CHAPTER 8

URBAN VISUAL DESCRIPTION AND ANALYSIS

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INTRODUCTION

Of all the environments that we perceive, record, and analyze, the only one that we classify as "urban in nature" is the most complex. The multiple interactions and interfaces of the built components—whether that be the overall plan, infrastructure, buildings, or streetscapes—with the natural ones—geographic location, topography, water bodies, or flora—generate this complexity and provide the environmental planner and designer with a rich, diverse, and multilayered context in which to practice.

There are many examples of strong form-giving urban planning practices in European cities, culminating with the Haussmann effort in Paris under Napoleon III. By contrast, roughshod early settlements in the United States developed with minimum planning and control. Early exceptions included planned industrial towns like Lowell, Massachusetts.

No cohesive planning movement related to cities' physical form took place until the Chicago World's Fair in 1893 exposed the public to an orderly, articulated plan with generous open spaces, regular cornice lines, trees, canals, and other bodies of water. The so-called "City Beautiful" movement resulted in Burnham's plan for Chicago and influenced physical planning for Washington, D.C. and Philadelphia in fragmentary ways. During the next 25 years, much of city planning was focused on control of physical development through zoning and planning streets, transportation, and recreation—so called "comprehensive planning" which really was not comprehensive in that socioeconomic concerns were not addressed. However, the major positive contribution of the early nineteenth century to urbanism was the great central park—the large, romantic naturalistic oasis—characterized by the designs of Frederick Law Olmsted. Examples include Central Park in Manhattan, Prospect Park in Brooklyn and others in St. Louis, San Francisco, Boston, Hartford, and Trenton.

Basic or organic city planning in the 1930s was a counterreaction to prior planning efforts and focused on slum-like housing conditions and the need to remedy basic living conditions in cities. The intent of the U.S. Housing Act of 1937 was to spread the need or requirement for community planning. A series of federal legislative enactments followed which focused on specific socio-economic defects of previous legislation, until 1969 when physical environmental concerns came back into concern.

The 1930s was also typified by the socially oriented planning group that stood "above the melee." The professional planner and city planning commission assumed the sacred tenet of professional neutrality, and activity was focused on the evolution of the single, "right" plan. From the initial scope and purpose of orderly and spatial development, utilities, and transit system along with some architectural awareness or emphasis, there came the input of social, economic, and even psychological thinking. The planner became more the orchestrator—no longer the architect or engineer—but more of a manager. Public hearings soon became more than a formality, and formidable opposition to proposed plans and projects became a reality in the 1960s. This was especially true for "urban renewal" projects in many U.S. cities as well as major transportation planning efforts in New York, Philadelphia, San Francisco, and Boston.

Twentieth-century planning can be characterized as major movements toward city and town extensions, suburbs without distinction, urban renewal which was often ill-fated, tenuous model cities or demonstration cities, selected new towns and communities, and some metropolitan and regional planning. Probably the new communities of Bosten, Columbia, and Radisson are the most physical or tangible form-giving results.

The complexity of urban environments has posed problems for designers, social scientists, and urban dwellers. How complex should urban environments be? Some designers propose simplifying urban environments (Ashihara 1983) to make them more aesthetically pleasing and understandable. Social scientists have stated that a certain amount of ambiguity and complexity in urban environments is desirable (Rapoport and Hawks 1970; Rapoport and Kanter 1967). Still other social scientists inform us that urban visual material has excessive complexity compared to natural environments (Kaplan, Kaplan, and Wendtt 1972; Wohlwill 1968). Are we to trust the designer or the social scientist when are are inventoring, analyzing, and assessing visual qualities of urban environments? This chapter will assist us in dealing with this question as well as in arriving at a generic framework for doing urban visual analysis.
We will first review the types of decisions or actions which visual analysis can affect. Given the tasks at hand, we will historically review how urban designers and architects approached these problems. Then we will explore in detail the expert designer approach for a more detailed analysis of scale, design elements, light effects, and static versus dynamic viewing of the environment. This will be contrasted with a social science framework which can be used to choose environments to be sampled, environmental displays, stimulus material, and choosing respondents. Finally, we will discuss how we can combine approaches in a generic overview, and describe new emerging methods and technologies.

DECISIONS/ACTIONS

Let us start from the largest scale and work down to smaller-scale urban activities. On the largest scale, the activity addressing urban environments would be deciding which regions are suitable for urbanization or increased density of development. In other words, can visual analysis assist us in determining which geographic areas are suitable for urbanization? In the United States, this would apply to new town development or to areas which are threatened with urbanization from belt-line highways (Jacobs and Way 1969a, 1969b; Yuill and Joyner 1979). In other areas of the world, visual analysis has been used as part of an assessment for suitability for urban development [for example, Australia (Wright 1974) and Yugoslavia (Pogacnik 1979a, 1979b)]. Lynch has also given us some general approaches in his book Managing the Sense of a Region (1976).

The second application would be the siting and design of major new transitways in urban areas or analyzing existing ones (for example, the view from the road or "city as a trip"). Much of the urban visual analysis work has been done from this perspective and it's true that we perceive much of urban environments from major highways and transitways (see Appleyard et al. 1964; Carr and Schissler 1969; Craik 1975, Smardon and Goukas 1984; Winkel 1969).

The third application is deciding what to keep at the district or neighborhood level because of its inherent or associated visual quality via neighborhood or historic district preservation, or what to develop because of its loss of visual quality through downtown or waterfront revitalization (Frey 1981; Palmer 1983; Robinson 1980; Huspeth 1982; Lambe and Phillips 1981; Peterson 1967; Willmott et al. 1983; Zoelling 1981). An important aspect of any analysis technique at this scale is to facilitate a sound reflection of citizen values and attitudes within the process.

The fourth application is control of undesirable land uses which create visual environmental problems. Commercial strips are the typical example of a mixture of land uses which create traffic safety problems as well as visual disorder. A common misconception is that the two problems are separate. They are not—they are interdependent; visual disorder due to too many signs and other artifacts creates cognitive confusion and way-finding problems which may cause traffic accidents. Only a few studies have attempted to address this problem (Carr and Schissler 1969; Ewald and Mandelker 1969; Smardon and Goukas 1984). A more positive aspect to this problem would be saving or preserving high-quality streetscapes, where the first object would be to document environmental quality (Craik and Appleyard 1980, Ulrich 1974), and the second step would be to involve appropriate parties in the process of redesign or rehabilitation of the streetscape (Ramati 1981; Willmott et al. 1983).

The fifth application would be the siting and design of specific urban structures. The object would be to minimize incompatable building scale or materials, unless intended contrast is the design objective, and to avoid unintended physical effects such as view blockage, shadow and glare effects, as well as surface wind acceleration (Appleyard and Fishman 1977). Some cities, such as Seattle, Washington (Erickson 1980) and San Francisco, California (Bosselman 1982), have made great strides in review processes to attempt to avoid such impacts.

The introduction to this chapter included an extremely short history of public physical planning relating to the physical form of cities. What about control of private development? Since Euclidian zoning in the 1930s, there have been extremely sporadic and spotty applications of general zoning and architectural controls to private development in cities. Courts have rarely upheld aesthetic controls on architectural development, and most of the cases are concerned with outdoor advertising. There are two interesting developments from legal and administrative aspects of
aesthetic development control. One is a recent Supreme Court case which addresses the right to control private development when historic and aesthetic issues are at stake, and the second is the use of urban design review processes to review private projects. One of the most sensitive areas is the use of police power to restrict uses of an historic property or building without providing compensation. The Supreme Court recently decided that New York City did not violate the Penn Central Transportation Company’s Fifth Amendment property rights when it designated Grand Central Terminal as an historic landmark, thus blocking the company’s proposal for an office tower above the facility.

The company is not entitled to compensation as a result of the city’s denial of permits for the office project, the court said in a decision which is expected to spark similar preservation efforts in other cities. The court gave historic preservation constitutional status similar to that enjoyed by zoning and other conventional land use controls. Over the last 50 years, the court noted, over 500 cities and states have adopted landmark protection laws “to encourage or require the preservation of buildings and areas with historic or aesthetic importance.”

In Justice William Brennan’s opinion, the court rejected Penn Central arguments that the landmark designation constituted a “taking” of property for which “just compensation” is required under the Fifth Amendment. The restrictions imposed on the terminal site, Brennan said, “are substantially related to the promotion of the general welfare” and “permit reasonable beneficial use of the landmark site,” namely, the terminal itself. The facility was described in the opinion as “one of New York City’s most famous buildings.”

Some interesting possibilities are suggested by the decision. While it emphasizes “historic” preservation, Justice William Brennan’s opinion also stresses the need to protect areas of aesthetic importance. That phrase could be sufficiently vague to protect communities seeking to block development proposals on specific sites which may have no real “historic” significance. The court’s ruling seems to expand a city’s authority to single out certain sites for protection.

Urban design review is a process whereby a public entity can review private development within a city’s jurisdiction, and subject matter can include aesthetic aspects of design. In his recent book, Urban Design Review: A Guide for Planners, Hamid Shirvani characterizes the nature of urban design review as performance-based or prescriptive or whether standards are accompanied by comprehensive prototypes or specific design components (Shirvani 1981, 26).

On a more specific level, Shirvani addresses specific elements addressing issues of concern or scope of issues. He gives the example of design review process for the City of Palm Springs as an outstanding example of an aesthetic guideline that includes aesthetic issues. The standards state that building design, material, and colors are to be “sympathetic with desert surroundings” and that there should be a “harmony of materials, colors and composition of those structures which are visible simultaneously” (Shirvani 1981, 28). He also gives an example from the process for Santa Barbara which states that “skyline trees be incorporated into the landscape plan when practical” and that “building components such as windows, doors, and arches should have appropriate proportions to the structure” (Shirvani 1981, 29). The former standard from Palm Springs is a performance standard whereas the latter example from Santa Barbara is both prescriptive and performance-based. A standard which would be descriptive would merely state that aesthetic issues be addressed.

Let us now explore approaches to urban visual analysis that attempt to address some of the five applications or problems listed above. For a broader review of architecture and perception of urban environments, the reader is referred to Prak (1977) and Ashihara (1983). For an overview of urban environmental aesthetics from a multidisciplinary perspective, the reader is referred to recent reviews by Porteous (1982) and Lynch (1981).

DEVELOPMENT OF EXPERT APPROACH

Kevin Lynch’s Image of the City (1960) stands as the seminal work and influence on how we as environmental designer—architects, landscape architects, urban designers, planners—have, subsequently, viewed and analyzed the urban space. Lynch’s work introduced concern for the importance of finding out how humans experience and relate to their environments. It also lead to a com-
prehensive approach to analyzing how people see, perceive, use, and remember their surroundings. It alerted the design and planning professionals to the importance of taking the lay person's perceptions of the physical environment into consideration. Lynch developed one of the first notational and mapping systems that allowed for the recording of individual "images" and, subsequently, composites that showed commonly held perceptions. The terms path, edge, node, district and landmark, taken from Image of the City (see Figure 8.1), became commonplace in the environmental planning and design community.

Lynch's greatest contribution, however, lies in his introduction of the notion of imageability which was originally derived from Boulding. As early as 1915, Paul Stern addressed this issue of environmental sensory response when he dealt with apparencty. As an initial probe of the inner

meaning of art objects, he felt that the clarity and harmony of a form elicit a response during the observer's search for an appearance that is comprehensible.

Lynch's definition of imageability is worth noting, for it not only describes the qualities that make an impression on any observer, but, in fact, it provides a very applicable conceptual framework for the structuring of an inventory and analysis of the urban scene. It reads:

*Imageability: that quality in a physical object which gives it a higher probability of evoking a strong image in any given observer. It is the shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment. It might also be called LEGIBILITY, or perhaps VISIBILITY in a heightened sense...* (Lynch 1960, 9).

In Lynch's concern for the comprehensible city, he clearly states the interface between the analytical process and the use of the findings when he states:

*The work was done with the conviction that analysis of existing form and its effect on the citizen is one of the foundation stones of city design, and in the hope that some useful techniques for field reconnaissance and citizen interview might be developed as a by-product.* (Lynch 1960, 14)

His research incorporated two basic analytical techniques: that of a systematic field reconnaissance by a trained observer, and lengthy interviews with a sample of city residents in order to ascertain their images. This latter technique included requests for descriptions, locations, sketches, and performances of "problem" trips.

In Lynch's brief section on the method as the basis for design (1960, 156), he recommends an improved two-step approach based on the two concurrent sources—trained observers (two or three) and general population (large sample). He points out that by comparing the two results, an initial identification of critical points, sequences, or patterns can be made. A second, more detailed, and intensive investigation by both trained observer and a small public sample would deal with identity and structure under many field conditions of light, distance, activity, and movement. All the material would be synthesized in a series of maps and reports that would give the basic public image, the visual problems and strengths, the critical elements, and their interrelationships and possibilities for change.

Gordon Cullen's book, *Townscape*, published in 1961 (also *Concise Townscape* 1971) was quickly recognized by architects and planners as a major contribution to the concept and method of urban scene analysis. In fact, it affected academics and practitioners who were seeking to bring cohesiveness and comprehension to the urban environment.

The first contribution was that specific visual perceptions of both urban building and spaces were based on aesthetic principles. The second contribution was an exploration of what makes a town "work"—in urban design terms. The third contribution was the quality of Cullen's graphic analysis of the urban scene (see Figure 8.2). Taken collectively then, *Townscape* truly introduced the notion of urban design (a term he did not use and one not common at the time) as process and product when he wrote in his introduction:

> Now turn to the visual impact which a city has on those who live in it or visit it... [b]ring buildings together and collectively they can give visual pleasure which none can give separately.

> One building standing alone in the countryside is experienced as a work of architecture, but bring half a dozen buildings together and an art other than architecture is made possible. Several things begin to happen in the group which would be impossible in the isolated building. We may walk through and past buildings, and as a corner is turned an unsuspected building is suddenly revealed. (Cullen 1961, 7)

He also spoke to the idea of the analysis of the buildings, their elements or characteristics, and how those relate to context when he wrote:

> Suppose that we are just looking at the temple by itself, it would stand in front of us and all its qualities, size, color and intricacies would be evident. But put the temple back amongst...
the continuous habit of the body to relate itself to the environment, this sense of position cannot be ignored; it becomes a factor in the design of the environment. . . ." The third category is content, which addresses the exactness of the fabric of towns; color, texture, scale, style, character, personality, and uniqueness.

The work of Appleyard, made familiar in his book The View From the Road (with Lynch and Myer 1964), established the foundation for the critical concept of dynamic perceptions. Since the users of the urban environment are, most often, in motion, either on foot or in an automobile, coming or going, the understanding of the complexity involved in changing vistas, unfolding views, ever-changing "images," becomes critical to the urban design process.

Since publication of The View from the Road in 1964, the inclusion of an analysis of an urban-scape as perceived when moving through it has become more commonplace. A quote from the preface underscores the importance.

Design involves a balanced judgment about many factors, of which visual requirements are only one set. We are convinced, however, that these requirements are among the most important that the road must satisfy. . . . If it is also a good example of a design issue typical of the city: the problem of designing visual sequences for the observer in motion. (Appleyard et al. 1964, 2)

It is important to note that movement implies a sequence of events, views, perceptions, and interpretations. Therefore, the recording of the existing situation/context/environment and proposals for their alteration requires specialized graphic and notational systems. These were first investigated and presented in The View From the Road (see Figure 8.3), also developed by Philip Thiel (1961) in his sequence-experience notation system, and further investigated and developed by renowned landscape architect Lawrence Halprin in RSVP Cycle, published in 1969. In developing the notion of scores, Thiel displayed a series of graphic techniques to record, analyze, and set forth events involving a sequence of human actions and interactions. A short passage from the conclusion of The View From the Road underscores the importance of the application of findings when it states:

Additionally, he addressed the process of looking, analyzing, and extracting information pertinent to the design process. In what he calls optics/serial vision, he discusses the concept sequence—existing view and emerging view (see Figure 8.2). Through what Cullen calls place he explores ‘‘. . .
The crucial test will come in applying these ideas to actual design problems, and in evaluating the results obtained. Here the techniques of design and of analysis can be refined, and our grip on principles strengthened.... An experimental road would be the proof of the pudding. (Appleyard et al. 1964, 63)

PROFESSIONAL OR EXPERT RECORDING AND ANALYSIS TECHNIQUES

In regard to this matter of "graphic skills," it is usually the expert's belief that the process of recording and analyzing is integrally tied to examination of relationships through graphic exploration. The expert approach is based on the premise that in the process of graphically recording and analyzing the urbscape, one continually discovers relationships, commonalities, juxtapositions, and sequences that are not evident upon first, or even subsequent, visual examination (see Figure 8.4).

In similar fashion to the methodology by which an architect analyzes a single building or a landscape architect a specific landscape, the urban designer must develop a basic vocabulary process which is then used to structure the analysis. This primary "process" can then be modified, refined, and detailed so as to allow for application to any given project.

Process

The first step for expert visual inventory and analysis is to prepare an overall process. Within Figure 8.5, we can trace some of the major steps in urban visual analysis. Critical steps include determining what observation points will be used to inventory the urban visual environment, how to describe the visual landscape, how to represent the urban visual environment with specific scenes, and how to evaluate visual quality.

Establishing Visual Control Points

One of the early, but important, decisions is how to visually record the characteristics of the urban visual environment. A standard technique from a professional perspective would be to take 35 mm photographs or slides from intersections or areas where people would congregate (see Figures 8.6a...
FIGURE 8.4. Example of expert graphic analysis. Source: Sadler, B. and A. Carlson, eds., 1982, Environmental Aesthetics: Essays In Interpretation, Department of Geography, University of Victoria, Victoria, Canada, 55.

and b) and then to record on a map of some type the position and direction that these photographs were taken. These individual positions where single or multiple photographs were taken would be called visual control points (after Litton 1973) and become the anchoring points for our visual data base.

A different approach would be to take totally random photographs of the urban environment (Milgram 1972), or to give subjects cameras and have them take pictures of what they think best represents the urban environment (user-employed photography; Chenoweth 1984). Still another method would document the experiences of the view in motion by using video or movie cameras to take tape or film while moving down a street. The latter technique has been used by the author (Smardon and Goukas 1984) and others (Appleyard et al. 1964; Craik 1975; Carr and Schissler 1969) as well. Chapter 5 on environmental perception tells us why these decisions are important.

Visual Elements

Beside recording images visually, one needs a procedure or method to characterize visual elements in the environment. The analyst needs to note a number of characteristics on a data sheet while looking at the specific view. The following typology of visual elements was derived from a number of sources (Velasques 1979; Erickson, 1980). Such notations can include:

1. The type of view: vista, wide angle, or panorama.
2. Viewer distance: close, intermediate, far.
3. Viewer elevation: inferior, normal, superior (see Figure 8.7a).

Specific physical attributes of views which may be recorded include:

1. Paths: grid, irregular, or radial.
2. Degree of enclosure: ratio, distant view, open-ended versus close-ended (see Figure 8.7b).
3. Street trees: height, distribution, canopy, and scale (see Figure 8.7c).
5. Activity pattern (see Figure 8.7d).

With physical elements recorded, one can then attempt to distribute them on a map in a geographic sense or begin to characterize sequences of views.

Analysis

Notation systems can be developed (see Figure 8.8) to begin to document sequential visual experiences. Such an approach was also utilized by
Figure 8.5. Sample visual inventory process.

Appleyard in *The View From the Road* (Appleyard et al. 1964) and Philip Thiel (1961) and in a recent North Syracuse Commercial Strip project (Smardon and Goukas 1984). Notation systems can also be used to classify urban landscapes into visual districts as originally conceived by Lynch (1960). This is illustrated in Figure 8.9 for the North Syracuse commercial strip. The visual units were derived from layers of notations which, in turn, were derived from video footage replayed many times.

Visibility

Once an analyst has developed a visual database and notational system, there should also be thought given to visibility assessment of the urban landscape (see Chapter 4). This is a fairly complex

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**LITERATURE REVIEW**
- Aesthetics of highway development
- Background analysis
- Visual inventory and analysis methods
- Design concept development
- Design evaluation methods

**BACKGROUND ANALYSES**
- Merchant survey
- Traffic
- Land use
- Pedestrian

**VISUAL INVENTORY**
- Study of passenger and driver’s view
- Script written from above
- Video taken of Main Street

**VISUAL ANALYSIS**
- Positive and negative attributes chosen
- Visual components chosen to describe landscape
- Visual description using symbols
- Development of visual districts

**DESIGN CONCEPT DEVELOPMENT**
- Problems and opportunities of districts
- Program potentials for design alternatives
- Design workshop
- Final design alternatives

**DESIGN EVALUATION**
- Photoquestionnaire designed
- Photoquestionnaire put in local newspaper
- Results analyzed

**SCALE MODEL BUILT**
- Reliability of model tested

**RECOMMENDATIONS**

**STUDY EVALUATION**
undertaking for urban landscapes since elevated highways and walks as well as buildings give the observer many different vantage points, and hence changes the viewable area drastically. Even at the street level, large buildings block or obscure sections of a stationary view (see Figure 8.10); but if the observer walks to a street corner, the viewshed changes drastically.

Some thought needs to be given to visibility criteria for foreground, middleground, and background zones of any given viewshed (see Figures 8.10 and 8.11). Then activities and use of the urban environment should be studied to develop a rationale for determining which visual control points viewsheds should be constructed from. Then any number of viewsheds should be developed based on methods discussed in Chapter 4.

**Light**

In the perception of any urbanscape, light plays an important role for it is a well-known fact that the quality of an urban space, in fact the entire “image” of a particular city, is determined in part by the quality of light. London, in the shrouded translucency caused by the fog, or the Greek hilltowns of the Aegean bathed in the Mediterranean sunlight are prime examples, as the ambiance and mood of both are greatly created by the light that pervades the urbanscape.

In addition to the idea of a lighting quality analysis which, by its very nature, is subjective, the more pragmatic study of shades and shadows is an important component of an analytical process. With the ever-increasing concern for energy
considerations, a detailed study of an urban site or existing building in terms of “sun access” is of great importance. Critical factors dealing with the sun’s relationship on the “celestial sphere” to an urban site, street, and so forth constitute a comprehensive, analytical technique (see Chapter 3 for more detail).

The impact of natural light considerations must be paralleled by an investigation of artificial light so that a total understanding of an urbanscape at night is ascertained (see Hack et al. 1974). Terms like the Great White Way (New York City’s Broadway Theatre District), and pearl necklace of car lights are terms which refer to a quality of a specific urban context created at night. Appleyard, Lynch, and Myer (The View From the Road, 1964) reinforce this notion:

At night a new order reigns in the city. The chaotic skylines, jagged shapes, erratic signs, forms, and shapes disappear into the darkness, to be replaced by the luminous dots, stripes, and diffused light. The path system becomes clearer. . . . The more prominent intersections or nodal points can gain extra emphasis. . . . Certain areas. . . . become nocturnal landmarks. (Appleyard et al. 1964, 57).

The above are positive aspects of lighting. There are negative aspects as well.

Seattle, Washington (see Erickson, 1980) adopted an ordinance in 1978 to help correct the adverse effects of lighting and glare by limiting:

The reflective qualities of surface materials that can be used in development;
The area and intensity of illumination;
The location or angle of illumination; and
The hours of illumination.

Glare is generally described as being either primary or secondary. Primary glare pertains to glare caused by a direct light source, whereas secondary glare is from reflected light, also often referred to as reflective glare. Reflective glare is generally of two types: “spot” glare in which parallel light rays from the source are reflected parallel from the reflective surface; and “scattered” glare when

![Matrix - Illustrated Definitions](image)

**Figure 8.7a.** Key view typology.
parallel light rays from a source such as the sun are reflected from a surface in a nonparallel fashion. With spot glare, one usually sees an image of the source on the reflecting surface, whereas with diffused flare the whole surface appears illuminated and one does not see the image of the source.

The adverse effects of glare on vision are often analyzed in terms of visual disability and visual discomfort. The former occurs when one’s eyes cannot adjust simultaneously to a bright light source against a dark background, which might happen one one looks at bright headlights of an oncoming car at night. Spot glare directly viewed also weakens vision if the source is intense enough. Visual discomfort results when a relatively intense source of light suddenly appears before one’s eyes have the opportunity to adapt to it. Squinting and visual avoidance of the source are signs of visual discomfort from glare.

Spot glare from reflected sunlight is actually quite common in our environment but rarely creates a visual nuisance since the angles of reflectance are usually sufficiently large so that the angle of incidence with the horizon is greater than 30 degrees and does not intrude on vision unless one looks up. Reflected glare from the sun is not noticeable during the early or late hours of the day when the altitude of the sun is still relatively low or during the winter months when the sun is continuously at an angle of less than 30 degrees. At other times, reflected spot glare may occur
when one looks up at an object and the glare from it is within one’s field of vision or when one feels the heat of reflected sunlight. Parking lots full of cars with reflective bumpers and windshields often cause solar spot glare, especially when viewed from nearby buildings above it.

The major determinants of direct glare are the intensity of the source and the brightness of the surroundings. Two factors significantly affecting reflective glare are the brightness of the light source and the reflectivity of the surface which reflects the light. Solar reflective glare is often most noticeable off highly reflective surfaces such as metal, glass, or water. Car bumpers and windshields, large glassed surfaces, and large bodies of water often function as reflectors of direct sunlight.

Just as the brightness of the light source has a major bearing on reflective glare, so also does the reflective power of the surface the source strikes. Smooth, nonporous metal surfaces were found to have the highest degree of reflectivity (50 to 95 percent), followed by lighter colors. Flat white has the highest degree of reflectivity (85 to 89 percent) followed by yellow (70 percent) and then diminishing as the spectrum of shades grows darker.

Also, the degree or coefficient of reflectivity alone cannot always be depended on since the visual impact varies considerably according to the surface type. Smooth specular surfaces reflect the sun’s rays in a parallel fashion (spot glare) whereas a porous surface such as concrete painted white scatters the sun’s rays in a number of directions, thereby diffusing it (scattered glare).

Besides metal surfaces, the other major type of specular surface is glass. All smooth glass gives off some spot glare, although the intensity varies considerably with the type of glass and the angle of incidence of the light source’s rays. For example, nonreflective glass (aminosilane) reflects at an average of about eight percent whereas reflective glass reflects at an average, depending on type, of between 14 and 44 percent. As the angle of incidence of the source light increases above 70 degrees, however, nonreflective glass takes on approximately the same degree of reflectivity as reflected coated glass.

The applications of light and glare evaluation are obvious as we progress toward visual impact assessment in urban environments with Chapter 13. As part of a visual inventory, however, we could start to note existing “problem” areas in the urban environment. This is exactly what was done
for our visual inventory of the Northern District. A simple procedure (see Figures 8.12 and 8.13) of using a light meter at different locations, atmospheric conditions, and times yielded some problem areas, especially near some building facades and parking lots.

Other analyses of shadow effects at different times of the day and season could be undertaken (Bosselman, 1982) as well as night illumination studies (Hack et al. 1973).

Summary of Expert Approach

After all inventories and analyses are completed, many professionals attempt to develop one composite map of an area. This composite map is often intended to represent all the incremental factors studied thus far in a holistic summary of an impression. This still does not address evaluation of visual quality in the urban environment. Evaluative assessments are best done with some sampling of respondents who experience the actual area in question, for example, people who live, work or visit the urban landscape.

A SOCIAL SCIENCE APPROACH TO URBAN VISUAL ASSESSMENTS

In the late 1960s and 1970s, there was increasing social science work performed by environmental psychologists, sociologists, planners and designers to improve our understanding of man-environment relationships in urban settings. Much of
this work centered around issues of whether increasing amounts of stimulus complexity or ambiguity was good for urban living or not (Wohlwill 1968; Rapoport and Hawks 1970; Kaplan et al. 1982; Rapoport and Kanter 1967), whether familiarity increased people’s preference for certain urban environments (Herzog et al. 1976), the role of personality in assessment of urban environments (Craik 1975; Winkel et al. 1969), the role of perceptual selection and memory (Carr and Schissler 1969) and the role of symbols and meaning (Appleyard 1969; Harrison and Howard 1972).

Of course, planners and designers would find more immediate utility in studies that attempted to correlate specific physical attributes of the physical environment with respondent preference (Carp et al. 1976; Peterson 1967) and less immediate utility in more sophisticated psychological statistical treatment of data (Garling 1976). It is interesting to note after a period of relative inactivity in urban perception studies that recent studies are being reported which assess specific types of urban environmental situations such as highrise buildings and their residents (Zoelling 1981; Ulrich 1984) or specific attributes such as the role of vegetation in urban environments (Palmer 1984; Thayer and Atwood 1978).

For the average environmental analyst or designer, this may not help much with the specific decision of which type of study to do, if one is to ask respondents about quality of the urban environment. To the author’s mind, one of the most useful papers in this regard is Craik’s paper, “The Comprehension of the Everyday Physical Environment” (1968). Within this paper, he addresses methodological situations in general but presents four elements that must be considered in research on the comprehension of the physical environment (see Figure 8.14). These elements are: (1) media of presentation, (2) observers, (3) environmental displays, and (4) response formats.

**Media of Presentation**

The first choice to be made is what medium or mediums of display are to be used. Typical choices might include: (1) direct exploration of the site, (2) viewing a model, (3) viewing photographic slide series, or (4) viewing a complete set of architectural elevations, and plans. Obviously, the first option would be most desirable but too expensive, and the last option would not be optimum because most people have a difficult time reading architectural elevations, plans, and perspectives. A choice between (2) and (3) would
GLARE PHOTOS & METER READINGS

A study of the degree of glare produced by buildings and vehicles has been conducted in the Syracuse Central Business District, Northern District. The results will hopefully aid in assessing those areas producing hazard, distraction, or stress. The procedure required a site visit on two different occasions, differing distinctly in lighting and weather.

DATE NO.1: April 8, 1982
DATE NO.2: April 12, 1982

CLIMATIC CONDITIONS: windy, gusty
TEMPERATURE: 35°F
TIME: 12:15-1:45 PM
WEATHER: 100% sunshine, 20% snow covering

<table>
<thead>
<tr>
<th>View Description</th>
<th>View Direction</th>
<th>View Distance</th>
<th>&quot;F&quot; stop</th>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. South Facing Facades</td>
<td>North</td>
<td>Close</td>
<td>5.6</td>
<td>500</td>
</tr>
<tr>
<td>2. Herald Journal Bldg</td>
<td>West</td>
<td>Intermediate</td>
<td>5.6</td>
<td>1.7</td>
</tr>
<tr>
<td>3. Front of Hanover Square</td>
<td>South</td>
<td>Close</td>
<td>5.6</td>
<td>2.3</td>
</tr>
<tr>
<td>4. Herald Journal West Side</td>
<td>North</td>
<td>Close</td>
<td>8.0</td>
<td>2.3</td>
</tr>
<tr>
<td>5. Supreme Parking Island by Brie</td>
<td>South</td>
<td>Intermediate</td>
<td>8.0</td>
<td>2.3</td>
</tr>
<tr>
<td>6. South Clinton by Clinton Square</td>
<td>North</td>
<td>Close</td>
<td>8.0</td>
<td>2.3</td>
</tr>
<tr>
<td>7. Herald Journal Clt. to Clinton Sq.</td>
<td>South</td>
<td>Intermediate</td>
<td>8.0</td>
<td>2.3</td>
</tr>
<tr>
<td>8. Brie, South Side of Post Office</td>
<td>East</td>
<td>Close</td>
<td>8.0</td>
<td>2.3</td>
</tr>
<tr>
<td>9. Roy's Facade</td>
<td>East</td>
<td>Close</td>
<td>8.0</td>
<td>2.3</td>
</tr>
<tr>
<td>10. Warehouse Face</td>
<td>North</td>
<td>Close</td>
<td>8.0</td>
<td>2.3</td>
</tr>
</tbody>
</table>


Observers

One must first decide whether one is concerned with individual or group differences in comprehension of the environment. In most cases, we are concerned with comparing one group’s reactions to another, such as in the Clayton Study (Willmott et al. 1983), where we compare three different populations’ reactions (year-round resident, summer resident, and day visitor) to waterfront revitalization differences. Sometimes we want to compare designer/planner preferences or evaluations with the public reactions. In most cases, we want to ensure that we have representation of most groups who use the urban environ-

<table>
<thead>
<tr>
<th>Citation</th>
<th>Location &amp; Time</th>
<th>Study Environment</th>
<th>Participants</th>
<th>Visual Stimulus</th>
<th>Survey Instrument</th>
<th>Special Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>local residents</td>
<td></td>
<td>questionnaires</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>door-to-door</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>35 local business &amp; community leaders</td>
<td>plans &amp; color simulations</td>
<td>verbal responses at workshops</td>
<td>color photocopy simulations</td>
</tr>
<tr>
<td>Zoelling (1981)</td>
<td>Syracuse, New York 1981</td>
<td>high-rise structures near CBD</td>
<td>78 high-rise &amp; low-rise residents</td>
<td></td>
<td>direct interview w/ questionnaires &amp; cognitive mapping</td>
<td>area maps &amp; color markers for marking pedestrian routes</td>
</tr>
<tr>
<td>Willmott et al. (1983)</td>
<td></td>
<td></td>
<td>designers</td>
<td>video-tape</td>
<td>design workshop</td>
<td>video inventory from streets, water and rooftops</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>year-round residents, seasonal residents, day visitors</td>
<td>photo simulations, plans &amp; descriptions</td>
<td>mail back ballot &amp; questionnaire</td>
<td>black &amp; white photo-montage simulations developed in photo darkroom</td>
</tr>
<tr>
<td>Smaardon (1983)</td>
<td>Syracuse, New York 1982</td>
<td>downtown CBD</td>
<td>25 students in 4 teams</td>
<td>field video, still photos, video of CBD scale models</td>
<td>team developed visual impact rating forms</td>
<td>video camera &amp; recording equipment &amp; editing lab, equipment for scale model production, modoscope/stop gantry</td>
</tr>
<tr>
<td>Smaardon &amp; Coulas, (1984)</td>
<td>Village of North Syracuse, New York 1983</td>
<td>small village w/ large regional commercial strip</td>
<td>6 local residents</td>
<td>actual views</td>
<td>tape recorder</td>
<td>scriptwriting ability to record video sequence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 students</td>
<td>videotape</td>
<td>open ended survey form</td>
<td>videotaping equipment to record passenger &amp; driver's experiences</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12 member village board</td>
<td>videotape</td>
<td>verbal responses in workshop</td>
<td>scale models of strip video footage &amp; equipment to record dynamic simulations through the modoscope/stop action recorder to do analysis on tv monitor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>92 local newspaper subscribers</td>
<td>B &amp; W photo simulations w/ descriptions</td>
<td>tear-off mail back ballot/ questionnaire</td>
<td>B &amp; W photomontage 35 mm camera &amp; equipped darkroom</td>
</tr>
</tbody>
</table>
ments that are being assessed (see Table 8.1 under column Participants).

Response Formats

We need to record observers’ reactions somehow and there are many different formats to do this. This aspect of survey design is covered in detail in Chapter 10. We have found in several community service projects that open-ended responses are very useful in the beginning of a study to uncover the range of qualitative attributes of urban environments (Smardon 1984). Cognitive mapping exercises are very interesting to the scientists, but often very intimidating to the subject (Zoelling 1981). Finally, high-quality black and white photoquestionnaires with rating scales and/or attached questionnaires have proved very useful in eliciting responses to existing qualities or proposed changes in urban environments (Frey 1981; Robinson 1980; Grant 1982; Hudspon 1982; Willmott et al. 1983). (See Figure 8.15.)

Purpose of Environmental Display

The basic structure which ties everything together is the purpose for the study. It is (1) descriptive assessment whose purpose is to uncover qualitative attributes or dimensions of urban environments, or (2) an evaluative assessment which compares, rates, or ranks one environmental setting with another or (3) a prediction assessment used to assess possible changes in the environment before it happens.

COMBINING EXPERT AND SOCIAL SCIENCE APPROACHES

At this point, let us attempt to bring the expert approach together with the public sampling approach. As a basic framework, we can array the four paradigms of landscape assessment (from Zube et al. 1982)—expert, psychophysical, cognitive, and experiential—against four application scales or environmental contexts—urbanizing region, transportation corridor/roadside view, neighborhood/district, and streetscape/place. As one can see from Table 8.2, many of the previously mentioned studies can be placed with this array.

As one can see from Table 8.2, most urban visual studies have been at the regional or citywide scale and are psychophysical or cognitive in nature. In other words, they were attempting to find correlations between preference or scenic evaluation and specific attributes in the environment, or were concerned with perceived meanings in the urban environment, respectively.

Transportation corridor or roadside view studies are scattered throughout the paradigms’ spread but concentrated primarily in psychophysical and experiential work. An experiential approach to the view from the road is a logical approach since one wants to gauge a subject’s reaction while traveling through a stimulus sequence.

Many district or neighborhood studies are psychophysical in nature, attempting to correlate physical attributes or urban districts and neighborhoods with preference or scenic evaluation. There are some notable professional approaches as well as cognitive approaches seeking meaning and cognitive structure of urban districts.

Finally, there are very few studies addressing visual quality perception at the streetscape or place scale with the notable exception of Cullen’s (1971) work from an expert or professional perspective.

There are interesting trends in subgroups of studies. These include assessment of views from highrise buildings (Zoelling 1981) and hospitals (Ulrich 1984).

PROCEDURAL GUIDANCE FOR URBAN VISUAL STUDIES

1. As a general rule of thumb, more public involvement is needed to solicit qualities of the environment as the scale of application decreases, unless one is dealing with strictly physical phenomena—shadow, solar glare, wind—where professionals should be able to describe and assess existing conditions.

2. Symbolically rich historical and multicultural urban environments will necessitate some type of cognitive approach to address the various meanings contained within the environment.

3. Environments rich in multisensory attributes, for example, the observer’s experiences, visual motion, olfactory sensations, water sounds, or tactile sensations of a number of unusual surfaces, will need an experiential approach.
CENTENNIAL PARK

NO CHANGE

The proposal provides both short-term docking (say 4-6 hrs) and overnight docking for cruise boats, providing toilets and showers for boat visitors. Wave protection comes from a floating breakwater similar to that at Keewaydin State Park.

PROPOSED CHANGE

The park, a small lawn area with one clump of trees, is used presently for sitting, sun baking & swimming. It lies immediately adjacent to the downtown area. At present, there is no docking.

FIGURE 8.15. Example of photoquestionnaire.
4. A mixed approach of professional assessment combined with either psychophysical, cognitive, or experiential studies (as originally proposed by Lynch in 1960) would probably be most practical and thorough for most urban visual studies, especially descriptive and evaluative assessments.

5. Approaches for visual urban predictive appraisals are treated in Chapter 13.

**NEW TECHNIQUES**

Because of the complexity of urban environments and the richnesses of multisensory experience, new techniques and technology will be needed to more fully “capture” aspects of urban environments. For basic field inventory and recording of experiences, video offers many advantages for urban visual inventories (Kopka 1979; Mertes and Smardon 1984). We have used video in a number of urban community service projects already (Smardon 1984 and see Table 8.1). Other techniques include building scale models and exploring them through use of modelscopes (Felleman 1983; Bosselman 1983) which has increasing utility for visual impact assessment (Smardon 1983). This will be covered in Chapter 13 for urban environments.

Finally, visual inventories should broaden to include all aspects of the aesthetic experience including sound (Southworth 1969), shadow effects, excessive daytime glare (Erickson, 1980) or nighttime light intrusion (Hack et al. 1974), pedestrian wind effects (Cohen et al. 1977) and air quality (Stewart et al. 1983). These are covered to some extent in Chapter 13, but basic inventory techniques need to be developed that ensure adequate preparation of urban aesthetic data bases.
PART 4

LANDSCAPE ASSESSMENT AND EVALUATION

Whereas the previous chapters give us means to describe, inventory, and to some degree analyze attributes of wildland, rural, and urban landscapes, the five chapters within this section are written specifically to address questions of evaluation. This includes landscape evaluation of two types: (1) existing landscape quality, and (2) proposed landscape changes and their visual impact.

Chapter 9 by Smardon is, as its title says, a review of agency methodology for visual project analysis. Much of the early innovation in methodology for incorporation of landscape values in project planning and analysis was done by federal agencies such as the U.S. Forest Service, the U.S. Department of Interior’s Bureau of Land Management, and the U.S. Department of Agriculture’s Soil Conservation Service. A brief history of these agencies’ internal procedures development is followed by a step-by-step comparison of the actual methods used for areawide visual landscape assessment and evaluation. This is followed by a discussion of methods of “scoping” or identifying at an early stage the visual effects of proposed projects. The approaches of New York State’s Environmental Quality Review Act, the Federal Highway Administration, and the Housing and Urban Development Administration to “scoping” are
presented. Finally, detailed visual impact assessment procedures that are used by the U.S. Forest Service, Bureau of Land Management, and Federal Highway Administration are presented and are followed by a summary comparison of all agencies and procedures described within Chapter 9.

Chapter 10 by Vining and Stevens lays the foundation for understanding basic principles for psychological assessment of landscape quality. After presenting a rationale for why assessments that involve public groups need to be used, Vining and Stevens present different assessment methods such as surveys and questionnaires, perceptual preference, and behavioral measures, which all can be used to collect information about landscape quality. These tools can be used for different assessment designs which include case studies, experimental designs, correlational methods and quasiexperimental designs. Finally, Vining and Stevens offer criteria for evaluating the appropriateness of assessment methods including reliability, validity, and sampling. Examples of actual methods, in four steps, are included as inserts.

Sheppard, in Chapter 11, offers another critical foundation chapter on visual simulation methodology. Before we can ask questions about a project’s visual impacts, we must know how to design approaches to eliciting responses from affected parties (Chapter 10) and be able simulate what the project will look like from all appropriate vantage points (Chapter 11). Sheppard has four purposes which organize his chapter. They are: (1) to identify the primary research findings and information sources which are applicable to visual simulation, (2) to establish principles of visual simulation for use at the project scale, (3) to review problems and advantages associated with simulation methods, and (4) to illustrate key procedures by means of simulation examples included as inserts.

With the three background Chapters 9, 10, and 11 in hand, one can proceed to Chapters 12 and 13, which address visual impact assessment (VIA) for natural/rural and urban environments, respectively.

Yeomans traces the demand for rural and wildland areas as well as the types of activities most likely to affect such environments, in Chapter 12. He then quickly summarizes visual impact assessment (VIA) methods used by agencies in the United States and Canada and then reviews VIA methodology research. Yeomans provides a summary of VIA criteria and six major steps within the VIA process: (1) conducting the landscape description or inventory, (2) assessing user (or viewer) characteristics, (3) making preliminary line-of-site determinations, (4) establishing key viewpoints, (5) assessing impact activity/land use characteristics, and (6) preparing a visual impact
assessment and mitigation summary. Additional guidance is given on project aesthetics including internal, relational, and environmental aesthetics and design guidelines.

Similarly, in Chapter 13 Blair outlines a VIA process for urban environments which contains: (1) a definition of the visual characteristics of the project, (2) a definition of the visual environment of the project, (3) a determination of visual impacts of project alternatives, (4) evaluation of visual impacts, and (5) identification of ways to mitigate significant visual impacts. Key contributions to methodology include means to involve publics in VIA and to address shadow and glare impacts in urban environments.