PART 6 PLANS, POLICIES AND PROGRAMS

chapter 6.1

the airport and the communities: a development concept

6.1.0 DEVELOPMENT CONCEPT

Sea-Tac International Airport is a regional asset and makes a substantial contribution to the economy of the Pacific Northwest. More than 15,200 jobs accounting for a gross annual payroll of over $16,000,000 and $390,000,000 in yearly business activity in King County are related to the commercial traffic of Sea-Tac Airport.

A forecasted rise in air traffic levels points toward even more economic benefits associated with the Airport. Population and employment forecasts also suggest increases to the Airport's economic impact (for the overall Sea-Tac study area, 1978-1993 growth in population, 23%; growth in employment, 48%). However, the local benefits of the Airport's presence in the community have, for the most part, been eclipsed by an unsatisfactory physical and environmental relationship between the Airport and the surrounding areas.

Communities surrounding Sea-Tac possess characteristics, problems, and potentials that are unique to their particular relationship with what has emerged as an international airport. Yet, there is a commonality amongst communities, neighborhoods, families, and individuals whose lives or lifestyles have been affected by the presence of the Airport. In a broad sense, they are all seeking a kind of compatibility; a reduction in aircraft noise and the annoyance it brings; the knowledge of what the ultimate growth and expansion of the Airport is to be; the ability to market a house in the normal way, when the need or the desire may arise; neighborhoods that are safe from encroachment by businesses and apartments;

pleasing visual effects to runway edges and fill-banks of the Airport; a chance to capitalize on the dynamics and vitality of the Airport and have a better community as a result.

Airport Balance:

The development concept for Sea-Tac Airport has centered on achieving a balanced facility that provides full and adequate service to the region's air transportation needs, "Balance" in this case refers to a blend of facilities and their respective capacities to handle required demands. For example, the runway and taxiway system must handle the hourly demands of aircraft arrivals and departures in an efficient manner. The terminal system consisting of terminal buildings, parking structures, and access drives must adequately move passengers and baggage through normal and peak load conditions.

Other support facilities that handle air cargo, provide for aircraft maintenance as well as the maintenance of the Airport itself, must be located and supplied in appropriate sizes to match the total present and future demands of airport operations. Included in this equation must be the utility, police and fire protection and other services and facilities which working together makes this complex system operate.

Since its inception, Sea-Tac has added facilities and planned their operations to insure that the total system operates as a balanced unit. Recent redevelopment of the passenger terminal complex along with the provision of a west runway has basically insured that Sea-Tac can adequately serve

the region's transportation needs for many years. Thus, the approach in continued planning has been to review the timing and content of various ongoing development phases occurring in locations allocated for them. In general, the current boundaries at the Airport provide adequate land for such needs. Only relatively minor adjustments to the Airport's land area and its basic facilities are anticipated for any airport operational purpose.

The one major element lacking in an otherwise adequately sized and balanced airport facility has been the need for a more compatible relationship with surrounding communities. Although Sea-Tac shares this problem in common with virtually all major airports in the world, there is an opportunity through common efforts to deal with problems of compatibility for Sea-Tac to achieve a unique position -- that of becoming a genuinely "balanced" airport in the larger sense of both serving its region and relating compatibly to surrounding communities.

Airport/Community Intergration:

The concept for the Airport and the communities must also display a balance; a properly integrated order of land uses complementing both the Airport and the communities. The development concept of the King County Comprehensive Plan (8.0.3, ref. 17) provides the basis for establishing such an order.

The comprehensive plan's concept promotes the idea of independent urban centers throughout the County; each with their own identity acting as focal points for employment, commerce, and cultural activities to serve

their own area and population. The ideal balance and distribution of land uses within such a center is illustrated as a "Theoretical Urban Center" (see sketch, page 5). The concept shows a hierarchy of land uses and a balance of land uses in terms of proportions and physical relationships of various intensities of commercial, industrial, residential, transportation and open space uses. The concept is theoretical in that every urban development situation would have some pecularity which would either modify the proportions of land uses or their physical relationship.

The Sea-Tac Communities are affected by the existence of a dominent and disproportionate land use - the Airport. Adjustments can be made so that proper land use relationships are maintained, as well as the form and general hierarchy of uses of the center concept. Modifications to the basic concept as they are applied to actual situations stimulate planning opportunities and provide variety to the urban environment.

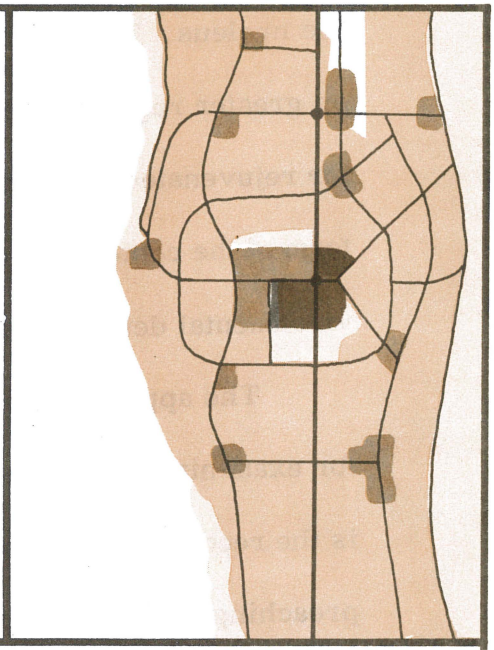
The size of an urban center should be such that it encompasses all the major uses to form the nucleus and then, to the best extent possible, orders a hierarchy of uses from the nucleus (see Modified Urban Center, page 5). Each center adapts to the scale and setting of its immediate proximity and its growth is governed by various opportunities, competition with other centers, position within the region, etc.

The urban center concept applied to the Sea-Tac Communities requires that the scale of the center be defined to include the Airport as a part of the center's nucleus. The size of the center becomes considerably larger than previously envisioned where only Burien provided

theoretical urban center

illustrating balanced land use proportions

illustrating land use heirarchy

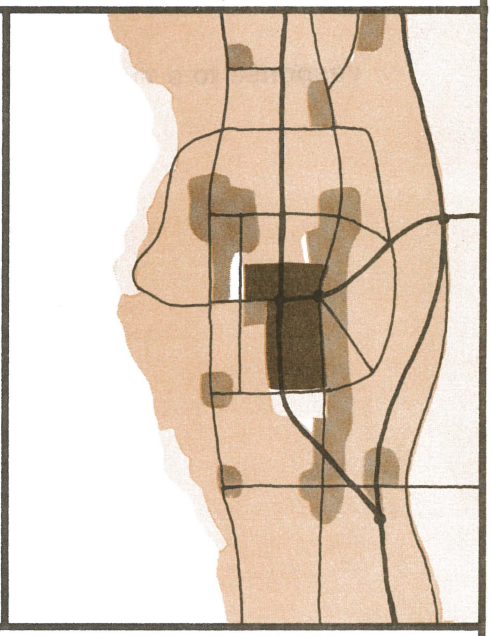


modified urban center

illustrating dominant land use

illustrating maintained heirarachy

illustrating adjusted transportation system



applied urban center

recognizing environmental determinants

recognizing physical and cultural features



the nucleus. The Applied Urban Center, like the Airport itself, would take on greater regional significance while offering renewed opportunities within for rejuvenated development in current poorly developed areas. The form of the center would also be governed by existing features and environmental determinants, such as open space.

The application of the urban center concept provides a new perspective for examining the relationship of the Airport and the communities. Paramount is the recognition that problems of compatibility cannot be addressed by approaching the Airport and the communities as being exclusive of each other. The following policies and programs of this plan are therefore in response to a mutual recognition of problem resolution and future directions.

6.1.1 AIRPORT/COMMUNITY COMPATIBILITY

Sea-Tac International Airport is a regional asset and makes a substantial contribution to the economy of the Pacific Northwest. More than 15,200 jobs accounting for a gross annual payroll of over $16,000,000 and $390,000,000 in yearly business activity in King County are related to the commercial traffic of Sea-Tac Airport.

A forecasted rise in air traffic levels points toward even more economic benefits associated with the airport. However, population and employment forecasts also suggest an increasing regionalism to the airport's economic impact (for the overall Sea-Tac study area, 1978-1993 growth in population, 23%; growth in employment, 48%). The local benefits of the airport's presence in the community have, for the most part, been eclipsed by an unsatisfactory relationship between the airport and the surrounding areas.

Noise generated by commercial aviation has become increasingly annoying. There has been widespread uncertainty associated with airport expansion, future noise levels, and home marketability. Apartments and businesses that have located in the area because of the airport have threatened some neighborhoods with encroachment. Finally, the airport itself looms as physically inaccessible and unnatural.

Surrounding Sea-Tac are communities which possess characteristics, problems, and potentials that are unique to their particular relationship with what has emerged as an international airport. Yet, there is a commonality amongst communities, neighborhoods, families, and individuals whose lives

or lifestyles have been affected by the presence of the airport. In a broad sense, they are all seeking a kind of compatibility; a reduction in aircraft noise and the annoyance it brings; the knowledge of what the ultimate growth and expansion of the airport is to be; the ability to market a house in the normal way, when the need or the desire may arise; neighborhoods that are safe from encroachment by businesses and apartments; pleasing visual effects to runway edges and fill-banks of the airport; a chance to capitalize on the dynamics and vitality of the airport and have a better community as a result.

The quest for compatibility has many facets and is an effort which must be fulfilled in order to solve environmental problems and realize community potentials. The basic goal of the Sea-Tac Communities Plan is to...

Make the airport and the community better neighbors

Airport/community compatibility is to be approached on two fronts. First, the land use, sociological, and psychological barriers associated with airport development and expansion must be broken down. Environmental problems associated with the airport must also be minimized in order to...

Blend the airport and the community together

Second, solutions to the problems of environmental pollution and airport-related growth must also focus upon expanding the airport's role as a local community asset. An aspiring approach to compatibility must do more than seek to solve a particular problem; it must strive to...

Direct the economic and land use development influence of airport related activities toward deliberate improvement of the local community.

The airport and the community will become better neighbors only by transcending the old ways, solving the old problems, and charting the course for a new airport community.

6.1.2 THE AIRPORT DEVELOPMENT CONCEPT

The concept at Sea-Tac Airport has centered on achieving a balanced facility that provides full and adequate service to the region's air transportation needs. "Balance" in this case refers to a blend of facilities and their respective capacities to handle required demands. For example, the runway and taxiway system must handle the hourly demands of aircraft arrivals and departures in an efficient manner. The terminal system consisting of terminal buildings, parking structures, and access drives must adequately move passengers and baggage through normal and peak load conditions.

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Since its inception, Sea-Tac has added facilities and planned their operations to insure that the total system operates as a balanced unit. Recent redevelopment of the passenger terminal complex along with the provision of a west runway has basically insured that Sea-Tac can adequately serve the region's transportation needs for many years. Thus, the approach in continuing planning has been to review the timing and content of various ongoing development phases occurring in locations allocated for them. In general, the current boundaries at the airport provide adequate land for such needs. Only relatively minor adjustments to the airport's land area and its basic facilities are anticipated for any airport operational purpose.

For these reasons, most of the current attention of the airport shares the focus of the surrounding communities on compatibility. The one major element lacking in an otherwise adequately sized and balanced airport facility has been the need for a more compatible relationship with the surrounding residential community. Although Sea-Tac shares this problem in common with virtually all major airports in the world, there is an opportunity through common efforts to deal with problems of compatibility for Sea-Tac to achieve a unique position -- that of becoming a genuinely "balanced" airport in the larger sense of both serving its region and relating compatibly to its surroundings.

6.1.3 THE COMMUNITIES

The Comprehensive Plan for King County reflects the desire of people to have available a variety of residential areas and to locate conveniently to major employment and service centers. The Plan promotes the idea of urban centers becoming focal points for employment, commerce, and cultural activities to serve their own area. The Plan also attempts to guide overall development in the Puget Sound region to conserve land and water open space and to protect fragile natural features. Moreover, it recognizes that proper urban development can contribute to an attractive, safe, and orderly urban landscape; and that both public and private development should be encouraged in every manner possible toward that end. Such a concept is referred to as the *urban center development concept.*

To discuss the urban center development concept the entire metropolitan area of Seattle must be examined. Seattle has been, and will continue to be, the principal employment center and the focal point for retail, service, wholesaling, and cultural functions. Burien, Renton and Bellevue historically have been urban centers for their respective portions of King County.

In applying the urban center development concept to Southwest King County, Burien's business and commercial areas, hospitals, offices, and apartments can be combined with the airport, its terminal, cargo and office facilities, to define an extensive-although complex - urban center. Surrounding the urban center are the communities.

The development concept, then, is one of enhancing and protecting the remaining residential neighborhoods in which people wish to live; to improve neighborhood quality through programs aimed at reducing the uncertainty connected with noise impact and programs to renew neighborhood improvements; to solve drainage and pollution problems; to assure compatibility amongst different land uses; to capitalize on the opportunity to promote an extensive open space system; to preserve and protect the natural environment.

There is little question that the Sea-Tac communities face difficult problems. However, it is clear that the unique challenges to be met also present unusual opportunities for regenerated, enriched and lasting communities.

chapter 6.2
noise remedies

6.2.1 INTRODUCTION

A thorough noise measurement program and analysis of the Airport's noise problems provides the basis for developing remedial programs which will help achieve a more compatible relationship between the Airport and the surrounding community.

Three basic policy objectives are:

policy: *Minimize noise at the source directly through local programs where possible.*

policy: *Accurately identify and support source reduction programs that are occurring nationwide.*

policy: *Apply a complete set of community-based remedies directly in the neighborhoods affected significantly by noise exposure, remedies which deal with the residual problem not resolvable at the source.*

As indicated in the noise exposure studies, time is a relevant factor, Noise exposure is presently at a peak level and will be decreasing through changes at the source, changes which include engine retro-fitting, increasing use of new quieter aircraft, modified operating procedures, etc. Programs must deal with the changing nature of noise over time. As the exposure studies indicate, reaction to noise is a highly subjective matter. Annoyance is a complex mix of factors attributable both to the noise itself

as a primary component and to "secondary components" that are also present. These "secondary components" include difficulty in selling property, concern over property value, fear of increasing noise, fear of neighborhood deterioration, uncertainty in planning for home improvements and repairs and many other similar concerns.

This Chapter is divided into two categories. The first is a listing of all programs either adoptable locally or identifiable nationally which will reduce noise at the source. Special emphasis has been placed on the source reduction programs most likely to occur in projected future noise exposure. Although currently proposed Federal regulations on aircraft engines indicate a relatively rapid decrease in noise levels, more conservative assumptions for forecasts of exposure have been used. A more conservative margin is desirable inasmuch as community remedy programs must be based in part on these future exposure values.

The second category of noise remedy programs is represented by recommendations for change or support of noise-affected residential neighborhoods in the airport vicinity. Such programs address not just the noise itself but the secondary annoyance factors that contribute to the total problem. They deal, not with the source, but with the area receiving the noise impact.

To date, the most direct kind of program applied in impacted areas has been total acquisition through condemnation. This method removes the impacted neighborhood entirely. It is an appropriate solution in areas where noise impact is extremely severe and likely to remain so. Often,

however, total acquisition may be so drastic and disruptive to existing neighborhoods that is should not apply unless no possibility remains of relieving otherwise suitable residential areas. Therefore, where noise is not quite so severe and prolonged, the program emphasis is on stabilizing and strengthening neighborhoods. These programs apply in many cases to the "secondary" aspect of noise exposure that result in annoyance and concern among residents.

6.2.2 AIRCRAFT NOISE REDUCTION

Improvement at the source in aircraft noise can result from several abatement strategies. Modification of the aircraft itself will cause the most improvement. Changes in landing, take off and over-flight procedures will produce additional benefits to the communities surrounding airports by further separating the source and the receiving areas.

CHANGES IN AIRCRAFT:

Aircraft engine changes and air frame technology will reduce noise levels. A program in effect and regulated by the Federal Aviation Administration is FAR Part 36 requirements for subsonic jets, (specified noise limits that must be met by new design and current production aircraft). Extension of this regulation to include previously produced aircraft through a modification or "retrofit" program is proposed for rapid implementation. Retrofit can be undertaken by two methods: "SAM" and "REFAN". The SAM (Sound Absorbent Material) procedure involves applying new sound reducing nacelles to existing engines. REFAN is the conversion of engines through the introduction of new front fans. Although SAM retrofit does not gain the noise reduction available through REFAN programs, it has been proven technically feasible for the JT8D engine found on B727, 737 and DC-9's. SAM achieves a marginal take-off noise reduction and a 6 to 8 EPNdB reduction on approach over the present engines. SAM nacelles for the JT3D engine powered aircraft (DC-8, B707) are still under develop-

ment and present directions indicate that they too will allow reduction to current FAR Part 36 standards.

The REFAN reduction method under study for current JT8D engines could approximate the high bypass ratio-type engines powering the 747 and DC-10. This phase of aircraft noise reduction would attain levels significantly below present FAR Part 36, would require a longer development and installation period. Development of the REFAN method for the older 707, DC-8 models has been dropped and FAR Part 36 requirements will be met by SAM or by removal of the models from service.

The Federal Aviation Administration and Environmental Protection Agency have indicated in the past that a better than a 50% retrofit program could be accomplished by 1978. The majority of the United States' jet fleet would then meet FAR Part 36 performance standards. With such a schedule full compliance by the aircraft industry would occur by 1981. However, to provide a more conservative margin, the future exposure patterns utilized for the Sea-Tac/Communities Plan Study Area are based on a 1983 full compliance year. Foreign registered aircraft operating in the United States would also be required to comply to these regulations. Additional restrictions on small corporate jets, propeller aircraft, helicopters and supersonic transports are pending.

In addition to the modification of present-day aircraft, new models will be introduced to fulfill the demands of the air transport industry. These new planes are required to meet FAR Part 36 regulations and any additional noise stipulations imposed at a Federal level. The oldest, noisiest pure turbojet 707 and DC-8 models will be replaced by these new

aircraft, helping the noise picture by directly substituting the most noisy with the least. Such "Fleet mix" changes have been developed in cooperation with the Air Transport Association (ATA) and are reflected in the Sea-Tac Community Plan projected noise calculations.

policy; *Support through local programs of advocacy rapid implementation of all Federal aircraft source noise reduction efforts.*

OPERATIONAL MEASURES:

Operational measures can provide a considerable change in noise impact. Flight procedures on approach/landing and takeoff are controlled by the Federal Aviation Administration while on-airport operations (taxiing, runways) are the responsibility of the airport operator. Technical inputs are received from the Air Transport Association, Airline Pilots Association, Environmental Protection Agency and other interested groups affected by any proposed actions. Specific actions may be adopted at specific airports for a variety of reasons (examples are a 5! approach slope at San Diego and Sea-Tac's Elliott Bay Departure), but generally, standardized national operational procedures are recommended. Such procedures try to achieve the lowest practical noise exposure commensurate with safety and economy.

Noise reductions of from two to ten decibels have been achieved by use of one or more of the operational changes instituted over the last few years. Three FAA programs, "Keep 'Em High," reduced flap angles on

approach, and "Get 'Em High Earlier" have reduced impact areas considerably since being introduced. In accord with FAA directives, sonic booms are also regulated, and special air traffic rules and patterns are enforced.

Compliance with the ATA recommended "Get 'Em High Earlier" has been voluntary; changes have been suggested and after extensive testing, two procedures are emerging...one recommended by the ATA and one being flown by Northwest Airlines. Both procedures have been utilized with the projected Sea-Tac fleet mix and some differences in exposure appear; however, with new aircraft types and advanced guidance systems in the offing, more intensive research must be completed assessing the comparative effectiveness of these takeoff procedures. Both contribute to an improved exposure pattern depending on where the measurements are taken.

Increased approach angles for landing would reduce noise over a greater distance. The "two-segment approach", which combination of a steeper angle transistioning to normal final glide slope, has been evaluated by many pilots in different aircraft under instrument approach conditions. A Notice of Proposed Rule Making (ANPRM) was introduced by the FAA on March 20, 1974, to implement the two-segment approach, with results still pending. Steeper and curved approach paths are also in the experimental stage and a microwave landing system may offer some potential for noise reduction.

A national standardization of the Instrument Land System (ILS) to a 3° glide slope was adopted in 1971. However, the south glide slope at Sea-Tac to runway 34R remains at 2°45' because of topographic and electronic diffi-

culties. The glide slopes on the other three approaches, 34L, 16R, and 16L, are 3°. Technological problems also limit the use of "exclusive" runways at Sea-Tac as depicted as the West Approach NEF predictions in the noise analysis (Element 5.5 reference numbers 9, 10 and 11).

Special departure and arrival routing is in evidence at the Airport. Aircraft are given special headings and minimum altitudes for directional change over heavily populated areas. Confining over-flights to industrial land and Puget Sound, such as the Elliott Bay routing, reduces noise exposure to many people. To the south, aircraft are directed to maintain a runway heading to a minimum altitude (3,000 ft.) before initiating a change of direction.

policy *Support through local advocacy programs the rapid development and adoption of all operational measures effective in reducing noise exposure.*

LOCAL PROGRAMS:

In order to assure compliance with the recommended flight and operational procedures at the Airport, a noise monitoring system will be useful. The ability to measure the change in aircraft noise exposure will help evaluate progress toward solving the noise problems. Both single aircraft operations and overall composite can be measured. Geneva, Osaka, New York and Taipei all have noise monitoring equipment in operation and report significant improvement in dealing with noise exposure patterns.

On-Airport operations are the responsibility of the airport operator. Engine maintenance has incurred unfavorable comment throughout the years. Modifications of the procedures, locations and time restrictions have been required. A recommendation (already implemented) has moved the engine run-up locations to positions allowing better patterns of noise impact. Possible use of special run-up devices can be evaluated in terms of the new locations, however, the tremendous expense of such equipment will not be justified if the run-up noise falls mostly on airport property and generates few complaints. Future monitoring programs will help in this evaluation. Nighttime curfews also apply to maintenance activites. From 10 p.m. to 6 a.m. there currently can be no full power engine run-ups except for emergency situations. These provisions can be further restricted to allow no run-ups whatsoever.

policy: *Adopt an ongoing noise monitoring program to continuously determine compliance with operational procedures and general trends in community exposure levels.*

policy: *Utilize new locations for engine maintenance run-ups to minimize exposure patterns off airport property.*

policy: *Further restrict nighttime curfews on maintenance run-ups during sleep hours.*

6.2.3 NOISE REMEDY PROGRAMS

Various ways and means to improve the community-wide noise environment in the vicinity of the Airport have been identified and analyzed. Some fifteen separate noise remedy programs were examined in detail by the numerous citizen or technical groups and interests that participated in the Study.

Each potential program covered by this extensive analysis focused on the area experiencing excessive or annoying noise as a result of aircraft operations at the Airport. In general, the noise remedy programs studied fall under one of the following categories.

1. Outright acquisition of noise-affected properties
2. Purchase assurance for impacted property owners
3. Acquisition of easements from impacted property owners
4. Insulation of noise-affected structures
5. Development controls by public agencies
6. Property advisory services

A comprehensive effort to improve the noise environment associated with any busy commercial airport may include part or all of these categories The Sea-Tac Communities Plan will employ all six in what is intended to be feasible and coordinated effort. The following sub-section of this chapter provide descriptions of their respective characteristics.

OUTRIGHT ACQUISITION:

Under this program, private or publicly owned properties located in areas subject to specified levels of aircraft generated noise will be acquired by an appropriate unit government, such as the Port of Seattle or King County. Such acquisition will be accomplished through negotiation to the maximum extent possible; however, condemnation procedures could also be utilized, if necessary.

Following acquisition, and dependent upon the type of land use prescribed by the Sea-Tac Communities Plan, three different actions may be taken:

1. All existing buildings and structures will be removed, and new uses involving a minimum concentration of human activity will be introduced, such as golf courses, farming or outdoor storage. The resultant low-intensity open type of pattern will be suitable for areas most seriously impacted by aircraft noise.

2. All existing buildings and structures will be removed (to the extent necessary) and new uses considered to be compatible with aircraft noise will be introduced. The new uses may be of a commercial, industrial or other nature (as appropriate), and the resultant pattern will be more intense and less open than the first option.

3. Some or all of the acquired property will be maintained in its present use and leased back to prior or new occupants for a specified period of time. The existing land use pattern may not change much under this option, particularly in the short run (up to 10 years).

The advantage of outright acquisition is that lands most subject to intense or prolonged aircraft noise exposure come under public ownership,

and thus public control. However, this process typically costs more than other noise remedy programs that may be employed and it removes the acquired property from the tax rolls.

PURCHASE ASSURANCE:

Most (if not all) home owners are concerned from time-to-time about their ability to dispose of their property when they desire and at a price they consider to be equitable. Owners of property near major airports experience such anxieties more often than is otherwise typical. This is usually due to such specialized factors as (a) excessive aircraft noise at certain times which result in a less than desirable living or working environment; (b) uncertainty as to whether the noise problem will grow worse as time passes, the airport will require even more land for operational purposes, or both ; (c) mortgage funding practices of local and federal institutions (such as FHA) which may be prohibit or restrict the financing or properties subject to certain levels of airport-oriented noise exposure; and (d) increased local traffic congestion and thus property access problems as airport workforce and passenger activity grows with time.

In recognition of the above concerns, several potential noise remedy programs that can best be classified as "purchase assurance" activities have been investigated. These activities are so designed and carried out as to assure noise-impacted owners that they can sell their property, if and when desired, with no more than the usual difficulties associated with such transactions. Of the various assurance programs studied, two have

been selected for implementation. They are:

Purchase Guarantee:

A guarantee will be provided to owners of developed or undeveloped residential property subject to specified levels of aircraft noise that their holdings will be purchased for fair market value in the event they decide to sell. Terms of such an agreement will be as follows:

a. Owner files request for purchase with agency.

b. Property goes on the open real estate market for a minimum period (such as 90 days) with the agency monitoring or participating in the marketing effort.

c. If sold, the transaction may be completed between buyer and seller. The one-time purchase guarantee will be passed on through subsequent resales until exercised.

d. If not sold, the agency will purchase the property at fair market value. If developed with a residence, prior to resale the residence may be sound-insulated to the degree possible and as required to produce an acceptable inside noise environment. An appropriate avigation easement will be attached to and become part of the property deed acquired by the new owner.

HUD/FHA Mortgage Insurance:

The Federal Housing Administration (FHA) of the U.S. Department of Housing and Urban Development (HUD) provides federal mortgage insurance for eligible residential properties throughout the United States. In areas

subject to unusual noise conditions--such as those often found near a major airport--FHA mortgage commitments may not be available due to an inability to meet published HUD Noise Standards. (*See HUD Circular 1390.2 originally dated August 4, 1971). In some instances, these commitments are withheld as long as the adverse environment prevails. In other cases, there is considerable confusion and misinformation as to where such insurance is or is not available.

Owners affected by either or both of these conditions may well be nervous and uncertain about the marketability of their property. To deal with this situation--which does exist in the vicinity of the Airport--a second purchase assurance program could be employed. Such a program will consist of three components:

a. A clear and comprehensive description of the present and anticipated airport noise environment, based upon recently completed noise measurements and forecasts of future aircraft operational levels and characteristics.

b. Establishment and operation of a permanent aircraft noise monitoring system designed to provide the data needed to update the above description from time-to-time.

c. Modification of FHA practices in the vicinity of the Airport to correspond more directly with the Sea-Tac Communities Plan for long term neighborhood character and stability.

The mortgage insurance program involves fewer initial costs and may be implemented as soon as HUD/FHA agrees with the Sea-Tac Airport noise environment (present and future), as measured and described by the Study.

Although the purchase guarantee approach is more costly, it does

provide an eligible property owner with the opportunity to move if he is truly concerned about the aircraft noise problem. Moreover, since affected residential properties are retained and improved, neighborhood patterns are not disrupted or altered, the local tax base is protected and property values may be expected to stablize.

AVIGATION EASEMENTS:

The acquisition of an avigation easement purchases the right of flight over the land together with the right to cause noise, vibrations, smoke, glare, dust, and all other effects of aircraft operations. This type of easement differs from an obstruction and hazard easement in that the latter only grants the right to keep the property free from structures, trees, or other hazards to the safe operation of aircraft.

Since a property right is involved, the owner is compensated. The amount of this compensation is negotiated; unless the easement is acquired through eminent domain where a court-decreed settlement is used, easements may also be acquired by gift or they may be leased on a term basis.

As implied by their name, permanent-, long- and short-term avigation easements are effective for specified amounts of time. Long-term is here defined as 10 to 20 years, while short-term refers to a less than 10-year period.

The use of term easements requires (a) a good description of the prevailing noise environment near Sea-Tac International Airport; (b) sophisticated forecasts of future aircraft activity; and (c) the establish-

ment of a permanent noise monitoring system.

Permanent easements may be appropriate in connection with lands that are suitable for farming or similar types of open use.

While avigation easements are less costly and owners do receive some compensation in return for contending with the periodic annoyance of aircraft operations, the use of this form of noise remedy does have certain disadvantages. For instance, the occupants of noise-impacted properties are not physically relieved by the problem through the sale and purchase of an easement. The value of such easements are difficult to determine due to the dynamic ever-changing nature of aircraft noise as well as by the wide variation of personal attitudes that usually prevail as to the nature or extent of the "problem."

policy: *Avigation easements do not represent satisfactory noise remedies for affected property owners in and of themselves--they should be used in conjunction with other forms of improvement such as purchase assurance or noise insulation programs.*

NOISE INSULATION:

Since the interior environment of residential and other noise sensitive uses (such as school and offices) can be insulated against the transmission of exterior sources of noise, the potential application of "sound attenuation" improvement programs was analyzed as part of the Sea-Tac Study. Char-

acteristics of insulation measures were investigated, together with costs and the degree of success or failure associated with this form of noise remedy. Sound insulation for an existing dwelling unit usually consists of some combination of the following:

a. Provision of a forced air ventilation system designed to function best when windows and doors are closed;

b. Replacement of exterior doors with acoustical doors and seals;

c. Provision of double glazed windows and seals when and as appropriate;

d. Repair of cracks and openings;

e. Installation of fireplace dampers (if needed); and

f. Modification of kitchen and bathroom ducts by including a bend and acoustical lining.

The degree of success that may be achieved as the above improvements are made will vary widely according to the age, condition, and type of structure that is involved. Based on one recent study,* modifications can result in additional noise insulation improvements of about 15 dBA above the normal 20 dBA reduction typically provided by standard housing. Thus a total noise attenuation of 35 to 40 dBA is about the maximum achievable without major reconstruction of the entire house.

Of the various sound insulation programs that were evaluated, a system currently in use around London's Heathrow Airport proved to be of

*Aircraft Noise Impact - Planning Guidelines for Local Agencies, U. S. Department of Housing and Urban Development, November 1972, p. 214.

special interest. The object of this particular scheme is to give direct help to those residents in certain prescribed areas who are disturbed by aircraft-generated noise. The help takes the form of cash grants from the British Airports Authority toward the cost of sound insulation of dwellings. Although the program has been devised primarily for houses of standard brick construction, other residential structures are also eligible upon special application.

Under the Heathrow plan, two noise impact districts have been designated--a "Special Area" most seriously affected by aircraft noise, and the "Standard Area" which consists of the remainder of those local governmental jurisdictions covered by the scheme. The owners of residences located within the Special Area may qualify for grants amounting to 100% of the cost of prescribed insulation or £360, ($900) whichever is smaller, while their counterparts in the Standard Area may receive up to 75% of such costs or £206, ($515) whichever is smaller. A formal application must be submitted and approved in order to obtain a grant. Also, the work may be accomplished by the applicant or by a contractor, but it must conform to the specifications called for by the program.

First established in 1966, results of this British Airports Authority scheme are represented to some extent by an opinion survey taken in 1971. According to the survey, some 64% of the sample of grant recipients interviewed felt that their respective noise modifications were "fairly effective," while 25% of the sample considered the improvements to be "very effective."

Although the exterior noise environment is not changed as a result of sound attenuation, the occupants of insulated homes, offices, schools,

and similar uses are less subject to the periodic annoyance of aircraft operations. Other advantages include (a) lower costs than outright acquisition; (b) improved properties remain on the tax rolls; (c) prevailing neighborhood patterns are neither disrupted nor altered by this type of program; (d) owners/occupants of properties are not required to relocate; and (e) heating and cooling costs are less expensive in most cases--an important consideration in this time of energy conservation, inflation, and economic recession.

While not as expensive as outright acquisition, sound attenuation modifications can be very costly if applied over a wide area. Achievement of the previously mentioned 15 dB improvements could run as high as $7.00 to $9.00 per square foot of house area. (*See HUD Circular 1390.2 originally dated August 4, 1971) In general, however, such costs may be expected to approximate those typically associated with the acquisition of avigation easements over residential properties. That is, approximately 20 to 30% of the total appraised value of such properties.

The noise insulation program will be to provide assistance in a format basically similar to the Heathrow program. The percentage share of insulation cost up to a stated maximum will vary in relation to the severity of the noise impact, as will the combination of modification measures needed to achieve reasonable attenuation. Thus, both the cost per structure and the percentage share of assistance available will be highest in the more noise impacted locations and less elsewhere.

DEVELOPMENT CONTROLS:

Two forms of development controls were considered. The first in-

/es the adoption and enforcement of new or modified construction code quirements. These code revisions would be applied in connection with the renovation of existing structures as well as new construction after the date of adoption.

The building industry has made some progress in recent years toward resolution of noise problems within structures. This is particularly true with interior walls and partitions. A wide variety of construction formats have been tested and given a Sound Transmission Class (STC) rating. Such a rating represents the sound transmission loss performance of walls, doors, floors, ceilings, plumbing, and other materials. The use of STC ratings in building, housing, and plumbing code standards or specifications is growing and is appropriate for areas impacted by the noise of aircraft operations.

In addition to being less costly than other noise remedy programs previously discussed, the establishment of specialized code requirements for new or modified construction in the vicinity of the Airport has certain other advantages. Prevailing land use patterns can be retained and even reinforced through code compliance. New administrative costs and machinery associated with this type of program are negligible. Acceptance of the construction code form of noise improvement may be expected. The establishment of up-to-date code provisions for sound transmission affords some protection for propospective new residents of the aircraft-oriented noise environment.

As with avigation easements and insulation programs, however, the construction code approach does not improve the out-of-doors noise environment. Moreover, costs are typically borne by property owners and the initiation of extensive new construction requirements may adversely affect

the local real estate market. Also, since more than one unit of government is required to adopt and enforce a common code provision, uniform application may be more difficult to achieve.

The construction code noise remedy will be implemented by the adoption of amendments to the appropriate construction codes of King County and the Cities of Des Moines, Kent and Seattle.

Regulations pertaining to the zoning and subdivision of land represent the second development control program. Under this approach, new zoning and subdivision regulations will be adopted by responsible governmental entities for those portions of King County affected by noise attributable to aircraft operations at the Airport. These new regulations will be designed to foster with time a land use pattern that is more compatible with the Airport.

In order to be both effective and legally defensible, zoning and subdivision regulations must be based upon an acceptable land use plan that has been duly adopted by the implementing public body.

A land use plan for an already built-up area around a busy, established commercial airport usually calls for more industrial and business uses in some locations, more open-type uses, and less residential use adjacent to or in close proximity to an airport. The rate of actual land use transformation is dependent to a large extent on the location and uses contemplated by the plan. As a consequence, this type of noise remedy must be considered as a long- rather than short-term program of improvement.

Advantages of the land use approach, as identified during the noise remedy program analysis, are:

a. The public costs are minimal in contrast to most of the programs that received consideration.

b. Properly prepared and administered land use regulations can lead future development (and redevelopment) to produce maximum compatibility between the Sea-Tac Airport and the surrounding community.

c. Maximum benefits from public expenditures for capital improvements can be gained through strict adherence to improved land use regulations.

d. Future Airport development can be effectively coordinated with community change.

e. Good land use plans and regulations should encourage neighborhood change, where such change is called for, to take place in an orderly fashion.

Some disadvantages can also be identified:

a. By and of itself, a land use control program provides little relief for the occupants of existing structures who must contend with the periodic annoyance of aircraft operations.

b. Meaningful implementation of land use regulations is difficult at best and ineffective at worst. If correct zoning decisions are not made in virtually every instance, such regulations may produce less improvement than is desired or anticipated.

c. To a large degree, market conditions govern the success of a given land use plan and attendant regulations. For example, transformation from residential to industrial land use is dependent upon the availability of a market for such a change. If a forecast market condition does not materialize, then very little of consequence can or will take place.

d. The long-term nature of this type of improvement program requires citizens adversely affected by aircraft operations to exhibit a degree of patience and forbearance that is difficult, if not impossible, to achieve.

Development Control noise remedy programs are relatively inexpensive, depend upon uniform and coordinated governmental action, are likely to be accepted with a minimum of controversy, result in gradual land use change, and require a long period of time to produce desired results.

PROPERTY ADVISORY SERVICES:

The final category of action is the provision of various advisory services to noise-impacted residential property owners. The latter would include present and potential owners as well as real estate, legal and financial entities.

A property advisory program will be made available. It will include:

a. Detailed analysis of noise impact characteristics associated with individual property locales.

b. Information about the various noise remedy programs that have been established for the use and benefit of property owners.

c. Consultation on housing-related decisions and options that an owner or occupant of residential property may encounter.

d. Referrals to other housing services, locations and types of housing that may be available in the Seattle area.

The fact that this type of program can be made available to <u>all</u> property owners within the Study Area--regardless of location or position relative to

aircraft noise exposure--represents a key advantage. The proper application of such services will eliminate or reduce uncertainties in alternative housing decisions that a particular owner might have to cope with. Furthermore, the program offers a means to correct rumors or misinformation that may circulate from time-to-time within the Sea-Tac Communities.

6.2.4 NOISE REMEDY PROGRAM APPLICATION

The Noise Remedy Programs formulated here are based on uniquely detailed noise measurement and analysis. The ANE (Adjusted Noise Exposure) method is derived from the widely accepted national standards of airport noise exposure analysis, NEF (Noise Exposure Forecase). ANE and NEF represent identical noise measurement methodologies. This report uses the ANE terminology whenever referencing the specific analysis data for the Sea-Tac Airport. The ANE method employs local measurements and a detailed grid system of data presentation. The forecasts conducted reflect specific operational conditions at Sea-Tac Airport for the forecast years 1978, 1983 and 1993. This program is also based on duration and change of exposure rather than soley on present conditions. Noise Remedy Programs in turn are part of a total community planning effort derived from objectives, conditions, resources and opportunities also unique to the Sea-Tac communities. Therefore, similar approaches at other airports may vary in what is derived as a workable total program.

SINGLE FAMILY RESIDENTIAL AREAS:

Recommendations referenced in Section 5.2 from the noise consultant analysis, indicate that a level of 45 ANE and above is not acceptable for permanent residential use under any circumstances. The data provided indicates that some residential areas are currently exposed to levels this high. Forecast data also indicates, however, that most of this exposure is

projected to decrease sufficiently in the future and to be eventually encompassed largely by existing airport boundaries.

Additional criteria can be identified that apply in designating areas not appropriate for residential use. In addition to the criteria of being within an existing ANE 45 or above level. As far as land use change is involved, a margin of safety is desirable to allow for any possible inaccuracy of the noise data used. Also, it is commonly recognized that ANE 40 and above still comprises an area of severe exposure. By using both existing and forecast noise exposure, it is possible to identify unsatisfactorily high exposure for residential land use in terms of areas permanently exposed to ANE 40 levels and above. "Permanent" is defined here as remaining at an ANE 40 or higher throughout the 20-year planning period of the Sea-Tac/Communities Plan. Using ANE 40 in this manner provides a margin to ensure that the existing ANE 45 and above exposure areas are fully addressed. Analysis of grid data indicates this approach would encompass all areas that have been and are presently still experiencing 45 ANE or greater levels. In addition, it would insure that the Remedy Program would eventually eliminate all residential exposure above ANE 40.

The Environmental Protection Agency has tentatively determined that for levels above NEF 45 no structural treatment technology is acceptable. The only feasible land use alternative is the conversion of existing residential land to uses that are noise compatible. Use of a permanent ANE 40 criteria accomplishes this with a significant margin. Acquisition programs would be required to affect a conversion of residential lands to noise compatible use. Thus,

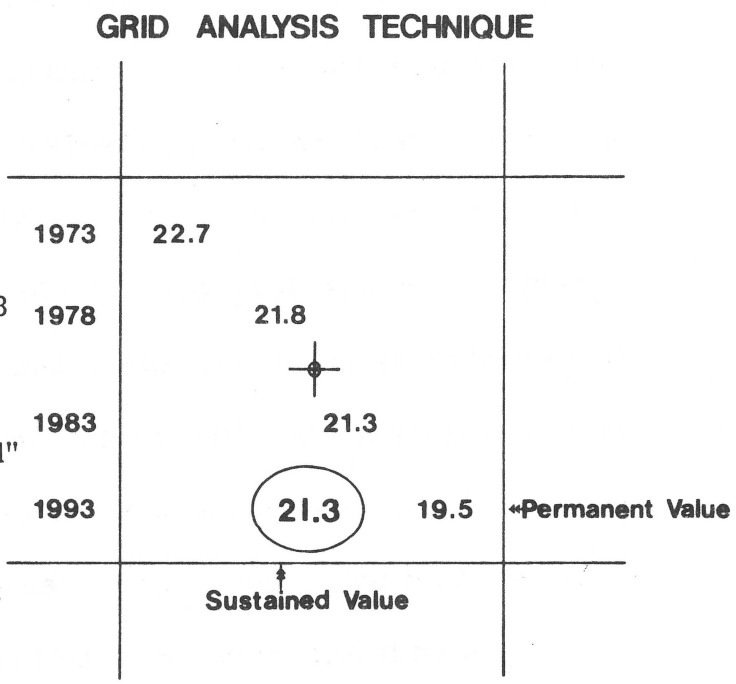
policy: *Noise exposure areas permanently above ANE 40 should be included in land acquisition programs.*

For areas of less exposure than a permanent ANE 40, there remains a significant community welfare problem. Programs are needed that address residential properties with noise exposure levels that are not high enough to warrant change of use, but are clearly of real concern to a significant portion of a resident population. Consultant recommendations (Section 5.2) indicate that combinations of noise programs identified (Section 6.2.3), should be applied in areas of exposure between ANE 35 and 45. Tentative EPA recommendations indicate that for levels below NEF 45, there is a structural treatment technology which can ensure that noise intrusions will not effect the daily activities of the public inside the treated structures.

Community survey data and other community input into the Sea-Tac Communities Plan indicates that concerns over the ability to sell property is one of the greatest annoyance factors affecting the general welfare of noise impact areas. Residential properties lying just beyond areas of permanent ANE 40 can be addressed through programs which better ensure that individuals who wish to sell homes can do so. Purchase guarantee, if combined with a program of structural modifications to reduce interior noise levels (the insulation program), is an appropriate combination of programs. Such an approach would assume that with these modified conditions a significant segment of the population would be willing to reside in a neighborhood; thus, a reasonably viable residential area could be sustained and could provide housing for many people. Conditions would be less than optimal from a

noise exposure standpoint, but some improvement over time would be evident. In exchange for full application of purchase guarantee and a full insulation program, easements, either permanent or long-term (at least 20 years), would be required.

In applying noise exposure criteria to define this category, the ANE 40 value can again be applied but on the basis of a "sustained" exposure level. By incorporating exposure values for 1973, 1978, 1983 and 1993 through the sum of the four values divided by four, a "sustained" value can be expressed. This value is not an average but it places somewhat more emphasis on present than on future levels. It defines exposure areas which eventually (within the planning period) will fall below the ANE 40 value. Using this approach:



policy: *For areas defined by "sustained" exposure levels of ANE 40 or above (but below "permanent" ANE 40 levels), purchase guarantees should be applied in conjuction with a residential soundproofing program and with permanent or long-term easements.*

For areas with noise exposure below ANE 40 (permanent or sustained) but above ANE 35, it is possible to define program areas on a similar basis. A permanent ANE 35 and above exposure area exists as does a sustained ANE 35 and above exposure area. Residential property permanently above ANE 35 represents the largest resident area within which some definite community noise impact will exist on a long-term basis. Such impact is not in the severe category typified by levels above ANE 40. A large segment of the population in locations permanently ANE 35 to ANE 40 feel that noise exposure conditions are within tolerable limits, that is evidenced by the Community Attitudes Survey (Ref. 8.0.1, #13). Nevertheless, a significant level of annoyance remains which, if not addressed through appropriate program measures, could result in less desirable community conditions. Given the fact that large residential neighborhoods are already well established in this exposure area, it is in the general public interest to reinforce and improve the livability of these neighborhoods.

Again, as with higher exposure areas, concern with saleability of homes has been a major concern. Clearly mortgage insurance through existing FHA and VA programs must be available in this area. Also, structures with these exposure levels are clearly amendable to sound attenuation measures through insulation improvements. While a total purchase guarantee program could not be justified in terms of the severity of exposure, a more limited form of assistance directed toward easing marketing and livability conditions could prove helpful. An insulation assistance program could provide such improvement on a cost sharing basis. An assistance program providing 75% of the total cost of noise attenuation

improvements would substantially increase residents' opportunities to improve the quality and livability of their homes and neighborhoods. In view of the present exposure levels (near or exceeding 40ANE) and permanent levels above ANE 35, a program of permanent of long-term easements geared to these exposure conditions would be required. The combined effect of these noise remedy programs can result in improved neighborhood quality in an area where noise exposure will decrease, but still will remain moderately severe in the view of some individuals. In turn, such programs would result in long-term progress toward improved compatibility between established neighborhoods and the Airport.

policy: *For exposure areas permanently above ANE 35 (but below sustained 40ANE) a program of cost sharing insulation assistance and easements should apply.*

The last category of major concern in program application is the area not permanently above ANE 35, but still have above ANE 35 as measure on a sustained basis. Such areas will clearly improve in noise exposure during the planning period to a point somewhat below the level associated with significant exposure problems. Many people in these exposure areas do not view noise as a critical problem. In general, the same kinds of programs in combination appear workable for this area as are described above for the permanently above ANE 35 areas. The chief differences is in the amount of program applications appropriate to the exposure problem. An application of the same program on a lesser percentage financial share basis (50% instead of 75%) would be commensurate with the reduced duration and intensity of

the exposure. Again, it is clear that the mortgage insurance programs of the FHA and VA must be fully available. Easements in this case, however, would clearly be of a limited term appropriate to exposure levels that eventually fall below ANE 35.

policy: *For exposure levels above ANE 35 on a "sustained" level basis (but below ANE 35 on a permanent basis) a program of cost sharing insulation assistance and limited term easements should apply.*

OTHER USE CATEGORIES:

Undeveloped Residential Property:

Properties consisting of individual platted lots within residential neighborhoods zoned for such use will be eligible for programs as follows. In total acquisition areas such property would be acquired. In purchase guarantee areas the property itself would be eligible for purchase guarantee--in which case easements would apply. In areas of noise insulation programs such properties would be eligible for easement purchase at amounts lower than that offered for developed properties. The lower amount would reflect the lower costs of adding soundproofing to potential new construction and the absence of existing noise exposure to residents.

Residential Properties Where Community Plan Recommendations Call for a Use Change:

In areas where long term single-family residential stability is unlikely and a

change to non-single family residential use has been recommended, the following would apply. In purchase guarantee areas the guarantee to acquire would apply but insulation programs would not. Easement purchase may be offered on an equivalent basis to undeveloped property. In areas of noise insulation programs a special purchase guarantee program may be offered at an appropriate time and for a limited period to assist use change. Easements may be acquired on an undeveloped property value basis.

Multi-Family Residential Property:

No multi-family residential structures exist in the acquisition areas. Where they occur in purchase guarantee and noise insulation program areas, the insulation cost sharing program would be reduced in amount to reflect lower costs in structural modifications required and in accordance with the differences in noise sensitivity associated with these uses. Individual variations in percentages available may be made, based on structure type and general configuration of the dwelling units. The purchase guarantee program itself would not apply to multi-family structures.

Schools:

Public school facilities will be handled through direct negotiations with the public agencies involved to accomplish changes as may be determined mutually appropriate.

Non-Residential Developed Property:

Such properties within acquisition program areas may be acquired if necessary to allow general change to compatible land use in accordance

with the adopted plan. If acquisition is not necessary to achieve these objectives, such property may not be acquired. In purchase guarantee or insulation program areas, purchase guarantee or easements purchase may be offered on an individually negotiated basis depending on the nature of the existing development.

Non-Residential Undeveloped Property:

Such properties within acquisition areas may be acquired if needed to allow general change to compatible land use in accordance with the adopted plan. If acquisition is not necessary to achieve these objectives, such property may not be acquired. Purchase guarantee, noise insulation and easement programs will not apply outside the acquisition areas.

DEVELOPMENT CONTROLS AND PROPERTY ADVISORY SERVICE PROGRAMS:

Among the various programs identified for possible use in noise exposure areas, some can apply equally throughout the various exposure level categories. These include Developmental Controls and Property Advisory Services. They can be applied throughout the four major impact area categories and beyond. As indicated in the Noise Analysis (Chapter 5.2), it is possible to trace some noise influence from the Airport out to ANE 25. Exposure at these levels warrant consideration as a factor in community planning and will be addressed further in program recommendations under Community Development, Chapter 6.6.

PROGRAM APPLICATION PROCESS:

In order to identify the various noise exposure areas in terms of their permanent and sustained levels, the grid system of measurement provided by the noise consultants was utilized. As described in Chapter 5.2, this system provides Adjusted Noise Exposure data for each of a complete pattern of 40 acre units. In turn, noise exposure values have been identified for the present and forecast years (1973, 1978, 1983 and 1993) for each 40 acre unit. Computation of the sustained value was then provided for each unit.

This grid method generally aligns with the basic street and property boundary patterns throughout the Airport vicinity. Further refinement of boundaries will require application of additional planning criteria as discussed under Community Development, Chapter 6.6. An example of the need for further refinement occurs in the north Airport approach. In this instance, the boundary line between grids aligns directly with the Airport's east runway (16L-34R). This will necessitate some adjustment of the recommended acquisition boundary eastward to better relate to exposure patterns. Noise Remedy Program application must reflect concentrated transitional level changes within these grids. Chapter 6.6 discusses additional community planning aspects which will further define boundaries and guidelines for use and development.

It is also anticipated that some administrative review procedure must be instituted to provide for minor adjustments of programs as they apply to individual cases. Such a review appeal process will be established along

with other administrative mechanisms for program implementation. Administrative criteria and procedures will be identified. These points will be reviewed in more detail in Part 7, Implementation.

volves the adoption and enforcement of new or modified construction code requirements. These code revisions would be applied in connection with the renovation of existing structures as well as new construction after the date of adoption.

The building industry has made some progress in recent years toward resolution of noise problems within structures. This is particularly true with interior walls and partitions. A wide variety of construction formats have been tested and given a Sound Transmission Class (STC) rating. Such a rating represents the sound transmission loss performance of walls, doors, floors, ceilings, plumbing, and other materials. The use of STC ratings in building, housing, and plumbing code standards or specifications is growing and is appropriate for areas impacted by the noise of aircraft operations.

In addition to being less costly than other noise remedy programs previously discussed, the establishment of specialized code requirements for new or modified construction in the vicinity of the Airport has certain other advantages. Prevailing land use patterns can be retained and even reinforced through code compliance. New administrative costs and machinery associated with this type of program are negligible. Acceptance of the construction code form of noise improvement may be expected. The establishment of up-to-date code provisions for sound transmission affords some protection for propospective new residents of the aircraft-oriented noise environment.

As with avigation easements and insulation programs, however, the construction code approach does not improve the out-of-doors noise environment. Moreover, costs are typically borne by property owners and the initiation of extensive new construction requirements may adversely affect

the local real estate market. Also, since more than one unit of government is required to adopt and enforce a common code provision, uniform application may be more difficult to achieve.

The construction code noise remedy will be implemented by the adoption of amendments to the appropriate construction codes of King County and the Cities of Des Moines, Kent and Seattle.

Regulations pertaining to the zoning and subdivision of land represent the second development control program. Under this approach, new zoning and subdivision regulations will be adopted by responsible governmental entities for those portions of King County affected by noise attributable to aircraft operations at the Airport. These new regulations will be designed to foster with time a land use pattern that is more compatible with the Airport.

In order to be both effective and legally defensible, zoning and subdivision regulations must be based upon an acceptable land use plan that has been duly adopted by the implementing public body.

A land use plan for an already built-up area around a busy, established commercial airport usually calls for more industrial and business uses in some locations, more open-type uses, and less residential use adjacent to or in close proximity to an airport. The rate of actual land use transformation is dependent to a large extent on the location and uses contemplated by the plan. As a consequence, this type of noise remedy must be considered as a long- rather than short-term program of improvement.

Advantages of the land use approach, as identified during the noise remedy program analysis, are:

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Advantages of the land use approach, as identified during the noise remedy program analysis, are:

chapter 6.3
water quality and drainage

chapter 6.4
air quality

6.4.0 AIR QUALITY IMPROVEMENT PROGRAMS

Mitigation measures to improve the future air quality around Sea-Tac are aimed at an airport operational change, modification of access and parking patterns, increased vehicle emission technology and land use change in areas where an annoyance but no detrimental health factor exists.

Although only one part of the vast national air transportation network, Sea-Tac and its surrounding communities must become advocates of strict standards for aircraft emissions. Modifications in engine design and fuel composition can reduce present levels by approximately 50% by 1983.

Ground operational changes must be weighed against safety, noise and capacity alternatives. Considerable reduction of pollutants is observed by use of fewer engines while taxiing, reduced idling time and increased towing of aircraft. Hydrocarbon (HC) losses associated with fuel handling should be minimized. Vapor recovery systems would reduce terminal area levels...

> *introduction of current pollution prevention equipment and procedures is essential at Sea-Tac.*
>
> *All fuel and oil spills should receive immediate attention to prevent vaporization.*

Mobile source controls again are being regulated from the Federal level. Even though they are less than 10 to 20 percent of the total Sea-Tac emission, localized problems exist. Access roads, terminal drive and parking garage areas especially are susceptible to high concentrations of

nitrogen oxides (NO_x). A reduction in vehicular traffic and elimination of congestion by structured parking rates, hourly traffic limits, development of mass transportation and remote parking facilities would improve conditions.

Most areas at Sea-Tac adversely affected by air quality in present and future years lay within proposed Port of Seattle boundaries. Those areas exposed to Federally non-regulated irritants and odor will be diminished during future years, however, action must be taken for further improvement by land use programs as proposed by the Port, King County and citizens. In particular, uses that generate pollutants already found in quantity around the Airport (HC, NO_x particulates) should be avoided. This would eliminate gas stations, firms dealing in the manufacture of solvents or chemicals, and firms consuming vast amounts of carbon fuels. Too, uses that attract crowds (and traffic) should also be discouraged...stadium complexes, shopping centers, and regional educational centers. These uses will also be addressed by FAA safety regulations if they fall within the clear zones of the Airport.

To monitor air quality around the Airport, the Puget Sound Air Pollution Control Agency should add hydrocarbon (HC) detection equipment to their McMicken Heights monitoring station.

During September, the worse month for air pollution, the agency's mobile van should be utilized for sampling more specific readings at either end of the runways. Coordination between the Port and control agency will be required to implement this recommendation. Continued planning and implementation of measures like this should prevent future air quality problems from increasing.

chapter 6.5
airport improvement programs

6.5.1 INTRODUCTION

This chapter deals with the Airport itself - its runway system, terminal, and other facilities that provide air transportation services. It comprises a review of existing facilities followed by an evaluation and recommendations for additional improvements or changes. Although no major requirements are identified such as additional runways, new terminal configurations, etc. there are many technical features of airport development that must be be addressed.

6.5.2 EXISTING AIRPORT FACILITIES*

AIRFIELD:

Key characteristics of active runways at Sea-Tac International Airport are as follows:

16L-34R	150' x 11,900'
16R-34L	150' x 9,425'
17-35	75 x 2,875'

Runway 16R-34L, equipped with ILS (Instrument Landing System), has Category II capability (see note). Located at the north end of the runway are the approach lighting system and 3,000' touchdown lights. The runway, surfaced with concrete, has high intensity runway lighting (HIRL) and all-weather marking.

Runway 16L-34R meets requirements for Category I * weather conditions. It is equipped with an approach lighting system and all-weather marking on an asphalt surface.

Runway 17-35 is utilized for general aviation flights. It has a concrete surface and all taxiway lighting to serve VFR operations.

NOTE: CAT I - An instrument approach procedure which provides for approaches to a decision height of not less than 200 feet and visibility not less than 1/2 mile.

CAT II - An instrument approach procedure which provides for approaches to a decision height of not less than 100 feet and visibility not less than 1200 feet.

*Reference is made to Chapter 6.7 for map of Existing Facilities and Airport Land Use.

TERMINAL AREA:

The Sea-Tac International Airport terminal expansion program, begun in 1966, included major increases in airline passenger service space, an automated baggage handling system, expanded parking facilities, improved access, increased passenger lounge and concession space, as well as the addition of VIP and press facilities. The result is an up-to-date airport which will be a long-term facility for the Puget Sound Region.

The terminal building is the outcome of an innovative approach to dealing with site limitations and the restraints presented by the existing terminal location and its configuration. Two satellite terminals were constructed and connected to the main terminal by an underground rapid transit system. The North Satellite terminal handles domestic flights while the South Satellite terminal handles the international traffic.

Construction of the terminal was completed in 1973, and is designed to ultimately accommodate some 20 million passengers per year. The terminal complex provides aircraft gate positions for 65 aircraft; 37 gates in the main terminal building, and 28 gates, (total) in the two satellite terminals. Currently 35 of the 59 developed gate positions are in operation.

AIR CARGO FACILITIES:

The airport's major existing air cargo facilities are located to the north of the passenger terminal building. Some facilities are also immediately south of the terminal. At present, half of the 70-acre area designated for air cargo is developed for that use, the rest remains undeveloped. Ad-

ditional acreage in this "northeast cargo area" and on the west side of the Airport is available for expansion of air cargo facilities.

AIRPORT SUPPORT FACILITIES:

Airport support refers to the many utilities and accessory functions necessary for the efficient and safe operation of Sea-Tac Airport.

Located at the airport's northeast side of are an elevated water tower and pump house, and within the northeast cargo area are the fire station and airport maintenance area. Straddling the sides of the airfield at the south end are the industrial waste treatment plant and the fuel storage area. Two electrical substations are located at the lower level of the terminal. Aircraft waste disposal is accomplished by a private contractor who collects and hauls the wastes to King County's Bow Lake Transfer Facility.

The fire station is located in the northeast cargo area south of Air Cargo Building No. 1. Present capacity is:

1. One lightweight fire and rescue truck (unnumbered); one combination foam and dry chemical fire and rescue truck (Truck No. 1; one water tank trunk (Truck No. 7); and three water-foam trucks (Trucks Nos. 3,4, and 6).

2. Present manpower levels are eight firefighters on duty per shift. Also supporting airport operations are 94 trained security police. These officiers duty is to insure safe travel and courteous service for all persons on Sea-Tac Airport property.

GENERAL AVIATION

On the northwest side of the Airport, Runway 17-35, rather short in length, is used by both general aviation and commuter (air taxi) aircraft, It is a combined taxiway/general aviation runway. There is one fixed base operator (FBO) offering line services including fueling, tie-downs, and overnight parking for itinerant aircraft. This operation is temporarily located in the northeast cargo area. Other services such as major maintenance, aircraft sales and flight training are not provided. At present, there are no general aviation aircraft based at the Airport.

AIRPORT ACCESS AND PARKING:

Access to the passenger terminal at Sea-Tac International Airport is provided by Pacific Highway South (Highway 99) and the North Approach Drive both of which link the facility to the overall road network of the Puget Sound Region. Highway 99, the old major north-south arterial linking Seattle and Tacoma,is connected with Interstate 5 Freeway (which runs parallel to it) by State Highway 518 north of the Airport and by South 188th Street at the south end of the Airport. North Terminal Drive provides direct access from Highway 518 to the parking terminal, as well as passenger check-in and pick-up routes which pass in front of the main terminal and loop around the parking structure. The South Drive plugs into this loop from Highway 99. An interchange at South 188th Street and Highway 99, along with the possible completion of the Highline Freeway (SR 509), would improve access to the Airport from the south.

Parking facilities for airline passengers and terminal-related activities at Sea-Tac International Airport include the seven-level parking garage owned by the Port of Seattle, and remote parking in several commercial parking lots near the Airport. The existing Sea-Tac Terminal Garage currently has 4,150 parking spaces available for public and employee parking. In addition, one level of the garage is presently utilized for rental car parking and servicing. An estimate using recent aerial photos of remote public parking spaces in the Airport vicinity indicated 1,200 spaces were available with some 500 additional spaces utilized for rental car storage.

6.5.3 EVALUATION OF EXISTING FACILITIES AND REQUIREMENTS

PLANNING GOALS:

In general, a principal goal to be achieved in long-term development of an airport is that...

Goal: *Sufficient acreage is available to accommodate long-term air traffic requirements.*

Another equally important goal is that...

Goal: *Land surrounding the airport shall be developed under appropriate control to assure compatibility.*

The importance of these goals for airport planning reflects the fact that airport facilities represent a tremendous investment and that the operation of any airport will unavoidably have far-reaching impacts on the surrounding land areas.

With reasonable foresight, long-term utilization of the airport site can be achieved without excessive disruption of future land use patterns, and costly land acquisition to accommodate airport expansion requirements can be minimized. This means that adequate consideration must be given to long-term expansion possibilities within the airport boundaries and to the compatibility of future land uses in the neighboring communities.

Planning in this manner strives for flexibility and adaptability necessary to respond to a range of possible demand levels in the future. Demand may overshoot the forecasts (due, for example, to an unexpected economic boom in the region triggered by Alaska's North Slope activity), or it may be less than anticipated by predicted growth rates.

PLANNING APPROACH:

The Sea-Tac International Airport can be considered a system composed of several major elements which must be analyzed individually and balanced in relation to one another. The major system elements are:

Airfield
Airspace
Terminal Complex
Access and Circulation
Support Facilities

The first two represent "airside" considerations, the last three are "landside" aspect of the airport system.

These elements were analyzed by Peat, Marwick, Mitchell and in relation to their capability to satisfy forecast aviation demand. The Peat, Marwick, Mitchell & Co. report, Demand Capacity Analysis, contributed to the Port of Seattle's effort to refine the requirements for airport facilities to accommodate air traffic activity through 1993.

SUMMARY OF PRELIMINARY REQUIREMENTS:

Based upon the air traffic demand forecasts for Sea-Tac International Airport, preliminary physical facility requirements for the Airport were

developed. Included are requirements for the forecast years 1978, 1983, and 1993.

The above referenced Demand Capacity Analysis provides a preliminary evaluation of the existing Airport facility. Generally, in terms of technical requirements...

policy: *The existing Airport site has adequate capability to accommodate foreseable air traffic demand. (e.g. throughout the 20 year forecast period to 1993)*

AIRFIELD REQUIREMENTS:

The initial phase of study leading to the determination of future airfield requirements at Sea-Tac International Airport included the development of air traffic demand forecasts, as well as an analysis of meterological conditions affecting aircraft operations. Current and anticipated air traffic volumes, aircraft mix, and useage of the runways and taxiways were taken into consideration in the evaluation process.

Runway Orientation:

FAA criteria specify that at air carrier airports a crosswind runway is required for planes in excess of 12,500 pounds gross weight if the primary runway is oriented so that crosswinds exceed 15 miles per hour (13 knots) more than 5% of the time (less than 95% wind coverage). The wind coverage on the Sea-Tac runways is slightly greater than 97%; therefore, crosswind

runways are not required.

Runway Lengths:

The Consultant found the existing lengths of parallel runways 16-34 (9,425 and 11,900 feet) adequate to accommodate all anticipated aircraft types on expected stage lengths throughout the forecast period. However, Runway 17-35 (2,875 feet) which is presently used for general aviation and communter airline traffic, falls 725 feet short of FAA planning criteria for accommodating all aircraft less than 12,500 pounds in weight.

Airfield Capacity:

An analysis was made of the existing airfield capacity at Sea-Tac International Airport. Airfield capacity is related to aircraft delay. Because aircraft can economically tolerate just so much delay, the airfield must be planned so that such delays do not exceed an acceptable duration; otherwise serious congestion can result.

Factors that affect airfield capacity include aircraft mix, runway and taxiway configuration and use, visibility, runway occupancy times, and the ratio of aircraft arrivals to departures. These factors were evaluated on the basis of data from a recent air traffic survey conducted at Sea-Tac International Airport, available FAA statistics, meteorogical conditions, and discussions with FAA air traffic control personnel.

As a result of this evaluation, hourly capacity of the existing airfield configuration at Sea-Tac Airport in 1973 was determined to be about 63 aircraft operations per hour during Visual Flight Rule (VFR) conditions,

and approximately 54 operations per hour during Instrument Flight Rule (IFR) conditions. The method used to compute these figures assumes airfield hourly capacity is reached when the average delay to arrivals or departures equals four minutes.

Airfield capacity is expected to decrease between 1973 and 1993, due to an anticipated increase in "heavy jets" as a percentage of aircraft mix and also because of increase separation rules for this type of equipment. In anticipation of this future situation, the hourly capacity of the existing airfield configuration in 1993 is expected to be about 55 aircraft operations per hour under VFR conditions, and some 46 operations per hour under IFR conditions.

The annual capacity (reached when delays to aircraft exceed the four-minute level for 10% of the annual operations or for 5% of the time) of the existing airfield was 331,000 aircraft operations in 1973. This is expected to decrease to 278,000 operations in 1993 but will still exceed the forecast demand level of 241,000 total aircraft operations for that year.

From the analysis of airfield capacities and aircraft delays in relation to forecast demands, it was concluded that...

policy: *The existing runways at Sea-Tac International Airport should provide adequate capacity throughout the 20-year planning period.*

High-Speed Turnoffs:

High-speed exit B-5 in the Sea-Tac airfield configuration is not being used as designed and is of particular concern in regard to taxiway egress problems. The large aircraft types such as Boeing 747's

and DC-10', are not likely to make this turn even under favorable weather conditions, and certainly not when the pavement is wet. A stop is necessary before crossing the runway during times when there is a mix of departures and arrivals. This situation can be remedied by establishing a new exit off Runway 16R-34L between the present high-speed turnoff and the south end of the runway. The new exit would not have to be designed for high-speed egress.

Navigation Aids:

The south end of Runway 16R-34L represents an area that now presents occasional problems and may become of more concern as air traffic congestion increases in the future. The Instrument Landing System (ILS) localizer at this end of the airfield is situated such that its "critical area" extends beyond the end of the runway, causing taxiing aircraft to penetrate this critical area.

The addition of a new exit south of the existing high-speed exit (B-5) on Runway 16R would create even more difficulties with reliable operation of the localizer. Shifting the localizer southward involves topographical limitations constricting relocation possibilities. The runway is on fill and the bank at the end of the runway has a sharp drop off. Wherever the localizer is sited, it must be at the same elevation as the subject runway.

Other interference problems relative to navigational equipment will arise in the above area of the Airport as the west side is developed. Such interference may necessitate the relocation of the Airport Surveillance Radar (ASR), Airfield Surface Detection Equipment (ASDE) and Very High Frequency

(VHR) communications towers associated with the Remote Transmitter/Receiver (RTR) facility. When the need for this move becomes apparent, several locational criteria must apply. They are:

a. ASR--high elevation with a 25-60 mile clear scanning area, and a 1,000 foot radius clear area to act as a safety zone.

b. ASDE--must be located on the airfield with good visibility of the runways. (Present location is excellent-- should remain there if possible).

c. RTR-- should be a distance of 1,000 feet between the transmitter and receiver (can be located off the airfield if necessary). Please refer to the approach and clear zone plan, Element 7.0.

Approaches and Obstruction:

A clear zone is an area at ground level within the runway approaches that provides for unobstructed passage of landing aircraft. This area is dimensioned according to specifications set forth in Federal Aviation Regulations (FAR) Part 77, Objects Affecting Navigable Airspace. All obstructions (which are primarily required navigational facilities) at Sea-Tac Airport are properly marked and lighted.

The obstruction-free approach surface slopes required at the Airport (according to FAR Part 77 criteria) are tabulated below along with the listing of existing slopes for the various runways.

Runway	Required Slope	Existing Slope
16L	34: 1	50: 1
16R	50: 1	50: 1
17	20: 1	20: 1
34L	34: 1	40: 1
34R	50: 1	50: 1
35	20: 1	20: 1

All of the approaches meet the criteria of FAR Part 77, with the exception of the approach slope to Runway 16L. The existing 50: 1 slope shown above is an operational approach slope related to a 500-foot displaced threshold. However, the approach slope criteria in FAR Part 77 is specifically related to the end of the runway pavement, a localizer antenna penetrates the approach surface of the FAR Part 77 slope. If the localizer antenna can be appropriately moved, then the threshold could be relocated to the end of Runway 16L and still satisfy FAR Part 77 criteria.

AIRSPACE/AIR TRAFFIC CONTROL:

Airspace and air traffic control conditions in the Seattle-Tacoma area are described in detail in Section 8.0.1 ref. 4.

In general, air traffic control and airspace considerations are presently not limiting aircraft operations at the Airport. In this regard, the consultant estimated that the Sea-Tac facility can accommodate air traffic demands through the planning period and beyond.

Terrain is a somewhat limiting factor relative to the Sea-Tac Terminal Area airspace locale. The Cascade Mountain Range to the east, and the Olympic

Mountain Range to the west, create a band of low altitude airspace 40 nautical miles wide that runs from 20 nautical miles south of Puget Sound to the Canadian border.

One factor that is critical (or could be) in connection with or the vicinity of airspace Sea-Tac is the potential demand by IFR traffic at surrounding airports -- particilarly at nearby Boeing Field International Airport. Under certain weather conditions, close proximity of two busy airports could cause a bottleneck, particularly for traffic using the Sea-Tac installation. This conflict occurs when weather is less than about 2,000 feet ceiling and/or less than three miles visibility. Under these conditions, all IFR traffic at both airports must use part of the same airspace. There is significant loss in Sea-Tac's arrival capacity in a south flow and to a lesser extent, there is a loss of departure capaicty when traffic flow at Sea-Tac is to the north.

Although such weather conditions occur infrequently on an annual basis, they may persist for relatively long periods when they do occur. Problems caused by the overlapping use of airspace by Boeing Field International Airport and Sea-Tac International Airport during these particular weather conditions will become more critical as traffic volumes increase in the future. The consultant suggests that at some point before 1993, during these conditions, the demand at Sea-Tac will probably exceed the capacity of the final approach/departure airspace in the vicinity of Boeing Field.

TERMINAL COMPLEX REQUIREMENTS:

Passenger Aircraft Gate Positions:

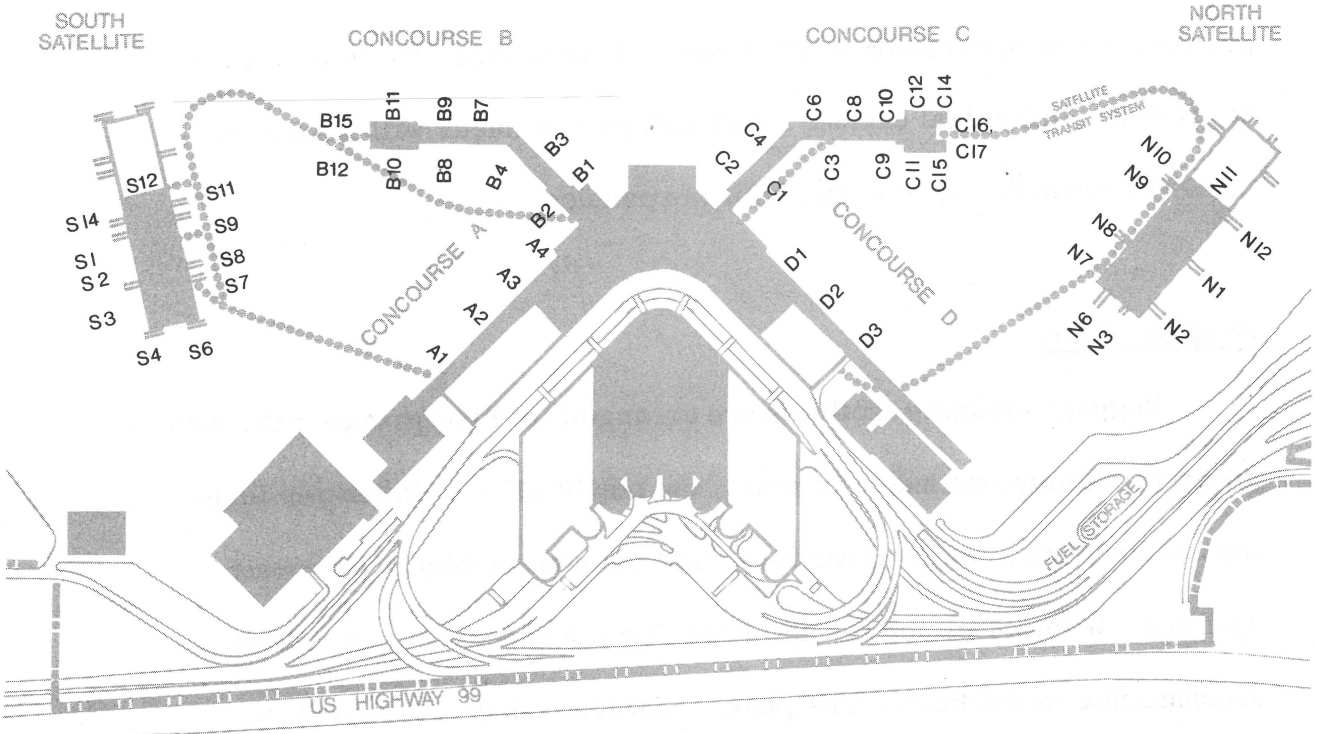
The present terminal at Sea-Tac International Airport provides 59 passenger aircraft gate positions (35 of which are presently in use), with an ultimate design capacity of some 65 aircraft gate positions. Existing terminal facilities and their programmed expansion appear to be more than adequate to meet the needs of air traffic demand through the forecast period. Full gate capacity will not be required until the annual passenger level exceeds 20 million, a fourfold increase over the 1973 level of 5.2 million passengers, (See Table 4.3.5: 2).

Of the total aircraft gate positions constructed, 35 are located at the main terminal and the rest are evenly split between the north and south satellite terminals.

The satellites currently are built to some two-thirds of their intended capacity with expansion capability for approximately 10 additional gate positions total. The North Satellite presently handles domestic flights and is utilized exclusively by United Air Lines, the dominant air carrier at Sea-Tac. The South Satellite handles all international arrivals and departures.

The area and location occupied by the various tenants utilizing the passenger terminal facilities are indicated on map, page 11. United Air Lines, as mentioned previously, occupies the North Satellite, operating out of eight aircraft gate positions, and shares the use of one gate located in the South Satellite with SAS. Along Concourse C, at the main terminal building, space is provided for Alaska Airlines (3 gates), Eastern Airlines (2 gates), and Hughes Air West (4 gates). Also located at the main terminal are Pan Am with

LOCATION OF TENANTS
Sea-Tac International Airport



ALASKA: D-1,2,3
BRANIFF: B-4
CONTINENTAL: C-6, 8, 10, 16, 17
EASTERN: C-2, 4
HUGHES AW: C-1, 3, 9, 11
NORTHWEST: S-1, 2, 3, 4, 6, 7, 8
PAN AM: A-5, 6
PAC WEST: S-14
SAS: S-11
UAL: N-1, 2, 3, 6, 7, 8, 9, 10
WESTERN: B-1, 3, 5, 7

two gate positions on Concourse A; and Braniff International and Western Airlines are on Concourse B, utilizing one and four gate positions, respectively. At the South Satellite, Northwest Airlines has eight aircraft gate positions and Pacific Western Airlines has one. Air taxi service requirements are met by ramp positions directly in front of the passenger terminal.

Ticketing/Baggage Check-In:

Based on current arrangements, it is estimated that there is potentially space for 106 check-in positions at Sea-Tac. A total of 72 positions have been constructed to date and 48 of these are in actual use at present. Individual carrier relationships and needs will have to be reviewed periodically to guide future expansion.

Baggage Claim:

Baggage claiming facilities are arranged in three groups with each group containing one major carrier: the north lobby, United Air Lines, the center lobby, Western Airlines; and the south lobby, Northwest Airlines. Within each lobby, all of the claim devices are joint-use to accommodate individual airline peaks; however, they are signed, to designate the normal claim area for each airline in order to facilitate the movement of arriving passengers to the proper area.

The baggage signing system is designed to accommodate the addition of automatic changing signs when the need justifies them in the future so that joint-use of all claim devices can occur irrespective of lobby group. This would allow greater flexibility in joint usage and would enhance the

baggage claim capacity at the Airport.

In terms of baggage delivery times for the Sea-Tac facility it takes 20 to 30 minutes from time of wheel block to last bag delivered for conventional jets, and 30 to 50 minutes for wide-bodies aircraft. Present baggage claim facilities appear to be adequate to handle some 3,200 peak hour passengers.

Terminal Curb Capacity:

Due to site limitations and the resulting central terminal design, passenger terminal curb capacity at Sea-Tac is very limited compared to other large airports. Several additional contributing factors have compounded this situation: the proliferation of courtesy cars; the delay in solving baggage claim problems, particularly in the Parking Terminal; and the additions to curb demand by Metro Transit vehicles without an accompanying reduction in demand for private auto curb space.

Federal Security Investigation:

Compliance with anti-hijacking requirements at Sea-Tac Airport has presented some design problems in adapting the existing terminal complex to accommodate these security provisions. The concourses in the main terminal building have been relatively easy to handle in contrast to the difficulties incurred in providing acceptable security processing for the Satellite Transit Stations. The limited space, and unique passenger flow and signing at these station areas do not lend themselves to the easy imposition of stringent security features.

FAA officials anticipate no major change in passenger terminal security procedures for the next 5-10 years, however, these officials would like to see preventive measures taken to preclude the success of any organized armed attempts to capture a plane at ground level. This might entail the installation of remotely controlled doors to the aircraft loading bridges and the provision of a manual control device for the main doors leading to the Concourses. This addition to and improvement in existing control systems can be accomplished fairly simply Sea-Tac Airport.

Airport Access and Circulation:

The airport drive system was designed to provide direct access from the freeway network linking the major urban areas in the Puget Sound Region. The north approach drive connects with Highway 518, the east-west intertie which provides convenient access to the facility from Interstate 5 and Highway 509. Temporary south access to the Airport is via Highway 99, the old major arterial linking Seattle to Tacoma.

Surface Access Capacity:

Traffic counts taken in November, 1973, and passenger counts taken throughout the year provided the information base for assessment of traffic characteristics for the Sea-Tac Terminal.

The average daily traffic (including employees) for the 5.2 million passenger year in 1973 was 31,000 vehicles. Excluding employee traffic, peak hour entering traffic to the Airport is 1,500 vehicles per hour. Approximately 1.4 vehicular trips are generated for each enplaned

and deplaned passenger.

In the maximum traffic hour, the directional split of traffic at Sea-Tac Airport is 88% in one direction. The split of traffic between the north and south is 70/30.

Terminal Drives Capacity:

The terminal drives are designed for non-stop access to the passenger terminal. Optimally, traffic volumes on the drives should not exceed about 1,000 vehicles per hour per lane, but the maximum capacity is around 1,500 v.p.h. per lane.

No real capacity problems on the terminal drives system are anticipated through the 20,000,000 passenger year. However, capacity problems may potentially be posed in two areas: the single lane exit from the garage to the northbound exit lane, and the temporary south exit. Access traffic volume forecasts, based on the continuation of existing conditions through the 20,000,000 passenger year, are within the estimated capacity of these potential problem areas.

PEAK DAILY TRAFFIC

(Total Two-Way Volume)

ANNUAL PASSENGERS LEVEL	PEAK DAILY TRAFFIC WITH EMPLOYEES	PEAK DAILY TRAFFIC WITHOUT EMPLOYEES
6,900,000	41,400	35,700
9,600,000	53,800	46,400
15,100,000	78,500	67,700
20,000,000	98,000	84,500

If the northbound exit to the garage does become a capacity problem, the south exit will have to be made operational. This would entail dealing with difficulties raised by site restrictions and traffic congestion at the intersection on U.S. 99. It may be necessary to provide south entrance/exit and the 188th Interchange prior to opening of the south garage exit.

Automobile Parking Requirements:

Excluding rental car parking and servicing areas, some 4,150 parking spaces are currently available for public and employee parking. The existing parking demand is highly variable, but maximum demand levels are reached by accumulated long-term parking during holiday periods.

The maximum parking usage in 1973 occurred in November and December during the holiday peaks. Garage capacity was nearly reached during the Thanksgiving peak period while parking demand exceeded capacity on four different days during the high Christmas period.

The peak period of employee parking accumulation occurs between 2 and 3 p.m. when shift changes cause an overlap of employees. The maximum parking accumulation (recorded in August, 1973) for this time period was 3,300 parking spaces or about 80% of capacity. Without employee cars, the public demand was about 2,200 parking spaces.

Several commercial parking lots near the Airport provide remote public parking. It is estimated that a total of 1,700 parking spaces are provided by five such lots with approximately 1,200 of these spaces available for public parking and the remainder taken up by rental car storage.

Currently, about 25% of the total public parking demand at Sea-Tac Airport is served by remote commercial parking facilities.

Table, page 18,shows the estimated public parking demands for various levels of annual passenger volumes. A conversion factor of 0.036% has been used to translate Annual Passengers to Peak Hour Passengers. These estimates assume a relationship of 1.5 parking stalls for each peak hour passenger and that all employee parking will be located remote from the garage at an appropriate time. If the peak employee accumulation is removed, the existing Terminal Garage will have adequate capacity to serve the public parking demand until the peak hour reaches about 2,800 passengers.

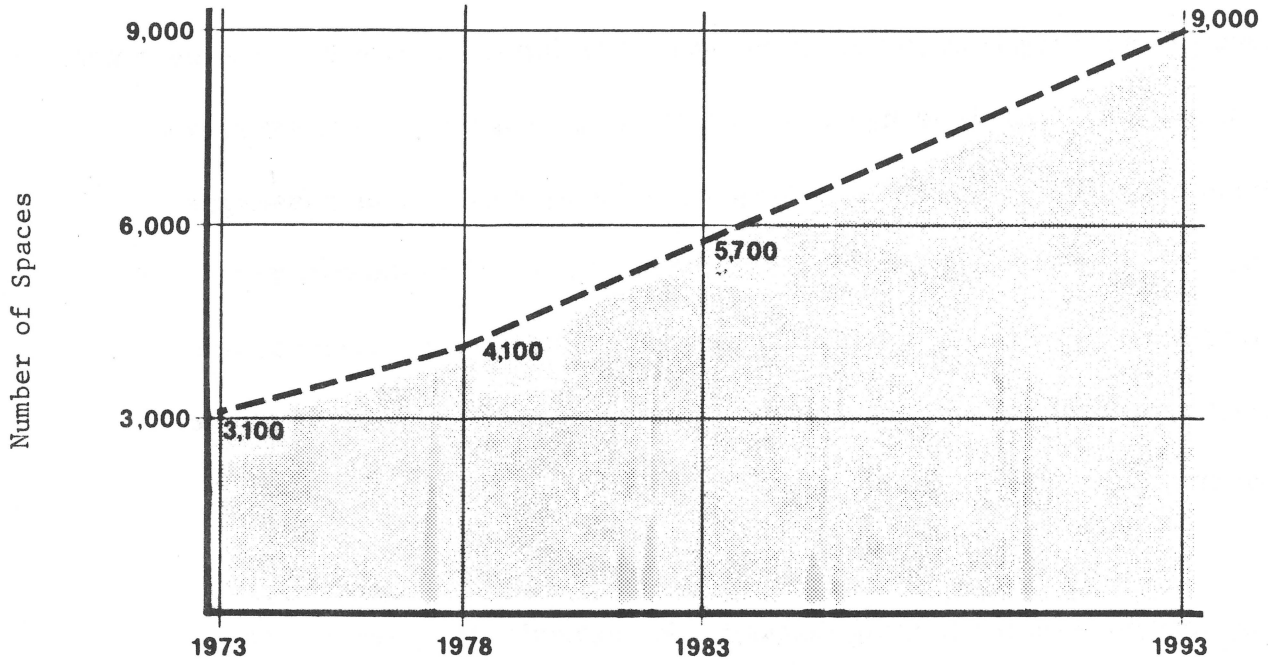
Several factors which are not reflected in these forecast figures may influence future parking demand. For example, the parking projections assume uninterrupted operation of the remote commercial parking lots. However, should these be eliminated and replaced by some higher land use in the future, parking demand would subsequently be increased at the Terminal Garage by some 1,000 to 2,000 additional spaces.

Also, the pricing system could be used to encourage remote parking by long-term parkers at commercial or Port of Seattle-owned lots as well as to make public transit more economically appealing to Airport patrons. Improved service by alternative modes, coupled with higher automobile operating costs may substantially reduce auto traffic and parking demands.

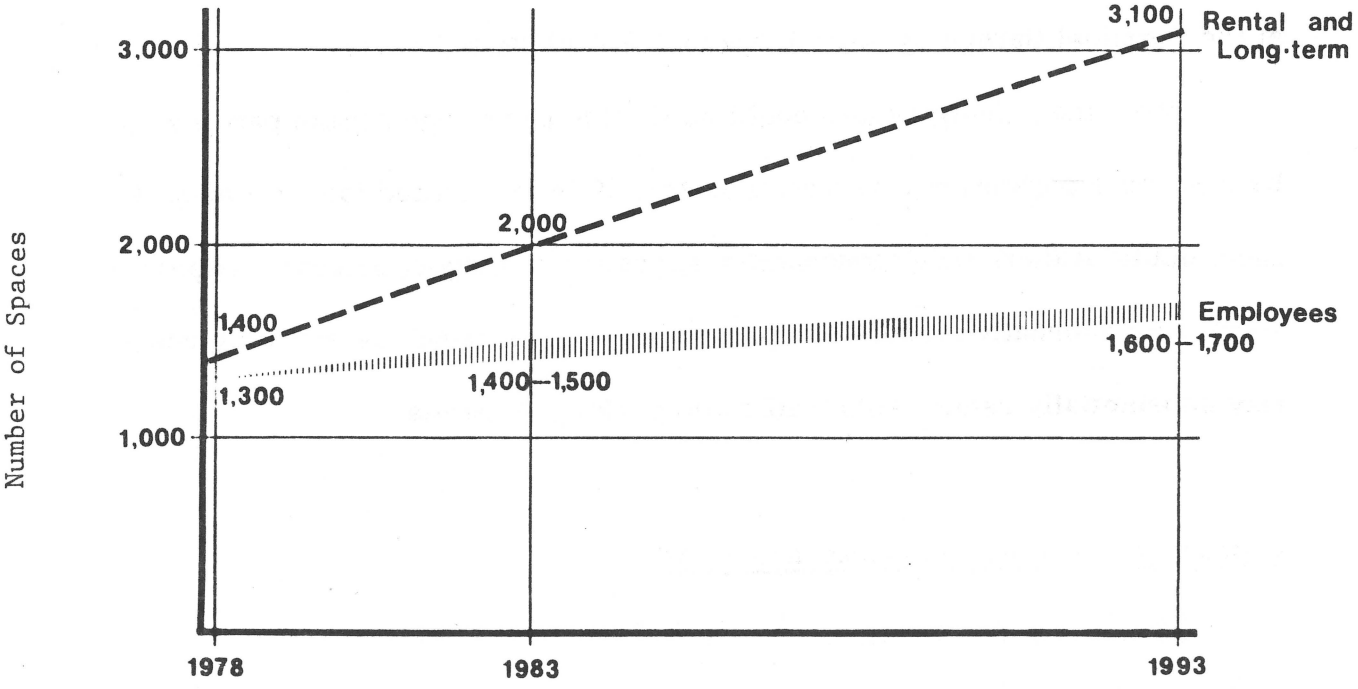
Capacity of Parking Entrances and Exits:

Entrance ticket spitters: A reasonable capacity figure for the parking entrance is 400 cars per hour per lane; With four ticket spitters

AUTOMOBILE PARKING FORECASTS
Sea-Tac International Airport
1973-1993



Public Parking Requirements



Employee and Long-term Parking Requirements

available at both the north and south entrances, the hourly garage entrance capacity may be calculated as:

8 entrance lanes x 400 vehicles/hr/lane = 3,200 v.p.h.

It is anticipated that entrance capacity will be sufficient to accommodate the projected peak hour traffic through the 20,000,000 passenger year.

Toll collection facilities: Present toll collection procedures can handle an estimated two cars per minute per toll booth (120 v.p.h.) but with improved techniques and experience, three cars per minute (180 v.p.h.) should be a reasonable capacity to expect.

Currently, there are nine toll booth lanes available for use at the north exit with six in operation. Two toll booths are planned for the future south exit.

Exit Capacity - North Only: 180 vph x 9 = 1,620 vph

Ultimate Capacity: 180 vph x 11 = 1,980 vph

It is estimated that at least nine toll booth lanes will be needed for the 15,100,000 passenger year and ten for the 20,000,000 passenger year. If employee parking is excluded from the Terminal Garage, the existing six toll booths now in operation should be sufficient at least to the 9,600,000 passenger year.

Parking Analysis:

Parking needs at Sea-Tac International Airport can be divided into short-term and long-term requirements. The most urgent problem to be faced is that of employee parking. The various recommendations for the short-term

parking needs contained in this section focus on the problem, concentrating on ensuring adequate facilities to meet total parking demands for about the next five years (1973-1978).

A long-term program for parking will require the eventual expansion of the terminal garage for additional public parking. A possible alternative would be to accommodate public parking overflow at the Expanded Services site via an even more extensive development at that location. The long-term approach must recognize that even a fully expanded garage will be inadequate by itself to accommodate the anticipated parking demand through the 20-year planning period. Additional remote parking will be required at some point prior to 1993 regardless of any efforts to increase capacity (by expansion and/or more efficient use) of the existing Parking Garage.

Table 6.5.3: shows the forecast demand for parking at Sea-Tac Airport, indicating additional space various user categories may require through the 20-year planning period. To meet the anticipated parking demand over this period of time, a total of 9,000 customer spaces, 3,100 spaces for rental cars and long-term parking, and some 1,600 to 1,700 stalls for employee parking will be required by 1993. It is estimated that by the 15 million passenger year (1987-1993), total parking space demand will be at the 14,000 level.

Appropriate actions must be taken to assure the adequate provision of parking space throughout the planning period. For the short-term, this may mean the relocation of some users (long-term parkers, rental cars, and, in particular, employees) from the Parking Garage to a remote lot; or if this is not accomplished, then the early expansion of the Garage will become

necessary.

Presently, the only major parking area on the Airport is the garage at the Main Terminal. The choices made as to who may use this facility will in large part determine when it will require expansion. If it is to focus on serving public parking needs, substantial space could be gained for this user category by restriping the areas, removing employee and long-term parking, and reducing rental car space. The existing Parking Garage thus could satisfy public parking demand until the 10 million passenger year (about 1983). This would require remote parking for 1,500 employees, plus some 2,000 spaces for rental cars and long-term parking. Fully expended, the Parking Garage could provide as many as 9,800 spaces if the recommended restriping is carried out. However, to meet the anticipated parking space demand of some 14,000 by the 15 million passenger year, some 4,200 to 4,800 remote parking spaces will be required to supplement the fully expanded Garage.

The early expansion of the Garage, as a short-term strategy, could not immediately relieve the parking problem. There would be a time lapse of some sixteen months to design and construct a new wing. In the interim, temporary remote parking would be necessary in order to handle the growing parking demand.

It is important to consider the appropriate time frame for various short-term and long-term strategies to operate within in order to minimize phasing or timing problems. One of the main advantages of developing remote parking to relieve the existing parking problem is that it can be implemented relatively quickly (approximately seven months for a surface

lot and 16 months for a structured parking lot).

Immediate parking expansion alternatives are:	Capacity	Estimated Cost 1975 Dollars
A. Structured Parking Lot	1,640	6.430,000
B. Surface Lot (Full Provisions)	1,500	760,000
C. Surface Lot (Minimal Development)	1,500	498,000
D. Expansion of Parking Garage	2,275	10,916,000

The locational requirements of remote parking include: (1) adequate space (minimum of 1,200-1,500 parking stalls), and (2) proximity to the Main Terminal allowing for a maximum headway time of 15 minutes for shuttle bus service. The Expanded Services site meets all the criteria for remote parking. Incorporated into initial phases of development of the Expanded Services Area, such a parking facility would not only serve to relieve the immediate problem of employee parking, but with expansion would also provide accessory parking for this complex when it becomes operational.

Other considerations include the likelihood that additional commercial developments at the Expanded Services site (encouraged at least in part by remote parking developed there) will ultimately support the bulk of a transit connection cost. Construction impact on operations would be less for a remote site. However, since garage expansion in the future would have to occur in any event, the only advantage in moving at an early date to a remote site would be to avoid terminal construction impact immediately upon the recently completed terminal project.

Remote parking will tend to disperse air pollution impact in principle; however, since ultimate development of the Airport includes both

types of locations such benefits would be temporary. Access congestion into the terminal would also in principle be eassed by a remote site, but this advantage is offset considerably by the uncertainty as to the ultimate access facility needs of the Expanded Services and remote parking site. These questions relate to the problem of Airport south access --a problem that must be dealt with in more detail in the future. Certainly, some costs for eventual access improvements in the general area south of the terminal will be impart oriented to the need for remote parking accommodations.

AIR CARGO FACILITIES:

All existing air cargo facilities are located in the N.E. Cargo Area. This area is sufficient to accommodate air cargo needs for some time, but future demand will eventually exceed space available and thus require development of other areas. The Auxiliary areas east of the present cargo area, as well as the proposed Westside Air Cargo/Maintenance area, could be developed to handle the overflow.

The N.E. Cargo Area is divided into six separate tracts. Two tracts, comprising a total of 35 acres, are presently vacant. The other four tracts are partially developed with the remaining unused portions already obligated for construction of future facilities. The rest of this section will describe the current state and potential development of each tract.

Tract A:

Existing facilities - Air Cargo Building #1 occupies 45,000 square feet of Tract A. It provides joint use facilities for the following tenants: Airborne Air Freight, Airport-Drayage Co., Inc., Braniff International Airways, Continental Airlines, Eastern Air lines, Emery Air Freight Corp., Flying Tiger Lines, Inc., REA Express Agency, J.T. Steele & Co, and Wing & Wheels.

Building #1 also contains the existing Western Airlines Hangar. North of this hangar is the old United Air Lines hardstand area which is now utilized for general aviation parking.

Proposed facilities. The southern 7-1/2 acres of Tract A is the tentative site of a new cargo building for Western and Continental Airlines. This unit will replace the existing Air Cargo Building #1 and Western Airlines Hangar. The northern 11 acres of the tract will be the site of a new Air Mail Facility which will move from its present location at Cargo Building #2 in Tract C.

Tract B:

Existing facilities. Currently, the sole development of Tract B is the United Air Lines Cargo Building which is located on the western 5 acres.

Proposed facilities. Approximately two acres in the eastern part of the tract will be developed for air freight forwarding, allowing direct servicing by supplemental carriers off a common taxiway.

Tract C:

Existing facilities. POS owns Air Cargo Building #2 which occupies 48,000 square feet of the eastern four acres of the tract. This building is currently leased to the U.S. Postal Service for use as an air mail facility.

Proposed facilities. The present air mail facility will relocate to a new building in Tract A. The then vacant Air Cargo Building #2 will serve as a joint-use air cargo building similar to the manner in which Air Cargo Building #1 is now utilized. In fact, upon removal of Air Cargo Building #1, its remaining tenants will be shifted to Building #2 which will continue to serve their needs.

A two-acre site in the western half of the tract will be developed as an air freight forwarding facility. Future supplemental air carrier service is anticipated, requiring the development of such additional space.

Tract C will also serve as the temporary location of general aviation plane parking. Approximately 24 parking stalls will be provided for this purpose at a site south of the air freight facilities and west of Air Cargo Building #2. When the west side of the Airport is ready for development, this type of use will be transferred to that location.

Tract D:

Existing facilities. Tract D is the site of a 5,000,000 gallon City of Seattle reservoir and the existing POS maintenance facilities, both of which will be relocated outside of the N.E. Cargo Area. The

reservoir will be re-established in the north clear zone. When required by air carrier demand, the maintenance facilities will be moved to Auxiliary Area B, (east of the N.E. Cargo Area), thus freeing additional space for air cargo activity.

Proposed facilities. The eastern 10 acres of Tract D are now being developed for Flying Tiger Air Cargo. By the end of 1974, a building covering 40,000 square feet of the site will be ready for such use. South of Flying Tiger structure is the tentative location for construction of an air freight forwarding building, while the remaining portions of the site are reserved for further development of air carrier cargo activity.

Tract E:

This area encompasses some 25 acres which is presently not in use. When demand materializes, Tract E site has potential for serving air carrier maintenance needs.

Tract F:

This 10-acre tract currently represents another vacant portion of the N.E. Cargo Area. Its future use could be as a maintenance site supporting the activities of the air carrier operating out of Tract D.

S.E. Cargo Area:

The S.E. Cargo Area, just south of the passenger terminal, is now the location of air carrier hangars for four airlines at Sea-Tac: Northwest, Western, Alaska, and Pan Am. Northwest Airlines, which also operates a

flight kitchen in its building, occupies the largest space within the tract.

This cargo area encompasses some 22 acres which are currently developed to their fullest extent. There is no room for expansion of existing facilities or addition of new facilities at this location. Other areas must be relied upon to serve the needs of increased air carrier/ air cargo activity at Sea-Tac.

GENERAL AVIATION:

Presently, the old United Air Lines hardstand area in the N.E. Cargo Area is used for general aviation purposes. This is strictly a temporary facility for general aviation since the site is part of a proposed lease area for the new Air Mail Facility.

When full development of the Air Mail Facility is completed, a new interim general aviation site will be established in Tract C, adjacent to Air Cargo Building #2. A permanent site for general aviation on the west side of the airfield will be determined later.

OTHER SUPPORT FACILITIES:

Maintenance:

As of the present time, there are two separate sites for maintenance activities at Sea-Tac Airport one in the northeast and the other in the southwest part. The existing maintenance facilities located in Tract D will have to be relocated when this tract is needed for air carrier use. The second

maintenance area, located in the existing industrial buildings at the Expanded Services site, will also have to be relocated when the latter is developed.

It should be noted that higher priorities exist for the use of these two areas than the maintenance functions which now occupy the land. Logically these sites should be made available for further development and a new permanent consolidated maintenance area must be planned and improved as soon as possible.

Industrial Waste Treatment Plant:

The industrial waste treatment area is located on the southwest portion of Sea-Tac Airport. This area consists of holding lagoons and a treatment plant which handles all the industrial wastes and runoff from airfield activities. Water from these sources is thoroughly treated before being discharged into Des Moines Creek.

Expansion of this particular facility can be provided in two ways. One would be to increase the capacity of the holding ponds. This would be cheaper than the second option, which involves enlargement the treatment plant. The latter method of expansion, however, provides flexibility in case of equipment breakdown.

Fuel Tank Farm:

The existing fuel storage area lies just south of the S.E. Cargo Area within the airport boundary. Presently, this area consists of eight tanks with a total capacity of 560,000 barrels. Capacity is sufficient to meet anticipated demand levels.

It is expected that expansion of this facility will not be necessary in the near future. Capacity conditions of the existing tank farm may even be improved if costs of supplying "bonded fuel" (tax free) continue to approximate that of domestic fuels. Since bonded fuel and domestic fuel must be stored separately, this requirement imposes certain limitations on the efficient use of existing capacity. However, the costs of shipping and storing bonded fuel now approximates that of domestic fuel and if this situation continues, demand for bonded fuel may subsequently be eliminated. Should this occur, it would mean a substantial improvement in real capacity of the tank farm since the artificial separation of fuel and extra storage would no longer be needed.

Several important factors must be considered when demand requires expansion of the existing tank farm facilities. Considerable care must be exercised in the siting of a large and potentially hazardous area such as a fuel tank farm among other activities at Sea-Tac International Airport. While such a tank farm must be convenient to the servicing of the various aircraft, it must not intefere with the operation of other important functions.

The airlines serving the Airport presently have an option on some 6 acres directly south of the existing tank farm for expansion purposes; however, this proposed use may have to be reviewed in light of subsequent development plans for adjacent areas. When the 50-acre site which adjoins this option area is developed for employee parking and other more intensive uses which will comprise the Expanded Services Complex, a holding pond to handle the runoff from this area will have to be constructed. The option area is the natural choice for a holding pond since it is the lowest land surface in the vicinity.

The present tank farm facilities could remain at their present site with proper screening, but expansion should occur at an alternative location. Use of the option area for further additions to the clustered storage tanks would appear to impede commercial development of the ESC as well as create an undesirable visual effect. Rather than jeopardize the development potential of the ESC, alternative sites to expand fuel storage capacity must be considered. A new site based on the following location parameters should be determined at the appropriate time so as to: 1) minimize the costs of extending the existing pipeline; 2) be compatible with adjacent land uses (especially non-Airport uses,); and 3) be close to pumping stations and cargo areas.

Fire Station:

The existing Airport fire station building is located adjacent to the North-east Cargo/Maintenance area. When the North Satellite of the Passenger Terminal is expanded, the station will be relocated due to its position in the required aircraft taxiway clearance area. The new location is the southernmost triangle of Tract A of the Northeast Cargo Area.

The relatively poor condition and inadequate capacity of the station suggests that relocation be accommodated prior to expansion of the passenger satellite. The fire department is presently operating at approximately 50% below FAA recommended manpower standards. FAA certification requires that the airport operator show that there is available on-duty qualified firefighting and rescue personnel in sufficient numbers to ensure at least 85% of the required maximum agent discharge rate of the fire-fighting equipment. To meet this requirement, the fire department will need

to have on duty the manpower minimum of 12 firefighters, plus at least two additional firefighters per duty shift to cover as relief men.

If the desired manpower requirements were to be achieved, the existing station would not have adequate housing space. Moreover, the fire department will also be acquiring a rescue vehicle which in turn requires additional personnel. This will create additional demand for housing accommodation. In addition, construction of the present building is such that soundproofing is minimal; with the number of people working at this location (adjacent to the airfield) on a daily basis, a soundproof structure is almost essential.

Solid Waste Systems:

The Solid waste handled by the Sea-Tac International Airport disposal facilities is generated at several locations; aboard aircraft, in hangars, in flight kitchens, within the terminal, and the Airport grounds area.

Garbage (putrescible solid waste) is ground and flushed into the sanitary sewer system, while other solid waste defined as trash is placed in containers and compactors and removed by a private contractor. Wastes collected from regular sweepings of aircraft aprons and vehicular driveways are used to fill in low spots on Airport grounds.

Solid waste removed from international flights arriving at Sea-Tac Airport are disposed of separately from other aircraft wastes in accordance with United States Department of Agriculture requirements. Non-putrescible solid wastes from these flights are incinerated by a private contractor using the POS-owned Airport incinerator. This incinerator meets all air pollution control standards set by Puget Sound Air Pollution Control Agency

and with planned additions has more than adequate capacity to handle all regulated flight wastes through 1993.

Airport wastes have little impact on King County solid waste disposal facilities. The amount of waste generated at the Airport is an insignificant portion (approximately 1%) of total waste handled by King County's disposal system. It is important, however, to maintain a cooperative relationship between the Port of Seattle and King County Solid Waste Utility to continue compatible waste management practices between the Airport and the County.

Solid waste disposal methods and capacities were analyzed in a report prepared for the Master Plan project by Stevens, Thompson, & Runyan, Incorporated, and the Port of Seattle. It was determined that current waste management practices are more than adequate. No adverse impacts created by solid waste disposal at Sea-Tac could be identified. Aesthetic and health problems associated with poor waste management practices, such as litter and overflowing waste containers, were found to be nonexistent and all applicable governmental regulations were being met.

6.5.4 RECOMMENDED AIRPORT PROGRAMS

AIRFIELD:

Very few aspects of the airfield configuration at Sea-Tac International Airport need extensive review in regard to meeting aviation forecast requirements through the planning period. As indicated, the Airport is well past the point in its development where extensive expansion projects are or will be needed to adequately serve aviation demand. What is needed at Sea-Tac is some "fine-tuning" to refine the existing airfield conditions. For example, significant adjustments to navigation aids could be required in conjunction with conversion of the Airport to a strict "dual-lane" operational mode with all landings confined to the west runway (16R-34L). However, as discussed under Noise Remedies, Chapter 6.2, technological limitations preclude this opportunity during the next 5-10 years. The previously discussed conclusion, (see 6.5.3:4) that the existing basic runway system has adequate capacity through the 20-year planning period remains applicable with certain minor refinements, as discussed below.

Runway Exits:

Some additional provision of runway exits is anticipated in the future. Hi-speed Exit B-5 does not allow utilization by many larger aircraft. It appears that the addition of a new exit on Runway 16R, between taxiways B-5 and B-6, would ease this situation. Aircraft that are now unable to make the B-5 turnoff

could be better accommodated by such a new exit.

The Air Transport Association (ATA) was asked to comment on the need for a new taxiway off Runway 16R. Representatives of ATA recognized the advantages of having a hi-speed exit near the south end of the runway and recommended that it be located approximately 7,700' from the threshold of Runway 16R, exiting at a 30 degree angle.

This design would facilitate egress of 4-engine heavy jets as well as eliminate the navigation and interference problems caused by aircraft penetration of the southend ILS critical area. Recommended action is:

policy: *The addition of an hi-speed exit between taxiways B-5 and B-6 would make the development of proposed Taxiway B-4 unnecessary. The B-4 exit can thus be deleted from the Sea-Tac Airport Layout Plan.*

Navigation Aids:

Navigation aid provisions at Sea-Tac Airport need few additions or adjustments other than as discussed in conjunctions with potential noise remedy programs.

However, a Category I ILS can and should be installed on Runway 34L. This would increase airport capacity and contribute to the safe operation of the airfield in general. A Category I ILS can be adequately established within the terrain constraints that exist to the southwest of Sea-Tac Airport although detailed analysis of possible interference with the category II localizers on Runway 16R should be conducted.

General Aviation Runway:

Provision of supplemental capacity for the various activities associated with general aviation operations at the Airport requires special attention. The temporary general aviation Runway 17-35 which is 2,875 feet in length, falls some 725 feet short of FAA planning criteria for accommodating all aircraft weighing 12,500 pounds or less. As it exists, the clear zone for Runway 17-35 restricts development of the west side area. Provision of a permanent Runway 17-35 would impost further restriction on west side land use. The development costs associated with this runway would be considerable because of the terrain, and the integrity of the buffer area between it and adjacent residential property would be lessened. In view of this...

policy: *Proposed Runway 17-35 should be eliminated, and Taxiway C should be extended to serve as a permanent Runway 17-35 for general aviation operations.*

When the Westside Cargo and Maintenance Area is ready for development, Taxiway C can be further extended to service this area both as a taxiway and as a general aviation runway. Moving the runway threshold with cargo/maintenance development.

AIRPORT LAND USE AND SUPPORT FACILITIES*

Recommendation for land use within the Airport will be discussed in terms of geographic sub-areas of the Airport as follows:

S.E. Cargo Area:

The S.E. Cargo Area is currently fully developed and no further expansion can be accommodated at this location.

N.E. Cargo Area:

Most of this area is already obligated for specific uses. The development pattern is well established in this sector. Only two tracts remain completely vacant at present while the other tracts have some additional undeveloped acreage yet available. The following discussion explains how each tract can be handled in the programmed development for this general area.

A new fire station will be relocated in the southernmost triangle of the N.E. Cargo Area. This should occur before the North Satellite undergoes expansion so that adequate maneuvering space will surround the enlarged structure. The southern half of Tract A will be developed for air cargo space. The existing Air Cargo Building No. 1 and the Western Airlines hangar will be removed in this changeover of use. Removal of existing facilities and redevelopment of the area will also improve the working space around the expanded satellite. The proposed cargo building is to be situated with

*Reference is made to Chapter 6.7 for maps of Airport Land Use and 1978 Terminal Area Plans.

adequate setback for aircraft parking. The new Air Mail Facility is slated for construction on the north half of Tract A. This location will permit the development of a larger building specifically suited for this function, whereas the existing facility is a converted air cargo building.

Proposed Tract B development includes construction of an air freight forwarding building east of the existing United Airlines cargo building. This structure will be designed for direct servicing of aircraft and thus could be of benefit to future supplemental air carrier service.

Within Tract C, Air Cargo Building No. 2 will be converted to its original function when Air Mail operations are relocated. Air freight forwarding activities will be accommodated here as in Tract B, to the east of Building No. 2.

Flying Tiger Cargo facilities are programmed for development in Tract D. The City of Seattle reservoir now located within this tract will be relocated in the North Clear Zone. At the same time, POS maintenance will need to be removed to Auxiliary Area B. These two adjustments will allow Tract D to be more appropriately used for air cargo functions. It is expected that the two undeveloped tracts, E and F, will remain designated as future aircraft maintenance sites. This function will be required as the Northeast Cargo Area becomes more fully developed.

General Aviation Area:

While the main function of Sea-Tac Airport is to accommodate commercial air carrier operations, there is also a need to handle a limited amount of general

aviation activity. The present temporary location of general aviation parking and servicing in the N.E. Cargo Area will be needed for air cargo activities as this function expands. As the west side is developed, general aviation can be given a permanent fixed based support location adjacent to Taxiway C. Extending this taxiway and utilizing it for general aviation operations will be possible when and as the west side area becomes more developed.

Another factor in the problem of handling general aviation traffic at the Airport is the U.S. Customs situation. If Boeing Field were better prepared to handle the needs for Customs clearance, general aviation requirements at Sea-Tac Airport would no doubt decrease. The Airport's role as the only full-time Customs location in the region necessitates use by many international general aviation arrivals.

If a major Customs clearance demand is still present at the Airport after Fixed Base Operation (FBO) facilities are transferred to the west side, then some difficulties may be experienced in the need to cross runways to reach the International Satellite Customs location. It may prove feasible at that time to provide Customs service via ground vehicles to the west side, but this question will require further attention as development takes place.

Westside Cargo Maintenance Area:

The southwest portion of the Airport is generally designated as a future cargo-maintenance area. This location represents the only major land area remaining undeveloped with potential runway system access available at a sufficient reserve for cargo and aircraft maintenance demands during the 20-year planning period.

Access to the site is a major concern-- both from an intra-airport standpoint and in terms of off-airport connections. Several potential methods exist to connect this area to nearby roads and SR 509. Such connection could occur in the S.W. 188th St./Des Moines Way area to the south end of the site. Another possibility is at 176th St. in the center of the site. A third opportunity exists from the north via 160th St., which connects to SR 509 at an existing intersection. This last method would depend heavily on the vicinity development pattern occurring along 160th St. Access within the Airport proper is important, especially the necessity of passenger terminal access for cargo destined to aircraft belly compartments at gate positions. The most desirable access would be a service road tunnel connection paralleling the 188th St. tunnel. The other service road possibility would connect around the northern perimeter of the Airport along an alignment already established by an unpaved service road.

The exact nature and timing of westside development is critical to eventual intra-Airport access to the west side. Because of the considerable cost represented by a tunnel connection (estimated at $2.8 million), a very clear indication of tenant demand would have to be established before a cost effectiveness assessment of access could be conducted. It is recommended that...

policy: *The majority of the west side of Sea-Tac Airport be held as a developmental reserve for cargo and maintenance uses as long as possible so that capital programming for access and utilities can be directly related to established user requirements.*

Fixed Base Business Aviation:

Sea-Tac Airport has not provided space for the business aviation segment of general aviation in the form of ground lease operating base locations. As westside development occurs, it is likely that increasing demand for such uses will be generated. The Airport's location in this region is potentially convenient to many business aviation users. From this standpoint of land use alone, it is recognized that, while future space for direct runway system-related uses is limited, some space on the west side might be safely allocated to business aviation without severly jeopardizing the higher priority air carrier-related uses. However, such allocations would of necessity need to be very restrictive in view of the long-term need to reserve space for the prime air carrier-related functions. In addition, the potential inclusion of some forms of business jet operations to the Airport will add to total community noise exposure. Such exposure would be minimal but could be significant from a policy standpoint unless the leasing policy includes limitations...

policy: *Business aviation can be subject to FAR-36 noise restrictions or equivalent performance restrictions applicable to noise generated by aircraft based or utilized at Sea-Tac Airport.*

And the area is limited....

policy: *Total allocations to business aviation at the Airport should not exceed 15 acres and must be confined to the peripheral portions of the westside cargo/maintenance land reserve area, i.e., the*

extreme south or north ends of the latter site.

Facility Maintenance:

POS maintenance facilities can be consolidated in auxiliary areas A and B. Presently, this function is fragmented and scattered over several locations. Development of the auxiliary areas for this purpose will necessitate a holding pond to contain runoff water since no means of draining the site with existing drainage facilities appears feasible.

It is recognized that the proximity to Highway 99 and Riverton Heights interchange would make some airport-related commercial development of this area possible. Potentially, such development could also occur at this general location along with the aforementioned facilities, although the total available area is limited.

Fuel Tank Farm:

Adjacent area south of the existing fuel tank farm at Sea-Tac Airport has previously been proposed for expansion of the tank farm if and when needed. It is considered desirable, however, in view of potential use conflict with the Expanded Services site and because of storm drainage considerations, to examine alternative locations. The area south of the existing tanks has been identified topographically as appropriate for a holding pond.

Alternative expansion sites were assessed in terms of these locational criteria:

a. Minimize costs of extending the existing pipeline.

b. Be compatible with adjacent land uses (especially non-airport

uses).

c. Proximity to pumping stations and cargo areas.

A search for the best expansion site resulted in the selection of an area in the southwestern sector of the Airport next to the ponds on the western ridge of the Tyee Golf Course. This area is convenient to the existing tank farm, and will fit in with the general development pattern of the west side. It will also be compatible with the surrounding land uses. This area is generally zoned for manufacturing use with some large lot residential uses mixed in. It is a transitional area which will probably become more intensely developed for manufacturing and commercial purposes.

It is possible that, with decreasing reliance on bonded aviation fuel, the need to segregate fuels in the tank complex will decrease in the future and thus increase net capacity. If this occurs, the likelihood of expansion requirements would be lessened.

Industrial Waste Treatment Plant:

It is recommended that:

policy *The existing treatment plant at the Airport should be expanded to include additional holding lagoons so as to adequately handle the anticipated capacity requirements over the 20-year planning period.*

Possible locations of new ponds would be south of S. 188th Street or north of the proposed west side perimeter road. These areas would be sufficient to deal with this particular need.

Airport Viewing Park:

policy: *An area on the west side of Sea-Tac Airport, currently used as a viewpoint, should be developed as a park for people interested in observing aircraft operations.*

There is a strong community identification with this section of Sea-Tac Airport and the suggested site at S. 170th and 12th Avenue South has perhaps the best visibility of the airfield of any undeveloped area available for such uses. This area serves well as a buffer zone between Airport operations and the adjacent residential community. It should be made a permanent viewing area with proper landscaping and the possible addition of other amenities.

Development of the site should be accomplished as soon as possible after the adoption of the plan. Its present informal use as a viewing area and orientation to the old Evergreen Tennis Club courts and proposed restaurant facility would let it grow in concert with other activity on the west side of the Airport.

The fact that the general aviation site will be located next to the viewpoint will also add to the enjoyment of this Airport-community interaction point. The scale of the general aviation aircraft as well as their variety will perhaps make it easier for viewers to relate to the Airport operation in general.

A park can provide a close-up look at the full range of aviation activities including air cargo and maintenance operations as the west side is developed. Some commercial development could occur in conjunction with view park/general use in the form of services to both users and the general public.

Fire Protection

The fire department at Sea-Tac International Airport has written a fire protection master plan concurrently with the Sea-Tac/Communities Plan Airport Master Planning effort. The following recommendations have been derived from that report:

Manpower should be brought up to FAA certification standards--

Truck No. 1 - three firefighters
Truck No. 3 - three firefighters
Truck No. 4- three firefighters
Truck No. 5 - two firefighters
Truck No. 6 - three firefighters
Truck No. 7 - two firefighters

16 firefighters (minimum on-duty force)

In order to respond to aircraft response alarms it is recommended that there be...

policy: *Increase in to the manning of all crash trucks from the present one man to three men on each truck by the end of 1975.*

The purchase of large-capacity AFFF crash trucks as replacements for Trucks Nos. 3 and 6 by the end of 1976.

In order to respond to structural response alarms it is recommended that there be...

policy: *An increase in the engine company's manning by the end of 1975 from three men to four men to comply with the Washington Survey and Rating Bureau recommendation.*

The purchase of one additional engine and an aerial truck by the end of 1975.

The purchase of a medical aid vehicle within one year.

Fire station locations-- Fire stations should be located so as to provide an average response time of three minutes or less to all parts of the Sea-Tac International Airport. It is recommended that....

policy: *The construction of a new and larger Sea-Tac Airport fire station at the intersection of South 170th St. and the North Perimeter Rd should be completed by the end of 1976, or sooner. This location should include construction of a "burn building" to be used in training for structural fires.*

A second fire station should be located and constructed at the southern end of the Airport when the need arises. This will be determined by construction of the initial phases of the

Expanded Services Complex. A rough breakdown of the equipment types and personnel requirements for each station is described below.

North Station

Apparatus and Full Manning:

Truck No. 1 -- (light rescue-combination engine)

Truck No. 3 -- (3,000 AFFF crash truck) --three men

Truck No. 4 -- (1,500 AFFF reserve crash truck) - one man late response

Truck No. 5 -- (multi-purpose vehicle) - two men

Truck No. 8 -- (medical aid vehicle) -- two men

Truck No. 10 -- (3,000 AFFF crash truck) -- three men

South Station

Apparatus and Full Manning:

Truck No. 2 -- (combination engine/telesquirt/hose) -- four men

Truck No. 6 -- (3,000 AFFF crash truck) -- three men

Truck No. 7 -- (tanker) -- two men

Truck No. 9 -- (heavy-duty rescue truck) - two men

Undeveloped/Reserved Areas:

Expanded Services Complex. A 50-acre site directly south of the S.E. Cargo Area has been identified for several years as an Expanded Services Complex. Construction of the remote parking garage in the northernmost part of the site will be the forerunner of more intensive use of the available

acreage.

As proposed the Expanded Services Complex would include a wide range of airport-related activities. Passenger services which do not require location within the passenger terminal complex would have priority for space in this development. A relatively compact, well organized pattern of terminal supporting commercial and business uses are planned for this area. Parking is a major component at this site and is discussed in detail under the Terminal Area Parking section (see 6.5.3: p.18). When development of the Expanded Services Complex reaches a point which would justify the investment, a transit link similar to that now servicing the satellites is to be installed. Such a link would provide rapid access between the site and the terminal area, and representation essential addition if the Complex is to reach its full potential.

Present and future areas, under Port of Seattle ownership at Sea-Tac International Airport, should be utilized in accordance with the recommendations of this Plan. Facility demands and financial constraints will dictate the rate at which areas will be developed. Clear Zone or other open spaces should be developed to the fullest possible extent for approach navigation needs, recreation, or other uses compatible with aircraft operation and noise impact. In order to allow maximum use of the areas by the public....

policy: *Airport boundary fences should be located no further from the runways, navigational aids and individual airport facilities than is necessary for safety, security and the general public well being.*

TERMINAL COMPLEX:

Passenger Terminal:

Passenger terminal facilities at Sea-Tac International Airport, as presently constructed and programmed for expansion, appear to be adequate to meet the forecast demand through and beyond the 20-year planning period. Careful management practices and periodic review of individual airline needs will provide a check on any unanticipated fluctuations in passenger levels at the Airport and their subsequent impact on terminal area operations.

In terms of passenger check-in, waiting areas, baggage handling and baggage claim facilities, the existing space designated for these purposes is sufficient to meet the expected demand levels. Full gate capacity will not be required until the annual passenger level exceeds 20 million, a fourfold increase over the 1974 level of 5.2 million passengers. No significant problems are anticipated in expanding these facilities as passenger levels rise over the forecast period.

Existing and planned concessionaire and passenger service facilities, likewise, are generally adequate to meet anticipated demand. These facilities should also be regularly reviewed, however, to assure that there is an orderly coordinated effort to expand.

It has become apparent that serious parking problems and difficulties with south access to the Airport will require careful attention. The Airport drives have adequate capacity for the forecast period but congestion problems at the S. 188th St. intersection will increase over the next five years and may necessitate construction of a major interchange to adequately handle the traffic

flow; therefore...

policy: *King County, Port of Seattle, and the State Highway Department must coordinate their planning and work programs for the S. 188th St. corridor. Traffic growth should be monitored and improvements made as necessary.*

Parking:

The parking situation at the Sea-Tac Terminal presents problems now and will be of increasing concern over the next few years. Existing or future potential capacity of the Parking Garage is insufficient to handle projected demand throughout the study period. Alternative locations for parking must therefore be developed to meet this anticipated demand. At the same time, more efficient use of space in the Garage must be accomplished to assure full utilization of this facility for Airport patrons, as well as to enable expansion plans to continue on their currently programmed schedule.

The present terminal area is experiencing congestion and overload problems at peak traffic times. The situation needs immediate attention to prevent even more serious problems from developing. Suggested monitoring and surveying of individual carrier and concessionaire needs will provide a reliable means for assuring that these problems are properly handled. Because this complex question has required considerable analysis, a special parking study was conducted concurrently with the overall planning project. The following describes recommendations derived from that study.

The Port of Seattle's Engineering Department has prepared cost estimates

for three alternative ways of developing remote parking at the Expanded Services Complex site. They range in nature from intensive to very minimal development. Alternative A is structured parking lot (garage), while Alternative B and C offer varying degrees of surface lot development.

Alternative B provides for a surface lot fulfilling the following design parameters: Parking spaces for approximately 1,500 cars, paving on both the parking areas and the drive lanes, several shuttle bus stations (including lighting and telephone connections), security guard stations, security fencing, storm drainage facilities (this will necessitate a detention pond), parking area lighting, bus turnaround south of the existing Parking Garage (in the vicinity of the cooling towers). This fully paved and equipped lot would cost some $760,000.

Alternative C is a surface lot which has the same capacity as Alternative B, but offers certain economies. Reducing the level of construction (fewer pick-up stations, and minimum surfacing) provides the means for achieving lower cost of development. The cost estimates for this lot (some $498,000) represent about a 50 percent reduction of costs from that of Alternative B. Further cost reductions could be achieved by reducing the size of the lot in its initial phase to 900 or so cars (approximately $288,000 total cost).

Alternative A, though more expensive at the outset than Alternatives B or C, offers important advantages which justify its preferred selection over the other two. Its design is more feasible in that it calls for more intensive use of the very costly and limited acreage available. Whereas the surface

lots require some 10 acres (approximately one-fifth of the ESC area), construction of the garage requires only four to five acres. The garage fits the long-term development pattern of the Expanded Services Complex in this regard. The surface lots, however, would be inconsistent with the development potential of the land. When the ESC site reaches a point in its development that requires full utilization of the land, space consuming surface lots would have to be eliminated. Another consideration must be the aesthetic appeal of a well designed, relatively compact garage over that of acre-upon-acre of car-studded blacktop.

The alternative to providing for employee parking at a remote site would be early expansion of the passenger Parking Garage. This would mean the addition of at least one wing to the Garage to relieve the overload problem which will become of increasing concern in the next few years.

Costs were analyzed in two different ways. The first analysis looks only at the comparative costs of the four different alternatives, A through D. A comparison of annual capital costs indicates that expansion of the Parking Garage would represent a greater financial liability than that of any of the three development alternatives for remote parking.

The annual operating costs used in this analysis only take into consideration the shuttle bus service to the terminal area until such time as a permanent transit connection is provided. While it is realized that the costs of the transit system might exceed shuttle bus costs, it is assumed that the major portion, if not all of the operational maintenance expenses, would be supported by the commercial aspects of the Expanded Services Complex.

	Annual Capital Cost*	Annual Operating Cost	Total Annual Cost
Remote Parking Alternative A (1640 car capacity)	$544,436	$185,322	$729,758
Remote Parking Alternative B (1500 car capacity)	64,350	185,322	249,672
Remote Parking Alternative C (1500 car capacity)	42,166	185,322	227,488
Expansion of Parking Garage D (2,275 car capacity)	924,270	185,322	924,270

*Alternative D based on annual payments

The second analysis examines two plan strategies. Plan I is based on initial construction of the remote parking garage with expansion of the main Parking Garage in 1980.

Annual Costs:

(1975-1980, 30 yrs. @ 7-1/2%- quarterly payments)	Remote Garage	$ 540,404
	Operational Cost	185,322
	1975-1980	$ 725,726
(1980-2005, @8-1/2%)	Term Garage Exp.	$1,008,768
	Remote Garage	540,404
	1980-2005	$1,549,172
(2005-2010,@8-1/2%)	Term Garage Exp.	$1,008,768

Total Outlay - Plan I = $47,401,770
Ave. Annual Cost - Plan I = $ 1,354,336

Plan II is based on initial expansion of the main Parking Garage with construction of the remote garage taking place in 1980.

Annual Costs:

(1975-1980, 30 yrs. @ 7-1/2% - quarterly payments	Term. Garage Exp.	$ 917,424
	1975-1980	$ 917,424
(1980-2005 @ 8-1/2%)	Term Garage Exp	$ 917,424
	Remote Garage	594,208
	1980-2005	$1,511,632
(2005-2010 @8-1/2%)	Remote Garage	$ 594,208
	2005-2010	$ 594,208

Total Outlay - Plan II $45,348,960
Ave. Annual Cost - Plan II $ 1,295,685

Upon reviewing these two analyses, one may conclude that, while initial construction of the remote garage and delayed expansion of the main parking terminal (Plan I) is the lesser total outlay cost, the short-term annual cost of the remote garage is less than that of expansion of the main parking terminal. In view of present burdens in retiring construction bonds for recent passenger terminal expansion, it may be prudent to construct remote parking now at the lower annual cost.

Public parking. Priority for space within the main parking facility should be given to Airport patrons. Their need for convenient direct access to the main terminal should be of primary concern. In order to meet public parking needs in the existing facility, such policies as restriping the garage and elimination of reduction of long-term parking, employee parking and rental car space need to be established.

Complete removal from the present parking terminal of employee parking is necessary in order to adequately serve the public parking demand. One parking space can accommodate 4.5 customers for every employee parker,

so the deletion and relocation of employee parking would significantly improve public parking capacity. If employees were moved out of the Parking Terminal, there would be adequate capacity to handle total passenger traffic peaks until about 1979.

Long-term parkers are tying up a considerable portion of garage capacity. Limiting maximum length of stay to three days for public parking would enable the Garage to accommodate an additional passenger flow of over one million. This would acheive about two extra years of below capacity operation for the Parking Terminal.

Another step can be taken to extend the useful life of the existing parking facility by restriping the Parking Garage. Approximately 340 additional parking spaces may be created be restriping two floors for exclusive use by compact cars utilizing straight-in (90degree) parking and by eliminating pass-through lanes.

The relocation of half of the rental car space at the main garage to remote lots would free some 170 parking slots for public use. Rental car companies would still have adequate space at the Parking Garage to keep a sufficient ready-supply of cars to serve customer demand at the Terminal. Utilizing half of the present rental car spaces for public parking would help extend the life of the existing garage by approximately one year.

If all the above actions were undertaken, the existing garage would be adequate to serve public parking demand until about 1982 or 1983. At that time, excess demand could be accommodated by the addition of one wing to the Parking Terminal or the overflow could be handled by further development of Expanded Services Complex parking facilities.

Employee parking. Employee parking presents significant problems at the Parking Terminal, particularly at times of capacity overload of this facility during the holiday peak periods. In order to reduce this overload, employee cars are diverted to remote parking (e.g., the NE Cargo Area) during the holidays. As a general practice, employees are encouraged to use public transit or park at sites other than the Terminal Garage.

Several alternative sites have been assessed for relocation of employee parking at Sea-Tac. A study entitled, "Inquiry into the 'Expanded Services' Complex at Sea-Tac," was completed in November, 1969 by the Port of Seattle Planning and Research Department. It explored several locational scenarios and proffered one site near the south end of the airport as the most likely choice for other future development of an expanded services complex. This area, which would be an organized montage of commercial, business, residential and recreational uses, could help solve problems at the Airport by providing remote lots connected by the Satellite Transit to the Terminal.

One of the Port of Seattle's most recent efforts at evaluating alternative sites for employee parking was in April, 1974. Five sites were assessed in a brief report entitled "Airport Employee Parking Location Analysis." It was determined that the proposed site of the Expanded Services Complex best meets the criteria for a remote parking site of space, distance to the terminal, shuttle bus headway time, and possibilities for being a long-term solution to the parking problem.

Conclusions. Total parking demand at Sea-Tac has reached a level which now presents over-load conditions at peak traffic periods and this will

become even more serious within the next few years. Appropriate actions must be taken to alleviate the immediate problem, as well as to assure adequate provision for future parking requirements.

Remote parking may be needed to help meet short term, as well as long-term, parking needs at the Airport depending on the phasing program.

policy: *Remote parking must be eventually developed to supplement the existing Parking Garage.*

All methods to extend the useful life of the Garage should be considered between phasing programs in order to maximize its capacity to serve parking demand. Measures to extend the capacity of the existing Garage should be used. Primary, of course, is the addition of structural parking. In the long run, both the existing garage and the remote Expanded Services site will require structural parking.

policy: *The addition of new structural parking should be undertaken.*

An analysis of which location to emphasize first in a phased development program resulted in a relatively equal comparison technically and financially. However, final selection should be based on a review of all developmental policy considerations of the plan with particular emphasis on traffic and land use implications.

Parking and traffic congestion in and near the garage and terminal area can be more effectively controlled through better use of the major terminal curb. It is necessary to.....

policy: *Initiate coordination of all major terminal curb users with primary emphasis on the reduction of the "single user" and to facilitate mass transit access.*

chapter 6.6
community development programs

6.6.1 COMMUNITY DEVELOPMENT GOALS AND BASIC POLICIES

The Airport and the communities existing together in a balanced relationship depends not only on the individual Noise Remedy Programs (Chapter 6.2), Water Quality and Drainage Programs (Chapter 6.3), Air Quality Programs (Chapter 6.4), and Airport Improvement Programs (Chapter 6.5), but depends on the coordination of such programs as part of a carefully conceived community development concept. In this concept the above programs are coordinated with land use policies in order to assure that all concerned are most effectively and efficiently working toward the fundamental goals of the Sea-Tac Communities Plan.

LAND USE COMPATIBILITY:

The Airport, a regional asset, makes a substantial contribution to the economy of the Pacific Northwest. Locally, however, its relationship has been less than satisfactory. Although the Sea-Tac Communities face a variety of other problems including stream flooding and pollution, airport expansion, and commercial land use encroachment, the effect of aircraft noise has been the most significant. Therefore, one fundamental goal is:

Goal: *Make the Airport and the community better neighbors.*

An effort will be made on the Airport to properly locate uses and buffer

adjoining land. North and south of the Airport noise remedy programs will be the primary means to achieve compatibility. On the east side of the Airport commercial and hotel uses are well established, adaptable to noise, and certainly compatible with the terminal activities. The land on the west side is isolated between the Airport and the freeway, S.R. 509. The west side includes substantial amounts of undeveloped land, and few homes remain after freeway and Airport expansion. In this case a substantial change will be possible with the land providing growth for both Burien and airport-related uses. On all four sides not only will noise problems be addressed and hopefully solved, but all land use decision will be based on the following policy objective:

policy: *Blend the Airport and its surroundings.*

The Sea-Tac Communities contain an extensive freeway systems consisting of Interstate 5, S.R. 518 and the north airport freeway, S.R. 509; as well as major through arterials, such as 1st Ave. So., Pacific Highway So. (Hwy. 99), and S.R. 516. Compatibility between land uses can be better achieved by using freeways and arterials as planning elements.

policy: *Recognize freeways and major arterials as potential barriers between neighborhoods and different land use areas.*

COMMUNITY AND ECONOMIC DEVELOPMENT:

Growth of the Sea-Tac Communities prior to 1960 consisted largely of single-family homes accompanied by commercial development providing household goods and services. In the early sixties, the first hotel was built which catered primarily to Sea-Tac passengers. Numerous hotels followed in response to the jet-age boom. Multi-family development began in the sixties as in many other suburban areas. Except for the growing airport-related business on the Hwy. 99 strip, commercial development throughout the area continued to serve the needs of the areas's household.

Many citizens within the Sea-Tac Communities have expressed a need for a greater sense of place and feeling of belonging, i.e. community identity. Unfortunately, growth and development has produced a variety of unrelated features which hinder community identity. Because new development has been inhibited by noise, uncertainty and the economy, efforts to foster community identity have been ineffective. Therefore, another fundamental goal of the plan is:

Goal: *Provide a focus for community identity.*

Certain kinds of activities can provide the focus or image for community identity. Clustering community service uses, such as cultural, governmental and recreational, is one approach. The improvement and beautification of existing business centers to strenghten them as community focal

points is also an option. However, the orderly physical and economic growth of existing business centers can make the biggest contribution to community identity.

policy: *A variety of retail, trade, service and commercial uses should be encouraged to locate within existing business concentrations or logical extensions of existing centers.*

No other facet of the Sea-Tac Communities is expected to display the growth dynamics of those land uses directly related to the Airport. Although the Airport itself will not substantially expand since present runway system is designed to handle a 20 million passenger year, there will be continuous, substantial increases in air passenger traffic. This increased air passenger traffic will support growth of airport-related and air trade related activities. Therefore, there are opportunities for change within the communities.

The graph shown in Section 4.2.3, page 4, illustrates the trends since 1960 and the forecasts to 1990 of Sea-Tac passengers and corresponding hotel rooms. The forecast number of air passengers by 1993 is 15,100,000. The corresponding forecast for hotel rooms is 4,159, a 2,410 room increase. This is tantamount to the addition of nine more Holiday Inns (260 rooms) to serve future Sea-Tac passengers. In varying proportions, other airport-related activities such as rental car, entertainment, personal services, etc. can also be expected to increase.

The potential of these activities to contribute to the orderly growth of the surrounding area depends on their ability to minimize their impact on surrounding neighborhoods and enhance area image. A special opportunity exists, then, when major local governments coordinate their plans. New improvements and investments can be examined and chosen to serve a new purpose often without additional cost. For instance, a new road necessary for airport purposes also may be located and designed to serve a community purpose, thereby stimulating renewed community and economic development. Therefore...

policy: *The Port and King County should assume an active, positive role in planning for and stimulating local community and economic development.*

ENVIRONMENTAL MANAGEMENT:

Many people credit their enjoyment and appreciation of the Sea-Tac Communities to the beauty and natural character of the area. To maintain that character, deliberate community and governmental action will be necessary.

goal: *Safeguard the abundant natural features of view, water, and vegetation.*

Public as well as private projects must be based upon an environmental conscience which will...

policy: *Preserve and protect the natural environment.*

Saving as many trees, ponds, and green belts as possible; taking advantage of view potentials; using natural features to separate different land uses; and using open space as a visual focus should be part of responsible development. Therefore, to retain natural qualities such measures should be used in both public and private projects.

Control measures would further assure that construction is sensitive to its natural surroundings. The height of buildings in areas which have views or the potential of views should be controlled. Additional development controls in areas containing bogs, marshes, wetlands, and steep slopes should be imposed.

The establishment of open space provides a solution to major problems, especially in noise areas where other land uses may not be feasible. Differing development characteristics found in the north and south of the Airport require flexibility to compliment the surrounding neighborhood.

policy: *Promote diversified and extensive open space systems.*

A natural approach to drainage such as holding ponds as presented in Chapter 6.3 may be applied. Open space can also be used to separate residential neighborhoods from incompatible land uses. The Creeks, therefore, provide the backbone of the open space network.

policy: *Use the drainage holding ponds, water courses, and wetlands of Miller and Des Moines Creeks for recreation incorporated into a network of open space.*

Open spaces can also plan a valuable role in achieving compatibility by separating incompatible land uses.

policy: *Use natural features and open spaces to separate different land uses and to define land use areas wherever possible.*

RESIDENTIAL NEIGHBORHOODS:

The condition of residential neighborhoods is a fundamental concern of all communities. Action which can strengthen the identity or enhance the character of permanent neighborhoods should be encouraged.

goal: *Enhance and protect permanent residential neighborhoods.*

The removal of uncertainty associated with airport expansion, future noise levels, and home marketability will be a major step in achieving stability. Many of the noise remedy programs will be aimed at promoting stability in the residential neighborhoods.

policy: *Resolve the uncertainty connected with noise impact.*

A major step toward removing such uncertainty will be assured by determining once and for all the extent of airport expansion, by removing the financial restrictions which have inhibited home sales, by providing noise remedy programs to the remaining neighborhoods, and, of course, by reducing the noise generated by the aircraft. With those uncertainties removed, other programs to improve neighborhoods where needed and to change neighborhoods where appropriate can then be effective.

Another major step toward enhancing and protecting residential neighborhoods will be through road improvements. Roads can do more than serve automobile traffic by providing community assets such as street tree planting, view points, underground wiring, and bicycle and pedestrian paths.

Parks can also be a major factor in fulfilling the neighborhood identity. In some areas, a park development might be the start toward improving neighborhood quality and cohesiveness by bringing people together in its planning and by providing a common and shared place.

Schools presently serve as the focal point for many neighborhoods. Although declining enrollment and possible changes in service areas due to noise remedy programs may somewhat alter this relationship, neighborhoods can be enhanced by maximum use of school facilities as activity centers for all ages.

Zoning, as a tool for neighborhood protection, can help provide adequate buffering or transition between residential and non-residential uses. In neighborhoods where some non-residential uses may be planned,

developments that provide buffering and open space would be the most compatible with adjacent homes. Commercial planned unit developments and industrial parks are examples of this approach.

In some instances compatibility will result only through substantial change within a neighborhood. Since such a change may occur over a number of years the manner in which the conversion of land uses occurs is critical throughout the process. Conversion of single-family areas, especially those more densely developed, can obviously bring about a number of problems. During the period of transition, existing residents may feel threatened by new uses being developed nearby, or by unorderly acquisition of land. To minimize the problems, it is necessary that...

policy: *Conversion of land uses within or near single-family residential areas should be accomplished through orderly transition programs.*

6.6.2 ACHIEVING COMPATIBILITY

Three basic programs can be identified to achieve compatibility between the Airport and the communities: outright acquisition of an area by a public authority, private redevelopment or land use conversion, and reinforcement of existing land use areas or neighborhoods. While each is not mutually exclusive, an understanding of the three approaches gives greater meaning to the detailed development guidelines which will follow in Sections 6.6.3, 6.6.4, and 6.6.5

PUBLIC ACQUISITION:

Acquisition of land by a public authority is a most direct and complete form of land use change. It is complete because public agencies possess the power of eminent domain and thereby have the right to take, or condemn, private land at fair market value, provided that the land will be for the "public use or necessity". Although the term "condemnation" has somewhat a negative connotation, the power is generally only used when normal negotiations are unsuccessful.

Additional factors considered in large public acquisitions include cost, source of funds, effect on the tax base, relocation of existing uses or residents, effects of abandoning utilities should future uses have no need for them, environmental impact, and the future cost of operating and maintaining the property. These factors, and certainly more, complicate the

public decision of whether to add real property for the public's use or necessity.

PRIVATE CONVERSION:

The second general program of land use change is through private initiative. As opposed to public acquisition, the private sector is at a disadvantage because of the lack of legal means (such as condemnation) to assemble small parcels, e.g. single family land use. Since it is a significant feature of this plan to rely on the private sector to bring about land use change, it is important to review the factors influencing private development or redevelopment or urban land:

Economic Return. Foremost of course, is the probability of an economic return on the development investment.

Ownership. Because private developers do not have the power of eminent domain, single family areas of multiple ownership, which are otherwise logical for redevelopment are usually rejected. Private developers and their financial supporters instead have preferred large vacant tracts further from present urbanization.

Cost of Redevelopment. The intensity of existing use, in this case the density of single family use, poses the most significant constraint to redevelopment in the vicinity of the Airport. Platted or subdivided residential land not only presents the problem of high clearing costs, but also the problem of vacating streets.

Physical Site Suitability. In some cases clearing a developed site maybe more economically feasible than dealing with a difficult vacant site which possess soil, geologic, drainage or other natural problems.

Transportation. Proximity, or competitive position, of the property to its intended market makes transportation a significant factor whether the use is an apartment, business, industry or hotel. Each use has its own transportation and access requirements.

Availability of Utilities. While sewers and streets are primary necessities, their actual existence is not always the total consideration. The cost, possibility to share the cost, and timing of the improvement are also included.

Development of Surrounding Properties. The market position of a site is enhanced if an intended use becomes a part of an area where other mutually supportive uses exist. If a major anchor-type development is pending, the area in the near vicinity may experience change in anticipation.

Local Character, Quality and Potential. Some private development interests are concerned with the overall character or quality of the community in which their development is to be located. Also some more far-sighted interests attempt to create character and are more concerned with the potential of an area.

Local Attitude. Increased public awareness supported by environmental legislation has made the consideration of local attitudes a serious factor in evaluating private development alternatives.

Government Support and Assistance. Large scale developments often consider the degree to which government support and assistance is available.

Towns are occassionally found competing for new uses to boast their local economy. Zoning, utilities, taxes all become bargaining points. At a different level government can give financial support or guarantee private development. Degrees of government assistance can be provided through various forms of economic development programs, coordination of local capital improvements, and planning coordination at all levels of government.

Market Suitability. While all of the above factors are in a sense measures of market suitability, the presence of existing markets, or potential for future markets are distinct and critical factors.

Redevelopment Potential:

The question remains, "why should private developers be interested in redeveloping urban land when thousands of acres of vacant land exist out and away from the urban areas?".

The first consideration must be whether there is or isn't a desire to return to the urban area or a desire to be within a closer time and distance proximity to not only urban places of employment, but also urban activities. The continued rise in the popularity of condominium living somewhat expresses this as well as the desire to be rid of the upkeep of the large suburban house and yard. An incentive to redevelop urban areas would be a shift in the desire of people to live, shop, and work in urban developments rather than move to new growth areas in rural King County.

General planning directions at the County, Regional and State levels are pointing toward defining some sort of outer limits for suburban development in order to curtail urban sprawl, retain sensitive environmental and

agricultural areas, conserve energy, and limit costs of new freeways and utilities.

It is not fully known to what extent this kind of urban redevelopment or life style exists or what trends are prevailing. However, recent action, such as the court ordered delay of the third Lake Washington Floating Bridge, make those once certain high-return suburban developments much more speculative. The trend in state and federal legislation makes unrestricted growth less assured and is more supportive of in-city living. The factors supportive of redevelopment appear to be more and more prevalent. The Sea-Tac Communities Plan should recognize this direction and assure orderly conversion within redevelopment areas.

STABILITY THROUGH REINFORCEMENT:

In the majority of cases actually changing land use or ownership does not solve a community's problem. The community may be well established, but suffering from undesirable forces. The more desirable and economical solution in these cases is to achieve compatibility by reinforcing what is already there. Reinforcement programs can remove a problem, or correct a situation created by a problem. The programs can also be preventative. In the long run the most effective programs may be those which are designed to stimulate renewed community interest and confidence in itself.

Although much of the result of planning for communities in general is to "reinforce", that concept in the Sea-Tac Communities Plan is given special attention. Areas are actually delineated which show the application,

rationale and expected benefits of various programs, such as those outlined in Chapter 6.2, Noise Remedy Programs, and Chapter 6.3, Water Quality and Drainage. In most cases reinforcement means the Port of Seattle, King County and other responsible agencies taking the initiative in carrying out a combined set of programs.

THE ECONOMICS OF ACHIEVING COMPATIBILITY:

Achieving compatibility between the Airport and the communities results in changes to the community's social and economic structure, as well as changes to the priority and commitment of public funds. Programs to achieve compatibility cannot be evaluated unless community losses and public expenses are addressed. A comprehensive program of acquisition, conversion and reinforcement is a manner of addressing compatibility and its consequences.

Community Losses:

Acquisition of land for airport compatibility results in a number of losses to the community. Since residential neighborhoods comprise most of the area defined for acquisition, population will be relocated; some moving to areas beyond the Airport's vicinity and the immediate community. The Community Attitudes Survey (ref. no. 12) revealed that 60% of those residing in the high noise zone (35 NEF and above) desired either not to move at all or to remain within the general Sea-Tac or Highline area.

The sudden mobility of a portion of the community's population obviously has consequences. The recent trend of declining school enrollments will be

further compounded by population mobility out of the area. Even if a large share of the population relocates within the boundaries of the present school district, service area boundaries will require substantial alteration. Commercial markets are also highly affected by population loss, especially those catering specifically to the provision of household goods and services.

Material, or capital, losses are also incurred. Extensive relocation or demolition of housing units is necessary to prepare the acquisition area for conversion to more compatible, non-residential uses. Retention of these units by moving them to vacant lots within the community may help to offset the overall loss. As property is transferred to public ownership the assessed valuation is removed and tax base for the community's special districts lost. The need and support for local utilities and community facilities are simultaneously lost.

Public Expenses:

Public expenses are incurred far beyond that of meeting the cost of acquisition. Federal matching fund programs require that assistance be given for the relocation of affected households. Costs are added for clearing the area by removing or demolishing structures and cleaning up the vacated site, and preparing the site for future development.

Development of the area to its ultimate "compatible" use requires extensive costs, even if developed to less intensive uses. Development of parkland often costs as much as site acquisition where park sites are undeveloped and of large ownership. Often forgotten are the on-going costs of operations, maintenance, security and liability.

Acquisition is a major cost of achieving compatibility, although not the only one. Programs of reinforcement, specifically purchase assurance and insulation, represent substantial cost committments. Such large committments and expenditures of public funds possibly results in a lower priority for other public needs. Fiscal resources become largely, if not exclusively, commited to such major fiscal programs.

Approach to Community & Economic Development:

Achieving environmental, or airport, compatibility only through land acquisition may result in other social and economic problems. A mere "buffer" approach is an insufficient approach to compatibility. Programs of community and economic development must also be addressed.

policy: *Community and economic development programs should emphasize the maintenance of a stable community population and economy.*

Maintaining a stable community population and economy requires programs which direct land uses to effectively capitalize on community and airport-related growth potential.

Policy: *Direct the economic and land use development of airport-related activities, general urban development, and public projects toward deliberate improvement of the local community.*

Conversion areas are intended to capitalize on growth potential. In

addition they will offset property tax losses due to acquisition. Reinforcement suggests that exisiting characteristics be maintained in stable areas. A limitation on growth or change there enhances the potential in other areas where change is more desirable. Neighborhoods which previously had been threatened by the encroachment of airport-related commercial development, excessive airport generated traffice, etc. can be protected through redirected growth and deliberate reinforcement. The three general programs of achieving compatibility - acquisition, conversion and reinforcement - represent an interrelated and interdependent attempt to balance the community's social and economic losses and gains.

ACQUISITION, CONVERSION AND REINFORCEMENT AREAS DEFINED:

Chapter 6.2, Noise Remedy Programs, presented criteria for program application by a grid of 40 acre blocks. Precise boundaries on the ground must now be established to administer programs and effectively compute costs. The determination of Airport acquisition area is based on the application of all policies and criteria defined in previous chapters on Noise (Chapter 6.2), Water Quality and Drainage (Chapter 6.3), Air Quality (Chapter 6.4) and Airport (Chapter 6.5), as well as the goals and basic policies of this Chapter on Community Development. These considerations, in turn, were correlated to existing land use, topographic and geologic conditions, as well as existing and planned road patterns. Following sections (6.6.3, 6.6.4 and 6.6.5) will present specific delineation and application criteria, as well as development guidelines, for each acquisition, con-

version and reinforcement program area.

Airport Acquisition Defined:

The most significant and long lasting action resulting from the Sea-Tac Communities Plan will be the determination of the extent of land acquisition for airport environmental purposes. With the boundary firmly established, priority in other programs can be given to those remaining areas of conversion and reinforcement adjoining the acquisition area. The following map depicts the ultimate acquisition boundary which may vary in detail as final engineering studies and property negotiations are undertaken.

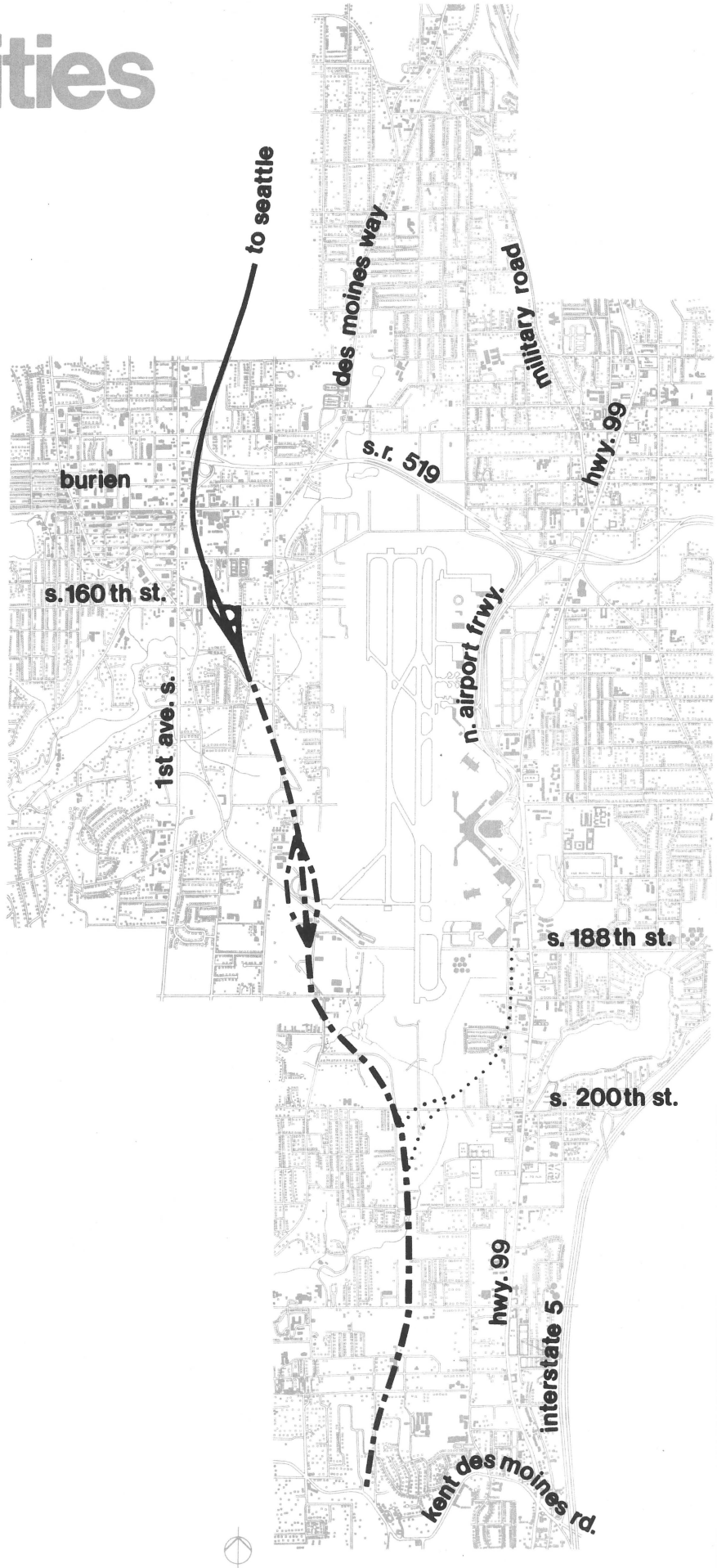
S.R. 509 Corridor Defined:

Another factor in determining program areas is the future extended route of S.R. 509. The four lane controlled access freeway presently exists between the 1st Ave. So. bridge in Seattle and Des Moines Way, just south of Burien. Further extension to the south has been a subject of considerable review and controversy centering on questions of need and perceived drainage problems. As with the Airport itself, S.R. 509 and its extension are topics involving compatibility for the Sea-Tac Communities Plan.

The posture of the State Highway Department and the present status of S.R. 509 was summarized in August, 1974, by the State Highway Department District #1 engineer:

> *"The Department does have an established corridor for S.R. 509 between So. 160th and S.R. 516. Right-of-way is presently being purchased within this corridor. Although the department is committed to this route, a study plan has been set up to evaluate the environmental impact and consider*

sea-tac communities plan



s.r. 509 corridor

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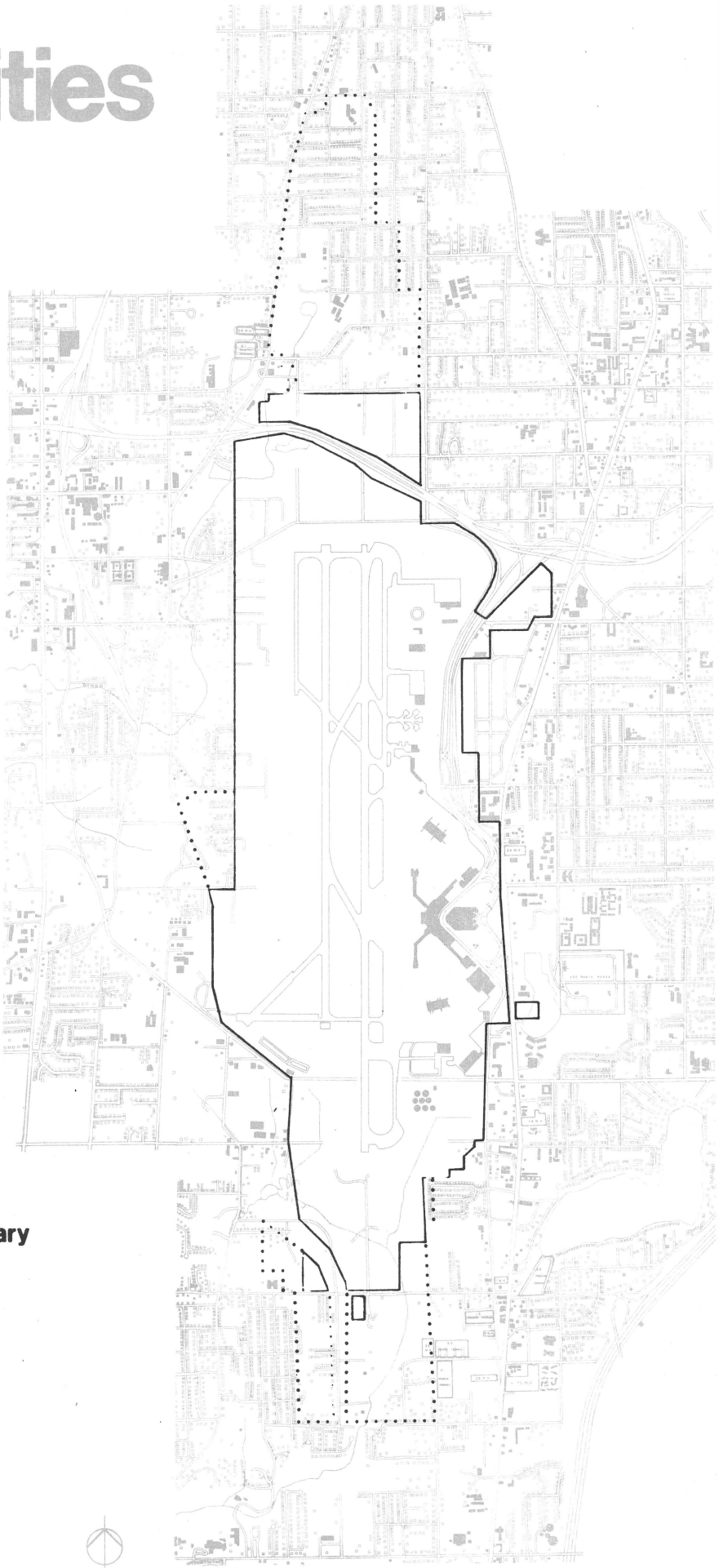
6.6.2

(Revised 4/22/75)

sea-tac communities plan



——— existing airport boundary

..... acquisition area

airport acquisition

SEA-TAC COMMUNITIES PLAN

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1000 2500 5000 scale in feet

design alternatives for S.R. 509 from So. 160th St. to S.R. 516 within this corridor."

Although the primary planning responsibility lies with the State Highway Department, the Sea-Tac Communities Plan has examined local factors and secondary benefits of the proposed corridor, as well as other alternative corridors.

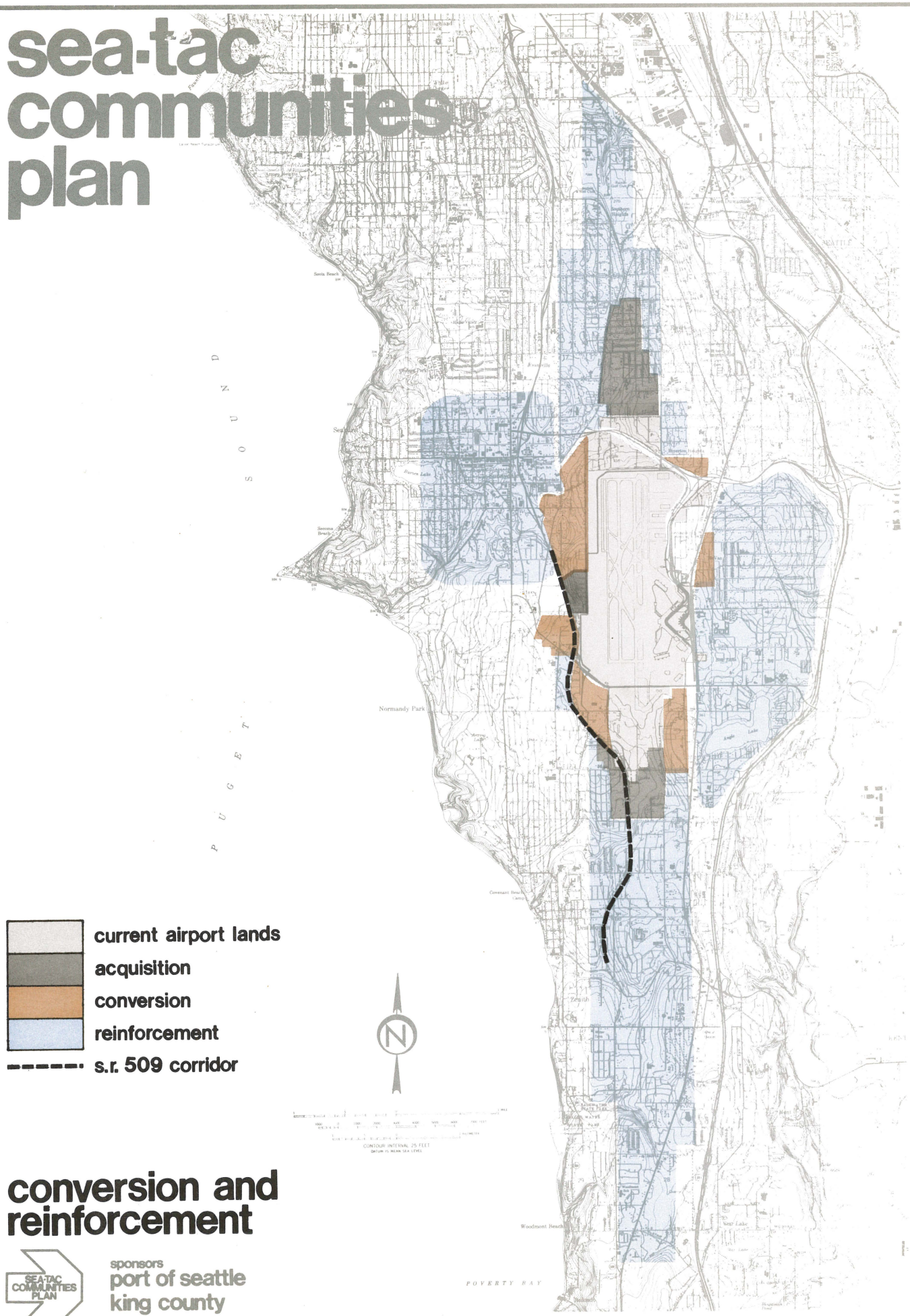
After review it was concluded that the proposed S.R. 509 corridor could be successfully utilized to separate land use areas (policy, 6.6.1) and to define program areas. It was also concluded that if a major East Reinforcement, south access to the Airport was included in the design, major local traffic problems could be stabilized or relieved (See 6.6.5 for discussion). Therefore, this plan recognizes the proposed S.R. 509 corridor to the Kent-Des Moines Road (S.R. 516) with ultimate connection to Interstate 5. If final location and design is significantly different, some revision to the Sea-Tac Communties Plan may be necessary.

Conversion and Reinforcement Areas Defined:

The following map identifies the general areas of conversion and reinforcement and illustrates their relationship to the Airport and acquisition areas, and the S.R. 509 Corridor. Maps in sections 6.6.3, 6.6.4 and 6.6.5 present precise program area boundaries.

Development guidelines for each of the 12 areas attempt to capitalize on existing character or opportunities unique to each side of the Airport. The guidelines direct urban development, guide the conversion of land use, and reinforce and protect appropriate areas.

sea-tac communities plan



conversion and reinforcement

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6.6.3 DEVELOPMENT GUIDELINES - ACQUISITION PROGRAM AREAS

Each of the three acquisition areas possess unique characteristics and potentials which offer opportunities to achieve compatibility. The development guidelines for acquisition program areas consider appropriate general land uses, delineation of specific area boundaries and proposals for future uses.

GENERAL LAND USE CONSIDERATIONS:

Prior to developing specific land use plans for the three acquisition areas, consideration must be given to the appropriateness of various general land use types. Compatibility with surrounding uses, of course, is a major consideration in examining general uses. Further, suitability of those uses includes considerations of physical site conditions, availability of supportive secondary uses, regional implications, the need or appropriateness of the uses relative to the overall community land use pattern, and the goals and basic policies of community development.

Residential Considerations:

Acquisition in the north and south areas is specifically intended to remove incompatible single-family residences from aircraft flight operations and excessive noise. The basic critieria for determining areas not suitable for residential use is where noise values of permanent ANE 40 or higher

prevail (Chapter 6.2). Beyond those boundaries residential neighborhoods can remain and should be made more liveable through reinforcement (6.6.5).

Commercial Considerations:

An early assumption was that impacted lands could best be put to industrial or commercial use, the type of development compatible with aircraft noise. However, it soon became apparent that such a simple solution was plagued by questions of suitability and compatibility.

The existing assortment of commercial centers in the vicinity must be accounted for when considering new commercial growth in noise impacted areas. Southcenter, Burien, Des Moines, and Pacific Highway South are all existing commercial areas with considerable growth potential. Burien is located at the center of a network of arterials and freeways serving the surrounding resident population in excess of 100,000 persons. Southcenter with its location at the intersection of interstate freeways, I-5 and I-405, and S.R. 518, can draw from a regional population in excess of 1,000,000. These already existing regional and community centers, along with neighborhood business nodes and strip commercial development represent a commercial community embodying a wide range of retail, service, entertainment, and trade activities.

The existing commercial areas have personalities and growth potentials that are unique to each. The ability of each area to grow as part of a diversified commercial community requires the concentration of particular

activities and specialized attention in each area. Growth in activities and competition for attention and markets must therefore be complementary, and they can be. Growth and expansion of the role of Des Moines as a marine center, for example, would not hinder the capability of Burien to capitalize on airport-related activities and markets.

Commercial development in acquisition areas, however, would not be a suitable addition to the over-all commercial community. The acquisition areas could not compete with surrounding centers for a share of the market because of inadequate access and adverse noise conditions. Further, commercial development in the acquisition areas would not be logical or natural geographic extensions of existing commercial development (policy, 6.6.1), nor would it support or further the urban center development concept (Chapter 6.1).

The physical suitability of land in the North and South Acquisition Areas also poses some limitation to the orderly development of commercial uses. Wetlands and areas of steep topography occupy significant portions of the north and south areas. Introduction of intense development with increased amounts of impervious surface would not only destroy the areas' natural character, but would further complicate effective drainage planning (Chapter 6.3). In addition, the physical presence of aircraft noise is an obvious drawback to businesses seeking a prestige location.

The presence of residential uses adjacent to these areas would also restrict the capacity of businesses to grow or operate unimpeded. Improved access would ultimately be required. Increased traffic volumes generated

by commercial development would require new or expanded routes through residential neighborhoods, thereby jeopardizing the reinforcement of their residential character.

Businesses that seek a compatible, funtional relationship to local markets, or perform specialized functions requiring a regional market setting, or desire a prestige location, would not likely find an isolated, noisy residential neighborhood attractive.

Industrial Considerations:

The use of noise impacted lands for industry initially appears more logical than for commercial. The Airport itself is an industrial type use, especially considering those activities such as cargo handling, fuel transfer, aircraft and airport maintenance, etc. Also, airport activity, air cargo in particular, is often thought to require support of warehouses and freight terminals.

Industrial use, however, must prove to be economical, feasible, and logically located. The Duwamish and Green River Valleys contain industrial development that is significant, not only to South King County, but to the entire region. These industrial areas have evolved and grown principally due to some distinctive advantages they posses such as rail access, navigable waterways, adequate power, and large level sites. In addition, they are also convenient to the Airport. The influence of the Duwamish and Green River Valley industrial belt on the Sea-Tac Communities is unmistakeable.

Very little non-airport industry exists in the Highline area. Over 200 acres of land within the airport vicinity are currently zoned for manufacturing or industry and only approximately 15 acres are presently developed with industrial uses.

The noise impacted areas do not contain the necessary economic factors and amenities to attract major industry in competition with nearby industrial centers. In addition, conversion of areas north and south of the Airport to industrial use could impose incompatible uses on surrounding permanent residential neighborhoods.

A significant market for air cargo related warehousing does not really exist. The nature of air freight is one involving little lay-over in storage; to warehouse goods for long periods would defeat the purpose of rapid air shipping. The limited storage and warehousing needs, along with the more extensive maintenance facility requirements of air carriers, are presently being met by facilities located on the Airport itself.

Future air cargo and aircraft maintenance needs can better be met by adding some land to the Airport's west side. Such additions must be limited to land at or near runway elevation to be usable. This area has been designated as the West Acquisition Area.

Open Space Considerations:

Various forms of open space are compatible with aircraft noise exposure. Extensive open space and recreation uses, although not problem free, can provide substantial opportunities. Such uses are compatible with

residential use and can even improve the quality of adjoining neighborhoods. In developed residential areas which may be presently deficient in park land, such as north of the Airport, open space can provide needed park land without further disrupting the residential neighborhoods. This aspect of compatibility is recognized in the King County Comprehensive Plan and the Interim Regional Development Plan of the Puget Sound Governmental Conference; both espouse the policy of limiting airport approach areas to open space type uses. Those open space uses which involve large gatherings of people, of course, are not logical, both because of noise and safety.

policy *The Airport acquisition areas should be primarily open space, put to community multiple use.*

SUITABILITY OF OPEN SPACE USES:

A variety of open spaces and recreation needs, desires and requirements have been analyzed throughout plan development. Recreation groups, as well as individuals and staff members, have expressed views on recreation and open space needs. While a number of land uses can exist in noisy environments, the selected open space uses must meet local needs and support other policies and programs.

policy: *Uses of noise impact acquisition areas should not further degrade the prevailing noise and air quality environment or the residential character of surrounding neighborhoods.*

Some recreational type uses suggested for inclusion into acquisition area development are inconsistent. Motorcycle uses, requiring upwards of 200 acres for motorcross, scrambles and flat track areas, may prove to be incompatible with other acquisition area open spaces, as well as with surrounding neighborhoods. Excessive noise and exhaust emissions produced by motorcycles compound an already existing problem. The large area required makes it especially difficult to contain such uses within the acquisition area and buffer them from their surroundings.

Model airplane flying was also considered to be a possible use. While also producing noise and ordorous fuel emission, model planes may also interfere with the Airport's flight operations.

More recreation uses undoubtedly could be found incompatible with either other uses in the acquisition area or surrounding neighborhoods. Even comparatively innocuous activities may be viewed with concern relative to potential vandalism, undesirable use by people and parking problems on adjacent neighborhood streets. However, an open space concept with carefully planned use areas utilizing the boundaries formed by freeways, arterials and natural features continues to provide the best opportunity to maximize suitability and compatibility.

Natural Determinants:

Some uses are highly dependent on the natural suitability or condition of the land. Agricultural open space, for instance, is compatible

with noise; however, is dependent on proper soils, a scarce resource in the Sea-Tac vicinity.

Areas of steep topography have limited suitability for active uses. These areas possess more dense and mature stands of trees and other vegetation. Maintaining these areas as passive buffer areas supports the basic open space policies of community development (6.6.1).

Topographic variations also produce natural depressions which have become wetlands with a unique vegetative character. These areas correspond to existing and planned holding pond and drainage system (Chapter 6.3) and constitute an essential part of the open space network (policy, 6.6.1).

Community Use Reserves:

The following uses and activities, along with acreage requirements for each, are some open space uses considered suitable:

a: soccer, 15 to 20 acres plus a meeting room;

b. rugby, 5 acres; tennis, 2 to 5 acres for indoor courts and a clubhouse;

c. field archery, 10 to 20 acres plus a clubhouse;

d. watersports, encompassing swimming, boating and fishing;

e. horseback riding, including trails, 40 or more acres for semi-public riding, and 2 to 5 acres for corrals;

f. nature walks, primarily trails along Miller and Des Moines Creeks;

g. landscaped buffer areas intended only for visual, or aesthetic improvement, and some trails;

h. golf, over 120 acres to include a clubhouse and, possibly, 'pitch-n-putt' areas.

Specific interest has been expressed in all of these activities. Some of the larger uses, such as the golf course, can and must have specifically defined sites. Smaller acreage uses can be provided for within a general area, or reserve area, set aside for such uses. These community recreation and activity spaces not specifically designated by type are termed community use reserves.

It is difficult to forecast the exact mix of future community open space and recreation needs. Therefore, some areas should be reserved for future community multiple use. In most cases these areas should not be diverted to non-open space/recreation uses. The appropriateness of future community needs and the proper location must be carefully examined for suitability through the plan's implementation provisions and programs.

NORTH ACQUISITION AREA GUIDELINES:

The neighborhoods north of Sea-Tac are collectively known as the Boulevard Park area. Homes here occupy virtually all of the available residential land. The overall density of about 8 persons per acre (1970 census) consists primarily of older development (about 60% of the housing units being built prior to 1980; 11% prior to 1940) on small lots (7-9,000 square feet).

Delineation of Boundaries:

The noise remedy criteria for acquisition (6.2.4) determine the general grid cell application of that program. Neighborhood features must be considered to refine the application of acquisition programs & (Map, 6.6.3:21).

Des Moines Way S. along with the rising topography to the west define existing neighborhoods and can separate different land uses in the future. The commercial properties along Des Moines Way S. near S.R. 518 are at the perimeter of the overall acquisition. Compatible with aircraft noise, these properties would not interfere with future land uses and need not be included in airport acquisition.

West of Des Moines Way, S. near S. 128th St., a small triangle falls within the grid cell criteria for acquisition. Yet, with the exception of four homes, commercial uses exist here as part of a commercial node near the intersection. The commercial properties are less susceptible to noise and

need not be included as part of the acquisition (6.2.4). For the residential properties, the purchase guarantee program will apply. Des Moines Way S. should be maintained as a boundary for airport acquisition.

The southeast quadrant of the S. 128th St. - Des Moines Way S. intersection is fully developed with 10 homes comprising a residential block. While this area falls within a grid cell identified with the acquisition program, it also represents space for eventual expansion of the nearby neighborhood commercial concentration. Rather than acquisition, a purchase guarantee conversion program would apply here (6.2.4). This approach still offers relief for those anxious to escape aircraft noise; it also allows property owners the option of retaining a stake in potential commercial growth.

Because the alignment of the east runway coincides with the boundary line between grid cells (which is also 20th Ave. S.), the normal transition of noise exposure between cells is disrupted. This requires the adjustment of actual noise remedy program boundaries eastward. Between S. 128th St. and S. 136th St., east of 20th Ave. S., mid-block property lines define the acquisition boundary. An exception occurs immediately south of S. 128th St. where the boundary skirts an interior block development in order to preserve the internal orientation and access. South of S. 136th St., the boundary is formed by topography: elevation peaks and then drops rapidly to the east. This hill forms a natural separation for future land uses (Map, 6.6.3: 22). The land bounded by S. 140th St., S. 146th St., 20th Ave. S. and 24th Ave. S. is included in the North Acquisition Area under F.A.A. dimensional criteria for aircraft approach areas.

The outer boundary delineated above encompasses 305 acres, 83% of which is developed with 636 homes, 2 commercial dog kennels (1.2 and .9 acres, respectively), a power equipment manufacturer (3.4 acres), Sunset Junior High School (9.4 acres), Boulevard Park Elementary School (8.2 acres), Sunset Park and county maintenance facilities (16.6 acres), and about 6 miles of streets (44.5 acres of right-of-way). There are 50 acres of vacant land held in 53 ownership parcels. Of that amount, 13 vacant properties totaling 27 acres are associated with the Miller Creek wetlands.

Future Use:

Miller Creek has received concentrated attention and intense evaluation from the perspective of storm water and pollution control (Chapter 6.3). Water quality and drainage programs also complement the desire for recreational use of streams and wetlands. A trail along Miller Creek can link many of the open space use areas. An historic elm grove and rest stop along Des Moines Way S. can serve as the trail head. Because of poor suitability for other uses, an expressed desire to maintain a natural-like state along the creeks, and the importance of wetlands in stormwater control...

policy: *The area surrounding Tub Lake should be a wetland preserve; development for community recreation should allow only the Miller Creek footpath and, if suitable, a public swimming area.*

Enough space exists in the North Acquisition Area for a golf-course, where such a use compliments the north-end development theme. Within the north airport acquisition boundary, the proposed site offers suitable topography; a north-south orientation that will necessitate few tee shots into a setting sun; potential for little interference with other community uses.

Market demand for golf facilities can be measured against the national standard of: one 18-hole golf course for each 50,000 persons. The Interim Regional Development Plan of the Puget Sound Governmental Conference recommends that "Local park and recreation agencies should utilize the 1985 regional standard of one 18-hole public or semi-private course for every 30,000 persons."

The number of golf courses can be compared to existing and forecast population within the Sea-Tac market area, assumed to be unserved by golf courses in Seattle, Renton, or Tacoma. An additional assumption here is that private golf and country clubs are only half* as useful in meeting population service demands as public courses.

Existing Facility	Number of holes	Effective number of holes
Glen Acres (private)	9 (times 1/2)*	4.5
Rainier (private)	18 (times 1/2*)	9
Tyee	18	18
Foster	18	18
		49.5

The equivalent of less than three 18-hole golf courses presently serves a population of around 180,000; a population which, according to the national standard, needs four 18-hole courses; regional criteria suggests that six 18-hole courses are necessary. In twenty years the combined Sea-Tac and Federal Way population is forecast to exceed 260,000 persons. Five 18-hole golf courses will be needed in order to adequately meet the national standard; or nine 18-hole courses to meet regional standards.

Consumption of 130 acres by a golf course would not preclude substantial amounts of other community use (Map, 6.6.3:22). The Interim Regional Development Plan asserts that "public golf courses should be developed in combination with other compatible outdoor recreational activities."

policy: *A portion of the north acquisition area should be preserved for development as a public golf course.*

King County's Sunset Park, an active-play facility located immediately northwest of Sunset Junior High School, is another use generally compatible with aircraft noise.

policy: *The intended use of Sunset Park should continue to be active recreation.*

The Highline School District has two facilities, Boulevard Park Elementary and Sunset Junior High Schools which represent substantial

public investments now impacted by aircraft noise. Opportunity still exists to utilize the facilities through joint exploration of potential uses by the school district, other public agencies, and citizens. Expressed needs for organized recreations suggests that community facilities are required which provide clubhouse and meeting room use for recreation groups, community meetings, workshops and classes. Further, some institutional uses (YMCA, for example) or publicly operated training academies could appropriately utilize the school buildings.

policy: *The Sunset and Boulevard Park School plants should be utilized as community facilities; integrated with the North Acquisition Area open space development.*

Boulevard Park Elementary School has potential for use connected with commercial recreation, because of its particular location with respect to the proposed golf course.

policy: *Shared use of the Boulevard Park Elementary School building for golf course clubhouse facilities should be examined.*

In order to best relate to nearby land uses, minimize conflicts, and correspond to the potential use of a school building...

policy: *Golf courses access and parking should be located near the commercial concentration at the intersection of Des Moines Way S. and S. 128th St.*

Three businesses occupy parcels within the acquisition area. The two commercial kennels are less drastically affected by noise than residences. However, these land uses could not compliment the eventual open-space development scheme. These isolated businesses should have a low priority for acquisition, but should nonetheless eventually be acquired (6.2.4).

The lone manufacturing firm, also tolerant of aircraft noise, is in an area currently zoned M-P (Manufacturing Park) and Potential M-P. At the time of the last Highline Area Zoning (1968) it was felt that airport related industrial development at this location was logical. A basic assumption was that the Airport's property which extended up to S. 146th St. would be developed by the Port of Seattle for airport industrial use.

However, currently only approach navigation equipment and a City of Seattle water reservoir are planned for the property between S.R. 518 and S. 146th St. It may be possible, however, for some limited industrial development to occur which would not jeopardize the open space development concept nor be incompatible with nearby residential areas. Acquisition of the existing manufacturing use would then not be necessary (6.2.4).

policy: *Light manfacturing and office uses should be allowed within a circumscribed portion of the north acquisition area.*

S. 142nd St., 24th Ave. S., and S. 146th St. form the north, east, and south development area boundaries (Map, 6.6.3:20). To the west, existing property lines generally coincide with a break in topography, sloping westward; an existing large stand of trees provides a ready made buffer. Industry west of here would not only lie directly under east runway flight paths, but would create an overall manufacturing area of substantial proportion for which favorable market factors do not exist. Amplified traffic volumes, not easily restricted to certain ingress and egress, could interfere with active community use areas and jeopardize neighborhood land use compatibility.

Care must also be exercised within this limited area in order to provide a compatible exception to the total open space-recreation concept.

policy: *Manufacturing and office uses should compliment the character of surrounding development and avoid degrading the prevailing environment.*

Access and buffering considerations can further assure neighborhood land use compatibility (Map, 6.6.3:20). For instance, 24th Ave. S. could

serve as the only access to the interior block, thereby discouraging industrial traffic movement past community open space uses. S. 146th St. and 22nd Ave. S. could separate access to the manufacturing park, flight control equipment, and the reservoir from other local traffic. Further, direct access to S. 142nd St. could be restricted; all development would then be oriented inward.

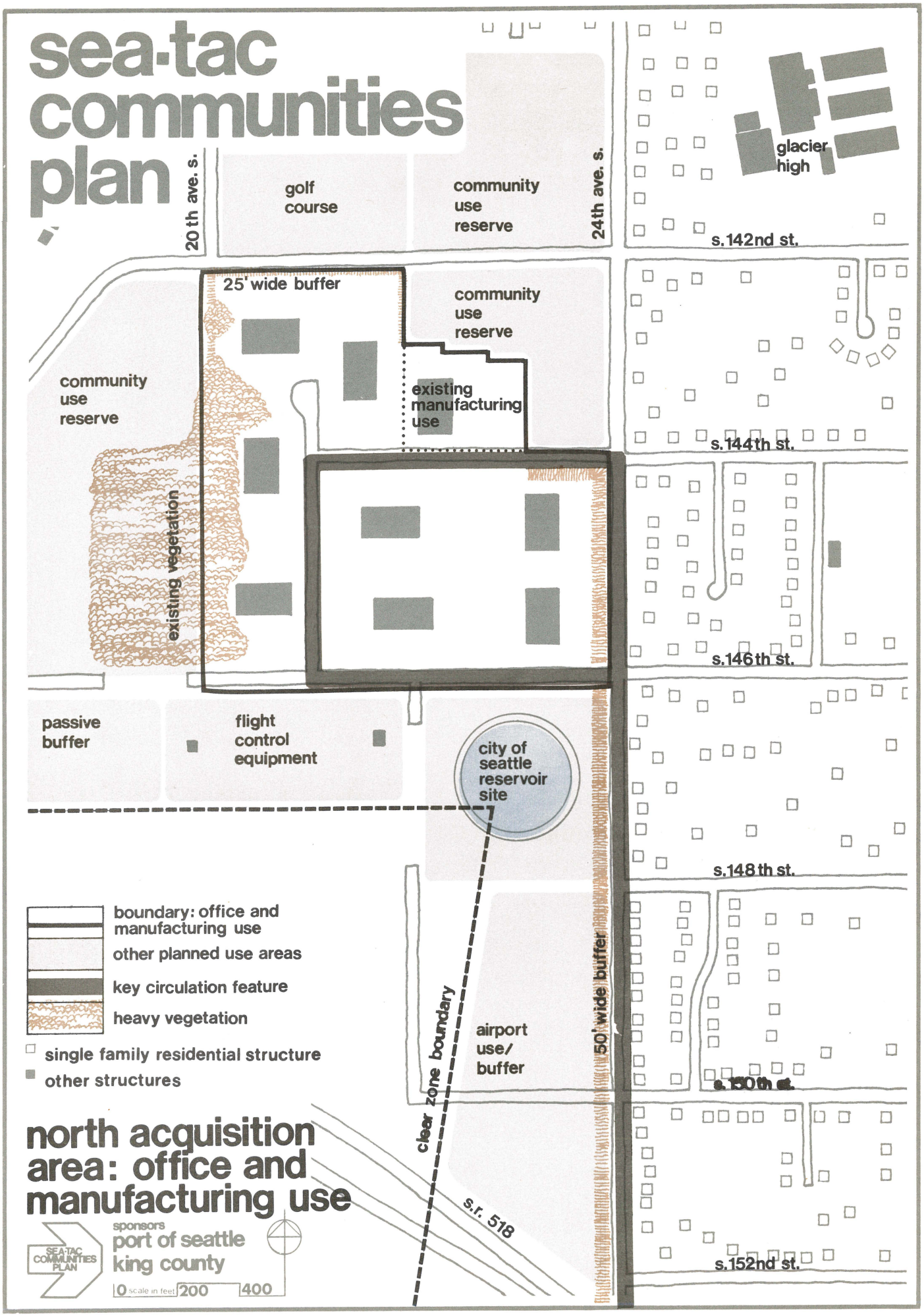
Visual buffering can further lessen the potential for obtrusive effects and possibly even provide a neighborhood amenity.

policy: *Development of the manufacturing and water reservoir sites should be accompanied by landscaping designed to visually screen the sites.*

Effective screening can be accomplished by a 50' wide landscaping strip along 24th Ave. S. and the southerly perimeter of the reservoir site. These areas have a direct visual relationship with nearby neighborhoods. Along S. 142nd St., a 25' wide landscaping strip would be sufficient; it will adjoin open space uses. Along the westerly boundary of the development area, existing trees should be incorporated into a minimum 25' buffer. Should fencing be necessary or desirable, it should be located along the interior margin of the landscaping strip.

With the homes around Sunset Park to be removed, county maintenance shops would no longer conflict with the residential atmosphere and traffic patterns. However, eventual relocation of the maintenance and storage

facilities would further improve Sunset Park for recreation. The limited industrial growth area outlined above might provide a preferable location, with access directly onto a secondary arterial.


sea-tac communities plan
20 th ave. s.
golf course
community use reserve
24th ave. s.
glacier high
s.142nd st.
25' wide buffer
community use reserve
community use reserve
existing manufacturing use
existing vegetation
s.144th st.
s.146th st.
passive buffer
flight control equipment
city of seattle reservoir site
s.148th st.
boundary: office and manufacturing use
other planned use areas
key circulation feature
heavy vegetation
single family residential structure
other structures
clear zone boundary
airport use/ buffer
50' wide buffer
s.150th st.
s.r. 518
s.152nd st.
north acquisition area: office and manufacturing use
SEA-TAC COMMUNITIES PLAN
sponsors
port of seattle
king county
0 scale in feet 200 400

sea-tac communities plan



- current airport lands
- acquisition area boundary
- streams and ponds
- wetlands
- heavy vegetation

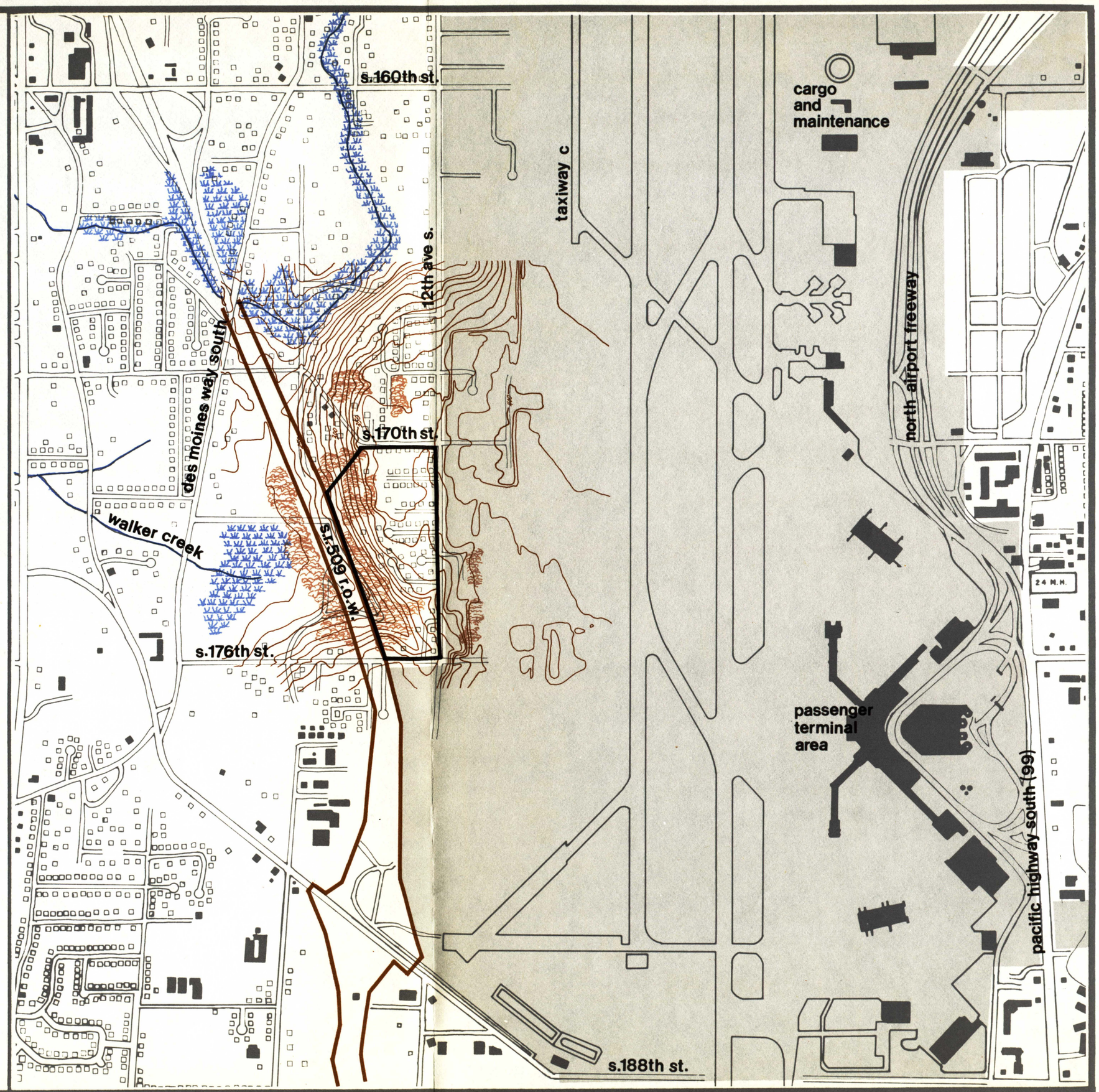
- □ single family residential structure
- ■ other structures

west acquisition area: present situation

SEA-TAC COMMUNITIES PLAN

sponsors
port of seattle
king county

0 scale in feet 500 1000 2000



sea-tac communities plan



current airport lands

acquisition area boundary

streams and ponds

wetlands

heavy vegetation

single family residential structure

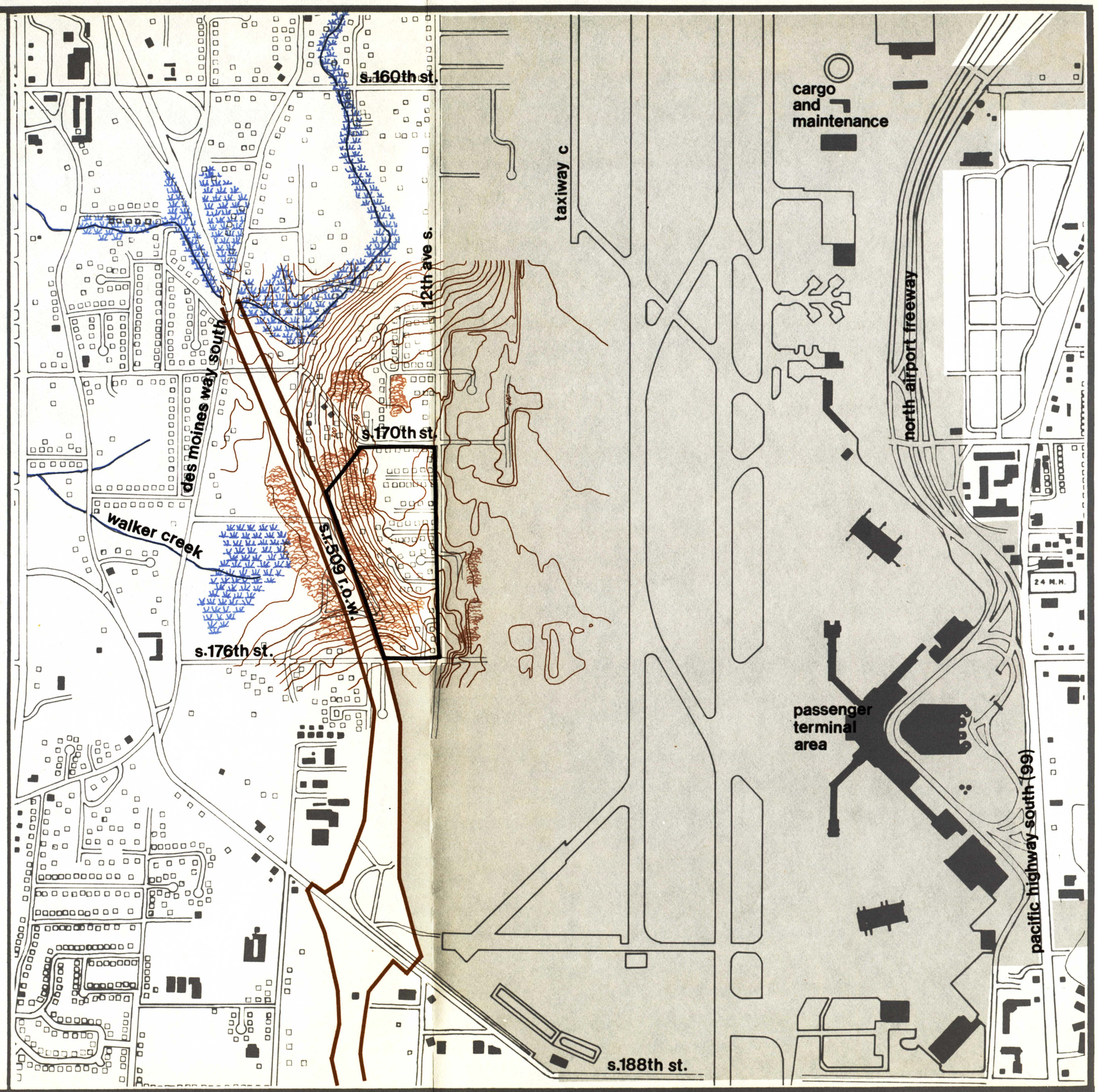
other structures

west acquisition area: present situation

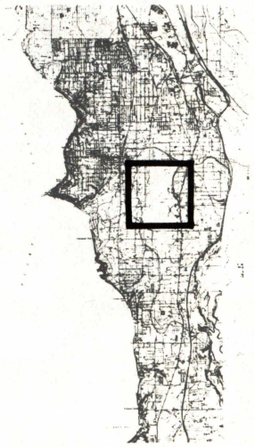
SEA-TAC COMMUNITIES PLAN

sponsors
port of seattle
king county

0 scale in feet 500 1000 2000



sea-tac communities plan



planned use area

key circulation feature

streams and ponds

topography after grading

single family residential structure

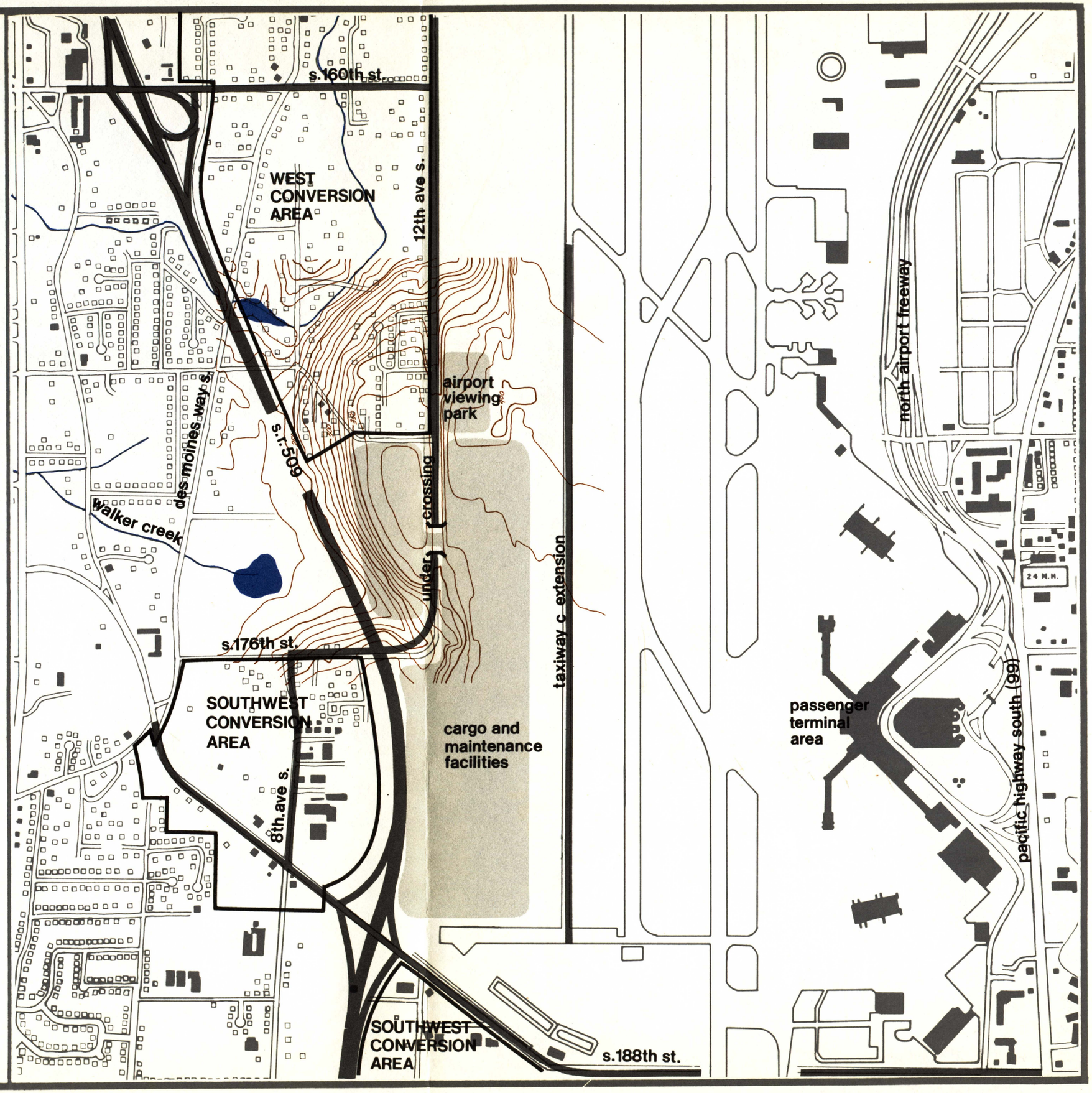
other structures

west acquisition area: planned use

sponsors
port of seattle
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000



SOUTH ACQUISITION AREA GUIDELINES:

The Maywood and Madrona neighborhoods contain slightly newer homes (about 50% of the housing units having been built prior to 1960, 7% prior to 1940) and more rural qualities than Boulevard Park. Yet some areas, notably Seeley's Addition, contain full development on urban-size lots (7500 sq. ft.) with overall density of about six persons per acre (1970 census). Many acreage tracts do still exist, including the heavily wooded Des Moines Creek Canyon to be found directly south of Sea-Tac. The majority of residential development lies to the west of a direct alignment with the Airport's runways.

Delineation of Boundaries:

The noise remedy criteria for acquisition (6.2.4) determine the general grid cell application of that program. Neighborhood features must be considered to further refine the application of acquisition programs (Map, 6.6.3:29).

An exception to acquisition is near S. 188th St. at Des Moines Way S. where offices and warehouses presently exist. Although falling within the noise exposure criteria for acquisition of homes, these uses are not susceptible to aircraft noise. Further, the properties are part of the Southwest Conversion Area; a larger district planned for industrial use (6.6.4). The acquisition program will not apply to these properties; it is not necessary to alleviate a noise impact situation, nor is it required in order to achieve

a preferred land use (6.2.4).

Between S. 197th and S. 208th Sts., the westerly line of grid cells identified with acquisition falls at the edge of the Maywood neighborhood. The boundary formed by a platted, interior alley between 15th Ave. S. and 6th Ave. S. is consistent with development and ownership patterns.

North of S. 200th St., to the west of S.R. 509 right-of-way, some land is included in the acquisition area under the previously mentioned F.A.A. dimensions criteria for aircraft approach areas.

S. 208th St is near the southerly line for acquisition defined by the noise criteria. Although presently serving as a residential access street, S. 208th St. is planned as a collector arterial linking 1st Ave. S. and Pacific Highway South. As an arterial, the street will firmly separate the residential and open space land uses.

The easterly acquisition grid cell lines generally follow the alignment of what would be 24th Ave. S. This street actually exists only in small segments; where it does, its westerly right-of-way line forms the acquisition boundary. Where 24th Ave. S. is not in, acreage tract property lines establish the boundary along the same alignment.

The outer boundary delineated above encompasses 176 acres, with 151 homes and a mobile home park with 21 units. Between S. 200th and S. 208th Sts. S.R. 509 right-of-way totals 17.8 acres and King County park land, 48.78 acres.

Future Use:

Many people chose the area south of the Airport principally because

of its pastoral atmosphere. Open space uses here should compliment that image.

policy: *Development of the South Acquisition Area should stress open space and recreational uses that contribute to the dominance of a natural, rural, and greenbelt character.*

Consistent with a low intensity development theme and expressed demand for horseback riding facilities, 37.5 acres to the west of future S.R. 509 are designated for equestrian use, (Maps, 6.6.3:28,30). A range of features would be possible, including pastures, corrals, stables, trails, etc. To assure compatibility with the adjacent residential area, any corrals, stables, and off-street parking should be located on the S.R. 509 side of the property; grazing areas and riding trails would be more compatible uses along the westerly boundary. The site as a whole contains a large stand of trees which should be preserved as a natural buffer between the homes to the west and the active equestrian uses and S.R. 509 to the east. Access should be restricted to 18th Ave. S., a road which will serve only this property and link two arterial streets. Finally, should the planned Des Moines Creek Trail provide for equestrian use, a route from this parcel to the trail can be established when full development of S. 208th St. occurs.

Near S. 200th St., the Hill Grove Cemetery occupies about one acre, and is an open space-type use unaffected by aircraft noise. Therefore, acquisition is not necessary.

Along the western edge of the equestrian use area, a 8.5 acre community use reserve can serve the neighborhood to the west. The topography and vegetation of the site make it particularly suitable for informal, unstructured play.

The acquisition boundary formed by S. 208th St. and the 24th Av. S. alignment will establish 39.4 open space use acres adjacent to Des Moines Creek Park property. Of these, 19.4 are wooded, generally topographically oriented to the creek and will add to the passive trail and park use.

policy: *A portion of the south acquisition land should be incorporated into Des Moines Creek Park.*

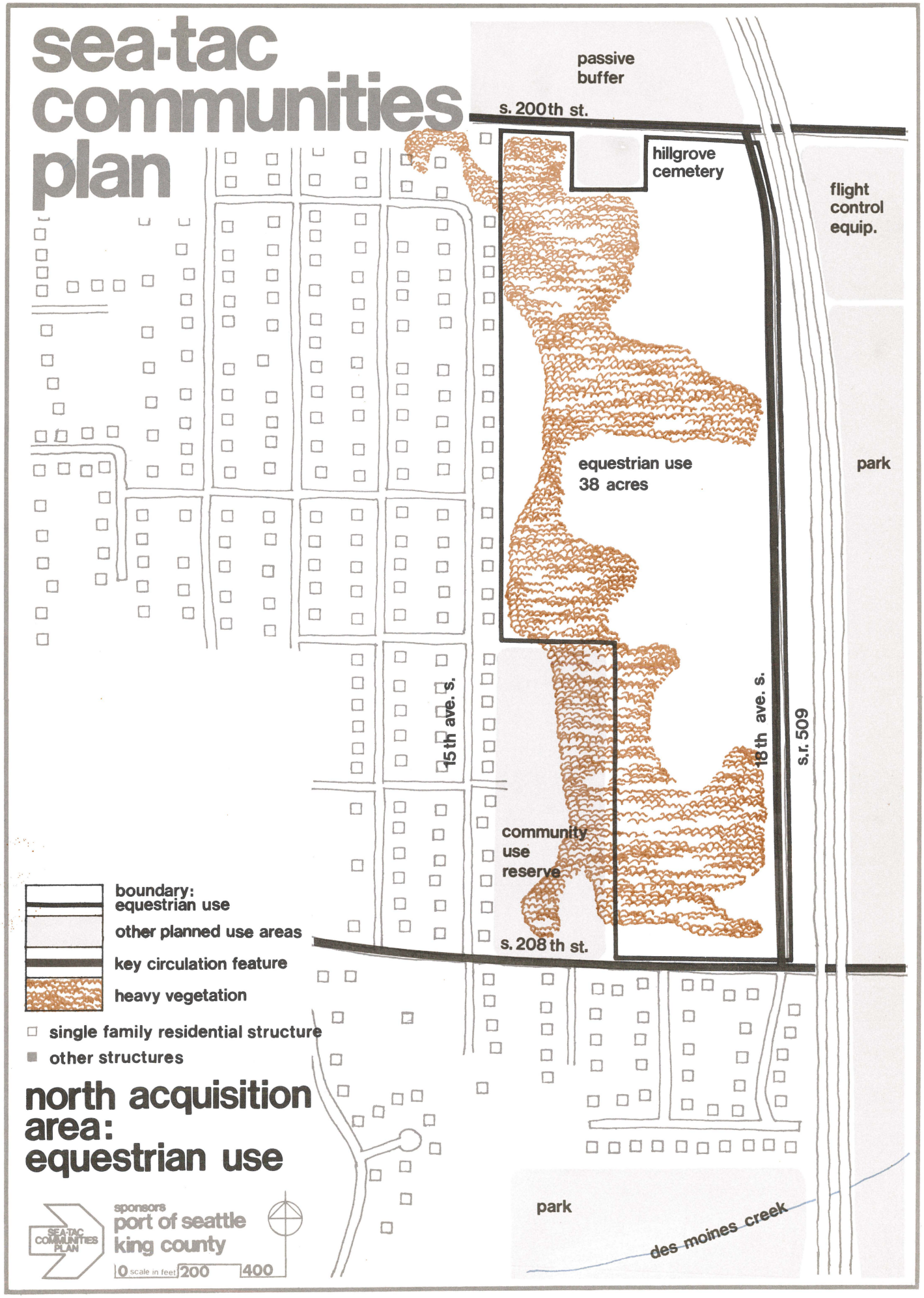
West of Pacific Highway South, between S. 200th and S. 208th Sts., nearly 200 mobile homes are located beyond the acquisition boundary. Over 40 acres are vacant, yet planned for eventual medium density residential use. There is potential for a population density substantially higher than the most intense single-family development. While mobile home and apartment populations generally contain fewer children than single-family residential neighborhoods, there remains a need for active recreation facilities. Space should be reserved for open space development tailored to respond to the demands of a higher density living area (Map, 6.6.3:30).

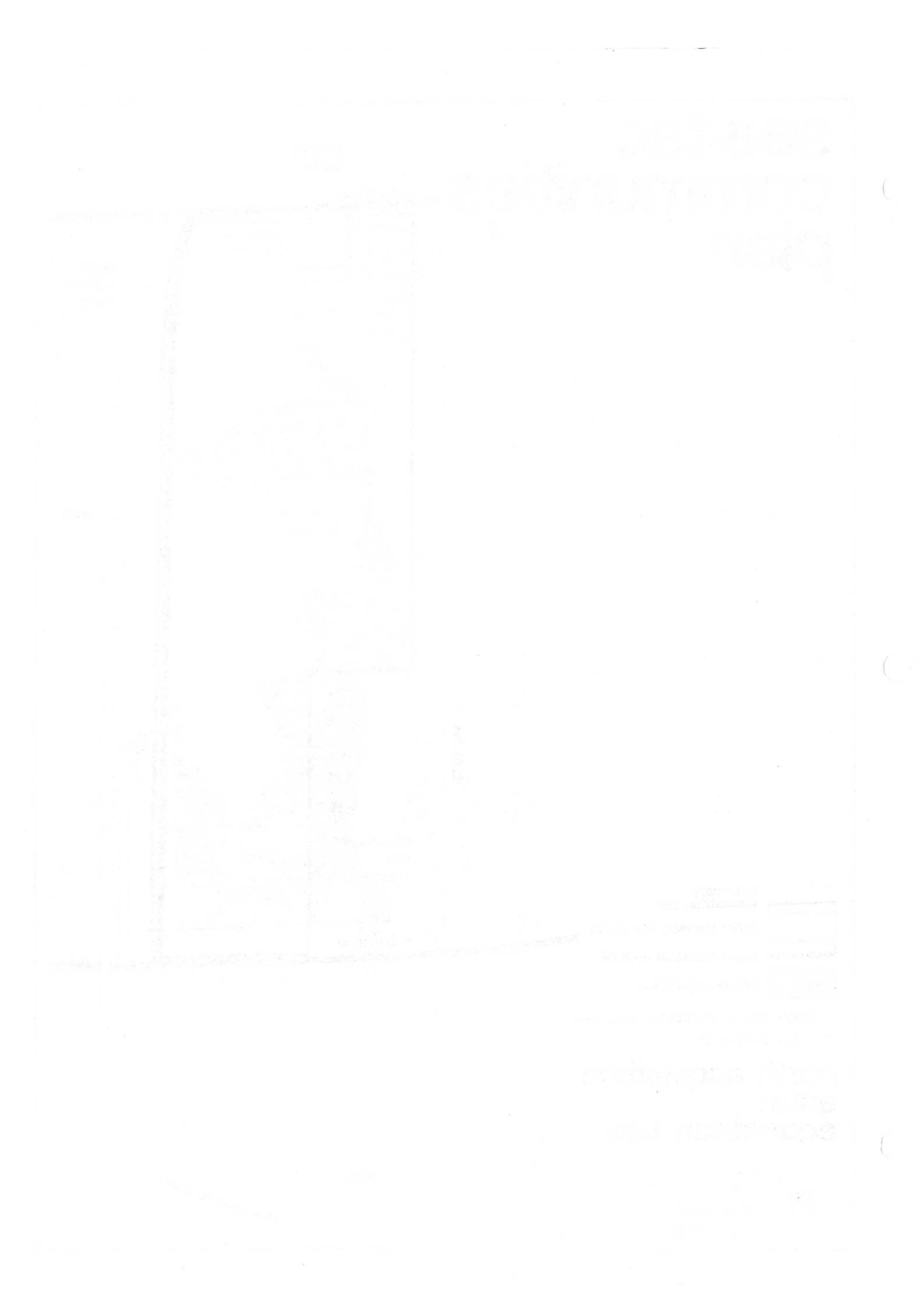
policy: *Within the South Acquisition Area, a community use reserve should be accessible to the medium density population adjacent on the east.*

Circulation within the medium density living area, as well as access

to the adjacent community use reserve, could be provided by extending 24th Ave. S. north from S. 208th St. to S. 204th St.

North of S. 200th St., the three additions to airport land will be incorporated into existing open space. West of 18th Ave. S., the small acquisition area will remain part of a heavily wooded, natural buffer formed by the hillside. Adjacent to S. 200th St., near Des Moines Creek, the acquisition lands are to become part of Tyee Golf Course and the Des Moines Creek drainage system; a holding pond is proposed in this area (6.6.3). Along 24th Ave. S. the 2.4 acres presently occupied by 13 homes will also become part of Tyee Golf Course and eventually accommodate relocation of clubhouse facilities.


sea-tac communities plan
passive buffer
s. 200th st.
hillgrove cemetery
flight control equip.
park
equestrian use 38 acres
15th ave. s.
18th ave. s.
s.r. 509
community use reserve
s. 208th st.
boundary: equestrian use
other planned use areas
key circulation feature
heavy vegetation
single family residential structure
other structures
north acquisition area: equestrian use
sponsors
port of seattle
king county
SEA-TAC COMMUNITIES PLAN
0 scale in feet 200 400
park
des moines creek



WEST ACQUISITION AREA GUIDELINES:

The area between the Airport's west side and Burien has redevelopment potential, a portion of which can serve direct airport needs. In general, the sparsely developed single family area (about 1-1/2 to 2 units per acre) will be impacted by the extension of S.R. 509, probably within the next 10 years. Upon S.R. 509's completion the area will be between the Airport and the freeway with little opportunity remaining for the neighborhood to maintain itself as a unified and stable residential environment.

Delineation of the Area:

The West Acquisition Area is bounded by S. 170th St. to the north and S. 176th St. to the south. 12th Ave. S. forms the easterly boundary, beyond which is airport land. To the west, S.R. 509 right-of-way and the break in topography define the acquisition area (Map, 6.6.3:36).

Future Use:

The development of air cargo, aircraft maintenance, general and corporate aviation uses are planned for the Airport's west side (Chapter 6.5). The southern portion of the area south of S. 170th Street, between 12th Ave. S. and the freeway route, is largely at a high enough elevation to make its future use directly compatible with the airport facilities on-grade with the runways and taxiways. For this reason this site becomes a scarce resource; since it is the only remaining area of such elevation not

already designated for airport use. Adding this area for future airport use contributes to redevelopment of the west side.

policy: *On the west side of Sea-Tac, south of S. 170th St., property at or near runway elevations should be acquired for future airport use.*

This area differs from the other acquisition areas in that it relates directly to a conversion area (6.6.4). The timing and manner in which this land is redeveloped can affect the success of the West Conversion Area.

The West Acquisition Area is somewhat more densely developed than other areas on the west side. Residential subdivisions exist here, and other residential areas are more sparse with single homes on large tracts. Effective timing of redevelopment can be managed, since a major obstacle to provate land development - the assemblage of small platted parcels - will be eliminated through acquisition. The area is wedged between the Airport and the proposed freeway, with approximately 1200 feet between the two at S. 170th Street and only 600 feet between them at S. 176th Street. For this reason acquisition should occur in a manner timely to the residents of that area.

policy: *Acquisition of the west side cargo auxiliary area should occur prior to the development of S.R. 509 and prior to extensive use of the west side for Airport purposes.*

Circulation:

Use of the West Acquisition Area for cargo and maintenance hinges on its topographic relationship to the runway system and the potential convenience for aircraft access. 12th Ave. S. presently forms a physical boundary between airport property and the acquisition area, yet its current alignment will also play a major role in linking industrial, airport, commercial and apartment traffic with S.R. 518 and S.R. 509. Several circulation alternatives are possible.

For example, re-direction of 12th Ave. S. around the acquisition area on the west edge would allow an unobstructed link between the acquisition area and airport property. Only a small amount of right-of way, north of S. 170th St., would need to be acquired. Such a route, however, may be more circuitous for through traffic related to the industrial Southwest Conversion Area (6.6.4) and S. 188th St.

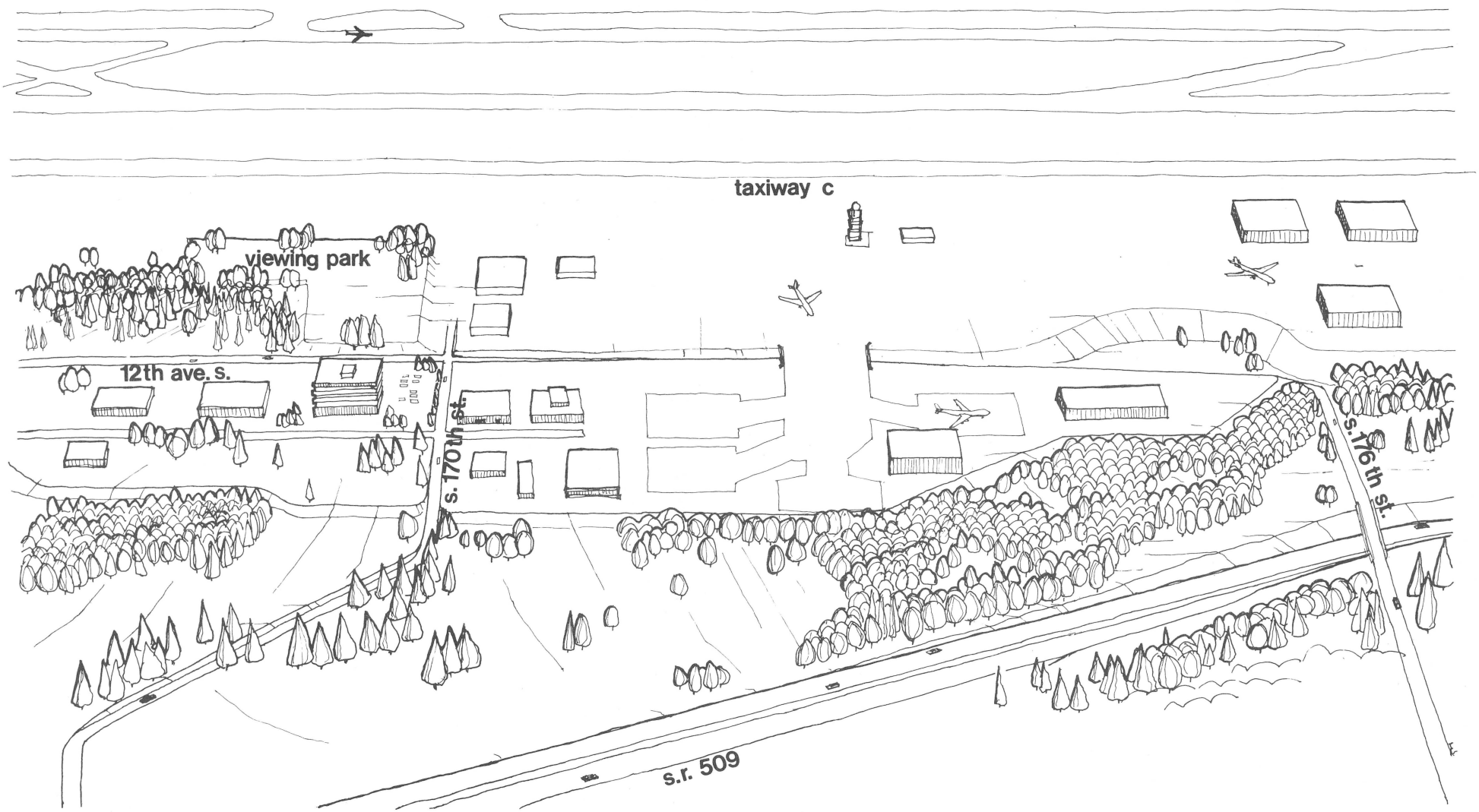
Using the present alignment of 12th Ave. S. could serve through traffic related both to the Airport and industrial development near S. 188th St. However, some form of bridge connection over 12th Ave. S. would be needed for airport use of the West Acquisition Area (Sketch, 6.6.3:35).

Generally, the acquisition area plateau is 30' below the grade of what will be taxiway C (this north-south taxiway will be extended southward in order to serve the air cargo development area). Grading will

be necessary to establish a gentle slope and continuous surface for airport use, irrespective of the location of 12th Ave. S. In addition, some fill and grading along the west edge of the acquisition area will enlarge the total useable area. This site work should be integrated with the establishment of a new grade or alignment for 12th Ave. S., enabling the road to be developed along its present alignment for major north-south circulation (Map, 6.6.3:37).

The role of 12th Ave. S. as the major north-south route on the west side would warrant connection with S.R. 518, east bound, and enable the regional linkage of Des Moines Way S. to be de-emphasized. This measure could help Des Moines Way S. survive as an historical community collector; it would fall between S.R. 509 and an arterial, 12th Ave. S., and no longer connect to eastbound S.R. 518.

policy: *12th Ave. S. should serve as the major north-south arterial circulation, provide access to the Airport's west side, and be designed to complement airport use of the West Acquisition Area.*



west acquisition - 12th ave. s. concept

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6.6.4 DEVELOPMENT GUIDELINES- CONVERSION PROGRAM AREAS

Conversion of land use is often a difficult process. Obstacles must be overcome, including the problems of assembling many small parcels into larger tracts and escalating land values. Orderly direction toward new uses is desirable and methods are needed to protect and assist the public affected by such conversion.

ACHIEVING CONVERSION:

A primary problem in parcel-by-parcel changes in land use is that a single house, or a small residential enclave, may find itself surrounded by redevelopment. In some cases this may be desirable from the property owners standpoint since new development may raise the property value more than if it had been included in the initial development. Many people, however, will wish to avoid the transition of their neighborhood, especially if they are owner-occupants. During the period of transition, existing residents may feel threatened by new uses being developed nearby, or by unorderly acquisition of land. Many would feel the effects of nearby homes being removed or demolished. To minimize these problems, it is necessary that programs of conversion are undertaken to assure an orderly transition of land uses within or near single-family residential areas.

Development Controls:

Timing, coordination and the manner in which land uses are converted are major considerations in programming an orderly transition. To a certain

extent existing development controls, such as zoning, planned unit developments, subdivision controls, etc. can be relied on.

Zoning can be applied "outright", that is, developers would be permitted the range of uses allowed by the code and subject only to the general provisions of the code. Zoning can also be applied as a "potential" use, in which case a change to out-right zoning then will require the preparation and approval of a Planned Unit Development (P.U.D.). Another method would be to retain existing zoning. Redevelopment would then require the approval of an application for rezoning subject to this Plan's recommended uses and development conditions. Such a change of zoning could also be initiated on a sub-area basis by the local zoning authority (King County), which might better assure coordinated timing of land use change as opposed to a parcel-by-parcel rezone. Of the above zoning methods, outright zoning is the least likely to achieve orderly transition. Measures which utilize planned unit development provisions or other development conditions therefore must be heavily relied on.

policy: *Land use changes in identified conversion areas shall be subject to the approval of planned unit developments or similar development conditions.*

Through preparation, review and approval of a P.U.D. consideration can be made for the development's relationship to surrounding properties, as well as for access, landscaping and architectural provisions. More

specific provisions can be placed on actual development of the site in the review of a PUD than a rezone. However, due to the redevelopment nature involving small parcels and existing residences, variations to these controls or the development of new controls must be also considered.

Tract Planned Unit Development:

A P.U.D. of a new type is necessary which would combine a number of parcels into logical development tracts. Such a "Tract P.U.D." could be under a single or multiple ownerships. Current owners could join together to form a tract. Preparation and approval of a Tract P.U.D. could make their properties more marketable for prospective developers. A major hurdle of assembling small parcels, site planning, and official approval would be accomplished.

A further refinement to this approach would be to divide the process into two phases. The first phase would consist of establishing the "tract" and setting the general nature of the future uses. This would required little, if any, actual site planning. The tract would be reviewed to determine whether it was a logical unit, to outline its constraints for development, to determine whether the general uses intended met the direction of this Plan, and most importantly whether the tract could be developed without undue impact to surrounding single-family areas. Upon approval of the first phase, the tract would be considered a developable unit. At this point current owners could market the tract, or its development rights, to prospective developers who would prepare and submit detailed second phase plans. It is essential that

the tract stay as one unit and any reduction in its area would require an additional first phase review and approval. Second phase Tract P.U.D. plans would include specific uses, architectural design, access and circulation plans, landscaping plans, drainage plans, and plans for open spaces, and would further assure that the phase one conditions are maintained.

The Tract P.U.D. concept is merely introduced here. It appears to have potential in assuring orderly transition of single-family areas. For that reason...

policy: *The Tract P.U.D. should be further developed as an official means to encourage orderly transition of single-family areas where necessary and desirable.*

The mechanics of the Tract P.U.D. are not nearly as difficult to overcome as the ways in which to encourage its use. Since additional costs and energies will be required to assemble parcels to form tracts, gain approvals, and prepare more detailed plans, new incentives also need to be developed. Currently developers are permitted additional densities should they go over and above what the code requires to accomplish a quality development.

Individual Initiative:

Existing owners can also undertake measures to facilitate the conversion of their area. Assuming there is a fair amount of ageement among owners, legal development corporations could be formed where advertising, negotiations and sale of the properties is done as a unit.

An additional committment and impetus could be added to this approach by forming a 'single' ownership under a corporation. While some legal questions remain, a subdivision could conceivably be vacated forming one single tract with ownership by a single corporation with numerous shareholders. The corporation might be synonomous with a condominium owners association. The land unit could then be sold or other official actions taken, as approved by the board of directors and the shareholders.

While there are obvious pit falls to this approach, it probably comes most closely to addressing the problem of assembling parcels to create unified ownership. As with the Tract P.U.D., new incentives, possibly including public assistance, need to be developed to encourage individual initiative in converting land use in poorly developed single-family areas.

Public Assistance:

Various forms of development programs have been sponsored by local, state and federal governments. The Housing and Community Development Act of 1974, which replaces older federal programs like urban renewal, is far reaching and innovative. Much of the Act is oriented to reclaiming our already developed areas. Among other things, the Act includes as eligible activities for general purpose local governments..."the acquisition of real property which is blighted, deteriorated, undeveloped, or inappropriately developed from the standpoint of sound community development and growth", certainly a condition prevalent in the Airport's vicinity.

The Act furthermore considers eligible..."construction, reconstruction,

or installation or public works facilities, and site or other improvements". Use of Act funds can assist local and state governments in effectively timing their capital improvements in a concerted manner to compliment the private development process. Especially important in conversion areas are the timely provision of sewer and water utilities, local access roads and freeway interchanges, and drainage facilities.

Since the Act encourages coordination and greater partnership between local governments, existing property and homeowners, and interested developers, greater emphasis should be placed on future application of Act related funds toward assisting the orderly transition of land use within identified conversion areas.

An additional way of assisting redevelopment is through outright public acquisition of parcels and their eventual resale. While such purchase/sellback could not be practiced indiscriminately, in many cases it could be an effective way in which to assemble small parcels to form larger tracts, especially where public acquisition programs are likely to be in effect, such as in purchase guarantee noise program areas (Chapter 6.2).

Portions of identified conversion areas may be generally included in some noise remedy programs. Application of those programs should not act to hinder conversion. For instance, if noise insulation program improvements were made to existing single-family residences, their conversion to more appropriate use would be hampered. Public assistance in the form of noise remedy programs should facilitate conversion rather than provide an obstacle to it.

Escalated Land Values:

Another difficult obstacle to conversion is the effect escalated land value has on orderly transition and redevelopment. Normally, the private market establishes land values. In the vicinity of the Airport, however, values established through court condemnation proceedings for airport acquisition can have a substantial effect. Even if the future use of acquired areas is for open space, or passive buffers, court established values can create artificial values for surrounding land far beyond their worth as single-family areas, and even more significantly, beyond their redevelopment potential. The effect of such values is to obstruct the conversion of those areas by seriously diminishing, or narrowing, their market as development sites.

Current appraisal practices of "highest and best use" and "comparative sales" do little to alleviate this effect. Such practices of applying values to private land based on public condemnation values could produce values representative of substantial development, while, in fact, such development may not exist anywhere in the area. The consequences could be large areas with relatively high redevelopment potential and with substantial public commitment left virtually vacant because they were totally out of the prevailing market. At the least, considerable delay in the establishment of a market could occur.

It is characteristic of a redevelopment situation that property improvements, largely single-family houses in this case, already exist and have no role in the ultimate redevelopment scheme. Unless values of these properties,

including their existing improvements, remain competitive with vacant tracts of potentially the same future use, existing improvements could be a liability to conversion. If parcels with existing improvements were not escalated because of future use potential, a competitive incentive would be added for developers to assemble a number of such parcels and help to defray the costs of clearing existing and unnecessary improvements.

Zoning land to outright uses too far in advance of development can also have the effect of escalating values beyond market potential, as well as to increase tax assessments. Zoning, however, can be guided directly by this Plan and changes to it can be made in such a way to facilitate timely conversion.

Redevelopment of the West and Southeast conversion Areas could be particularly subject to these situations. Commitments by private investors and developers and public agencies must be timed to optimally capitalize on market potential to assure proper and orderly transition. Careful monitoring of this situation must be undertaken to assure that substantial private development can occur before irreversible public commitments are made.

NORTH CONVERSION AREA GUIDELINES:

The North Conversion Area lies outside eligibility for noise remedy programs except for its western 1250 feet where 24 of the area's 74 houses are located. That western section is within an insulation noise program area.

Delineation of the Area:

The triangular shaped area is bounded by S. 152nd St. on the north, 24th Ave. S. on the west, and apartments to the east between 31st and 32nd Aves. S. The conversion area is bordered on the south by freeway S.R. 518. As traffic volumes increase on that facility, vehicular noise impacts will undoubtedly increase. Airport and freeway generated air pollution, expecially hydrocarbons and particulate, also affect this area.

Future Use Potential:

Conversion from single-family use to multi-family use seems logical. impacts from the indoor environment through sound proofing during construction and by providing air conditioning. Outdoor areas, such as yards and gardens which are currently affected by air pollution particulate, are also not as prevalent in multi-family developments. The conversion area would also be an expansion of an existing 153 unit multi-family complex to the east.

Much of the area is about 30 feet above the freeway's elevation

providing good unobstructed views of the north portion of the Airport. Although now a constant reminder of the Airport's negative impact, the spectacular views of aircraft taxiing to their take-off position and north take-offs could be a real amenity for apartment dwellers. Additional height achieved by multi-story apartment structures would also open up views to the west of the Olympic mountains and the North Acquisition Area open spaces, as well as the Airport operations.

policy: *The area identified as the North Conversion Area should be encouraged to convert to medium density multi-family use with proper sound insulation.*

Traditional P.U.D. requirements may be all that is required for orderly conversion. However, property owners may find it to their advantage to form more developable units. In the noise remedy program area a special purchase guarantee program may be offered at an appropriate time and for a limited period to assist use change. Easements may be acquired on an undeveloped property value basis. This benefit should provide added assistance to existing property owners in marketing their properties to prospective apartment developers.

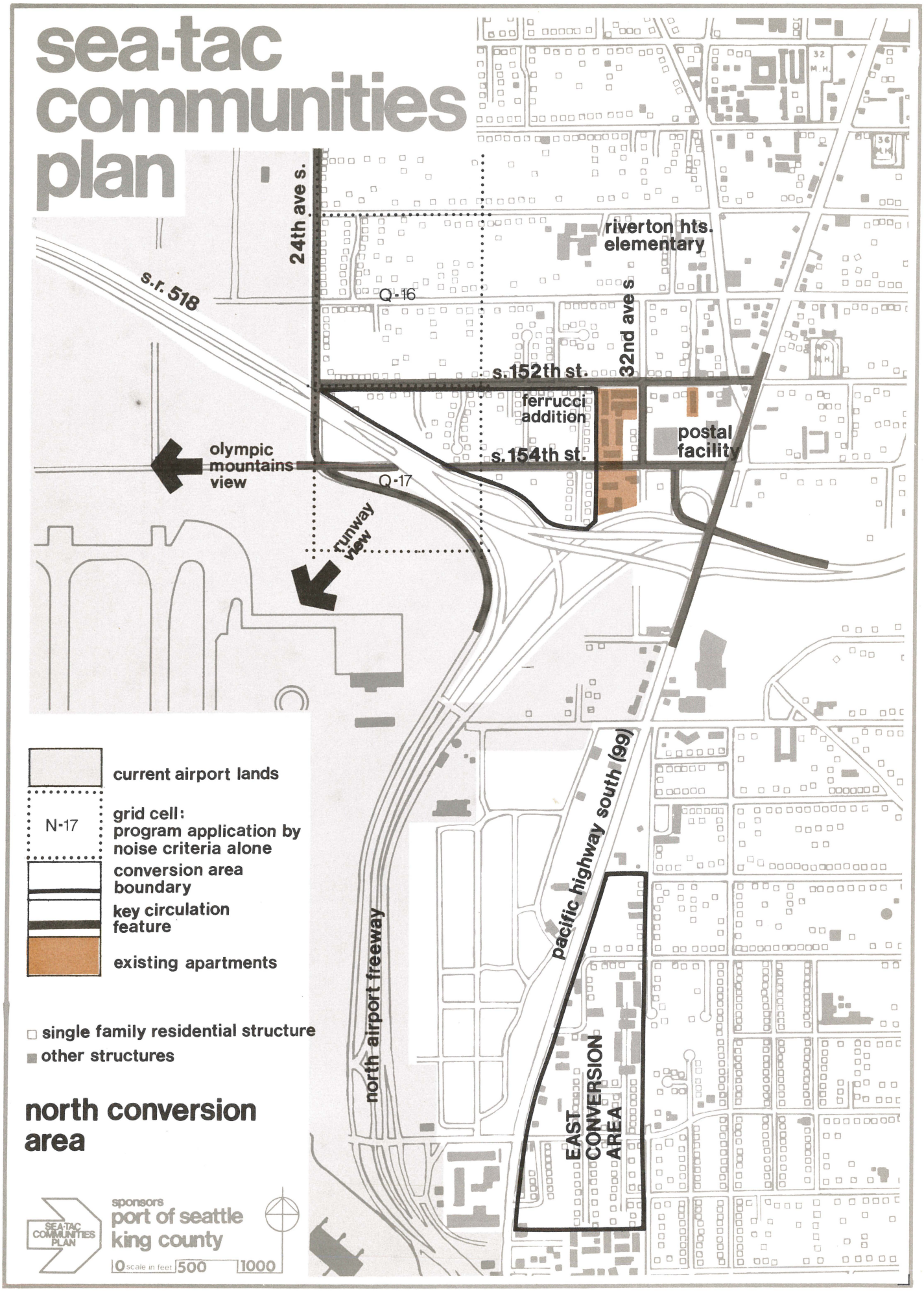
Public Improvements:

S. 152nd St., between 24th Ave. S. and Hwy. 99, should be improved as conversion progresses. An improved road with pedestrian facilities and landscaping will not only better serve and enhance the future multi-family area, but will also provide a better transition with the single-

family neighborhood to the north. Additional right-of-way, if necessary, should be obtained through P.U.D. and zoning approvals.

An improved connection between the conversion area and the S.R. 518/ Hwy. 99 interchange, particularly the north off ramp, should also be undertaken. An improved 32nd Ave. S. between S. 152nd and 154th Streets may provide the best connection and also serve the new postal facility fronting on 32nd Ave. S. and 154th St. S. If additional right-of-way cannot be obtained for adequate improvement of 32nd Ave. S., improvement of 30th Ave. S. may be a suitable alternative.

Improvement, or realignment, of 30th Ave. S., if undertaken, must be coordinated with conversion opportunities. For instance, the potential for conversion of the single-family lots on each side of 30th Ave., north of 152nd St. This action and the vacation of the existing right-of way would form a more developable tract out of the 18 lot Ferrucci Addition. If apartment expansion from the east should occur, the existing alignment may be satisfactory. Ideally, only one connection between 152nd St. and 154th St. should exist, rather than a multitude of uncontrolled through streets.


sea-tac communities plan
24th ave s.
riverton hts. elementary
s.r. 518
Q-16
32nd ave s
s.152th st.
ferrucci addition
postal facility
olympic mountains view
s.154th st.
Q-17
runway view
current airport lands
N-17
grid cell: program application by noise criteria alone
conversion area boundary
key circulation feature
existing apartments
single family residential structure
other structures
north airport freeway
pacific highway south (99)
EAST CONVERSION AREA
north conversion area
SEA-TAC COMMUNITIES PLAN
sponsors
port of seattle
king county
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EAST CONVERSION AREA GUIDELINES:

The East Conversion Area containes three small single-family subdivisions and scattered residences which are amidst airport-related businesses and multi-family development. Almost all large tracts have now been developed with hotel, office, miscellaneous commercial, or apartment uses.

Delineation of the Area:

The East Conversion Area is defined by Pacific Highway South (Hwy. 99) and 32nd Ave. S. on the west and east, respectively. North and south boundaries are less precise, but can be considered to be approximately S. 164th St. and just beyond S. 172nd St. where a major apartment complex forms the south boundary. The area is defined to include those single-family residences, which may have existing or future problems with encroachment resulting from airport-related and multi-family land uses. (Map 6.6.4: 18).

Future Use Potential:

Large apartment complexes have been established on the west side of 32nd Ave. S. Continued conversion of single-family areas to apartments can provide a transitional use between airport-related business to the west along Hwy. 99 and single-family areas to the east. Properly contained, this action can support the reinforcement of the McMicken Heights neighborhood.

Two small single-family subdivisions are involved in multi-family conversion: Bowmont Terrace, containing 39 existing residences; and all but the western 9 houses of the 35 home Sue-Linda Park. Lots in both subdivisions are 8,000 square feet or less. Individual initiative to form developable tracts is fundamental to their conversion. An addition of approximately 200 apartment units could be expected through properly planned conversion of these areas.

Two areas to the west fronting primarily along Hwy. 99 can appropriately convert to airport/passenger related business uses. One area, south of So. 170th St., includes the remaining 12 single-family residences of the Tagas Addition. The area north of So. 170th includes the nine houses of Sue-Linda Park which are west of 31st Ave. and miscellaneous marginally developed businesses, vacant properties, and storage yards. Tracts as large as possible should be encouraged in these areas in order to include the single-family residences and avoid the possibility of leaving small lots remaining with little redevelopment potential.

policy: *The East Conversion area should be encouraged to develop with high and medium density apartments and airport-related business.*

Should Sue-Linda and Bowmont, and even Tagas, redevelop as single tracts, existing streets can be vacated and new internalized circulation established which is tailored to the planned redevelopment. Vacated streets provide an additional incentive by adding four acres for potential redevelop-

ment. Single tract development would add the following areas in street vacations: Sue-Linda - 51,000 squ. ft., or 1.2 acres; Bowmont - 84,000 sq. ft., or 1.9 acres; and Tagas - 42,600 sq. ft., or .9 acre.

Circulation Guidelines:

Circulation in and around the conversion area should be improved or controlled, as conversion progresses. 31st Ave. S. should be extended to provide through access between S. 170th St. and S. 166th St. S. 167th St. from Hwy. 99 to 31st Ave. S. could then be vacated. An improved 31st Ave. S. would carry S. 166th St. traffic and form a controlled intersection at S. 170th St. 31st Ave. S would also provide local access to apartment and business development. Commercial uses north of S. 170th should front off of 31st ave. S. rather than Hwy. 99. This would permit controlled access via the intersections of S. 170th at Hwy. 99 and 31st Ave. S., and avoid a multitude of access points along the highway.

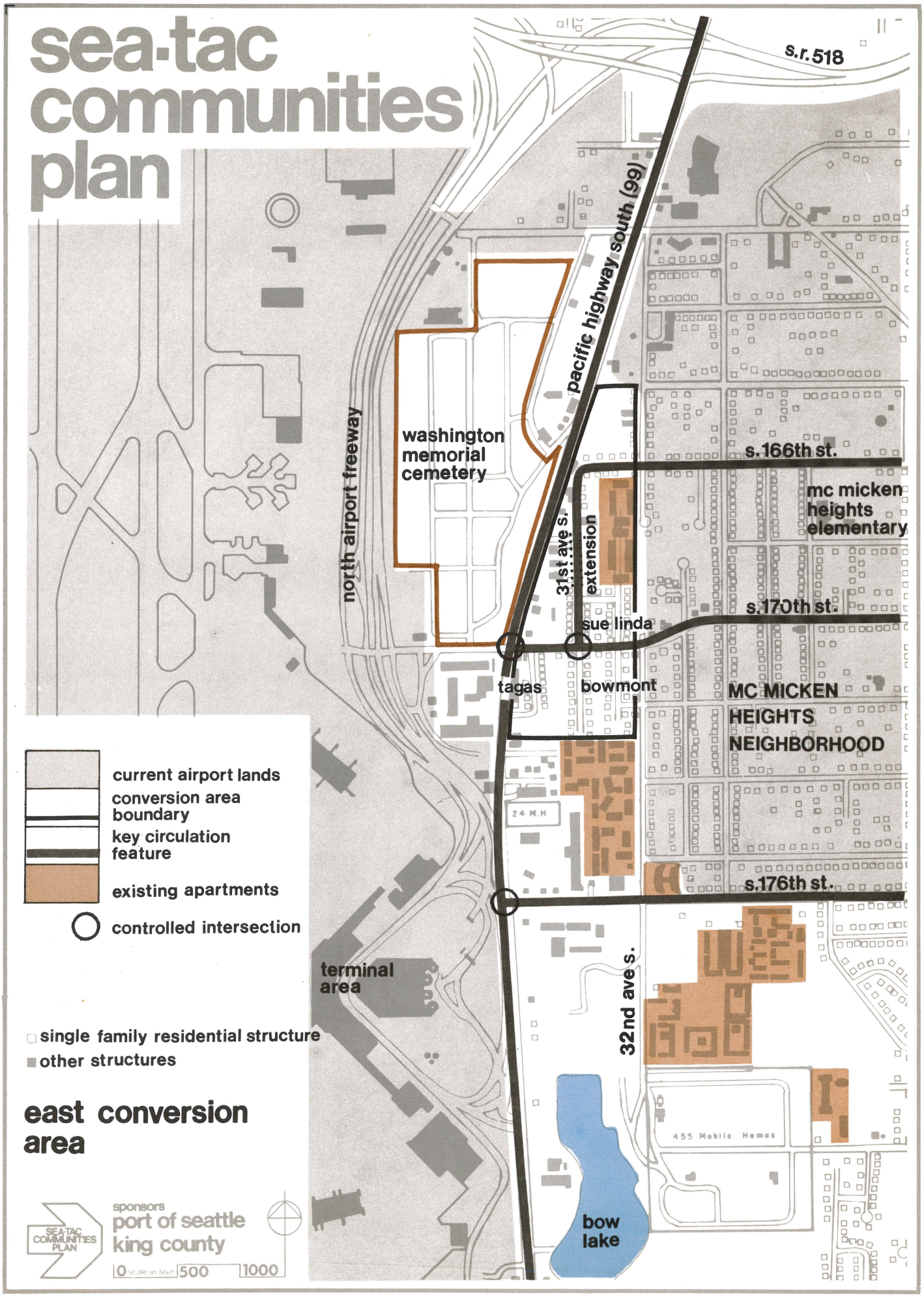
Apartment generated traffic should also be controlled. 32nd Ave. S. is the line of demarcation between the conversion area and single-family residential areas to the east. Increased traffic volumes on 32nd Ave. S. therefore jeopardizes reinforcement of the McMicken area.

policy: *Access for apartment conversion areas should be restricted from 32nd Ave. So. and traffic volumes thereon minimized.*

More controlled and efficient access can be provided from S.. 170th St. and the improved 31st Ave. S.. Orientation of apartment uses should ideally be toward these streets. However, special design and landscaping provisions should be made along 32nd Ave. S. to soften their edge with the single-family area.

Limited access onto and use of 32nd Ave. S. will also act to minimize the use of residential side streets. However, some traffic can be expected between the conversion area and Military Road. It is expected that several alternative minor through routes, such as S. 166th, S. 170th and S. 176th, will tend to disperse, or even discourage, increased through traffic volumes, rather than one major through arterial.

Whenever possible, traffic generated by the conversion area and other Hwy. 99 uses, should be encouraged to use Hwy. 99, S.R. 518 and S. 188th St.


sea-tac communities plan
s.r.518
pacific highway south (99)
north airport freeway
washington memorial cemetery
s.166th st.
mc micken heights elementary
31st ave s. extension
s.170th st.
sue linda
tagas
bowmont
MC MICKEN HEIGHTS NEIGHBORHOOD
24 M.H.
s.176th st.
terminal area
32nd ave s.
455 Mobile Homes
bow lake
current airport lands
conversion area boundary
key circulation feature
existing apartments
controlled intersection
single family residential structure
other structures
east conversion area
SEA-TAC COMMUNITIES PLAN
sponsors
port of seattle
king county
0 scale in feet 500 1000

SOUTHEAST CONVERSION AREA GUIDELINES:

The Southeast Conversion Area includes the 35 acres owned by the Port and designated as a future Expanded Services Complex (see Chapter 6.5). A small, but densely developed, 98 house subdivision is also included. In addition to the impacts of aircraft operation, this conversion area will eventually be further affected by development of the Expanded Service Complex, south airport access roads and encroachment of Highway 99 commercial uses. The area will lose, if it hasn't already lost, its neighborhood cohesiveness. This will be further heightened if Angle Lake School is acquired and its area incorporated into the expanded complex.

Delineation of the Area:

The Southeast Conversion Area is formed by S. 188th St. on the north, 28th Ave. S. on the east, and S. 200th St. on the south. The Port owned Tyee golf course is adjacent to the area on the west (Map, 6.6.4: 22). Only the narrow western edge of Lowe's Terrace Subdivision containing one row of houses (13 0f 98) is identified for acquisition (also see, 6.6.3, south reinforcment). The remainder of the area(cells Q-26 through Q-29) is within an insulation noise program area according to criteria presented in 6.2.4.

Large tracts with portions of their area west of the cell line,

but not included in acquisition, form a jog in the west boundary of the area. As discussed in the delineation of boundaries for the South Acquisition Area (6.6.3), their areas are largely vacant and thus appropriately included in conversion rather than acquisition.

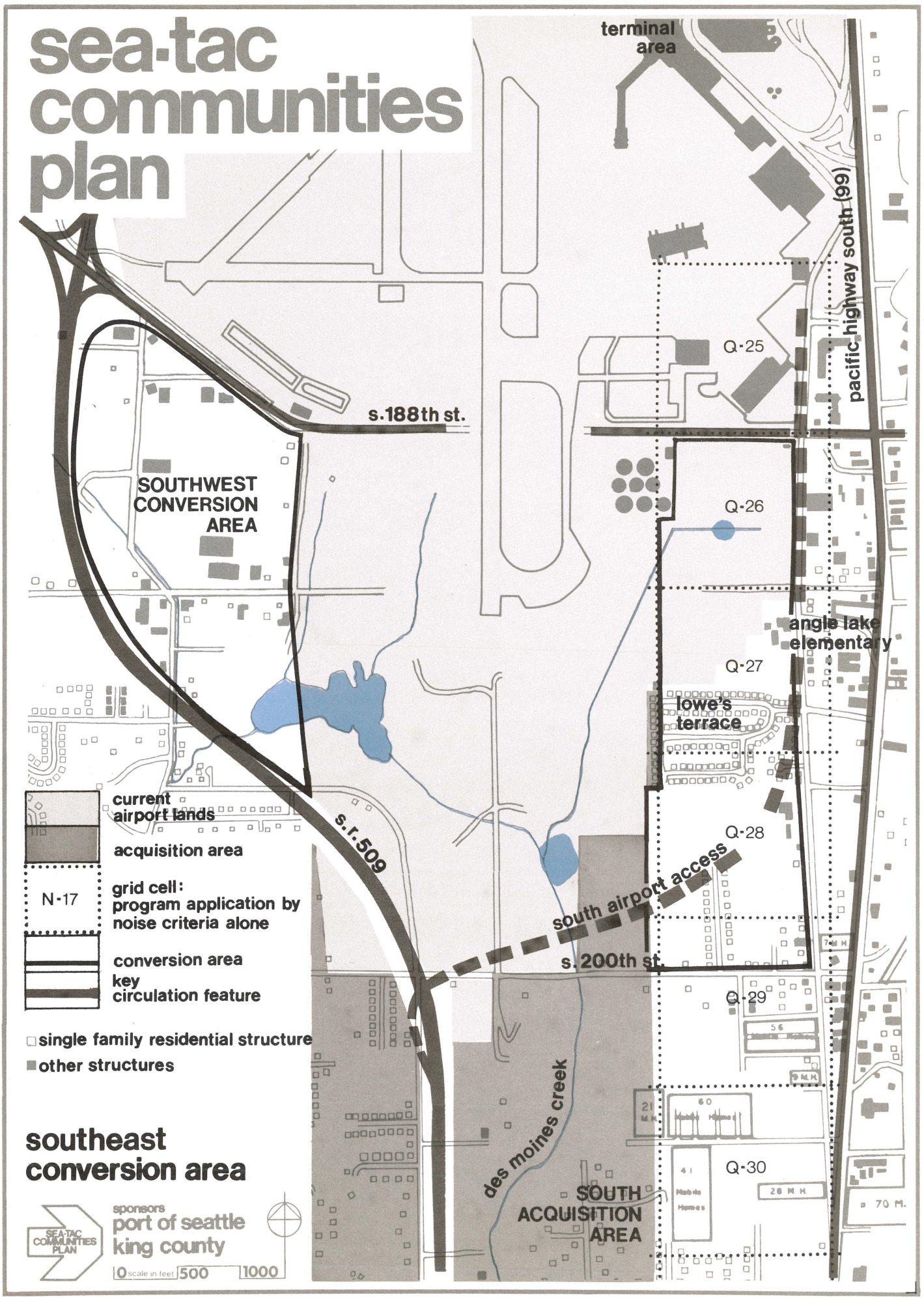
Future Use Potential:

The Expanded Services Complex needs to be defined to include private land area which can be converted to uses complementary to the entire conversion area. Such uses may well be high and medium density apartments and offices. To encourage proper land use integration and to facilitate orderly conversion...

policy: *Site planning and design for the Expanded Services Complex should include, whenever possible, the privately owned land of the Southeast Conversion Area.*

Under application of noise remedy program criteria only, the "insulation" noise remedy program would apply (ref. 6.2.4). In order to assist conversion, a special version of "purchase guarantee" may also be applied at an appropriate time. Those homes which are acquired could be retained, or "land banked", and resold once a significant number of parcels were assembled. Development could be contingent on legal covenants that describe uses and conformity to certain plans. Planning

and design for the Expanded Services Complex could thereby be effectively controlled for both the public and privately owned portions.


sea-tac communities plan
terminal area
pacific highway south (99)
Q-25
s.188th st.
SOUTHWEST CONVERSION AREA
Q-26
angle lake elementary
Q-27
lowe's terrace
current airport lands
acquisition area
s.r.509
Q-28
N-17
grid cell: program application by noise criteria alone
south airport access
s. 200th st.
conversion area
key circulation feature
Q-29
single family residential structure
other structures
des moines creek
Q-30
SOUTH ACQUISITION AREA
southeast conversion area
sponsors
port of seattle
king county
SEA-TAC COMMUNITIES PLAN
0 scale in feet 500 1000

SOUTHWEST CONVERSION AREA GUIDELINES:

Privately owned land immediately southwest of the Airport presently supports the only significant non airport-related industrial uses within the entire Sea-Tac Communities. Uses are primarily those of the light manufacturing or heavy commercial type, such as commercial storage, vehicle storage, some office and limited light fabrication. Few single-family residences (less than 30) are currently within the defined conversion area. The Highline School District's bus storage/dispatch and industrial/vocational education facilities are the only major public uses in the area.

Delineation of the Area:

The extension of S.R. 509 and S. 188th St. diagonally bisect this area into northwest and southeast quadrants (Map, 6.6.4:26). The southeast quadrant is bounded by airport property, S. 188th St. and S.R. 509. The northwest quadrant is formed by S.R. 509 on the east, S. 176th St. on the north, and Des Moines Way on the west. The conversion area includes property on both sides of S. 188th St.; the southern boundary thus being formed by property lines.

Future Use Potential:

Two future actions will substantially affect this area. The extension of S.R. 509 will form a full diamond interchange at S. 188th St. This action will greatly improve this area's access to the regional transportation system. Another action is the development of Sea-Tac's west side to airport uses (see Chapter 6.5). Both of these actions can be expected

to influence the type, timing and extent of development in this area. Orderly conversion with careful site planning can add to the community's industrial and employment base.

policy: *Manufacturing and industry uses within the Sea-Tac Communities should be directed to locate within the Southwest Conversion Area.*

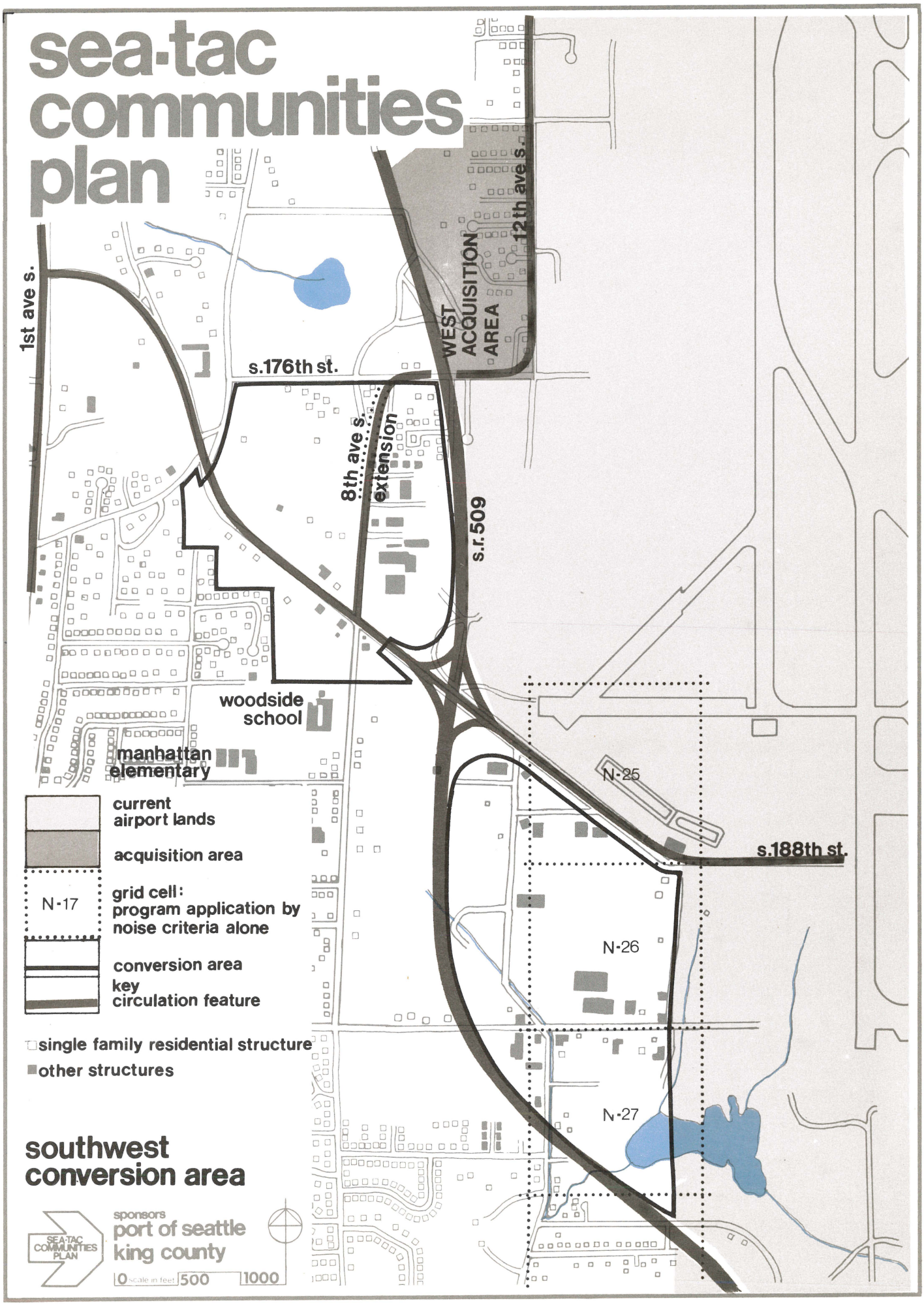
The primary concern in this area's conversion, much like the other areas, is compatibility with surrounding single-family residential areas. Upon completion of S.R. 509, the southern portion of this area will be effectively separated from single-family neighborhoods since it will be confined by S.R. 509 on the west and southwest, S. 188th on the north, and airport clear zone and open space to the east and south. The northern section will also be effectively surrounded by compatible transition uses to the east, north and west. However, the portion of this area south of S. 188th does abut a single-family area, (Map, 6.6.4:26) While changes in topography aid in the transition, special considerations should be made to control the type of uses and to assure proper buffering and set-back. Thus, Planned Unit Developments or equivalent design controls are essential here regardless of the size of the parcels.

The potential for a totally planned business or industrial park approach to this area is limited by a number of existing uses and the preponderance of small parcels. However, a few vacant parcels of five acres or more could be planned to include the addition of surrounding

lesser developed properties for their eventual redevelopment. Hopefully, the new developments would serve as anchor-type developments and influence the character and future redevelopment of the entire area. This type approach should be encouraged and assisted whenever possible.

Circulation:

Internal and through circulation can be improved by extending 8th Ave. S. to S. 176th St. (Map, 6.6.4:26). The extension would allow traffic fenerated by the West Acquisition and Conversion Areas an efficient route to the S.R. 509 Interchange at 188th St. Use of Des Moines Way could thereby be reduced. However, 8th Ave. S., south of 188th St., should not be used for heavy traffic.


sea-tac communities plan
1st ave s.
s.176th st.
WEST ACQUISITION AREA
12th ave s.
8th ave s. extension
s.r.509
woodside school
manhattan elementary
N-25
s.188th st.
N-26
N-27
current airport lands
acquisition area
N-17
grid cell: program application by noise criteria alone
conversion area
key circulation feature
single family residential structure
other structures
southwest conversion area
SEA-TAC COMMUNITIES PLAN
sponsors
port of seattle
king county
0 scale in feet 500 1000

WEST CONVERSION AREA GUIDELINES:

The West Conversion Area contains 410 single-family residences. Except for its northern portion, the area does not fall under any direct noise remedy program. Past airport expansion has impacted the residential neighborhood, and the future extension of freeway S.R. 509 from Des Moines Way to S. 188th St. will further diminish its residential character.

Delineation of the Area:

The West Conversion Area is generally the area between the Burien Business Center and the Airport (Map, 6.6.4:35). More specifically, its boundaries are defined by 12th Ave. S. and current airport lands on the east, the West Acquisition Area and S.R. 509 right-of-way on the south, S.R. 518 and Des Moines Way S. on the north. Western boundaries between S. 156th St. and S. 160th St. include single-family residences between apartments along S.R. 509 and Des Moines Way S.

Future Use Potential:

Development of the West Acquisition Area would provide impetus to redevelopment of this conversion area. The nature of west side airport use can influence the initial development within the conversion area. Corporate aviation activities might stimulate the location of corporate offices within the conversion area. As another example, Alaska

related air cargo activities might produce an Alaska theme or specialization for private office and business development. As west side development progresses, growth of the Burien business district should be directed toward integration with the conversion area, as defined in 6.6.5, West Reinforcement Area Guidelines.

policy: *West conversion should take the form of a variety of urban uses related to both the Airport and Burien.*

Fundamental to west conversion are timing and coordination. Primary factors include the extension of S.R. 509, major developer interest, provision of utilities, etc. While a substantial number of houses are ultimately involved, it is apparent that a number of small residential enclaves could coexist with the redevelopment for a considerable length of time. An example is the small 26 home subdivision of Burien Estates, which presently coexists with major apartment developments and a freeway (Map 6.6.4:35).

Redevelopment prior to significant use of development of the Airport's west side would possibly produce premature, or piecemeal, development and not capture its optimal redevelopment potential. Private development potential should, at least initially, relate closely to the development of the West Acquisition Area. However, premature anticipation of future Airport uses could lead to escalated land values and therefore prolong redevelopment.

Coordinated timing of such improvements as the extension of S.R. 509, local capital improvements of roads (especially S. 160th St.

and 12th Ave. S.), sewers and drainage facilities, Port improvements of the West Acquisition Area, and private development would constitute a significant community development program. Control measures such as the Tract P.U.D. should be vigorously pursued. Existing property owners may find particular opportunity here to coordinate their efforts and time property sales in concert with improvements to the west side, extension of S.R. 509, etc.

Natural Suitability:

The West Conversion Area possesses a variety of natural features; some, typically thought of as constraints to development. Extensive variations in topography offer highland viewpoints, ravines and gullies forming drainage passages, heavily wooded steep slopes, and relatively flat lowlands. These variations result in an interesting pattern and form often sought in urban developments.

Areas suitable for heavier building are found in the upland area between 12th Ave. S. and the steep slope to the west. The West Acquisition Area possesses about 18 acres suitable for heavier uses. An 17 acre area immediately north of S. 170th St. is also capable of supporting substantial development (Map, 6.6.4: 36). This area of 52 existing houses is identified for private conversion. Between these two areas and the extension of S.R. 509 is the area of heavily wooded steep slope ranging from 15 - 30%. The slope area possesses soil and geologic conditions which present poorer foundation stability and moderate landslide hazards.

Portions of the slope area should be included into the development plans for the upland areas, but used primarily as open space with little disruption of its natural state. The steep slope serves as an excellent greebelt within the conversion area and also buffers the upland development from lowland development from the extension of S.R. 509. Because of this unique attribute...

policy: *The area identified as possessing slope of 20% and greater should serve primarily as open space and low density development within the West Conversion Area.*

Residential development of the medium density apartment type in the lowlands should also include portions of the slope, but again, primarily as open space. Some carefully designed terrace apartments could be integrated into the slope. Inclusion of the slope into the developments as an open space requirement precludes the need for public acquisition of these open space areas.

Lowland developments should also retain areas along Miller Creek in open space. Access, or right-of-way, could be obtained in this manner for that portion of the Miller Creek trail. Three locations within the lowland area have been identified for holding ponds (see Chapter 6.3). These sites will require public acquisition and development. Sizing of these ponds is highly dependent on the potential contribution of both upland and lowland drainage.

Certain lowland areas can also act as greebelts. Miller Creek lowlands widen out north of S. 156th St. to form a broad fertile area currently used for truck farming. The wide low area includes Lora Lake and extends into the north clear zone to include Lake Reba, the north clear zone holding pond. Areas between the broad lowland and the steep slope open space have the unique characteristic of being situated between two greenbelts. Redevelopment to medium density apartment use appears desirable. The area primarily north of of S. 156th St. is the only porti4n of the West Conversion Area with eligibility for noise remedy programs. As with the North and Southeast Conversion Areas, a special purchase guarantee program may be offered at an appropriate time and for a limited period to assist use change. Easements may be acquired on an undeveloped property value basis.

Public Improvements:

Several public capital projects, primarily surface transportation facilities, will have a dramatic effect. The extension of S.R. 509 will contribute to land use change in the west side. It will on the one hand, further degrade some single-family areas. The freeway's extension south, however, can play a valuable role by providing the western boundary of the West Conversion and Acquisition Areas. Further airport growth (cargo & maintenance facilities) will require convenient access. In part, that requirement can also be met by the S. 188th St./S.R. 509 Interchange. Land use change stimulated by the combination of freeway

and interchange construction, development of air cargo and maintenance facilities, and Burien's urban growth have consequences for other significant west side roads, primarily S. 160th St., 12th Ave. So and Des Moines Way S.

S. 160th St. presently serves as the major link between Burien and the residential areas on Sea-Tac's west side. In addition, a full interchange exists at S.R. 509 and S. 160th St. The importance of these two features increases as the amount of commercial, apartment, and air cargo development on the west side increases. In order to adequately serve apartment, commercial, and office traffic; to strengthen the present tendencies of Burien's urban growth; and to provide for flexibility in access to west side airport development...

policy: *S. 160th St. should serve as the major east-west road connecting Burien and the west side.*

Des Moines Way S. is a significant north-south raod with interchange connection to S.R. 518, as well as receiving S.R. 509 traffic. Des Moines Way S. was to be improved to four lanes between S. 128th St. and Ambaum Blvd, but such action would not only have removed the remaining WWI commemorative elm trees, it would also have increased the traffic bearing capacity of the road and consequently, encouraged more traffic. Because of the historic value and the "country road" character of Des Moines Way S., citizens forestalled the planned construction claiming it to be untimely, if not altogether inappropriate.

The completion of S.R. 509 from S. 176th St. to S. 188th St. and beyond will further relieve through-traffic demand on Des Moines Way S. The use of S. 160th St. and 12th Ave. S. as major west-side routes, the proximity of 1st Ave. S., S.R. 518, Ambaum Blvd. S., and S. 188th St., together with the extension of S.R. 509, point toward the plausibility of less intensive usage of Des Moines Way S. and allowing retention of only two travel lanes. Therefore, in order to be consistent with the role of an historical community collector....

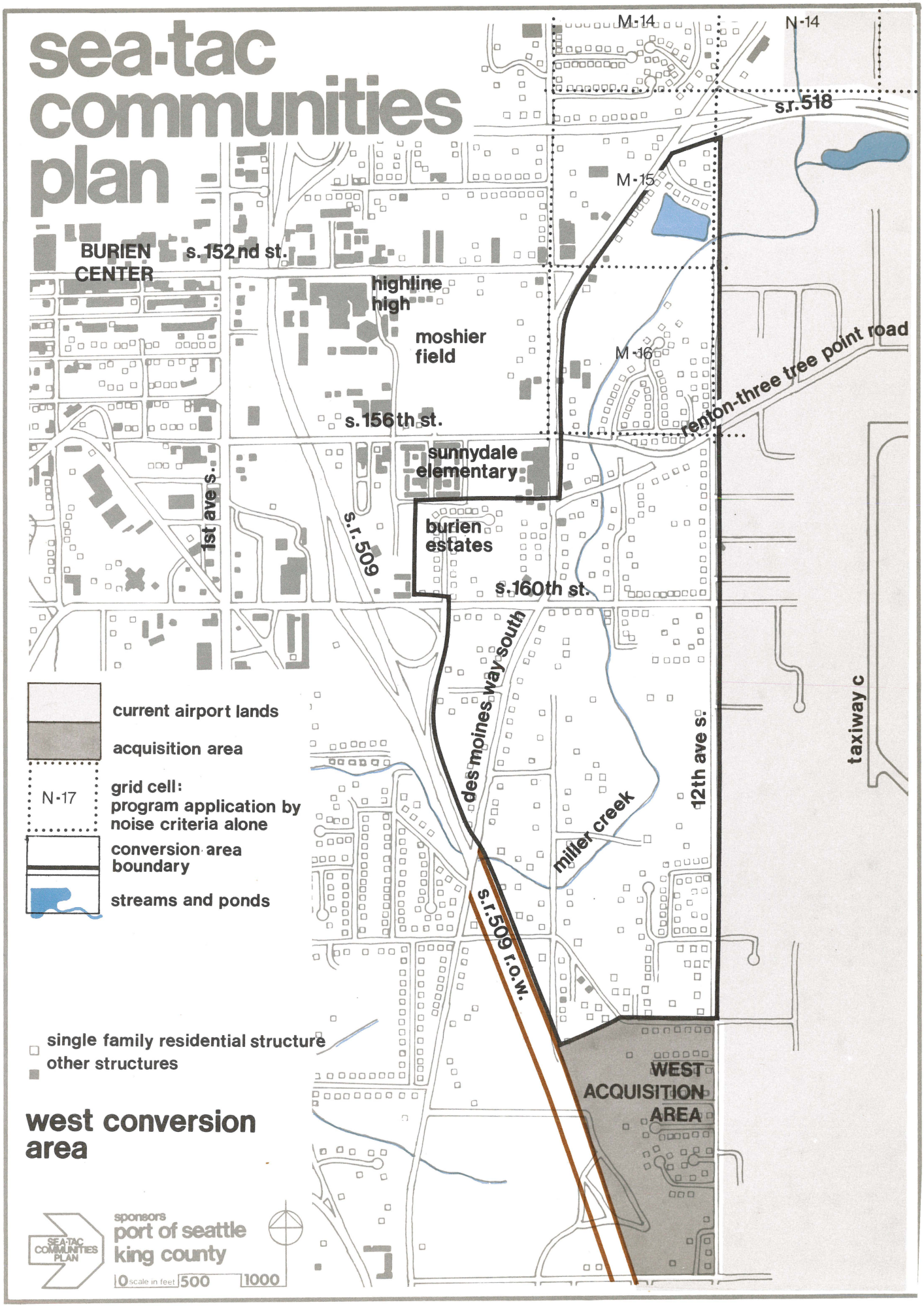
policy: *Public improvement of Des Moines Way S., between S. 128th and Ambaum Blvd., should focus upon preservation and appropriate replacement of memorial elm trees, landscaping treatment, historical designation, and provision for pedestrian and bicycle travel.*

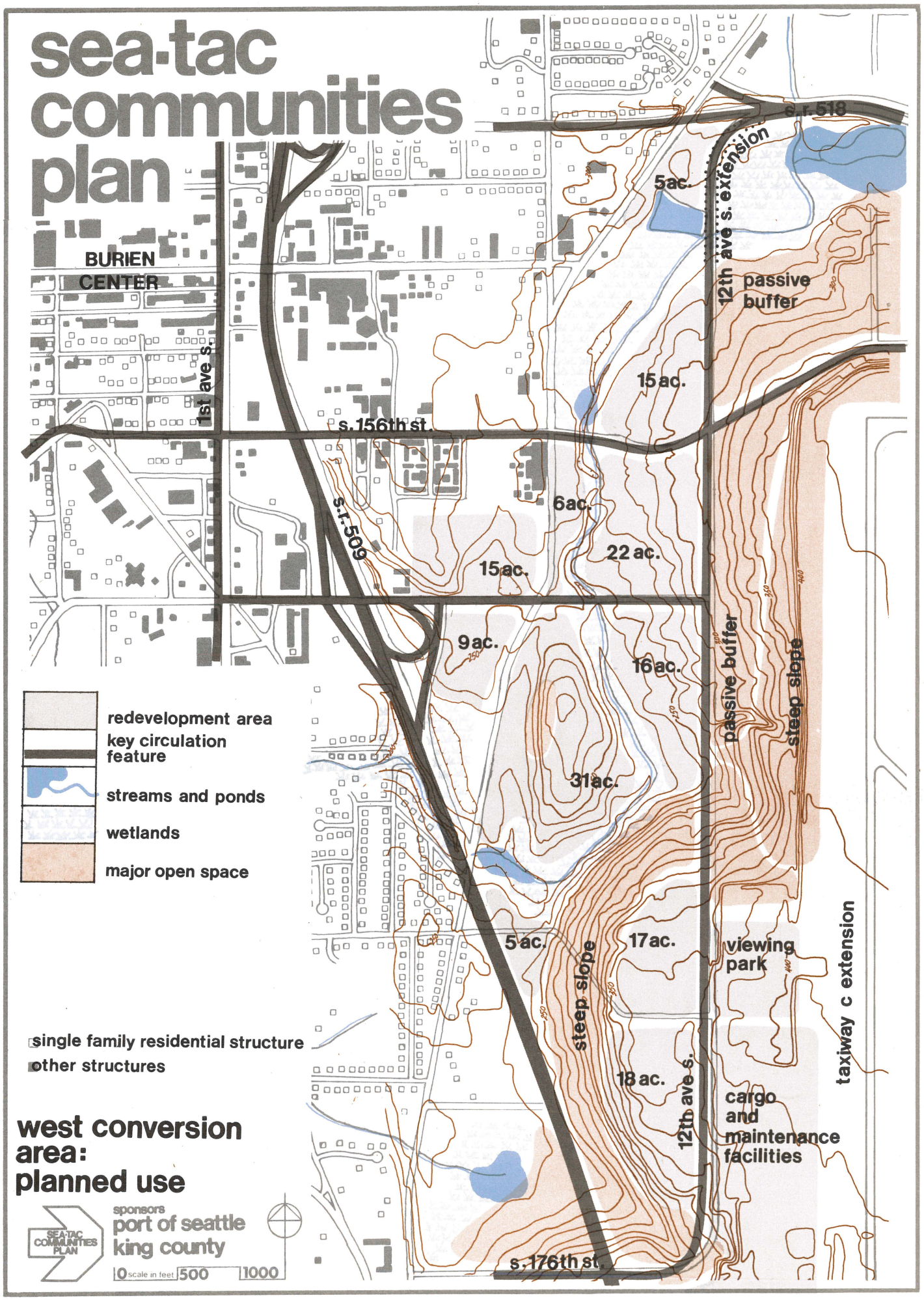
12th Avenue South is dramatically affected by development of Sea-Tac's west side. In order to facilitate access to west side airport development, while at the same time providing for the surface access needs of upland development areas...

policy: *12th Ave. S. should serve as the major north-south road within the west side conversion area.*

In order to further emphasize 12th Ave. S. as the major north-south route and allow retention of Des Moines Way S. as an historical community collector, 12th Ave. S. should be extended (Map, 6.6.4:36).

policy: *An extended 12th Ave. S. should connect with S.R. 518 in order to serve traffic destined for the eastbound lanes of the freeway, replacing the existing on-ramp from Des Moines Way South.*


sea-tac communities plan
M-14
N-14
s.r.518
M-15
BURIEN CENTER
s.152nd st.
highline high
moshier field
M-16
renton-three tree point road
s.156th st.
sunnydale elementary
1st ave s.
s.r.509
burien estates
s.160th st.
des moines way south
12th ave s.
taxiway c
miller creek
s.r.509 r.o.w.
current airport lands
acquisition area
N-17
grid cell: program application by noise criteria alone
conversion area boundary
streams and ponds
single family residential structure
other structures
WEST ACQUISITION AREA
west conversion area
SEA-TAC COMMUNITIES PLAN
sponsors
port of seattle
king county
0 scale in feet 500 1000


sea-tac communities plan
BURIEN CENTER
1st ave s.
s.156th st.
s.r.509
s.r.518
12th ave s. extension
5ac.
passive buffer
15ac.
6ac.
22 ac.
15ac.
9ac.
16ac.
passive buffer
steep slope
31ac.
5ac.
steep slope
17ac.
viewing park
taxiway c extension
18 ac.
12th ave s.
cargo and maintenance facilities
s.176th st.
redevelopment area
key circulation feature
streams and ponds
wetlands
major open space
single family residential structure
other structures
west conversion area: planned use
SEA-TAC COMMUNITIES PLAN
sponsors
port of seattle
king county
0 scale in feet 500 1000

6.6.5 DEVELOPMENT GUIDELINES - REINFORCEMENT PROGRAM AREA

Community development programs of acquisition and conversion directly respond to land use incompatibilities between the Airport and the community. Reinforcement deals with land uses and areas which are to be maintained and supported in their existing use and character. Noise remedy programs (Chapter 6.2), water quality and drainage programs (Chapter 6.3) and the land use guidelines presented in this chapter define a direction for more satisfactorily relating the Airport and the communities.

ACHIEVING REINFORCEMENT:

The North and South Reinforcement Areas encompass the primary neighborhoods impacted by aircraft noise beyond acquisition boundaries. A variety of noise remedy programs apply in these areas and precise geographic application of those programs must now be defined.

Chapter 6.2, Noise Remedy Programs, presents the basic noise programs and the application criteria for each program type. That criteria prescribes that Airport acquisition programs be applied in noise exposure areas permanently above ANE 40. The precise definition of these areas and their future use was presented in Section 6.6.3. Reinforcement deals specifically with the application of noise programs in

areas exposed to noise values between sustained ANE 35 and permanent ANE 40. The basic reinforcement noise programs and their application criteria are as follows (ref, 6.2.4);

purchase guarantee with residential soundproofing and permanent easements - applied in areas of sustained exposure levels of ANE 40 and above;

cost-sharing insulation assistance and easements - applied in areas of exposure permanently above ANE 35, but below sustained ANE 40;

limited cost-sharing insulation assistance and limited term easements - applied in areas of exposure above ANE 35 sustained, but below permanent ANE 35.

The noise values expressed in these criteria are associated with individual 40 acre, or 1/16 section, cells which comprise a symmetrical grid covering the entire study area (ref. 5.2 for grid).

Adjustments of boundaries is necessary to better relate to such features as streets, existing and planned freeways, topography, and other development. Such adjustments result in more logical areas of program application than offered by the strict application by cell, or

grid, boundaries. Additional criteria also presented in Chapter 6.2 considers the type of land use and the nature, or extent, of development. Residential use is the primary concern of remedy programs. Thus, other uses will be within a program area, but will not be eligible for that program because of the nature of the use. Similar provisions apply regarding the potential for future use. The program applications shown in reinforcement areas, therefore, are outer boundaries based on residentially defined criteria and do not reflect individual exclusion within the area due to type of use.

The manner in which noise remedy programs are applied can do much to advance reinforcement. Consideration of local features when making precise applications is important so that the improvement potential of one area is not greatly favored over another which is immediately adjacent. The intent of the programs and their application must be one of reinforcing livability and stimulating neighborhood improvement and not one of "compensation" or legal bartering.

Community Planning:

The reinforcement areas are characteristic of much of the Highline Area in that many platted and buildable single-family lots have been "skipped-over" and left vacant. The North and South Reinforcement Areas have had the additional handicap of noise impact, and uncertainty about future airport expansion. Some decline in neighborhood conditions

is evidenced. Whatever the cause of these neighborhood conditions, reinforcement, in conjunction with community planning activities, can now stimulate a renewed interest and confidence in utilizing these skipped-over and poorly used areas.

New residential construction in skipped-over areas can help replace housing lost to the community through acquisition (ref, 6.6.2: 6 & 7). Maintaining a stable population, tax base, housing units, school enrollment and commercial markets is fundamental to the basic community and economic development policies of this plan.

In order to maximize the effect of noise remedy programs and fulfill the plan's basic policy to "enhance and protect permanent residential neighborhoods", a full range of community planning services must be pursued.

Community planning must continue reinforcement by addressing those issues which are not necessarily related to the Airport's impacts of noise, drainage and land use encroachment. Reinforcement areas must become planning units for on-going community planning activities. Comprehensive programs of park, road, school and land use planning, along with general neighborhood improvement, community facilities and utilities programming are reguired to achieve quality living environments.

NORTH REINFORCEMENT AREA GUDELINES:

The noise exposure criteria for reinforcement determine the grid cell application of that program; the noise remedies of purchase guarantee, sound insulation and avigation easements are contained within it. Neighborhood features refine the cell noise information in defining the reinforcement program boundaries. Maps 6.6.5: 8-10 depict such an application for the North Reinforcement Area.

Delineation of Boundaries:

Map 6.6.5: 8. Cells N14, N15, Q16 and Q17 represent cost-sharing insulation. To the west, the boundary is formed by property lines along the 12th Ave. S. alignment. East of Des Moines Way S., an area has been excluded from acquisition because of existing development and future commecial and apartment use which can be compatible with noise. At the NE corner of the Airport, the cell lines for cost-sharing insulation form a boundary along S. 148th St., 24th Ave. S., and S.R. 518; the easterly boundary is delineated by property lines nearest the 1/16 grid cell line. South of S. 152nd St. the application of cost-sharing insulation falls within the North Conversion Area (6.6.4).

Limited cost-sharing insulation is represented by cells M 14-17 and Q15. 8th Avenue S. coincides with the westerly grid cell lines to define that boundary. The easterly boundary, north of Des Moines Way S., is common with the delineation of cost-sharing insulation, discussed above. South of Des Moines Way S., application of limited cost-sharing insulation falls within the West Conversion Area (6.6.4). Grid cell A-15 aligns

with streets on three sides, S. 144th St., 24th Ave. S., and S. 148th St. The easterly boundary is formed by property lines along the 1/16 section grid cell line.

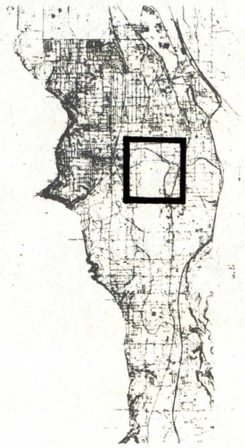
All three noise remedies of the reinforcement program are present on Map 6.6.5:9 as well as the previously delineated acquisition area (6.6.3). Purchase guarantee is represented by grid cells 0-8 to 0-10 On the east side, cell lines coincide with 20th Ave. S. As discussed under application of the acquisition program, 20th Avenue S. aligns directly with the Airport's east runway; noise exposure values represent noise at the center of the cell and cannot account accurately for a flight pattern between grid cells. Hence, mid-block property lines east of 20th Ave. S., between S. 120th St. and S. 128th St. delineate acquisition and also become the purchase boundary. To the west, 8th Ave. S. delineates purchase guarantee. At the SW corner of Des Moines Way S. - S. 128th St. intersection, purchase guarantee will be extended to include four homes which would otherwise fall under the criteria for acquisition in order to maintain a firm physical boundary for future land use. The southeast quadrant of the intersection is included in the purchase guarantee program as well; eventual change to commercial use would be allowed to occur via the private market (6.6.3).

The limited cost-sharing insulation program is represented by cells M-9 to M-14. Between 8th Ave. S. and 12th Ave. S., up to S. 120th St., the grid cell lines coincide with street alignments to form the noise remedy boundary.

Map 6.6.5:10 depicts cost-sharing sound insulation within grid cells N-6 & 7, 0-5, 6, & 7; limited cost-sharing insulation within N-2 to N-5, 0-1 to 0-4. The westerly boundary for both noise remedies is the 12th Ave. S. alignment, which coincides with the grid cell lines. To the east, the boundary line is 20th Ave. S., a slight eastward adjustment from the grid cell line to a physical boundary. The division between the two sound insulation programs requires one adjustment. The Glenaire Subdivision at S. 106th St. is an isolated residential development at the edge of a ravine. The homes west of 16th Ave. S. are to be included in cost-sharing insulation in order to encourage consistent improvement in both market and living conditions for the entire subdivision.

The northern boundary for limited cost-sharing insulation is formed by U.S. 99; the Sea-Tac plateau ends here, with industrial and commercial uses found to the north.

sea-tac communities plan



current airport lands

N-17 — grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

single family residential structure

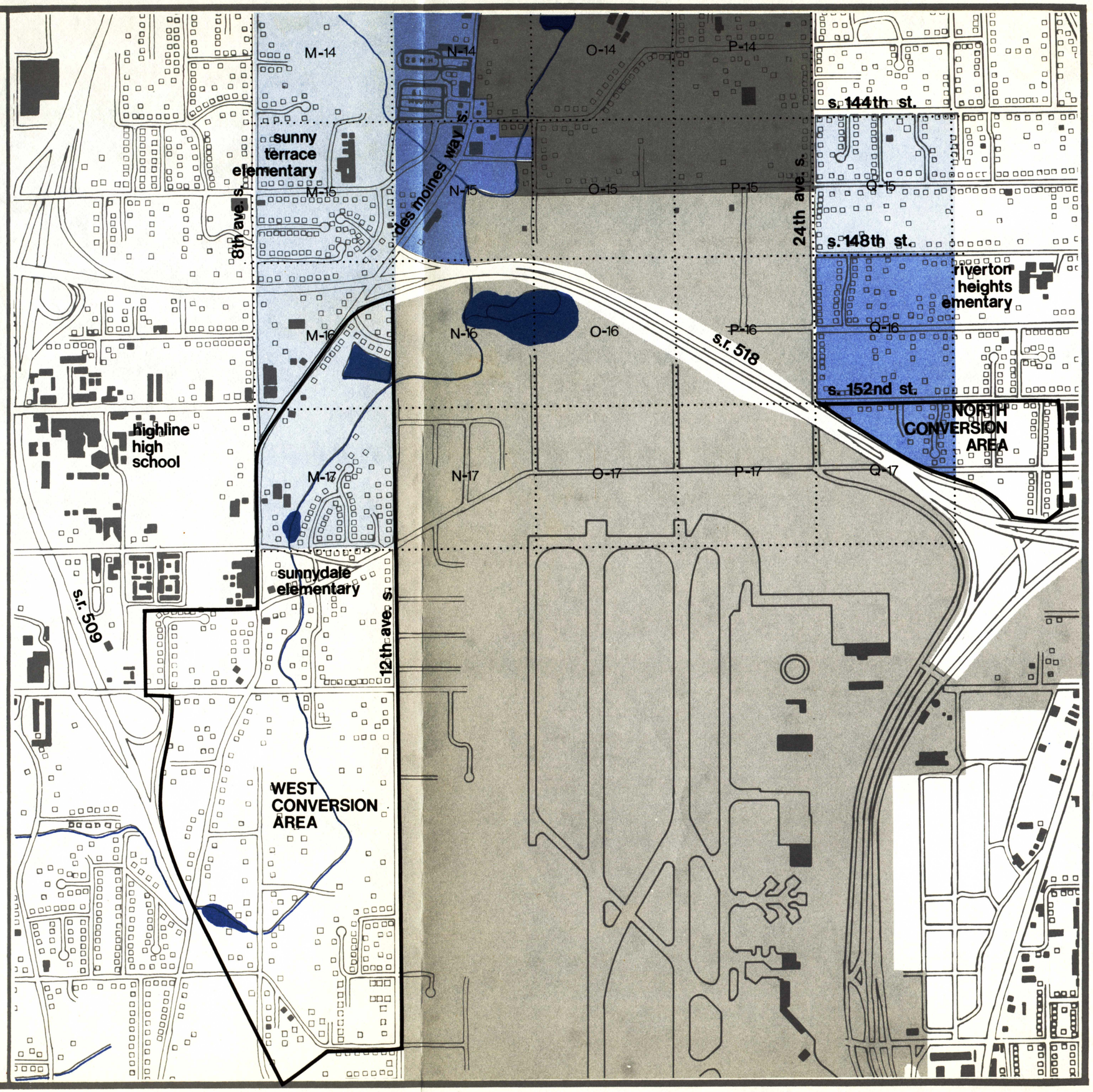
other structures

north reinforcement area: program application

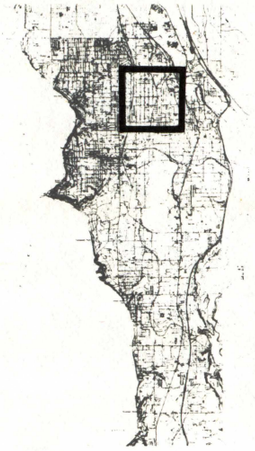
sponsors
port of seattle
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000



sea-tac communities plan



current airport lands

N-17 grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

single family residential structure

other structures

north reinforcement area: program application

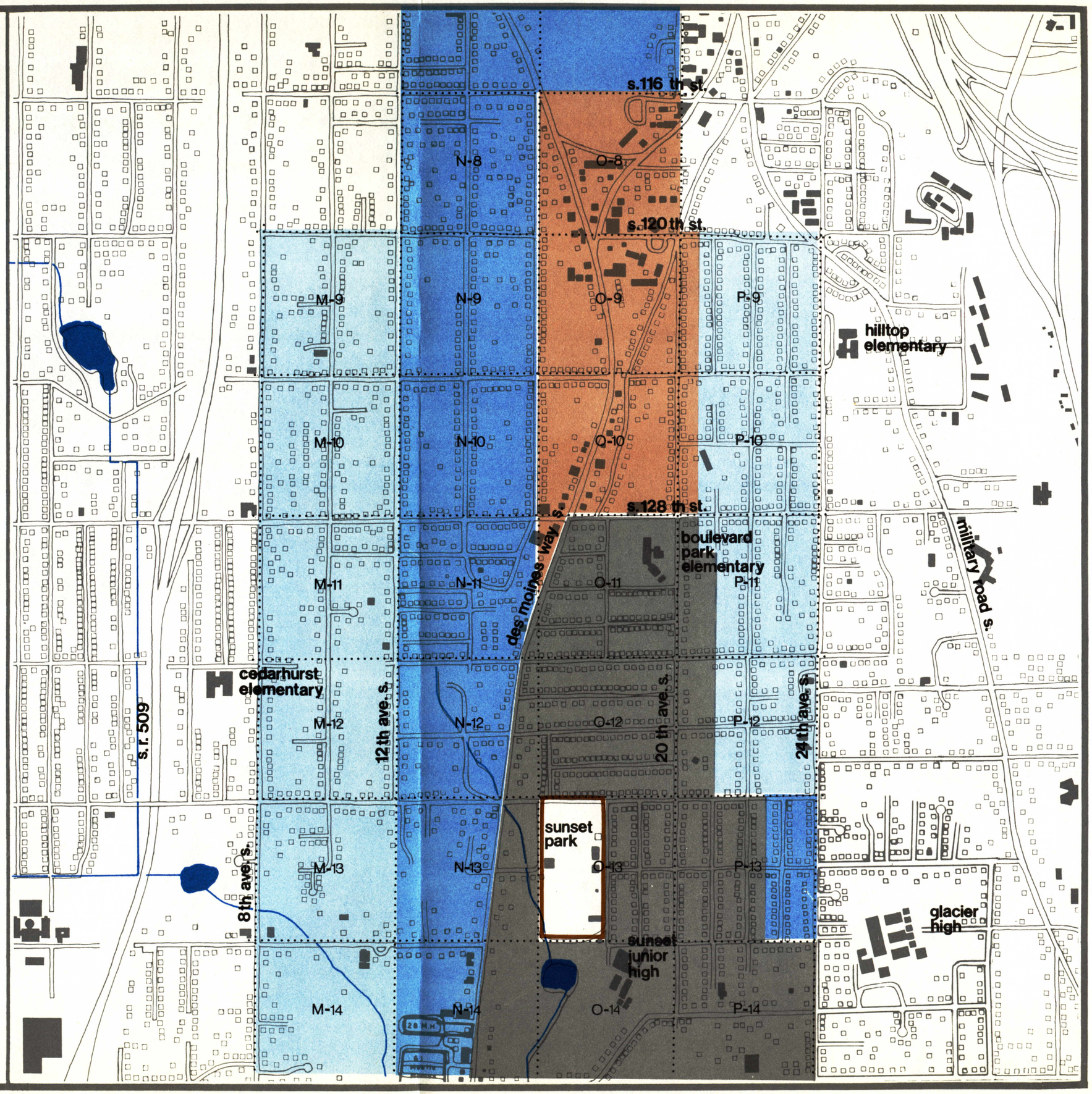
sponsors

port of seattle

king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000



sea-tac communities plan



current airport lands

N-17 grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

single family residential structure

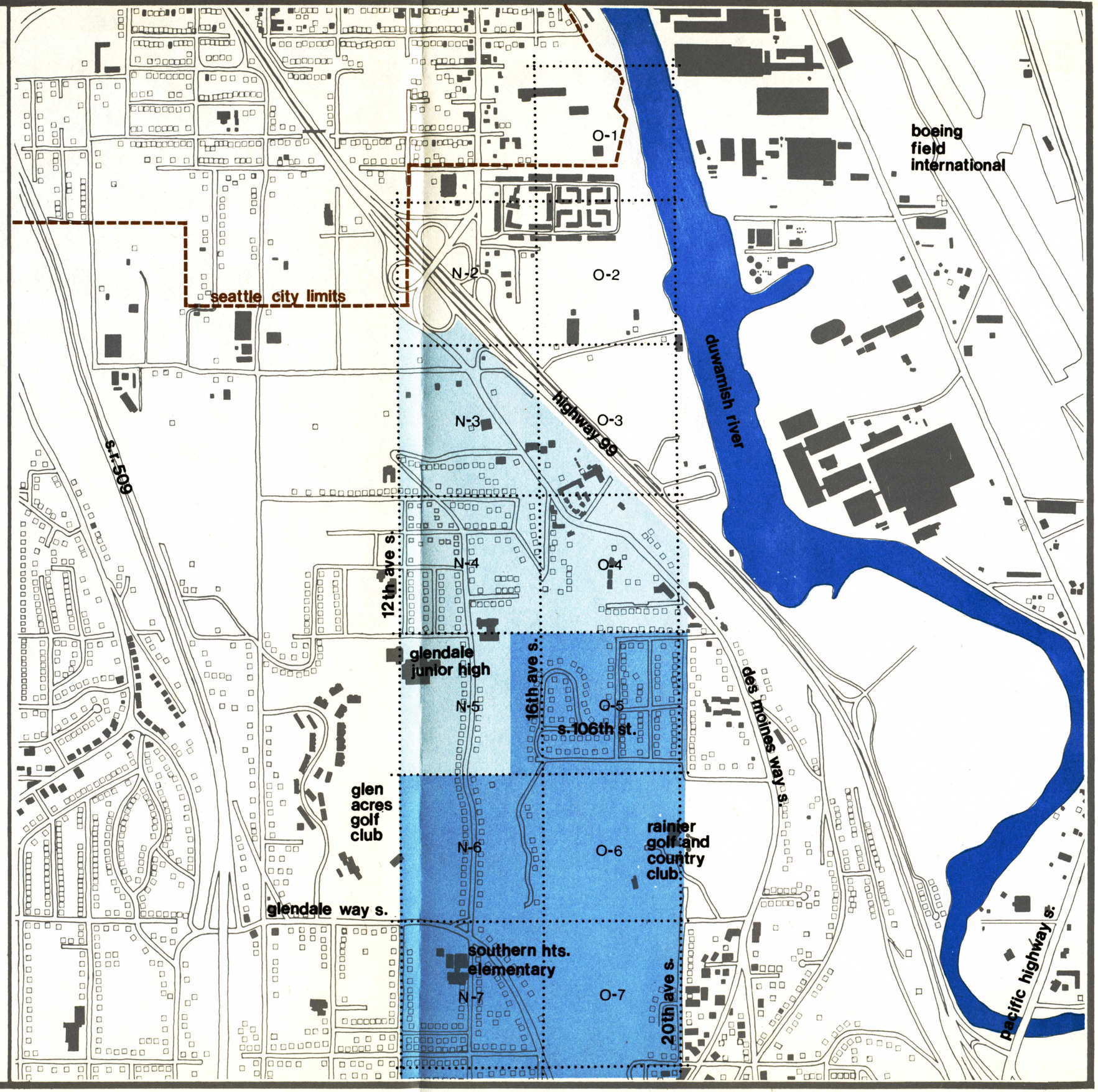
other structures

north reinforcement area: program application

sponsors
port of seattle
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000



EAST REINFORCEMENT AREA GUIDELINES:

Concerns of land use and traffic encroachment are primary to the reinforcement of areas east of the Airport. Reinforcement must maintain the stability of residential neighborhoods while recognizing the expanding potential of airport-related land uses and ground traffic.

Delineation of the Area

The East Reinforcement Area lies east of the Airport, loosely bound by S.R. 518, I-5, and S. 200th St.

Land Use Encroachment:

The area along Highway 99, between approximately S. 200th St. and S. 170th St., is the primary development area for private uses directly related to the Airport and to the needs of air passengers. Seven hotels of one hundred rooms or more are located in this "99 Strip". Currently, these hotels and other commercial uses are reasonably well confined to the Hwy.99 frontage, although office and multi-family development have grown into adjacent single-family neighborhoods.

Certain policies need to apply to the Hwy. 99 area as it relates to the function of the Airport and to the neighborhoods upon which it borders. Growth of commercial development into the McMicken Heights and Angle Lake neighborhoods is considered to be undesirable, since these neighborhoods possess residential environments relatively secure from noise and air quality impacts of the Airport (Maps 6.6.5:19,20). Their residential character should be closely protected. Therefore it is important that...

policy: *Commercial development of the "99 Strip" should be limited to the highway frontage.*

The linear expansion of the "strip" should also be limited. The area between S. 170th and slightly beyond S. 188th Sts. lies within a natural depression, or bowl, with the topography breaking toward the airport terminal area from both the north and south. Open space presently exists at each end of the area with the Washington Memorial Cemetery to the north and Angle Lake Park to the south. The presence of these open spaces and the topographic character of the area properly utilizes natural features and open spaces to define land use areas (policy, 6.6.1). To the extent possible, Angle Lake Park should be expanded to the south and to the northwest to further define the "99 Strip" and separate it from residential neighborhoods.

"99 strip" development should be closely associated with the operations of the terminal and the immediate needs of air passengers. The general area between S. 170th St. and S. 188th St., including the airline and parking terminal and commercial development, should be considered a unified district for passenger in-and-out flight processing, lay-over and short-term lodging, passenger transportation including car rental provisions, remote ticketing, etc. This is a preferential role for this area since it possesses a short-time and distance relationship with the terminal. The primary intent is to dedicate the use of this area to the needs of the air passengers; more specifically, to the needs of the air passenger relative to air travel, and not to uses or

activities relative to the destination or purpose of air trips, i.e. business or conferences. In addition, uses which cater to groups which are not air-travel related, but tend to congregrate near airports for business, seminars, conventions, etc. should not be located in the strip.

policy: *Encourage the use of the "99 Strip" to be devoted primarily to the "immediate" needs of air passengers.*

Therefore, uses such as offices and convention facilities are better situated in other areas, i.e. Southeast or West Conversion Areas.

Greater emphasis should also be placed on integrating the terminal and parking area of the west side of Hwy. 99 with the commercial and passenger related activities of the east side. Improved access between the east side and west side of Hwy. 99 will further integrate the area as a center for passenger service. Improved pedestrian access achieved either through an overhead crosswalk or personal rail transit (people mover) are possibilities. Should a people mover be the mode ultimately selected, its use should be available to the general pedestrian traffic so as to improve the multi-family areas east of Hwy. 99 as desirable airport employee housing. The transit system should also tie into the local bus system. The obvious benefit is reduction of employee commuting and rush-hour traffic, as well as reduction of overall airport parking requirements.

Future uses of still vacant properties can either reinforce or degrade the

residential character in the McMicken Heights and Angle Lake neighborhoods. An example is the rather large vacant parcel south of Bow Lake Trailer Town. Potential use for this 21 acre area depends highly on its ability to obtain proper access. Should the 48 acre, 455 stall trailer court redevelop, access to the vacant parcel could be obtained through the redeveloped area with ultimate access along 32nd Ave. S. to S. 176th St. Development of the vacant parcel could then take on a higher density residential character with lower densities along the south and east property line to form a compatible transition with the 137 single-family home subdivision of Bow Vista (Map, 6.6.5:20).

Development of the vacant parcel prior to redevelopment of the trailer court will probably depend on access through Bow Vista using 36th Ave. S., the only public street now serving the property. However, use of 36th Ave., a residential street, will restrict the parcel's development, since limited use of the street is necessary to properly reinforce the residential character.

policy: *The use of 36th Ave. S., north of S. 188th St., should be restricted to low volume residential traffic.*

Development of the vacant parcel with uses associated with airport and passenger business requires access with Hwy. 99 and related to other commercial uses. Possibilities for this approach seem unlikely and would

counter the policy of limiting commercial development in this area to the highway frontage. Business, even if a carefully designed hotel development, presents problems of compatibility with single-family areas beyond those of planned multi-family development. Therefore, commercial uses should be confined to the area between 32nd Ave. S. and Hwy. 99.

Traffic Encroachment:

One method to define the "99 Strip" is to segregate types of ground traffic and better distribute traffic volumes. Ideally, those uses and users not related specifically to air travel should ideally be situated in new areas, such as the West Conversion Area, where they can be better served by the local and regional highway systems. Greater separations of air travel-related from non air travel-related traffic would result; hence, less likelihood of traffic congestion in the vicinity of the terminal and more stable volumes on selected streets.

The most critical impact of airport-related traffic is on S. 188th St. where traffic volumes and congestion may result in additional widening and traffic control measures. Increased traffic will be accompanied by more traffic noise and exhaust emissions, thereby degrading the existing environment and making it increasingly difficult to sustain single-family development. Property owners along S. 188th St. have demonstrated a desire to maintain the single-family character of their neighborhood by successfully opposing a number of apartment rezone applications along or near S. 188th St. Although an arterial location is appropriate for

many public facilities, increasing volumes on S. 188th St. will also jeopardize the environments of Chinook Junior High, Tyee Senior High, Valley Ridge Park, and a church; all of which front on S. 188th St.

policy: *Solutions to airport traffic problems should, to the greatest possible extent, be designed to minimize the growth in traffic volumes on S. 188th St. between Highway 99 and Interstate 5.*

Potential problems for airport drives, parking garage, south airport access and the Hwy. 99/S. 188th St. intersection are explored in Chapter 6.5, Airport Improvement Programs. The study recommendation for easing the situation at the intersection is a two-tiered interchange. The design study (8.0.3, reference 16) which was jointly funded by King County, the Port of Seattle, and the State Highway Department recommends maintaining the existing intersection with a second intersection directly above, which would provide solely for south access to the airport terminal. While alleviating congestion at the intersection itself, the interchange would not alter the basic useage of S. 188th St. or Hwy. 99 as they relate to the Airport. Therefore, traffic volumes on S. 188th St. and Hwy. 99 would not be minimized, but probably encouraged to increase.

The recommended design did not progress to the development stage due to a lack of determination of responsibility, funding, and a timetable for

construction. Two factors guided the design alternatives that were proposed and studied. First, 28th Ave. S., north of S. 188th St., was to be considered a service road only; south of S. 188th St., 28th Ave. S. was considered only as an access street to the adjacent developable properties. Second, for the purposes of the design report, it was assumed that the southern terminus of S.R. 509 would be at Des Moines Way S. in the vicinity of S. 188th St. These assumptions are now considered to be highly questionable.

policy: *The issues of south airport access and congestion at the Hwy. 99/S. 188th St. intersection should be re-examined, and the currently proposed solutions re-evaluated.*

Opportunities exist for new solutions. Examination of local opportunities that may accompany S.R. 509's extension, as well as the regional implications of that construction must consider the planned continuation south to Kent-Des Moines Road. S.R. 509, in conjunction with 28th Ave. S. and development of the Southeast Conversion Area, may offer an option for improving south access to Sea-Tac.

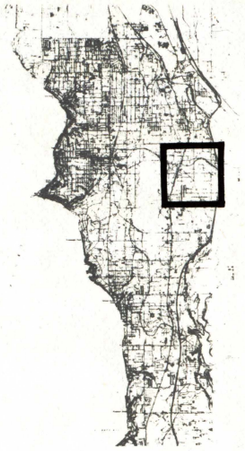
A south limited access divided highway, similar to the north airport freeway, would provide an additional link between the terminal and the regional transportation system. Such a road would serve as a major south airport access by following a 28th Ave. S. alignment from the terminal area, across S. 188th St., through the Southeast Conversion Area, and

form an interchange with S.R. 509 at approximately S. 200th St. (see Map, 6.6.2:12, for conceptual route). Expected results of a new major south access would include stabilized, or reduced volumes on S. 188th, greater separation of air travel and non air travel related traffic and greater impetus for redevelopment within the Southeast Conversion Area. Development funds for the Hwy. 99/S. 188th St. Interchange could be redirected to this approach.

Additional examination of these proposals should be included in upcoming transportation studies. The State Highway Department will be conducting a route study for S.R. 509 while King County transportation planners are comprehensively reviewing streets and highways, as well as public transit needs, in the Sea-Tac vicinity. Hopefully, these study programs will finally resolve the south airport access situation by defining specific routes between the Airport and S.R 509; assure an alternative to the Hwy. 99/S. 188th St. interchange; and facilitate land use and redevelopment plans proposed herein.

policy: *Considerations for transportation and land use should, irrespective of jurisdiction, seek to fulfill the intent of the south Sea-Tac access concept.*

sea-tac communities plan



air passenger business "99 strip"

N-17 grid cell: program application by noise criteria alone

single family residential structure

other structures

east reinforcement area:

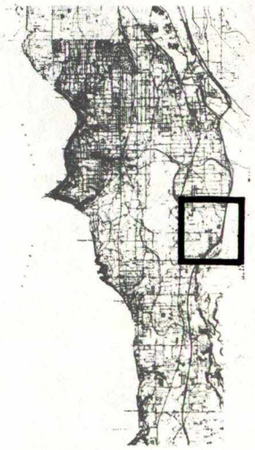
SEA-TAC COMMUNITIES PLAN

sponsors
port of seattle
king county

0 scale in feet 500 1000 2000

riverton heights elementary
Q-15
NORTH CONVERSION AREA
Q-16
s.r.518
tukwila interchange
pacific highway south (99)
apts.
apts.
s.160th st.
apts.
crestview elementary
north airport freeway
washington memorial cemetery
MC MICKEN HEIGHTS NEIGHBORHOOD
mc micken heights elementary
apts.
EAST CONVERSION AREA
s.170th st.
military road s.
interstate 5
24 M.H.
apts.
s.176th st.

sea-tac communities plan



air passenger business "99 strip"

N-17 grid cell: program application by noise criteria alone

single family residential structure

other structures

east reinforcement area

sponsors
port of seattle
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000

passenger terminal area
apts.
MC MICKEN HEIGHTS and BOW LAKE NEIGHBORHOODS
military road s.
bow lake trailer town
bow lake
bow lake elementary
21 ac. vacant parcel
Q-25
bow vista subdivision
chinook junior high
tyee senior high
valley ridge park
s.188th st.
Q-26
ANGLE LAKE NEIGHBORHOOD
south airport access
pacific highway south (99)
SOUTH CONVERSION AREA
Q-27
angle lake park with expansion
angle lake
interstate 5
green river
Q-28
Mobile Home
s.200th st.
Q-29

SOUTH REINFORCEMENT AREA GUDELINES

The noise remedy criteria for reinforcement determine the grid cell application of that program; the noise remedies of purchase guarantee, sound insulation and avigation easements are contained within it. Neighborhood features refine the cell noise information in defining the reinforcement program boundaries. Maps 6.6.5:25-28 depict such an application for the South Reinforcement Area.

Delineation of Boundaries:

Map 6.6.5:25 cells N-25 to N-28 and Q-25 to Q-28 represent noise exposure criteria for cost-sharing insulation. To the west, most of the area which would otherwise be included in the insulation area is currently part of the Airport, included in future S.R. 509 right-of-way, or within the Southwest Conversion Area (6.6.4). In these locations, noise remedies would not apply (6.6.2). South of future S.R. 509 the boundary consists of property lines along the 1/16 section line (what would be the 12th Ave. S. alignment). To the east, the grid cells depicting cost-sharing insulation all require some adjustment in the application of that noise remedy.

Within the Southeast Conversion Area, bound on the east by 28th Ave. S., a special purchase guarantee program would apply in order to assist conversion to a new land use (6.6.4). The remainder of the area is either within current airport lands or planned for future uses which will be compatible with noise exposure. In those cases, no noise remedy would apply.

Map 6.6.5:26 illustrates program applications in the Des Moines Creek Park area. Considerations in application of the acquisition program (6.6.3) have established its southern boundary at S. 208th St. South of there, cells 0-31 to 0-34 and P-31 to P-34 are identified with purchase guarantee. Of course, that noise remedy will not apply in S.R. 509 right-of-way or Des Moines Creek parklands; the purchase guarantee boundary abuts these publicly owned lands. The boundary is adjusted westward immediately south of S. 208th St.; four homes to the west of 16th Ave. S. are included in purchase guarantee along with the homes on the east side of the short, dead-end street. Another addition to purchase guarantee is the triangle of land between S. 224th St. and S.R. 509 rights-of-way and 16th Ave. S. The freeway would otherwise separate this triangle of land from adjacent sound insulation areas; eventual platting and development of the property to the east would more likely include the triangle if noise remedy application is uniform. The southerly and easterly boundaries for purchase guarantee coincide with the grid cell lines which fall on S. 224th St. and 24th Ave. S.

Cost sharing insulation flanks the acquisition and purchase guaran-

tee noise remedy areas and is represented by grid cells N-28 to N-34 and Q-28 to Q-34. The westerly boundary is formed by property lines which fall along the grid cell lines. To the east, 28th Ave. S. and Pacific Highway South mark a change from predominantly single family residential use to commercial uses unaffected by noise, and become the cost-sharing insulation boundary.

Map 6.6.5:27 depicts cost-sharing insulation within grid cells 0-35 to 0-41 and P-35 to P-41. To the west, S.R. 509 extending down to Kent-Des Moines Road once again forms the noise remedy boundary. South of there, the grid cell line forms the boundary; although it passes through built-up single family residential areas it does not bisect any residential enclaves.

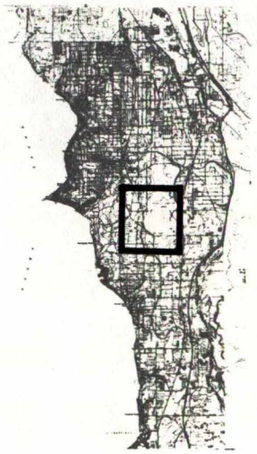
Limited cost-sharing insulation is represented by cells N-35 to N-41 and Q-35 to Q-41 and flanks the cost sharing insulation noise remedy area. Adjustments in the boundary are again appropriate relative to S.R. 509 and Pacific Highway South.

South of Kent-Des Moines Road the route of S.R. 509 in its continuation to I-5 as yet undetermined, although it is known that such an extension will be made. Once a route is finalized, some adjustment in the application of sound insulation and easements may need to be made.

Cost-sharing insulation is represented on Map 6.6.5:28 by grid cells 0-42 and P-42. The grid cell lines form the boundary as they are not inconsistent with the existing development pattern.

Limited cost-sharing insulation criteria found within cells 0-43 to 0-45, P-43, P-44, Q-41, and Q-43. Boundary adjustment is again made to reflect Pacific Highway South as a physical boundary and land use demarcation.

sea-tac communities plan



current airport lands

N-17 grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

single family residential structure

other structures

south reinforcement area: program application

sponsors
port of seattle
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000

s.r. 509 right of way

12th ave. s.

SOUTHWEST CONVERSION AREA

woodside school

manhattan elementary

passenger terminal area

24 M.H.

M-25 N-25 O-25 P-25 O-25

s. 188th st.

SOUTHWEST CONVERSION AREA

M-26 N-26 O-26 P-26 Q-26

40 M.H.

N-27 O-27 P-27 Q-27

tyee golf course

24th ave. s.

28th ave. s.

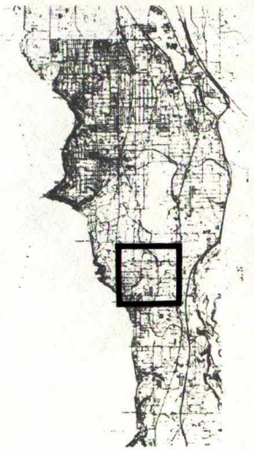
SOUTHEAST CONVERSION AREA

pacific highway s. (99)

des moines way s.

N-28 O-28 P-28 Q-28

sea-tac communities plan



current airport lands

N-17 grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

□ single family residential structure

■ other structures

south reinforcement area: program application

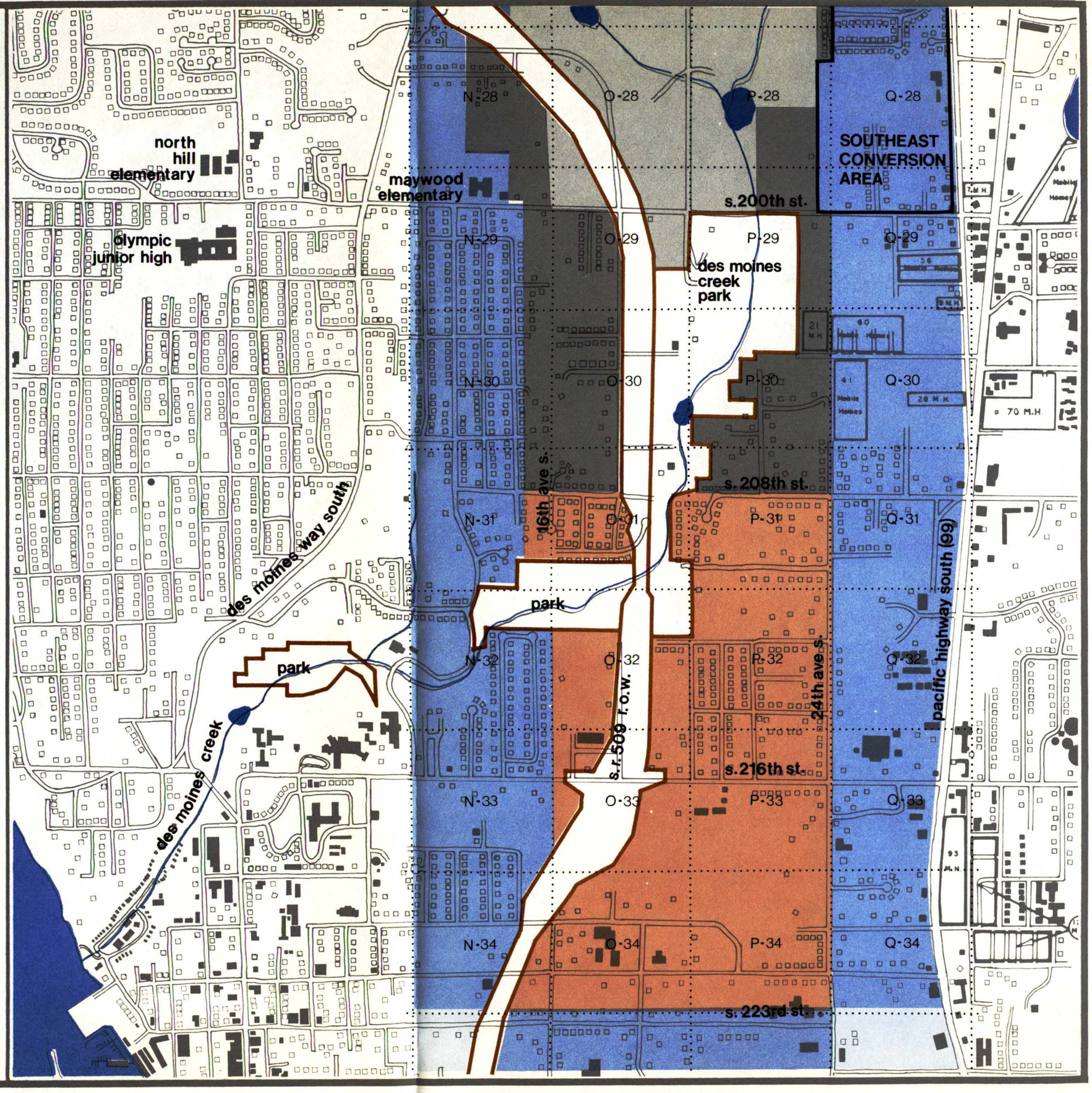
sponsors

port of seattle

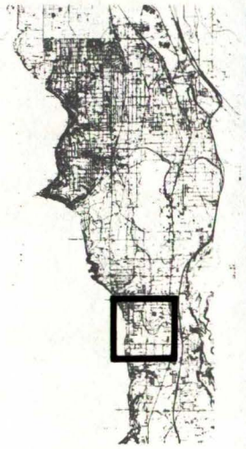
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000



sea-tac communities plan



current airport lands

N-17 grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

□ single family residential structure

■ other structures

south reinforcement area: program application

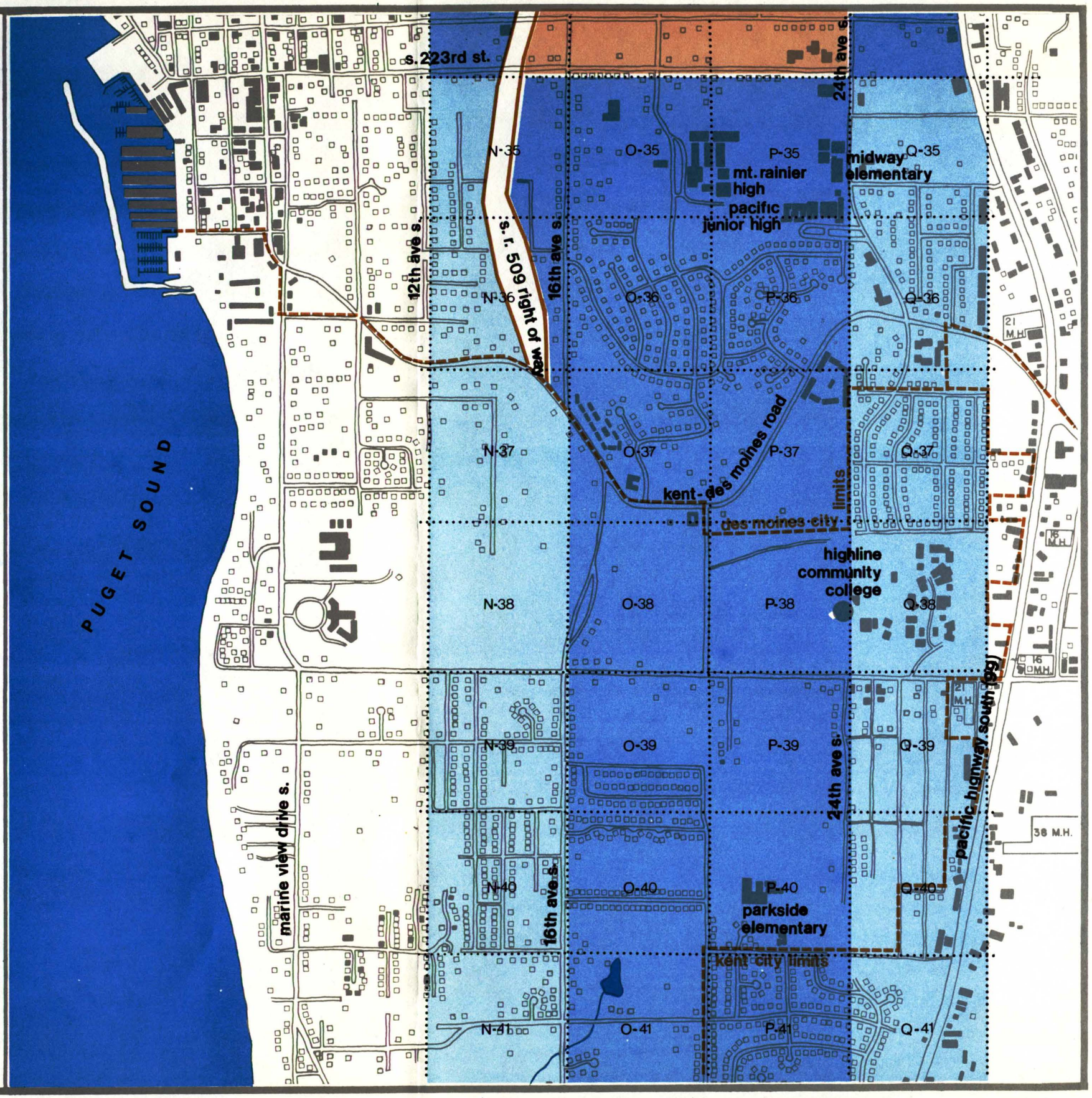
sponsors

port of seattle

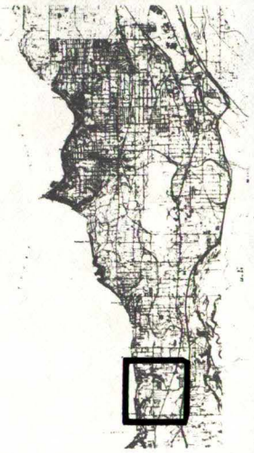
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000



sea-tac communities plan



current airport lands

N-17 — grid cell: program application by noise criteria alone

streams and ponds

acquisition

purchase guarantee

cost-sharing insulation

limited cost-sharing insulation

□ single family residential structure

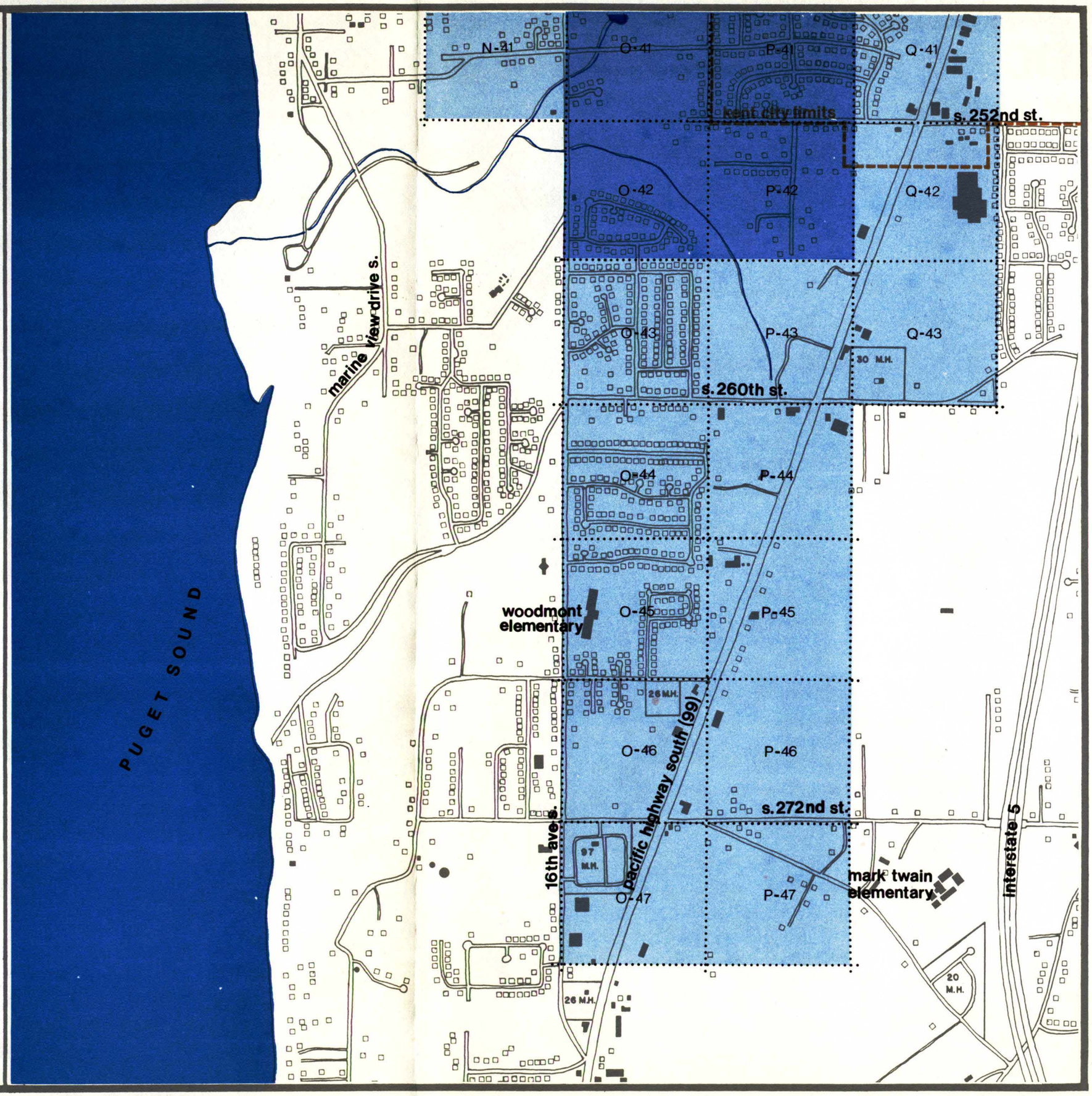
■ other structures

south reinforcement area: program application

SEA-TAC COMMUNITIES PLAN

sponsors
port of seattle
king county

0 scale in feet 500 1000 2000



WEST REINFORCEMENT AREA GUIDELINES:

The West Reinforcement Area recognizes the relationship of the Burien Business Center to surrounding single-family neighborhoods and to the West Acquisition and Conversion Areas. Burien's business economy should be reinforced in a positive manner directed at not only achieving physical compatibility with the community, but also at achieving renewed economic and physical compatibility with the Airport.

Delineation of the Area:

The west reinforcement area refers to the Burien Business Center, the single family residential neighborhoods surrounding Burien, and the area of mixed land uses found between S.R. 518, S.R. 509, and the West Conversion Area (Map, 6.6.5: 31)

Future Use Potential :

Burien is presently well confined by single-family residential areas to the north, west and southwest. Any encroachment into those areas would seriously degrade their residential character. Those areas are stable living environments and no actions should be taken which would jeopardize them.

policy: *Expansion of the Burien Business District and facilities serving that District should not jeopardize the cohesiveness of surrounding permanent residential neighborhoods.*

Expansion of Burien commercial uses southerly is considered to be highly undesirable since it would result in a strip form of development which

is already prevalent along Ambaum Blvd, 1st Ave. S. north of the business district, and other arterials within the Sea-Tac Communities. Natural features used to define land use areas (policy, 6.6.1) applies well in defining Burien's southern boundary. A heavily wooded ravine formed by Miller Creek crosses 1st Ave. just south of 5 corners (S. 160th St.). Single-family residences abut 1st Ave. So, south of the Miller Creek ravine. The natural ravine then becomes a logical natural feature to define the southern expansion of Burien and to separate it from single-family areas to the south (Map, 6.6.5:31).

Burien's growth should logically be directed toward the Airport to interrelate with the West Acquisition and Conversion Areas. A greater relationship with future air cargo, general and corporate aviation uses on the Airport's west side and the West Acquisition Area could provide a new air-trade economic impetus to Burien's further growth and development. Unification of the West Reinforcement, Conversion and Acquisition Areas with the Airport presents a regional center of significant physical and economic proportions. Burien's business markets and uses could diversify from those primarily of household goods and services of today and enhance its ability to attract office uses on the corporate level.

policy: *Expansion of the Burien Business District should be directed toward improvement and redevelopment of the west side for ultimate integration of that area,*

Uniquely, the center would exist in harmony with surrounding single-family areas since they would be largely separated by freeways and natural features.

sea-tac communities plan



burien center

N-17 grid cell: program application by noise criteria alone

streams and ponds

heavy vegetation

single family residential structure

other structures

west reinforcement area

sponsors
port of seattle
king county

SEA-TAC COMMUNITIES PLAN

0 scale in feet 500 1000 2000

HAZEL VALLEY and CHELSEA NEIGHBORHOODS
SEAHURST NEIGHBORHOOD
chelsea park elementary
ambaum boulevard sw.
1st ave s.
s.r. 509
SUNNY TERRACE NEIGHBORHOOD
M-14
N-14
NORTH ACQUISITION AREA
sunny terrace elementary
M-15
N-15
s.r. 518
lake reba
M-16
lora lake
s. 152nd st.
highline high
moshier field
M-17
lake burien
sunnydale elementary
lakeview elementary
s. 160th st.
GREGORY HEIGHTS NEIGHBORHOOD
burien general hospital
sylvester junior high
sylvester road
miller creek ravine
12th ave s.
WEST CONVERSION AREA
taxiway c
miller creek
1st ave s.
BLAKLEY MANOR NEIGHBORHOOD
s.r. 509 r.o.w.
normandy park city limits

chapter 6.7
general land use plan