelines for operating helicopters in multiple jurisdictions around the Washington, DC metropolitan area, and tried to foster regional cooperation between agencies. It appears that this agreement has not been updated since it was originally drafted. Letters of agreement or standard operating procedures should be redrafted and re-signed by participating agencies anytime there is a change in staff or authority.

8.3.11 Update Assessment of the Use of Helicopter for Emergency Medical Transport in the Metropolitan Area

COG commissioned a report in 1985 to inventory all the emergency medical transport operators in the metropolitan area and to identify all emergency-landing sites in the region. This report was originally drafted in 1979 and provided the data necessary for officials to establish effective policy related to the operation of Medevac operators in the region. The report also listed various predetermined landing sites that could be used by the rescue operators to transport patients between ground and air modes of transportation. Predetermined sites were identified in Alexandria, Arlington, Fairfax, Loudoun and Prince George's counties, the District of Columbia, and Fairfax City. These sites were located at numerous hospitals and police stations in the region and identified sites at elementary school sport fields, recreation parks, and shopping centers. These sites allow for multiple landing areas, easy access to ground transportation, ample vehicle parking, and known locations. These are the emergency landing sites identified and included in local emergency plans as well. Most agencies do not publicly disseminate this information. The plan is distributed only to the emergency management agencies and rescue personnel within the effected area.

Considering that emergencies can happen anywhere, it is generally recommended that temporary helicopter landing sites are located as close to the emergency operation as possible. If helicopter assets are needed, local police and fire rescue personnel have the jurisdiction and responsibility to establish a suitable landing zone for responding aircraft.

9. POLICY AND PROGRAM RECOMMENDATIONS

9.1 Synopsis

The Maryland Aviation Administration (MAA) and the Metropolitan Washington Council of Governments (COG) both have existing formal and informal policies or programs relating to heliports. For example, the MAA has exclusive authority to regulate aviation and aviation development within Maryland. On the other hand, COG does not regulate aviation within its region, rather it helps set policy and establishes programs to assist member governments with transportation related issues, such as heliports and helicopters.

An overview and general assessment of these formal and informal polices and programs are presented in this Chapter. The general policy and program recommendations are summarized as follows:

1. The existing Maryland aviation regulations could be improved by clarifying and providing direct reference to heliports and helistops where applicable. Specific reference to heliports is currently limited to inclusion by definition of a designated land area, and the minimum standards defined as those contained in the FAA "Heliport Design" Advisory Circular.

2. Existing COG transportation policies should be extended to formally include helistops, heliports, and helicopter operations within the region.

3. Environmental impacts, such as noise, should continue to be studied though existing COG boards and committees. The Committee on Noise and Aviation at National and Dulles Airports (CONAANDA) should continue to study helicopter noise and established helicopter routes.

4. Improved land use regulatory controls should be addressed in many jurisdictions in Maryland and some in the COG region, as less than half in Maryland have regulations that address aircraft-landing facilities of any kind, including airports. A similar situation exists in some COG jurisdictions.

5. An education program is needed to promote the benefits of helicopters and heliports. This could be done through existing outreach programs administered by the MAA and

COG. In particular, emphasis should be placed on enhancing intermodalism to support regional transportation needs.

6. Obtaining funding for new helistop or heliport facilities is difficult through private sources without financial support from public sources. One way to approach public funding is to promote helistops and heliports through economic development initiatives. Heliports, by their size and operating needs, can be incorporated into economic development initiatives to revitalize, grow, or create economic development within communities.

7. Public funding for privately owned facilities that are available for public use should also be supported by COG and MAA.

In addition to the policy and program recommendations, two "tools" were developed and included in this Chapter to aid local planning boards and other authorities in reviewing applications for proposed helistops or heliports. The tools include a Land Use Compatibility Consideration Guide and a Facility Review Checklist.

9.2 Formal Policy Recommendations

Each agency has a different function in terms of addressing aviation. MAA's policies focus on regulatory statutes that give MAA various powers such as licensing and funding aviation development. COG, which is a Metropolitan Planning Organization (MPO), is not regulatory in nature, but rather addresses aviation issues through non-regulatory means such as regional planning groups and policy coordination between municipalities and counties. The formal policies of each agency are summarized below. Recommendations to improve these polices are also provided.

9.2.1 Regulation, Certification, and Inspection of Heliports

Currently, MAA has exclusive powers to regulate aviation and aviation development within Maryland. Conversely, COG operates as an MPO. Therefore, COG does not have regulatory authority over aviation development within its region. However, COG does have the ability to help coordinate policy issues between a number of local and county governmental agencies.

9.2.1.1 Existing MAA Policies and Recommendations

The regulations governing the MAA are contained in the Department of Transportation Title 11, Subtitle 03 Maryland Aviation Administration. These statutes detail the regulatory powers of the

MAA that include registering and licensing airports, funding capital programs for public-use airport facilities, inspection and enforcement for public-use airports, addressing obstructions to air navigation, zoning authority adjacent to state owned aviation facilities, and defining minimum facility standards for airports. The statutes also regulate the operation of Baltimore/Washington International and Martin State Airport. The current regulatory statues for MAA are as follows:

- Chapter 01 – Baltimore/Washington International Airport
- Chapter 02 – Martin State Airport
- Chapter 03 – Airport Noise Control Program
- Chapter 04 – Aeronautical Regulations
- Chapter 05 – Obstructions to Air Navigation
- Chapter 06 – Airport Zoning Regulations
- Chapter 07 – Maryland Air Terminal Assistance Program
- Chapter 08 – Maryland Assistance to Private Airports
- Chapter 09 – Issuance of Citation by MAA Personnel

The primary focus of these statutes are to regulate airports and seaplane bases. Specific reference to heliports is limited to inclusion by definition of a "designated landing area" and the minimum standards defined as those contained in the FAA "Heliport Design" Advisory Circular. These statutes could be improved by clarifying and providing direct reference to heliports and helistops where applicable. The following suggestions should be considered during the next overall revision to these statutes.

1. Define Heliport and Helistops and Incorporate Minimum Facility Requirements

Chapter 04 Aeronautical Regulations define airports, seaplane, and landing facilities, licensing requirements, inspection and enforcement regulations, and minimum facility requirements for both public and private facilities serving General Aviation and Commercial Service activity. This Chapter could be improved with the following revisions: Section 02 should be revised to include a definition of a helistop, heliport, and helicopter activity; Section 04, Paragraph A should be revised to directly include heliports; Section 06 should be revised to specifically include heliports, and helistops and the minimum standards defined for each; and Sections 08 though 12 should also be revised to directly include heliports and helistops.

2. Obstructions

Title 11, Chapter 05 pertains to controlling obstructions around airports. This Chapter should be revised to include heliports and define Federal Aviation Regulation Part 77 surfaces specific to

heliports. These standards are provided in FAA AC 150/5390-2B and could be easily incorporated by reference.

3. Zoning Regulations

Title 11, Chapter 06 pertains to zoning regulations at State-owned airports. These statutes currently do apply to public-use facilities not owned by the MAA. However, the review process contained in this Chapter would also benefit municipalities or counties who review development proposals near airports, helistops, and heliports. Consideration should be given to include the MAA in the review of development proposals near existing or new helistops and heliports. A sample Land Use Regulatory Approach is provided in Section 11.2.2. The sample approach would be beneficial to local municipalities and counties, as well as to the MAA.

4. Funding for Commercial Heliport Facilities

Title 11, Chapter 07 provides State funds for airport terminal facilities to support commercial aviation. Chapter 07 should be revised to include public-use heliport terminal facilities as well. This would help support the development of commercial service heliports within Maryland.

5. Funding for Privately Owned Heliport Facilities

Title 11, Chapter 08 creates a funding program specifically for capital improvements at privately owned facilities open to the public. The Maryland Assistance to Private Airports (MAPA) program should be revised to include privately owned helistops and heliports open to the public. This would be especially beneficial to owners of existing privately owned, private use heliports that want to open their facilities for public-use. This would greatly enhance the development of a public-use heliport system.

The MAPA program is limited to existing airport facilities. The grants are not intended to finance the planning and permitting of new facilities. Rather, the private owner is expected to acquire the necessary permits, certifications, and property ownership before a grant can be awarded for capital improvements. It is assumed that his would also be the case for privately owned, public-use helistops and heliports.

9.2.1.2 Existing COG Policies and Recommendations

COG provides planning assistance to municipalities within its geographic boundaries. COG currently supports 19 governments in the Washington, DC metropolitan area. COG also interacts

with state and federal agencies related to issues affecting the metropolitan area, such as transportation and environmental related issues. COG does not have regulatory authority over the municipalities within the metropolitan planning area. However, COG does coordinate a number of transportation committees that address various transportation and environmental issues within the region.

Existing transportation policies should be extended to formally include helistops, heliports, and helicopter operations within the region. For example, COG should continue to assess the role that helicopter operations have on regional activities, including economic development, land use, and transportation utilizing its existing committee structure. This would include the planning for existing and new facilities and could include the development of recommended regulations similar to that proposed for Maryland to foster development and operation of heliport facilities as well as encourage the use of helicopters as a supplemental transportation alternative. This effort could also promote helicopters and heliport facilities as economic generators for individual communities as well as facilities to support public service helicopter operators such as police or air ambulance uses.

Likewise, environmental impacts, such as noise, should continue to be studied though existing COG boards and committees. The Committee on Noise and Aviation at National and Dulles Airports (CONAANDA) should continue to study helicopter noise and established helicopter routes. The airspace for Reagan Washington National Airport directly impacts helicopter operations in the Washington, DC area, thus generating the majority of helicopter noise complaints.

9.2.2 Land Use Regulatory Approach

In 2002, data was collected and analyzed regarding the current regulation and permitting procedures for helicopter landing facilities in all jurisdictions in the State of Maryland and COG. This work revealed that less than half of the jurisdictions in Maryland have regulations that address aircraft-landing facilities of any kind, including airports. A similar situation exists in COG jurisdictions. Moreover, the jurisdictions that do regulate helicopter landing facilities generally are larger and more developed, while those without regulations tend to be smaller and less developed, in area, density and intensity.

This information was gathered in order to set the context for policy recommendations that address the future siting of helistops and heliports throughout the study area, as identified in the System Plan. To that end, this report is divided in two parts: (1) a discussion of the land use aspects of these recommendations, and (2) the outline of a general approach to implementing these recommendations through local zoning regulations. Montgomery County's zoning regulations

pertaining to helistops and heliports are included in Appendix D as an example of a comprehensive approach to the topic.

This report is meant to guide local jurisdictions that want to implement the System Plan. It is not meant to preempt the prerogative of local jurisdictions to set their own approach. For example, in the drafting of zoning regulations there is often a temptation to borrow language from other jurisdictions. This report, in fact, cites such language. However, ordinances are the product of local circumstances and compromises that are not necessarily transferable directly to other places. Each municipality must assess its own precedents and legal and political realities as it generates ordinance language. The examples in this report are not intended to be copied literally, then, but rather to be used to frame the land use analysis and guide the regulation of helicopter landing facilities at the local level.

9.2.3 Land Use Issues

The jurisdictions throughout Maryland, northern Virginia and the District of Columbia surveyed in 2002 do not regulate helistops and heliports in the same manner, but in looking broadly across the region, patterns can be discerned.

Most jurisdictions that allow helicopter-landing facilities permit them by special exception, and of these, the facilities are most commonly permitted in industrial and rural residential/agricultural zones. A limited number of jurisdictions also allow these facilities by right or as a principal permitted use in a small number of zoning districts, mostly industrial zones.

By restricting helistops and heliports to industrial and rural residential/agricultural zones, jurisdictions are essentially directing them to the areas where they are most likely to be located (in the case of industrial zones, to serve industrial uses) and to areas where they are less likely to affect a large number of adjacent users (in the case of less dense rural residential and agricultural zones).

In most jurisdictions, “public-uses” are not subject to zoning regulations. Thus, if a heliport is designated as a public-use in the zoning regulations, as most hospital heliports are, it can be located anywhere within a jurisdiction.

The remainder of this Section examines the questions of “where” and “how” in more detail.

9.2.3.1 Where

Under the System Plan, the proposed system of general aviation helistops generally would be located on publicly owned land near existing transportation facilities and sites along major highways or other easily identifiable and accessible locations. To the extent that such sites are likely to be in areas where helistops and heliports are not currently allowed, jurisdictions will need to review their zoning regulations to determine if these facilities can be built in these areas.

Jurisdictions that allow heliports in highly developed areas and/or by right include Baltimore City and Anne Arundel, Fairfax and Prince George's counties.

Baltimore City allows helistops and heliports as a conditional use (similar to a special exception). Helistops are allowed in all zoning districts in this manner, while heliports are restricted to industrial and business zones.

In Anne Arundel County, helistops and heliports are permitted as a principal use in industrial districts, by special exception in certain low density and marine districts and as an accessory use in high density and multi-family residential districts.

In Prince George's County, helistops and heliports are permitted by special exception in several residential, commercial, industrial and mixed use zones. They are also permitted by right in the high density MAC (major activity), EIA (employment and industrial) and MXT (mixed use) zones.

In Fairfax County, helistops and heliports are permitted as part of an approved development plan in three planned development districts, in addition to being allowed by special exception in other areas. The establishment of a planned development district in Fairfax County is permitted through a rezoning action approved by the Board of Supervisors. Any proposal to add a new helistop or heliport to an existing planned development district where such a use is not on the approved development plan would require the approval of an amendment by the Planning Commission and would likely require a proffer condition amendment by the Board of Supervisors. There are also a number of zoning districts in Fairfax County where helistops and heliports are not allowed (higher density residential districts for example), either by right or by special exception.

9.2.3.2 How

As noted above, helistops and heliports are generally permitted by special exception in the study area, where they are allowed at all.

The special exception process allows a use as long as (1) it meets the conditions specified in the zoning ordinance related to heliport and helistop use (where these conditions are specified), as well as conditions applicable to all special exception uses, and (2) the jurisdiction grants approval through the special exception process. This process allows jurisdictions to review a heliport/helistop proposal and take steps to ensure that the impacts associated with the use are controlled per the regulations. In many cases, depending on the approval process, petitioners that receive a special exception are granted approval subject to conditions or restrictions under which the heliport or helistop must operate and under what time period.

To obtain a special exception, a petitioner must formally apply to a jurisdiction. The process usually involves a formal application and review by the Planning Commission. Many jurisdictions that regulate helistops and heliports have identified conditions of use or performance standards that must be met for the use to be approved. These conditions include regulations on noise, setbacks, maintenance facilities, lighting, screening and so on. Many jurisdictions also require that the heliport or helistop design comply with Federal Aviation Administration or Maryland Aviation Administration regulations.

Special exceptions are generally defined as: "A use permitted in a particular zoning district after a petitioner demonstrates that the use in a particular location will comply with all conditions and standards regarding the location or operation of the use as specified in the zoning ordinance and authorized by the approving agency."

Some jurisdictions refer to special use permits as "conditional uses." Conditional uses are permitted uses and are appropriate in the zoning district only when all conditions are met. By classifying them as conditional uses, separate regulations can be imposed to mitigate the adverse impacts. The conditions must be specific.

Special use permits are similar to special exceptions but are reviewed by the Board of Zoning Appeals instead of the Planning Commission.

9.2.4 Incorporating Provisions Related to Helicopter Landing Facilities into Local Zoning Regulations

Effective zoning provisions are needed to implement the recommendations of the System Plan. Zoning regulations define a jurisdiction's land use policies and guide local officials in the administration of these policies. If the regulations are too strict, they may impede the establishment of needed facilities. If they are too lenient, they may not address the potential

negative impacts associated with the use or they may fail to protect the health, safety and welfare of community residents.

The following sections identify the key areas of zoning regulations related to helicopter landing facilities and identify language that has been used by jurisdictions throughout the region to effectively regulate the land use aspects of these facilities.

9.2.4.1 Statements of Legislative Intent

Well-crafted zoning ordinances include statements of legislative intent (or "purpose clauses") within each zoning category. These statements articulate (1) the community's goals and objectives regarding the use being regulated; (2) the intentions and purposes of the elected officials who enacted the legislation; and (3) the policies of the local government regarding the regulations. These statements guide the public and local government when the ordinance must be interpreted and implemented. Because no ordinance can anticipate all future uses or contingencies, these clauses often serve as the legal basis for legislative decisions.

Montgomery County's ordinance contains language within its purpose clause that emphasizes the compatibility of helicopter landing facilities with nearby residential areas (the full text of the county's ordinance is contained in Appendix D).

Private use and public-use heliports/helistops may be allowed if found to be compatible with nearby existing and master planned land uses. Compatibility must include such factors as safety, noise and the impact of proposed flight paths on nearby existing and master planned land uses. The standards and requirements of this Section are intended to prevent adverse effects on existing and master planned residential use or other noise sensitive land uses that could result from heliport/helistop operations.

Recommendations

1. In regard to helistops and heliports, one statement of legislative intent would be to state explicitly that it is a jurisdiction's desire to implement the recommendations of the System Plan.

2. The ordinance also may contain language articulating the jurisdiction's policy on helicopter landing facilities, their potential locations, and the steps the jurisdiction has undertaken to mitigate these impacts.

3. More specific provisions may be drafted that relate to the need for such facilities in the community. For example: "Industrial, commercial and business settings in urban locations are demand generators for helicopter services. The existing system of private use corporate and business heliports and helistops in the region has been concentrated in areas of corporate and business activity. Therefore, such facilities should be located within industrial parks and urban mixed use centers and serve the uses located within these areas."

4. A statement of legislation intent can be drafted that addresses the jurisdiction's desire to make helicopter landing facilities compatible with nearby residential areas, as in Montgomery County.

9.2.4.2 Conditions of Approval

Because most helistops and heliports in the study area are permitted by special exception, which requires a petitioner to demonstrate that a proposed facility meets certain conditions, most local zoning regulations related to helicopter landing facilities contain conditions of one sort or another. These conditions include provisions related to the frequency of use, the existence and intensity of support facilities, buffering and setbacks, time limits, noise provisions, as well as design standards specifying certain physical aspects of the support facilities.

The design standards may reside in the zoning regulations, in an adopted design manual or, in the case of Baltimore County, in a policy manual adopted by the Director of the Department of Permits and Development Management. In such cases, a petitioner must refer to both the zoning regulations and the appropriate manual when proposing a helicopter-related use. Local development review officials have said that all of these approaches have been effective at regulating helicopter landing facilities.

<u>Frequency of Use</u>

Charles County is one jurisdiction that differentiates between helicopter landing facilities by frequency of use. Helicopter-landing facilities that are used at least five days a week or at least 20 days in any 12-month period are considered helistops, which may have minor support facilities such as a sheltered waiting or loading areas and an administrative office. Helicopter landing areas with larger support facilities -- such as fueling or maintenance shops, or parking and cargo areas -- are considered heliports and are permitted in fewer zoning districts than helistops.

Although frequency of use provisions can be inserted into the zoning regulation, in the case of helicopter landing facilities, they can lead to confusion and/or unintended consequences and the need to monitor the use over time.

In Charles County, it is not clear how the regulations address helicopter landing facilities that are used less than five days a week or 20 days a year. A similar problem exists in Baltimore County.

Baltimore County makes a more explicit connection between frequency of use and the definition of helistops and heliports. In that jurisdiction, any helicopter landing facility that is used at least 15 times per month is considered a heliport if it is located within 500 feet of a property line. By defining such facilities as heliports, the county restricts the potential location of these facilities more tightly than they would if they were considered helistops and thus are holding facilities that are close to adjacent properties to a higher standard.

In this case, if the concern is the potential impact of the facility on adjacent uses, the intent of the regulation would be better met through buffering or setback regulations. Moreover, it should be noted that the System Plan identifies potential activity levels at public-use helistops at between 100 and 250 operations per year; public-use heliports at 3,500 to 13,500 operations per year; and medical-related heliports at 150 to 2,000 per year (depending on the size of the medical facility). Therefore, if these figures hold, provisions such as Baltimore County's would likely classify all but the most lightly used facilities as heliports, therefore holding them to a higher standard and potentially restricting the use. Again, the more effective approach is to mitigate impacts through site standards related to the specific issue of concern.

Recommendations

1. Frequency of use provisions should be avoided within definitions to avoid unintended restrictions on the location of facilities that also may result in enforcement issues.
2. Jurisdictions should use the System Plan's estimated activity levels as benchmarks and not draw a distinction between helistops and non-medical use heliports at less than 250 to 500 operations per year. This will likely classify all helicopter landing facilities as heliports. If more restrictive conditions of use are needed in a particular development context or zoning district, conditions of use should be defined precisely and not trigger unintended consequences because they are written too broadly.

Support Facilities

Helistops by definition have minimal support facilities, while heliports may have passenger terminals, maintenance sheds, cargo facilities, aircraft parking and storage terminals, and other related facilities. A number of jurisdictions also require that helicopter landing facilities have lighting and fencing.

Fairfax, Loudoun, Prince George's counties and other jurisdictions, in fact, share common ordinance language requiring that helistops contain "no operation(al) facilities other than one (1) tie down space and such additional facilities as are required by law, ordinance or regulation." This reference to other facilities relates to operational standards set by the Federal Aviation Administration and state governments and is common in local ordinances related to helicopter facilities.

Recommendation

1. To the degree that the System Plan seeks to establish a network of heliports with a similar set of support facilities throughout the study area, it is recommended that local jurisdictions amend the definition of heliports as noted below to require that certain support facilities be available, as stated in the System Plan.

Buffering and Setbacks

Several ordinances (including Cecil County) contain language stating that the storage and repair of helicopters must take place no closer than 50 feet from a property line and 200 feet from any dwelling or adjacent institutional use. Many jurisdictions also require that helicopter facilities be surrounded by a "sturdy and well-constructed fence" or dense planting at least six feet high, with a gate controlling access to the area.

Recommendation

1. Provisions for buffering and setbacks pertaining to takeoff and landing areas and support facilities are useful to mitigate noise and visual impacts. Almost every zoning ordinance contains setback provisions of some kind. Setback and buffering standards can be set at a jurisdiction's discretion, based on requirements for uses already in place.

Time Limits

Allowing a use by special exception does not trigger a future review of the use unless such a condition is written into the zoning ordinance. Given the potential impact of a helicopter landing facility on adjacent areas, reviewing how the use affects adjacent uses is prudent.

Montgomery County is one jurisdiction that has imposed time limits upon the approval of helistops and heliports. Under the county's ordinance:

Permission to use a site for a private use helistop/heliport may be granted by the Board for a 5-year period or such shorter period as the Board may specify in granting the special exception. The special exception may be renewed by the Board for additional periods, not to exceed 5 years each, upon the same findings required for the initial approval by the Board.

Recommendation

1. Adding a provision requiring a future review of helicopter landing facilities after five years will allow a jurisdiction to review impacts after the use has been established and to review how these impacts are affecting adjacent uses. This provision can be added to the conditions of use if the facilities are allowed by special exception.

Noise

A few jurisdictions in the study area classify helistops and heliports with other aircraft landing facilities including airports. These include Allegany, Caroline, Harford and Queen Anne's counties. Therefore, the noise regulations these jurisdictions have enacted regarding aircraft landing facilities apply to helistops and heliports as well.

In most other cases, existing noise regulations pertain to helicopter landing facilities. A few jurisdictions in the region have enacted noise provisions specific to helicopter landing facilities. Montgomery County has the most vigorous standards and process, requiring a noise analysis be completed based on models created for use by the Federal Aviation Administration.

This approach defines two noise impact areas: at noise-sensitive locations around the facility (the primary impact area) and along and under principal access routes (the secondary impact area). The primary impact area includes the helicopter landing facility and the area within a 4,000-foot radius of the landing and takeoff area. The secondary impact area includes all areas in the county along and under the principal access routes to the facility, excluding the primary impact area.

One of the future goals for the Metropolitan Washington Region identified in the System Plan is to "manage the system better to help reduce community noise impacts." One aspect of this goal is to determine the extent of the noise issue related to helicopter overflights. To the extent that this effort identifies and/or refines noise guidelines related to helicopter use, these standards and/or guidelines can be adopted by local jurisdictions and written into zoning ordinances to regulate the noise levels associated with these facilities and to apply these standards as much as is feasible across the region.

Recommendation

1. A jurisdiction may establish primary and secondary noise impact areas as per Montgomery County if it requires a noise study be completed as a condition of use. The need for such reviews is more acute as these facilities become more common in developed areas and the potential for noise impacts on residential and other developed areas increases.

2. Additional noise standards and/or guidelines generated during future studies, either for a specific helistop or heliport site or for an update to the System Plan, should be shared with local jurisdictions so they may review, apply and adopt them as necessary within their zoning regulations. At the very least, these standards and/or guidelines can inform local jurisdictions as they review their ordinances in light of the System Plan during the implementation of a heliport network throughout the region.

9.2.4.3 Definitions

As noted above, several jurisdictions make a distinction between helistops and heliports. The System Plan itself also differentiates heliports based on whether they serve public or private uses. Some jurisdictions in the region mirror this approach, while others classify heliports based on size or frequency of use.
The System Plan identifies three types of helicopter landing facilities:

Helistops (Public-Use): A helistop is a heliport without auxiliary facilities such as parking, waiting areas, fueling and maintenance equipment.

Heliports (Private Use): An area, either at ground level or elevated on a structure, licensed by the federal government or an appropriate state agency and approved for the loading, landing and

takeoff of helicopters and including auxiliary facilities such as parking, waiting areas, fueling and maintenance equipment.

Heliports (Public-Use): A heliport available for use by the public without prior approval of owner or operator. A heliport may be privately or publicly owned and operated and accommodates helicopters used by individuals, corporations, air taxi services and EMS operators. Larger and busier heliport facilities may have multiple landing areas, parking for several helicopters and a small terminal building. The facility should have lights for night operations and an instrument approach for poor weather conditions.

Montgomery County has the most rigorous definitions of helistops and heliports.
Helicopter: See "rotorcraft."

Heliport: A designated area, either at ground level or elevated on a structure, that is used on a regular basis for the landing and takeoff of rotorcraft. A heliport may include major rotorcraft support facilities such as refueling services, maintenance and cargo loading areas, rotorcraft tie-downs and hangars, administration offices, and other appropriate terminal facilities. Heliports shall be designated as either public or private use facilities regardless of ownership:

a. Public-use facility: Open for use to any rotorcraft capable of using the facility regardless of ownership or control of the facility; provided, however, that publicly owned or publicly operated facilities shall demonstrate upon mandatory referral that the standards applicable to privately owned facilities have been met.
b. Private use facility: Owned or controlled by the owner or occupant of the property for the exclusive use of the owner/occupant, his guests or patrons. Commuter and/or commercial operations are specifically excluded from a private use facility.

Helistop: A designated area, either at ground level or elevated on a structure, used for the landing and takeoff of helicopters or other rotorcraft. No major rotorcraft support facilities are allowed such as those permitted in a heliport. Minor support facilities such as a small sheltered waiting or loading area, a small administrative office, and one permanent tie-down space are allowed. A small fuel tank for a ground level facility is allowed, if necessary. Helistops may be public or private use facilities in accordance with paragraphs (a) and (b) of the heliport definition.

Helistop, temporary: An area, either at ground level or elevated on a structure, whether public or private, that may be used for the landing and taking off of rotorcraft on an occasional or temporary basis, but without rotorcraft support facilities. A temporary helistop is intended to be used only in

visual flight rules (VFR) weather conditions for a period of less than 30 consecutive days within a one-year period and not to exceed 10 operations per week during the period.
Recommendation:

Helistops and heliports should be defined by their function and specify which types of support facilities are permitted. The facilities identified in the System Plan provide a list of appropriate uses at heliports.

9.2.4.4 Sample Land Use Regulatory Process

Montgomery County's zoning regulations provide an example of a vigorous regulatory process specifically designed to address helicopter landing facilities and related land use issues. While this process may be too detailed for many jurisdictions, it illustrates how a community can approach helistops and heliports from a zoning perspective and includes many examples of best practice, including a specific purpose clause.

Montgomery County, MD Zoning Code
Sec. 59-G-2.27. Heliport and helistop.

(a) *Purpose*. Private use and public-use heliports/helistops may be allowed if found to be compatible with nearby existing and master planned land uses. Compatibility must include such factors as safety, noise and the impact of proposed flight paths on nearby existing and master planned land uses. The standards and requirements of this Section are intended to prevent adverse effects on existing and master planned residential use or other noise sensitive land uses that could result from heliport/helistop operations. Rotorcraft facilities shall be classified as either a public-use or private use facility, and also classified as being either a heliport or helistop. It is further the intent of these regulations to encourage a small number of public-use rotorcraft facilities to serve major employment centers, rather than encourage a proliferation of private use facilities throughout the county.

(b) *Application.* All applications for heliport/helistop special exceptions must contain the following information:

(1) An aerial photograph showing the primary impact area, as defined in subsection (e), at a scale no less than one inch equals 400 feet showing the location of the proposed heliport/helistop; the approach and departure routes and altitudes within the primary impact area; the location of all residences, schools, churches, hospitals, and other areas

used for the open assembly of people, and other noise sensitive uses that exist, have been approved for development, or are master planned within the primary impact area.

(2) A map showing the intended flight paths and altitudes within the secondary impact area, as defined in subsection (e). This map must indicate the proposed routes and altitude restrictions, if any, found to be acceptable by the Federal Aviation Administration.

(3) Information concerning the type of rotorcraft facility proposed (heliport/helistop); the nature of the use (public-use/private use); type, weight and noise characteristics of rotorcraft that would use the facility; the proposed number of operations and approximate time of day that landings and departures would occur for each type of rotorcraft; and finally, the facility's proposed operating hours.

(4) A plan must be submitted for the Board's approval that contains the same information as required for the contents of a site plan that are enumerated in Section 59-D-3.2. In addition, the plan must comply with all the heliport design guideline recommendations in the Federal Aviation Administration's Heliport Design Guide, Advisory Circular No. 150/5390-2B and as subsequently amended. These guidelines are the minimum standards for the design and approval of a heliport/helistop plan. Exemptions to specific standards contained in the heliport design guide may be approved by the Board of Appeals, but only after receiving a recommendation for approval of the requested exemption from the Federal Aviation Administration.

(5) A detailed noise analysis showing how operations at the proposed heliport/helistop are designed both to minimize noise exposure and to comply with the noise compatibility criteria contained in subsection (e).

(6) For elevated facilities, an architectural drawing must be submitted which has been certified by a structural engineer licensed by the State of Maryland as demonstration that the structure will support the static and dynamic loads of rotorcraft proposed to use the facility, and that the fire safety regulations, as established in NFPA Publication #418, current edition, or any other regulations in effect at the time of application, have been satisfied.

(7) A copy of the “Notice of Landing Area Proposal,” a copy of the Federal Aviation Administration's response to the Notice of Landing Area Proposal, and a copy of the Air Space Determination from the Federal Aviation Administration must be submitted.

(8) In addition to the above requirements, the Board may require any additional information and analyses that may be relevant as the evidence of record and the public interest shall require.

(c) *Special requirements for public-use heliport/helistop.* In addition to the information required in subsection (b), the following information is required for any public-use heliport/helistop:

(1) A statement demonstrating the public need for the public-use facility, in accordance with the requirements of Section 59-G-1.25, title "County Need."

(2) Information concerning the anticipated origin and destination of rotorcraft that would use the facility. The information should indicate any major employment centers to be served by the facility as well as a proposed schedule for commuter or other commercial operations.

(d) *Special requirements for private use heliport/helistop.* In addition to the information required in subsection (b), an application for a private use heliport/helistop must provide information that demonstrates that the proposed rotorcraft facility will not have an adverse effect on the surrounding community which might preclude the approval of a planned public heliport/helistop because of an unacceptable increase in the ambient noise levels, as defined in subsection (e).

(e) *Noise standards*.

(1) Impact areas. All applications for heliports/helistops must provide noise analysis sufficient to make a finding of noise compatibility at noise-sensitive locations around the facility (hereafter called the primary impact area) and along and under the principal access routes (the secondary impact area). The primary impact area includes the rotorcraft facility and the area within 4,000-foot radius from the helipad. The secondary impact area includes all areas in the county along and under the principal access routes to the rotorcraft facility excluding the primary impact area.

(2) Noise analysis. The heliport/helistop noise analysis must include a description of detailed operational procedures to minimize noise levels affecting sensitive land uses in both the primary and secondary impact areas ("fly neighborly" procedures). Based on use of these procedures and worst-day noise scenario with peak usage of the facility, projected rotorcraft noise levels (in terms of day-night average sound level or DNL) must be developed using models approved for use by the Federal Aviation Administration (see FAA Advisory Circular 150/5020-2). This worst-day operational scenario becomes the

maximum allowable limit for the type, weight and noise characteristics of the rotorcraft proposed to use the facility; proposed number of operations; and approximate time of day that landings and departures could occur. Public-use facilities are allowed 10 days per calendar year with operations in excess of their maximum approved level, not to exceed a 20 percent increase in the number of approved operations, so long as the extra operations do not occur during the nighttime hours (10:00 p.m. to 7:00 a.m.) or other designated noise sensitive hours.

(3) Noise standards. Rotorcraft operations are considered noise compatible if ambient DNL noise levels at noise sensitive areas with rotorcraft operations (post-rotorcraft ambient noise levels) exceed pre-rotorcraft ambient DNL levels by one decibel or less. If rotorcraft operations already exist in the vicinity, the cumulative impact of all operations must be calculated to determine compliance. In accordance with the purpose clause, public-use facilities must be given preference over private use facilities in the allocation of noise capacity for rotorcraft operations.

In lieu of monitoring ambient conditions, the following noise-compatible land use planning goals for various land use types and densities must be used, as generally shown in the following table:

Maximum Compatible Sound Levels

Land Use/Approximate Density Residential	Day/Night Average Sound Level (DNL) in A-Weighted Decibels
Rural (less than or equal to 1 unit per acre)	55 dBA
Suburban (2 units to 15 units per acre)	60 dBA
Urban (multi-family and high rise)	65 dBA

Based on this table and the compatibility standard of allowing only a one-decibel increase in the ambient levels, the following table designates maximum rotorcraft sound levels:

Maximum Rotorcraft Sound Levels

Land Use/Approximate Density Residential	Day/Night Average Sound Level (DNL) in A-Weighted Decibels
Rural (less than or equal to 1 unit per acre)	49 dBA
Suburban (2 units to 15 units per acre)	54 dBA
Urban (multi-family and high rise)	59 dBA

In cases where ambient noise levels significantly differ from those in the Maximum Compatible Sound Levels Table, measurements or modeling may be performed for the purposes of establishing compatibility standards appropriate to the ambient environment. Office, commercial and industrial land uses are generally considered to be noise-compatible land uses and will not be reviewed for noise impacts with the following two exceptions: (1) situations where it appears likely that workers will be subjected to noise levels in excess of LEQ = 75 dBA for an 8-hour period; (2) in CBD or Transit Station areas, where amenity spaces are provided, if it appears that noise impacts may be of such magnitude as to significantly reduce the usefulness or inhibit the proper function of these spaces for their intended purpose(s). In addition to the cumulative noise standards, the Board of Appeals may designate additional conditions for use in the public interest which may include, but not be limited to, restricting the number of rotorcraft operations, restricting the hours of operation of the facility, restricting operations of high noise generating rotorcraft during noise-sensitive hours, or any combinations thereof.

(4) Noise standards for on-ground facilities. All on-ground operations, with the exception of operations on the helipad, are subject to the standards of the Montgomery County Noise Control Ordinance, Chapter 31B, "Noise Control," Montgomery County Code, as amended. In particular, heliport maintenance operations must be subject to these standards.

(f) Action by the Board. A helistop/heliport may be approved by the Board upon a finding that:

(1) The helistop/heliport complies with the provisions of Division 59-G-1.

(2) The helistop/heliport complies with the noise standards contained in subsection (e) of this Section.

(3) The flight path(s) or routes proposed will minimize noise exposure to existing and master planned residential communities or other noise-sensitive activities.

(4) A private use helistop/heliport will not be contrary to the public interest as specified in the purpose section for helistop/heliport special exception.

(g) Time limits. Permission to use a site for a private use helistop/heliport may be granted by the Board for a 5-year period or such shorter period as the Board may specify in granting the

special exception. The special exception may be renewed by the Board for additional periods, not to exceed 5 years each, upon the same findings required for the initial approval by the Board.

(h) Monitoring operations. Operators of approved heliports/helistops must maintain an accurate log of all rotorcraft operations, specifying each operation that occurs including the type of rotorcraft and the date and time of the operation. This log must be available for inspection by the Department as part of any inspection of operations for special exceptions under Section 59-G-1.3. Failure to maintain the log or failure to make the log available to the Department as part of an inspection is a violation of the special exception approval.

9.3 Informal Program Recommendations

Both MAA and COG have informal programs that support aviation activity and address community concerns related to aviation activity within their respective jurisdictions. This Section briefly discusses existing aviation programs under each agency and options to enhance these programs to incorporate helicopter operators and heliport facilities.

9.3.1 Existing MAA and COG Programs

As noted earlier, MAA and COG have very different functions relating to aviation. MAA's focus is in regulatory control and enforcement of aviation facilities in Maryland, whereas COG focuses on non-regulatory participation to address aviation activity and concerns.

MAA has a number of programs to address noise around BWI and MTN airports. In particular, Neighborhood Committees have been established to address various operational and development concerns with communities surrounding these two airports. In addition to these committees, MAA has also developed a BWI Community Ambassadors Program, which has been effective in developing an outreach program to communities surrounding BWI. MAA personnel attend different schedule meetings within the surrounding communities and act as liaisons to provide information and to communicate issues and concerns back to MAA.

COG provides planning coordination for the communities within their jurisdiction at a number of different levels. They have been very effective in coordinating various committees with the Metropolitan Washington Airports Authority (MWAA) in addressing operations at Reagan Washington National Airport and Dulles International Airport. One such example is the Committee On Noise Abatement and Aviation at National and Dulles Airports (CONAANDA). This committee addresses noise and other aviation related issues at these two airports and the surrounding

communities. This committee has been very effective in educating community groups as well as addressing community concerns relating to aviation activity.

9.3.2 Recommended Programs to Support Helicopter Activity and System Development

The MAA and COG have various programs that address aviation activity at airports within their respective jurisdictions. Similar programs could also be developed to address helicopter activity and to assist in the implementation of the recommended system of helistops and heliports within the region.

1. Promotion of Helicopter Activity and Heliport Development

Existing MAA programs address the development and improvement of airports to support aviation activity within the State. Airports are well known for their transportation benefits and their ability to supplement transportation infrastructure within a municipality or within a region. Heliports and helicopters, on the other hand, are not as well regarded and are not seen in the same category as airports and fixed-wing aircraft. However, this study has shown the significant transportation and social benefits of helicopters within the study area, and how a system of helistops and centrally located heliports could enhance these benefits within the region. The problem continues to be, however, a general lack of understanding of the value of helicopters and a misconception that they are all loud and noisy.

An education program is needed to promote the benefits of helicopters and heliports. This could be done through existing outreach programs administered by the MAA and COG. In particular, emphasis should be placed on enhancing intermodalism to support regional transportation needs. Helistop facilities could be located at existing or planned ground transportation facilities, which offer a unique transportation option to helicopter passengers and operators. An additional benefit of collocating heliports with other ground transportation facilities is a reduction in helicopter impacts by focusing helicopter operations within existing transportation corridors and at transportation facilities.

Another program need is to better understand current helicopter activity within the region. Today, there is very little actual data on historical and existing helicopter activity. As a result, helicopter activity is not fully understood. There must be a program put in place to generate activity statistics for use in understanding current and future helicopter use within the region. This system would also help to identify where and at what frequency helicopters are operating within the region. Without this information, a true picture of helicopter activity will not be known. Such a program

could be a collaborative effort between COG, MAA, MWAA and the FAA. The program should collect and maintain statistics on helicopter activity from control towers at the major airports and through the Potomac Terminal Area Control facility, which monitors aviation activity in the region.

2. Funding Heliports and Supporting the Recommended System

An important issue to the successful implementation of the system recommendations is the funding for new facilities, should proponents for new facilities come forward. The MAA can fund improvements at existing public-use facilities. Therefore, other private or public entities will have to establish the system of public use helistops and heliports. Once established, the MAA could participate in future capital development programs.

Obtaining funding for a new facility is difficult through private sources without financial support from the MAA or other public source. One way to approach public funding is to promote helistops and heliports through economic development initiatives. Heliports, by their size and operating needs, can be incorporated into economic development initiatives to revitalize, grow, or create economic development within communities. Thus, funding of the facilities can be made part of the overall economic development initiatives. Both MAA and COG could do this through collaborative efforts with state and local economic development agencies and local and regional planning.

Another funding option would be to encourage the use of existing privately owned heliports for public use. Opening these facilities for public use would make the private owner eligible for MAA and VDOT funding. However, the MAA and VDOT can only provide funding for privately owned public-use facilities that are already established. That is, either a private developer or a local agency would have to obtain both ownership and the permits before State funds could be used to improve the facility. COG should collaborate with the MAA and VDOT to promote funding at privately owned public-use facilities. However, the merits of each site for which such conversion may be pursued should be carefully evaluated as there may be operational restrictions imposed on a private use facility through development conditions, and a particular facility may not be optimally sited to adequately address noise impact s on nearby developments.

Some communities or government agencies may be eligible for FAA funding to construct a new public-use heliport, or to purchase an existing privately owned heliport. This would require an eligible public sponsor to receive the FAA funds.

3. Addressing Helicopter Activity

Both MAA and COG have programs to address aviation activity at the large airports. Liaison and community committees are an effective way to provide two-way communications to discuss aviation needs and needs of the community. Although helicopter activity is well established in the region, there is little communications with helicopter operators. Discussions with various operators revealed that regional helicopter organizations were effective in providing communications with the community. However, over the years, these groups have decreased in size and their effectiveness has been reduced. As such, it is recommended that one or more working groups be created to address helicopter activity within the region.

9.4 Review of Heliport Applications

Local planning boards and other authorities within Maryland and the Metropolitan Washington Region may be required to review an application for a proposed helistop/heliport at some time in the future, particularly if the System Recommendations are to be implemented. With this in mind, two "tools" were developed to aid in this review. These tools will aid the local authority reviewing the application, as well as the prospective developer submitting the application. The tools include a Land Use Compatibility Consideration Guide and a Facility Review Checklist.

9.4.1 Land Use Compatibility Consideration Guide

Land use compatibility planning for heliports presents more of a challenge for a heliport compared to an airport because of the unique operational characteristics of helicopters. Helicopters generally use steep approach and departure profiles and can approach or depart a facility in a number of different directions. Helicopters are effectively operating in an en route manner once beyond a short distance from the heliport (FAR Part 77 airspace surfaces extend just 4,000 feet from the heliport versus up to 50,000 from an airport). Within the immediate vicinity of a heliport, helicopter noise impacts can be relatively intensive on a single-event scale. However, except for the few heliports that experience a high volume of operations, cumulative noise impact contours are generally very small. In addition, the limited accident data available for helicopters suggests that significant safety concerns are generally confined to within a few hundred feet of the landing pad. Perhaps most important with respect to safety is the necessity of keeping the airspace near the heliport clear of obstructions. Given this combination of factors, some consideration of compatible land use is appropriate within the immediate vicinity of a heliport.

In order to initiate a general discussion of compatible land use at the outset of the siting or review process for a new helistop/heliport, a Land Use Compatibility Guide was developed as part this

study. This guide is intended for informal review purposes only. A more formal land use compatibility review should be conducted once detailed plans are developed for a specific facility. Land use compatibility issues were grouped into three general categories: noise considerations, safety considerations, and airspace considerations for the purpose of this study. Each of these categories is discussed below. Land Use Compatibility Templates were prepared for each of the three heliport activity levels discussed in Section 6.2.3.1. These Templates are shown as Figure 9-1, Figure 9-2 and Figure 9-3.

9.4.1.1 Noise Consideration Area

There will inevitably be some level of noise impacts associated with a helistop/heliport. The general questions are how great will the impact be, and how far from the facility might the impact extend? Naturally, the answers to these questions will depend on the location of the facility, the level of activity, the types of helicopters using the facility, the approach and departure paths, and the proximity of noise sensitive land uses.

A Noise Consideration Area was developed for the three heliport activity levels developed for this study (i.e. low, moderate, and high use). The Noise Consideration Area was defined by using the 65 DNL noise contours developed for each of the heliport activity levels (see Table 8.1). The FAA generally considers the 65 DNL or higher contour as areas of significant noise impact. However, some communities and organizations use or recommend different noise standards to define a significant noise impact. The 65 DNL is used as a reference to define the noise consideration area and should be used accordingly.

The 65 DNL noise contour for the low-use facility extends about 354' at the furthest point along the approach path from the center of the Final Approach and Takeoff Area (FATO). Because helicopters could potentially approach or depart a facility from a number of directions, a 354' radius from the center of the FATO was used to define the Noise Consideration Area. Likewise, the 65 DNL contour for the moderate-use facility extends about 1,315' from the center of the FATO and the 65 DNL contour for the high-use facility extends about 2,150' from the center of the FATO. The Noise Consideration Area for the moderate and high-use facilities was defined using a 1,315' and 2,150' radius respectively.

Figure 9-1 Low-Use Heliport Land Use Compatibility Template

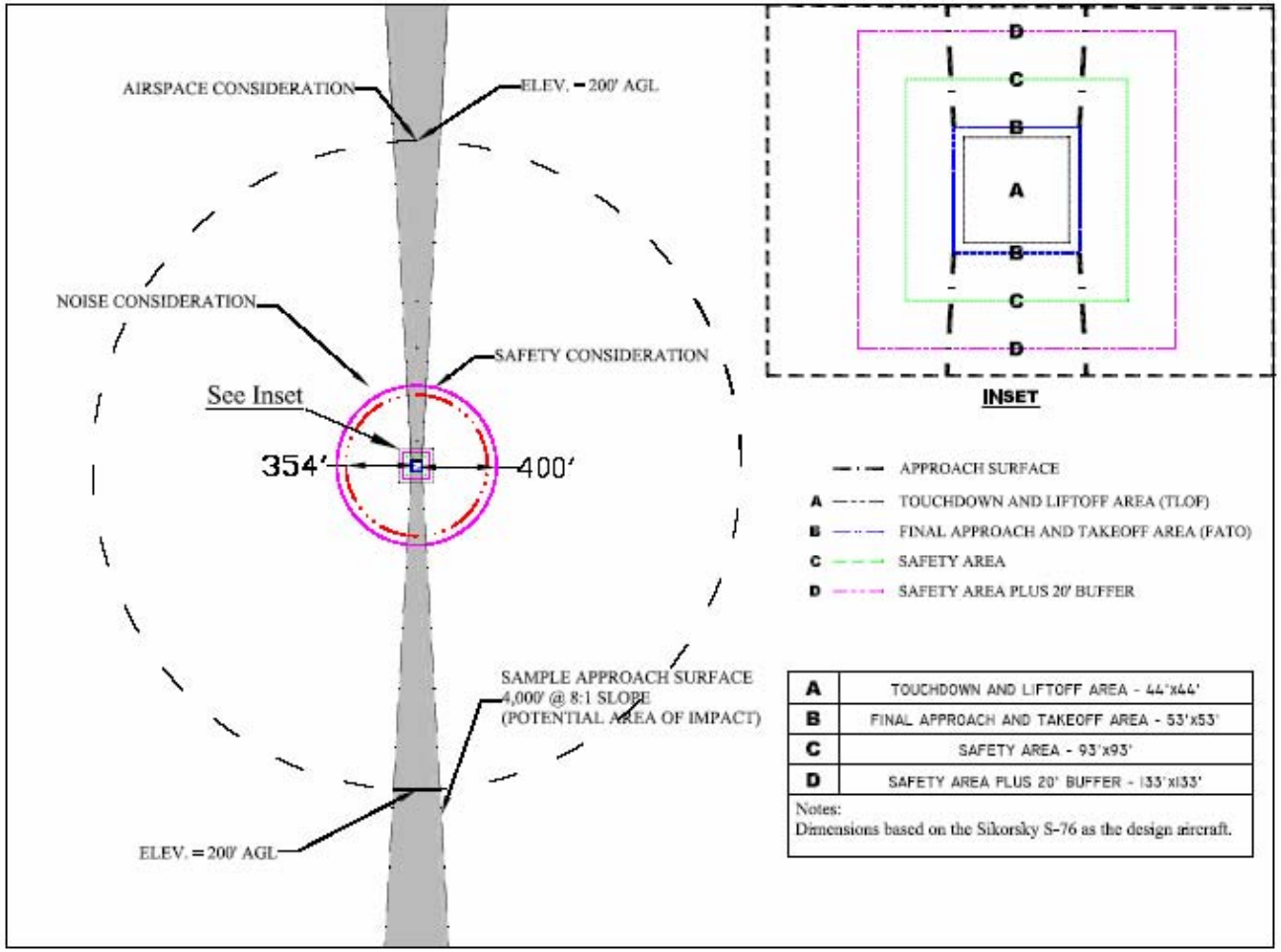


Figure 9-2 Moderate-Use Heliport Land Use Compatibility Template

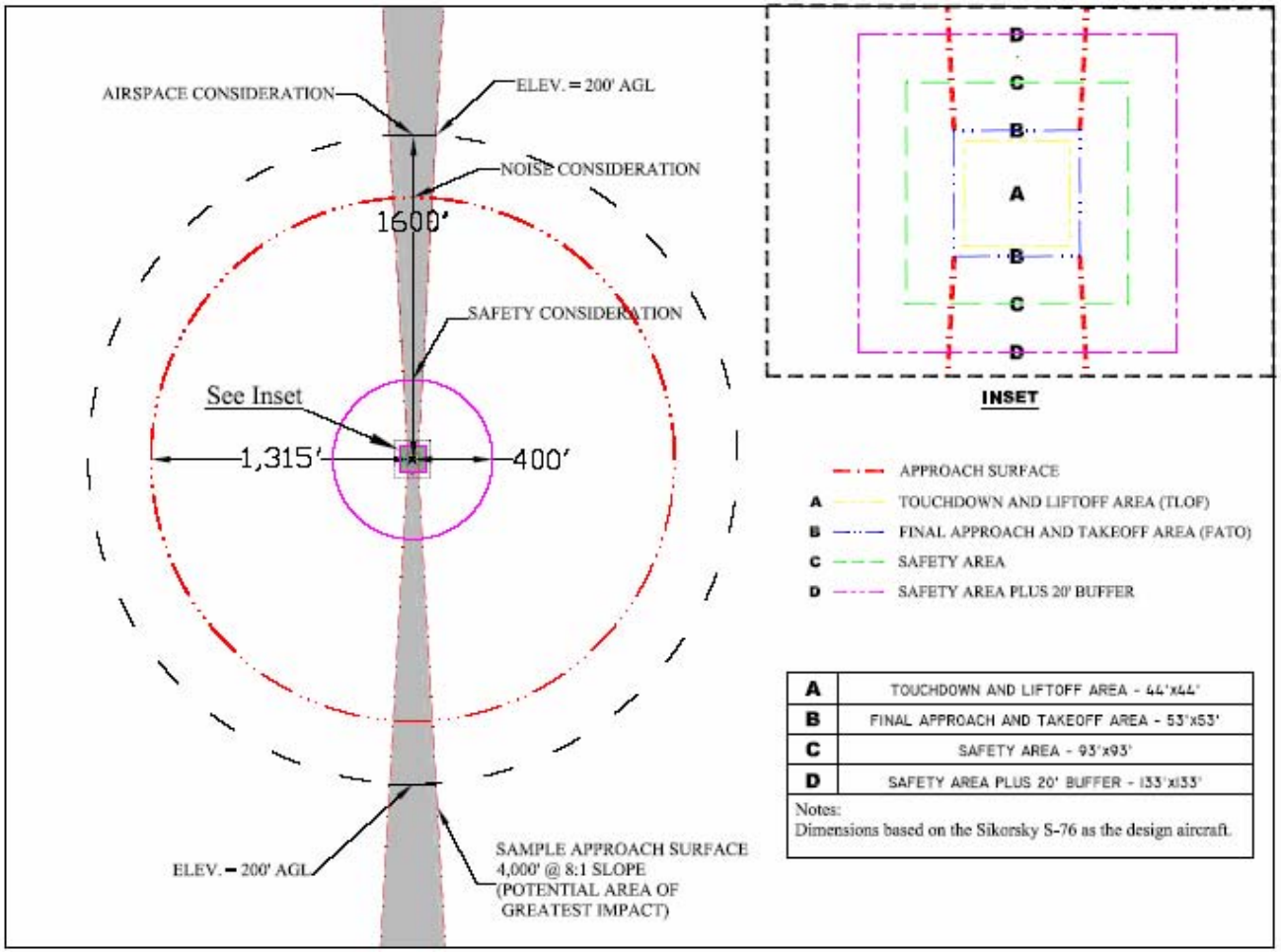
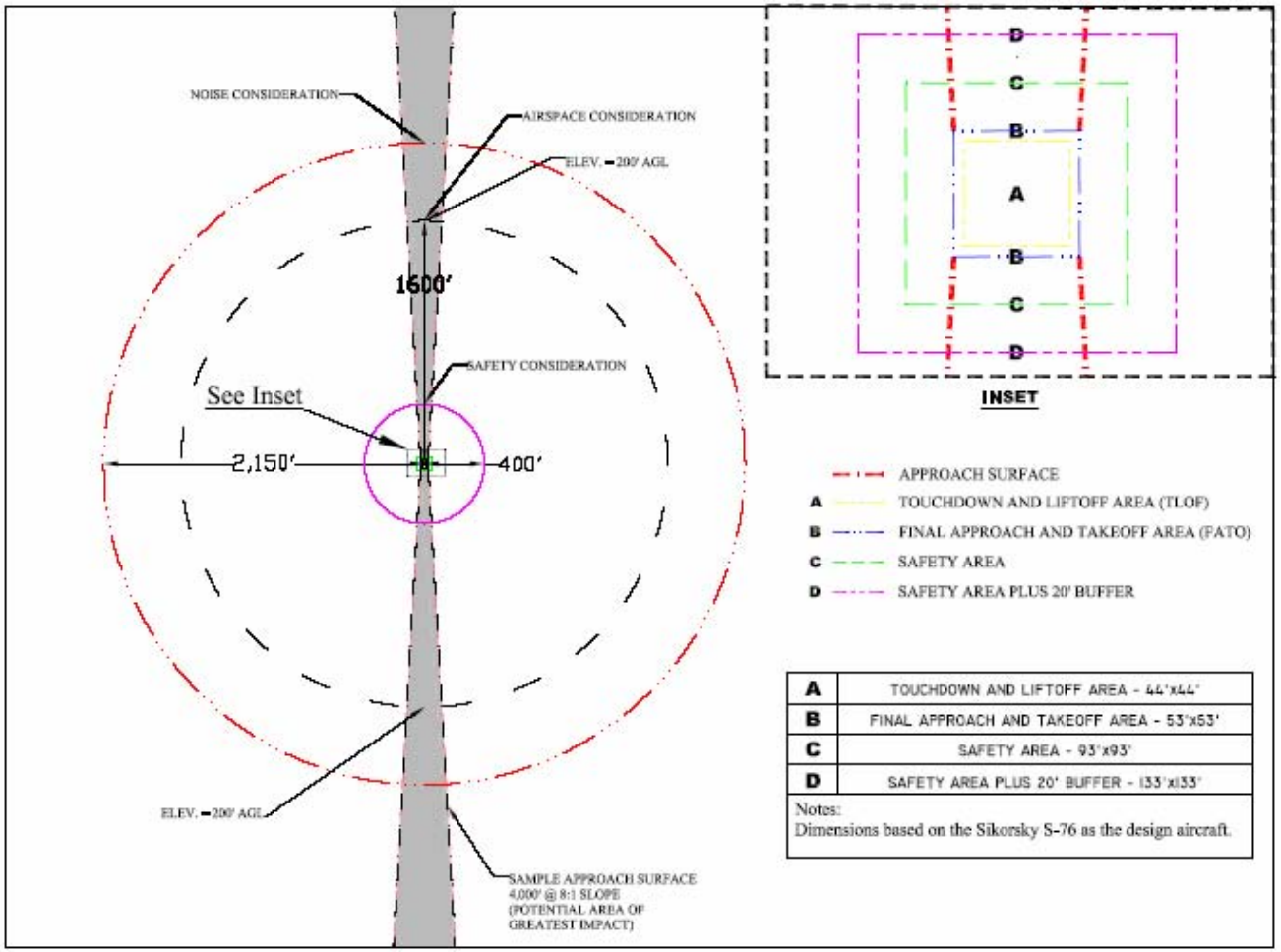


Figure 9-3 High-Use Heliport Land Use Compatibility Template



Using the Noise Consideration Area for either a low, moderate, or high use helistop/heliport facility, noise sensitive land uses such as schools, churches, residential areas, or other noise sensitive areas should be identified within the area of potential noise impact. If noise sensitive land uses are identified with the Noise Consideration Area, then specific approach and departure paths should be identified to avoid these areas, and a more detailed noise analysis conducted. It is likely that noise sensitive areas will not be found within the Noise Consideration Area for most low-use facilities, as the potential impact area extends only 460' from the facility. However, as the use of the facility increases (e.g. the moderate and high-use facilities), the more likely it is that there will be noise sensitive land uses within the Noise Consideration Area.

The Noise Consideration Area should be used only to help identify areas of potential impact when siting a new facility or reviewing the initial proposal for a new facility. The Noise Consideration Area should not be used to determine if there will or will not be a significant noise impact associated with a particular helistop/heliport facility. The actual noise impact will depend on several variables specific to a particular helistop/heliport.

9.4.1.2 Safety Consideration Area

The FAA Heliport Design Advisory Circular (AC 150/5390-2B) provides some land use suggestions, but only in terms of planning the Final Approach and Takeoff Area (FATO) and requirements for obstruction-free approach/departure paths. In regards to managing obstructions with the approach and departure paths, the FAA established a Protection Zone that extends out 400 feet from the edge of the FATO. These zones are equivalent to runway protection zones at airports and should be clear of incompatible objects and any land uses involving a congregation of people. Establishment of Protection Zones should be a desirable safety-compatibility objective for all heliports. However, there are a few practical limitations to doing so at heliports. For example, even when approach/departure routes are formally defined and approved, the highly maneuverable capabilities of helicopters means that their actual routes may differ. Furthermore, many helistops/heliports are located on small parcels of land, and therefore the Protection Zones are likely to extend onto adjacent property.

In order to facilitate a general discussion of safety and land use compatibility in the immediate vicinity of the helistop/heliport, a Safety Consideration Area was developed as part of the Land Use Compatibility Consideration Guide. The Safety Consideration Area was defined using the FAA dimension for a Protection Zone.

> *"The Protection Zone is the area under the approach and departure surface starting at the FATO perimeter and extending out for a distance of 400 feet. The*

heliport proponent should own or control the property containing the Protection Zone. This control should include the ability to clear incompatible objects and to preclude the congregation of people." FAA AC 150/5390-2B.

The Safety Consideration Area consists of an area within a 400' radius from the FATO. When siting or reviewing a proposed helistop/heliport, incompatible objects and any land uses involving a congregation of people should be identified within the Safety Consideration Area. If such land uses are found within the Safety Consideration Area, a more detailed analysis should be conducted to determine if the land use presents a safety hazard to either aircraft, or people and property on the ground. If it does, the approach and departure paths should be studied to determine if it is feasible to avoid that particular hazard – keeping in mind that the actual Protection Zone is actually confined to the approach and departure area not within a 400' radius of the facility.

9.4.1.3 Airspace Consideration Area

The airspace surrounding a helistop/heliport is an important consideration when siting a new facility or reviewing a proposed facility. Although it is unusual for a land use condition to cause a helicopter accident, buildings, towers, and other structures near a helistop/heliport can severely limit access to and from the facility. Furthermore, airspace issues should also be considered to protect people and property on the ground. An Airspace Consideration Area was established based on the FAA Heliport Approach/Departure Surface. This surface extends outward from the FATO at a slope of 8 to 1 along the approach and departure path for a distance of 4,000'. At this slope, the approach surface extends up to 500' above the FATO elevation. For the purpose of the initial sitting or review process, a height of 200' above the FATO elevation was considered more appropriate as the approach and departure paths often curve to adjust for obstructions, avoid sensitive land uses, or to move quickly to the en route phase of the flight. Therefore, the Airspace Consideration Area extends outward from the FATO at a radius of 1,600' at an 8 to 1 slope.

If potential obstructions or hazards are identified within the Airspace Consideration Area, the approach and departure paths should be planned accordingly. Airspace issues should be considered most relevant along the approach and departure paths.

9.4.2 Facility Review Form

A sample Facility Review Form is provided as Table 9-1. A form similar to this should be provided to a developer of a proposed helistop/heliport. The form should be submitted to the local review board as part of the initial permitting/approval process. Naturally, this form should be modified to reflect local data needs and terminology.

Table 9-1 Sample Facility Review Form

Heliport Facility Review Form *Page 1 of 4*	
1. Facility Ownership, Location and Zoning	
1a. Facility Ownership:	1b. Name and address of Owner and Operator:
Private:_____ Public: _____	
1c. Will the facility be open for public-use? Yes ____ No ____	
1d. Where will the heliport be located? Please provide a street address and longitude and latitude coordinates.	
2. Proposed Facilities	
2a. Describe the proposed heliport and attach a graphic layout of the facilities using FAA design Criteria (see FAA Advisory Circular 150/5390-2B).	
3. Level of Activity and Approaches	
3a. What is the largest helicopter expected to use the facility? 3b. Will helicopters be based at the facility? 3c. On average, how many operations are expected per week? 3d. How many annual operations are expected? 3e. What are the anticipated hours of operations? 3f. Will there be night operations at the facility?	
3g. Number, location and types of approaches (attach a graphic clearly showing the approach and departure path(s) using FAA criteria):	

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Heliport Facility Review Form

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4. Zoning Land Use Considerations

4a. What is the current zoning at the proposed location?

4b. Provide a general description of the surrounding land use within a 1,600' radius of the proposed facility location. Attach a land use map of the area.

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Heliport Facility Review Form

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4c. Noise Considerations: Are there noise sensitive land uses within the following radii of the Final Approach and Takeoff Area (FATO)?

- 460' radius for a low-use facility (less than 300 annual operations)
- 1,315' radius for a moderate-use facility (between 300 and 2,600 annual operations)
- 2,150' radius for a high-use facility (between 2,601 and 13,000 annual operations)

Residential	Yes_____	No_____
Mobile Home	Yes_____	No_____
Transient Lodgings	Yes_____	No_____
Schools	Yes_____	No_____
Hospitals, Nursing Homes	Yes_____	No_____
Churches, Auditoriums	Yes_____	No_____
Communication	Yes_____	No_____
Outdoor Music Shells	Yes_____	No_____
Zoos	Yes_____	No_____

If yes, please explain and show the approximate location. Are any of these within the proposed approach and departure path(s)?

Heliport Facility Review Form

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4d. Safety Considerations: Identify any potential incompatible objects or any land uses involving a congregation of people within a 400' radius of the FATO.

4e. Airspace Considerations: Identify buildings, towers, and other structures within a 1,600' radius of the FATO that penetrate an 8 to 1: slope starting at the center of the FATO.

10. IMPLEMENTATION PLAN

10.1 Introduction

This Chapter outlines several initiatives necessary to implement the recommendations of this Study. The initiatives include mitigating noise impacts, mitigating airspace restrictions within the Washington, DC area, collecting accurate helicopter activity data, creating land use controls to standardize the permit review process and to gain community acceptance, incorporating helicopter facilities into economic development and intermodal initiatives, and to initiate policies and programs to improve the overall regional helicopter system. Only after these steps have been undertaken should the process begin to implement the heliport facility recommendations.

10.2 Mitigating Noise Impacts

A goal of this study was to identify ways to better manage the helicopter system to help reduce noise impacts. That is, helicopter noise continues to be an issue particularly within the Metropolitan Washington Region. The majority of the noise impacts are caused by military, government, police, Medivac (EMS), and helicopters transitioning through the Washington, DC area. Better management of the system is needed to mitigate the noise impacts, particularly in terms of understanding who is flying, where they are flying, for what purpose, and if a particular flight or routine can changed to reduce a potential impact.

Options to mitigate the police, military, and government operations over densely populated areas are limited as these operations are a necessity and are fixed in location due to the location of a police or security event, or a particular government facility. The best potential to mitigate the noise impacts caused by these operations are to encourage pilots to use techniques that reduce noise exposure, such as higher altitudes, management of blade/power settings, and avoidance of noise sensitive areas when practical.

Likewise, options to mitigate the noise impacts caused by EMS operations into private-use hospital heliports are limited as these operations are a necessity and are fixed in location due to a hospital's location. However, the effect of helicopter operations on nearby noise sensitive areas could be considered in the design and layout (including altitude) of the typical approach and departure paths for the heliport, to the extent possible, for safety and operating requirements. Additionally, pilots should be encouraged to use techniques that reduce noise exposure, such as higher altitudes, management of blade/power settings, and avoidance of noise sensitive areas when practical.

Noise impacts caused by aircraft transitioning through the Washington, DC airspace at low altitude and over noise sensitive areas can be improved by routing some operations away from those routes that typically cause noise complaints (i.e., routes along the Potomac River and over the South Arlington area). It is suspected that some flights over these areas may be caused by aircraft transitioning to points north or south of the District and therefore may not need to flyover these areas to reach another destination.

Mitigating some of the noise impacts caused by aircraft transitioning through the area should be addressed through a continuous review and periodic update to the Baltimore-Washington Helicopter Route Chart. Routes and altitudes depicted on this chart should be reviewed periodically to determine if higher altitudes or modification to the routes is possible, and would be beneficial. Today, most of the altitudes assigned to helicopter routes were established because of arrival, departure, and transit routes for fixed-wing aircraft that are traveling above the helicopter routes. The altitudes are needed to ensure aircraft separation given the heavy and increasing volume of air traffic in the Washington, DC area. In reassessing the Helicopter Route Chart, higher altitudes could be identified for segments of some routes with coordination with ATC and FAA. Alternatively, pilots could request ATC clearance for higher altitudes for noise purposes when there are no conflicts with other air traffic (this would be more practical at night due to the reduced number of nighttime operations). A continuous review of helicopter operations over the low flying routes around Washington, DC, particularly along the Potomac and South Arlington areas, should be conducted and pilots must be continuously educated about noise sensitive areas and noise reduction techniques.

Mitigation of helicopter noise impact can be accomplished by establishing a Helicopter Working Group to periodically review and recommend revisions to helicopter routes, airspace issues, and noise complaints as needed. The Helicopter Working Group must include government, military, police and EMS, and private operators, as well as citizen groups. For example, a Helicopter Working Group was established in the early 1990s to review the helicopter routes and altitudes throughout the Baltimore-Washington area. A result of this group's effort were changes to some minimum altitudes along some routes and the inclusion of special notes on the chart to avoid over flying certain noise sensitive areas.

A centralized and formal process to address noise complaints is needed to improve the management of the system. Currently, there is no centralized or formal process to report and resolve helicopter noise complaints within the Baltimore-Washington Region, where the vast majority of noise complaints are generated. A noise complaint process that allows citizens the opportunity to voice their concerns and to receive feedback on potential resolutions would be very beneficial. It will be vital for this process to be coordinated with the Helicopter Working Group.

10.3 Mitigating Airspace Impacts

A goal of this study was to ensure that current airspace structure, limitations, and restrictions meet users needs and future demands. Several recommendations were identified in this study to improve airspace at existing and potential helistop and heliport facilities. However, from the standpoint of helicopter activity, not to mention the development of helistops or heliports within Maryland and Metropolitan Washington, the current airspace restrictions over our Nation's Capitol are a significant roadblock to activity or development. Based on discussions with federal agencies, the likelihood of eliminating the airspace restrictions around Washington, DC are not promising in the near future. Although police, military and public service operators will continue to operate within the airspace, commercial and corporate operators will be excluded.

If the airspace restrictions around Washington, DC were revised to allow for general aviation or commercial helicopter operations, overall helicopter activity would increase. For example, prior to the current airspace restrictions, the South Capitol Street Heliport experienced about 3,000 operations per year and was used by a variety of corporate, business, and police/EMS operators. Thus, previous activity levels indicate that there is a demand and need for a downtown heliport facility in Washington, DC. However, the current airspace restrictions would prohibit the public use of such a facility.

Implementing the necessary revisions to the airspace restrictions will need to be an industry, state, and government collaboration. Currently, there are no groups that have been formed to deal specifically with this issue. Thus, a proponent, or set of proponents, will need to form a coalition to mitigate the impacts of the current airspace restrictions. Until this is done, helicopter activity within the Washington, DC area will remain limited. The coalition should include the FAA, TSA, industry representatives, other federal and local agencies, and the MAA, all of whom have a stake in mitigating the impacts of the airspace restrictions.

10.4 Collecting Accurate Activity Data

Today, there is very little actual data on helicopter activity in Maryland and Metropolitan Washington. As a result, helicopter activity, their related noise impacts, potential mitigation measures, and the level of demand for new facilities are not fully understood. A system is needed to generate activity statistics for use in understanding current and future helicopter use within the Maryland and Metropolitan Washington Region. This system would help to identify where and at what frequency helicopters are being used. Without this information, a true picture of helicopter activity and effective means to improve the regional helicopter system will not be realized. Such a

system could be a collaborative effort between MAA, COG, MWAA and the FAA that could collect and maintain statistics on helicopter activity from control towers at the major airports, through the Potomac Terminal Area Control facility, or other manual or automated techniques.

Furthermore, there is no way to know if there is an increasing level of activity that will further support the need for implementing the recommended system of helistops and heliports without accurate activity data. The lack of accurate activity data will continue to create credibility issues with the public and the local municipal governments when attempting to propose or support new heliport facilities and to improve the overall regional helicopter system.

10.5 Permit Review Process and Community Acceptance

A sample land use regulatory approach was provided in this study to help communities standardize local zoning and permit review procedures related to helicopter landing facilities. This is one of the more important recommendations necessary to locate and construct new facilities. The use of the sample land use regulatory approach will help simplify the zoning and review process for the proponent, and better protect the community in terms of noise and safety.

For example, if the review process is cumbersome, it will be very difficult for a proponent to navigate the process with the expectation that the project can be permitted. Local operators in the Metropolitan Washington Region have experienced this problem when they proposed the development of a new heliport in Northern Virginia. The level of understanding as to the proposed operation of the facility, the ability to control or limit future operations, as well as noise and safety impacts were significant obstacles in obtaining a permit for the facility. This was compounded by the fact that the information and review process were not fully defined as part of the permitting process. Ultimately, the process became too cumbersome and contentious and the project did not move forward.

Equally important as the need for a well defined and somewhat standardized permitting process is the need to adequately address noise and safety issues during the review, and if approved, the continued operation of the facility. A thorough land use zoning approach that clearly defines the expected noise and safety controls is the best way to ensure these issues are addressed and community concerns are protected. Additionally, an educational effort is needed to communicate the actual safety and noise impacts of today's modern helicopters. Typically, helicopters are not viewed as a safe vehicle based on news accounts and the community's perception. In fact, today's helicopters are considerably safer and do not create as large a noise signature as older aircraft. Regardless, there are at times a negative community perspective toward helicopters. If an educational effort is not undertaken, community acceptance of helicopters and heliports will be a

significant obstacle to overcome. This educational effort should involve industry groups, the MAA, and COG.

10.6 Economic Development Initiatives

Incorporating heliport development into economic development initiatives is important for the overall success of the recommended regional helicopter system. Economic development initiatives are intended to increase the economic potential of a given project. In cases where a business park, a warehousing complex, or an industrial or commercial complex is being proposed, placing a helistop within this development would create both economic and transportation benefits. Combining economic development and helistop development initiatives could provide additional funding and opportunities to build new helicopter landing facilities. Such an endeavor will require a joint effort between economic development agencies, the MAA and COG. Existing committees and relationships should help to initiate the concept to incorporate helicopter facilities into various economic development initiatives.

10.7 Overall Transportation Improvements and Intermodal Benefits

Heliports are an aviation transportation facility. Although helicopter activity makes up only a small part of the overall transportation system, it is a viable mode of transportation. As with fixed-winged aircraft, helicopters provide fast and efficient transportation of people. Helicopters also provide important EMS, police, and other public service functions.

Heliports, like airports, are also intermodal facilities. They provide an interface between helicopters and other modes of transportation such as automobiles, limousines, taxis, buses, and rail. One of the recommendations is to locate helistops at existing ground transportation facilities, such as rail stations or park and rides located throughout the Baltimore and Metropolitan Washington Region. This would help link helicopter activity to rail, bus, and taxi service. It may also provide the opportunity for a public agency, for example, to fund the heliport facility under their transportation capital improvement program, have it licensed by MAA, and operated by a third party.

The transportation and intermodal benefits need to be highlighted in order to gain public acceptance for helicopter facilities. The ability to improve the overall transportation network and help reduce delay and congestion should be emphasized when promoting the benefits of the recommended helicopter system. This can best be accomplished through interagency collaborations and existing regional transportation committees.

10.8 Implementing Policy and Program Recommendations

The MAA and COG both have existing formal and informal policies or programs relating to helicopters and helicopter land facilities. Both agencies should consider incorporating the following recommendations into existing or new policies and programs:

1. The existing Maryland aviation regulations could be improved by clarifying and providing direct reference to heliports and helistops where applicable. Specific reference to heliports is currently limited to inclusion by definition of a "designated land area" and the minimum standards defined as those contained in the FAA "Heliport Design" Advisory Circular.

2. Existing COG transportation policies should be extended to formally include helistops, heliports, and helicopter operations within the region.

3. Environmental impacts, such as noise, should continue to be studied though existing COG boards and committees. The Committee on Noise and Aviation at National and Dulles Airports (CONAANDA) should continue to study helicopter noise and established helicopter routes.

4. Improved land use regulatory controls should be addressed in many jurisdictions in Maryland and some in the COG region, as less than half in Maryland have regulations that address aircraft-landing facilities of any kind, including airports. A similar situation exists in some COG jurisdictions.

5. An education program is needed to promote the benefits of helicopters and heliports. This could be done through existing outreach programs administered by the MAA and COG. In particular, emphasis should be placed on enhancing intermodalism to support regional transportation needs.

6. Obtaining funding for new helistop or heliport facilities is difficult through private sources without financial support from public sources. One way to approach public funding is to promote helistops and heliports through economic development initiatives. Heliports, by their size and operating needs, can be incorporated into economic development initiatives to revitalize, grow, or create economic development within communities.

7. Public funding for privately owned facilities that are available for public use should also be supported by COG and MAA.

10.9 Implementing the Heliport Facility Improvement Recommendations

A goal of this study was to ensure that the current helicopter system meets the region's transportation and public services needs. It was concluded through discussions and surveys with existing helicopter operators and the Study Advisory Group formed for this project that an improved system of public-use helistops and heliports is needed to meet current and future demand.

It is recommended that all hospitals providing trauma and critical care services have an heliport. Hospital heliports are typically a privately owned facility providing a unique service to the public by facilitating the fast and safe transfer of patients. The Washington and Baltimore Metropolitan areas are served by existing Level I and II Trauma Centers. However, not all hospitals have currently established heliports.

It was also concluded that public-use helistops in various geographical areas throughout the study area are needed, particularly in the Baltimore and Washington Metropolitan Region. The helistops would provide an improved system for the drop-off and pickup of helicopter passengers. The current system of airports, which provides the primary public-use drop-off and pickup locations, are not located near business centers and other land-based transportation facilities where most of the passengers are generated. A system of public-use helistops would also provide quick access for emergency medical and police helicopters responding to accidents, in some circumstances.

The helistops should be located in areas along existing transportation corridors and incorporated into existing transportation facilities such as transit facilities, park & rides, or within existing business or commercial developments. Besides the benefits of these known and easily identifiable locations, these sites also offer a potential for masking helicopter noise by flying routes over existing transportation corridors. Some of these helistops could be new facilities and others may consist of private facilities newly opened for public use.

A system of up to 18 public-use helistops is suggested for future planning and implementation purposes. Additional facilities could be added to the system as needed to decrease the ground travel time between helistops. The initial 18 helistops would include 12 in the Metropolitan Washington and Baltimore Region, 2 in Western Maryland, and 4 on Maryland's Eastern Shore. The helistops should be located along the major transportation corridors within each geographic area when possible. The suggested geographic areas are listed in Table 10-1.

Table 10-1 Potential Geographic Areas for Helistops

ID	Geographic Area
Metropolitan Washington and Baltimore	
1	I-83 Corridor, Baltimore County, Maryland
2	I-95 Corridor, Harford County, Maryland
3	I-695 Corridor (East), Baltimore County, Maryland
4	I-97/Route 50 Corridors, Anne Arundel County, Maryland
5	I-495 Corridor (Southeast), Prince George's County, Maryland
6	I-95 Corridor (South), Prince William County, Virginia
7	I-495/I-66 Corridors, Fairfax County, Virginia
8	I-270 Corridor, Montgomery County, Maryland
9	I-70 Corridor, Howard County, Maryland
10	I-495/I-95 Corridor, Howard, Montgomery, Prince George's Counties, Maryland
11	I-270/I-70 Corridors, Frederick County, Maryland
12	Route 7 Corridor, Loudoun County, Virginia
Western Maryland	
13	I-70/I-81 Corridors, Washington County, Maryland
14	I-68 Corridor, Allegany County, Maryland
Eastern Shore Maryland	
15	Route 50 Corridor, Talbot County, Maryland
16	Route 50 Corridor, Dorchester County, Maryland
17	Route 50 Corridor, Wicomico County, Maryland
18	Route 50 Corridor, Worcester County, Maryland

Source: Edwards and Kelcey, Inc.

There is also a need for a downtown heliport in Washington, DC and Baltimore. The downtown heliports would primarily benefit corporate, charter/air taxi operators, and perhaps scheduled commercial helicopter operations. Other operators would also use the downtown heliports such as government and public service agencies.

10.9.1 Development of the Recommended System

Developing the recommended system of helistops and heliports will require a phased approach. It is anticipated that the proposed facilities will be developed by private operators or public agencies as demands dictate over the twenty-year planning period. The MAA and COG are not expected to construct or operate any heliport facilities. However, the MAA, VDOT, and FAA can participate in the funding and development of such facilities.

Given that private and possibly public service agencies will build the system of helistops and heliports, market demands must drive the development of the system infrastructure. However, existing airspace restrictions will prohibit the development of most heliport facilities within the 15 nautical mile radius "no-fly zone" over Washington, DC. As such, development of public-use heliport facilities within 15 nautical mile of the Washington, DC area would be developed somewhere around 2010 or later, unless the airspace restrictions are modified before that time.

Building downtown heliport facilities in the District and Baltimore will be dictated by market demand and community acceptance. In downtown Baltimore, for example, there have been several attempts in the past to build a heliport in the Central Business District. However, these attempts were not realized due to community opposition. Therefore, the construction of a downtown Baltimore heliport may still be many years in the future.

In Washington, DC, on the other hand, there is currently a full service privately owned public-use heliport located on South Capitol Street. However, current airspace restrictions prohibit the public-use of this facility. Furthermore, redevelopment of the riverfront will eventually require the relocation of the heliport to another site. The District of Columbia is studying options to relocate the facility, however no specific plans have been prepared. The ultimate success of relocating the South Capitol Street Heliport will depend on the will to build a new facility, community acceptance, and the easing of the current airspace restrictions. Therefore, the timing of a new facility in Washington, DC is uncertain.

10.9.2 Estimates of Program Costs

The cost for the proposed facilities will vary based upon site location and conditions as well as the facility requirements for each helistop or heliport. The small single pad helistops would cost much less to build than a full service heliport providing a landing pad, several parking spots and a terminal building.

Construction costs were estimated based on the type of facility. Specific site development costs, which tend to be the variable in cost escalation, were not included. The estimates were also based on available construction cost data from other heliport facilities as well as cost information obtained from discussions with area helicopter operators. Table 10-2 lists the facility costs that should be used to develop funding estimates.

Table 10-2 Estimated Facility Costs

Heliport	Cost	Facilities
Private-Use Hospital Heliport	$350,000	Ground or Elevated Landing Pad, Lighting, Hospital Access, etc.
Public-Use Helistop	$200,000	Ground based helipad with lights, wind sock, and some fencing
Public-Use Downtown Heliport	$2,000,000+	Landing pad for medium to large size helicopters, two or more parking pads, taxiways, terminal building, security fence, and automobile parking

Source: Edwards and Kelcey, Inc.

The smaller hospital heliports and public-use helipads are small and should be inexpensive to build. The larger downtown heliports would be more expensive as they require a greater infrastructure. Development costs will likely involve a combination of local public funds, private investment, as well as State and potentially FAA funds.

A recommendation of this system plan is to formally establish a funding program for the development of public-use helistop and heliport facilities. The MAA already has such a program for both publicly and privately owned airports. This program should be formally extended to heliports. The MAA should program about $200,000 per year for the next five years to stimulate the development of the public-use helistops. Thereafter, the program should be adjusted accordingly.

COG does not have the authority to participate in the construction, improvement, or maintenance of the transportation facilities. Therefore, COG will not participate in the physical development of the recommended system. However, COG can continue to educate users, coordinate user committees, and conduct planning and data collection studies.

10.9.3 Other Case Study Successes and Failures

The success or failure of implementing the system of heliports will depend upon interest, funding, and acceptance by local municipalities. To get an understanding of what may be encountered by heliport proponents when proposing a heliport or helipad facility, historic experience in building heliports around the nation can provide a flavor for the issues involved. The FAA conducted a study of heliport case studies titled “Heliport/Vertiport Implementation Process – Case Studies (DOT/FAA/ND-96-1).” This study outlined the issues affecting the development of seven heliports.

The primary focus of the report was to identify the potential success or failure in the planning and permitting process of heliport facilities. Table 10-3 summarizes the findings of the report.

Table 10-3 Heliport Case Studies - Application of Public Involvement Results

Public Involvement Elements	Degree of Application					
	Dallas	Portland	Miami	Pittsburgh	Wash. DC	San Francisco
Addressing an Important problem	+	+	+	+	-	-
Problem addressed by agency responsible	+	+	+	+	-	-
Reasonable process and approach	+	+	+	+	+	+
Understanding and caring	+	+	0	0	+	+
Success Rating	Yes	Yes	Yes	Likely	No	No

Source: Heliport/Vertiport Implementation Process – Case Studies (DOT/FAA/ND-96-1)

Key: + = Applied 0 = Unnecessary - = Not Applied

Three of the heliport projects were successful because they adequately justified the project and addressed public concerns. The Pittsburgh case, as stated in the report, was expected to be built, but had not been completed when the report was done. The Washington, DC project was not expected to succeed due to a number of issues, including the lack of interest by government agencies as well as a change in governmental participants. The San Francisco case was not successful, although the public involvement elements were properly applied. The opposition groups were much more organized and better articulated the issues related to helicopter operations. As a result, the proponent was unable to convince the public of the overall need and benefits of the project.

The case study report brings to light some important issues. There must be a significant level of participation by the proponents to identify the purpose and need for the project, and to effectively address the effects of the project to the public. Therefore, when approaching the study or permitting process, all the information needs to be presented and the public's issues must be addressed to obtain consensus.

10.10 Summary

Implementing the recommendations of this regional helicopter system plan will involve several initiatives, some to improve the system by mitigating noise and airspace impacts, others to improve the system by developing new facilities. In other words, the initiatives should increase the benefits of helicopter activity to Maryland and the Metropolitan Washington Region, while decreasing the social costs of having helicopters operating within our communities.

Before emphasis is placed on developing new facilities, initiatives should be implemented to mitigate noise impacts and airspace restrictions, collect accurate helicopter activity data, create land use controls, incorporate helicopter facilities into economic development and intermodal initiatives, and to initiate policies and programs to improve the overall regional helicopter system.

The actual sighting, approval, and construction of new helistop or heliport facilities should be driven by market demand. Market demand could include the needs of existing and future helicopter operators, economic development opportunities, or increased helicopter activity. Thus, the impetus to support and develop new facilities will depend greatly on an effective private/public partnership and cooperation among the various helicopter stakeholders.

Private users and industry groups will also need to partner with public agencies such as the MAA and COG to educate communities as to the value, safety, and need for helicopter facilities, and to minimize or reduce the impacts of helicopter operations. Reestablishing and continuing a helicopter working group to educate both the public and helicopter users is key to the successful implementation of the system recommendations.

REGIONAL HELICOPTER SYSTEM PLAN

For the Maryland and Metropolitan Washington Area

JUNE 2005 – FINAL REPORT

Police and Fire

Government Agencies

Military

Air Ambulance

Commercial Operators

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