LEGAL AND ECONOMIC ASPECTS OF ENVIRONMENTAL CONSTRAINTS ON AIRPORT LANDSIDE CAPACITY

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This paper focuses on environmental considerations and some ancillary institutional factors arising out of common law rights, major federal legislation, and state legislation. Until recently, landside capacity was not subject to significant environmental constraints. However, the probability of federal funding for heretofore ineligible landside components and the increasing sophistication of environmental analysis suggest that landside capacity will be constrained in the future by environmental considerations. Accordingly, this paper reviews the experience of airports under the environmental legislation for the years 1968 to 1974 as an indicator of the nature and dimensions of environmental constraints. In that period, projects or operations at more than 50 airports were delayed, halted, abandoned, or modified as a result of the federal environmental statutes. As an analytical tool, the paper presents a matrix of potential costs associated with the statutes, together with a summary of the limited data on actual costs incurred in that period, both as a result of the statutes and as independent or voluntary expenditures. Environmental processing and litigation under the National Environmental Policy Act have entailed significant delay to projects, which in turn resulted in substantial cost increases, primarily associated with inflation. Although there is some room for improving the consideration of environmental factors, airport development has become an inherently more complex undertaking. Four phases of the environmental era are delineated, and issues relating to landside capacity are identified for further study. The information from these studies is needed to convert the constraining influence of environmental factors into opportunities for improved decision making.

The primary focus of this paper is on environmental constraints; some discussion of ancillary institutional factors is also included. The environmental constraints discussed arise out of common-law rights, major federal environmental legislation, state environmental legislation, and the manner in which the rights and laws are construed and implemented. (The federal legislation is treated

more extensively than the other sources of environmental constraints because of its application nationwide.)

In the case of airports, "opposition to airport development had reached a peak before the enactment of the myriad of environmental protection laws" (1). In 1966, more than 160 suits were pending against airport sponsors. With the enactment of several federal statutes since 1966, the federal government received a strong congressional mandate to integrate environmental considerations into its policies and programs. State governments have followed suit. The advent of the environmental statutes has introduced new elements and priorities into the decision-making process at all levels. But with the exception of congressional oversight hearings on certain statutes, there has been little analysis to date of the overall effect of environmental considerations on airport development and operations, and none insofar as the author knows related specifically to landside capacity.

The importance of considering the impact of environmental constraints on landside capacity is underscored by the magnitude of the landside investment contemplated during the next 5 years. According to the most recent published survey (2), almost $4 billion in capital development is required to meet the landside needs of the nation's airline and reliever airports. The large hub airports account for the largest proportion of landside investment to total investment (56 percent or $1,953 million), not counting land banking requirements. Although it was not possible to determine from the survey report the basis on which need was calculated (relative to factors such as projected enplanements or rate of growth in air transportation or fleet mix and frequencies), the relative proportion of landside needs to airside needs supports the view that landside capacity at large hubs may soon be the operative constraint on an essentially mature airside. Assuming for argument that these data are realistic estimates of resources required to support airside capacity as it exists or is likely to be developed, the question becomes, What impact, if any, will environmental considerations have on achieving the landside capacity? (Support includes any stimulation factor to traffic growth associated with improved landside capacity.)

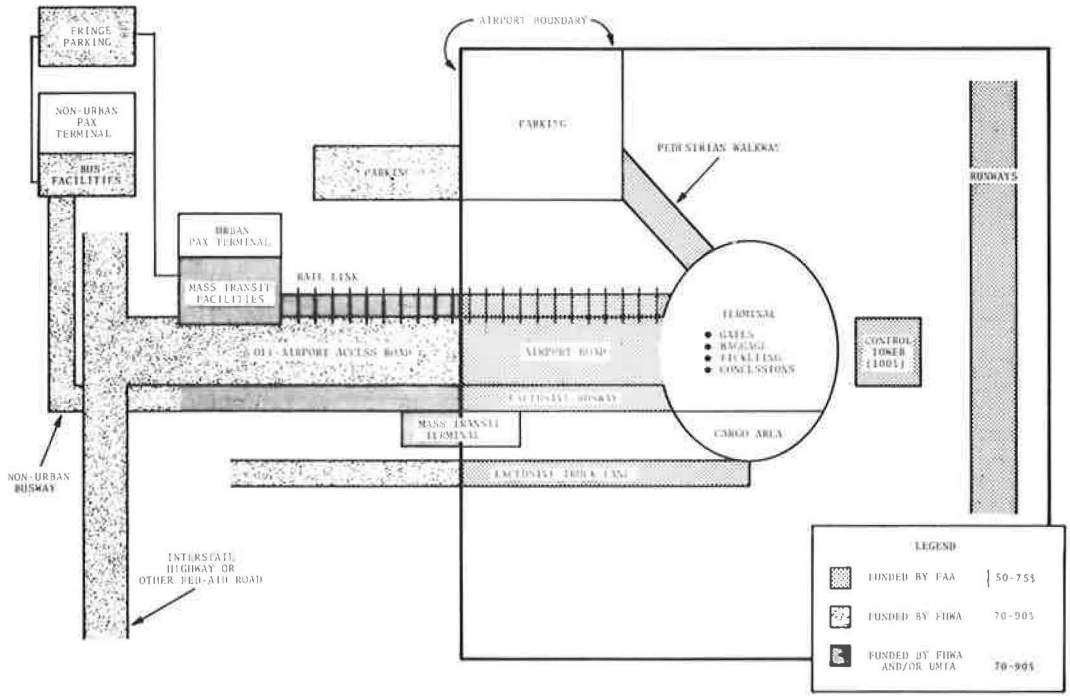
Until recently, landside capacity was not subject to significant environmental constraints on its own account, but was impacted indirectly by environmental constraints imposed on the airport airside, the airport in toto, or access systems (principally highways). This is not surprising in view of the interface function of the landside, within a limited geographical scope, and the predominance of noisy aircraft as the source of opposition to airport development and operations.

Moreover, some landside components have been effectively insulated from certain federal environmental requirements because they are ineligible for funding by the existing federal assistance program under the Airport and Airway Development Act of 1970, which expired in June 1975. (There is a legal argument to be made that the absence of federal funding alone is not sufficient to insulate a component if the project is sufficiently "federalized.") Current funding is shown in Figure 1.

However, the situation is changing. Environmental analysis has become more sophisticated, and increasing attention is being paid to issues that are directly related to landside components. Of particular interest are those components associated with automobiles, such as garages and other parking facilities. At the same time, the probability appears high that federal funding will be provided for previously ineligible landside components under the successor federal assistance program currently being considered in Congress. Thus, environmental constraints on landside components per se may increase.

This paper offers a capsule review of the experience of airports under the environmental statutes to date and outlines some factors that may shape the future of environmental constraints on landside capacity. The remainder of the paper is organized into 3 sections: statutory framework, impact on airports, and future outlook and issues.

Figure 1. Summary of federal capital funding of airport and access components (excluding land acquisition).



STATUTORY FRAMEWORK

Federal Environmental Statutes

Seven environmental statutes constitute the bulk of federal environmental legislation affecting airports. Relevant aspects of the 7 statutes and their implementation are briefly discussed below.

National Environmental Policy Act

Under section 102(c) of the National Environmental Policy Act of 1969 (NEPA), an environmental impact statement (EIS) is required in all cases of major federal action significantly affecting the environment.

Another "action-forcing" provision of NEPA is the requirement in section 102(2)(b) that federal agencies identify and develop procedures to ensure consideration of currently unquantified environmental amenities and values.

Section 309 provides for a review procedure by the Environmental Protection Agency (EPA) and referral to the Council on Environmental Quality (CEQ). Revised CEQ guidelines (as of August 1973) reflect judicial interpretations, clarifications of existing policy, and statements of evolving policy such as a strengthened emphasis on public participation in the analysis of environmental factors. Although CEQ's role is limited to review, it can recommend to the president that an executive order be issued to stop a proposed action by a federal agency.

This landmark legislation has engendered substantial litigation to interpret the statutory language. Confusion has resulted from varying and often conflicting interpretations

of NEPA issues and from the successive changes in agency guidelines and regulations for implementing the statute.

Department of Transportation Act

Section 4(a) of the Department of Transportation Act of 1966 (DOTA) provides for research and development on noise abatement; section 4(f) relates to parklands, recreation areas, wildlife and waterfowl refuges, and historic sites and calls for "all possible planning to minimize harm" after determination that there is no feasible and prudent alternative to the use of such land.

Airport and Airway Development Act

Sections 16(c)(3), 16(c)(4), 16(d), 16(e), and 18(4) of the Airport and Airway Development Act of 1966 (AADA) deal with the determination by the secretary of transportation that certain prerequisites or conditions have been met as to community interest, environmental protection, public hearings, assurance of compliance with applicable air and water quality standards, and zoning and other compatible land use procedures.

Air Quality Act and Clean Air Act Amendments

Pursuant to the Air Quality Act of 1967, the secretary of health, education and welfare undertook a study of the impact of aircraft on the national air pollution problem, transmitting the study results to Congress in December 1968. Smoke emission research had already been under way since 1964, but it was not until January 1970 that 31 airlines, the U.S. Department of Health, Education, and Welfare (HEW), and the U.S. Department of Transportation (DOT) reached an agreement to accelerate a voluntary program to retrofit smoke burners, now essentially complete.

Under the Clean Air Act Amendments of 1970 (CAAA), EPA was given responsibility for aircraft emission standards, thereby preempting state action, and provision was made for citizen suits. Compliance with the fuel venting and exhaust emission standards set by EPA (effective February 1, 1974, with certain exceptions) has been assured by a Federal Aviation Administration (FAA) regulation issued December 28, 1973. EPA has also promulgated (a) proposed regulations banning federal grants and loans to facilities violating requirements of the Clean Air Act Amendments and (b) regulations requiring preconstruction review of indirect sources of air pollution, which will apply to any new airport with 50,000 or more aircraft operations annually and any modified airport increasing operations by 50,000 or more. (For lack of funding, preconstruction review was postponed until July 1, 1975. However, state laws modeled on the federal regulation may have required permits for construction prior to July 1, 1975.) EPA yielded on some aspects of transportation control plans that would have affected airports.

Federal Aviation Act Amendments

The Federal Aviation Act Amendments of 1968 (FAAA) authorize the FAA administrator to establish standards for measuring aircraft noise and sonic boom and to provide for their control and abatement. FAA has promulgated Federal Aviation Regulations (FAR) Part 36, to achieve reduced noise levels for new subsonic jets and other transports. Regulations have also been issued covering new production of previously certified jets. Proposed retrofitting of older jets not covered by FAR Part 36 is being extensively analyzed. FAA has also prescribed preferential runway use, courses and altitudes for landings and takeoffs, and other operating procedures. Other operational procedures are being developed.

Noise Control Act

The most recent noise control measure, the Noise Control Act of 1972 (NCA), assigns primary responsibility to FAA, after consultation with the secretary of transportation and EPA, for control and abatement of noise and sonic boom by prescribing standards for noise measurement and by issuing regulations for control and abatement of noise. EPA was directed to conduct a study of aircraft and airport noise and to review FAA regulations in an advisory capacity. FAA would be required to hold hearings on EPA-proposed regulations, but retains sole authority to promulgate such regulations, taking into account factors such as safety and feasibility. Its decisions are to be published in the Federal Register.

Notwithstanding the Noise Control Act of 1972 and the 1973 Burbank decision, which affirmed federal preemption of aircraft noise jurisdiction, a 1962 decision is still controlling, which renders the airport operator responsible for acquiring easements and, therefore, liable for damages. (The famous footnote 14 in the Burbank decision left open the extent to which proprietary rights of the airport sponsor could be exercised to abate noise. Litigation of this issue is pending in California.)

Federal Water Pollution Control Act

The principal relevance of the Federal Water Pollution Control Act Amendments of 1972 (FWPCAA) has been to federal facilities pursuant to Executive Order 11752. It provides for effluent limits and a permit program for point sources. Both the clean air and the water acts specifically reference state legislation, which is enforceable over and above federal requirements, with certain exceptions such as aircraft emission standards.

State Statutes

The states can be expected to play an increasing role in environmental decision making. Since 1970, "nearly every state legislature enacted laws to protect or preserve environmental quality," including land use regulations, constitutional guarantees to clean air and water, citizen suit provisions, and legislation to protect water, coastlands, and shorelands (3). Of particular significance are the so-called "progeny of NEPA." Twenty-one states have instituted impact assessment requirements, and 15 others are considering such action, according to the Council on Environmental Quality. Both California and Massachusetts laws requiring impact assessments have been applied to airport sponsors.

Several state statutes go beyond the federal requirements. For example, Michigan includes the cost of modification to eliminate or minimize an adverse environmental effect. The California statute provides for explicit evaluation of the secondary consequences of a facility, e.g., the "growth-inducing impact." Also, the states may provide a lower threshold for environmental procedures. For example, the Massachusetts Supreme Judicial Court upheld a lower court decision that the threshold of potential environmental damage is minimal, in accordance with the intent of the statute and the safeguards in the implementing regulations against unnecessarily burdensome paperwork (Boston v. Massachusetts Port Authority, Supreme Judicial Court of Massachusetts, No. 112, 113, Feb. 5, 1975).

IMPACT ON AIRPORTS

Substantial progress has been made in incorporating the national concern for the environment and human wellbeing into the day-to-day functioning of government bureaucracies and the private sector. However, this institutionalization has been achieved only at the price of delays and complications inherent in developing a more sophisticated

decision making process.

The administration of the environmental statutes has become increasingly complex since 1966. Heavy demands have been placed on airport sponsors and government agencies that are frequently understaffed and underfunded for the tasks involved. Three federal agencies—FAA, DOT, and EPA—now have significant influence over the development and operations of airports. In addition, the U.S. Department of Housing and Urban Development (HUD) and the U.S. Department of the Interior (DOI) can control important elements. [The role of the Civil Aeronautics Board (CAB) via the economic regulation of carriers appears to have been less than fully appreciated.] This fragmentation of responsibility, together with the encouragement of public participation and judicial review, has engendered a confusing and sometimes conflicting body of regulatory policies. Within the scope of this paper only a few aspects of the implementation of the environmental statutes can be touched on. The following sections discuss affected airports, costs of the environmental statutes, impact statements, and litigation.

Impacted Airports

One parameter of impact is the number of airports significantly affected by environmental issues. For the period 1968 to 1974, projects or operations at 53 airports or proposed airports were delayed, halted, abandoned, or modified as a result of the federal environmental statutes (Table 1). These comprise 22 large hub, 9 medium hub, 4 small hub, and 18 nonhub airports. (In some cases, opposition to projects or operations predated the statutes and might have continued or been successful even in the absence of the statutes.) In addition, projects in California and Massachusetts have been halted or delayed on account of state statutes. Only one of these projects (San Francisco) involved opposition to landside development per se.

These airports were identified by an informal canvassing of FAA regional offices and industry sources. In addition there are a number of airports that experienced delay to projects as a result of NEPA procedures.

The most severely affected airports as measured by the length of time between initiation and ultimate result or current status have been those airports whose development plans began prior to 1970. These include both expansion plans and new jetport plans. Many of these airports would also qualify as most severely affected as measured by the divergence between original conception and actual outcome.

The experience of 2 such airports, Portland (International) and Miami (Everglades), is illustrative. In Portland, a proposed expansion plan initiated in 1967 was withdrawn in 1973 after challenge by a small but active group that lost every legal battle but won the war with the threat of continued litigation. The proposed Miami (Everglades) jetport became a national focus of the environmental concern leading to the enactment of NEPA. Through a special interagency effort following an executive order terminating work on the Everglades, the issue was resolved in favor of a new site-selection process coupled with the first full-scale environmental assessment. Both cases also demonstrate the limitations of environmental analysis and decision making in the context of a political controversy.

Costs Associated with Statutes

Potential costs associated with the federal statutes are given in Table 2. Similar matrixes could be developed for the state statutes to assist in identifying and structuring cost information to assist in decision making.

Data on actual cost impacts of the statutes to date are limited. Cost data were not readily available for most of the airports given in Table 1. Presumably an in-depth analysis of each case would yield some useful data. With some exceptions, few organizations maintain accounting records or have performed analyses that identify actual costs associated with the statutes, and even fewer have made such data available to the

Table 1. Airports impacted by environmental legislation.

Airport	Environmental Issues	
	Development Stage	Operations
Large hubs		
Atlanta (Hartsfield)	—	Noise
Boston (Logan)	Runway extension opposed; ILS opposed	Noise
Chicago (O'Hare)	—	Noise
Chicago (Midway)	—	Noise
Cleveland (Hopkins)	—	Air quality
Dallas-Fort Worth	New airport; major land acquisition	Noise
Denver (Stapleton)	Runway moved in plan; project halted	Noise
Honolulu (International)	Reef runway opposed	—
Houston	Runway extension opposed	Noise
Las Vegas (McCarran)	—	Noise
Los Angeles (International)	—	Noise, access
Los Angeles (Palmdale)	Land acquired; further development held up	—
Minneapolis-St. Paul	Search for new site	—
New Orleans (International)	Site selection problem	—
New York (Kennedy)	Expansion plan dropped	Noise
New York (La Guardia)	—	Noise
New York (Stewart)	Scale of proposed development reduced	—
Philadelphia (North Philadelphia)	Expansion to serve larger aircraft opposed	—
St. Louis	New site selected, but not confirmed	—
San Francisco (International)	Parking garage, apron opposed	Noise
Seattle-Tacoma	EIS for expansion	Noise
Southern Florida	Original site opposed; new site selected	—
Medium hubs		
Albany, New York (Albany County)	—	Noise
Birmingham (Municipal)	Draft and comments submitted 1 year ago	—
Hartford (Bradley)	Runway extension turned down	Noise
Louisville (Staniford)	Search for new site	—
Omaha (Eppley)	Levee moved	—
Phoenix (Sky Harbor)	—	Noise
Portland (International)	Airport extension dropped	—
San Antonio (International)	Search for new site dropped	—
West Palm Beach (International)	—	Noise
Small hubs		
Burlington, Vermont (International)	—	Noise[a]
Colorado Springs (Municipal)	Runway moved in plan	—
Providence, Rhode Island (Green)	Expansion opposed	—
Sarasota (Sarasota-Bradenton)	New replacement airport halted	—
Nonhubs		
Ames, Iowa (Municipal)	—	Noise
Bridgeport, Connecticut (Municipal)	Increased capacity opposed	Noise
Chesterfield, Virginia	Increased capacity opposed	—
Fairfax County, Virginia	Proposed airport plans dropped	—
Fargo, North Dakota (Hector)	Negative declaration contested; upheld	—
Jackson, Wyoming (Jackson Hole)	Expansion of airport opposed	Noise
Jackson County, West Virginia	Environmental processing of new airport	—
Manchester, New Hampshire (Municipal)	—	Noise
Montrose, Colorado	—	Noise
New Haven, Connecticut (Tweed)	Citizen opposition; litigation	—
Ogden, Utah (Municipal)	Runway extension and ILS held up	—
Republic Washington	Environmental processing	—
Southern Idaho Regional	Selected site opposed	—
Spencer, West Virginia	Environmental processing of new airport	—
Summers County, West Virginia	Environmental processing of new airport	—
Trumbull, Connecticut	ILS delayed	—
Valdez	Section 4-F: placement of outer marker opposed	—
Ventura County, California	—	Noise

[a]HUD urban renewal funds for neighboring Winooski were withheld because of noise from military jets landing in Burlington.

Table 2. Potential cost elements associated with environmental legislation.

Potential Cost Element	Statute[a] NEPA	DOTA	AADA	CAAA	FAAA	NCA	FWPCAA
Analysis of environmental impacts							
Research and development	SR	SR	SR	SR	SR	SR	SR
Environmental studies	SR	SR	SR	SR	SR	SR	SR
Environmental impact statement	SR						
Public participation	SR	SR	SR	SR		SR	SR
Agency review	SR	SR	SR	SR		SR	SR
Environmental administration	SR	SR	SR	SR	SR	SR	SR
Aircraft research and development		SR		SR	SR	SR	SR
Land							
Publicity	RE	RE	RE				
Land acquisition	RE	RE	RE				
Relocation	RE	RE	RE				
Land banking	RE	RE	RE			SRP	
Soundproofing	RE	RE	RE				
Construction							
Methods	RE	RE	RE	RE			RE
Reclamation	RE	RE	RE	RE			RE
Facilities							
Configuration	RE	RE	RE	RE		RE	RE
Abatement	RE	RE	RE	RE		RE	RE
Relocation	RE	RE	RE	RE		RE	RE
Utilization	RE	RE	RE	RE		RE	RE
Operations							
Flight procedures	RE	RE	RE	SR	SR	SRP	
Ground procedures	RE	RE	RE	SRP	SE	SRP	
Congestion	SE	SE	SE	SE	SE	SE	
Monitoring	RE	RE	RE	RE		SRP	RE
Aircraft and vehicles							
Retrofit				SR		SR	
New aircraft				SR	SR	SRP	
Maintenance				RE	RE	SRP	RE
Ground equipment				RE		SR	
Legal costs							
Litigation	SE	SE	SE	SE		SE	SE
Damages				SE		SE	SE
Penalties				SE			SE
Opportunity costs	SE	SE	SE				
Uncertainty							
Project development	SE	SE	SE				
Interest	SE	SE	SE				
Contracts	SE	SE	SE				
Inflation	SE	SE	SE				

[a]NEPA = National Environmental Policy Act of 1969; DOTA = Department of Transportation Act of 1966; AADA = Airport and Airway Development Act of 1966; CAAA = Clean Air Act Amendments of 1970; FAAA = Federal Aviation Act Amendments of 1968; NCA = Noise Control Act of 1972; FWPCAA = Federal Water Pollution Control Act Amendments of 1972; SR = statutory requirement as currently implemented; SRP = proposed additional implementation of statutory requirements; SE = side effect; and RE = related expenditure to implement requirement.

Table 3. Summary of available data on airport-related costs (in millions of dollars) of environmental statutes.

Item	Representative Current Year	1968 to 1974	Proposed Multiyear Program Costs
Statutory requirements			
As currently implemented	23.5	101.4	–
Proposed additional implementation	–	–	875 to 1,236
Side effects	–[a]	38.7	–
Subtotal	23.5	140.1	875 to 1,236
Other airport-related environmental costs			
Expended	45.8	393.2	–
Proposed	–	–	340
Total	69.3	533.3	1,215 to 1,576

[a]Not estimated.

public. Inputted costs apparently have not even been calculated.

However, the available data do provide some measure of the resources committed to environmental considerations and also serve as proxies for less tangible impacts. In some cases, cost data point to problem areas that need attention; in others, the data suggest that the purposes of the statutes are indeed being accomplished as intended. Conversely, and paradoxically, in some cases the absence of data reflects the incorporation of statutory mandates into practice. (For example, it may not be possible to determine whether more expensive runway alignments are being used to satisfy environmental requirements because the less environmentally satisfactory alignments are being eliminated from consideration before costs are calculated.)

A summary of the available data on costs associated with the federal environmental statutes is given in Table 3. It represents a national commitment of approximately $140 million for the period 1968 to 1974, plus those costs for which no value was estimated.

The 3 "procedural" statutes gave rise to costs of more than $69 million, of which $49 million was associated with NEPA. Of that amount $33 million, or more than two-thirds, represents the effect of inflation on construction costs for projects delayed by NEPA processing. (NEPA may add a minimum of 90 days to projects requiring a full-scale review; however, some of the delay experienced from 1971 to 1974 was attributable to internal management. Nevertheless, these costs are considered to be the social cost of accomplishing institutional change and are therefore properly ascribable to the statute.) Inflation has a particularly strong effect on smaller communities that may have difficulty in raising the additional local funds necessary to undertake a project.

The total cost of the analysis of environmental impacts and environmental administration associated with the 3 procedural statutes is estimated at about $30 million. The data for these categories are believed to be almost complete. The direct costs of public participation and agency review were not estimated, but would not be expected to exceed $1.5 million.

There was no evidence that any costs in the following categories were incurred to meet statutory requirements: land, construction, facilities, and operations. However, substantial investment for land acquisition or aviation easements has been made by a few airports. Also, wastewater treatment facilities are being constructed for San Francisco and New York (Kennedy) Airports at costs of $9 million and $3 million respectively.

Opportunity costs were not estimated and are considered speculative in view of the decline in traffic growth rates. However, the full economic cost of constrained development including congestion costs has not yet been incurred. The cost may be significant to the extent that present capacity proves unable to accommodate demand for air transportation in the years required to bring additional facilities onstream. In this respect, landside capacity may be particularly important to the full use of existing airside capacity.

Uncertainty costs of $5.5 million were included, representing the experience of one airport, Portland (International). It has been argued that this cost category actually reflects management decisions and is therefore not attributable to the statutes; however, the Portland case was based on current industry practices. Similarly, Boston (Logan) Airport is currently facing a potential uncertainty cost of $31 million associated with runway extension projects that may never be completed. This potential cost is not included in the tabulation, but is mentioned as evidence of the possible magnitude of costs in this category. Portland did incur one cost component—a contractual liability—that Boston avoided by specifically providing in its construction contract for the possibility of not completing the project in light of pending litigation.

Aircraft research and development constitutes the bulk of costs incurred pursuant to the clean air, water, and noise acts. In the period 1968 to 1974 about $69 million was spent pursuant to statutory authority for research and development. The cost of environmental analysis and administration was not estimated, but probably did not exceed $1 million. FWPCAA may have been an influence in the construction of several new wastewater treatment plants at airports, but appears to have been directly applied only to Washington (Dulles) Airport, a federal facility. In terms of proposed additional

implementation, the cost of retrofitting aircraft (estimated to be as much as $1 billion) dwarfs all other costs to date.

Total costs for environmental expenditures that were voluntary or undertaken independently of the statutes were estimated at $393.2 million.

Of that amount, the largest single category is research and development expenditures by industry ($106 million) and National Aeronautics and Space Administration (NASA) ($136 million), totaling $242 million. Some of the NASA funds were used in joint programs with FAA. Another large item is land acquisition: $96.7 million at Los Angeles; $24.0 million at Newark, New York (Kennedy), and Dallas (Love Field). These sums were expended by airport sponsors from the proceeds of bonds underwritten by carriers. Similar expenditures have been made at at least 8 other airports, but actual cost data are not available.

Other costs have been incurred in connection with the noise-abatement procedures that have long been advocated and are in use. The Air Transport Association of America (ATA) estimates that at least one minute has been added to takeoffs and landings for each carrier operation at major airports. The use of preferential runways has also had an effect on airport capacity, notably in New York. However, the effect on capacity and congestion costs has been mitigated by the decline in traffic growth and number of operations associated with the fuel crisis and economic conditions.

The aircraft retrofit for visible smoke emissions, although technically voluntary, was prompted in large measure by pending litigation (e.g., in New Jersey) and the certainty that mandatory retrofit would be forthcoming.

The litigation costs of common law actions against airport operators and carriers have not been estimated, but are likely to have run on the order of at least $3 million, considering that there were 166 actions pending in 1966 against 27 airport sponsors. They have generally been unsuccessful, although in August 1974 the California Court of Appeals awarded damages. More recently, the use of class actions in noise damage cases involving Los Angeles was proscribed, thus substantially reducing the potential value of pending suits seeking billions of dollars in relief. (The decision is under appeal.)

The institutionalization of the statutes suggests that the proportion of costs associated directly with the statutes will increase substantially over past levels, primarily for aircraft retrofit. To date, virtually all the costs associated with the statutes have ultimately been borne by 2 groups: air carrier passengers and the general public.

The passengers provide via the ticket tax most of the trust fund revenue that supports the Airport Development Aid Program (ADAP) and airport planning grants to airport sponsors. Thus, the passengers pay for the federal share of the environmental costs incurred by the sponsor in connection with a project funded by a grant. Except for public land states and certain items, the federal share of eligible expenses is 50, 66⅔, or 75 percent under current programs. Depending on the financial structure of the airport sponsor, the passengers may also pay for the sponsor's share of the environmental costs, either directly in the form of airport revenue such as parking fees or indirectly as higher fares associated with landing fees paid by carriers and passed on to passengers.

Passengers also pay in the form of higher fares for other costs incurred by carriers. The principal carrier costs have been landing fees to cover land acquisition programs of airport sponsors and additional operating expenses. It was not possible to determine what premium, if any, is included in the price of new aircraft designed to meet FAR Part 36, since other performance factors were also involved. (Boeing reported that the company had not conducted such an analysis.)

There is a generally unrecognized "hidden subsidy" of air transportation in that the business passenger's contribution via the ticket tax is a deductible expense for tax purposes. Assuming business passengers constitute 50 percent of all passengers and a corporate tax rate of 50 percent, this results in increasing trust fund revenues at the cost of reducing general fund revenues by 25 percent of the total ticket tax revenue.

The general public pays for virtually all other costs. Most federal research and development funding provided to manufacturers and other contractors is derived from general revenues, with the exception of some funding from the Aviation Trust Fund.

Research and development conducted with corporate funds is presumably expended or depreciated for tax purposes. Federal, state, and local agency costs for administration of the environmental statutes and for litigation are also derived from public funds. (Some litigation expenses incurred by organizations like the Sierra Club are paid by private contributors or foundations who obtain tax benefits; the statutory provision for attorneys' fees and court costs has not been used in an airport case to date.) The public pays for airport sponsor expenses not picked up by passengers or other sources of airport revenue in the case of large carrier airports.

Costs anticipated for the future involve large capital outlays and operating costs (including loss of revenue) by the air carriers. These costs are currently expected to be funded by a set of user charges. Capital costs of FAA equipment installations in connection with noise abatement procedures (e.g., 2-segment approach) will presumably be charged to the trust fund. Thus, the emphasis will continue to be placed on internalizing the cost of environmental controls. (It is not expected that demand for air carrier transportation will be affected significantly by any increase in passenger fares associated with such costs.)

Impact Statements

This section relates to the implementation of NEPA, with particular reference to the programs established under AADA for federal assistance in planning and developing airports.

The requirement for an EIS in all cases of major federal action significantly affecting the environment affects both FAA and airport sponsors. Generally, under current interpretations, the sponsor provides FAA with information on the environmental impact of a proposed project, which FAA uses in making its independent assessment of impact. In addition, FAA conducts studies and prepares assessments in connection with other FAA activities (e.g., radar installations).

For the period 1971 to April 1974 a comparison of total ADAP projects and environmental impact statements filed with CEQ shows that statements were filed for about 20 percent of the projects. About 600 environmental impact statements representing 380 projects were filed (225 final EIS, 225 predecessor drafts, and 155 current drafts). FAA expended $908.2 million for 1,355 ADAP projects at 503 air carrier and reliever airports and $104.8 million for 603 projects at 511 general aviation airports.

Of the projects for which statements were filed (and reported in the Congressional Record and 102 Monitor), almost 80 percent (300 out of 380) represented nonhub airports, as shown in the breakdown of statements by hub and airport classification given in Table 4. Further, the 80 large, medium, and small hub airport projects do not include several highly controversial projects such as the Miami jetport; Los Angeles (Palmdale), for which a 4-volume draft EIS was submitted in the summer of 1974; and the fourth New York jetport (Stewart), for which the draft EIS was returned by DOT as inadequate in October 1974.

Costs

In the period 1971 to 1974 an estimated $10 million was expended by airport sponsors and the FAA in conducting environmental studies and preparing and processing impact statements for airport projects. This sum does not include the costs of delay to projects, which are primarily price increases under inflation, opportunity costs, and costs of inefficient use of existing capacity, and does not include the intangible costs in adapting to new requirements. The $10 million represents $7.3 million in federal and local funds for studies, plus an estimated $3 million in staff time of Airports Service of FAA to prepare statements and negative declarations. In fiscal year 1973, Airports Service staff costs with respect to 197 impact statements were almost $1 million. Processing of 617 negative declarations took 2.34 person years, or an estimated $58,500. (NEPA did not provide additional funding to assist agencies in their implementation.)

Table 4. Environmental impact statements filed from 1971 to April 1974 by type of airport.

EIS Type	Hub Classification[a]	EIS by Airport Classification			
		Primary	Secondary	Feeder	Total
Draft	Existing airports[a]				
	Large	5	5	0	10
	Medium	3	5	2	10
	Small	0	7	1	8
	Nonhub	0	6	79	85
	Subtotal	8	23	82	113
Draft	New airports				
	Large	2	0	1	3
	Medium	0	1	0	1
	Small	0	0	2	2
	Nonhub	0	0	36	36
	Subtotal	2	1	39	42
Final	Existing airports				
	Large	5	5	1	11
	Medium	2	3	3	11[b]
	Small	0	17	6	24[c]
	Nonhub	0	15	121	136
	Subtotal	7	40	131	182[b,c]
Final	New airport				
	Nonhub	0	0	43	43
All[d]	All airports				
	Large	12	10	2	24
	Medium	5	9	5	22[b]
	Small	0	24	9	34[c]
	Nonhub	0	21	279	300
	Total	17	64	295	380[b,c]

[a]Includes 80 hub airports, 28 existing and 6 new for which draft EIS's have been filed and 40 existing for which final EIS's have been filed.
[b]Includes 3 not classified.
[c]Includes 1 not classified.
[d]Does not include predecessor drafts of final EIS's.

Delay

The high price of delay in a period of double-digit inflation is justification for efforts to improve the decision-making process. NEPA itself does not generate inflation, but the delay NEPA entails to projects, translated into dollars, should be recognized for purposes of budgeting and program planning. In the absence of escalator clauses in ADAP grants, efforts to reduce the delay or use the time productively will minimize the effects of inflation on airport sponsors. It is important to note that, under current ADAP rules, the reimbursement of funds expended by an airport sponsor is conditioned on project approval. In practice this means that no further work can be done pending environmental approval. Thus, the absolute minimum additional time required for processing an ADAP project application involving a full EIS review is 90 days even under a proposed streamlined procedure (FAA Order 5050.2A). Although an additional 3 months may not seem unduly burdensome, it could mean losing an entire construction season in some parts of the country. At the very least, this adds to the lead time, if not to delay, in planning and implementing airport projects. Similarly, the environmental process may affect the ability of airport sponsors to recoup capital expenditures via landing fees on the successful completion of a project. For example, the Massachusetts Port Authority has spent $31 million to date on extending 2 runways that may never be completed, although a federal EIS has just been approved. The carriers have threatened not to pay the costs involved, thereby triggering concern on behalf of the revenue bondholders. (Independent justification for work to date might be possible if the runway extensions are not completed.)

Despite the generally noncontroversial nature of the 380 projects given in Table 4,

analysis showed that delay was experienced in 46 percent of hub projects and in 42 percent of nonhub projects. This was based on a review of the statements noted in the 102 Monitor, the monthly CEQ publication, and an FAA internal study of delayed projects. For purposes of the FAA analysis, delay is computed as the number of months between the receipt of a draft EIS by Airports Service and the release date in excess of the 4 months considered normal or minimum processing time. It does not include the time required to conduct environmental studies in connection with the EIS. The FAA study supports the following findings:

1. Of 79 actions approved by negative declaration, 75 percent were not delayed, 15 percent were delayed 1 to 2 months, and 10 percent were delayed longer;
2. Of 119 actions approved with final EIS, 23 percent had no delay, 56 percent were delayed 4 to 8 months, and 3 percent were delayed more than 14 months; and
3. Of 73 actions pending, 20 percent have been pending more than 14 months, and 25 percent have been pending more than 1 year.

An analysis of large, medium, and small hub airport projects did not produce any useful correlations between delay and either project type, project cost, or year of submission. A first-cut analysis of hubs and nonhubs by region appears to support other, subjective information that environmental resources, skills, commitment, and management vary from region to region.

The 2 main causes of delay appear to have been (a) a need to improve the quality of assessments, which entailed acquiring expertise, and redoing and resubmitting statements, and (b) internal management procedures within FAA and DOT. One major aspect of managing the NEPA process involves working out the respective roles of the FAA field offices and headquarters and the Office of the Secretary of Transportation. This has been complicated by successive changes in CEQ guidelines and agency procedures in keeping with evolving judicial interpretations of NEPA. At another level, several cases of noncontroversial, routine projects were delayed in the environmental processing stage because of FAA staff involvement in major controversial projects. In some cases, airport sponsors and even FAA personnel cited difficulties in obtaining status reports on pending projects. Other cases apparently required extensive legal review.

To a large extent, both these factors reflect a "learning curve" that typically accompanies the introduction of major new responsibilities into an ongoing enterprise. In the case of NEPA, the learning curve was compounded by years of confusion, conflict, and uncertainty as to its scope and implementation, with important regional variations. Only recently has there been some semblance of predictability across the country. Ongoing efforts to improve NEPA processing for airport projects have resulted in a recent overhaul of DOT and FAA procedures, and that is expected to alleviate most of these problems.

Although the full extent to which other federal agencies contributed to the delay of airport projects was not determined, specific instances were found of delays on account of internal distribution procedures at DOI and delays on account of particular individuals at other agencies participating in the federal review process. Further, many state and local agencies have contributed to delays in airport projects by being unable to respond within prescribed time limits for the coordination and review requirements of Circular A-95 or section 16(c)(4) of AADA. Extensions have been generally granted in keeping with the spirit of the Intergovernmental Cooperation Act, NEPA, and AADA.

In addition to requiring extra time, some agencies have raised issues ostensibly within another agency's purview even though the latter agency may have approved (or refrained from objecting to) the project. This particularly engenders resentment when the critical agency is in no position to help address the issue.

Controversial Projects

As noted earlier, the analysis of delay does not include time spent in conducting studies,

holding hearings, and responding to comments in developing EIS or negative declaration. In controversial cases, this could involve months or years of delay. For example, 22 hearings (reputedly a national record) have been held by the Massachusetts Port Authority in attempting to extend 2 runways at Boston (Logan) Airport. NEPA was prematurely invoked by opposing litigants to require preparation of an EIS and then to challenge its adequacy, causing additional delay. In the St. Louis case, the airport sponsor noted that frivolous NEPA challenges caused undue delay. In particular, the consideration of alternatives, one of the few specific mandates in NEPA, has been exploited for political reasons. It also raises the open issue of the substantive scope of NEPA, which has become increasingly complex as agencies are required to consider alternatives other than a "build here, there, or nowhere" approach. In the case of airports, it may be necessary to investigate alternatives using other modes of transportation.

Litigation

A number of lawsuits against airport sponsors, air carriers, FAA, DOT, and EPA have been grounded in 1 or more of the 7 environmental statutes. These suits differ importantly from the noise litigation based on common law rights, which are limited to damages or abatement of a nuisance, and which typically have not affected airport operations or development. In contrast, the environmental statutes led to a Supreme Court decision in 1973 ensuring the right of any citizen to sue on an environmental question affecting the public as a whole. Furthermore, it was no longer necessary that damage be imminent before seeking legal relief. Thus, prospective operations or development could be challenged. In some cases, projects under construction were stopped. NEPA in particular afforded a broader base for challenging airport development, and has been so used against airports in Honolulu, Boston, San Francisco, Detroit, Portland, Chicago, Los Angeles (Palmdale), and Ogden and Provo, Utah. A NEPA challenge has been prematurely invoked against Schenectady. The result has been substantial delays (e.g., Honolulu), and project abandonment (e.g., Portland) even in cases where the airport sponsors won the suits. The mere threat of litigation has sufficed to deter other airport projects.

Both NEPA and section 4(f) of DOTA have been construed in wide-ranging body of case law (dealing principally with projects other than airports). Although some key issues have been clarified, many other issues remain to be resolved and offer significant potential for litigation. For example, in April 1974 the Supreme Court declined to review Life of the Land v. Brinegar [U.S., cert. den. (1974); CA-9 (5 ERC 1780), 1973], thereby leaving in effect a lower court ruling that federal agencies could delegate much of the work involved in preparing impact statements. This issue was obviously a vital consideration in determining how agencies could implement NEPA. However, the extent to which a court can or will review on substantive grounds is still unresolved, although the trend in EIS cases seems to be toward court deference to agency expertise once procedural compliance has been determined.

FAA policy does not preclude selecting a section 4(f) site. However, section 4(f) is viewed by many airport sponsors, FAA staff, and lawyers as virtually insurmountable so that in some cases potentially attractive sites for new airports or expansions are prematurely eliminated from further consideration for fear of extensive litigation. Moreover, its scope has not been fully defined. For example, litigation is pending to determine whether "recreation areas" include school playgrounds. Section 4(f) requirement for "all possible planning to minimize harm" has not been fully resolved.

A Sierra Club suit (Environmental Defense Fund v. Brinegar, D.D.C., 74-340, February 25, 1974) sought to have FAA prepare an EIS on the National Airport System Plan. Suit was also brought against DOT, FAA, and EPA to force the preparation and circulation of an environmental analysis of the operation of the supersonic Concorde. A task force convened to conduct the analysis submitted a draft statement and hearings have been held recently.

Suits have also been based on the other statutes. For example, the Massachusetts

Port Authority, the airport sponsor, is an independent state authority, but was held nonetheless subject to the city's air pollution regulations under the Clean Air Act. In another case involving Massport, the judge noted that the required air and water quality certification pursuant to the Airport and Airway Development Act had not been issued for a project at Boston (Logan) Airport.

Several projects have been affected by litigation based on state laws. Los Angeles failed to prepare an adequate impact report in connection with the Los Angeles Airport Plan. The court specifically referred to deficiencies in the consideration of alternatives such as building or expanding other airports (4). The judge also ordered a separate report on the recent change in the over-water approach procedures, although acknowledging federal preemption.

The court denied an injunction against expansion of Chicago (O'Hare) Airport, but noted that the expansion could be challenged before EPA or FAA (Village of Bensenville v. City of Chicago, Ill., App. Ct. No. 57070, December 28, 1973).

An FAA-sponsored study of noise levels was the basis for a California decision affirming the liability of the city of Los Angeles as airport operator for reduction in property values due to aircraft noise affecting 520 parcels. The city argued unsuccessfully that the Noise Control Act was evidence of federal preemption of all aircraft noise-related aspects and that therefore the federal government should be liable.

Litigation is still pending in California on the extent to which an airport proprietor can restrict airport usage to limit noise. The ATA challenge to California's stringent antinoise regulation for airports and aircraft was decided on February 10, 1975. Part of the statute was declared unconstitutional. However, the appropriate limits and options for nonfederal actions affecting airport use have still to be determined.

FUTURE OUTLOOK AND ISSUES

Although the various statutory mandates have not been in existence a full decade, 4 phases of an environmental era can be delineated (Table 5). Phase 3 is characterized by the institutionalization of environmental considerations and processes. However, the final resolution of many legal and institutional factors has not yet been achieved. Moreover, trends are not clearly indicated. Generally, recent developments reflect, on the one hand, concern, particularly at the federal level, that environmental procedures have been too constraining and, on the other hand, a growing tendency of courts and state and local governments to expand the scope of environmental requirements.

Thus, EPA retreated on the issue of significant deterioration in its December 1974 regulations, although a court test is expected. EPA has been forced by statute and public opposition to withdraw parking controls as an instrument of its transportation control plans. However, the concept of control plans has been judicially sanctioned. The implication for airport landside capacity appears to be a continued if cautious reliance on automobile access, at least in the short term.

New proposals for ADAP are being considered. Both the Administration bill (H.R. 5017) and Representative Dale Milford's bill (H.R. 4313) would reduce the environmental processing currently required for airport projects. However, both bills

Table 5. Phases of environmental era.

Phase	Period	Character	Stimulus
1	Pre-1966	Jet impacts (noise, smoke), urban encroachment	Community
2	1966-1972	Early environmental era, minimal compliance	Congress, professional environmentalists, courts
3	1973-1979	Maturing environmental era, institutionalization	Federal agencies, states, Congress
4	Post-1979	High technology, land use, regional development	Intragovernmental, airport sponsors

provide for funding certain landside components, thereby bringing into play whatever federal environmental procedures may be then applicable. The implementing regulations for landside components will need to be reviewed and if necessary adapted to their environmental and economic characteristics. For example, categorical exemptions of certain terminal facilities may be appropriate.

The environmental characteristics of automobile access and parking facilities have been studied extensively. But with the proposed restoration of an airport "head tax" and increased federal funding, the need to rely on parking revenue may be diminished so that other access systems and counterpart landside capacity will be developed. Their environmental characteristics should be as well documented, to facilitate due consideration of alternatives. (The requirements for "mass" access systems may derive from other regulatory developments, such as CAB-approved low fares, which may exacerbate peaking and congestion at some terminals.)

For given scenarios of environmental and landside requirements, potential environmental constraints can be postulated. Constraint is viewed as any influence that contributes to shaping the planning or implementation of a goal by narrowing in some fashion the decision maker's choice. Thus, the impact of environmental constraints on landside capacity may be analyzed in terms of one or more of aspects such as

1. Scope and design (geographic, technical, level-of-service),
2. Timing (delay or lead time),
3. Cost (price increases, inflation, higher operating costs relative to a given capital investment, higher capital costs, opportunity costs, distribution of cost burden),
4. Rate of achieving balance with airside,
5. Use of available capacity, and
6. Future options.

There are obvious interrelations among the aspects, and the analytical task is further complicated by a lack of criteria and methodology for a comprehensive analysis. The task becomes somewhat more manageable as the perspective narrows from the federal policy-making level to the airport manager. The further implications for regional development, intermodal competition, and ultimately a national transportation system and its consequences also require methodological development.

A first step might be a study of the application of the environmental statutes to the projected development at specific airports. At the least, such an analysis could provide an early warning system, both in terms of particular projects and in terms of the overall development of the air transportation system. There are admittedly a number of uncertainties involved, particularly issues related to land use, traffic forecasts, and technological development. However, the analysis would identify relative priorities for the near term to guide the administration of the environmental statutes within the context of plans for the future. Other issues to be addressed include the following:

1. What are the implications for airside capacity if landside development is constrained by environmental factors?
2. Are airport sponsors or their consultants adequately prepared to foresee potential constraints? Is there sufficient opportunity for aviation interests to provide input to the environmental decision-making process? Are existing institutional arrangements appropriate?
3. What kinds of landside development should be considered to have no significant adverse effects on the environment?
4. What methods or approaches are needed to mitigate any adverse effects?
5. Should airside and landside development projects be separated to forestall backlash to landside projects?
6. How should costs of environmental constraints be allocated, especially those associated with off-airport systems?

Undoubtedly, many other issues will emerge during the workshop sessions. Fortunately, as documented in earlier studies, the time frame has been extended, and

saturation of landside facilities is no longer anticipated within the next 5 years. If environmental aspects can be viewed as challenges to better decision making, their constraining influence can become opportunities for the improved use and development of landside capacity.

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