STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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SEP 07 2006
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September 1, 2006

MEMORANDUM TO: Greg Thorpe, PhD, Director
Project Development & Environmental Analysis

Art McMillan, PE
State Highway Design Engineer

FROM: Debbie Barbour, PE Debbie Barbour
Director of Preconstruction

SUBJECT: Wetland, Stream, and Riparian Buffer Impact Calculations

The following information has been developed to establish uniformity regarding wetland, stream, and riparian buffer impact calculations and to provide impact numbers consistent with the stage and accuracy of the project design and mapping. Please begin using these guidelines for impact calculations on TIP projects that are being developed within Preconstruction.

- **EEP ANNUAL ESTIMATES**

Under a Memorandum of Agreement with the NC Ecosystem Enhancement Program (EEP), the Department prepares annual estimates of riverine and nonriverine wetland, coastal marsh, stream, and riparian buffer impacts associated with funded projects in the Transportation Improvement Program (TIP). Since EEP bases their plans for providing mitigation on these impact projections and considering our Fiscal budget, it is very important that these estimates be as accurate as possible.

In the development of these annual estimates, the Natural Environment Unit (NEU) will be responsible for tabulating this data. With the necessary assistance from the Project Development Unit and the Roadway Design Unit, the NEU will coordinate the following:

1. Identify construction-funded projects that will require mitigation.

2. Determine if impacts are likely and whether NCDOT is responsible for mitigation (i.e. if municipality or other entity is handling mitigation).

3. For projects with no completed functional or preliminary designs, GIS data will be used to estimate impacts.

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4. For projects that have completed functional and / or preliminary designs, the NEU will contact the Project Development Project Engineer for the most up-to-date information on the project and impact estimates. On projects with completed final designs and permit drawings, the NEU will contact the Hydraulics Project Engineer for impact estimates.

5. For the EEP annual estimates, the NEU will be responsible for tracking project information by adapting their existing database, as IT determines feasible, to include such information as Planning and Design contacts, current design status, current TIP funding, and past impact numbers.

- **FUNCTIONAL DESIGN** - Calculate Wetland & Stream Impacts Only

This design is generally prepared for EIS and new location projects on orthophotos (aerial photos) and is used for Concurrence Point 2. Impacts at this stage will be computed from slope stake limit to slope stake limit plus an additional **40 feet** to each side of the slope stake limit where applicable (for both wetlands and streams). Wetland impacts will be computed to the nearest 0.1-acre per site and the total wetland impacts to the nearest acre. Stream impacts will be computed to the nearest foot per site and total stream impacts to the nearest 10 feet.

The Project Development Unit or its consultant is responsible for computing the impacts to wetlands and streams for the impact tables that will be prepared for the Concurrence Point 2 meeting. If the Project Development Unit needs assistance with impact calculations, the Roadway Design Unit will provide assistance with the impact measurements, as requested.

However, the Project Development Unit will continue to be the primary group responsible to make sure the impact calculations are complete, tabulated, and reasonably accurate. Prior to beginning any impact measurements, the Project Development Unit, the Roadway Design Unit, and the NEU will coordinate to review the functional designs to properly identify the wetland and stream locations. The Project Development Project Engineer will be responsible for setting up this "impacts" meeting.

***NOTE** – At this stage of the project, only wetland and stream impacts are calculated. The goal at this stage of the project is to establish an approximate impact number to each alternative under consideration for Concurrence Point 2. At the functional design stage, NEU may not have been requested to visit the project site. GIS mapping may be the only source to determine the quality of the resources or types; i.e. riverine, nonriverine, or coastal marsh. Temporary impacts, shaded areas under bridges, residual wetland areas, riparian buffers, braided streams in wetlands, etc. should not be included at this time.*

- **PRELIMINARY DESIGN** - Calculate Wetland, Stream, and Riparian Buffer Impacts

This design is prepared on preliminary mapping between Concurrence Point 2 and Concurrence Point 2A on all Merger projects and is used for Concurrence Points 2A, 3, & 4A. Impacts at this stage will be computed from slope stake limit to slope stake limit plus an additional **25 feet** to each side of the slope stake limit where applicable (for wetland, streams, and buffers). Wetland impacts will be computed and rounded up to the nearest 0.01-acre per site and total wetland areas to the nearest 0.1 acre. Stream impacts will be computed to the nearest foot per site and the total stream impacts to the nearest foot. Where applicable, riparian buffer impacts will be calculated to the nearest square foot per site for both Zone 1 and Zone 2 and the total riparian buffer impacts to the nearest square foot. Impacts will be computed for each jurisdictional feature using the same identifying label as supplied by NEU.

The Project Development Unit or its consultant is responsible for computing the impacts to wetlands, streams, and riparian buffers, for inclusion into the planning document or for any impact tables prepared for the concurrence meetings. If the Project Development Unit needs assistance with impact calculations, the Roadway Design Unit will provide assistance with impact measurements, as requested.

However, the Project Development Unit will continue to be the primary group responsible to make sure the impact calculations are complete, tabulated, and as accurate as possible. Prior to beginning any impact measurements, the Project Development Unit, the Roadway Design Unit, the Hydraulics Unit, and the NEU will coordinate to review the preliminary design plans to properly identify the wetland, stream, and riparian buffer locations and the quality of the resources. The Project Development Project Engineer will be responsible for setting up this "impacts" meeting.

NOTE *– At this stage of the project, wetland, stream, and Zone 1 and Zone 2 riparian buffer impacts are calculated. At the "impacts" meeting, the NEU will have the necessary information to discuss the quality of the resource, riverine vs. nonriverine wetlands, coastal marsh impacts, braided stream issues, residual wetlands decisions, and buffer zone locations. No temporary impacts (work bridge, work pads, culvert sites, etc.) are computed at this stage of the project. Calculation of shaded areas under bridges will be handled on a case by case basis.*

- **FINAL DESIGN (4C)** - Impact calculations for permit application package

This design is prepared on final surveys and is used for preparation of right of way and final construction plans. Impacts at this stage will continue to be computed from slope stake limit to slope stake limit plus an additional 5 or 10 feet (depending on the significance of the environmentally sensitive areas) to each side of the slope stake limit where applicable. Any additional impacts beyond the standard 5 or 10 feet from the slope stake limits in jurisdictional areas required for construction will also be tabulated. The accuracy of the impact calculations should be to the nearest 0.01 acres for wetlands, to the nearest foot for streams, and to the nearest square foot for riparian buffers (Zone 1 and Zone 2).

The Hydraulics Unit will continue to be responsible for computing the wetland, stream, and riparian buffer impacts as they prepare the final permit drawings and assist the NEU with the preparation of the final permit application package. The Structure Design Unit will supply the Hydraulics Unit with temporary impact calculations for causeways and / or work bridges and permanent impact calculations for the proposed bents.

Please share this information with your staff who will be involved in this process. If you have any questions, please contact Phil Harris, Eric Midkiff, Rob Hanson, Teresa Hart, Ron Allen or David Chang.

DMB/rda

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