Draft
Environmental Studies Methodology Memo
SR 20 Improvements from Canton to Cumming
(PI Nos. 0002862, 0003681, 0003682)

Prepared for the
Georgia Department of Transportation

December 2013

DRAFT

Table of Contents

1.0 INTRODUCTION 5

2.0 EPM METHODOLOGIES 5

3.0 PROJECT-SPECIFIC METHODOLOGIES 6

3.1 AESTHETIC AND VISUAL IMPACTS 6

3.1.0 Background 6

3.1.1 EIS Methodology 6

3.1.2 EIS Chapters 7

3.2 COMMUNITY IMPACTS ASSESSMENT 8

3.2.0 Background 8

3.2.1 EIS Methodology 8

3.2.2 EIS Chapters 12

3.3 INDIRECT AND CUMULATIVE IMPACTS 12

3.3.0 Background 12

3.3.1 EIS Methodology 13

3.4 HISTORIC RESOURCES 17

3.4.0 Background 17

3.4.1 EIS Methodology 17

3.4.2 EIS Chapters 18

3.5 ARCHAEOLOGICAL RESOURCES 18

3.5.0 Background 19

3.5.1 EIS Methodology 19

3.5.2 EIS Chapters 20

4.0 SUMMARY 20

TABLE

Table 1: ICI Analysis Resources Methods 14

Definitions of Acronyms

American Association of State Highway and Transportation Officials	AASHTO
Advisory Council for Historic Preservation	ACHP
Agency Coordination Plan	ACP
Atlanta Regional Commission	ARC
Area of Potential Effect	APE
Archaeological Resources Planning Study	ARPS
Carbon Monoxide	CO
Citizens Advisory Committee	CAC
Clean Air Act	CAA
Code of Federal Regulations	CFR
Community Impacts Assessment	CIA
Conceptual Stage Study	CSS
Council on Environmental Quality	CEQ
Draft Environmental Impact Statement	DEIS
Development of Regional Impact	DRI
Economic Impacts Assessment	EIA
Environmental Protection Division (Department of Natural Resources)	EPD
Environmental Impact Statement	EIS
Environmental Justice	EJ
Environmental Procedures Manual	EPM
Environmental Protection Agency	EPA
Federal Transit Administration	FTA
Final Environmental Impact Statement	FEIS
Federal Emergency Management Agency	FEMA
Federal Highway Administration	FHWA
Geographic Information Systems	GIS
Georgia Department of Transportation	GDOT
Georgia Regional Transportation Authority	GRTA
Historic Research Design	HRD
Indirect and Cumulative Impacts	ICI
Interstate	I
Mobile Source Air Toxics	MSAT
Moving Ahead for Progress in the 21st Century	MAP-21
National Ambient Air Quality Standard	NAAQS
Noise Abatement Criteria	NAC
National Environmental Policy Act	NEPA
National Park Service	NPS
Natural Resource Conservation Service	NRCS
Official Code of Georgia Annotated	OCGA
Particulate Matter	PM
Public Involvement Plan	PIP
Record of Decision	ROD
Regional Transportation Plan	RTP
Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A	SAFETEA-LU
Legacy for Users State Route	SR
State Historic Preservation Office	SHPO
Social Impacts Assessment	SIA
State Implementation Plan	SIP

State Route	SR
Technical Advisory Committee	TAC
Transportation Improvement Program	TIP
United States Army Corps of Engineers	USACE
United States Department of Housing and Urban Development	HUD
United States Department of Transportation	USDOT
United States Geological Survey	USGS
United States Fish and Wildlife Service	USFWS
Vehicle Miles Travelled	VMT

1.0 INTRODUCTION

The Georgia Department of Transportation (GDOT) and the Federal Highway Administration (FHWA) are initiating the environmental review process as required by Section 6002 of Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and amended by Section 1305 of Moving Ahead for Progress in the 21st Century Act (MAP-21) for the Environmental Impact Statement (EIS) for the proposed State Route (SR) 20 Improvements from Canton to Cumming. GDOT, as the project sponsor, in coordination with the FHWA, the lead Federal agency, prepared this Methodology Memo to document the methodologies for analyzing the resources to be included in the EIS documentation. Opportunities to comment on these methodologies will be afforded to the public and agencies during the Scoping Meetings and during meetings with the Citizens Advisory Committees (CAC) and Technical Advisory Committee (TAC).

All methodologies utilized in the proposed project will follow the GDOT Environmental Procedures Manual ([EPM] dated July 2012, and accessed at: http://www.dot.ga.gov/doingbusiness/PoliciesManuals/roads/Pages/EnvironmentalProceduresManual.aspx). If revisions to the EPM are made, methodologies will be conducted accordingly. This Methodology Memo includes three types of methodologies:

1) Methodologies following the EPM (in Section 2.0 below);
2) Three methodologies using project-specific approaches including Aesthetics and Visual Resources, Community Impact Assessment, and Indirect and Cumulative Impacts; and
3) methodologies primarily based on the EPM, but also incorporating some project-specific approaches, and not identified in the #2 list above.

2.0 EPM METHODOLOGIES

The methodologies for the following special studies will follow the EPM unless determined otherwise through the course of project development. Agency coordination, public involvement, and development of the project's Need and Purpose will be conducted per SAFETEA-LU Section 6002 and MAP-21 requirements.

1. Conceptual Stage Study
2. Energy-Greenhouse Gases/Climate Change
3. Historic Resources
4. Archaeological Resources
5. Ecology Resources (includes waters of the U.S.)
6. Noise
7. Air
8. Land Use
9. Section 4(f)
10. Section 6(f)
11. Phase I/II Site Assessment/Underground Storage Tanks/Hazardous Waste Materials
12. Utilities/Construction Effects

Ecology resources will be described in an Ecological Resources Technical Report, which will address Waters of the U.S., State Waters of Georgia, federal and state protected species, aquatic resources, farmland/forestland, wild and scenic rivers, water quality, floodplains, and river basins.

Although the EPM is being used for the Historic and Archaeological Resources methodologies, for the proposed EIS documentation, elements of the Historic and Archaeological Resources methodologies have been modified in collaboration with GDOT subject matter experts (SMEs) based on recent best practices and lessons learned for the corridor. These methodologies are further discussed in Section 3.4 'Historic Resources' (pages 17) and Section 3.5 'Archaeological Resources' (page 18).

3.0 PROJECT-SPECIFIC METHODOLOGIES

The following methodologies are proposed for the study area based on the EPM, best practices, and project-specifics outlined herein.

1. Aesthetics and Visual Impacts
2. Community Impacts Assessment
3. Indirect and Cumulative Impacts

3.1 Aesthetic and Visual Impacts

3.1.0 Background

To address visual and aesthetic impacts associated with the project, the project team will prepare a Visual Impact Assessment for EIS documentation. Visual quality is the character of the landscape that generally gives the aesthetic value to a setting. Because visual quality is inherently subjective, objective descriptions will be used to quantify the visual assessment. The findings of this technical report will be based upon information gathered from review of reference materials (i.e., comprehensive plans and other local planning documents), input from stakeholders in the scoping process, and findings from field investigation and the public involvement process. This report will use the *FHWA Visual Impact Assessment for Highway Projects* (1988) methodology to identify and assess potential visual impacts.

3.1.1 EIS Methodology

Existing conditions and the reasonable range of alternatives will be evaluated using the Visual Quality Rating Scale and Visual Analysis Matrix (based on the *FHWA Visual Impact Assessment for Highway Projects Manual*), which includes a numeric ranking system used to objectively measure visual quality. Identification of potential locations for analysis will be based on a preliminary survey of the study area. Once the potential locations for analysis are identified, scoping stakeholders and the public will provide input that identifies additional locations or remove certain locations from consideration. Therefore, location selection will correspond with the public coordination effort (CAC input). Preliminary scoring of the existing conditions will then occur. The recommended "scoring" of these locations will then be presented to the CAC for approval/refinement. This process will be repeated once proposed DEIS alternatives are developed.

The Visual Impact Assessment will be circulated among the various stakeholders of the scoping process to ensure the impacts have been adequately considered and

documented. This report will then be maintained in the project file and can be summarized in the project's EIS in a way easily understood by the public. The five steps to assess and mitigate visual impacts are:

- Define the project setting and potential key views;
- Analyze existing visual resources and viewer response;
- Depict the visual appearance of the proposed project;
- Assess the visual impacts of project alternatives; and
- Propose methods to mitigate adverse visual impacts.

Three criteria will be used to perform and evaluate appraisal of the landscape visual quality: vividness, intactness, and unity. Each of these criteria is independent and intended to evaluate one aspect of visual quality. Definitions of these terms are (FHWA 1988):

- **Vividness**: The combination of landform, water, vegetation, and human development that forms a memorable composition and distinctive visual pattern.
- **Intactness**: The visual integrity of the natural and built landscape and its freedom from encroaching elements.
- **Unity**: The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual platter.

Vividness, intactness, and unity will be rated from very low quality through very high quality. Visual quality will be evaluated and then rated using a qualitative ranking of 'high', 'medium', and 'low' scale. A matrix will be developed to measure visual quality of specific viewpoints along the corridor under the existing and proposed build conditions. This will allow the effects of various build conditions to be evaluated against the no build, or existing, condition.

The documentation will include digital photography of the various locations that are surveyed and analyzed. The project team will graphically superimpose the proposed project into existing aerial and elevations photography to assist reviewers in visualization and evaluation of the various DEIS alternatives.

Based on the outcome of the evaluation, mitigation could be proposed at specific locations to improve visual quality if it is determined that the degree of impact on the viewshed will be considered significantly adverse. Again, this will be done in coordination with the various stakeholders identified in the agency and public involvement process.

3.1.2 EIS Chapters

The data from aforementioned technical report will be summarized in the DEIS in Chapter 3: Affected Environment; Chapter 4: Environmental Consequences; and Chapter 5: Indirect and Cumulative Impacts and Mitigation; as well as assorted graphics and tables in these chapters of the DEIS. This discussion will also be referenced in the FEIS and ROD documentation.

3.2 Community Impacts Assessment

3.2.0 Background

A Community Impacts Assessment (CIA) focused on the project's study area will be conducted early in the project's planning process. Community Impact Assessment is the process that evaluates the potential impacts of proposed transportation projects on a local community and its sub-populations throughout the transportation decision-making process. The CIA will utilize the methodology found in FHWA's *Community Impact Assessment: A Quick Reference for Transportation*.

The major topics listed below will be included in the report.

- Population Characteristics
- Housing Characteristics
- Business and Employment Characteristics
- Community Resources – Facilities, institutions and schools
- Crime, Safety, and Emergency Services
- Plans and Regulations
- Other Proposed or Recently Completed Projects in the Area

The CIA will consist of a multi-step process including documentation of existing conditions, consequences of the proposed reasonable range of alternatives, public involvement assessment of alternatives impacts, and identification of potential mitigation measures. Report discussion will focus on the most important potential issues of the project and interrelating points will be presented in a fashion which best presents the potential issues and cross-referenced in the EIS documentation where applicable. In cases where many of the impacts addressed will have a current or direct component and a longer term or indirect component, the Indirect and Cumulative Impacts (ICI) portions of the EIS documentation will be referenced to stress these reasonably foreseeable impacts. Efforts for soliciting input to the CIA for the EIS documentation are detailed in the Public Involvement Plan and Scoping Booklet.

3.2.1 EIS Methodology

3.2.1.1 CIA Overview

The CIA Technical Report will be developed and findings will be summarized as part of the EIS documentation. The CIA will consist of an Economics Impact Assessment (EIA) and a Social Impacts Assessment (SIA) for each of the DEIS Alternatives. The EPM 2012 will be used as a foundation for the approach to this assessment. The CIA Technical Report will serve as one of the appendices to the EIS documentation. The SIA will consist of utilizing demographic data to identify communities that have the potential to be affected by the corridor improvements. The EIA will utilize existing labor statistics and economic driver data to evaluate the economic drivers along the corridor and how the corridor is used to reach economic drivers outside the immediate surrounds.

Community resources are typically found within a project study area and include any public services provided by local government agencies and institutions such as fire and rescue,

public safety, educational, parks and recreational areas, religious institutions, and cemeteries. Many of these land uses are closely associated with the quality of life within a community and can aid in the development of project alternatives that avoid or minimize effects to these facilities.

3.2.1.2 Economic Impacts Assessment

An EIA is an element of the CIA. The EIA assesses the following in the project corridor: general employment data (i.e., local businesses, unemployment rate, type of employment, employment distribution, dominant businesses, stability of businesses, ownership of businesses); per capita income levels; economic generators, activities, markets; property values; tax base and revenues; orientation of local and regional businesses; number of employees; growth trends; and income distribution. The EIA will focus on the impacts of the proposed project to these economic and business resources and associated access/parking issues; development plans; and issues surrounding Developments of Regional Impact (DRIs).

3.2.1.3 Social Impacts Assessment

A SIA is an element of the CIA. The SIA will focus on impacts of the proposed project on specific groups of individuals within a community. The following groups will be given consideration when analyzing the impact of a transportation project: elderly persons; disabled persons; non-drivers and transit-dependent persons; Environmental Justice populations (e.g., low-income and minority populations); migrant workers; and Temporary Assistance to Needy Families (TANF) recipients. Major topics in the SIA consist of:

- Environmental Justice (EJ)
- Physical, social, and perception aspects including community stability and neighborhood cohesion, relocation impacts (as determined through the Conceptual Stage Study [CSS]); community safety/emergency response; public institutions; open spaces/ parkland/ recreation; cemeteries
- Land use patterns and compatibility
- Transportation access – neighborhood access, pedestrian and bicycle access, Americans with Disabilities Act, public transit; and mobility
- Transportation network – changes in commuting patterns, travel time, consistency with thoroughfare plans
- Safety – pedestrian and bicycle safety, emergency response, vehicular safety

In order to address these aforementioned topics, the SIA will include the size of the population, the neighborhood boundaries, and community cohesion. A description of the relevant ethnic/income data for the census tracts affected, the character of the adjacent communities, and the value and availability of housing would be included. Unemployment rates of the community will be noted. The SIA will discuss the location, types, and access to community facilities, including principal hours of use. In the SIA, the relevant housing characteristics will be identified, such as, type of occupancy (e.g., renters or owners), density of housing, condition of housing, and occupancy rate. The age and ethnic distribution of the community will also be part of the SIA. A SIA will consider public facilities (e.g., police/health), the school districts, recreation areas, churches, medical facilities, and

community centers. The discussion will identify these resources and services, define the service areas, discuss the relationship with the community, and determine if these might be adversely affected by right-of-way requirements, noise, construction activities, traffic diversion, changes in land use, changes in access, and changes in tax and revenue base. The potential displacements will be discussed in this section as well by including data obtained from the Conceptual Stage Study. A Conceptual Stage Study identifies displacements and relocation options. The SIA will consist of options to avoid, minimize, and mitigate adverse socio-economic effects. Potential effects of the reasonable range of alternatives will be evaluated through public involvement efforts and specific outreach to locals directly responsible for resources. The SIA will follow the policies and guidance of *The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* to ensure that those affected by any potential displacement or relocation will be treated fairly and equitably.

3.2.1.4 Environmental Justice Analysis

An EJ analysis will be part of the SIA and will focus on impacts of the proposed project on EJ populations. The regulatory framework of the EJ will be detailed. Analysis of EJ in relation to transportation projects funded by the federal government will be completed in compliance with Title VI of the Civil Rights Act of 1964, NEPA, Federal-aid Highway Act of 1970 (23 United States Code 109(h)), Executive Order (EO) 12898 – *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations* (1994), U.S. Department of Transportation (USDOT) Order 5610.2(a) *Final DOT Environmental Justice Order* (2012), FHWA Order 6640.23A *Actions to Address Environmental Justice in Minority Populations and Low Income Populations* (2012), and FHWA's *Guidance on Environmental Justice and NEPA* (2011). Specifically, EO 12898 requires Federal agencies to identify and address disproportionately high and adverse human health or environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations in the United States. USDOT Order 5610.2(a) and FHWA Order 6640.23A state that all DOT operations will be administered in a way that identifies and avoids discrimination (Title VI and related statutes) and ensures that programs, policies, and other activities do not have disproportionately high and adverse human health or environmental effects on minority or low-income populations.

An EJ evaluation will assess the proposed projects impacts on minority and low-income populations (identified by using localized census tract data, public involvement, and other relevant data sources). An important element in conducting an EJ study is determining a reference population. The population in the area of impact will be compared with the city, county, state, and/or country in order to evaluate the status of disproportionate effect. If it is determined that there are no disproportionately high and adverse impacts, then the EJ analysis will be augmented with any information acquired through public involvement or previous planning efforts. Specifically, the EIS documentation will discuss the major proactive efforts taken to ensure meaningful opportunities for public participation including activities to increase low-income and minority participation. Pursuant to FHWA Order 6640.23A, if the data demonstrate that there may be a disproportionately high and adverse human health or environmental effects to a minority or low-income population, then efforts must be proposed to avoid, minimize and/or mitigate the disproportionately high and adverse human health or environmental effects. Guidance regarding practicable alternatives to further avoid or reduce disproportionately high and adverse effects is outlined in the FHWA

Guidance on EJ and NEPA (2011). The EIS documentation will identify what practicable mitigation commitments have been made.

The EJ analysis expands on the community impacts and social/economic demographic analyses by focusing on minority and low-income populations. The identification and addressing of EJ is a requirement through all stages of federal processes and decision-making, including planning of alternatives and mitigation. Public involvement, a key component in the USDOT order, ensures that procedures are inclusive for all people.

The Limited English Proficiency (LEP) populations protected under EO 13166, *Improving Access to Services for Persons with Limited English Proficiency*, will also be addressed. EO 13166 requires Federal agencies to examine the services they provide, identify any need for services to those with LEP, develop and implement a system to provide those services so LEP persons can have meaningful access to them, and requires that the Federal agencies work to ensure that recipients of Federal financial assistance provide meaningful access to their LEP applicants and beneficiaries. To assist Federal agencies in carrying out these responsibilities, the U.S. Department of Justice has issued a Policy Guidance Document – *Enforcement of Title VI of the Civil Rights Act of 1964 - National Origin Discrimination Against Persons With Limited English Proficiency*. This LEP Guidance sets forth the compliance standards that recipients of Federal financial assistance must follow to ensure that their programs and activities normally provided in English are accessible to LEP persons and thus do not discriminate on the basis of national origin in violation of Title VI's prohibition against national origin discrimination.

3.2.1.5 Data Sources

Data sources may include but are not limited to localized US Census tract data and other relevant data sources, including city and county comprehensive transportation plans and land use plans, Department of Health and Human Services poverty guidelines, Bureau of Economic Analysis and Georgia Department of Labor Employment Data, public transportation data, community facilities, and other relevant data sources, early coordination (e.g. with chambers of commerce and key business leaders), scoping, public outreach, United States Geological Survey (USGS) topographic maps, and detailed windshield survey of the study area.

3.2.1.6 Detailed Approach

The Direct Community Impact Area (DCIA) will encompass the communities or neighborhoods that will be affected by the DEIS reasonable range of alternatives of the proposed project. When determining the boundary of the DCIA, topography, access, commuting patterns, and other relevant information will be taken into account. A description of the general boundaries of the DCIA and justification as to why these boundaries were chosen will also be included. The demographic area will be derived from the census block groups that best illustrate the demographic trends of the DCIA. A brief discussion outlining the justification for the demographic area boundaries will be included. Data from interviews with the following will contribute to developing the CIA: city and county planning staff, city and county transportation planner(s), city and county Geographic Information Systems (GIS) specialist(s), city manager/county manager, community organizations (such as the Chamber of Commerce), leaders, etc., religious organizations, and Neighborhood associations. Based on census data, information from the field visit, and interviews, a narrative discussion of the community or DCIA will be created. During field visits, field notes will be made on readily

available base maps or aerial photographs. Photographs of representative areas of the community will be taken as part of the field visit.

Qualitative and quantitative methods of CIA analyses are used to evaluate transportation projects with respect to social, economic, environmental, and public health matters at both local and corridor levels. Using localized census tract data and other relevant information sources, groups or clusters of minority or low-income persons within the EJ study area will be identified. An analysis of demographic information of the general populations in the project study area will be performed to provide context for understanding area demographics. If no minority or low-income populations are present within the study area, no EJ analysis is required. If it is determined that there will be no adverse effects on identified EJ populations, the EIS documentation will describe the basis for this determination. Alternatively, if minority and low-income populations may be adversely impacted, the EIS documentation will discuss the proactive efforts taken to ensure meaningful opportunities for public participation including activities to increase low-income and minority participation. If there is a disproportionately high and adverse effect on an EJ population, the EIS documentation will evaluate whether this is a further practicable mitigation measure or practicable alternative that would avoid or reduce the disproportionately high and adverse effect(s). Finally, the EIS will identify practicable mitigation commitments for the proposed project.

An example of a quantitative data source is the US Census data. Quantitative approaches also include GIS, statistics, and modeling. One qualitative approach is public involvement. Public involvement can define the community as well as the community's needs and wishes. It can also determine the community's views towards a project and project alternatives, and identify programs that may serve as mitigation for project impacts. In these public involvement activities, local minority leaders, local religious leaders, and local community leaders may serve as contacts to obtain community information. The analysis also will consider other factors such as whether the project may result in impacts to environmental justice populations, displacements, community isolation, destruction of community cohesion, disruption of community economic vitality, air/water pollution, or destruction of natural resources. In addition, the analysis may take into account how the project may affect disabled, elderly, non-drivers, and transit dependent.

Indirect and Cumulative Impacts to the CIA will be covered in the ICI section for this analysis as described herein.

3.2.2 EIS Chapters

The data from the aforementioned technical report will contribute to Chapter 3: Affected Environment; Chapter 4: Environmental Consequences; and Chapter 5: Indirect and Cumulative Impacts and Mitigation; as well as assorted graphics and tables in these chapters in the DEIS. This discussion will also be referenced in the FEIS and ROD documentation.

3.3 Indirect and Cumulative Impacts

3.3.0 Background

The requirements to assess indirect and cumulative impacts of proposed federal actions were established in the Council on Environmental Quality (CEQ) regulations for implementing NEPA. Indirect (also referred to as secondary) impacts are changes that result from the proposed project facilitating development in the region. Indirect effects are those "caused by an action and are later in time or farther removed in distance but are still reasonably

foreseeable" (40 CFR 1508.8). Indirect effects include induced growth and related environmental impacts, including changes in land use, water quality, and population density.

Cumulative effects are the aggregate result of the incremental direct and indirect effects of the proposed transportation action, the effects of past and present actions, and the effects of reasonably foreseeable actions by others on resources of concern. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). These impacts will describe the indirect consequences which result in the immediate project area and beyond at some point in the future. An example of cumulative effects is the cumulative commercial and residential development resulting from new highway construction that facilitates greater numbers of people to travel in the region.

3.3.1 EIS Methodology

An indirect and cumulative impacts (ICI) evaluation will be developed as a separate technical report which evaluates each of the resource areas. The methodologies for the indirect impacts and cumulative impacts evaluations will follow the analyses described in the American Association of State Highway and Transportation Officials (AASHTO) *Practitioner's Handbook: Assessing Indirect Effects and Cumulative Impacts under NEPA*. The following resource areas will be covered: Aesthetics and Visual Resources, Air Quality, Noise, Cultural Resources (including history, archaeology, Native American resources), Water Quality (including wetlands, streams, floodplains, aquatic species), Protected Species, Farmland/Forestland, Transportation Context (traffic patterns and access), Land Use, Community Impacts (including environmental justice, displacements, recreation, economics, and institutions). A combination of qualitative and quantitative analyses will be performed, as generally shown in the following table.

Table 1 ICI Analysis Resources Methods

Resource Category	Impact Examples	Analysis Method (Qualitative, Quantitative, Combination)
Displacements	Residential, Commercial, Institutional, Industrial	Combination of Quantitative and Qualitative
Energy- Greenhouse Gases/Climate Change	Energy usage	Qualitative
Cultural Resources (Historic and Archaeological)	Eligible/potentially eligible properties, historic districts	Combination of Quantitative and Qualitative
Ecology	Wetlands, streams, groundwater, open waters, protected species, farmland/forestland	Combination of Quantitative and Qualitative
Noise	Noise levels	Qualitative
Air Quality	Level of emissions	Qualitative
Land Use	Land use changes, consistency with local plans, demographic changes	Combination of Quantitative and Qualitative
Section 4(f) Resources	Potential Physical Impacts	Combination of Quantitative and Qualitative
Section 6(f) Resources	Potential Usage	Combination of Quantitative and Qualitative
Phase I/II Site Assessments	USTs/Hazardous Waste Impacts	Combination of Quantitative and Qualitative
Utilities/Construction Effects	Utilities Impacts/Duration of Construction Effects	Combination of Quantitative and Qualitative
Community Impacts	Environmental Justice, displacements, recreation, economic development, community facilities	Combination of Quantitative and Qualitative
Aesthetics and Visual Resources	Natural, historic viewsheds	Qualitative

The indirect and cumulative impacts analysis will each follow the step-by-step approach recommended in the *Practitioner's Handbook*:

1. *Information Gathering.* Information will be gathered throughout the scoping process which will indicate whether or not the proposed project has the potential for indirect/cumulative impacts, and will provide an indication of whether or not more extensive information-gathering is needed for analysis. The project's purpose and need, potential for increased mobility/accessibility, local land use plans, growth trends and projections, and the presence of sensitive resources, will all inform the likelihood that the project will have indirect/cumulative effects.

2. *Initial Assessment of ICI.* An initial assessment will be done to determine the likelihood of the project alternatives causing indirect effects, and potential magnitude of those effects. This will provide a qualitative assessment which will determine if a more detailed analysis will be needed.

3. *Develop Scope & Methodology.* The study areas, time horizons and methodologies will be determined before proceeding into the ICI analysis. This will be informed by the previous steps, as well as through resource agency coordination and any applicable legal requirements. Although determined at the outset before analysis, some updates to the scope and methodology may be necessary if new information arises as to the potential impacts.

4. *ICI Analysis.* The analysis involves the study of the causal relationship between the proposed improvements and the growth and impacts that may be caused either indirectly or cumulatively. The specific methodology for the indirect and cumulative effects is discussed further in the following two subsections (3.3.1.1 and 3.3.1.2)

Analysis and findings will be submitted as part of the EIS documentation. Meeting minutes, emails, telephone conversation records of applicable discussions with locals, and any studies will be referenced in the technical report and provided as background to support the documentation record. Possible methods of analysis may include: interviews, checklists, matrices, ICI sub-committees of the TAC and CACs, conducting panel discussions, a Delphi panel, consulting experts, modeling, GIS, ecosystem analysis, economic impact analysis, and social impact analysis. A table listing the resource, the past actions, the present actions, the proposed transportation action, the future action, and the cumulative effects will be a useful tool for analysis. The analysis will interpret incremental effects of the proposed project in context with other actions.

3.3.1.1 Indirect Effects

The discussion on indirect impacts will include the reasonably foreseeable indirect social, economic, and environmental changes which could result from the proposed transportation project as outlined in the *Practitioner's Handbook* analysis details. This evaluation will note the existing conditions of the natural and human environment and document the changes that may occur. The indirect impact evaluation will include how the reasonable range of alternatives (including the No-Build alternative) under consideration will stimulate low density, non-transit oriented, sprawl-type development, or assist in achieving sustainable development. In many cases, the historical development of a community or region can be an indicator of future development patterns. According to the FHWA Position Paper: *Secondary and Cumulative Impact Assessment in the Highway Project Development Process* (1992), the "acceptable guideline for determining the area of influence is the geographic extent to which the project will affect traffic levels." The area of influence for the indirect effects analysis will be clearly defined, shown in a graphic, and may vary from resource to resource.

The following approach will be used in the Indirect Effects Analysis, based on AASHTO's *Practitioner's Handbook*:

Step 1: The initial step in the analysis is gathering information on the project's purpose, the project's potential for changed mobility and/or accessibility, growth use trends, land use plans, constraints on growth potential, and the presence of protected resources.

Step 2: Using these data, the starting point for assessing indirect effects is the project's potential to change growth. For example, if a new intersection is proposed at the periphery of a developing area, could that intersection attract development that would have otherwise occurred elsewhere? Other questions to be evaluated include "Is it likely that current growth

trends would continue regardless of the project?", "What is the magnitude of the increase in accessibility?", "If this wetland were lost, then what impact will its loss have on water quality?", "If this business were displaced, what impact will it have on the local economy?", "What sensitive resources are present?", "Is it possible to determine the locations where induced growth is likely to occur?", "If induced growth does occur where sensitive areas are located, are there reasons to believe that impacts can be avoided or minimized?", among others detailed in the *Practitioner's Handbook*. However, the functional relationship between cause and effect is not always well defined. The overall process will consider indirect effects that are "likely" and "probable" to occur; rather than those which are considered "speculative".

Step 3: In this step the study areas, time horizons, and methodologies are developed for each resource.

Step 4: The final step in the analysis is evaluating the connection between induced growth and environmental impacts. Predictions of induced growth on environmental resources will be made based on feedback from regulatory agency personnel, input from local governments, and evaluation of applicable planning documents (e.g., Cherokee County Comprehensive Plan).

The indirect effects discussion will demonstrate the impact of the proposed project on the community and how the proposed project will benefit the community. The study will also include the regional impact of the proposed project with respect to employment opportunities, infrastructure, tax revenues, and access to activity centers. The analysis will demonstrate the effect of the proposed action on the existing and foreseeable future connectivity of bike paths, pedestrian sidewalks, and automobile travel. The discussion on indirect impacts will delineate the cause and effect relationships among the proposed action and natural and human environments of concern.

3.3.1.2 Cumulative Effects

Scoping is critical for a cumulative effects analysis. Scoping will identify the baseline conditions and the relevant past, present, and future actions that relate to the analysis. Through the Scoping Process for the SR 20 project, information for the cumulative effects analysis will be obtained. The evaluation will establish a geographic scope and time scale for the project impact area (these parameters are anticipated to vary from resource to resource). The baseline conditions and the meaningful changes in the natural and human environment will be described. The discussion on cumulative impacts will delineate the cause and effect relationships among the multiple actions and the natural and human environment of concern. The study will also consider prior NEPA and planning studies of similar actions or nearby actions and also evaluate the proposed route in context with other planned projects in the region, including non-transportation projects. Determining the consequences will include analyzing the additive and long-term effects of the proposed projects.

Step 1: The initial step in the analysis is gathering information on the existing condition and historic condition trends of the environmental resources identified within the project study area, additional future proposed actions (information obtained through comprehensive plans and feedback from local governments), and data obtained from economic development plans, land use plans, and other similar federal, state, and local resource management plans.

Step 2: An initial assessment of qualitative vs. quantitative approach, sensitivity of resources, and an extent of other actions and their impacts is evaluated to assist in developing Step 3.

Step 3: Using these data, the starting point for assessing cumulative effects is defining the resource- specific study areas and determining the resource specific time horizons. For each resource selected for cumulative effects analysis discussions will be provided for current conditions and trends pertaining to historical data as well as: forecasts of future changes; a summary of the proposed project's direct and indirect effect; a description of other reasonably foreseeable future actions; and, an assessment of those actions to the selection environmental resource.

Step 4: Finally, the assessment will draw conclusions about the aggregate impact of all the reasonably foreseeable actions by others, plus the direct and indirect impacts of the proposed project. These conclusions will be based on facts, not on speculation.

3.3.1.3 EIS Chapters

The data from the aforementioned documentation will contribute to the EIS documentation as well as assorted graphics and tables in this chapter of the DEIS. This discussion will also be referenced in the FEIS and ROD documentation.

3.4 Historic Resources

The principal methodology for this effort is outlined in the EPM. The text included herein serves to document modifications and clarifications of protocols established in the EPM. The primary difference in the protocols outlined in the EPM as compared to this project is the development of the History Research Design (HRD). Each DEIS Alternative will be surveyed for historic resources.

3.4.0 Background

There are four critical issues associated with the completion of the Section 106 process for the proposed project:

- Early identification and consultation with project stakeholders;
- Accurate identification of the project's area(s) of potential effects;
- Establishing criteria for determining what properties will be recorded during subsequent field surveys and when they will be recorded;

Timely completion and agency approval of all relevant Section 106 documentation, including early coordination letters, resource reports, impact assessments, and any mitigation measures that might be necessary, to ensure that environmental constraints are brought to the attention of the project designers and stakeholders in a timely manner.

3.4.1 EIS Methodology

Given the estimated number of historic resources previously identified along the project corridor during the scoping process and as part of Section 106 efforts for previous projects along the corridor, the coordination required with multiple project stakeholders, and the number of alternatives potentially under consideration for the DEIS, the project team proposes that a HRD be prepared and submitted to GDOT and the State Historic Preservation Officer (SHPO) for review and approval prior to undertaking any early coordination efforts or fieldwork. The HRD adds value to the Section 106 process by

clarifying the goals of the project, correlating the project goals to the goals of the Section 106 studies, and establishing the criteria for identifying project stakeholders, defining the project's area of potential effect (APE), and determining what properties will be recorded during the subsequent field surveys and when they will be recorded. Providing a contextual framework for evaluating the findings and conclusions drawn from the investigations can be addressed in the HRD and set the tone for how potential Section 106 issues associated with the project are approached and dealt with by the project team, GDOT, and the SHPO. Consensus between these parties on the HRD will be acknowledged through HRD review process. Acceptance of the HRD will ensure that each party's expectations regarding research methods, survey criteria, duration of review times, and resource documentation standards are clearly understood from the outset of the project. Through this collective and proactive approach, any initial uncertainties regarding these expectations can be resolved at the earliest point in the environmental process rather than surfacing after the Section 106 process is underway.

Within this framework, the HRD will include the following:

- Establishment of the project's physical, visual, and indirect/cumulative APEs
- Establishment of age parameter of resources to be identified
- Establishment of survey methodology and preferred documentation standards
- How to handle structure that are over 50 years of old but do not have an historic context? Can the results of past resource identification efforts along the corridor be integrated into the current survey?

The answers to these questions will be based on coordination efforts among GDOT, the SHPO, the consultant team, and any other identified stakeholders involved in the Section 106 process. As previously stated, consensus between these parties on the HRD will be acknowledged through approval by each party and will ensure that each party's expectations regarding research methods, survey criteria, and resource documentation standards are clearly understood from the outset of the project.

The HRD has been completed and will be used as a planning tool. A combined Cultural Resources Assessment of Effects (AOE) including historic and archaeological resources will be prepared for this project.

3.4.2 EIS Chapters

The data from the aforementioned documentation will contribute to the EIS documentation as well as assorted graphics and tables in this chapter of the DEIS. This discussion will also be referenced in the FEIS and ROD documentation.

3.5 Archaeological Resources

The principal methodology for this effort is outlined in the EPM. The text included herein serves to document modifications and clarifications of protocols established in the EPM. The proposed modification to standard protocols established in the EPM consists of an Archaeological Resources Planning Study (ARPS) and conducting a Phase I Archaeology Survey for each DEIS Alternative. These distinctions are described below.

3.5.0 Background

An ARPS would be conducted to evaluate objectively the potential of each alternative route for containing archaeological resources in order to inform planning and alternative selection and to guide the implementation of fieldwork once an alternative has been identified.

3.5.1 EIS Methodology

Past experience with predictive locational modeling in Georgia clearly shows that pre-contact and historic sites should be treated separately in such studies. Therefore, the project team proposes the completion of a planning study that consists of two separate elements: a predictive model to establish potential pre-contact site contexts and an archival repository and online database search to plot historic site locations onto a master map in order to establish potential historic site contexts. The predictive model will determine areas of high probability for pre-contact archaeological sites for all build alternatives, whereas the master historic resources map will define specific locales for all build alternatives that are likely to contain Historic period archaeological sites. Together in the ARPS, the predictive model and master historic resources map will objectively determine the potential for encountering archaeological sites for each alternative route currently under consideration.

The ARPS will be used as a planning tool in the identification of DEIS Alternatives and completed prior to the selection of a preferred Alternative. The completion of the proposed ARPS will require access to online and archival repositories and map libraries, as well as to online databases containing geographic and environmental data for the project area in order to obtain raw data to be used in the construction of a predictive model and master map. GIS technology will be used to render results in graphic form. A Phase I archaeological survey will be undertaken for each DEIS Alternative. Following the selection of DEIS Alternatives and using the results of the planning study for guidance, a Phase I archaeological survey specifically designed to maximize data recovery of potential resources within the project area will be undertaken. Special attention will be directed to high probability areas and certain resource types, such as cemeteries. Such areas can be targeted for specialized investigation through close-interval shovel testing, geophysical survey (i.e., ground penetrating radar, magnetic gradiometry, and electrical resistivity), metal detecting, or other methods appropriate for the investigation of particular site types. A separate Phase II Study will be conducted for sites that are found to be potentially eligible for listing on the National Register of Historic Places (NRHP) based on the Phase I survey.

The Official Code of Georgia Annotated (OCGA), Section 36-72, addresses the conversion of land from cemeteries and, in instances where a cemetery (or isolated grave site) is located within the project study area, a boundary needs to be established. The tax record and land deed will be obtained to determine if the cemetery boundary is legally defined. If the land records do not denote the cemetery boundary, an archaeologist will be consulted to determine the number and location of graves and establish a boundary. Please refer to Archeological Resources Section, in this document and the GDOT EPM for additional discussion about the archeological procedures that will be employed for this project.

A Cultural Resources Assessment of Effects (AOE) Report will be prepared to evaluate the effects of each DEIS alternative on the historic and archaeological sites determined to be eligible for listing on the NRHP.

3.5.2 EIS Chapters

The data from the aforementioned documentation will contribute to the EIS documentation as well as assorted graphics and tables in this chapter of the DEIS. This discussion will also be referenced in the FEIS and ROD documentation.

4.0 SUMMARY

The methodologies included herein will undergo review and approvals from GDOT and FHWA. As part of their roles and responsibilities under SAFETEA-LU (amended by Section 1305 of [MAP-21]) and CEQ, the participating and cooperating agencies will be afforded opportunities to provide comment and refinement on these methodologies during the Agency Scoping Meeting, during ongoing collaboration opportunities, during the TAC, and through the coordination efforts being conducted for the EIS documentation.