

Crystal City Plan Feasibility Study Arlington, Virginia

PLANNING FOR REDEVELOPMENT NEAR RONALD REAGAN WASHINGTON NATIONAL AIRPORT

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Arlington County planners collaborated with local land-owners and airspace authorities to solve a complex problem: how to reconcile plans for dozens of new buildings (some exceeding 300 feet) with safe and fluid operations at a major airport that is within walking distance of the new development. Complicating matters, it was also necessary to consider the effects on radar coverage in the sensitive airspace nearby and westward into the Virginia countryside.

Arlington's 50-year plan for the redevelopment of Crystal City is ambitious. It calls for the replacement of approximately 30 existing buildings with more than 55 new ones, adding some 15.5 million square feet of net density to the 24 million square feet already in existence. Failure to address the legitimate issues with this plan that were raised by the Metropolitan Washington Airports Authority (MWAA) and the Federal Aviation Administration (FAA) could have stalled or derailed the redevelopment.

In the airspace evaluation process, Arlington planners learned about such arcane terms as Part 77s, TERPS, and Fused Tracking Radar, while the FAA got familiar with long-term community planning concepts. In time, each team provided the knowledge—land-use plan data from the county, modeling technology from the FAA—needed to complete the project. The outcome of the analysis is mutually-beneficial: a long-term land-use plan that is closely coordinated with airspace interests.

■ ABOUT CRYSTAL CITY AND THE FAA FEASIBILITY STUDY

Situated between the Pentagon and Ronald Reagan Washington National Airport (DCA), Crystal City commands one of the best locations in the capital region. With a crewcut



skyline, Crystal City looks like the kind of downtown one might expect to see near an airport. But with new buildings and a more urban future on the way, the relationships between Crystal City and the airport had to be revisited.

The Crystal City Plan is a countermeasure to the federal Base Realignment and Closure (BRAC) action of 2005. BRAC moves defense-related federal agencies out of urban locales—which tend to be ill-suited for post-September 11 security standards such as 82-foot setbacks—and into less dense environments and military installations. Because of BRAC, Crystal City is scheduled to lose 13,000 employees and the occupancy of 3.2 million square feet of office space.

The county was determined to plan for the next generation of development in Crystal City, but it needed to ensure that future development would not run afoul of FAA standards or imperil the safety and integrity of operations at the airport. Wherever standards could not be met, mitigations would have to be planned for the anticipated conflicts.

At the beginning of the land-use planning process, the county and the largest property owner (Vornado Charles

E. Smith) enlisted MWAA and the FAA to evaluate the plan. Together these groups produced a feasibility study, also known as a broad area assessment, of existing and future development in Crystal City.

The feasibility study positions the county to adopt its long-term land-use plan with a firm understanding of:

- 1) How each future building would be viewed by the FAA under its normal single-building evaluation;
- 2) The cumulative impact of the buildings on air traffic, navigation, communications, and surveillance systems, as projected over 15 years; and
- 3) Recommended mitigations to accompany certain buildings and the area at large.

■ THE FAA BUILDING REVIEW PROCESS

At airports across the United States, the FAA establishes virtual obstacle surfaces designed to protect the airport—and more broadly the National Airspace System—from encroachments that would limit operations. These surfaces are established through Federal Aviation Regulation Part 77, Objects Affecting Navigable Airspace.

As stated in FAA procedures for handling airspace matters, “a structure that exceeds one or more of Part 77 standards is a presumed hazard to air navigation unless the obstruction evaluation study determines otherwise.” The Part 77 surface can generally be described as a conical or tiered surface in the air, rising with the distance from the airport. In addition, development must be balanced against the surfaces established by the U.S. Standard for Terminal Instrument Procedures (TERPS), which pilots use to navigate between airports and make safe arrivals and departures.

When a development project is planned near an airport, the real estate developer (or developer representative, typically an aviation consultant) must submit an FAA Form 7460, which the FAA uses to review the project information. If a proposed structure exceeds a Part 77 standard, it automatically triggers a detailed aeronautical study intended

to further evaluate the structure based on TERPS and other potential areas of conflict.

The study passes through FAA divisions specializing in air traffic; airports; flight procedures and flight standards; airway facilities; and military branch interests. Each team examines the potential impacts to their area of responsibility before the FAA makes a determination. A determination identifies any impacts the building would cause and what changes to the use of the airspace or to the proposed building would be required to mitigate the obstruction. Sometimes, the changes are relatively minor and with the proper technical adjustments can be implemented without concerning the aeronautical community. However, if an obstruction would cause substantial impacts (known as “adverse effects”) to safety, operations, efficiency, national security, or another critical function, which would affect a certain volume of air traffic, the FAA will declare the obstruction a hazard.

■ FEASIBILITY STUDY PROCESS AND FINDINGS

The feasibility study process took place through a series of working sessions held in Washington, D.C., with participants from the FAA, the U.S. Air Force, DCA air-traffic control, MWAA, and the National Security Agency. Arlington County staff from the planning and economic development units attended the working sessions to answer questions about the proposed buildings and timing.

The working group decided to focus on conditions during the first 15 years (2011–2025) of redevelopment. The 15-year period was subdivided into three five-year increments, allowing technicians to identify specific buildings affecting the airspace. Using the building data provided by Arlington County, the FAA and the Air Force modeled the impacts. The Air Force brought in the technology needed to assess radar coverage. All impacts were reviewed, including navigation, radar, flight procedures, radio communications, and review by the armed forces. Special consideration was given to the cumulative impacts of the buildings on radar coverage.

Initial results showed that some of the tallest proposed buildings would likely produce radar shadows in pockets of airspace northwest of the Washington area such that mitigation would become necessary. The working group devised several mitigation scenarios (for example, a new location for the existing radar and overlay of a new surveillance technology) under which the proposed development could be re-evaluated. After testing those scenarios, the results were issued in the feasibility study report.

The report includes the effects of the buildings (individually and collectively) on regional airspace and operations. The impacts on TERPS from each building are noted in the report, along with direction for potential mitigations; they are to be addressed during the future aeronautical-review process when a developer files a project with the FAA. The impacts to TERPS do not suggest a need to adjust planned building heights, provided the proposed mitigations are pursued when the project is filed.

In terms of radar coverage, the buildings analyzed for the first increment will not impair radar services currently provided to air-traffic operations in the region. Buildings in the second and third increments will require a technology called radar-track fusion between the radar at DCA and a regional installation called Potomac Tracon. This technology joins the capacity of multiple radar signals into one view, filling any gaps affecting a single installation. An operational radar-track fusion function at DCA would resolve the shadowing issues caused by buildings in the second and third five-year increments.

Radar-track fusion is planned for implementation at DCA in three to five years. Track fusion is an initial step in the transition to Global Positioning Systems (GPS) technology, which will ultimately replace radar at airports around the country as the primary airspace surveillance tool. Representatives from the FAA and the county will meet periodically to update the progress of development and the status of new technologies.



The new plan would increase density in Crystal City by about 60 percent.

■ WHAT MAKES THE CRYSTAL CITY STUDY DISTINCTIVE?

It evaluates a plan, not a building. Each of the proposed Crystal City buildings was evaluated according to the standard FAA aeronautical-review process outlined above. However, this study looked at an entire collection of planned buildings and their impacts over time, based on a projected build-out schedule.

It comprehensively assesses radar coverage. The study is groundbreaking for the assessment of cumulative impacts on the radar coverage from DCA. While a typical aeronautical study evaluates radar impacts for the building under review, it would not necessarily join those impacts to those from nearby or proposed buildings—and it definitely would not project impacts 15 years into the future. It is the cumulative impacts that should most concern planners, because under the current system it is not possible to foresee problems until the next marginal development project

causes the entire area to cross a threshold of concern. By assessing cumulative impacts on radar coverage, the Crystal City study unlocked critical pieces of information needed to determine both the plan's viability as well as the potential technology needed to address impacts.

It links to future building reviews. Setting expectations today will allow future building evaluations near the time of construction to be processed more smoothly. The Form 7460 applications accompanying new construction will track back to the feasibility study. This linkage assures the county, the FAA, and real estate developers that this series of buildings can be pursued within the recommended mitigations outlined in the study.

It provides context for the aeronautical review. Representatives from the FAA shared the county's sense that this project charted new territory in the way the agency works with local communities. For those on the FAA side, it may have been the first time they heard about how buildings fit into a larger plan and why the plan is important to the community—in Arlington's case, on account of the economic concerns raised by BRAC. On the county side, planners gained an appreciation for the complexity inherent in managing and protecting the airspace. Face-to-face meetings facilitated the communication of these concepts.

■ INTEGRAL PREREQUISITES

Have a concept plan and an economic analysis. Before any planned buildings could be evaluated in the feasibility study, Arlington had to develop an illustrative concept plan for Crystal City. This planning process took several years, requiring dozens of community meetings, technical inputs, and hefty staff commitments from divisions across the county government, as well as consultant assistance for master planning, economic analysis, and transportation analysis.

During the planning process, Arlington Economic Development (AED) prepared economic analyses to test whether

the amounts and types of development planned could be built and absorbed and estimated when the construction would be likely to occur. The economic analysis turned out to be a critical component of the FAA review. One of the first hurdles overcome in working with the FAA was to convey that redevelopment in Crystal City would occur incrementally, rather than all at once. The market analysis showed which buildings would be built and when.

The concept plan, plotted to the building footprint level, allowed the county to show exactly where buildings would be located and how tall they would be, from ground level and from sea level. The timing of construction, based on the AED analysis, was shown in three five-year increments. This allowed airspace conditions to be measured at the five-, 10-, and 15-year marks. It also allowed the FAA to test the buildings against the technologies that would be available at different points in the future. This was tremendously important for identifying when a new technology would be needed. For example, the study found that the Phase One buildings could be built without substantial changes to the surveillance technology, whereas Phase Two buildings would require some changes.

Build and maintain a relationship with the FAA. The project would not have gotten started without building a relationship with the FAA, a process that began before the Crystal City project. Arlington's location near the agency headquarters in Washington, D.C., had enabled previous face-to-face meetings related to individual building proposals between county staff and FAA personnel. When the Crystal City study came along, Arlington already had relationships with the agency and a mutual understanding that looking at all of the buildings at once would save everybody's time in the future.

In addition, Arlington took advantage of its existing partnerships with MWAA and the local real estate development community. Like Arlington, these groups had prior relationships with the FAA and knowledge of the agency structure. MWAA provided the FAA with any information needed

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about the airport, such as physical layout, future plans, and the obstacles and opportunities related to improving operations and surveillance. MWAA representatives attended every meeting and joined every conference call. MWAA and the county have worked well together, recognizing the overlaps between a prosperous community and a prosperous airport.

The primary landowner, Vornado Charles E. Smith, and its aviation consultant, Ben Doyle of JDA Aviation Technology Solutions, helped tremendously with the educational aspects of the aeronautical review process, potential mitigations, new surveillance technologies, and FAA agency structure. The landowner will eventually build many of the proposed buildings, so it was critical to have its buy-in on the evaluation and how it would match up with its plans.

All three local groups—Arlington County, MWAA, and the landowner—were key to securing the FAA's participation in the study. Once the study began, it was critical to stay on the (perhaps more difficult) path toward a solution rather than the easier path to rejection. This was accomplished by stressing the benefits for each side: For the county, it was to advance a long-term land-use plan compatible with airport and airspace interests; and for the FAA, it was an opportunity to settle many individual issues at once and to create a model for addressing community plans elsewhere.

KEYS TO SUCCESS

While the right approach to working with the FAA cannot be boiled down to a formula, this particular project was successful because Arlington County took the following actions:

- Developed a conceptual plan for the long-term future of Crystal City with enough detail to know where buildings will be located and how tall they will be;
- Completed an economic analysis to determine when buildings are likely to be built;
- Built and maintained relationships with local partners, such as the airports authority and the real estate developer, and joined efforts with them to engage the FAA;
- Nurtured a mutual understanding of county goals and FAA goals by sharing information and educating counterparts; and
- Established a framework for follow-up interactions between the county and the FAA regarding the project.

Completing the feasibility study process with the FAA allows Arlington to move forward with its plans for Crystal City. The study moves the county closer to reinventing an important downtown and provides the assurance that future building reviews will trace back to this evaluation.