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# Table of Contents

3 KU Wayfinding System Principles, Guidelines and Program Overview  
6 Planning Principles and Guidelines  
7 General User-centered Principles and Guidelines  
12 Specific Principles and Guidelines of User-centered Characteristics of Roadway and Walkway Users, e.g., Drivers, Bicyclists, and Pedestrians.  
14 Structure of Environmental Knowledge  
17 Principles and Guidelines of Usability  
18 Iterative Design and Prototyping Guidelines  
19 Task Analysis Principles and Guidelines  
20 Principles and Guidelines for a Visual Language Approach to Design  
21 Principles and Guidelines for Institutional Identity  
27 Positive Guidance Process Principles and Guidelines  
28 General Principals and Guidelines of the Manual on Uniform Traffic Control Devices  
31 Fabrication Principles and Guidelines  
33 Sign Maintenance Principles and Guidelines  

## The Wayfinding System Program

39 The Wayfinding System Matrix  
40 Main Campus Map with Emphasis on Primary Roadways for the Visitor-driver  
41 Main Campus Map with Emphasis on Primary Walkways for the Visitor-pedestrian  
42 Campus Map System for Use in the Wayfinding System  
43 Examples of the Typical Sign Types  
48 Chart of Campus, Districts, and Building Names  
49 Examples of the Message Structure of Various Sign Types
KU Wayfinding System Principles, Guidelines and Program Overview

Introduction
This signage document by Forcade Associates outlines the principles and guidelines that underpin the system development issues, e.g., user, planning, design, fabrication and maintenance, in the KU wayfinding program.

The current KU signage program was developed in 1973-5.
**KU Wayfinding System Principles, and Guidelines**

**Introduction**
This section outlines the *principles* and *guidelines* that underpin the KU wayfinding *program*.

Information about the strengths and weaknesses or limitations of human perception and information processing are the *principles* that eventually guide design decisions. They reflect knowledge about human sensing, cognition, and responding, e.g., visual detection, perception, attention, memory, learning, decision making, movement control, and anthropometrics. They are stated in general terms, e.g., “build on user’s prior experience.” Also, information about the strengths and weaknesses of the wayfinding system development procedure is explained in four stages: *planning, design, fabrication, and maintenance*. The system development *principles* are defined, and they also guide design decisions.

*Guidelines* are based on *principles*, but are specific to a particular element of the wayfinding system development, e.g.; user, planning, design, fabrication, and maintenance. For example, a design guideline might state “use consistent layout and visual language throughout the system.”

These principles and guidelines were used as the basis for the development of the KU Wayfinding Program. The principles and guidelines can be used to further develop the wayfinding system well into the future.
Introduction
This section outlines the KU wayfinding program.

The wayfinding system development requires specific design decisions be specified for the designer to follow, e.g., user-centered, planning, designing, fabricating, and maintaining the system. There usually are many equally good ways to develop a system component using the principles and guidelines outlined in this document, but the choice must align with the wayfinding system goals and users’ requirements. The wayfinding program might specify “use specific layouts and a specific visual language throughout the wayfinding system.”

The KU wayfinding program outlined here can be understood by studying the Wayfinding System Matrix and relating it to the two Campus maps identifying the general location of the various sign types. The two Campus maps also show the location of the primary and secondary roadways and walkways. The nodes (circles with letters or numbers) identify the primary and secondary directional sign types. The districts (groups of buildings, roadways, and walkways) and buildings are also identified.

The several pages that follow illustrate the visual look of the signs and how they relate to the Landscaping Program. Next is a chart illustrating the naming of the districts and buildings. Following that are several pages illustrating the message structure for the various sign types.
Planning Principles and Guidelines

**Define goals**
Goals are statements that embody a broad set of values; they answer the question:

What are we trying to accomplish?

**Define policies for goals**
Policies for goals are directives for continuous action; they answer the question:

How will we achieve our goals?

**Define objectives**
Objectives are specific task(s) that are measurable and attainable and have a stated time frame; they answer the question:

What are we going to do to achieve the policies for our goals and when should the task(s) be completed?

**Define policies for objectives**
Policies for objectives are directives for continuous action and time frames; they answer the question:

How will we achieve our objectives and when should our work stated in the objectives be complete?
General User-centered Principles and Guidelines

User-centered principles help guide design decisions. They reflect knowledge about human sensing, cognition, and responding, e.g., visual detection, perception, attention, memory, learning, decision making, movement control, and anthropometrics. They are stated in general terms, e.g., “build on user’s prior experience.”

Human sensing principles

Sensory limits

1. Detection
A visual element must have a minimal magnitude to be detected. This absolute threshold has been computed for many different types of visual elements. Neurons that detect edges inhibit each other; if a mark is not large enough, the cells that typically would detect it are inhibited from responding.

2. Discrimination
Visual elements must differ by a minimal proportion to be discriminated. This just noticeable difference has been determined for many types of visual elements.

Vision

1. Sensitivity
The sensitivity of the eye at a given moment depends on many things, including the size of the stimulus, the brightness and contrast of the stimulus, the region of the retina stimulated, and the physiological and psychological condition of the individual.

2. Visual angle
The measurement of size is the visual angle. This is the angle formed at the eye by the viewed “sign.”

3. Color defectiveness
Two major defects are associated with seeing colors: color weakness and color blindness. The most common defect is color weakness. People with color weakness are capable of seeing all colors, but tend to confuse some of them, especially under dim light. Their ability to distinguish different colors tends to be less acute than for people with normal color vision. The second most common defect is color blindness. Most people who are color-blind tend to confuse red, green, and gray. Many more men than women have defective color.

Human cognition principles

Perception principles

1. Absolute judgement - discrimination
Do not require the sign-viewer to judge the level of a represented variable on the basis of a single sensory variable like color, size, or loudness, which contains more than five to seven possible levels. To require greater precision as in a color-coded map with nine hues will be to invite errors of judgment.

2. Top-down processing
Sign-viewers will perceive and interpret signals in accordance with what they expect to perceive on the basis of their past experience. See the principle of “expectancy” in the section on Positive Guidance Process Principles and Guidelines.
General User-centered Principles and Guidelines - Continued

3. **Redundancy - dual coding**
When the same message is expressed more than once, it will be more likely to be interpreted correctly. This will be particularly true if the same message is presented in alternative physical form, for example, the STOP sign which is coded in color, shape, and text. Redundancy is not simply the same as repetition. When alternative physical forms are used, there is a greater chance that the factors that might degrade one form, the red color of the STOP sign, will not degrade the other, the octagonal shape of the STOP sign.

4. **Similarities**
Similarity causes confusion. Similar appearing signals will likely be confused, either at the time they are perceived or after some delay if the signals must be retained in short-term (working) memory before action is taken. Where confusion could be serious, the designer should delete unnecessary similar features and highlight dissimilar or different ones in order to create distinctiveness.

5. **Processing priorities - hierarchies**
Some marks are noticed and attended to more than others. Visual elements should be chosen to be noticed in accordance with their importance in the display. Some colors, weights and types of line, and sizes are noticed before others. For the most part we do not have formal rules for determining which these are; instead we rely on a general principle: the visual system is a “difference detector.” Any sharp contrast will draw attention. Some stimulus properties have been determined empirically to be “salient” (for example, all other things being equal, a yellowish-orange is recognized before a deep blue). Physical dimensions of visual elements should be used to emphasize the message; they should not distract from it – for example, the background should not be too prominent.

6. **Visual variables**
Variations in different kinds of marks can be used to convey information, some better than others. The visual variables, suggested first by J. Bertin and modified and explained in more detail by others, provide a systematic way for converting verbal, numerical and other forms of data into visual information. These visual variables are defined as size, value, texture, orientation, color, and shape.

7. **Visual distortions**
The visual system sometimes results in our having distorted impressions of visual dimensions. Some visual dimensions are systematically distorted, notably area (size differences are underestimated), volume (size differences are very much underestimated), and intensity. On the other hand, line length (and width) is registered relatively accurately (although vertical lines appear longer than horizontal lines of the same length). These distortions are described by the exponent in the psychophysical power law (S. S. Stevens).

Mental (conceptual) model principles

When sign-viewers perceive a display, they often interpret what the display (the sign) looks like and what it communicates in terms of their expectations or their mental or conceptual model of the system being displayed, a concept that is discussed in the section on “Users conceptual model.”

8. **Pictorial realism**
A display should look like the variable that it represents. If the display contains multiple elements, then these elements should be configured in a manner that looks like how they are configured in the environment that is represented.
9. **Principle of the moving part**
The moving element(s) of any display of dynamic information should move in a spatial pattern and direction that is compatible with the user’s mental model of how the represented element moves.

10. **Ecological interface design**
Collectively, adherence to the principle of pictorial realism and the principle of the moving part can create displays that have a close correspondence with the environment that is being displayed. Because of this adherence to the ecology of the displayed world, these types of displays have been recently referred to as Ecological Interfaces.

### Attention principles

Complex multi-element displays require three components of attention from the sign-viewer to process the information displayed. Selective attention may be necessary to choose the displayed information sources necessary for a given task. Focused attention allows those sources to be perceived without distraction from neighboring sources, and divided attention may allow parallel processing of two (or more) sources of information if a task requires it. The three attentional principles below characterize ways of capitalizing on attentional strengths or minimizing their weaknesses.

11. **Minimizing information access cost**
There is typically a cost in time or effort to “move” selective attention from one display (“sign” or “sign module”) location to another to access information.

12. **Proximity compatibility**
Sometimes two or more sources of information are related to the same task and must be mentally integrated to complete the task; that is, divided attention between the two sources for the one task is desirable. These information sources are said to have close “mental proximity.” As described in the previous principle, good display design should then provide them with close “display proximity” by displaying them close together so that their information access cost will be low.

13. **Multiple resources - visual and auditory**
Sometimes processing a lot of information can be facilitated by dividing that information across resources — and presenting visual and auditory information concurrently — rather than presenting all information visually or auditorily.

### Memory principles

Short-term or working memory is vulnerable because of its limited capacity. We can only keep a small number of “mental balls” in the air at one time and so, for example, may easily forget the phone number before we have had a chance to dial it or write it down. Long-term memory is vulnerable because we forget certain things or, sometimes, because we remember other things too well and persist in doing them when we should not. The following three principles address different aspects of these memory processes.

14. **Predictive aiding**
Sign-viewers, being human, are not very good at predicting the future. In large part this limitation results because prediction is a difficult cognitive task, depending heavily on working memory. We need to think about current conditions, possible future conditions, and the rules by which the former may generate the latter. When our mental resources are consumed with other tasks, prediction falls apart, and we become reactive, responding to what has already
happened, rather than proactive, responding in anticipation of the future. Since proactive behavior is usually more effective than reactive, it stands to reason that displays that can explicitly predict what will (or is likely to) happen will generally be quite effective in human performance.

15. Knowledge in the world
D. Norman has identified two kinds of knowledge that support people's interactions with systems. Knowledge in the head is what we typically think of when we think of knowledge. It is remembering what needs to be done when, which is a pretty good memory system for routine tasks but not so good for tasks that are complex, recently learned, or poorly explained. Knowledge in the world, on the other hand, involves placing explicit visible reminders or statements of what is to be done at the time and place that will trigger the appropriate action. Clearly, when knowledge is put in the world, it will not be forgotten, whereas when it must be accessed only in the head, forgetting is possible. Signage systems are an example of “knowledge in the world.” Signage systems should be based on user-centered information-processing principles and guidelines also known as “wayfinding or environmental cognition.”

16. Consistency
When our memory works too well, it may continue to trigger actions that are no longer appropriate, and this is a pretty instinctive and automatic human tendency. Old habits die hard. Because there is no way of avoiding this, good designs should try to accept it and “go with the flow” by designing displays in a manner that is consistent with other displays that the user may be perceiving concurrently or may have perceived in the recent past. Hence, the old habits from those other displays will transfer positively to support processing of the new displays. Thus, color coding should be consistent across a set of display “signs” so that, for example, red always means the same thing.

17. Capacity and duration

Anthropometrics principles

Average person fallacy

There is no such thing as the average person, anthropometrically speaking.

Important body dimensions

1. Standing eye height
   The average (mean) standing eye height of American office workers is sixty-two inches.

2. Sitting eye height
   The average (mean) sitting eye height of American office workers is thirty and one-half inches.

Users’ conceptual model

It is possible to design the way in which users will think about KU. The signage system is our (designers’) way of communicating the idea of KU to the user. With signage systems, the external myth (conceptual model) is the carrier of the idea. We must construct an effective external myth.

Users process information actively. They generate hypotheses and verify their accuracy (Neisser 67). Internally, users build up models of the content and process, e.g., airport terminals. They use information they receive in conjunction with their conceptual models to navigate. Conceptual models, then, provide the basis for expectations. When first time users start to learn about the KU campus, they immediately start to build conceptual models. These models invariably relate to what
they already know. As they learn more, their models become more elaborate and, ideally, more accurate. **If users can easily build consistent models of the KU campus, they will perceive KU as easy to learn.** If they must build complex models, they will perceive KU as difficult and confusing.

*Consistency of myth,* then, is the foundation of a clear conceptual model. Inconsistencies not only cause confusion; they require the user to develop a more involved conceptual model of how things work. The external myth used for a signage system is often a *metaphor or analogy,* that suggests that the signage system is *like* something with which the user is already familiar. Users also develop models that describe KU at different levels of detail, especially with a campus as complex as that of KU. A given signage system may support *more than one conceptual model,* depending on who is using it and what they are doing. Users must be able to develop a set of expectations that are met by the system, even in new situations. In other words, the signage system must behave *predictably.*

### Conceptual load

Our main design objective is to keep the users’ *conceptual load* to a minimum by developing a system that employs a *few rules* to develop an understanding of the navigation system at KU. Conceptual load can be minimized by designing a simple set of ‘signs’ that gives good coverage to the problem. Then, instead of adding a lot of “bells and whistles” to cover special cases, we just stop. Conceptual load is a function of the structure and complexity of the signage system. Consider the following chart.

![Conceptual Load Diagram](image-url)
Specific Principles and Guidelines of User-centered Characteristics of Roadway and Walkway Users, e.g., Drivers, Bicyclists, and Pedestrians

Introduction to specific characteristics of drivers, bicyclists, and pedestrians.
The human factors in wayfinding systems relate to the capabilities and limitations of the roadway and walkway user. Thus an understanding of the human element in the wayfinding system is essential, as humans design, build, operate, and maintain roadway and walkway environments. The limitations of the roadway and walkway user in terms of experience, impairment, physical and mental skills, abilities, motivation and other characteristics are factors in the safe and efficient functioning of the wayfinding system. Characteristics of roadway and walkway users and their interaction with the other elements of the system have all been the objects of considerable research, but they are still not well understood.

Driver characteristics
The driver is sometimes referred to as the motorist or motor vehicle operator.

1. The driving task, see Positive Guidance Process, Principles and Guidelines p. 27.

2. Information processing and perception
   Evidence suggests that the main factors in information processing and perception involve looking in the right place at the right time, that is, paying proper attention (selective attention).

It is generally agreed that about 90% of the information a driver receives is visual, and the importance of vision is reflected in the emphasis placed on it in licensing tests. Following is a listing of the major visual factors that should be important to the driving task, along with examples of related components of the task.

Accommodation (visual factor)
Characteristic: Change in the shape of the lens to bring images into focus (definition)
Example: Changing focus from dashboard displays to the roadway (related driving tasks)

Static visual acuity
Characteristic: Ability to see small details clearly
Example: Reading distant signs

Adaptation
Characteristic: Change in sensitivity to different levels of light
Example: Adjusting to changes in light upon entering a tunnel in daylight

Angular movement
Characteristic: Seeing objects moving across the field of vision
Example: Judging speed of cars crossing the path of travel

Movement in depth
Characteristic: Detecting changes in size of the images on the eye
Example: Judging speed of an approaching vehicle

Color
Characteristic: Discrimination of different colors
Example: Identification of colors of signals
Specific Principles and Guidelines of User-centered Characteristics of Roadway and Walkway Users, e.g., Drivers, Bicyclists, and Pedestrians - Continued

Contrast sensitivity
Characteristic: Seeing objects that are similar in brightness to their background
Example: Detection of dark-clothed pedestrians at night

Depth perception
Characteristic: Judgment of the distances of objects
Example: Passing on two-lane roads with oncoming traffic

Dynamic visual acuity
Characteristic: Ability to see objects that are in motion relative to us
Example: Reading signs while moving

Eye movement
Characteristic: Changing the direction of gaze of the eyes
Example: Scanning the roadway environment for hazards

Glare sensitivity
Characteristic: Ability to resist and recover from the effects of glare
Example: Reduction in visual performance due to headlight or sun glare

Peripheral vision
Characteristic: Detection of objects at the side of the visual field
Example: Seeing a bicycle approaching from the left

Vergence
Characteristic: The angle between the lines of sight of the two eyes
Example: Change from looking at the dashboard to looking at the roadway

Bicyclist characteristics
Similar to driver characteristics
Types of roadway and walkways shared with bicyclists
1. Bicycle paths or bikeways
2. Restricted right-of-way on a shared roadway (bike lanes on a city street)
3. Shared right-of-way designated as such by signs (walkway path shared by pedestrians and city roads designated as bike routes)

Pedestrian characteristics
1. Walking speeds
2. Nighttime conditions
3. Handicapped pedestrians
4. Child pedestrians
5. Elderly pedestrians
Structure of Environmental Knowledge

Lynch’s Model
City images are referable to physical forms which can be classified into five types of elements:

Paths
Paths are channels along which the observer customarily, occasionally, or potentially moves. They may be streets, walkways, transit lines, or railroads.

Edges
Edges are the linear elements not used or considered as paths by the observer. They are the boundaries between two phases or linear breaks in continuity: shores, railroad cuts, edges of development or walls.

Districts
Districts are the medium-to-large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters “inside of,” and which are recognizable as having some common, identifying character. Always identifiable from the inside, they are also used for exterior reference if visible from the outside.

Nodes
Nodes are points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which they are traveling. They must be primarily junctions, places of a break in transportation, a crossing or convergence of paths or moments of shift from one structure to another.

Landmarks
Landmarks are another type of point-reference, but in this case the observer does not enter within them; they are external. They are usually a rather simply defined physical object: building, sign, store, or mountain. Their use involves the singling out of one element from a host of possibilities. Lynch, Kevin, The Image of the City, MIT Press: Cambridge, MA, 1960

General Model
People construct environmental knowledge in 3 stages:

Declarative (landmark) knowledge
At the simplest level, an individual has knowledge of what is in an environment. It consists of lists of objects (roads, brick buildings, signs) people, trees, sidewalks, events and places (parking lots, circle drives, courtyard, etc.). The term “environmental cue” can be used to describe the elements in such a knowledge structure. When a cue is identified with a specific place, it can be referred to as a ‘location cue’, or a landmark (Lynch 1960). Declarative knowledge requires an ability to state with certainty that an object or place exists, an ability to recognize it when it is within a sensory field, and an ability to communicate with others about cue properties (including its location and composition, shape, size, color, etc.). Following the general model is a listing of all campus buildings as of 5/25/99.

Landmark knowledge represents information about the visual details of specific locations in the environment. This knowledge presumably takes the form of perceptual icons, or images, of the sensory data they represent. People acquire such knowledge by directly viewing indirect representations of the environment, such as photographs or film. Location recognition depends on accurate landmark knowledge. Such recognition presumably requires matching perceptual features of the current scene to representations of perceptual features stored in memory.
**Structure of Environmental Knowledge - Continued**

**Procedural (route) knowledge**

Procedural knowledge builds on declarative knowledge base and adds to that base new and more complex abilities for linking information and transmitting such information into movement. Procedural knowledge appears to be hierarchical.

Procedural knowledge represents information about the sequence of actions required to follow a particular route. It includes explicit representation of points along the route where turns occur and the actions to be taken at each one. In addition, procedural knowledge implicitly represents distances along route segments, local orientation cues, i.e., directions of turns and ordering of landmarks. Thus, this type of knowledge encodes the spatial relationship between two points in terms of the route connecting them. Procedural knowledge derives from the experience of navigating the represented route. Once acquired, procedural knowledge can be used to navigate or to mentally simulate navigation by imagining the sequence of landmarks and turns required in traveling between two locations. Mental simulation can be useful in computing spatial relations, such as estimating the distance between two points along the route or determining the direction for travel between two locations.

**Configurational (survey) knowledge**

Survey knowledge represents the configural relations among locations and routes in an environment. This type of knowledge represents object locations and inter-object distances with respect to a fixed, global coordinate system, as on a conventional map. Accordingly, survey knowledge can be acquired directly by learning a map. However, repeated navigation in an environment also leads to the development of survey knowledge. Extended experience presumably allows an individual to coordinate different aspects of landmark and procedural knowledge, to make spatial inferences, and to gradually abstract the configurational relations and straight-line distances among locations from perceptually-grounded landmark and route knowledge. The map-like quality of survey knowledge makes it an efficient knowledge source for estimating straight-line distances and for judging the absolute relation between two locations on a fixed frame of reference.
Structure of Environmental Knowledge - Continued

Building Names and Campus Places

Adams Alumni Center
Allen Field House
Amini Scholarship Hall
Anschutz Science Library
Anschutz Sports Pavilion
Art and Design Building
Baehr Audio-Reader Center
Bailey Hall
Bales Organ Recital Hall
Battenfeld Scholarship Hall
Blake Hall
Bridwell Botany Research Lab (Herbarium)
Broadcasting Hall
Burge Union
Budig Hall (Hoch Auditoria)
Burt Hall
Campanile
Carruth-O’Leary Hall
Chamney House
Chancellor’s Residence
Computer Services Facility
Continuing Education Building
Corbin Residence Hall
Danforth Chapel
Dole Human Development Center
Douthart Scholarship Hall
Dyche Hall
Ekdahl Dining Commons
Ellsworth Annex
Ellsworth Residence Hall
Facilities Operations Warehouse
Foley Hall
Fraser Hall
Gertrude Sellards Pearson Residence Hall
Grace Pearson Scholarship Hall
Green Hall
Hambleton Hall
Hawes House
Haworth Hall
Horejsi Family Athletics Center
Housing Maintenance Warehouse
Jayhawk Towers Apartments
Joseph R. Pearson Hall
Kansas Memorial Union
KU Endowment Association Building
Kurata Thermodynamics Labs
Learned Hall
Lewis Residence Hall
Lied Center
Lindley Annex
Lindley Hall
Lippincott Hall
Malott Hall
Marvin Hall
McCollum Labs
McCollum Residence Hall
Memorial Stadium
Military Science Building
Miller Scholarship Hall
Moore Hall
Motor Pool
Multicultural Resource Center
Murphy Hall
Nichols Hall
Nunemaker Hall
Oldfather Studios
Oliver Residence Hall
Parking Facility
Parrott Athletic Complex
Pearson Scholarship Hall
Pharmaceutical Chemistry Labs
Printing Services
Recreation Services Building
Robinson Center
Sellards Scholarship Hall
Shaffer-Holland Strength Center
Simons Biosciences Research Labs
Smissman Research Labs
Smith Hall
Snow Hall
Spahr Engineering Library
Spencer Museum of Art
Spencer Research Library
Spooner Hall
Stauffer-Flint Hall
Stephenson Scholarship Hall
Stewart Children’s Center
Stouffer Place
Strong Hall
Sudler Annex (KJHK)
Sudler House
Summerfield Hall
Sunflower Apartments
Templin Residence Hall
Twente Hall
University Press Offices
University Press Warehouse
University Relations Center
Visitor Center
Wagnon Student Athlete Center
Watkins Scholarship Hall
Watkins Home (Hall Center for the Humanities)
Watkins Student Health Center
Watson Library
Wescoe Hall
Wesley Building (Hilltop Child Care Center)
Youngberg Hall (Center for Research, Inc.)
517 W. 14th St. (Environmental Studies Building)
525 W. 14th St. (Western Civ. Annex)
Principles and Guidelines of Usability

Usability definitions and principles (International Standards Organization)
The International Standards Organization (ISO) defines usability as “…the effectiveness, efficiency and satisfaction” with which specified users can achieve specified goals in particular environments (ISO 9241-11: 1998.)

Effectiveness
The extent to which a goal, objective, or task, is achieved

Efficiency
The level of effort required to accomplish a goal, objective or task

Satisfaction
The level of comfort that the user feels when using a product and how acceptable the product is to users as a vehicle for achieving their goals, objectives or tasks

Principles of usable design

Consistency
Designing a product so that similar tasks are done in similar ways.

Compatibility
Designing a product so that its method of operation is compatible with users’ expectations based on their knowledge of other types of products and the ‘outside world’.

Consideration of user resources
Designing a product so that its method of operation takes into account the demands placed on the users’ resources during interaction.

Feedback
Designing a product so that actions taken by the user are acknowledged and a meaningful indication is given about the results of these actions.

Error prevention and recovery
Designing a product so that the likelihood of user error is minimized and so that if errors do occur, they can be recovered from quickly and easily.

User control
Designing a product so that the extent to which the user has control over the actions taken by the product and the state that the product is in is maximized.

Visual clarity
Designing a product so that information displayed can be read quickly and easily without causing confusion.

Prioritization of functionality and information
Designing a product so that the most important functionality and information are easily accessible to the user.
Iterative Design and Prototyping Guidelines

This model is focused on the process of design and the increased participation of users (visitors) and other stakeholders (community groups, government groups, historical groups, business groups, etc.) in the design process. The primary goals of this model were met by forming a community steering committee with wide constituent representation and involving that committee completely in the initial development and final design processes.

The iterative prototyping method combines iteration (the repetition of a design sequence) with feedback from the stakeholders regarding the design solutions. The citizen-visitor information system incorporated evolving prototypes with a distinctive visual language, wayfinding principles, and a new form of task analysis, providing the most effective approach to the problem.

The iterative prototyping method (Bailey, 1996) assumes that the system design and development process is too difficult and complicated to accomplish without making and correcting mistakes. For example, even after users and designers agree on a “final” set of functions for the new system, they know that some additional functions will eventually be added. The initial set of tools is recognized as only a partial set. The complete set of needs will only become apparent as users (visitors) experience using a prototype of the system.

The system “tools” were prototyped by first establishing a baseline by defining what was currently available in terms of signage, brochures, and all other visitor material that could be collected. Then, an interactive matrix of the system was developed to explore the basic visitor tool concepts (see Figure 1). Next, these basic visitor tool concepts were presented to and discussed with many stakeholders within the area. The feedback from these groups (testing results) was used to revise and further develop the visitor tool concepts. The process was then repeated several times to refine the concepts further. After numerous iterations, the concepts were finalized and documented.
Task Analysis Principles and Guidelines

The first step in determining how users will interact with a system is to conduct a task analysis (Bailey, 1996). Task analysis is intended to identify the specific activities (tasks) to be performed by users. There are two distinct approaches to conducting a design-oriented task analysis. The traditional approach begins with systematically decomposing tasks and ends with identifying activity modules. This approach assumes that the final product will be based on a definite, clearly defined process that users will be performing. The user interface is based on how people will typically perform activities or use the product. It requires that the designers know exactly how, when, and how often the product will be used.

In contrast, the type of task analysis used for designing object-oriented products does not make the same assumptions about how and when products will be used. Instead, the focus is on identifying the objects of greatest interest to the users who will interact with the product. There is less emphasis on identifying a hierarchical activity process; the emphasis is on providing whatever user interface objects are necessary to carry out the activities users require, in whatever order they desire. The major difference between the two approaches is that the traditional one focuses on decomposing functions down to the task level while the object-oriented focuses on directly identifying user interface objects. While the first approach is process oriented, the second approach tends to be product oriented. Another important difference is that rather than identifying tasks and converting them into activity modules, designers using object-oriented task analysis identify tasks and organize them into scenarios.

Object-oriented task analysis (Bailey, 1996, and Branham and Chen, 1996) assumes that the product consists of a collection of objects that cooperate to achieve some desired functionality. The focus is not on decomposing the tasks but on breaking the tasks into meaningful parts, each part representing some object from the problem area.

This new approach includes three steps: directly identifying potential user tasks, organizing the tasks into alternative scenarios, and evaluating a broad selection of task scenarios. During system development, it is difficult to identify meaningful objects if the designer focuses first on process. It is preferable to identify user interface objects as soon as possible, and then determine the underlying process. Shifting from the traditional task analysis to object-oriented task analysis allows greater flexibility and effectiveness, particularly in systems that inevitably undergo change.
Principles and Guidelines for a Visual Language Approach to Design

Just as spoken languages are the basis for conversations with other people, visual languages are the basis for interaction with products and services (Rheinfrank, 1992). Visual language is used in the design of an information system. The resulting system exhibits a consistent use of visual variables. The system, therefore, also will express what it is, what it does, how it can be used, and what its overall potential might be. The best visual languages take the design experience one step further by making interactions between people and objects pleasant and continuously meaningful.

Essentially, visual languages are (1) the means by which designers build meaning into objects, (2) the means by which objects express meaning to people, and (3) the means by which people learn to understand and use objects, and engage in experiences associated with objects. By utilizing an appropriate visual language in promotional material, potential visitors are invited to visit Douglas County, its cities and various attractions. In the final product, the interface between the visitors and the community consists of “tools” which help inform the visitor, help the visitor to navigate, and assist the visitor in having a rewarding and fun experience.
Principles and Guidelines for Institutional Identity

An important part of the student-visitor wayfinding system is the identity program. The basis of an identity program is the visual language that defines, in this case, the University’s image, goals and objectives. A sub-system of guidelines articulates this visual language into its many varied applications, such as symbols, pictograms, signage, and promotional materials. A well-developed identity program reflects order, integration and consistency in and among all communications with the public.

Street Graphics and The Law. Twenty-five years ago the American Planning Association (Mandelker and Ewald, 1988) developed a model sign ordinance which was conceived and derived from the function of driver perception and based on driver visual performance standards. The ordinance has been updated several times based on the experience of over thirty-five communities. The primary function of such an ordinance is to index the environment (e.g., identify a tourist attraction), while maintaining the creative freedom of the sign designer.

A comprehensive street graphics control system has two primary issues: identity and legibility. Each primary issue contains particular sub-issues: identity sub-issues are identity strategy and visual style, and legibility sub-issues are sensory perception along with short and long-term memory. Four criteria should be addressed in a successful street graphics control system:

1. Is the graphic expressive of the individual proprietor’s identity?

2. Is the graphic appropriate to the type of activity to which it pertains?
   Common institutional activities include: banking, real estate, insurance, medical, legal, educational, utilities, churches, government, and private households.

3. Is the street graphic compatible with the visual character of the area surrounding it?
   Areas are usually divided into two general categories: (1) commercial and industrial, or (2) institutional, residential or rural.

4. Is the street graphic legible in the circumstance in which it is seen?
   Effectiveness of street graphics is a function of dynamic visual acuity, i.e. the legibility of the graphic while in motion.

Every designer of street graphics should consider the potential users, since the users will determine the success of the system.
## Principles and Guidelines for Institutional Identity - Continued

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Determinant</th>
<th>Basis of evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Identity or image the street graphic is to communicate within the framework of the other three determinants</td>
<td>Individual proprietor (business, tourist attraction)</td>
<td>“Good” identity design</td>
</tr>
<tr>
<td>b. Type of activity to which street graphic pertains</td>
<td>Commercial, industrial, institutional activity (SIC codes)</td>
<td>Appropriateness of style</td>
</tr>
<tr>
<td>c. Character of surrounding area in which street graphic is displayed</td>
<td>Areas (commercial, historical, industrial, institutional, residential, or rural surrounding areas)</td>
<td>Compatibility</td>
</tr>
<tr>
<td>d. How the street graphic is seen</td>
<td>By pedestrians or drivers at various speeds; 2, 4, 6 lanes of traffic</td>
<td>Legibility</td>
</tr>
</tbody>
</table>

It is important to have an established identity strategy before planning a signage program. The three principles defined below are essential to a successful implementation of an identity program.

### Consistency

Consistency creates a strong visual identity. By appearing organized, a city’s printed matter becomes part of a visible team that stands out from the crowd. If a sign, letterhead, brochure, newsletter, and package are consistent, they reinforce each other. They contribute to a whole, rather than remaining isolated and lost. Consistent printed matter becomes an opportunity to communicate an appropriate image, as well as expressing the company’s efficiency, care and quality to the users.

Consistency also avoids unnecessary customization. Since certain attributes of all communications are established, they need not be rethought for every communication and time and money are saved. Consistency avoids the confusion that will weaken communication. A designer, working within guidelines established to maintain consistency, is free to focus on the most important part of design — making each communication right for its task. The communication should result from a search for appropriateness, the second criteria by which communications are evaluated.

### Appropriateness

Appropriateness is based in part on proportion. The size of any visual element should be based on the size of the graphic image, or the visual elements that surround it, and the emphasis desired. Appropriateness is also related to the audience and content. Whether or not a graphic solution is appropriate depends on two issues: how well it advances the communication’s purpose and whether it is suitable for the audience.

The combination of a search for both consistency and appropriateness results in meaningful diversity. Without consistency, meaningless changes in the visual identity will camouflage those changes that are purposeful. Just as a writer should not change tense or person arbitrarily, so, too, the designer should not arbitrarily change such things as typeface, type size, color or spatial organization. Such changes should only grow out of the needs of each communication.
Conspicuity

Conspicuity addresses the way the elements of a company’s identity are visually (and cognitively) clear to the target market, in this case visitors. The following questions should be asked: Can the headline, sub-head and the company signature be seen? Can the copy be read? Does the visitor understand the copy? More importantly, can the visitor understand the message that is being presented?
Computing the area of a sign, based on performance data in table below

The basic legibility standard, for all institutional economic activities, is based on using no more than 10 items of information, 10 inch letters (which are readable at 510 feet, in 4 lanes of traffic, traveling 30-40mph). The standard also suggests a 60-percent space (gray area in diagram below) for the letters and a 40 percent space (black area in diagram below) which acts as a background for the lettering, separating the message from the environment. A white background and one color, or two different materials, can be used on the street graphic.

Institutional economic activity (and Commercial economic activity surrounded by Institutional)

<table>
<thead>
<tr>
<th># of lanes</th>
<th>Speed limit</th>
<th>Items of information</th>
<th>Reaction time</th>
<th>Distance traveled</th>
<th>Letter height</th>
<th>Ground Area</th>
<th>Signs Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>30-40</td>
<td>10</td>
<td>8 sec</td>
<td>410 ft</td>
<td>8 inch</td>
<td>20 sq ft</td>
<td>6 ft</td>
</tr>
<tr>
<td>4</td>
<td>30-40</td>
<td>10</td>
<td>10 sec</td>
<td>510 ft</td>
<td>10 inch</td>
<td>35 sq ft</td>
<td>12 ft</td>
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<tr>
<td>5</td>
<td>30-40</td>
<td>10</td>
<td>10.5 sec</td>
<td>532 ft</td>
<td>10.5 inch</td>
<td>37 sq ft</td>
<td>12 ft</td>
</tr>
<tr>
<td>6</td>
<td>30-40</td>
<td>10</td>
<td>11 sec</td>
<td>564 ft</td>
<td>11 inch</td>
<td>40 sq ft</td>
<td>12 ft</td>
</tr>
</tbody>
</table>

Example:
4 traffic lanes and a speed limit of 30-40 mph computes to a 35 sq ft signage area for the street graphic
## Tables of Basic and Auxiliary Design Elements

1. Determine the “identity” the street graphic will communicate.

2. This chart is for economic activities classified as *Institutional*, including college campuses.

3. Use the Tables of Basic and Auxiliary Design Elements below to configure street graphics.

   a. How will the street graphic be seen? See number of lanes & speed limit adjacent to street frontage.

   b. The street graphic will be surrounded by which area? Commercial, Industrial or Institutional?

### Table of Basic Design Elements

<table>
<thead>
<tr>
<th># of lanes</th>
<th>Speed limit</th>
<th>Items of information</th>
<th>Wall signs</th>
<th>Roof peak signs</th>
<th>Projecting signs</th>
<th>Ground signs</th>
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<td></td>
<td></td>
<td>Area</td>
<td>Height</td>
<td>Below</td>
<td>Above</td>
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<td>2</td>
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<td>***</td>
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<tr>
<td></td>
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<td>10</td>
<td>20%</td>
<td>***</td>
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<td></td>
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<td>10</td>
<td>20%</td>
<td>***</td>
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<td>No</td>
</tr>
<tr>
<td>4</td>
<td>15-25</td>
<td>10</td>
<td>20%</td>
<td>***</td>
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<td>No</td>
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<td></td>
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<td>5</td>
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<td>10</td>
<td>20%</td>
<td>***</td>
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</tbody>
</table>

**See wall and roof signs, section 1.06  
***% = Signable area  
Area = Square feet
Principles and Guidelines for Institutional Identity - Continued

Tables of Basic and Auxiliary Design Elements - Continued

* Institutional economic activities

**Group E.** Agriculture, forestry, fisheries: Farms SIC 01; Ag services SIC 07; Forestry SIC 08; Fisheries etc. SIC 09; Finance, insurance, real estate: Banking SIC 60; Credit agencies SIC 61; Securities & commodities SIC 62; Insurance carries & agents, brokers & services SIC 63-64; Real estate SIC 65; Holding & investment companies SIC 67.

**Group F.** Services: Medical & health SIC 80; Legal SIC 81; Educational SIC 82; Museums, zoos SIC 84; Nonprofit organizations SIC 88; Private households SIC 88; Misc. SIC 89.

**Commercial economic activities**

**Group A.** Retail trade: Building materials, farm equipment SIC 52; General merchandise SIC 53; Food SIC 54; Auto dealers SIC 55; Apparel SIC 56; Furniture SIC 57; Misc. retail SIC 59; Transportation: SIC 40, 41 & 44-48; Services: Personal SIC 72; Misc. SIC 73; Auto SIC 75.

**Group B.** Retail trade: Eating & drinking places SIC 58.

**Group C.** Services: Theaters SIC 78; Amusement-recreation facilities SIC 79.

**Group D.** Retail trade: Gasoline services SIC 55.

**Industrial economic activities**

Mining: Metals SIC 10; Coal, petroleum, nonmetallic minerals SIC 12-14; Manufacturing: All SIC 20-39; Transportation: Motor freight SIC 42; Wholesale trade: SIC 50-51.

---

### Table of Auxiliary Design Elements

<table>
<thead>
<tr>
<th>Special street graphics:</th>
<th>Banners</th>
<th>Marquees, canopy, awning</th>
<th>Temporary window graphics</th>
<th>Permanent window graphics</th>
<th>Sidewalk showcases</th>
<th>Design factors:</th>
<th>Surface colors</th>
<th>Color of light</th>
<th>Bare bulb illumination</th>
<th>Flashing and moving lights</th>
<th>Mechanical movement</th>
<th>Flame</th>
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</thead>
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<td>25%***</td>
<td>15%***</td>
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<td>****</td>
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<td>No</td>
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<td>15%</td>
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<td>No</td>
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<td>No</td>
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<td>15%</td>
<td>Yes</td>
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<td>White</td>
<td>No</td>
<td>No</td>
<td>All</td>
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</tr>
</tbody>
</table>

**Center = CBD  ****% = signable area  **** white plus one color or two materials**
Positive Guidance Process Principles and Guidelines

The Positive Guidance approach, based on a performance model of the typical driver, has been developed by Alexander and Lunenfeld*, for the American Association of State Highway Officials and the Federal Highway Administration. This model is also the basis of much of the information contained in the Manual on Uniform Traffic Control Devices for Streets and Highways. All public roadways must follow this Uniform Manual; it is the law.

The three main components of the driving task, as described by Alexander and Lunenfeld, are control, guidance, and navigation. Control involves the driver's interaction with the vehicle in terms of speed and direction. Relevant information comes mainly from the vehicle and its displays and controls. Guidance refers to maintaining a safe path and speed while keeping the vehicle in the proper lane on the road. Information comes from the roadway alignment, hazards, traffic control devices and other vehicles and pedestrians using the roadway. Navigation requires planning and executing a trip from one location to another. Navigational information comes from maps, guide signs, landmarks, and so on.

The five principles of the Positive Guidance approach that apply to the driver's navigational task are primacy, spreading, coding, redundancy and expectancy.

**Primacy**
*Primacy* determines the placement of signs according to the importance of their information and to present the driver with information only when and where it is essential.

**Spreading**
*Spreading* occurs where all the information required by the driver cannot be placed on one sign or on a number of signs at one location; by spreading the information over space, the information load on the driver is reduced.

**Coding**
*Coding* relates to organizing information into larger units. Color and shape coding of traffic signs accomplish this by representing a specific message based on the color and the shape of the sign plane.

**Redundancy**
*Redundancy* refers to stating the same information in more than one way. The STOP sign in North America has a unique shape and message, both of which convey the message to stop.

**Expectancy**
*Expectancy* relates to the driver's previous knowledge; for example, most freeway exits will be on the right side of the roadway, advance warning will be given for hazards on the road, and so on. The driver's conceptual model of the roadways of an educational campus is essential to successfully navigating to a parking space which is close to the appropriate building entrance. The signage system must have a simple and consistent model which is easy to learn and easy to use. Information from signage in the environment must be provided when and where it is expected to facilitate positive guidance.


The Positive Guidance approach was developed as a synthesis of highway engineering and human factors techniques, procedures and information.
General Principles and Guidelines of the Manual on Uniform Traffic Control Devices

The Manual on Uniform Traffic Control Devices [MUTCD] defines five requirements for a traffic control device to be effective. The device must:

1. Fulfill a need
2. Command attention
3. Convey a clear, simple meaning
4. Command respect of road users
5. Give adequate time for proper response

Five considerations insure that these five requirements listed above are met:

Design
The combination of physical features such as size, color, and shape should command attention and convey a simple meaning. Consider the Uniform Manual criteria as governing guidelines with some flexibility for specific signs.

Placement
Devices should be installed so that they are within the cone of vision of the user to command attention and give adequate time for proper response. Vertical and lateral locations must be adjusted to fit the horizontal and vertical properties of the roadway.

Operation
The devices should be applied in a uniform and consistent manner so that they fulfill a need, command respect, and provide adequate time for response. Keep displays (signs) simple and assure they command attention by at least informally measuring their success.

Maintenance
The devices should be properly maintained to ensure legibility and visibility. In order to command respect and hold attention while meeting the needs of the users, the devices should be covered or removed when they are no longer appropriate.

Uniformity
This factor concerns the application of the same or similar devices in a consistent fashion for like situations so that they will fulfill the need of the user and command respect.

Driver based sign design
The following will address the classification, types, and general specifications applicable to all signs.

1. Sign types are classified into four functional groups:
   a. Regulatory signs are used to impose legal restrictions applicable to particular locations and are not enforceable without such signs, such as speed limit signs.
   b. Warning signs are used to call attention to hazardous conditions, actual or potential, which otherwise would not be readily apparent, such as intersection warning signs.
   c. Guide signs are used to provide directions to motorists, including route designations or visitor parking locations.
   d. Informational signs are used to provide motorists with information on points of interest, services, parking, and district and building identification.
General Principles and Guidelines of the Manual on Uniform Traffic Control Devices - Continued

2. The Uniform Manual stipulates certain design features that are inherent to signs by functional categories. For example, regulatory signs are generally of a rectangular shape with red or black legend. Warning signs have a diamond shape and a yellow background. Guide signs generally have a green background with a white legend, as do informational signs, except that some can have a white, blue or brown background depending on where they are installed. Backgrounds and legends are reflectorized unless they are applicable only in daylight hours. As a practical matter, it is usually more cost-effective to mandate all backgrounds to be reflectorized because of exchange, fabrication, and warehousing.

3. General specifications.
The fundamental qualities of a traffic sign are its ability to have attention value, be legible, and obtain recognition. These terms are as follows:

   a. Attention value.

   This characteristic of a sign demands attention by target value where the quality makes a sign or group of signs stand out from the background or the priority value where the quality makes it possible for a sign to be read first in preference to other existing signs. This is accomplished by sign shape, color, size, and placement.

   b. Legibility.

   The characteristic of a sign that allows it to be read and understood

   Pure legibility provides a distance in which a sign can be read in an unlimited time. In 1939, Forbes and Holmes determined when a series “D” letter height is maintained, drivers with 20/20 vision will read and comprehend the legend at 50 feet for every 1 inch of letter height. This remained the standard for 50 years, but recently Mace found that by altering the letter height ratio to 1 inch equals 30 feet, drivers of lesser visual acuity up to 20/40 could also read and understand sign legends at comparable positions in advance of the sign placement. Mace constructed a sign dictionary used in a model to determine Minimum Required Visibility Distance (MRVD). This standard is proposed as minimum distances for the sign to be read for proper driver reaction.

   Glance legibility of a sign provides a distance in which a sign can be read at a glance (usually from 0.5 to 1.5 second within a visual cone of approximately 5 feet by 100 feet). This vision cone is based on sign placement within the horizontal and vertical allowances set by the MUTCD.

   c. Recognition.

   This attribute of signs being quickly recognized and understood is due to the utilization of standard colors, shapes, and legends.
General Principles and Guidelines of the Manual on Uniform Traffic Control Devices - Continued

d. Sign design.

Properties of a sign design include its shape, color, symbol, or message. These and other fundamental properties are reflected in the Uniform Manual, and adherence to them tends to provide the motorist consistency in sign information.

- Shapes
- Colors
- Standard symbols
- Standard messages
- Standard sign sizes
- Reflectorization
- Illumination
- Active or passive signing
- Temporary signs
- Changeable sign messages
- Sign location, mounting, and support
Fabrication Principles and Guidelines

Materials
Signs are fabricated from a various assortment of materials including aluminum, steel sheeting, structural shapes, fiberglass, and plastic.

1. Aluminum
This material is suited to handle a large variety of signage tasks involved in this system. It is available in several different configurations (e.g., sheet, rod, extrusions, pipe and rectangular tubing) that can be used to construct the framing and signblade components. Aluminum makes fabrication for in-house production favorable due to its weight characteristics and ease of tooling.

2. Steel
The use of steel should be limited to applications that require strong structural capabilities. This material is an excellent choice for permanent components like frames and regulatory signage supports. Surface preparation is paramount when working in steel because it will rust easily which is a maintenance issue. Steel is not a forgiving material and requires more aggressive tools and equipment to make the substrate respond to a design requirement. Another plus for using steel is that is one of the best materials to handle the punishment of a public venue.

3. Plastic
Plastic goods are best suited for temporary considerations in an exterior signage system. It is easy to paint and fabricate with traditional tool sets. Plastic stocks only have average life in high trafficed areas but serve a purpose for fast turnaround requirements.

Sign face materials
The materials used for sign faces include paint, adhesive-coated plastic film, and porcelain. Cutout letters, numerals, and symbols can be made of vinyl reflective sheeting. If signs are to be used exclusively in a daylight operation or if they are adequately illuminated for nighttime visibility, considerations can be given for using paint, non-reflective vinyl, or porcelain materials in the legend.

Fasteners
1. Tamper-proof sign fasteners like spanner head or one-way head screws should be used to fasten signblades to structural components. These screws should be stainless steel and shielded with washers from dissimilar materials.

2. Adhesives like silicone and 3M Brand VHB tape are acceptable materials for bonding certain types of signage in the built environment. Care should be taken to follow the manufacturers’ requirements for cleaning surfaces before applying adhesives to ensure a good bond.

Replacing and updating the sign hardware over time
1. Design for evolution
It is imperative that the signage system contain as much engineered flexibility as possible. This is a requirement because the needs of the university will change and the signage must accommodate changes to remain as current as possible. Therefore:
   a.) Signblades should be fastened to signs with tamper-proof screws for easy removal
   b.) Messages should be applied with opaque and reflective vinyl so information can be updated without making an entire signblade.
   c.) Signs should be illuminated with exterior lighting instead of routed facepanels with interior illumination. Interior illuminated signage is labor intensive and the message changes would need to be handled by outsourcing which is not time effective. Simple common sense design details will help keep the signage current and functional for years.
Sign inventory practices
1. There are three objectives of a sign inventory:
   a. To classify all traffic signs by condition, location, and size of sign and mounting by day, and reflectivity by night.

   b. To discover the conditions requiring change in design or size of signs, refurbishing, or reflectorization.

   c. To establish existing and future sign needs and a plan to upgrade signs systematically to current standards.

2. The University sign shop will want to develop a field-inventory procedure that will allow signs to be identified and tabulated with existing computer-processing equipment or inventorying process. To accommodate either system, the following factors should be considered minimal needs in the process:
   a. Block number
   b. Side of the roadway or walkway (north, south, etc.)
   c. Direction the sign is facing
   d. Sign type(s)
   e. Mounting type
   f. Distance from the intersection or other reference point
   g. Offset distance from the roadway or walkway
   h. Installation date
   i. Condition of the sign(s)
   j. Other signs mounted in the same location
   k. Condition of the other signs
   l. Visibility factor to the motorist or pedestrian

Sign shop operations
1. The method of sign shop operations is dependent on a cost-effectiveness analysis of local sign fabrication versus purchase of manufactured signs. Factors in the analysis include:

   a. Number of signs in the system (installing a new sign system in stages)

   b. Cost of labor

   c. Time factor (installing a new sign system vs. maintaining an existing sign system)

   d. Purchasing policies

   e. Cost-benefit of special equipment required and skilled labor to operate the equipment

2. Equipment needs
Sign production is greatly simplified if sign backings are purchased in proper blank sizes and ready for 'facing,' or sheeting. Although some or most blanks are purchased to size, facilities are generally needed to fabricate other sign sizes.
Sign Maintenance Principles and Guidelines

A maintenance management system for the roadway and walkway sign program is very important to its success.

**Inspections**

To keep signs effective, adequate maintenance must be performed on a regular basis several times a year. Signs should be inspected during both daylight and darkness on a regular basis, to assure that visibility and legibility have not become impaired. The inspection process should identify those signs that require cleaning or replacement to generate a work list for maintenance attention. The use of simple forms can record damaged or obscured signs found at various locations. Inspections should assure that weeds, trees, shrubbery, or construction materials have not obscured the face of any sign.

**Routine maintenance**

This includes washing the sign with a good detergent or soap material as well as the removal of the sign in order that it might be cleaned with a steam generator, refurbished, or otherwise replaced in the cycle.

Illuminated signs demand greater attention. Because of their larger size, an occasional check is necessary for weather damage to either the sign or the mountings. It is quite common as a result of wind or lightning to have the mounting fixtures slip off-center. Additionally, lamp standards must be checked to eliminate hot spots that tend to wash out the effectiveness of the sign legend.
Letterform Visibility Chart
Letterforms

Letterforms are an essential part of all sign systems. The selection of an appropriate font should take into consideration image, coding and legibility. The fonts pictured here are a possible choice for the signage at KU.

Garamond

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789 10-

Univers Condensed

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789 10-
## Signage Sizes, Materials and Budget

The following is a description of signage sizes, materials and budget numbers for the sign types illustrated on pages 36-40. The budget numbers were solicited from 2 regional signage manufacturers and the pricing is based on the production of one unit at a time. The prices per unit would drop if multiples were produced simultaneously.

<table>
<thead>
<tr>
<th>Size</th>
<th>Materials</th>
<th>Est. Price per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>36’ x 8’</td>
<td>20” cast bronze prismatic letters applied to ornamental gate that is primed and painted. The gate is set into a stone base along the bottom edge for support and detail. The columns at both ends of the gate are clad with limestone. Each column has a cast plaque of the university seal. This is an exterior illuminated sign.</td>
<td>$50,000 - $75,000</td>
</tr>
<tr>
<td>8’ x 6’</td>
<td>Cast bronze plaques with prismatic letters applied to ornamental gate that is primed and painted. The gate is fabricated from square and round sectioned steel tubing. The gate is set into a stone base with a limestone cap. This is an exterior illuminated sign.</td>
<td>$15,000 - $25,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Materials</th>
<th>Est. Price per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor Parking 3’-6’ x 8’</td>
<td>The ornamental gate is primed and painted and set into the site by direct burial method. The gate is fabricated from square and rectangular sectioned steel tubing. The messages are applied to aluminum signblades fastened to the structure. This is an exterior illuminated sign.</td>
<td>$3,500 - $4,500</td>
</tr>
<tr>
<td>Directional 3’-6’ x 8’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Directional ID 3’ x 8’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Signage Sizes, Materials and Budget - Cont.

<table>
<thead>
<tr>
<th>Size</th>
<th>Materials</th>
<th>Est. Price per Unit</th>
</tr>
</thead>
</table>
| Pedestrian Directional  
6’ x 11’          | Pedestrian Directional, Street ID  
The signage is fabricated from painted steel, limestone and applied messages. The steel support passes through the limestone base to a concrete pour that is a direct burial. The vertical post is fabricated from steel tubing and the signblades are set into frames that are then attached to the post. This is an exterior illuminated sign. | $2,500 - $4,000     |
| Street Id  
6’ x 11’          |                                                                           |                     |
| Map/Kiosk  
6’-6" x 2’-6"    | Map/Kiosk, Building ID  
The ornamental gate is primed and painted and set into the site by direct burial method. The gate is fabricated from square and rectangular sectioned steel tubing. The messages are applied to aluminum signblades fastened to the structure. This is an exterior illuminated sign. | $3,500 - $4,250     |
| Building Id  
6’-6” x 2’-6”    |                                                                           |                     |
| Parking signs  
1’-6 x 6’-6”      | The signs are fabricated from aluminum components that are set into the ground with a break base. The vertical support is aluminum tubing that is primed and painted. The signblades are framed with vinyl applied messages. | $500 - $1,000       |
| Stop sign  
3’ x 8’          |                                                                           |                     |
ACKNOWLEDGEMENTS:

University of Kansas Campus Landscape Master Plan Committee
Robert Hemenway, Chancellor
Rodger Oroke, Director Facilities Management
Jim Long, Provost Office, Planning & Management
Warren Corman, University Architect
Tom Waechter, Campus Planning
Greg Wade, University Landscape Architect
Mike Richardson, Facilities Operations
Bob Hohn, Faculty Governance
Steve Scannell, Architectural Consultant Services
Gary Grimes, State Architectural Services
Phyllis Fast, State Architectural Services

Kansas University Endowment Association
James Martin, President
Daryl Beene, Senior Vice President for Property

Master Plan Consultants
Jeffrey L. Bruce & Company, L.L.C.
N. Kansas City, Missouri
Prime Consultant
Turf Diagnostics & Design
Olathe, Kansas
Turf Agronomic Design & Turf Maintenance
Mark M. Mahaday & Associates
Carmel Valley, California
Cultural Maintenance & Assessments
Forcade Associates
Chicago, Illinois/Lawrence, Kansas
Signage & Wayfinding
Main Campus Map with Emphasis on Primary Roadways for the Visitor-driver

The visitor-driver Campus map shows the location of the primary and secondary roadways. The nodes (circles with letters or numbers) identify the primary and secondary directional sign types. The districts (groups of buildings and roadways and walkways) and buildings are also identified. See the legend on the map for more information.
The KU Wayfinding Program outlined here can be understood by studying the Wayfinding System Matrix. The matrix is organized horizontally by following a general scenario to Campus, Campus entrance, primary roadways, secondary roadways, visitor parking lots, then primary and secondary walkways to building entrances. The matrix is organized vertically by the user (driver or pedestrian) and general sign type (identification or directional). The resulting interaction within the matrix identifies twelve different sign types.

<table>
<thead>
<tr>
<th>General scenario</th>
<th>Vehicular</th>
<th>Pedestrian</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Campus</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to Visitor Center &amp; Museum Drug (entrance point &amp; porta)</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Example: Iowa &amp; 15th Street, 19th &amp; Miscellaneous Street, 19th &amp; National Drive</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Campus</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of entrance</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Example: Iowa &amp; 15th Street, 19th &amp; Miscellaneous Street, 19th &amp; National Drive</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Primary streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to Visitor Center &amp; Museum Drug (entrance point &amp; porta)</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Secondary, tertiary streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to secondary visitor areas</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Visitor parking lots</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of parking lots</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to primary entrance walkways</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Primary, secondary, tertiary entrance walkways</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of primary, secondary</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to primary buildings-other activity areas</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Buildings (other areas 'points')</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of building-visitor area entrances</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to floors &amp; primary interior walkways</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
</tbody>
</table>

### The Wayfinding System Matrix

<table>
<thead>
<tr>
<th>General scenario</th>
<th>Vehicular</th>
<th>Pedestrian</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Campus</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to Visitor Center &amp; Museum Drug (entrance point &amp; porta)</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Example: Iowa &amp; 15th Street, 19th &amp; Miscellaneous Street, 19th &amp; National Drive</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Campus</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of entrance</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Example: Iowa &amp; 15th Street, 19th &amp; Miscellaneous Street, 19th &amp; National Drive</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Primary streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to Visitor Center &amp; Museum Drug (entrance point &amp; porta)</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Secondary, tertiary streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of streets</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to secondary visitor areas</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Visitor parking lots</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of parking lots</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to primary entrance walkways</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Primary, secondary, tertiary entrance walkways</td>
<td>Driver</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Identification of primary, secondary</td>
<td>Driver</td>
<td>Pedestrian</td>
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<td>Buildings (other areas 'points')</td>
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<td>Pedestrian</td>
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<tr>
<td>Identification of building-visitor area entrances</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Directions to floors &amp; primary interior walkways</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
</tbody>
</table>

### Vehicular Sign Types

1. Campus ID sign
2. Street identification
3. Identification of visitor areas in parking lots
4. Visitor parking space identification
5. Directional signs to parking lots
6. Directional signs to secondary/visitor areas
7. Directional signs to the primary/visitor walkways
8. Walkway identification - name, location, map
9. Walkway identification - name, location, map
10. Up-left/right arrows for buildings - other activity areas
11. Identification of building entrances & other areas
12. Entrance identification

### Pedestrian Sign Types

39
Main Campus Map with Emphasis on Primary Walkways for the Visitor pedestrian

The visitor-pedestrian Campus map shows the location of the primary and secondary walkways. The nodes (circles with letters or numbers) identify the primary and secondary directional signs. The districts (groups of buildings and roadways and walkways) and buildings are also identified. See the legend on the map for more information.
A map system for use by the KU Wayfinding Program must be developed. The map system could be used by the many stakeholders at KU who have an interest in visitors to the Campus. Cartographic Services at KU has the technical knowledge and experience to develop a map system.
Examples of the Typical Sign Types

The several pages that follow illustrate the visual look of the signs and how they relate to the Landscaping Program.
Examples of the Typical Sign Types - Continued

Museum District

North Entrance

PRIMARY DISTRICT IDENTIFICATION
Examples of the Typical Sign Types - Continued

Visitor Parking Lots
Directional
Building Directional I.D.

FORCADE ASSOCIATES

The University of Kansas
Examples of the Typical Sign Types - Continued
Examples of the Typical Sign Types - Continued
Chart of Campus, Districts, and Building Names

The following chart illustrates the naming of the districts and buildings on both the Main and West Campus.
### Examples of the Message Structure of Various Sign Types

The several pages that follow illustrate the possible message structures for the various sign types.

<table>
<thead>
<tr>
<th>Decision code and/or path identification</th>
<th>Identification</th>
<th>Location of sign (NW, NE, SW, SE)</th>
<th>Message</th>
<th>Arrow</th>
<th>Body</th>
<th>Arrow</th>
<th>Sign side (sign face direction)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directional</td>
<td>SW</td>
<td>The University of Kansas</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Signs are being installed April/May '99</td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>Visitor Center</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>Main Campus</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>West Campus</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>Last Center</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification</td>
<td>SW</td>
<td>The University of Kansas</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>Visitor Center</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>Main Campus</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>West Campus</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SW</td>
<td>Last Center</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification</td>
<td>SE</td>
<td>The University of Kansas</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SE</td>
<td>Visitor Center</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SE</td>
<td>Main Campus</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SE</td>
<td>West Campus</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SE</td>
<td>Last Center</td>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification</td>
<td>SE</td>
<td>Visitor Center</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Directional</td>
<td>SE</td>
<td>Main Campus</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SE</td>
<td>West Campus</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional</td>
<td>SE</td>
<td>Last Center</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

The University of Kansas

Campus Landscape Master Plan

Message List

Examples

Figure 49
### Examples of the Message Structure of Various Sign Types - Continued

<table>
<thead>
<tr>
<th>Decision node and/or path identification</th>
<th>Identification, directional, or regulatory sign</th>
<th>Location of sign (NW, NE, SW, SE)</th>
<th>Message</th>
<th>Body</th>
<th>Arrow</th>
<th>Sign side (sign face direction)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parking</strong></td>
<td>Identification: Several locations within parking lot</td>
<td>Visitor Parking (symbol)</td>
<td></td>
<td></td>
<td></td>
<td>Both</td>
<td></td>
</tr>
<tr>
<td><strong>Visitor Center</strong></td>
<td>Identification: By main entrance</td>
<td>Visitor Center Entrance</td>
<td></td>
<td></td>
<td></td>
<td>West</td>
<td>Raised glass doors and/or glass panels</td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>University Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>West</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>Lewis Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>West</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>Hasler Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>West</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>Elsworth Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>West</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>McCullum Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>West</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>Telecommunications</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>West</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>University Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>East</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>Lewis Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
<td>East</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directional: SW</td>
<td>Hasler Hall</td>
<td>Arrow right</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Directional: SW</td>
<td>Elsworth Hall</td>
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<td></td>
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<td>East</td>
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### Examples of the Message Structure of Various Sign Types - Continued

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<th>Identification, directional, or regulatory sign</th>
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<th>Body</th>
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Campus Landscape Master plan | Title | Message List | Examples | Figure 51
### Examples of the Message Structure of Various Sign Types - Continued

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