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AUSTIN-BERGSTROM INTERNATIONAL AIRPORT



ABIA Environmental Initiatives

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The City of Austin is currently constructing a new international airport at the former Bergstrom Air Force Base site. The cost of the new facility is estimated at \$585 million and the airport will be open in spring 1999.

Throughout the planning, design and construction, the City has seized every opportunity to develop the airport in the most environmentally friendly way. With the following environmental initiatives, *the City has embraced and protected the environment, reduced airport costs and minimized environmental liabilities.*

Austin-Bergstrom International Airport (ABIA) is a model for sustainable development. *Energy efficiency, improved air and water quality, water conservation, and the efficient use of resources* are examples of the City's innovative approach to sustainability.

The City assisted the US Air Force with expediting the clean up of environmentally contaminated sites. The "Team Approach" developed by the City *resolved significant environmental clean up delays, reduced costs* and enabled airport construction to proceed as scheduled.

The reuse and recycling of the existing infrastructure and facilities represents a highly innovative use of scarce resources. Activities such as the *relocation of military housing, reuse of fuel tanks, recycling of concrete and the salvage of building components* conserved resources and reduced waste streams.

By pursuing innovative noise mitigation techniques, such as the enactment of *noise compatibility zoning*, the City will *reduce noise impacts* while improving community relations.

Public workshops and hearings, quarterly newsletters, virtual reality videos and education programs enable the City to keep *local residents informed and involved* in the development of the new airport.

The City has placed strong emphasis on the preservation of archeological and historical sites located on the airport. This effort will help *preserve local history.*



Environmental Initiatives

ABIA



INTRODUCTION

The City is developing ABIA as a model environmental airport. From the start of the project in 1992, the City has seized every opportunity to develop the airport in the most environmentally friendly way.



From assisting with the Air Force environmental cleanup of the base to salvage and recycling of existing military infrastructure, ABIA represents the state-of-the-art in environmentally sensitive airport development.

The Federal Aviation Administration (FAA) Southwest Region recognized the environmental initiatives being made with the airport and in 1997 bestowed on the City an Environmental Achievement Award.

SUSTAINABLE AIRPORT DEVELOPMENT

In developing the new airport the city is using materials, principles and practices that will result in an environmentally sustainable airport. Beginning with careful site planning and design, the city is constructing an airport that will operate efficiently and effectively while minimizing the depletion of natural resources.

Energy Efficiency & Peak Demand Reduction

The terminal building and its central heating and cooling systems are among the most reliable and energy efficient type available. With



the addition of thermal storage, the plant will provide a peak electrical reduction in excess of 1400 kW. This equates to a 48% reduction in peak demand.

The City's goal for energy efficiency in the terminal is to exceed the Lighting and Thermal Envelope standards of the energy code by more than 15% and 10% respectively. The integration of all building systems will enable the city to achieve this goal. Additional energy efficiency and peak demand reduction techniques include:

- As sited, the orientation of the terminal building reduced the amount of wall and window glazing required on the eastern and western portions of the terminal. In addition, shading devices functioning as window glazing have been installed on the southern portion of the terminal.
- Thermally efficient glass that restricts heat flow but allows natural light to pass has been installed throughout the terminal. Ceramic frit also has been applied to certain glass lights located in carefully designed areas to specifically reduce glare and heat gain while retaining visual acuity.
- Efficient building insulation had been utilized throughout the terminal.

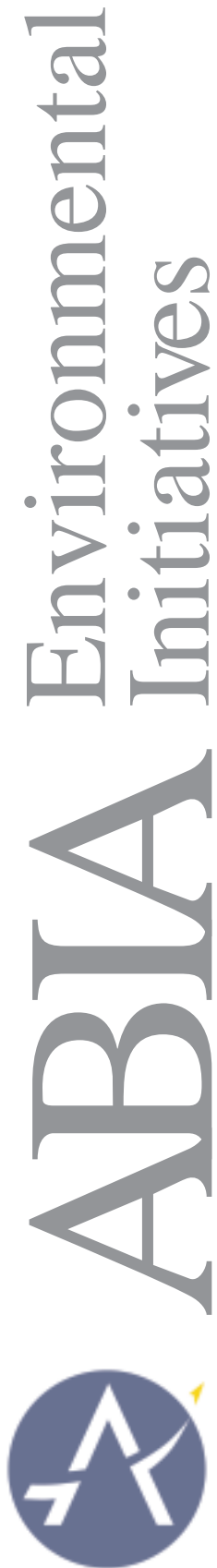
Efficient & Environmentally Sensitive Use of Raw Materials & Building Materials

Building materials were selected for durability, longevity and ease of maintenance. The finished surfaces exposed to public activity were designed to withstand the rigors of people and baggage with little need for replacement or "touch-up." By utilizing the following materials the City was able to minimize the depletion of natural resources.

Building Structure

- Primary structural framing system of the terminal which includes, beams, columns, shapes and plates were constructed from 100% recycled materials.
- Concrete reinforcing steel used in the terminal construction contained 95% recycled materials while the steel studs used in the terminal wall infrastruc-





ture contained 65% - 75% recycled materials.

- Concrete used in terminal construction contained 10%-15% flyash while the runway, taxiways, and apron concrete mixes contained 20% flyash. Approximately, 16,000 tons of flyash has been utilized to date.

Finish Material

- Granite flooring and walls, and terrazzo flooring were used throughout the terminal, as they are durable and capable of withstanding the rigors of public traffic. The materials also are non-absorptive which improves the Indoor Air Quality (IAQ).
- Finishing paints utilized in the terminal emit low levels of volatile organic compounds (VOCs), also enhancing IAQ.
- Recycled products such as gypsum paperboard facing which contains 100% recycled materials were used throughout the terminal.
- Toilet partitions installed in the restrooms contain a High Density Polyethylene (HDPE) recycled plastic content.
- Carpeting installed throughout the terminal has a manufacturer guarantee that stipulates that all returned carpet will be recycled into other products.
- Wood products used in the overall construction of the airport were supplied from controlled growth forests.
- Roofing insulation installed throughout the terminal was manufactured without the use of "CFCs." In addition, the roofing is comprised of light colored cap sheets that reflect heat.

Site Construction

- Contractor Environmental Protection Programs were developed and implemented



in order to minimize environmental impacts resulting from construction activities.

- Clean builder practices such as the installation of silt fencing, use of run off controls, creation of sedimentation ponds, and the fencing and relocation of trees were required.
- Proper site planning and design balanced the amount of cuts (excavations) and fills (embankments) to maximize the reuse of materials existing on site and to minimize the quantities of materials being imported or removed for disposal.

Air Quality Initiatives

The City is continuously searching for new and innovative ways to improve the regional air quality. As such, the City has developed and implemented the following landside and airside initiatives, in order to reduce emissions from airport sources.

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Landside Initiatives

ABIA can be expected to have excellent IAQ that will be a model for other airports.

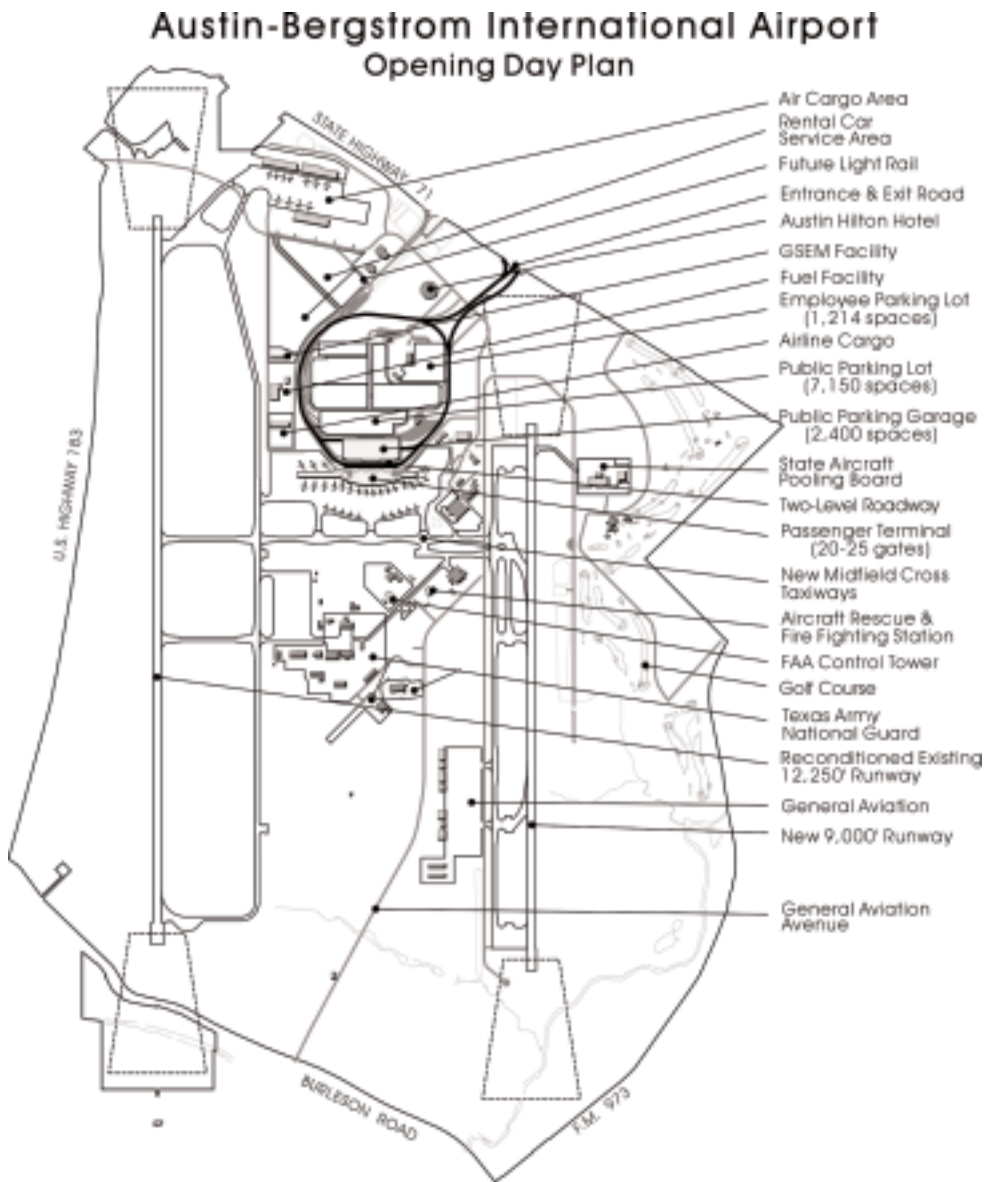
This will be achieved through:

- Restricting the infiltration of contaminated outdoor air through the use of vestibules and air doors.
- Purifying ventilated air through the use of high efficiency air filters that absorb odors, VOCs and emissions.
- Utilizing interior finish materials and air delivery ducts that are resistant to microbiological growth. All air conditioning equipment and duct insulation is treated to resist microbiological growth.
- Exhausting of air contaminated prone areas directly out doors.
- Providing automatic ventilation control on the apron through the use of a carbon monoxide sensor system.
- Utilizing low emission fuels heating and cooling equipment in the terminal and central plant.

Airside Initiatives

The City has designed the airport to minimize air emissions to reduce the effect on regional air quality. Some of the more creative design features include:

- An efficient airfield layout that minimizes aircraft taxi distances, resulting in lower fuel use and reduced air emissions. As alternative fuels are not available for commercial aircraft, reducing engine burn time is primary mitigation strategy to reduce emission.
- While parked at the gate, aircraft at ABIA will use building-supplied electric power and air conditioning. This will eliminate the need to run on-board auxil-



ary power units thus helping to reduce emissions near the passenger terminal.

- The latest Instrument Landing System technology will allow aircraft operations in the poorest of weather conditions. Aircraft will spend less time idling while waiting for clearer weather, resulting in lower emissions. In addition, aircraft holding time while waiting to land will be reduced also helping to lower emissions.
- Alternative fuels such as compressed natural gas and electricity will be avail-

ABIA Environmental Initiatives



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able for use by Ground Service Equipment (GSE) which service airplanes. The use of these fuels will result in lower emission and higher air quality environment in the vicinity of the passenger terminal aircraft parking apron.

- Airport planning worked closely with Capital Metro to ensure accessibility by current available mass transit (buses) and future proposed mass transit (light-rail) systems.
- Aviation Department is planning to utilize alternate fuel vehicles with low emissions for its airport operations and is encouraging the airline tenants to do the same.
- Providing cooling and power supplies from ramp service equipment to parked aircraft will greatly reduce aircraft emissions.

Water Conservation

The City's Water Conservation efforts were focused in three areas; Plumbing Fixtures, Landscaping and Landscape Irrigation as these consume most of the water at the airport. In addition to providing low consumption plumbing fixtures, all fixtures in public toilets will utilize automatic flow control valves to eliminate wasting of water by excessive use or by being left open.



Landscape plant materials will be limited to native plants with some use of xeriscaping. Prairie grass installations and the selection of low growing native grasses will be used as a means to reduce mowing requirements and other field maintenance. Landscaping will be irrigated by a system that delivers water where it is needed in an efficient manner.

Reclaiming wastewater will continue to be used for irrigation of the ABIA Golf Course and the City's landscape designer will incorporate the ability to add reclaimed water (stormwater or treated effluent) to the irrigation system supply as adequate quantities become available. Additionally, discussions with the City's Water and Wastewater Department have been initiated to investigate the integration of the Airport's distribution system with the Department's treated effluent distribution system.

WATER QUALITY IMPROVEMENTS

The City has seized every opportunity to improve the quality of water leaving the airport property. Nearly 2 million square feet of water quality improvements, including sedimentation/filtration basins, temporary holding ponds and other runoff controls have been constructed at ABIA. Water quality ponds have been placed at strategic points across the site to filter storm water runoff from aircraft ramps and vehicular parking areas. Some of the more innovative water pollution initiatives include:

- Sophisticated recovery equipment and separators were incorporated into the Aircraft Fuel Storage Facility to recover fuel leakage associated with normal fueling operations.
- All aircraft fueling and de-icing areas have fuel spill collection and containment systems.



ABIA Environmental Initiatives




- Contaminated runoff will be captured and disposed of, primarily via sanitary sewer and treatment plants, rather than being discharged.

ENVIRONMENTAL REMEDIATION

The ABIA property was formerly occupied by the U.S. Air Force, which was responsible for the creation and remediation of 481 hazardous waste sites. These sites cover a wide range of character and size including fuel spills, landfills and underground plumes of solvents. Cleanup is expected to cost \$55 million.

The cleanup is led by the Air Force Base Conversion Agency (AFBCA) and involves many entities as shown in the graphic below. Construction of new airport facilities cannot occur in any areas of contamination, which have not been cleaned up by AFBCA and approved by the regulators. Additionally, the City must closely monitor the cleanup to ensure that City construction workers are not inadvertently exposed to hazardous materials. Thus, the cleanup of the former military base is critical to the construction and operation of ABIA.

In early 1994, it became clear that the cleanup was not progressing according to published schedules. An administrative logjam developed, characterized by deferred decisions and time-consuming paper trails, which threatened to delay construction and opening of the new airport. The Austin City Council passed a resolution indicating serious concerns about the cleanup process, and Mayor Bruce Todd led a series of meetings with elected representatives and Air Force officials in Washington, D.C. The Air Force responded to this statement of urgent need and all parties began to implement a process to enhance the cleanup efforts.



- The City assembled a comprehensive graphic and text data base of all known environmental sites on the property. (The Air Force had multiple studies and documents throughout which information about the sites was scattered.) The database is being used to track cleanup and closure of sites.
- Overall coordination was increased and the City took a leading role in the process, recognizing its responsibility as a representative of the citizens of Austin. The participants formed a new process based on a "Team Approach"

ABIA Environmental Initiatives



that included weekly coordination meetings, monthly conflict resolution meetings with environmental regulators, and monthly executive-level meetings. A new Executive Team provided senior-level management, prioritization and decisions.

The change in structure and roles worked, and there are currently no known environmental cleanup sites in the critical schedule path of airport construction. In addition, the increased cooperation and coordination resulted in significant cost savings for the cleanup and the new airport construction projects.

- The Air Force saved \$1.5 million when regulators and remediators together worked out a highly strategic plan for testing the entire base sanitary sewer system for contamination.
- The City proposed that a small hill to be removed from the new East Runway corridor be used in Air Force work on several landfills. This resulted in more than \$500,000 in savings to the Air Force and almost \$1 million in reduced airport construction costs.

In recognition of the efforts of the Executive Team, the Public Employees Roundtable in 1996 awarded the partnership and cleanup with a Certificate of Excellence.



REUSE AND RECYCLING

The City is recycling much of the existing military base infrastructure. Wherever possible, facilities and elements of facilities are being reused. One important benefit of the reuse/recycling effort is that less waste material is taken to area landfills, preserving capacity for other needs. By pursuing the following initiatives the City is able to utilize scarce resources more effectively, while contributing to the local communities:

- The City provided an on-site salvage yard to assist contractors with salvage and reuse of building components. Contractors displayed and sold doors, cabinets, windows, electrical and plumbing fixtures, air conditioning and heating equipment and other salvageable items.
- Building demolition waste was segregated by type of materials to allow recycling of steel and copper building components.
- An existing aircraft hanger scheduled for demolition was disassembled and reused by the contractor.
- Existing topsoil was stockpiled for reuse. Topsoil, which is created by years of environmental conditions, was removed from project areas where excavation was required. This soil was stockpiled for latter reuse after project completion, reducing airport construction costs and contributing to a better planting environment.
- On-site fencing had been reused for both permanent and temporary access controls.
- Existing Air Force runway, taxiway, and apron pavements were rehabilitated and reused.
- Electrical primary wiring was salvaged and sold for scrap.



ABIA Environmental Initiatives

- Terminal Contractor is recycling steel scrap from construction.
- More than 40 trees were relocated on the site, making way for new airport facility construction.
- Excess soil from excavations had been reused for embankments rather than hauled to landfill.
- The existing Air Force golf course was modified to accommodate the new airfield configuration and was added to the City's inventory of public golf courses.
- Implementation of an Airport Waste Recycling Program, reuse of paint solvents, recycling waste oil from vehicle engines and oil filters, and reclamation of jet fuel from the airport fueling facility.
- Installation of dual trash chutes in the terminal. At each trash chute location there are two chutes - one for recyclable waste and one for all other waste. The trash compactor area also is set-up with dual compactors for the separation of waste materials to foster recycling of terminal generated wastes.

Some of the more noteworthy programs implemented by the City included:

Military Housing Relocation

Over 700 single family and duplex military houses are being relocated from the



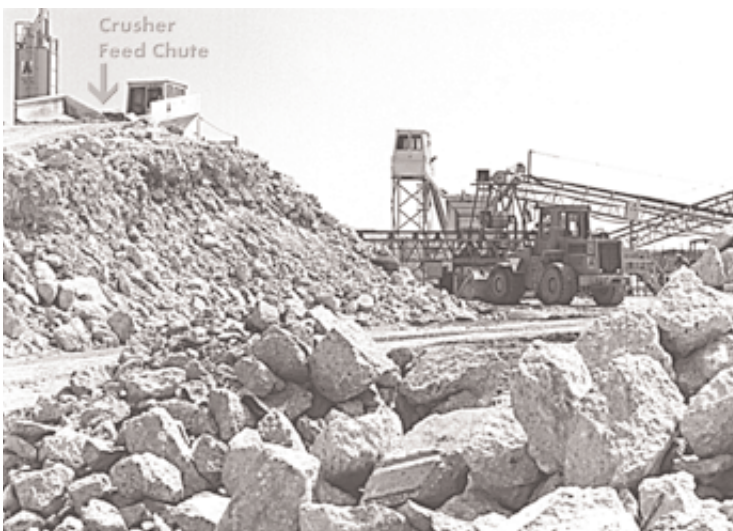
property and made available to low-income families. These houses are sold to families using low-interest loans. The brick is removed from the houses and they are unbolted from the concrete slabs. Duplex houses are cut in half, yielding two smaller houses. Long steel beams are inserted through the houses and attached to a truck for the move. Following placement on a new slab, siding is installed as the exterior finish. The City is saving approximately \$1 million in demolition costs by relocating the military housing.

Existing Fuel Tanks Relocated

Two large aircraft fuel tanks were relocated on the site to allow refurbishment and reuse. The tanks, which together can hold over one million gallons of fuel, needed to be moved away from the soil contamination area. A contractor installed larger air compressors on the tank sides connected to a large rubber ring around the base. The tanks were cut free from their bases and "floated" to a new home, saving \$200,000.

Concrete Recycling

A major on-site concrete plant has saved the City more than \$2 million in crushed aircraft pavement. The City received assistance from the FFA, which





approved the use of the crushed concrete as a drainage layer under new airfield pavements. The FAA believes that this is the largest installation of drainable base course ever undertaken at an airport. More than 250,000 tons of existing Bergstrom aircraft parking pavement have been removed to allow construction of the passenger terminal and the midfield cross taxiways. The concrete was broken up and transported to a crush plant. Two types of crushed material, fine and coarse, were produced and separated by the crusher. The crushed concrete is used underneath new pavements and utilities, providing a stable base for airport facilities construction.

Chapel Elements Salvaged

The existing military chapel was relocated in a corridor needed for airport access roads. During demolition the City worked with its contractor to locate a small church which needed the beautiful wood beams and the bell. The contractor carefully worked around the beams preventing damage while exposing them for removal. The materials were then trucked to their new church home.

REDUCED NOISE IMPACT

When ABIA opens, noise impacts due to aircraft activity will be significantly reduced. The number of residents who live in an airport noise area will be reduced from over 30,000 (around Robert Mueller Municipal Airport) to approximately 1,500. The City will save over \$50 million in sound insulation costs for the residences around Robert Mueller Municipal Airport. Four schools adjacent to ABIA, which were previously impacted by military aircraft noise, will be relocated. In 1996, the City reached an agreement with the Del Valle Independent School District for the purchase of the schools. The FAA is providing a significant portion of the funding for the school purchase.

To prevent encroachment of incompatible land uses around the new airport, the City in 1994 enacted compatibility zoning. As shown at left (What is this referring to?), new noise sensitive land uses cannot be established within the airport noise impact area. The zoning is based on a conservatively large area, which will shrink with the increasing use of latest-technology quieter aircraft engines. Airlines are required by Federal law to convert all of their aircraft to this technology by the year 2000.



COMMUNITY INVOLVEMENT

The City used every avenue available to involve the local community in the development of ABIA.

- During the Airport Master Plan, Environmental Impact Statement and FAR Part 150 Noise Study, open house workshops and public hearings were used to discuss the project with citizens and learn about public questions and concerns.
- A newsletter has been published since 1992, which informs the public of the progress and overall status of the airport development program. Distribution

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ABIA



is via direct mail (approximately 2,000) and through public presentations.

- The City has produced three generations of a virtual reality video to help the public visualize the new airport. The latest version of the video, which takes the viewer up the access road and into the passenger terminal, was awarded first place in the 1997 ACI-NA Marketing and Communications Contest.
- The City conducts over 40 public presentations annually to interested citizen groups. These presentations typically include photographic slides on the latest airport construction and handout materials,
- The New Airport Project Team (NAPT) developed an Educational Outreach Program for local Del Valle High School students. Called "Passport to Aviation," the program uses airport construction to teach environmental principles, math and science. The students visit the new airport monthly for brief lessons followed by field visits to see the principles put into action. The education program was honored in 1996 with an "Above & Beyond" Red Apple award from the school district.



ARCHAEOLOGICAL AND HISTORIC PRESERVATION

In follow-on investigations resulting from the Environmental Impact Statement, the City took action to preserve cultural history through analysis, field testing and protective measures. This work had been completed and approved by the Texas Historical Commission.

- Two on-site cemeteries were designated as State Archeological Landmarks, but were not eligible for inclusion in the National Register of Historic Places. Both cemeteries are located away from future airport development areas. A permanent buffer zone has been established on the Airport Layout Plan and a long-term management plan has been prepared for these cemeteries.
- A total of 44 archeological sites and three architectural properties were evaluated. Five of the archeological sites were found to be potentially significant and field testing was accomplished for each. The testing indicated that only one site was eligible for State and National historic designation.
- During the course of the analysis, extensive coordination with local citizens was accomplished. The City provided field visits and early reviews of draft reports to interested citizens. Students in the "Passport to Aviation" program participated in actual data recovery during archeological site field testing.

CONCLUSION

The City, in cooperation with the various regulatory agencies and the local community, has developed and implemented environmental initiatives in order to protect and enhance the local environment. The "Team Approach" adopted by the City has allowed the incorporation of state-of-the-art environmental practices into the planning, design and construction of the ABIA. The City believes that these initiatives and the lessons learned can be used by other airports dealing with similar environmental and facility redevelopment challenges.

