

# The Urban Freeway: An Experiment in Team Design and Decision-Making

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## THE MULTIPLE FUNCTION OF THE HIGHWAY

•HIGHWAYS are, and have always been, more than single-purpose conduits for the movement of goods and people. They are, in addition:

1. Determinants of uses flanking the corridor (e.g., the crossroads country store, which is today the regional shopping center at a freeway interchange).
2. Determinants, therefore, of land values along the route (e.g., a farm may cease to have value as such because of severance, but may have instead ten times more value as a subdivision, due to access).
3. But one element in the system of transportation: (a) To "close" the system of transportation modes using the highway, garages and pedestrian paths are required, as are terminals for trucks and depots for buses; (b) To "close" the total transportation system, interchange points are also required between the highway modes of transport and the nonhighway modes, such as air, sea, and rail pathways.
4. An essential element of the "public skeleton" (i.e., the armature of concentrated public investment in streets, buildings, utilities, open spaces, etc.), which is the basic framework for urban or city design and which, if skillfully developed, will determine urban form around it for the foreseeable future, as this form is fleshed out by the incidental addition of architectural elements.

## THE FAILURE OF SINGLE-PURPOSE DESIGN AND DECISION-MAKING

Given the preceding definition, highway design has often failed, but not so much because of insensitivity on the part of administrative officials and designers (a charge that is often advanced but may not be always fair). Rather this failure has been due to the narrow interpretation of their charge by responsible officials, which narrow interpretation has been, in turn, passed on to (and accepted by) those whom these officials employ as designers. Under this narrow interpretation, the major public highway programs are thought of as:

1. Serving a limited sector of the public who drive cars or trucks, or ride interstate buses. (Yet this public must park their cars and become pedestrians at some point in their journey, if their journey is to be successfully completed; the competition between automobile, truck, and bus is often abrasive and destructive on the highway and its debouchments.)
2. Being in aggressive competition with other pathways serving other modes of transportation. (Thus issues are often oversimplified with battle lines drawn between highways and railroads, instead of establishing complementary relationships such as, for example, making available median rights-of-way within the freeways for the construction of railroad lines.)
3. Being paid for by someone called a "highway user" and thus with benefits restricted only to this shadowy individual. (Am I not a highway user when I buy a bag of groceries? Even though I have no car, some of the cost of my purchases may well have gone into the highway trust fund, since it is used to defray the costs of distributing the goods I buy, including in such costs the gasoline taxes paid by the trucker.)

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4. In the interest of serving the highway user and the highway user only, the cost and benefit spectrum has been reduced to consideration of highest efficiency (measured in terms of maximum speed and minimum distance of travel) and minimum first cost (to spread the highway user's tax dollar as far as possible). Even the safety of the highway user is subordinated to these consideration (witness the traditional design of overpasses, with columns in the median; this reduces the span and thus the cost of the overpass but, of course, greatly increases the hazard for the drivers below).

In the present approach to highway design and decision-making, little, if any, attention is paid to the effect of highways on other modes of transportation and the interconnection between these; to the actual development of terminals (garages, etc.) at the time the highways themselves are planned and built; or to the economic effects of the highways. (Other than citing the general benefit to the economy by the fact of a highway per se, there has been little effort to design the highway so as to maximize these presumed benefits, and equally little effort to minimize its opposite effects, even when these are admitted.) Almost totally ignored has been the social impact of the highway and the matter of aesthetic value for those who view it and those who travel upon it. Yet one of the greatest public works of any civilization, which is our Interstate Freeway System, could have been a great civic monument, comparable to the great engineering works of the past, such as the Roman Aqueducts.

### THE URBAN FREEWAY

The foregoing description of the nature of the highway and of its design and decision-making failures thus far are "doubled in spades" when these are freeways to be built in urban areas. So much social, political, and economic controversy has developed that it is clear that, unless a new approach is taken, the Interstate Freeway System will simply not be completed as regards its urban mileage.

This new approach, moreover, is not only essential to the resolution of the conflicts plaguing the urban interstate program; it is equally important to the overall solution of urban planning problems in general. Since the typical interstate highway within a city will "slice through" a cross section of the physical and social fabric of that city, it is clear that a solution to the highway problem will be applicable far beyond the concern of the interstate program per se.

#### Recommended New Approach to the Urban Highway

A new approach to the design of, and decision-making for, the urban highway is elaborated in Appendix B, "Urban Design Policy." As applied to urban highways, it may be summarized as follows:

1. The urban highway, and the funds therefor; should be used to provide for the redevelopment of the entire highway corridor by planning for joint construction of the highway and of other uses beside its right-of-way and over or under its roadbed. The highway is a catalyst, and this catalytic effect should be used to benefit the urban environment, rather than to blight it as has so often been the case to date.
2. This linear development objective requires that the highway be designed by the broadest kind of multidisciplinary teams. These teams should be headed by a qualified urban designer drawn from any of the several design disciplines. It should include all of these design disciplines (engineering, architecture, landscape design, and planning). It should also include all relevant non-design disciplines such as real estate, economics, sociology, architectural history, acoustical engineering, lighting, and graphic specialties.
3. The multidisciplinary design team must be responsible to a decision-making team, including representatives plenipotentiary of all levels of government involved (federal, state, local), of all public programs involved (highways, housing, recreation, education, etc.), and of all private interests involved.
4. In addition to the above two legs of the three-legged development team, there is the general public, which, in a democratic society, must ratify the decisions taken if these are to become reality. Instead of the secrecy which has traditionally surrounded

highway planning, this planning should be conducted in a "fishbowl." At the very least, the alternatives considered by the decision-making teams should be publicized by the news media before a selection is made. At the most, an organized community representative group should be encouraged to participate with the design and decision-making team (see Appendix A).

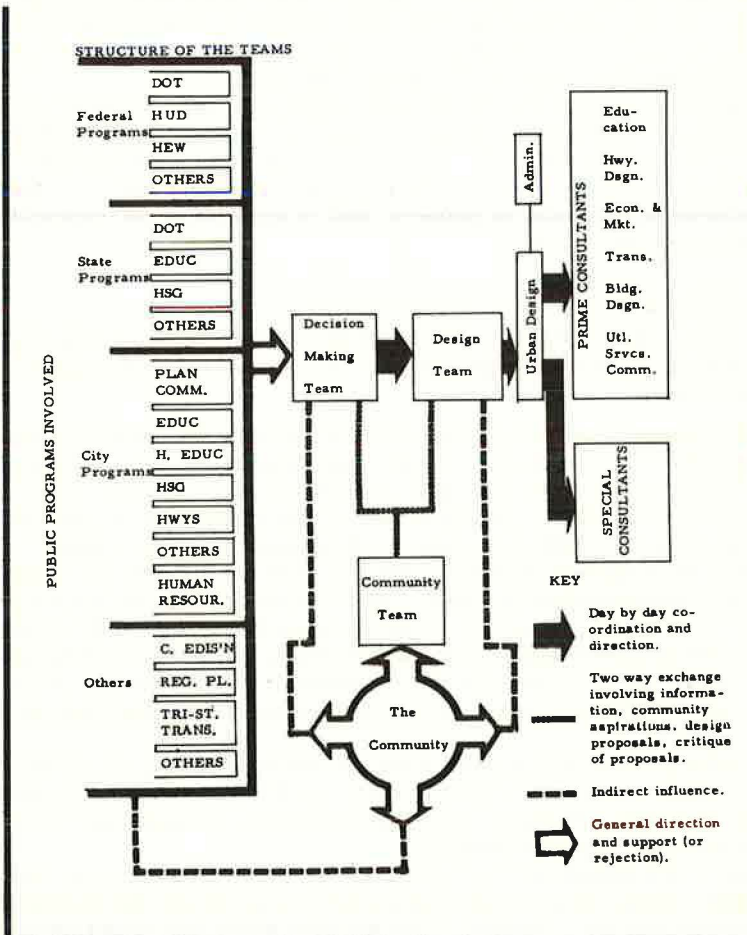
5. The evaluation of all alternatives should be made against the total spectrum of costs and benefits including, but only in proper perspective, the traditional values of first cost and efficiency. Other values must also be included, even though these are not thus far quantifiable, such as considerations of social impact and aesthetic opportunities.

6. The decision-making team must be the source for "pooling" not only decisions but also funds for joint development. A highway dollar and a housing dollar spent separately may only buy half of what these two dollars spent together would buy.

7. Finally, the highway itself should be viewed as potentially a great work of civic architecture, a source of pride and pleasure for those who drive it and those who see it from the outside.

## Appendix A

### STRUCTURE OF THE TEAMS



## *Appendix B*

### URBAN DESIGN POLICY

A paper prepared for presentation to the Senate Subcommittee  
on Executive Reorganization of the Government

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Ends are shaped by means and process shapes its product. The end product of the physical design process is our physical environment. Today, this end product is clearly chaos—a chaos developed during our present century, explosively expanded during its three middle decades and promising continued acceleration in the decades ahead.

The process which produces chaos is itself chaotic. Our failure to create an orderly physical environment is due first to the absence of a coordinated series of goals to be accomplished by the design process and second to the absence of a mechanism for depicting such goals.

The failure of the end product of physical environment is clearly recognized. The failure of process is not yet recognized.

### FAILURE OF CURRENT PROGRAMS

Expensive environmental programs have been sponsored by government since the thirties ranging from public housing to highway beautification. Each program is aimed at a sore spot in our physical fabric. Most programs are well administered and indeed have created occasional islands of environmental order. (Constitution Plaza and the Washington-Baltimore Parkway are examples.) Yet, the total impact of these corrective programs has thus far been negligible.

Their failure is due to their discreteness and their discreteness is due to the absence of coordinated national goals.

A program having as its aim the provision of new single family housing quickly and at a massive scale may most expediently achieve its purpose at the sacrifice of open space surrounding the city. The creation of a national highway system having as its single purpose the movement of vehicles will, quite properly within the limits of its mission, ignore the goals of other programs. It counters the national purpose of housing the poor by de-housing the poor and the objective of creating new neighborhoods through urban renewal by disrupting such neighborhoods.

The attempt to coordinate these discrete programs through the creation of new departments (HUD and DOT) is a belated recognition of this programmatic defect. Yet, this approach to coordination, while certainly justified, will not of itself correct the basic defect, which is that these programs, even so coordinated, remain product rather than process-oriented.

So long as our environmental programs deal with the physical end product without evolving a coordinating design process, we are unlikely to create a form for our physical environment that will come close to matching in quality the high level of our national aspirations and resources.

### ENVIRONMENTAL FORM

Environmental form is the result of the total decision-making process that ends with the "putting in place" of each component of our national physical fabric. Its embryo is found in the very beginning of the process—in goal-setting; in economic feasibility decisions; and in site selection decisions. Its final form is forecast in the words of a program statement and in the dollars of a capital program budget.

When "designing" starts—when the planner, architect or engineer begins his sketches—all that remains is to test alternative design concepts against the previously recorded decisions (generally only one foreordained concept is found to fit) and the minor decisions as to the decor that will clothe this concept. It is no surprise that the

design professionals are today regarded as cosmeticians—decorators called in at the last moment to embellish concepts developed prior to their involvement. Nor should it be a surprise that each new product of such process makes its contribution to chaos; that the users of this product often react to it adversely despite the obvious intention of most sponsors to benefit these users; and that the sponsor himself is so often disappointed by the final result of what may have been years of costly effort on his part.

Design is inherent at every stage of the decision-making ladder, whether it is recognized or not. But, if it is not recognized by the decision-makers, if it is left latent until the topmost rung of the ladder is reached, its potential for creative physical synthesis is lost.

### DESIGN

Design is the conscious synthesis of each family of alternatives posed for evaluation and decision at each stage of the decision-making process. It is the depiction of the formal image that is inherent in each family of alternative decisions. It is the fitting together of the separate pieces of our physical environment at each stage of decision-making:

1. Relating man-made to natural elements of our environment.
2. Ranging from the microscale of a single building to the broadest scale of a metropolis or region.
3. Coordinating the tangible program requirements, such as functions and costs, with the less visible but more important intangibles—the social and psychological needs of those who will use and experience the final product.
4. Coordinating these requirements not only horizontally as a two-dimensional plan but vertically as a three-dimensional architectural concept from the smallest to the largest scale of development.

Design is finally the creation, through each such concept at any scale, of that enduring architectural art which should properly be the final purpose of each segment of our physical environment.

### THE LESSON OF THE PAST

The design process of past ages produced a certain order and beauty as seen in the historic buildings and cities that are our heritage. Our respect for this heritage is reflected in our tourist tradition and in our efforts at historic preservation. And, this respect is as much a condemnation of our contemporary achievements as it is a tribute to the achievements of the past. But, the scale of past undertakings was so much simpler than those of today that the earlier design process is not really applicable to our own circumstances.

In the simpler past, the sponsor was normally an individual—a monarch, magnate, or minister who acted as patron of the art of architecture. The designer was also an individual whether he was titled architect, military engineer, or simply "artist." He conceived and executed for his patron the full range of physical elements—palaces, parks, bridges, boulevards, and cities.<sup>1</sup>

We are faced today with the urgent need to evolve a new design process fitting our complex circumstances as that of the past fitted the simplicity of prior circumstances.

### THE CIRCUMSTANCES OF TODAY

Despite the overwhelming complexity of our age, there is concrete evidence that a new design process fitting this complexity can be articulated and can achieve significant results. Two examples illustrate this point. The first example is the utilization of this process in planning for the renewal of downtown Cincinnati in 1963 ("Process for

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<sup>1</sup>The designer of the excellent plans for Annapolis and Williamsburg was also their sponsor—Sir Francis Nicholson, the colonial governor of Virginia and Maryland.

Action," by Jonathan Barnett, from the May 1966 issue of the Architectural Record, reports on this example). The second example is the organization in 1966 of a concept team to design the Interstate Freeway System in Baltimore City (John Schmidt reports on this example in the January 1967 issue of Baltimore Magazine).

These two examples point the way toward the evolution of a design process that fits the circumstances of our time and that can be applied to every element at every scale in the building and rebuilding of our physical environment. The circumstances that must be satisfied by this process are:

1. The new scales of complexity, geography, and time that typify most of today's projects.
2. The fact that the individual sponsor has now become the exception rather than the rule for such projects. Today's sponsor is generally impersonal—a school board, a government agency, a corporation—and behind this impersonal sponsor, whether private or public, there is the direct or indirect involvement of government through its regulatory function as an anonymous co-sponsor.
3. The fact that the individual designer of such projects has also become the exception. As the complexity of our social and economic organization has increased and as the multiplication of knowledge has accelerated, the singular design profession of the past has spawned its specialties and sub-specialties in order to manage its facet of social organization and of accumulated knowledge.

Given these circumstances, the new design process requires:

1. An articulation of the process to fit the project complexities and the adaptability of the process so articulated to fit the full range of scales and types of projects.
2. A new form of sponsor that will reintroduce the personal commitment of the past into the design process as well as a new concern for, and involvement of, the user in the decision-making process.
3. A new form of designer that will reintegrate today's specialties into a design team or group capable of developing a creative conceptual synthesis.

### THE ARTICULATED DESIGN PROCESS

The design process is articulated to match the several levels of decision-making. For clarity, these levels are labeled in accordance with military planning custom. Decisions are customarily rendered by the sponsor upon proposals offered by the designer. Decisions are customarily rendered at an increasing level of detail and decreasing scale of compass:

1. Vertically, starting with basic objectives and ending with detailed design.
2. Horizontally, starting with a broad geographic frame of reference (the environment) and ending with intensive study of the project area itself (the focus).

The sequence of decision-making steps will normally involve the following stages in the design process, stages that presuppose the initial and all important establishment of goals.

#### Stage I—Reconnaissance

A generalized appraisal by the designer to define the environment and the focus and, within these definitions, to draw their profiles—their salient features and trends both physical and functional. The objectives of the reconnaissance are to distinguish factors that cannot be changed from those that can; to identify, for factors capable of change, those that constitute problems to be corrected and opportunities to be capitalized in the design synthesis; to forecast the near-term and long-term future of these factors; to prepare a coordinated depiction of the environment and its focus; and to conclude with a generalized functional, social and physical program for the focus within the limitations imposed by the resources inherent in the environment.

Decisions by the sponsor at the conclusion of the reconnaissance are essentially judgments as to the validity of the findings submitted by the designer.

## Stage II—Strategic Objectives

The designer translates the reconnaissance findings, in their approved form, into a range of attainable alternative objectives. Each alternative objective is technically analyzed to confirm its compatibility with the reconnaissance findings. Each alternative found to be compatible is subjected to a comparative evaluation of its costs and benefits.<sup>2</sup> The family of subordinate objectives which relate to each major strategic objective are identified and similarly evaluated.

The designer, in order to give image to the latent physical form, diagrams the design implications of each alternative family of objectives for both the focus and the environment. He compares the relative costs and benefits and recommends as to which alternative is judged technically best from the viewpoint of design implications and the ability to solve the problems and to capitalize the opportunities identified in the reconnaissance.

Decisions by the sponsor at the conclusion of this stage involve his selection of the strategic design objective from among the alternatives posed. This selection may not conform to the technical recommendation of the designer as there are considerations of a nontechnical nature that may override. Moreover, the selected objective may not precisely conform to any of the alternatives but may rather represent a compromise decision. The important thing is that a decision be made to which the sponsor is fully committed; that he clearly understand the design implications of this decision; that it not be changed by the sponsor later in the design process; and that it be completely accepted also by the designer, whether or not it conforms to his technical recommendation and whether or not it involves a compromise.

## Stage III—Alternative Strategies

The author prepares sketch diagrams of alternative design concepts covering the geographic area of the frame<sup>3</sup> and the focus. These diagrams are normally two-dimensional where large areas are being studied. Each alternative concept incorporates the program agreed to at the conclusion of the reconnaissance, as amended to fit the strategic objective selected. Each is evaluated as in Stage II to judge its ability to attain the strategic objective selected. A technical recommendation is prepared by the sponsor and decisions rendered as in the case of the strategic objectives.

## Stage IV—Alternative Tactics (Design)

The concept selected is developed in the third dimension. The design incorporates the final space and use program detailed on the basis of the Stage III decisions. The design is normally limited to the area of the focus—the development project itself.<sup>4</sup>

The alternatives in this stage are more limited and are posed to the sponsor for decision at check points throughout the evolution of the final three-dimensional design. The costs and benefits of these tactical alternatives are, as in previous stages, presented to the sponsor for guidance in decision-making. During this design stage the sponsor becomes directly involved in architectural design decisions. This involvement must be accepted and encouraged by the designer.

## Stage V—Implementation

The sponsor and designer must continue their involvement during this phase. At the smallest scale of focus this may be the preparation of construction documents and construction supervision of a single building over a time period of a few months. At

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<sup>2</sup>The spectrum of costs and benefits considered is far broader than the customary evaluation of least first cost for greatest functional efficiency. Consideration is given to impact on social systems, area economy, and design opportunities as well as cost and efficiency.

<sup>3</sup>By "frame" is meant the area of the "environment" immediately abutting the "focus."

<sup>4</sup>Note that the focus may be the site of a single building, an entire city set within its region or the region itself.

the larger scale, decades may be required to implement the design. The important point is that implementation is the culmination of the entire design process and it must be carried through to this stage once it is started. If the decision-making process is interrupted, momentum may be lost and the entire design process aborted.<sup>5</sup>

### THE NEW SPONSOR

For small-scale design, an individual representing the sponsor is normal. For large-scale projects affecting diverse areas of interest, a team or committee is often required. In any case, the sponsor must be constituted so that he can function effectively within the urban design process as articulated above.

The key attributes of the new sponsor must be:

1. The ability to make decisions when they are posed and to make them well: (a) As a group or an individual he must have sufficient knowledge (or have it available through staff) to act intelligently upon the technical proposals of the designer and to relate these to the original goals established for the process; and (b) He must, at the point of decision, receive the designer's proposals in their totality and be capable of responding totally through his decisions as a synthesizer of all the sponsor's requirements.
2. The power to make binding decisions, regardless of employment or contractual relationships with the designer, as power is the key attribute of the sponsor.
3. The time to devote to the design process and to prompt decision-making.
4. The willingness to participate as an individual (or as a group of individuals) in personal involvement with, and commitment to, the design process.
5. Continuity throughout the process. To change the individual or individuals constituting the sponsor during the design process can be just as damaging as changing the designer.

One form of this new sponsor is Cincinnati's Working Review Committee for its downtown redevelopment—a committee that, by virtue of its membership and staff, has all of the above attributes even though it has no employment or contractual relationship to the designer.

The new sponsor contrasts with the situation as it often exists today—particularly within a public agency but often including private sponsors also. In this situation, the designer may submit his proposals for decision to an agent not vested with decision-making power. His proposals are often reviewed, not by that agent, but by others—committees or bureau employees. The reviewers are normally concerned with separate segments of the proposal with no one responsible for review of the whole.<sup>6</sup> The designer often is not permitted to discuss his proposals directly with those who review them. In the end he receives his decision in the form of a consensus report ratified by the individual in the hierarchy of the sponsor who does have decision-making power but who often has not even seen the proposals upon which he is rendering his decisions.

### THE NEW DESIGNER<sup>7</sup>

As in the case of the sponsor, the designer too must reorganize if he is to function effectively within the design process. He is the technical master of this process and

<sup>5</sup>This loss of momentum, together with the failure to utilize an articulated design process, may account for the large proportion of design proposals that are never implemented.

<sup>6</sup>The designer in this situation must substitute his design synthesis as a means of coordinating these separate decisions. The equally important synthesis of sponsor's requirements is often lost in this process.

<sup>7</sup>The term designer is used as a comprehensive designation of the professional physical designer—it signifies the architectural and landscape architecture professionals in their entirety since these professions are involved almost completely in the design of elements of the physical environment. It signifies those branches of the engineering profession similarly involved (the civil, structural, and mechanical-electrical engineering disciplines). It signifies finally the physical planner and urban designer in all of the above professions as well as within the body of professional planners.



must be able to administer it and to adapt it to fit the particularities of each project. Regardless of the scale of project the designer today is generally a team. Each team is made up of differing specialties tailored particularly to the requirements of each project. This team may be for a small project no more than an architect, mechanical-electrical engineer and landscape architect. For a large urban design project fifteen or twenty different specialists may be required (traffic engineering, sociology, political science, systems engineers, etc.). The latter case is illustrated in the Concept Team established to design the Baltimore Interstate System.

While such a team of specialists requires a coordinator, it functions best as a co-equal group of peers when developing or testing concepts. It is this group which, in fact, is the designer in the sense that the designer is the generalist who synthesizes all the specialties.

If the chief attribute of the sponsor is power, that of the designer is creative conceptualization and imagination—the ability to forecast the image of decisions. Although each individual member of the team may have an isolated area of expertise, he must be capable of contributing toward this attribute which must be inherent in the team as a whole.

The architect is often best qualified as team coordinator as he is by experience an individual generalist rather than a specialist. Yet, in this role he should not take upon himself the sole responsibility for synthesis, which is rightly the role of the team itself.

### A NATIONAL DESIGN POLICY

Given the results of the absence of process—or at least from an incoherence of process—as we see these today in our physical environment; given the initial demonstration that the process proposed above, with its new sponsor and designer, can achieve far better results where offered the chance; given the involvement of government in the public and private decision-making process that shapes our environment today; and given the leadership role inherited by the federal establishment in this governmental influence on decision-making, it is today feasible to consider the adoption of the recommended process as a national design policy.

This process is adaptable to all types of physical design projects and to all scales—including the scale of the nation. By modifying the process and carefully structuring the sponsor's team and the designer's team to fit each situation, it can be applied to the model cities program; to the development of new towns; to public planning programs from the neighborhood to the regional scale; to community renewal programs; to urban renewal and rehabilitation projects; to area economic development activities; and to highway planning. It can and should be applied to the development of individual structures and facilities—to private and public buildings, parks, and systems.

This process holds out the hope of producing order to replace our present chaos, of creating a framework for the art of architecture in place of our present artistic impoverishment. This, as a national goal, is attainable if the process is correctly understood and applied; if the sponsor and designer are concerned with the social realities of the citizenry who must live within the end product; and if the citizenry is involved in the process by making public the decision-making and the image of its design that is today normally withheld from public view. Beyond these conditions is the fundamental precondition that there be developed a set of coordinated national objectives, and strategies to achieve same, as these relate to our physical environment.

The federal government can apply the recommended design process to establish these national objectives and strategies. It can adapt the process to its current public programs. It can encourage the use of this process in all areas of activity outside of its direct jurisdiction.

The goal of constructing a national physical environment matching the quality of our national aspirations and resources is clearly attainable. The complexities of programming and planning for this goal are no greater than those faced in our exploration of space or in our successful prosecution of a world war. It has been achieved by less resourceful nations in the past.

The first step toward such a goal is to reintegrate design into the decision-making process and to apply the enlightened process at every scale of endeavor consistently and creatively as we add to and rebuild our national physical fabric.