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# a study of airspace utilization

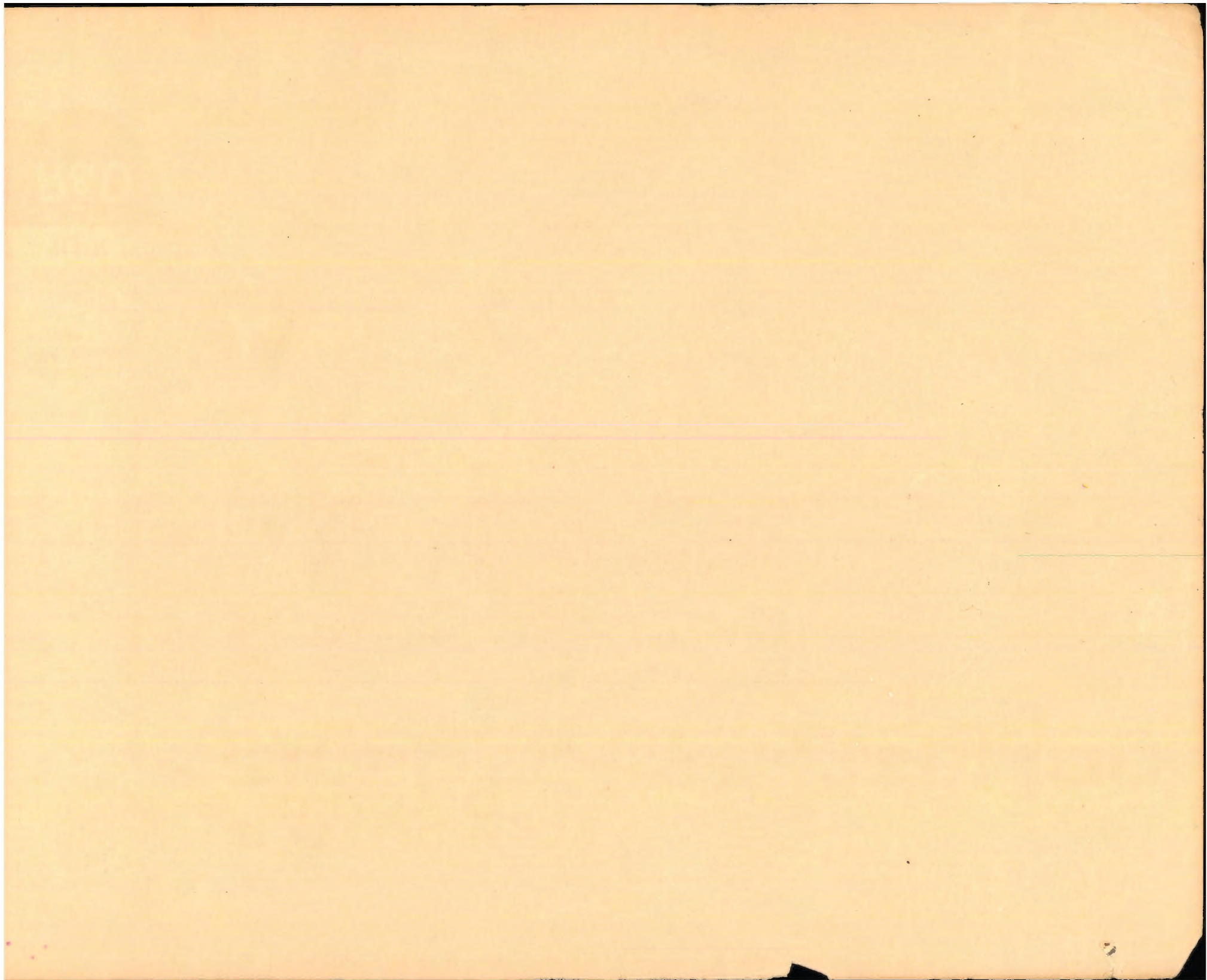
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RESEARCH &  
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REPORT





# **a study of airspace utilization**

PREPARED FOR  
CALIFORNIA DIVISION OF HIGHWAYS  
BY  
REAL ESTATE RESEARCH CORPORATION  
IN COOPERATION WITH  
OFFICE OF RESEARCH AND DEVELOPMENT  
BUREAU OF PUBLIC ROADS  
HPR-1(4) A 1003 S/A 13036



U.S. DEPARTMENT OF TRANSPORTATION/Federal Highway Administration/Bureau of Public Roads/June 1968

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This publication contain: of a study to provide policy and procedure guidelines for those who deal with air rights over and under freeways.

The study was conducted by the Real Estate Research Corporation for the California Transportation Agency, Division of Highways, in cooperation with the Department of Transportation, Federal Highway Administration, Bureau of Public Roads, under the Federal-aid highway planning and research project HPR-1 (4)

A 1003 S/A 13036

The final report of the study, on which this publication was based, was prepared by the Real Estate Research Corporation and its consultants. The opinions, findings, and conclusions expressed in the contents are those of the research agency and not necessarily those of the Bureau of Public Roads.

Except for a revised format, the information presented is the original work of the research agency

At the time that the original report was prepared the Bureau of Public Roads was a part of the U.S. Department of Commerce.

## PREFACE

This report summarizes our findings, conclusions, and recommendations as to policy and procedure guidelines for the State of California Legislature in dealing with air rights over or under freeways. There are substantial benefits to be derived from the prudent use of freeway airspace, and our research indicates that the technical problems (engineering, architectural, legal and administrative) are surmountable.

Broad policies are needed to create a spirit of cooperation among the cities and counties and the state and Federal jurisdictions. The State of California and U.S. Bureau of Public Roads can encourage airspace development in selected areas and, since these agencies have primary responsibility for the construction and safe operation of the highways, they must retain engineering approval. Initiative and control over the type and character of development should reside with the local community but be coordinated over regional areas by the state.

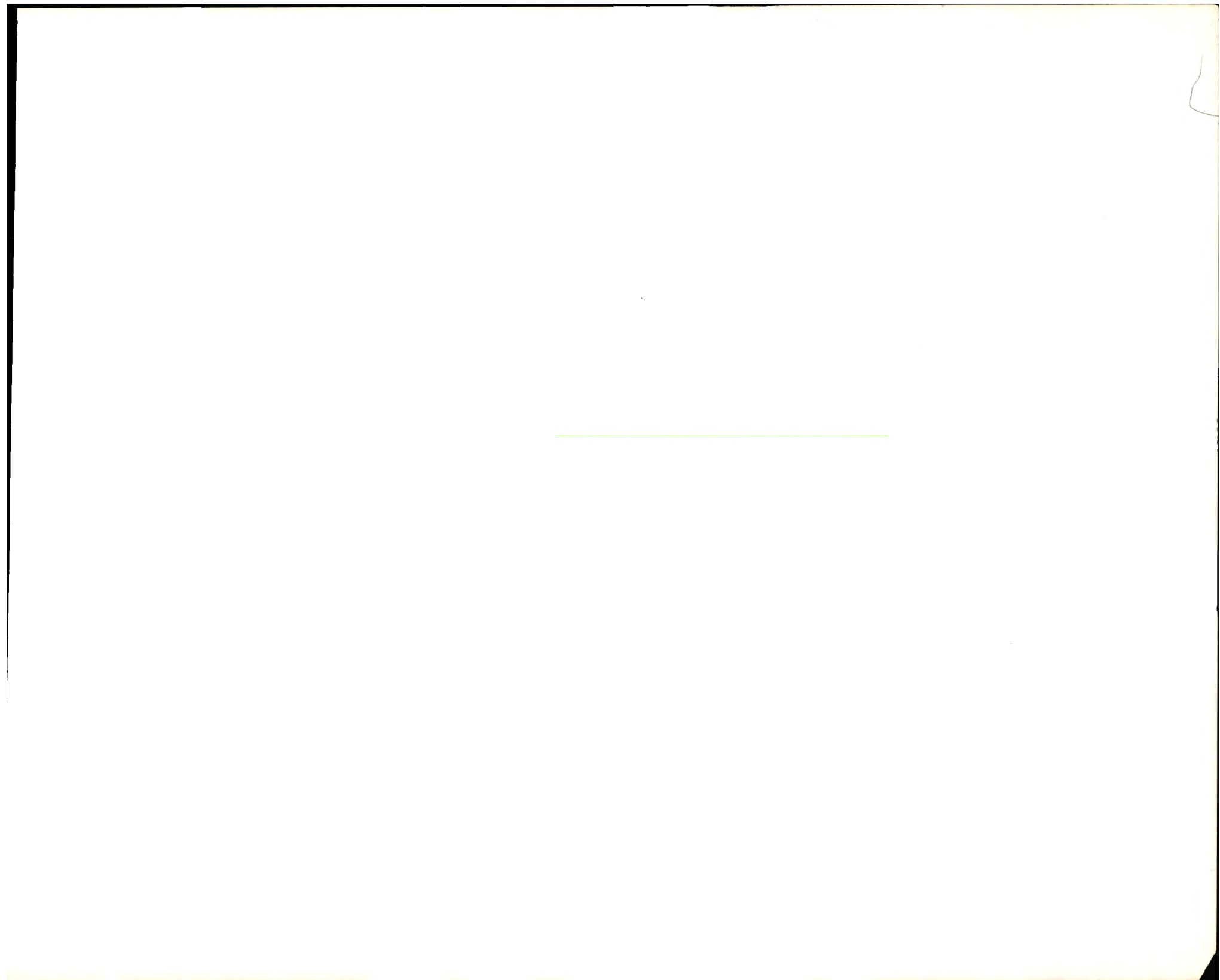
Enabling legislation empowers the Division of Highways of the California Transportation Agency and the Bureau of Public Roads of the United States Department of Commerce to lease the airspace over or under freeways; however, there is no legislative mandate dealing with whether these rights should be promoted aggressively or whether only incidental projects should be approved passively. If a vigorous program is undertaken in California to make full use of freeway land and to create lease revenue and possessory tax funds, a specific administrative staff will be required. The parking lot uses now added under freeway viaducts throughout California provide nearly \$500,000 in annual income for the State Highway Fund. Although use of airspace over the freeways will be limited to selected areas, this greater source of revenue remains untapped.

The use of airspace is not new, but it has only recently been deemed practical for the West Coast. The scarcity and high values of land in eastern cities--in Chicago and particularly on Manhattan Island in New York--have forced multiple land use. With the rapid growth of the West, attention is now being focused on the use of this "newfound land," but there are socio-political questions which must be faced before an intensive program of airspace use can be promoted.

In researching this assignment, we have reviewed striking airspace projects across the United States and in Canada, conducted in-depth technical interviews, reviewed relevant published literature, studied enabling legislation and analyzed current administration. The highlights of our investigation, the significant findings of our three consultants and our recommended guidelines for policy and procedure in dealing with airspace utilization are outlined in the accompanying report. This report has been prepared to assist the California Legislature, but it is also designed to assist the Division of Highways, the Bureau of Public Roads, local cities and other agencies and jurisdictions in dealing with the problems likely to be encountered as a result of intensive use of freeway airspace.

It has been our pleasure to undertake this basic research project, and we wish to thank the numerous individuals and groups whom we interviewed for the generous contribution of their time. We look forward to conducting further fundamental research on various technical aspects of this fascinating subject.

REAL ESTATE RESEARCH CORPORATION



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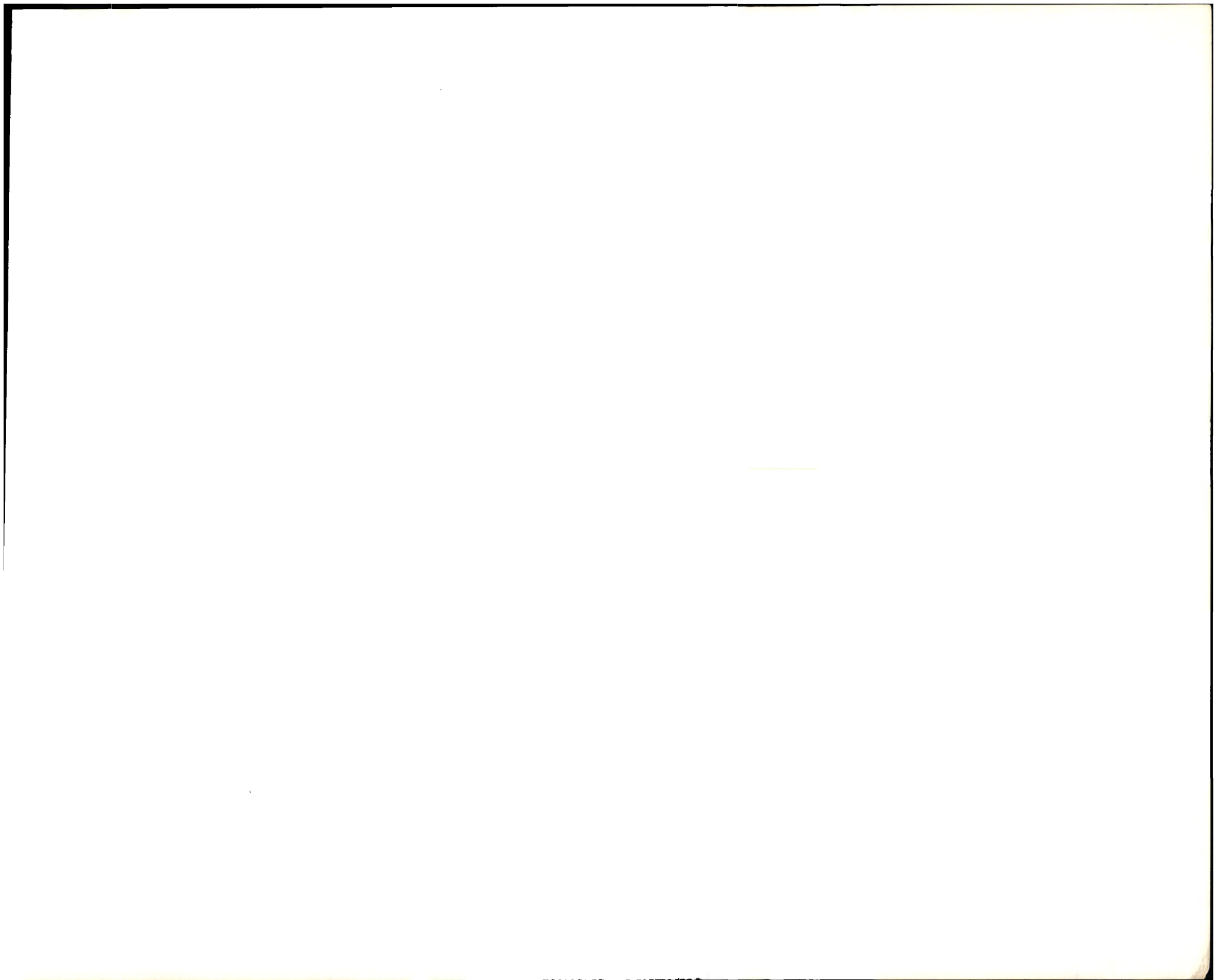
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## I. ASSIGNMENT AND SUMMARY

Legal Aspects - Robert B. Krueger

Nossaman, Waters, Scott, Krueger and Riordan  
Los Angeles, California

### A. Assignment and Purpose

Our assignment has been to study the general question of the utilization of airspace over and under freeways and, on the basis of our research, to provide policy and procedure guidelines for the State of California Legislature, the California Division of Highways, the U.S. Bureau of Public Roads, city and county governments and others interested in air rights. This research is in fulfillment of contract HPR-1 (4) A 1003 S/A 13036 and is pursuant to California Senate Resolution No. 5. The complete text of this resolution is included as the first page of the Addenda. Specifically, the objectives of this comprehensive study have been:

1. To identify the major issues and problems connected with freeway air rights.
2. To analyze these issues, including the procedural, legal, technical, financial, aesthetic and policy aspects of air rights.
3. To recommend guidelines and design a course of action for the utilization of airspace in California.

The purpose of this research is to answer the broad and fundamental questions of freeway air rights. Such questions as, "Why are these rights significant," "what uses are desirable" and "under what circumstances will the use of freeway airspace be successful," are answered in terms of the impact upon local communities, the California Division of Highways, the Bureau of Public Roads and the airspace developer. We have considered present legislation, current policy and adopted procedure on the use of airspace in the State of California and the related regulations, policy and procedure of the Bureau of Public Roads. We have not attempted to provide a new procedure manual or a group of case studies of known airspace projects; rather, we have studied both the broad and the detailed technical aspects of airspace use, and our analyses result in determinations of the policy and procedure guidelines that should be adopted.

This research has been conducted under California State and Federal Highway and Planning Research Funds; however, the opinions, findings and conclusions expressed in this publication are those of Real Estate Research Corporation and not necessarily those of the State of California or of the U.S. Bureau of Public Roads. Real Estate Research Corporation has been assisted in special aspects of this study by the following technical consultants:

Architecture and Planning - Robert E. Alexander,  
F.A.I.A. and Associates  
Los Angeles, California

Engineering Concepts - Kaiser Engineers  
Structural and Transportation Projects Department  
Oakland and Los Angeles, California

### B. Summary of Conclusions and Recommendations

For convenience, our detailed research and that of our three consultants is organized under broad subjects as denoted by the divider tabs. Summarized below are the major findings, recommendations, and policy and procedure guidelines that are discussed in the subsequent sections of our report.

#### 1. Question of Policy

Our research indicates that development of airspace is not so much a technical problem as it is a matter of broad policy and determined belief that profitable and beneficial multiple use can be made of the freeway rights-of-way. The state can foster public and private use in selected areas; however, the initiative for development should reside with the local jurisdiction which should also retain control over the type and character of development. The multitude of significant airspace projects throughout the United States provide evidence of engineering ability and architectural accomplishment that can be applied to existing California freeway airspace. The use of airspace over future freeways, however, may entail legal questions regarding the state's ability to acquire land in excess of basic right-of-way needs.

#### 2. Nature of Air Rights

We have attempted to ascertain the common characteristics of the many projects inventoried and cataloged as a part of this research and then have studied the applicability of these characteristics to successful development of freeway airspace in California. Many published articles and speeches were also reviewed, but only a small portion of the literature is relevant to the problem now facing the state.

There are numerous misconceptions about the potential use of airspace over freeways. The usual argument is to point to the prominent airspace projects throughout the country and to infer that identical uses can be undertaken in California. Such inferences cannot be made. There are fundamental differences of ownership, construction, property values and legal authority.

##### a. Authorization to Improve Airspace

Although airspace has been used in other parts of the world since antiquity and has been important in the eastern United States since the beginning of the century, the legal authority to improve airspace over California freeways has only recently been gained. Basic state and Federal legislation enacted in 1961 made it possible to make multiple use of airspace over or under freeways. Many profitable parking lot projects under freeway viaducts followed this legislation, but it was not until the California Highway Commission resolution of December 1964 that it became possible

to construct improvements on airspace. Up to the present time, few improvements have been built.

b. Basic Site Costs

The high costs of bridging freeways is such that only a small portion of the airspace in the freeway system can be economically improved. Foundation or so-called platform costs are only part of the reason that airspace construction is more expensive than that on normal land. Even if an airspace project is integrated with initial freeway design and construction, structural costs are likely to be 3 percent greater than on nonhighway land, and carrying charges pending freeway completion must be considered. The alternative is to construct over operating freeways, but the structure may then cost 5 to 6 percent more than if constructed on a normal site. These costs for a standard, 10-story building might be justified for intensive uses but would be prohibitive for small developments. Depending on the use, foundation costs will approximate \$15 to \$20 per square foot of platform surface.

c. Economic Feasibility

With few exceptions, only high-density projects that are able to sustain high site costs will be able to make economic use of airspace. The usual criteria for locating successful real estate developments must be applied to airspace projects; for example, there must be adequate market demand for a specific use at a particular location. Special considerations relating to the impact of the right-of-way must then be considered. Improvement construction costs under freeway viaducts will be similar to those on normal land, but the impact of the right-of-way will influence lease negotiations. Site costs for superimposed projects will be greater, as mentioned above.

3. Major Issues and Problems

Cities throughout California have expressed both concern and enthusiasm over contemplated development of airspace within their communities. The state generally owns fee simple or absolute interest in its rights-of-way, but there is a fundamental question of which jurisdiction shall have the authority to decide on the type and extent of airspace use. Existing state legislation offers no guidance in this matter. While these concerns relate to the possible disposition of airspace already acquired over existing freeways, different problems of ownership face the state and the U.S. Bureau of Public Roads in the acquisition of future freeways.

a. Concern Over Jurisdiction

The California Transportation Agency has proceeded cautiously and is concerned over its role of making greater use of rights-of-way. Several contemplated projects have already brought quick recognition that the state cannot retain sole jurisdiction over the

use of airspace. The fact that the state owns already acquired right-of-way land is not enough. Many communities remain fearful of state intervention, even though they have been assured that no project will be considered without prior local approval.

b. Existing State Legislation

Present state legislation is so broad that it is probably insufficient for extensive practical application to complex and improved airspace developments. There are obvious conflicts at various government levels, and existing legislation does not adequately meet these situations. Without a greater mandate for active development, including legislative determinations and enactments, it is unlikely that the orderly or efficient development of airspace can be achieved.

c. Creation of Airspace Now and in the Future

Past ability to acquire absolute title to right-of-way land, including rights to the airspace, has led to newfound wealth. Extensive use of airspace was not considered, and even when parking lots under viaducts were leased to private operators, the courts upheld purchase because construction usually requires clearance and all short leases can be canceled. In the future, it is likely that only a limited right-of-way will be acquired, excluding possibly valuable air rights. In areas where it is well established that subsequent use can be made of airspace, there is likely to be the question of whether the state would be willing or able to purchase property rights in excess of need, and especially to purchase private property for possible long-term private airspace use. In any event, the title to be acquired would depend on the particular right-of-way and local circumstances.

4. Recommended Policy

The California Transportation Agency has been receptive to considering applications for constructing improvements on highway airspace since the December 1964 resolution of the California Highway Commission. Fundamental procedure is established for the routing of possible airspace applications, but responsibility for processing and approval is divided. The attitude toward airspace development is open-minded and optimistic, but neither a central plan nor set objectives exist for maximum multiple use of freeway rights-of-way. In short, airspace use is allowable under broad state and Federal legislation and individual applications will be carefully considered; however, the legislation will have to be more specific and administration will have to be developed before extensive or numerous projects can be undertaken.

a. Two Courses of Action

With some exceptions, the present course of action is to administer airspace passively on a case basis after receiving applications. The alternative course of action is to pursue an aggressive program

of fostering orderly development. Our research indicates that such a program would be beneficial but that it would require adequate administration and staff with defined responsibilities and goals. Legislative discussion and a mandate will be required since a vigorous program will necessitate continuing land management functions and will entail extensive coordination with local communities.

All of the conclusions and recommendations which follow assume that an aggressive program will be adopted. Guidelines of policy and procedure are given for the further implementation of present legislation and for the future decisions that will be necessary.

b. Create Airspace Division

Our first recommendation is for the creation of a centralized authority to deal with airspace development on a statewide basis. We believe such responsibility is best placed under the State Highway Engineer at the middle management level or in a position similar to that of the Division of Contracts and Rights-of-Way (Legal Department). Our reasoning for selecting the California Transportation Agency and this particular level is that effective development of airspace will require careful and continuing coordination among the various departments of the Division of Highways, with the district offices and with the local jurisdictions. A Division of Airspace would provide the various California communities and the public with a central authority with which to work out the complex problems of the development of areas or individual projects.

c. Stimulate Local Initiative

Our second recommendation is for the legislature and the Transportation Agency to stimulate local initiative for creation of airspace, to work in conjunction with local communities and to act as a coordinator to accomplish successful development. In such an endeavor, the state will have to do advance planning and establish basic construction standards for various rights-of-way, but the communities must decide on the type and intensity of use. The state has not attempted to maintain sole jurisdiction, but its zeal for development has been misconstrued in several instances. A clear statement of policy should be made to the effect that the state, because it owns the right-of-way and because the Transportation Agency is responsible for the uninterrupted flow of traffic, will retain structural controls but that the local communities will govern land use.

d. Encourage Greater Private Participation in Airspace Use

Our third recommendation is to urge greater private participation by standardizing airspace requirements so that local government and private industry can have greater confidence in the use of airspace. Private use will be a source of new rental income

and local tax revenue, but it is last in priority, following present highway needs, defense and future highway expansion requirements, complementary transportation facilities and public uses.

5. Recommended Procedure

Assuming that a vigorous program of airspace utilization is undertaken, the following guidelines are offered for the implementation of present and possible future legislation to lead to orderly airspace development.

a. Standardize Airspace Use

Whether under a passively or actively administered program, the use of airspace should be standardized as far as possible. Uniform building requirements should be established for the freeway networks on a regional basis so that local governments will know what space is available for development. The key to greater private participation is to meet the general financing requirements of major private lenders. This will entail an extensive review of all legislation and procedure to devise acceptable leasing provisions and requirements; but most importantly, a standard long-term lease form should be devised with the cooperation of the Bureau of Public Roads.

b. Revise Disposition Procedure

The state has progressed from an exclusive bid basis to an offer and proposal format for airspace applications. Other forms of disposition also should be considered because, in most cases, projects of the complexity of airspace sites will require negotiation as a method of disposition. For example, adaptations could be made of the Land Disposal Procedures used by the Department of Housing and Urban Development (HUD) in the Urban Renewal Program (see Urban Renewal Manual, Book I, Part 14).

c. Assist in Coordinating General Planning

Besides identifying possible sections of the freeway network that are suitable for airspace development, the state should assist by coordinating the general plans and zoning requirements formulated by the local jurisdictions to provide orderly development over regions and large areas. As soon as possible, the local communities should undertake the initiative to advance plan and identify the desirable areas for civic and private airspace development. Early joint announcements by local and state government of available airspace with established zoning and use requirements should have a stimulating effect on development.

6. Recommended Future Research

A study should be made to determine the general loan requirements of major United States lending institutions with respect to leaseholds. Such

a study would include market analysis of the real estate factors and legal research, with the combined effort directed toward formulating a workable long-term lease for airspace. Architectural studies which might be undertaken are listed on page 66 of the Architecture and Planning section of this report.

#### 7. Action Program

Assuming a legislative mandate to pursue a vigorous airspace development program, the next step is for the California Legislature or Transportation Agency to create an Airspace Division to more fully implement present and possible future legislation. Such a department will require a capable administrator and staff with definite responsibilities and goals.

After creation of the Airspace Division, the sequence of administrative decisions will closely approximate the decision flow shown in the model on the following page.

## II. BASES OF DEDUCTION

Our research approach has been to analyze the characteristics of selected airspace projects throughout the United States, to conduct in-depth interviews with persons and groups with relevant experience in airspace use and to review pertinent published literature. The guidelines outlined in this report are based upon data obtained from the following four general sources:

### A. Library Data

Real Estate Research Corporation maintains an extensive library of private, institutional and governmental statistics with regard to urban trends. In addition, our data bank contains current information on building costs, highway construction, and other social and economic factors pertinent to urban economic analyses. These sources of information have been drawn upon where appropriate to this study.

### B. Recorded Experience

For over 35 years Real Estate Research Corporation has been engaged in the study of real estate and in economic analyses of national, regional and local markets. During this period, there has been a systematic recording of data bearing upon the operation of the real estate market, the critical analysis of economic factors and the impact of transportation patterns and growth upon the community market structure. A variety of data has been developed through this experience, and this information has been drawn upon in connection with the present study.

### C. Collateral Research

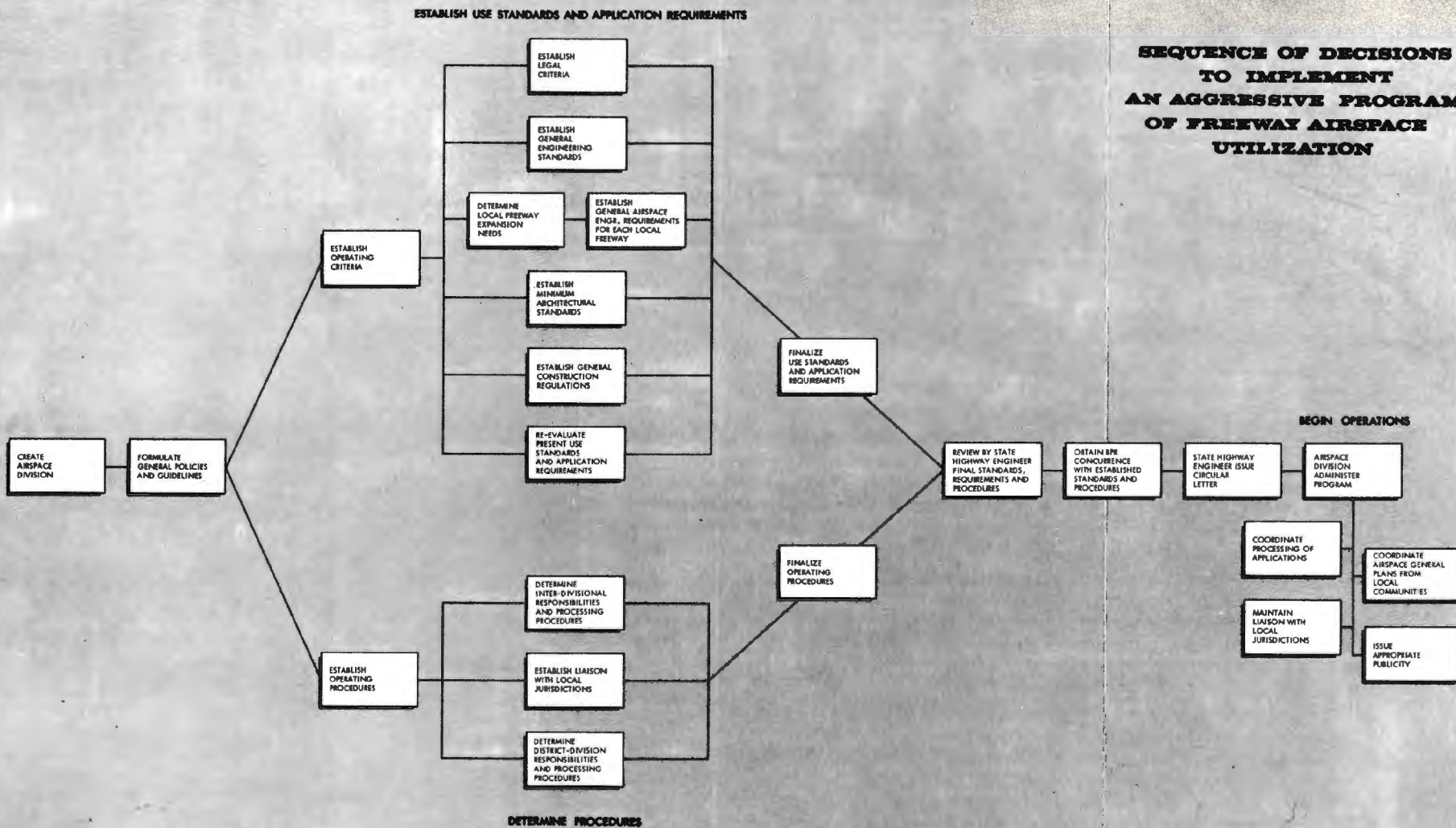
Real Estate Research Corporation is continuously engaged throughout the United States in research and analytical assignments, for private organizations and governmental agencies, that involve projects related to the present assignment. The techniques employed, analyses undertaken, findings derived and eventual conclusions set down in other studies have provided a valuable background of information for this report. During the past several years, Real Estate Research Corporation has been privileged to undertake appraisals and market studies involving the use of airspace, and at the time of this writing three such assignments are in process in various areas of the United States. Several of our completed and current studies have a direct bearing on various aspects of this analysis and provide important background. Real Estate Research Corporation studies concerning air rights include:

Western Greyhound Lines - A study of potential uses of air rights, Greyhound Terminal, Seattle, Washington.

Boston University - A market analysis of certain air rights areas in Boston and Brookline, Massachusetts.

Bay Area Rapid Transit District, San Francisco - Estimate of damages involving tunnel easements.

# SEQUENCE OF DECISIONS TO IMPLEMENT AN AGGRESSIVE PROGRAM OF FREEWAY AIRSPACE UTILIZATION



PREPARED BY REAL ESTATE RESEARCH CORPORATION, 1967

Virginia Department of Highways - Appraisal of aerial easement over property of Chesapeake and Ohio Railway Company.

Illinois Central Railroad - Certain air rights studies over rail tracking in Chicago Loop.

Chicago and Northwestern Railroad - Certain air rights studies over rail trackage.

Sacramento Redevelopment Agency - Reuse value of certain airspace over the pedestrian mall in the Gateway Mall Redevelopment Project.

Federal City Council - An economic feasibility analysis of the proposed Washington Channel Waterfront Bridge to be located in Southwest Washington, D.C.

Richard L. Nelson, former Vice Chairman of the Board of Real Estate Research Corporation, published a technical paper, "The Appraisal of Air Rights," in The Appraisal Journal, XXIII (October 1955), 495-508.

D. Original Field Work and Research

In the course of the extensive field investigations, interviews and library and other research involved in this study, Real Estate Research Corporation personnel completed the following basic assignments:

1. Cataloging, analyzing and inspecting selected existing and proposed airspace developments throughout the United States and in Canada to identify their successful characteristics as they may apply to the use of freeway airspace. (Selected examples of airspace uses are cataloged by state and city in the Addenda.)
2. Conducting in-depth interviews with over 100 individuals and groups with personal or technical experience in actual airspace projects. Interviewees included skilled technicians in Federal agencies and in state government, responsible city officials, private developers, investors, contractors, mortgage lenders and others. (A partial list of persons and groups interviewed appears in the Addenda.)
3. Reviewing pertinent published literature on the subject of airspace use. The library facilities used include those of the Bureau of Public Roads in Washington, D.C., the New York public library, the Los Angeles City library, university libraries and others. (An annotated bibliography is in the Addenda.)
4. Researching State of California and Federal legislation that regulates the use of airspace over and under freeways.
5. Analyzing the current policy and procedure adopted by the Division of Highways of the California Transportation Agency and by the Bureau of Public Roads of the United States Department of Commerce in the handling of air rights projects.

6. Conferring with responsible officials of cities, of other states and of other Federal agencies regarding jurisdictional and other aspects of the utilization of freeway airspace.
7. Analyzing in detail the interrelated jurisdictions and decision making responsibilities to be considered in freeway airspace development.
8. Designing a matrix of the spectrum of possible airspace uses and their broad requirements and use characteristics.
9. Constructing a flow chart to summarize our recommendations of the policies and procedures that should be adopted and their effects on the sequence of decisions that will be necessary in dealing with requests for air rights over or under freeways.



### III. GENERAL DISCUSSION

#### A. Definition of Terms

In order to avoid misunderstanding in this study, several terms that will recur in the following pages are defined below.

Air Rights - The rights to inclusive and undisturbed use and control of a designated space within delineated boundaries, either at the surface (i.e., under a freeway viaduct) or above a stated elevation. Such rights may be purchased or leased for the construction of improvements under or above a freeway structure. Air rights, like mineral easements, are only a partial interest.

Airspace - The separate parcel and legally described area under or over another structure (e.g., a freeway, railroad tracks, or a subway tunnel).

Fee or Fee Simple - An absolute title to real estate which is an inheritable estate without restrictions or limitations to any particular class of heirs. All titles, however, are subject to the limitations of eminent domain, escheat, police power and taxation.

According to the basic concept, fee simple title is the right to all property within a specified boundary from the center of the earth outward to infinity. In practice, however, local communities govern the land use and the Federal Aviation Agency controls the aviation area above specified heights.

Freeway versus Expressway - A freeway has completely controlled access, whereas an expressway may have intersecting crossroads; either form of highway could be a toll road or a turnpike if so legislated.

#### B. History of Air Rights

##### 1. Early and Nonhighway Projects

One of the earliest structures built on air rights is the Ponte Vecchio Bridge which was built in Roman times over the Arno River in Florence, Italy. This revered antiquity has three, one to seven ratio spans of 90 to 100 feet and, since its reconstruction in 1345, has been lined with goldsmith, jewelry and other shops. The areas at both ends of the bridge were bombed during the second World War, but the shops of the Ponte Vecchio remain a tourist attraction today.

The proposed Washington Channel Waterfront Bridge, to be located just southeast of the Jefferson Memorial in Washington, D.C., follows the Ponte Vecchio concept. An imaginative plan and a model by Chloethiel Woodard Smith of Washington, D.C. were prepared by the National Park Service. The six-span bridge over the 874-foot crossing would serve pedestrians and mini-buses en route from the mainland parking area to the proposed aquarium in East Potomac Park. The envisioned three-level bridge improvements are recreation-oriented and include shops, restaurants, balconies, roof terraces, sidewalk cafes, galleries and exhibits.

The original American airspace activity took place at the height of the

railroad age when the rights-of-way along Park Avenue were depressed during the 1890's. It is interesting to note that the term "air rights" was probably first applied to the commercial use of space over railroad terminals and tracks, beginning with the development of the Grand Central Terminal area in New York City in 1902 and followed by the New York Central Railroad's Grand Central and Park Avenue project initiated in 1913. The term gradually acquired a broader and more general application and the concept is no longer limited to railroad areas. In the peak construction years around 1930, railroad airspace projects were built over the corridors that skirt downtown Chicago, the most significant projects being the 25-story Daily News Building (now called Riverside Plaza) and the 4.2 million square foot Merchandise Mart. The U.S. Post Office in downtown Chicago was built in 1931, and in the late 1950's the eight-lane Congress Expressway was constructed through the center of the building (see Addenda photograph).

Other significant developments occurred during the 1950 boom years. Prominent among these were the 40-story Prudential Mid-America Building over the Illinois Central Tracks in Chicago's Lake Front area, the Twin Tower Marina City with its 896 apartment units over the railroad right-of-way alongside the Chicago River and the impressive 59-story PanAm Building over and adjoining the Grand Central Terminal in New York City.

The projects of the early 1960's were equally spectacular. The luxury 40-story Outer Drive Apartments -- 940 units recently completed over the Illinois Central Yard on the edge of Lake Michigan and downtown Chicago -- is an excellent example of the use of airspace to capture locational amenities. Concourse Village, a gigantic, 10-acre complex of seven high-rise towers over the Mott Haven Railroad Yard in the lower Bronx of New York, is keyed to a very different market. This cooperative apartment complex is for middle-income families and is surrounded by slum areas to the east and fair residential areas to the west. The size of the project and the lack of autonomous community facilities have proven serious detriments. (Photographs of the Outer Drive Apartments and Concourse Village are included in the Addenda.)

Pedestrian bridges or portions of structures connecting two buildings of a single ownership on either side of a city street are quite a common form of airspace use. Notable examples in downtown Los Angeles are the Bullock's department store building over St. Vincent's Court (an alley) at Seventh Street and the United California Bank and Bank of America links over the alley east of Spring Street between Sixth and Seventh Streets. The nine-story high pedestrian bridge of Gimbel Brothers department store over 32nd Street between Sixth and Seventh Avenues in New York City reportedly is to be demolished. The effect of the Hamburgers Men's Apparel Store pedestrian bridge over Lafayette Street in Baltimore, Maryland is amusing; although we did not consider it important enough to verify, the story is that the street had to be lowered when it was discovered that the city fire trucks did not have sufficient clearance under the bridge.

##### 2. Freeway and Expressway Projects

No study of airspace would be complete without mention of the much written about, 960-unit Bridge Apartments and the adjoining, three-level

Uptown Bus Terminal (Port Authority Building) built on airspace over the approaches to the George Washington Bridge in Manhattan. The four-building, 32-story, low-income housing complex was financed under FHA 221-d-3 funding and tax concessions. This impressive project has stimulated wide interest in building over freeways; unfortunately, however, the obvious design shortcomings are not tested in terms of the open market because of the type of financing, housing shortages and subsidized rentals. Noise and fumes rise from the unvented and open freeway between the buildings. The problem was serious enough that New York City's Department of Air Pollution Control took air samples, and the City of New York changed its building code to forestall similar open freeway developments. In spite of these failings, the building managers report a stable occupancy of over 90 percent without undue tenant turnover. (A photograph of the Bridge Apartments appears in the Addenda.)

The War Memorial Auditorium, two of the apartment towers and other buildings of the Prudential Center on the edge of downtown Boston are over the Massachusetts Turnpike. The square, 52-story Prudential Tower, the focal point of the 31-acre complex, apparently stands alongside an eight-lane highway and the tunnel right-of-way of two railroad tracks. The Sheraton-Boston Hotel and an impressive array of other buildings make up this complex. Like the Bridge Apartments in New York City, the Prudential Center was built in coordination with freeway construction (see Addenda photographs).

The Star Market in Newtonville, about 12 miles east of downtown Boston, is perhaps more unique. Half of this neighborhood market is above the six-lane Massachusetts Turnpike, and the roadside retaining wall bisects the front portion of the building. An unusual drive-through system allows shoppers to pick up their groceries under the building on the main site adjoining the highway. It is difficult to justify such a structure in terms of investment return on the obviously high capital requirements. The nearest freeway access is over one mile away, in either Newton or West Newton. (See the Star Market photographs in the Addenda.)

Five Oasis Restaurants with adjoining service stations are over Interstate 90 and 294 on the outskirts of Chicago, Illinois. Each of the identical complexes features a Fred Harvey Restaurant on a flat, double span bridge over the four-lane (future six-lane) Illinois Tollway. Direct access ramps lead to separate, 20-pump Standard Oil Stations that are located beyond the approximately 100-car parking lots at each end of the restaurant. Truck fuel is available from four additional pumps on the outer margins of each complex, beyond the 100- by 40-foot service station buildings. The restaurant buildings have approximate gross dimensions of 75 by 240 feet. Because Interstate 90 and 294 are toll roads, access is rigidly controlled and each of the twin service stations is on a loop off the main highway. Standard Oil built all five of the complexes at a reported cost of \$13.5 million. A sixth and larger Oasis complex is to be built and owned by the Illinois Tollway in the Hazelcrest area where the complex will intercept through traffic coming from Indiana along Interstate Route 90. These restaurant-service station complexes are notable exceptions to the Federal legislation that regulates interstate route projects and does not permit direct highway access to commercial enterprises. (See Oasis

photograph in the Addenda.)

Similar in concept but different in structure is a restaurant-service station that serves the Will Rogers Turnpike near Vineta, Oklahoma. This project has a Conoco Service Station, is said to be on a 25-year lease and is reported to have cost \$1,743,000. The restaurant over the highway is within a series of bowstring trusses that join two rectangular buildings at either side of the right-of-way.

### 3. Highway Airspace in California

California's experience in highway airspace development has generally been limited to surface parking areas under various freeway viaducts; the leases on these areas are for short terms. The first such use of airspace under freeways began in 1954 when parking areas were leased under San Francisco's Bayshore Freeway, although the first leasing of airspace in California occurred in 1942 when parking areas were placed under the San Francisco approaches to the San Francisco-Oakland Bay Bridge. These by-products of highway construction remain a valuable means of putting odd-shaped highway remnants to use and of creating off-street parking in congested areas.

The 1956 Federal legislation dealing with interstate highways limited airspace use to parking by public agencies, and it was not until the Federal Highway Act of 1961, which was followed by similar state legislation, that multiple use could be made of highway land. California was instrumental in requesting more intensive use of airspace, but little development has occurred since the 1961 authorizing legislation.

Several proposed projects have fallen by the wayside, although not from lack of enthusiasm on the part of the Division of Highways. Unfortunate examples of a forestalled project are the Safeway Market and Super-S Discount Store buildings which were to have been located under the Interstate 80 viaduct on either side of K Street in Sacramento, California. Detailed structural requirements were worked out with the Division of Highways, and the Bureau of Public Roads was consulted on allowable building clearances; but the project was rejected by the city of Sacramento because of conflicts with zoning and land use objectives.

Another project, for which there is no official application before the Division of Highways, is worthy of mention because it would be a first of its type in California. This is the proposed Penryn Oasis over Interstate 80 near Auburn, California. The planned restaurant and service station uses follow the general concept of the Illinois Tollway complexes, except that the 36-acre site will have no direct access from the highway and will depend upon an adjoining interchange. When requested, the air rights will be in the nature of an overstreet bridge linking a single ownership.

### C. Title to Airspace

The forms of legal ownership of airspace give a clue to present and future problems confronting the Division of Highways. It now may be desirable to dispose of air rights that are by-products of fee-owned rights-of-way; and in the future, the

state may not acquire the airspace because it might be legally impossible or impractical to obtain a fee title to land that possesses potentially valuable air rights.

## 1. Forms of Legal Ownership

The three basic forms of conveying ownership to airspace are as follows:

- a. Long- or short-term lease - Early lease activity began over the New York Central Railroad Company rights-of-way along Park Avenue; the initial lease term of 21 years was followed by two additional 21-year options. This form of ownership is common in New York City and Chicago. In contrast to these medium-length terms, leases on the viaduct parking lots in California are generally for five years with short-term cancellation privileges.
- b. Fee Title to Airspace Portion - Fee or absolute title may be granted to the airspace portion of a larger property. Foundation supports are not necessarily thought of as airspace, but they can also be granted in fee.
- c. Easement for Airspace Use - This method involves either a perpetual or a limited-term easement in which the fee owner of the land grants a non-possessing interest and use of a portion of the property for a specific purpose. The Prudential Center in Boston involves the insurance company's purchase of the property from a railroad which, in turn, reserved an easement; and the insurance company subsequently granted a perpetual easement to the Massachusetts Turnpike Authority.
- d. Combinations of These - The foregoing basic forms can be used in various combinations. Each of these forms of legal ownership conveys an adequate title, but there are differences of control.

Of the preceding forms of ownership, leasing provides the most control for the Division of Highways, since the Division retains title subject to use terms for a period of years, has the right to receive rent, has a reversionary interest and may possibly realize appreciation in value at the termination of the lease. The leasing of airspace is most advantageous for the state because the U.S. Bureau of Public Roads does not share in the rental income; by legislative requirement, however, all such income must be deposited in the State Highway Fund. Providing lease clauses are not unusually stringent, a lease also has advantages for the airspace user. For example, a lessee requires less capital because there is no purchase of the space, and a lessee can usually depreciate his entire investment.

Grants of fee title or perpetual easement both divest the state of title to the airspace, and would be objectionable unless appropriately conditioned so as to reserve to the state controls similar to those which it would normally have in a lease. In addition such grants would violate present Federal policy and might give rise to a claim by the Federal government for 90 percent of the sale proceeds.

## 2. Methods of Legal Description

The description of a normal parcel of land is usually stated in only one dimension -- the perimeter of the horizontal area. More complex titles may cover a second dimension to give one vertical limit or a starting plane. This occurs, for example, when all subsurface rights to minerals are granted. Title to airspace is generally stated in these two dimensions but may be stated in terms of length, width and height. Basically, one or another form of title is given to the two general portions of airspace -- the primary site and the necessary foundation support areas. The means of describing the three dimensions of airspace are as follows:

- a. Perimeter Description (First Dimension) - Two means of perimeter description are common. The metes and bounds method involves a series of verbalized lines, angles and lengths which describe a regular or irregular perimeter. The second means is to record a subdivision plat that delineates the property as a series of divided lots.
- b. Rights Above a Plane (Second Dimension) - Rights may be granted above a specified horizontal elevation or an inclined plane. Usually an established elevation over the city datum point is cited.
- c. Space Envelope (Third Dimension) - A three-dimensional block of space or an elevated right-of-way which might be called an "air tunnel" may be granted by describing the bottom plane or floor, the perimeter or side walls and the top limits or roof. Columns and foundation footings may also be described by this means.

Usually the entire fee simple interest to the property is described, and then specific areas are exempted so that the partial airspace interest is distinguished from whole ownership. Various combinations of these descriptions and title forms may be used, either to solve a technical problem or as a matter of policy preference. A specific project may be used to illustrate possible combinations. Chicago airspace over the Illinois Central Railroad is usually sold in fee by describing the space in relation to the Chicago City datum (low water level of Lake Michigan in 1847) and by subdividing various lots to describe the forest of posts surrounding the tracks. In the case of the Chicago Prudential site, the roughly horizontal plane was described and a subdivision plat was recorded, including complex vertical sections detailing various lots. The recorded title plat covering 627 lots measured approximately 16 feet by 3 feet, and the revised and final plat was four feet longer. Seventeen vertical sections were shown, in addition to the horizontal delineations.

## 3. Acquisition of Fee Versus Easement for Highway Land

Acquisition of fee title to highway land includes the purchase of air rights, while such rights are forfeited when only an easement is acquired. Some of the primary reasons for obtaining a fee title to freeway land are the following:

- a. Freeway use necessitates full possession of access rights.

- b. Severance damage to the remainder can equal the cost of acquiring the whole property.
- c. Freeway construction usually constitutes the full use of the property.
- d. Maintenance requirements and possible freeway expansion needs require full control.
- e. The question of abutting property owners' rights usually is settled.
- f. The former owner has no reversionary rights as is the case with an easement.

#### 4. Present Versus Future Title of Highway Land

The established California Division of Highways and U.S. Bureau of Public Roads policy has been to acquire a full fee title; however, the Bureau is flexible in this respect and will allow acquisition of a lesser estate, such as an easement. The recent question of the full utilization and development of air rights over state-owned freeway land poses two related problems. The first problem, how to dispose of dormant rights, is similar to the problem of an investor finding undiscovered minerals on his land and facing the decision of whether to develop this wealth or whether to dispose of his rights. The second problem involves the intentional purchase of air rights; continuing the above analogy, the private investor is faced with the decision of whether or not to purchase and develop more expensive land with established mineral (air) rights potential. The analogy breaks down at this point. The private investor may be limited by his resources, but he has complete choice of whether to buy and whether or not to partially or completely develop a property. The state, in contrast, must show necessity for public use -- and the use must be clearly related to the freeway projects -- before highway trust funds and eminent domain authority can be used.

Up to the present, almost all California freeway airspace projects have been viaduct parking lots which are by-products of highway construction and are leased for short terms. Significant and economically feasible airspace projects contemplated for the future, such as a 40-story office building, are not in the same category. The possibility of private development over state freeway land raises two questions: the question of whether the state has the statutory authority to purchase the fee interest which includes usable airspace, and the practical question of whether the state can afford to pay for land that includes valuable air rights which are usable but not needed for highway purposes.

The future acquisition of three-dimensional, right-of-way easements, rather than the acquisition of full fee title to land, may offer the solution to the foregoing questions; but without ownership, the state would lose rental income and close control. The U.S. Bureau of Public Roads has already prepared sample conveyances to cover three-dimensional legal descriptions or "air tunnels." California precedents for this type of title

acquisition have already been set. For example, one such highway easement over a railroad right-of-way in the San Francisco area has recently been negotiated.

#### D. Enabling Legislation

In the course of this study, we have reviewed present Federal and California legislation which affects ownership and control of freeway air rights. Both jurisdictions have broad statutory authority to deal with airspace and, except for a few restrictions, interpretation and implementation is left to the discretion of the respective agencies. The procedural memoranda and circular letters discussed at the end of this chapter define the basic regulations that presently obtain.

##### 1. Federal Legislation

The following chronological list shows the sequence of significant Federal legislation and procedural directives (indicated in parentheses):

- 1956 - Federal-Aid Highway Act instituting the National System of Interstate and Defense Highways.
- (1957) - Cherry Memorandum No. 31 of the Bureau of Public Roads which implements the foregoing legislation (dated April 8, 1957).
- 1961 - Section 111 of Title 23 of the United States Code, June 1961.
- (1961) - An Information Guide on Air Rights Above and Below Interstate Highways by the American Association of State Highway Officials (dated October 7, 1961).
- (1962) - IM 21-3-62 - This Bureau instructional memorandum (dated May 4, 1962) implemented the 1961 legislation.
- (1967) - PPM 80-5 - This Bureau procedural memorandum, now in process, will supersede IM 21-3-62.

The 1956 Federal-Aid Highway Act, as interpreted by the Bureau of Public Roads in the Cherry Memorandum, restricted the use of airspace to parking leases to other public entities. The 1961 amendment authorizes the state to use airspace and also authorizes granting of airspace use to private interests. The amendment restricts direct access from the established grade line of the highway.

The following quotation, directly from IM 21-3-62, describes the significant portion of the amended act:

"Section 111 of title 23 of the United States Code, as amended by section 104 of the Federal-Aid Highway Act of 1961, approved June 29, 1961, provides as follows:

All agreements between the Secretary of Commerce by the Bureau of Public Roads and the State highway department for the construction of projects on the Interstate System shall contain a clause providing that the State will not add any points of access to, or exit from the project in addition to those approved by the Secretary. Such agreements shall also contain a clause providing that the State will not permit automotive service stations or other commercial establishments for serving motor vehicle users to be constructed or located on the rights-of-way of the Interstate System. Such agreements may, however, authorize a State or political subdivision thereof to use or permit the use of the airspace above and below the established grade line of the highway pavement for such purposes as will not impair the full use and safety of the highway, as will not require or permit vehicular access to such space directly from such established grade line of the highway, or otherwise interfere in any way with the free flow of traffic on the Interstate System."

## 2. State Legislation

California authority to lease airspace is stated in Section 104.12 of the Streets and Highways Code. This legislation was enacted in 1961 and was amended in 1965 to allow parking of emergency vehicles at no cost to local government (see the brackets in the amended portion cited below). Sections 104.12 and 104.6, which relate to acquisition of air rights for state highway purposes or future needs and the leasing thereof, were implemented by the Division of Highways in Circular Letters as follows:

Circular Letter No. 62-224, issued August 7, 1962 and expiring August 7, 1967 and entitled, "Use of Airspace on the Interstate System and Freeway Lease Areas Generally."

Circular Letter No. 65-11, issued January 12, 1965 and expiring August 7, 1967 and entitled, "Use of Airspace for Building Improvements" (Supplement to No. 62-224).

Circular Letter No. 65-126, issued May 14, 1965 and expiring August 7, 1967 and entitled, "Use of Airspace for Building Improvements Under Viaducts." (This supplements the two preceding circular letters.)

Verbatim Section 104.12, "Lease of Areas Above and Below Highways," as amended by Chapter 1906 of Statutes 1965, is as follows:

"The department may lease to public agencies or private entities the use of areas above or below state highways, subject to such reservations, restrictions and conditions as it deems necessary to assure adequate protection to the safety and the adequacy of highway facilities and to abutting or adjacent land uses. Authorized emergency vehicles as defined in Section 165 of the Vehicle Code which are on active duty and are not merely being stored shall be given preference in the use of such areas, and no payment of consideration shall be required for this use of the areas by such

vehicles." Prior to entering into any such lease, the department shall determine that the proposed use is not in conflict with the zoning regulations of the local government concerned. Such leases shall be made in accordance with procedures to be prescribed by the California Highway Commission, except that in the case of leases with private entities such leases shall only be made after competitive bidding unless the commission finds by unanimous vote that in certain cases competitive bidding would not be in the best interests of the state. The possibilities of entering into such leases and the consequent benefits to be derived therefrom may be considered by the department in designing and constructing such highways.

"Revenues from such leases shall be deposited in the State Highway Fund."

## E. Characteristics of Airspace Use

In the Addenda, we provide a selected bibliography of published articles on airspace. These articles offer fertile ground for research, because of the presentation of theoretical background and because most contain concise descriptions of the sizes, prices and characteristics of various airspace projects throughout the United States and in Canada. Our field inspections and inquiries have given us firsthand knowledge of most of the developments cited. We have also included in the Addenda a selected catalog of significant projects, but we have made no attempt to provide a complete inventory of airspace uses. Our constant goal has been to study all forms of airspace development to determine the elements of success or failure as they might relate to freeway projects. To this end, we have researched the literature, investigated completed improvements and made probing inquiries into the technical aspects of extant developments.

We find that the important projects can generally be categorized according to physical characteristics and according to circumstances of ownership. The majority of unique or outstanding examples of airspace use reflect engineering solutions to challenging physical problems, but ownership and control of most of the projects differ considerably from state-owned freeway space. The ownership of California freeways built with tax revenues differs materially, for example, from that of the railroads, toll commissions and other quasi-public entities that are expected to make a profit and are seldom questioned in the disposition of their land.

### 1. Project Characteristics

Because of such common characteristics as similarity of ownership, of structural problems and of unique solutions to problems, present airspace uses fall into general categories as follows:

- a. Railroad Airspace - America's most prevalent use of airspace is over the nation's railroads. The most common development in railroad airspace is on a "mat" or level "deck" area over a forest of posts constructed at close intervals. Such developments are usually over terminals, marshalling yards or single tracks that

have limited slow traffic. There are fewer problems in building over rights-of-way of light subway trains than in construction over tracks used by fast moving, heavily-laden freight trains. In the latter case, expensive collision walls are often required to contain possible derailments, and costly foundations which reduce vibration also may be necessary. Special fencing and patrols to prevent trespassing can also be costly. Right-of-way lighting, if provided, is usually inexpensive, and forced ventilation may not be necessary. Financing can entail problems since airspace projects must be released from blanket revenue debenture bonds or consolidated mortgages which normally cover all railroad property and rolling stock.

In contrast, airspace structures built over freeways require much longer spans and greater consideration of noxious fumes and noise; freeway noise is generally less but more constant than that of railroads and subways. Right-of-way lighting is more critical in freeway projects, but protection from the collision of light vehicles is less consequential.

- b. Railroad and Subway Terminals - The use of airspace over passenger terminals is well established, largely because early land purchases by the railroads often preceded downtown development; many of the terminal facilities in central areas are now near the concentrations of highest land values. Aside from scarcity of downtown land, impetus for terminal airspace use derives from the fact that advantages accrue to land users who are near convenient transportation and great concentrations of people. The Pan Am Building next to and over the New York Grand Central Terminal benefits from these advantages, as will the new Madison Square Garden project.

The most recent and imaginative use of transportation terminal airspace is in Montreal, Canada. The newly-opened Metro, a rubber-tired, bus-train subway under the streets, features adjacent small terminals that are to be surrounded by buildings constructed on leased air rights. The airspace structures will have retail shops facing the subway lobby and multistory office buildings above. This development is carried on by the city of Montreal which packages the air rights using the slogan "Two Million People in Your Basement." An emphyteutic or French long-term lease is made for 60 years plus three to four years to allow for construction. Broad expropriation (condemnation) laws make it possible to purchase extra property and lease the majority of the space to private interests. The city benefits from direct lease revenue, possessory tax income and sales taxes from newly-created retail stores.

- c. Toll Road Conveniences - Toll roads are planned as self-sustaining facilities that will be supported by the users. This type of road system serves captive motorists whose tolls are used to pay off the highway debt; the extra conveniences usually provided for motorists also generate income. The already discussed Oasis projects in the Chicago area are examples of such added conveniences; the revenues

and services of the Oasis restaurants and service stations provide assets to the toll road system, to the community and to the traveler.

The engineering problems of building over these quasi-public road facilities are directly comparable to the problems of building over the tax-supported California highways, although the fundamental ownership and scope of authority differ considerably.

- d. California Highway Projects - In contrast to toll roads, California freeways offer the traveler freedom of choice in products and services purchased adjacent to the right-of-way. Private enterprise in California has sought key locations to serve the demand of freeway travelers, and the petroleum industry and others engaged in roadside business would not welcome controlled competition, even if it were legally possible to establish.

Current highway airspace projects in California generally follow the Federal regulations set forth in Instructional Memorandum 21-3-62 where the most important rules relating to type of use are those prohibiting inflammables and direct access to any commercial enterprise. To date, California projects have been limited to parking areas under viaduct freeway structures. All space is on a short-term lease that allows some form of automobile parking or storage but prohibits construction of buildings.

A 1964 monograph by the Automotive Safety Foundation entitled Freeway-Parking Developments lists the salient characteristics (and problems) of freeway parking projects. The summary conclusions are as follows: "1) Existing urban freeways generally have been built too far from the core of the Central Business District for air rights parking developments to serve the highest parking demand. 2) Air rights parking facilities on existing urban freeways have been developed at a reasonable cost to serve all day worker and specialized parking demands."

Parking is the use most compatible with freeways since automobile noise and fumes are problems that arise from both. Airspace multilevel parking structures could be built if there were sufficient demand and if the venture were economically feasible or the cost could otherwise be justified.

## 2. Freeway Airspace Criteria

We have studied the characteristics of existing and currently proposed airspace developments to determine the factors underlying successful freeway projects. The basic elements of success apply equally to private and public developers, except that public improvements might be evaluated on the basis of social benefit rather than solely on the basis of cash investment return. The two primary considerations in an airspace project are location and economic feasibility.

a. Locational Criteria

The standard requirements and objectives for a normal site apply to airspace developments, although the effect of the freeway right-of-way will have to be carefully determined. Some uses are more compatible with the right-of-way than others. For example, a parking garage is most compatible; and office space uses, as proven by the many existing railroad and highway airspace buildings, are also very suited. The tenants of office buildings are active and are usually enclosed in an air-conditioned environment with carpeted floors and suspended ceilings that dampen noise. Conversely, the occupants of apartment buildings -- even buildings with the same quality of insulation and air-conditioning -- often may be disturbed by freeway noise, especially during sleeping hours.

b. Economic Criteria

The probability of higher development costs will usually restrict airspace projects to particular uses. The basic site requirements and land carrying capacities of land uses vary. For example, parking garages often do not require large sites but are only average revenue producers; at best, they are only able to sustain land values of about \$50.00 per square foot. Office buildings that accommodate a high concentration of tenants at expensive rates may be able to sustain up to double this value. On the West Coast, the experience has been that developers of luxury high-rise apartments pay under \$25.00 per square foot. Under proper circumstances all of these uses might be considered for freeway airspace developments.

In contrast, the large land area that must be acquired to meet parking needs of food markets in neighborhood shopping centers results in substantially lower per square foot land values. In concentrated sections of Los Angeles, land values for free-standing markets may range from \$7.00 to \$10.00 per square foot. A regional shopping center would be likely to pay only \$2.00 to \$3.00 per square foot. With the basic airspace platform costs of at least \$17.00 per square foot, it is obvious that neighborhood or regional shopping center uses are not particularly feasible. Although some airspace could be acquired to augment an otherwise unusable site, neighborhood markets on airspace are likely to remain a rarity. The Star Market in Newtonville, Massachusetts might be considered in this category but, except for possible locational identity to passing motorists who have no direct access to this facility, there can be little economic gain attributed to the use of airspace for this market. Our preliminary investigation indicates that Newtonville commercial land is available at \$3.00 to \$5.00 per square foot, that the tenant is obligated to pay annual airspace rent based on approximately 60 percent of the fee value of surrounding land, and that the Massachusetts Turnpike Authority paid for a retaining wall at the edge of the highway but that the tenant was generally responsible for all other (higher) foundation costs. These economic

factors indicate that this particular market is likely to be a misplaced improvement.

F. Freeway Structures and Timing

To a large extent, the structure of the freeway itself will control the potential for airspace development. It is likely that the depressed rights-of-way will attract the most airspace development; in addition, it is generally conceded that this type of freeway design has the least effect on adjacent land values. Our technical interviews with qualified experts and the work of Kaiser Engineers (see Engineering Concepts section) indicate that it is possible to build over operating freeways but that the costs are higher than when planning and construction of airspace projects and freeways are coordinated.

1. Types of Freeway Structures

The fundamental freeway structures and their airspace development possibilities are as follows:

<u>Freeway Profile</u>	<u>Airspace Possibilities</u>
Subterranean Tunnel	At or above surface
On-Grade	Elevated
Elevated on Fill	Beneath or elevated above
Elevated on Viaduct	Beneath or elevated above

There are many variations to these basic structures. For example, it may be economically feasible to build a subterranean basement, to construct facilities at grade under a viaduct and to surround the freeway with uses elevated above the right-of-way. Under certain circumstances, cantilever construction may be an effective design to utilize elevated airspace. In New York City, a platform at the base of the United Nations Building is a cantilever that juts out over an expressway next to the East River; the motorist is not particularly aware of this platform because he maintains a full view of the river. The Sutton Place apartments farther to the north are constructed over the same expressway, but a series of posts along the edge of the highway support these buildings. Lighting and ventilation are minimal problems under these circumstances.

2. Future Freeway Expansion

There is no refuting the fact that elevated airspace projects on some form of bridge over a freeway limit or hamper future freeway expansion. Eight lanes plus two transitional speed or ramp access lanes are becoming standard in California freeway construction, but it is often necessary to widen older freeways or raise the overpasses. If there are a minimum of obstructions, it may be possible to double deck some of the older routes that are now particularly congested.

Airspace developments could reduce the number of alternate routes and adversely affect the flow of national defense materials, but good planning and careful projections of future freeway needs should make it possible to

standardize airspace requirements for entire freeway rights-of-way, or at least for large segments thereof.

### 3. Construction Timing

Highway engineers are in complete agreement that the optimum time to develop airspace is at the inception of the freeway design when the right-of-way may be properly modified. Drainage structures, retaining walls, foundation supports and other requirements can then be provided with minimum disruption and cost. Like the Bridge Apartments in New York City and the Prudential Tower in Boston, the development of airspace can also be coordinated with the improvement of the right-of-way. However, such coordinated construction is a goal or ideal that probably will be the exception rather than the rule. Private interests and many public bodies simply cannot afford the several years and general uncertainty involved in highway planning, design, land acquisition and phased construction.

It is reasonable to believe that, unless adequate planning is undertaken, freeway airspace developments will continue to be subsequent projects or by-products. From the engineering standpoint, future airspace should be planned and set aside in advance at the inception of the design. As in the past, extra costs must be justified, but the goal of blending freeways into the fabric of a community is desirable. In a manner similar to urban renewal, cities can assemble large areas for public or private airspace use; but if extra costs are to be borne by the state in advance of needs, legislative decisions and authorization will be required.

## G. Problems of Using Freeway Airspace

The basic problems of using airspace fall into two categories: first, there are the general shortcomings of using this medium to encumber otherwise unrestricted land; and second, there are the nagging questions that highway officials, local jurisdictions and airspace developers are asking themselves and each other. These interwoven problems are discussed in this subchapter according to the parties most likely to be affected, and many of the adverse arguments to use of airspace are rebutted in the following subchapter, Benefits of Using Freeway Airspace. Given an economically feasible project, many of the seemingly insurmountable problems can be solved by skillful engineering and by determined cooperation between state and local governments.

### 1. Fundamental Problems

Accepting the premises that freeway construction cannot be impeded and that the free flow of traffic cannot be restricted, there are fundamental problems in the use of freeway airspace. Some of these problems will have to be answered in connection with specific projects, but other issues will have to be researched intensively before substantial airspace development takes place. Some of the physical, environmental and sociological problems are the following:

#### a. Higher Costs

The initial construction costs of an airspace project may be substantially higher than the cost of building on an equally suitable, nonfreeway site within the same area. Carrying charges or operating costs for both the airspace developer and the highway administrators could be burdensome, if not properly handled. The cost of required bridge structures of long span, the inability for a developer to wait for a new freeway to be completed, the added use restrictions and the necessary government controls all tend to discourage freeway airspace development.

#### b. Environmental Problems

Proper engineering and architectural design can solve many of the practical problems that hinder the use of airspace, but there is limited experience from which to measure the impact of the rights-of-way on airspace projects and the effects of airspace developments on highways. Noise, fumes and vibration from the freeway can probably be adequately controlled, but the visual impact of overhead buildings on motorists is often difficult to determine. These and other subjects will require research.

#### c. Sociological Problems

The use of airspace can either ease or complicate congestion within central business district areas. Traffic balance can be influenced by using airspace outside the most congested areas or by intensifying uses within central areas; for instance, downtown apartment uses would reduce commuter traffic, but more office structures might aggravate conditions.

A corollary to this problem is the advisability of relocating people and businesses within a freeway right-of-way. Most city dwellers are accustomed to noise and fumes, and the poor have to be more tolerant than persons who can afford to choose from a broader variety of housing types and locations, but housing over a freeway is not necessarily ideal. As demonstrated by the Sutton Place apartment buildings over the East River Expressway in New York City, high-rise apartments can be compatible with freeways under proper circumstances. We suspect, however, that it would be economically feasible to relocate only a small portion of people or businesses.

### 2. Problems of State Government

The goal of making full multiple use of state-owned freeway land conflicts with the highway department's primary purpose of providing rapid and unimpeded flow of traffic. The impact of an airspace project on a highly restricted right-of-way is a vital issue, and the first concern must be to protect the present investment in the freeway land which is already intensively used. It must be assumed that airspace projects will continue to be incidental, that they will not conflict with the use of the right-of-



way and that they will not disrupt these vital access routes. Some of the particular problems that face state and Federal highway officials are the following:

a. Physical Problems

Hazards to the motorist are of primary concern. Hazardous conditions might derive, for instance, from freeway traffic congestion created by a major building being poorly placed too close to a freeway ramp. The possibility of objects being thrown onto the right-of-way is also of concern, but the simplest means of prevention is to extend the airspace platform coverage over the right-of-way. Greater deck coverage, however, may result in more subtle objections, for motorists may be subjected to the visual impact of going from sunlight into a dark tunnel. The steady surge of traffic and West Coast high speeds complicate these and other possible hazards.

The freeway is a long-life asset, and the shorter life of airspace projects may result in obsolete or abandoned structures. Abandonment of improvements could also result from the failure of the airspace lessees' businesses. The obvious answer is for the state to demand lease restrictions which will allow a lender to cure any deficiencies, but if not carefully handled, such restriction would directly affect a private lessee's ability to finance a project. The answer to this series of dilemmas is to adopt some of the lease practices of the railroads which for years have dealt with similar problems.

b. Possible Encumbrance of Future Freeway Expansion

There is a contention that the sale or long-term lease of airspace may encumber future freeway expansion that might involve different engineering techniques. This line of reasoning is only partially valid, since it might be unrealistic to double deck or widen particular rights-of-way in any event. For example, one might question the logic of expanding the six-lane, serpentine Pasadena Freeway that is now 27 years old; it probably would be more practical to acquire more land and construct an entirely new facility.

Viaduct parking structures on short-term leases with cancellation clauses do not impede future highway expansion and are an excellent means of making remnant parcels productive, but greater multiple use of land might be made. Bridge-type airspace projects do confine highway expansion, both horizontally and vertically; therefore, the possible need for expansion is a problem for highway officials. There is also the possibility that the airspace developer would need to expand his property rights.

c. Administrative Burden

The expanded use of freeway airspace will be felt by most of the Division of Highways' departments, although the amount of burden

will depend upon whether a passive or aggressive program is adopted. Except for parking projects, there has been little California activity since enabling legislation was enacted in 1961. An aggressive statewide program, however, would require adequate staff at state and Federal levels, but increased administrative costs must be viewed in conjunction with new revenue, possessory tax income and the socially desirable objectives of making freeway land more productive.

d. New Land Management Role

There are a group of complex problems that relate to the advanced planning, the packaging and the supervision of airspace. Highway engineers and officials have been responsible for planning and constructing highways, and they are not oriented to the development of real estate for miscellaneous uses. As evidenced by the coordinated administration of parking projects, the Division of Highways and the Bureau of Public Roads have the fundamental mechanism to assemble, acquire, price and sell unneeded real estate; but the wholesale disposal of airspace will require new capability. There have been suggestions that airspace be used for the relocation of the persons displaced by land acquisition for freeway purposes, and such a plan would involve the state in many of the problems that face an urban renewal agency. Aggravating all of these management concerns is the knowledge that it is better to build airspace projects in conjunction with freeways than after the freeway is in operation, that it is difficult for the state to acquire excess land and that there may be objections that the state is in the real estate business.

e. Withholding of Air Rights

Land owners often sell their property but retain useless mineral rights that only tend to cloud the title. There is the possibility that air rights will also be cherished indiscriminately as a part of ownership, regardless of the fact that airspace can only be used under special circumstances.

3. Problems of Local Government

In spite of the fact that the California Transportation Agency has stated that local approval of zoning is required before state consideration of an airspace application, the local jurisdictions are fearful of state intervention. Local governments are concerned that the state alone will decide what is to be done with freeway airspace and will dispose of these rights without consultation. The state holds fee title to the airspace, but there are problems of jurisdiction and control that worry local governments. Other local concerns are as follows:

a. Loss of Open Space

Los Angeles Beautiful and others have expressed their concern that intensive multiple use of highway airspace will result in loss of

desirable open space through elimination of landscaped travel corridors. This is a worthwhile concern, but in reality only a small portion of the freeway airspace could be developed.

b. Traffic Impact on Local Streets

There is concern that central business districts will be further congested by intensification of uses. The reverse may actually be true, since congestion can be reduced by building on airspace on the margin of downtown areas and by using airspace to create central area parking structures.

c. Airspace Impact on Abutting Uses

State ownership of the fee title to freeway land minimizes the legal problems of abutting owners' rights since all access rights have been acquired, but surrounding owners still have rights to light, air and view (both to and from their properties). There is a possibility that intensive airspace construction along a corridor could be detrimental to the values of the contiguous properties. Two hypothetical examples illustrate this point. An engineering report of the city of Los Angeles proposed that parking structures be built on the airspace over the Hollywood-Santa Ana Freeway ("the slot") adjacent to the north of the Civic Center. Because of the need for parking and the particular topography in the area, this reasonable use probably would enhance rather than depreciate adjacent property. The second example involves the Harbor Freeway which forms the west boundary of downtown Los Angeles. Many oil companies and others sought sites adjacent to this key stretch of freeway as a form of institutional advertising; but if portions of the freeway were enclosed, it is probable that the value of the prominent high-rise office buildings and adjacent land would be diminished. These examples indicate that the net benefits of developing airspace must be carefully determined, and that proposals for individual projects must be analyzed with care.

4. Problems to the Developer

Private developers will look at the extra costs and greater business risks of building on airspace. Highway officials, therefore, must formulate standard policies and procedures to minimize objections such as the following:

- a. Standardized requirements for construction are presently lacking.
- b. Costs are more difficult to anticipate.
- c. There is an apparent lack of a central department or authority to assist the developer.
- d. The developer is not encouraged by the prospect of extensive local, state and Federal government control.

H. Benefits of Using Freeway Airspace

The positive aspects of the use of airspace over existing and proposed freeways are difficult to measure, for in addition to the direct assets, there are more subtle benefits such as the possible relocation of people or businesses that would normally have to be dislocated by freeway construction. The greatest benefits, however, will usually occur with privately-owned developments that will produce new lease income for the state, important possessory tax revenues for local government and desirable social improvements. Significant benefits to the state, the local governments, and the airspace developers are briefly discussed in the following paragraphs.

1. General Benefits

Judicious use of freeway airspace will result in a variety of general benefits, some of which are discussed below.

a. Multiple Use of Old Rights-of-Way

It is becoming increasingly difficult to justify only one use of land, particularly in downtown areas. Central business districts need rapid automobile access, but these areas are so intensely developed that it is now impossible to acquire a central area freeway right-of-way without wholesale destruction of values. The Manhattan area of New York City and the Ginza section of Tokyo (see Addenda photograph) are examples of congested central city areas where concentrated use is being made of transportation rights-of-way.

By taking maximum advantage of now unused airspace above freeways, it may be possible to benefit the motorist and the general taxpayer. Office buildings or other possible projects might defray part of the cost of the basic right-of-way and also balance development in other parts of the city. Any well-planned project that in some way helps to eliminate peak-hour congestion -- thereby adding convenience to the motorist -- would be of inestimable benefit.

b. Creation of New "Land"

Freeway airspace that can be economically developed represents newfound "land", some of which is in congested areas where there is scarcity of land. Conflicts often arise over the pressing needs of government and private industry for sites in these congested areas. More plentiful supply will help to relieve the problem by reducing land prices, but it is important to note that an increase in the supply of land is not necessarily accompanied by a corresponding increase in market demand.

c. Reduction of the Barrier Effect of Freeways

Present viaduct parking developments partially counteract the disruptive effect of new freeways that cut or divide urban areas. An elevated right-of-way on fill can provide a desirable barrier

under proper circumstances, but the splitting effect can be particularly detrimental to established commercial areas. The use of airspace provides an aesthetic means of blending the highway into the community and may reduce local resentment. The possibility of airspace projects may also modulate resistance in communities that are in need of a freeway but balk at the loss of tax-profitable property. Prized locations might thus be preserved.

d. Airspace as a Solution to Acquisition Difficulties

Many highway officials believe that, besides providing revenue, airspace could prove a useful tool in solving difficult right-of-way acquisition problems. Airspace might provide valuable trade equity, and it is possible that severance damage could be reduced by consolidating land remnants with airspace. In addition, savings in freeway construction might be accomplished by such means as retaining fill dirt to improve remnants or constructing rough freeway structures that would be enclosed or screened by airspace uses.

Urban renewal agencies allow former owners to participate in the final planned project after the areas are cleared. Even though freeway construction problems differ, this concept may have some application to freeway projects. Under proper circumstances, the Division of Highways might acquire less than a fee interest, and the owner might be allowed to improve the airspace within specified limits.

e. Relocation Within the Right-of-Way

The social expense of relocating residents and operating business concerns might sometimes be saved. There is an expressed hope that residents in the path of a freeway can be relocated in housing built on the airspace over the right-of-way. This is usually just a paper solution because such a plan would be economically feasible only under ideal circumstances and would only be possible in multifamily residential areas. Also, although studies indicate that displaced residents usually relocate in the same locale, there is no assurance that people will remain to occupy the airspace housing.

The publicized Center Leg Joint Housing and Freeway Project in Washington, D.C. is a proposed program for the phased construction of new housing to replace the buildings that must be demolished for a needed freeway. This project is close to the nation's capitol in a low-income neighborhood surrounded by land that is said to have a value of \$22.00 per square foot. Cost estimates indicate that the freeway deck (or man-made "land") will cost substantially less than this amount. The relatively equal land values and the savings in social displacement may make this project feasible; however, rent subsidies will be required to relocate most of the 196 families.

2. Local Benefits

Communities can directly benefit by the full utilization of important portions of freeway land and by the new sources of revenue that such use will provide. A short discussion of these and other local assets follows:

a. Retention and Increase of Land Supply

By using airspace, part of the land formerly lost to freeways can be retained, and the needed access to congested areas can still be provided. The airspace can be used for civic projects like the civic center in Fall River, Massachusetts or the public library in Hartford, Connecticut. Private use of airspace is even more important since such uses can usually be taxed.

b. New Revenue Sources

California law allows possessory interests in leasehold property to be taxed by the local city or county. Through leased airspace projects, some of the property demolished by needed freeway rights-of-way could be retained on tax rolls. Also, prosperous downtown businesses might be saved and incorporated into the right-of-way, with the result that sales revenues could be retained or increased in an area where access and land use have been improved.

There is little question that the use of airspace can provide important local revenue; however, a note of caution is necessary. The net income is worth pursuing, but there may be expenses involved, particularly if special community services must be provided. It also should be noted that if local tax concessions are made, they must be weighed against direct revenue and possible increases in sales taxes or other benefits. For example, the Bridge Apartments in New York City enjoy reduced possessory taxes for a period of years.

c. Revenue Sources for Bonding

In particular instances, it may be desirable for a city to acquire bulk airspace (or acquire property, sell highway access routes and reserve the airspace) and thus create space for private development. Such a venture might be financed by the revenue from the completed project. The city of Philadelphia has been developing projects in this manner. It is also possible to elevate a highway on a viaduct to allow maximum airspace use, but the extra construction costs usually must be underwritten by local government. The city and county of San Francisco have for some time been using the airspace over public garages which are indirectly supported by the airspace buildings. A similar project has been proposed in the city of Sacramento; the plans for the development to be located at 10th and L Streets call for construction of an eight-story garage topped by a 17-story major hotel.

### 3. Benefits to Airspace Developer

The airspace developer or investor stands to benefit from relative savings in lower overall land and project costs and/or in the ability to capitalize on a location otherwise impossible to obtain. Already established demand in a land-scarce area may be satisfied, and the cumulative business attraction of surrounding stores may also be of value. Other advantages might be the following:

#### a. Unique Locations

By the use of airspace, it might be possible to obtain unusual views or valuable exposure to traffic. As explained in the architectural section of this report, a view of moving traffic can benefit businesses located in airspace projects.

#### b. Land Assemblage Benefits

Private developers often find it impossible to assemble a suitably-sized site at a proper location. Land may be scarce, or assemblage may be impossible because the developer lacks condemnation power. However, the joint objectives of a city to renew a particular area and of the state to provide necessary freeway access can include the developer who is the key to realizing the full rehabilitation of an area.

### I. Current Policy

Our analyses of the present state and Federal policies for handling air rights are based on our numerous interviews with responsible highway officials, research in published and unpublished articles and speeches, review of pertinent legislation and careful examination of internal procedural directives. Policy and procedure are intertwined, but it is clear that the intent of both the California Transportation Agency and the U.S. Bureau of Public Roads is to handle all highway monies as trust funds to be disbursed in provision of maximum benefits to motorists. The fine extant highway system is visible evidence of this prudent and conservative course of action. There have been numerous speeches of great expectation for the use of airspace and the bountiful revenue that might be produced, but there also has been quiet disappointment over the small number of applications that have been received since more adequate airspace legislation was enacted in 1961.

The sequence of events appears to have been that the State of California was aggressive in stimulating initial legislation at the national level, that concurrent state legislation followed this, and that basic administrative procedure was set up at both the national and state levels to approve or disapprove applications submitted by potential developers.

#### 1. California Transportation Agency Policy

The California Highway Commission Resolution of December 1964 made extensive changes in the previous policy that limited air right leases to five years, that prohibited construction of building improvements and that called for competitive bidding. The commission indicated that they would

consider long-term leases and adopt an offer and proposal format which calls for a developer to submit his plans and offers to rent specific space.

The corresponding procedure dictated by the State Highway Engineer, discussed more fully in the following subchapter, indicates that applications must have the advance approval of the city or local jurisdictions, to the effect that the contemplated project does not conflict with local planning or zoning ordinances. The local district office of the Division of Highways must also certify that the proposal does not conflict with any highway changes in the foreseeable future.

Another expressed state policy is that highway funds may not be used to pay for added foundations or special highway costs, except where funds receive adequate investment return and are of benefit to the general public in terms of general land values. Cities are normally given first right of refusal for the use of air rights in their jurisdiction, but they too must pay for airspace use. For example, one city wanted a free community parking lot and, although the state legislature responded with the 1965 amendment to Section 104.12 of the Streets and Highway Code, they limited free use to emergency vehicles. The state constitution (Article IV, Section 31) does not allow gifts of public land.

### 2. U.S. Bureau of Public Roads Policy

In airspace matters, California must comply with all Bureau standards for interstate routes and the same requirements are usually applied to state routes. The Bureau, acting in behalf of the Secretary of Commerce, prohibits Federal financing of any charges beyond the normal cost of freeway construction. Utilization of highway airspace must be initiated by the state, and the Bureau will then take the state's recommendation and rule on the legality and technical aspects of the use within their purview. The Bureau exercises full authority over the nature and term of proposed airspace uses, the general design of facilities, advance arrangements for emergency maintenance procedure and other matters. Like California, the Bureau operates under broad legal authority for the utilization of airspace, and they are proceeding cautiously. Also like California, the Bureau has taken a passive role which is generally restricted to the approval or disapproval of submitted applications. There is a recent policy shift, however, to stimulate greater use of airspace and an obvious trend toward liberalization and toward research aimed at making air rights more usable. This trend is encouraging; but in order to be effective, a program with better defined goals will have to be established.

Other U.S. Bureau of Public Roads policy is as follows:

#### a. States Receive Leasehold Revenue

The Bureau will not participate in any funding beyond the normal cost of a freeway; and partly because of this, they have taken the position that they will not share in the leasehold revenue from the use of airspace. A similar stand has been taken in the case of income from subsurface oil rights. This is a sound position

because the use of airspace imposes a greater administrative burden on the state than on the Bureau and also because the right to receive all income proceeds stimulates the state to make multiple use of freeway land.

Several steps led to the Bureau's established decision not to share in airspace rental revenue. Following the 1961 Federal amendment and just prior to the issuance of IM 21-3-62, the Bureau, through the Assistant Secretary of Commerce, requested an opinion from the U.S. Comptroller General. The Comptroller General responded to the effect that Congress had not considered the question and there was considerable doubt that the Bureau had authority to require a share. The Instructional Memorandum, Item 22, then directed that the "disposition of income received from the authorized use of airspace will be the responsibility of the states."

A further but unsuccessful effort was made by the General Accounting Office which recommended that congressional legislation be enacted to resolve the matter. The subsequent Congressional Bill HR 12143, as drafted, required that the United States should participate in the net proceeds in the same ratio that it participated in the cost of the right-of-way, but this bill died with the adjournment of the 88th Congress.

The foregoing established policy of no share in the revenue applies where the airspace is leased. In the event of sale, Federal participation in the proceeds follows a formula as detailed in IM 21-1-65, entitled "Right-of-Way Excess Takings."

b. Construction Guidelines

Highway engineers, both Federal and state, are concerned that the freeways should not be forced into closed tunnels for the sake of developing airspace. This concern is not for aesthetic reasons only. Tunnels have the disadvantages of being more expensive to build, more costly to maintain and often more hazardous to motorists. There is no policy against tunnels, but there is an obvious reluctance to allow extensive building that may enclose a right-of-way.

The policy of not allowing an airspace improvement to touch the underside of a freeway viaduct is also important. According to Item 3 of IM 21-3-62, eight feet of clearance between the bottom of a viaduct and the roof of an airspace improvement are required. A proposed, but city-declined, Safeway Market improvement to be built in Sacramento, California led to a modification of this rule; the proposed building plans called for six inches of clearance and a special mechanism to flood the roof in the event of fire.

3. Policies of Local Communities

The policy of the many cities of California might best be summarized by quoting from the "Resolution Regarding Procedures For the Utilization of

Air Space Over and Under Freeways" adopted by the General Assembly of the League of California Cities at their annual conference held in San Diego on October 19, 1966. Excerpts from this two-page resolution by the Mayors' and Councilmen's Department are as follows:

"WHEREAS, the selective use of air space over and under freeways for parks, recreation facilities, public buildings and certain private developments can improve substantially the opportunity for realistic community planning; now, therefore, be it RESOLVED . . . ~~that~~ in order to insure that public agencies may participate fully in the utilization of air space over and under freeways in California ~~we~~ recommend that the following statement of principles be adopted by the Department of Public Works.

- "1. In permitting the use of air space over and under freeways, the most careful consideration must be given to preserve whatever rights are necessary to assure that the efficient and safe use of the highway facility will not be impaired in any way and further that the rights of the highway authorities to do whatever is necessary in the way of maintenance of the highway facility are not limited by the air space development.
- "2. The use of the space over and under the highway must remain as an incident to the proper location and design of the highway project.
- "3. In considering air space development, public uses which contribute to the aesthetic, cultural, recreational, public building or other desirable public needs of the community should be given prior consideration.
- "4. In the case of development for public or private use, the proposal must be approved by the local agency responsible for zoning administration as well as the state regarding compatibility with highway uses and plans before any commitment is made to the proposed developer.
- "5. When private interests desire to develop air space for private use, the community values shall be considered with full play of fair market concepts prevailing when other factors of the proposals are equal.
- "6. State and local agencies should establish an early and continuous relationship for the coordination of planning, exchange of pertinent information and the preparation of policy guidelines prior to and during the development of the air space."

J. Current Procedure

Present handling of applications for use of interstate airspace must begin at the local level, since the Division of Highways requires that proposals first be

discussed and certified by local authorities to be sure that there is no conflict with planning and zoning ordinances. The second step is for the district office of the Division to certify that the project will not conflict with probable high-way expansion. The Division then reviews the proposal and transmits the completed file to the U.S. Bureau of Public Roads which makes the final decision. This is the procedure set forth in the Instructional Memorandum and circular letters. In practice, applications filter through the respective departments with the general guidance of the Deputy State Highway Engineer--Planning. The best evidence of current administrative procedure is the handling of viaduct parking leases; the procedure is adequate for the present low level of activity in airspace development, but if applications increase appreciably, more sophisticated methodology will be required.

1. State Procedure

The Division of Highways procedure is set forth in three circular letters, all of which expire August 7, 1967. The present system, as outlined in these circular letters, and our comments based on our research are discussed in the following paragraphs.

a. Circular Letter No. 62-224

This letter, issued August 7, 1962, is the basic state procedural document that implements and expands the Federal Instructional Memorandum. The third paragraph of this procedural guide states that, "For the present time our only request will cover the purpose of parking of motor vehicles." Abstracted portions of the three-page body of this directive are as follows:

Section A, Interstate - Requests from the district offices are to be routed through Headquarters to the Bureau. A form lease shall be used as a guide in preparing leases for space over or under either state or interstate systems.

Section B, Freeway Lease Areas Generally - Airspace leases made under Section 104.12 of the Streets and Highway Code shall be made subject to such reservations and restrictions as the department deems necessary. The statute does not require competitive bidding when leasing to public entities; however, such leases with private entities shall only be made after competitive bidding, unless the Commission determines by unanimous vote that in certain cases competitive bidding would not be in the best interest of the state. As a matter of policy, the Commission shall approve all leases, both to public and to private entities, in cases where there is no competitive bidding.

Highlights of the stated policy and procedure to be followed in conforming with the requirements of the Highway Commission are as follows:

- a) The district shall submit a full report setting forth the facts to justify the district's conclusions that

it is in the best interest of the state to enter into a lease without calling for competitive bids.

- b) The lease agreement shall retain authority for the state to enter upon the demised premises for necessary maintenance or reconstruction.
- c) The department shall determine that the proposed use is not in conflict with the zoning regulations of the local government concerned. (This procedure should be followed and is of utmost importance in maintaining harmonious relationships with the local jurisdictions.)
- d) Lease agreements shall contain other conditions that the department deems necessary.

The exhibits attached to Circular Letter No. 62-224 are as follows:

Exhibit A, Bureau of Public Roads, IM 21-3-62 - This is discussed under Federal procedure in Section 2 of this subchapter.

Exhibit B, Standard Lease Form - This 15-page lease form has now been superseded by an approved sample lease form adopted by the Bureau of Public Roads as of September 15, 1966.

Exhibit C, Notice of Call for Bids - This terse, one-page notice identifies the lease area and sets forth the minimum acceptable bid amount and the time and place that sealed bids will be opened.

Exhibit D, Other Lease Provisions - The significant lease requirements are that uses will be limited to parking of automobiles, buses and trucks. No storage of material, automotive equipment, or supplies of any nature will be permitted, and no improvements will be placed on the lease premises unless approved by the lessor. The lease is to call for a flat monthly rental for five years, subject to 90 days written notice of cancellation by either party. (In effect, there is no lease because of the very permissive cancellation option.)

Exhibit E, Proposal for Leasing of Parking Space - This one-page form identifies the lease area, sets forth the monthly rental rate under the five-year lease and identifies the bidder.

Exhibit F, California Highway Commission Resolution of April 25, 1962 - Important elements of this resolution are included in the above discussion.

b. Circular Letter No. 65-11

This two-page letter, issued January 12, 1965, transmits the broad policy change brought about by the December 16, 1964 Resolution of the California Highway Commission. The change is summarized as follows in the first paragraph: "It now appears to be in the best interest of the state to encourage the construction of building improvements in a space under or over state highways." To assist this more intensive and economic use of state-owned lands, the California Highway Commission has approved the use of an offer and proposal format for securing bids on available airspace; this format is to be used in lieu of standard competitive bidding procedures where building construction appears to be feasible. Leases that do not involve building improvements follow the procedure outlined in Circular Letter No. 62-224.

Circular Letter No. 65-11 includes the requirements that all plans or proposals for construction of building improvements be directed to the Deputy State Highway Engineer--Planning, and the requirement that in each case a full report be prepared by the district to the effect that the proposal does not conflict with future highway expansion and that the proposal complies with local planning and zoning ordinances. After approval of each proposal, the Deputy State Highway Engineer--Planning will prepare brochures describing the space to be offered for lease and widely advertise the offering to assure that potential developers are reached. (This procedure appears workable in the case of the district taking the initiative to work with local jurisdictions to advance a plan and then explore an airspace inventory for lease. However, if a developer originates a proposal -- which entails preparing plans and obtaining local city and district approval -- and the space is then widely advertised for other bids, the original proposal could be discouraged at its inception. Other forms of disposition also should be considered.)

Circular Letter No. 65-11 also states that all offers and proposals to lease and develop airspace will be evaluated by the District Design and Right-of-Way Departments, and the advice of the Bridge Department and the State Division of Architecture will be secured when it appears desirable. Each development proposal will be discussed with the technical staff of the local authority within whose jurisdiction the proposed development lies, and written comments will be secured from the local staff. After obtaining the necessary comments and approvals, the district will submit a final report to the Deputy State Highway Engineer--Planning who will recommend action to the California Highway Commission.

The two exhibits attached to the letter are:

Exhibit A, California Highway Commission Resolution of December 16, 1964 - Besides indicating that they will be receptive to an offer and proposal format for awarding leases involving building improvements, the Commission indicates herein that they will entertain long-term leases

of periods sufficient to permit amortization of building costs. The Commission again reinforces the stand that a proposal should not be in conflict with the zoning regulations of local governments who are responsible for the protection of land uses abutting and adjacent to freeways.

Exhibit B, Offer and Proposal for Lease and Development - This three-page document, which is addressed to the District Engineer, is to be completed by the airspace developer. In addition to requiring answers to specific questions about the developer's proposal, the form serves as a check sheet of the documents that are required by the state.

c. Circular Letter No. 65-126

This two-page letter pertains to the use of airspace under viaducts for building improvements. The letter points out that, although a clearance of at least eight feet between the underside of a highway structure and the airspace use was required in Federal IM 21-3-62, the clearance requirement was waived in a specific case where the highway structure was of reinforced concrete, where the building was of fireproof construction and where a minimum clearance of three feet would be desirable. Other desirable design changes with reference to vertical clearance are summarized in the letter.

2. Federal Procedure

Current Bureau of Public Roads procedure is outlined in IM 21-3-62, Use of Airspace on the Interstate System. Following the June 29, 1961 approved amendment to Section 111 of Title 23 of the United States Code and during the interim period before this memorandum was issued on May 4, 1962, policy guidelines were outlined in the American Association of State Highway Officials Guide (An Information Guide on Air Rights Above and Below Interstate Highways) as approved by the Committee on Planning and Design Policy on October 6, 1961. This guide, which is a means of updating procedural memoranda, was in the process of being revised on September 30, 1966, with the possibility that A.A.S.H.O. might: 1) publish a revised guide that would be withdrawn when the Bureau general council revises its Instructional Memorandum or, 2) obtain the approval of the executive committee of A.A.S.H.O. or accept the planning and design policy committee's revision of the guide and send it to the Federal Highway Administrator with the suggestion that it be incorporated into the Instructional Memorandum. At the time of this writing, the Bureau is in the process of updating its 1962 Instructional Memorandum and plans to issue a Policy and Procedure Memorandum which may be known as PPM 80-5. We are advised that this procedural memorandum is already drafted and is now being reviewed by the operating departments but that it is not approved. The PPM draft is said to follow generally the draft of the revised A.A.S.H.O. Guide which is discussed later in this subsection.

a. IM 21-3-62

A copy of this important and detailed memorandum is included in the Addenda of our report. As discussed previously, the requirement for an eight-foot clearance area below viaducts has been modified, and a three-foot crawl space between the bottom of the freeway structure and the top of the airspace improvement has been deemed acceptable.

Items 4 through 8 of IM 21-3-62 pertain to structural guidelines, including tunnel lengths and the possible necessity for tunnel ventilation. Item 9 states that the occupancy and use of the airspace shall not be hazardous or objectionable. Item 10 pertains to signs and indicates that policy is flexible but subject to Bureau approval. Item 11 states that there will be no permanent or temporary change of alignment or profile of the highway during airspace construction. Policy with respect to highway maintenance is outlined in Item 12; and Item 13 establishes that any special highway costs, such as lighting or ventilation, will be at the expense of the state (the state will, in turn, place the financial responsibility upon the developer). Item 14 requires that any agreement authorizing the use of airspace shall include a three-dimensional legal description. Item 15 deals with Federal and state authority to inspect the airspace premises, and Item 16 requires that the authorized airspace uses must be adequately insured. Item 17 dealing with revocability of a lease because of violations, cessation of use or abandonment is extremely important for its impact on possible private financing of projects. In Item 18, public utility facilities are excepted from the memorandum instructions. Item 19 requires that the design and construction of proposed airspace facilities conform to the applicable criteria of the Federal Aviation Agency. Item 20 requires that title to airspace authorized for nonhighway use be retained by the state. Item 21 states that each proposal will be studied on a case basis, and Item 22 makes the disposition of airspace revenue the responsibility of the state.

b. Revised A.A.S.H.O. Guide

Excerpts from the currently proposed revision of An Information Guide on Air Rights Above and Below Interstate Highways by the A.A.S.H.O. Committee on Planning and Design Policy are discussed in the following paragraphs. Taken as a whole, the 1966 drafted revisions reflect the contemporary shift to a more liberal and sensible approach to the utilization of airspace. It is unnecessary to reproduce the October 1961 A.A.S.H.O. Guide here since it closely follows and was superseded by the Instructional Memorandum. It is likewise impractical to reproduce the unpublished draft of the revised guide, for the draft is committee approved but subject to change. There is merit, however, in excerpting from the revised guide to show the differences of intent from the first guide and the memorandum; the latter is likely to be superseded by the procedural memorandum that is now in process

and reportedly follows closely the A.A.S.H.O. changes.

The revised guide encourages full economic development and compatible use (consistent with the adjacent land usage) of the highway right-of-way in densely-developed areas. In contrast, the old guide was in terms of conformance with the requirements of the Highway Act of 1961. The new guide indicates that the authority for use of airspace over interstate highways is applicable to all types of highway construction, including the depressed, ground level and elevated sections; the old guide indicates that air rights are usually for uses of space above depressed sections, or at the general existing ground level. The revision, as drafted, states that in some cases the compatible and concurrent use of airspace both above and below an interstate highway may be warranted; the old version indicated that this might occur in rare cases. Both the published Guide and the draft of the revised guide indicate that a variety of airspace uses may be warranted. The old and revised guides, and the Instructional Memorandum, require detailed, three-dimensional legal descriptions for airspace. The revised guide generally follows the structural requirements outlined in the memorandum, stating that all airspace structures must be fireproof and that no storage of flammable material is allowed. The revised guide also follows the present memorandum with regard to the possible revocation of authorization for use of airspace in the event of noncompliance, abandonment, etc. (If not properly handled, these stringent provisions could prevent conventional financing by a private developer.) Other provisions include added highway facilities, accessibility, insurance and easements for interstate highways. Although unchanged, the last item is important because it suggests that a state highway department may deem it appropriate to acquire three-dimensional easements for an interstate highway, including the supports and foundations but omitting the space above and below the highway.

The draft of the revised guide includes an entirely new provision entitled Disposition of Air Rights Above and Below Interstate Highways. The drafted addition includes the following:

"Where the use of airspace within an Interstate highway is needed for an extended period of time for non-highway purposes, the State Highway Department may consider the permanent disposition of air rights. However, the State Highway Department must determine that the airspace to be used for non-highway purposes is not needed for present or foreseeable highway purposes, including scenic, rest or recreation purposes, as set forth in Title III of the Highway Beautification Act of 1965, and that the use of the airspace will not adversely affect the highway facility and the free and safe flow of traffic thereon. An agreement between the State Highway Department and the grantee shall provide that the airspace to be disposed of above or below the Interstate highway may be used only under the applicable conditions stated herein."



#### IV. ECONOMIC CONSIDERATIONS

##### A. Implications of Airspace Use

The possibility of multiple use of freeway airspace has various implications for responsible highway officials, motorists, communities and airspace developers. The viewpoints of these groups are discussed below, but it must be borne in mind that, in order to be successful, an individual project will have to be generally acceptable in the eyes of the Division of Highways, the U.S. Bureau of Public Roads, the motoring public and the local residents and businesses, as well as in the eyes of the project planners.

In broad terms, a project's success will depend on the economic factors normally considered for a real estate development -- such factors as the compatibility of the environment and adjoining land uses, the market demand and the financial feasibility of the project. For airspace projects, the positive and negative economic effects of the right-of-way will also have to be analyzed. Our research indicates that there can be no simple rules for the granting or denial of air rights; each project must be judged separately, with its problems and their possible solutions and its benefits or shortcomings.

##### 1. Highway Officials

The goal of the state and Federal highway planners is to provide the best possible highway facilities at the most reasonable cost. Any plan that results in lower land acquisition costs, aids in desirable joint use of land and does not restrict future needs or increase hazards to motorists is worthy of consideration and testing.

##### 2. Motoring Public

Added conveniences to motorists are looked upon favorably, but the possibility of hazards or added traffic congestion prompts serious question. The local commuter is also part of the community which benefits from and must support highway facilities.

##### 3. The Community

The social impact of airspace development on communities is a subtle factor that depends upon the individual project and its influence on the surroundings. Adjacent land uses could be improved or impaired; land could be salvaged where scarcity exists, but congestion could be increased; and the cohesiveness of a community with a bisecting freeway could be retained or could be further destroyed. Ideally, a privately sponsored project should produce added tax revenues for local government, while public projects must be weighed in light of their contribution to the people.

##### 4. Airspace Developer

Assuming that the developer is a private individual or profit-making corporation, the project must provide adequate investment returns on the required capital investment, which may possibly be higher for an

airspace project than for unencumbered land. The pure profit may, of course, be of only secondary interest to an owner occupant who prizes the identity and the location of his structure.

In summary, the varied implications of each project will have to be weighed carefully, with consideration given to all parties concerned. The other sections of this chapter deal more specifically with the economic factors involved in using freeway airspace for particular land uses and for public, quasi-public and private development.

##### B. Valuation of Air Rights

A knowledge of the fundamentals of valuing airspace property is essential for determining the feasibility of a particular use and for understanding the limitations of air rights. Whether in the form of a lease, conveyed title or easement, air rights are a partial interest and are subject to special regulations and to the influences of the primary use. Substantial value may be attributed to these rights; for example, air rights in Manhattan often sell for 80 percent or more of the fee value (in some areas the fee values approach \$300 per square foot, in which case the air rights can be worth about \$240 per square foot). The cost of construction for an airspace site, however, may be substantially more than on a normal site, especially in the case of long-span structures over freeways. Thus, added construction costs may offset the lower price that the developer pays for the site.

The broad concepts of the property rights that may be won or lost in a normal acquisition of airspace are worthy of discussion, for they must be considered as a basis for the formulation of policy and procedure. Without delving into various appraisal techniques, the following concepts are important.

##### 1. Concept that Deck Equals Land

Since airspace is a form of created land, the deduction is often made that a platform built over a railroad or freeway is equivalent to normal land. Higher costs and lost utility refute this idea. Depending upon span distances and loads, a basic platform may cost \$15.00 to \$20.00 per square foot at its surface, so that when added to the price of the air rights, the deck may exceed surrounding vacant land values. There are also supplementary building costs that must be considered. For example, basement parking or mechanical equipment and storage rooms usually must be built above platforms at higher costs. Airspace foundations may also require periodic maintenance, whereas the foundations of normal buildings need attention only in unusual, dire circumstances.

##### 2. Concept of Substitution

Land is most often valued on the basis of comparable substitutes. Airspace values are likewise determined on the basis of supply and demand for unencumbered land that will offer equal utility, except that the special construction costs of airspace development must also be considered. Comparable sales of other airspace are few, and each site is likely to have unique construction problems.

Particular air rights may or may not be of value, depending on the scarcity of alternative sites and the total project costs. Except in instances where there might be monopoly business advantages or an outstanding feature such as an unusual view, airspace development would not be feasible in rural areas where land is in plentiful supply. In contrast, high values generally force multiple use of land or airspace in areas where land is scarce. Manhattan, which is confined by two rivers and by city boundaries, is a good example. In such restricted, high-density areas, the use of airspace may be a convenient means of capitalizing on a perfect location that would be impossible to obtain otherwise.

### 3. Concept that Air Rights are Worth Less than Fee Title

We have said that air rights are in some respects similar to oil rights, that both types of rights are usually less valuable than the fee title to the whole property and that either oil or air rights could be so restricted as to be valueless. Following are the principal reasons for air rights usually being less valuable than the fee title to unencumbered land:

- a. Use restrictions and rigid controls may be imposed by a lease agreement, or additional control may be in the form of police power over a public right-of-way.
- b. Added construction costs may include:
  - 1) Direct costs for foundations or extra floors.
  - 2) Indirect costs resulting from lost space, such as rental area lost to air shafts necessary to vent the right-of-way.
  - 3) Special costs for unusual structural requirements to satisfy either the needs of the airspace project or of the right-of-way.
- c. Utility may be impaired by:
  - 1) Structural foundation requirements that may adversely affect the building design and floor plan layout.
  - 2) Inconvenient or limited access.
  - 3) Lack of ability to expand the site.
- d. The impact of the right-of-way use may be detrimental because of noise, fumes, vibration or visual effects.

### 4. Concept of Air Rights as Percent of Fee Title

Every type of real estate is often sold on the basis of rules of thumb or common bench marks. Normally, the price or cost of development is likely to be the same as that of known previous and apparently similar projects. However, the costs for airspace projects tend to be unique

because of unusual structural requirements and site problems that depend on surrounding topography and the particular form of right-of-way. Because general building costs can vary greatly and because of limited experience on the West Coast, rules of thumb can be misleading.

In spite of the fact that general multipliers or factors may be deceptive, we would like to discuss the percentages that often are applied in calculating the value of air rights as a percentage of the absolute fee ownership. In our research, we have heard and read of air rights projects having a value of from 20 to 85 percent of fee. In the high value areas of Chicago and Manhattan, air rights value ratios may range between 50 and 80 percent, with the particular circumstances dictating the narrower range. Comparing one metropolitan area to another is likely to be very misleading. For example, structural costs on bedrock in eastern cities may be approximately the same as airspace structural costs. The density of airspace use will also influence value ratios. Air rights are a matter for negotiation and carefully analyzed feasibility and not for formulas or convenient but deceiving ratios.

### 5. Concept of Balance

Compared to an unencumbered land project in terms of cost or value, a successful airspace development usually represents a combination of financial gains and losses. An airspace project will usually be more expensive because of the special costs likely to be encountered; however, the special benefits may more than balance these capital deficits. For instance, there may be no demolition costs, a developer may be able to assemble a site at a point of highest demand, or business advantages may be derived from unique site characteristics.

A corollary of this concept is that the balance of losses and benefits is in terms of differentials. For example, assume that a basement area which is lost in an airspace project would cost \$10.00 per square foot and that this lost space must be replaced by a \$15.00 per square foot upper floor. The differential or lost utility, compared to building on normal land, would be \$5.00 per square foot, but special benefits or advantages that may accrue as a result of building on particular airspace might more than offset this differential.

### 6. Concept of Highest-and-Best Use

Potential use and value of a property are directly related to the uses allowable according to the local community's general plan or zoning restrictions. The questions of jurisdictional control (discussed in Chapter V) do not affect this relationship, though a lease or other controls imposed to preserve the highway right-of-way may also regulate the potential use of the airspace. Value can be controlled, to a large degree, by regulating the highest-and-best use, but market demand for the allowable use or uses is also a critical factor. Urban renewal projects make use of this principle by creating a specific plan that restricts land uses within a completed renewal project. Airspace uses over freeways generally will have to conform to surrounding land uses, but the proper jurisdictions will have to decide these matters.

The valuation or analysis of the feasibility of an airspace project can be a complex task. Fundamentally, value is estimated on the basis of comparisons with unencumbered fee land that is of similar size and location; lost property rights (such as added construction costs and lost utility) are deducted; and cost savings (such as no demolition expenses) and special benefits (such as ability to assemble land at an ideal location) are credited. Simply stated, all capital costs must be justified in terms of adequate investment return, considering the type of property and the type of ownership.

### C. Feasibility of Airspace Use

The use of airspace on raised platforms is not new, but such use over West Coast freeways has become practical only in recent times. The areas where airspace development is feasible are still limited, however; and it is necessary to establish criteria for determining when the use of air rights is practical in terms of types of use and specific requirements. Our research indicates that, except for publicly owned projects or "Oasis-type" restaurant-service station complexes that may be justified in terms of social benefit, land values surrounding a right-of-way usually should exceed \$15.00 to \$20.00 per square foot before it is economically feasible to consider using freeway airspace. The reason that land values are used as general criteria is that construction on freeway airspace usually necessitates the added cost of some form of long double span bridge to support the building from the sides. Such site costs, which may exceed \$15.00 per square foot, usually rule out low-density uses and would not be feasible where proximate land is available at low prices.

Land values of \$15.00 to \$20.00 per square foot usually occur only in the central business districts of large West Coast cities. For example, Los Angeles land values range from \$20.00 to \$30.00 per square foot in the Civic Center, from \$40.00 to \$60.00 per square foot in the old financial district and from \$60.00 to \$100.00 per square foot in the west portion of the central business district. By comparison, downtown San Francisco land values approach \$150 per square foot in some areas. It should be noted, however, that highway planners usually place freeway facilities along downtown perimeters and try to avoid the areas of very high value.

The paragraphs which follow present some of the fundamental elements for determining feasibility of various uses. Type of ownership (public, quasi-public or private) has a direct bearing on feasibility considerations, but this subject is covered later in the chapter; the factors enumerated below must always be considered, no matter what the ownership characteristics may be.

#### 1. Market Demand

The best and most successful airspace projects are placed at a location where demand is already established or available for the specific kind of facilities to be constructed. The increases in supply of land resulting from the use of previously dormant airspace is not necessarily accompanied by new market demand. For example, in areas that are already overbuilt, any additional retail stores or office facilities -- whether built on land or airspace -- face severe competition at the outset. Unfortunately, there is no shortcut to predicting the success or failure of a particular use at a specific location. On the basis of our experience and current

research, however, we feel safe in generalizing that proper types of uses that can sustain site values in excess of \$15.00 to \$20.00 per square foot should be considered.

#### 2. Supply of Available Sites

The use of freeway airspace in rural areas, where there are vast quantities of available land, or in low-density residential areas will not normally be advantageous. Abundant supply does not absolutely rule out the use of airspace, though, because past studies and practical examples have shown that highway-oriented uses such as motels, restaurants and motorists' conveniences can thrive at prominent road intersections.

The supply of available substitute sites has a direct influence on the feasibility and relevancy of using airspace. Other things being equal and unless there are special benefits to be derived by the use of airspace, the investor normally will prefer conventional land that is subject to fewer controls and problems. As discussed earlier, multiple use of land is most likely to occur in areas of land scarcity. Construction and other costs are of secondary importance when a developer is confronted with the high land values that are prevalent in Manhattan, for example; sites for high-rise buildings in this area range from \$250 to \$400 per square foot. The much lower land values in Los Angeles and San Francisco are still high enough to warrant serious consideration of airspace use.

#### 3. Use Productivity

Most businesses have productivity limitations and site requirements that are common to their particular types of industry. Such average limitations constitute good criteria for determining whether or not a type of use could be expected to sustain high site values. For example, industrial users would not normally consider an airspace site feasible because there is usually an ample supply of alternative sites and because additional airspace construction costs would be prohibitive, considering the basic rental income normally generated by manufacturing and distributive uses. On the other hand, high-density users like hotels or office buildings could afford an airspace site. In all cases, additional construction costs for building on airspace must be offset by corresponding higher rental revenues and/or business profits that will result in adequate investment returns.

#### 4. Financing Arrangements

Both public and private airspace developments will usually require long-term financing. Project feasibility is of primary concern, although use or lease restrictions are of equal importance because abnormal limitations imposed on airspace will affect financing and will have direct impact on the marketability of space.

a. Joint State, City and Private Projects

The possibility of much advantageous airspace use may be eliminated if basic drainage and other structures are not built at the time of original highway construction. To avoid such a situation, coordinated development could be undertaken by the Division of Highways in cooperation with local governments to provide basic structures for future private projects. If planned efficiently, for example, a city could acquire land, sell a three-dimensional easement to the state for a freeway right-of-way that would provide necessary access, and later sell or lease airspace to private users to produce revenue that would finance the initial project. A transaction of this sort is sound and in the best interests of all, but judging from past experience, it is difficult to obtain advance commitments. In the past, several cities and business groups have been contacted and advised that: (1) particular roads could be placed on a viaduct rather than on solid fill, (2) airspace under an elevated right-of-way could thus be made available, (3) the local group would be required to underwrite extra freeway structural costs of about \$4.50 per square foot of road surface, and (4) the local group would be required to assume a master lease on the created viaduct space. Local response to such a proposal is often indecisive, and the state usually has to proceed with a normal fill since no Federal funds may be expended for extra costs and since the state would have to justify such expenditures on the basis of adequate investment return. Future use of airspace over rights-of-way is likely to meet the same obstacles.

b. Multi-Use Financing

A group of uses may be advantageously financed by pooling weak or nonproductive uses with others that generate ample revenue. By this means, public and private uses with different but perhaps complementary objectives could be combined to create a desirable overall development. The principle is similar to that used in the creation of a feasible shopping center consisting of strong and weak tenants. Three examples indicate the practical application of this concept:

- 1) A city might build a needed public garage by revenue bonds which are paid for by the income from a private office building constructed on leased airspace above the garage.
- 2) A city might lease subsurface rights to a developer who builds and operates a garage over which the city retains a right to maintain a public park.
- 3) Assuming a large project, a freeway right-of-way could be incorporated in either of these two proposals.

5. Determination of Feasibility

Market or economic studies may be required to determine the feasibility of a proposed project, the amount of airspace rent that should be required and the lease terms that would be advisable. Such studies should customarily be the responsibility of the developer, although the state will have to review study findings and possibly make separate estimates. In ascertaining feasibility of a proposed development, the following factors should be taken into consideration:

- a. Adequacy of the proposed or offered site for the planned use.
- b. Suitability of the location.
- c. Needs for such ancillary facilities as parking.
- d. Demonstrable market demand.
- e. Pricing of equally suitable and available alternative sites.
- f. Project costs.
- g. Adequacy of adopted financing.
- h. Adequacy of investment return or, in the case of public or quasi-public projects, probability of fulfillment of socially desirable objectives.
- i. Experience of the developer on former projects.

D. Public Uses

Present administrative policy recognizes that it is generally desirable to make multiple use of publicly-owned land. In fact, the Transportation Agency has stated an intention to give cities the privilege of first refusal to available airspace. The objective is to make additional use of land that is (or soon may be) off the tax rolls and, if the airspace is not needed for public use, to seek private enterprises whose structures will produce rental and tax revenue. It should be remembered that, although the freeway itself is a very valuable public use shared by most citizens, compatible secondary uses may also be considered.

1. General Feasibility of Public Use

Public uses are usually considered in terms of community cost and benefit to all citizens; therefore, public uses may be feasible because of direct or indirect financial advantages or because of social improvement. The use of airspace for desirable public projects may result in the following advantages:

- a. Scarce land that may produce high tax revenue may be saved by diverting public activities to airspace.

- b. Unique sites in congested areas, such as the downtown Los Angeles Civic Center, could be created by the use of airspace.
- c. Strategically-located airspace may be improved with facilities needed to serve the community.
- d. The continuity of surface activity can be maintained by joining areas that would otherwise be disrupted by a right-of-way.
- e. Freeways may be blended into a community by such aesthetic airspace uses as parks.
- f. A local community can benefit from use of freeway rights-of-way as corridors for other transportation-oriented improvements such as rapid transit facilities, heliports or depots.
- g. A community may revitalize congested areas by using airspace for basic public improvements needed to attract private development.

Museums - Possible but thus far unexploited use  
 School Facilities - Proposed in the New York City area  
 Sports Arenas - Madison Square Garden in New York City

All of the foregoing uses require special architectural and engineering analysis to assure that the uses will not be detrimental to the right-of-way or vice versa. Noise from a freeway might be objectionable for general hospital use; but in the Birmingham facility, the surgery was placed over a noninterstate right-of-way. A school gymnasium, being a structure that requires long spans anyway, would be an adaptable airspace use. Under new legislation in New York, it is possible to build a school topped by an apartment; the two uses could be compatible because the activity hours often differ.

There are numerous examples of airspace being used for recreational purposes. In San Mateo, California there are several tennis courts built over a parking garage adjacent to the central business district; in New York, there are all-weather handball and tennis courts over transportation rights-of-way; Chicago has a park along Michigan Avenue above public parking garages and above the Illinois Central tracks. Because of costs, it would not be feasible to landscape great expanses, but small parks and other recreational uses can prove to be very desirable uses of airspace.

## 2. Related Transportation Uses

Other transportation uses that may relieve traffic congestion take obvious precedence over civic or private airspace use. There has been considerable talk of using airspace along various freeway corridors for some form of rapid transit. Other suggested transportation-oriented uses include heliports, depots or vertical, short take-off and land (VSTOL) facilities.

Imaginative plans and some existing projects incorporate the ideas of these transportation-oriented uses of airspace. One model displayed by the California Division of Highways envisions a restaurant-heliport straddling a freeway. This compatible but low-density use would probably have to be publicly supported. A desirable example of a transportation terminal facility is the Public Accommodations Building in Sunnyvale, California; this under-viaduct structure well represents public use of formerly wasted remnant land.

## 3. Civic Projects of Social Value

The many parking lots under California freeway viaducts are ready proof that land that would be costly to maintain and even a hazardous nuisance can be productively used for community benefit. More fully developed, multilevel parking structures could also be constructed.

Our catalog of selected airspace projects (see the Addenda) lists many types of public buildings, including the following:

- Auditoriums - Boston, Massachusetts
- City Halls - Fall River, Massachusetts
- Convention Centers - Cobo Hall in Detroit, Michigan
- Libraries - Hartford, Connecticut
- Medical Centers - Birmingham, Alabama

## E. Quasi-Public Uses

Many of the nation's notable airspace projects are public housing projects that are privately owned and operated but publicly financed. These developments usually have been low- and middle-income housing of high-rise construction and have been located in densely populated areas of high land value in eastern cities. State financing has been available for many projects. Whether or not such housing will work over West Coast freeways is another matter.

The key to public housing is finance and, more specifically, the loan grant or guarantee policy of the Department of Housing and Urban Development (HUD) and the Federal Housing Authority (FHA). These agencies determine project feasibility within their purview according to enabling legislation and established policy. Both agencies are authorized to underwrite loans on airspace projects, but HUD has a limited budget that is adequate for only a few cities and FHA is receptive but concerned over environmental factors of constructing over a freeway.

There are several fundamental problems in the placement of public housing over freeways. Given the lower fixed rental income of public housing, the extra construction costs must be subsidized in some way; but loan criteria do not necessarily meet the problem and freeway funds cannot be used to absorb extra costs. Project approval and funding may be too slow for coordinated action with highways. The coordinated programs are good in theory but difficult in practice.

### 1. Public Housing Financing

The applicable HUD requirements are defined in Local Public Agency Letter No. 324 dated February 15, 1965 and entitled "Air Rights Projects and Air Rights Sites Over Low-Rent and Moderate-Income Housing." This

six-page letter quotes authorizing legislation and sets forth detailed procedural criteria. According to report, however, there have been a number of applications submitted under these general requirements, but no HUD-financed airspace projects exist in the nation. The significant criteria set forth in this administrative letter are the following:

- a. The acquisition of an air rights site in an area need not qualify as an urban renewal area.
- b. Foundations and platforms for development of housing (and related facilities and uses) for families and individuals of low or moderate income can be considered, outside of or within an urban renewal area.
- c. Eligibility requirements demand that the proposed development "have continuing compatibility with the land uses in the surrounding area . . . be in conformance with the General Plan for the locality as a whole . . . and be economically justifiable."
- d. The cost of providing the air rights (also value of these rights) must not be relatively more expensive than providing cleared land for the same use, although in some instances site costs may be higher if important community objectives can be achieved.
- e. The acquisition of real property and interests "shall be limited to what is reasonably necessary." Title forms include:
  - 1) Fee simple estate for platform and foundation areas.
  - 2) Fee simple subject to perpetual easement of former owner for the reserved area.
  - 3) Perpetual easement for the airspace project.
  - 4) Long-term lease on airspace and necessary land. Such lease generally will be acceptable only if a single payment is made in advance for the entire lease term (i.e., a lease that is effectively a final sale).
- f. Air rights acquired over public streets, alleys and other rights-of-way must be acquired without cost to the project.

## 2. Public Housing Feasibility

In most areas of California, we suspect that it will usually be more practical to develop low-income housing on normal land rather than on airspace. Even in Manhattan, where land is scarce and expensive, low-income airspace housing has required subsidization by loans and tax concessions. In California, it is likely that many blighted areas can be purchased and cleared for under \$5.00 per square foot, which is substantially less than the costs of an airspace foundation and platform *over a freeway*.

## F. Private Uses

An important part of our research has been to determine the likelihood of private participation in the use of freeway airspace. The amount of freeway development has been meager compared to the many railroad airspace projects, but we are confident that the advantages of a near freeway location may more than compensate for the usually higher construction costs. Streamlined procedures will have to be adopted for the handling of applications, but the key to private development is to provide lease terms that are compatible, as far as possible, with the lending practices of the major financial institutions, principally the insurance companies. All indications are that freeway airspace should be leased rather than sold, but leaseholds are often difficult or impossible to finance.

The private developer or investor is motivated by anticipation of adequate return on his investment. To make an investment in airspace attractive, the state must do everything possible to reduce the unknowns and to expedite handling procedures. This is doubly important to attract a lender to make a loan at favorable terms and thereby assist the investor. The objectives of the investor and the lender are essentially the same; each requires reasonable safety and control over his principal investments and returns commensurate with the respective risks.

### 1. Development Carrying Charges

The physical characteristics of freeway airspace represent additional demands and business risks for the developer. Whether improvements are coordinated with freeway construction or whether they are built after the freeway is operating, the costs of airspace construction are higher than those for use of normal land. The best means of development is to integrate design and construction of the airspace project with that of a new freeway, but most investors would be unwilling to wait during the normal five- to seven-year period of highway planning and construction. Developers of extremely large projects might be more patient. Fortunately, it is possible to build over operating freeways, although early, coordinated construction may cost 2 to 3 percent less (see Engineering Concepts section). Present policies and procedures preclude the use of Federal and state highway funds to pay special site costs. A local community could finance blocks of space by tax increment bonds or other means, but it is more likely that the developer will carry most of the burden. Other than early announcement of the availability of airspace, there appears to be little that can be done to encourage coordinated development.

### 2. Physical Limitations

The physical limitations of building on airspace influence the entire life of the investment. At the outset, the private developer will carefully consider the advisability of building early and facing carrying charges or of building later and being subject to requirements which do not allow the disruption of traffic. The rigid foundation supports will control the form of the airspace structure, and future expansion will probably be difficult. Further, the full impact of the right-of-way on the development may be impossible to anticipate.

The above points represent the cruxes of private participation. The developer and his lender must deal with controls, risks and influences not found in normal land development. At the same time, the state is concerned that the airspace project may be detrimental to the right-of-way, that it may restrict future freeway expansion and that the improvements may be abandoned. The solution to these dilemmas is for the state to standardize the conditions for airspace use and to provide a basic lease that is acceptable to the major financial institutions and at the same time protects the state.

### 3. Financing Possibilities

The success of private participation will depend largely upon the attraction of private (or conventional) financing that will represent new money resources. State and Federal funding or guarantees -- through FHA, for example -- are often cumbersome and restrictive. Before private funds can be attracted, extensive market and legal studies will be needed to determine loan requirements with respect to leasehold airspace projects.

The present limited research on this problem indicates that existing policy and procedure of the California Transportation Agency and the Bureau of Public Roads would discourage most conventional lenders from participating in airspace projects. In terms of lenders' objectives and considering that airspace would be leased to private individuals or corporations, various points of contention are as follows:

#### a. Leasehold Security

Many insurance companies consider a leasehold improvement loan a lien equivalent to a second trust deed or mortgage. This attitude results from the fact that improvements placed on normal land are subject only to tax liens and the like, whereas a leasehold is subject to the lessor's interest in the ground or, in this case, the airspace. Fortunately, in dealing with the state, a perpetual entity, this objection is less serious -- providing the lender has suitable latitude to preserve his security.

#### b. Adequate Lease Terms

The California Highway Commission has expressed its willingness to enter long-term lease agreements for major airspace projects. This is a distinct departure from past practice involving five-year parking lot leases with short-term cancellation clauses; a lender does not interpret such an agreement as a lease. Cancellation or appraisal revaluation clauses also limit the effective or creditable length of lease. Most lenders, according to their home state law, also require that the lease term be longer than the loan maturity by a fixed number of years.

#### c. Lender's Right to Cure Defaults

In the event of cessation of business, violation of uses or abandonment of improvements, the lender must be given adequate notice of

default and must be given the ability to rectify curable defaults. Such provisions might include the right for the lender to foreclose, to pay back rent and taxes and to seek a new occupant for the property. The right of the lender to assign the lease to a business successor offers complications and is one of the principal reasons for many lenders' reluctance to lend on leasehold interests.

#### d. Lessee's Right to Assign Lease

This is always a trouble area. The lessor usually should be allowed to assign use of the property upon written approval of the lessor, but such consent should not be unreasonably withheld.

#### e. Removal of Improvements

Leases requiring the removal of all improvements at termination may be difficult or impossible to finance. Neither the investor nor the lender would favor such a requirement. Usually the lessor considers the residual right as an asset, but such rights could be burdensome in the case of airspace projects.

#### f. Instructional Memorandum 21-3-62

Paragraph 17 of this memorandum, if followed to the letter, could be extremely objectionable to an average lender. As discussed above, the limitations of lease assignment, the revocation of permitted use and the required restoration of the premises will have to be greatly modified to attract private capital and financing. The 1961 American Association of State Highway Officials' Guide and the contemplated revision (see Chapter III, Section J, "Current Procedure") contain similar objectionable stipulations.

A concentrated effort to make lease terms attractive to conventional lenders is a sure means of stimulating private participation in airspace development. It should be noted, however, that leasehold interests have the following inherent advantages and shortcomings:

#### a. Income Tax Advantage

From the viewpoint of the private airspace user, there is a distinct income tax advantage in leasing rather than purchasing space. Assuming no lease premium, a down payment is usually not required and the entire amount of all rental payments is tax deductible. On the other hand, money paid for a purchased site would not be deductible.

#### b. Limited Loan Fund

Compared to loans on fee interests, leasehold loans are always margined 10 to 20 percent lower and the loan interest rate is typically one-half of one percent higher. These limitations directly influence the marketability of airspace (e.g., compared

with a typical loan of 70 percent of fee at 6.5 percent for 25 years, a leasehold loan might be 50 percent of fee value at 7 percent with the loan term generally not to exceed the lease term).

#### 4. Possible and Feasible Private Uses

Under-viaduct uses can be very modest, like the many existing parking lots or the lot in Los Angeles used as a well-lighted used car lot. However, an infinite variety of structures are possible, so long as they do not constitute a hazard to the right-of-way and so long as there is a crawl space of approximately three feet between the bottom of the freeway structure and the roof of the airspace building. Free-standing or clusters of retail stores surrounded by customer parking lots are excellent under-freeway uses, providing the location is suitable. A partial subterranean garage also could be feasible (see Engineering Concepts section, Figures 6 and 7).

Many superimposed airspace uses are possible, but only intensive uses that can sustain high site costs will be feasible. Advisable private uses include transportation terminals, apartment buildings, hotels, motels, office structures (both general and special purpose) and recreational facilities (bowling alleys and the like).

Federal legislation precludes private, direct access projects which have inter-action with traffic flow on the freeway. The "Oasis" projects with special access ramps (discussed in Chapter III) are generally not permitted over interstate routes; gasoline service stations are specifically excluded. Such uses that offer unique convenience to the motorists could be considered, however, over state-financed highways. The view of the right-of-way may be an important benefit to the restaurant business, but it should be remembered that the feasibility of such complexes is dependent upon the adjoining service stations.

To summarize, private participation in the development of state-owned freeway land is inevitable, but the California Transportation Agency and local communities will have to provide standardized requirements for carefully chosen locations. The Bureau of Public Roads can also assist in this desirable enterprise by standardizing long-term lease provisions and streamlining administration procedures.

#### G. Possible and Feasible Uses

An important part of our research has been to identify a spectrum of possible uses for development of airspace under and over California freeways. Judging from the diverse experience of other states, it is a proven fact that multiple use can be made of significant freeway segments and that two, three or more compatible uses can be promoted. The freeway must always be protected and traffic must be influenced as little as possible. Equally important, the airspace use must be compatible with its surroundings and take advantage of the desirable freeway exposure and nearby access.

All of the significant developments that are listed in the Catalog of Airspace Projects Throughout the United States and in Other Countries (see Addenda) have

been analyzed in terms of potential use that might be made of California freeway airspace. A great number of these projects were inspected and related published data were reviewed. All of the projects display basic elements that must be considered. For example, some of the fundamental design concepts of the contemplated Washington Channel Bridge (discussed in Chapter III) could be applied to freeway airspace. Any project that includes a clear span bridge involves more than just solutions to structural problems. Pedestrian access, traffic and parking at either end of the Washington Channel Bridge were carefully considered. The influence of the surroundings also were carefully planned to capitalize on the unique location. Another example is the great amount of site planning that went into the newly completed Prudential Center over the Massachusetts Turnpike on the edge of downtown Boston.

Specific factors to be considered in determining the possibility and feasibility of uses include the following:

##### 1. Relative Benefits

Development will depend on the relative advantages and the costs which together create a net benefit that will motivate public or private use of airspace. In general, air rights projects are feasible whenever benefits, in terms of direct and indirect economic factors, exceed costs. The following cost statements are important:

##### a. Potential Costs are High:

- 1) When foundation or site costs are excessive compared to normal land.
- 2) When highway locations are disruptive to communities, or to abutting land users.
- 3) When the highway is considered austere and the community is wealthy enough to use airspace for landscaping.
- 4) When the community places high value on beauty and the preservation of uninterrupted views and will not allow airspace use.

##### b. Potential Costs are Low:

- 1) When the highway must be elevated for technical reasons connected with traffic and it is possible to build under viaducts, although the costs of creating superimposed structures at such locations may be prohibitive.
- 2) When the freeway is depressed and superimposed structures do not result in visual discontinuity or lack of flow with the surrounding area.

An obvious set of circumstances that points to net benefits is a sound basis to stimulate development of valuable airspace uses. The right physical environment is the first element to be considered. Probable basic platform



costs are also of primary importance, for if the estimates are inaccurate, a project will be defeated at the outset. Other elements, such as the probable impact of the right-of-way, should be anticipated; and the general motives and objectives of developers, in terms of various types of use, also constitute basic criteria for the successful blending of highway airspace with the community. Where possible, such unique benefits as the visibility of a landmark site or impressive panorama should not be overlooked. Cost and other structural factors are often secondary to the primary urge to create a project that has individual identity and advertising value.

## 2. Feasible Freeway Uses

In the engineering or physical sense, a multitude of uses are possible for freeway airspace; in fact, engineering is not a particular problem. Whether or not there is sufficient market demand to make a particular use economically feasible is another problem. It may be relatively easy to predict the success of a well located high-rise structure, but medium-sized properties in fringe locations may require very detailed analysis.

We are cognizant of the general uses that are not allowed under existing legislation and procedures, but we have oriented our thinking to possible desirable uses which someday may be permitted. For example, current stated policy and procedure with respect to under-viaduct projects requires eight feet of clearance below the bottom of the freeway structure, although there is an indication that a three-foot crawl space might be permitted. Despite the present space requirement, we believe that the buildings in Tokyo, Japan that use the freeway as a roof (see Addenda photograph) offer a desirable example of what might be accomplished. Fire sprinkler systems to eliminate hazards to the freeway structure and light-weight suspended ceilings with ample space above for inspections pose ready means of meeting the intentions of the present requirement.

The first set of variables that can have profound influence on particular types of airspace uses relates to types of freeway structures. A multitude of other variables must be tested before determinations can be made of whether or not a proposed airspace building is compatible with the location. For example, a building is compatible:

- a. When it has minimum impact on the right-of-way.
- b. When the use conforms with the general planning and zoning requirements of the local jurisdiction.
- c. When the use conforms with established requirements of the Bureau of Public Roads and the Division of Highways.
- d. When the use is tolerant of possible noise, fumes and vibrations from the right-of-way.
- e. When the structural characteristics match the necessary long span for freeway construction (e.g., auditoriums or department stores).

- f. When the use blends with the neighborhood.
- g. When site and construction costs are sustained by adequate net income revenue.

Extensive research would be necessary to devise a network system that would incorporate these and many other variables to enable determination of whether or not particular airspace uses should be approved. In any event, the validity of such a system would probably be questionable because it is extremely difficult to devise sufficient criteria or to establish proper weights for judgmental factors. The common characteristics and basic site requirements of particular uses can be analyzed systematically, however, so actions can be taken to attract proper users. For example, the site requirements for the average church dictate:

- a. That the facility should be placed near residential areas or concentrations of people.
- b. That it should have a quiet or serene location.
- c. That it should have good access.
- d. That it may be advantageous for the building to be placed near a freeway interchange.
- e. That it probably would be advantageous for the facility to be placed where it can be seen from the freeway (site prominence for advertising value).

From these site criteria, it is apparent that, although proximity to a freeway is beneficial in a church location, airspace use is precluded by the necessity for quietude and serenity.

## 3. Urban Freeway Uses

Only the more intensive uses that can sustain high foundation or so-called platform costs will be generally feasible for airspace development. In California, comparable high land values are usually found only in the heart of central business districts. Airspace uses in these areas will be increasingly important since the multiple use of rights-of-way may be the only means of constructing future freeways through the most congested areas.

Particular airspace uses may or may not be economically feasible, even in downtown areas; for market demands often relate directly to location (retail stores that normally depend on proximity of a major tenant would not be a feasible use, for example, if the major retail area were on the side of the downtown core opposite to that of the freeway). We believe that, because of unique locational advantages, well planned sites at locations surrounding major communities might make isolated airspace projects economically feasible (and possibly reduce congestion).

The entire freeway and highway system of the state should eventually be studied for its adaptability to airspace uses. Such a study would take

considerable time but would assist the local communities in initiating interest in airspace development. The congested portions of the metropolitan areas should be studied first. The study of a particular freeway network should begin at the central business district core along the inner distributors, then extend to the radial arteries and finally include the circumferential routes.

#### 4. Rural Freeway Uses

Airspace at isolated locations along the interstate freeways connecting major metropolitan areas could be developed with highway-oriented uses. Such projects will become more important as increased leisure time and greater mobility stimulate cross-country travel. It must be noted, however, that present Federal legislation does not allow direct access from the grade line of the highway. We do not question the judgment of these decisions, but we wish to point out that the abundance of inexpensive land makes it generally infeasible to develop superimposed airspace uses in rural areas unless direct access or special advantages are given.

The "Oasis" restaurants over the Illinois Tollway and the contemplated Penryn "Oasis" in Northern California both represent isolated convenient stops for motorists. Another form of facility that serves the needs of motorists is the "motor park." Airspace could be considered for supplements to these larger complexes which may include service stations, restaurants, motor-hotels, truck terminals, bus stations, retail stores, auto supply centers, recreational improvements and other diversified uses.

#### H. Matrix of Freeway Airspace Uses

Based on our inspections, study of published articles and technical interviews, we have identified possible public and private airspace uses. Primary emphasis has been placed on the related site characteristics and income potential of various uses; these factors vary depending upon whether the improvements are under or over different types of freeway structure.

Our Matrix of General Use Requirements which follows represents a spectrum of potential site situations. Possible uses over or under basic types of freeways are evaluated on the basis of various characteristics. The ratings of "good," "average" and "poor" depend upon the following general assumptions:

1. Each type of project is rated individually, although certain uses could be combined as a multiple use.
2. All development is assumed to be located entirely on airspace; therefore, a regional shopping center would be given a low rating, even though in practice a small portion of a center might effectively use airspace.
3. Matrix ratings for each use category are general because of the possible variables in project size.
4. Site costs of \$25.00 per square foot are assumed as a constant criterion.
5. Access is assumed to be available. Uses over an at-grade freeway or

over an elevated freeway are generally less feasible, although the different types of uses vary considerably in this respect.

6. Aesthetic considerations have been ignored because of the wide range of variations for individual projects and locations.
7. Under freeway projects do not necessarily incorporate a clearance area between the bottom of the freeway structure and the roof of an airspace improvement. We envision that airspace improvements will eventually be integrated with the freeway structure, but there is little effect on the ratings either way.
8. Service stations have been rated as a feasible use, although they are not allowable under present legislation.

The nine columns of ratings for each type of freeway show similarities for various uses. The criteria for rating the basic characteristics are as follows:

1. General feasibility is a summary rating incorporating all of the basic characteristics and taking into account additional factors that are not otherwise considered in the matrix (e.g., the impact of high site costs as they relate to general feasibility).
2. Tolerance to noise and fumes is a general characteristic that has a fairly clear pattern of ratings. For example, parking garages with similar objectionable characteristics are most compatible. In the case of windowless structures like convention halls, outside influences are of negligible effect. Conversely, living quarters are more or less intolerant to these influences.
3. Advantage of highway view is rated according to whether it is generally desirable to have a view of the freeway.
4. Advantage of being seen from highway is rated from the developer's viewpoint. Most commercial developments derive benefits from locations that are visible from the freeway. Public uses may be similarly enhanced.
5. Effect on local traffic is rated according to the airspace project's impact on its surroundings. Uses that create local traffic and parking problems are given low ratings. For example, a large sports arena in its normal course of operation often causes severe traffic congestion.
6. Reduction of barrier effect refers to the airspace project's desirability as a means of blending the right-of-way into its surroundings. Uses are accorded high ratings if they would tend to draw people across the physical barrier created by a freeway or if their appearance would generally reduce the visual effect of a barrier.
7. Lease revenue to state, tax revenue to local government and profitability to developer are based on their respective relationship to general economic feasibility.

Our matrix is a guide only, for the actual feasibility of each proposed development will be determined by the specific conditions that pertain.



## V. MAJOR ISSUES

The major problems of using freeway airspace are socio-economic rather than physical. For example, it is best to build airspace foundations as a part of initial highway construction, but it also is possible to develop a structure under or over an operating freeway at a later date. Given an economically feasible project, however, there remain sociological, jurisdictional, policy and procedural questions to be answered.

### A. Consequences of Use

The benefits of multiple use of rights-of-way more than offset the disadvantages, but many problems must be worked out through joint efforts of the Bureau of Public Roads, the California Transportation Agency and the local communities. The Transportation Agency is now faced with assuming land management functions that are not unlike past routine but that impose new and complex responsibilities. The differences in these responsibilities must be realized. For example, the nation's railroads and some of the toll road authorities have engaged in both lease and outright sale of air rights, but these entities are in a sense detached from the airspace development that might occur. In contrast, the Transportation Agency owns the rights-of-way and, even if part of the interest is divested, the Agency must remain responsible for activity that may affect the highway.

#### 1. Sociological Questions

Obscure problems are connected with the use of airspace over any active traffic artery. For example, the motorists are likely to be affected by tunnels and the visual impact of the airspace projects themselves. Further, depending on the type and density of use and whether or not there is an opportunity of choice, an occupant of an airspace improvement may find the environment incompatible. It is obvious that great care must be taken with each airspace project to be sure before construction that it will be compatible with its neighborhood and tolerant of its environment.

Other questions remaining to be answered by broad and specific research include:

Should more intensive use be made of downtown areas or should dispersion be encouraged?

How much open space over freeways should be eliminated by construction of various projects?

In the case of subsidized housing, can equally suitable and perhaps cheaper land be acquired elsewhere?

#### 2. Disposition of Airspace

The state has taken a limited view of the methods of disposing of airspace. Current systems are workable for handling viaduct freeway projects but are insufficient for dealing with major airspace projects involving long-term occupancy. The state progressed from a strict bid system to an offer and proposal format, but it is likely that major projects can be secured only through negotiations. Other forms of disposition also should be considered.

### 3. Past and Future Acquisition

The decision of the state to deal with long-term freeway air rights is essentially limited to airspace under or over already-acquired property. The methods of dealing with property rights-of-way acquired in the future will probably differ substantially from the present approach to air rights already owned by the state. In the past, the state acquired fee-owned land, including dormant ownership rights in airspace that was generally considered unusable. The subsequent leasing of miscellaneous unneeded airspace presented a minimum of problems because all leases had been made for short duration. Future long-term leasing of airspace will present entirely different circumstances that have not as yet been fully analyzed from the legal standpoint. In the future, assuming that private use may be made of valuable airspace, the state will find:

- a. That it may be too expensive to acquire superfluous airspace rights.
- b. That public necessity can only be shown for use of a more limited right-of-way (probably a three-dimensional easement covering only the highway right-of-way).
- c. That it is impossible for the state to acquire private land which includes airspace that, according to advance state announcements, is to be used subsequently for long-term private development.

### B. Jurisdiction and Control

Jurisdictional problems of responsibility for airspace have resulted in either apathetic or vehement reactions from local governments. Local communities have misunderstood the rapid shift of highway-related legislature and of Transportation Agency policy from a single-minded emphasis on only constructing highways to a new policy of considering airspace development that entails land management functions. Highway engineers have been rebuffed for ostensibly forcing unwanted development upon localities, and the responsibilities of the various jurisdictions are vague. Many California cities apparently have not been made sufficiently aware of the fact that their coordinated efforts are needed if full and satisfactory airspace utilization is to be achieved.

Present Division of Highways procedure requires what amounts to advance approval from local government before an airspace application can be considered. Paragraph four of the Division of Highways Circular Letter No. 65-11, issued January 12, 1965, actually includes the statement, "The report of the Division of Highways District Office must contain statements . . . that the proposal has been discussed with local authorities; and that the proposal will not conflict with local planning or zoning ordinances." Mr. Robert B. Bradford, former Transportation Agency administrator, also was quoted as saying "Selected airspace development can be accomplished only by the teamwork of the state, cities and counties, and . . . all such construction must conform to the zoning of local government." We believe that the shared responsibility needs to be more emphatically expressed.

1. Role of Local Jurisdiction

State procedures that require mere zone compliance are short-sighted, especially since most jurisdictions have not considered freeway airspace in their general plans or zoning requirements. Equally unrealistic, however, are the current requests of several major cities that the state relinquish title to already-purchased property rights without payment. It is clear that the state cannot retain undivided jurisdiction over the matter of air rights, but the cities cannot expect the Transportation Agency to divest itself of property interests or of responsibilities to the motoring public either. It also should be noted that interstate freeway improvements and property acquisitions are financed predominantly by Federal funds.

The fundamental issue seems to be the actual and advisable extent of local control over freeway airspace development. In our opinion, the solution is that the cities or counties:

- a. Should govern the type and intensity of all permitted uses.
- b. Should control the operations of properties within their normal purview (e.g., require building permits, licenses and city health compliance).
- c. Should supply city services to the airspace projects.
- d. Should receive possessory tax revenue from private airspace projects.

2. Role of State and Federal Jurisdictions

The state and Federal interests are similar in that both jurisdictions desire that freeways serve the communities and be as productive as possible. Also, the Transportation Agency and the Bureau of Public Roads both anticipate that the ability to utilize airspace will offer a means of serving congested areas with a minimum of lost value.

a. Highway Trust Funds

No Federal highway funds may be applied to airspace foundations or extra construction costs; and since the Bureau of Public Roads does not share in extra costs, it likewise does not require a share of airspace lease revenue. The Bureau, however, does demand a proportionate share of sales proceeds. State highway funds are similarly disbursed and usually may not be diverted to pay extra costs unless added administrative and construction costs are offset by creation of desirable lease and tax revenues. Local governments are expected to pay market value for airspace (see Legal Aspects section); and although the local tax base benefits from private development, it should be noted that private projects should have priority over needed improvements that may be less profitable.

b. Responsibility of the State

The responsibility of the Division of Highways is to maintain the uninterrupted flow of traffic and the safety of the motorist. The complexity of this task with respect to airspace development is considerable. The impact of each airspace project on the freeway right-of-way must be analyzed, along with its influence on projected highway expansion. Construction of airspace structures will have to be regulated to prevent hazardous freeway driving conditions, and periodic inspections of the airspace foundations will also have to be made.

It is our opinion that the local jurisdiction should control the type and intensity of use; but the state must maintain general control of airspace development over large regional segments of the freeway system. We recommend that the state act as an agency for coordinating the general plans of the various cities and counties, toward the goal of balanced regional development of airspace.

In Los Angeles County alone, for example, there are 76 cities and large, unincorporated county areas, and uncoordinated development could result in two similar uses being placed in nearby airspace when market demand would only justify one structure. Business failures are to be averted whenever possible in airspace development, and in a case such as this the state could profitably serve as overseer.

3. Optimum Jurisdictional Responsibility

Because each community has its own history, topography, economic base, rate of growth, style of living and long-range planning, the local people and government should dictate their own policies as far as possible with respect to airspace use. At the outset of statewide development, we would recommend that the state coordinate the requirements of the separate communities so that sound planning concepts could be applied to long stretches of freeway on a regional basis. Physical requirements relating to the freeway could also be standardized and incorporated in area-wide planning. For example, the guidelines already suggested by the American Association of State Highway Officials (A.A.S.H.O.) indicate that coverage should not exceed 300 linear feet of highway, followed by equal open space.

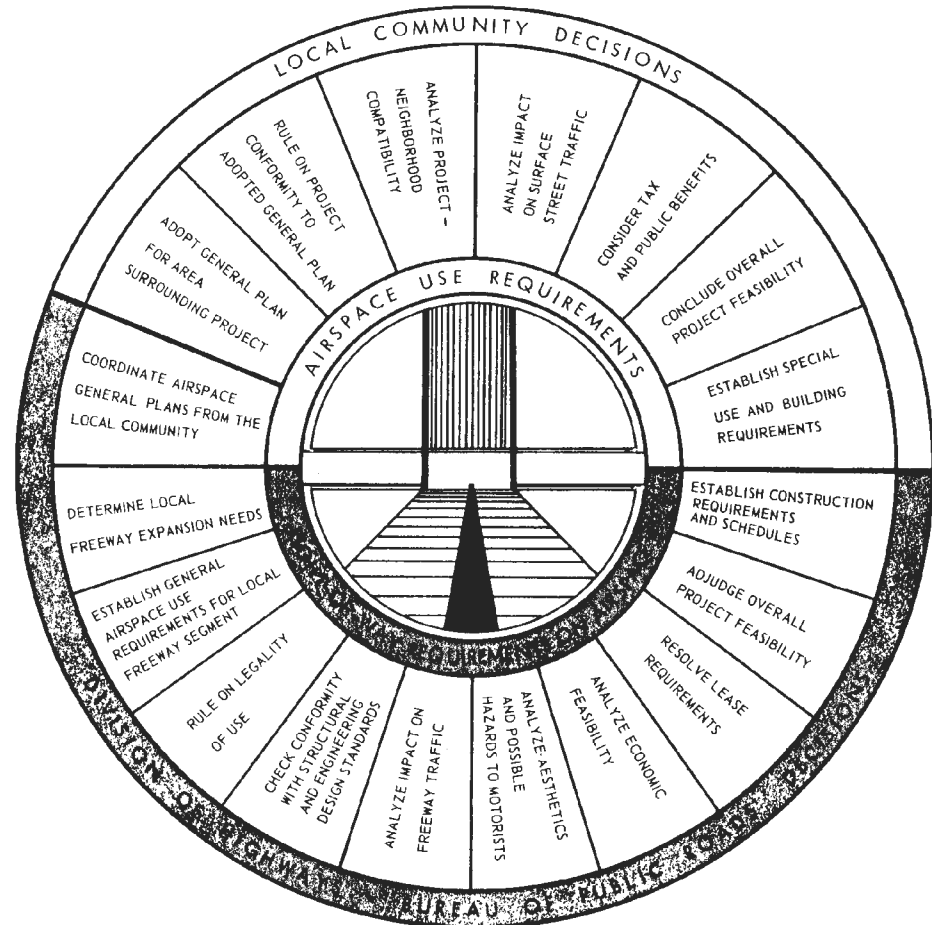
As far as possible, the respective cities and the state should work on an equal basis. In fact, ultimate decisions of overall project approval would best be made by a joint committee of city, county and state officials. Owing to the great number of California cities, however, such a system would in all probability be unworkable. We believe that a more practical solution would be for the California Legislature or the Transportation Agency to create an Airspace Division which would be responsible for coordinating interdepartmental approvals and for maintaining close liaison with the cities and counties. Local approval should precede state consideration of an airspace project, although the unusually complex nature

of airspace development and the costly planning that is necessary should be recognized; in exceptional cases a project developer should be able to approach the state for preliminary approval of design in advance or concurrent with local application for use. This would be particularly advantageous to the developer if approval were likely to hinge on complicated physical problems rather than on use considerations. Every avenue should be open to enable a developer to expedite a project, but he must be informed that in almost all instances full city approval should be obtained prior to application to the state.

4. Circle of Jurisdictional Responsibility

The extent of joint responsibility necessary for airspace development is shown on the facing graphic representation of the steps to be taken in approving an above-freeway project. In a sense, local communities should have responsibility for all of the decisions relating to use above the freeway, and the decisions of the Division of Highways and Bureau of Public Roads should be related to the right-of-way. There are obvious interrelated responsibilities, and the overlapping state interest that is shown relates to necessary coordination of the planning activities of groups of cities. The related decisions and internal steps for processing an application are shown for the respective jurisdictions; the steps for the local community and for the state and Federal bodies begin at the left-hand separation.

## JURISDICTIONAL RESPONSIBILITY FOR LEASED FREEWAY AIRSPACE DEVELOPMENTS



## VI. POLICY AND PROCEDURE

This final section of our report concerns our detailed recommendations and conclusions. The many guidelines offered apply predominantly to an aggressive program of airspace utilization, but the underlying principles would be similar for a moderate administrative program. For example, we recommend that an Airspace Division be created in the Transportation Agency, but the division could have either a large or a small staff, depending upon whether an ambitious or a modest program is to be implemented.

### A. Goals for Development

Because of physical and environmental differences from normal land sites, the use of freeway airspace requires a new set of objectives, both for the Division of Highways and for the developer. The Division must orient itself to accepting an increased number of land management functions, at the same time as preserving the integrity of the freeways; and the developer must think in terms of making projects fit completely new circumstances. Old design concepts must be adapted and construction methods modified. Neither the Division nor the developer can forget that multiple use of land is a joint venture that requires both to make adjustments within a new framework.

#### I. Blending Freeways Into Communities

It has been suggested that, while freeways are a necessity of our times, every effort should be made to blend them into the surrounding communities. There is no longer a sole criterion in freeway planning wherein the least expensive highway route and construction method is adopted. Freeways are now extensively landscaped, and bridges are designed with attention to aesthetics as well as to function. Further, the Highway Beautification Act of 1965 makes it possible now to purchase easements for restoration, preservation and enhancement of scenic beauty. Improvements built on airspace must blend with their surroundings and be of benefit to the community, but at the same time, airspace improvements must not infringe on the use of the right-of-way -- there must be no visual discontinuity and minimal distraction for the motorists. There should be little conflict with local zoning ordinances because airspace use should be as closely compatible as possible with the environment.

The use of airspace offers new hope for solving the barrier effect of a needed right-of-way that will divide a community by physically or psychologically disrupting surface continuity. Airspace use can provide an effective bridge. A freeway on a raised solid earth fill can be a beneficial means of screening noncompatible uses (for example, residences from industries), but more often than not a freeway that requires acquisition of all abutting access rights contains growth and prevents interchange. In congested areas, the use of even a small portion of the airspace under or over a freeway should help to reduce this problem and perhaps make it possible to relocate businesses within a right-of-way.

Besides being harmonious with the environment, airspace improvements should be aesthetic -- but aesthetic to whom? The freeway driver may experience the feeling of confinement or distraction, and his reactions may differ with changes in terrain and rate of speed (at high speeds, there

is a forward cone of vision). The driver's reaction will also depend upon whether he is a conditioned commuter or a leisurely traveler. (For more on these subjects, see the Architecture and Planning section following.)

The foregoing points are indicative of the impossibility of establishing precise criteria for evaluating airspace projects in general. Each development will have characteristics in common with others but each must be studied separately. Other design variables, the impact of which is difficult to weigh, are the following:

- a. That the design may be so striking that it contrasts with the environs or is distracting to motorists on the right-of-way.
- b. That there may be intermittent light and dark areas that adversely affect driving.
- c. That signs or lighting attract the driver's attention (it is a fact of advertising that fewer signs often have greater impact).

#### 2. Creative Engineering

Conventional structures that are designed for level land may be abnormally expensive if adapted to an airspace site above a freeway. Airspace improvements that are suspended over a right-of-way require bridge type structures rather than just decks or platforms. Local building ordinances may require modification, and the developer may save considerable time and expense by being familiar with bridge design and construction procedures.

New lightweight structures should be designed for above freeway use, but there are several existing examples of imaginative structural designs for solving the problem of spanning roadways. For instance, the highway restaurant over the Will Rogers Turnpike near Vineta, Oklahoma is set within a series of bowstring trusses. A second example is the Alcoa building that is under construction in the Golden Gateway Urban Renewal Project in downtown San Francisco; this high-rise office building is set over a garage and floor loads are carried on a framework of cross beams outside of the building. Based on present construction techniques, the following general costs may be used as guidelines for suspended airspace development:

	<u>Average Costs Per Square Foot*</u>
Platform Costs Over Railroad Tracks	\$15 to \$20
Bridges	\$10 to \$30

\* Depending on use, loads, height and length of spans.

Full utilization of airspace under viaducts should be considered. The present rules requiring at least a crawl space below the freeway should be reviewed. It is true that the designs now required would be easy to administer, but it is possible that an airspace project beneath a freeway could result in some cost savings to both the state and the developer.

For example, viaduct structural supports could be left rough and be enclosed later by airspace improvements. Strip foundation walls (rather than posts) for a freeway also could be used to divide stores or other uses. Modern fire sprinkler systems should eliminate hazards, and a lightweight ceiling suspended from the bottom of a freeway could result in substantial savings for an airspace occupant. This type of construction beneath freeways would be ideal for congested business districts, as is evidenced by development in Tokyo, Japan.

### 3. Direct Access Projects

Direct access to the larger airspace buildings and complexes of the future may be advisable. The freeways or expressways that serve as connectors could route terminal traffic directly into parking areas that would relieve surface street congestion; great care would have to be taken, however, to avoid loss of a freeway's effectiveness as a fully controlled access right-of-way. Judging by the direct access projects over the turnpikes in the eastern United States, airspace projects receive particular benefit from such access.

In rural areas, traveler oriented roadside conveniences with direct highway access would effectively serve the motorist but could well monopolize business over a particular area. Although not presently allowed on airspace, service stations would especially benefit from prominent airspace locations. It is interesting to note, however, that the petroleum suppliers do not tend to favor the use of airspace for service station sites. Any company would welcome a prominent site, but on the whole the suppliers would rather seek free enterprise locations where they would not have to submit to leasing or other controls imposed by government. There is also an implicit fear that already acquired service station sites would be subjected to severe business interception over which there would be little control.

Although a greater amount of land is required for interchanges, the present California policy of providing freeway entrances and exits on the basis of congestion and general traffic needs appears sufficient.

### 4. Limitations and Trends

The customary and desirable attempt to locate freeways in areas of low land values is at cross purposes with a goal of creating high value for related airspace, and this is one of the reasons that construction on freeway airspace will be economically feasible over only a small portion of the freeway system. In any event, indiscriminate use of airspace may create more problems than it solves. Taken as a whole, the vast amount of airspace represents newfound "land" that must be marketed gradually, depending on local capacity for absorption. Land uses that are compatible with freeways and for which there is demand will be most effective.

West Coast cities are maturing and trends favor the utilization of airspace. Abundant suburban land is available, but prices are often high and there is an increasing realization that land must be conserved; private and public urban renewal is occurring in the large and small cities, and land is being more intensively utilized everywhere. San Francisco even has some of

the problems that trouble the old European cities, namely that buildings and areas have historical significance and must be preserved because of popular demand. The most encouraging sign of maturation from the standpoint of this study is the fact that major California cities have central business district land values that already are sufficient to warrant the economic use of air rights.

## B. Guidelines for Airspace Utilization

The main variables affecting airspace development are the type of freeway, the controls that are to be applied to the right-of-way, the local jurisdiction regulations that will affect use and the criteria for the type of use itself. All of these requirements will vary at any given location, so it is obvious that no single set of criteria will adequately apply to all situations or uses. Case studies or *pro forma* income-expense statements for various types of improvements serve no useful purpose because they only represent illustrations of a set of circumstances that may or may not be representative of the problems in another project application.

The general and special criteria listed in the following paragraphs give the elements and characteristics that will most influence development. The application of these or other criteria, however, will require the combined technical skill of many persons. For example, highway engineers must devise controls that will generally apply to segments of freeway; local government personnel must study the neighborhood and its future before deciding on an allowable use or uses; an economist must analyze the specific circumstances in relation to the proposed use; and the developer must ultimately decide whether or not to construct an improvement and invest in the location.

### 1. Right-of-Way Criteria

The type of freeway structure (discussed in Chapter III, Section F, "Freeway Structures and Timing") will control the airspace use possibilities to a great extent. For example, the advantages of building on an airspace site over a depressed right-of-way may be that the improvements are level with surrounding surface street grade, that the site has advertising value because it is in a prominent position visible from the freeway, that the airspace tenants can enjoy viewing the freeway traffic but are isolated from it and, most importantly, that the use is perfectly suited to the location and circumstances.

Each freeway route will eventually have to be studied to determine the conditions under which airspace uses should be allowed. Prior to publishing particular physical requirements for any route, the following basic factors must be determined:

- a. Present public and National Defense highway needs
- b. Future highway expansion needs
- c. Freeway horizontal clearance requisites
- d. Freeway vertical requisites



- e. Freeway coverage or enclosure limitations
- f. Precise airspace areas to be released

Other fundamental procedures that must be carried out after the specific use above a freeway is determined are the following:

- a. Verify that the proposed use has been sanctioned by the local jurisdiction.
- b. Determine possible hazards to the right-of-way.
- c. Study the design to determine its probable overall impact.
- d. Analyze whether or not the proposed improvements would be compatible with the freeway (also, because the state is the lessor, analyze whether or not the proposed improvements would be compatible with the environs).
- e. Analyze critically the elements of the proposed structure, including such matters as how it is to be served by utilities.
- f. Ascertain foundation demands for the proposed improvements.
- g. Establish limitations for spanning the roadway.
- h. Consider the general construction difficulties and requirements.

## 2. General Use Criteria

In terms of economic feasibility, the most compatible freeway airspace developments will be high-density improvements, and, in terms of structural design, the most suitable buildings will be those usually requiring long spans. Both of these basic characteristics should be considered in the advance planning conducted to delineate general areas where airspace might be developed.

### a. Economic Feasibility

Besides verifying local jurisdictional approval of a particular use, the state must make its own investigation to determine project compatibility and economic feasibility. The state will have the administrative burden of reviewing economic reports submitted by the airspace applicant, conducting its own analysis or perhaps performing both of these functions before approving an application and ruling on lease rates and terms. Required application papers should therefore include such basic data as project plans, building specifications, cost estimate breakdowns and market studies to document project feasibility.

Private projects should be self-supporting or be backed by substantial and proven assets. In the latter instance, allowance should be made for certain improvements that are built for purposes

other than direct profit from an investment. For example, large financial institutions often build grand edifices that may in themselves be uneconomical but that create an image of prestige that is valued for advertising. Public improvements must be justified on the basis of their contribution to the community.

Our research indicates that, to be economically feasible, a proposed airspace development to be built over a freeway should be able to sustain site values of \$15 to \$20 per square foot of site area. If surrounding land values are below these minimums, the advisability of using air rights should be questioned. If, in order to preserve needed surface airspace, a freeway that would normally be built on fill is built on a viaduct, the airspace user would have to pay approximately \$5 more per square foot because the state and Federal funds cannot be used for unusual additional construction costs.

### b. Long Span Structures

Buildings that normally require long clear spans (e.g., convention halls, auditoriums, gymnasiums) may be most easily adapted to above-freeway locations. Cobo Hall, a convention center in Detroit, and the War Memorial Auditorium that is part of the Prudential Center in Boston are well-known examples of this principle.

Industrial buildings would have similar structural compatibility, but the disadvantages of such use are that heavy floor loads are often required and that land values usually must be minimal. Garage structures are particularly compatible because of nuisance characteristics similar to those of freeways. Garages also provide very satisfactory ground floor buffers to isolate upper floors from unwanted noise or fumes.

## 3. Rules for Development

In our proposal for this assignment, we originally envisioned that a simplified list of rules could be devised to assure proper action with respect to any proposed airspace use. Our extensive research indicates, however, that such a list would be so extensive and conditional that it would be useless; probably only a computerized matrix of variables would provide a means of rapid consideration of what must now remain judgmental factors. Further, the assignment of proper weight to various factors would seriously limit the reliability of even the most sophisticated system because such weights are affected by the circumstances of each situation.

As proved by the existing viaduct parking lots, utilization of airspace under a freeway need not be elaborate, and costs can approximate those at an alternate, nonfreeway location. Only the greater density uses that can sustain high land values are likely to be economically feasible for airspace sites above an operating or proposed freeway. As shown in the Matrix of Freeway Airspace Uses (discussed in Chapter IV, Section H), the relevant situations for development depend on common characteristics

that, among other things, are influenced by the type of freeway structure. The criteria or rules for various types of uses or for a single property will likewise vary according to the investors' individual objectives. The presence of the freeway can be a considerable benefit or a detriment, depending on the particular characteristics and circumstances of use.

### C. Guidelines for Agency Cooperation

Our extensive in-depth interviews with individuals and groups indicate that there is general willingness on the part of Federal, state, county, city and local groups to assist in the move to improve freeway airspace. There is also great concern over how these complex projects are to be administered. In our opinion, if development is to succeed, the several levels of government will have to work in unison with each assuming burdens of responsibility. Unnecessary restraints or lack of cooperation by any jurisdiction will forestall private development which would represent the greatest benefits to all concerned. Unfortunately, all agencies are held accountable by the public, regardless of which jurisdiction may be primarily responsible for delaying a normally desirable project.

#### 1. Federal-State Relationships

The U.S. Bureau of Public Roads and the California Division of Highways, judging by the processing of applications for California viaduct parking projects, have a smoothly running and routine procedure. In our opinion, complex and improved airspace projects will require more concentrated handling. On interstate freeway projects, the Bureau acts as a final authority that reviews applications submitted by the state and checks compliance with set criteria. The state must deal directly with potential developers, maintain liaison with local jurisdictions, coordinate departmental efforts and collaborate with the Bureau of Public Roads. In our opinion, the Division of Highways needs a centralized authority with which the public can deal in airspace matters -- a department that will be responsible for expediting a project application and maintaining records after approval.

#### 2. City-State Relationships

The present role of the local jurisdictions is unnecessarily vague. The California Transportation Agency has announced the policy that full local approval from the city or county must be obtained at the outset of a project application; this policy should be reemphasized.

Complete local approval, as a general rule, should be obtained before submitting an airspace application to the Division of Highways. Such a procedure will conserve the state's time and will eliminate possible jurisdictional jealousy. It is our opinion, however, that at the inception of state-developer preliminary discussions, the state should not be charged with making a lengthy investigation to determine whether or not prior local approval has been obtained. A developer should be able to approach either the district office or the Division of Highways headquarters for preliminary approval of use concepts. Considering the complex physical aspects of airspace use, many queries might be necessary as a part of

basic planning, prior to formal application to local governments. In any event, a knowledgeable developer would be prudent to advise the local jurisdiction of his reasons for and intention of going to the state first.

State advance announcement of available airspace and construction requirements for various rights-of-way would assist both local jurisdictions and developers by making the majority of such preliminary discussions unnecessary. It will be a considerable time, however, before the state can perfect an airspace general plan for all freeways, and it likewise will be a considerable time before the interested local jurisdictions will be able to incorporate freeway airspace into their general plans and zoning patterns.

The October 1966 resolutions of the General Assembly of the League of California Cities, as quoted in Chapter III, Section I, "Current Policy," are very broad but do indicate the adamant feelings of various cities. The concept that the state cannot allow development of airspace without local approval is a good guideline for harmonious city-state relationships. The true objective is for the proposed airspace development to be as compatible as possible with its environment, and such compatibility can best be assured by careful local planning regulations. Our only reservation is that the state should not relinquish all authority and allow random development that would be detrimental on a regional or area-wide basis.

The Division of Highways Circular Letter No. 62-224, which establishes primary state procedure for leasing airspace, requires that the district office submit a full report setting forth the facts of an airspace proposal. Such reports should be continued and obviously are necessary for decisions at the Division of Highways headquarters and the Bureau of Public Roads. We caution, however, that local-state relations could be harmed by early assertive investigations by the state. In final applications, the developer should supply proper certification of local concurrence, and this could be subsequently verified by the state. If the developer chooses to make preliminary inquiries, the state should weigh such inquiries accordingly, giving limited or conditional approvals and generally refraining from making time-wasting preliminary investigations. Well-established and publicized policy that local approval always is required and that the state prefers that the developer contact local government first would be sound.

#### 3. Stimulation of Local Initiative

The key to cooperative relationships with the cities and counties is for the state to inspire local initiative. As a first step, the state could project its expansion needs, including bridge clearances and other physical criteria, and advise local governments of the specific inventory of local airspace that could be made available. Armed with this knowledge, local government could begin to incorporate small or large segments of rights-of-way into their master plans and zoning patterns. With the same cooperative goal in mind, local governments could precede the state by submitting their decisions regarding uses that might

be permitted in various areas. To prompt successful development, private industry should be made aware of the airspace available and its possible uses.

#### D. Recommended Policy

Our research and that of our three consultants indicates that development of airspace is not so much a technical problem as it is a matter of establishing broad policy to make greater use of freeway airspace. Utilization of space under or over the freeways in the central areas of the larger cities should be both feasible and a desirable asset. Isolated use can be made of air rights in the suburban and rural areas, but high construction costs are a critical factor that will forestall widespread development.

##### 1. Present and Future Policy

The problems of disposition or creation of airspace appear to be divided into two related questions: "what should be done with airspace under or over already acquired fee-owned rights-of-way that are fully improved?" and "what planning and action should be taken with respect to proposed or future freeway routes?"

Development of airspace under or over an operating freeway is possible in most instances; therefore, disposition is a matter of administrative policy. No one can anticipate all of the engineering and administrative problems that might arise, but a responsible staff could overcome most difficulties during normal day-to-day involvement.

What may escape notice is that the decision to lease airspace under or over already purchased freeway land on a long-term basis may prejudice future acquisition procedure. There is no question about the state's right to acquire fee simple interest or absolute rights to land that is for public use, and the courts have also upheld the state's right to acquire land in excess of highway needs when it was known in advance that the airspace would later be leased on a short-term basis for privately operated parking lots. Long-term leasing to private interests, however, raises unresolved legal questions of the state's ability to take privately owned property when there is expectation of leasing part of the property to other private interests for protracted periods of time. We have predicted that the state will generally be forced to acquire less than fee interests; but regardless of the type of ownership, the state will have to provide orderly control of the airspace that is so closely related to freeway operation.

##### 2. Possible Courses of Action

The first and primary decision to be made is whether airspace is to be passively administered in response to piecemeal applications, or whether airspace is to be energetically administered by a special staff that have defined responsibilities and established goals. Because of our research discloses that substantial benefits may be derived from the multiple use of freeway land, all of our conclusions and recommendations assume that an aggressive program will be adopted. Legislative discussion

will be required to arrive at more definitive legislation; and assuming an energetic and extensive program of airspace utilization were adopted, a legislative mandate may also be necessary.

#### 3. Creation of Airspace Division

Our first recommendation is for the creation of a centralized authority to deal exclusively with airspace development on a state-wide basis. We believe that such responsibility is best placed under the State Highway Engineer at the middle management level or as a part of the Transportation Agency in a position similar to that of the Division of Contracts and Rights-of-Way (Legal Department). The number of assigned staff need not be great (depending on the extent of the adopted program), but it is most important that the division or department have sufficient stature to maintain adequate liaison with the various California communities, to deal with qualified major developers and to coordinate intra-agency functions relating to airspace. Such a division or department could be created either by the legislature or by the State Highway Engineer.

Our reason for selecting the Transportation Agency and, more specifically, the Division of Highways, is because the successful creation of airspace will depend on actions by various departments of the Division of Highways. In our opinion, because of the close association of airspace improvements with the primary right-of-way, the administrative staff can operate successfully only from within the Division of Highways or in a closely related capacity. The complex technical and administrative problems must be worked out with the respective divisions and departments of the Transportation Agency, and the respective cities must be apprised of the policy decisions. The separate activities of the various communities must be apprised of the policy decisions. The separate activities of the various communities must also be coordinated.

Writing the job description for an airspace division administrator would be a difficult task and falls well beyond the scope of this assignment. For discussion purposes, however, we would suggest that the job responsibility be close to that of a knowledgeable real estate developer: the administrator must be well founded in general real estate, must be familiar with lease procedures, must be skilled in negotiation and must be able to inspire the confidence of local communities.

#### 4. Stimulation of Local Initiative

Our second recommendation is for the legislature and the Transportation Agency to stimulate local initiative for the creation of airspace, to work in conjunction with local communities and to act as a coordinator to accomplish successful development. The first step in inspiring local initiative is to recognize that the type and intensity of all airspace use shall be determined by the local jurisdictions as a part of their general planning and zoning ordinance procedures. In essence, the Transportation Agency has already announced this method of administrative handling; but the policy should be emphatically reaffirmed, subject to the proviso that, if necessary, the state may impose additional lease

restrictions that may also control use. Highway airspace, although generally unclassified with respect to zoning, should be compatible with adjacent land use patterns; but such decisions should be made by local authority. The state will also have to exercise some authority in these matters because:

- a. The state is responsible for the uninterrupted and safe flow of traffic.
- b. The state will be the lessor of the air rights, unless airspace is sold.
- c. The state, by use restrictions imposed as a part of the lease agreement, may have to supplement local controls that are ineffective or loose.
- d. The state will have to assist in coordinating and overseeing the separate community efforts and preserving regional or areawide use planning. This recommendation does not imply intervention with local prerogatives; it simply means that the state, because of its direct responsibility and interest in the joint use of freeway land, must assure good planning standards along entire rights-of-way that may pass through a succession of small communities. Indiscriminate use of airspace by a single community at the expense of the right-of-way or of several other communities cannot be allowed.

The Transportation Agency has recognized that local governments should have rights of first refusal for the use of available airspace within their jurisdictions. This does not entail a gift of land or a diversion of highway funds; rather, it is a recognition that public uses have basic priority over private uses. Because the use of the airspace should be compatible with but must remain incident to the use of the highway, we would favor a more precise definition of priorities of use. In the order of priority, the use of airspace not directly required for the present highway should be reserved for:

- a. Highway expansion resulting from additional or projected public or National Defense needs.
- b. Complementary public transportation facilities that would tend to relieve traffic congestion.
- c. Civic projects of the local, state or Federal government.
- d. Private developments that are economically feasible or that are otherwise justified as being self-sustaining and unlikely to become a burden on the state.

#### 5. Stimulation of Greater Private Participation in Airspace Use

Our third recommendation is to urge greater private participation by standardizing airspace requirements so that local government and

private industry can have greater confidence in the use of airspace. Although last in priority, private use is first in benefits. Like wharves or filled ground, airspace is a form of created land that can provide new sources of rental income and local tax revenues. In the congested areas where land values are high, properties that normally would be displaced by needed freeways can be retained on the tax rolls, and properties can be added over existing rights-of-way. Further, the use of airspace can make it possible to blend the freeway into the fabric of the community. The goal is to make freeway land that is already under intensive public use into an even more productive multiple facility.

#### 6. Broadening of Policy on Disposition of Air Rights

Our fourth recommendation is for the California Highway Commission to allow the Division of Highways more flexibility in the methods of leasing or possibly selling airspace. Present allowable procedures of a bid and offer format are sound but limited when considering a long-term lease of airspace for major developments (see Recommended Procedure section following).

#### E. Recommended Procedure

Present broad legislation permits either a passive or an aggressive program of fostering airspace utilization, but in either event several procedural steps should be taken to stimulate more general use and private participation. Further research will be needed to perfect standardization of a long-term lease form that would be generally acceptable to private financial institutions. Explicit and systematized procedural controls are premature at this time because detailed administrative problems cannot be adequately anticipated until more day-to-day staff experience has been gained. Our research, however, enables us to make several basic recommendations of guidelines for procedure.

#### 1. Standardization of Airspace Use

Whether under a passively or actively administered program, the use of airspace should be standardized as far as possible. Standardization by the Division of Highways and the Bureau of Public Roads of physical, technical and title requirements for the use of airspace will be of great assistance to local governments and potential developers. Uniformity of requirements will instill confidence in the rights to be acquired and assist an investor in determining the parameters of probable negotiation with the state. Construction on airspace is at best complex, so every effort should be made to reduce the number of unknowns.

Desirable standardization might include such things as advance notice of typical construction designs that would be required over various types of freeways. For example, simplification of the probable foundations and span systems for various physical conditions would materially assist the potential airspace developer. This type of information would also aid local governments in coordinating building requirements and providing assistance to private developers.

The key to greater private participation is to meet the general financing requirements of major private lenders. The present leasing requirements and much of the stated procedure represent unfavorable terms upon which to base long-term financing.

Large and complex improvements will obviously require investment capital. We have recognized the basic problem of obtaining financing under the present terms, but the scope of our assignment precludes the in-depth research that must be directed to this single topic. We recommend, therefore, that a study be made to determine the general loan requirements of the major United States lending institutions with respect to leaseholds. Such a study would include market analysis of the real estate factors and legal research, with the combined efforts directed toward formulating a workable long-term lease for airspace.

In spite of the difficulties of financing leasehold improvements, we conclude that it is on the whole more desirable for the state to lease rather than to sell airspace. The general reasons for leasing of airspace are as follows:

- a. Leasing gives the state close control over permitted use and specified assurances against abandonment.
- b. Leasing provides rental revenues for the State Highway Fund.
- c. Leasing provides local possessory tax revenue (however, sale would provide similar or greater local tax revenue).
- d. Leasing makes it possible to reacquire the property at a specified time in the future when highway expansion may be necessary.

## 2. Revision of Disposition Procedures

Other forms of disposition besides the bid and offer format for airspace applications should be considered. In most cases, because of the complexity of airspace sites, leasing will have to be very flexible and tailored to meet specialized or unique development needs. As a basis for other forms of disposition that might be considered, adaptations could be made of the Land Disposal Procedures used by the Department of Housing and Urban Development (HUD) in the Urban Renewal Programs (see detailed summary in Urban Renewal Manual, Book 1, Part 14).

## 3. Coordination of General Planning

Besides identifying possible sections of the freeway network that are suitable for airspace development, the state should assist by coordinating the general plans and zoning requirements formulated by the local jurisdictions to provide orderly development over regions and large areas. As soon as possible, the local communities should undertake the initiative to advance plan and identify the desirable areas for civic and private airspace development. Because of the costs of airspace project foundations, the urban centers should be planned first. The Division of Highways should project their future needs and decide upon

the general inventory of airspace that might be released, the general clearances surrounding the right-of-way and the probable foundation requirements. Concurrently, the cities should study state freeway and highway routes as they relate to their general plans and adopted use patterns. Ideally, no individual project should be considered until the surrounding general area has been studied by the Division of Highways and the local community has determined general plan uses that will be permitted. At the outset, because it would take many months to determine future highway needs and to general plan all of California's freeway and highway system, it might be advisable for the state to require the local jurisdiction to determine the general plan for one quarter mile on either side of a proposed individual project. However, both the state and local governments should be willing to give a potential developer preliminary assistance to obtain the earliest possible idea of overall project feasibility.

## F. Decisions for Administration

Two decision flow models are presented as a part of this report. The first, entitled "Sequence of Decisions to Implement An Aggressive Program of Freeway Airspace Utilization," is at the end of Chapter I, the Summary of Conclusions and Recommendations. This series of decisions begins with the creation of an airspace division or department at the middle management level under the State Highway Engineer. The decisions in this sequence lead to the start of an energetic program to administer the airspace over state freeways. This chart mainly represents policy matters that must be decided by the State Highway Engineer or others before operations begin. Set responsibilities and goals would be formulated during this period. The second graphic representation, entitled "Sequence of Decisions for the Administration of Freeway Airspace Development," follows at the end of this chapter.

### 1. Preliminary and Final Application Procedure

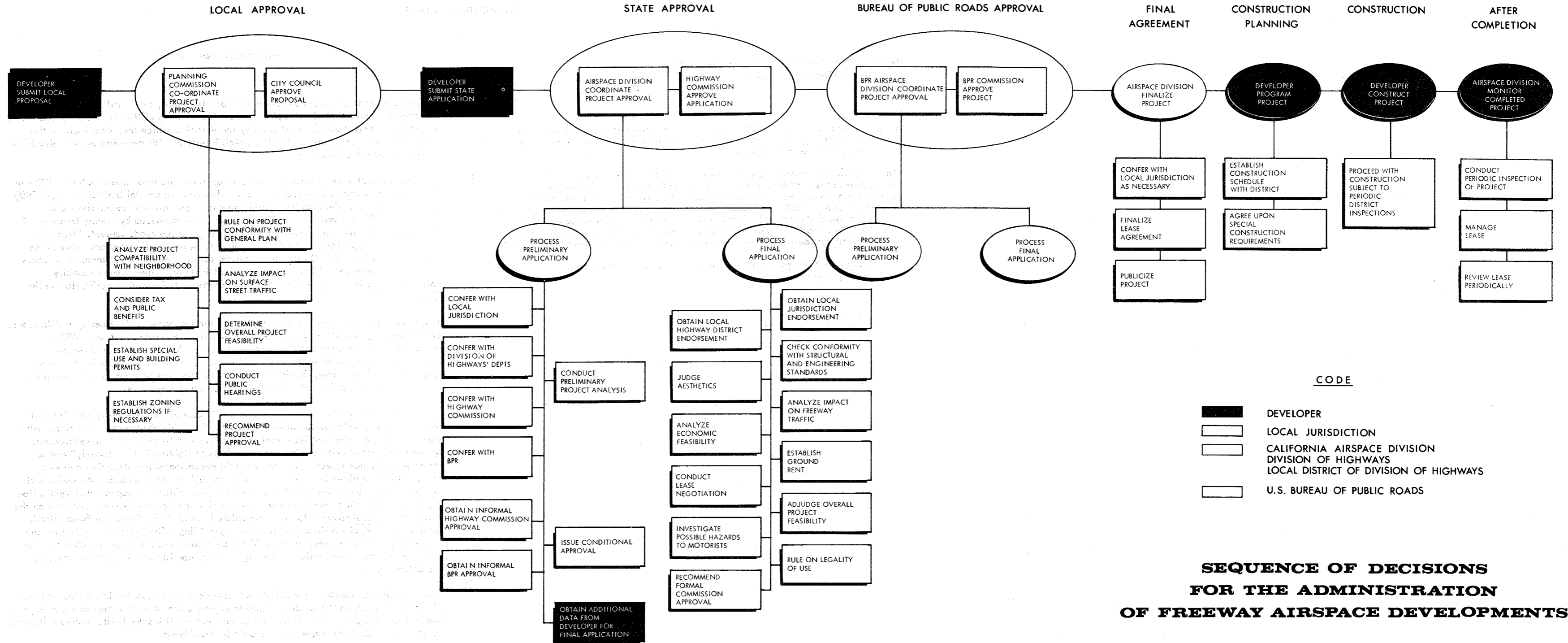
The sequence of administrative decisions covers procedural decisions for the most part, although an implicit policy change is also shown. We have shown an alternative two-step application procedure that would be at the option of the state as an accommodation to the prospective airspace developer. This is not a complete departure from present procedure, although such methodology is not now formalized. For example, the alternative or preliminary Bureau of Public Roads inquiry for concurrence is made after a very informal telephone conversation regarding a potential developer's project. Because of the complexity and great expense involved in making applications (or proposals for use), we have chosen to recognize formally a preliminary application procedure. In essence, a developer would be able to get prompt encouragement or authoritative refusal before spending thousands of dollars to draw detailed and complete plans. This desirable procedure is a courtesy to a potential project developer and at the same time offers a basic advantage for both the Division of Highways and the Bureau of Public Roads; namely, quick and therefore inexpensive decisions are generated.

A preliminary application and conditional approval system is a tool for rapid communication. If adopted, however, the state should use this privilege wisely. As shown, local government should usually give full prior approval to any project before the state gives it consideration. Such a procedure saves the state from processing projects that would necessarily be rejected at the local level. Further, prior application with the state may prejudice the developer's chances for local approval -- it should not, but some communities unwarrantedly fear state intervention. Regardless of these precautions, the state should provide every means to assist serious potential airspace developers that may be in need of early engineering or highway policy advice. In order to expedite proposals, therefore, we recommend that a preliminary application and a final or complete application be considered by both the state and the Bureau of Public Roads.

## 2. Functions of an Airspace Division

In our concept of an airspace division or department, the administration would act as a single clearing house for all air rights matters involving the use of excess right-of-way space under or over freeways or other state highways. Such a department would be responsible for the following:

- a. Soliciting, evaluating and coordinating the approval of airspace applications from private or governmental developers. This would include coordinating the approvals within the Division of Highways district office and departments that would be necessary before approval from higher authority, maintaining liaison with local government and conferring on airspace matters with the Bureau of Public Roads.
- b. Coordinating the leasing (or possible sale) of airspace.
- c. Assisting the local communities in their general planning and insuring that overall regional planning is accomplished. (Actually, an airspace division would act in conjunction with the responsible planning group of the Division of Highways on regional planning matters.)
- d. Coordinating proper construction surveillance.
- e. Managing and periodically auditing existing airspace project leases.
- f. Maintaining public contact and publishing pertinent information on adopted policy and procedure affecting air rights.
- g. Effecting such other procedures as are delegated or allowed for the successful handling of airspace projects.







*Airspace Utilization Study Preliminary Engineering Analysis  
prepared by Kaiser Engineers, February 1967*

All air space utilizations postulated in the attached report appear ultimately feasible, although numerous administrative and political procedures must be solved prior to implementation.

More intensive studies are necessary to determine the overall requirements for engineering criteria suitable for a wide range of air space utilizations, particularly in the area of ventilation, fire protection, and actual site construction practices. Additional study is also required to establish procedures for engineers, architects and contractors to follow in executing air space projects. Finally, the broader concepts of government control must be established to provide firm guidance for all potential participants in these projects.

We appreciate the opportunity of making a contribution on a subject of such community impact.

KAISER ENGINEERS

I. TRAFFIC CONSIDERATIONS

The prime purpose of a freeway system is to provide rapid, safe, and orderly (if not uncongested) movement of vehicular traffic. Candidate facilities for freeway-associated air rights projects should be evaluated by the extent to which they contribute to this prime objective; any proposed facility which interferes with the prime purpose should be eliminated from consideration.

From the point of view of traffic movement, air rights projects appear to have utility in all types of freeway designs and locations. However, in central business district (CBD) vicinities there are elements that could cause air rights projects to interfere with "normal" traffic movement. The CBD freeway is characterized by having frequent off ramps, interchanges, and transition lanes. It is generally grade separated from the surrounding surface streets. Traffic is medium to heavy in all directions between the commuter peak periods. During the commuter peaks, average speed tends to be below optimum for maximum vehicle capacity and all lanes are filled beyond capacity. Fortunately, some air rights projects could contribute to improving traffic flow in the CBD.

There are only two positions for air rights structures relative to the freeway traffic lanes. The structure is over the roadway, or the structure is under the roadway. While structures under freeways pose no apparent traffic problems, traffic engineering considerations are necessary to assure sufficient access to prevent interference with ramp traffic. Engineering should also provide fireproofing or other means to keep the freeways and adjunct facilities from being damaged during a fire.

Structures built over the freeway are potentially capable of interfering with "normal" traffic through psychological slowing of the traffic. This phenomenon occurs through a variety of causes, the most important of which seem to be physical lane restrictions, apparent restricted vertical clearance, inadequate lighting in the "tunnel," and an attractive nuisance effect. With the possible exception of the attractive nuisance effect, these interferences can be mitigated through design standards. An additional problem associated primarily with CBD areas is ventilation. It appears that ventilation requirements should be evaluated on traffic projections for the freeway itself and on the extent of the total road enclosure contemplated, instead of adhering to fixed criteria. Another problem of overhead construction is providing a fire protection system for the air rights structural members that would not be a hazard to the freeway motorist in the event of accidental activation. Drainage must be considered for sprinkler type fire protection systems.

Necessary design standards for buildings located over freeways should consider uniformity of the structures from the roadway, both to minimize the attractive nuisance and to provide adequate lighting and ventilation as adjacent facilities are built. Future allowance for double decking the freeway also should be considered.

Since freeways are often on the edge of the CBD, heavy vehicular traffic generating facilities should be given first priority as air rights projects because they would tend to alleviate surface street traffic in the core area. Just as important is encouraging



projects that produce heavy weekday or evening off-peak traffic. Public buildings such as central transportation centers, licensing offices, administrative offices, court houses, libraries and vehicle parking garages are capable of meeting both requirements. Medical office buildings, hotels, and apartment-retail complexes are also ideal.

However, in order to reduce the surface street traffic, it would be necessary to provide parking space adjacent to these structures.

A refinement worth consideration is a requirement for parking structures with each air rights project that includes direct access to the freeway. To complement this arrangement, a computer-operated, traffic metering system could be incorporated to control all air rights projects in the CBD. The computer-controlled metering of air rights-associated traffic could relieve the congestion in the CBD freeway system. These parking garages would function as reservoirs to keep the freeway supplied with the optimum instantaneous vehicular density by momentarily delaying vehicles at the ramp. The apparent predictability of traffic from a single-purpose garage could greatly simplify the controls required to effectively meter this traffic.

Direct access to freeways from any air rights project should be evaluated on the usefulness of the access ramp in serving the best interest of the motorist. Certainly on CBD freeways, where many ramps to public streets are required, connection from parking garages to these ramps would be beneficial. A flexible policy which includes this type of potential benefit should be considered.

In summary, the following subjects should be topics of more intensive future studies, either to set general air rights policy or to provide guidelines for individual projects:

- Generally acceptable facilities for air rights projects.
- Clearances from roadways, including provisions for double decking.
- Roadway lighting requirements for elevated airspace projects.
- Controls to minimize attractive nuisances.
- Roadway ventilation criteria for elevated airspace projects.
- Fire protection criteria to protect the motorist.
- Standards to provide uniformity for future adjacent facilities.
- Direct access to freeway from selected facilities that include computer supervised egress.

## II. ENGINEERING DESIGN CONSIDERATIONS

### A. Basic Design Criteria

Orderly execution of the design for any project first requires promulgation of a set of rules, called design criteria, upon which the entire design effort will be based. In addition to steel and concrete design code references, floor loading requirements and other such information found in usual project design criteria, freeway airspace structures will require special criteria setting forth specific requirements peculiar to these types of buildings.

The American Association of State Highway Officials' Informational Guide on Air Rights Above and Below Interstate Freeways (October 1961) and the United States Bureau of Public Roads Instructional Memorandum 21-3-62, issued May 4, 1962, are documents which include, among other things, engineering design criteria pertaining to highway airspace structures. Engineering design criteria included in these documents are broad and general in scope; however, these documents, together with other information on the subject, serve as a foundation for future, more precisely defined design criteria that will suit conditions in the State of California and will serve as a guide in complying with Federal highway financing requirements. These future engineering design criteria will be strongly influenced by traffic engineering requirements and architectural or aesthetic considerations.

Design criteria to be established should set forth sufficiently detailed information so that an architect and engineer will be able to prepare preliminary plans, with which to secure approval of a proposed project from the appropriate governmental agencies, and to prepare final working drawings without having to request special rulings for various items.

A partial listing of required engineering design criteria is discussed below. Basic criteria would probably vary, depending on the class and type of roadway and on the location.

1. Clear span requirements over freeway - These figures probably should be based on the projected ultimate section for the portion of freeway under consideration; the maximum width is usually four lanes in each direction. Provision must also be made to clear speed change lanes and roadway shoulders.  
  
Median strip support usually would be permitted, although not always.
2. Height clearance over freeway - This requirement could be fairly uniform, although higher than normal clearances may be specified in such special instances as at sign locations and at sites of possible future double decking.
3. Length of longitudinal cover - This requirement has roots in architectural, traffic engineering and general engineering design objectives. It also depends on the amount of side confinement, top cover and the total cross sectional clear area of the roadway.

Other items affecting this variable are the amount of ventilation (natural or forced), quantity of lighting (natural or artificial), required site distances

at ramps, proximity of other airspace projects and aesthetic value of the landscape that is removed from the motorist's view.

4. Impact resistance of columns - Building columns are not usually designed to resist high speed impacts from heavily loaded motor vehicles. Consideration must be given to this possibility.
5. Fire resistance of structures - A severe hazard can result from a vehicular accident involving a tank truck carrying flammable liquids. It should be noted here that unprotected structural steel loses strength rapidly at elevated temperatures and must be protected.
6. Foundation spacing - Foundations for separate but adjacent structures must be spaced sufficiently apart to avoid overloading the underlying supporting soils.
7. Combination structures - Design criteria might be established to permit blending an elevated freeway and a multistory overhead building into one structure as shown in Figure 9. Since commercial and highway structures generally use different design criteria, these differences would have to be resolved.
8. Utilities - There appear to be no major problems in this area, although it may be wise to require concealment of all utility services so they are not exposed to view beneath the floor over the freeway.

Wherever possible, the official criteria must have clearly defined requirements to make administration as objective as possible. It is realized, however, that there will be subjective items, and final resolution of these may in some instances require adjudication by an impartial board.

## B. Types of Air Rights Structures

The possible types of air rights structures would undoubtedly form a long list; however, for engineering purposes, they can be divided roughly into six types by classifying them according to their position relative to the freeway. The primary considerations are structural since, from an engineering viewpoint, this is where the main differences will be in freeway airspace developments.

### 1. Structures Over at Grade Freeways (See Figures 1 and 2)

In general this type of structure would be similar to buildings not utilizing air rights, except that the floor area and columns would be omitted from the freeway right-of-way in accordance with established design criteria. Resulting spans across the right-of-way would be 90 feet more or less (assuming an eight-lane freeway and placement of columns in the median strip), instead of the more usual building column spacing of approximately 25 feet. Some form of truss type structural arrangement might be utilized for these longer spans, as shown in Figure 2. Building column spacing

parallel to freeway lanes would be essentially unaffected. Column sections adjacent to the freeway right-of-way would generally be larger than usual for the following reasons:

- a. They must carry a higher vertical load because of the greater spacing required transverse to the freeway.
- b. They must be resistant to vehicular collision.
- c. They would be subject to higher bending stresses from seismic loading because of their greater spacing.

### 2. Structures Over Depressed Freeways (See Figures 3 and 4)

The structure over a depressed freeway shown in Figure 3 is virtually identical to the structure over a freeway at grade shown in Figure 1, except that the ends of the building rest on grade and thus provide seismic resistance at slightly lower expense. The other comments mentioned under section 1 above are also applicable here.

The type of structure illustrated in Figure 4 is essentially a two-story, frame building erected on a site created by widening a normal street overpass above a depressed right-of-way. This building site would be designed similarly to an ordinary grade separation structure.

### 3. Structures Over Elevated Freeways (See Figure 5)

Whether the freeway is an elevated viaduct or on fill, a separate building will be similar in construction requirements to a building over a freeway at grade, except that the lowest floor over the freeway will be raised somewhat. Columns beneath the structure have a longer unsupported length with the result that larger sections are required.

If the structure extends for some distance on each side of the freeway, seismic resistance may be more economically obtained through shear walls extending to foundations at or below grade.

### 4. Structures Under At Grade Freeways (See Figure 6)

Frames for this type of structure could be similar to those for underground parking garages. Essentially, the freeway overhead must be supported by the roof of the structure. If a structure of this type were to be erected beneath an existing freeway, some form of temporary traffic detour would probably be required.

### 5. Structures Under Elevated Freeways (See Figures 7 and 8)

Improvements under freeways elevated on fill would have to meet the same structural requirements as buildings under freeways at grade.

Buildings under elevated viaducts, if not permitted to touch or be a part of the freeway, would be no different from similar improvements at non-

freeway locations. Footings would have to stay clear of the freeway foundation footings.

#### 6. Combined Use Structures

If airspace improvements over and beneath an elevated freeway and the elevated viaduct itself were combined into one structure, construction economies could accrue to both the highway and the airspace improvement. Interagency and/or private-public cooperative projects that have been undertaken in other environments have raised coordination problems, but the difficulties are usually resolved satisfactorily and the result is mutual benefit.

One special engineering problem to be considered is that of vehicle induced vibrations. Structures would have to be of sufficient mass and stiffness to hold these vibrations to acceptable limits.

Engineering problems related to utilities (heat, air conditioning, light, water, sewage, drainage, etc.) are generally small in magnitude and probably can be resolved through joint efforts of architect and engineer during design.

Civil engineering aspects including approach roads, sidewalks and site drainage would depend on city street locations and architectural site planning.

#### C. Conclusion

From a general engineering viewpoint there appear to be no severe problems standing in the way of using freeway airspace for non-highway structures. For that matter, similar use can be made of rapid transit and railroad airspace.

### III. CONSTRUCTION COSTS

#### A. Comparative Costs

Generally speaking, construction costs are increased if the project is located within freeway airspace, although there are some exceptions to this, such as the structures shown in Figure 8. When land costs are added to construction costs, the total financial consideration may favor airspace utilization.

For structures located above a freeway, the most important additions to the construction cost would result from (1) additional structural framing costs and (2) problems in access and construction working conditions. The second factor would result in the principal additional expenses of structures located beneath at grade freeways or beneath freeways elevated on fill.

A study of the costs of a standard 10-story structure on a normal land site made in comparison with various airspace locations reveals that a 10-story airspace structure built coincident with freeway construction would cost approximately 3 percent more than if built on a normal site. If subsequently built over various forms of operating freeways, the structure would cost 5 to 6 percent more than a normal land site. The obvious savings of coincident construction is 2 to 3 percent.

The comparative costs for the 10-story structure, in various locations and built at different times, are summarized in the table below and discussed in Section III-B.

Figure	Base Cost	Coincident Cost	Subsequent Cost
1	100	103.0	105.8
3	100	102.7	104.8
5	100	103.3	106.1

#### B. Cost Variations for Standard Construction

The costs of the various kinds of air rights structures (again classified into six types based on position in relation to the freeway) are discussed below. All costs are based on average California construction and are approximate, for comparative purposes only. Cost differences result primarily from structural changes determined by the location of an assumed standard building. Land costs are excluded from all of the following comparative estimates.

##### 1. Structures Over At Grade Freeways (See Figure 1)

The typical, rectangular, 10-story structure chosen for this study has been extended only slightly beyond the freeway limits because building costs beyond the freeway limits are essentially the same as for a non-freeway location. The estimated cost of this basic structure constructed over an existing freeway, excluding land, is \$8,340,000. This cost compares with \$7,880,000 for the same structure at a non-freeway location (assuming that the first floor is the ground floor and there is no basement).

If this structure were built prior to or during freeway construction when essentially unlimited access would be allowed during construction, the cost would be \$8,120,000.

Approximately 50 percent of these additional costs are for structural frame. Usually the foundation and frame for such a building amount to between 20 and 25 percent of the total cost, excluding land. The second most important factor in increased cost is the effect on working conditions, access, etc. The least effect on cost results from special routing of utility services. No lighting or ventilation equipment for the freeway below the building is included.

## 2. Structures Over Depressed Freeways (See Figures 3 and 4)

The same basic 10-story structure placed over a section of depressed freeway, as shown in Figure 3, has an estimated cost of \$8,260,000. Cost at a non-freeway location is \$7,880,000 as before. Cost of construction prior to or during freeway construction is \$8,095,000.

Since the opposite ends of the structure rest on grade, the extra framing, access and utility services routing costs are not as high as for a freeway at grade.

Another option investigated (see Figure 4) is that of providing a platform beneath a one- or two-story frame commercial structure. This platform may roughly be considered to be a lateral extension of a grade separation structure. The platform cost would be approximately \$10 per square foot.

## 3. Structures Over Elevated Freeways (See Figure 5)

In this case, the basic 10-story structure is placed on a section of elevated freeway. Estimated cost is \$8,360,000. The cost at a non-freeway location is again \$7,880,000. Cost of construction prior to or during freeway construction is \$8,140,000.

Costs in excess of those for a structure over an at grade freeway are mainly due to the added height of supporting columns.

## 4. Structures Under At Grade Freeways (See Figure 6)

An underground parking garage beneath a freeway is shown in Figure 6. If this structure is constructed beneath an existing freeway, the estimated cost is \$2,900,000. If the same structure were constructed at a non-freeway location or prior to construction of the freeway, the estimated cost would be \$2,690,000.

The difference in cost between these two alternatives is mainly attributable to problems arising from working around an existing freeway.

## 5. Structures Under Elevated Freeways (See Figures 7 and 8)

The cost of the parking structure beneath a freeway elevated on fill, as shown in Figure 7, is similar to that for a parking garage under a freeway at grade.

The cost of structures under elevated viaducts should be approximately the same as for the same structure located at a non-freeway location. Figure 8 illustrates such structures.

## 6. Combined Structures

Combined structures will realize cost savings for all parties involved because of two main factors:

- a. Combined and more efficient usage of structural members.
- b. One large job instead of two smaller, separate construction jobs.

Costs of combined structures to each of the parties involved also will be dependent to some extent on negotiations between the parties which may include factors not related to construction.

#### IV. TIMING FOR ENGINEERING PLANNING

##### A. Freeways Completed and in Use

Engineering planning for freeway airspace projects to be constructed over and/or under operating freeways would be performed in substantially the same manner as for planning these projects at normal locations away from freeways. This planning could be undertaken at any time.

During preliminary planning, the architects and their clients would require basic engineering advice, chiefly structural. At this time, studies of officially approved airspace requirements and design criteria would be made and decisions arrived at as to the methods of compliance and possible variance requests.

Following completion of preliminary plans and approval thereof by the proper authorities, detail design would start. Completed detail design drawings and specifications would also require final approval by the same authorities. These drawings and specifications would contain, in addition to the usual information, special instructions pertaining to protection of adjacent freeway traffic and structures by the contractor during construction. To secure compliance with these requirements by the contractor, his operations should be checked periodically.

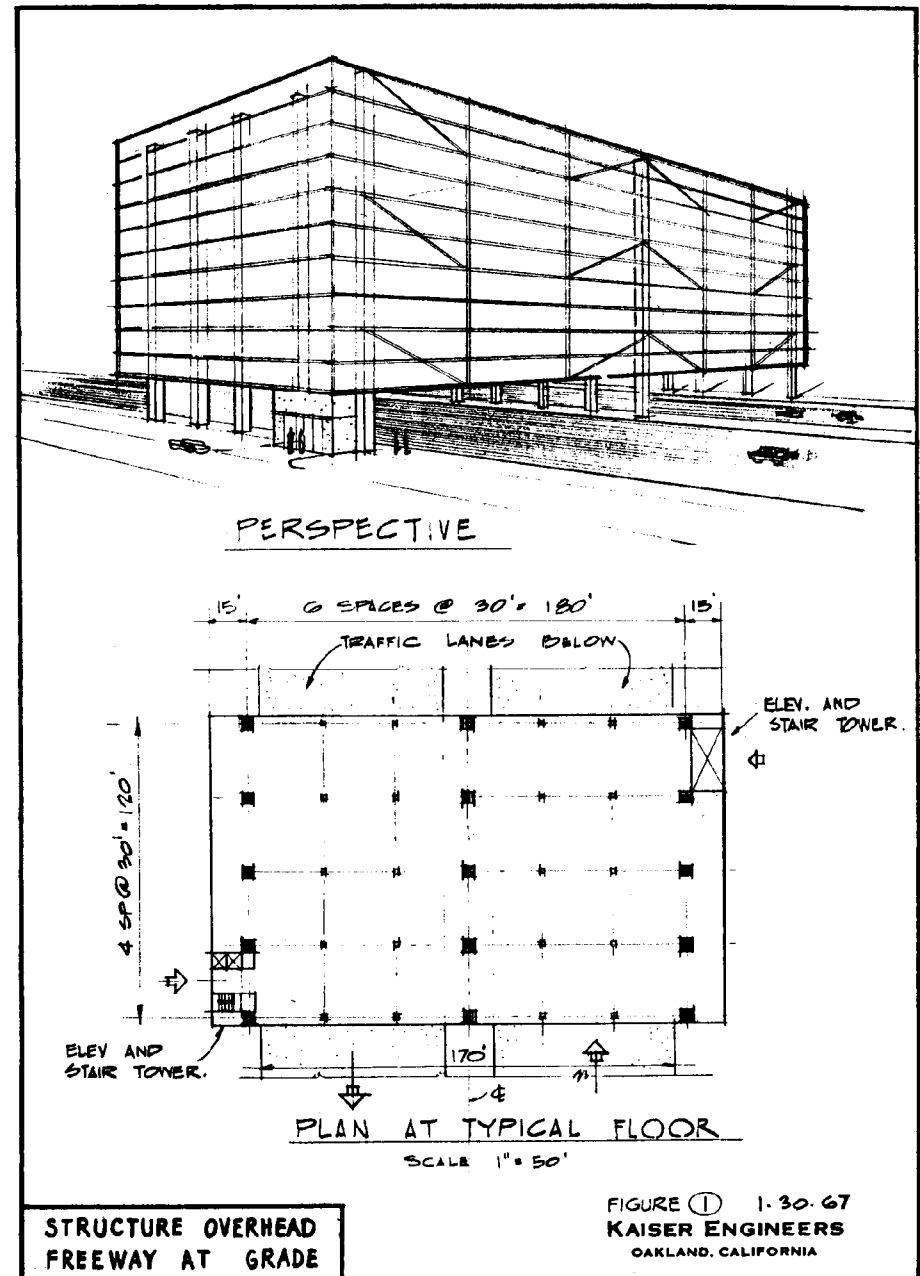
In order to make full use of freeway associated airspace, it may be advisable to consider some inconveniencing of freeway traffic during the construction period. For instance, construction of the parking garages shown in Figures 6 and 7 would almost certainly require re-routing of the roadway, at some expense to orderly traffic movement. In such a case, the total community benefit should be evaluated in determining the advisability of traffic interference.

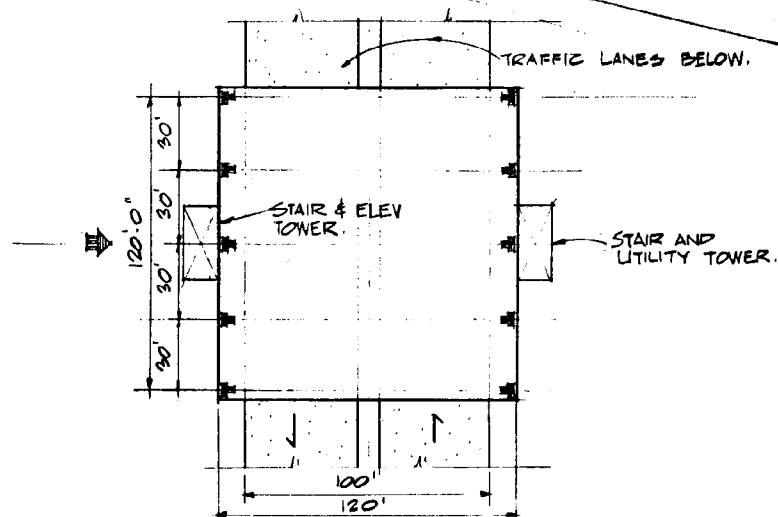
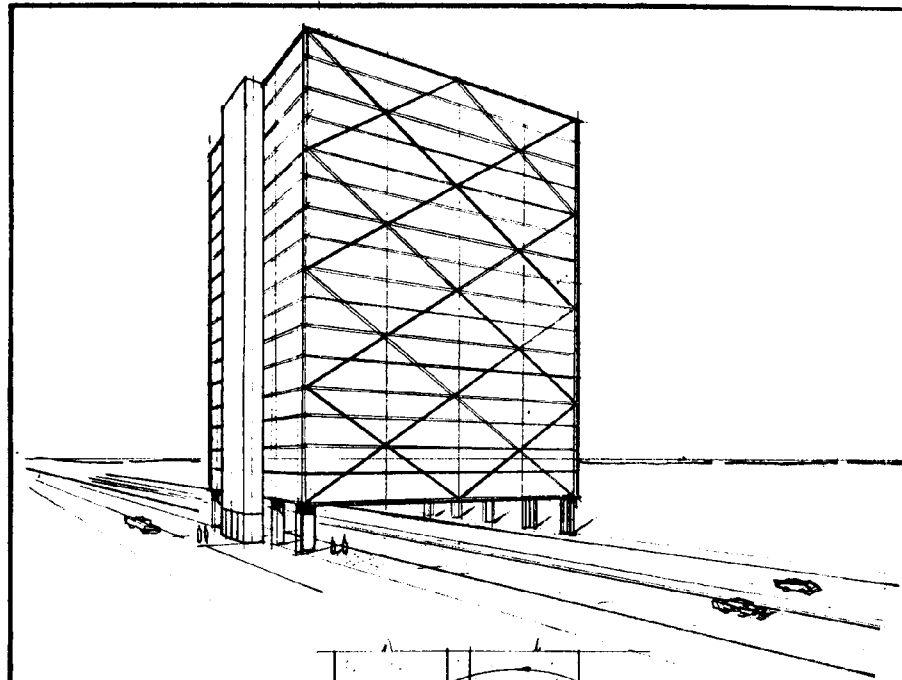
##### B. Freeways in Planning Stages

If the freeway section for which the airspace project is contemplated is in the initial study phase, close planning and design coordination between the two projects is possible.

Under similar circumstances, possibilities may exist for master planning an entire section of freeway together with several airspace projects, enabling consideration to be given to combination structures, special ramps and wider median strips. Other ideas and decisions at that point in time will be important in creating well integrated, functional, aesthetic and economic projects. Additional study and research in this type of planning could be of immense benefit to metropolitan areas.

All design coordination between private individuals and state and local agencies should be done within the framework of a well defined official procedure. Considering engineering economies only, a single agency coordinating these procedures as well as interpreting and enforcing them would be beneficial, even though diverse interests may be represented in any project.



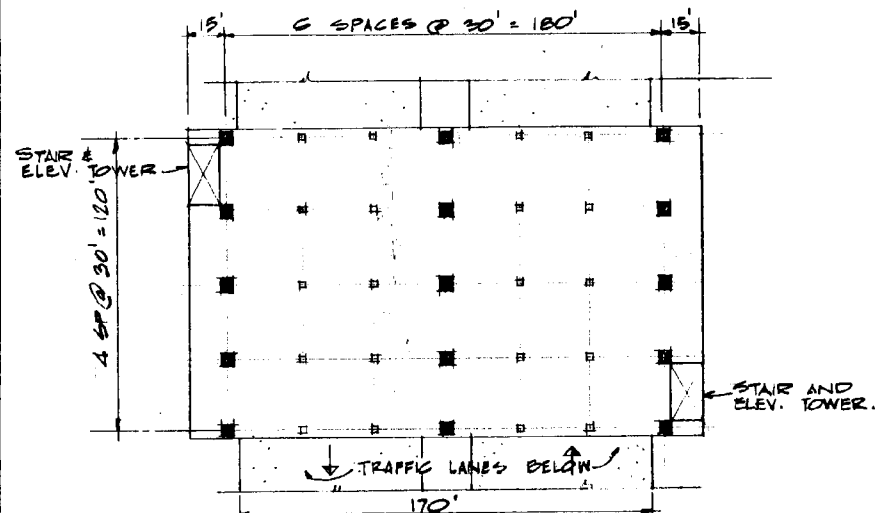
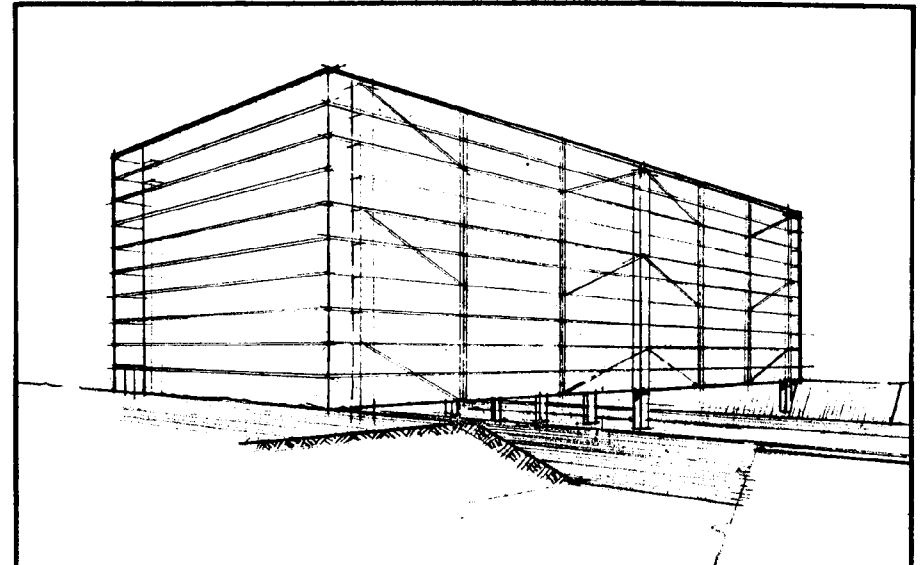


PLAN AT TYPICAL FLOOR

SCALE 1" = 30'

FIGURE ② 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA

STRUCTURE OVERHEAD  
FREEWAY AT GRADE



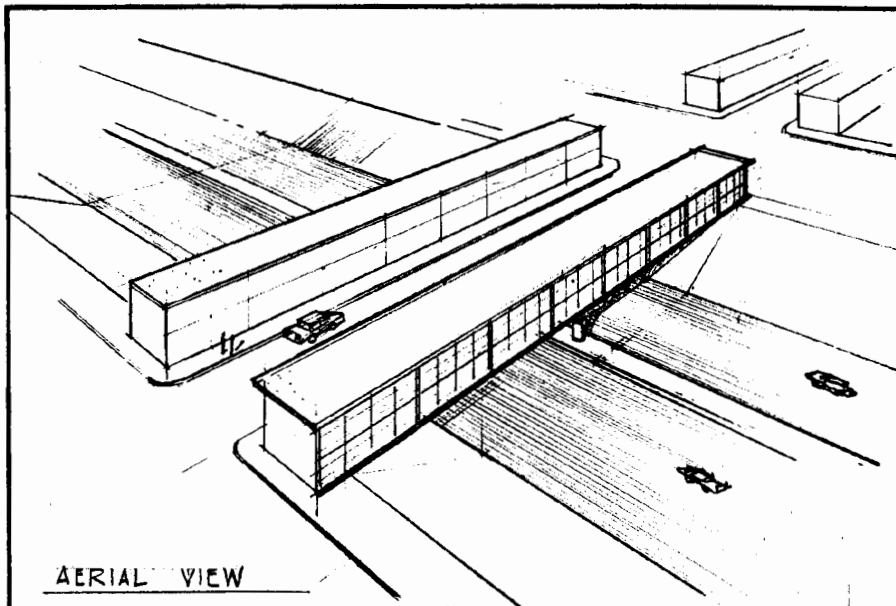
PLAN AT TYPICAL FLOOR

SCALE 1" = 30'

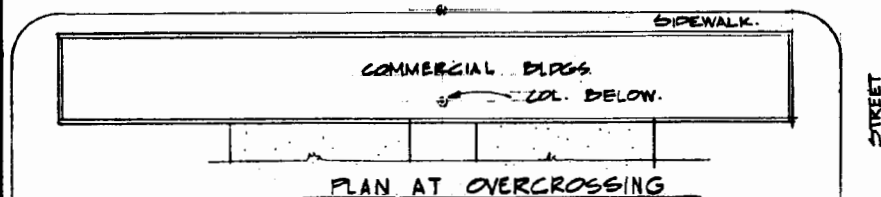
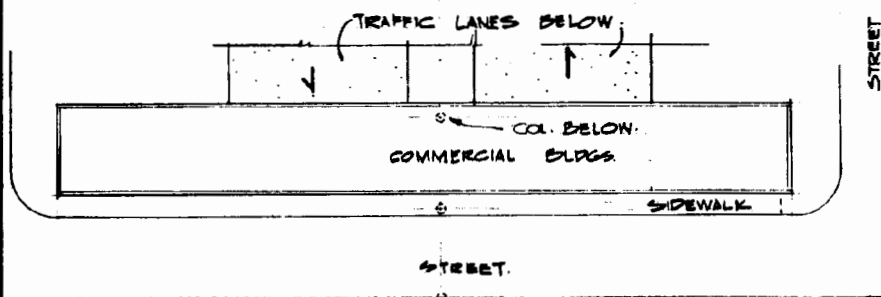
FIG. ③ 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA

STRUCTURE OVERHEAD  
FREEWAY DEPRESSED





AERIAL VIEW

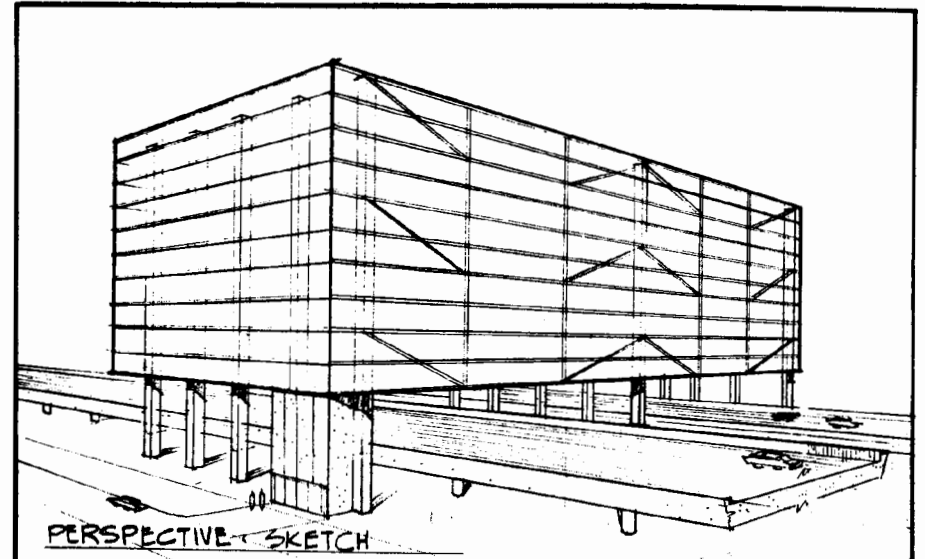


PLAN AT OVERCROSSING

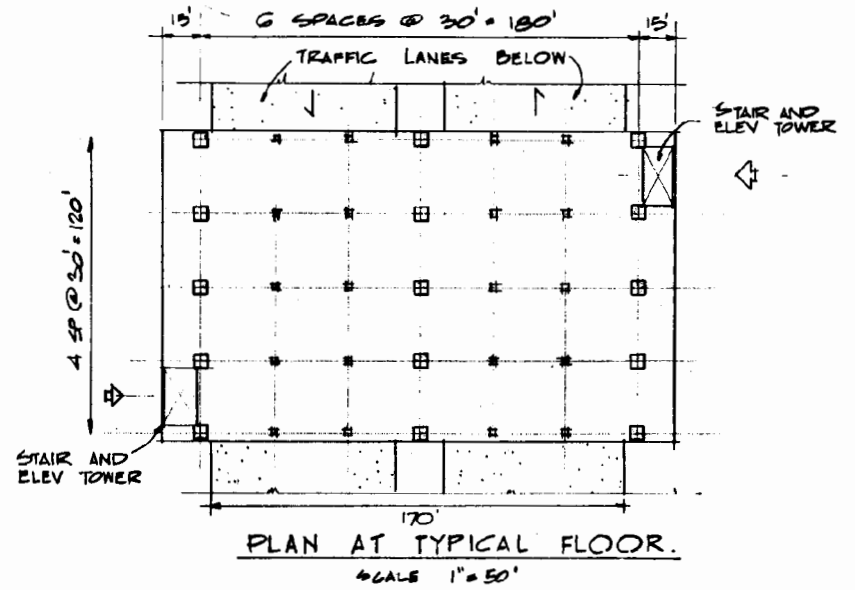
SCALE 1" = 40'

STRUCTURE OVERHEAD  
FREEWAY DEPRESSED

FIGURE (4) 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA



PERSPECTIVE SKETCH

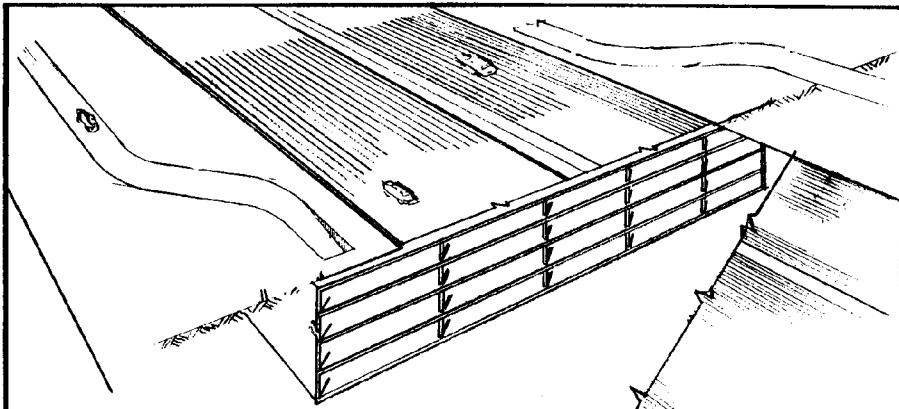


PLAN AT TYPICAL FLOOR.

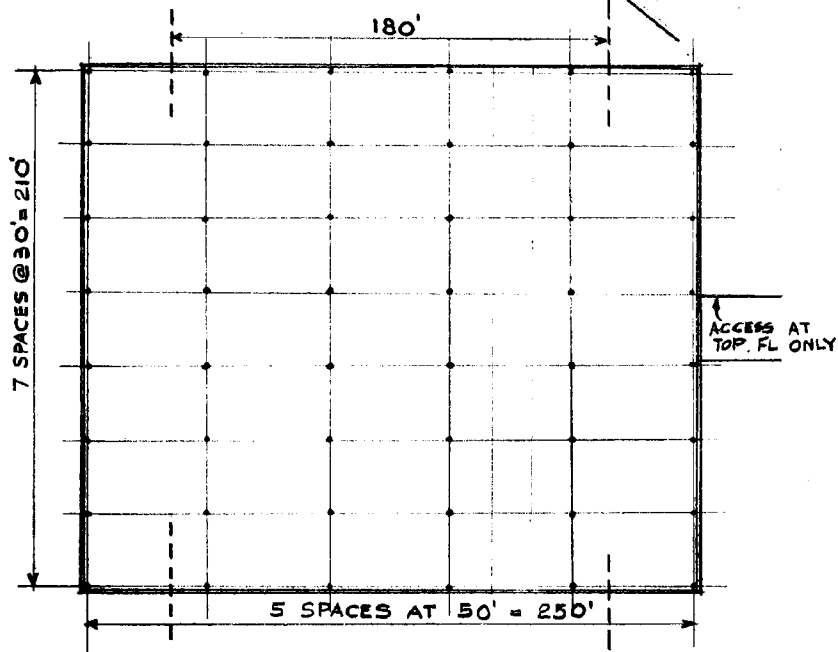
SCALE 1" = 50'

STRUCTURE OVERHEAD  
FREEWAY ELEVATED

FIGURE (5) 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA



CUT-AWAY PERSPECTIVE

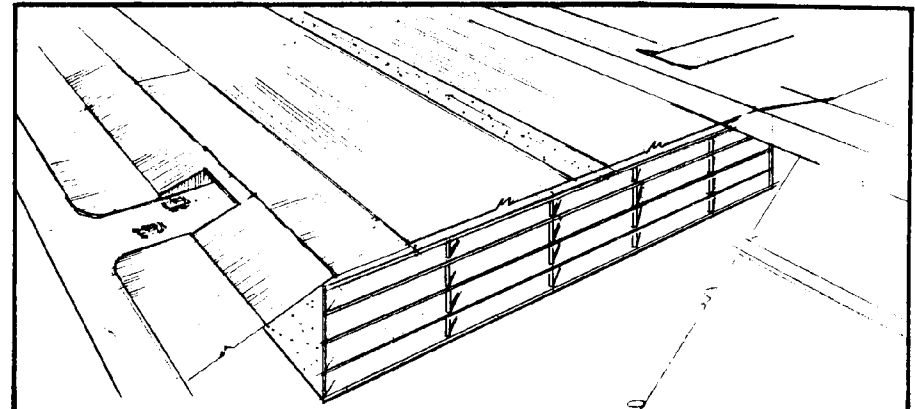


PLAN AT TYPICAL PARKING FLOOR

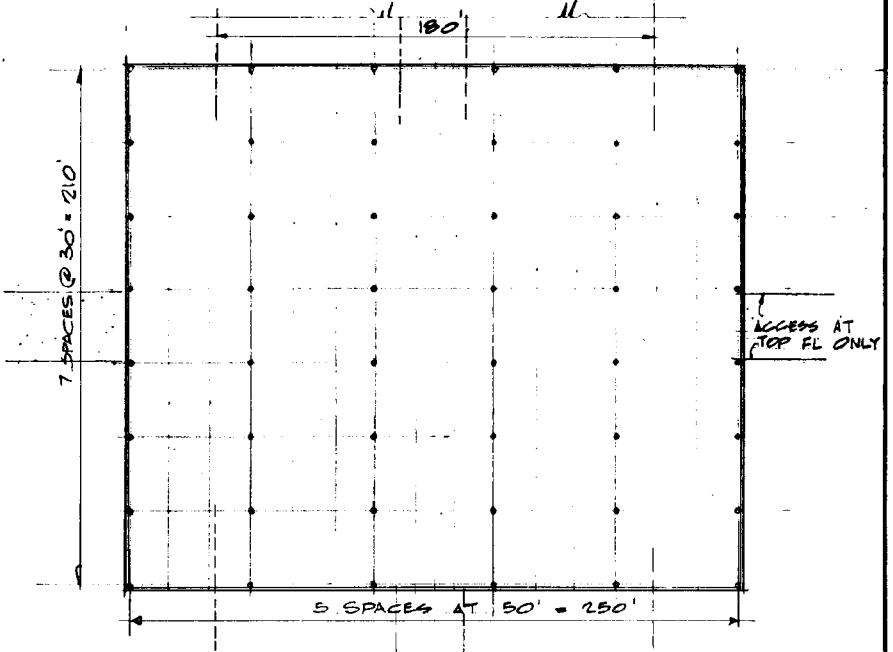
SCALE 1" = 50'

STRUCTURE BELOW  
FREEWAY AT GRADE

FIGURE 6 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA



CUT-AWAY PERSPECTIVE

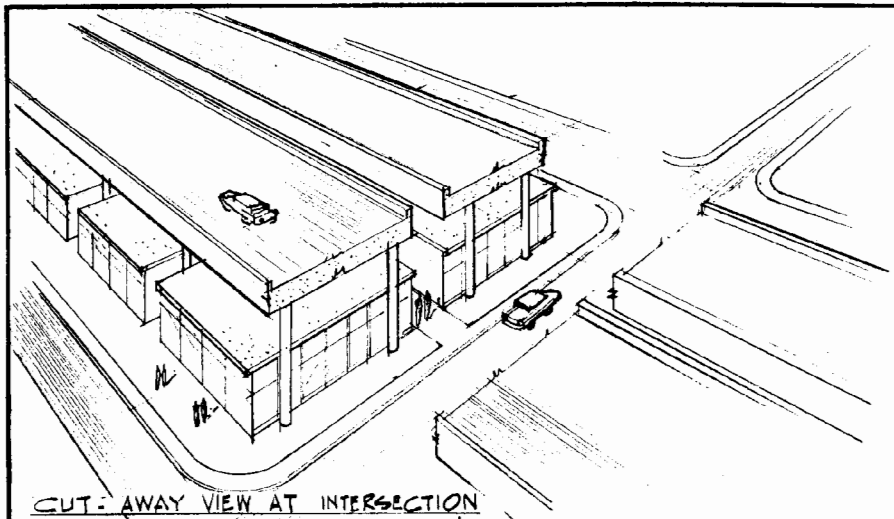


PLAN AT TYPICAL PARKING FLOOR

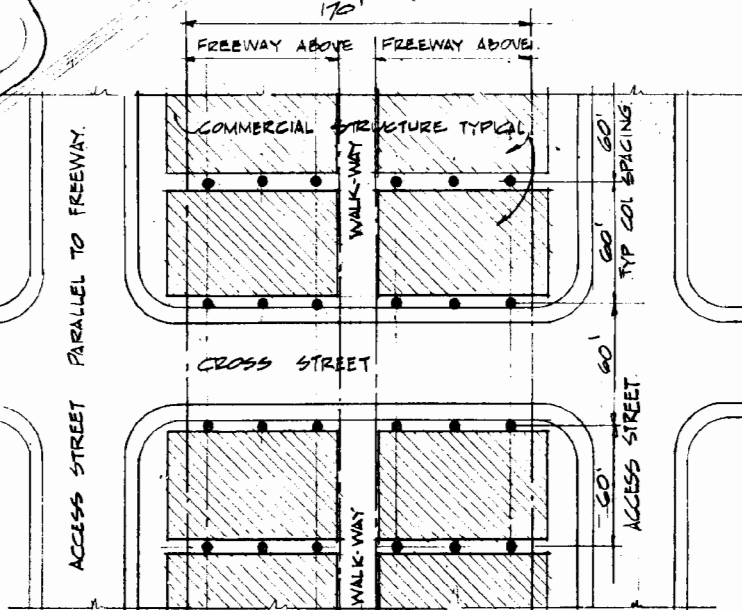
SCALE 1" = 50'

STRUCTURE BELOW  
FREEWAY AT GRADE

FIGURE 7 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA



CUT-AWAY VIEW AT INTERSECTION

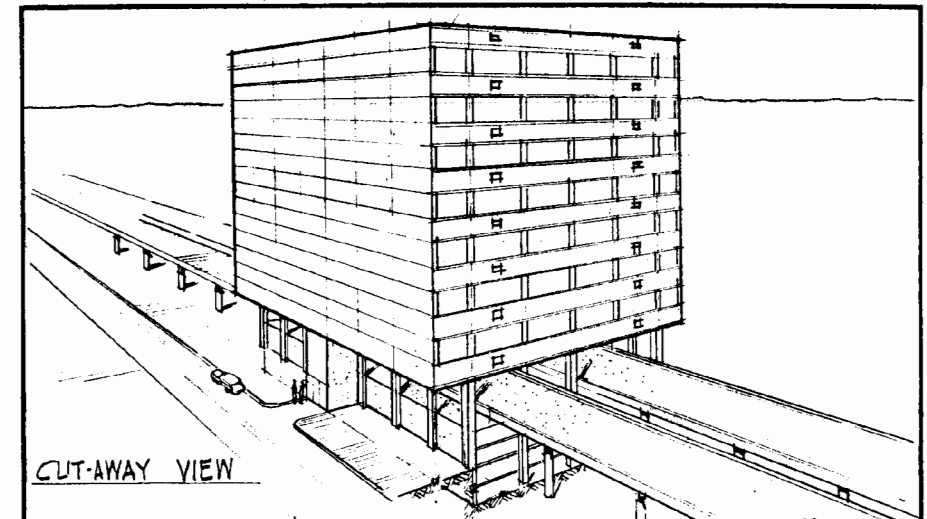


TYPICAL PLAN THRU STRUCTURES BELOW.

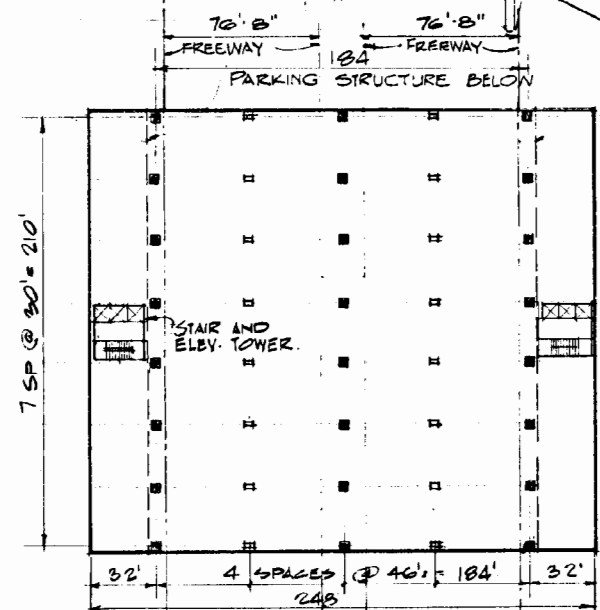
SCALE 1" = 60'

STRUCTURE BELOW  
FREEWAY ELEVATED

FIGURE 8 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA



CUT-AWAY VIEW



PLAN @ TYPICAL FL. OF UPPER STRUCTURE

SCALE 1" = 60'

COMBINED STRUCTURE  
FREEWAY ELEVATED

FIGURE 9 1-30-67  
KAISER ENGINEERS  
OAKLAND, CALIFORNIA

## LEGAL ASPECTS

*Airspace Utilization, Preliminary Opinion Letter  
prepared by Nossaman, Waters, Scott, Krueger & Riordan,  
Law Offices, March 1967*

Our analysis of the foregoing conclusions follows:

You have requested our opinion as to the legal feasibility of the Department of Public Works ("Department") leasing or otherwise disposing of airspace over or under free-ways and other state highways ("highway airspace") and any restrictions which may be encountered in engaging in such activity. Based upon our examination of state and federal statutes dealing with this subject and other applicable legal authorities, and subject to the qualifications which follow, we are of the opinion that:

- (i) The leasing of highway airspace is authorized and is feasible under existing law;
- (ii) The sale of fee or easement interests in highway airspace also appears to be authorized by state law, although it is contrary to existing federal policy and could give rise to a claim by the federal government to a large percentage of the proceeds of sale in some situations;
- (iii) The conveyance of either leasehold, fee or easement interests in highway airspace will create a property interest to which ad valorem taxes would apply;
- (iv) The statutory authorization for the conveyance of highway airspace is very broad and does not contain any standards for the resolution of conflicts between governmental agencies at various levels which could develop in its administration; if a comprehensive program for the use of highway airspace for non-highway purposes is to be undertaken, the applicable statutes should be studied with a view toward improvement in this respect;
- (v) The Department is prohibited by the state and federal constitutions from acquiring property except for public use, and it appears likely that this issue will be raised in a number of condemnation situations where the use of the airspace for non-highway purposes is being considered or should reasonably be considered by the Department at the time of condemnation;
- (vi) The Department is prohibited from giving its property to other governmental agencies without the receipt of legal consideration, which factor will need to be taken into account in the planning of projects to be located in highway airspace by the Department and other interested agencies; and
- (vii) Third parties, such as those possessing a residual interest in the highway where an easement only has been acquired by the Department and abutting property owners, may have rights which will require their cooperation and/or approval to projects in highway airspace.

### I. PRESENT ENABLING LEGISLATION

#### A. Lease

##### 1. State of California

It is clear that the Department has both the statutory and the administrative authority to lease highway airspace. Section 104.12 of the California Streets and Highways Code provides:

"The department may lease to public agencies or private entities the use of areas above or below state highways, subject to such reservations, restrictions and conditions as it deems necessary to assure adequate protection to the safety and the adequacy of highway facilities and to abutting or adjacent land uses. . . . Prior to entering into any such lease, the department shall determine that the proposed use is not in conflict with the zoning regulations of the local government concerned. Such leases shall be made in accordance with procedures to be prescribed by the California Highway Commission, except that in the case of leases with private entities such leases shall only be made after competitive bidding unless the commission finds by unanimous vote that in certain cases competitive bidding would not be in the best interests of the state. The possibilities of entering into such leases and the consequent benefits to be derived therefrom may be considered by the department in designing and constructing such highways.

"Revenues from such leases shall be deposited in the State Highway Fund."

See also Str. & H. Code §§104.6 ("The department is authorized to lease any lands which are held for state highway purposes and are not presently needed therefor . . . ."); 24 ("state highway" defined); 23.5 ("freeway" defined).

On April 25, 1962, and on December 16, 1964, the State Highway Commission ("Commission") adopted procedures to effectuate the provisions of said Section 104.12. At its 1962 meeting the Commission resolved to enter into leases of highway airspace only after competitive bidding, except where there is a unanimous determination of the Commission that it is "in the best interests of the State" to omit the same. At its 1964 meeting, however, it found that "recent public demands have indicated the need for considering the possibility of more intensive occupancy of space above and below State highways by building improvements which will require firm lease provisions for periods sufficient to permit amortization of building costs," and for this and other reasons adopted the following resolutions:

"RESOLVED, That the California Highway Commission finds it to be in the best interest of the State to use an offer and proposal format for awarding of leases involving building improvements under and/or over State highways rather than standard competitive bidding procedures; and be it further

"RESOLVED, That the Department of Public Works may analyze and investigate said offers and proposals in accordance with the policy outlined hereinabove, and thereafter recommend the award of air, or ground, space leases for California Highway Commission approval."

The Department's internal regulations regarding this subject which appear in Division of Highways Circular letters Nos. 62-224 (dated August 7, 1962; expires August 7, 1967) and 65-111 (dated January 12, 1965; expires August 7, 1967; supplements No. 62-224) are worthy of note. These letters set forth:

- (a) Procedures to be followed in securing Bureau of Public Roads approval for highway airspace leases where interstate highways are involved;
- (b) Forms of leases, notice of call for bids, special provisions and proposal for leasing;
- (c) A general discussion of Streets and Highways Code Section 104.12;
- (d) A statement of policy and procedure to be followed in conforming with the requirements of the Commission;
- (e) A designation of the Deputy State Highway Engineer (Planning) as the coordinator for such leases; and

(f) An outline of the contents of the report to be filed by the Highway District to the Deputy State Highway Engineer (Planning) regarding such proposals.

See also Division of Highways Circular letter No. 64-126 (dated May 14, 1965; expires August 7, 1967; supplements letters Nos. 62-224 and 65-11) which is limited to a discussion of the use of airspace for building improvements under viaducts.

It should also be noted that Sections 1239.2, 1239.3 and 1239.4 of the California Code of Civil Procedure concern the acquisition of interests in airspace for the protection of airport approaches. Although not directly related to the problem of the sale and lease of highway airspace, these sections should be considered in any comprehensive plan for the development of highway airspace.

## 2. Federal Government

Federal control is involved in Interstate Highways in which title is held by the state although the federal government contributes the majority of the cost of the same and over which it exercises a large degree of control through its project contracts. In this situation it is also clear that the necessary statutory and administrative controls have been adopted to permit the leasing of highway airspace. Section 111 of 23 U. S. Code provides in part as follows:

"[A]greements [between the Secretary of Commerce and the State highway department for the construction of projects on the Interstate System] may . . . authorize a State or political subdivision thereof to use or permit the use of the airspace above and below the established grade line of the highway pavement for such purposes as will not impair the full use and safety of the highway, as will not require or permit vehicular access to such space directly from such established grade line of the highway, or otherwise interfere in any way with the free flow of traffic on the Interstate System."

Administratively this was effectuated by INSTRUCTIONAL MEMORANDUM 21-3-62 dated March 4, 1962, from the Bureau of Public Roads entitled "Use of airspace on the Interstate System" which provided in paragraph 17 thereof as follows:

"In applications for the use of airspace for nonhighway purposes, consideration will be given by the State highway department and [Bureau of] Public Roads

to all future needs for such airspace for public highway purposes. The uses permitted will be on:

- (a) a term basis; or
- (b) revocable at will, or revocable on a specified period of notice."

B. Sale

1. State of California

In addition to leasing highway airspace it seems clear that the Department may sell or exchange a fee or a lesser interest in the same. Section 118 of the Streets and Highway Code provides:

"Whenever the department determines that any real property or interest therein, heretofore or hereafter acquired by the State for highway purposes, is no longer necessary for such purposes, the department may sell or exchange such real property or interest therein in the manner and upon the terms and conditions approved by the commission. Any such conveyance shall be executed on behalf of the State by the director and the purchase price shall be paid into the State Treasury to the credit of any fund, available to the department for highway purposes, which the commission designates.

"Any such real property or interest therein may in like manner be exchanged, either as whole or part consideration, for any other real property or interest therein needed for state highway purposes."

Section 104.5 of said Code permits any such conveyance to contain "such conditions, covenants, exceptions and reservations as in his [the Director of the Department] opinion are in the public interest."

These provisions taken together would seem to authorize the Department to grant any type of interest that appeared appropriate in highway airspace. The Department and the Commission have not, however, taken any administrative steps to effectuate such provisions as they have done in the case of the leasing provision of said Section 104.12, possibly because of the adverse interest shown in this type of transaction by the federal government where the Interstate System is concerned. We are advised by the Department that Section 118 has not been employed in the conveyancing of highway airspace, and there appears to be no administrative inclination at this time to do so.

2. Federal Government

The federal government does not condone the conveyance by states of interests in highway airspace in excess of a leasehold where its interests are involved. Paragraph 20 of the INSTRUCTIONAL MEMORANDUM cited in Section I of this part B provides:

"Title to airspace authorized to be used for nonhighway purposes shall be retained by the State."

Paragraph 17 of said MEMORANDUM, moreover, provides:

"Such authority to use the airspace shall not be transferred, assigned or conveyed without approval of the State highway department and Public Roads."

If in some manner a conveyance of a fee or easement were effected with respect to highway airspace on state-owned roads in the Interstate System, there have been strong indications on the part of the federal government that it would claim 90% of the purchase price as its proportionate part of the cost of acquiring the same on the grounds that the same was disposed of as "excess" property. Even where the leasehold situation is concerned, the Bureau of Public Roads has shown great interest in the sharing of income despite the absence of support within the federal government for this position. In 1965 Bill No. 12143 of the House of Representatives providing for a sharing of income from the leasing or other disposal of highway airspace on the Interstate System between the federal and state governments on the basis of their respective participations in the cost of the right-of-way died upon the adjournment of the 88th Congress. In addition the Comptroller General found (41 Compt. Gen. 652) that there was considerable doubt that the federal government had the power to require a state to share with the federal government proceeds from the disposition of highway airspace in the Interstate System. Apparently as a result, the Bureau of Public Roads provided in paragraph 22 of the above-cited MEMORANDUM as follows:

"Disposition of income received from the authorized use of airspace will be the responsibility of the State."

See Harry S. Fenton, "Legal Aspects of the Utilization and Development of Airspace Over and Under Freeways," 78 Highway Research Record 52, 59, et seq. (1964). The history of this matter suggests that the interest of the Bureau of Public Roads in revenue from non-highway use of highway airspace will grow with the increase in such use by the states.

The controls of the federal government are applicable only to those highways in which the federal government has a direct interest and there are numerous

state highways, particularly those without the state freeway system, in which the federal government has no control over the disposition of highway airspace.

### C. Tax Effect

We are of the opinion that the effect of the leasing or granting of fee or easement title to highway airspace will create taxable interests in real property for the benefit of the local taxing entity.

The conveyance of fee title or an easement to airspace would clearly be a transfer of a portion of the land on which the highway was located and thereby constitute a taxable interest in "real property" within the meaning of Section 104 of the Revenue and Taxation Code. See L. E. White Lumber Co. v. County of Mendocino, 177 Cal. 710 (1918).

So, too, where the state leases real property to private parties, it is clear that the leasehold interest is separately assessable for possessory interest tax purposes. See Rev. & Tax Code §107.1, De Luz Homes, Inc. v. County of San Diego, 45 Cal. 2d 546, 563 (1955); State Land Settlement Board v. Henderson, 197 Cal. 470, 481 (1925); San Pedro, etc. R. R. Co. v. Los Angeles, 180 Cal. 18, 23 (1919).

In addition, any improvements constructed by a lessee upon lands owned by the state and leased to him are regarded as the property of lessee and are assessable to him for tax purposes. See San Francisco v. McGinn, 67 Cal. 110 (1885); Outer Harbor Dock and Wharf Co. v. County of Los Angeles, 47 Cal. App. 194, 196 (1920).

### D. Need for Statutory Revision

While Section 104.12 of the Streets & Highways Code provides that the Department "shall determine that the proposed [lease] use is not in conflict with the zoning regulations of the local government concerned" prior to entering into a lease, it does not provide any procedure for resolving such a conflict if one should exist. The state's planning of highway airspace is consequently made subordinate to local interests which is clearly inconsistent with the effectuation of a state-wide coordinated program for the multiple use of such airspace by the Department.

The state has the authority to prescribe the means by which its property may be developed, with the power to supercede any local regulations. See Calif. Const. Article XI, §§ 6, 11; Monterey Oil Co. v. City Court, 120 Cal. App. 2d 31, 36 (1953). We do not recommend that the state ignore local interests. We do recommend that a study be made of the problem and that some procedure be established for resolving conflicts that may, and probably will, develop between local governments and the state with respect to intended use of highway airspace. The state's action with respect to the development of its tide and submerged lands for oil and gas purposes may be valid precedent in this respect. Section 6873.2 of the Public Resources Code requires the State Lands Commission to publish

notice of any intended offer of state-owned tide and submerged lands for oil and gas lease and to hold public hearings with respect thereto if "any affected city or county" requests the same. Within 30 days after such hearings said Commission is required to determine whether to offer the same for lease. The statutory standards imposed for such determination appear relevant, at least in principle, to the highway airspace lease. Said Section 6873.2 provides:

"In such determination the commission shall consider whether the issuance of a lease as to all or a part of such lands would result in an impairment or interference with the developed riverbank or shoreline recreational or residential areas adjacent to the proposed leased acreage, or whether to offer such land for lease as to all or a part thereof and include in the offer for lease such reasonable rules and regulations which, in the opinion of the commission, are necessary for the exploration, development, and operation of said lease in a manner which will not impair or interfere with said developed riverbank or shoreline recreational or residential areas . . .

"The Commission in determining whether the issuance of such lease or leases would result in such impairment or interference with the developed riverbank or shoreline, recreational or residential areas adjacent to the proposed leased acreage or in determining such rules and regulations as shall be necessary in connection therewith shall at said hearing receive evidence upon and consider whether such proposed lease or leases would

(a) Be detrimental to the health, safety, comfort, convenience, or welfare of persons residing in, owning real property, or working in the neighborhood of such areas;

(b) Interfere with the developed riverbank or shoreline, residential or recreational areas to an extent that would render such areas unfit for recreational or residential uses or unfit for park purposes;

(c) Destroy, impair, or interfere with the esthetic and scenic value of such recreational, residential or park areas;

(d) Create any fire hazard or hazards, or smoke, smog or dust nuisance, or pollution of waters surrounding or adjoining said areas.

. . . ."

## II. RESTRICTIONS ON ACQUISITION AND DISPOSITION

### A. Public Use Requirement in Acquisition

While, as we have seen above, the Department has the authority to lease or otherwise dispose of highway airspace, its right to acquire the same by eminent domain for such purpose can be questioned. Section 103 of the Streets & Highways Code provides that the resolution of the Commission to acquire property is "conclusive evidence . . . [o]f the public necessity" of the proposed improvement, and the same has repeatedly been upheld in the absence of a showing that the resolution was tainted by fraud, bad taste or abuse of discretion.

See People v. Lagiss, 160 Cal. App. 2d 28 (1958), hrg. den. (1958); People v. Thomas, 108 Cal. App. 2d 832 (1952), hrg. den. (1952); People v. Milton, 35 Cal. App. 2d 549 (1939); People v. Olsen, 109 Cal. App. 523 (1930), hrg. den. (1931). It is further well established that a condemning agency may acquire lands in addition to those strictly necessary for the proposed improvement where a public purpose is served by their acquisition, even though there may be incidental private benefit. In 2 Nichols on Eminent Domain, 658 (Rev. 3d Ed., 1963) it is stated:

"When a taking is made for a public use, it is no objection that a by-product of the property taken is to be sold for private profit, even, it has been held, if the public improvement would not have been made had it not been for the expected profit from the by-product."

Accord: Redevelopment Agency v. Hayes, 122 Cal. App. 2d 777, 804 (1954); Fenton, supra, page 8 at 55 et seq.

Thus it is appropriate to authorize condemning agencies to acquire property other than that strictly necessary for the proposed public improvement. Section 104 of the Streets & Highways Code authorizes the Department to acquire "either in fee or in any lesser estate or interest, any real property which it considers necessary for state highway purposes." Section 104.1 of said Code permits the Department to acquire the entirety of a parcel "[w]henever a part of a parcel of land is to be taken for state highway purposes and the remainder is to be left in such shape or condition as to be of little value to its owner, or to give rise to claims or litigation concerning severance or other damage." Section 104.3 authorizes the Department to condemn real property within 150 feet of a boundary of a proposed improvement for the purpose of imposing thereupon "reservations concerning the future use and occupation of such real property or interest therein, so as to protect such public work and improvement and its environs and to preserve the view, appearance, light, air and usefulness of such public work."

On the other hand, if the non-highway use of airspace becomes a primary purpose in its acquisition, a grave issue is raised as to the Department's power to acquire the same. In

People v. Nahabedian, 171 Cal. App. 2d 302 (1959), the trial court refused to allow a defendant in a condemnation action to show that the "real purpose" of the Department in taking certain property was a private one of leasing to an auto park. On appeal the trial court was reversed on the grounds that the issue of public use was a constitutional one which was required to be decided on the facts and could not be avoided by statute or the Department's administrative action. The District Court of Appeals said:

"There can be no doubt that both the court and counsel for respondent clearly understood that appellant's contention was that the 'real purpose' of the condemnor was to take part of appellant's property not for freeway purposes, but to lease it to Walt's Auto Park for private purposes, without any relation to the freeway project. Certainly, if such contentions could be proved, respondent could not acquire the portion of the property in question, because the latter is without authority in law to acquire the property of a citizen for private use (U.S. Const., Fifth and Fourteenth Amendments; Cal. Const., art I, § 14; People v. Chevalier, (Cal.App.) 331 P. 2d 237; City & County of San Francisco v. Ross, 44 Cal. 2d 52, 59, [279 P.2d 529]).

". . . Respondent also contends that appellant's argument of the lack of public use due to a future lease for private parking lacks substantiality because of the need for the property during construction, even though the property is later leased or sold to private parties (Redevelopment Agency v. Hayes, 122 Cal. App. 2d 777, 803), [266 P. 2d 105]). However, the holding in the case just cited was contingent upon the determination that the taking initially is for a public purpose. In the case at bar, all efforts of appellant to establish that the taking was not for a public purpose were excluded by the trial court. Here the court seemingly concluded that the question whether the proposed taking is for a public purpose, was committed to the conclusive determination of an administrative agency of the condemning body. Such is not the law." 171 Cal. App. 2d at 308-309.

Accord: People v. Lagiss, supra; People v. Mascotti, 206 Cal. App. 2d 772, 778 (1962), hrg. den. (1962) (this was a rehearing of People v. Nahabedian in which it was determined that the parcel there involved was being taken for a public use); People v. Garden Grove Farms, 231 Cal. App. 2d 666, 673 (1965), hrg. den. (1965); University of Southern California v. Robbins, 1 Cal. App. 2d 523, 525 (1934); Con. Channel Co. v. C. P. R.R. Co., 51 Cal. 269 (1876); Black Rock etc. Dist. v. Summit etc. Co., 56 Cal. App. 2d 513 (1943); City of Cincinnati v. Vester, 33 F. 2d 242, 244 (6th Cir. 1929); 2 Nichols on Eminent Domain, 659, 660 (Rev. 3d Ed. 1963). See also People v. Rodoni, 243 A.C.A. 978 (1966).



For the present it is likely that the Department will be able to continue its practice of acquiring the fee title, including all airspace, in its condemnations for highway purposes. With the growth of non-highway uses in highway airspace and the acceptance of airspace as an independent, transferable interest in real property (which is even today being evidenced by the acceptance of the condominium concept in the United States), however, it is likely that it will become increasingly difficult to establish that the acquisition of all airspace is a public use under the Department's powers. Concomitantly, because the acceptance and use of airspace rights is expected to cause them to become increasingly more valuable, the Department will have greater reason to exclude airspace from its takings where the same practicably can be done.

## B. Gift Prohibitions in Disposition

### 1. Cal. Const. Art. IV § 31

Section 31 of Article IV of the California Constitution ("Section 31") prohibits any public agency from making "any gift or authorize the making of any gift, of any public money or thing of value to any individual, municipal or other corporation whatever . . . ." Many California municipalities and local agencies have shown an interest in obtaining the use of highway airspace for parks, recreational facilities, green belts and other projects which appear to be principally of local concern which squarely raises the issue of whether the same would be proper under Section 31. See Doyle, "AIRSPACE--State Groups Plan for Over and Under Freeway Use" Calif. Hwys. and Pub. Works (Sept.-Oct. 1965)1.

If adequate and full consideration is to be given to the Department for the right to use such airspace, it is clear that Section 31 is not violated irrespective of whether the entity receiving the interest is public or private. On the other hand, if something less than full and adequate consideration is given for such right, the Section may be violated even if the entity receiving the interest is public and a public interest is being served. In Mallon v. City of Long Beach, 44 Cal. 2d 199, 211(1955) it was held that funds impressed with a public trust for the benefit of the entire state could not be devoted to the construction of public facilities of a purely municipal type. The court there said:

"[A]s we said in City of Oakland v. Garrison, 194 Cal. 298, 304 [228 P.433], in reference to the appropriation of county funds for the improvement of a city street, 'It is not sufficient, therefore, that the appropriation here in question be for a public purpose. It must also be for a purpose which is of interest and benefit generally to the people of the county of Alameda. The question, then, is whether the improvement of this particular

street within the city of Oakland is a matter of such general county interest that the county funds may properly be expended therein.'

"Applying that principle to the present case, we cannot hold that the construction and establishment by the city of Long Beach of storm drains, a city incinerator, a public library, public hospitals, public parks, a fire alarm system, off-street parking facilities, city streets and highways, and other expenditures that have been authorized to be made from the 'Public Improvement Fund,' are of such general state-wide interest that state funds could properly be expended thereon. Such expenditures are for purely 'municipal affairs' within the meaning of section 6 of article XI of the Constitution. (See City of Grass Valley v. Walkinshaw, 34 Cal. 2d 595, 599 [212 P.2d 894] [sewer]; Jardine v. City of Pasadena, 199 Cal. 64, 68 [248 P. 225, 48 A.L.R. 509] [isolation hospital]; Steger v. City of Richmond, 194 Cal. 305, 312 [228 P. 461] [city streets]; City of Pasadena v. Paine, 126 Cal. App. 2d 93, 98 [271 P.2d 577] [city library]; Alexander v. Mitchell, 119 Cal. App. 2d 816, 825-827 [260 P. 2d 261] [off-street parking facilities]; Perez v. City of San Jose, 107 Cal. App. 2d 562, 566 [237 P. 2d 548] [city highways]; Beard v. City & County of San Francisco, 79 Cal. App. 2d 753, 755 [180 P. 2d 744] [public hospital]; Armas v. City of Oakland, 135 Cal. App. 411, 420 [27 P. 2d 666, 28 P. 2d 422] [fire protection].)" 44 Cal. 2d at 211-212.

See also 46 Ops. Cal. Atty. Gen. 138, 139 (1965) ("A sanitary district may transfer property which its board determines is no longer required for sanitary district purposes to a recreation and park district for an adequate and full consideration, but it may not give the property to the recreation and park district.")

As indicated in City of Oakland v. Garrison, *supra*, it is clear, however, that the recipient agency may meet the standard of Section 31 by giving something less than full and adequate consideration for the interest received if the contribution in some way benefits the public purpose of the transferring agency. Thus in Santa Barbara etc. Agency v. All Persons, 47 Cal. 2d 699 (1957) it was held that the Santa Barbara County Water Agency could properly expend funds in assistance to local member units. The court there said:

"It is the general rule that a contribution from one public agency to another for a purely local purpose of the donee agency is in violation of the constitutional prohibition [Art. IV, sec. 31], but that such a contribution is legal if it serves the public purpose of the donor agency even though it is beneficial to local purposes of the donee agency." 47 Cal. 2d at 707.

Moreover, if the state legislature specifically authorizes a transfer or expenditure for a specific purpose, there is a strong presumption in favor of its validity. Thus in County of Alameda v. Janssen, 16 Cal. 2d 276 (1940) the court upheld the provisions of the Welfare and Institutions Code which granted aid to indigent aged as against the contention that such provision was violative of Section 31, saying:

"It is well settled that, in determining whether an appropriation of public funds or property is to be considered a gift, the primary question is whether the funds are to be used for a 'public' or a 'private' purpose. If they are for a 'public purpose', they are not a gift within the meaning of section 31 of article IV. (County of San Diego v. Hammond, 6 Cal. (2d) 709 [59 Pac. (2d) 478]; City of Oakland v. Garrison, 194 Cal. 298 [228 Pac. 433]; Allied Architects Assn. v. Payne, 192 Cal. 431 [221 Pac. 209, 30 A.L.R. 1029]; Veterans' Welfare Board v. Riley, 188 Cal. 607 [206 Pac. 631].) The benefit to the state from an expenditure for a 'public purpose' is in the nature of consideration and the funds expended are therefore not a gift even though private persons are benefited therefrom. (Allied Architects Assn. v. Payne, *supra*.)

"The determination of what constitutes a public purpose is primarily a matter for legislative discretion (Veterans' Welfare Board v. Riley, *supra*; Allied Architects Assn. v. Payne, *supra*; Daggett v. Colgan, 92 Cal. 53 [28 Pac. 51, 27 Am. St. Rep. 95, 14 L.R.A. 474]), which is not disturbed by the courts so long as it has a reasonable basis. (Nebbia v. New York, 291 U.S. 502 [54 Sup. Ct. 505, 78 L. Ed. 940]; Powell v. Pennsylvania, 127 U.S. 678 [8 Sup. Ct. 992, 1257, 32 L. Ed. 253].) This court has frequently upheld the expenditure of funds by the state or its subdivisions for the benefit of individuals as for a 'public purpose' and hence not within section 31 of article IV. (MacMillan v. Clarke, 184 Cal. 491 [194 Pac. 1030, 17 A.L.R. 288] [free school text

books]; Veterans' Welfare Board v. Riley, *supra* [transportation, tuition and living expenses for education of veterans]; Allied Architects Assn. v. Payne, *supra* [erection of memorial hall for war veterans]; City of Oakland v. Garrison, *supra* [street improvements]; Patrick v. Riley, 209 Cal. 350 [287 Pac. 455] [payments for destruction of diseased cattle]; Sacramento & San Joaquin Drainage Dist. v. Riley, 199 Cal. 668 [251 Pac. 207] [flood control]; City of San Francisco v. Collins, 216 Cal. 187 [13 Pac. (2d) 912] [bond issue for relief of indigent sick and poor]; Housing Authority of Los Angeles v. Dockweiler, 14 Cal. (2d) 437 [94 Pac. (2d) 794] [slum clearance]; City of San Diego v. Hammond, *supra* [use of county funds to pay delinquent assessments on overburdened property]; Goodall v. Brite, 11 Cal. App. (2d) 540 [54 Pac. (2d) 510] [free treatment in county hospital only for those unable to pay]. See 9 Cal. Law Rev. 431; 18 Cal. Law Rev. 697.)" 16 Cal. 2d at 281-282.

Accord: Shean v. Edmonds, 89 Cal. App. 2d 315, 322 (1948) (appropriation of State funds to a private county fair association); Sacramento-Yolo Port Dist. v. Rodda, 90 Cal. App. 2d 837 (1949) ("contribution" of money by a river port district to the U. S. Corps of Engineers to expedite the work on a port project under an agreement for the return of such advances from anticipated federal appropriations); Housing Authority v. Dockweiler, 14 Cal. 2d 437, 457 (1939); City of Los Angeles v. Post War etc. Bd., 26 Cal. 2d 101, 114 (1945); Santa Barbara etc. Agency v. All Persons, 47 Cal. 2d 699, 707 (1957); Dittus v. Cranston, 53 Cal. 2d 284 (1959); Dittus v. Cranston, 186 Cal. App. 2d 837 (1960) (statute requiring the purchase of fish nets and other equipment which were no longer useable for commercial fishermen because of a change in fishing regulations); City of Montclair v. Donaldson, 205 Cal. App. 2d 201, 206 (1962) (Construction of library by city with county funds); People v. City of Long Beach, 51 Cal. 2d 877, 881 (1959) (construction of building to be leased to the Y.M.C.A.); 47 Ops. Cal. Atty. Gen. 171, 181 (1966).

A recent example of this principle is seen in the opinion of the Attorney General regarding Section 104.4 of the Streets & Highways Code adopted in 1961 which permits the Department to acquire "by purchase or condemnation, any buildings or improvements constructed upon such lands by the person . . . [w]henver the right of occupancy of any person upon national forest or national park lands is terminated be-

cause of the proposed construction of a state highway across such lands." In 38 Ops. Cal. Atty. Gen. 134 (1961) it was held on the basis of the Dittus v. Cranston decisions, supra, that the legislative decision would not be judicially tampered with in the absence of "an extreme situation."

With due regard to the foregoing authorities, we are of the opinion that:

(a) Under existing law the Department would probably violate Section 31 if it granted to a municipality or other agency highway airspace rights for uses unrelated to state highway purposes. Parks, recreational areas and other facilities that are designed so as to be accessible principally to residents of a particular area would seem to fall within this category.

(b) Even under present law it is probable that Section 31 would not be violated if the Department were to grant highway airspace rights to a municipality or other agency for uses that would benefit directly or indirectly to state highway purposes. In this category we would include parks, recreational areas, and other facilities that were designed so as to be accessible and useful to persons traveling on a state highway. If, for example, permission were granted to construct a city park on highway airspace located near an off-ramp with a state highway sign showing that rest rooms or other public facilities were there available, it is likely that it would be sustainable under Section 31. In the same category we would include green belts and open areas designed so as to enhance or "preserve the view, appearance, light, air and usefulness" of the highway within the meaning of Section 104.3 of the Streets & Highways Code. If the Commission were under Section 104.12 of the Streets & Highways Code to adopt a comprehensive, state-wide policy establishing a uniform procedure by which municipalities and other agencies could obtain grants of highway airspace this would add to the sustainability of such grants, as evidencing a state-wide interest in the same.

(c) If the state legislature were to specifically authorize grants of highway airspace to municipalities and other agencies by the Department there would be a strong presumption in favor of the validity of the same under Section 31. This would be particularly true if the statute contained a comprehensive state-wide plan similar to that described in subparagraph (b) of this paragraph. If the statute were a special one it would be more likely to give rise to judicial inquiry. See 31 Ops. Cal. Atty. Gen. 21 (1958), infra.

## 2. Cal. Const. Article XXVI

In addition to the effect of Section 31, the restriction on use of state highway funds contained in Article XXVI of the California Constitution must also be considered. Article XXVI requires that funds collected from "any tax now or hereafter imposed by the State upon the manufacture, sale, distribution, or use of motor vehicle fuel" (§1) and from "motor vehicle and other vehicle registration license fees and from any other tax or license fee now or hereafter imposed by the state upon vehicles, motor vehicles or the operation thereof" (§2) "be used exclusively and directly for highway purposes." It seems clear that the restriction of Article XXVI would apply not only to state highway funds but interest or accretions thereto, and this has been the conclusion reached both by the Attorney General and the Department's legal counsel. See 38 Ops. Cal. Atty. Gen. 207, 210 (1961); Ltr. from Rudolph Hess, Chief Right-of-Way Agent to E. T. Telford of the Division of Highways dated May 7, 1962; Mallon v. City of Long Beach, 44 Cal. 2d 199 (1955). Question can be raised as to whether moneys received from the leasing or other disposition of highway airspace are accretions to such funds. Article XXVI was not adopted until 1938, and it is doubtful that the trust created thereby would apply to state highways which were acquired prior to that time. The tracing concept would also appear to be invalid as to the various state highways which were not acquired with funds of the type described in Article XXVI, such as those transferred to the Department from counties and municipalities. In view of the fact that rental is clearly traceable in the same fashion as interest (State v. Rawson, 312 P. 2d 849 (Ore. 1957)) and that Section 104.12 of the Streets & Highways Code provides that revenue from the leasing of highway airspace is to be deposited in the State Highway Fund, however, the Department would seem justified in taking the prudent position that Article XXVI may apply to the leasing of highway airspace and thus require in the words of the Department's legal counsel "fair market value in terms of rental [for the lease of highway airspace to other public agencies] or other adequate consideration in lieu of rental." See Rudolph Hess' letter, supra. Article XXVI, then, may be considered a restriction similar but in addition to Section 31 of Article IV.

Assuming that Article XXVI is applicable to the leasing of highway airspace, we are inclined to the view that it would be interpreted consistently with Section 31, and that if a particular lease or other grant of a right in highway airspace were not deemed to be a prohibited gift within the meaning of Section 31, it would probably meet the requirements of Article XXVI. In 31 Ops. Cal. Atty. Gen. 21 (1958) the Attorney General was asked to determine the validity of a legislative appropriation from the State Highway Fund for the removal of an island in the Eel River near a state highway where the budget act specifically declared the work to be "an expenditure for highway purposes within the meaning of

Article XXVI of the Constitution of California." The Attorney General stated that the determination of the legislature was "entitled to great weight" referring to a number of cases that dealt with Section 31, but held that the limited factual issue involved was one which would have to be judicially resolved. It is likely as suggested above in subparagraph (c) of paragraph 1 of this Section B that a less restrictive answer would be forthcoming if the legislature had adopted a comprehensive statewide legislative plan rather than special legislation limited to a particular area. Certainly 38 Ops. Cal. Atty. Gen. 134 (1961), *supra*, upholding the constitutionality of Streets & Highways Code Section 104.4 indicates this; it is noteworthy that said opinion did not consider the question of whether the payment there in question was "exclusively and directly for highway purposes" within the meaning of Article XXVI, and considered solely the possible application of Section 31 of Article IV. See also 3 Ops. Cal. Atty. Gen. 339 (1944).

With due regard to the foregoing we believe that the standards set forth in subparagraphs (a) - (c) of paragraph 1 of this Section B will be applicable to Article XXVI as well as Section 31.

### C. Conflicting Rights of Third Parties

#### 1. Owners of Easements

While the Department now has the power to condemn a fee interest in highways and it is its present policy so to do, the grants under which the state previously obtained title to rights of way for state highways often effected only a grant of easement. See Park v. Gates, 186 Cal. 151, 154 (1921); Fletcher v. Stapleton, 123 Cal. App. 133, 137 (1932); People v. Thompson, 43 Cal. 2d 13, 19 (1954); City of Los Angeles v. Pacific Electric Railway Company, 168 Cal. App. 2d 224, 228 (1959); Political Code section 2631 (amended in 1935 to limit applicability to county highways; re-enacted as Str. & H. Code §905; subsequently repealed).

It is clear that the holders of easements may not make any uses beyond those contained in the grant, with the exception of the so-called "secondary easements" for maintenance and repair of rights of way (See City of National City v. California Water & Tel. Co., 204 Cal. App. 2d 540, 548 (1962); Wall v. Rudolph, 198 Cal. App. 2d 684, 694 (1961); Fletcher v. Stapleton, 123 Cal. App. 133, 137 (1932)), and that "every incident of ownership not inconsistent with the easement and the enjoyment of the same, is reserved to the grantor" (Dolske v. Gormley, 58 Cal. 2d 513, 519 (1962). Accord: Hoyt v. Hart, 149 Cal. 722, 728 (1906); Dierssen v. McCormack, 28 Cal. App. 2d 164, 170 (1938)). Consequently, the fee owner of land upon which the state possesses an easement only for highway purposes or his

assigns could theoretically make any use of the airspace above the highway so long as the use was not inconsistent with the free use of the highway. His rights so to do, however, are presently stringently controlled by the Department. Section 670 of the Streets & Highways Code prohibits an encroachment without the written permit of the Department. Section 660(b) of said Code defines "encroachment" to include "any structure or object of any kind or character not particularly mentioned in this section, which is placed in, under or over any portion of the highway," which clearly seems to include all highway airspace. No limitation is made for the situation in which the state possesses an easement only in the property involved, and it was held in People v. Henderson, 85 Cal. App. 2d 653, 657 (1948) that said Section applied to a fee owner:

". . . owners of the fee would have had no greater right than those who were strangers to the title. Any structure or obstruction that would be unlawful if maintained by a stranger to the title would also be unlawful if maintained by the owner of the fee."

For the present, therefore, the Department's controls would seem adequate to regulate the use of highway airspace by the owners of the fee underlying highways. The Department's discretion in this regard is under the Henderson decision "final and conclusive except where shown to have been the result of capricious or arbitrary action or abuse of discretion" (85 Cal. App. 2d at 657). It would seem clear that this discretion could be exercised at the present time so as to prevent development in highway airspace at most, if not all, locations. As the Department itself permits the use of highway airspace, however, its discretion to prohibit the use of the same by others will undoubtedly come under greater scrutiny. Compare Pacific P. Assn. v. Huntington Beach, 196 Cal. 211, 216 (1925); Trans-Oceanic Oil Corp. v. Santa Barbara, 85 Cal. App. 2d 776 (1948); Bernstein v. Smutz, 83 Cal. App. 2d 108 (1947); City of Los Angeles v. Gage, 127 Cal. App. 2d 442 (1954). Furthermore, as noted at the conclusion of Section A of this Part II, it is possible that some portions of highway airspace will become so recognized as being interests independent from those necessary for highway development that the Department will no longer be able to show public use for the acquisition of the same. At this point it would be very difficult to justify the Department's regulation of similar highway airspace of which it was not the owner.

#### 2. Claims for Personal Injury and Property Damage

There are a number of situations both during and after the construction of projects in highway airspace in which there would be a possibility of

liability on the part of the state for personal injury or property damage. The present policy of the Department to require indemnities and obligatory liability insurance on the part of its lessees in the leasing of airspace is, therefore, a very desirable one. In addition the obtaining of waivers and releases directed to the state for claims for property damage and personal injury from the lessees and other users of highway airspace should be considered.

The breadth of the subject of liability makes it inappropriate to cover extensively at this time. Suffice it to say that it is an issue that should be fully researched and policies developed pursuant thereto by the Department before extensive highway airspace leasing is undertaken. The starting point should be the California Tort Claims Act of 1963 (Gov. Code §810, et seq.).

In addition to possible claims for personal injury and property damage, we would also like to note the possibility of claims against the state based upon the theory of inverse condemnation. For example, if the additional user of highway airspace occasioned by the construction of a highrise building authorized by the Department were to render abutting property uninhabitable, there would be the possibility of such claims even though the Department was otherwise protected under the California Tort Claims Act of 1963. An additional situation which might give rise to such a claim would be where such a structure caused a loss of light and air to abutting property. See California Government Tort Liability, Van Alstyne (Continuing Education of the Bar, 1964), p. 125; Fenton, supra, page 8 at 54-55.

## CONCLUSION

The legal issues presented by the subject of highway airspace are very broad and complex, and have not in all instances been exhaustively researched by us. Further, for purposes of readability and brevity we have not cited many authorities which relate to the points covered where we felt that no authority was necessary or sufficient support for the point was found in an authority which we had cited. An exception to this is found in our discussion of California Constitution Article IV, Section 31, contained in paragraph 1 of Section B, Part II. There we covered the legal points and authorities pertaining to said Section in some detail because we felt that it was necessary to an understanding of the issues involved.

NOSSAMAN, WATERS, SCOTT,  
KRUEGER & RIORDAN

## ARCHITECTURE AND PLANNING

### *Use of Freeway Airspace—Visual Aspects*

*A report on the visual aspects and general planning concepts of the use of airspace over and under freeways—specifically in California*

*prepared by Robert E. Alexander, F.A.I.A. & Associates  
January 1967*

In this report we have organized our findings and recommendations into a number of sections which we believe cover most of the important considerations of the problem from an architectural, aesthetic and bulk control standpoint.

Inasmuch as the potential use of freeway airspace is inseparably associated with the use of the freeways themselves, we felt it wise, for a more definitive understanding of the use of freeway airspace, to note in the opening section what we believe to be fairly widespread attitudes regarding the use of the automobile and the freeway in the life and economy of our society.

The planning, routing and construction of our freeways have been subjects of considerable controversy. The proposed and potential use of freeway airspace will be no less controversial.

Also included is a list of subjects suggested for future study which could be pursued to bring certain problems into sharper focus. The development of additional data should be useful to those who will be called upon to review and decide upon future possible uses of airspace over and under the freeways of California. These pioneering studies also should be of value to other groups throughout the country faced with similar problems.

We have welcomed the opportunity of participating in and contributing to this timely study.

ROBERT E. ALEXANDER, F.A.I.A. & ASSOCIATES

### **The role of the automobile and the freeway in the life and economy of our society.**

1. The National System of Interstate and Defense Highways is rapidly becoming the major land surface communications network of the nation. The expressways and throughways in the East and the freeways of the West are primary links in this network. All are vital elements in the economy of the country and in the daily life of its citizens.
2. The private automobile is not only an essential means of individual and group transportation, it is the object of individual and family affection. It is a recognized fact the people fall in love with their cars, and herein lies the root of many problems related to the private car and to highway facilities. Under these circumstances, any problems associated with the freeways and to the possible use of freeway airspace become as much emotional and political as they are economical, structural, or even visual.
3. When the presently planned Federal Interstate Highway System is completed, scheduled for 1972, it is estimated that at least 25% of the more than 100 million cars then in use, will be traveling on the freeways of the country. The land used by these limited-access highways perhaps will be the nation's most intensely used property, considering the several categories of commonly recognized land uses.
4. While the freeway rights-of-way are consuming vast amounts of land in urban areas, the use and possible multi-use of these rights-of-way must be evaluated in light of the intensity of use of the freeways as vital lines of communications.

### **General planning considerations related to freeways, their rights-of-way and airspace.**

1. Freeways and freeway rights-of-way have significant impact on the physical character of the community.
2. While minor streets usually are designed to serve adjacent land uses, major traffic arteries such as freeways usually determine the uses of adjacent land. In fact, present day freeways are playing similar roles in determining contemporary and future urban land uses as did harbors, canals, and rail lines in the past.
3. Problems of the use of airspace over or under freeways relate essentially to central urban areas with high land values. Possible use of airspace over freeways in rural and mountain regions would be unusual and would call for special consideration.
4. The fundamental function of a freeway requires that it enter the most intensively used land in the city, where competition for location is most keen. To serve their function, therefore, freeways often preempt some of the potentially most useful and valuable sites in the city. Their intro-

duction moreover, adds to the value and desirability of these increasingly valuable sites by improving access. Air-rights would resolve this need for two bodies to occupy the same space at the same time, but would pose substantial problems.

#### Environmental aspects of the use of airspace over and under freeways.

1. Freeway airspace uses should be in harmony with the proposed land use pattern of the community.
2. A superbly landscaped freeway can provide an attractive approach to all structures over or adjacent to a freeway. Just as the plaza provides a pedestrian approach to buildings, so the freeway could provide a dynamic setting for structures built over them.
3. Viewing the city from the freeways can result in a lasting visual image. And airspace structures, if properly planned, could enhance this image.
4. Because segments of freeways offer excellent vantage points to view and enjoy the cityscape, the use of freeway airspace should not obstruct these views.
5. Viewing the freeways from the city can be a constant attraction. Anything moving -- water, fire, lights, traffic -- is fascinating, and the traffic on the freeways is no exception.
6. The visual image of the city is important to the driver for his orientation. Reliance on signs for directions is often secondary to orientation by the visual image. In a recent public opinion poll in Los Angeles, nearly half the persons interviewed said they used tall buildings or the mountains to help them find their way around the city.
7. Urban freeways might be designed as green rivers of traffic in the urban setting. Just as pedestrian malls provide ideal environments for pedestrian shoppers, and are replacing the small scattered shops along the streets, so the freeways can provide excellent environments for fast moving vehicular traffic and a means of relieving congested local streets and highways.
8. It is just as satisfying to man to view landscaped areas as it is to walk through them. A landscaped freeway right-of-way provides great satisfaction both to the urban dweller and to the freeway user. The open space provided by freeways is a desirable by-product.
9. Wherever possible, freeways and urban renewal projects should be planned together, and airspace over or under the freeways should be utilized to maximize the overall aesthetic environment.
10. Freeways cut and separate elements of a city. The seriousness of this situation could be somewhat remedied by more bridging for local vehicular and pedestrian use. This situation also could be partially overcome by the use of airspace over freeways.
11. "Main Street" and similar major traffic arteries, formed the circulation backbone of the cities of the past, but freeways will form the circulation backbone of the cities of the future. Accessibility will determine the fabric of the cities of the future, just as it has in the past. The complementary system of local streets will remain important, but the freeways will channel regional growth.
12. The basis for urban form as perceived at the metropolitan scale, is the relationship of natural and man-made shapes. The composite of these to the human eye form the urban fabric. Various accents or structures planned within the skyline give orientation and are clues to both location and function. Freeways marked by identifying structures and accompanying greenways and open spaces can serve as visual guides for the motorist traveling through a metropolis.
13. Structures over freeways planned to blend with surrounding land uses and with the freeways could be valuable tools in forming a satisfying urban structure.
14. As the city grows, the construction of high-rise structures over freeways as elements of planned clusters, creates the possibility of large new elements in urban design.

#### Arguments for the use of airspace over and under freeways in urban areas from visual and functional standpoints.

1. Rapid and continuing population growth, especially in metropolitan areas, will demand more intensive utilization of land in urban areas. Population surveys indicate that California is gaining about 1,750 persons a day. State highway officials believe that by 1980 the resulting land shortage in central urban areas will force building over and under freeways for non-highway purposes, whether this is being planned for now or not.
2. Utilizing at least some of the airspace over freeways in central urban areas would help reduce the barrier effect created by the freeways.
3. Many public uses could logically use airspace over freeways: public parking (one or several levels), parks and playgrounds, public buildings (city, county, state, federal), libraries, convention centers, etc.
4. Many private uses could logically use airspace over freeways: Private garages, retail stores, restaurants, bus stations, transportation terminals, heliports, a combination of these, and other uses.
5. There are many vehicular and pedestrian bridges over existing freeways. Additional structures using freeway airspace would simply be extensions of conditions which already exist.
6. Throughout the United States there are a number of existing examples of structures built over expressways, freeways or toll roads -- bus stations, apartment houses, restaurants, etc.

7. In built up urban areas, a structure over a freeway will be only slightly more obvious to the driver than a similar structure at the edge of the right-of-way.
8. Lease of airspace over freeways to private developers would restore some of the substantial tax base removed when the right-of-way was removed from the tax rolls.

**Arguments against the use of airspace over freeways in urban areas from visual and functional standpoints.**

1. Freeways help to provide needed "open space" (breathing space) in crowded urban environments.
2. Present freeway land use is in fact productive. Such property represents one of the most intensively used areas in the urban environment. On a comparative square foot basis, the freeway is used by more people during the course of a 24-hour day than any other comparable area in the urban environment.
3. The freeway right-of-way, or the space over it, must not be considered as "wasted" any more than streets and parks and the space over them are considered "wasted".
4. Freeways are actually means of mass transit -- there are many cars and many "motormen" -- but still a means of mass transit.
5. From a structural and perhaps a visual standpoint, the present-day freeway might be considered a "monument" of the present generation. Any proposals for the use of the airspace might well be viewed as attempts to detract from this image. Freeways are "monuments of movement" as well as major lines of communications.
6. From the standpoint of the fabric and form of the central city, there has been a trend to reduce land coverage and increase the heights of structures. If this trend is logical -- in terms of light, air, etc. -- then the open space created by the freeways should be retained.
7. In all urban areas, the values of properties abutting open areas are greater. If this is true for properties abutting freeway rights-of-way (in congested central areas) then the use of the airspace over the freeway may reduce the value (and tax revenues) of properties now facing on these rights-of-way. The taxes gained from the airspace use may not offset the taxes lost on the other properties.

**Design considerations applicable to structures over freeways.**

1. Any proposed use of airspace over freeways should recognize the possibility of future highway expansion such as the need for double-decking the freeways.
2. Freeway airspace structures must conform to local zoning and building regulations. In addition, special regulations would apply to all airspace structures.

3. Structures or other facilities over freeways would have to be designed to prevent the dropping or throwing of any objects onto the traffic lanes.
4. Airspace structures must be specially designed to insulate against noise, vibration and fumes from the freeway.
5. Structures over a freeway should not distract the driver, especially at critical decision-making points.
6. Foundations for structures over freeways must not reduce angles of vision which insure safe driving and full awareness of exits and all directional signs.
7. Adherence to standards required for structures using airspace over or under national Interstate Highways:
  - a. 300 ft. maximum horizontal structure.
  - b. 300 ft. minimum spacing between structures, without artificial ventilation.
  - c. No signs visible from highway.
  - d. Construction in airspace not to change any profile of highway.
8. Tunnel effect should be avoided. In part, this could be achieved by:
  - a. Allowing greater clearance between freeway lanes and bottom of structure.
  - b. Avoid solid side walls.
  - c. Provide sufficient artificial lighting to minimize difference between uncovered and covered freeways.
  - d. Minimize length of structure over freeway. While 300 ft. may be allowable, shorter lengths may be advisable.
9. Special landscaping should tie airspace structures to right-of-way. Tall trees would soften abutments.
10. Structurally, the use of airspace over freeways is possible for all types of existing freeways. Structures need not be limited in height, but would have to meet several restrictions on design and construction because of a freeway passing underneath. Development of airspace under freeways is always limited in height.
11. From the standpoint of control, each individual case must be considered separately as a "conditional use". In addition to conformity to general design criteria, the project must conform to specific regulations imposed on a particular site and project, and schematic, preliminary and working drawing designs must be subject to public review and control by the agencies having jurisdiction.
12. Designs for airspace structures should be conspicuous for their conveyance of imaginative structural systems and related building designs, which should reflect a high degree of design conveying motion, grace, desirable impact on the motorist, and compatibility to the surrounding environment.
13. In general, the short range success of the use of airspace over freeways will depend on economics, but the long-range success will depend on



popularity, which in turn will depend on design, not what is done, but how it is done.

14. The visual sensation of going from low to high density from suburbs to central city, provides a natural sequential rhythm to the traveler. This urban approach sensation could be enhanced and exploited through the construction of freeway airspace buildings.
15. A series of freeway airspace parking structures at predictable intervals along urban freeways could not only serve as logical functional elements in the transportation system of the city, but as terminal facilities could be revolutionary developments in the evolution of the urban core.

#### Use of airspace over freeways from the human point of view—the visual impact.

1. From the point of view of the driver and passenger:
  - a. Structures over freeways could add interest and enjoyment for those using the freeways.
  - b. The use of airspace over freeways could enhance the view of the cityscape from a moving vehicle.
  - c. The use of airspace over freeways could add interest without necessarily adding distraction. It is preferable to have an interesting freeway environment and it is often safer for the motorist. A freeway environment lacking interest leads to driver hypnosis, and unsafe driving. Most accidents on the Pennsylvania Turnpike have been caused by driver hypnosis.
  - d. Carefully planned and architecturally controlled structures over freeways should not have a distracting impact upon the immediate circle of vision of the driver any more than the impact made by existing overpasses and nearby buildings. If well planned, an airspace structure should be in harmony with its environment.
2. From the point of view of a stationary viewer (from a nearby street or building).
  - a. The use of the airspace over the freeway could add interest to the urban panorama viewed from any given point.
  - b. The stationary viewer usually receives greater satisfaction if this view encompasses wider horizons and more elements of interest. Things in motion add to this satisfaction. The streams of fast moving cars (especially at night) on the freeways, provide a fascination to any observer. If the use of airspace over a freeway would significantly reduce the view of the traffic flow on the freeway, the viewer may feel that the interest in his panorama has been restricted. However, if the use of freeway airspace is limited, the play of cars and lights streaking under and out from under airspace structures would add interest to the urban panorama.

3. From the point of view of an occupant in a structure over a freeway:
  - a. The most fascinating point of view, in terms of watching traffic flows on a freeway, would be from some vantage point in a structure over the freeway. The feeling of being "on top of" the traffic gives one the satisfaction of being a part of the movement and the excitement associated with it.
  - b. Any use in a structure which could capitalize on a freeway view -- restaurant, refreshment lounge, night club, office building lobby, showroom, sales area, etc. -- would have an advantage not afforded in a structure at another location.
  - c. A panorama over the freeway is analogous to the expanse of view of a river winding through a mountain valley with long corridors of ever-changing open space in two directions, with the cityscape on either side.

#### Suggestions for future studies.

1. Study on the comparative safety of open vs. covered freeways. Check experience in tunnels and with covered freeways.
2. Program to develop a series of basic principles or guidelines to aid in the evaluation of proposed airspace uses. This might take the form of a freeway airspace "zoning ordinance" or "development guide".
3. Study to develop standards and criteria for architectural controls for structures over freeways other than controls related to size, bulk, openings, etc.
4. Study to determine the composition and area of jurisdiction of a local commission or board which would review all proposed airspace uses.
5. Surveys in given metropolitan areas to evaluate important views and vistas from freeways and to serve as basic documentation for checking significance and impact of proposed freeway airspace structures. The classification of a view would include the extent of the panorama, its symbolic importance, and its relative value. A sequence of views should be given special attention.

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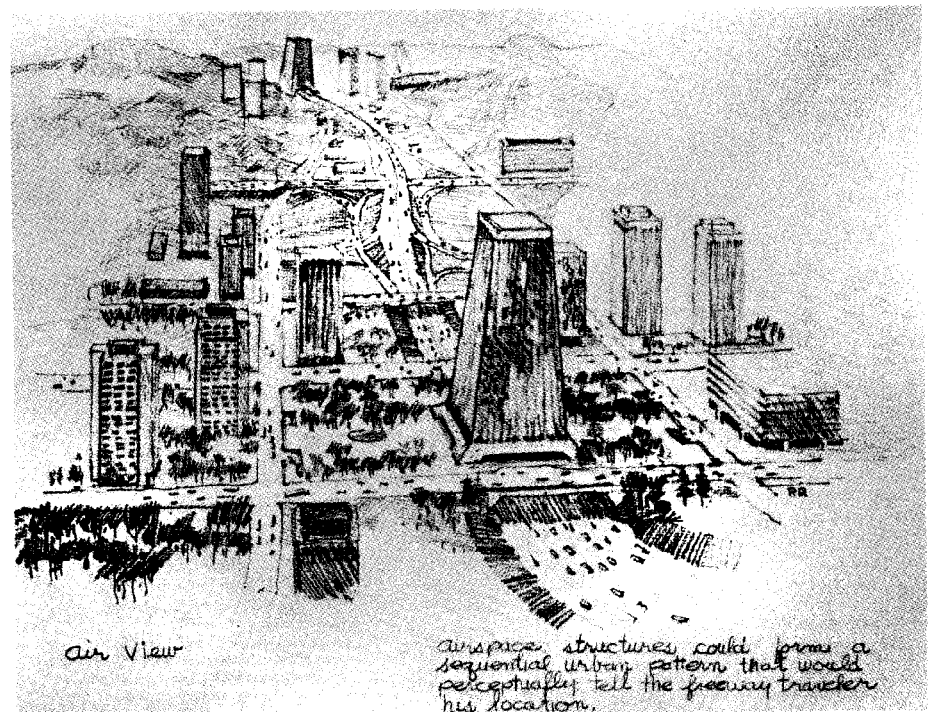
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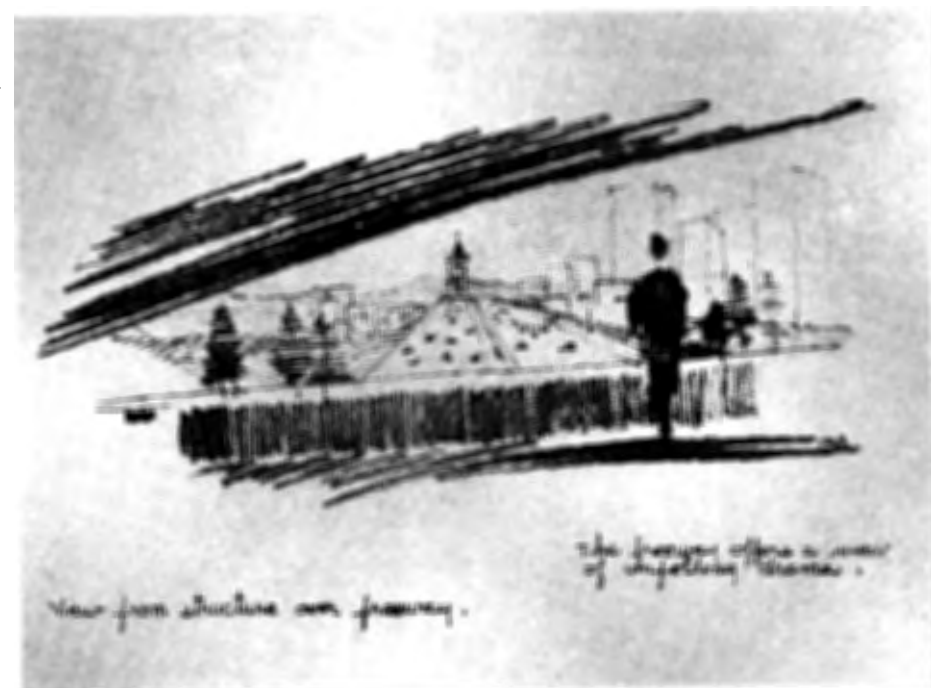
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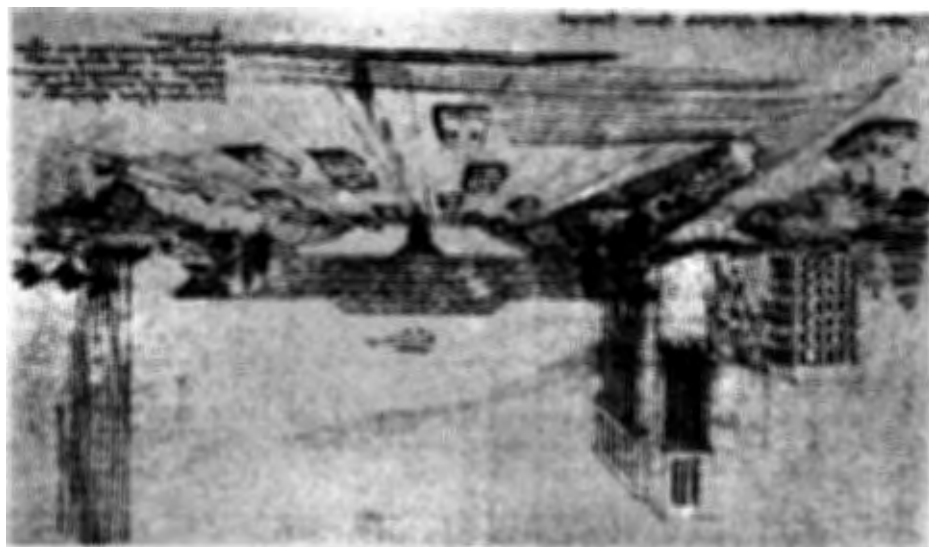
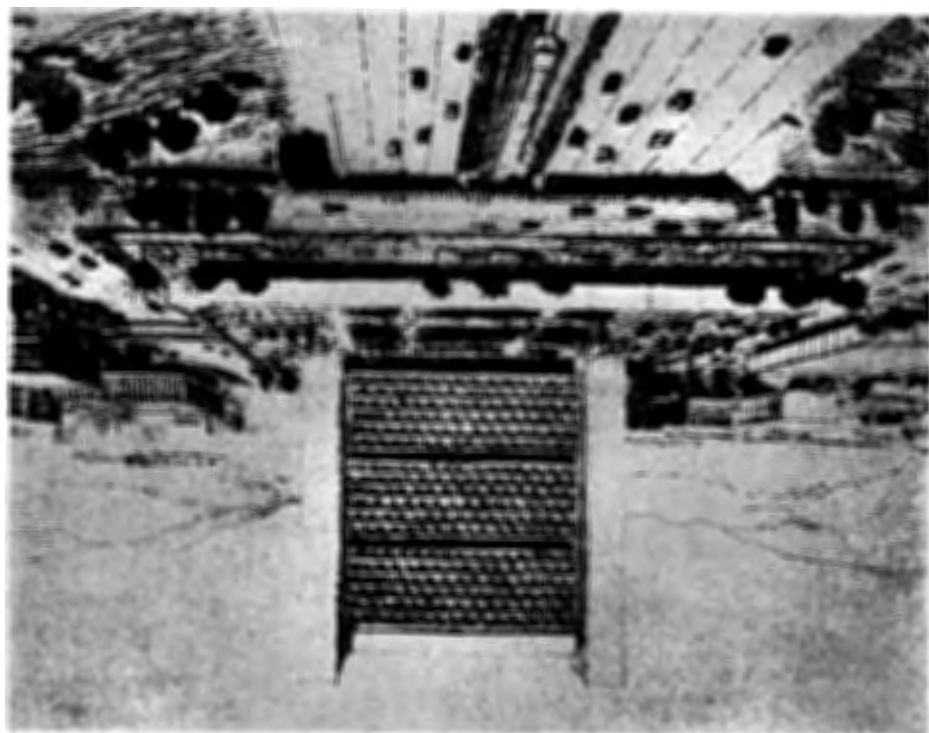
Air View

airspace structures could form a  
sequential urban pattern that would  
perceptually tell the freeway traveler  
his location.



View from structure over freeway.

The freeway offers a series  
of sequential views.



ADDENDA

Copy of California Senate Concurrent Resolution No. 5

SENATE CONCURRENT RESOLUTION NO. 5--RELATIVE TO A  
STUDY OF AIRSPACE UTILIZATION.

List of Persons Interviewed

Catalog of Airspace Projects Throughout the United States and in Other Countries

Photos: Bridge Apartments and Sutton Place - New York City, New York  
Concourse Village (2 pages) - Bronx of New York City, New York  
Outer Drive East and Prudential  
Mid-America Building - Chicago, Illinois  
United States Post Office and  
Des Plaines Oasis - Chicago Area, Illinois  
Children's Play Yard and  
Industrial Warehouses and  
Railroad Yard - Chicago, Illinois  
Prudential Tower and  
War Memorial Auditorium - Boston, Massachusetts  
Star Market - Newtonville, Massachusetts  
Miscellaneous Retail Stores - Tokyo, Japan

A Selected Annotated Bibliography

Copy of U.S. Department of Commerce, Bureau of Public Roads, Instructional  
Memorandum 21-3-62

WHEREAS, California's dramatic increase in population and a concomitant urban land shortage have demonstrated the need for multiple use of publicly owned lands wherever possible and feasible; and

WHEREAS, The Senate Fact Finding Committee on Transportation and Public Utilities has in its current interim study hearings learned of outstanding examples of other states and countries successfully utilizing airspace over and under freeways; and

WHEREAS, The selective multiple use of air rights for such facilities as parks, recreational areas, transportation terminals, restaurants and office buildings should be thoroughly investigated; and

WHEREAS, There is little information currently available regarding not only the value of such air rights, but the impact of possible multiple-use facilities on freeways, the future and continuing economic feasibility of projects constructed over freeways, consideration of the disbursement of air pollution resulting from freeway areas below airspace usage projects, and the effect of such projects on the local tax base, and any related community costs or benefits; and

WHEREAS, Adequate guidelines are desirable for state and local governments and the citizens of California to assist in the development of policies and procedures for the multiple use of airspace; now, therefore, be it

RESOLVED BY THE SENATE OF THE STATE OF CALIFORNIA, THE ASSEMBLY THEREOF CONCURRING, That the Transportation Agency is hereby requested to cause to have a comprehensive study undertaken to provide adequate information to state and local government on the procedural, legal, technical, financial, aesthetic and policy aspects of airspace development over and under freeways; and to report thereon to the Legislature not later than the fifth legislative day of the 1967 Regular Session of the Legislature; and be it further

RESOLVED, That the Secretary of the Senate be directed to transmit copies of this resolution to the Governor of the State of California and the Administrator of Transportation.

## LIST OF PERSONS INTERVIEWED

The following is a comprehensive list of persons interviewed as a part of our study of airspace utilization. In-depth interviews ranged in length from a few minutes to several hours and were conducted in the period between October 1966 and February 1967. This list has been compiled with the intent that it may be of aid in further research on the subject of air rights. The generous assistance of these individuals is gratefully acknowledged.

Amalgamated Meat Cutters and Butcher Workmen of North America, New York City, New York (owners of Concourse Village in the Bronx).

Jerome Belson, National Director of Housing

City of Beverly Hills, California.

John R. Ficklin, Chief Administrative Officer

State of California, Department of Public Works, Division of Highways, Sacramento, California.

Bamford Frankland, Supervising Right-of-Way Agent

Arthur L. Elliott, Bridge Engineer-Planning

Emerson W. Rhyner, Deputy Chief Counsel

Rudolf Hess, Chief Right-of-Way Agent

John B. Matheny, Assistant Chief Counsel

David Henry, Design

State of California, Department of Public Works, Division of Highways, District No. 4, San Francisco, California.

Alan S. Hart, District Engineer

Michael K. Stevenson, Right-of-Way

State of California, Department of Public Works, Division of Highways, District No. 7, Los Angeles, California.

Edward T. Telford, District Engineer

Heinz Heckeroth, Executive Assistant to District Engineer

James W. Greathead, Metropolitan District Right-of-Way Agent

Richard Harris, Supervising Right-of-Way Agent

Gary L. Stevens, Assistant Highway Engineer (Information Officer)

Dominion of Canada, Province of Quebec Roads Department, Montreal, Quebec, Canada.

Guy Laframboise, Regional Supervisor Trans Canadian Route

Vianney Houle, Project Engineer

Ivor B. Clark Co., Inc., Washington, D.C.

Robert Beer, Mortgage Broker

Ralph F. Clark, M.A.I. (Independent Appraiser), San Francisco, California.

Cook County Assessor, Chicago, Illinois.

John Corsiglia, Real Estate Division.

Countrywide Realty, Inc., New York City, New York (owners and managers of Bridge Apartments in Manhattan).

Sam Goodman

Floyd Sayer

District of Columbia, Department of Highways and Traffic, Washington, D.C.

Carroll B. Harvey, Director of Programming

Robert Kneipp, Corporation Counsel.

District of Columbia Redevelopment Land Agency, Washington, D.C.

Howard R. Moskof, Deputy Director and General Counsel

Robert Firman, Bethesda, Maryland (Building contractor of Bethesada Air Rights Building).

Illinois Central Railroad, Chicago, Illinois.

J. M. Trissal, Vice President and Chief Engineer

State of Illinois, Division of Highways, District No. 10, Chicago, Illinois.

Marshall Suloway, Assistant Chief Engineer, Design

Illinois State Tollway Commission, Chicago, Illinois.

Donald R. Bonniwell, Chairman

Institute for Center Planning, Lyngby, Denmark.

Jesper Harvest, Director of Planning

Svend Sokolt, Director of Economics

(I interviewed Messrs. Harvest and Sokolt in Los Angeles regarding airspace utilization in the Scandinavian countries.)

Joseph and Walter Kueknle, Real Estate Appraisers, Chicago, Illinois.

Joseph G. Kueknle, M.A.I.

Walter Kueknle, M.A.I.

(Valuation of Air Rights technique)

James D. Landauer Associates, New York City, New York.

John Robert White, Executive Vice President

Harry Spensley, Appraiser

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CATALOG OF AIRSPACE PROJECTS  
THROUGHOUT THE UNITED STATES AND IN OTHER COUNTRIES

CALIFORNIA (Continued)

CALIFORNIA

Los Angeles

Beverly Hills Space City (proposed) - Two-mile long, controversial development over the proposed Beverly Hills Freeway. The developer proposed that commercial enterprises would subsidize public uses.

Bullock's Department Store - Pedestrian bridge over St. Vincents Court, an alley.

Bank of America and United California Bank Buildings - Pedestrian bridges over the alley between Spring and Main Streets.

Miscellaneous viaduct parking - Under the Santa Monica and Harbor Freeways.

Sacramento Area

Safeway Market and Discount Store (proposed) - The two blocks bordering K Street beneath Interstate 80 were to have been improved for a small shopping center, but the proposal was denied by the Sacramento City Council.

Garage and hotel (proposed) - An eight-story, city-owned garage topped by a 17-story hotel which is to be built on airspace at 10th and L Streets.

Penryn "Oasis" (proposed) - The owner of a 36-acre property bisected by Interstate 80 near Auburn plans a restaurant and service stations to span the highway, but there will be no direct access to the highway.

San Francisco Area

Japanese Cultural and Trade Center (under construction) - The pedestrian bridge spanning Webster Street will include shops and will connect the center and a three-level, city-owned garage. This development is part of the western addition of an urban renewal project.

Oakland Office Building (under construction) - A three-story office building over the Webster Street tube of State Route 61.

Municipal parking garage with housing above (proposed) - A municipal parking garage owned by the city of Oakland is to be improved with moderate-income housing units above.

Alcoa-Golden Gateway Garage Complex (nearing completion) - A high-rise office building, a bank and a restaurant over a municipally-owned, three-story garage. The complex is within an urban renewal project.

San Francisco Area (Continued)

Numerous parking garages under parks - For many years, the city and county of San Francisco have used the airspace over public garages for small public parks.

International Building - A portion of this high-rise building located at Kearny and California Streets is cantilevered over the city-owned St. Mary's Square Garage.

Matson-Standard Building - The 10-story, Matson navigation building at the corner of Mission and Spear Streets is built over a modern Standard Service Station.

Elderly housing project (proposed) - A private developer plans to build a three-story apartment complex over the city-owned garage at Bartlett and 23rd Streets. A request has been made for Federal financing.

San Diego

Coronado Bridge (proposed) - The bridge which will connect Coronado Island and the mainland is to be built over an "air tunnel easement" (see Title to Airspace, Section C, Chapter III).

San Diego County Court House - A public building partly built over C Street between Front and Union Streets.

Travolator Motor Hotel - An elevated moving sidewalk over Seventh Avenue at Ash Street connects the El Cortez and Travolator Hotels.

Stockton

Viaduct freeway parking (proposed) - Service parking beneath the freeway is being considered in the general plan for city redevelopment.

Sunnyvale

Public Accommodations Building - A small bus station is located under the State Route 85 viaduct.

ILLINOIS

Chicago

Chicago Passenger Terminal - Train depot over the Chicago and Northwestern Railroad Company tracks.

Illinois Center - This is a complex of four, 52-story apartment buildings, an office building and a hotel on an 18-acre site over a railroad right-of-way.



## ILLINOIS (Continued)

### Chicago (Continued)

Fulton Street Warehouse - Several warehouses and part of a rail yard are over the John F. Kennedy Expressway near downtown

Gateway Center Building - Newly-completed, 22-story office building at 10 South Riverside Plaza over a railroad right-of-way.

Lakefront Plaza - A complex of hotel and office buildings on a 33-acre site over railroad tracks near the Illinois Center.

Marina Center Apartment Towers - Twin 40-story apartment buildings on a two-acre site over the railroad right-of-way adjoining the Chicago River.

Merchandise Mart - Nineteen-story office and commercial building which contains 4.2 million square feet and is built over the Northwestern Railroad right-of-way.

Neighborhood playground - A fenced neighborhood playground is located under the Dan Ryan Expressway (see Addenda photograph).

Oasis Restaurants - Five Fred Harvey Restaurants span the Illinois Tollway System on various routes west of downtown Chicago (see Addenda photograph)

Outer Drive East Apartments - Forty-story apartment building on two-acre site over the Illinois Central Railroad yards adjoining Lake Michigan (see Addenda photograph).

Prudential Mid-America Building - Forty-story office building at 130 Randolph Street over the Illinois Central Terminal (see Addenda photograph).

Riverside Plaza - A 25-story office building formerly known as Daily News Building over the railroad right-of-way adjoining the Chicago River.

U. S. Post Office - This large office building surrounding the Eisenhower Expressway is one of America's best-known airspace projects (see Addenda photograph).

## MASSACHUSETTS

### Boston

Boston Stadium (proposed) - This new stadium is to be built over a railroad yard.

Prudential Center - Newly-completed, 52-story office building, auditorium, apartment buildings and Sheraton Hotel over the approaches to the Massachusetts Turnpike on the edge of downtown Boston (see Addenda photograph).

## MASSACHUSETTS (Continued)

### Fall River

Civic Center Complex (under construction) - The city hall and other administrative office buildings will be located over Interstate 195.

### Newtonville

Star Market - Freestanding neighborhood market, half of which spans the Massachusetts Turnpike (see Addenda photograph).

## NEW YORK

### Buffalo

Erie County Library - This building surrounds a surface street.

### New York City

Apartment Complex - An airspace building over Franklin D. Roosevelt Drive between 54th and 56th Streets.

Bridge Apartments - Four, 32-story apartment buildings over the depressed approaches to the George Washington Bridge (see Addenda photograph).

Columbia Broadcasting System Building - A 38-story structure over a railroad right-of-way.

Concourse Village - A complex of seven high-rise, cooperative apartment buildings on a 10-acre platform over the Mott Haven Railroad yards in the Bronx (see Addenda photograph).

East River Drive Heliport - Air rights structure over a railroad right-of-way.

Gimble Brothers - A nine-story high, enclosed pedestrian bridge spanning 32nd Street.

Jerome Park Towers (proposed) - A four-building, moderate-income housing complex over the subway train yards at Jerome Avenue and 205th Street in the Bronx.

Madison Square Garden (under construction) - This significant new sports arena is circular with suspended roof and is over the old Penn Station.

Litho City (proposed) - A 35-acre housing complex with schools and shops over railroad tracks in Manhattan along the Hudson River.

New York City Municipal Building - This old, multistory building is similar to Chicago's U.S. Post Office and surrounds Chamber Street.

## NEW YORK (Continued)

### New York City (Continued)

Pan Am Building - This 59-story office building topped by a heliport is over the Grand Central Terminal at 200 Park Avenue.

Park Avenue - Approximately 19 acres of buildings and streets over the New York Central Railroad tracks.

Park Lane Plaza (proposed) - Two, 10-story apartment buildings over the Long Island Railroad tracks.

Port Authority Building - This Uptown bus terminal adjoins the Bridge Apartments over the approaches to the George Washington Bridge.

Public School 126 (proposed) - Three-story school topped by a 25-story apartment building.

New York Telephone Company Building - This multistory office building is located over a railroad right-of-way.

Riverside Drive Park - A buried railroad tunnel that runs for approximately half a mile along the Hudson River is landscaped and adjoins playgrounds and other uses.

Sutton Place Apartments - Several multistory apartment buildings over the expressway adjacent to the East River just north of the United Nations Building.

United Nations Building - The park area facing the East River is on an unusual cantilevered structure over the six-lane expressway.

United Nations Plaza - Six-story office building later topped with 34 stories of cooperative apartments.

Whitney Museum - This newly-completed, modern structure is cantilevered beyond the usual property line.

### Rochester

Midtown Plaza (proposed) - An enclosed shopping center that would have 55 shops with three floors of parking below and a 13-story office and four-story hotel above.

## WASHINGTON, D.C.

Center Leg Joint Housing and Freeway Project (proposed) - Medium- and low-income group housing project to accommodate approximately 196 families to be built over the center leg of the Interloop Freeway.

Department of Labor Building (proposed) - General Services Administration Building to be built in 1968 over the center leg of the Interloop Freeway between C and D and 2nd and 3rd Streets.

L'Enfant Plaza Complex - A multistory, privately-owned hotel is to be built as a part of the 10th Street Mall development.

Rhode Island Avenue Playground (proposed) - This proposed playground will be built over Rhode Island Avenue.

Washington Channel Bridge (proposed) - Commercial bridge to connect the 10th Street Mall and East Potomac Park (see History of Air Rights, Section B, Chapter III).

## MARYLAND

### Baltimore

Charles Center - Hamburgers Men's Apparel Store has a pedestrian bridge which spans Lafayette Street.

### Bethesda

Bethesda Air Rights Building - This newly-completed, multistory office building spans a single railroad track that has minimum traffic.

## OTHER STATES AND CITIES WITH AIRSPACE PROJECTS

### ALABAMA - Birmingham

Medical Center - Part of the medical center of the University of Alabama is constructed on airspace over a city street.

### CONNECTICUT - Hartford

Public library - Built over a four-lane state highway.

### MICHIGAN - Detroit

Cobo Convention Hall - Mammouth facility with parking over a depressed section of the Lodge Freeway.

### OHIO - Cincinnati

Lytle Park - The historic park and surrounding structures are constructed over Interstate 71 which is in a tunnel.

### OHIO - Cleveland

Terminal Tower Complex - A 708-foot high office building over a railroad right-of-way.

#### OKLAHOMA - Vineta

Restaurant and service station complex - An oasis-type facility spans the Will Rogers Turnpike near Vineta. This facility was built at a reported cost of \$1.9 million by Continental Oil Company and is said to be on a 25-year master lease.

#### PENNSYLVANIA - Philadelphia

Penn Towers - This is a 30-story, high-rise apartment building over a railroad right-of-way.

Belmont Reservoir Project (proposed) - A 10-story office-apartment complex is to be built over a 15-acre city reservoir.

#### PENNSYLVANIA - Pittsburg

Allegheny Center - Shopping center over public garage.

#### TEXAS - Dallas

Main Place Project (proposed) - Office building and commercial development to be built on a 10-acre site over a parking garage.

#### TEXAS - El Paso

El Paso National Bank Building - Multistory office and garage building over a railroad right-of-way.

#### FOREIGN COUNTRIES AND CITIES WITH AIRSPACE PROJECTS

##### CANADA - Montreal

Place Ville Marie - Several airspace projects surround this elaborate complex which is across the street from and connected by pedestrian tunnel to the Canadian National Railroad terminal. A Metro station terminal is in the basement.

Terminal Tower (proposed) - This multistory office building will be the first of several private buildings surrounding the Metro subway station.

##### FRANCE - Paris

Rond Point de la Defense Project - High-rise office and apartment buildings are on an extensive platform which straddles a multilevel expressway.

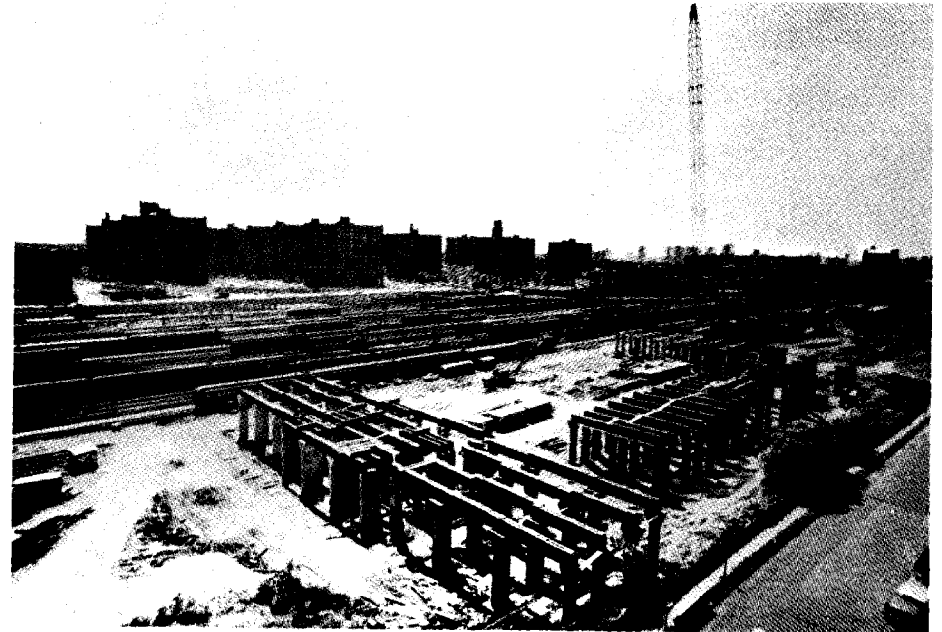
##### JAPAN - Tokyo

Ginza Section Stores - Retail stores and offices are placed beneath and made a part of the elevated roadways in Tokyo (see Addenda photograph).

Source: Compiled by Real Estate Research Corporation from field surveys and published articles, February 1967.



The four Bridge Apartments (960 units) and three-level Uptown Bus Station in New York City over the approaches to the George Washington Bridge spanning the Hudson River are one of the nation's best known freeway airspaca projects. July 1963 photograph courtesy of The Port of New York Authority.

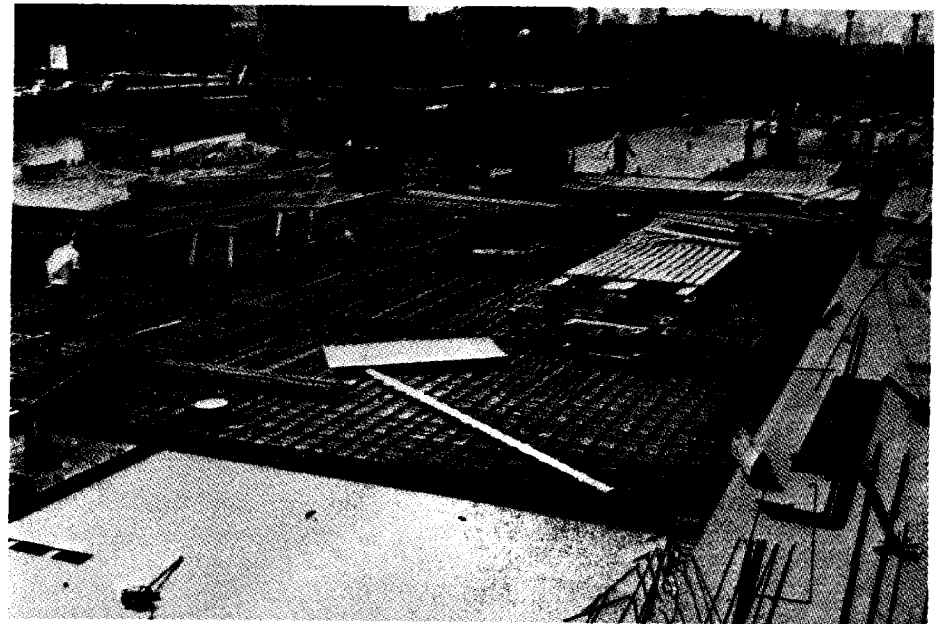


Concourse Village—This cooperative apartment project is in the Bronx of New York City. The first phase of construction over the Mott Haven Yard entailed removal of the tracks. August 1963 photograph courtesy of Amalgamated Meat Cutters and Butcher Workmen of North America.



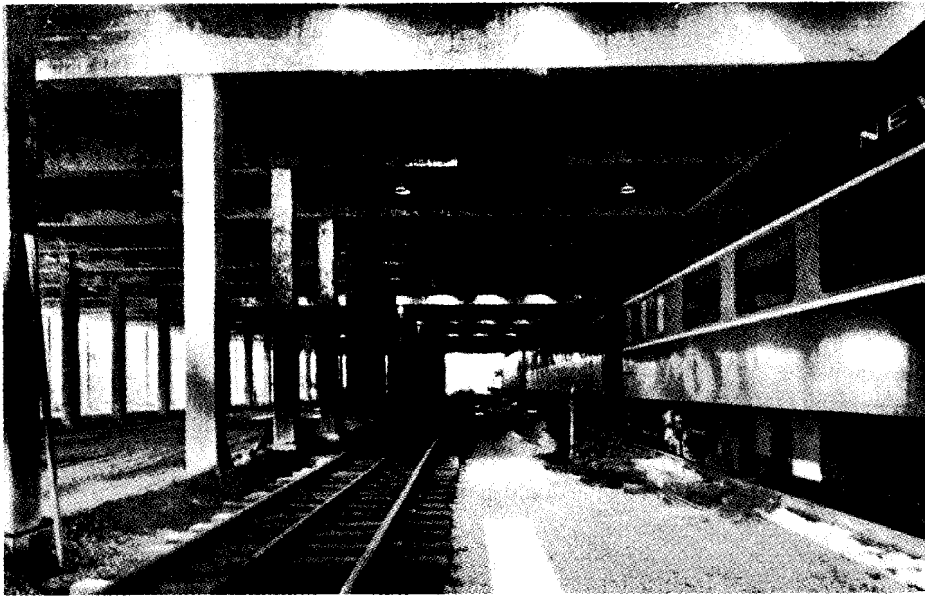
Sutton Place—One of several luxury apartment buildings over the expressway along the East River just north of the United Nations Building in New York City.

Real Estate Corporation, October 1966.



Concourse Village—This construction phase photograph shows the structure of the 10-acre deck which stretches across the entire yard.

July 1965 photograph courtesy of Amalgamated Meat Cutters and Butcher Workmen of North America.



Concourse Village in the Bronx of New York City. The railroad tracks were relayed as a part of the deck construction phase. Note right-of-way lighting fixtures.  
 April 1965 photograph courtesy of Amalgamated Meat Cutters and Butcher Workmen of North America.



Outer Drive East—These luxury apartments (940 units) are on the shore of Lake Michigan at the east edge of downtown Chicago, Illinois. The Prudential Tower beyond the Illinois Central Railroad yard also fronts on Randolph Street.  
 August 1966 photograph courtesy of Prudential Insurance Company of America.



Concourse Village high-rise apartments after completion. The open deck serves as a play and recreation area and makes it possible for efficient snow removal during the winter.  
 The 1965 photograph courtesy of Amalgamated Meat Cutters and Butcher Workmen of North America.



Prudential Mid-America Building, 40 stories, is over the Illinois Central Terminal which may be seen at the foreground corner of the building. The view is south along Lake Michigan with downtown Chicago on the right.  
 August 1963 photograph courtesy of The Prudential Insurance Company of America.



The United States Post Office over the Eisenhower Expressway on the west edge of downtown Chicago is another of America's best-known airspace developments. The view is of the east wall which faces downtown.  
 April 1962 photograph courtesy of State of Illinois, Public Works & Building Department, Division of Highways, District 10.

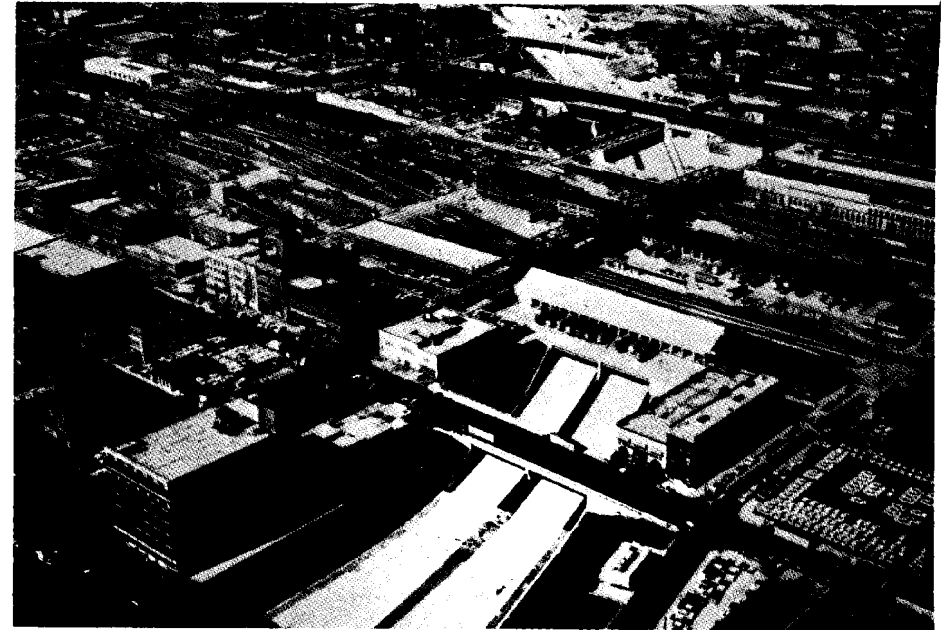


Children's Play Yard at 18th Street under the Dan Ryan Expressway (Interstate 94) south of downtown Chicago, Illinois.  
 May 1965 photograph courtesy of State of Illinois, Public Works & Building Department, Division of Highways, District 10.



The Des Plaines Oasis, located over Interstate 90 one mile northwest of Chicago's O'Hare International Airport, is one of five identical facilities. The Fred Harvey Restaurants on the horizontal bridges are flanked by Standard Oil Stations which serve passenger cars and trucks.

August 1959 photograph courtesy of Illinois State Toll Highway Commission.



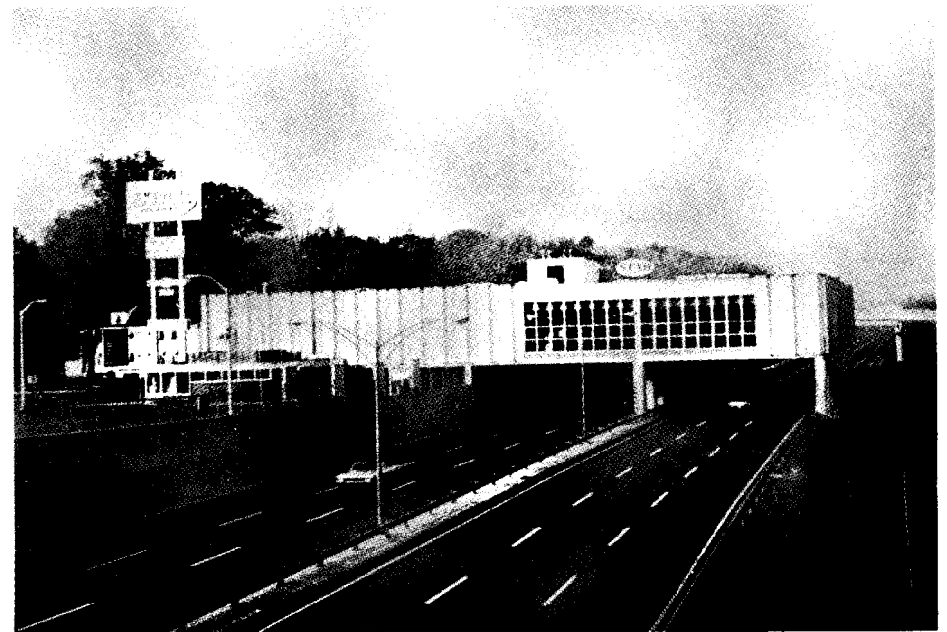
These industrial warehouses and railroad yard over the Kennedy Expressway near the intersection of Fulton Street and North Union Avenue are just northwest of downtown Chicago, Illinois.

October 1960 photograph courtesy of State of Illinois, Public Works & Building Department, Division of Highways, District 10.



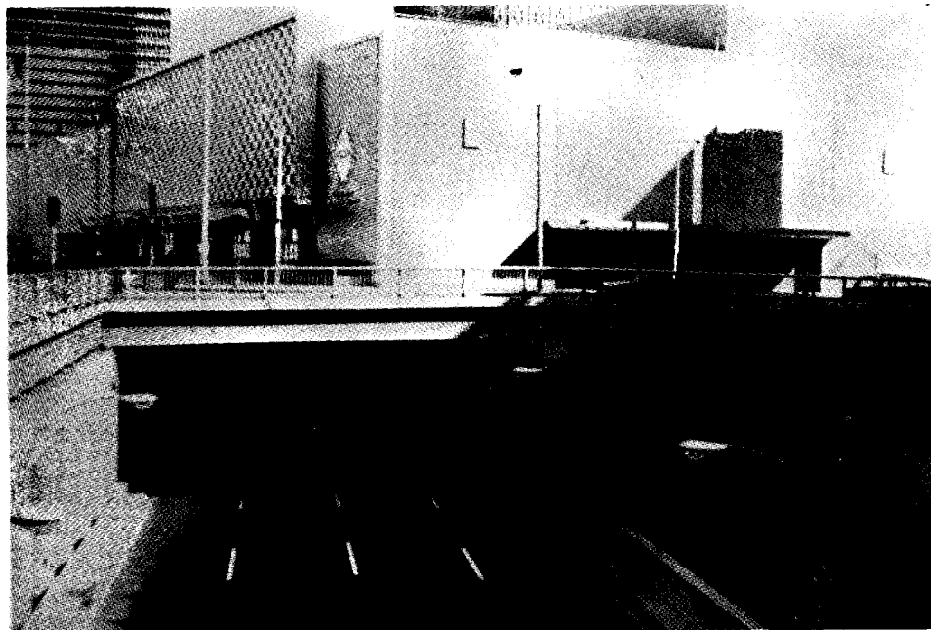
The 52-story Prudential Tower—Part of the Prudential Center on the edge of downtown Boston, Massachusetts. The 31-acre project includes the War Memorial Auditorium in the foreground.

Real Estate Research Corporation, October 1966.



Star Market over the six-lane Massachusetts Turnpike in Newtonville about 12 miles east of downtown Boston, Massachusetts.

Real Estate Research Corporation, October 1966.



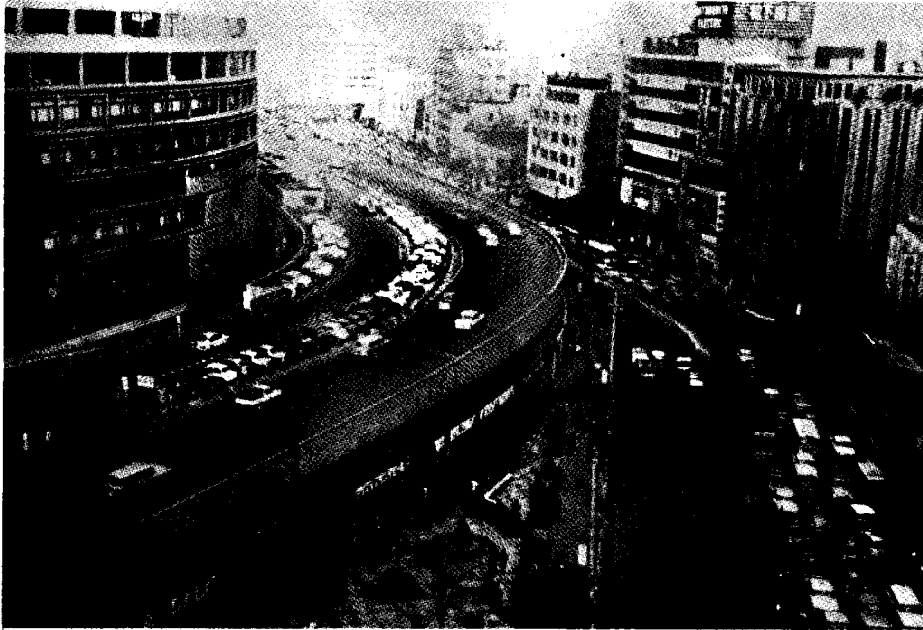
The War Memorial Auditorium is an airspace over the railroad and the eight-lane divided highway tunnel of the Massachusetts Turnpike.

Real Estate Research Corporation, October 1966.

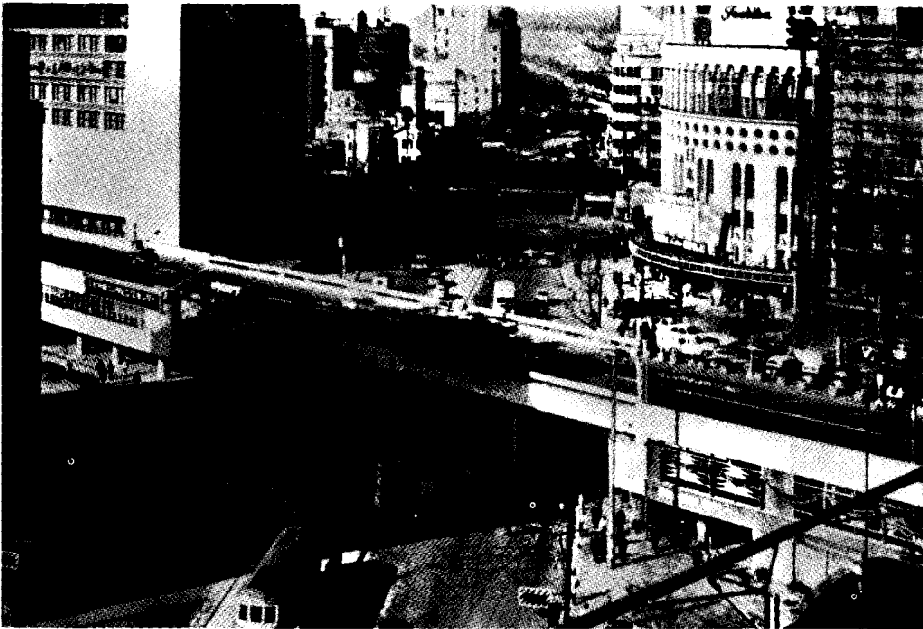


The Star Market is a freestanding neighborhood store. The nearest freeway off-ramp is more than one mile in either direction. Note the hazardous edge of highway abutment.

Real Estate Research Corporation, October 1966.



Miscellaneous retail stores under roadway in the Ginza section of Tokyo, Japan. December 1962 photograph courtesy of the State of California Transportation Agency, Division of Highways.



Other miscellaneous retail stores in the Ginza section of Tokyo. Note that the roadway serves as a roof and that the stores are blended into a multiple structure. December 1962 photograph courtesy of the State of California Transportation Agency, Division of Highways.



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U. S. DEPARTMENT OF COMMERCE  
BUREAU OF PUBLIC ROADS  
INSTRUCTIONAL MEMORANDUM 21-3-62

Subject: Use of airspace on the Interstate System  
Issued: May 4, 1962

Section 111 of title 23 of the United States Code, as amended by section 104 of the Federal-Aid Highway Act of 1961, approved June 29, 1961, provides as follows:

All agreements between the Secretary and the State Highway department for the construction of projects on the Interstate System shall contain a clause providing that the State will not add any points of access to, or exit from the project in addition to those approved by the Secretary. Such agreements shall also contain a clause providing that the State will not permit automotive service stations or other commercial establishments for serving motor vehicle users to be constructed or located on the rights-of-way of the Interstate System. Such agreements may, however, authorize a State or political subdivision thereof to use or permit the use of the airspace above and below the established grade line of the highway pavement for such purposes as will not impair the full use and safety of the highway, as will not require or permit vehicular access to such space directly from such established grade line of the highway, or otherwise interfere in any way with the free flow of traffic on the Interstate System.

It also provides that agreements, executed prior to the amendment, may be revised, to the extent that they relate to the utilization of space on rights-of-way of the Interstate System, to conform to section 111 as amended.

In order to conform with the requirements of the Act as amended, and yet insure the stability and safety of the Interstate System, the free access thereto, and the freedom and safety of traffic thereon, it is desirable to outline the rules and controls under which the airspace above and below Interstate highways may be used, so that they can be applied uniformly throughout the States.

The dimensional controls which follow are deemed to be minimum and should be exceeded wherever economically feasible.

Instances where it is desirable to utilize airspace above or below Interstate highways will ordinarily involve airspace above depressed sections or space below viaducts carrying roadways of an Interstate highway. However, the Secretary may enter into agreements or amend agreements to authorize the use of airspace at any location above or below an Interstate highway determined to be appropriate.

Considerations Involved in the Granting of Authorizations  
for Use of Airspace Within the Right-of-Way

In any case where proposed to use airspace within the right-of-way for other than highway purposes, the State must establish to the satisfaction of the Bureau of Public Roads that the proposed use will not:

- (a) impair the full use and safety of the highway;
- (b) require or permit vehicular access to such space directly from the established grade line of the highway;
- (c) otherwise interfere with the free flow of traffic on the Interstate System; or
- (d) result in violation of Part 626 of the Regulations of the Administrator, Federal Aviation Agency, as amended.

Where a proposed use meets the foregoing criteria, it may be approved subject to the following conditions to protect the public interest:

1. Federal funds will not participate in any added costs whatsoever of construction of the highway project required by such use; i. e. for additional right-of-way, increased clearance for depressed highways, structural columns, ventilation, lighting, signing, etc.; or other changes in design, construction methods, or materials.
2. That the State and Public Roads shall approve prior to commencement of construction:
  - (a) the nature and term of the proposed use;
  - (b) the general design of the proposed facilities and such plans as the State highway department and Public Roads deem necessary to review; and
  - (c) the proposed manner of constructing and maintaining the facilities including advance arrangements for emergency maintenance procedures.
3. The proposed use of airspace below the grade line of the highway will not, at any point within the boundaries of the right-of-way, extend above a horizontal plane which is at least eight feet below the underside of an elevated structure, and the proposed use of airspace above the grade line of the highway will not, at any point within the boundaries of the right-of-way, extend below a horizontal plane which is at least 16 feet 4 inches above the grade line of the highway, except as necessary for columns, foundations, or other support structures, and except that use of airspace by vehicles may be permitted within the eight-foot clearance area below viaducts where appropriate. Where control and directional signs needed for the highway are to be installed beneath an overhead structure, vertical clearance will be at least 20 feet from the grade line of the highway to the lowest point of the overhead structure.
4. No use will be permitted of airspace above ramps and the roadways with which they connect as will require piers, columns, or any other facilities to be placed so as to interfere with necessary visibility or reduce sight distances of drivers or in any other way interfere with the safety and freedom of traffic on such ramps and roadways.
5. All structure supports will be placed so as to clear the shoulders and safety walks of the highway and so as to conform to any other horizontal dimensions established by the highway department and the Bureau, provided that where the State highway department, with Bureau approval, determines there is sufficient width of median or outer separation and that location thereof within the median or outer separation will not interfere with the highway, supports may be located in the median or outer separation. All supports will be back of or flush with the face of any wall at such location. No supports will be located in the vicinity of the approaches to ramps or to the signing necessary to the use of such ramps in such position as will obstruct the view of approaching drivers.
6. No structure or structures over any Interstate highway which would be enclosed thereby shall occupy more linear feet of the right-of-way than can safely be occupied and permit adequate natural ventilation of the tunnel section for the conditions at the location, assuming a volume of traffic equal to capacity. Furthermore, each such covered length shall be preceded and followed by uncovered lengths of Interstate highway as will safely effect natural ventilation. The State highway department shall determine such lengths for each particular case subject to Bureau approval. Exceptions may be considered when complete tunnel ventilation is provided.
7. Unless tunnel ventilation is provided, structures over Interstate highways shall be so designed and constructed as to facilitate natural ventilation of the highway. To this end, the underside and any supports for such structures shall have smooth and easily cleanable surfaces. Supports for such structures shall leave as much open space on the sides of the Interstate highway as feasible, which space shall be appropriately grated where deemed necessary by the State highway department.
8. Structures authorized to occupy the airspace will be of fireproof construction as defined by the provisions of applicable building codes, and will not be used for the manufacture of inflammable material, or for any storage of materials or other purpose deemed by the State highway department or Public Roads to be a potential fire or other hazard to the Interstate highway, and the operation and maintenance of the space will be subject to regulation by the State highway department to protect against fire or other hazard impairing the use, safety and appearance of the highway.
9. The occupancy and use of the airspace above or below an Interstate highway shall not be such as will permit hazardous or unreasonably objectionable smoke, fumes, vapor, or odors to rise above the grade line of the highway, or such as will subject the highway to hazardous or unreasonably objectionable drippings, droppings, or discharge of any kind, including rain or snow.
10. On-premise signs, displays, or devices may be authorized by the State highway department, but shall be restricted to those indicating ownership and type of activity being conducted in the facility to occupy the airspace, and shall be subject to reasonable restrictions with respect to number, size, location, and design by regulation of the State highway department, subject to Bureau approval.
11. Construction above or below an Interstate highway shall not require any temporary or permanent change in alinement or profile of the Interstate highway.
12. Provision is to be made for the proper maintenance of the facility to occupy the airspace in such manner as to cause no interference with traffic and to assure that the structures and the area within the highway right-of-way boundaries will be kept in good condition both as to safety and appearance, and shall include advance arrangements, for emergency maintenance procedures, approved pursuant to paragraph 2 of this heading.
13. Where the proposed use of the airspace above or below an Interstate highway requires additional highway facilities for the proper operation and maintenance of the highway, they shall be provided without cost to the Federal Government. These might take the form of fixed-source lighting, ventilation, additional signing and marking, special warning and communication devices, or other facilities.
14. Any agreement authorizing the use of such airspace for nonhighway purposes shall include a three-dimensional description of the airspace authorized to be so utilized.
15. The design and construction of the facility permitted in the airspace shall be such that

access to the Interstate highway for maintenance and reconstruction is not impaired, and the agreement shall retain for the State the authority to enter upon the right-of-way and perform such maintenance and reconstruction. The agreement shall also enable the State to have full access to inspect the facility permitted in the airspace.

16. The agreement for the use of airspace shall require the authorized user to provide necessary safeguards to protect the public and the Interstate highway, including adequate insurance for the payment of any damages which might result during the construction of the facility occupying such airspace or thereafter, and to save the State harmless from damage.
17. In applications for the use of airspace for nonhighway purposes, consideration will be given by the State highway department and Public Roads to all future needs for such airspace for public highway purposes. The uses permitted will be on:
  - (a) a term basis; or
  - (b) revocable at will, or revocable on a specified period of notice.The authorized uses will be subject to revocation for:
  - (a) violation of conditions of use;
  - (b) cessation of use; or
  - (c) abandonment of facilities.

Such authority to use the airspace shall not be transferred, assigned or conveyed without approval of the State highway department and Public Roads. Upon revocation of any such authority to use the airspace, it shall be restored to a condition satisfactory to the State highway department and Public Roads with no expenditure of Federal funds.

18. The instructions contained herein with respect to the use of airspace above or below the grade line of the highway do not apply to installations of public utility facilities occupying the rights-of-way of the Interstate Highway System pursuant to the AASHO Policy on Accommodations of Utilities on the Interstate System, 1959, accepted by the Bureau of Public Roads. (PPM 40-2, 3a(2) (g), October 26, 1961).
19. Where authorization is given by the Administrator to occupy the airspace for non-highway purposes involving the construction or alteration of structures the nature of which is such that notice to the Administrator, Federal Aviation Agency, is required by Part 626 of the Regulations of the Administrator, Federal Aviation Agency, as amended, such authorization will be subject to the conditions:
  - (a) that such notice will be given as required and Public Roads be advised thereof;
  - (b) that the design and construction of the proposed facility will conform to the proper applicable criteria established by Part 626 of the Regulations of the Administrator, Federal Aviation Agency, to assure the safety both of the authorized nonhighway use of airspace within the right-of-way and of air navigation.
20. Title to airspace authorized to be used for nonhighway purposes shall be retained by the State.

21. Each case will be considered upon an individual basis by the State highway department and Public Roads.
22. Disposition of income received from the authorized use of airspace will be the responsibility of the State.

#### Applications for Approval of Use of Airspace

Each proposal by a State for the use of airspace will be submitted to the Administrator for approval. Proposals for incorporation of authorization in a project agreement, pursuant to section 111 of title 23, U.S.C., as amended, may be made at any time prior to execution of the project agreement. Applications for revision of a project agreement thereunder may be made at any time. The State's application will show:

1. a general statement of the proposed use;
2. the State's legal authority to use or permit such use of airspace;
3. how and by whom the space is to be developed and operated;
4. the general design for use of the space, including the construction of facilities; and
5. any other information available to assist in evaluating the State's proposal.

#### Exceptions

Requests for approval of exceptions to this memorandum will be submitted with detailed supporting information for decision in the Washington office.

This Instructional Memorandum supersedes Cherry Memorandum No. 31 dated April 8, 1957.

(signed)

Rex M. Whitton  
Federal Highway Administrator

