


CTP-ICE Best Management Practices Recommendations

PROCEDURE

(CTP-ICE Product 4)

Transportation Planning Branch OR Project Development and Environmental Analysis Branch		Approved: Insert final approval date Version 1 (The most current version of the procedure will be numbered. Older versions will be archived.)
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Purpose

The purpose of this procedure is to identify Best Management Practices Recommendations for addressing potential Indirect and Cumulative Effects (ICE) identified in long-range planning. These best practice recommendations consist of guidance and strategies that MPOs/RPOs and local governments may use to aid in expediting future project implementation when a particular project proposal has been identified as having potential indirect impacts. For example, one or more best practices may be recommended if a project proposal has an explicit economic development purpose and the ICE assessment during the CTP Study found there were potential indirect and cumulative effects. Based upon the recommendations, municipality(ies) can be engaged in proactively implementing land use, infrastructure, planning, development and environmental regulations, etc., to protect important resources and to support the selected CTP scenario and ultimately their desired land use outcome. It is intended that, by implementing various ICE best practices, local governments can help streamline project implementation by proactively managing growth in environmentally sensitive areas.

Background

Prior to developing the CTP-ICE Best Management Practices Recommendations, the other elements of CTP-ICE Assessment will have been completed, including the CTP-ICE Existing Conditions Assessment (Product 1), the CTP-ICE Future Growth Potential Assessment (Product 2), and the CTP Indirect and Cumulative Effects (ICE) Screening (Product 3). The Draft CTP has been developed, with proposed projects addressing future transportation needs, given a selected land use scenario, and may include multi-modal alternatives for highways, public transportation, rail, bicycle, and pedestrian facilities. The CTP project proposals have been screened for indirect effects and a cumulative effects screening may have been completed, if appropriate.

For the transportation project proposals in the Draft CTP, Best Management Practices Recommendations to avoid and minimize potential future indirect and cumulative effects of transportation alternatives will be identified and described in a Technical Memorandum. These CTP-ICE Best Management Practices recommendations provide resources and examples of planning techniques and tools that can be utilized by local governments to address potential ICE issues as development is occurring and prior to the implementation of a transportation project.

Responsibility

The TPB/MPO/RPO staff will prepare the CTP-ICE Best Management Practices Recommendations Technical Memorandum. The NCDOT PDEA Human Environment Section-Community Studies (HES-CS) staff will review the Technical Memorandum and provide comments to the TPB/MPO/RPO staff.

Policy, Regulatory, and Legal Requirements

National Environmental Policy Act (NEPA)

<http://ceq.hss.doe.gov/>

State Environmental Policy Act (SEPA)

http://www.ncleg.net/EnactedLegislation/Statutes/HTML/ByChapter/Chapter_113A.html

Scheduling and Time Constraints

The CTP-ICE Best Management Practices Recommendations Technical Memorandum will be developed after the Draft CTP has been completed, but prior to final adoption. It is to be coordinated with the work to document and communicate any differences between the scenario proposed as part of the Draft CTP and local land use plans (CTP Steps LU 24 and LU 25). These ICE Best Management Practices Recommendations become part of the recommend land use strategies to support the recommended transportation plan.

Procedures

The TPB/MPO/RPO will consult with local government planners to identify CTP-ICE Best Management Practices to address potential impacts of CTP project proposals. The CTP-ICE Best Management Practices Recommendations, documented in a Technical Memorandum, will identify recommendations for local governments to address the results of the ICE screening through local plans, policies, ordinances, public education and other programs. These recommendations will provide a mechanism for local governments to develop planning strategies to address potential ICE issues as development is occurring and prior to the implementation of a transportation project.

The Appendix in this Procedure provides links to a number of technical resources, websites and tools; however this list is not all inclusive and MPO/RPO's are encouraged to carry out research to find applicable tools for the CTP Study Area, especially for the community's human and natural environmental features and resources that have special importance.

Procedure Input –

- CTP-ICE Existing Conditions Assessment (Product 1)
- CTP-ICE Future Growth Potential Assessment (Product 2)
- CTP Indirect and Cumulative Effects (ICE) Screening (Product 3)

Procedure Output –

- CTP-ICE Best Management Practices Recommendations Technical Memorandum

Steps to Prepare CTP-ICE Best Management Practices Recommendations

Step	Action
1	The TPB/MPO/RPO will review the results of the CTP-ICE Assessment (see list of procedure inputs above). From the CTP Indirect and Cumulative Effects (ICE) Screening (Product 3), the resource features on the indirect effects and cumulative effects matrix(ces) that have been rated as areas of more concern will be the focus for the next steps, further research and review.
2	<p>Using the Resources/Tools provided in this procedure and/or supplemental tools not contained in the procedure, the TPB/MPO/RPO will identify how impacts on elements of the project proposals (e.g., notable water quality features) rated as areas of more concern might be avoided or reduced.</p> <p>The Resources/Tools provided in this report represent several examples of the many resources and tools available for addressing water quality, land use and growth, and natural resource concerns. They are listed below and additional resources can be found in the Appendix categorized by these three broad areas. The TPB/MPO/RPO are encouraged to research and apply other resources/tools not listed in this procedure as new and updated tools are frequently being released. NCDOT PDEA Human Environment Section-Community Studies may be consulted to provide guidance and recommendation for identifying the most appropriate tools to address potential issues for ensuring consistency between long-range planning and the NEPA/Project Development process.</p> <p>Smart Growth</p> <p>Aims to enable growth in a low-sprawl or no-sprawl fashion that locates/encourages growth closer to existing developed areas or to areas targeted for growth, while avoiding important resources.</p> <p>EPA – Smart Growth Publications: http://www.epa.gov/smartgrowth/publications.htm</p> <p>American Planning Association – Growing Smart: http://www.planning.org/growingmart/</p> <p>American Planning Association – Policy Guide on Smart Growth: https://www.planning.org/policy/guides/adopted/smartgrowth.htm</p> <p>EPA – Protecting Water Resources with Smart Growth: http://www.epa.gov/smartgrowth/pdf/waterresources_with_sg.pdf</p>

Low Impact Development (LID)

Design and development practices to minimize footprints and impacts from the built environment.

EPA – Low-Impact Development Design Strategies:

<http://water.epa.gov/polwaste/green/upload/lidnatl.pdf>

EPA – Incorporating Low Impact Development into Municipal Stormwater Programs:

<http://www.epa.gov/region1/npdes/stormwater/assets/pdfs/IncorporatingLID.pdf>

Massachusetts – Low Impact Development:

http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-lid.html

New Hampshire – Innovative Land Use Planning Techniques Handbook:

http://www.des.nh.gov/organization/divisions/water/wmb/repp/innovative_land_use.htm

Mixed use zoning/development

Mixing a variety of land uses in the same general vicinity allows for fewer auto trips and increases the likelihood of greater pedestrian & bicycle activity.

American Planning Association – Model Mixed-Use Zoning District Ordinance:

<https://www.planning.org/research/smartgrowth/pdf/section41.pdf>

Complete Streets policies

Designs include bicycle and pedestrian facilities as a part of the entire project – this supports higher density and mixed use zoning.

NCDOT Complete Streets Planning and Design Guidelines:

http://www.pedbikeinfo.org/pdf/PlanDesign_SamplePlans_CS_NCDOT2012.pdf

NCDOT Complete Streets Website:

<http://www.completestreetsnc.org/>

American Planning Association – Article on complete streets:

<http://www.planning.org/planning/2005/may/completestreets.htm>

Conservation/Preservation strategies/processes/practices for important resources

Resources and strategies for identifying important resources and finding appropriate measures to preserve/conservate them.

The Conservation Fund – Strategic Conservation:

<http://www.conservationfund.org/our-conservation-strategy/major-programs/strategic-conservation/>

NC Wildlife Resources Commission – Green Growth Toolbox

<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/GreeningOrdinances.aspx#32461099-zoningbrbr>

Watershed-based approach to resource management/protection/development

Protects water quality by encouraging higher-density development within a watershed to minimize impact and impervious surfaces.

EPA – Protecting Water Resources with Higher-Density Development:

http://www.epa.gov/smartgrowth/pdf/protect_water_higher_density.pdf

New Urbanism

Employs connected street system with variations of mixed use development and some higher densities.

New Urbanism:

<http://www.newurbanism.org/>

Congress for New Urbanism – The SmartCode:

<http://www.cnu.org/resources/projects/smartcode-2009>

LEED for Neighborhood Development

Newest LEED element – focuses on larger context community/neighborhood design to lessen impact on landscape and promote multimodal transportation options for lower energy use, etc.

A Local Government Guide to LEED for Neighborhood Development:

<http://www.usgbc.org/ShowFile.aspx?DocumentID=6131>

LEED-ND and Healthy Neighborhoods: An Expert Panel Review:

<http://www.usgbc.org/ShowFile.aspx?DocumentID=5895>

Form-based zoning and Unified Development Ordinances

Zoning ordinances can guide growth to be more compact and have less of an impact on natural resources.

American Planning Association – Article on zoning codes

<http://www.planning.org/planning/2004/nov/formfirst.htm>

Congress for New Urbanism – The SmartCode:

<http://www.cnu.org/resources/projects/smartcode-2009>

Green Infrastructure Planning

Resources include examples of green infrastructures and guidance for implementing it to minimize impact on natural resources.

EPA – Smart Strategies for a Sustainable Future:

<http://www.epa.gov/greenkit/index.htm>

The Conservation Fund – Green Infrastructure:

<http://www.conservationfund.org/our-conservation-strategy/focus-areas/green-infrastructure/>

American Planning Association – Article on green infrastructure
<http://www.planning.org/planning/2008/apr/takinggreen.htm>

Habitat cohesion & protection

These tools assist in avoiding substantive habitat fragmentation.

Wetland and Shoreland Zoning Tools:

http://www.beginningwithhabitat.org/toolbox/wetlands_wl.html

Tree ordinances

Tree ordinances mandate tree retention for site development and also mandate tree replacement and planting for site development.

NCSU – Developing Successful Tree Ordinances:

<http://www.ces.ncsu.edu/forestry/pdf/ag/ag693.pdf>

Stormwater Control Ordinances

Stormwater control ordinances lessen the impact of runoff from impervious surfaces into waterbodies.

Stormwater Operation and Maintenance Model Ordinance (US EPA):

http://water.epa.gov/polwaste/nps/upload/Storm_model_ordinance1.pdf

State of Maryland’s Model Stormwater Management:

http://www.mde.state.md.us/assets/document/sedimentstormwater/model_ordinance.pdf

Model Stream Buffer Ordinance:

http://documents.northgeorgiawater.org/MNGWPD_StreamBufferModOrd.pdf

Model Post Development Stormwater Management:

http://documents.northgeorgiawater.org/MNGWPD_PostDevelopmentModOrd.pdf

Guidebook for local governments to incorporate LID into local ordinances:

http://www.psp.wa.gov/downloads/LID_Guidebook/20120731_LIDguidebook.pdf

Multi-modal transportation options with Transit Oriented Development (TOD)

Multi-modal transportation (transit) requires higher densities and this in turn makes for “tighter” development, less sprawling development, which provides for less “coverage” over important resources.

American Public Transportation Association – Sustainable Urban Design and Transit Guidelines:

<http://www.apta.com/resources/hottopics/sustainability/Documents/TOD-201-Sustainable-Urban-Design-Transit.pdf>

City of Charlotte’s TOD Ordinance:

http://ww.charmeck.org/Planning/Rezoning/TOD-TS-PED/ZoningOrd_TOD.pdf

	<p>Farmland Preservation</p> <p>The resources below provide guidance for preserving farmland, which can minimize the impacts from new development spurred by transportation projects.</p> <p>USDA Farmland Protection Policy Act Information: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/?ss=16&navtype=SUBNAVIGATION&cid=nr cs143_008275&navid=100170180000000&position=Welcome.Html&ttype=detail</p> <p>Locally adopted (County) VAD Ordinances/Farmland Protection Plans: http://www.cals.ncsu.edu/wq/lpn/modelordinances.htm#ordinances</p> <p>Water Quality Programs and Policies</p> <p>Model ordinances and regulations for protecting water quality are provided below.</p> <p>Model Watershed Protection Ordinance: http://portal.ncdenr.org/web/lr/water-supply-watershed-model-ordinance</p> <p>NCDENR Local Government – Laws, Rules, and Regulations: http://www.ncstormwater.org/pages/local_gov_laws.html</p>
3	<p>The TPB/MPO/RPO staff will work with the local planners within the CTP Study Area to assess the draft recommendations that address the notable resources and features of concern from the indirect effects and cumulative effects matrix(ces) (Product 3). The draft recommendations are to be assessed to determine if they can be implemented within the context of the local government and revised as appropriate.</p>
4	<p>The TPB/MPO/RPO staff will draft a Technical Memorandum providing a narrative description of recommendations for planning provisions, policies and codes that may help to address the potential impacts to resources or features of concern, or a statement that there are no recommendations.</p> <p>The Technical Memorandum should also include documentation of resources/tools used by the TPB/MPO/RPO staff in consultation with local planners so that HES staff may share these resources/tools with other MPO/RPOs around the state. Documentation should include, at a minimum, a description of the resource/tool, how it was used in the Technical Memorandum, and a website link or contact for the resource/tool.</p>
5	<p>The TPB/MPO/RPO and PDEA HES-CS Staff Planners will review and finalize the CTP-ICE Best Management Practices Recommendations Technical Memorandum and distribute to appropriate recipients. Ultimately, the CTP-ICE assessment documentation will be included in the final CTP Study Project File and referenced/included in other study documentation, as appropriate. <u>These products may also be used to inform project development (NEPA/Merger process) and would typically be shared during the scoping process. This Technical Memorandum may also be used to inform NEPA/Merger documentation.</u></p>

Resources and Tools

- Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina.”
<https://connect.ncdot.gov/resources/Environmental/Compliance%20Guides%20and%20Procedures/Volume%2001%20Assessment%20Guidance%20Policy%20Report.pdf>

Flowchart

Comprehensive Transportation Planning Process

Record of Revision

Version	Section Affected	Description	Effective Date

For more information, refer to the “[Revising and Archiving Procedures](#)” procedure.

APPENDIX

Water Quality

Tool	Description
<p>EPA Water Quality Scorecard http://www.epa.gov/smartgrowth/water_scorecard.htm</p>	<p>The US EPA developed a Water Quality Scorecard to help local governments identify opportunities to remove barriers, and revise and create codes, ordinances, and incentives for better water quality protection. It guides municipal staff through a review of relevant local codes and ordinances, across multiple municipal departments and within the jurisdiction of a local government to ensure that these codes work optimally to protect water quality goals. This tool allows local planners/governments to assess zoning ordinances, subdivision ordinances, street standards, parking standards, setbacks, density, open space, and comprehensive or land use plans to determine how they affect impervious surface. The scorecard's review of land use and development policies provides guidance for implementing a range of regulatory and non-regulatory approaches, including land use planning elements, land acquisition efforts, and capital investment policies that can help various municipal agencies integrate green infrastructure into their programs. Each policy or approach is described in the context of its potential for providing water quality benefits. Many of the policies have additional benefits for community livability, human health, air quality, energy use, wildlife habitat, and more.</p>
<p>NOAA N-SPECT http://www.csc.noaa.gov/digitalcoast/tools/opennspect</p>	<p>Nonpoint Source Pollution and Erosion Comparison Tool (N-SPECT) was developed by the NOAA Coastal Services Center to predict locations in a watershed contributing runoff, sediment, nutrients, and toxins; the load of those contributions; and the load and concentration of where they accumulate in streams and rivers.</p>
<p>NOAA Watershed Mapping Tools http://response.restoration.noaa.gov/</p>	<p>The Office of Response and Restoration has a webpage devoted to watershed mapping tools, including data for over 15 watersheds in coastal areas of the United States.</p>
<p>EPA's Model Ordinances to Prevent and Control Nonpoint Source Pollution http://water.epa.gov/polwaste/nps/ordinance_index.cfm</p>	<p>The MPO/RPO may work with the local government jurisdiction to assess the information needed to develop effective resource protection ordinances. The EPA provides model ordinances that will serve as a template for decision-makers responsible for growth and environmental protection. For each model ordinance listed, there are several real-life examples of ordinances used by local and state governments</p>

around the nation that can help in the selection of the appropriate regulation for the community.

Examples of ordinances include:

- Aquatic Buffers
- Erosion & Sediment Control
- Open Space Development
- Stormwater Control Operation & Maintenance
- Illicit Discharges
- Post Construction Controls
- Source Water Protection
- Miscellaneous Ordinances

Land Use and Growth

Tool	Description
<p>HUD-DOT-EPA Partnership for Sustainable Communities http://www.sustainablecommunities.gov/</p>	<p>The HUD-DOT-EPA Partnership for Sustainable Communities helps communities develop growth strategies for transportation choices and affordable housing while increasing economic competitiveness and directing resources toward places with existing infrastructure. The Partnership has compiled a list of useful tools and key resources that can assist local governments in sustainable, smart growth.</p>
<p>EPA Smart Growth Model Codes http://www.epa.gov/dced/codeexamples.htm</p>	<p>The EPA has compiled a list of example codes and guidelines from communities across the country that support principles of smart growth.</p>
<p>EPA Smart Growth Scorecards http://www.epa.gov/dced/scorecards/index.htm</p>	<p>The EPA Partnership website provides scorecards which are assessment tools that allow communities to determine how the current regulatory environment influences the pattern of growth and development. The scorecards allow communities to assess their existing policies and determine if they allow for compact, mixed-use, walkable development. The first step in adopting or adapting a smart growth scorecard is to decide whether to focus on municipal policies or project attributes. Once this is decided, the scorecards in that category are reviewed, and, if necessary, the components from several of the scorecards can be mixed and adapted to fit local conditions. Scorecards can be reviewed by staff, or circulated to developers, citizen groups, stakeholders and decision makers, and revise it to reflect their input. There are a number of the scorecards found on the EPA website can be completed without extensive research or additional expertise. In most cases, completing a scorecard requires studying a community's land use plan, zoning ordinance, and zoning map. Scorecards can assess policies or projects. The results of the scorecard can</p>

	help local governments and the MPO/RPO staff to identify mitigation strategies.
Purchase of Development Rights (PDR) and Transfer of Development Rights (TDR) Programs	These programs are voluntary, market-based approaches that allow real property owners to receive monetary compensation in exchange for development rights. In effect, the landowner is restricted from developing her land in excess of a level determined by public policy, while permitted to realize financial gain as if the land were fully developable. Local Land Trusts can assist in these programs, and typically hold conservation easements. The biggest challenge is obtaining funding for these programs. PDR's and TDR's can help local government protect important resources, and mitigate the indirect and cumulative effects of transportation alternatives.

Natural Resources

Tool	Description
NC Wildlife Commission Green Growth Toolbox http://www.ncwildlife.org/Conservation/Programs/GreenGrowthToolbox.aspx	The NC Wildlife Commission developed a Green Growth Tool Box that is intended to help communities conserve priority wildlife habitats and natural resources for future generations while accommodating planned growth. The toolbox provides North Carolina specific conservation data which can be used for visioning, plan development, ordinances, and in development review. The toolbox and its data can be used to create a conservation planning element for an existing land use or comprehensive plan, and links in the toolbox can be used to review examples of "green planning" documents that guide land use in other communities.
Nature Serve Vista http://www.natureserve.org/conservation-tools/data-maps-tools/natureserve-vista	Nature Serve Vista is a free spatial decision-support system that helps users integrate data and expert knowledge on conservation with land use and resource planning.
Landscape Fragmentation Tool http://www.csc.noaa.gov/digitalcoast/tools/lft	Another digital tool is the Landscape Fragmentation Tool, which maps four types of fragmentation present for a specified land cover, and can quantify and assess the amount of fragmentation present in a landscape and evaluate potential habitat impacts.
NC Wildlife Commission Technical Assistance http://www.ncwildlife.org/Conservation/Programs/GreenGrowthToolbox/TechnicalAssistance.aspx	<p>The NC Wildlife Commission provides technical assistance and training for counties, towns, and cities in order to utilize the data and tools contained in the toolbox, including:</p> <ul style="list-style-type: none"> • Integrating the Green Growth dataset with the local GIS database • Writing a local habitat conservation plan

- Incorporating habitat conservation into land use plans
- Creating nature-friendly ordinances
- Establishing nature-friendly development review standards
- Designing wildlife-friendly development projects
- Developing habitat management plans for parks and open space

Other References

CEQ. In 1997, the CEQ issued the handbook, *Considering Cumulative Effects under the National Environmental Policy Act*.

FHWA. In 2003, FHWA issued an interim guidance document, *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process*. This interim guidance has never been finalized. It remains FHWA's most current and comprehensive guidance on indirect effects and cumulative impacts.

State DOTs. Several State DOTs have developed their own guidance documents for conducting indirect effects and/or cumulative impacts assessments, including California, Maryland, North Carolina, Oregon, Texas, Washington, and Wisconsin.

NCHRP Reports. Several reports on indirect effects and cumulative impacts have been introduced by the National Cooperative Highway Research Program (NCHRP). They include:

NCHRP Report 403, *Guidance for Estimating the Indirect Effects of Proposed Transportation Projects* (1998). This report presents an eight-step process for analyzing indirect effects of transportation projects. It has been widely followed by State DOTs in developing their guidance for analyzing indirect effects.

NCHRP Report 466, *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (2002). This report updated the material presented in NCHRP Report 403 and provided additional training materials for practitioners.

NCHRP 25-25, Task 22, *Forecasting Indirect Land Use Effects of Transportation Projects* (2007). This report provides an in-depth review and assessment of models, expert panels, and other methods for estimating the growth related impacts of transportation projects.

NCHRP 25-25 Task 43, *Legal Sufficiency Criteria for Adequate Indirect Effects and Cumulative Impacts Analysis as Related to NEPA Documents* (2008). This report reviews the legal principles governing indirect effects and cumulative impacts assessments, and lists specific factors to consider in reviewing them for legal sufficiency.

NCHRP 25-25 Task 36, *Recurring Community Impacts* (2008). This report provides recommendations for considering "recurring community impacts" in a cumulative impacts analysis. Recurring community impacts are defined as multiple impacts affecting the same community over time by past public and private actions.

NCHRP 25-25 Task 54, *Evaluate Colorado's ACEA Methodology as a Mechanism for Cumulative Impacts Assessment in Regional Transportation Plans* (2009). This report describes an "Area-Wide Cumulative Effects Assessment" that has been used in Colorado. ACEA is a tool for addressing cumulative effects on a regional scale.