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**CONTEXT SENSITIVE DESIGN
THINKING BEYOND THE PAVEMENT
Documentation of Workshop Development and Training**





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CONTEXT SENSITIVE DESIGN – THINKING BEYOND THE PAVEMENT
Documentation of Workshop Development and Training

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16. Abstract This report documents the development and presentation of the workshop titled “Thinking Beyond the Pavement – A Workshop on Context Sensitive Design”. Work began on the workshop development in 1998 after the Kentucky Transportation Cabinet was selected as one of the pilot states to implement a training program for context sensitive design. The Kentucky Transportation Center at the University of Kentucky was selected to develop and deliver the training to state personnel and consultants who were commonly involved with project development. The training course was comprised of the following four modules: <ul style="list-style-type: none"> • Facilitated Communication and Public Involvement, • Environmental Issues, • Liability Issues, and • Design Guidelines, Safety, and Aesthetics. A case study was prepared for use with the training modules in order to simulate the project development process and promote participant interaction. Through May 2004, there were 46 presentations of the workshop with 1,693 participants.			
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EXECUTIVE SUMMARY

In 1998, the Kentucky Transportation Cabinet (Cabinet) made the commitment to adopt context-sensitive design (CSD) for development of all new transportation projects. That decision was based upon the desire to improve project delivery and to establish a better relationship with the citizens of Kentucky. Among the actions taken to implement CSD was the delivery of a workshop to state personnel and consultants who were commonly involved with project development. Cabinet officials contracted with the Kentucky Transportation Center (Center) at the University of Kentucky to develop and deliver the course. Specific focus areas and learning objectives were desired along with acquainting state personnel and consultants with the following:

- A fundamental explanation of CSD,
- The need for improved communication and participation throughout,
- The use and roles of a multidisciplinary project development team,
- A new environmentally attuned end-to-end project development process,
- Liability issues and the design exception process requirements, and
- Innovative aesthetic and design approaches and techniques.

The Center workshop team, including a public planner, sociologist, environmental specialist, environmental engineer, safety engineer and design engineer; sought to simplify the course presentation by separating it into basic modules that were to be prepared by the appropriate team expert. The course was comprised of four modules:

- Facilitated Communication and Public Involvement,
- Environmental Issues,
- Liability Issues, and
- Design Guidelines, Safety and Aesthetics.

The Center workshop team members believed that class participation would be vital to improving the attendees understanding of the materials presented. To promote class participation, the attendees were separated into four groups or teams. The teams were to address case study tasks in the manner similar to the newly mandated Cabinet Project Development Teams. The objective was to have 10 members on each team, with overall workshop attendance limited to 40 participants.

A case study was prepared involving a road rehabilitation project between two communities. The case study incorporated a variety of CSD issues including endangered species, environmental justice, historic areas, and farmland preservation and wetlands. Role-playing was used to familiarize project development teams with the perspectives of both roadway proponents and opponents and the types of contentious issues encountered during project development. Related to the case study, each team was required to prepare a project purpose and need statement, conduct an initial public involvement meeting and select “guiding principles” to address public concerns about the project, prepare a public involvement plan, and develop a design plan for one of the overall project alternatives, (along with mitigation and environmental enhancements).

Through May 2004, the CSD Workshop was presented a total of 46 times including two pilot presentations in September and November 1999. Since the pilot presentations, there have been 22 workshops in Kentucky with 815 participants. Outside Kentucky, there have been another 22 workshops presented with 878 participants.

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Additional appreciation is extended to the numerous representatives of the several state highway agencies hosting the workshop when it held outside Kentucky, as well as representatives of the respective Federal Highway Administration division offices in each of those states.

The efforts of Harold Peaks and Keith Moore from the Federal Highway Administration's Office, who were responsible for managing and overseeing the contracts providing funding for the workshops, were instrumental in the overall success of development and delivery of the training.

1.0 INTRODUCTION AND BACKGROUND

The public has become more involved in highway project development and in some cases resistant to the construction of new highways or the modernization of existing ones. As a result, the following consequences have become evident in Kentucky as well as in other states:

- Decisions and plans are made and then scrapped or revised,
- Project costs grow with litigation and other delays, and
- Transportation projects take much longer to complete.

The difficulties that many state highway agencies (SHAs) experience when addressing public concerns about new highway projects has culminated in a Federal Highway Administration (FHWA) call for a new approach to designing highways. This new approach is termed context-sensitive design (CSD) or alternately “thinking beyond the pavement” or “flexible design”. Federal law asks that designers of federally funded highway projects now consider the non-traditional “environmental, scenic, aesthetic, historic, community, and preservation impacts” in the design of highways (1). This non-traditional approach is new to most highway agencies and is something that was only done sporadically in the past.

As a relatively new approach to highway design, SHAs face numerous obstacles to implementing CSD. Among those identified in 1998 at a conference sponsored by FHWA, the American Association of State Highway and Transportation Officials (AASHTO), and the Maryland Department of Transportation (DOT) titled “Thinking Beyond the Pavement” (2) were:

- Poor communication between SHAs and the public;
- An unwillingness to place environmental representatives on the project design team;
- Indifference to project impacts on communities;
- A misinterpretation of the flexible guidelines in the Green Book as strict standards; and
- Insufficient attention to aesthetics.

SHAs attempting to implement CSD must employ a series of complementary actions to be successful. A major hurdle is training SHA personnel involved with project development about CSD principles and how to properly apply them. The normal and expected resistance of people to change compounds the problem. Project development has long been the primary domain of engineers whose mindset has been to build roads with a focus on capacity, cost and safety. In many cases, SHA personnel have been reluctant to “step out of the box” or consider that there might be more than one right answer. New training programs are needed to meet these challenges and promote the broader use of CSD principles.

In 1998, the Kentucky Transportation Cabinet (Cabinet) made the commitment to adopt CSD for development of all new transportation projects. That decision was based upon the desire to improve project delivery and to establish a better relationship with the citizens of Kentucky. Among the actions taken to implement CSD was the delivery of a workshop to state personnel and consultants who were commonly involved with project development. The Cabinet had become one of five SHAs nationwide who were selected by FHWA to prepare pilot courses on CSD and present those to other SHAs in their respective AASHTO regions. Subsequent actions taken by the Kentucky Transportation Cabinet to implement CSD include the following:

- Instituted the use of multi-disciplinary Project Development Teams on all projects.
- Created environmental coordinator positions in each highway district office.

- Created public relations positions in each highway district office.
- Prepared policy statements formalizing the implementation of CSD on all KYTC projects. (This included the requirement for preparation of formal public involvement plans for each project.)
- Conducted Environmental Leadership Workshops for all KYTC Divisions/Districts (with the assistance of FHWA Kentucky Division Office).
- The Secretary of Transportation visited all KYTC Divisions/Districts discussing the KYTC adoption of CSD in small group sessions.

Cabinet officials contacted the Transportation Center at the University of Kentucky and requested that it prepare and deliver the proposed course. Responsiveness to the Cabinet request along with the close working relationship between the two entities resulted in the rapid development of a workshop that has proven both effective as a training tool and amenable to delivery to a wide variety of audiences including those from other areas throughout the U.S.

2.0 WORKSHOP DEVELOPMENT

When Cabinet officials approached the Center about the proposed workshop, they requested that it have a specific focus and clear learning objectives. They were seeking to acquaint state personnel and consultants with:

- A fundamental explanation of CSD,
- The need for improved communication and participation throughout,
- The use and roles of a multidisciplinary project development team,
- A new environmentally attuned end-to-end project development process,
- Liability issues and the design exception process requirements, and
- Innovative aesthetic and design approaches and techniques.

The Cabinet goal for the workshop was to sufficiently familiarize project development staff and consultants with CSD that they could begin to use the approach to become aware of the wide range of issues impacting project development. In addition, a secondary goal was to achieve a general consensus or buy-in by Cabinet staff that CSD was a necessary and desirable procedure to implement for project development.

Those requirements resulted in the preparation of a general introductory course that spans the project development process. Another advantage for having a general course was that the Cabinet policies related to CSD were rapidly evolving at that time making it impractical to focus on specific issues.

In October 1998, the Center assembled a core group of persons with applicable expertise to prepare the workshop. In addition to the Transportation Center staff, the group included representatives from the UK Civil Engineering Department and the FHWA Kentucky Division Office. After a series of meetings the workshop focus and learning objectives were finalized. A significant driving force was that Cabinet officials wanted the workshop presentations to begin in the fall of 1999 to coincide with the plan to apply CSD on all new state projects. They also asked that the workshop require no more than two days attendance.

To meet the imposed deadline, the Center workshop team (including a public planner, sociologist, environmental specialist, environmental engineer, safety engineer and design engineer) sought to simplify the course presentation by separating it into basic elements

(modules) that were to be prepared by the appropriate team expert. The course was comprised of the following four modules:

- Facilitated Communication and Public Involvement,
- Environmental Issues,
- Liability Issues, and
- Design Guidelines, Safety, and Aesthetics.

Due to the varied backgrounds of the proposed Cabinet and consultant attendees, fundamental training was necessary to familiarize them with the myriad of issues currently impacting highway project development. Experts in each area prepared their respective modules and presented the materials in workshop mini-lectures. Graphical aids such as video and PowerPoint presentations were used to stimulate attention.

The Center workshop team members believed that class participation would be vital to improving the attendees understanding of the materials presented. To promote class participation, the attendees were separated into four groups or teams. Prior to meetings, the attendee list was reviewed and the teams were formed, to the largest extent possible, of parties with different technical and organization backgrounds. Teams were grouped at separate tables and class exercises were typically conducted as team breakout sessions. The teams were to address case study tasks in the manner similar to the newly mandated Cabinet Project Development Teams. The size of each team was limited to 10 participants providing a cap on the workshop attendance to 40 persons.

A case study was prepared involving a road rehabilitation project between two communities. The case study incorporated a variety of CSD issues including: endangered species, environmental justice, historic areas, and farmland preservation and wetlands. Role-playing was used to familiarize project development teams with the perspectives of both roadway proponents and opponents and the types of contentious issues encountered during project development.

The case study was organized so that each team focused on a unique potential corridor, each with a series of environmental issues to address. At various points during the workshop, the teams were given the “hands on” activities that included 1) preparation of project purpose and need statement, 2) conducting an initial public involvement meeting and selecting “guiding principles” to address public concerns about the project, 3) preparation of a public involvement plan, 4) identification of safety issues for each corridor, 5) addressing a potential liability issue, and 6) developing a design plan for one of the project alternative corridors (along with mitigation and environmental enhancements). The team selected leaders to make presentations to the entire group on the team’s results for each major “hands on” task exercise.

Once the basic workshop was prepared, it was reviewed on several occasions by teams of KYTC central office and FHWA Division officials. Two separate pilot presentations were made and the course underwent several revision cycles until a satisfactory product was provided. To insure the course was consistent with the theme of “culture” being aspired to within the KYTC, workshop content was also presented to the Kentucky Transportation Cabinet secretary and the director of the FHWA Southern Region for review. The schedule of the revised course included provisions for several breaks and working lunches (see the Workshop Agenda presented in Text Box II). At lunchtime, KYTC officials and consultants with significant CSD experience provided interesting presentations dealing with public involvement and design practices previously applied

in Kentucky. A common topic focus of those presentations was the well-known reconstruction effort on Paris Pike (US 27 & 68) in central Kentucky.

Context-Sensitive Design Workshop Agenda

Day One

- *Overview of Case Study*
- *Communication & Public Involvement Module, Part I & Purpose & Need Exercise*
- *Environmental Concerns Module*
- *Luncheon Speaker: The Kentucky Experience*
- *Case Study Role Playing & Guiding Principles Exercise*
- *Communication & Public Involvement Module, Part II*
- *Developing a Public Involvement Plan-- Major Exercise*
- *Team Presentations*

Day Two

- *Design Issues Module, Part I and Safety Concerns/Options Exercise*
- *Liability Issues Module & Defense Exercise*
- *Design Issues Module, Part II, Aesthetics*
- *Luncheon Speaker: Aesthetics or Historic Preservation*
- *Case Study Route Selection and Design--Major Exercise*
- *Team Presentations*
- *Workshop Summary and Evaluation*

Workshop Delivery

Kentucky was selected by FHWA to prepare a CSD program and the state's mandate for rapid development of a CSD Workshop, its focus, the interagency cooperation achieved, and the efforts of the Center workshop team facilitated its progress. After pilot presentations in September and November 1999, the first formal CSD workshop was held in December 1999. Through May 2004, the KTC team has presented 22 workshops in Kentucky to over 800 attendees. Observers have attended from other pilot SHAs and the FHWA. Attendees and observers have provided critiques of the workshop contents that have resulted in continuing improvements since the initial presentations. In addition the Center made a presentation to representatives from SHAs in the AASHTO Southern Region in Tunica, Mississippi in May 2000. Several of those representatives expressed interest in having the workshop presented to personnel in their states.

By the end of 2000, the frequency of workshop presentations in Kentucky decreased. The Center was contacted by a number of SHAs throughout the U.S. requesting information on the presentation of the workshop. FHWA officials decided to provide funding to support the presentation of workshops to interested SHAs outside Kentucky. Beginning with the workshop in Mississippi, the workshop has been presented 22 times outside Kentucky in a total of 16 states with nearly 900 participants in attendance.

Workshop Results

The KTC CSD workshop has addressed the requirements set forth by Cabinet officials. The workshop has an introductory focus intended to serve SHAs struggling to transition into CSD. The unique combination of teaching and “hands on” experiential learning have given course participants a good flavor of the intent of CSD and the fundamental actions that are required to implement it properly. Despite the reluctance of some attendees to accept CSD wholeheartedly, the workshop has received consistently positive reviews indicating a willingness to embrace and employ CSD principles.

The considerable efforts of the Center and the Cabinet have resulted in agency-wide delivery of the CSD concept. In addition, FHWA’s plan to expose other SHAs to the concept has been successfully implemented through Kentucky’s involvement as a pilot-state. Persistent support by the FHWA and Cabinet officials was commendable and necessary for the overall success of the workshop.

3.0 WORKSHOP CONTENTS

3.1 Overview of Concept

Background

Context-sensitive design is a collaborative approach in which all interested parties are part of the design team; with a focus on purpose and need, while equally addressing safety, mobility, and preservation of the natural and human environment. This definition can be expanded to incorporate the project development process and the characteristics of design excellence; however, the foundation of CSD must be a “joining together or weaving together the whole situation” as documented by Webster’s New World Dictionary (3). Critical to this new approach to highway design is the proper inclusion of the issues related to preservation of scenic, esthetic, historic, environmental, and community values.

Context-sensitive design is a relatively new concept based on previously developed principles related to environmentally-sensitive issues. The most significant action taken was a commitment to preserving and protecting environmental and cultural values affected by transportation facilities through the National Environmental Policy Act of 1969 (4). The more recent trend toward emphasizing context-sensitive issues was Congressional action in 1991 to pass the Intermodal Surface Transportation Efficiency Act (5), which in addition to safety emphasized the importance of good design that is sensitive to the surrounding environment, especially scenic and historic areas. In 1995, Congress reemphasized and strengthened this direction through the National Highway System Designation Act (1) with clearly stated opportunities to consider more than safety, durability, and economy of maintenance by taking into account the constructed and natural environment, and preservation impacts of the activity.

The genesis of the full concept of context-sensitive design was the result of a workshop in Maryland in 1998 (2). The participants in this workshop formed the principles of context-

sensitive design by identifying seven qualities of excellence in transportation design and eight characteristics of the process to yield excellence. Following are those qualities of excellence:

- Satisfy purpose and need through a consensus of stakeholders,
- Achieving safety for the user and the community,
- Assuring the project is in harmony with the community,
- Exceeding expectations related to levels of excellence in people's mind,
- Providing efficient and effective use of resources,
- Creating minimal disruption to the community, and
- Creating a project of lasting value to the community.

In combination with the qualities of excellence were the following characteristics to yield excellence:

- Communication is open, early, and continuous with all stakeholders,
- Creation of a multi-disciplinary team early with public involvement,
- Identification of a full range of stakeholders in the scoping phase,
- Insuring that the project development process is tailored to the circumstances,
- Securing a commitment to the process from agency officials and local leaders,
- Including a public involvement process tailored to the project,
- Understanding the landscape, community, and resources prior to design, and
- Employing a full range of communication tools.

The overall process of context-sensitive design seeks to encourage movement away from the rigid project development process and view the process differently with a full range of design alternatives and public involvement.

The linkage between the concept of context-sensitive design and the traditional design process is documented in the forward to the “Green Book” or the Policy on Geometric Design of Highways and Streets (6). This primary source of guidance for highway design includes the following excerpts:

- “the intent of this policy is to provide guidance to the designer by referencing a recommended range of values for critical dimensions”,
- “sufficient flexibility is permitted to encourage independent designs tailored to particular situations”, and
- “minimum values are either given or implied - larger values within the ranges will normally be used where the social, economic, and environmental values are not critical”.

The first document devoted entirely to the concept of context-sensitive design was the Federal Highway Administration publication titled Flexibility in Highway Design (7). This guide was not an attempt to create new standards, but rather an effort to build on flexibility in current laws and regulations to explore opportunities to use flexible design as a tool to sustain community values without significantly compromising safety. This “Flexibility Guide” and the Green Book” are compatible documents and should be used to create designs that balance safety with the concerns for the natural and human environment.

In addition to the “Flexibility Guide” and the “Green Book”, the third document critical to the overall concept of context-sensitive design is the Community Impact Assessment (8). This Federal Highway Administration publication is intended to increase awareness of the effects of transportation actions on the human environment and emphasize the importance of community impacts. Guidance provided indicates that equal attention should be given to the human and natural environment in the project development process.

Project Development and Context-Sensitive Design

Traditionally, project development has been the process to move a project from the planning stage through construction. In addition, the process has focused on the following steps to develop the project; 1) refinement of purpose and need, 2) development of alternatives, 3) evaluation of alternatives, and 4) development of mitigation. An evolution of practices has resulted in a project development process that includes an overlay of public involvement throughout the stages, with increased emphasis on involvement of the Federal Highway Administration NEPA process, beginning in the planning stages. The project development team has an increased role and there are more stages of project development; including planning, preliminary design, final design, right-of-way, construction, and operations. The benefits of this proactive posture can result in timely decisions, partnerships not opponents, public trust, and an improved project delivery schedule.

Kentucky's Commitment to Context-Sensitive Design

There has been a major commitment to the principles of context-sensitive design in Kentucky beginning with the early involvement at the Maryland workshop, and continuing to the present training program for all participants in the project development process. A commitment has been made by Kentucky's Transportation Cabinet Secretary indicating that all projects will be designed and constructed with appropriate application of context-sensitive design. There has been a series of policy statements issued with direction to project development participants indicating the need for public involvement and integration of context-sensitive design. In general, there is a new way of conducting the business of designing and constructing highways in Kentucky with emphasis on "consistent and responsive interaction with the public" while taking into account "the natural and manmade environment of the area through which the road traverses and include consideration of environmental, scenic, aesthetic, historic, community, and preservation impacts in the development of a project

3.2 Facilitated Communication and Public Involvement

Communication is all about sharing information: it's two-way. Why would we bother? We want improved roadway designs and design decisions that will stick. We want successful and timely project development. We want sensitivity to the physical and human environment. In order to achieve this, broader participation in roadway design (within agencies and with the community) is needed. Kentucky is intent on improving communication and expanding participation in the project development process.

Project Team. Kentucky is using the project development team (PDT) approach for roadway projects to improve the internal participation. The team consists of staff representatives of the various work phases in project development (from planning to operations) and, as appropriate to the project's context, others including design or specialty consultants. The teams are intended to be interdisciplinary and are called upon to stretch for some creativity.

<p>There's more than one right answer! According to Dewitt Jones in his Everyday Creativity video: creativity is a matter of perspective; there's always more than one right answer; and you can reframe problems into opportunities. We all need to check our lenses from time-to-time and Dewitt, a world-class photographer, vividly demonstrates the results of applying his concepts on assignment for the National Geographic.</p>
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Outreach, to the public and various stakeholders, is being strengthened (not just to convey information but to seek broader stakeholder participation). A public involvement plan/program is being required of the PDT. These efforts cause a need for developing added skills and tools for working in interdisciplinary teams and with public groups.

Project Purpose. The keystone for beginning a project development process is the purpose and need statement. It makes the case for a roadway improvement. It is the first consensus building opportunity for the PDT. The statement answers questions such as -- What is the primary transportation purpose of the intended facility? (linkage and/or access) and What are the specific transportation needs it will fulfill? (safety and/or capacity). Some affirmation of the intent to be context-sensitive may also be included. A simple purpose and need statement lead-in example follows:

“This project’s primary purpose is to provide an efficient highway linkage for travelers between Rushmore and Pleasantville that will safely meet the projected traffic capacity needs for the next twenty years at the least long-term cost. It is to be accomplished with the least construction disruption, and with a design that is sensitive to the physical and social environment of the corridor community.”

This is the first marketing opportunity for the PDT as it moves into the public arena. Educating the broader public about the needs for a roadway improvement and beginning to receive their opinion and belief about community values and resources is a primary mission.

Involvement Plan. Developing a public involvement plan is also an early PDT work requirement. A review of the community/corridor situation is warranted to provide guidance on targeting the audience and selecting outreach methods. Determining the range and extent of the outreach from the early planning phase through construction is the heart of the PDT’s required thinking. An action program then specifies the outreach meetings and media as well as their timing. Any public involvement plan should answer the following questions:

- What are the community’s concerns, issues and interests?
- Who are the affected stakeholder groups?
- What are the sensitivities that will require special involvement efforts?
- What are we trying to accomplish with public involvement (for each phase)?
- What meeting types or other media will we use to communicate with stakeholders?

An early two-way information meeting could allow the PDT to present a draft purpose and need statement and allow each participant to provide verbal/written comments regarding interests and concerns in a one-on-one setting at the end of the meeting. On potentially controversial projects a citizens advisory committee, having representative membership, meeting early and regularly throughout the project development process may be appropriate. It would provide guidance and feedback to the PDT. Special focus groups or neighborhood meetings may also be appropriate at times during the process to deal with special issues and concerns of property owners. Other media should be considered to expand communication such as mail surveys or a web site. In the end the members of the PDT must actively employ the first communication skill – listening.

Participatory Design. Participatory design acknowledges that: no expert is fully knowledgeable of the entire situation; information sharing takes effort (time for translation and interpretation); and participants must be given equal opportunity. Simple facilitation techniques to avoid voting or yes/no polarization and build greater group consensus for a design solution are available. In

Kentucky additional support staff including a public information officer and an environmental coordinator is available to each PDT. The tools and techniques of visualization including photos, artist's renderings, 3-D models and computer simulations can be important for the PDT's design understanding as well as engaging and informing stakeholders.

Successful participatory design requires: better group facilitation technology (trained facilitators using special group techniques); longer term participation; and better organization and technical support (e.g. visualization tools) for the PDT.

Advanced techniques of communication, involvement and participation are required in order for context-sensitive roadway design to be realized. In Kentucky, context-sensitive design has been initiated by executive leadership and is being extended throughout the organization to all the leaders who play critical roles in implementing change. Kentucky employs CSD philosophy for all roadway projects. It was found necessary to create a tracking system to record all promises made throughout the project development process to insure that that these promises are realized in the project. Most recently Kentucky has gone a step further to establish a project managers academy that provides 8 days of specialized training for PDT leaders. One trainee summarized context sensitive design as just a matter of "doing the right thing, in the right way, in the right place."

3.3 Environmental Issues Related to Context-Sensitive Design

The Traditional Environmental Review Process

Most of the significant laws/regulations/presidential orders impacting transportation agencies evolved from the mid-1960's onward. Over time, the reaction of transportation agencies has evolved. Initially, those agencies considered the environmental review process as merely a compliance activity. Permitting was a clearance action to allow work to progress on road building projects.

During the interstate construction era, public participation in decision-making was considered an unwanted intrusion into transportation agency affairs. Those agencies adopted a stance known as "DAD" which means that an agency **D**ecides upon an action, **A**nnounces it to the public, and **D**efends its stance against all subsequent opposition. In the interstate era, state transportation agencies designed roads emphasizing safety, mobility and capacity (and cost) ignoring many environmental depredations caused by their projects and discounting the will of locals impacted by them. There were many consequences of transportation agency actions, many of them bad – public mistrust, project delays (due to project litigation), duplicative efforts (in stopping and re-starting projects), higher overall project costs (due to project delays), and poor relations with resource agencies. The cumulative effect of these woes was the creation of environment where project delivery was stifled to the point that was taking almost 6 years to complete the necessary project environmental documentation.

Facing a situation where vital projects could not be programmed and completed in a reasonable timeframe, some transportation agencies slowly began a transformation process to address the issues that were causing the delays. Those agencies sought to create **P**ublic **O**wnership of **P**rojects or "POP" by providing a participatory environment where the public, elected officials, resource agencies and stakeholders worked together to obtain objective, responsible transportation decisions. "POP" is scalable from small projects such as a single-lane bridge to larger ones including interstate routes.

In developing the Environmental Policy Act of 1969 (NEPA)(4), Congress sought to make Federal agencies consider environmental issues when planning their actions. It recognized that those agencies had a primary focus on need/benefits of their proposed actions and often enacted environmentally damaging projects without heed to measures that could have limited or avoided the unfavorable impacts. The objective of NEPA is to promote a balanced decision-making process for all agency actions. To achieve that goal, NEPA required each of those agencies to establish environmental review processes, called NEPA processes. Those reviews ensured that all agency decision-making encompassed not only the benefits of a proposed agency action (in transportation – mobility, capacity and safety), but also the impacts of the action on the environment, economics and society. Agencies were to document all decisions and show that a reasonable effort had been made to identify all environmental issues related to a proposed action, to consider the overall wisdom of the proposed action and investigate alternatives and to develop mitigation measures to limit environmental impacts from the action.

The FHWA NEPA process provides the basic framework for proper project development. It incorporates public involvement, environmental compliance and a balanced decision-making process. NEPA is an evolving process that is periodically supplemented by FHWA or other federal policies, orders and guidance. Adherence to FHWA NEPA will address public concerns and minimize the possibility of unnecessary controversy about proposed projects. The Kentucky Transportation Cabinet (KYTC) is generally following the FHWA NEPA process on state-funded projects to secure its benefits.

The Environmental Quality Council of the Federal Government Executive Branch provided Federal agencies with a set of tools/options to limit environmental impacts of agency actions. The Federal Highway Administration lists those as:

- Avoidance,
- Minimization, and
- Mitigation.

Those are listed in order of desirability with avoidance being the preferred option. Examples are provided in Figures (A-C).

In addition to those, the Federal Highway Administration, in its *1994 Environmental Policy Statement (9)* stated, “It is FHWA Policy To: Seek opportunities to go beyond traditional project mitigation efforts and implement **innovative enhancement measures** to make the project fit harmoniously within the community and natural environs.” Federal transportation funds could be used for project improvements (termed enhancements) that were not necessarily tied directly to a transportation project. Enhancements include building/improving parks, establishing interpretive centers, and constructing roadway crossings for wildlife (Figures D & E).

At this point a brief explanation of the two environments is needed. When most people think of environmental issues, they likely think of streams, plants, and animals, etc (i.e., the natural environment). A context-sensitive project is one that seeks to blend the transportation facility into the natural surroundings (the context). Avoiding impacts to the natural environment, minimizing any unavoidable impacts, mitigating to replace those resources, and enhancing the surrounding environment are all context-sensitive ways of dealing with natural environmental issues related to transportation projects.

The less frequently linked component of the environment is made up of communities, neighborhoods, and people: the human environment. Unlike the natural environment, human environmental issues are not closely regulated by any single resource agency. The Corps of

Engineers regulates wetlands and waterways. The Fish and Wildlife Service has authority over endangered species. But who looks out for the interest of communities? Oddly enough, the responsibility for human environmental impacts falls on the shoulders of the transportation agencies themselves. They regulate themselves when it comes to Section 4(f) impacts to parks and recreation areas. They are also responsible for complying with the Civil Rights Act and the Executive Order 12898 on Environmental Justice (10).

Transportation agencies are in a sense the “resource agency for the people.” Traditionally, this is not a role that has been embraced by transportation agencies. However, context-sensitive design calls for increased awareness, sensitivity, and inclusion in the consideration of human environmental impact. An excellent and underutilized tool for addressing human environmental impacts is the Community Impact Assessment booklet produced by the Federal Highway Administration in 1996 (8). If context-sensitive design is to become a part of the way transportation agencies do business, then the principles of the Community Impact Assessment must also become a part of the way human environmental factors are incorporated into projects.

Historic preservation (Section 106) and Section 4(f) environmental requirements also limit/restrict proposed projects that impact historic and public properties (11). Section 106 of the federal National Historic Preservation Act of 1966 requires federal agencies to consider project impacts on historic sites. Recent Section 106 amendments require further participation in those decisions by consulting parties, SHPOs, Native Americans and the public. Section 4(f) of the 1966 DOT Act provides severe restrictions on the impacts of projects to public properties (i.e., parks, recreation areas, fish and wildlife refuges and sites of local, state and national historic significance) (12). Those impacts are allowed only if there is no prudent and feasible alternative to those impacts and if project planning minimizes harm to a 4(f) property. Context-sensitive design plays a large role in addressing projects that impact these protected properties while enabling projects to be completed in an environmentally sound manner.

For years design engineers worked in their own circle and environmentalist and planners worked in different circles. As one section finished their work the job would be “thrown over the fence” and the next section would begin their work on the job. In many cases, the work done by the planning and environmental sections was often redone by the design section because various aspects of the job would not fit the design guidelines. This type of “over the fence” mentality often results in the same job being done more than once, better known as total inefficiency.

One of the main goals of context-sensitive design is to merge both the environmental and design processes. Important decisions are made in both stages of a project. However, the environmental decisions can have a profound affect on the design decisions. For example, environmental commitments may limit the total amount of right-of-way, which can affect the designer’s ability to fit the roadway into the surroundings. Also, design decisions can have impacts on environmental commitments previously made during the process. The result of this interdependent relationship is that design decisions and environmental decisions are all essentially project decisions. Rather than having an environmental decision-making process and a design decision-making process, context-sensitive design relies on the two processes being merged into one seamless transportation decision-making process.

Public involvement is vital to human environmental issues. Every major decision point should include public involvement. It is important for: the development of purpose and need statements; the development of a public involvement plan; the identification of alternatives; and

the selection of appropriate mitigation measures. KYTC officials are revising the project development process to facilitate stakeholder and public involvement. The new process entails early and continuous involvement of those parties throughout the project development. Project development (including environmental) personnel will work as interdisciplinary teams that will remain associated with a project from the planning phase through construction (and beyond). The project development team will prepare a public involvement plan to identify how and when the public will be involved on a project (e.g. use of advisory committees). KYTC personnel working concurrently in teams will reduce project duration by eliminating unnecessary delays and rework that occurred in the traditional “handoffs” between functional divisions. The continuous involvement of the team throughout the project will also promote better compliance with environmental commitments.

In the end, context-sensitive design is much more than a new tool, it’s a new way of doing business. The transportation mission of the 20th century focused heavily on facilities that were safe and improved mobility. The transportation mission of the 21st century will likely add a third factor into the transportation equation: harmony. New facilities will not only need to improve safety and mobility, but will also need to be in harmony with the context of the facility. Workshops promoting this concept will aid in the overall transformation to appropriate highway project development.



Figure A. Road Aligned to Avoid Historic Trees (Avoidance).



Figure B. Lynn Cove Viaduct Erected above Ground Level (Minimization).



Figure C. Conservation Group Rebuilding a Dry Stone Fence (Mitigation).



Figure D. Road Crossing for Large Wildlife (Enhancement).

3.4 Design Guidelines and Context Sensitive Design

The basic premise of a properly designed roadway is to consider the capacity and safety issues while addressing its physical and human environmental needs. To achieve such a balance, trade offs among these factors are needed which are routinely performed either consciously or unconsciously. The flexibility on the geometric aspects of roadways is not a new concept, since it has been stated clearly in the foreword of the Green Book since its first edition (13). However, several designers have viewed the suggested values of the Green Book as rigid standards instead of guidelines to be used in roadway design to be applied with a reasonable flexibility based on the ambient conditions.

The approach of guidelines instead of standards was emphasized even more in the Flexibility in Highway Design guide (7), a recent publication by the US Department of Transportation, and it will be further stressed in an upcoming publication of AASHTO on the same topic (14). These publications attempt to reinforce the concept of guidelines and eliminate the notion that the Green Book values have to be firmly applied irrespective of the project characteristics and requirements. Such an approach typically leads to roadways that put less emphasis on the impact of the design on the human and natural environment by creating wide swaths of pavement cutting through communities and natural resources. This approach has been typically justified under the pretense of a design with increased safety, which is not always true. Several design guidelines are based on empirical data from several decades ago, some have not been validated through research, and for others research has demonstrated that lower values than those suggested in earlier versions of the Green Book will work as well (15). Therefore, a more open-minded approach with respect to these guidelines is needed to properly address the needs of each roadway.

Functional class is an important characteristic of the roadway and most design aspects are presented in the Green Book based on this aspect. Two issues arise from such a treatment and have a significant impact on design flexibility. First, the existing guidelines for determining the functional class of a roadway were developed in the 1970's and they have not been updated to reflect the current uses of roadways (16). Second, the notion of the functional class was developed to provide a common language between planners and designers and was not intended to associate the class to specific design standards. It should also be mentioned that the Green Book provides flexibility within each functional class that is often overlooked. However, the way that functional class is typically used forces the decision on the number of lanes simply based on this aspect without considering other issues.

A number of design features are required to be defined to complete the roadway design including number and width of lanes, type and width of shoulders, width and type of median, and size of clear zones. Typically, the number of lanes is determined based on capacity requirements and the desired level of service of the facility. Even though level of service is presented on letter grades, designers should consider and evaluate travel speeds in the various alternatives, since it is possible that fewer or narrower lanes

may provide a lower letter grade level of service but practically similar travel speeds. Moreover, the use of simulation to determine travel speeds is an additional tool that could be implemented to evaluate different design alternatives. The type of shoulders should consider not only the requirements of the design vehicle but address the aesthetic features of the roadway. In addition to safely separating the opposing traffic streams, medians can also serve to improve the aesthetic appeal of a roadway, an aspect that is given little attention in the past. Moreover, the use of variable medians is a concept that is gaining appeal and should be considered as a viable alternative. Finally, clear zones provide great flexibility to creatively address the aesthetic appeal of the roadway without compromising its safety. All these components provide an immense opportunity to designers to create a roadway that would address the capacity, safety, and aesthetic issues without compromises.

Even though there is such flexibility within each of these components, there are cases where innovative design is required to address specific cases. Such an approach may include adjusting the design speed to provide flexibility in determining geometric design components or establish design consistency. For example, a tangent section could allow for a 60 mph design speed while the curve preceding and following this section require lower speeds. It is more reasonable to use a consistent design speed for all sections, say 50 mph, and thus create a consistent speed profile. Additional approaches may include the use of different slopes for the clear zones that minimize right of way or a combination of radii and superelevation values that would provide a curve that could fit the road profile so to maintain consistency both in design and driver expectations.

A final tool that could be used to address flexibility in cases where the existing guidelines do not provide an acceptable value is the design exception process. This approach allows the designer to introduce lower design values for a specific element to properly address the impacted area. This process allows for adjusting almost every aspect of the geometric design and depending on the project may require both state and federal approval. It should be pointed here however that there is very little research that quantifies such decisions and their impact on safety. Moreover, the use of this approach may be avoided with the use of innovative design or by reexamining other parameters of the project that may affect the specific component.

The issues addressed here stressed the fact that flexibility in roadway design is not a new concept but rather an overlooked one by most roadway designers. The existing Green Book has provided all along such flexibility in its guidelines and the current effort to address this approach mainly stems from the fact that communities have started to play a more active role in roadway decisions. Moreover, this approach enforces the notion that human and environmental issues should be addressed on the same level as safety and capacity and thus, necessitate the search of non-traditional methods to appropriately address all these issues.

3.5 Liability Issues and Context Sensitive Design

With the emphasis on increased flexibility in the design of highways in order to consider the natural and manmade environment around the highway, the issue of liability has been raised. The designer is asked to consider environmental, scenic, aesthetic, historic, community, and preservation impacts in the development of a project in addition to design, construction, and safety guidelines or standards. There has been concern that consideration of these other factors could possibly increase liability exposure.

Before considering the potential for increased exposure to liability, it must be noted that claims related to the area of highway design have been filed in the past and will continue irrespective of the concept of context sensitive design. Attorneys have in some cases taken information from the Policy on Geometric Design of Highways and Streets (6) and interpreted the guidelines given in this publication to be strict standards. The use of context sensitive design places even more emphasis on the documentation and justification process needed to defend these cases.

Tort claims against highway agencies have been increasing in recent years. While most of the claims have involved maintenance and operations, the potential for increased claims relating to design is a concern. A tort is a violation of a legal duty for which the law provides a remedy of monetary damages. A tort is a civil wrong controlled by civil law, not statutory law. A party who suffers an injury or property damage can sue any party believed to be responsible. The defendant may be found liable if injury or damage resulted from their negligence.

In order for a plaintiff to be successful in a tort liability case, four elements must be met. The defendant must have a duty and then breach that duty. Also, the breach of the duty must be a proximate cause of the crash that then must result in proven damages. It is recognized that designers have a duty to design a safe roadway. The question is whether that duty was breached causing the crash and resultant damages. Negligence must be proven; that is, the designer must have failed to exercise reasonable care in the design of the highway.

A limitation on the exposure of state agencies is the doctrine of sovereign immunity. Only a few government agencies have retained full sovereign immunity such that they cannot be sued. Several other agencies have a technical retention with an administrative claims procedure. Sovereign immunity has been abolished in most states.

An important concept that becomes an issue is whether a specific decision was the result of a discretionary or ministerial function. A discretionary function is defined as one that requires exercise in judgment and choice that has been referred to as “engineering judgment”. A ministerial function is defined as one that involves obedience to instructions but demands no special discretion or judgment. Discretionary decisions will not result in liability while a violation of a ministerial function is a breach of the duty and subject to a liability claim. The argument can be made that design decisions are discretionary and not subject to a liability claim.

A key question relating to a design decision made as a result of the context sensitive design concept is whether the decision violated a duty to conform to a particular standard. Publications such as the Green Book have been used to support a claim that the design violated a standard (6). However, the foreword to the Green Book states that “the intent of the policy is to provide guidance to the designer by referencing a recommended range of values” (6). It specifically states that “sufficient flexibility is permitted to encourage independent designs tailored to particular situations” (6). Flexibility in the use of design criteria is also present in other commonly used design references.

Documentation of all decisions is a key to implementing context sensitive design. This has been referred to as the design exception process but it should apply to all decisions that may not be considered typical. This process involves creating a written record, which documents engineering decisions and shows approval of each exception or non-typical design. This process identifies, justifies, and documents design decisions for situations where typical design guidelines are not utilized.

Many agencies have developed a form to summarize information needed to document approval of justified design exceptions. The types of information needed include: project description, roadway classification, amount and character of traffic, design criteria, crash history, information pertaining to type of exception including reasons for requesting the exception, effect on other design features, cost of attaining a typical feature, future improvements, and features which mitigate the deviation.

Federal law and regulations provide that designers of federally-funded highways on the National Highway System may consider the non-traditional environmental, aesthetic, community, scenic, historic, and preservation impacts in the design of highways (United States Code, Title 23, 109 Standards) (1). It is suggested that each state should have a policy to permit designers of roads on other highways systems to consider these same types of factors. This type of policy is consistent with the concept of discretionary immunity for highway design.

There are many examples of discretionary immunity being upheld in court cases. The use of proper documentation and, in some instances, a safety study justifying the specific decision is noted. Care must be taken to document all non-typical design features. Use of permissive language rather than mandatory language in design documents is also encouraged.

Financial considerations are part of the documentation needed. However, rather than simply stating that a particular design was too expensive, a more detailed cost/benefit analysis should be presented.

In summary, innovative design will not cause an engineer liability problems. However, failure to justify innovative design with “comprehensively documented” and “well reasoned” design exception information may cause a problem. The justification needs to be based on sound engineering judgment and not just cost considerations.

3.6 Use a Case Study for Context Sensitive Design Training

People learn in different ways: from viewing films and other visual presentations, from reading texts, from listening to lectures, but most of all from working on projects that is, from the experience of doing. The best strategy, then, for imparting new knowledge and skills is to weave these different modalities of learning together into a tight-knit program. A case study was devised with a set of exercises to do just that. The approach was to employ various ways of learning with an accent on learning by doing.

At the beginning of the workshop the case study was presented visually and aurally through a Power Point presentation. The workshop participants then read an overview of the issues and facts in the case study. Over the next two days, they were expected to complete a series of group exercises related the case study. The latter is a proposed highway project that connects a city of 99,000 with a smaller city of 25,000 ten miles distant. The area is growing economically and is expected to outgrow the current road, which is narrow and crosses an environmentally sensitive wetland or bog.

There were choices for an alternative route, but the various alternatives also cross environmentally sensitive areas: one through prime farmland, another through an historic area, and the last through a small African-American community. Workshop participants were asked to design a road through one of these areas. To do so, while preserving environmental integrity required the application of many of the principles of context sensitive design, as well as much work with representatives of the public.

As previously noted, the workshop contains four modules: communication and interaction with the public; environmental issues; geometric or creative design and aesthetics; and addressing issues of liability. There were approximately two group exercises per module. The presentations in each module were deliberately kept quite short, typically in range of 20 to 30 minutes. One of the goals over the two-day workshop was to alternate exercises with presentations to maximize attentiveness and learning. The presentations included a variety of formats, including standard lecture, Power Point, question and answer, and film excerpts.

Each of the short presentations was followed by a group project designed to illustrate the main points made in the module. The exercises shed light on the major steps for doing context sensitive design. They also entail use of techniques that facilitate effectively working with the public.

The goal was to take the workshop participants through the process of CSD. More than anything else, CSD is a process of partnering with the public. Therefore, the exercises are designed to guide the attendees through the major steps in the process. This process ve the participants both the big picture as well as a hands-on experience.

In the first exercise, the participants were asked to write a purpose and need statement for the project. As part of this exercise they were introduced the structured go-round technique of group facilitation. This is a technique that has been successfully

applied in an attempt to reach a consensus when dealing with a citizen's groups. The participants are then taken through several sessions that culminate in the development of a public involvement plan. In their plans, they are required to describe the type of meetings and media they will employ at each stage of the project development process.

In other exercises the utility of brain-storming and role-playing is demonstrated to increase participants' capacity to communicate with the public. In the role-playing exercise, participants are asked to play the role of a specific concerned citizen. After each person in a group plays their role from a provided script, they then discuss the issues and write a set of guidelines for the project, much as a citizens' advisory committee would.

CSD calls for flexible use of the guidelines in the Green Book. One of our modules addresses the range of possibilities by looking at liability issues. In this part of the workshop, the participants discuss ways to document and justify design decisions.

The last group exercise of the workshop requires teams of participants to devise a route with a detailed cross section for the road. They are charged with designing a context sensitive road to connect the two cities. They are then asked to present their route to the other attendees. In their presentations they must identify all context sensitive items they included in their designs as well as all environmental enhancements. The ultimate design must be consistent with their earlier purpose and need statement, the public involvement plan and their project guidelines.

4.0 RELATED ACTIVITIES RESULTING FROM WORKSHOPS

The Center and Cabinet are cooperating to prepare new context-sensitive training initiatives and extend the current CSD workshop into the foreseeable future. Among those activities currently underway are the following:

- The current Workshop on Context-Sensitive Design continues to be presented twice yearly to new state personnel and consultants
- A one-day workshop on Context-Sensitive Construction was developed and presented for contractors and state construction personnel
- The Project Managers Academy has been established and a series of workshops has been presented to Transportation Cabinet employees
- Preliminary work has begun on the development of a one-day workshop on becoming a proficient CSD practitioner for state project development team members and consultants
- Preliminary work has begun on the development of a one-day workshop for administrators and managers to present the organizational steps and necessary policy to support the effective implementation of CSD
- Preliminary work has begun on the development of an on-line short course for those interested in the concept and process of CSD

5.0 SUMMARY OF WORKSHOPS - LOCATIONS AND PARTICIPANTS

The following two tables summarize dates, locations, and participants in the CSD workshops presented in Kentucky and other states. Through May 2004, there have been 22 workshops presented in Kentucky with 815 participants and 22 workshops presented in other states with 878 participants.

Kentucky Workshops

DATE	LOCATION	TOTAL PARTICIPANTS	NUMBER KYTC	NUMBER CONSULTANTS	NUMBER FHWA	OTHER
12-14-99	Lexington	36	20	12	0	4
01-19-00	Georgetown	35	28	6	1	0
02-16-00	Lexington	37	19	15	3	0
03-22-00	Lexington	39	21	13	1	4
04-19-00	Lexington	38	24	12	2	0
05-16-00	Lexington	39	29	10	0	0
06-14-00	Lexington	37	17	15	2	3
07-19-00	Lexington	41	20	20	1	0
08-22-00	Lexington	36	17	18	1	0
08-30-00	Lexington	38	29	9	0	0
09-19-00	Lexington	38	18	17	3	0
10-17-00	Lexington	36	9	24	0	3
11-01-00	Lexington	35	12	20	1	2
12-05-00	Lexington	37	13	21	2	1
01-30-01	Lexington	33	7	24	2	0
05-29-01	Lexington	37	8	24	0	5
10-16-01	Lexington	43	5	38	0	0
5-22-02	Lexington	38	4	34	0	0
8-7-02	Lexington	40	0	34	3	3
5-13-03	Lexington	34	3	31	0	0
12-2-03	Lexington	31	15	15	1	0
1-28-04	Lexington	37	5	32	0	0
Totals		815	323	444	23	25

Workshops Outside Kentucky

DATE	LOCATION	TOTAL PARTICIPANTS	NUMBER DOT	NUMBER CONSULTANTS	NUMBER FHWA	OTHER
05-03-00	Mississippi	55	38	0	17	0
11-30-00	Arkansas	40	32	0	8	0
01-22-01	Georgia	40	25	13	2	0
01-24-01	Georgia	40	25	13	2	0
02-20-01	Indiana	44	39	0	4	1
03-07-01	Iowa	39	33	0	6	0
04-30-01	New York	38	30	0	2	6
08-14-01	North Carolina	34	30	0	0	7
09-04-01	Montana	38	32	0	2	14
10-23-01	Kansas	40	39	1	0	0
12-12-01	New York	38	28	0	1	9
4-2-02	Kansas	39	31	0	5	3
4-4-02	Iowa	36	36	0	0	0
10-8-02	South Carolina	49	35	1	7	6
11-19-02	Louisiana	38	33	1	4	0
8-11-03	North Dakota	48	41	0	7	0
8-13-03	Idaho	40	35	0	5	0
8-28-03	Illinois	40	33	1	6	0
10-21-03	Louisiana	41	35	0	2	4
11-19-03	Tennessee	40	32	3	5	0
1-22-04	Tennessee	30	12	5	3	10
5-6-04	West Virginia	31	27	0	4	0
Totals		878	701	38	92	60

6.0 REFERENCES

1. U.S.C. Title 23, 109 Standards, Design Criteria for National Highway System, 1995.
2. Thinking Beyond the Pavement: A National Workshop on Integrating Highway Development with Communities and the Environment; College Park, Maryland, 1998.
3. Webster's New World Dictionary, Second Edition, 1976.
4. National Environmental Policy Act of 1969, Section 2, 42 U.S.C., Part 4321.
5. Intermodal Surface Transportation Efficiency Act, 1991.
6. A Policy on Geometric Design of Highways and Streets, 4th Edition, American Association of State Highway and Transportation Officials, 2001.
7. Flexibility in Highway Design, U.S. Department of Transportation, Federal Highway Administration, FHWA-PD-97-062, 1997.
8. Community Impact Assessment, Federal Highway Administration Office of Environment and Planning, FHWA-PD-96-036, 1996.
9. FHWA Environmental Policy Statement, Publication No. FHWA-PD-95-006(10M)E, 1994.
10. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898, 1994.
11. National Historic Preservation Act of 1966, 16 U.S.C. 470-470W-6, Section 106.
12. National Historic Preservation Act of 1966, 16 U.S.C., Section 4(f).
13. A Policy on Geometric Design of Highways and Streets, AASHTO, 1984
14. A Guide for Achieving Flexibility in Highway Design, AASHTO, May 2004.
15. Hauer, E. Safety in Geometric Design Standards, University of Toronto, Toronto, Canada 1999.
16. Highway Functional Classification: Concepts, Criteria, and Procedures; U.S. Department of Transportation, Federal Highway Administration.