

Project Statement for the Overview
Planning Development of the

ISLAND OF GUAM

MARIANA ISLANDS

TO MEET THE REQUIREMENTS OF
THE DEPARTMENT OF HOUSING AND
URBAN DEVELOPMENT

VOLUME I:
PROPOSAL SUMMARY
QUALIFICATIONS

ASSOCIATED CONSULTANTS:
WILLIAM L. PEREIRA ASSOCIATES
DEVELOPMENT RESEARCH ASSOCIATES
POD:
WILBUR SMITH AND ASSOCIATES

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PLANNING
CITY OF GUAM
FACILITY
AGASSA, GUAM 96910

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VOLUME I

PROPOSAL SUMMARY

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General Approach

Information Base

Master Planning

TEAM QUALIFICATIONS

William L. Periera Associates

Development Research Associates

POD₂

Wilbur Smith and Associates

Overview of Problem

Unlike many other entities in the process of change and growth, Guam looks to the future with very few basic handicaps. The need for a development plan is, fortunately, less dictated by problems of rampant poverty than by present and anticipated affluence. Therefore, the true objectives for such a plan are to insure a sustained quality of life for the inhabitants of the island over a 30-50 year period, not simply a short-term program to relieve distress or to generate partial economic activity.

A high rate of employment, an adequate population base, geographic location, high per capita income, good educational level, sound political institutions, climate, the interest if not eagerness of investors and manageability due to size, all combine to suggest great pressures for ever faster development. To translate these pressures into opportunities, there is a real need for a developmental policy that integrates the plans for change in matters economic, physical-environmental, social, fiscal, administrative and managerial, as well as cultura.

Among these questions urbanization may pose the most serious challenge. Both through the control of existing trends and a strategy for new communities development. A comprehensive plan may go far in ensuring orderly and qualitative growth.

Whether planned constraint, or planned encouragement, the pattern of growth

requires deliberation and control. The adequate planning for such growth also requires the incorporation of information on all aspects of life and environment on the island. Because of its relatively small size, it will be possible to treat the island as a whole, and consider it as one community for the benefit of Federal Agencies interested in assisting the planning and development effort under various legislation.

Finally, since the ultimate beneficiaries of this long-range plan would be the inhabitants, they should participate prominently in the elaboration and the implementation of the goals of this plan.

GENERAL APPROACH

For several years senior professional members of the Project Team have been concerned with developing the approaches that will be needed to bring about orderly future growth and development. Our economic, social and political structures are becoming more complex, more technical, and more interdependent at an increasing rate. At the same time, our natural resources—land, clean air, water, minerals—are rapidly becoming more scarce. Innovative approaches to the management of our growth and our resources are needed if we are to achieve the living standards we and future generations desire.

The first and perhaps most important feature of our approach to undertaking a general plan for Guam is that it consider, as much as possible, all interactions between economic, social, political, physical, and environmental factors together with the consequences of alternative courses of action. To do this requires that the island be treated as a total system responsive to changes in technology, goals, and objectives of its residents, and the development pressures placed upon it.

The second key feature of our approach is that the Plan must be a policy guide and as such must reflect current policy planning to the extent that it is applicable and pertinent. It must also structure new policy plans where needed in order to attain the most desirable alternative in physical and social structure.

The third feature is that the planning process must be a continuing one as the development actually occurs so that the hypothesis developed in the planning stage may be tested over time in the real world. This consideration recognizes and accepts the fact that technology will change in the future; that individual and collective goals and objectives may change with future generations; and that any change from the existing will produce a correlary change in the ecological balance. As these changes occur, the Plan must be tested against them to assure that it remains valid. To do this will require that the planning process be capable of iteration on a repeatable basis in which the independent variables can be updated to reflect then current conditions. This is best accomplished by a systematic set of models, which can be used as tools in the planning process. This factor of continuity underlies our total approach to the study.

Successful analysis, planning, and decision-making for an area as complex as Guam is very difficult, if not impossible, without the aid of systematic analysis methods. The economic, social, governmental, environmental interrelationships of a dynamically growing island have become too complex for the analyst, planner, and decision-maker to handle in detailed and reasonably accurate quantitative terms without some powerful analytical assistance. Our planning approach envisions the limited use of regional development models during the planning project proposed here. We, however, readily recognize the high cost and limited uses of models and,

consequently, we are proposing only models which are cost effective and which have present practical applications.

The last feature is that in order to adequately structure such a program, a careful and thorough analysis must be made of available data, capacity and capability of the various agencies, public and private, to participate in the study, and the goals and objectives to be sought. Such analysis will permit the structuring of a planning program which is both responsive to the needs of the island and its citizens and capable of performance within a prescribed time and budget.

Review Previous Studies

A thorough search will be made to identify all previous studies, analyses, reports, and other documents which relate to the project objectives. These documents will be reviewed carefully, and the ones useful to the study project will be identified. Information and data pertinent to subsequent study project activities will be extracted from the useful documents and organized in data bank format. In addition, primary data which needs to be collected to fill data gaps will be collected at this time and added to the data bank. As the study progresses, new documents pertinent to the study may be released by other parties. These documents will be collected, reviewed, and used as appropriate. The need for additional primary data may also become apparent

during the course of the study. It will be collected and used as the need for it is identified.

Analyze Planned Projects

Clearly it will be impossible to stop all development on the island while the study is being carried out. However, a clear understanding of the implications of currently scheduled development will be necessary in order to evaluate realistic alternatives for future growth.

The object of the analysis will be to quickly evaluate the impact that these developments are likely to have on the socio-economic structure and the physical environment of the island, and where necessary, advise on the quality and/or desirability of the project.

Particular study will be made of presently planned developments related to the tourist industry and the Department of Defense.

Detailed guide lines for the use of developers as well as the Government of Guam will be generated, and, where necessary, priority projects will be suggested.

Priority Projects

As a general policy with planning studies as large and comprehensive as this, it is advisable to enact an interim restriction on any significant and new developments on the island until sufficient planning information is available to

the government to guide such development in harmony with the proposed planning recommendations. Such interim action can be extremely critical to the validity and credibility of the entire planning process being fostered for Guam. It is, therefore, suggested that interim development restrictions of a 90-day period be initiated concurrent with the beginning of this study. Such interim restrictions may be continued for additional time periods as required. Exceptions might be granted where sufficient information is available to make sound planning decisions.

As a product of this planning study, the consultants will identify certain priority projects that may require early attention. Also, it is likely that prior to the completion of the master plan sufficient information may be available to initiate priority projects having a critical timing requirement.

Nature of Priority Projects

Such projects will be varied according to type, size, complexity and urgency. The consultants will rank these projects by importance to the destiny of the island, indicate the recommended timing sequence, describe likely methods of financing and suggest one or more appropriate locations in accordance with the Master Plan.

Both public and/or private projects will be included, as for example, tourist complexes, new communities, industrial complexes, transportation facilities, community facilities, recreation projects, military installations, conservation areas, etc.

One of the key elements of the plan will be an island-wide new communities strategy. As sufficient information becomes available the consultants, upon authorization by the Client, will initiate preliminary planning for one or more new communities. These may be publicly or privately sponsored. In the event of publicly sponsored new communities the consultants will prepare one or more Preapplication Proposals for submission to the HUD Office of New Communities Development in accordance with Title VII of the 1970 Act.

Priority project consulting services will generally include the following, depending on the specific assignments:

Conceptual, schematic, preliminary and/or precise planning including economics, financing, engineering, environmental, social and other factors.

Identification of public funding programs available and assistance with securing such funds.

Liaison and coordination with governmental agencies, contractors and other consultants.

Management plans for the implementation of projects.

Recommendations for the selection of consultants, contractors and others as may be required.

Special reports and presentation materials required on specific matters on projects.

Preparation and coordination of extended infrastructure plans and requirements for existing developments.

Study Design

The purpose of the study design element is to specify, in considerable detail, the exact tasks, sub-tasks, sequences of activity, responsibilities, costs and schedules required to complete successfully a planning study such as this.

In such a large and complex project three real dangers face the client and the project team:

There is no clear way for the client to control and monitor the program.

Areas of responsibility , and relationships between team members become confused.

The solution to the problem becomes lost in the complexity of the program.

By establishing a study design early in the project, much of this confusion can be eliminated. Each team member will be assigned clear areas of

responsibility and will have a clear understanding of when inputs which he requires will be available, when his outputs will be required, and the form and precise nature of these outputs.

The Government of Guam, from its part will be in a position to monitor the program as it progresses, to amend, amplify or curtail tasks as become necessary, and, significantly have a clear overview of the project budget.

Develop Local Capability

The approach will strive to help Guam develop its own planning capability and establish the institutional, administrative and managerial capability to carry on the implementation of its long-range policies without exclusive dependence on outside help. Though seemingly contradictory with the above point, the two, in fact, relate to each other rather closely since the full effectiveness of Guam's own planning capability may take some time, and thus require transitional management assistance.

INFORMATION BASE

An important contribution of the research task will be the establishment of information gathering capability, update and monitor capabilities, as well as probably the identification of significant social, economic and environmental quality indication categories, to guide the island's future data gathering and statistical efforts.

Identity Issues

The impetus for long-range developmental planning comes from unresolved major issues in need of clarification and eventual policy determination of course. These issues are both relative as to time—i. e., determined by current trends, situations and priorities, —and as to the point at which they enter the policy planning process.

Even a cursory look however shows that all planning efforts that deal with the future of the Island of Guam as a whole must reckon with some basic and major categories of issues.

The first issue of course is the overall complexion, or basis of the Island's economy. What combination of services should Guam offer and make into its particular anchor. Though resort/ communications/ transportation link and financial center for region may make sense, what particular mix and specific directions would be the most beneficial and/or feasible for the long term economic viability and prosperity of the Island.

The second issue is the preservation and conservation of the island's resources and the question of environmental quality. The study phase not only must determine what those resources are, but also what are the current and possible future threats to the environment. Considerations of natural beauty, ecological metabolic balance, the depletion of agricultural resources, all will have to be considered. The seriousness of this issue not only will point toward some specific corresponding developmental goals, but may also necessitate developmental alternatives that respect the island's capacity to "carry" a certain level of economic and human activity.

Parallel to the issue of conservation of resources, there is the question of the local populations' participation in the prosperity of the island. No developmental plan will be acceptable and sound if it does not conceive of the Guamanians being the main beneficiaries of economic growth. This issue, however, will have to deal with the willingness and ability of the Guamanians to adapt their social institutions and their life styles to changing economic and societal processes, and to formulating policies that control economic and financial activities on the island.

Closely related to this are the several issues related to the style and specifics of control of investment and land tenure. These issues not only concern the question of foreign investments, but also the more crucial problem of long term land ownership and development, the pattern of urbanization, and of course the relations between the United States Department of Defense, the

Government of Guam and the Guamanian private sector.

Another major issue is the continuing need to improve the utilization of revenues by the Government of Guam, and to undertake those projects which will have the highest and most efficacious cost/benefit ratio. In this context it is worth mentioning that all long-range developmental objectives will have to be reconciled and attuned with the question of public fiscal management and administrative efficiency in order to effectuate island-wide long term comprehensive programs. In terms of the socio-demographic well being of the island and the need for orderly growth and urbanization, some of these issues can be differently stated.

Thus, one can say that the rapid depopulation of rural areas (farming villages) coupled with the sudden growth of small and piecemeal urbanization, the transition from an agrarian to a service economy, from subsistence and barter farming to a diversified and money economy of plenty and affluence, may lead to long-term social and environmental dislocations and irretrievable damage. Short term advantages may hide more distant problems as very often demonstrated in the rapidly developed areas of the mainland. The major issues thus may be the regulation and channeling of the rate of economic growth, to keep it consistent with requirements of environmental quality and conservations, as well as with societal and cultural patterns.

Finally, there is an inevitable issue to which much Federal legislation alludes

more or less directly. This is the issue of planning for a more equitable distribution of the benefits of change, and growth, and urbanization and affluence. The comprehensive planning effort not only must strive to make the developmental policies reach the widest population and affect them positively, but it must provide for the less fortunate to benefit from the public expenditures and community-wide planning and implementation. Whether through transportation, or education or recreation, or especially employment and housing, the planning study must explicitly deal with the present and future needs of the low and moderate income inhabitants of the island.

Formulate Goals

To respond to the issues described above, it is necessary for the planning study to identify and formulate some preliminary goals, as well as assess the conditions under which these goals might be modified.

It is first necessary to point at some of the questions related to the formulation of goals. Foremost of course is the question "whose goals," and how are these goals to be identified and ascertained, and for how long are these goals to be assumed as remaining valid? There are no immediate answers we can provide now, but the planning study will have to confront this question early and explicitly. As indicated above, the existing social and political institutions of the island will have to be utilized for the process. However, this can be augmented by the inputs of more special interest groups, residents

of specific areas, the views and ideas of the Department of Defense, as well as the population at large. The relatively small size of and compactness of the population, the fairly homogeneous ethnic composition of the people, and the lack of significant linguistic barriers should permit fairly clear cut pattern of opinion and preference, as well as a meaningful consensus about major goals.

To have operational validity however, the goals must be distinguished in terms of broad general and long-term statements of desirables and more delineated, action-oriented, median and short-term objectives. While the broad goals can average out of the widest popular participation, more operational developmental objectives will have to rely on more expert and politically accountable judgment.

It is the output of this step, namely the formulation of broad goals and more operational objectives which will become an integral part of the synthesis of preliminary policy alternatives. These policy alternatives will thus have to be evaluated, and their internal trade-offs calculated in terms of each alternatives' ability to fulfill the goals and objectives set in this study.

Collect Data

The purpose of this activity is of course to produce the most complete and comprehensive profile of the Island of Guam. Thus, data will be collected on all elements and aspects of life and the environment on the island. And the

data will at the outset strive to include qualitative as well as quantitative information. Thus for instance, an attempt will be made to assess the effectiveness and quality of the present educational system, as well as the number of students enrolled, or classroom space available or budget allotted. Similarly, when talking about the environmental resources, we will try to assess the present threats, the existing deterioration, as well as determine what constitutes positive assets, and not simply limit ourselves to a listing of components.

Define Constraints

A detailed framework of constraints will be established early in the planning process. These constraints will generally be the limitation within which the planning process will take place and will be formulated from:

The physical, environmental, social, economic and political background of the island.

The goals of the people and government of Guam and of the various Federal departments represented on the island.

Project Growth

Rigorous forecasting techniques will be employed to look at future changes that are likely to occur and modify the factors surveyed. This is often done through a modified Delphi technique to access expert opinion about likely changes and transformations.

The development of growth alternatives will be used extensively and they will reflect:

Projection of the pressures presently affecting the island.

The output of the Delphic process.

The goals of the island.

They will give an indication of the alternative futures which are available to Guam and will, after the impact of the various alternatives has been assessed, form the basis for the definition of growth criteria.

In order to aid the subsequent factors of translating growth projections into physical requirements, the island will be divided into sectors. The cross impact analysis of these sectors will be important in determining future growth patterns.

Evaluate Growth Impact

Several matrices of factors will have to be generated to study impacts and cross impacts of growth. Thus, for instance, we will have to anticipate the impact of growing tourism on employment, use of resources, education, transportation, etc. Conversely, we may have to evaluate the impact of improved education or better transportation on employment or the growth potential of commerce.

The forecasting activity will be augmented by a special contingency analysis to determine the probable impact of some major and unpredictable decisions

on the activities of the island. For instance, one such contingency may be the changing role of the DOD interests on the island and the increase or decrease of their landholding. Any such change would drastically affect the factors operating there. Thus, for each contingent event, an analytic matrix will be constructed to evaluate probable influences.

For example, contingencies may include change in status and size of Navy / Air Force land, major natural disasters, change in the island's political status (vis-a-vis United States); specific policies governing the financial transaction of foreigners, new technologies in transportation, etc.

It is in response to these planned and unplanned changes that the configuration of elements on the island will change. Due to its size, the entire island can be mapped to a meaningful level of detail as to any factor, e. g. , per capita income, and then the map can be made to be modified with the introduction of new factors or contingencies as programmed. This will be a powerful policy and planning tool, whereby the decision makers can see the IF - THEN relationships between certain decisions and their consequences.

* With the above, the research and analysis phase would have achieved the means through which meaningful tradeoffs can be explored in the light of issues and goals elaborated previously or simultaneously. It is thus that the gathered information can appear as

opportunities or constraints in the fulfillment of goals through the formulation of preliminary policy alternatives that mix minimum and maximum values in inputs and outputs.

Define Growth Criteria

The function of this activity is to identify and to elaborate the criteria on the basis of which the alternative preliminary plans have to be evaluated and that the master plan must satisfy.

The determination of these criteria will involve the active participation of the client and incorporate the goals specified in the study. More particularly, these criteria will have to include the following considerations (some of which are required by law for HUD-assisted planning grants):

Physical

The proposed alternatives must each address themselves to the function of an orderly urbanization. Population growth, together with some rural out-migration will increase the pressure for more intensive urbanization. The master plan should, therefore, be the one which best proposes a policy for urban growth on the Island of Guam. This criterion will ask such questions as what is the optimum size and number for urban centers in the island; what policy should guide the rural-urban migration; the adequacy of projected public facilities in the course of urbanization; and the island-wide integration of the activities and linkages of the many urban centers.

Environmental

What are the environmental consequences of each alternative plan, through proposed land use schemes and various developmental policies; what are the special consequences on air and water pollution, wildlife, scenery, the marine life and resources, the vegetation; what are possible long-term versus short-term effects of these proposed or explored alternatives on the overall environmental quality of the island?

Social

The effectiveness and quality of the explored alternatives will finally vary according to the recognition of the influence of social and cultural forces and characteristics. Thus, two important criteria in the evaluation alternatives and selecting one are:

Whether the plan duly incorporates societal and cultural phenomena in proposing policies for change as well as plans for island-wide transformations of life styles and activities.

How will the proposed plans impact the social and cultural characteristics of the island, and whether the influences of the proposed changes would stress the existing, indigenous institutions and lifestyles in such a way as to cause damage and disruption to the lives and culture of the residents.

Economic

This criterion will relate to such issues as the alternative employment opportunities for the residents that each preliminary plan would create; the requirements for capital investment to generate that growth; the short-term versus long-term consequences of alternative economic activities both in economic as well as environmental or social terms; the rate of resource utilization required for each growth alternative; and the public revenues each would produce.

Fiscal

Though begun earlier, this criterion will be applied in the evaluation and the selection of a comprehensive master plan. The questions answered will deal with the availability, cost and type of funds, the sources and the political implications of foreign investments, the cost and procedures necessary for obtaining the funds; finally the organization/management of administering these resources; the relationship of the expected investments to the projected revenues as anticipated in the plans.

Political

This criterion will attempt to measure which alternative plans are likely to generate the widest public political support and participation; which are likely to stress the least institutional structures of the community and its political consensus. This will also assess the alternatives in terms of the likely reactions of the United States Department of Defense, general, and United

States Navy in particular, as well as other interested United States agencies, such as the Department of the Interior, HUD and the Department of Commerce.

Develop Land Use Distribution Requirements

The detailed, sector-by-sector aggregate projections produced during Phase 2 will be converted into estimates of the amounts of land area the sectoral activities will utilize. Such aggregate estimates of land utilization are necessary for the spatial allocation process to follow. Aggregate sectoral activity levels will be converted into land use estimates based on existing and / or proposed island planning standards and the extensive experience in land use and environmental planning represented by Project Team staff.

The aggregate land use demands will be allocated based on the factors which guide land use distribution that are contained in each alternative physical form selected for testing.

The attributes of each sector for each potential type of land use will be described in a standard specification for the sector. An attribute specification is prepared for each sector for each alternative physical form. The demand for the same kinds of attributes will be described in the same standard specification for each aggregate land use demand previously projected. Demand will then be allocated for land use to sectors by matching demand attribute specifications with sector supply attribute specifications.

Develop Infrastructure Requirements

No criteria can be fulfilled properly without a technically, financially and environmentally acceptable infrastructure, and to this end alternative utility and transportation plans will be developed.

The alternative plans will be compared very significantly in terms of the infrastructure which they propose. The alternatives will deal with such questions as : the cost of alternative systems; their contribution to employment and in the case of transportation to the adequacy or inadequacy of the housing / job linkage; their impact on environmental protection and resource depletion; their influence on economic activities such as the growth of tourism; warehousing and transit activities; the quality of service; accessibility to remote communities; and their financial feasibility and the terms of the required financing.

MASTER PLANNING

Alternative System Plans

A great variety of different land use patterns can develop over the island to accommodate its projected growth. Many of the patterns will represent close equivalence in economic patterns, governmental and social efficiency, and in environmental impact and quality, between alternative physical forms.

A restricted number of alternative patterns— small enough in number to be thoroughly analyzed — will be developed in conceptual form. The alternative patterns selected, however, will be different enough in basic characteristics to present a wide array of potential economic, social and governmental efficiencies, and a differentiated spectrum of environmental impact and quality. At this point the alternative spatial form patterns will be developed only in enough detail to be presented effectively for public and governmental review.

At this point the alternatives will specify the location and form of those land uses which strongly guide the way in which activity ultimately distributes itself over the island. These factors include industrial site location, government facility location, and zoning and land use control patterns. Most of these factors are completely or partially under the control of different levels of government, and can thus be used to guide the final spatial distribution of other activity over the island. The constraint framework developed previously

Will also be used in selecting the exact forms of the alternative patterns. The alternatives will contain different mixes of the spatial arrangement of the factors throughout the island.

Evaluate

After island-wide activity, and its associated land uses, is allocated spatially throughout the island for each alternative physical form, and after the time-phased growth progressions which create those allocations have been specified, the consequences of each spatial distribution pattern and growth program will be analyzed. The consequences will be analyzed in quantitative terms, and qualitative analyses will be done for important consequences which cannot be quantified.

The analysis framework will be the cost-benefit analysis methodology. The consequences of alternative spatial distribution patterns and time-phased growth programs will be expressed in terms of the benefits to Guam and costs created by the alternative patterns.

The benefits and costs estimated will describe consequences of alternative spatial distribution patterns and growth programs in terms such as:

- Cost of transportation .

- Cost of productive inputs of goods and services used by industry.

- Cost of consumer products.

- Impact on the natural environment.

- The human living-working environment created.

The demand for government-provided services

The cost of providing government services

Government revenues produced

Cost of providing public and private infrastructure

Housing costs

Employment and personal income created

The cost and benefit consequences of each alternative physical form and growth program will be compared with those of each other alternative on a relative basis. One alternative will be selected as a baseline alternative, and its costs and benefits will be compared with the costs and benefits of each other alternative. This approach eliminates most of the need for computations of costs and benefits in terms of absolute magnitudes, which is very difficult to do completely and accurately. The cost-benefit computations and analyses need to be done only for the relative differences in levels of specific costs and benefits between the baseline alternative and the other alternatives.

Select Prepared Alternative

The most important costs and benefits determined for each physical form alternative and growth program will be organized and displayed in the form of a set of comparison matrices. The matrices will be designed to highlight the most important relative cost and benefit differences between the alternatives. The matrices will serve several objectives: detailed analyses and

evaluations by the Project Team; presentation of analysis results to the Government of Guam for review; presentation of results to selected public organizations for review and commentary. From this, the preferred development alternates will be selected.

Physical Plan

A detailed, comprehensive, phased physical plan for the island will be prepared. The plan will address itself to:

Recommended land uses, in stages.

The location, intensity and type of proposed housing projected over the plan period.

The network of necessary public improvements, such as sewage, water, power, communications.

The location, nature and characteristics of required public facilities such as parks, streets, playgrounds, fire-houses, hospital clinics, and public buildings.

The school system and its physical facilities, including higher education.

The transportation network, including roads, seaports, airports, rail or other modes, and their linkages as well as their relationship to other facilities.

Major industrial/commercial/tourist facilities, such as shopping and retail centers, industrial parks, hotel

and convention facilities; warehouses, special tourist attractions, with descriptions of the functions of each.

The location and uses of agricultural and wilderness areas, the development or curtailing of agricultural villages and their support facilities.

Changing quantities and patterns of land use by the United States military.

Tourist, fishery or commerce-oriented development of the shoreline, beaches, and immediate ocean area.

Location and characteristics of proposed new communities.

Prepare Final Report

This task will produce the master plan and conclude the pre-implementation phase of the project work and will include:

An element-by-element description and explanation of recommended policies.

A phased physical master plan for the island.

Description and explanation of an economic development plan.

Recommendation and description of an implementation approach and mechanism, possibly through a public development corporation.

The final report will contain a detailed element-by-element description of

the plan. The elements will be:

Physical

Environmental/Ecological

Land use and utility systems

Land use controls

Transportation systems

Housing

Socioeconomic systems

Government operations and finance

Private finance

Legal and institutional

Public Participation and Review

In close cooperation with the government, the Project Team will select a set of groups, organizations and individuals who represent island public interest adequately. They will be selected for the purpose of public review and commentary on the alternative growth patterns and impacts developed during the study project. Presentations of study projections and evaluations will be made to these groups, and their comments and recommendations for modifying the alternative growth patterns analyzed will be solicited.

The inputs received during the public review process will be used to refine and improve the physical form alternatives to produce a set which best represents the diverse possibilities for development of different spatial

distribution patterns in the island. The complete presentation, review and alternative refinement process will be repeated as many times as necessary to develop a satisfactory set of alternatives for the detailed allocation and cost-benefit analyses to follow.

United States Departments of: Interior, Housing and
Urban Development, and Defense - Continuing Consultation

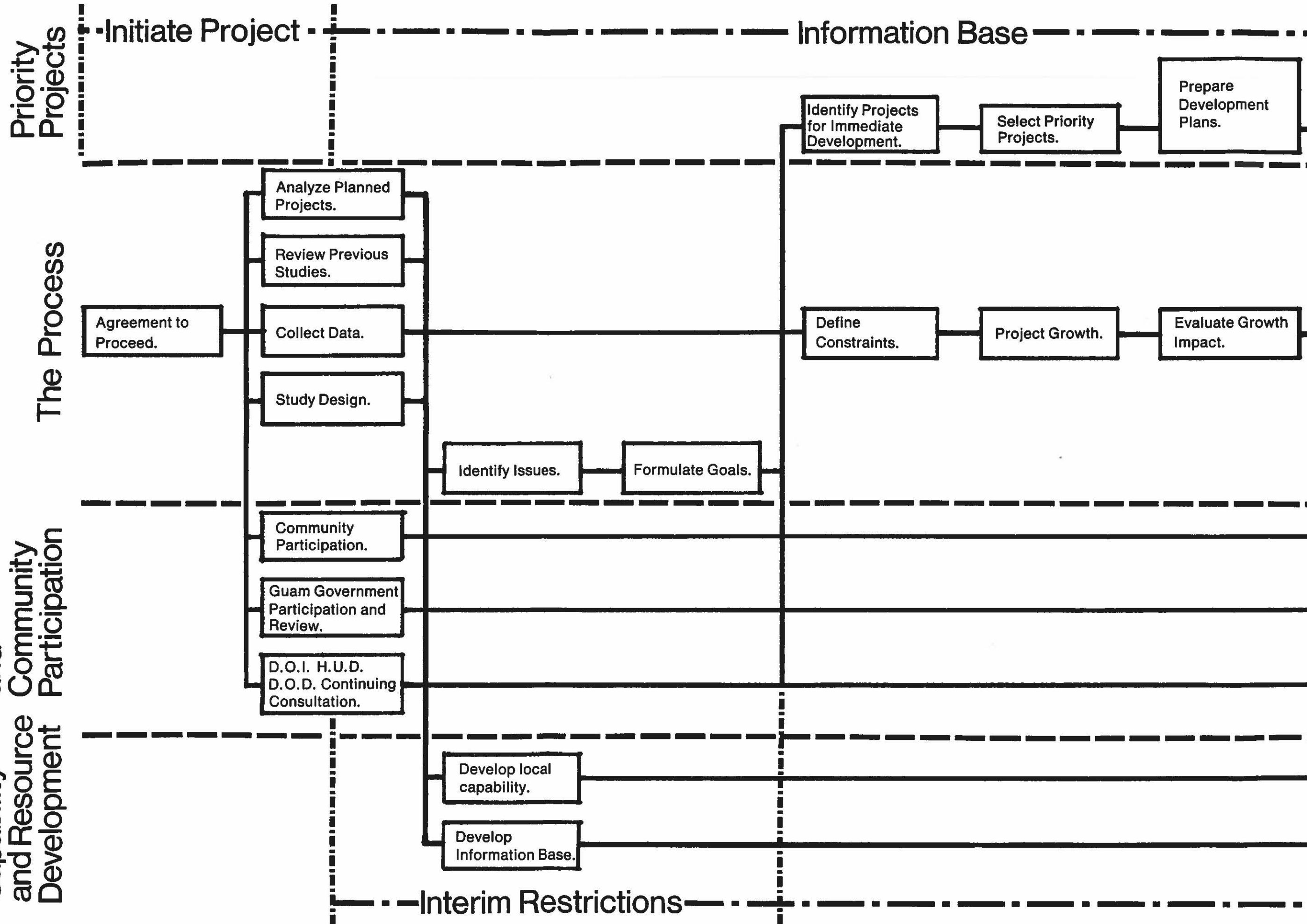
At various points during the planning program, meetings will be conducted by the Project Team with various concerned Federal agencies. The purpose of the meetings will be to receive information from the agencies which may affect directly or indirectly the future of Guam, and also to present to them the alternative concepts as they are developed for review, commentary and constructive recommendations.

The object of the presentations and reviews is to improve the alternative concepts developed by the Project Team, to forestall possible problems of compatibility (particularly related to the Department of Defense), and to eliminate, as far as possible, delays in input, review, approval and, where appropriate, the initiation of priority projects.

Task Diagram

Local
Capability
and Resource
Development

Government
and
Community
Participation



Master Planning

ent

Title 7
Pre-Application.

rowth

Define Growth
Criteria.

Develop Required
Infrastructure.

Develop Required
Land Use
Distribution.

Develop Policy
Influences.

Alternate System
Plan.

Evaluate.

Select Preferred
Alternative.

Prepare Final
Output.

Physical Plan.

- Elements:
- Physical.
 - Environmental/Ecolo
 - Land Use/Utilities.
 - Land Use Controls.
 - Transportation System
 - Housing.
 - Social/Economical S
 - Governmental Operat
 - Finance.
 - Private Finance.
 - Legal and Institutiona

Development Planning

Elements:

Physical.
Environmental/Ecological.
Land Use/Utilities.
Land Use Controls.
Transportation System.
Housing.
Social/Economical System.
Governmental Operations and
Finance.
Private Finance.
Legal and Institutional.

Final Report.

Implementation.

Continuing Plan
Update and
Review.

WILLIAM L. PEREIRA ASSOCIATES

The firm of William L. Pereira Associates is a professional organization functioning in the fields of planning and design, land use and urban planning, architectural and interior design, and engineering. In support of these activities, the firm maintains three comprehensively staffed offices in California at Los Angeles, Corona del Mar and San Francisco, and project administration facilities at Houston, Texas, New York, New York, and Honolulu, Hawaii. The firm is so constituted as to provide inclusive solutions to land and facility development programs, within the context of its disciplinary expertise, and toward this end employs over 200 skilled professionals and support personnel.

Since its founding, the body of the firm's work has been characterized by its diversity. Projects contributing to the firm's resources have included the planning and design of numerous large-scale community and regional projects, airports, marinas, universities, resorts, tourist centers, medical centers, research and development headquarters, marine biology stations and residential subdivisions. Complete new communities with provisions for industry, commerce, civic, cultural and recreational activities have also been planned and designed. Although much of the work in which William L. Pereira Associates has been engaged has come from the private sector, the nature and scope of these projects have, more often than not, demanded a proficiency in public and governmental planning. As a consequence, the

firm's staff is highly experienced in this respect, and has been called upon for evaluation and recommendations regarding various governmental projects.

The resources of the firm reflect a broad range of highly skilled professional personnel from whom selections can be made to staff assignments. This resource includes architects, planners, engineers and designers. From this group, key personnel are selected, depending upon the qualifications needed for each project.

HISTORY

William L. Pereira, F. A. I. A., has been actively engaged in the practice of architecture since 1931, when he established the firm of William L. Pereira, Architect. The firm continued under his sole proprietorship until 1950, when, following the formation of a partnership with Charles Luckman, the firm became known as Pereira & Luckman.

Eight years later, in 1958, the partnership of Pereira & Luckman was dissolved. In November of the same year, the firm of William L. Pereira Associates opened its offices in downtown Los Angeles, with a group of architects, planners, and other specialists who had worked together closely in the past, some of them having been continuously associated with Mr. Pereira for more than fifteen years. The Los Angeles office was removed to its present building at 5657 Wilshire Boulevard in 1960 and has grown to

its present level of 103 persons.

The Orange County office of the firm was established at Urbanus Square in Corona del Mar in 1961 with core personnel drawn from the regular staff. The purpose at the time was to provide closer geographical relationship to such large planning projects as The Irvine Ranch, the University of California, Irvine, and Santa Catalina Island. In the course of time, however, the staff of the Orange County office has been slowly and carefully expanded to its present strength of about 55 persons, with a full range of professional and technical qualifications, and the office now undertakes a broad variety of planning and architectural projects throughout the United States and abroad. It is now a permanent operating office, with much the same functional capabilities and policies as the Los Angeles office.

The firm also has established its San Francisco office, which offers the identical resources of Los Angeles and Corona del Mar. Its present strength is about 29 persons.

Offices in Honolulu were opened in 1968 in the Financial Plaza of the Pacific to enable coordination and supervision of a variety of projects. More recently, offices have been opened in Houston, Texas, and New York, New York, to provide guidance and supervision over urban design and planning projects in these areas.

While the six offices operate independently, the administration of the firm

is so organized that the full resources of all offices are available as needed on any project. Consistent standards of design and operating procedures are maintained with Mr. Pereira as Chairman of the Board and Director of Planning and Architecture, participating directly in all professional activity. His time is divided equally among the six offices and constant communication is maintained at all times.

FUNCTIONS

Professional activities of William L. Pereira Associates primarily centers around the fields of master planning, urban design, architecture and interior design. In accomplishing these activities significant basic policies of the firm have evolved over years of practice. These distinguish it now in important professional areas.

The fundamental policy pursued by the firm, first expressed at the time of its establishment is to restrict its practice to those assignments to which it considers it can contribute the most and to which it can devote its undivided collaborative attention.

The firm has relatively large offices in terms of manpower resources but is divided into small components in order to preserve the best characteristics and capabilities of both the large and small office. This can be observed in

the physical organization of its spaces which reflect the functional organization of its project teams.

The firm maintains a highly active Research Department which includes extensive materials related to planning and architecture. All pertinent research information and accumulated archival data on comparable projects undertaken in the past are available to project teams. Creative research is constantly undertaken to explore both historical patterns and new innovations in construction systems, materials and techniques. The Research Department plays a particularly prominent role in the preliminary planning and design development stages, as well as during all phases up to and including construction.

Cost controls are instituted from the outset, commencing with initial program evaluation to determine, in consultation with the client, firm budgets respecting the clients' goals and his basic requirements for the project. Detailed cost estimates are emphasized during the critical preliminary planning and design development phases to insure reconciliation of program, design and budget. Control estimates are made during the progress of working drawings and construction documents. General contractors, subcontractors, tradesmen and various building specialists are called in frequently to review design, construction systems and costs.

Operations departments under the supervision of executive directors in each

office establish and maintain day-by-day schedules of all projects, coordinate relations with consultants, review and provide careful checks on all technical work, conduct the administration of professional contracts and maintain liaison between offices and various project teams.

STAFF CAPABILITIES

The unique professional practice developed and followed by William L. Pereira Associates combines an equally strong emphasis on master planning and architectural design with in-house civil engineering consultation. Table I identifies a breakdown of present personnel.

TABLE I

WILLIAM L. PEREIRA ASSOCIATES PERSONNEL

PROFESSIONALS	85 PERSONS
SUBPROFESSIONALS (NONDEGREE)	50 PERSONS
NONPROFESSIONALS (CLERICAL)	68 PERSONS
TOTAL ----	203 PERSONS

These personnel represent skills and capabilities in such areas as master planning and land use planning, urban planning and design, architecture, interior design, construction administration, and civil engineering. In addition, the firm supplements these staff capabilities through utilization of consultant help in specialty areas. In such cases the firm associates itself with only the most outstanding engineers and other technical consultants, including economics and marketing, landscape and agronomy, traffic analysis, soils and geology, and others.

RELEVANT PROJECT EXPERIENCE

The "African Riviera" Master Plan - Abidjan, The Republic of the Ivory Coast

The Ivory Coast, one of the most stable and progressive countries in West Africa, is pushing forward with a dramatic and soundly-based development drive.

The capital city, Abidjan is one of the fastest growing cities in Africa and to prepare for the changes such growth brings, in 1965 the government commissioned a major revision of the city's master plan. A team of sociologists, economists, engineers and physical planners created the framework for growth that delineated several new relatively self-contained quarters or suburbs to be built by 1990.

William L. Pereira Associates was retained to design the definitive plan for the largest of these new suburbs, to extend from the existing resort and embassy area of Cocody to the former capital of Bingerville to the east. In keeping with announced government policy to encourage a vast expansion of the tourist industry, the most important part of the planning concept relates to the creation of exciting facilities for visitors.

The 10,000 acre, \$300 million resort and residential complex will have fifteen hotels, four shopping centers, elaborate convention facilities and the country's first golf course, designed by Robert Trent Jones. There will be residential areas of varying densities, ranging from apartments and single

family houses catering to European tastes, to specially-designed living complexes, which will translate into an up-dated form, the traditional way of life of the native Ivoirians. There will be a zoological garden, featuring animals of the country, where the various species appear to roam freely and the spectators are confined in cage-like walkways. This facility is designed not only for tourists, but also for the local inhabitants, who rarely have the opportunity to see the fauna of their own country.

Bishop Ranch - Master Plan - Santa Barbara, California

Lying between the Pacific Ocean and the San Ysidro Mountains and located north of the city of Goleta, the Bishop Ranch comprises 4,100 acres of varied terrain.

William L. Pereira Associates aimed at designing a balanced community with a town center oriented toward the nearby University of California, which would create the definite community identity and spirit found in other university towns.

For recreational use, the plan emphasized the retention of open spaces connected by green belts. An important facet of the project was the stress on the inhabitant rather than the automobile. The use of foot paths and bike trails was suggested to facilitate movement quickly and easily between home, shopping, work and recreation. The neighborhood unit including schools and service centers, was planned with the pedestrian way, not the street, as the unifying design concept.

Another major concern of the planners was to provide a wide variety of housing types and to create a highly controlled district for science-oriented industry close to the town center. This Research and Development Park, along with the University, would provide the fundamental economic basis for the community.

Houston Center - Master Plan - Houston, Texas

This is a master plan for what is probably the largest urban development project ever undertaken by private enterprise, comprising a 74-acre central city complex in downtown Houston. When completed, the undertaking will occupy 33 contiguous blocks east of and immediately adjacent to the existing central business district. It will ultimately provide some 23 million square feet of new building space, including office towers, hotels, shops and stores, apartments, recreational facilities, extensive public spaces and enclosed parking for approximately 35,000 to 40,000 cars, depending on future needs.

The concept for development integrates the many diversified elements of the project, all forms of public and private transit, both vertical and horizontal such as moving sidewalks, people movers and escalators. The plan is a totally integrated community development to serve all the people of Houston and Harris County. The first increment will include a major hotel, three high-rise office towers clustered around a great enclosed plaza, retail stores and low-rise office blocks flanking pedestrian open spaces and cascading apartments along the eastern perimeter. A four-level parking garage will provide the substructure with automobile oriented service facilities ranging from car wash to bank to motel, incorporated within it.

Irvine Ranch Master Plan - Irvine, California

The 93,000-acre ranch is the largest single private land ownership known to exist within an expanding metropolitan area. It lies in Orange County at the southeastern limits of the path of urbanization and for many years has formed an effective barrier to further growth. Long-standing land policies, and the tax structure of the company, inhibit land sales and have necessitated development under leasehold concepts which have set new national standards.

The basic master plan provided a cohesive overall framework for development, within which three major sectors and many subsectors were analyzed and studied in detail. Primary development was to take place within the 35,000 acre Coastal Sector for a period of 10 to 20 years, allowing The Irvine Company to continue and expand its profitable agricultural operations in the fertile central sector during the interim.

One of the basic concepts of the plan was to establish major centers of activity which would then generate development around them. Among the centers already begun are the University of California, Irvine, which is expected to generate a University Community of at least 150,000 people; the Newport Center, providing a retail, professional and cultural focal point for the City of Newport Beach; the Irvine Industrial Complex with approximately 2,500 acres of land for prime industrial clients, which will provide the jobs and the tax base to support future residential areas. The detailed plan of the Southern

Sector was designed in conjunction with the company staff and various county governmental agencies. In a slightly simplified form, it was adopted as the official General Plan for the area.

Lockheed Southern California Master Plan, Lockheed Aircraft Corporation,
Burbank, Van Nuys, Rye Canyon and Palmdale, California

A master facility plan was prepared for CORLAC, CALAC and LAT in Southern California as a part of Lockheed's project entitled "Corporate and Business Goals for the Next Ten Years."

The services for this project included Master Planning, Site Planning, Site Selection, Utility Engineering, Industrial Engineering, Research and Analysis, and continuous consultation with Lockheed on all sites whether presently owned or to be purchased.

In addition, the Joint Venture will oversee the complete long range program, execution of the Master Plan, programming and scheduling of the various projects as outlined by Lockheed.

Phase I of the Master Plan study involved investigation of the regional background of the Lockheed facilities, industry trends, and detailed analysis and evaluation of the potentials of the Lockheed sites and facilities in Burbank, Rye Canyon, Palmdale, Orange County and Van Nuys.

Phase II developed a firm program to serve as a guide for siting, in a logical pattern, all future structures in the Lockheed complex, taking into account the wide variety of individual projects and programs that will be included in the total Lockheed manufacturing effort.

Los Angeles International Airport - Master Plan, City of Los Angeles Department of Airports, Los Angeles, California

On June 28, 1966, the firm of William L. Pereira Associates was authorized to proceed with the "Master Planning for the future development and expansion of terminal and other facilities at Los Angeles International Airport and such other airports and heliports as may be under the control of the Department."

In general, the master plan development envisions the Los Angeles International Airport as the hub of a satellite system which incorporates provisional air carrier, business and private aviation fields within an orbit of some 150 miles around its perimeter. The system is planned to encompass major population centers in six counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Santa Barbara.

At its present stage, the master plan, as developed by the Board of Airport Commissioners, the Department of Airports and William L. Pereira Associates, embraces three major phases:

1. Optimum use of Los Angeles International Airport by expanding existing facilities; construction of new terminals; and improvement ground access to the airport.
2. Development of a downtown air terminal and a system of metroports in the metropolitan area for use of helicopters and V/STOL (vertical and

short takeoff and landing) aircraft.

3. A ring of outlying satellite airports scattered conveniently through the greater Los Angeles area, each offering service to distant cities. These airports would include Ontario and Palmdale and other military fields if they become available for civil use.

In order to unify and coordinate the vast scope and complexity of this capital improvement program, the Board of Airport Commissioners, in August 1967, selected William L. Pereira Associates to act as the Supervising Architect.

Makaha Valley Master Plan, Oahu, Hawaiian Islands

One of the highlights of the Master Plan is the central village, situated at the heart of the valley and surrounded by the lush greenery of two 18-hole championship golf courses. The village centers on a convention facility located on an island in a lagoon. From this a series of hotel sites radiate. Each hotel village contains shops, craft center, restaurants and a hotel. Each is designed to recreate the atmosphere of a different country or cultural area associated with the Pacific Basin, such as China, Japan, Central America, the South Pacific, Latin America, and of course, Hawaii. Pedestrian malls, lined with commercial facilities, radiate from the center like spokes of a wheel, separating the villages from one another.

Housing in the valley ranges from the high density hotels and condominiums to medium and low density family housing. A Hawaiian atmosphere keynotes the housing styles and the concepts for design are adapted to a variety of terrains up to 30 percent slope. A small transit system will eventually serve the central area from parking near the beach. Here a distinctive gateway structure, linked to a restaurant on the westerly ridge by a funicular railway, will provide a dramatic entrance to the entire valley, as well as serving as a "window" to the famous surfing beach.

Moulton Ranch Master Plan - Orange County, California

The Moulton family, which has controlled the Ranch (now 9,020 acres) and managed its agricultural production for over 70 years, was concerned about the accelerating approach of urbanization which will, within a few years, encircle the property. The owner wished to establish a framework within which to evaluate the many separate land-management decisions which invariably affect the horizon potential of the land.

To do this it was necessary to take a searching look at the future urbanized mix of the entire ranch. The ranch occupies uniquely beautiful terrain within one half mile of the ocean at Laguna Beach. The most striking topographical features of the property are the Aliso and Wood Canyons, penetrating over six miles into the ranch from the ocean and the "Sheep Hills," a distinctive triple-ridged land overlooking the canyons and dominating the central ranch. The master concept plan proposes a 2,000 acre resort complex, most of which would remain as permanent parkland. Lakes would be developed in Aliso Canyon as a setting for hotels, cabanas and vacation condominiums. Sheep Hills would become a 380-acre urban center with major shopping, office, hotel and apartment complexes.

The remainder of the ranch would support a resident population of about 80,000 in a wide variety of housing types and neighborhood styles. There would be local shopping, schools, and employment areas distributed throughout the community.

A 100-acre site is set aside for a college or institute, which may become a second campus for one of the institutions facing crowded conditions in the Los Angeles area.

Mountain Park Master Plan - Santa Monica, California

This property of 11,000 acres, the largest single piece of land under private ownership in the City of Los Angeles, consists of rugged mountainous land lying generally between Sunset Boulevard and Mulholland Drive, Topanga Canyon and the San Diego Freeway. It ranges in elevation from 100 feet to over 2,100 feet.

The Master Plan concept involved development of only one-third of the land in eleven compact villages which would be separated by large areas of undeveloped open space. The concept stimulated new "open-space maintenance district" legislation, which was created after the intensive planning and a legal study were completed. The plan, approved in principle by the city, allows for a mixture of land uses based on balanced communities with commercial services, employment and higher density development of residential areas.

Early implementation has been stimulated by the owner's donation of a 351-acre site to UCLA for a special science research center and by a detailed plan and design of a gateway project on Sunset Boulevard which will provide primary access to an enormous bowl of 3,000 acres of prime land. Once completed, the area will include hotels, conference facilities, retail, residential, headquarter buildings and quasi-research and development offices.

Parker Ranch Master Plan - Hawaii, Hawaiian Islands

Parker Ranch, one of the largest in the United States, is situated on the 3,000 foot high plateau below Mauna Kea on the Island of Hawaii.

The assignment involved an analysis of the entire ranch, the selection of optimum development areas, and the detailed planning of selected sites for community, commercial and recreational elements. Three acres were given particular attention.

In the Puako area, land ownership along the bayfront was divided into several small parcels, two of which were owned by Richard Smart, owner of the Parker Ranch. Recommendations for development included acquisition or lease of as many as possible of the small shoreline parcels and their incorporation with a large area of State-owned property immediately inland, currently leased to Richard Smart, into a recreational and residential development. A full-size championship golf course financed by the developer would be created on State-owned property. The golf club for this course would be closely related to a fishing and boating center.

The general vicinity of Anaehoomalu was planned as a secluded residential resort, with small, beach-cottage type hotels and some residential development along the shore. Sand beaches along the shoreline made attractive places for private homes. One of the finest beaches, with lagoons of sheltered, clear blue water, would be the general location for the principal hotel and the

focal center for the development.

The third area of potential development was at Waikii, situated in the Waimea-Hilo Saddle Road at an elevation of approximately 6,000 feet. Included in the concept for this area was a championship golf course with such supplementary facilities as a driving range; putting green; pro shop; starters' hut; etc. The golf club would be associated with a social center, which would also include facilities for hunting and riding enthusiasts.

Background for the planning of these facilities included a careful analysis of various tourism studies conducted by the State of Hawaii and an evaluation of their projections in terms of facility design.

San Antonio Ranch New Community - Bexar County, Texas

The plan for the 8,348 acre San Antonio Ranch envisions a new community of nearly 70,000 persons, located about 17 miles from downtown San Antonio.

The community is planned to contain a wide variety of occupational and residential choices, an innovative educational system and convenient shopping, recreational and other supporting facilities, sensitively related to a beautiful wooded site.

An extensive canyon system, which separates the property into numerous developable promontories, will be largely retained in a near-natural state. Thus, the various land uses will be separated as desired by permanent parkland.

In answer to the particular socio-economic needs of the San Antonio metropolitan area, a technical education center occupying a 500-acre site will form an institutional-industrial consortium which can: train the technologically and vocationally underskilled; develop research programs and products which are relevant to an improved standard of living; and produce goods and implement programs which fill social needs. At the same time, firms which locate in the 850 acres of industrial parks on the ranch will, in partnership with the technical center, ultimately develop opportunities for 17,000 new jobs.

Over 21,000 residential units are programmed for construction on San Antonio

Ranch by 1990. These dwellings will include a complete range of types and prices, and about 22% will be low-cost housing built with federal aid or local self-help programs.

A 150-acre Town Center will include not only full scale regional shopping facilities, but office buildings, motels, entertainment centers, apartment buildings and branch civic functions. Five smaller centers elsewhere in the community will bring daily shopping and other conveniences within 3/4 mile of every resident.

A right-of-way for public transit circulates throughout the ranch, terminating at the regional arterials which link to downtown San Antonio.

The plan was submitted to the Department of Housing and Urban Development in November 1970 for final approval under the New Communities Act of 1968 to qualify for up to \$50,000,000 in federal loan guarantees for development costs.

Santa Catalina Island Master Plan - Los Angeles County, California

Initial planning, research and analysis for this project include detailed evaluation and codification of all existing leases in effect, as well as a review of the voluminous files of proposals submitted to the company for a variety of projects on the island. A moratorium on any new commitments was established to enable development of a master concept and general plan framework within which new commitments could more intelligently be made.

The master concept is based on retaining Catalina Island's 47,000 acres as essentially an island with expanded tourist potential, encouraging the development of a broader based, stable and energetic permanent population. Its destiny is to become a major playground and spa—not unlike the Mediterranean Riviera—for the enormous population of Southern California.

Permanent residents will live mostly in concentrated small towns in Avalon and Two Harbors at the Isthmus with the remaining land left generally in its natural state for land preserves, hunting and recreation.

Studies included transportation, marine, and harbor planning and development of an architectural vocabulary, adapting the special technology of island construction to the unique climate, topography and historical character of Santa Catalina.

Sterling Forest Master Plan - Tuxedo, New York

In March, 1970, City Investing Company of New York retained William L. Pereira Associates to prepare a long-range master plan for Sterling Forest, Tuxedo, New York. The uniquely beautiful 21,600-acre forest is located in the Ramapo Mountains, 35 miles north of New York City.

Phase I, Preliminary Master Plan, was completed in September, 1970, with the primary goal being the creation of a unique environment for a full community while protecting both the character and ecology of the property. During this phase, emphasis was placed on the evaluation of the greater New York Metropolitan Area to identify present and future conditions of influence. The plan also designates inherent physical limitations and development potentials of the site, establishes a basic concept for development, develops alternative physical planning ideas, and establishes basic recommended land use and circulation elements.

Phase II of the Sterling Forest Master Plan, now in its final stages, is concerned with definitive testing of the planning ideas. An intensive ecological study was conducted to provide an environmental resources inventory including geology, hydrology, meteorology, silvics and zoology. This information was interpreted into the natural environmental factors operative on the property. Environmental engineering studies and programs were prepared to ensure the development of sufficient water resources and the maintenance of

water purity. Development costs were prepared based on physical planning concepts. Economic marketability studies were conducted to determine the size and nature of demand for space over a 20-year time period, with emphasis on middle and moderate income groups. Planning solutions were formulated in keeping with these factors and tested for financial feasibility.

Phase III of the study will provide a Final Master Plan.

The plan was submitted to the Department of Housing and Urban Development in April, 1971 for preliminary approval of loan guarantees under the New Communities Act of 1968.

Waiawa New Community - Oahu, Hawaii

The Waiawa site is located in the southern portion of Oahu's central valley on the westerly slopes of the Koolau Range, just north of Pearl Harbor. The land rises from an elevation of 50 feet above sea level to over 1,250 feet at the northern extremity. The site is exceptionally attractive and varied in topography with spectacular views of the coastline from Pearl Harbor to Diamond Head.

Approximately 1,800 acres of the 4,544-acre site with slopes of 20% or less are considered readily developable and it is this acreage which will be utilized for the new community.

In the development of the Master Plan, the planning team adopted several general social goals and objectives in the areas of community involvement, health and well-being, education, housing and safety, and culture and religion. It was noted that social goals involve a conflict between the desire to preserve the many traditions of Hawaiian society and the steady encroachment of mainland influences.

In the early stages of planning, it was determined that if the site were to retain much of its rugged beauty, the size of the new community should be limited to approximately 18,000 housing units or 60,000 to 65,000 population. As the property is in the midst of rapidly urbanizing areas and major employment bases and as these surrounding areas are failing to provide the

good low-cost housing so much in demand on Oahu, the Waiawa community will act as a stabilizing influence and a model for the development of the entire area.

The proposed University of Hawaii branch campus, if located on the property, would further enhance the potential for a well-balanced, liveable community. It would provide a sound employment base, add significantly to the cultural amenities of the area and give the community that unifying element which is so important in the development of civic pride and community identity.

The decision about the location of the new campus will not be made until possibly late in 1971, but the planning team has prepared a master plan which is sufficiently flexible to accommodate this unknown factor.

The Plan will be submitted to the Department of Housing and Urban Development towards the end of 1971 for preliminary approval of loan guarantees under the New Communities Act of 1968.

Woodland New Community - Montgomery County, Texas

William L. Pereira Associates has been retained by the Owner as the lead firm in a team of consultants to develop a preliminary master plan for the 15,000-acre Woodland property as a part of an application to HUD for New Community guarantees under Title VII of the 1970 Housing and Urban Development Act.

Houston is today and is projected to remain one of the fastest growing metropolitan areas with one of the most rapidly expanding economies in the country. A large and important part of the future physical growth is expected to take place in the northwest quadrant of the metropolitan area between the present edge of the city and the Houston International Airport, and beyond, into Montgomery County.

In Montgomery County, the flat Gulf plain changes to the more gently rolling, well-watered, well-drained Pine Belt that extends north and east into Louisiana and Arkansas. The aesthetic and climatic characteristics of this area are preferable to most of the existing urban areas.

George P. Mitchell & Associates has acquired approximately 15,000-acres of densely wooded land on the southern boundary of Montgomery County, 30 miles from the center of Houston and 15 miles from the airport. The site is bounded on the east by Interstate Highway 45, the freeway connector between Houston and Dallas.

This property is being designed as a complete new town for 100,000 people and 23,000 jobs by 1990. It will be a satellite to Houston but developed to be as self-contained and as self-sufficient as possible.

DEVELOPMENT RESEARCH ASSOCIATES

The firm of Development Research Associates (DRA) engages in a consulting practice covering a wide spectrum of socioeconomic and environmental research, analysis and planning. DRA was formed in 1963 to provide clients with objective analyses and recommendations contributing to the practical solution of complex problems in regional economics, land economics and real estate development. In more recent years, DRA has also become deeply involved in finding solutions to problems in the transportation, environmental, urban redevelopment, housing recreation and tourism fields.

DRA is a subsidiary of the international consulting firm of Booz, Allen & Hamilton, Inc., which has offices in Amsterdam, Dusseldorf, London, Mexico City, Paris, Vienna, Algiers, Sao Paulo and Toronto, as well as major U.S. cities. This relationship provides DRA with ready access to a wide range of specific technical expertise in disciplines complementary to the firm's own areas of technical strength. The worldwide coverage of Booz, Allen and Hamilton offices also provides DRA with the organizational vehicle required to undertake international assignments quickly and efficiently.

A continuing DRA program of in-house research and development has produced several innovative advances in the "state of the art" of regional economic, transportation system, and benefit-cost analysis methods. These advances have been primarily applied to the highly diverse environments found

in U.S. cities and regions. However, DRA has recently been using these techniques with great success on a variety of international assignments.

The firm's basic approaches, models and techniques have found useful application in different social, cultural, political, economic and environmental situations throughout the world.

For socioeconomic tasks requiring in-depth social systems analysis DRA will be assisted on this project by the firm of Social Engineering Technology (SET). The SET organization was established to provide policy makers and administrators with professional social system analysis and planning assistance. SET typically researches and describes social system structures and attitudes, identifies areas of social conflicts and their causes, analyzes the need for social service delivery and social action programs.

Both DRA and SET have completed socioeconomic research, analysis and planning assignments for a broad array of public and private clients. The scope of this extensive experience is indicated by the following brief descriptions of typical assignments completed.

RELEVANT PROJECT EXPERIENCE

YONA LAND UTILIZATION-MARKETABILITY STUDY (DRA)

Location: Territory of Guam

Client: Guam Housing and Urban Renewal Authority

Yona was an area on the Island of Guam that sustained severe damage from typhoon activity in 1962 and 1963. The Guam Housing and Urban Renewal Authority prepared a series of urban renewal programs to relieve and upgrade the Yona area.

Development Research Associates was retained by the Authority to prepare a land utilization-marketability analysis and feasibility study of the Yona Urban Renewal Project Area. Primary objectives of this study were:

To establish the guidelines for implementing a program which would improve housing conditions for the residents of Yona.

To establish guidelines for implementation of a housing program that would not impose undue financial burdens on the residents of Yona.

DRA's study analyzed the economic and financial feasibility of rehousing those who lost homes during the 1962 and 1963 typhoons in the renewal project area. To develop programs and recommendations relevant to meeting Yona's needs, DRA drew heavily from an extensive field relocation study conducted by the Guam Housing and Urban Renewal Authority.

Combining the information available from the field relocation study with a recognition that existing local and federal housing programs and policies might have to be adjusted to meet Yona's special needs, DRA's study began with an analysis of those economic, physical, and social factors which would influence the accomplishment of the objectives proposed for the project area. The demand for housing in the Yona area was estimated, and programs available for meeting the identified demand were evaluated in detail. Having evaluated housing demand and types of programs available to meet the need for housing, DRA developed recommendations relative to the implementation of the Yona Urban Renewal Program.

REGIONAL HOUSING STUDY (DRA)

Location: Southern California

Client: Southern California Association of Governments

This study developed projections of regional housing demand throughout a five-county area through 1990. Various housing types and price/rental levels were established. DRA's final report identified specific demand for low-and moderate-income housing, as well as possible federal, state and local programs that might be utilized to meet housing needs. A key portion of this study was the development of a "Market Aggregation Model" related to proposed Operation Breakthrough activities.

REGIONAL HOUSING STUDY (DRA)

Location: Orange County

Client: University of California at Irvine "Project 21" Program

Development Research Associates recently completed a comprehensive analysis of housing needs in Orange County as part of the "Project 21" Program sponsored by the University of California at Irvine. The analysis included recommendations for the establishment and implementation of organizational entities, such as a housing development corporation, and alternate financing techniques which might be employed to alleviate housing deficiencies in the county. The study also explored strategies for achieving marketing aggregation programs—an integral part of the Operation Breakthrough program.

MASTER PLAN CONCEPT EVALUATION (SET)

Location: Los Angeles, California

Client: Los Angeles City Planning Department

The principal staff members of SET participated in a critical evaluation of the four concepts for the future of the City of Los Angeles as part of a specially designated committee. The SET reports were particularly addressed to questions of city-wide social problems and the flexibility and adaptability of the proposed development concepts to change.

LOW AND MODERATE-INCOME HOUSING PROJECT (DRA)

Location: Long Beach, California

Client: City of Long Beach

Development Research Associates developed potential means of financing a large housing project for the Housing Authority of the City of Long Beach. Various alternatives included state redevelopment law/tax increment flow estimates and several possible federal assistance programs. Particular attention was given to obtaining the proper mix of private and public financing.

FRESNO COMMUNITY DEVELOPMENT PROGRAM (DRA)

Location: Fresno, California

Client: City of Fresno

DRA was part of an innovative consultant team approach to preparing a Community Development Program for Fresno. The FCDP project was funded jointly by HUD and EDA, and was a first attempt to apply systems analysis and systems management techniques to solving the total community development problems of a medium sized city. The study took the traditional Community Renewal Program Structure and expanded it into a major regional analysis of employment, population, income generation, industrial development, land use, transportation, and public investment requirements.

DRA's primary responsibilities included: analysis of the economic base of the Fresno urbanized area; developing projections of future population, employment, and household income growth; analysis of regional industrial location, relocation and growth trends; development of land use projections; and exploration of industrial development policies.

As part of its assignment DRA developed a model of the economic system of the Fresno urbanized area. The model is a system simulation model based on the flows of funds among different sectors of the Fresno economy, and the inflows and outflows of funds over the economic system boundary. The model was developed to a stage of manual operation and used as the basis for sector-

by-sector projections of future Fresno economic system growth, and for testing the benefit and cost consequences of Fresno industrial development policies.

Fresno is experiencing a large influx of migrant workers as they are displaced from farm work by agricultural mechanization. Development of population projections for Fresno consequently involved a substantial study of the migration patterns of Mexican-American agricultural workers in the San Joaquin Valley and the Southwest. The migration analysis included a study of agricultural development and mechanization trends, and extensive interviewing of migrant workers and migrant worker labor organizations throughout the San Joaquin Valley.

STATEWIDE COMPREHENSIVE HEALTH TRAINING PROGRAM (SET)

Location: Oklahoma City, Oklahoma

Client: Oklahoma State Health Planning Agency

Design, coordination, and evaluation of a training and participation program in comprehensive health planning. Preparation of contextual studies and material for the statewide institutionalization of health planning on a more comprehensive scale that would include not merely the providers of medical care services, but that would include a voice in health planning for the consumers, the insurers, the communications media, and the business community.

TWIN CITIES AREA TRANSIT PLANNING PROGRAM (DRA)

Location: Minneapolis-St. Paul Metropolitan Area

Client: Twin Cities Area Metropolitan Transit Commission

DRA recently played a major role on a team performing a study of future transit needs and potential transit impact for the Twin Cities Area Metropolitan Transit Commission. The study was directed toward the refinement and development of long-range transit planning and programming, the integration of transit planning with other urban planning and development processes, the preparation of reports for legislative action, and preliminary engineering for the first increment transit facilities determined to be necessary.

A primary DRA responsibility was to analyze Twin Cities' regional growth, both with and without implementation of a trunkline rapid transit system for the region. DRA developed the population, income, employment, housing and land use forecasts necessary to evaluate the impact of rapid transit on the region. Detailed projections of these important socioeconomic variables were made through the year 2000.

DRA also developed the methodology for performing a comprehensive cost-benefit analysis of alternative integrated transportation systems to serve the Twin Cities region. DRA participated heavily in the cost-benefit analysis, and developed quantitative estimates of the regional benefits and costs created by alternative transportation systems, some of which include trunkline rapid transit.

Since most of the costs and benefits created by alternative transportation systems in the region will result from the different patterns of urban growth stimulated by the alternatives, DRA developed a regional allocation model to distribute growth spatially for each of the transportation system alternatives. The model allocates regional employment, population, land use, and office space among a set of subregions into which the Twin Cities region was partitioned.

Another major DRA assignment was a financial resources study. Development of a balanced regional transportation system requires a series of substantial public investments. The lack of viable financing programs for integrated, multi-mode regional transportation systems has delayed development of such systems in several major metropolitan areas of the United States. The financial resources study includes a thorough analysis of the financial experiences of other regional transportation systems, and investigation of sources of transit system financing available in the Twin Cities region. One product of the financial resources study was preparation of a recommended transit financing program, and preparation of a legislative program supplement on transit system financing for action by the Minnesota state legislature.

Subsidiary studies by DRA included evaluation of the economic impact of a major new regional airport in the Twin Cities area, and evaluation of the localized economic impact caused by construction of a major freeway segment.

TUCSON COMMUNITY RENEWAL PROGRAM (DRA)

Location: Tucson, Arizona

Client: City of Tucson

Development Research Associates participated as a member of a multi-discipline, analytical team in one of the most comprehensive Community Renewal Programs in the Western United States. The assignment was divided into four major elements: 1) Economic base analysis; 2) Land use and marketability analysis; 3) Financial analysis; and 4) Implementation.

The economic base analysis provided the foundation for more detailed "market evaluations" of specific study areas as possible project areas. With its heavy emphasis on primary research, the economic base analysis included 600 personal interviews and 10,000 mail questionnaires. Interview findings were electronically tabulated for use in both the market research analysis and an input-output matrix. In order to generate broad-based community interest, preliminary results of the economic base analysis were presented to the Tucson City Council and a three-day citizens workshop.

The financial and implementation elements were concerned with determining the financial feasibility of specific projects and programs, with particular attention given to financing alternatives. The financial analysis, coordinated with the City financial staff, became an integral element of the City's long-range capital budgeting program.

UPPER GREAT LAKES ECONOMIC DEVELOPMENT STUDY (DRA)

Location: States of Wisconsin, Minnesota and Michigan

Client: Upper Great Lakes Regional Commission

The northern regions of Wisconsin, Minnesota and Michigan, which border on the Great Lakes, have experienced a long period of economic decline. Historic regional industries, such as iron ore mining and forest products, have declined substantially in level and in some cases disappeared. The remote location of these regions has prevented new industries from replacing them, and employment, personal income and population have followed a continual decline.

DRA conducted a study in order to determine which industries might be encouraged to locate in the region's small towns to provide an economic base and reverse the region's economic decline. Several prototypical towns representative of all towns in the region were selected for detailed analysis. This analysis involved compiling an inventory of the assets of the selected towns, researching industry characteristics, and interviewing industrial leaders and industrial site selection consultants.

The towns' assets were compared with the needs of candidate industries to identify suitable industries. In the case of almost every industry examined, the gap between regional assets and the industry's needs was too great to induce industry to locate in the region. The industries most suitable for

regional location were identified, and recommendations were then prepared for regional asset development projects required to attract these candidate industries and other industries to the region.

POLICIES FOR CARE OF THE RETARDED (SET)

Location: Sacramento, California

Client: California Council for Retarded Children

Preparation of an action plan for the formulation of alternative policies in the area of care for the retarded.

Exploration of effective policy-making and resource allocation mechanics to seek new means of integrating the retarded into the community and avoiding the further waste of vast human and social resources.

OZARKS REGIONAL DEVELOPMENT STUDY (DRA)

Location: Ozarks Region

Client: Ozarks Regional Commission

In this assignment, DRA developed a strategy to optimize the economic benefits to the Ozarks Region from the growth of leisure industry. Study efforts were guided by the following major criteria:

Maximized private investment relative to public investment

Gained significant involvement of local groups and individuals

Identified immediate action programs

Oriented all actions to market opportunities

Identified projects providing the greatest long-term economic growth stimulus to the region

The basic analytical method employed was the establishment of a subregional approach in which the total Ozarks Region was subdivided into twelve sub-areas for more detailed field and statistical analysis of each. Leisure opportunities were identified and translated into leisure development possibilities. The leisure developments were keyed to markets to be served, natural attractions, present levels of development, marketing opportunities and regional economic impact.

MEXICO NATIONAL TOURISM STUDY (DRA)

Location: Mexico

Client: Impulsora De Empresas Turisticas, S. A. de C. V.

DRA is currently conducting an analysis of 26 Mexican states in order to determine the feasibility of a national tourism and recreation program to stimulate regional economic development. The year-long study will consist of three phases:

Facility Inventory—Through extensive field surveys, DRA compiled an inventory of existing tourist facilities and their infrastructure in order to make recommendations regarding near- and long-term plans for tourism development.

Program Feasibility—Based on the results of an intensive interview program which determined the preferences of recreation users, DRA is determining the feasibility of developing a national recreational facility and tourism program, which would include development of new resorts and off-season use of existing facilities.

PLANNING FOR COMMUNITY EDUCATIONAL FACILITIES (SET)

Location: Compton, California

Client: Carey K. Jenkins and Associates

This study involved a survey of potential change and events in Compton and the Los Angeles region and their impact on educational requirements and resources. Particular emphasis was placed on the future influence of the projected Century and Industrial Freeways and the relative options available to the community in the event of certain route selections. A survey of total community resources was conducted to explore the feasibility of joint utilization schemes in meeting new and expanding demands.

CENTURY FREEWAY DEVELOPMENT STUDY (DRA)

Location: Los Angeles, California

Client: State of California Division of Highways

DRA was part of an urban design team assisting the State of California to develop and implement strategy for the new Century Freeway (Route 105). Elements of strategy involved freeway design, relocation policy, creation of new job opportunities, utilization of government programs, etc. Studies in which DRA had a major responsibility include:

Reconnaissance Study of Route 105 Corridor: Emphasis on a comparative cost-benefit analysis of nine communities bordering Route 105's 17-mile corridor.

Cost-Benefit Analysis of the City of Downey: Detailed evaluation of the freeway's physical land use impact and financial impact on Downey's tax base; a special analysis of these factors for the Downey Unified School District; impact of noise pollution on residential and school buildings; and local share of user benefits.

Watts-Willowbrook: Identification of major programs and plans for this area, and the potential impact of these programs on the freeway and the freeway's potential impact on them. DRA surveyed many public and private agencies and community organizations in order to gain first-hand knowledge of development activities underway or projected.

Case Study of Joint Use (Including Air Space Utilization): Physical planning, financial and market feasibility evaluation of shopping center, office building-hotel center and residential redevelopment area. Study included a theoretical evaluation of the best future policy for the Division of Highways to identify and accommodate such developments.

SAN FRANCISCO BAY AREA OPEN SPACE STUDY (DRA)

Location: San Francisco Bay Area

Client: People for Open Space

This landmark study evaluated the potential costs and benefits to a regional economy from a comprehensive Open Space Program. Starting with the recently completed Association of Bay Area Governments' (ABAG) Open Space Plan, DRA developed detailed cost information on the open space proposals, including acquisition costs, loss of assessed value, open space maintenance costs, acquisition, timing, and estimated future value by five-year periods. The data collection system was designed for computer tabulation and retrieval.

The impact portion of the study examined the potential positive and negative economic impacts of the region under two assumptions: (1) assuming implementation of the Open Space Plan, and (2) assuming that development was permitted to continue in the future as it had in the past. In order to forecast the impact on urban growth caused by the introduction of open space as a variable, the study was coordinated with the Bay Area Simulation Study Model (BASS).

Basis for the economic benefit inputs was developed through a number of case studies throughout California and selected areas of the United States. The final output of the study was expressed by benefit-cost analysis of alternative methods of implementing the Open Space Program in terms of net economic cost or benefit to the area's taxpayers.

COMMUNITY ANALYSIS PROGRAM (SET)

Location: Long Beach, California

Client: City of Long Beach

As a member of a consultants team, the SET participated as the social planners in this HUD assisted major planning study that was geared towards describing and assessing the City's social conditions and services and proposing alternative policies and programs to improve the overall quality of life. Particular emphasis was also put on the elaboration of a citizen's participation program, to be integrated in the study-planning phase.

LOS ANGELES INTERNATIONAL AIRPORT IMPACT STUDY (DRA)

Location: Westchester and Playa del Rey Communities

Client: Los Angeles City Planning Department and Department of Airports

This landmark study has been concerned with investigating the impact of LAX expansion on the predominantly residential communities located along the airport's northern and northeastern boundaries. Development Research Associates has been serving as prime contractor of a multidisciplinary team which has been working with residents, merchants, and property owners of the two communities, as well as with airport and Los Angeles City officials.

The social, economic and environmental impacts of expanded LAX jet aircraft operations on the communities have been thoroughly researched and cataloged.

The team is now developing programs of future community growth which is compatible with the noise environment, sound economic development, financial realities, and preservation of as much of the residential community as possible. Major recommendations made to date include:

The modification of certain aircraft operational procedures which could significantly reduce sideline noise.

The establishment of a broadly based committee to evaluate and implement voluntary operational modifications.

The construction of a fixed barrier—either an earth berm or a barrier of reflective material—as a noise and visual buffer between the airport and the community.

The soundproofing of schools in high-noise environments which cannot be relocated.

Additional public acquisition of homes in excessive noise environments.

Public and private redevelopment—including allowable reuse, mechanics of redevelopment, and necessary restrictions on redevelopment—for areas exposed to high noise environments.

The construction of a freeway and several arterial improvements to serve future traffic requirements of the community and the airport as well as to provide an impetus for redevelopment.

The assignment of responsibility to public and private groups, specific legal, administration and financial vehicles, and schedules for the implementation of the recommendations.

REGIONAL INDUSTRIAL SITE STUDY (DRA)

Location: Southern California Region

Client: Confidential

DRA was retained by a national corporation in the building products industry to investigate the opportunities available in Southern California for the development of industrial parks. Major elements in this study included:

An investigation of the supply and absorption of industrial lands within the Five-County Region including eight Los Angeles County subareas.

A study of the trends in labor supply for each county and sub-area to determine long-term labor availability, a primary ingredient to attract firms to the subject park.

An analysis of the supply of industrial land in each county and subarea with respect to plottage and respective topography, access and urban pressure.

An analysis of the marketing techniques employed in the major competitive industrial park developments and other industrial land developments in each county and subarea.

An analysis of high priority properties within a socioeconomic area to determine the effects of political pressures, tax

considerations, freeway construction community acceptance, etc., on the successful marketing of the industrial park concept.

A survey of the characteristics of the most probable industrial users within each county and subarea to aid in formulating the appropriate marketing strategy with respect to pricing, promotion and land and facility planning.

During the course of this study, DRA interviewed over 2,000 industrial executives about their future facility requirements and attitudes toward various sections of the Southern California region. Land use, economic trend and industrial asset definition studies were also undertaken as described above. Recommendations of the sites with the highest industrial park development potential were prepared for the client.

SAN DIEGO REGIONAL PARKS STUDY (DRA)

Location: San Diego County

Client: San Diego County Public Works Agency

DRA developed an implementation program for the San Diego County Regional Parks System. Designed to maximize the recreational opportunities and experiences of the people of San Diego County, the program will provide a realistic funding program for the planning, development and operation of existing and proposed regional parks.

DRA responsibilities in this assignment included determining the recreational demands and preferences in the study area; evaluating the near- and long-term potential of each existing and proposed regional park; developing a list of priorities for the order of park development in order to satisfy anticipated needs; and evaluating the physical aspects and constraints of each site and their relationship to county urban growth.

LEISURE-RECREATION DEMAND CHARACTERISTICS (SET)

Location: Kansas City

Client: Midwest Research Institute

MRI has undertaken, for corporate clients, a survey-projection-market study of the leisure-recreation demand and characteristics in the United States in the next 20 years. The SET performed a major part of the tasks, particularly in the area of Lifestyles, social change, future scenarios and alternative approaches to evaluating and responding to changing leisure time use patterns.

NEW TOWN DEVELOPMENT (DRA)

Location: Nationwide

Client: Private Corporations and Developers

Development Research Associates has evaluated the economic potential of a number of large acreage, multi-use projects throughout the nation. Although some of these studies place primary emphasis on one aspect of a new town development, such as the demand for condominium units or resort facilities, they usually involve appraisal, market and financial analyses of large acreage holdings to be used for residential, commercial and recreational purposes. DRA's experience in this field includes studies in:

Ventura County, California

Rancho Santa Fe, California

San Jose, California

San Mateo, California

San Juan Capistrano, California

Simi Valley, California

Las Vegas, Nevada

Queen Annes County, Maryland

Kona Coast, Hawaii

Oahu, Hawaii

RENEWAL PLANNING AND BENEFIT-COST ANALYSIS STUDY (DRA)

Location: Richmond, Virginia

Client: Richmond Redevelopment and Housing Authority

In this recently completed project, Development Research Associates developed a benefit-cost analysis system which represents a significant advance in the state-of-the-art of benefit-cost analysis methods. The study also included analysis and recommendations regarding organization, staffing, salary levels, and activity programming for three NDP projects in Richmond.

The benefit-cost analysis system developed uses an approach which is substantially different from traditional benefit-cost analysis methods. The objective of the DRA system was to provide local government and private decision-makers with the factual benefit and cost consequence information they need to make renewal decisions—and to provide the information in easily understandable formats.

The system accordingly concentrates on identifying the important groups of people (such as government agencies, neighborhood residents, or business enterprises) who will be affected by proposed renewal actions; and then estimates the benefit and cost consequences of the actions for each group. As many of the benefits-costs are quantified in dollar terms as possible within time and budget constraints. Other benefits-costs are quantified as indexes of change, and important non-quantifiable benefits-costs are handled in

qualitative terms. All the benefit and cost consequences experienced by each group of people are summarized for each group in a set of standard tables. The summaries provide decision-makers with vital information about the impacts experienced by important groups as the result of renewal actions.

Using the benefit-cost analysis system, DRA completed benefit-cost analyses of three proposed projects connected with Richmond renewal activities. The number of alternatives considered in the analyses ranged from two to seven. The benefit-cost analysis system was designed with sufficient flexibility to be useful for benefit-cost and impact analyses in a wide range of applications outside the urban renewal field. Use of the system in other applications has already begun, and the system has proved to be a highly effective and efficient analysis methodology.

REGIONAL RECREATIONAL DEVELOPMENT STUDY (DRA)

Location: Four Corners Region (States of Arizona, Utah, Colorado and New Mexico)

Client: Four Corners Regional Commission

DRA conducted a study to determine how the development of recreational and tourism facilities could be most effectively utilized to create new jobs and to increase per capita personal income in the most economically depressed areas of Arizona, Utah, Colorado and New Mexico. A major emphasis of the study was devising a program of pilot recreational developments which could be implemented in the near-term future.

During the study's early stages, DRA inventoried the recreational-tourism facilities which now exist in the four-state region. Potential sites for future recreational facility development were also inventoried. Based on these inventories and on projections of future demand for recreational facilities in the region, DRA recommended the most attractive opportunities for short-term recreational developments so that planning could begin on these priority projects. In addition, nationwide contacts were made with prospective developers of recreational facilities to determine the extent of their interest in the proposed developments.

Later phases of the study included integration of short- and long-term development potentials for a wide variety of different recreational facilities, and preparation of estimates of the economic impact these recreational develop-

ments will have on the region. Economic impacts were expressed in terms of the number of jobs and the amount of personal income that will be generated in the region by implementation of the recreational facility development programs recommended.

SALTON SEA REGIONAL STUDY (DRA)

Location: Salton Sea, California

Client: State of California Water Resources Board

Development Research Associates developed the benefit-cost analysis portion of the overall Federal-State Reconnaissance Investigation of the problems of the Salton Sea. This study, initiated by the United States Department of the Interior and the Resources Agency of the State of California, investigated the benefits and costs of a plan to stabilize the water level in the sea, limit salinity, and control the nutrient-related problems. Without these proposed controls, the Salton Sea would reportedly lose its fishery, recreation and agriculture values and take its place alongside the Great Salt Lake. The results of DRA's work were used to evaluate the engineering and financial proposals in the study effort.

DRA's analysis involved projections of user recreation demand and secondary benefits to surrounding communities through the year 2020 and included surveys of property and boat owners. The results of DRA's study were coordinated with over 20 federal and state agencies.

REGIONAL TRANSPORTATION STUDY (DRA)

Location: Denver, Colorado Region

Client: Regional Transportation District

DRA was recently selected to lead a multidisciplinary team project to plan a transportation system which will satisfy the Denver region's transportation needs for the next several decades. In a joint venture with an environmental and ecological planning firm, DRA is using a revolutionary approach to regional transportation system planning.

In this approach, an integrated regional transportation system which includes all modes is being defined primarily on the basis of the economic, social, environmental, and political needs and characteristics of the region. Engineering work will be undertaken during later detailed implementation design phases after the basic system plan has been developed. The DRA approach is a reversal of traditional transportation planning, in which transportation systems have been typically designed on the basis of engineering criteria alone.

DRA's major responsibilities on the project team cover the financial, economic and land use analyses. Specific DRA technical work includes:

Detailed projections of important socioeconomic variables through the year 2000, such as: population, labor force, employment by industry, number of households, housing

units, household and personal income, office space requirements, and land requirements by major types of land uses.

Projection of the region's financial resources potentially available for financing the transportation system, and development of alternative mixes of financing methods in programs suitable for legislative implementation.

Projections, by small subregion, of future regional patterns of population, employment, and land use location for several alternative regional transportation system possibilities.

Development of realistic regional growth and transportation goals.

Use of a DRA-developed benefit-cost analysis system to measure the impacts of alternative transportation systems on the region.

Team efforts to which DRA is also making substantial contributions include specification of feasible alternative regional transportation systems, projection of trip flows through these alternative systems, evaluation of the total regional impact of each system, and selection of the system best suited to the Denver region's future needs.

PROJECT WIRE (Western Installation Resources Evaluation) (DRA)

Location: California

Client: Department of Defense

A directive from the President to evaluate the need for continued operation of military bases, and to determine the highest and best use of these lands for nonmilitary purposes with maximum benefits to the general public, resulted in two Project WIRE studies conducted by Development Research Associates. Approximately 50 installations operated by the Army, Navy, Air Force, and Marines were analyzed.

The analysis of market demands and potentials for the military lands varied from downtown sites in major cities to tracts of thousands of acres in remote desert areas. Agricultural, suburban, and urban lands were studied for potential alternate uses, which ranged from beach to recreational to agriculture and to high-rise commercial.

The study included the evaluation of the economic base of the communities and regions in which the military installations were located. Future relationships between the military and civilian populations were explored in-depth, based on the following assumptions about the future activity level of the military installations: remain stable, decrease, close down, increase, or increase substantially. The study also included an appraisal of the present value of the installations' lands and buildings under alternative highest and best uses.

An important part of the study involved an attitude survey designed and executed by DRA in conjunction with a national survey firm. A random sample of property owners, businessmen, and persons from the general population surrounding the installations were surveyed to determine their attitudes toward the military installation, possible relocation impacts, and reuse of installation land. The survey results provided valuable inputs to the development of alternative reuse possibilities for the military land.

DRA's recommendations were coordinated with purely military demands by the Project WIRE DOD staff in San Diego and presented to top level civilian and military leaders in briefings at the Pentagon and around the nation.

POD₂

Description of POD₂

POD₂ is an environmental research and analysis subsidiary of POD, Inc. Its purpose is to conduct research in applied urban ecology, and use such information to analyze and improve urban design. Services to clients include basic and applied research in urban ecology, consultation and analysis of human environments, educational presentations to professional, student and public groups, and publication of research findings and studies in urban ecology.

Current activities include:

Environmental impact analyses, to determine influence of various human developments on the environment (as required of clients by federal and state laws, or as part of comprehensive area planning);

Research projects such as analysis of particulate air pollutants in the human microclimate, and secondary succession in urban areas;

Speaking engagements to various institutions and groups on ecological topics;

Publications dealing with public-interest topics in urban

ecology, and research findings in methods of analysis of the human environment.

Purpose

POD is an acronym for "Process Oriented Design" which supports the concept that "The Design Process is critical to the quality of the end product." We believe that successful and creative design of exterior spaces in a highly complex urban society requires an ability to objectively define and clearly understand the key environmental problems and relationships.

Thus, as a problem solving firm with the ability to synthesize diverse analytic processes with intuitive talents, it is our goal to evolve design solutions of the highest quality, and provide the client with standards of excellence in professional services.

Background and Experience

POD Landscape Architects as an idea began in 1966, in Cambridge, Massachusetts. Three members of the founding group attended the Harvard University Graduate School of Design where they received training in the use of design tools, such as: computer graphics, aerial photo interpretation, and various ecological resource and urban spatial analysis techniques. They found a mutual interest in the need for practical application of valid analytic design processes to the rapidly growing urban environment of Southern California.

In the summer of '67, upon receiving their Masters Degree in Landscape Architecture and gaining further practical experience in design, planning and research they moved to California where they associated with the fourth member who added insight into problems facing the Southern California environment; also a fine arts background from the masters program at Claremont College. In the fall of '67 Process Oriented Design was formed in Orange, California. In the spring of '68 the name was changed to POD and shortly thereafter incorporated.

Since this period the office has worked for governmental, institutional, corporate, and architectural clients on a broad range of projects from regional scale environmental studies to the detailed design of specific projects. In addition POD has been able to: Attract a highly talented and diverse design staff; begin an environmental research program and library; and maintain a close relationship with the academic community.

RELEVANT PROJECT EXPERIENCE

POD LANDSCAPE ARCHITECTS, 34 Plaza Square, Orange, California

Recent Work Completed or in Design Development

ECOLOGICAL, SITE ANALYSIS AND
LAND PLANNING PROJECTS

Big Sky of Montana, Gallatin Gateway, Montana

Client: Mr. Roger Houseman, Chrysler Realities

Environmental design and planning consultant to investigate and refine all master plan programs for the 11,000 acre recreational resort.

Corps of Engineers, Los Angeles, California

Projects: Cucamonga Creek Environmental Impact Study

Santa Barbara Creek Environmental Impact Study

San Diequito River Project

Pacific Palisades Landslide Study Area

Environmental consultant to the Corps of Engineers to provide expertise in all areas of ecological concern.

Lake Julian, Julian, California

Client: Corona Land Company

To investigate a proposed 1,000 acre recreational second home development.

and to provide an ecological study to determine the impact of development on the natural environment.

Corona Foothill Lemon Property - Corona, California

Client: Corona Lemon Company

850 acre master plan study to determine highest and best use of the subject property using ecologic, economic and architectural criteria.

Golden Triangle Project, Rancho California, California

Client: Rancho California

Site analysis through a detailed master plan for 800 acres of ranch properties. The emphasis was to illustrate how housing units might be sited on the rolling terrain.

Maybury Orchards, Santa Ana, California

Client: O. K. Earl Corporation, Pasadena, California

Urban design study of 175 acres in the City of Santa Ana. The project included the land allocation for commercial centers and high density housing that would be developed on pedestrian greenbelt system.

Wesleyan Project, Middletown, Connecticut

Client: Mr. Emil Hanslin, Emil Hanslin & Associates
Cape Cod, Massachusetts

Master plan for a 400-acre planned unit development.

Regional Study - Scripps-Miramar Ranch, San Diego, California

Client: Macco Realty Corporation, Newport Beach, California

Site analysis through master plan alternatives for 180-acre ranch properties.

Irvine Street Scape Study, Irvine Ranch, California

Client: The Irvine Company, Newport Beach, California

Environmental qualities study. To develop a clear understanding of the relationship of the parts that form the Irvine environment and what relation the circulation system has to its surroundings. The emphasis will be to illustrate the opportunities, both visual and functional, and basic desirable goals that are available within the development of Irvine Ranch.

Claremont Back-up Walls Study, Claremont, California

Client: The City of Claremont, Claremont, California

Study the effects of back-up wall subdivisions on secondary and major highways and develop alternative visual goals for their use.

MAJOR APARTMENT PROJECTS

Vista del Lago, Costa Mesa, California

Client: Interland Corporation

Architect: Matt Copenhaver, The Copenhaver/Belz Association
San Francisco, California

Complete landscape development package for a lake oriented 1100 unit apartment complex.

Sycamore Village, Diamond Bar, California

Client: Levitt & Sons of California

Architect: Gerald Sy Golob & Associates, Los Angeles, California

Landscape development for 13.5 acre 204 unit apartment complex.

Park West Apartments, Irvine Ranch, California

Client: Mr. Bill Watt, The Irvine Company
Newport Beach, California

Architect: Frank Gehry & Associates, Inc., Los Angeles, California

Rolly Pulaski, Newport Beach, California

Development of master plan concept with architect for 1,000 unit apartment complex. Complete landscape development plans.

Macco Realty Corporation - Apartment Division, Newport Beach, California

Client: Macco Realty Corporation, Newport Beach, California

Architects: Gerald Sy Golob
Los Angeles, California

Rolly Pulaski
Costa Mesa, California

Huxley & Thoryk
San Diego, California

Jerry Pujdak, A.I.A.
Pasadena, California

Fred Briggs, A.I.A.
Laguna Beach, California

Bracken, Arrigoni, Ross
San Francisco, California

Stewart, Thurston, Becker
Dallas, Texas

Site planning and complete landscape development through supervision of 3400 apartment units in 11 different projects in both California and Texas.

*Tustin Treat Project, Tustin, California

Client: Macco Realty Corporation, Newport Beach, California

Architect: Backen, Arrigoni, Ross, San Francisco, California

*Recent Progressive Architecture Award Winner

The City Apartments, Orange, California

Client: The City Management Corporation, Orange, California

Architect: Robert Thomas/Associates, A.I.A., Newport Beach, California

Master site plan development in conjunction with Thomas/Richardson/

Associates for 1200 unit apartment complex. Complete landscape development plans for 441 unit first phase.

CONDOMINIUM AND PLANNED UNIT DEVELOPMENTS

Diamond Bar Townhouses, Diamond Bar, California

Client: Mr. Joe Dray, Levitt & Sons of California

Architect: Gerald Sy Golob & Associates
Los Angeles, California

Environmental Land Use Study to determine best housing types for existing site conditions. Site plan for 200 acres.

Willow Park, Irvine, California

Client: Mr. Joe Dray, Levitt & Sons of California

Site plan for 18 acre court oriented townhouse development at 13 units per acre with greenbelt spine leading to major recreation center and open space park.

Mesa Village, San Diego, California

Client: A. J. Hall Corporation, San Diego, California

Land planning through to design development of a 600 unit moderate-low income housing development.

Acadia Village, San Diego, California

Client: A. J. Hall Corporation, San Diego, California

Architect: Robert Van Roekel

Land planning through to design development of 35 acre cluster housing project and 210 unit apartment complex sited adjacent to a nine hold golf course.

Huntington Seacliff Townhouses, Huntington Beach, California

Client: A. J. Hall Corporation, San Diego, California

Site analysis through site planning and landscape development for an 80 acre medium density condominium development.

La Costa Townhouses, La Costa, California

Client: Marview Investors, LTD., San Diego, California

Architect: Walter Richardson & Associates, A.I.A., Costa Mesa, California

Preliminary landscape development concept and complete working drawings for 128 unit townhouse development.

Mount La Jolla, La Jolla, California

Client: Mr. Al Hall, Marview Investors
San Diego, California

Architect: Walter Richardson and Associates A.I. A.
Costa Mesa, California

Landscape development plan for 60 acre planned unit development.

Wildwood Condominiums, Thousand Oaks, California

Client: William P. Lyon Homes, Newport Beach, California

Site analysis through site planning for a 52 acre medium density condominium development. The project included a detailed evaluation and design of the recreational facilities.

Potrero Valley, Thousand Oaks, California

Client: William P. Lyon Homes, Newport Beach, California

Master plan study to develop sections for 37 acre 4-plex greenbelt project.

Pepper Urban Renewal Project, Pasadena, California

Client: Federal Housing Administration

Architect: Kahn, Kappe, Lotery, Santa Monica, California

Preliminary landscape development through working drawings for F. H. A. low-cost housing development.

Rancho Domingo Development, San Diego, California

Client: Hatfield & Wasserman, San Diego, California

Architect: Huxley & Thoreyk, San Diego, California

Master plan study to develop a city owned and maintained park with a 140 unit low-cost housing project.

MISCELLANEOUS PROJECTS

Spehar Property Mobile Home Park, Yorba Linda, California

Client: William P. Lyon Homes, Newport Beach, California

Site analysis through detailed site plan for a 42 acre mobile home development. The emphasis was to develop a unique cluster arrangement which could be a prototype for most mobile home parks.

Huntington Beach Civic Center, Huntington Beach, California

Client: City of Huntington Beach, Huntington Beach, California

Architects: Honnold & Rex, Los Angeles, California

Kurt Meyer, Los Angeles, California

Complete landscape development for the proposed Civic Center. The project included a complete analysis of pedestrian and vehicular circulation.

Cochiti Recreation - Commercial Project, Santa Fe, New Mexico

Client: Mr. Ben-Ami Friedman, Great Western Cities, Inc.
Los Angeles, California

Architect: Frank O. Gehry, Los Angeles, California

Project landscape architects for regional shopping-recreational complex.

Plaza de Oro Shopping Center, Encino, California

Client: Plaza de Oro Company, Beverly Hills, California

Architect: Emery Kanarik, Los Angeles, California

Site analysis through complete landscape development plans for a major neighborhood shopping center.

Marina Playa Executive Center, Santa Clara, California

Client: Interland Corporation

Architect: Matt Copenhaver, Copenhaver/Belz Associates
San Francisco, California

Complete landscape development for 14 acre lake oriented commercial executive center.

San Mateo Executive Center, San Mateo, California

Client: Interland Corporation

Architect: Copenhaver/Belz Associates
San Francisco, California

Complete landscape development for 21 acre executive center and retreat.

Pitzer College Mall, Claremont, California

Client: Pitzer College, Mr. Jim Jamieson

Landscape development plans for 2 acre central mall, including major focal fountain and pedestrian circulation for central campus area.

WILBUR SMITH AND ASSOCIATES

General Firm Background

Wilbur Smith and Associates is a consulting engineering and planning firm of national and international scope with varied and broad experience in urban and regional planning as well as transportation planning, economics, engineering, and design. The firm's engineering activities include studies and reports relating to traffic, transit, parking, highways, aviation, and general transportation. Planning studies have covered such major phases of urban planning as urban redevelopment, community renewal programming, central business districts, comprehensive land use analysis, waterfront development, community facilities, economic analysis and projections, population analysis and projections and community shelter planning.

Permanent offices are maintained in New Haven, Connecticut (Home Office); Columbia, South Carolina; San Francisco and Los Angeles, California; New York, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Washington, D. C.; Winston Salem, North Carolina; Kansas City, Missouri; Houston, Texas; Orlando, Florida; Toronto, Canada; Melbourne, Australia and London, England. Field offices are established to meet work requirements. All offices generally are comprised of engineering, planning, and other administrative personnel. The firm has over 500 permanent personnel and during an average year, employs approximately 4,000 additional temporary employees.

The firm is employed by agencies of the United States Government, states, counties, cities, towns, public authorities and commissions, and private businesses and professional organizations. In addition to work in the United States, Wilbur Smith & Associates performs work in Canada and more than 20 other foreign countries.

The Western Region has its principal office in San Francisco and a permanent office is maintained in Los Angeles. A long-term field office is also being established in Denver. The combined Western Region staff totals over 30 engineers and planners. Additional personnel are drawn from firmwide manpower resources as required. This division has completed major projects and studies in city planning, transportation system planning, transit planning, market research, traffic operations, urban renewal, parking, airport development and revenue and earnings studies for public and private clients in Alaska, Washington, Oregon, California, Utah, Colorado, Arizona, Nevada, and New Mexico; and British Columbia and Alberta.

Wilbur Smith & Associates has assembled a professional staff which is experienced in comprehensive transportation planning and design of highways and related facilities. Experience with the modern comprehensive travel studies began with the Honolulu urban study of 1946-49, directed by one of the firm's principal associates, Mr. F. Houston Wynn, who carried the study through all phases of design, data collection, analysis and development of long-range plans. This work was supplemented by four years of

research on data from more than 20 of the early comprehensive urban area surveys, conducted under Mr. Wynn's direction at the Yale Bureau of Highway Traffic, 1949-54. From these studies emerged findings and urban travel relationships which began to form the basis for a basic theory of urban travel.

During the years 1955 to 1956, basic research accompanied the planning work associated with carrying out a comprehensive survey and plan development for the Omaha Urbanized Area (1955-56). Simple models for traffic generation and trip distribution were developed and applied in the Omaha study and in a follow-up analysis and projection of the 1947 comprehensive survey of the Philadelphia-Camden area. From 1956 to 1959, the firm was engaged in analysis and long-range projection of travel patterns for the National Capital Region, and developed the first complete package of analytical models for long-range urban transportation planning. These models continue as the basic plan for organization of urban travel data for transportation planning. Most current models build on them and have modified and improved, rather than originated new approaches to urban travel projection. Since 1959, the firm has applied and improved upon the urban travel models in more than half a hundred major urban areas throughout the world, including many state and national capitals.

In the process of analyzing travel in cities and developing reliable models to represent urban traffic behavior, many aspects of trip-making and trip motivation have been investigated and reported by Wilbur Smith and

Associates' staff. Many of these studies are continuing, and many of them result in new understanding of urban travel motivations and significant incremental improvements in the urban travel models. Recent improvements include several variations in modal split technology, among them a "short-cut" modal split formula prepared for the Bureau of Public Roads in 1968.

In recent years, the planning staff of Wilbur Smith and Associates has been engaged in an extensive group of land analysis and marketing studies for private clients in major urban areas of almost every state of the Union. Many of these studies have centered upon development of projected land uses, income and population figures for urban areas, based upon the transportation developments planned for them. Much of this data is available in-house on computer tapes and represents an important data source for research.

Because of the firm's very deep and continued interest in urban travel behavior, we have maintained a keen appreciation of the materials used for urban transportation planning and the quality and capabilities of the various sets of data with which we work. We believe that the proposed study represents an excellent opportunity to resolve a problem that is of real and significant interest to the profession and which can be studied to yield fruitful results within the limited time available for this examination. Wilbur Smith and Associates, have, we believe, the resources and expert personnel that the study requires.

Company Information

History - The firm was organized in 1952 as successor to the partnership of Smith-Dibble and Company. Subsequently, in 1965, it added the staff and full engineering design capabilities of Smith-Pollitte and Company. It acquired in 1969 Southeastern Surveys, Inc., a firm specializing in air transport services.

Initially a traffic engineering firm, Wilbur Smith and Associates' staff pioneered in the development of mathematical models for use in comprehensive urban transportation studies. The urban planning functions of the firm have gradually broadened from transportation planning and demographic projections to include comprehensive development plans, central city studies, and environmental impact studies.

Functions - Wilbur Smith and Associates' most extensive experience is in transportation engineering and planning. Expertise is available in the area of public transportation system planning and economic analysis as well as the design of airports, access, highway geometrics and signalization. The firm has followed a policy of broadening the scope of its activities while retaining a basic engineering philosophy favoring functional reliability, safety, and adaptability to staged development. The firm's transportation studies have consistently given consideration to social, economic, and environmental factors in engineering design. Versatility, initiative and creative thinking by staff members are encouraged.

Organization - To fully allow for creative developments within a framework of operating efficiency, Wilbur Smith and Associates is organized into three major divisions under the direction of a Technical and Policy Review Committee. The major divisions are classified as Central Functions, Staff Services, and Operating Regions.

The Executive Committee has the principal function of reviewing and establishing the methodology of all projects undertaken by the firm. Under the direction of Wilber S. Smith, the Executive Committee, in addition to technical reviews, also has managerial responsibility to insure all work is completed within time and budgeting limitations. The Central Functions are the major research and development areas of the firm and their resources are available worldwide. The Staff Services of accounting, personnel, public information, and computer service are centralized to provide maximum efficiency and economy.

The Operating Divisions of the firm have headquarters in the major cities of the geographical regions which they represent. The offices of each region are located in project cities to best serve the professional service requirements of that area. In addition to the five major geographical divisions (Northeast, Southeast, Central, Southwest and West Coast), special operating divisions for Design, Revenue and Feasibility, and International Affairs have been established. The offices of the firm located in the various cities are fully staffed and serve as the locations from which the professional

services of the firm are offered. In addition, project and field offices are opened as necessary to fully support projects of a special nature.

Wilbur Smith and Associates were transportation consultants for one of the first design concept teams organized to undertake the major problems of implementing urban land use and transportation plans. Special offices were established and staffed to cooperate with major planning, architectural, and economic firms in developing solutions to many of the problems related to downtown development. Similar design teams have been established both in the United States and abroad for major transit and airport programs. Working under Central Functions division, these offices have firmwide technical and administrative support.

The firm follows a policy of staffing its permanent offices with qualified planners and engineers, assuring key project responsibility at the local level. The principal analytical and technical operations of Wilbur Smith and Associates are centralized for flexibility in major offices in San Francisco, Columbia, Houston, New York, New Haven, and London. Specialized staff members from these offices are assigned to projects as their abilities are required, and they may become resident at a project location whenever this is justified by their full-time participation on the job. Project cost data are compiled on a monthly basis by the accounting section, and monthly reports of the financial status of each project are supplied each month to the project engineer.

ORGANIZATION CHART

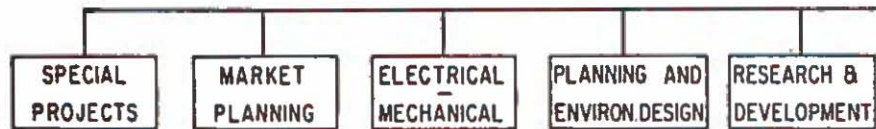
Wilbur Smith & Associates

PRESIDENT
WILBUR S. SMITH

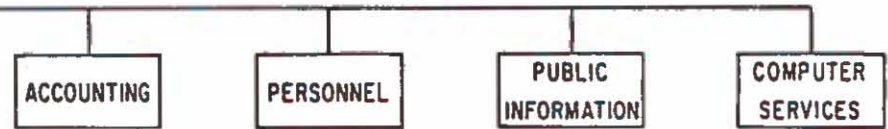
EXECUTIVE COMMITTEE

- SENIOR VICE PRESIDENTS
- SENIOR ASSOCIATES

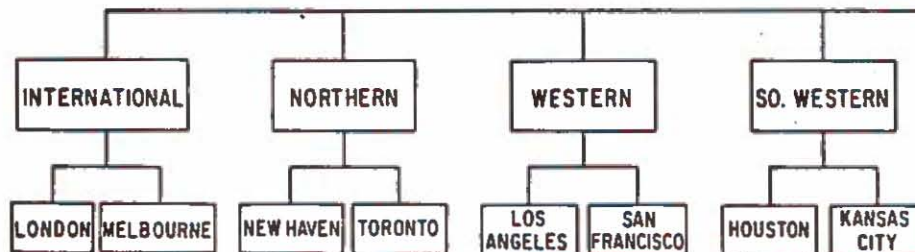
CENTRAL FUNCTIONS



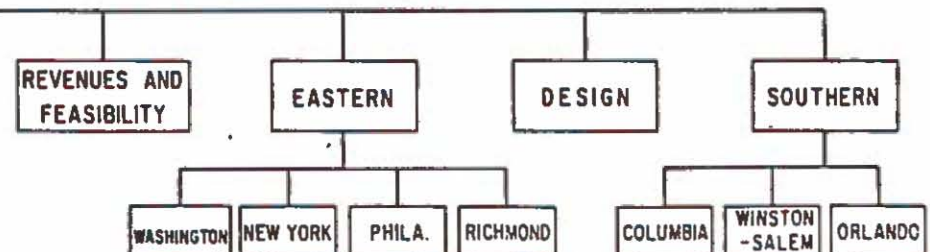
STAFF SERVICES



OPERATING



DIVISIONS



Staff Capabilities - A broad scope of professional talents has been assembled to provide the most appropriate services in the firm's spectrum of projects. The technical and professional staff is fully departmentalized to provide highly specialized services. However, it is recognized that it is important to interrelate and coordinate all of the resources of the firm so that a complete multidiscipline approach can be brought to bear on each project.

The following is a listing of employees by major classifications:

Principals and Key Personnel

Engineers	32
Other	9

Other Personnel

Architects	1
Mechanical Engineers	1
Electrical Engineers	1
Civil Engineers	122
Transportation and Urban	
Regional Planners	62
Draftsmen	53
Specification Writers	4
Estimators	8
Inspectors	13
Surveyors	23

Miscellaneous	166
Economists	<u>10</u>
Total	507

Facilities - Wilbur Smith and Associates owns an IBM 360 Model Computer located in Columbia, South Carolina, on which much of the firm's electronic data processing is performed. (The firm's transportation model software, however can be operated on many types of IBM, CDC, and compatible makes of equipment, allowing local computers to be used where desired.) Libraries covering transportation, city planning and traffic engineering are maintained in all offices of the firm, supplemented by more extensive collections in San Francisco, New Haven, Columbia, and London. Basic Research activities are conducted in Columbia and New Haven offices.

RELEVANT PROJECT EXPERIENCE

Relevant Experience

Wilbur Smith and Associates has worked throughout the United States, Canada and more than 20 foreign countries. It has been employed by many agencies of the United States government, states, counties, cities, towns, public authorities and commissions, and private businesses and professional organizations.

The firm has considerable experience in all facets of comprehensive land-use and transportation planning, public transportation planning, environmental impact and urban design, central area transportation studies, multi-modal transportation terminals, parking, traffic and transit operations, expressway planning and design, traffic and revenue evaluation for major urban toll facilities, traffic counting procedures and transportation research. They have been key participants in many interdisciplinary urban design-team, transit planning, and central area studies. They have pioneered in many of the research techniques applied in comprehensive transportation planning. Principals of the firm have published extensively in all aspects of transportation planning, and are recognized as national authorities.

The firm is an acknowledged leader in transportation planning, having completed comprehensive transportation studies in major urban areas throughout the world. Alternative future land use plans and transportation systems were evaluated in the San Juan, Puerto Rico and Ohio-Kentucky-

Indiana (Cincinnati) comprehensive studies. Multiple alternative evaluation and sketch plan techniques characterized the Bogata, Columbia study. Sketch planning techniques also were used in a study for Houston, Texas, and in research studies undertaken for the Bureau of Public Roads.

Wilbur Smith and Associates also has extensive experience in evaluating the user and non-user impacts of transportation facilities. In addition to the firm's participation in the pioneering Baltimore design team, relevant studies include impact studies for Maryland (Capital Beltway) and New Jersey (I-287, I-95 Corridor). The following section illustrates the nature and extent of the firm's work and identifies those studies which are especially relevant to the proposed project.

Sketch Planning Studies

Bogota, Columbia, South America

A comprehensive study was undertaken for the International Bank for Reconstruction and Development to assist the Republic of Columbia in the initiation of a 2-phase, long-range program for transport and urban development in the metropolitan region of Bogota and its rural environment. Outlines of alternative development patterns for the region were provided to 1980, and assessments were made of each alternative in terms of its quality, costs, administrative problems, and major features of the required transport infrastructure. Proposals for measures that could be taken

immediately to improve transport services, irrespective of future development patterns, were also made to achieve the most effective and economical development of transport. Urban land use recommendations were developed for transport pricing, taxation policies, and changes in laws, regulations and administrative procedures relating to transport and city planning. Improvements for the operation and organization of the services that provide public transport were recommended. A unique feature of the study was the testing of the concept of imposing charges on the use of private automobiles in the central business district as one possible solution to peak-hour traffic congestion.

Houston, Texas

This study area included eight counties and 8,400 square miles. A synthetic projection of travel by transportation mode was made using available data. These traffic assignments provided the corridors where extreme deficiencies in the highway system would occur. Based on the synthetic projection and assignments, specific corridors were recommended for rapid transit development as part of a total program of transportation and land-use studies conducted under the auspices of the Houston-Galveston Area Council.

Multiple Plan Evaluation Studies

San Juan, Puerto Rico

This study included the inventory and analysis of all travel within the urban

area including major generator studies, airport studies, modal split research, detailed traffic operation studies and the development of parking demands and needs for three downtown areas. Urban planning studies were also made to develop four land use plans for which three different transportation systems were tested using each projected development plan. The long-range plan includes recommendations for an extensive rapid transit and highway system as well as 1985 parking demands and needs. These studies were conducted for the Puerto Rico Planning Board and the Puerto Rico Department of Public Works through federal assistance from the Department of Housing and Urban Development.

Ohio-Kentucky-Indiana (Cincinnati Urban Area)

This comprehensive study was probably one of the largest ever undertaken (on an area basis) involving nine counties and three states covering approximately 2,700 square miles. A pioneering effort, with regard to modal split and trip projections, this study gave full consideration to development of a balanced transportation system. Alternate land-use planning concepts were used in the testing and evaluation of transportation systems prior to delineation of the final plan and presentation of recommendations.

Impact Studies

Maryland Capital Beltway Impact Study

The purpose of this study was to measure and project the impact of the

Capital Beltway on land development, land values, and travel patterns in Montgomery and Prince Georges Counties, adjacent to Washington, D.C. Projections were made for a 10-year period in two-year increments. Projections included socio-economic factors, such as population, employment, income, automobile ownership, and retail sales. Changes in travel patterns resulting from the Beltway were projected, and the economic benefits of the highway facility were estimated for the 10-year projection period. Investigations, analyses, and projections were made at regional and detailed subregional levels with the use of growth models and trend analyses of zoning and other land use controls. The research nature of the study was emphasized by the establishment of a continuing program of data collection and review to measure and compare the actual impact of the Beltway with the projected impact.

State of New Jersey (I-287, I-95 Corridor)

The purpose of this study was to measure the socio-economic impact of Interstate Routes 287 and 95 in Middlesex and Somerset Counties, New Jersey. The study was prepared for the New Jersey Department of Transportation. This study showed through a detailed analysis of the area near a section of I-287, I-95 in Middlesex and Somerset Counties, some of the manifestations of this guiding influence. The area traversed has experienced an in-migration of industry, commerce, and persons which can be directly related to the accessibility the highway provided. Through this same attribute, the highway

has expanded the social, cultural, recreational and employment horizons of those it serves.

Land values, land use, and land investment near the highway have increased substantially affecting increased municipal tax revenues, assessed and equalized valuations. By the same token, municipal governments have recognized the highway as a tool to be used for the development of a well-balanced economic base, socially viable, and fiscally sound.

Industry has found that freeways, particularly when constructed through areas with low levels of land use, provide a number of good sites suitable for relocation and expansion. Because of the highway, these sites provide excellent access to clients, customers, labor, and also provide good site visibility.

Residential developers involved in properties near the highway have experienced strong demands for housing due largely to the migration into the area of population from more densely inhabited areas. Freeway proximity and accessibility to employment, commercial, social, and recreational centers throughout the region were credited with stimulating this demand.

Studies in Island or Isolated Areas

Hong Kong

In the first of several studies conducted by the firm in the Hong Kong urban area, a mass transit feasibility study to determine existing and 1985 potential demands, to evaluate alternative transport systems, and to formulate function-

al plans for a total transport system was performed for the Hong Kong Government, Department of Public Works.

A second study was undertaken for the Hong Kong Government which involved inventory of a road system, regulations, usages and other factors. Land use effects on trips generation were studied and alternate road systems formulated. A major route plan, coordinated with the mass transit system, was developed.

A third study was conducted for a private client to determine the financial feasibility of extensive school bus service in Kowloon, the mainland portion of Hong Kong. Recommendations for service were developed.

Juneau, Alaska

This special study of population, land use, and economic characteristics for Juneau was authorized by the Alaska State Highway Department for the purpose of providing a basis for projecting future traffic characteristics in the Juneau urban area. Detailed estimates and projections were proposed on a small area basis for such categories as population, economic basis for growth, land use, employment and retail sales.

Anchorage, Alaska

The firm was employed to prepare a comprehensive plan that would include land use, population, employment and retail sales projections. Physical, social and economic characteristics were also analyzed with reference to

community goals as a part of a comprehensive area transportation study. As part of the comprehensive transportation study, a TOPICS and parking program was developed for this urban area. This study required that special consideration be given to the highway seasonal travel and the effect of small trucks and campers on the recommended facilities. Extensive traffic counting, functional classification, and financial studies were included in the report recommendations.

Fairbanks, Alaska

In an effort to continue their planning program, local officials engaged the firm to prepare a comprehensive area transportation study. As an integral part of this plan recommendations for providing for future growth and development through alternate land uses were made on the basis of detailed inventories, analyses and projections of land use, population, economic activity, and financial resources.

Comprehensive System Evaluation

California Transportation Systems Evaluation Project (Joint Venture With TRW)

This project, now underway, is intended to develop a systematic, objective and equitable procedure for evaluating alternative transportation systems. State and regional goal structures have been inventoried and goal development needs noted. Studies and recommendations have also been made of the required data base, of candidate subsystems and their characteristics, of

analytical methodology, and of the funding and legislative considerations. Presently being developed are system comparison procedures, methodology for identifying socio-economic strata for consideration of system benefits and costs, and development of a procedural guide.

Santa Cruz Transportation Study Design

The purpose of this study was to design a comprehensive transportation study which reflects and is responsive to the interaction between transportation and land development. An analytical framework was developed to evaluate the effect of alternative land development on the transportation system. Recommendations were made on decision-making instruments which can be utilized at points in the development process.