



RESEARCH & DEVELOPMENT

Research & Development Manual

**North Carolina Department of
Transportation**

Research & Development Unit

December 2015

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1.0 Introduction

Transportation Research is vital to the [North Carolina Department of Transportation's](#) (NCDOT and/or the Department) on-going effort to improve transportation engineering, technologies and operations. It provides a means to develop solutions to improve mobility; build better, safer and longer-lasting highway, airport, transit and freight facilities; lessen the Department's environmental impacts; provide safer conditions for drivers and pedestrians and increase the service life of bridges and pavements.

Improvements to our transportation networks are crucial to the success of the economy, educational system, recreational endeavors, environmental initiatives and general quality of life. Effectively managed transportation research programs are a valuable national and local resource. Long-term outcomes from the NCDOT Research and Development (R&D) program include savings to operations (reduced manpower needs, improved assets, lower bids, etc.), benefits to the public (reduced congestion, improved safety, enhanced environment, etc.) and increased knowledge (storm water strategies, material properties, etc.). A robust research program assists the Department, our customers and business partners in understanding and maximizing the economic benefit of the overall Transportation Program.

NCDOT seeks to conduct practical, implementable research that will serve the agency and public at large for many years.

1.1 Document Purpose

This document describes the functions of the NCDOT's Research and Development Unit and presents an R&D management process designed to incorporate department needs and goals into a cohesive program. It includes discussion of program development, project administration and management, training, implementation, external program support and federal funding requirements.

This Research & Development Manual fulfills the U.S. Department of Transportation requirements to assure the applicability of NCDOT' research in meeting national research goals as referenced in [23 CFR Part 420.209\(7\)\(b\)](#).

1.2 Basic Structure

NCDOT develops and manages its research program using a three-tiered structure: At the top is the Research Executive Committee (REC) composed of NCDOT Executives. Providing recommendations and input to the REC are five topical Research Advisory Subcommittees (RACs). Each project has a Steering & Implementation Committee (StIC) that provides technical feedback to the researcher as well as Departmental personnel. Internal customers and NCDOT Management play a primary role in setting the strategic direction for research via the solicitation of research needs submittals and project approval.

In order to investigate defined research needs, the Department contracts with various universities and Transportation Research Centers and consultants throughout the state and nation. The primary focus is on conducting research with North Carolina-based university programs, but specialized expertise may be needed from outside universities. As Research projects involve graduate students, an additional benefit to solving real-world problems is the development and recruitment of the next generation of

transportation professionals that will work with NCDOT and its partners in the private sector and academia.

In addition to contract research, this manual discusses the R&D Unit's role in providing support and coordination for national level research activities through TRB, AASHTO, NCHRP, SHRP and Pooled Funds. In addition, the R&D unit provides contract review and project management services to NCDOT business units conducting research with Universities with alternative funding sources.

2.0 Background Research Program Information

2.1 Federal Funding History

Funding for transportation research began with The Federal Highway Act of 1921 which authorized the first sustained fiscal support for highway research. Support for highway research was reaffirmed in the Federal-Aid Highway Act of 1962 which mandated funds for planning and research purposes only. Transportation research funding was expanded with the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240; ISTEA, pronounced Ice-Tea). As a result, the NCDOT broadened its approach to highway research and development. ISTEA included a provision assigning 2% of each state's federal allocation to State Planning and Research (SPR) funds. Within this SPR program, 25% of the funds were designated for research activities. ISTEA expired in 1997 and was followed by the [Transportation Equity Act for the 21st Century \(TEA-21\)](#) in 1998, the [Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users \(SAFETEA-LU\)](#) in 2005.

Involvement with highway research began in the North Carolina Department of Transportation (formerly the North Carolina State Highway Commission) in January 1959 with the establishment of cooperatively funded studies at North Carolina State University. The first permanent research staff member in the former State Highway Commission, a Highway Research Coordinator, was employed in 1967 and this official was assigned to a newly created Planning & Research Branch. Under the provisions of annually renewable cooperative agreements and the oversight of a Research Steering Committee, the Planning & Research Branch continued to contract with the North Carolina State University Engineering Research Services Division through 1981.

In 1981, a research and development agreement was executed with the Institute for Transportation Research and Education (ITRE) which provided the Department an avenue to undertake contractual research with state supported universities in North Carolina. This agreement with ITRE was superseded by a Master Agreement for Services for Research and Development and Training Projects in 1988.

The R&D Unit was formed in 1990 and assigned to the Statewide Planning Branch and later the Program Development Branch. In 2009, the R&D Unit was reassigned to the Technical Services Division and shortly thereafter established Master Agreements with individual universities. Currently, the R&D Unit is designated to Transportation Programs Management under the Technical Services Division.

2.3 Benefits of the Research Program

This document provides a framework for the administration of NCDOT's Research & Development Program and sets forth procedures that comply with the state planning and research program administration [guidelines](#) issued by the Federal Highway Administration (FHWA.)

The programs, projects and products generated by the R&D Unit, provide benefit for the Department's employees and other transportation agencies and users. The program is primarily made up of contractual research with local state supported universities but also includes limited intramural and internal support research activities. R&D also supports research opportunities that are external to the Department (such as Transportation Pooled Fund, AASHTO and NCHRP).

Research project effectiveness is measured by its level of implementation, impact on the business and by the quality of interaction between research staff and the Department's operating units. To ensure the effectiveness of the research management process and the research program, implementation is tracked via surveys documenting increased safety, enhanced performance and cost reduction. Furthermore, effectiveness is measured by the on-going effort of the R&D Unit to encourage operational units to be lead participants in bringing innovative practices to transportation. Return on investment will be documented and made available to stakeholders.

To enhance the effectiveness of the research program, the R&D Unit develops and maintains positive relationships with knowledgeable researchers and fosters recruitment and development of new transportation research professionals via graduate student funding. This simultaneously aids in solving important transportation problems and attracts university students to work on NCDOT research projects. These students will be well equipped for careers in transportation research or to work directly with the Department and supporting industries.

The program contributes to developing technologies, enhanced knowledge, better processes and streamlined project delivery and assists the State in meeting transportation needs created by growth and changing technology. It is imperative that the agency remain innovative and open to change.

2.4 Alignment with Departmental Vision, Mission and Goals

To address the evolving mission and goals of NCDOT, the research program seeks to address research in a way that promotes a strategic research mindset throughout the Department.

The mission of the Department is supported by the R&D Program as NCDOT seeks to connect people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina.

The Annual R&D program process asks participants to keep in mind the mission statement and the following [NCDOT goals](#) of:

- Making transportation safer,
- Providing GREAT customer service,
- Delivering and maintaining our infrastructure effectively and efficiently,
- Promoting economic growth through the better use of our infrastructure
- Making our organization a great place to work.

2.5 Authority

The authority for a state transportation research organization to use federal funds is found in [Title 23 of United States Code 505](#). The authority for the state organization to administer the SPR funds in its program is found in [Title 23 of the Code of Federal Regulations Part 420.105](#). State funding authority for highway and transportation research procurement in North Carolina is permitted under [General Statute 136-44.2](#). [N. C. Statute 136-28.1](#) exempts the research procurements with universities and non-profits from competitive requirements.

2.6 Administrative Terms and Definitions

The following administrative terms and provisions will apply to this document:

Strategic Research & Development Plan

A guiding plan that will identify major goals and strategies for transportation research. This plan is developed by the R&D Unit with the concurrence of the Research Executive Committee. The plan will consider the mission and goals of the Department, the state's transportation system, the economic environment of North Carolina, and the major problems challenges that the state transportation system faces.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO is a nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico. It represents all five transportation modes: air, highways, public transportation, rail, and water. Its primary goal is to foster the development, operation, and maintenance of an integrated national transportation system.

Annual Research & Development Work Program

A narrative and tabulation of all activities to be undertaken by the R&D Unit for each fiscal year. The tabulation shall be separated into federal aid State Planning and Research funded components and one hundred percent state funded components. It will also include obligations to organizations such as TRB, AASHTO, Pooled Fund Participation etc.

Applied Research

Research that is used to answer a specific question that has direct applications to the world. This is the type of research that solves a specific problem. Most of the research performed by NCDOT is applied research.

Basic Research

Research driven purely by curiosity and a desire to expand knowledge. This type of research tends not to be directly applicable to the real world in a direct way, but enhances our understanding of the world around us. This type of research is largely conducted at the national level in transportation topics.

Budget Authorization

The portion of the Project Authorization detailing the total funds required for work accomplishment over the entire study duration. The Budget Authorization is subdivided into line items which depict both direct costs and indirect costs and are subdivided by fiscal years.

Catalog of Federal Domestic Assistance (CFDA)

The Catalog of Federal Domestic Assistance (CFDA) provides a full listing of Federal programs available to state and local governments (including the District of Columbia); federally-recognized Indian tribal governments; Territories (and possessions) of the United States; domestic public, quasi-public, and private profit and nonprofit organizations and institutions; specialized groups; and individuals. NCDOT's CFDA is 20.205. Available at: <https://www.cfda.gov/>.

Demonstration Project

A formal research project which is conceived to apply specific research results to an actual highway construction project, maintenance operation or operating procedure. This type of project is intended to demonstrate the value and applicability of specific research results. Demonstration projects may include experimental evaluation projects, applied demonstrations, implementation projects, and operational tests. It is identified by a formal work plan and scope of work. It may also include provision for the allocation of special federal funds through a project specific cooperative agreement work order.

Development

The systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems or methods, including design and development of prototypes and processes.

Direct Costs

Elements of the Budget Authorization which include salaries, wages, fringe benefits, supplies, materials, travel, printing, binding, expendable equipment, non-expendable equipment, equipment rental, laboratory use fees, and data processing expenditures.

Federal Fiscal Year

The twelve month period beginning on October 1 of one year and ending on September 30 of the following year.

Final Report

A report documenting a completed R&D study or activity.

Formal Intramural Research Investigation

A formal type of study undertaken by the R&D Unit staff, usually at the request of and in coordination with other Departmental elements. This type of investigation will differ from a routine staff investigative assignment in that a formal work plan and scope of work are necessary. The duration of the formal intramural research investigation will generally be longer, usually in terms of months, and there may be repetitive nature to some of the work plan tasks. A formal intramural research investigation may be similar in scope to a demonstration project yet it will generally require more synthesis of information. It may also require the application of mathematical and scientific principles and theories to data collection, data analysis and reporting. A formal intramural research investigation will involve a similar level of commitment as a demonstration project and will require the designation of a Project Monitor and other key affiliated staff within the Department.

Indirect Costs

Elements of the Budget Authorization which cover clerical, accounting, bookkeeping, procurement, and other administrative services for which no charge is identified or allowable elsewhere in the Project Authorization. Indirect Costs are also referred to as Overhead. Indirect costs are based on twenty percent of eligible modified total direct costs (MTDC). The MTDC includes all allowable cost items except capital equipment and tuition. Subcontract costs are also eligible direct costs, but the rate for such costs

is limited to twenty percent of the first \$25,000 of eligible MTDC covered under each annual subcontract.

Master Agreements

Contractual agreements entered into by the Department and Universities. These agreements provide the overall framework and contract details and are typically multi-year. Project Authorizations for individual projects are executed under the terms of the Master Agreement.

National Cooperative Highway Research Program (NCHRP)

A pooled funds research program directed toward problems of national significance. This research program is sponsored by the State Departments of Transportation and the Federal Highway Administration. This program is administered through the National Academy of Sciences' Transportation Research Board (TRB). Funds are provided to support this program through an annual agreement allocation devised by the American Association of State Highway & Transportation Officials (AASHTO) and the Federal Highway Administration. The annual agreement currently requires that each State Department of Transportation contribute five and one half percent of its total federal SPR appointment. The AASHTO Board of Directors has the prerogative to set or adjust this apportionment rate.

Peer Exchange

A periodic review of a State DOT's RD&T program or portion thereof, by representatives of other State DOTs, for the purpose of exchange of information or best practices. The State DOT may also invite the participation of FHWA and other Federal, State, regional or local transportation agencies; the Transportation Research Board (TRB); and academic institutions, foundations, or private firms that support transportation research development or technology transfer activities. Peer Exchanges should be held every 4-5 years and NCDOT will actively participate in those held by other states.

Period of Performance

2 CFR 2 CFR Period of performance. Requires an end date to be included in agreements and a non-Federal entity may charge to the Federal award only allowable costs incurred during the period of performance.

Principal Investigator

The research professional responsible for the oversight of a research project.

Project

An undertaking by a State highway department for highway construction, including preliminary engineering, acquisition of rights-of-way and actual construction, or for highway planning and research, or for any other work or activity to carry out the provisions of the Federal laws for the administration of Federal aid for highways. Completed NCDOT research projects can be access via link on the R&D Unit's webpage: <https://connect.ncdot.gov/projects/planning/Pages/ResearchAnalysis.aspx>

Project Authorization

A formal contract of specific study objectives and arranged by specific work tasks, methods, and procedures. The Project Authorization duration will vary based on the complexity and time constraints of the research project under consideration. The Project Authorization will include a Budget Authorization for each fiscal year of activity. The Project Authorization may be supported with state appropriated funds, or an eighty (80) / twenty (20) percent Federal/State combination.

Project Engineer

The R&D Unit Engineer responsible for the oversight of a specific research project investigation. The Project Engineer works with the Chairperson of the Research Project Steering & Implementation Committee to assure project deliverables are met. The Project Engineer is responsible for the project from its approval date to the completion of all formal reporting, implementation, and technology transfer activities.

Research

A systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research can be basic or applied.

State Fiscal Year

The twelve month period beginning on July 1 of one year and ending on June 30 of the following year.

Research Executive Committee

The Executive Committee consists of senior management and executive staff and provides research policy and oversight. The REC reviews and approves annual research and development work programs.

Research Subcommittees

Five research advisory Subcommittees comprised of representatives throughout the Department. These representatives will have authority and expertise in each of five designated research program technical areas. These areas will include (1) Pavement, Maintenance & Materials (2) Traffic, Safety & Roadway Design, (3) Planning, Policy & Transit (4) Structures, Construction & Geotechnical and (5) Hydraulics and Environment. The advisory subcommittee structure is reevaluated annually to meet agency needs. Committees are typically made up of permanent central and design unit members and rotating field (Division) members.

Hydraulics and Environment Technical Area

The hydraulics & environment research program technical area encompasses but is not limited to the following subjects: NCDOT's highway storm water program, sediment and erosion control, vegetation management, natural and human environment, waste management, environmental analysis, historic architecture, archaeology, biological surveys, environmental mitigation, soil and water engineering and environmental operations.

Pavement, Maintenance & Materials Research Program Technical Area

The pavement, maintenance and materials research program technical area encompasses but is not limited to the following subjects: liquid asphalt concrete and cement pavement mixture additives and admixtures, pavement mix and structural design, soils, aggregates, petroleum products, rubbers, latexes, epoxies, polymers, plastics, fibers, geotextiles, recyclables. This committee also covers roadway asset management and fleet management.

Planning, Policy, Programming, & Transit Research Program Technical Area

The planning, policy & transit research program technical area encompasses but is not limited to the following subjects: highway planning, non-highway transportation programs, environmental planning, economics, and finance. The non-highway transportation programs will include transit, rail, ferries, aviation, pedestrian, bicycle and intermodal facilities. This technical area may include information technologies.

Structures, Construction & Geotechnical Research Program Technical Area

This technical area includes, but is not limited to the following subjects: structural steel, bridge design, bridge construction, portland cement concrete construction, bridge maintenance, bridge management, large overhead sign structures, seismology and seismic design, culverts and major drainage structures, hydraulics, drilled foundations, tunnels, innovative structural materials and geotechnical and foundation engineering.

Traffic, Safety & Roadway Design Research Program Technical Area

The Traffic and Safety research program technical area encompasses but is not limited to the following subjects: highway inventory management, roadway design, photogrammetry, engineering surveys, highway engineering services, Traffic and Safety engineering automation, Traffic and Safety engineering applications development, traffic engineering, traffic safety, intelligent transportation systems, and field and district Traffic and Safety operations.

Research Database

Internal tracking database designed to assist the Unit in tracking program development and managing active projects.

Transit Cooperative Research Program ([TCRP](#))

A national transit research program authorized in July 1992 and administered under the cooperative agreement by the National Academy of Sciences' Transportation Research Board, the Federal Transit Administration, and the Transit Development Corporation Incorporated. This program is funded by the Federal Transit Administration.

Transportation Pooled Fund ([TPF](#))

The Transportation Pooled Fund (TPF) Program allows federal, state, and local agencies and other organizations to combine resources to support transportation research studies.

Transportation Research Board (TRB)

TRB is one of six major divisions of the National Research Council (NRC)—a private, nonprofit institution that is the principal operating agency of the National Academies in providing services to the government, the public, and the scientific and engineering communities. TRB is responsible for providing a forum for information exchange, managing research programs, developing policy analysis based on objective data and research and disseminating transportation research results.

Technology Transfer

Those activities that lead to the adoption of a new technique or product by users and involve dissemination, demonstration, training, and other activities that leads to eventual innovation. This activity include Includes library services and dissemination of national training and research opportunities to NCDOT staff.

United States Code of Federal Regulations (CFR)

The codification of the general and permanent rules published in the Federal Register by the departments and agencies of the Federal Government. Available at: <http://www.ecfr.gov/>.

3.0 Organization of the Research Program

Research at NCDOT is a cooperative effort led by the Research and Development Unit staff. The primary components include the R&D Unit, Research Executive Committee (REC), Technical Subcommittees and Steering and Implementation Committees (StIC.) The R&D Unit solicits, selects, and monitors all State Planning and Research-funded research projects, which are conducted primarily by state colleges and universities.

3.1 Research & Development Unit

The R&D Unit is led by the State Research and Development Manager. This position reports to the Transportation Program Management Unit Head within the Technical Services Division. The Technical Services Director is the signatory on Project Authorization documents. The R&D Manager is assisted by Research Engineers specializing in the previously listed topical areas of research. (See the [APPENDIX A](#) for Organizational Charts of the Department and the R&D Unit)

The day-to-day administration of the R&D Work Program is the responsibility of the R&D Unit. The Unit works to ensure that the Annual Work Program complies with [23 CFR Part 420.209\(b\)](#). The Unit directs all formal staff research activities conducted within the Department; manages federally funded and state funded contract research projects sponsored by the Department; coordinates Department research interests with those of other external research programs; and promotes research implementation and technology transfer.

External research programs of interest to the Department include the United States Department of Transportation and its various modal administrations including the Federal Highway Administration, the Transportation Research Board (TRB), the American Association of State Highway & Transportation Officials (AASHTO), the various state highway and transportation agencies, foreign countries and transportation research institutes, and transportation research societies such as the American Society of Civil Engineers, the Intelligent Transportation Society of America, and the Institute for Transportation Engineers.

The expenditure of federal aid SPR funds per [49 CFR Part 420.209\(7\)\(d\)](#) is subject to evaluation. The use of these funds must add value to and improve efficiencies and/or effectiveness of Department operations. After selecting research needs statements and developing the annual research and development work programs, the research work program follows clearly defined procedures to ensure meaningful results.

One measure of success for the research program is the R&D Unit staffs' ability to develop strong and lasting interactive relationships inside and outside of the agency. These relationships assist the R&D Unit with program development, project management, consensus building, implementation assistance and outreach.

3.2 The NCDOT Library

The NCDOT library was originally created to house meeting agendas and minutes for the State Highway Commission, now the NC Board of Transportation. Over time, the library expanded to become a repository of many transportation related documents.

The Collection Includes:

- Books on many transportation and engineering related topics
- Research and Government Reports ([NCDOT Research Reports](#), TRB publications, and AASHTO publications)
- Transportation Related Periodicals and Pamphlets
- Engineering and Construction Manuals
- Maps
- Historical newsletters and documents dating to the 1920s (Currently available only in print)
- Board of Transportation Minutes

The collection is searchable through the [State Library of North Carolina's Government and Heritage Library Online Catalog](#), and currently consists of approximately 1500 items and resources available to researchers and engineers.

Library outreach activities produce greater awareness for identifying basic needs and enhancements for technical reference services. This includes the development and maintenance of an Internet Homepage for the Unit; the introduction of prospective new technologies and connection to other informational services.

The R&D Unit employs a full-time librarian to maintain both the physical portion of the Department's research library and the internet based on-line catalogue in conjunction with the State Library of North Carolina. The NCDOT Library has executed a MEMORANDUM OF UNDERSTANDING with the State Library of North Carolina that sets forth the responsibilities and relationship between the libraries in an effort to promote access to information through cooperative networks and library services.

The research librarian stays abreast of the most current methods of collecting and disseminating information on transportation subjects. The results keep the Department and the professional community informed of the latest advances in the field.

The librarian is also responsible for assembling the Research and Development Newsletter on a quarterly basis.

Research technical reference services and other related informational transfer activities performed by the R&D Unit Library are outlined in the annual SPR work program. Line items may be established to fund printing and binding services, journal subscriptions, [TRID](#) (TRIS and ITRD Database) subscription services, document acquisitions, newsletters, website development, SharePoint and other related services.

The R&D Unit continues to enhance and update its Internet Homepage to provide vital and timely informational services.

3.3 Research Committees and Subcommittees

The Research Executive Committee (REC) provides formal review and approval of the annual work program and oversight of the research process.

Research Subcommittees are established for specific technical areas. The subcommittees hold primary responsibility for review and approval of the technical and financial content of research proposals and for recommending project funding to the REC. Through these committees, the R&D Unit staff maintains direct contact with the operating units of the Department and with outside institutions.

Individual research project Steering and Implementation Committees (StIC) work with the R&D Unit to oversee individual projects.

3.3.1 Research Executive Committee

Responsibilities

The responsibilities of the REC are approval of the annual research and development work programs, project authorization budgets, major related activities and decisions; review and approval of the Strategic Research & Development Plan; approval of major determinations for research implementation and technology transfer; review of formal university master agreements; approval of special funding requests by AASHTO, TRB, and/or other national organizations; and participation in the periodic Peer Exchange event hosted by the R&D Unit.

Executive Committee Membership

The Research Executive Committee membership will consist of the following permanent membership, except as noted:

- Technical Services Director (Chair);
- Chief Engineer (Vice Chair);
- Deputy Secretary - Transit
- Director - Preconstruction
- Director - Prioritization
- Director – Strategic Planning
- Director of Field Support*
- Director – Planning and Program Development
- Manager – Transportation Planning Branch*
- Deputy Chief Engineer*
- State Structures Engineer
- State Traffic Engineer*
- Manager – P.D.E.A. *
- Director – Equal Opportunity and Workforce Development
- FHWA – Division Administrator (Ex officio)
- FHWA – Division R & T (Ex officio)
- State Research Manager (Ex officio)

*These positions also act as chairs of technical subcommittees.

3.3.2 Research Subcommittees

Five Research Subcommittees have been established according to specified technical areas. Responsibilities of the designated Research Subcommittees are to review, prioritize, champion and evaluate formal research preliminary and full proposals; support specific research implementation and technology transfer activities; review and evaluate external research program activities such as NCHRP problem statements, NCHRP work program ballots, FHWA and regional pooled fund projects, and other national level transportation research initiatives.

Environment and Hydraulics Subcommittee

Committee membership is comprised of the following permanent assignments, except as noted:

- Manager – P.D.E.A (Chair)
- State Hydraulics Engineer (Vice Chair)
- State Roadside Environmental Engineer
- Head – Natural Environment Unit
- Head – Human Environment Unit
- State Maintenance and Equipment Engineer
- Field Division Representative (Three Year Appointed Term)
- Field Division Representative (Three Year Appointed Term)
- FHWA Division – Environment

The Planning, Environment and Transit Research Engineer serves in a special ex officio capacity as the Subcommittee's Secretary.

Pavements, Maintenance & Material Subcommittee Membership

Committee membership is comprised of the following permanent assignments, except as noted:

- Deputy Chief Engineer (Chair)
- State Materials Engineer (Vice Chair)
- State Pavement Management Engineer
- State Maintenance and Equipment Engineer
- State Roadside Environmental Engineer
- State Roadway Construction Engineer
- State Pavement Construction Engineer
- Division Maintenance Engineer (Three Year Appointed Term)
- Division Maintenance Engineer (Three Year Appointed Term)
- FHWA Division – Pavement and Materials

The Pavement, Maintenance and Materials Research Engineer serves in a special ex officio capacity as the Subcommittee's Secretary.

Planning, Programming, Policy and Transit Subcommittee Membership

Committee membership is comprised of the following permanent assignments, except as noted:

- Manager- Transportation Planning (Chair)
- Manager – Program Development (Vice Chair)
- Manager – P.D.E.A
- Director - Prioritization
- Director – Public Transportation
- Director - Rail
- Director – Bicycle & Pedestrian
- Commissioner – DMV
- Staff Engineer – Technical Services
- Field Division Representative (Three Year Appointed Term)
- Filed Division Representative (Three Year Appointed Term)
- FHWA – Planning

The Planning, Environment and Transit Research Engineer serves in a special ex officio capacity as the Subcommittee’s Secretary. Assistance may be provided by the Construction and Structures Research Engineer as needed.

Structures, Construction and Geotechnical Subcommittee Membership

Committee membership is comprised of the following permanent assignments, except as noted:

- Director – Field Support (Chair)
- State Structures Engineer (Vice Chair)
- State Construction Engineer
- State Bridge Construction Engineer
- Assistant State Structures Engineer - Operations
- State Geotechnical Engineer
- State Materials Engineer
- State Hydraulics Engineer
- Division Construction Engineer (Three Year Appointed Term)
- Division Construction Engineer (Three Year Appointed Term)
- FHWA Division - Structural

The Structures, Construction and Geotechnical Research Engineer serves in a special ex officio capacity as the Subcommittee’s Secretary.

Traffic, Safety and Roadway Design Subcommittee Membership

Committee membership is comprised of the following permanent assignments, except as noted:

- State Traffic Engineer (Chair)
- State Roadway Design Engineer (Vice Chair)
- State Systems Operation Engineer

- State Traffic Management Engineer
- State Traffic Safety Engineer
- Transportation Planning Branch – Head – Technical Services Unit
- Director – Safety & Risk Management
- Division Operations Engineer (Three Year Appointed Term)
- Division Operations Engineer (Three Year Appointed Term)
- FHWA Division – Traffic Operations and Safety

The Traffic, Safety and Roadway Design Research Engineer serves in a special ex officio capacity as the Subcommittee's Secretary.

3.2.3 Research Project Steering and Implementation Committees

Definition and Responsibilities

A Research Project Steering and Implementation Committee (StIC) is appointed for each research project. Responsibilities of the StIC include establishing initial project expectations and implementation actions; evaluating overall progress on specific projects; reviewing progress reports, interim reports, draft final reports and other official project related documents; participating in project Kick-Off, progress and Close-Out meetings; advancing technical aspects of projects and investigations including technology transfer and implementation activities.

Research StIC Committee meetings are scheduled by the R&D Unit staff in conjunction with the StIC Committee Chairperson at appropriate intervals to ensure the understanding of the project's goals, objectives and methodology. The StIC Committee Chairperson is responsible, in cooperation with the State Research Engineer, for approval of budget adjustments, project scope, personnel modifications and extensions of contract periods.

Membership

Each StIC Committee Chairperson is appointed by the State Research Manager in conjunction with NCDOT management and the R&D Unit staff. The generator of a particular Research Need Statements or an RFP is commonly, but not always, the chairperson of the project StIC.

The StIC Committee Chairperson

- Helps select appropriate StIC Committee Members for the project;
- Works with the R&D Unit to review specific researcher requests for out of state travel, equipment purchases or other items not itemized in the original project budget;
- Reviews and approves changes in the professional research team, including adding a subcontractor(s) or changing PIs;
- Works with the R&D unit to review and approve the use of surveys and questionnaires;
- Recommends approval or denial of modifications to Project Authorizations including material changes or simple extensions;
- Approves project deliverables or recommends action to the rest of the committee;

- Helps develop an implementation plan for project results and oversees implementation of project results or works to identify a champion for implementation;

The remaining members of the Research StIC are recommended by the participating Departmental Unit, the appointed StIC chairperson and R&D Unit staff. Membership in the StIC is not limited to Department personnel. Stakeholders from the FHWA, state and federal regulatory agencies and local governments are encouraged to participate. Each StIC member is selected to provide additional or special expertise in a specific technical area. It is important for the right people to provide good quality and specific feedback. All funded research projects that involve Information Technology (IT) will have a Department IT representative on the StIC. Additional IT policies and cybersecurity information will be included in this manual as the policies are created and may be added to project authorizations as addenda.*

4.0 Research Engagement, Partners, Customers & Transportation Research Centers

The R&D Unit continually strives for enhanced engagement with research customers and partners through forums, departmental functions, transportation research centers, rapid technical assistance and the R&D Library.

4.1 Customer Support

The programs, projects and products of research are intended be of benefit to Departmental employees and contractors, the users of the transportation network, and to other transportation agencies. Attaining this objective requires the support of these customers. Their support can best be achieved by involving the customers in the process of developing the program and generating the products. This assures that the customer needs and satisfaction are considered at all times.

4.2 Research Partners

Research partners come from within the Department, North Carolina's universities, companies affiliated with transportation (vendors, contractors, etc.), private engineering firms, other State DOT's, local governments, legislative personnel, local and national government regulatory agencies, FHWA, AASHTO, NCHRP and the public. The level of involvement of these various partners will vary throughout the research and development process. Successful implementation will depend on successful engagement of all research partners.

Gaining and maintaining support of beneficial research partners is crucial to the R&D program. Maintaining relationships established with the Department's operating units, university research centers and universities and faculty, local governments, other State Departments of Transportation, the FHWA and the public requires continuous effort.

4.2.1 Forums for Partner Inclusion

The R&D Unit interacts with various partners on an ongoing basis to drive the content of the research program. Meetings, consultations, electronic contacts and other opportunities are scheduled for input on specific critical and emerging transportation research issues. These interactions are solicited during predetermined annual cycles and periodically throughout the year to identify both specific research topics and to understand broader, strategic research issues. Interaction with each Departmental Unit is critical to advance the understanding of issues and to promote research efforts for the Department.

In addition to seeking feedback on the direction and goals of the general research program, the R&D Unit participates in Unit and Division staff meetings to educate Departmental personnel about the research program, solicit research ideas and identify potential project champions.

Institutional discussions with the Universities and other governmental representatives are conducted for both educational purposes and to aid researchers in submitting high quality proposals.

Input for the development of the annual work program is obtained from public/private meetings, institutional discussions, solicited feedback and formal research needs solicitation processes. Any

formal seminars or other formal events are scheduled with the approval of the Technical Services Director and/or the REC as needed.

4.4 Participation in Departmental Functions and Support of Research Centers

The R&D Unit staff will participate as requested as regular members in important Departmental functions, task forces and committees. Departmental inquiries are assigned to the R&D Unit as the need arises. The inquiries may include up-to-date literature searches and/or current state-of-the-art practices on particular Departmental, legislative, fiscal and policy issues. The Unit responds to assignments directed by the REC in addition to assisting with requests directly from NCDOT staff.

The R&D Unit is involved with and supports the activities performed by transportation research centers in North Carolina. These research centers include, but are not limited to the [University of North Carolina Highway Safety Research Center](#) (HSRC), the [Institute for Transportation Research and Education](#) (ITRE) at NC State University and the [Transportation Institute](#) at North Carolina A&T University.

The HSRC provides a prominent role for contract research with the [Governor's Highway Safety Program](#) and the [National Highway Traffic Safety Administration](#). The R&D Unit works with NCDOT customers to engage the HSRC in SPR funded contract research or in research and training activities using other funding sources. The R&D Unit acts in concert with the Governor's Highway Safety Program to ensure maximum attention to research projects directly related to enhancing the safety of the traveling public.

In addition to being a source of Research and Training, ITRE provides an important technology transfer role as the manager of the [federal local technical assistance program](#) (LTAP) for North Carolina and conducts significant amounts of training for NCDOT staff.

4.5 Rapid Technical Assistance Program

The Rapid Technical Assistance Program is designed to provide technical support for the Department's staff on matters requiring additional expertise or specialized laboratory testing. The referrals are limited to 80 hours of consultation between a Department official and a designated faculty member for a particular subject. NCSU-ITRE manages the technical assistance referrals in coordination with the State Research and Development Manager. Researchers may be engaged from any state supported school or with private consultants as needed. A standard Technical Assistance Request form is used to document and contract with individual researchers or consultants. (See [APPENDIX B](#))

5.0 Research Program Development

The R&D Unit works with NCDOT customers and external partners to produce an annual work program. This program consists of contracted research with universities and non-profits and commitments of funds to Federal and national programs. The program is approved initially by the Research Executive Committee and then by the FHWA NC Division Office.

5.1 Annual Work Program Cycle

The Research & Development Work Program is initiated on a fiscal and academic year basis. The Department's fiscal year begins on July 1 and ends on June 30. Research Projects typically begin on August 1 of each fiscal year to correspond with university academic years. The annual work program is supported with federal aid SPR funds, state matching funds, special federal aid grants and one hundred percent state funds. Certain activities, such as pooled fund participation, may be eligible for 100% SPR funding.

The NCDOT Transportation Planning Branch produces a work program for planning funds (SPR Part I), while the research component (SPR Part II) is prepared by the R&D Unit as required by [23 CFR Part 420.207\(a\)](#). Elements of the research program include, but are not limited to, staff research administration, contract research project authorizations, formal intramural research investigations, FHWA and regional [pooled funds projects](#), demonstration projects, [federal aid experimental evaluation studies](#) and other special studies.

Contract research Project Authorizations and formal intramural research investigations are developed for each project's total period of performance. Contract research projects must comply with the provisions, terms and conditions set forth in the Master Agreement signed by each participating university. Budget authorizations are prepared for the total period of performance of each project and are structured by fiscal year. Budget authorizations shall reflect the maximum permissible costs per fiscal year. Line item adjustments are allowed with proper documentation and justification and written approval by the appropriate NCDOT representative.

Contract research project authorizations are the products of a formal process. This process includes problem statement needs determinations, literature reviews, comprehensive proposal reviews, preliminary implementation analysis, and overall prioritization of need and urgency in the context of NCDOT operations.

The goal of the prioritization and selection process is to produce the best collection of projects for the Department's work program.

The following are the basic elements for work program development:

- Research Need Statement solicitation from NCDOT Employees
- Advertisement to University Researchers
- Preparation and submission of Preliminary Proposals by Researchers
- Simultaneous submission of researcher generated Research Needs Statements and proposals
- Evaluation of Preliminary Proposals by the R&D Unit and technical subcommittees

- Recommendations for creation of more detailed full proposals with corresponding notice to researchers.
- Evaluation of Full Proposals and compiling of recommendations for REC evaluation
- Submission of draft work program for REC approval
- Requesting of final proposal and project authorization documents for selected projects
- Submission of Work Program for federal approval
- Sign and return project authorization (PA) documents
- Initiation of projects
- Project Kick-Off Meetings

5.2 Research Solicitation Process

Purpose

An annual request for specific Research Needs is sent out to all NCDOT staff each spring by the R&D Manager. Nearly all aspects of NCDOT business operations are eligible for research funding. Focus is placed on helping the department achieve its strategic and business goals.

Research partners and interest groups can also provide input for general research needs. The prospective principal investigators in the academic community may submit potential problem statements and proposals within their specific fields of expertise and with NCDOT support.

Eligible activities (FHWA Guidance) include but are not limited to:

- Improving highway safety – utilizing research and development activities from an integrated perspective to establish and implement systematic measures that improve highway safety
- Improving infrastructure integrity – utilizing research and development activities to maintain infrastructure integrity, meet user needs, and link Federal transportation investments to improvements in system performance
- Researching improved materials and construction techniques
- Strengthening transportation planning and environmental decision making – utilizing research to both minimize the cost of and improve transportation planning and environmental decision making processes and minimize the potential impact of surface transportation on the environment
- Reducing congestion, improving highway operations, and enhancing freight productivity – utilizing research to address congestion problems, reduce the cost of congestion, improve freight movement, and increase productivity and improve the economic competitiveness of the United States
- Engineering and economic surveys and investigations
- Planning of future highway programs and local public transportation systems and planning of the financing of such programs and systems, including metropolitan and statewide planning
- Development and implementation of management systems, plans and processes under the NHPP, HSIP, CMAQ, and the National Freight Policy
- Studies of the economy, safety, and convenience of surface transportation systems and the desirable regulation and equitable taxation of such systems

- Research, development, and technology transfer activities necessary in connection with the planning, design, construction, management, and maintenance of highway, public transportation, and intermodal transportation systems
- Study, research, and training on the engineering standards and construction materials for transportation systems described in the previous bullet, including the evaluation and accreditation of inspection and testing and the regulation and taxation of their use
- Conduct of activities relating to the planning of real-time monitoring elements

5.2.1 RNS Solicitation Process

Annual Cycle

The RNS solicitation process is executed on an annual basis. Official solicitation requests are distributed to Department branches, units and field divisions annually during May, June and July. However, research needs statements are accepted at any time throughout the calendar year. **All NCDOT staff members are encouraged to submit research needs statements.** Solicitation is conducted electronically via NCDOT News Distribution, Research and Development Newsletters and direct emails to key personnel.

Research need statements may be submitted at any time throughout the year. However, advertisement to researchers will occur during the next upcoming fiscal year's work program. For example, if an RNS is submitted in December, it will be considered for development in the following August, 9 months later.

If the research need is urgent, a Request for Proposals (RFP) may be developed and considered for contingency funding on an out-of-cycle basis.

RNS Forms

A Research Need Statement form and associated instructions will accompany all solicitations and be posted on the R&D Connect website. (See [APPENDIX C](#)). The final deadline for the return of these needs statements will generally be in late July of each year. The research need statements shall be submitted in electronic format per the attached instructions. Upon receipt of the research needs statements, the R&D Unit staff performs initial reviews of submissions, prior to distribution to potential researchers.

RNS Evaluation

The R&D Unit staff may discuss the individual needs statements with each submitter as needed. This discussion examines the conditions or circumstances under which a specific need or problem exists. If helpful, the R&D Unit staff involves the management of other units that may be affected by the research needs statement to expand or clarify the problem. Discussions may be held to determine if the needs statement topic improves the operation of these units.

From these discussions and from a literature review, the R&D Unit may decide, along with the associated Departmental Unit, to defer taking further action on any specific needs statements due to recently completed or other current related research. In addition, the R&D Unit may defer further action because the affected operating unit(s) cannot alter current practices. A written disclosure from

the State Research Engineer to the appropriate officials within the Department and, as appropriate, to the universities and other external agencies will accompany any deferral.

RNS submissions are accepted from outside the Department and affected Departmental units are asked to assess the study's potential benefits and implementation potential. The R&D Unit staff may conduct a TRID literature search on any suggested topic to look for duplicate research efforts and explore the current state of the art. This information aids in avoiding unnecessary duplication of ongoing or completed research and enhances the scope of the specific problem statement.

RNS Distribution to Researchers

Research needs statements are made available via the [NCDOT website](#) and electronic mail. Potential researchers should contact the appropriate Departmental Unit and RNS submitter for feedback and to have questions answered as they prepare proposals.

5.2.2 Criteria for a Successful Needs Statement

Successful Research Need Statements are created with the following criteria in mind:

- Is the subject of the proposed research currently being studied, either at the state or national level?
- Does it appear that the research would fill a void in the basic level of understanding of the subject?
- Does it appear that the research would yield a payoff?
- Does the research concept respond to new and/or potential changes or lead to potential changes in state or national policy?
- Does the research concept relate to provisions of federal or state legislative initiatives?
- Does the research concept respond to technological changes, or lead to potential changes that would help the Department better fulfill its mission?
- Does the needs statement assist in obtaining permits from regulatory agencies?
- Does the research concept address an area that will improve safety or environmental conditions?
- Is the concept stated clearly and does it introduce an idea that could result in a research project that could be supported by the Department?
- If the concept was submitted by Department personnel, is there a researcher (or researchers) in the University system that would be suggested as a possible Principal Investigator(s)?
- If this concept is developed into a formal research project, is there someone from the Department willing to serve as the Research Project StIC Chairperson and implementation champion?

5.3 Preliminary Proposals

Universities and researchers are encouraged to submit brief, no more than 7 page, preliminary proposals to address specific research need statements. Researchers are also encouraged to submit their own research needs statements and preliminary proposals concurrently. The preliminary proposal will enable the Research Subcommittees to formally review the research needs statements in concert with the preliminary proposals. The typical format for preliminary proposals, with associated instructions, can be found in [APPENDIX D](#).

The R&D Unit compiles and distributes the Research Needs Statements along with the coinciding preliminary proposals and comments into an electronic PDF document which is distributed to each of the subcommittees for evaluation. The research Subcommittees use the above criteria to judge the technical merits of the preliminary proposals using a standard review form with associated instructions. The R&D Unit schedules evaluation meetings for each of the technical subcommittees.

These meetings are held in September – October each year to review each preliminary proposal and recommend actions to be taken. Subcommittees can recommend solicitation of a full proposal; defer preliminary proposals or recommend for national project development. The R&D Unit prepares the subcommittee meeting minutes and distributes to the appropriate parties.

5.3.1 Preliminary Proposal Evaluation Criteria

Preliminary proposals are evaluated to identify those that warrant further consideration and development into detailed full proposals. Evaluation is conducted through the appropriate Research Technical Subcommittee. A preliminary proposal evaluation form and associated instructions is provided to each Subcommittee member (See [APPENDIX E](#)). Subcommittee members are encouraged to provide suggestions to amend preliminary proposals to better capture department needs and/or clarify the research proposed. Preliminary proposals are evaluated by the assigned Research Subcommittees in accordance with, but not limited to, the following criteria:

- Does the research topic directly address immediate or strategic Department needs and concerns?
- Have clear products of the research been identified and are these product(s) feasible?
- Are specific ways of implementing these product(s) identified?
- Are the objectives of the proposed research clearly defined and realistic?
- What are the consequences of not conducting the research?
- Who within the Department will use the product(s) and how?
- What will it take for our customers to implement and use the product(s)?
- Are the budget and time reasonable and appropriate for the proposed research?
- Will the implementation of research results be cost-effective for the Department?
- Does the researcher have a good track record of performing quality research?
- What resources will the Department need to provide in order to conduct the research?

The Research Subcommittee members may recommend a proposal for consideration at the national level if better suited for [NCHRP](#), [NCHRP Synthesis](#), or national [pooled fund studies](#). If a preliminary proposal is not advanced, appropriate feedback to the researcher will be transmitted.

5.4 Full Proposals and Project Selection

Once the subcommittees have provided recommendations, the R&D Unit Manager notifies prospective principal investigators in writing of the preliminary proposals that have been recommended for development into full proposals. Full proposals are written according to the specific format requirements noted below and per any additional R&D Unit guidance. Prospective researchers must address comments and suggestions provided by the Research Subcommittees as part of the preliminary proposal review process.

5.4.1 Full Proposal Format

Full Proposal research documents are developed in the project authorization format. The principal elements of a full proposal are as follows (See [APPENDIX F](#) for additional details).

- Cover Page
- Executive Summary Page
- Table of Contents
- Formal Statement of Work
- Budget Authorization Page
- Justification of Budget Line Items
- Breakdown of Effort
- Federal Assurance Documents (if required)

5.4.2 Full Proposal Evaluation Criteria

The R&D staff compiles and distributes electronic copies of the full proposals to the members of the respective Research Subcommittees. Selected other key Departmental staff with a direct interest, for example needs statement generator and/or unit head, and are also requested to participate in the evaluation process. By mid-October, the Research Subcommittee members evaluate the respective documents using a standard evaluation form, guidance document and score sheet (See [APPENDIX G](#)) Basic evaluation criteria may include but are not limited to:

- Clear Understanding of the Problem Statement
- Organization of Proposal
- Quality of Literature Review
- Research Methodology
- Proposed Data Collection Techniques
- General Readability
- Grammar, Spelling and Punctuation
- Full Proposal Cost versus Value

The subcommittee members may also comment on items such as:

- Budget reasonableness (sufficient or insufficient based on past experience)
- Should Period of Performance be increased or decreased?
- Should the Scope of Work add or delete tasks?

5.4.3 Full Proposal Recommendations

The Research Subcommittee members rank their respective full proposals based on urgency, need and priority. Technical Subcommittee meetings are held to discuss the compiled rankings and comments. Often, top projects will receive a clear priority and high ranking. For those projects for which the members' evaluation responses do not reveal a consensus, discussion during committee meetings are used to evaluate the relative merits of the proposals. If necessary, major deficiencies in full proposals are identified and returned to the submitters for revision. Efforts are made at this time to identify persons in the Department who may provide an important role as the StIC Committee Chairperson for the individual candidate research projects.

The R&D Unit staff is responsible for compiling the information from the reviews of the candidate full proposals. Sometime in January (scheduled is revised annually), a ranked list of all full proposals in each technical program area is prepared for submission to the Research Executive Committee. The R&D Unit distributes the compiled information to the REC and schedules the REC meeting.

5.4.4 REC Research Program Review

The Research and Development Staff generates a synopsis of each candidate full proposal and the StIC recommendations for funding. Projects in each technical area are prioritized by the appropriate subcommittee during the Full Proposal review phase. Recommendations are provided to the Research Executive Committee (REC) members in January. The REC typically meets in February to approve, deny, or modify the recommendations.

The REC is provided details of the contract research project development process and reviews the goals and strategies of the Research & Development Work Program, the budget projections, the recommendations of the Research Subcommittees, and recommends a final prioritized list of projects within budget constraints.

This robust selection and prioritization process is designed to produce the best collection of research projects that the Department can develop for each annual work program.

5.5 Project Authorization Contract Documents

Following the REC meeting, the R&D Manager notifies researchers with selected projects of the meeting results. The researchers then submit formal project authorizations to the R&D Manager. The formal project authorization, per the terms of the Master Agreement with each University, serves as the contract for the research project (See [APPENDIX H](#)). The project authorization consists of the full proposal, amendments that address provided comments, and a formal signature cover page.

For projects not selected by the REC, the R&D Manager will notify the researchers and include a brief explanation of reasons the project was not selected for funding.

The R&D Unit Staff reviews the project authorizations for proper adherence to budgetary guidelines and that all documents are complete and accurate. The project authorizations are provided to the Director of Technical Services for signature and formal execution of the contract.

Approval from the FHWA Division Office is obtained prior to NCDOT signature and execution.

5.5.1 Title VI Responsibility

The R&D Unit will comply with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C 2000d-42 and all requirements imposed by or pursuant to [Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21](#), Nondiscrimination in Federally-Assisted Programs of the Department of Transportation-Effectuation of Title VI of the Civil Rights Act of 1964 and other pertinent directives. (See [APPENDIX I](#))

5.6 Work Program Submittal for FHWA Approval

The annual work program will be submitted by the R&D Unit to the FHWA Division Office prior to the beginning of the state fiscal year (July 1), typically in April. This document outlines the expected expenditure of resources in the upcoming fiscal year on a technical and financial basis. At a minimum, the work program will include

- A summary of work program costs
- A list and executive summaries of each new project
- A list and executive summary of continuing research projects
- A list of expected pooled fund participation and costs
- A break-down of in-house research costs, including but not limited to
 - a. Staff Research
 - b. Library services
 - c. Technology Transfer and Training
 - d. National Program Support (NCHRP/TRB/SHRP Etc.)
- A list of non-SPR II funded projects is also be provided to as stated in 23 CFR Part 420.207(b)

The federal research, development and technology work program requirements are contained in [Title 23 Code of Federal Regulations \(CFR\) Subchapter E Part 420](#). The R&D Unit will comply with all federal requirements listed in the above referenced CFR.

5.7 Proposals for National External Consideration

The R&D staff may assist NCDOT business units in preparing NCHRP and TCRP problem statements, NCHRP synthesis of practice submissions, and FHWA pooled funds study submissions. Processes and procedures for these submittals are posted on appropriate websites.

5.8 Internal and Demonstration Research

The research staff may conduct investigations and inquiries into specific subjects as directed. These specific elements may be developed into formal internal research investigations or demonstration projects as necessary. Formal intramural research investigation work plans are prepared by the R&D Unit staff and the appropriate NCDOT Business Unit. These work plans apply to experimental evaluation projects and to demonstration projects as well.

5.9 Pooled Fund Participation

DOT employees may contact the R&D Manager to request participation in National Pooled Fund studies (<http://pooledfund.org>). Participation will be contingent upon management support and availability of SPR Part II funds.

6.0 Program Management and Reporting

Management of the research effort focuses on results and customer benefits with an emphasis on implementation. As projects progress, information must also be captured to monitor the status of the project and to provide supporting documentation to process invoices.

Proper reporting on individual projects is critical for the evaluation of the entire research program. The process described as follows applies to formal contract research projects and, as appropriate, to intramural research investigations.

6.1 Project Kick-Off Meetings

Each formal research project will begin with a Kick-Off Meeting scheduled by the assigned PM. The meeting will be held within thirty (30) calendar days of the project start date. The purpose of the Kick-Off Meeting is to introduce the researcher to the StIC, the PM and other interested parties. The researcher presents the projects proposed methodologies, tasks and timelines.

It is critical in the Kick-Off Meeting for both the researchers and the StIC reach a mutual understanding of how the project will proceed, action items, items to be furnished by the Department and implementation measures.

6.2 Project Progress Meetings

There are no formal procedures for project progress meetings, however these are important tools for assuring the Department is receiving quality deliverables and that the project is staying within the agreed upon scope of work. Research Project Engineers will coordinate and schedule meetings to discuss progress as needed and/or at the request of the project StIC chair or Principal Investigator.

6.3 Quarterly Progress Reports

The purpose of the quarterly progress report is to provide a succinct summary of the work performed over the quarter for the research committee members. The implementation process is aided by the exchange of information beginning with clear, concise and thorough quarterly progress reports. These reports detail the accomplishments and deliverables status for a research project. They also provide a record of expenditures used to validate and process invoices.

6.3.1 Requirement for Quarterly Progress Reports (QPR)

As specified in each Master Agreement or Research Contract, quarterly progress reports are submitted via email to the assigned NCDOT Project Manager by the last day of each quarter (March 31, June 30, September 30, and December 31) using a standard format (See [APPENDIX J](#)). The assigned PM will review and distribute the reports to the individual StICs. **Invoices will not be paid without a suitable QPR.** QPRs assist in the R&D Unit's compliance with [23 CFR Part 420.209\(a\)\(3\)](#).

6.3.2 QPR Technical Status

Project tasks outlined in the project authorization document are identified in the work progress summary. Each major research task results in a milestone. Steps taken to reach the milestones may take the form of a laboratory investigation phase, a design of the installation or a prototype, an installation or prototype completion, data collection completion, a specification, a summary report, software development, model development et cetera. The QPR must discuss the significance of the accomplishment with respect to overall project completion and implementation.

The planned start and completion dates are provided for each of the tasks as well as percent completion.

Financial, staff, equipment and technical problems are discussed as they affect the individual tasks. Their resolutions, or attempts at resolution, must also be included in the report. The QPR must also include work scheduled for the next quarter.

6.3.3 QPR Financial Status

The summary table describes the budget authorization line items and quarterly expenditures. Researchers must submit cumulative fiscal year expenditures by listing each line item shown in the Project Authorization document and provide a best estimate of cumulative expenditure to date. Printouts from university fiscal offices are not accepted.

6.4 Project Close-Out Meetings

Closeout meetings are held for each research project with a focus on accomplishments of the project and moving forward into an implementation phase. Researchers and employees may be assigned tasks and responsibilities to facilitate implementation as needed. Attendees at closeout meetings include members of the Research Project StIC, R&D Unit staff, members of the applicable university research team, interested parties and other key Department personnel. The closeout meeting may afford the research project StIC with opportunities to present their implementation plans to Department's management.

6.5 Project Final Reports

The Project StIC Chairperson and committee members for a contract research project are informed of the project findings prior to the issuance of the final technical report. The final technical report is required as part of [23 CFR Part 420.209\(a\)\(6\)](#) and is expected to be a complete, formal document representing the methodology and findings of the research study. The R&D Unit sends notification to the FHWA Division Office for prior to publishing final technical reports.

6.5.1 Final Report Procedure

As required in Master Agreement, the principal investigator shall submit an electronic copy of the draft report to the R&D Unit within forty-five (45) calendar days of the project completion date. The assigned PM will provide final report instructions to the researcher within forty-five (45) calendar days prior to

project end date. The assigned PM will review the draft final report to assure reporting requirements are met and distributes it to the StIC and possibly other interested parties for review and comments. After the StIC has provided comments and conditions for approval the assigned PM will submit these to the project researcher.

Comments for revision and conditions for approval are provided to the researcher within the following thirty (30) calendar days. The principal investigator is required to incorporate the germane comments for revision and meet conditions for approval and return the approved final technical report manuscript within a period of thirty (30) calendar days. The final report will be due within the time period stated in the master agreement following the project close-out meeting. *Each researcher should review the university master agreement to assure deadlines for deliverables are met.* The R&D Unit staff facilitates the electronic and multi-media distribution of the final reports.

The R&D Unit staff prepare a notification letter to the FHWA office that a final report has been completed and distributed. The notification letter includes a short summary of the project along with implementable results and conclusions. In addition, the notification letter contains an internet link to final report.

6.5.2 Final Technical Report Format

The body of the final technical report is prepared according to a general format. The final technical report may be assembled in more than one volume. The general format for the final technical report body is:

- NCDOT Final Report Cover Page
- Title Page
- Technical Report Documentation Page (Form 1700.7), including an Abstract ([APPENDIX K](#))
- Disclaimer
- Acknowledgments
- Executive Summary
- Table of Contents, List of Tables, List of Figures, etc.
- Introduction
- Result of Literature Review
- Report Body
- Findings and Conclusions
- Recommendations
- Implementation and Technology Transfer Plan
- Cited References
- Bibliography
- Appendices

Unless previously discussed and approved by the StIC Chair, the main body of the report should be no more than 60 pages with key data, charts and tables included in addition to analysis and recommendations. Additional raw data and other detailed information should be included in the

appendices of the report or a separate volume. Appendices or data volumes are not limited in length, but should be well organized and provide clear benefit to the document.

The standard disclaimer statement used in a federally funded project report is as follows: *“The contents of this report reflect the views of the author who is responsible for the facts and the accuracy of the data presented herein. The contents of the report do not reflect the official views or policies of the North Carolina Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.”* A similar disclaimer, but without reference to the FHWA, is included in state funded project final technical reports.

6.6 Retention Requirements for Records

2 CFR 200.333 Retention requirements for records. Retention requirements are for records such as financial records, supporting documents, statistical records, and all other non- Federal entity records pertinent to the Federal award. These records must be retained for three years after the project is final vouchered in FHWA’s FMIS system.

7.0 Fiscal Procedures

For contract research projects, the prompt handling of fiscal matters is an important daily operation of the R&D Unit. Clear fiscal procedures permit the orderly flow of information between the R&D Unit and other agencies involved with the Research and Development work program. Good communication and detailed expectations expedite the handling of accounts payable and the orderly processing of research expenditures and federal aid grant vouchers. This section provides general guidance. Further details are included in individual master agreements and project authorizations. The R&D Unit will assure that NCDOT meets all requirements found in [2 CFR 200](#) and all funding recipients comply with [2 CFR 220](#).

7.1 Review of Fiscal Documents

There are several processes in the R&D Program that require thorough review of fiscal documents. The R&D Unit reviews the fiscal documents with attention to detail and informs, at the earliest convenience, affected parties when changes and/updates are warranted.

7.1.1 Review of Project Authorization Documents

The R&D Unit reviews each submitted Project Authorization document to assure the estimated budgets meet the requirements set forth in each master agreement. Line item reviews include Personnel and Benefits and Total Other Direct costs. In addition, the Unit reviews the calculated Facilities & Administrative Costs to make sure the costs conform to the master agreements. Any proposed equipment cost over \$5,000 is addressed as needed to address Federal requirements in 2 CFR Part 200.

7.1.2 Review and Approval of Research Project Line Item Budget Adjustment Requests

During the life cycle of contract research projects, estimated budgets require line item adjustments due to changes in personnel, travel, supplies, etc. All project line item budget adjustments must be submitted to the R&D Unit for review. The assigned PM notifies the StIC chairperson, if not already aware, of the request and obtains chairperson's approval.

Project budget adjustments less than three thousand dollars (\$3,000) require an updated budget spreadsheet, a written budget adjustment justification and can be approved by the R&D Unit. Project budget adjustments that are more than three thousand dollars (\$3,000) require an updated budget spreadsheet, a written budget adjustment justification and a modified Project Authorization cover sheet. The modified Project Authorization cover sheet must be submitted in triplicate to the R&D Unit. After the required signatures are obtained, the R&D Unit will notify the researcher that the budget adjustment has been approved.

7.1.3 Review of Quarterly Progress Report Fiscal Expenditures

Quarterly Progress Reports include budget summaries for each fiscal year. In the QPR budget table, under "Current" column, researchers show estimated cumulative fiscal year expenditures. The R&D Unit reviews the estimated cumulative expenditures to date and compares the expenditures to the original or modified estimated budgets.

7.1.4 Review and Payment of Quarterly Invoices

The universities that enter into specific contract research studies with the Department are required to submit quarterly invoices.

The deadline dates for receipt of these quarterly invoices is specified in the master agreements with each university, typically 45 days after the end of each quarter.

To assure compliance with [23 CFR Part 420.113](#) invoices are reviewed by the appropriate research engineer. The review includes a line item comparison of the university invoice with the most current estimated budget. Exceeded or questionable line item charges are returned to the university for revision. The research engineer assures all project deliverables have been met for the period of the invoice. If the invoice is acceptable the research engineer initials and dates the invoice and provides a copy to the R&D Unit's administrative personnel for payment.

The administrative assistant enters the invoices into SAP or current financial management system. The Research Manager reviews and approves in SAP. This process is accomplished within thirty (30) days of receipt of the invoices, and receipt of an approved Quarterly Progress Report. After invoices have been paid, the assigned research engineer places a copy of the invoice in the appropriate hardcopy file and updates the invoice spreadsheet.

7.2 Non-Expendable Research Equipment Procedures

Equipment means tangible personal property (including information technology systems) having a useful life of more than one year and a per-unit acquisition cost which equals or exceeds the lesser of the capitalization level established by the non-Federal entity for financial statement purposes, or \$5,000.

The use of non-expendable capital equipment is often necessary for contract research studies and formal intramural research investigations. Procedures are followed in compliance with [2 CFR 200.313](#) provisions that address the use of capital equipment in federally funded programs. These procedures are a guide to the acquisition of non-expendable research equipment with state and federal funds.

7.2.1 Eligible Expenditures

Non-expendable equipment required for use on a contract research project authorization or formal intramural research investigation is considered being an eligible expenditure under the following conditions:

- Use the equipment for the authorized purposes of the project during the period of performance, or until the property is no longer needed for the purposes of the project
- Equipment is not of a nature normally used in the regular administrative or engineering operations of the University or the Department
- Equipment item is required for and are used primarily on work incidental to the contract research project or intramural research investigation
- Cost of the equipment item is reasonable as to quoted market value

Non-expendable equipment will defined solely on its basis of initial acquisition cost of \$5,000 or more. Non-expendable equipment designation will not apply to readily consumable items and to items which

have less than a \$5,000 per-item value. The R&D Unit requires contracted researchers that submit equipment line items prepare a separate justification describing compliance measures in accordance with [200.313 \(2\)\(3\)\(b\)\(c\)](#). Under the individual Master Agreements the universities with budgeted equipment items using SPR II funds must comply with 200.313 (2)(d)(e) subject to brief audits by the R&D Unit.

7.2.2 Equipment Acquisition

Non-expendable equipment acquisition is handled in either one of two ways. (1) Equipment is rented or leased by the contracting university or the supporting element within the Department from a supplier. The lower of the rent or lease option will be used. The equipment rental rate must be approved by the R&D Unit. (2) Non-expendable equipment purchases when identified in an annual project budget authorization. The principal investigator must request written approval from the State Research Manager at least thirty (30) days prior to actual purchase of the equipment. The principal investigator is required to acknowledge satisfactory receipt of non-expendable equipment in the quarterly progress report. This accounting will include equipment description and model number by manufacturer, serial number, date purchased, cost and constituent components for assembled equipment. Non-expendable equipment purchases will not be reimbursed if unaccounted for in the annual project budget authorization.

There may be instances where non-expendable equipment is assembled by the contracting university or the supporting element within the Department. University/Departmental assembled equipment covers the major alteration of an existing piece of equipment within the Department to make it useable. This non-expendable equipment purchase must be accounted for in the annual project budget authorization. Written approval from the State Research Manager will be required for all component parts exceeding \$5,000. Assembled non-expendable equipment and partly assembled non-expendable equipment will become the property of NCDOT upon conclusion of any contract research project authorization. The contracting university may elect to dispose of such equipment and credit the money as reimbursed funds to the Department and/or FHWA less a standard percentage.

It is the responsibility of the contracting university or the supporting element within the Department to ensure the safekeeping, integrity and proper use of the non-expendable equipment. Any non-expendable equipment purchased by a contracting university will become the property of the Department upon completion of the project, unless otherwise agreed upon by FHWA and the Department.

7.2.3 Equipment Disposition

As stated in [CFR 200.313\(e\)](#) upon completion of a contract research project authorization or formal intramural research investigation, researchers must contact the R&D Office for disposition instructions. If R&D Office does not require the return of equipment with a current per unit fair market value of \$5,000 or less it may be retained, sold or otherwise disposed of with no further obligation. If the fair market value of equipment exceeds \$5,000 the *researcher must consult the Department and FHWA to determine disposition*. A complete record of the non-expendable equipment is submitted to the State

Research Manager with the official report manuscript. This record includes a report of the condition of the non-expendable equipment. The State Research Engineer is required to recover this equipment within sixty (60) days or to advise the contracting University of the final disposition of the equipment, unless otherwise stipulated in the Master Agreement.

7.3 Funding External Obligations: Pooled Fund, TRB, NCHRP, AASHTO TSP, and Others

NCDOT participates in several external programs for which the R&D Unit manages funds and/or agency contacts. Estimates for these funds must be included in the Annual Work Program.

A brief description of the typical external obligations:

7.3.1 Transportation Pooled Fund Program

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

Managed by FHWA, this program allows states to pool research dollars to tackle larger topics than can typically be addressed in their individual programs. A single state or FHWA acts as the lead agency and handles contracts with researchers and travel for steering committee members.

Pooled fund projects may be of almost any duration, with 2-5 years being common. Participating agencies can typically use 100% SPR funds via a direct transfer mechanism handled by the FHWA division office. Transfer request forms can be found on the website. It is imperative that funding levels be checked before creating a transfer. If in doubt, the Federal Funds Management section should be consulted.

Participation in a pooled fund is typically requested by a NCDOT business unit manager. Funds are allocated on a first-come, first-serve basis by the Research Manager. In cases where funding requirements are particularly large or the amount of SPR funds available is limited, the Research Executive Committee may prioritize participation. The business or technical expert on the steering committee for the project may often travel once or twice a year at the expense of the Pooled Fund project. The role is similar to any research StIC.

Annual Participation costs for Pooled Funds can be as low as \$5000 per year or as high as \$300,000 for large programs such as the National Center for Asphalt Testing. Most are in the \$10,000 to \$30,000 per year range.

7.3.2 Transportation Research Board Core Program

NCDOT has historically been an active member of TRB with many employees participating in committees and research projects. The annual contribution to the core program provides NCDOT with the following benefits:

- No conference fees for the TRB Annual Meeting
- Travel Costs paid for the TRB Representative, TRB Standing Committee Chairs and up to 2 committee members per year.

- Allows participation in TRB standing committees. These committees work to coordinate research efforts on both a national and international basis, and provide learning and networking opportunities for NCDOT employees.
- No-cost participation in TRB Webinars. Many of these webinars provide professional development credit to engineers and planners. NCDOT employees simply have to register using an ncdot.gov email address
- Copies of all NCHRP and TRB reports at no additional costs with free web-access to NCDOT employees.

Annual dues are based on the states federal allocation and TRB budgetary needs. Payment is carried out by either check or Pooled Fund Transfer. Pooled Fund Transfer is preferred as it allows the use of 100% SPR funding. Annual cost is typically \$170,000 +/-

7.3.3 National Cooperative Highway Research Program

[NCHRP](#) is coordinated by both AASHTO and TRB and is focused on research of national or regional importance. Much like the pooled fund process, it can often tackle projects of a larger nature and also engages national research resources. An annual program, made up of statements generated by state and federal agencies, is assembled, prioritized and voted on by all state agencies. States submit candidates to serve on panels (steering committees) for each project.

NCHRP is typically funded through the Pooled Fund transfer process. At this time, NCDOT splits the cost 75% / 25% between planning and research funds (SPR I and SPR II). Total cost, based on annual federal allocations, averages \$1-\$1.2 Million.

7.3.4 AASHTO Technical Service Program (TSP)

<http://www.transportation.org/Pages/Programs.aspx>

The R&D Unit coordinates participation and payment for several AASHTO products. These are typically paid directly by check. Participation is triggered by request from an NCDOT business unit. Upon receipt of each annual invoice, the R&D Unit confirms continued participation with the requestor. Costs are variable, however typically range from \$5,000 to \$20,000.

7.3.5 Other Programs

NCDOT often participates in other programs such as LTPP (Long Term Pavement Performance) and SHRP/SHRP II (Strategic Highway Research Program). These programs typically have their own funding and participation requirements, and after require consultation with business units and senior leadership.

8.0 National Report Distribution and TRID Database Searches

The [Transportation Research International Database](#) (TRID) is currently the most comprehensive repository of literature on all subjects in the field of transportation. The TRID database provides the R&D Unit access to the technical background on transportation and highway issues under investigation on a national level and also provides others outside the agency with information on the Department's research and development activities.

Technical information dissemination to Department staff is a major element of research and development support. The R&D staff performs literature searches when requested and as needed to support the development of the work program. An analysis of research needs statements and informational requests consider the literature available in TRID as defining the subject state of the art. The R&D Unit Library maintains direct on-line access to TRID through a subscription with the DIALOG Information Services for the program to comply with [23 CFR Part 420.209\(a\)\(4\)](#). The R&D Unit updates its project entries on a semi-annual basis and posts relevant deliverables at the appropriate time.

8.1 Reporting to TRID Database – Research In Progress (RIP)

Ongoing research activities are reported annually or as needed to the TRID-[RIP database](#). The reporting includes the status of projects, project abstract and summaries, and significant technology transfer and implementation activities. All completed reports are uploaded and documented in the TRID database.

8.1.1 Keywording

A search of the TRID database for information on a subject starts with the selection of the appropriate keywords. A selection of keywords is made after discussing the subject with a prospective customer. The search is structured so that the information made available to the customer or user adequately covers the subject and is current.

8.1.2 TRID-Based Literature review

A collection of the findings is developed from the abstracts returned from an informational search. This serves as the basis for defining further investigations of a subject. If the search is made as part of the literature review process at the outset of a project, this collection serves as background material for the prospective research project. As part of preliminary and full proposal literature reviews are required from the potential researchers. The R&D Unit will conduct a TRID literature search review to assure there is no duplication of research and report any relevant findings to the affected party.

8.1.3 Additional Data and Information Sources

A review of the abstracts generally leads to a greater level of technical knowledge, additional keywords and the possibility additional informational systems are to be accessed.

The R&D Unit's Library and technical reference services include inquiries to other transportation information repositories such as the Northwestern University Transportation Library at Evanston,

Illinois. The Unit's Library provides document locator service, interlibrary loans, and abstract retrieval services for all Departmental personnel.

8.2 Transportation Library Distribution

The R&D Librarian distributes hard copies and electronic copies of final reports to the State of North Carolina Publisher's Clearinghouse and provides electronic copies to the Federal Highway Administration Research Librarian, Office of Corporate Research, Technology, and Innovation Management, National Transportation Library, National Technical Information Service, Transportation Research Board and Transportation Library, Northwestern University.

The R&D Unit also continues to enhance and update its Internet Homepage to provide vital and timely informational services.

9.0 Research Peer Exchange Process

The Peer Exchange process is one technique designed to improve the quality of the program. It examines the deliverables of the R&D Unit through the management process. A panel, with knowledge of state research programs, will bring expertise to the Unit, assess the research process and advance recommendations for enhanced performance.

Peer Exchanges are designed to permit the Department to interact with other states on a formal review basis. This provides an opportunity for direct involvement with other transportation research professionals. The R&D Unit staff gains knowledge from and provides guidance to other agencies on the research process.

The R&D Unit will provide information necessary for peer exchanges to comply with [23 CFR 420.205 Subpart B \(b\)](#). The peer exchange team will prepare a written report of the exchange as per [23 CFR 420.209\(a\)\(7\)](#).

9.1 Peer Exchange Participants

The Department is responsible for selecting and organizing the peer exchange team. The peer exchange representatives are typically from the FHWA, universities, the Transportation Research Board, the private sector and the research programs from other states. The peer exchange team is expected to spend at least two days with the staff of the R&D Unit.

The R&D Unit will provide other states the information and documentation required to be collected and maintained under this subpart. Travel and other costs associated with the R&D Unit's peer exchange will be identified as a line item in the State DOT's work program and be eligible for 100 percent Federal funding.

When planning peer exchanges, the R&D Manager should investigate whether a pooled fund mechanism may be in place that allows for travel expenses to be managed independently from the agency, simplifying the travel process.

9.2 Peer Exchange Report

The peer exchange review team is required to prepare a closeout report for the Department as stated in [23 CFR 420.209\(a\)\(7\)](#). The report will summarize the discussions, itemize the findings and reiterate the recommendations discussed with the R&D Unit. Copies of the report are filed with the Transportation Program Management Manager, the R&D Unit, the Secretary of Transportation and the FHWA Division Office.

9.3 Meeting Frequency and Location

The R&D Unit will schedule a peer exchange approximately every four to five years. These peer exchange meetings are held at the Department's Headquarters or a suitable alternative.

9.4 Analysis of Peer Exchange

The peer exchange is conducted for the benefit of the R&D Unit. It is designed to improve the research and development process. The recommendations of the peer review team are reviewed with the R&D Unit staff and an appropriate management and presented to the Research Executive Committee. . The R&D Unit makes meaningful efforts to incorporate peer review recommendations that enhance the quality of the research process.

10.0 Implementation & Technology Transfer

Formal research is described as careful, systematic study to establish facts or conclusions on a specific subject. The net result of formal research for the Department is the dissemination or application of these results. Through involvement in technology transfer as stated in [23 CFR Part 420.205\(c\)](#), the R&D Unit staff keeps the Department knowledgeable of significant milestones in transportation research.

The implementation and technology transfer efforts document the progress and achievements for the annual research and development work programs. The compilations include progressive actions to cover intervals as follows:

- During the project development stage
- At all project level meetings
- During prospective field visitations
- At any specific implementation meeting or time of decision
- End of project period of performance
- Post project follow-up

10.1 R&D List of customers

The State Research Engineer maintains a listing of internal Departmental contacts, business unit contacts, university contacts, etc. In addition, a contact list including the wider research community and other states, ancillary organizations, MPOs, RPOs and local governments and general public may be maintained as well. The list is updated on an annual basis and as personnel change notifications are received.

10.2 R&D Outreach Activities

The R&D Unit staff are active participants in outreach activities as described below:

- The progress of the contract research projects, the formal intramural research investigations, and demonstration projects are examined to ensure the deliverables are amenable to implementation, including training activities.
- The results of the research projects, formal investigations and other significant external research studies are distributed for implementation.
- The staff supports essential training activities.
- The experience of staff is made available to the operating elements of the Department for technical discussions and problem solving.
- The staff schedules technical presentations for groups in the Headquarter and field offices as needed
- The Unit's Library and technical reference services will continually be enhanced and updated to better serve the needs of the Department, including providing a website, SharePoint, newsletter and other media services.
- The results of high-value research from other agencies and publications are made available to other operational units.
- Information on FHWA Demonstration Projects is disseminated to Department's staff and reviewed for potential benefit and involvement.

- The R&D Unit staff is actively involved in the promotion, installation, and analysis of experimental features in construction.
- The R&D Unit staff actively participates in special events and seminars that involve potential partners in the research process.
- The R&D Unit uses the resources and staff of contracted universities and faculty to promote the utilization of research findings.
- The R&D Unit staff attends important regional and national meetings and disseminates the findings to the Department.
- The R&D Unit staff develops and distributes a quarterly research newsletter to update Departmental personnel and researchers of recently completed projects and library resource updates.
- The R&D Unit staff tracks project implementation efforts on a semi-annual and annual basis.
- The R&D Unit staff maintains an implementation database for tracking implementation milestones and progress.

10.3 Implementation Champion and Responsible Unit

As part of a successful research program, someone must oversee implementation of research project results. This person may be the StIC chair, but it may also be another individual in a principally engaged unit. The responsible unit and champion should be identified early in the project development cycle.

The Research Unit manages NCDOT's research and implementation programs, including coordinating the development of annual programs, developing and managing research and implementation program budgets, providing technical and contracting support to all research committees, tracking and supporting the implementation of research results, completing required state and federal reports, maintaining relevant policies and procedures and reporting program status to the Research Executive Committee.

The Research Unit Manager executes all research and implementation Project Agreements for NCDOT, based on project approvals discussed earlier in this chapter and working with the Technical Services Director, approves the use of research contingency funds for unforeseen research needs.

10.4 Implementation Status Reports and Actions

The R&D Unit staff compiles summary data describing research project implementation activities as stated in [49 CFR 209\(7\)\(b\)](#). This information is obtained from Implementation Status Reports (See [APPENDIX L](#)). This document is distributed to each StIC Chairperson and/or business champion. There must be a continuous process for assessing and recognizing implementable results from contract research projects. The summary report is distributed to the appropriate Research Subcommittee members and to the REC members.

The R&D Unit staff assists the StIC Chairpersons and other key Department staff with decisions regarding research implementation actions and technology transfer. These efforts include the following:

- Decisions relative to design or retrofit of technical features involving the use of research findings

- Decisions for the selection of further experimental or demonstration type projects to promote the progressive application of specific research findings
- Scheduling of technical meetings, workshops, training sessions, or other implementation and technology transfer events
- Field or office visitations related to the resolution of technical problems or to information dissemination
- Other documentation and information gathering conducted to support the utilization of specific research findings
- Documentation of cost savings, life extension, increased capacity, improved safety, better systems and durability.

In addition, as necessary, the R&D Unit may conduct small focus group to assist with determining the outcomes and implementation actions for research projects and activities.

10.5 Technology Transfer Benchmarking

The achievements of the annual research and development work programs are reflected on a total performance basis. The quality of the program is evaluated by observing the progress toward the project milestones and other measurable parameters. Benchmarking will demonstrate progress and support quality improvement. The R&D Unit distributes a quarterly newsletter to the Department highlighting milestones and quality improvement as well as informing personnel of the overall program and key dates for participation. Factors that are benchmarked to show the performance and results of the work programs include:

- Programmed funds
- Intramural research investigations and demonstration projects
- Contract research projects
- Milestone achievements
- Implementation success
- Timely deliverables
- Quarterly newsletter

Benchmark data also supports the StIC Chairpersons and other key staff in making decisions and recommendations to utilize research findings. The benchmark data and efforts contribute to the Department's efforts at Continuous Process Improvement and other quality initiative programs. In addition, the R&D Unit works directly with the Value Management Unit and the Information Technology Unit to stay abreast of the latest Departmental updates and technological advances.

10.6 Technology Transfer Documentation

The documentation of successful performance for the R&D work program efforts is essential to receiving management and financial support. Objective and quantifiable measures provide the basis for this support. Overall program performance is measured by the achievement of positive and meaningful results, the achievement of milestones and the adherence to annual work program scheduling requirements. These results are accounted for in the Department's operations.

11.0 Procedures for Intellectual Property

Unique intellectual properties may be developed as a part of a contract research project. Examples could include computer software, equipment, prototypes, methods, machinery or other properties under patent, copyright or trademark protection. Assurances will protect the rights of the research entity or university, the Department and FHWA in the use of intellectual properties.

11.1 Computer Software and Data

Mainframe and/or microcomputer programs developed under a contract research project are identified in the formal statement of work in a contract research project authorization. NCDOT retains right to use the software. The mainframe and/or microcomputer programs will become the property of the Department upon completion of the research project and is considered as public domain software.

The databases that are collected or developed during the course of a contract research project will remain the property of the contracting university and its principal investigator. The Department will have the option to request such data during the active period of the project and during the period of the review of the draft final report.

Mainframe and microcomputer programs and data that are provided to interests outside the Department will include the following disclaimer: "No warranty is made by the North Carolina Department of Transportation, the Federal Highway Administration or (the responsible research agency) as to the accuracy, reliability or usability of the computer program and its associated data and documentation. No responsibility is assumed by the above parties for incorrect results or damages resulting from the use of this computer program or this data."

All IT activities shall comply with NCDOT Policy #601 "Acceptable Use Policy" dated October 21, 2014; #403 "Data Classification Policy" dated October 8, 2014; "Remote Support Policy" dated April 12, 2010; and Policy #100 "Information Security Program Charter" dated September 2, 2011. In addition all research projects involving software shall comply with The North Carolina State Chief Information Office's Statewide IT Policies and Standards found at <http://it.nc.gov/statewide-resources/policies>.

11.2 Other Intellectual Property Provisions

Royalty free patent rights for the North Carolina Department of Transportation and the Federal Highway Administration are fully preserved for intellectual properties which are either directly documented in a federal aid SPR contract research project or directly produced during the course of formal research activities. Federal agencies have a blanket exception based on code. NCDOT includes such language in Master Agreements with individual institutions. This royalty free provision also applies to the Department for fully state funded contract research projects. Intellectual properties includes artwork, processes, methods, machinery, manufactures, designs or compositions of matter or useful improvements thereof, and any variety of plant which is patentable under the patent laws of the United States of America or any foreign country.

Otherwise, the research principal investigator and/or the contracting university may pursue the development of other intellectual properties of similar but exclusive nature to those documented in a

Department or FHWA sponsored contract research project. The royalty free patent rights for the Department and the FHWA shall not apply to these exclusive intellectual properties. For any exclusive intellectual property upon which the principal investigator or the contracting university elects to file a patent application, these parties may reserve a revocable paid-up license to practice the use of such property throughout the United States, its territories and possessions, and any foreign country where a patent application is filed.

Where patentable intellectual properties apply to a contract research project, the principal investigator is required to have written documentation to disclose the conception and the first application of practice to the research project. The first application of practice is disclosed in the most immediate quarterly progress report and will convey the inventor and the nature, purpose and operation of the invention. A written disclosure is provided with the final report manuscript to divulge the full application of the intellectual property to the research project. This final disclosure identifies all parties covered under the contract research project investigation who provided creative contribution to the intellectual property, except for clerical labor and manual labor.

11.3 Identification of Intellectual Property

Intellectual Property management is an intensive process. It is important to understand that levels of proactive IP management require time and commitment. The R&D Unit will identify outcome(s) that may potentially be protected as IP. This includes:

- Review of projects at the beginning of process. The R&D Unit will document possible outcomes based on the expectation of the research project.
- Review of projects periodically, such as at the midpoint or at the point of a major deliverable to assess any potential IP.
- Review projects near completion to check that any potential IP has been accounted for.
- Identify the value of a specific outcome.
- Classify the outcomes, i.e. software, test method, machine, public service announcement, video, etc.
- Classify the potential IP protection for the outcome, i.e. patent, copyright, trademark or trade secret.
- Identify the funding source, i.e. Bayh-Dole implications.
- Strengthen the R&D relationship with the inventors/creators, i.e. query the creator/inventor on their suggestions on how the potential IP may be managed. This may include Departmental staff and counsel as well as researchers.

11.4 Intellectual Property Disposition

The following disposition and filing requirements are imposed for SPR supported contract research project investigations. With respect to each intellectual property to which the principal investigator or the contracting university elects to retain patent rights during the course of the contract research project investigation, a domestic patent application shall be filed within six months of disclosure to the Department. Within two months of this filing, the principal investigator or the contracting university

must provide the State Research Engineer a copy of the application, including the filing date and serial number.

The following statement is included within this application: “The United States Department of Transportation Federal Highway Administration has rights in this intellectual property pursuant to the project authorization agreement between (the contracting university) and the North Carolina Department of Transportation dated (date).” Within six months of this filing, the principal investigator or the contracting university must deliver to the State Research Engineer a duly approved, executed and recorded legal instrument fully confirmatory of all rights to which the United States Department of Transportation is entitled and to provide the Federal Highway Administration an irrevocable power to inspect and make copies of the patent application. A copy of this legal instrument is provided to the FHWA Division Office within thirty days of its receipt. If the patent approval requires longer than six months, the principal investigator or the contracting university will provide the State Research Engineer the approved document within sixty days of the approval and issuance of the patent.

Revenue sharing from patentable intellectual properties shall be addressed in individual Project Authorization documents. The net revenue will be shared among the inventor, the Department, the university and the State of North Carolina.

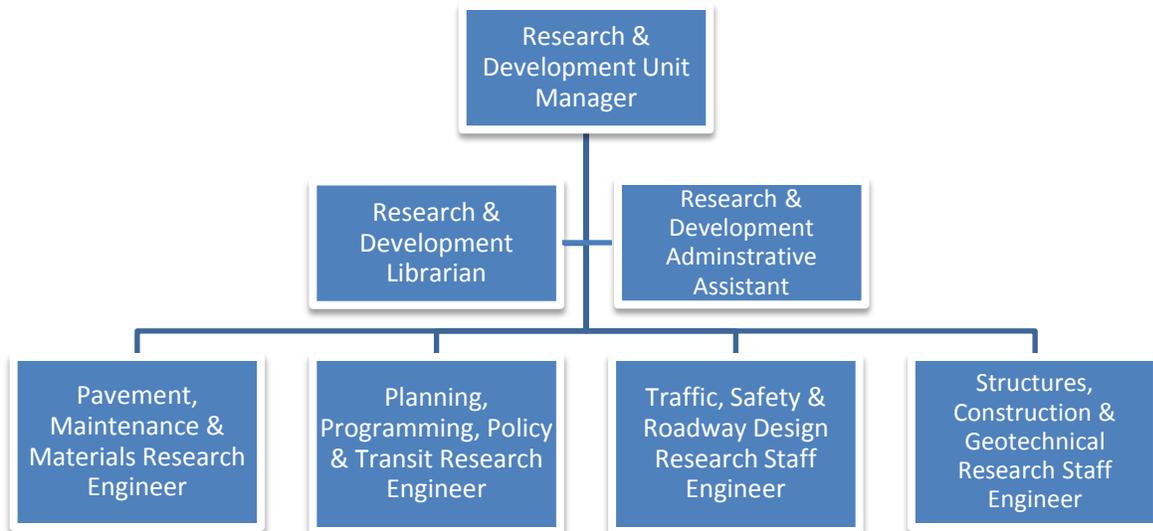
In the event the principal investigator or the contracting university elects to forego filing a patent application for either project authorization documented or subsequently disclosed intellectual property, a written disclosure of this decision will accompany the final technical report manuscript. The final technical report manuscript will include the following statement: “There was no invention or discovery first applied to practice in the course of this research project authorization, including any art work, methods, processes, manufactures, designs or compositions of matter or useful improvements thereof, or any variety of plant which may be patentable under the laws of the United States of America or any foreign country.

APPENDICES

LIST OF APPENDICES

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APPENDIX A



APPENDIX B



TECHNICAL ASSISTANCE REQUEST FORM

NCDOT Managers and their staff are invited to consult appropriate faculty at any UNC system university or at Duke University for technical assistance. Discussion with the faculty member should involve defining the scope of the assistance needed and estimating the time required to complete the assignment.

To initiate the work, the NCDOT business unit will fill out the scope of work, consulting faculty information and receive Division/Manager approval. R&D will review and process this request form with ITRE. A technical assistance project should be limited to activities requiring no more than 80 hours (10 work-days) of individual consultation and may include the use of research assistants, temporary labor, or laboratory equipment rentals.

Any technical assistance request that is not completed within ninety days of its approval by ITRE will be canceled.

Nature and Scope of Work – Be detailed and specific. Include estimated work hours required per task

Title:	
Description of Work (<i>box will expand as needed</i>):	

Faculty / Researcher Information

Name: _____

Affiliation: _____

Phone: _____

Email: _____

Requested by: _____ **NCDOT Business Unit:** _____

NCDOT Approval (Division Official or other Manager)

Print or Type Name	Signature	Date

NCDOT Approval (Research and Development Manager)

Neil Mastin, PE		
Print or Type Name	Signature	Date

Approval (ITRE Director)

Print or Type Name	Signature	Date

Total Hours: _____ **Cost: \$** _____ **Technical Assistance #: TA-** _____

APPENDIX C



RESEARCH NEED STATEMENT

Submission Date: _____ RNS#: _____
 (R&D Use)

Submitter Name: _____ Phone: _____

Division / Unit: _____ Email: _____

Research Idea Title: _____

What is the problem or issue needing investigation? *Be specific and detailed. (Click Here for Form Instructions)*

Background: *Provide supporting information about the business unit, processes and tools*

Research Tasks: *Describe specific activities that are anticipated (gathering data, structural testing, traffic analysis, etc.)*

Products of the Research: *Examples of products could include models, specifications, policies, general guidance...etc.*

Benefit / Knowledge Gain for NCDOT: *Check all that apply.*

<input type="checkbox"/> Increase Operational Efficiency / Time Savings	<input type="checkbox"/> New or Improved Specifications
<input type="checkbox"/> Cost Savings	<input type="checkbox"/> Improved Worker or Public Safety
<input type="checkbox"/> Improved Material, Structure, Pavement Performance	<input type="checkbox"/> Permitting / Regulatory Compliance
<input type="checkbox"/> Improved Models (Performance/Traffic/Financial etc.)	<input type="checkbox"/> Other (Specify)

Explain Anticipated Benefits: *Provide details for the benefits checked above.*

Implementation: *Describe how the results of research will be put into practice at NCDOT.*

Who will lead the implementation?

Provide Unit, Position Title and Name.

Unit: _____

Title: _____

Name: _____

Additional Comments and Information: *See guide. Recommend including info on involvement from other units.*

Approval (Division Official or Unit Head)

_____	_____	_____
Print Name	Signature	Title

Please email a PDF of the signed document **AND** an editable MS Word copy to **Ms. Melvena Sams** - msams@ncdot.gov; Questions can be directed to Ms. Sams via email, by phone (919-508-1790) or to the appropriate Research Engineer.

For additional guidance, see the Research Need Statement Guide (Insert web link here when it's ready)



RESEARCH NEED STATEMENT

Submission Date: _____ RNS#: _____
 (R&D Use)

Submitter Name: _____ Phone: _____

Affiliation: _____ Email: _____

Research Idea Title: _____

What is the problem or issue needing investigation? *Be specific and detailed. (Click Here for Form Instructions)*

[Empty text box for problem description]

Background: *Provide supporting information about the business unit, processes and tools*

[Empty text box for background information]

Research Tasks: *Describe specific activities that are anticipated (gathering data, structural testing, traffic analysis, etc.)*

[Empty text box for research tasks]

Products of the Research: *Examples of products could include models, specifications, policies, general guidance...etc.*

[Empty text box for products of research]

Benefit / Knowledge Gain for NCDOT: *Check all that apply.*

<input type="checkbox"/> Increase Operational Efficiency / Time Savings	<input type="checkbox"/> New or Improved Specifications
<input type="checkbox"/> Cost Savings	<input type="checkbox"/> Improved Worker or Public Safety
<input type="checkbox"/> Improved Material, Structure, Pavement Performance	<input type="checkbox"/> Permitting / Regulatory Compliance
<input type="checkbox"/> Improved Models (Performance/Traffic/Financial etc.)	<input type="checkbox"/> Other (Specify)

Explain Anticipated Benefits: *Provide details for the benefits checked above.*

[Empty text box for anticipated benefits]

Implementation: *Describe how the results of research will be put into practice at NCDOT.*

[Empty text box for implementation]

NCDOT Project Sponsor: _____ Unit: _____
Provide Unit, Position Title and Name. Title: _____
 Name: _____

Additional Comments and Information:

[Empty text box for additional comments]

Please email this RNS **AND** an editable MS Word copy of your Preliminary Proposal to **Ms. Melvena Sams** - msams@ncdot.gov;
 Questions can be directed to Ms. Sams via email, by phone (919-508-1790) or to the appropriate Research Engineer.

For additional guidance, see the Research Need Statement Guide (Insert web link here when it's ready)



Instructions and Guidelines for Developing a Research Need Statement (RNS)

Introduction: The primary function of the Research and Development Unit is to work with NCDOT business units to initiate contract research that addresses issues facing North Carolina's transportation community. Contract research is typically carried out with the assistance of universities and research centers. Most of NCDOT's research is applied research: Research that is intended to solve a specific problem or set of problems. Potential projects include, but are not limited to: new or revised specifications, new or revised design guides, new or updated performance or traffic models, safety studies, material testing, economic impact studies, environmental studies and revised policies.

→ *Nearly all operational, policy and design areas of NCDOT are eligible for research funding.*

While preparing a Research Need Statement, you can communicate with NCDOT research staff, others at NCDOT, national peers or even researchers in order to help to better define the problem. *No commitment for funding can be made or should be implied to researchers that provide input to an RNS.* Research Need Statements submitted by NCDOT personnel will be advertised and distributed to all eligible researchers. Research proposals are funded on a competitive basis.

Project Duration: Research projects typically vary in length between 6 months and 3 years, with 2 years the most common period. Proposals received from potential researchers include their best estimate of a schedule based on the complexity and needs of the proposed project. **Synthesis projects**, for which a researcher compiles knowledge and best practices to produce a guidance document typically have a maximum 1 year duration.

Please note that all fields on the form will expand as needed.

Take as much space as required to complete each portion, but try to be concise and clear.

Contact Information: Please fill in your name, email, phone number and the NCDOT branch and the NCDOT unit you work for. This information will be used in the Research and Development database. It will also be provided to potential researchers so they may reach out to the idea generator when preparing proposals. *You should expect contact from researchers interested in preparing a proposal for your idea.* The best proposals will be developed by researchers that fully understand the problem.

Title: The title of the RNS should be a few words describing the idea. Concise is best, but be specific.

Problem or Issue Needing Investigation: This field should be used to broadly outline the scope of the problem. Is a new specification needed? Does a new intersection design require investigation for safety and efficiency before being placed in wide use? Is material durability in question for certain applications? Is increased knowledge in a particular area needed?

When preparing the statement, you should identify the specific problem to be addressed by the research and think about the questions of How?, What?, and Why?.

If possible, conduct a preliminary research or literature review on the topic in current periodicals and journals to see what research has already been conducted and if it meets your needs. The research unit can assist with this. One of the best sources of existing research is the TRB Database, TRID: <http://trid.trb.org/>

Background: Please provide a brief background statement describing events, procedures, experiences and/or processes leading up to your idea. Providing sufficient background in non-technical language (without jargon) will help the researchers (and other NCDOT employees) understand the importance of the problem.

Research Tasks: A full listing and description of tasks to be completed as part of the research project will be developed by researchers submitting proposals. However, a basic list of what is *likely* to be required will be helpful during proposal development. Will data need to be acquired from the NCDOT sources? Will field studies be needed? Will surveys be required? Is lab testing likely to be needed? You are not committing yourself or the researcher to a particular task. If a task isn't needed, it can be dropped after further review during proposal development.



Products of the Research: Research products are deliverables associated with the research that will be used for implementation and integration of the results into departmental processes, policies, standards, and practices. This is not simply a final report document. Examples might be the development of manuals, protocols, improved processes, new products, new procedures, increased general practice knowledge, improved current practices, validated or improved models, developed guidelines, developed methodologies, updated design criteria, project prioritization methods, inputs for analysis systems, identification of additional resources needed, training manuals and courses, cost-benefit analyses, improved testing methods, etc.

Benefit to the Department / Explain Anticipated Benefits: This section includes a set of check boxes to capture the general area of benefit. In the explanation box, please provide additional details the benefits of the research. Each customer of the research program has a different set of needs, and for this reason each end-user and stakeholder may have a different way of evaluating the benefits of a research project. Providing a concise statement will encourage prospective researchers to develop relevant research proposals that address the range of end-users and expectations. Examples of benefits include: cost or time savings for the agency or the public, efficiency improvements, improved accuracy of models or design methods, validation of a design, material or technique, etc.

Implementation: Implementation is a key component of the NCDOT research program. By describing potential implementation measures, NCDOT personnel are able to move research from the lab and computer screen to the field and design office. *It is not expected that a detailed implementation plan can be developed at this early stage in the research process, but research ideas should be developed with the goal of production usage in mind.* Please describe any general concepts for implementation and also designate the unit, position title and name that will oversee placing this research into practice.

Additional Comments and Information: Include any additional information you think is relevant to the proposal. Key information could include units and personnel that were consulted during the development of the RNS and any additional business units that would be involved in implementation.

A Note on Contact with Researchers: The compiled Research Need Statements for the Department will be distributed to eligible researchers. You should expect to receive phone calls, emails and visits from researchers as they develop their proposals. Accurate and honest answers to their questions are critical to receiving the highest quality proposals. You may answer questions, but remember: *NCDOT cannot make any statement regarding awarding of work.* Responses should focus on technical and practical issues. Cost should not be discussed at this time. All research proposals will be evaluated by the research subcommittees and final approval will be made by the Research Executive Committee.

Assistance: If you would like assistance in preparing a statement, the Research Unit can help or we can put you in contact with an experienced project sponsor (i.e. former research project chairperson) in the appropriate technical area.

For questions or comments, please contact any of the following:

Neil Mastin	Research Manager	919-508-1865	jmastin@ncdot.gov
Rasay Abadilla	Structures, Construction, Geotech	919-508-1832	rabadilla@ncdot.gov
John Kirby	Planning, Environment, Transit	919-508-1816	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance	919-508-1819	mkadibhai@ncdot.gov
Ernest Morrison	Traffic, Safety, Roadway Design	919-508-1874	eemorrison@ncdot.gov
Lamara Williams-Jones	Research Librarian	919-508-1820	lcwilliams2@ncdot.gov
Melvena Sams	Admin Support and General Assistance	919-508-1790	msams@ncdot.gov



Instructions and Guidelines for Developing a Research Need Statement (RNS)

Introduction: The primary function of the Research and Development Unit is to work with NCDOT business units to initiate contract research that addresses issues facing North Carolina’s transportation community. Ideas and proposals are also accepted from University partners as they may have a novel approach to a transportation related issue. Most of NCDOT’s research is applied research: Research that is intended to solve a specific problem or set of problems. Potential projects include, but are not limited to: new or revised specifications, new or revised design guides, new or updated performance or traffic models, safety studies, material testing, economic impact studies, environmental studies and revised policies.

→ *Nearly all operational, policy and design areas of NCDOT are eligible for research funding.*

The Research Need Statement serves as the framework on which to build Preliminary and Full Proposals. While preparing a Research Need Statement and Preliminary Proposal, you are encouraged to communicate with NCDOT research staff and key business units at NCDOT in order to better define the topic and proposed research. *No commitment for funding can be made or should be implied from acceptance of an RNS and Preliminary Proposal.* Research Need Statements submitted by NCDOT personnel will be advertised and distributed to all eligible researchers.

Research proposals are funded on a competitive basis based on Departmental need, urgency and available funding.

Project Duration: Research projects typically vary in length between 6 months and 3 years, with 2 years the most common period. Proposals received from potential researchers shall include their best estimate of a schedule based on the complexity and needs of the proposed project. **Synthesis projects**, for which a researcher compiles knowledge and best practices to produce a guidance document typically have a maximum 1 year duration.

Please note that all fields on the form will expand as needed. Take as much space as required to complete each portion, but try to be concise and clear and limit the RNS length to 2 pages.

Contact Information: Please fill in all appropriate contact information. This information will be used in the Research and Development database and will provide a way for R&D or a business unit to contact you further.

Title: The title of the RNS should be a few words describing the idea. Concise is best, but be specific.

Problem or Issue Needing Investigation: This field should be used to broadly outline the scope of the problem. Is a new specification needed? Does a new intersection design require investigation for safety and efficiency before being placed in wide use? Is material durability in question for certain applications? Is increased knowledge in a particular area needed?

When preparing the statement, you should identify the specific problem to be addressed by the research and think about the questions of How?, What?, and Why?.

Conduct a preliminary research or literature review on the topic in current periodicals and journals to see what research has already been conducted and if it meets your needs. The results should be included in the preliminary proposal, but a brief reference is appropriate in the RNS document. One of the best sources of existing research is the TRB Database, TRID: <http://trid.trb.org/>

Background: Please provide a brief background statement describing events, procedures, experiences and/or processes leading up to your idea. Providing sufficient background in non-technical language (without unneeded jargon) will help reviewers understand the importance of the problem.

Research Tasks: This should be a basic list of what is *likely* to be required as part of this research (with less detail than the preliminary proposal).



Products of the Research: Research products are deliverables associated with the research that will be used for implementation and integration of the results into departmental processes, policies, standards, and practices. This is not simply a final report document. Examples might be the development of manuals, protocols, improved processes, new products, new procedures, increased general practice knowledge, improved current practices, validated or improved models, developed guidelines, developed methodologies, updated design criteria, project prioritization methods, inputs for analysis systems, identification of additional resources needed, training manuals and courses, cost-benefit analyses, improved testing methods, etc.

Benefit to the Department / Explain Anticipated Benefits: This section includes a set of check boxes to capture the general area of benefit. In the explanation box, please provide additional details the benefits of the research. Each customer of the research program has a different set of needs, and for this reason, each end-user and stakeholder may have a different way of evaluating the benefits of a research project. Examples of benefits include: cost or time savings for the agency or the public, efficiency improvements, improved accuracy of models or design methods, validation of a design, material or technique, etc.

Implementation: Implementation is a key component of the NCDOT research program. By describing potential implementation measures, NCDOT personnel are able to move research from the lab and computer screen to the field and design office. *It is not expected that a detailed implementation plan can be developed at this early stage in the research process, but research ideas should be developed with the goal of production usage in mind.* Please describe any general concepts for implementation and also designate the unit, position title and name that will oversee placing this research into practice.

NCDOT Project Sponsor: Please complete this field. Projects with an internal champion stand a much greater chance of being funded and of being successful.

Additional Comments and Information: Include any additional information you think is relevant to the proposal. Key information could include units and personnel that were consulted during the development of the RNS and any additional business units that would be involved in implementation.

A Note on Contact with NCDOT Personnel:

Prospective researchers are encouraged to contact NCDOT technical and business experts when developing an RNS and Preliminary Proposal. Phone calls, emails and visits are appropriate to better define and gain support for a topic. Remember: *NCDOT cannot make any statement regarding awarding of work.* Discussions should focus on technical and practical issues. Cost should not be discussed at this time. All research proposals will be evaluated by the research subcommittees and final approval will be made by the Research Executive Committee.

Assistance:

For additional information or clarification, contact any of the Research and Development staff listed below.

For questions or comments, please contact any of the following:

Neil Mastin	Research Manager	919-508-1865	jmastin@ncdot.gov
Rasay Abadilla	Structures, Construction, Geotech	919-508-1832	rabadilla@ncdot.gov
John Kirby	Planning, Environment, Transit	919-508-1816	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance	919-508-1819	mkadibhai@ncdot.gov
Ernest Morrison	Traffic, Safety, Roadway Design	919-508-1874	eemorrison@ncdot.gov
Lamara Williams-Jones	Research Librarian	919-508-1820	lcwilliams2@ncdot.gov
Melvena Sams	Admin Support and General Assistance	919-508-1790	msams@ncdot.gov

APPENDIX D

INSTRUCTIONS FOR PREPARING AND SUBMITTING
PRELIMINARY PROPOSALS FOR THE NCDOT RESEARCH PROGRAM

Please use the following guide to prepare and submit **Preliminary Proposals**.

Preliminary Proposals will be evaluated, and a screened subset will be selected for Full Proposal preparation based on quality, priority and departmental need.

Preliminary Proposals should contain a maximum of seven pages, should be typed in a font size not less than 11 point and be MS Word compatible. Please activate line numbering in the MS Word document for ease of reference during the review process.

No P.I. or university signature or cover letter is needed at this stage. There should be only one "Principal Investigator". Additional Researchers, if any, may be listed as "Other Investigators."

To achieve high quality and relevant proposals, **research teams are encouraged to communicate or meet with DOT personnel to discuss the technical content and goals of the research**. Contact information for research idea generators is listed on the RNS form.

Required Information for each Preliminary Proposal

1. Cover Page (*See attached format*)
2. Executive Summary Page
 - Research Need Statement (RNS) ID
 - Preliminary Proposal Title
 - Executive Summary
3. Elaboration on need for the project
4. Proposed scope of work
5. Anticipated Research Products (*do not include required deliverables, such as quarterly progress reports, draft final report, etc. Examples of products could include models, specifications, policies, general guidance, etc.*)
6. Details of how NCDOT will benefit, gain knowledge, and use the Research Product[s]
7. Proposed Work Schedule
8. Budget estimate and duration –Include the following broad line items by fiscal year:
 - a) Personnel
 - b) Non-personnel including in-state graduate student tuition
 - c) Capital Items
 - d) Indirect Cost*
 - e) Total

The allowable indirect cost rate is 20% of modified total direct costs excluding permanent equipment and in-state tuition

9. Implementation (Describe how the results will be put into practice)
10. A list of current research project commitments including title[s], duration[s], and sponsor[s]
11. A list of directly related publications (five max) by the proposer[s]
12. A list of directly related publications (ten max) by others (*do not include copies of resumes*)



Submission of Proposals

Submit preliminary proposals electronically to mkadibhai@ncdot.gov **AND** to the appropriate Research Engineer listed below.

All proposal files should be named such that the RNS # is at the beginning of the filename.

Example: 6101_Research Proposal Title_Doe_Preliminary Proposal (where Doe is the PI's last name)

For general administrative questions, call the Research and Development Unit at 919-508-1790. For questions in a specific topical area, email or call the appropriate research engineer as listed below.

Neil Mastin	Research Manager	919-508-1865	jmastin@ncdot.gov
Rasay Abadilla	Structures, Construction, Geotech	919-508-1832	rabadilla@ncdot.gov
John Kirby	Planning, Environment, Transit	919-508-1816	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance	919-508-1819	mkadibhai@ncdot.gov
Ernest Morrison	Traffic, Safety, Roadway Design	919-508-1874	eemorrison@ncdot.gov

APPENDIX E



Instructions and Guidelines for Preliminary Research Proposal Review

When reviewing Preliminary Research Proposals, please keep the following items in mind. If you feel the need to specifically address an issue, please do so in the comments box, particularly if revisions will be required for full proposals. The comment box will expand onto another page as you type.

Multiple Preliminary Proposals for one Research Idea

More than one preliminary proposal may be recommended for development into a full proposal if there is sufficient interest to do so. Select YES or With Revisions for all you think are suitable for further development and NO for those that are not.

Reviewer Qualifications

If you do not feel that a particular proposal falls into your area of expertise, *please choose the option to defer to other reviewers*. You should only review projects for which you feel comfortable providing quality feedback.

If there is someone with sufficient experience in your organizational structure, we suggest you have that individual conduct the review and provide feedback for you to pass along.

Need for the Research Product

- Is the anticipated result or product of the proposed work genuinely needed by NCDOT?
- Is the result or product needed now (urgency)?
- Will the work yield results of significant ongoing value?
- Who will be the customer and how will they benefit?

Technical

- Does the proposed research team have the expertise needed to carry-out the project?
- Does the proposal have a sound technical basis?
- Will NCDOT be able to provide any necessary resources required by the research? This could include samples, test sites or materials.

NCHRP and Pooled Fund Recommendations

If you feel that a project is suitable for consideration at the national or regional level in lieu of a state research project, please recommend that option.

Returning the Forms

Please email the completed MS Word review forms to the engineer assigned to each subcommittee. You may also complete the forms by hand, scan to a PDF file and submit by email.

If you have any questions please contact any of the following:

Neil Mastin	Research Manager	919-508-1865	jmastin@ncdot.gov
Rasay Abadilla	Structures, Construction, Geotech	919-508-1832	rabadilla@ncdot.gov
John Kirby	Planning, Environment, Transit	919-508-1816	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance	919-508-1819	mkadibhai@ncdot.gov
Ernest Morrison	Traffic, Safety, Roadway Design	919-508-1874	eemorrison@ncdot.gov



<Fill in ID and Title Information Here>

PRELIMINARY PROPOSAL RECOMMENDATION: (Please choose one of the following. Simply click check box)

Please see the attached review guidelines before beginning the review process. Note that for a single research topic, it is allowable to recommend more than one preliminary proposal for development into a full proposal.

- Defer** to others.
- YES**, the preliminary proposal should be developed into a full proposal.
- A full proposal should be developed with revisions (e.g., objectives, content, scope of work, period of work, and budget etc.). Enter specific revisions in the comment section below.
- NO**, the preliminary proposal should NOT be developed into a full proposal. Please provide feedback regarding this recommendation in the comment section below.

Budget Evaluation Reasonable? Too high? Too low? Explain below if high or low.

ADDITIONAL RECOMMENDATIONS:

- The topic should be considered for an NCHRP Synthesis project
- The topic should be considered for an NCHRP Research project
- The topic should be considered for a Pooled Fund study

Suggested revisions or comments on this proposal:

Add additional comment pages as needed. The box above will expand if you are using MS Word.

REVIEWER NAME: _____ DATE: _____

APPENDIX F



North Carolina Department of Transportation

INSTRUCTIONS FOR SUBMITTING **FULL PROPOSALS** NCDOT RESEARCH PROGRAM

Please use the following steps to prepare and submit “Full Proposals”.

By March, we plan to complete evaluation of full proposals. If successful, funding should be effective on August 1st of the upcoming academic year.

Proposal should be typed in a font size not less than 11 point and be MS Word compatible. **No** P.I. or university signature, or cover letter is needed. There should be only one “Principal Investigator.” Additional Researchers (if any) may be listed as “Other Investigators” on the following page.

-
1. Cover Page (See attached format)
 2. Executive Summary Page
 - Research Need Statement (RNS) ID
 - Proposal Title
 - Executive Summary
 3. Table of Contents
 4. Formal Statement of Work
 - Introduction including the background of the research need
 - Need Definition
 - Research Objectives
 - Literature Review and the relevance of the proposed research vis-à-vis state of the art, science, and practice
 - Research Tasks and Methodology
 - Significance of Proposed Work
 - Anticipated Research Product[s] (do not include required deliverables, such as quarterly progress reports, draft final report, etc.)
 - How NCDOT will use the Research Product[s]
 - Suggested Plan for Implementation and Technology Transfer for NCDOT
 - Proposed Work Schedule
 - P.I. and other investigators’ information (up to two pages, use attached form. Do NOT include copies of full resumes)
 - A list of directly related publications (five max) by the proposer[s]
 - A list of directly related publications (ten max) by others
 5. Budget Authorization Page (See attached format)
 6. Justification of Budget Line Items
 7. Breakdown (in days) by Personnel and Tasks (See attached format)
-

Submit full proposal electronically to the project manager from which you received confirmation as well as to jmastin@ncdot.gov.

APPENDIX G



Instructions and Guidelines for Full Research Proposal Review

When reviewing Full Research Proposals, please keep the following items in mind. If you feel the need to specifically address an issue, please do so in the comments box, particularly if revisions will be required prior to final funding decisions. The comment box will expand onto another page as you type.

Multiple Full Proposals Received

No more than one full proposal may be recommended for funding.

Reviewer Qualifications

If you do not feel that a particular proposal falls into your area of expertise, please choose the option to defer to other reviewers, or if there is someone with sufficient experience in your organizational structure, we suggest you have that individual conduct the review and provide feedback for you to pass along.

You should only review projects for which you feel comfortable providing quality feedback.

Need, Urgency and Expected Products for the Research Project

- Has the researcher identified the research **Product [s]**?
- Have **specific implementation** protocols been identified?
- Is the need for the research **urgent**?
- If not urgent, is there a **long-term benefit**?
- Are there **consequences** of not conducting the research?
- Who will use the **Product [s]**?
- How will the **Product [s]** be used?
- Does the researcher have a good **track record** regarding quality and timeliness?
- What **resources** will customers need to use the research product [s]?

Ranking the Full Proposals

Please rank the full proposal from 1 (one – highest priority) to the number of full proposals (least priority.)

Returning the Forms

Please email the completed MS Word review forms to the engineer assigned to each subcommittee. You may also complete the forms by hand, scan to a PDF file and submit by email.

If you have any questions please contact any of the following:

Neil Mastin	Research Manager	919-508-1865	jmastin@ncdot.gov
Rasay Abadilla	Structures, Construction, Geotech	919-508-1832	rabadilla@ncdot.gov
John Kirby	Planning, Environment, Transit	919-508-1816	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance	919-508-1819	mkadibhai@ncdot.gov
Ernest Morrison	Traffic, Safety, Roadway Design	919-508-1874	eemorrison@ncdot.gov



PROPOSAL ID.:

Title:

PLEASE CAREFULLY REVIEW THE INSTRUCTIONS PROVIDED WITH THIS PACKET BEFORE PROCEEDING

INDICATE YOUR RECOMMENDATION FOR FUNDING THE PROPOSAL:

- DEFER TO OTHERS (SKIP TO END)
No
MAYBE (PROJECT IS IMPORTANT, BUT WE CAN WAIT BEFORE FUNDING IT)
Yes (PROJECT IS VERY IMPORTANT, AND SHOULD BE FUNDED AS SOON AS POSSIBLE)

IF "YES" OR "MAYBE", PLEASE ANSWER THE FOLLOWING QUESTIONS:

- WOULD YOU BE WILLING TO CHAIR THE PROJECT STEERING COMMITTEE?
WOULD YOU BE WILLING TO SERVE AS A MEMBER OF THE PROJECT STEERING COMMITTEE?
WOULD YOU CHAMPION THE USE OF THE PRODUCT(S) OF THE RESEARCH?

IF MORE THAN ONE FULL PROPOSAL WAS RECEIVED FOR A TOPIC, WHICH DO YOU PREFER?

RANK THIS PROPOSAL: (1 = highest priority): OF (total proposals recommended for funding)

PLEASE EVALUATE THE PROPOSAL USING THE FOLLOWING CRITERIA (IF SUBMITTING ELECTRONICALLY, USE CHECK BOXES)

Table with 6 columns: Evaluation Item, Unsatisfactory, Adequate, Average, Above Average, Excellent. Rows include: Understanding of Problem Statement, Organization of Proposal, Quality of Literature Review, Research Methodology, Proposed Data Collection Techniques, Proposed Analysis Methodology, General Readability, Grammar, Spelling and Punctuation, Proposal Cost vs Value.

REVISIONS AND COMMENTS ON THIS PROPOSAL. PLEASE BE SPECIFIC AND DETAILED. THE BOX WILL EXPAND AS NEEDED

Budget (increase or decrease?):
Period of Work (extend or shorten?):
Scope of Work (add or delete tasks? Concerns about use of field sections?):
Other Comments:

REVIEWER NAME: DATE:

If you have any questions, please contact the appropriate Project Engineer or the Research Manager.

APPENDIX H

PROJECT AUTHORIZATION NO.

New _____

Revision No. _____

under

MASTER AGREEMENT CONTRACT MA-2009-08
FOR RESEARCH AND TRAINING SERVICES BETWEEN THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION AND
_____ STATE UNIVERSITY

Project Title << text >>
Formal Statement of Work See attached proposal
Period of Performance (e.g.) Month dd, 20yy - Month dd, 20yy
Budget by Year including Total
Property to be Furnished by the Department (list)
Special Terms Applicable to this Project (list)
Department & University Conducting Work (department, center, or institute, etc.) (university)
Principal Investigator (name)
 (Other investigators, if any, may be listed in the following page) (mailing address line 1) (mailing address line 2) (city, state, zip) (email address) (phone #, fax #)

NCDOT Research Engineer

IN WITNESS WHEREOF, the parties hereto have executed this Project Authorization as of _____ (leave blank)

NORTH CAROLINA STATE UNIVERSITY

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

BY: _____
Principal Investigator

BY: _____

BY: _____
Department / Business Unit Head

BY: _____
_____ State University

(you may slightly modify to meet your institutional requirements)
(do not type words that are in italics)

APPENDIX I

NCDOT'S NOTICE OF NONDISCRIMINATION

The North Carolina Department of Transportation (NCDOT) hereby gives public notice of its policy to uphold and assure full compliance with Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, and all related nondiscrimination authorities to the end that no person shall, on the grounds of race, color, national origin, sex, age or disability, be excluded from the participation in, be denied the benefits of, or be otherwise subjected to discrimination under any programs, activities, or services administered by the NCDOT.

Any person who believes they have been mistreated by an unlawful discriminatory practice under an NCDOT program has a right to file a complaint directly with the NCDOT. For procedures on how to file a complaint, or additional information regarding NCDOT's nondiscrimination obligations, please contact the:

NCDOT Office of Equal Opportunity & Workforce Services
External Civil Rights Section
1511 Mail Service Center
Raleigh, NC 27699
919-508-1808 or 800-522-0453 or TDD/TTY: 800-735-2962
slipscomb@ncdot.gov
www.ncdot.org/business/ocr/

NOTIFICACIÓN DE NCDOT ACERCA DE LA NO DISCRIMINACIÓN

El Departamento de Transporte de Carolina del Norte notifica públicamente su política de mantener y asegurar total cumplimiento con el Título VI del Acta de los Derechos Civiles de 1964, Acta de Restauración de los Derechos Civiles de 1987 y todo las autoridades relacionadas con la no discriminación, con el fin de que ninguna persona por motivos de raza, color, lugar de origen, sexo, edad o incapacidad, sea excluida de la participación en, sea negado los beneficios de, o sea de otra manera sujeta a discriminación bajo cualquier programa, actividades o servicios administrados por el NCDOT.

Cualquier persona que crea que ha sido maltratada por una práctica discriminatoria ilegal, bajo un programa del NCDOT, tiene el derecho de presentar una queja directamente con el NCDOT. Para los procedimientos de cómo presentar una queja, o alguna información adicional relacionada con las obligaciones de no discriminación del NCDOT, por favor póngase en contacto con:

NCDOT Office of Equal Opportunity & Workforce Services
External Civil Rights Section
1511 Mail Service Center
Raleigh, NC 27699
TDD/TTY: 877-735-8200 (Española)
slipscomb@ncdot.gov
www.ncdot.org/business/ocr/

APPENDIX A TO TITLE VI ASSURANCE

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(1) Compliance with Regulations: The contractor shall comply with the Regulation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

(2) Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) Solicitations for Subcontractors, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(4) Information and Reports: The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the North Carolina Department of Transportation (NCDOT) or the Federal Highway Administration (FHWA) to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information the contractor shall so certify to the NCDOT, or the FHWA as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the NCDOT shall impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:

- (a) withholding of payments to the contractor under the contract until the contractor complies, and/or
- (b) cancellation, termination or suspension of the contract, in whole or in part.

(6) Incorporation of Provisions: The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontractor procurement as the NCDOT or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the NCDOT to enter into such litigation to protect the interests of the NCDOT, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

TITLE VI PUBLIC INVOLVEMENT FORM

Completing this form is **completely voluntary**. You are not required to provide the information requested in order to participate in this meeting.

Meeting or Event:	Date:
Location:	

In accordance with Title VI of the Civil Rights Act of 1964 and related authorities, the **university name** assures that no person(s) shall be excluded from participation in any of its programs or activities based on their race, color, national origin, disability, age, gender, or income. Completing this form helps us meet our data collection and public involvement obligations and will help us to better serve you.

Please place your completed form in the designated box on the sign-in table, hand it to a **university abbreviation** official or mail it to the **university name and address**. All forms will remain on file at the **university abbreviation** as part of the public record.

Zip Code: _____	Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female
Street Name: (i.e. Main Street) _____	Have a Disability: <input type="checkbox"/> Yes <input type="checkbox"/> No
Total Household Income: <input type="checkbox"/> Less than \$12,000 <input type="checkbox"/> \$47,000 – \$69,999 <input type="checkbox"/> \$12,000 – \$19,999 <input type="checkbox"/> \$70,000 – \$93,999 <input type="checkbox"/> \$20,000 – \$30,999 <input type="checkbox"/> \$94,000 – \$117,999 <input type="checkbox"/> \$31,000 – \$46,999 <input type="checkbox"/> \$118,000 or greater	Age: <input type="checkbox"/> Less than 18 <input type="checkbox"/> 45-64 <input type="checkbox"/> 18-29 <input type="checkbox"/> 65 and older <input type="checkbox"/> 30-44
Race/Ethnicity: <input type="checkbox"/> White <input type="checkbox"/> Black/African American <input type="checkbox"/> Asian <input type="checkbox"/> American Indian/Alaskan Native <input type="checkbox"/> Native Hawaiian/Pacific Islander <input type="checkbox"/> Hispanic/Latino <input type="checkbox"/> Other (please specify): _____	National Origin: (if born outside the U.S.) <input type="checkbox"/> Mexican <input type="checkbox"/> Central American: _____ <input type="checkbox"/> Puerto Rican <input type="checkbox"/> South American: _____ <input type="checkbox"/> Chinese <input type="checkbox"/> Vietnamese <input type="checkbox"/> Korean <input type="checkbox"/> Other (please specify): _____

Thank you for your participation!

For more information regarding Title VI or this request, please contact the NCDOT Office of Civil Rights at (919) 508-1808 or toll free at 1-800-522-0453, or by email at slipscomb@ncdot.gov.

APPENDIX J

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

OFFICE OF RESEARCH

INSTRUCTIONS FOR QUARTERLY PROGRESS REPORTS (QPR)

- The purpose of the quarterly progress report is to provide a succinct summary of the work performed over the quarter for the research committee members.
- Use the format provided here.
- Please provide updates of work performed during the quarter only. Do not include accumulation of all work performed since the beginning. If you have additional information to report (Literature review, etc.), attach as a separate file.
- Submit a QPR within 7 days of the end of the quarterly period:
(Q1 –September 30, Q2 –December 31, Q3 –March 31, Q4 –June 30)
- Submit the report via email to the NCDOT Research Engineer assigned to your project in MS Word format. Do not cc: the chair or members of the committee because the research engineer will review and then distribute your report to the research committee members.
- In the QPR budget table, under “Current” column, show cumulative fiscal year expenditures (not balance remaining). List each line item shown in the Project Authorization Document and for each line item; show your best estimate of cumulative expenditure to date. Do not substitute printouts from your fiscal office.

QUARTERLY RESEARCH PROGRESS REPORT

Date of Report: *month, day, year*

Calendar Quarter ending _____, _____ **Research Project No.** _____
 Contract Start Date _____, _____, _____ Contract Expiration Date _____

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Office of Research**

Project Title: *Enter Title*

RESEARCH TEAM:

<i>Enter Name</i>	<i>Principal Investigator</i>
<i>Enter Name</i>	<i>Other Investigator</i>
<i>Enter Name</i>	<i>Other Investigator</i>
<i>Enter Name</i>	<i>Post-Doctoral</i>
<i>Enter Name</i>	<i>Graduate Student</i>
<i>Enter Name</i>	<i>Graduate Student</i>
<i>Enter Name</i>	<i>Undergraduate Student</i>
<i>Enter Name</i>	<i>Undergraduate Student</i>
<i>Enter Name</i>	<i>Technician</i>
<i>Enter Name</i>	<i>Technician</i>

STEERING AND IMPLEMENTATION COMMITTEE:

- (Chair)
-
-
-
-
-
-
-
-

WORK PROGRESS SUMMARY:

Task No.	Abbreviated Task Title	Task as a percent of Total Effort	Percent of Task Completed	Scheduled Start Date	Actual or Planned Start Date	Scheduled Completion Date	Actual or Planned Completion Date
1.							
2.							
i.							
n							

BUDGET SUMMARY

	(FY 20nn)		(FY 20nn)	
	Budgeted	Current	Budgeted	Current
Personnel (Itemized, including fringe benefits)				
1. SUBTOTAL: (Personnel)				
2. Supplies				
3. Travel:				
4. Services (Itemized)				
5. Other (Itemized)				
6. Equipment (Itemized)				
SUBTOTAL DIRECT COST				
7. INDIRECT COST				
TOTAL COST:				

OVERALL PROJECT SCHEDULE STATUS: AHEAD ON TIME BEHIND

OVERALL PROJECT BUDGET STATUS: UNDER EVEN OVER

Note: Ref. Budget Summary Table – Under “Current” column, show cumulative fiscal year expenditures (not balance remaining). For each line item, show your best estimate of cumulative expenditure to date. Do NOT substitute printouts from your fiscal office.

QUARTERLY RESEARCH PROGRESS REPORT

Calendar Quarter Ending _____ , ____ , _____ **Research Project No.** _____

Executive summary of significant research progress made in this quarter, by task:
(Include, as attachments, extended narratives, tables, charts, figures and bibliography, as appropriate)

Task 1. {*Task Title*}
{*Summary of Progress*}

Task i. {*Task Title*}
{*Summary of Progress*}

Task n. {*Task Title*}
{*Summary of Progress*}

QUARTERLY RESEARCH PROGRESS REPORT

Calendar Quarter Ending _____ , ____ , _____

Research Project No.

Problems and deviations encountered this quarter:

Including delayed deliverables and anticipated submission dates:

Work planned next quarter:

Including anticipated of utilization NCDOT personnel and resources:

Problems and deviations anticipated next quarter:

APPENDIX K

TECHNICAL REPORT DOCUMENTATION PAGE

*General instructions: To add text, click inside the form field below (will appear as a blue highlighted or outlined box) and begin typing. The instructions will be replaced by the new text. If no text will be added, remove the form field and its instructions by clicking inside the field, then pressing the Delete key twice.
Please remove this field before completing form.*

1. Report No. Enter the report number assigned by the sponsoring agency.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Enter title and subtitle (use mixed case with initial caps for first word in title and subtitle) with volume and part numbers, if applicable.		5. Report Date Enter same date as is on the report cover. Enter full publication date, including month and date, if available, and full year. Example: June 5, 2014 or June 2014 or 2014
7. Author(s) Enter name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. Form of entry is first name, middle initial (if applicable), last name, and any additional qualifiers. Primary author is listed first. After each author name, enter ORCID (http://orcid.org) URL, when available. Example: Jane G. Smith, Ph.D. http://orcid.org/0000-0002-0543-4268		6. Performing Organization Code Enter any/all unique numbers assigned to the performing organization, if applicable.
9. Performing Organization Name and Address Enter the name and address of the organization(s) performing the research.		8. Performing Organization Report No. Enter any/all unique alphanumeric report numbers assigned by the performing organization, if applicable.
12. Sponsoring Agency Name and Address 3T		10. Work Unit No.
13. Type of Report and Period Covered Enter the type of report (e.g. final, draft final, interim, quarterly, special, etc.) followed by the dates during which the work was performed. Example: Final Report (June 2012-June 2014)		11. Contract or Grant No. Enter the number of the contract, grant, and/or project number under which the report was prepared. Specify whether the number is a contract, grant, or project number. Example: Contract # 8218
15. Supplementary Notes Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration. Enter information not included elsewhere, such as translation of (or by), report supersedes, old edition number, alternate title (e.g. project name), hypertext links to documents or related information in the form of URLs, PURLs (preferred over URLs - https://purl.org/docs/index.html), DOIs (http://www.doi.org), insertion of QR codes, copyright or disclaimer statements, etc. Edit boilerplate FHWA statement above if needed.		14. Sponsoring Agency Code If available, enter the office code or acronym if a sponsoring agency (such as FHWA or NHTSA) is named in field #12. For FHWA office codes, see https://fhwaapps.fhwa.dot.gov/foisp/hqphone.do
16. Abstract Enter a brief factual summary of the most significant information, including the purpose, methods, results, and conclusions of the work. When appropriate, the abstract should include advice on how the results of the research can be used. For guidance, please see ANSI/NISO Z39.14-1997 (R2015) Guidelines for Abstracts (http://www.niso.org/apps/group_public/project/details.php?project_id=124).		

<p>17. Key Words Enter words, terms, or phrases that identify important topics in the report. When possible, terms should be selected from the Transportation Research Thesaurus (TRT) (http://trt.trb.org) in addition to terms not found in the TRT.</p>	<p>18. Distribution Statement No restrictions. This document is available through the National Technical Information Service, Springfield, VA 22161. Enter any other agency mandated distribution statements. Remove NTIS statement if it does not apply.</p>		
<p>19. Security Classif. (of this report) Enter security classification of this report (e.g. Unclassified). Reports carrying a security classification will require additional marking giving security and downgrading information as specified by the sponsoring agency.</p>	<p>20. Security Classif. (of this page) Enter the security classification of the form (e.g. Unclassified). When at all possible, Form DOT F 1700.7 should remain unclassified. If a classification is required, identify the classified items on the page by an appropriate symbol as per instruction from the sponsoring agency.</p>	<p>21. No. of Pages Enter the total number of pages in the report, including both sides of all pages and the front and back covers.</p>	<p>22. Price Refers to the price of the report. Leave blank unless applicable.</p>

APPENDIX L



RESEARCH IMPLEMENTATION SURVEY

Inquiry Date: _____ **Project #:**

Name: _____ **Phone:** _____

Division / Unit: _____ **Email:** _____

Project Title: _____

Project Close Date: _____

Note: All fields will expand as you type. Use as much space as needed.

What were the primary products of the research? Be specific and detailed. Examples of products could include models, specifications, policies, general knowledge, design guides, new material, software tools, etc.

How is the research product used on a regular basis?

Who is leading the implementation?

Provide Unit, Position Title and Name.

Unit: _____

Title: _____

Name: _____

Research Success and Impact: Check the box that best fits.

<input type="checkbox"/> Research objective fulfilled and product is in use <input type="checkbox"/> Research objective fulfilled and implementation is being considered <input type="checkbox"/> Research generated significant new knowledge <input type="checkbox"/> Research did not produce an implementable solution, but NCDOT gained information for future use.	<input type="checkbox"/> Research Objective not fulfilled <input type="checkbox"/> Research shows that NCDOT should not pursue use of the product/design/material etc. <input type="checkbox"/> Other (Specify)
---	---

Describe how the research has benefited the Department?

Estimated time and/or dollar value of research product: Detail any time or dollar savings resulting from research. Could also include life extension of materials, pavements or structures.

Barriers to implementation? Please list any barriers to implementing research.

Additional Comments and Information? How can R&D assist? Training? Additional Research? Other?

LIST OF APPENDICES

APPENDIX A	R&D Unit Organizational Chart
APPENDIX B	Technical Assistance Request Form
APPENDIX C	Research Needs Statement & Instructions
APPENDIX D	Preliminary Proposal Format
APPENDIX E	Preliminary Proposal Review & Instructions
APPENDIX F	Full Proposal Instructions
APPENDIX G	Full Proposal Review & Instructions
APPENDIX H	Project Authorization Cover Page
APPENDIX I	Title VI Assurances
APPENDIX J	Quarterly Progress Report
APPENDIX K	Technical Report Documentation Page
APPENDIX L	Implementation Survey