KYTC Highway Design

Chapter

ENVIRONMENTAL CONSIDERATIONS

Subject

General Information

OVERVIEW OF CHAPTER:

Environmental considerations are another key component of the project development process. This chapter outlines various topics related to environmental considerations. Discussed are the general processes involved in integrating environmental stewardship into the project development process. In this chapter is a description of the various environmental issues, documentation, types of permits, and certifications required in project development.

GENERAL INFORMATION:

Part of the Cabinet's mission is to develop its projects in an environmentally sensitive manner by identifying and evaluating the potential impacts to the natural and human environment. Failure to identify affected areas and environmental issues for the entire reach of the project in a timely manner can jeopardize project goals and schedule. It is recommended that at a minimum an environmental overview or identification of environmental constraints be identified within the project area prior to beginning to study alternative alignments.

The project team should develop projects in a manner to first avoid any adverse impact. If avoidance is not practical, the team should then work to minimize and/or mitigate the impact. The project team should also seek opportunities to enhance the natural and human environment.

Federal and state laws require the evaluation of the potential natural and human environmental effects of projects and the development of alternatives to minimize adverse effects. Beyond this requirement, it is also the right thing to do in assuring a project will exist in harmony with the environment and community. Applying for and obtaining the appropriate environmental clearances, permits, and certifications early in the design phase of a project are essential.

KYTC Highway Design

Chapter

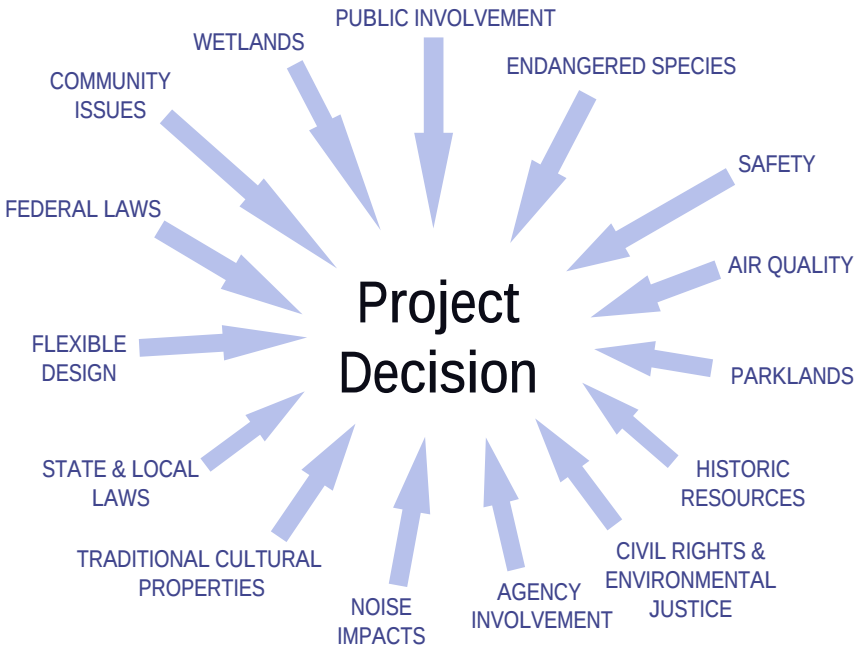
ENVIRONMENTAL CONSIDERATIONS

Subject

Environmental Issues

ENVIRONMENTAL ISSUES:

Along with economic and engineering factors, environmental issues require early identification and consideration during the project development process. Project managers and project teams must be knowledgeable of these issues, understand the interrelationship between the environment and the project, and be cognizant of appropriate policies and procedures to contend with these issues.



CONT.

ENVIRONMENTAL ISSUES (cont.): These issues include, but are not limited to:

- Air quality
- Aesthetics
- Cemeteries
- Cultural resources
- Endangered species
- Federal lands
- Floodplains
- Groundwater resources
- Hazardous materials and underground storage tanks (HazMat/UST)
- Noise
- Section 4(f) resources
  - Cultural resources
  - Recreational parks
  - Wildlife refuges
- Section 6(f) resources
- Socioeconomic concerns and environmental justice
- Streams
- Wetlands

The following sections briefly describe guidance in addressing these issues:

AIR QUALITY: Both the Clean Air Act (CAA) and the National Environmental Policy Act (NEPA) require that air quality be considered for any proposed project. The CAA also requires that all programs, plans, and projects conform to the State Implementation Plan (SIP) and that priority be given to implementing those portions of the plan that are to achieve and maintain the national primary ambient air-quality standards. Transportation projects must also be included in the State Transportation Implementation Plan (STIP). The level of detail in an air-quality analysis will vary considerably according to the size of the project, the existing level of air quality in the area, and the degree of controversy. The altering of the project and scope may require an SIP/STIP amendment.

AESTHETICS: The appearance of highway facilities will have an impact on the scenic and visual quality of an area. During project development, opportunities to enhance aesthetics should be explored in order to minimize the visual impact of the project. These should be in concert with public input, community goals, resource agency input, etc.

CONT.

CEMETERIES: Efforts should be made to identify and avoid cemeteries within the project corridor. These efforts should include communicating with local public agencies and residents for information that may reveal the locations of cemeteries that may not be readily visible or delineated. The historical significance of the cemetery will be determined by the appropriate resource agencies. A historic cemetery is likely to be subject to Section 4(f) requirements (see page 5). **Chapter HD-300 (**"Surveying") and **Chapter HD-1300** ("Right of Way") of this manual provide more information about surveying and documenting cemeteries.

CULTURAL RESOURCES: Preservation and protection of cultural resources (archaeological and historic) must be considered in the decision-making process of transportation projects. The area(s) of potential effect (APE) should be established, and appropriate levels of investigation of cultural resources should be accomplished as early as possible in the project development process. The investigation should be commensurate with the significance of the cultural resources as well as the magnitude of the project's impacts on the resources. Cultural sites shall be considered when corridors are examined.

The requirement to consider the effect of a project with federal involvement (Federal Highway Administration [FHWA], Army Corps of Engineers [ACE], etc.) on cultural resources is found in Section 106 regulations of the National Historic Preservation Act, which requires consultation with consulting parties and appropriate resource agencies. These consulting parties must include local government and the State Historic Preservation Officer (SHPO) and may also include local historical groups, preservation groups, recognized Native American tribe(s), or others who have a demonstrated interest in the resource. Due consideration of these concerns should also be given when developing state-funded projects.

Federal regulations require that agencies consider that historic properties of religious and cultural significance to a Native American tribe may be located on ancestral, aboriginal, or ceded lands of that tribe. Accordingly, agencies must make a *reasonable and good-faith effort* to identify Indian tribes that attach such significance but that may now live at great distances from the undertaking's area of potential effect. This requires consultation regarding any archaeological investigation concerning prehistoric resources.

If archaeological sites are depicted on plans, exhibits, etc., that are for public viewing, the location of these sites should <u>not</u> be shown precisely enough that potential looters or collectors can utilize the information to remove artifacts. A subject-matter expert should be consulted to find out how to show these areas for public viewing.

CONT.

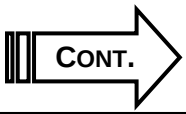
ENDANGERED SPECIES: The presence of endangered species, both plants and animals, is always to be considered a possibility in the project area. The Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service to ensure that actions do not jeopardize threatened or endangered species or their critical habitats. Decisions as to locations, construction activities, and letting schedules may be influenced by the presence of these species and should be discussed early upon discovery of their presence.

FEDERAL LANDS: Project teams should consider the unique uses and aspects of federal lands before utilizing them in a project and should avoid them if possible. Effects upon federal lands may result in unique permitting requirements, as well as other considerations that may result in lengthy delays. Contact with representatives for these federal lands should be early and often so as to facilitate development of agreements, permits, and access to the property.

FLOODPLAINS: Floodplain encroachments should be avoided where practicable. If an encroachment cannot be avoided, the degree of the encroachment should be minimized. Generally, any increase in the 100-year water-surface elevation produced by an encroachment on a National Flood Insurance Program (NFIP) floodplain cannot exceed one foot.

GROUNDWATER RESOURCES: Aquifers and springs may provide drinking water to individuals or communities via recharge areas receiving surface drainage from sinkholes or other groundwater supplies (water tables, etc.) The trend for many large communities nationwide is to obtain their drinking water from groundwater resources because they are safer and require less chemical purification than surface water. The Safe Drinking Water Act and the Underground Injection Control Program constitute the laws and regulations that pertain to this issue. Designated well-head protection areas may also have state or local regulations that must be considered.

HAZARDOUS MATERIALS & UNDERGROUND STORAGE TANKS: The potential impacts of hazardous materials (HazMat) and underground storage tanks (UST) should be considered during project development. The Cabinet may assume liability and responsibility for cleanup if it becomes necessary to acquire contaminated property, which may lead to exorbitant costs and/or project delays. It is imperative that the project team take adequate measures to identify and avoid, when possible, HazMat and UST sites before the initiation of final design and plan preparation. All known HazMat and UST sites should be shown prominently on the roadway plans. A list of potential HazMat/UST sites may be obtained from the Division of Environmental Analysis (DEA).



NOISE:

Baseline studies are used to determine the potential need for mitigation of adverse noise impacts to the community. This determination shall include a weighing of the benefits achieved and the overall adverse social, economic, and environmental effects and the costs of the abatement measures. The FHWA regulations for mitigation of highway traffic noise in the planning and design of federally aided highways require the following during the planning and design of a highway project:

- Identification of traffic noise impacts
- Examination of potential mitigation measures
- Incorporation of reasonable and feasible noise mitigation measures into the highway project
- Coordination with local officials to provide helpful information on compatible land use planning and control

The regulations contain noise abatement criteria, which represent the upper limit of acceptable highway traffic noise for different types of land uses and human activities. The regulations do not require that the abatement criteria be met in every instance. Rather, they require that a reasonable and feasible effort be made to provide noise mitigation when the criteria are approached or exceeded. Designers should look for ways to minimize noise intrusion into the surroundings of a highway by utilization of noise barriers, earthen berms, and/or vegetation; manipulation of geometrics; and other context-sensitive methods.

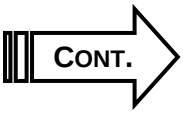
The designer should also keep in mind that noise impacts during construction may be mitigated by using alternative construction practices, and should include them when practical by notes on the plans or in the proposal.

SECTION 4(F) RESOURCES:

Any publicly owned park, recreation area, wildlife or waterfowl refuge, or significant cultural resource is defined as a Section 4(f) resource. FHWA approves the use of land from any of these properties if it is determined that:

- There is no feasible and prudent alternative to the use of land from the property.

- The action includes all possible planning to minimize harm to the property resulting from such use. Information supporting such determination must demonstrate that there are unique problems or unusual factors involved in the use of avoidance alternatives or that the cost; social, economic, and environmental impacts; or community disruption resulting from such alternatives reaches extraordinary magnitudes. In some cases, providing compensable land areas or financial reimbursement may be considered.



SECTION 4(F) RESOURCES (cont.):

All federal-aid projects or projects requiring FHWA approval should be examined for potential Section 4(f) impacts. However, all reasonable measures should be taken to avoid such resources regardless of funding source.

SECTION 6(F) RESOURCES:

These resources are those that have been secured or enhanced by the Land and Water Conservation Fund through the National Park System. No property acquired and/or developed under this section shall, without approval from the National Park System, be converted to other than public outdoor recreational uses. Approval of such a conversion is granted only if it is in accord with the then-existing comprehensive statewide outdoor recreation plan and only upon such conditions as deemed necessary to assure the substitution of other recreational properties of at least equal fair market value and of reasonably equivalent usefulness and location.

SOCIOECONOMIC CONCERNS & ENVIRONMENTAL JUSTICE:

Environmental justice is a concept to ensure avoidance, minimization, or mitigation of disproportionately high adverse effects on minority and low-income populations. Additional consideration may be appropriate for low-income family clusters. These effects would include impacts upon human health, environmental resources, and social and economic conditions. Efforts should be made to encourage the full and fair participation by all potentially affected communities in the transportation decision-making process.

Environmental justice, when properly implemented, affects all levels of transportation decision-making. This approach will:

- Make better transportation decisions that meet the needs of all people
- Design transportation facilities that fit more harmoniously into communities
- Enhance the public-involvement process, strengthen community-based partnerships, and provide minority and low-income populations with opportunities to improve their quality of life
- Minimize and/or mitigate unavoidable impacts by identifying concerns early in the process and providing offsetting initiatives and enhancement measures to benefit affected communities and neighborhoods

CONT.

SOCIOECONOMIC CONCERNS & ENVIRONMENTAL JUSTICE (cont.): The total project should be reviewed to ensure that the actions resulting from our transportation decisions do not result in a disproportionately high adverse effect on minority and low-income populations. For example, no decisions should be made as to locations of transportation facilities simply because it's "cheaper" to affect lower-cost housing rather than more expensive areas.

STREAMS: In the development of projects, the project team should consider and document the avoidance of stream impacts and stream channelization. Streams may consist of blueline streams (as depicted on United States Geological Survey [USGS] quad maps) and any other channels of definable surface water movement. Stream channelization can create long- and short-term impacts on water quality and aquatic and riparian ecosystems and may adversely affect domestic, municipal, and agricultural water supplies. Additionally, stream mitigation for these impacted waters is costly and time-consuming. Avoidance of stream channelization can both benefit the aquatic environment and minimize project costs. Stream channelization of 200 feet or more requires Section 401 Water Quality Certification from the Kentucky Environmental and Public Protection Cabinet (KEPPC), Division of Water, and General (Nationwide) or Individual Section 404 permits from the Army Corps of Engineers (ACE).

The information required for the development of permit applications should be provided early in the project development process, but no later than right-of-way plan submittal, in order to obtain approval from the necessary resource agencies. Plans depicting mitigation of impacted streams should be developed and included with the project, as advised by the subject-matter experts. This mitigation plan development should be initiated during the development of right-of-way plans.

WETLANDS: Wetlands are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (EPA, 40 CFR 230.3 and COE [Army Corp of Engineers], 33 CFR 328.3). The basic premise is that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. In other words, when applying for a permit, the applicant must show that:

- Steps are being taken to avoid wetland impacts where practicable
- An attempt has been made to minimize potential impacts to wetlands
- Mitigation is provided for any remaining unavoidable impacts through activities to restore or create wetlands

KYTC Highway Design

Chapter

ENVIRONMENTAL CONSIDERATIONS

Subject

Environmental Documents

DOCUMENTS: The environmental document records the project decision-making process. It includes the evaluation and selection of project alternatives through the consideration of engineering, environmental, and economic factors.

Depending on project scope, funding type (federal or state), and complexity and controversy associated with a project, the required environmental document can take the form of the following:

- Categorical Exclusion (CE)
- Environmental Assessment (EA)
- Finding of No Significant Impact (FONSI)
- Draft and Final Environmental Impact Statements (DEIS and FEIS)
- State-Level Approval (SLA)

Development of federally funded projects must adhere to the Federal Requirements Decision Tree (**Exhibit 400-01).** A federally funded project is a project in which any phase or part thereof includes federal funding. Projects requiring federal land transfers/easements and federal permits (Army Corps of Engineers, Coast Guard, etc.) can also qualify as federal undertakings and must comply with the National Environmental Policy Act process.

CATEGORICAL EXCLUSION (CE): CEs are actions that do not:

- Induce significant impacts to planned growth or land use
- Require the relocation of significant numbers of people
- Have a significant impact on any natural, cultural, recreational, or historic features
- Involve significant air, noise, or water-quality impacts
- Have, either individually or cumulatively, any significant environmental impacts

CEs are excluded from the requirements typically necessary to prepare an EA or EIS.

CONT.

CATEGORICAL EXCLUSION (CE) (cont.):

Through a programmatic agreement with the Federal Highway Administration (FHWA), CEs are processed as one of four types or levels. The appropriate type or level is dependent upon the context of the project and intensity of the impacts.

Projects with little to no impact are processed using either a Programmatic CE (PCE) or a CE Level 1, which is typically prepared in the district office and approved by the environmental coordinator and project manager. A specific list of CEs that do not require any approval from FHWA is found at 23 CFR 771.117(c) and in Table 1 of the KYTC *Categorical Exclusion Evaluations Users Manual*. Additional project types as described in Table 2 of the manual may also be processed without FHWA approval as either a CE Level 1 (prepared in the district) or as a CE Level 2 (prepared by the Division of Environmental Analysis [DEA]). With FHWA approval, projects that have greater impact to the environment may be processed using a CE Level 3 if the projects meet the criteria established in 23 CFR 771.117(d) and Table 2 of the manual.

Depending upon the potential for project impacts and the necessity to consult with outside resource agencies, PCE development may require only a few days or two to three months. CE Level 1 documentation will typically require two to six months, depending upon the resources affected, especially cultural historic or archaeological resources. CE Level 2 or 3 documentation can be expected to require 6 to 24 months, depending upon the complexity of the project, resources affected, securing resource agency agreements for mitigation, etc.

CE approvals expire after two years but may require reevaluation prior to then should the project scope change.

ENVIRONMENTAL ASSESSMENT (EA):

The primary purpose of an EA is to help the Transportation Cabinet and FHWA decide whether or not an EIS is needed. Baseline environmental studies are typically developed to assess potential impact of several proposed project alternatives upon the environment. The decision-making process is documented by inclusion of the results of the baseline studies, in addition to engineering and economic considerations. This process concludes with the determination as to whether the final documentation should be a CE, FONSI, or EIS. The document may, but does not typically, identify the preferred alternative of the project team.

The project team, in consultation with FHWA, should determine the level of effort needed for determining the range of alternatives and EA documentation. Depending upon project complexity, range of alternatives analyzed, resources impacted, resource agency agreements required, etc., EAs typically require 18 to 36 months to complete.

CONT.

FINDING OF NO SIGNIFICANT IMPACT (FONSI): Following a public hearing, the FONSI is FHWA's approval of the finding from the EA that the project will not result in any significant impacts. This document is preceded by an EA. The FONSI approval expires after one year but may require reevaluation prior to then should the project scope change. Depending upon archaeological work that may need to be completed, the scope of the public comments received, and whether additional alternatives or studies are required as a result thereof, the development of a FONSI may require 6 to 15 months.

ENVIRONMENTAL IMPACT STATEMENT (EIS): Under the National Environmental Policy Act (NEPA), an EIS must be prepared when it is determined that a proposed action may significantly affect the quality of the human environment. An EIS is not merely a disclosure document but is to be used, in conjunction with other relevant information, to plan actions and make decisions.

Following the publication of a Notice of Intent in the *Federal Register,* the EIS process results in three documents: the draft EIS (DEIS), the final EIS (FEIS), and the record of decision (ROD). Designers should consult with DEA and the project team to be aware of the timeframe necessary to complete this process for their project. A minimum of three years should be anticipated with as many as two additional years, depending upon the complexity of the project and scale of the impacts.

The DEIS and FEIS approvals expire after three years but may require reevaluation prior to then should the project scope change. Reevaluation of an FEIS is required prior to any major project action (right of way, utilities, or construction).

ENVIRONMENTAL REEVALUATION: Before the advancement of a project into any major phase, FHWA regulation 23 CFR 771.129 requires a reevaluation of any environmental documents. The intent of a reevaluation is to assess the project's current conditions and identify any changes that may affect the previous project decisions. Changes that should be considered during reevaluations include those in the project scope, in the project area, and in regulation. Project changes that occur after approval of an environmental document must be clearly communicated among all project team members to assure that project decision documents are properly updated.

CONT.

STATE-LEVEL APPROVAL (SLA): For state-funded projects, SLA as described below is adequate to address environmental issues. The project team should consider project impacts and determine avoidance and mitigation measures that are protective of resources as required by the involved federal agencies or to the extent deemed appropriate by the project team.

State-funded projects do not require the approval of FHWA but may require an approval or permit from another federal agency subject to NEPA requirements. Examples of such actions could include ACE permits, Coast Guard permits, and easements on purchase of federally owned property or from within federally designated lands such as the Daniel Boone National Forest. These agencies must prepare their own NEPA document based upon information about the project provided by KYTC.

For state-funded projects where there is federal agency involvement, the project team must develop the project in a manner that is consistent with all NEPA requirements. This includes the analysis of alternatives, compliance with the National Historic Preservation Act (Section 106), compliance with the Endangered Species Act, etc. The project will not need to comply with any FHWA-specific regulations or provisions, especially Section 4(f). All state-funded projects, regardless of federal involvement or permitting, must comply with the Endangered Species Act. Other environmental factors such as underground storage tanks, relocations, hazardous waste or cleanup sites, and noise must also be fully considered, regardless of funding source.

SLA may be issued from the district by the environmental coordinator or from the DEA, depending upon the nature and extent of the project impacts. Approvals are developed either as Level 1 by the district or Level 2 by the DEA. Development of SLA documents should commence at the outset of the project development process. As with federal environmental approvals, SLA should be completed prior to the initiation of the right-of-way phase. Completion of SLA may require only a few days or more than a year, depending upon project complexities, resources affected, securing resource agency agreements, etc. An SLA document is considered effective for a period of two years after completion but should be reevaluated if the project scope changes significantly.

KYTC Highway Design

Chapter

ENVIRONMENTAL CONSIDERATIONS

Subject

Karst & Significant Resource Areas

BEST MANAGEMENT PRACTICE:

The following best management practice (BMP) shall be used during the construction and the maintenance/operations of all roads listed on the National Highway System located in karst areas and on all roadways that may impact a significant resource as determined by the DEA.

1. Use grass swales for ditches. These swales shall be constructed as shown in **Exhibit 400-02,** with a flat-bottomed cross section of a minimum of two feet. The width of the bottom of the swale will be determined by the design engineer based on the expected peak flow and the slope so that resulting shear stress will allow as much grass or grass and geo-tech liner as possible.

2. Use interceptor ditches to prevent large volumes of off-site water from adding to the volume of runoff being carried by the swales.

3. Use detention/containment basins to temporarily impound the runoff from the swales before it is discharged from the right of way. These basins shall have a minimum volume of 10,000 gallons upstream from each final discharge point. This volume may be attained by constructing basins in series if necessary. The discharge point of each basin shall be constructed as a Silt Trap Type B (see attachment). Detention basins shall be designed to maximize the flow length between the entrance and exit.

4. All swales shall be seeded with the mixture shown on the detail at the rate of 5 pounds per 1000 square feet.

5. When and if these swales and/or basins are cleaned out, they shall be restored.

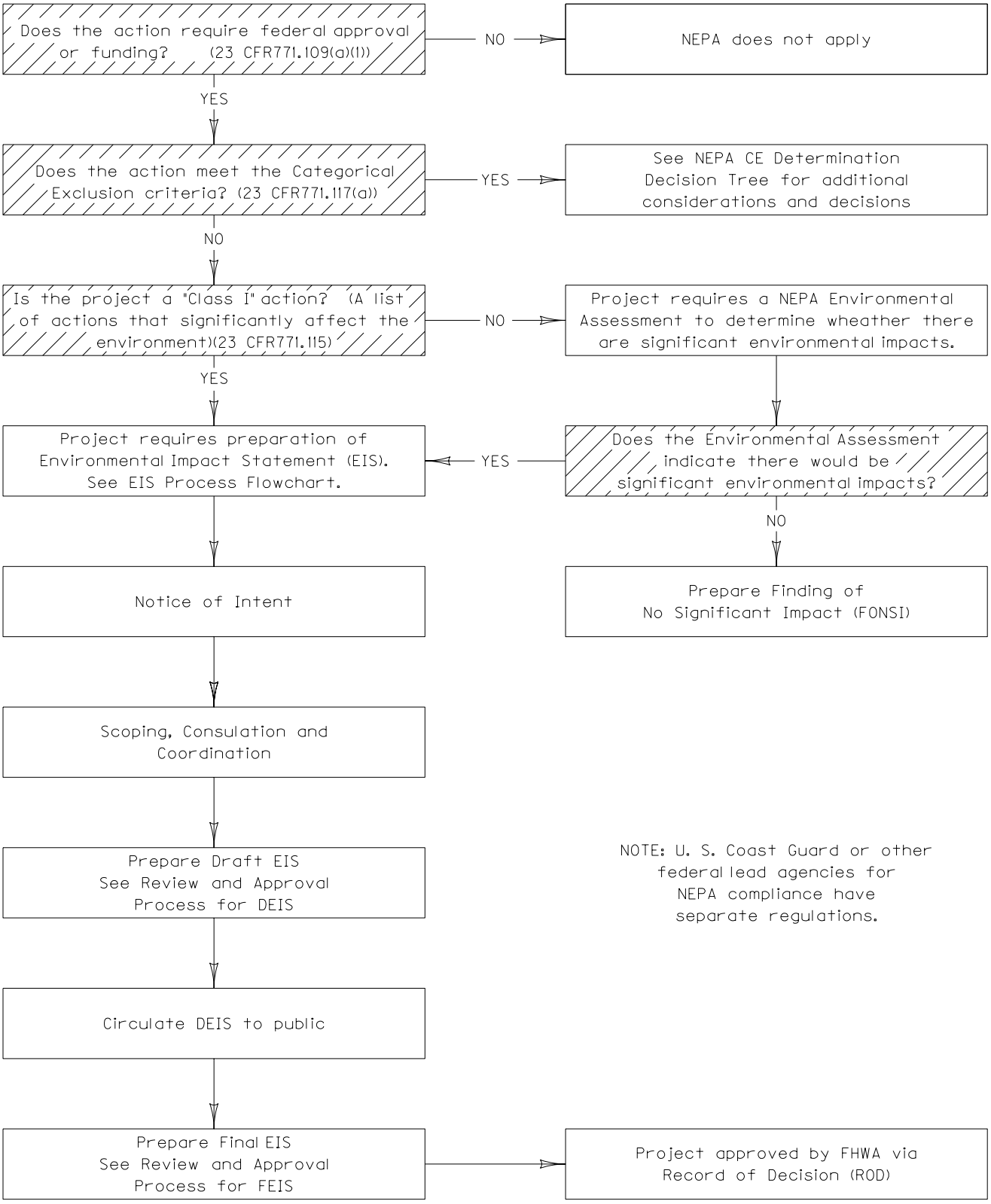
Maps of the National Highway System are located on the Division of Planning's Web site at

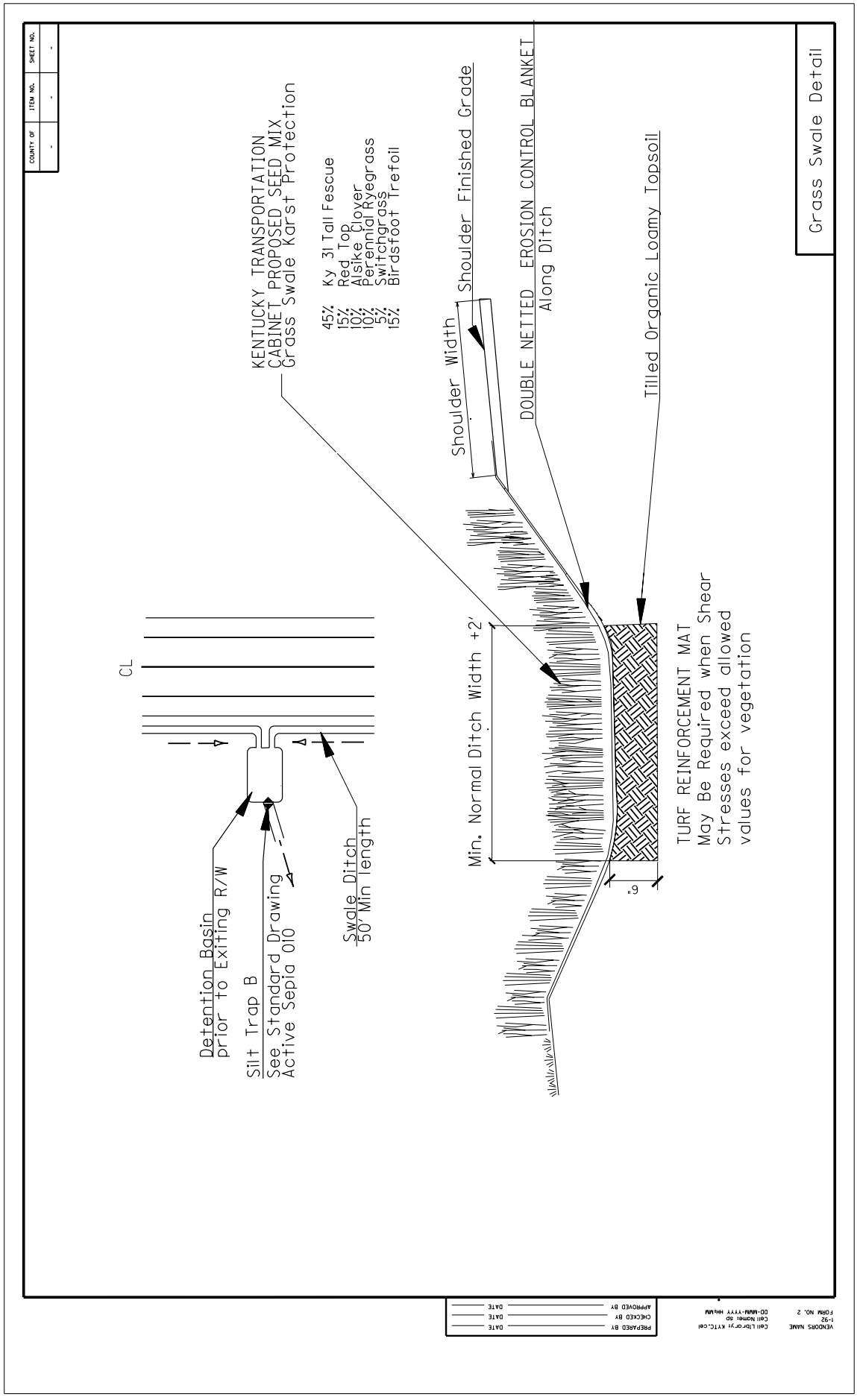
http://transportation.ky.gov/planning/maps/NHS/nhs_kysz_2005.pdf.

The Area of Karst Occurrence in Kentucky is located on the Kentucky Geological Survey's Web site at:

http://kgsweb.uky.edu/olop/pub/kgs/mc33_12.pdf.

FEDERAL REQUIREMENTS DECISION TREE




COUNTY OF
ITEM NO.
SHEET NO.
Grass Swale Detail
KENTUCKY TRANSPORTATION
CABINET PROPOSED SEED MIX
Grass Swale Karst Protection
45% Ky 31 Tall Fescue
15% Red Top
10% Alsike Clover
10% Perennial Ryegrass
5% Switchgrass
15% Birdsfoot Trefoil
Shoulder Width
Shoulder Finished Grade
DOUBLE NETTED EROSION CONTROL BLANKET
Along Ditch
Tilled Organic Loamy Topsoil
CL
Min. Normal Ditch Width +2'
6"
TURF REINFORCEMENT MAT
May Be Required when Shear
Stresses exceed allowed
values for vegetation
Detention Basin
prior to Exiting R/W
Silt Trap B
See Standard Drawing
Active Sepia 010
Swale Ditch
50' Min Length
PREPARED BY
CHECKED BY
APPROVED BY
DATE
VENDORS NAME
FORM NO. 2
Cell Library: KYTC.cel
Cell Name: 30
DD-MMM-YYYY HH:MM