

D8
Planning for Emerging Technology

PILOT FOR ASSESSING INDIRECT AND CUMULATIVE EFFECTS DURING MTP

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The North Carolina Department of Transportation has undertaken a major process improvement with the goal of integrating the long range planning process with the project development process, essentially the National Environmental Policy Act (NEPA) process and its state counterpart State Environmental Policy Act (SEPA). This integration will inform early decisions, improving the quality of transportation planning and producing products that may be built upon during project development.

Analysis of indirect and cumulative effects is required under NEPA when evaluating environmental impacts associated with a specific proposed project. However, a planning-level Indirect and Cumulative Effects (ICE) assessment completed early in the project planning process can provide useful information and improve consistency of the ICE analysis occurring later in the NEPA process, highlighting important issues early and potentially streamlining project delivery.

The proposed best practices for consideration of indirect and cumulative effects in long range planning include four (4) work products: documenting existing conditions assessment, assessing future growth potential, screening proposed projects in the long range transportation plan for ICE, and identifying best management practices for local jurisdictions to minimize the potential effects.

A pilot study conducted for the New Bern Area Metropolitan Planning Organization (MPO) is the first effort in North Carolina to apply a planning level ICE assessment in preparing a metropolitan transportation plan (MTP). The detailing of the MTP ICE technical process will identify the potential outputs from systems planning that would be available and useful to inform the project level ICE analysis required by NEPA.

The readers will learn the necessary context about project implementation from visioning to construction, as well as fundamentals about the relationship between MTPs, NEPA and ICE. How a planning level ICE assessment during development of a MTP can be conducted and used will be detailed. Benefits of such an assessment during an MTP, including benefit to the project level analysis will also be highlighted.

Pilot for Assessing Indirect and Cumulative Effects during MTP

INTRODUCTION

The North Carolina Department of Transportation’s (NCDOT) Transportation Planning Branch (TPB), in partnership with the New Bern Area Metropolitan Planning Organization (NBAMPO), implemented a pilot Indirect and Cumulative Effects (ICE) Assessment as part of their Metropolitan Transportation Plan (MTP) development process. The purpose of this study was to assess how natural and community resources in the MPO would be affected by different combinations of proposed projects, as well as determine what policies could be adopted to address negative impacts and maximize the life of the new or expanded roadways or other modal projects and access points. This paper presents the history of ICE integration into long-range planning, the plan-level ICE assessment and its connection to the project level ICE analysis required during project development, the plan-level ICE pilot study conducted for NBAMPO, and benefits and lessons learned from this work.

BACKGROUND OF THE INTEGRATION PROJECT

NCDOT undertook a major process improvement starting in 2003 called the “Integration Project”, with the goal of integrating the long-range planning process with the project development process following the National Environmental Policy Act (NEPA) and its state counterpart State Environmental Policy Act (SEPA). The overall purpose of the effort is to provide a seamless connection between long-range planning and project development. The long-range planning process results in a federally-required Metropolitan Transportation Plan (MTP) for Metropolitan Planning Organizations and in a Comprehensive Transportation Plan (CTP) established by North Carolina General Statutes for both urban and non-urban areas. The MTP and CTP are complimentary and may be undertaken together in urban areas, with the primary difference being that the MTP is fiscally constrained; whereas, the CTP includes “vision” project proposals beyond the fiscal constraint and are also developed for non-urban areas of North Carolina. References to the ‘long-range planning process’ in this document describes the comprehensive long-range transportation planning process that results in a MTP and/or a CTP. Through a series of discussions and workshops the NCDOT identified eight potential linkages (listed in Table 1) where work that is completed during the MTP and/or CTP process could inform or serve as the starting point for the NEPA/SEPA process.

TABLE 1: INTEGRATION LINKAGES

Long Range Planning	<i>linked to</i>	Project Development
Problem Statement		Purpose and Need
Alternatives analysis		Alternatives selected for detailed study
Unreasonable solutions		Alternatives selected for detailed study
Multi-modal analysis		Multi-modal alternatives
Community impacts assessment		Community impacts analysis
Land use		Indirect and cumulative effects
Public involvement		Public involvement
Mitigation opportunities		Mitigation needs and opportunities

The transportation plan (MTP and/or CTP) that results from the long-range planning process includes a set of multi-modal project proposals that are consistent with a community's vision, goals and objectives, and are designed to meet future travel demand while minimizing impacts to the natural and human environment. The planning process is designed to engage and involve environmental resource agencies and land use agencies. It is based on evaluation criteria and measures of effectiveness, including environmental considerations. It may also include testing of alternative growth scenarios being considered by local decision makers in order to determine the impact of various land use patterns on future transportation choices. Stakeholders are engaged in the process early and engagement is continued throughout the process at key analysis and decision points.

The project development process in North Carolina follows the requirements of NEPA and its state counterpart SEPA. For larger scale projects, this may be accomplished following a "Section 404/ NEPA Merger Process". Merger is a process to streamline the project development and permitting processes, agreed to by the US Army Corps of Engineers (USACE), the NC Department of Environmental Quality (NCDEQ, formerly NCDENR), the Federal Highway Administration (FHWA), and NCDOT, and supported by other participating agencies and local units of government. The Merger process provides a forum for appropriate agency representatives to discuss and reach consensus on ways to comply with Section 404 of the Clean Water Act during the NEPA/SEPA decision-making phase of transportation projects, and allows agency representatives to evaluate and resolve issues by following a shared decision-making process that addresses sometimes competing interests. "Concurrence points" document decisions made throughout the process prior to the submittal of the permit application, including 'Purpose and Need and Study Area Defined,' 'Detailed Study Alternatives Carried Forward,' 'Least Environmentally Damaging Practicable Alternative (LEDPA)/Preferred Alternative Selection,' 'Avoidance and Minimization,' and others.

As the process improvement called "Integration" sought to make the connection between these long-range planning and project development processes seamless, it was identified that substantial work completed during the long-range planning process, if documented well and transferred to project development, could improve the quality and timeliness of the project development process. This information from long-range planning is primarily useful in the early stages of project development, such as scoping, defining Purpose and Need, and developing a range of alternatives to be studied. Ultimately, Integration can provide the following benefits for project delivery when fully implemented:

- Identification of viable projects that meet the community's needs, address mobility needs, and are environmentally sensitive;
- Time savings in project development (long-range transportation planning information can be used to replace, inform or enhance work during the NEPA process); and
- Better predictability of cost and scheduling of projects.

DEVELOPMENT OF INTEGRATION ELEMENTS

The Integration Project, initially supported by a FHWA streamlining grant, was a multi-year process improvement effort. It started with defining the current processes and practices in North Carolina for both long range transportation planning and project development. Multi-agency teams were pulled together and numerous stakeholders were engaged through various methods, including surveys and interviews to assess current practices and determine opportunities for improvement. As part of the work to determine how to better connect long range planning with project development, topic areas to explore were identified, called "linkages" (see Table 1). While the initial work on Integration outlined the overall process, the actual implementation relied on the work of specialized multi-agency teams that documented the specific details for each linkage so that detailed best practices, procedures, and tools could be developed and incorporated into standard practice.

The initial approach was to view the long range planning and project development processes as producer and customer processes, respectively. Through a series of discussions and workshops, both processes were mapped, and the data analyses and decisions available from long range planning that can be useful for project development were identified.

After the initial framework for Integration was established, an interagency team was formed to manage implementation of the concepts, named the Integration Implementation Team (IIT). This team includes members from representative resource agencies, FHWA, Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), and various NCDOT business units. Specific multi-agency teams were formed for the linkages, or topic areas, with representatives of from long range planning, project development, and resource/ regulatory agencies, including subject matter experts on the given topic. Each team was charged with developing recommended practices, including detailed instruction on implementing the linkage and necessary tools, as well as recommendations for documentation standards, training protocols, and monitoring and maintenance plans. Best practices, procedures, and tools have been developed for each of these linkages, including Indirect and Cumulative Effects Screening. The Problem Statement linkage has been fully implemented and parts of the Planning Level Alternatives Analysis, Community Impact Assessment, and Public Involvement linkages have been implemented. Development and delivery of training modules for each linkage is currently underway.

INDIRECT AND CUMULATIVE EFFECTS IN LONG RANGE PLANNING LINKAGE

The Indirect and Cumulative Effects (ICE) Screening linkage has been particularly challenging and exciting. It was recognized that though the analysis of indirect and cumulative effects is required under NEPA when evaluating environmental impacts associated with a specific proposed project, an ICE assessment completed early in the planning process can provide useful information and benefits. Assessing indirect and cumulative effects in long range transportation planning provides the opportunity to assess effects at the systems level. Specific screenings can also be conducted for particular project proposals, and assist in comparing potential alternatives. Indirect and cumulative effects work in long range planning can improve consistency of the ICE information and analysis occurring later in the NEPA process, highlighting important issues early and potentially streamlining project delivery.

The integration team developed proposed best practices for consideration of ICE in long range planning, defined as four (4) work products: Existing Conditions Assessment, Future Growth Potential Assessment, Indirect and Cumulative Effects Screening, and Best Management Practices.

- Existing Conditions Assessment (Product 1): provides a baseline assessment of the long range planning study area based on seven human and environmental factors, such as forecasted population and employment growth, available land, water and sewer availability, market for development, public policy, and notable environmental features. This product sets the stage for the subsequent ICE analysis that follows.
- Future Growth Potential Assessment (Product 2): produces future growth potential map(s) that identify the difference between current and future utilities, current and future land use scenario(s), available land for development, and areas projected for short, medium, and long-term growth.
- Indirect and Cumulative Effects Screening (Product 3): conducted for the draft multi-modal long range planning project proposals. A Plan-Level Screening is conducted for the study area as a whole for both indirect and cumulative effects. A Project Level Screening is conducted for indirect effects if specific project proposal(s) are anticipated to result in a higher potential for impacts.
- Best Management Practices (BMPs) Recommendations (Product 4): identifies potential tools and resources for the local jurisdictions to manage/minimize the potential for indirect and cumulative effects of the proposed projects identified in the long range transportation plan (MTP and/or CTP).

PROJECT LEVEL ICE

ICE assessments are common practice during the project development process. The Council of Environmental Quality (CEQ) regulations (40 CFR §§1500-1508) requires that direct, indirect and cumulative impacts be addressed and considered in compliance with the National Environmental Policy Act (NEPA) process.

Direct effects are caused by the action and occur at the same time and place. (40 CFR §1508.8)

Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. (40 CFR §1508.8)

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7)

Federal and state agencies have identified different examples of indirect impacts and established guidelines for evaluation during the project development process. FHWA identifies potential indirect impacts to be associated with changes in land use, water quality, economic vitality and population density, negative impacts on endangered species, and impacts to existing environmental protection measures to absorb an increased load. Changes in land use patterns, growth or decline, in a given locale are attributable to many circumstances, events, and activities including Federal, non-Federal, and private actions. While transportation projects are not the only or primary factor in possible land use changes, the potential for certain transportation proposals to influence land use is undeniable.

NCDOT provides a framework for project level ICE analysis through the *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina*. This guidance was created through a joint effort between NCDOT and NCDEQ (at the time NCDENR). Not all transportation project proposals necessitate the same degree of indirect or cumulative impact consideration, analysis, or documentation. Therefore, NCDOT has implemented a multi-phase process during the project development stage for the ICE analysis, starting with an ICE Screening.

A project is identified as having the potential for indirect effects early in the project development process when local community characteristics are being researched and documented. Specifically, the project is evaluated for the following transportation impact causing activities (TICAs):

- Travel times (travel time savings);
- Travel patterns (permanent alteration of the transportation network (i.e., new connections));
- Property access (expand access to properties);
- Property exposure (permanent increase in property exposure); and
- Activity centers (opportunities for moderate to high intensity development or redevelopment).

If a project includes TICAs, an ICE screening is performed, which includes the analysis of growth trends and potential development for a specific horizon year associated with the project. A Future Land Use Study Area (FLUSA) is identified as the area surrounding a project that could possibly be indirectly affected by the actions of others as a result of the completion of the project and combined projects, and is examined for potential increases in development pressure as a result of the project. The FLUSA is typically based upon current travel patterns, municipal boundaries, neighborhood boundaries, development plans, and natural and man-made barriers (an example FLUSA may encompass a buffer around the project of one-half mile). Existing and projected conditions are documented for the FLUSA based on:

- Other transportation and infrastructure projects (approved and planned);

- TICAs;
- Population trends and projections;
- Job trends and projections;
- Utility infrastructure;
- Notable features (human and natural);
- Development regulations / public policy;
- Available land; and
- Market for development.

Screening matrices are used to determine potential indirect effects and cumulative effects through a low to high rating of concern, with low concern equating to indirect effects not being likely and high concern equating to indirect effects being anticipated. The cumulative effects matrix builds on the potential for indirect effects, evaluating notable cultural, community, and water resources, natural habitat features, and how the culmination of past, present, and future actions may impact said features.

Many transportation projects in the NCDOT project development process only require the ICE screening step. More complex projects may require a Land Use Scenario Assessment (LUSA), which defines areas within the FLUSA that will probably develop differently with or without the project. Build and No-Build scenarios are developed for each of the probable development areas through current conditions, land use requirements and zoning regulations, development trends, land management strategies, and coordination with local jurisdictions. Comparing the Build and No-Build scenarios through the standard LUSA tool determines the concern for indirect land use impacts. Recommendations on the types of actions local jurisdictions could take to proactively resolve or address higher concern areas are provided.

If the ICE screening and/or the LUSA indicate that the project will likely impact water quality in the area through storm water runoff, sediment, or nutrient loading, a water quality analysis may be required. The water quality analysis includes a very detailed land use projection input into a water quality model. The model focuses on the change in future levels of nutrients, sedimentation, and increased runoff associated with additional urban development and impervious surfaces.

Overall, the potential relationship of a transportation project to indirect impacts must be established on a case-by-case basis, early in the NEPA project development process. A major challenge remains in the project development process after assessing indirect and cumulative effects, of the complexity associated with the mitigation of indirect and cumulative impacts. Mitigation that is included, as a commitment in the environmental document becomes an integral and essential part of the transportation project decision, and may be most successful when working with local agencies to integrate context sensitive design and solutions.

PLAN LEVEL ICE

As part of the Integration Project, a beneficial linkage between the long-range planning and project development processes was identified for indirect and cumulative effects. Therefore, using the experience gained from project level ICE assessments and knowledge of the long range planning outputs, a detailed procedure guidance was prepared by NCDOT for performing ICE screening during long range planning. A pilot study was conducted using the ICE Screening procedure guidance with the New Bern MPO in development of their 2040 Metropolitan Transportation Plan (MTP). This study was the first effort in North Carolina to apply the ICE assessment in preparing a MTP and was completed in Spring of 2016. The four primary products (i.e., Existing Conditions Assessment, Future Growth Potential Assessment, ICE

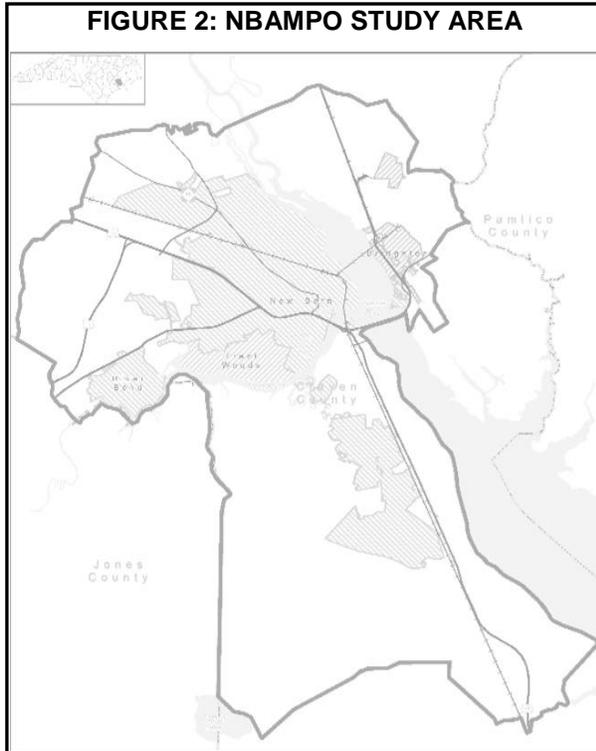
Screening, and BMPs Recommendations) were prepared as part of the ICE Assessment, with each product building off of one another.

These products were prepared based on the guidance included in NCDOT's draft CTP-ICE Procedures and Tools, revised July 2014, and coordination with regulatory and jurisdictional agencies. As the MTP development process provides a comprehensive and integrated plan for an area's future transportation needs, incorporating the evaluation of potential indirect and cumulative effects at this stage provides value to, and consistency between, long-range planning and project development.

NBAMPO 2040 METROPOLITAN TRANSPORTATION PLAN (MTP)

The NBAMPO MTP Study Area evaluated in the ICE Assessment was approximately 106,221 acres and included the City of New Bern, Town of River Bend, Town of Trent Woods, Town of Bridgeton, and unincorporated land in a portion of Craven County (see Figure 1). The MTP identifies future transportation deficiencies and investments and system improvement recommendations for all modes of transportation necessary to meet the transportation needs of the region through the design year of 2040. The projects proposed in the MTP are varied in scope, purpose and need, and location. The majority of the projects are related to existing location roadway improvements and those on new location. These roadway projects represented the MTP scenario analyzed in the ICE Assessment. In addition, the MTP includes projects related to other modes of transportation such as public transit, rail, bike and pedestrian. Extensive GIS mapping was performed for assessing the existing conditions, future growth potential and indirect and cumulative effects assessment, and illustrates the areas affected in each Product. In addition, the input from local jurisdictions, stakeholders, and community during the MTP process was important in defining a baseline and understanding important resources within the Study Area.





PRODUCT 1 – EXISTING CONDITIONS ASSESSMENT

The MTP-ICE Plan-Level Existing Conditions Assessment (Product 1) documented a preliminary screening of seven human and environmental factors at the MTP Study Area geography, including forecasted population and employment growth, available land, water and sewer availability, market for development, public policy, and notable environmental features. Each of the variables received a qualitative rating, varying from “lesser likelihood” to “greater likelihood”, relative to anticipated indirect effects resulting from the human and environmental factors. After compiling the ratings for each of the factors, the cumulative result was determined to be “possible” indirect effects. The great amount of notable environmental features in the MTP Study Area weighed heavily in this result, as did the amount of land available for development and the availability of water and sewer services, each representing a higher likelihood for indirect effects. However, the forecasted population and employment growth, along with the more stringent local growth management policies (rated at a lesser

likelihood) offset categories of higher likelihood. Table 2 illustrates the results of the Existing Conditions screening.

PRODUCT 2 – FUTURE GROWTH POTENTIAL ASSESSMENT

Product 2 was an assessment of the potential for growth in the MTP Study Area and could be used to inform the MTP planning process, including the development of land use scenarios and alternatives. Product 1 was used as a baseline, and the comprehensive and land use plans of the various jurisdictions within the MTP Study Area were evaluated to identify land use, zoning, water and sewer infrastructure, development limitations, and natural and cultural features. These factors, when assessed together, provided insight into future growth potential. Socioeconomic data from the New Bern MPO travel demand model for each of the Traffic Analysis Zones (TAZ) on forecasted population and employment growth was analyzed for the MTP Study Area to determine the areas of future growth potential, both short-term (within the next 10 years) and long-term (>10 years) (see Figure 2).

Growth in the MTP Study Area was expected to continue based on the socio-economic data projections from the MPO travel demand model and local plans. Craven County and the City of New Bern are actively promoting economic development and growth, the cultural and natural resources continue to attract people to the area, and infrastructure capacity exists. Furthermore, the positive economic trends in the area, quality of life, employment opportunities, and rail access are important drivers in the projected growth. The numerous natural resources and conservation efforts, in combination with the presence of regulatory policies and growth management, are expected to focus development and growth into specific areas.

TABLE 2 . PRELIMINARY MTP-ICE PLAN-LEVEL EXISTING CONDITIONS MATRIX

Rating	Forecasted Population Growth	Forecasted Employment Growth	Available Land	Water/Sewer Availability	Market for Development	Public Policy	Notable Environmental Features	Result
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Greater Likelihood	> 3% annual population growth	> 3% increase New Jobs Expected	60% or greater of available land*	Services available [muni 100%; county 20% of area]	Development activity abundant	Less stringent; no growth management	Notable Feature(s): Abundant / More Sensitive	
Expected							X	
Likely				X				
Possible		X	X		X			Possible Indirect Effect
Not Likely	X							
Not Expected						X		
Lesser Likelihood	No population growth or decline	No new Jobs or Job Losses	0 - 9% of available land*	Limited or no service available now or in future	Development activity lacking	More stringent; growth management	Notable Feature(s): Minimal / Less Sensitive	

PRODUCT 3 – ICE SCREENING

The ICE Screening (Product 3), using the results of Products 1 and 2, was an assessment of the potential indirect and cumulative effects of the NBAMPO MTP (plan-level) scenario and four selected proposed projects. The plan-level ICE screening of the MTP proposed projects resulted in a rating of “likely” indirect effects as shown in Table 3. While the proposed projects vary in size, scope, purpose and impact, the combination would result in changes to accessibility, capacity, and travel patterns within the MTP Study Area. These potential changes combined with the area’s available land, water and sewer service, and sensitivity and abundance of notable environmental features were the drivers for the indirect effects screening results, as detailed in Product 3.

TABLE 3. MTP-ICE SCREENING MATRIX FOR INDIRECT EFFECTS, PLAN-LEVEL

Rating	Scope of Trans. Plan Investments	Macro Change in Accessibility	Forecasted Population Growth	Forecasted Employment Growth	Available Land	Water/ Sewer Availability	Market for Development	Public Policy	Notable Environmental Features	Result
Greater Likelihood	High	High	> 3% annual population growth	> 3% increase New Jobs Expected	40% or greater of available land*	Services available [muni 100%; county 20% of area]	Development activity abundant	Less stringent; no growth management	Notable Feature(s): Abundant / More Sensitive	

Expected									x	
Likely		x			x	x				Likely Indirect Effects
Possible	x			x			x			
Not Likely			x							
Not Expected								x		
Lesser Likelihood	Low	None	No population growth or decline	No new Jobs or Job Losses	0 - 9% of available land*	Limited or no service available now or in future	Development activity lacking	More stringent; growth management	Notable Feature(s): Minimal / Less Sensitive	

The screening of cumulative effects for the overall MTP plan, when considered in the context of other past, present, and future actions resulted in a rating of “possible” cumulative effects to the area’s community and natural features as shown in Table 4. The potential direct natural environmental impacts by the proposed projects would require avoidance, minimization, and mitigation, consistent with prevailing regulations and coordination with environmental resource agencies. In addition, the MTP’s proposed projects and future development would be required to follow federal, state and local regulations for protecting resources. Future growth is expected within the MTP Study Area, and it is anticipated that the projects proposed in the MTP will spur development. Best management practices (BMPs) by local jurisdictions may support the protection of these important resources and manage the anticipated growth.

TABLE 4. MTP-ICE SCREENING MATRIX FOR CUMULATIVE EFFECTS: PLAN-LEVEL

Rating	Notable Cultural Features			Notable Community Features			Notable Water Quality Features			Notable Natural & Habitat Features			Result
	Unique Resources Not Protected / Recognized	Unique Resources Not Protected / Recognized	Unique Resources Not Protected / Recognized	Past Actions	Current Activities	Future Development	Past Actions	Current Activities	Future Development	Past Actions	Current Activities	Future Development	
Greater Likelihood													
Expected													
Likely				x						x			

Possible					X	X	X					X	X	Possible Cumulative Effects
Not Likely								X	X					
Not Expected	X	X	X											
Lesser Likelihood	Features Incorporated in Local Planning and Protection			Features Incorporated in Local Planning and Protection			Features Incorporated in Local Planning and Protection			Features Incorporated in Local Planning and Protection				

PRODUCT 4 – BEST MANAGEMENT PRACTICES (BMP) RECOMMENDATIONS

Overall, the findings of the ICE Assessment indicated a rating of “possible” cumulative effects to notable community features and natural features in the MTP Study Area. Product 4 outlined planning guidance and tools that could be used by the local jurisdictions within the MTP Study Area to assist in minimizing potential indirect and cumulative effects from proposed projects in the 2040 NBAMPO MTP. Some examples of these tools include Smart Growth policies to preserve open space, farmland, natural beauty, and critical environmental areas, and strengthen and direct development towards existing communities. Zoning ordinance revisions to provide a comprehensive approach to land use regulation and streamline the development process. Purchase of Development Rights (PDR) and Transfer of Development Rights (TDR) programs helpful in protecting farmland and preserve the rural area, focus compact growth in developed areas, and compensate property owners for the development potential of their property. Lastly, green infrastructure planning using the Green Growth Toolbox, which was developed by the North Carolina Wildlife Resources Commission (NCWRC) and can assist the jurisdictions within the MTP Study Area in identifying priority wildlife habitats for potential conservation and natural resources while accommodating planned growth.

Implementing one or more of the best management strategies to protect important natural and community resources may assist in streamlining future transportation project delivery, as project permitting focuses on avoiding and minimizing effects to resources in the vicinity of proposed projects. Some resources provide not only planning guidance, but funding opportunities, and grant-writing assistance for local communities. Using these resources, which provide lessons learned and example documents from similar communities, would assist in reaching the goals in the MTP Study Area.

CONCLUSIONS

In completing the pilot study, multiple benefits of analyzing ICEs during the planning process were identified that are important for both project level and systems-level planning work:

- It promoted Interagency Coordination among teams such as advisory groups, FHWA, MPO, NCDOT, Environmental Resource Agency and locals.
- Helped identify challenges/obstacles early in planning process
- Enhanced project credibility by reducing risk/uncertainty
- Yielded specific BMPs for the local jurisdictions to mitigate potential impacts of future development based on the ICE assessment

Work sessions with local jurisdictions will be key to the success of the plan level ICE assessments. The process is applicable to other MPO and Non-MPO areas, but should be tweaked depending on MPO characteristics. The MTP update may include changes due to the ICE assessment findings and recommendations or other BMPs that have been implemented. A training on recommended BMP and closing workshop with MPO committees should be held after completion of the ICE assessment. Indirect and Cumulative Effects can be as important as direct impacts to the long-term health of natural environments and human communities. Starting with an accurate baseline of what the community has and wants is crucial to using the correct tools and reaching a successful outcome.

REFERENCES

Clearbox Forecast Group, PLLC. New Bern MPO Model Development.

Craven County, North Carolina. <http://www.cravencountync.gov/>

Federal Highway Administration. <https://www.environment.fhwa.dot.gov/projdev/qaimpact.asp>

Federal Highway Administration. *Position Paper: Secondary and Cumulative Impact Assessment In the Highway Project Development Process*. April 1992.

NC One Map – various regulatory agencies <http://data.nconemap.gov/geoportal/catalog/main/home.page>

NCDOT GIS Unit <https://connect.ncdot.gov/resources/gis/pages/gis-data-layers.aspx>

New Bern, City of, North Carolina. <http://www.newbern-nc.org/>

New Bern, City of. Comprehensive Bike Plan, 2006.

North Carolina Department of Environmental Quality, Division of Water Resources. [http://portal.ncdenr.org/web/wq/ps/csu/303dimplementing the 25-Year Vision](http://portal.ncdenr.org/web/wq/ps/csu/303dimplementing%20the%2025-Year%20Vision). August 2015.

North Carolina Department of Transportation. Integration Website: <https://connect.ncdot.gov/projects/planning/Pages/Integration-Project.aspx>

North Carolina Department of Transportation. Community Understanding Report (CUR) template.

North Carolina Department of Transportation. *CTP-ICE Integration Scenario Overview*. July 2014.

North Carolina Department of Transportation. *CTP-ICE Procedure and Tools (DRAFT)*. July 2014.

North Carolina Department of Transportation. Merger Process Guide. <https://connect.ncdot.gov/resources/environmental/lists/merger%20process%20guide/allitems.aspx>

North Carolina Department of Transportation/Department of Environment and Natural Resource. *Guidance for Assessing Indirect & Cumulative Impacts of Transportation Projects in North Carolina. Volume I: Guidance Policy Report*. November 2001.

North Carolina Wildlife Resources Commission.

<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/ConservationData.aspx>;

<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/ConservationRecommendations.aspx>

River Bend, Town of, North Carolina. <http://www.riverbendnc.org/>

Socio-Economic Data by Traffic Analysis Zones (TAZs) from the New Bern Area MPO travel demand model

Trent Woods, Town of, North Carolina. <http://www.trentwoodsnc.org/>

United States Council on Environmental Quality. Regulations for Implementing NEPA (§§1500-1508).

United States Environmental Protection Agency. <http://www.epa.gov/smartgrowth/about-smart-growth>;
<http://www.epa.gov/smartgrowth/getting-smart-growth-100-policies-implementation>