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## **500 - Airport Planning**

### **General**

Airport planning is a systematic process used to establish guidelines for the efficient development of airports that is consistent with local, state and national goals. A key objective of airport planning is to assure the effective use of airport resources in order to satisfy aviation demand in a financially feasible manner. Airport planning may be as broad based as the national system plan or more centrally focused as an airport master plan for a specific airport. The primary types of airport planning may basically be classified as follows:

- (1) National System Planning (NPIAS)
- (2) State Airport System Planning (SASP)
- (3) Metropolitan Airport System Planning
- (4) Airport Master Planning

### **Limitations of Use**

Users of this guide should note the obligation for any required action addressed within this guidance originates within applicable Federal directives such as United States Code (USC), Public Law (PL), Code of Federal Regulations (CFR) and official FAA policies. The supplemental information provided within this guidance does not itself establish additional requirements for participation in the AIP. In the event there is a discrepancy between this guidance and current AIP policy, AIP policy shall always take precedence.

### **In this Section**

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## **510 - National Plan of Integrated Airport Systems (NPIAS)**

### **General**

Before the FAA can consider an airport eligible to receive Federal funds, the airport must be included in the [National Plan of Integrated Airport Systems](#) (NPIAS). The NPIAS is a Federal Aviation Administration (FAA) document that provides short (1-5 year) and long (6-10 year) cost estimates of AIP eligible projects associated with establishing a system of airports adequate to meet the needs of the National Airspace System (NAS). Section 47103 of Title 49 United States Code (USC) establishes the FAA requirement to maintain the NPIAS.

The NPIAS provides an inventory of airport development for the FAA's Airport Capital Improvement Plan (ACIP). The FAA formulates the ACIP based on the airport development needs identified by the NPIAS. The ACIP is essentially a subset of the NPIAS, highlighting airport needs over a 3-year funding cycle.

### **FAA Policy**

FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) establishes the criteria for inclusion into the NPIAS. The NPIAS includes airport development recommended by FAA-accepted airport master and system plans or as shown on FAA approved airport layout plans. It may also include airport development identified from FAA airport site visits and contained in airport owners' capital improvement programs.

### **Key Factors**

The FAA bases an airport's inclusion in the NPIAS on information provided by a potential airport sponsor. The FAA will evaluate an airport's inclusion into the NPIAS based upon:

- Whether an airport is considered a public-use airport
- The number of enplanements the airport has or is forecast to have
- The number of based aircraft located at the airport
- Whether an airport receives U.S. Mail service
- Whether there is a component of the U.S. Military, Reserves or National Guard permanently based on or adjacent to the airport
- Special justification that would consider the isolation of the community being served, whether the airport serves the need of an Indian tribe, supports recreation areas, or is needed to develop or protect important national resources

### **Limitations**

The listing of any location, airport or item of development in the NPIAS does not in any way legally obligate or commit the Federal government to provide funds for specific development. It also does not imply environmental approval of the proposed development.

### **RESOURCES**

#### **FAA Orders**

- [5090.3C, Field Formulation of the National Plan of Integrated Airport Systems \(NPIAS\)](#)

#### **Reports**

- [NPIAS Reports](#)



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## 515 – Master Plans

### Master Plan

For the individual airport, owners rely more on the airport master plan for their airport. An airport master plan represents the airport's blueprint for long-term development. A few of the goals of a master plan are:

- To provide a graphic representation of existing airport features, future airport development and anticipated land use.
- To establish a realistic schedule for implementation of the proposed development
- To identify an realistic financial plan to support the development
- To validate the plan technically and procedurally through investigation of concepts and alternatives on technical, economic and environmental grounds.
- To prepare and present a plan to the public that adequately addresses all relevant issues and satisfies local, state and federal regulations.
- To establish a framework for a continuous planning process.

### Limitations of FAA Actions

Sponsors must not construe the acceptance of an airport master plan by the FAA as an approval of the entire master plan document. The FAA only approves components of a master plan as opposed to the entire document. The key elements that the FAA evaluates and formally approves are:

1. Forecasts
2. Selection of critical aircraft
3. Airport layout plan (ALP)

It is from these elements that the FAA makes a determination regarding eligibility of AIP funding for proposed development. It is critical that airport owners and their consultant coordinate early and often with the appropriate FAA planner to identify significant planning issues and to determine the type and magnitude of effort required to address such issues.

## RESOURCES

### Advisory Circulars

- [Planning Advisory Circulars](#) – Listing of ACs applicable to airport planning
  - [AC 150/5070-6](#) – Airport Master Plans
  - [AC 150/5300-13](#) - Airport Design

### Guidance

- [Aviation Forecasts](#): Terminal Area Forecast, Long Range Forecast
- [Passenger & Cargo Statistics](#) – Enplanement and cargo data



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## 520 - Airport Layout Plans

### Overview

The Airport Layout Plan (ALP) serves as a critical planning tool that depicts both existing facilities and planned development for an airport. Sponsors of airport development carried out at federally obligated airports must accomplish the improvement in accordance with an FAA-approved ALP.

By definition, the ALP is a plan for a specific airport that shows:

- Boundaries and proposed additions to all areas owned or controlled by the sponsor for airport purposes
- The location and nature of existing and proposed airport facilities and structures
- The location on the airport of existing and proposed non-aviation areas and improvements thereon.

### AIP Funding

A current FAA approved ALP is a prerequisite for issuance of a grant for airport development. Any sponsor who has received a grant for airport development is obligated by grant assurance to “keep the ALP up-to-date at all times.”

### Keeping ALP Current

ALP’s become “out-of-date” when they:

- Do not adequately provide for future needs
- Do not conform with current airport design standards
- Do not accurately reflect existing features
- Do not reflect airport and critical land use changes which may affect the navigable airspace or the ability of the airport to expand

An ALP that has not been “updated” for several years is usually deficient in all four respects.

When the FAA advises a sponsor that they need to update their ALP, it simply means that the sponsor needs to review their plan for airport development for currency in all areas and revise as necessary. In actual practice, sponsors may accomplish the updating by revising the original reproducible drawings, Computer Aided Graphics (CAD) file, or by preparing an all-new set of drawings.

The decision for which method to use is the sponsors. A consulting firm with airport planning experience can normally provide reliable counsel in this regard, but if in doubt, sponsors may also contact the FAA Planner for advice. The updated ALP needs FAA approval prior to the issuance of any grant for an airport development project addressed by the ALP update.

It is important to understand that the physical completion of an airport development project will normally trigger the need to “as-built” their ALP to reflect work accomplished under the grant. Projects may require an ALP update before grant issuance and an update after project completion to reflect “as-built” conditions.

### AIP Eligibility

ALP Preparation and General Updates: The costs associated with preparation of an ALP and general updates are eligible under a planning grant. We caution Sponsors that the FAA cannot make upward amendments to a planning grant once the original grant agreement is established.

Project Specific ALP Updates: The cost of environmental studies and an ALP update for a specific project is an eligible project formulation cost under the AIP grant for that project. Sponsors must initially fund these costs with their own funds. Reimbursement under the AIP is retroactive contingent upon AIP funding of the project specific development. We caution Sponsors that they may not seek reimbursement for general ALP updates and revisions as a cost under a project development grant.



**As-built ALP:** The cost to revise an ALP set to reflect “as-built” conditions for the AIP funded development is an eligible project costs under the development grant that addresses the improvement. Such costs are generally limited to drafting costs associated with revising the graphical representation within the ALP set. These costs **must not** include updates for future development or for improvements not funded by the FAA. Sponsors should assure this task is included in the engineer’s statement of work whenever development improvements impact the airport configuration.

### **Grant Application**

To ensure that funds are available for reimbursement of the environmental studies and ALP updates, sponsors should include these costs in their grant application.

### **Guidance for Preparing ALPs**

The FAA Central Region has developed an ALP checklist for airport owners to use as an aid in preparing and updating ALPs. Questions regarding the preparation and submittal of an ALP set for approval may be addressed to the Central Region Airport Planner ([Central Region Roster](#)) responsible for your state. For GA and Non-primary airports within the state of Missouri, please contact the Missouri Department of Transportation at (573) 526-5571.

### **eALPS – The Future**

With the rapid advance of Geographical Information Systems (GIS), the future for ALPs will soon be in an electronic format, the eALP. The FAA’s current reliance on paper copy ALP sets has limitations that generate discrepancies and errors. Paper copies of ALPs are typically housed in multiple locations thus creating confusion regarding what version is current. Paper ALPs also come in a variety of formats and frequently contain out-of-date or contradictory information that differ from other data sources in use across FAA lines of businesses.

The eALP is a readily-available web-based application within the Airports GIS (AGIS) system that uses updated, precise airport data to dynamically generate eALPs. The eALP will permit sponsors, consultants and the FAA, to coordinate airport plans in a timelier manner and to share accurate airport data in an integrated environment. As a tool, the eALP will help airport planners dynamically visualize existing and planned airport layouts and features for efficient planning, review, comment/approval, and decision making.

An FAA pilot study is currently underway to further the AGIS eALP application and determine requirements for the systematic development of eALPs for all airports. Consult your FAA planner to determine when this transition will occur for you airport.

### **RESOURCES**

#### **Advisory Circular**

- [AC 150/5070-6](#) – Airport Master Plans
- [AC 150/5300-13](#) - Airport Design

#### **Suggested Form**

- [ALP Checklist](#) (doc): Steps to preparing an ALP



## 530 - Environmental Review

### Policy

Airport planning and development projects that include Federal involvement require an environmental review. Per statutory and regulatory requirements, the FAA must evaluate the environmental consequences of all proposed developments shown on the approved airport layout plan. Applicable regulations include but are not limited to the National Environmental Policy Act (NEPA), the Clean Air Act, and the Airport and Airway Improvement Act.

The FAA must carefully analyze and evaluate the impact that a proposed development presents to the environment. This involves a systematic and multidisciplinary approach that verifies compliance with the requirements of NEPA.

[FAA Order 1050.1 \(.pdf\)](#) Environmental Impacts: Policies and Procedures, establishes FAA policy and procedures for implementing NEPA. [FAA Order 5050.4](#) Airport Environmental Handbook provides guidance and instruction on meeting the requirements of NEPA and FAA Order 1050.1E.

### Environmental Assessment (EA)

As the proponent, the airport owner is responsible for identifying all environmental issues associated with the proposed development. The airport owner must also develop conceptual alternatives for consideration. The airport owner typically accomplishes this environmental review by preparing an environmental assessment (EA).

The FAA is responsible for independently analyzing and evaluating the environmental consequences identified in the sponsor's environmental assessment. After verifying the adequacy and sufficiency of the environmental assessment, the FAA will issue either a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS). The FAA formally documents the determination by issuing a Record of Decision (ROD).

### Categorical Exclusions

Since some projects have proven to have no significant impact to the environment, such specific projects may be categorically excluded from extensive environmental review. Sponsors should consult with the FAA early in the planning process to determine the criteria and limits required of their environmental review. Refer to section AIP-531 for additional guidance.

### Conditions for Federal Funding

AIP project funding and programming may not proceed ahead of the environmental review and concurrence from the FAA. The AIP programming and funding process may commence only after the FAA issues a favorable determination.

## RESOURCES

### FAA Orders

- [FAA Order 1050.1 \(.pdf\)](#) - Environmental Impacts: Policies and Procedures
- [FAA Order 5050.4](#) - Airport Environmental Handbook

### Guidance

- [Airport Environmental Program](#) – National Environmental Guidance
- [Central Region Environmental Program](#) – Supplemental regional guidance and resources

### Records of Decision (ROD)

- [Lambert-St. Louis](#) - Record of Decision for the W-1W improvements at Lambert-St. Louis (9/30/98)
- [Records of Decisions](#) - National listing of Record of Decisions



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## **531 - Categorical Exclusions**

### **Overview**

An airport sponsor considering a proposed project must understand what environmental documentation they need to provide to the FAA in order to satisfy requirements of the National Environmental Policy Act (NEPA).

Some projects may qualify for a categorical exclusion (CE), which means the airport does not need to prepare a formal Environmental Assessment (EA) or other environmental documentation. As an example, the acquisition of security equipment (required by 14 CFR Part 107), safety equipment (required by 14 CFR Part 139) or snow removal equipment qualifies for a categorical exclusion. It is thus not necessary for the sponsor to provide any further environmental documentation. Other proposed projects as listed in Chapter 6 of FAA Order 5050.4, may qualify for a categorical exclusion if there are no significant impact to the environment as a result of the project.

### **Categorical Exclusion Checklist**

To aid the FAA in making its determination as to whether a categorical exclusion or an environmental assessment is appropriate for a proposed project, we request that a sponsor fill out a Categorical Exclusion Checklist, and, if appropriate, contact other agencies for relevant information. The information that the airport provides to FAA in the categorical exclusion checklist can be a significant time-savings for the airport sponsor if it demonstrates that an Environmental Assessment is not required.

### **Agency Coordination**

In general, Sponsors should adhere to the following procedures for the projects they propose and which are listed in Chapter 6 of FAA Order 5050.4; particularly if the proposal would result in land acquisition or earthwork disturbances (taxiway, apron expansions, grading, etc.).

- To ensure that the proposed project will not violate the requirements of NEPA, the Endangered Species Act, the Historic Preservation Act, or Section 404 of the Clean Water Act, the sponsor should normally solicit comments from the agencies listed below (as a minimum), and attach that correspondence to the checklist. However, if the airport is confident that it has evidence to clearly demonstrate no impacts to the above three resources (for example, correspondence from a previously completed EA or wetlands determination), and that contact with the agency of jurisdiction is not necessary, they should contact the FAA to receive approval to include the airport's documentation in the checklist instead of the agency letters.
  1. U.S. DOI Fish and Wildlife Service, and appropriate State wildlife agency (for comment on possibility of impacting threatened and endangered species)
  2. Corps of Engineers (jurisdictional wetlands) and/or US Department of Agriculture (possible wetlands in or adjacent to areas being farmed)
  3. State historical/archaeological agency or agencies (cultural resources).

If the sponsor has information that may indicate a need to contact a different agency, the sponsor should contact that agency as well.

- In the letter of solicitation, the sponsor should give a complete description of the project along with a location map (airport in relation to neighboring community) and a schematic drawing of the project. The sponsor should identify a response time of 30 days. The letter should inform the agencies of any previous studies performed at the airport that might be applicable (i.e., archaeological or biological surveys for previous projects).
- If no response is received after the 30 day time period, the sponsor may assume that the agency has no concerns with the project. The sponsor should document the "no response" in the letter it submits to the FAA that transmits the checklist.



- Once all coordination is complete, submit the sponsor's letter of solicitation and its enclosures, the comments from the responding agencies, and the Categorical Exclusion Checklist to the FAA. Please submit as one complete package as opposed to submitting piecemeal information to the FAA.

A categorical exclusion is generally appropriate if the agencies respond with "no objection," or fails to respond after the 30 day period.

If an agency responds that it has concerns or that the project "may affect" an environmental resource, the sponsor may need to:

- (1) Conduct additional research or submit additional data, for example, a wetlands delineation or archaeological survey; or
- (2) Conduct an Environmental Assessment.

The responding agency may at times ask for more information. The sponsor should attempt to answer the questions as promptly and accurately as possible. A request for more information does not automatically indicate that an EA is needed. An EA may not be needed unless the agency continues to identify an impact based on the new information.

#### **Categorical Exclusions Listed in Chapter 6 of FAA Order 5050.4**

The items below **may be categorically excluded** from the requirement for formal environmental assessment, provided they don't trigger any of the **extraordinary circumstances (in FAA Order 5050.4 Chapter 6)**, which create a requirement for EA of actions otherwise excluded. The FAA will use the information provided in the categorical exclusion checklist to determine whether or not extraordinary circumstances exist.

1. Runway, taxiway, apron, or loading ramp construction or repair work including extension, strengthening, reconstruction, resurfacing, marking, grooving, fillets and jet blast facilities, and new heliports on existing airports, except where such action will create environmental impacts off airport property
2. Installation or upgrading of airfield lighting systems, including runway end identification lights, visual approach aids, beacons and electrical distribution systems.
3. Installation of miscellaneous items including segmented circles, wind or landing direction indicators or measuring devices, or fencing.
4. Construction or expansion of passenger handling facilities.
5. Construction, relocation or repair of entrance and service roadway.
6. Grading or removal of obstructions on airport property and erosion control actions with no off-airport impacts.
7. Landscaping generally, and landscaping or construction of physical barriers to diminish impact of airport blast and noise.
8. Projects to carry out noise compatibility programs.
9. Land acquisition and relocation associated with any of the above items.
10. Federal release of airport land.
11. Removal of a displaced threshold.





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## Questions

If you believe you may need to complete a Categorical Exclusion Checklist for your proposed project, please contact the Central Region Environmental Program Manager at (816) 329-2617 for any questions concerning the checklist.

## RESOURCES

### Forms

- Categorical Exclusion Checklist: [MS Word](#) or [PDF](#)

### Guidance

- [Central Region - Environmental Guidance](#) – Supplemental Information



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## **540 - Airport Site Investigations**

This this guidance clarifies the required content for Airport Site Studies. We are providing this guidance for Sponsors and consultants working on establishing new airport sites or seeking inclusion of an existing airport in the National Plan of Integrated Airport Systems (NPIAS).

### **Policy on Site Approval**

Site approval by the FAA is required for all locations as a prerequisite to receiving FAA funding. The site study will need to be updated for current standards at locations where a sponsor has previously received site approval based on obsolete standards or where the site was approved for a lower classification such as a VFR.

The Airport Improvement Program (AIP) Handbook (Order 5100.38) states in Paragraph 428.b. that:

“...Planning projects that include site selection...normally require a tentative approval of the site before proceeding with subsequent elements.”

The sponsor should not make a site selection endorsement until considering:

1. The airspace determination report
2. Site utility
3. Preliminary environmental findings
4. Public hearing testimony
5. Other pertinent factors

### **Site Selection Report Requirements**

The site selection report should contain detailed information in each of the above areas. Chapter 9 of FAA Advisory Circular 150/5070-6 contains a general overview of these requirements. The site selection report is a narrative report that responds to all applicable evaluation factors. Refer to AIP-541 for applicable evaluation factors.

### **Aeronautical Requirements**

First and foremost, any proposed site must be acceptable from an aeronautical perspective. Sponsors should not give further consideration to any sites that are not acceptable per the report. Preliminary screening should be based upon Part 77 requirements, review of topographic maps in relation to topography and obstructions, visits on the ground to the proposed sites, and over flight of the proposed sites by the Flight Procedures Branch of the FAA.

### **Environmental Requirements**

The site selection report should contain information on potential environmental impacts such as acres impacts to farmland, wetlands, historic properties, 4(f) properties, and forest lands as well as necessary relocations. Sponsors should provide such information for each of the proposed sites.

The report should also contain preliminary information about any known or suspected endangered species on any of the proposed sites. This information is preliminary in nature and is primarily for screening the proposed sites for potential environmental impact.

The recommended site will require a detailed environmental assessment after the FAA has given the recommended site tentative approval. The FAA must approve the environmental assessment before the FAA can provide final approval of the recommended site in accordance with FAA Order 5050.4 and Order 1050.1.

### **Financial Evaluation**

The site selection report must contain sufficient information to make an informed decision concerning the relative development costs of each of the proposed sites. This requirement is listed in attachment A and includes such items as land costs, utility extension costs, access costs, obstruction removal costs, and construction estimates.



## Evaluation of sites and Recommendation

The Sponsor shall evaluate the identified sites against the above criteria. Once this analysis has occurred, the sponsor should narrow the list to no more than three sites with one of the sites being the sponsors recommend site. This analysis should clearly set forth the reasoning for discarding sites as well as the reasons for recommending the preferred site. If other modes of transportation are affected, i.e. requiring a road to be closed or relocated, initial discussion with the authority having jurisdiction must be done to determine if the proposed changes will be allowed.

## Public Involvement

Public involvement is critical to the successful outcome to the site selection process, and an opportunity for a public hearing is required during the environmental assessment process. Early involvement of the public is essential to determine the publics' views on important issues such as safety, environmental impacts, and opinion of potential users of the airport. We strongly suggest a public hearing before recommendation of the preferred site to the FAA.

## Coordination

Coordination of the recommended site must occur with other divisions of the FAA and other units of government (such as the state aeronautics agency, local governments, and highway authorities) before FAA can approve the site. The Airports Division will request a flight check by the Flight Standards Division for the three candidate sites (including the preferred site).

## Approval of an Airport Site

The FAA will notify the proponent of a proposed site as to whether the recommended site will receive preliminary approval or disapproval after evaluation of all pertinent information and resulting information from the coordination with other affected agencies.

## Detailed Site Planning

The detailed site planning (included in a master plan or ALP report) may not occur until the site has received preliminary approval by the FAA. The preparation of the final ALP may also not occur until the site has received preliminary approval.

Preliminary site planning is necessary to determine the relative extent the proposed development will have on the proposed site. Such preliminary site information would include wind data, a forecast, identification of the critical aircraft, runway dimensions, type of approach needed (precision, non precision, visual), total acreage required, and dimensions of the site needed.

## RESOURCES

### References:

- [Airport Environmental Handbook](#) - FAA Order 5050.4
- [Airport Master Plans](#) - AC 150/5070-6
- [Field Formulation of National Plan of Integrated Airport Systems \(NPIAS\)](#) - FAA Order 5090.3
- [Land Acquisition and Relocation Assistance for Airport Development Projects](#) – FAA Order 5100.37
- **Local zoning and land use plans and regulations** – Consult Local/Regional officials
- **State Aeronautics System Plan** - Contact your State aviation authority



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## 541 - Evaluation Factors for Airport Site Investigations

### Location

1. Names, addresses, and business of local parties interested, including any planning and aeronautical organizations.
2. Reason for site investigation - (Statement of Need) including who proposed the airport, is it a local, regional or national need.
3. Conformity with other plans. Is the proposed airport shown in the NPIAS? Is it shown in the state system plan? Is it shown in local planning documents? Does the proposed site conform to the zoning? Do affected local governments agree with the need and the proposed site?
4. Driving time and distance to other airports from the proposed site within 45 miles.
5. Size and type of airport presently required (include critical aircraft and Airport Reference code); ultimate size and type required. (Refer to NPIAS and state system plan).
6. Relationship of airport to area proposed to be served.

Maps, including a vicinity map, showing locations of candidate sites, USGS quadrangle map(s) showing proposed sites, and Aeronautical chart with proposed sites.

### Airport Site Features

1. General topographic features of vicinity.
2. Meteorological conditions (Mean Daily Maximum temperature, at least one year of wind data for location).
3. Larger scale drawing of each site including topography. (sheet dimensions are recommended to not exceed 11 " by 17" with a scale of between 1" = 2,000' and 1" = 5,000').

### Analysis of Each Site

1. Approximate runway end coordinates and elevations.
2. Section, township, range.
3. Wind rose data.
4. Primary runway approach end.
5. Proposed type of approach to each runway end (Visual, Non precision, Precision).
6. Glide angle available for each approach after obstructions have been cleared.
7. List of obstructions that must be cleared for each runway end.
8. Existing zoning and zoning needed for airport (include name of jurisdiction having zoning authority).
9. Availability of utilities - electricity, gas, telephone, water and sewer.
10. Access road availability and travel time to nearest community.
11. Potential Environmental Impacts

### Engineering and Construction Factors

1. General geological features affecting soil and foundation conditions.
2. Types of soil for foundations and drainage.
3. Clearing requirements including fences, trees, etc.
4. Grading factors - light or heavy rock, need to remove adverse materials.
5. Natural drainage courses of site.
6. Drainage improvements needed for airport construction.
7. General pavement design information (i.e. estimates of excavation and fill, sub base volume and thickness, pavement thickness, type and dimensions).
8. Will the airport be lighted?



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### **Economic/Financial Feasibility for Each Site**

1. Total estimated development cost.
2. Estimated capital improvement plan including federal and local share of costs.

### **RESOURCES**

#### **Advisory Circulars**

- [AC 150/5070-6](#) – Airport Master Plans
- [AC 150/5300-13](#) - Airport Design



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## 550 - Runway Protection Zones

### Overview

Runway protection zones are a trapezoidal area “off the end of the runway end that serves to enhance the protection of people and property on the ground” in the event an aircraft lands or crashes beyond the runway end. Runway Protection Zones underlie a portion of the approach closest to the airport.

Many people have confused the RPZ with the need for Object Free Areas (OFA), Obstacle Free Zones (OFZ), Object clearing criteria, and Part 77 requirements. Each of these serves distinct purposes and are not all coincident.

While the RPZ also has limitations on obstructions (because it lies below the approach surface and because it includes safety areas and obstacle free areas), the primary purpose of the RPZ is the protection of people and property on the ground.

### Airport Property and the RPZ

Under FAA design criteria (which applies to all obligated airports), the airport must own the landing area.

Secondly the airport owner must have sufficient interest in the Runway Protection Zones to protect the Runway Protection Zones from **both** obstructions and incompatible land use.

Finally the airport owner must strive to attain compatible zoning around the airport in order to prevent incompatible land uses that:

- Could cause sufficient conflict that endangers the airport
- Cause it to be closed or
- Require substantial remedial investment to purchase conflicting developed property.

Sponsor may attain sufficient interest in the Runway Protection Zones in three primary ways.

- (1) The first and the preferred method is for the airport to purchase the approach areas in fee. Ownership in fee is preferred because it provides maximum control for the airport.
- (2) The second is through purchase of an easement (or a combination of easement and zoning).
- (3) The third alternative is to rely upon adequate zoning which should be enacted even if fee or easement ownership is in place.

FAA Advisory Circular 150/5300-13 states this ownership policy as follows:

“All ... existing and planned airport elements including the following should be on airport property. (A) Object Free areas, (B) **Runway Protection Zones** (C) Areas under ...Part 77 ... imaginary surfaces out where the surfaces obtain a height of at least 35 feet above the primary surface; and (d) Areas, other than those which can be adequately controlled by zoning, easements, or other means to mitigate potential incompatible uses...Such control includes clearing RPZ areas (and maintaining them clear) of incompatible uses and activities.”

Through experience we have learned that it is usually less expensive in the long run to acquire the RPZ in fee rather than acquiring an easement. This is because an easement must be very restrictive in order to provide adequate control unless zoning is also very restrictive.



## Compatible Land Use

Compatible land use within the RPZ is generally restricted to such land uses as agricultural, golf course, and similar uses that do not involve congregations of people or construction of buildings or other improvements that may be obstructions.

“The following land use criteria apply within the RPZ: (a) While it is desirable to clear all objects from the RPZ, some uses are permitted, provided they do not attract wildlife, are outside the Runway OFA, and do not interfere with navigational aids. Automobile parking facilities, although discouraged, may be permitted, provided the parking facilities and any associated appurtenances, in addition to meeting all of the preceding conditions, are located outside of the object free area extension. **(B) Land uses prohibited from the RPZ are: residences and places of public assembly. (Churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of persons typify places of public assembly.)**”

In cases where the land is already developed and it would be too expensive to acquire the existing development, this policy is a recommendation to the landowner (i.e. it is a notice to the landowner that the FAA considers such uses incompatible).

“Where it is determined to be impractical for the airport owner to acquire and plan the land uses within the entire RPZ, the RPZ land use standards have recommendation status for that portion of the RPZ not controlled by the airport owner.”

Where such land is vacant, it is rarely impractical to acquire the land in the RPZ. Even if the cost of the land seems to be prohibitive the airport owner is expected to exercise sufficient control through zoning or easements to prevent prohibited land uses.

It is FAA policy to object to incompatible land uses that are proposed for property within the RPZ whether or not the airport owns the land and such objection should be anticipated. In particular when we receive a proposal for an airspace study under Part 157 for the RPZ **we will object when that proposal conflicts with an airport planning or design standard or recommendation.**

## FAA Recommendation

We recommend that Airport owners and managers review the Airport Layout Plan for conformity with the above statement. Airports that do not own the entire RPZ should consider the need to acquire such land if there is any possibility that incompatible land uses could occur within the RPZ. In particular easements should be reviewed to ensure that land uses are restricted not just obstructions. Where necessary, requests should be made to the appropriate zoning authority to rezone such land to prevent future incompatible use. Where neither zoning nor easements are adequate the RPZ should be acquired in fee. Airport layout plans should be revised if necessary to show such future land acquisition so that it is eligible under the Airport Improvement Program. An airport can acquire such land and be reimbursed at a later date from a future AIP grant, if funds become available, such land acquisition is shown on an approved ALP, and the FAA determines that such land is eligible.

## RESOURCES

### Advisory Circulars

- [AC 150/5300-13 - Airport Design](#)



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## **560 - Airport Property Interests**

Under FAA design criteria, airport owner must protect existing and planned airspace required for safe and efficient aircraft operations by acquisition or a combination of zoning, easements and other legal means.

The type of control or interest may vary per the type of airport element. Airport owners should generally acquire in fee any property for landing areas, object free areas, apron areas and terminal areas.

For Runway Protection Zones (RPZ), the airport owner should maintain sufficient interest to offer protection from obstructions and incompatible land use. This may be by fee simple or by adequate restrictive easements. For property surrounding the airport, the airport owner shall strive to implement adequate zoning ordinances that would inhibit incompatible land uses.

The Airport Layout Plan (ALP) typically serves as the primary basis for determining the areas of land necessary for proper protection of the airport and associated airspace. Airport owner should give consideration to existing airports limits and planned improvements. From the approved ALP, the FAA will make a determination regarding AIP eligibility in property acquisition.

### **RESOURCES**

#### **Advisory Circulars**

- [AC 150/5300-13– Airport Design](#)

#### **Guidance**

- [AIP-1300 – Airport Land Acquisition](#) (pdf) – Central Region AIP Sponsor Guide





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## 561 - Avigation Easements

### Overview

An avigation easement is a conveyance of a specified property interest for a particular area that restricts the use by the owner of the surface and yet assures the owner of the easement the right and privilege of a specific use contained within the easement document. When acquisition in fee title is not necessary, an avigation easement may be appropriate to secure airspace for airport and runway approach protection and for noise compatibility programs.

Such easement rights may consist of the right-of-flight of aircraft; the right to cause noise, dust, etc.; the right to remove all objects protruding into the airspace together with the right to prohibit future obstructions in the airspace; and the right of ingress/egress on the land to exercise the rights acquired. The easement may also contain any number of additional restrictions as the airport owner deems necessary.

### Suggested Avigation Easement

In developing easement language, a sponsor should secure legal counsel and confirmation that the easement is sufficient to provide the intended property rights.

To assist airport owners in establishing an avigation and hazards easement for their airport, we have prepared a [sample avigation easement](#) they may use when preparing their specific agreement. While we recommend the sponsor furnish this sample to the attorney who will prepare the actual Avigation Easement, we also caution Sponsors not to construe this suggested sample as being complete and whole. Sponsors remain solely responsible for verifying the legal sufficiency of all contractual matters.

### RESOURCES

#### Advisory Circulars

- [AC 150/5100-17](#) - Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
- [AC 150/5300-13](#) - Airport Design

#### Guidance

- [AIP-1300 – Airport Land Acquisition](#) (pdf) – Central Region AIP Sponsor Guide

#### Suggested Form

- [Sample Avigation Easement](#)



## 562 - Zoning Around Airports

### Zoning Overview

When an airport sponsor (owner) accepts an AIP grant the sponsor agrees to the following condition (assurance) as a condition in accepting that grant.

*Compatible land Use: It (the airport owner) will take appropriate action, including the adoption of zoning laws, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility measures upon which federal funds have been expended.*

The objective of zoning land on and around the airport is to assure that future uses of the land are compatible with airport operations to protect and preserve the airport and the public investment in the airport. Zoning strives to prevent the following incompatible uses:

- Residential and other noise sensitive uses
- Congregations of people in approach and departure areas to protect people and property on the ground
- Man made and natural structures that can interfere with flight
- Uses which may be affected by vibration or fumes from aircraft operations
- Uses of land on the airport that interfere with areas needed for aviation related activities

Proper zoning of land on and around the airport can prevent the need to acquire land in fee or easement to protect the airport. (As zoning law is individual to each state, Sponsor must refer to state statutes to determine the extent of zoning authority.) However, typical state aeronautical statutes generally provide greater zoning latitude for airports. You may need to consult an attorney for a legal determination of the zoning authority available in the jurisdiction of your airport may be necessary.

### Airport Layout Plan

The first step in airport zoning is to develop a current Airport Layout Plan (ALP) for your airport. The ALP depicts land that the airport should own in fee as well as land for which easements may be necessary.

The airspace drawings show obstructions to navigation and indicate areas that an airport owner may need to regulate in order to prevent or remove such obstructions. The airport owner should protect Part 77 imaginary surfaces through height limitations on development both on and around the airport and especially in the approach areas and departure areas of the runways. The FAA has published Advisory Circular AC 150/5190-4 "A Model Zoning Ordinance to Limit the Height of Objects Around Airports" for this purpose.

The ALP may be adopted by reference and used to limit the height of objects that would interfere with airport usage. Such adoption needs to be coordinated with local zoning authorities such as the city or county of jurisdiction. Close coordination with the county or city planning departments is essential for successful implementation of airport zoning.

### Zoning for Incompatible Land Uses

Zoning solely to limit the height of objects around the airport will not be sufficient to prevent the construction of incompatible uses such as housing or uses that attract congregations of people in the approach areas. To control these types of uses, exclusionary zoning is necessary to prevent incompatible uses from occurring. We have also developed guidance on what uses the FAA considers incompatible with airports. This guidance is contained in the Advisory Circular AC 150/5020-1 "Noise Control and Compatibility Planning for Airports".



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## **Zoning Authority**

The airport owner has an obligation (due to the grant assurance) to request that the zoning authority enact zoning restricts sufficient to protect the airport. Where the zoning authority and the airport owner are the same it is reasonable to expect that the jurisdiction will enact the appropriate zoning. Good faith efforts to enact appropriate zoning should include a written request from the airport owner to the zoning authority.

Where the zoning authority refuses to enact appropriate zoning to protect the airport, the airport authority must be prepared to acquire the necessary control of land, especially in the approach areas, to ensure right of flight. Such acquisition is clearly more expensive than appropriate zoning. Failure to properly zone property creates the potential for conflicts with adjacent land uses that not only can cause expensive legal fees but can also endanger the public and users of the airport. The FAA encourages appropriate zoning and planning to prevent encroachment by incompatible uses around the airport that can ultimately cause an airport to close.

Various States and other public organizations have developed and implemented model airport zoning ordinances. Airport owner/operators may consider referring to these models as development guide for creating their own zoning ordinance.

## **RESOURCES**

### **Advisory Circulars**

- [AC 150/5190-4](#) - A Model Zoning Ordinance to Limit Height of Objects Around Airports
- [AC 150/5300-13](#) - Airport Design

### **Guidance**

- [AIP-1300 – Airport Land Acquisition](#) (pdf) – Central Region AIP Sponsor Guide



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## 570 - Apron Design

The basic design of airport aprons includes application of FAA airport standards, effective design considerations and AIP eligibility criteria. The primary considerations for apron design are:

- a) Apron Type (Terminal, Transient, Fueling, Based Aircraft and Holding)
- b) Tie down Layout
- c) Based Aircraft
- d) Itinerant Aircraft

Other Considerations include the following:

- Spacing of tiedowns need to match size of AC that utilize airport
- Wind orientation, tie downs into wind when possible
- Design Group considerations

### APRON DESIGN ELEMENTS

#### Taxiway

- A defined path established for the taxiing of aircraft from one part of airport to another.
- Assume a design speed of 20 mph

#### Taxilane

- Portion of the aircraft parking area used for access between taxiways and aircraft parking positions
- Lower speeds allow for reduced safety area and object free areas
- Taxilanes are located outside of the movement area
- Best practice is to locate taxilanes on edge of apron

#### Taxiway/Taxilane Object Free Area

- An area on the ground centered on the taxiway and taxilane that is provided to enhance the safety of aircraft operations by limited objects not fixed by function (e.g. taxiway lights)
- OFA Restrictions include service vehicle roads, parked aircraft, above ground objects not fixed by function.
- Vehicles may operate within an object free area but must yield to operating aircraft.

### APRON DESIGN

#### Locating Taxiways and Taxilanes

- Use ultimate separation standards (See tables in Chapter 2 of AC 150/5300-13)
- Leave room for potential growth of apron
- Provide access to apron, FBO and Hangars
- Aircraft parking areas shall be located outside of taxiway and taxilane object free areas

#### Dimensional Standards

- Refer to tables in Chapter 4 of AC 150/5300-13 for FAA standards on pavement width, safety area width and object free area width.



## **GRADE STANDARDS**

### **Maximum Grade for Aprons**

- For aircraft categories A and B maximum grade is 2%
- For aircraft categories C & D, maximum grade is 1%

### **Maximum Longitudinal Grade for Taxiways**

- For aircraft categories A and B maximum longitudinal grade is 2%
- For aircraft categories C & D, maximum longitudinal grade is 1.5%

### **Grade Changes for Taxiways**

- The maximum permissible change in grade is 3%
- A vertical curve shall be incorporated between changes. The length of vertical curve shall be 100' for each 1% change in grade

## **HANGAR CONSIDERATIONS**

### **Layout of Hangars**

- Best use of space is perpendicular to runway or parallel to runway.
- Separate locations for corporate hangars and T-hangars.
- Provide for potential expansion of hangars
- Avoid orientation that results in a north facing hangar door.
- Locate T-hangars away from the general apron area.
- Locate corporate hangars close to the general apron area

## **AIP ELIGIBILITY OF APRONS**

### **Eligible Areas**

- FAA Order 5100.38 states "The construction, alteration, and reconstruction of public use apron areas are eligible".
- Predominantly exclusive use not eligible.
- Eligibility of Taxiways and Taxilanes follow the same criteria as that of aprons, they must be public use pavements.

### **Ineligible Areas and Items**

- Exclusive use areas - Private use areas, no services for general public
- Pavement within the limits from the edge of the object free area to the face of a structure or object. Typically 20 to 25 feet from face of structure.
- Private use structures such as aircraft manufacturer structures.

## **Size Considerations for AIP Apron**

### **Apron for Transient Aircraft**

- Parking area sized for 50% of busy day itinerant aircraft
- Busy day = 10% more than average day in busiest month
- Allow 360 square yards per aircraft
- Allow 10% for growth
- Provide accommodations for different size aircraft.

### **Apron for Based Aircraft**

- Allow 300 square yards per based aircraft
- Tailored to meet needs of specific based aircraft



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## MARKING OF APRON

- Taxiway/Taxilane centerline must protect the object free area of the class of aircraft taxiing on the centerline.
- Parked aircraft and other objects shall not present a wing tip conflict for taxiing aircraft.
- Recommend spacing of tiedowns per the recommendations of AC 20-35 "Tiedown Sense". Generally the spacing shall be at least the wingspan + 10'. Tighter spacing may require wingwalkers be present for parking aircraft.

## RESOURCES

### Advisory Circulars

- [AC 150/5300-13](#) - Airport Design
- [AC 150/5360-13](#) - Planning and Design Guidelines for Airport Terminal Facilities
- [AC 150/5230-4](#) - Aircraft Fuel Storage, Handling, and Dispensing on Airports
- [AC 20-35](#) - Tiedown Sense

### Suggested Form

- [Apron Size Calculations for Transient Aircraft](#)



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## 580 - Planning Resources

This page presents various available planning resources for the benefit of Sponsors and planning consultants. Additional guidance is available from your assigned FAA planner.

### Advisory Circulars

- [Airport Planning Advisory Circular \(ACs\)](#) - Listing of Advisory Circulars relevant to airport planning.
  - [AC 150/5070-6](#) - Airport Master Plans.
  - [AC 150/5100-17](#) - Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
  - [AC 150/5190-4](#) - A Model Zoning Ordinance to Limit Height of Objects Around Airports
  - [AC 150/5200-33](#) – Hazardous Wildlife Attractants on or Near Airport (agricultural leases, crop restriction lines, etc.)
  - [AC 150/5230-4](#) - Aircraft Fuel Storage, Handling, and Dispensing on Airports
  - [AC 150/5300-13](#) - Airport Design
  - [AC 150/5360-13](#) - Planning and Design Guidelines for Airport Terminal Facilities
- [Design Standards](#) - A quick cross reference to design standards for various airport related equipment, facilities and structures.

### Publications, Reports and Documents

- [ALP Checklist](#) (MS Word) - A Central Region tool intended to assist airport planners in preparing airport layout plans in accordance with FAA requirements.
- [Aviation Forecasts](#) - Access various forecasts and trend analysis documents made available by the Office of Aviation Policy and Plans (APO)
  - Current FAA aviation forecast.
  - Long Range Forecasts
  - Terminal Area Forecast (TAF)
- [Passenger & Cargo Data](#) - Access enplanement and cargo data that is extracted from the Air Carrier Activity Information System
- [Aeronautical Survey/GIS Program](#) - The FAA website portal for submitting aeronautical survey and airport GIS data. This site includes
  - General information on how to gather and transmit survey data to NGS and the FAA.
  - Sample Scope of Work documents
  - Survey and Quality Control Templates
  - Geographic Format Templates (Autodesk, Bentley and ESRI)
- [Unpaved \(Turf\) Runways](#) – Information and guidance on turf runway dimension/design standards

### Software Applications

- [Apron Area Calculator](#) - A MS Excel spreadsheet for sizing of aprons for itinerant aircraft based upon guidelines established within Appendix 5 to AC 150/5300-13.
- [Snow Plow Calculator](#) - A MS Excel spreadsheet for sizing of rotary plow capacity and snow plow blade length based upon guidelines established within AC 150/5220-20.



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- **[Geodetic Toolkit](#)** - Applications provided by [National Geodetic Survey](#) to calculate geodetic positions and to determine magnetic declinations