FEMA

SOUTH CAROLINA
DEPARTMENT OF NATURAL RESOURCES

COOPERATING TECHNICAL PARTNERS
FLOOD STUDY MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. FY10.16

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated September 20, 1999 between South Carolina Department of Natural Resources (SCDNR) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. FY10.16 is as follows:

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SECTION 1—OBJECTIVE AND SCOPE

The objective of the Risk MAP Project documented in this MAS is to develop and / or support a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report, for the Wateree Watershed. All processes and deliverables shall be completed in accordance to the Federal Emergency Management Agency's (FEMA's) Guidelines and Specifications (G&S) for Flood Hazard Mapping Partners and effective Procedure Memoranda (PMs). These documents can be found on FEMA's website at http://www.fema.gov/plan/prevent/fhm/gs_main.shtm and http://www.fema.gov/plan/prevent/fhm/gs_memos.shtm. PMs are used to implement updates the G&S, to provide additional clarification of procedures that are not documented in published guidance documents, and to establish procedures and policies. Should a PM require a scope change, CTPs should work through the change process by submitting Special Problem Reports (SPRs) to the appropriate Regional office.

The DFIRM and FIS report will be produced for the Wateree Watershed - HUC 03050104, in the North American Vertical Datum of 1988 (NAVD88), which will be completed as PMRs for portions of Kerhsaw, Sumter, Lee, Lancaster, Richland (funded in a separate agreement under MAS FY10.17), and Fairfield counties. Additionally, a watershed report for the Wateree Watershed (03050104) will be created and distributed to identified counties. (Refer to PM 41 for exceptions.)

In addition, the Mapping Partners involved in this project will develop new and/or updated flood hazard data, as summarized in Table 1.1, Total Stream Mile Counts by Type of Study.

Table 1.1 – Total Stream Mile Counts by Type of Study

	Coastal	A zone Basic Study	AE, AH Zone Enhanced Study	Revisions due to Updated topographic data
Miles of Effective Flood Insurance Study	0.0	40.2	34.8	
Updated Effective Studies	0.0	0.0/ 0.0	34.8/ 0	0.0
New Studies Identified	0.0	0.0 / 0.0	30.2/ 0	

*Details on type of study will be documented in Full Project Scope Deliverable from Scoping task identified in an attached Appendices.

This Risk MAP Project will be completed by the following Mapping Partners:

- SCDNR;
- URS Corporation (Mapping and QA/QC contractor); and
- AECOM (Mapping and QA/QC contractor).

The Mapping Partner shall notify FEMA and all applicable parties of all meetings with community officials, and other relevant meetings, at least two weeks prior to the meeting (with as much notice as possible). FEMA and/or its contractor may or may not attend the community meetings.

The Mapping Partner shall maintain an archive of all data submitted. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA.)

SCDNR or its mapping contractor is responsible for the implementation of an independent Quality Assurance/Quality Control (QA/QC) plan for all assigned activities. The SCDNR or its mapping contractor will submit a Summary Report that describes and provides the results of all automated or manual QA/QC review steps. The report should include the process for all assigned activities.

Independent QC review activities may be performed by the CTPs or FEMA's contractor at the discretion of FEMA. If the CTP will be utilizing its contractors to do the QC review, this should be identified during Discovery and Project Planning phase. The CTP will need to submit its QC plan to the Regional Project Officer for approval. Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. Whether or not the CTP performs the QC review, the CTP will be responsible for addressing any and all comments resulting from independent QA reviews, including re-submittal of deliverables as needed to pass technical review. The SCDNR or its mapping contractor will submit Risk MAP products to FEMA's designated reviewer for QC prior to public issuance.

Metadata is required for all activities. Mapping Partners are required to comply with Appendix N (Data Capture Standards, or DCS) and Appendix M (TSDN) of Guidelines and Specifications for Flood Hazard Mapping Partners to completely document the work performed. On July 9, 2008, FEMA provisionally released a revised version of the DCS. FEMA recommends that the new DCS be implemented, in lieu of the current DCS (Appendix N), on any project where it is expected to save time and/or money. The ultimate goal of the new DCS is to consolidate the DCS deliverables and the TSDN to reduce the overlapping requirements for Mapping Partners. Because the newly released revised DCS is not yet complete and the necessary MIP changes have not yet been implemented, in order to ensure that FEMA retains complete documentation of studies, FEMA requires that all FEMA-contracted studies must comply with either the existing or the revised DCS and a complete TSDN be submitted as a final deliverable by the effective date of the project (in addition to uploads to the MIP). Mapping Partners are required to certify their TSDNs by signing the certification of project page to ensure that TSDNs submitted represent the final version of all required documentation or that all MIP uploads represent a complete set of required documentation. The submittal of the TSDN requirement will continue until the revised DCS is finalized.

DFIRM-related tasks require a passing QC Report from FEMA's National DFIRM database auto-validation tool for Quality Review (QR) #1, #2, and #5 as described in PM 42. Training materials for this step are available on the Mapping Information Platform (MIP) at MIP User Care>Training Materials.

FEMA will provide download/upload capability for data submittals through the MIP located at https://hazards.fema.gov. As each activity is completed, the data must be submitted to the MIP.

The SCDNR or its mapping contractor assigned the activity will respond to any comments generated as a result of the mandatory quality control checks by the Production and Technical Services contractor (PTS) as described in PM 42. The PTS QC process is nationally funded and required on each study.

In cooperation with the FEMA Project Officer, a Project Management Team (PMT) will be established by the SCDNR or its mapping contractor consisting of representatives from the SCDNR or its mapping contractor, FEMA's regional engineer, the Regional Support Center (RSC), and other appropriate parties. The PMT will be responsible for coordinating the activities identified in this MAS. The FEMA Region will be provided with documentation identifying the established PMT.

Earned Value Data Entry: The MIP Workflow is designed to track the Earned Value of mapping projects. This information is automatically calculated by the MIP, using the Actual cost and schedule of work performed, or "actuals" and comparing them to the expected cost and schedule of work performed, or "baseline".

Once the FEMA Regional office has funded a project FEMA, will complete the "Obligate Project Funds" screen in the MIP. This step establishes the baseline for the project in the MIP, using the cost and schedule information for each task as outlined in this document and agreed to at the completion of the Discovery and Project Planning process.

The MIP study workflow allows SCDNR or its mapping contractor to manage the status of these projects at a task level. The cost and schedule information, updated by the SCDNR or its mapping contractor for each contracted task, is compared to the baseline established for those tasks. This information is rolled up to a project level and monitored by the FEMA Region to assess progress and Earned Value.

Earned Value data entry involves updating cost, schedule and performance (physical percent complete) in the MIP by the SCDNR or its mapping contractor.

Once the baseline has been established in the MIP, the SCDNR or its mapping contractor shall input the performance and actual cost to date for each contracted task for each project. This must be completed at minimum **every thirty days** and at the completion of the task. When a task is completed, including all QA/QC activities in this MAS plus the Quality Control Reviews established in PM 42, the SCDNR or its mapping contractor shall enter 100% complete, enter the actual completion cost, and the actual completion date within the Manage Data Development, Manage Preliminary Map Production, or Manage Post Preliminary Processing, as applicable. The "Manage" tasks will be open and accepting updates for up to 90 days after the completion of the last producer task in each module. The MIP shall also be populated with appropriate leverage information regarding who paid for the data provided and the amount of data used by the Risk MAP Project. The SCDNR or its mapping contractor will maintain a Schedule Performance Index (SPI) and Cost Performance Index (CPI) of at least .92. SPRs must be submitted in a timely manner as required.

The Project Officer, as needed, may request additional information on status on an ad hoc basis.

Project Risk Identification and Mitigation

Responsible Mapping Partner: SCDNR

Threats to the planned completion of a project may come from various sources. Risks should be identified during the planning phase and monitored throughout the project so that potential impact can be assessed and solution strategies developed and implemented as needed.

Table 1.2 – Project Risk Identification

Project Risk	Potential Impact	Solution Strategy
LiDAR acquisition and QC review process for Kershaw, Lee, and Sumter counties is currently underway but may not be ready upon project commencement.	Delay in project start.	Develop schedule after the LiDAR acquisition and QC reviews are complete
Standards are not currently in place to ensure consistency across the Nation in the development of Risk MAP products	Potential for allocated funds to be insufficient to produce required deliverables.	Develop SPR requesting additional funds.
Delay in community supplied data such as Risk MAP data, base map data, and flood study data..	Delay in scheduled completion of data development task and possible delay in preliminary issuance.	Identify needed community supplies data during Discovery and Project Planning and build delivery schedule of community supplied data into the project schedule.

Perform Discovery and Project Planning

Responsible Mapping Partner: SCDNR

Scope: The Project Discovery and Project Planning phase typically begins once some level of a community's mapping needs have been identified and FEMA and the community have decided to initiate a Risk MAP Project to identify, assess, plan for, and communicate the community's risks. The discovery process is divided into three main parts – Production Planning, Discovery Meeting, and the Post-Discovery Meeting Activities.

Production Planning

Once projects have been prioritized based on the Risk MAP prioritization algorithm, the SCDNR or its mapping contractor will conduct production planning activities to collect data to support project planning and implementation. The data requested of the community by the SCDNR or its mapping contractor during Risk MAP production planning will include:

- Elevation data
- Local needs for new or re-studied areas to support updates to CNMS (the selected needs data identified during the CNMS process can be obtained through the FEMA Region/RSC and plotted on the Discovery map for discussion during the Discovery meeting)
- Status of current mapping assessment and planning within project area
- Contact information (including contacts for enhanced stakeholder group and major economic drivers in the watershed)

- Mitigation planning information (including collecting existing plans, plan data and expiration dates, and what technical assistance the communities may desire)
- Community data (e.g., boundaries, demographics)
- Engineering data (e.g., NID information, local studies, new/revised structures)
- Risk assessment data (e.g., local assessment data, non-flood hazards)
- Local communication capabilities, preferences, and demographics
- Insert additional data types

Production planning also presents the first opportunities to communicate with the community about the project. SCDNR or its mapping contractor will complete a Community Communications Assessment to assess the current communication capabilities within the community, and then complete a Community Communications Planning Tool to determine how risk communications capability will be built over the project lifecycle. Specific communications, such as notices of impending study, and a Risk MAP Project Initiation Packet will be sent to the local community from SCDNR or its mapping contractor during this phase.

If Production Planning steps are performed by a separate Contractor, submit a report summarizing the data collection efforts and deliverables.

Discovery Meeting

The main objectives of the Discovery Meeting are to: 1) leave with a common, documented understanding of the scope of the project and planned outcomes; and 2) initiate risk assessment, mitigation planning, and risk communication discussions. SCDNR or its mapping contractor will coordinate, setup, and hold the Discovery Meeting to inform the community of the upcoming flood study and of their responsibilities related to it; this includes identifying a time, place, and participants.

Activities to be conducted during the Discovery Meeting are detailed below.

- Review the NFIP in general and the mapping process in particular
- Identify the mapping needs identified by each affected community
- Identify the existing flood hazards in the project area, which can include riverine, coastal (ocean and gulf), lacustrine, alluvial fan, and shallow flooding hazards to be assessed
- Determine the existence and accuracy of available topographic data
- Determine the base map to be used for the production of the Digital Flood Insurance Rate Map (DFIRM)
- Finalize and document (through the Project Participation Agreement) the scope of the project, including determining which flooding sources would be studied
- Make or confirm assignments to SCDNR or its mapping contractor members using an updated MAS/SOW template
- Provide compliance/adoption information to community officials
- Initiate risk assessment and mitigation planning discussions
- Identify the level of risk assessment and planning support required
- Update the Coordinated Needs Management System (CNMS)

- Validate the information captured by the community assessment tool and identify appropriate local spokesperson(s) for the project moving forward
- Initiate development of a Project Risk Communications Plan
- Present the high level results of the ALE/HAZUS and risk assessment examples to meeting attendees

The Risk MAP Discovery Meeting will include members of an "enhanced stakeholder group" (described below) that will provide a broad local knowledge base to help inform the project. Meeting with this larger group will also allow FEMA to share Risk MAP project data with a wider local audience than has been done before.

Risk MAP Discovery Meeting invitees/attendees are listed below.

- Regional Project Team Lead (usually a Regional Engineer)
- CTP members of the PMT
- Regional Support Center (RSC) members of the PMT
- CTP contractor members of the Project Team
- State NFIP Coordinator(s), if not participating as a CTP
- Other Federal agencies that are active or have a vested interest in the Risk MAP effort in the area (either under an Interagency Agreement with FEMA or as part of their own programs)
- Community Chief Executive Officers (CEOs) and floodplain administrators (FPAs) in the watershed/study area affected
- Indian Tribal entity CEOs and FPAs in the watershed/study area if Indian Tribal lands affected
- Community floodplain managers/building officials that are not identified as FPAs for program purposes
- Community officials that are not identified as FPAs for program purposes
- Community Geographic Information System (GIS) specialists
- Community planners (e.g., mitigation planners, land-use planners, housing/ community development officials, planning and zoning officials)
- State and local emergency management officials
- Economic development and commerce representatives (e.g., local economic development officials, chambers of commerce, large businesses)
- Other stakeholders with ongoing projects
- Representatives of environmental groups
- Representatives of State agencies other than the State NFIP Coordinator(s)

The SCDNR or its mapping contractor will support the FEMA Consultation Coordination Officer (CCO) for this flood study as identified in 44 CFR Part 66. The CCO for this study is identified as Laura, Algeo, PE, CFM. During the Discovery Meeting, the SCDNR or its mapping contractor must inform the communities of their responsibilities as described under the above-referenced regulation. Following initial contact with the communities, the CTP will prepare and setup the Community Case File and Flood Elevation Determination Docket for the maintenance of all communication and coordination throughout the project as outlined in 44 CFR Parts 66 and 67.

Post-Discovery Meeting Activities

- Select available and needed geospatial data to be used in the study and risk assessments as well as update FEMA's geospatial data tracking systems, National Digital Elevation Program (NDEP)

and National Digital Orthophoto Program (NDOP) located at http://hazards.fema.gov/metadata/NDEP and http://hazards.fema.gov/metadata/NDOP.

- Evaluate selected needs and community requests to determine the community's unmet needs and develop the final Scope of Project document for delivery to FEMA and the community.
- Update CNMS with the final documentation showing newly validated and/or areas with remaining needs as appropriate.
- Supply a copy of the approved Discovery Report back to the communities in order to ensure they are aware of which needs were selected to be updated during the flood study.

Based on the discussion of flood data update and base map update requests, SCDNR or its mapping contractor and the FEMA Project Officer will finalize the areas to be included in the final scope of project (based on recommendations provided by the PMT). Areas to be studied by basic or enhanced study methods shall be identified. The following issues will be discussed and refined: Review and Refinement of Flood Hazard Identification Methodologies, Review of Proposed Paneling Scheme, Review and Refinement of Base and Topographic Map Source, and Finalization of Map Production and Database Options.

Identify all stream/coastal reaches where levees are shown as providing protection against the 1-percent-annual-chance flood. SCDNR or its mapping contractor must work with the FEMA Regional Office to request the information specified in Title 44 Code of Federal Regulations (CFR) 65.10, mapping of areas protected by levee systems, from the community or other party seeking continued recognition of the levee and provide this information to the FEMA Regional Office and/or PMT.

Many of the activities at each phase can take place concurrently and are not contingent on the completion of previous tasks. The FEMA Project Officer, working in close coordination with the PMT, has the flexibility of tailoring the Discovery process to best fit the needs of the project. SCDNR or its mapping contractor will evaluate the effective flood data, available base data and selected needs to determine the scope of project to be approved by FEMA.

Standards: All Discovery and Project Planning work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP.

- Final Discovery Report for project documented in MAS or SOW will be delivered in accordance with the schedule outlined in Section 6 - Schedule to the Regional Project Officer for approval. Project scope should include a list of watersheds and affected communities to be studied/mapped and a clear assessment of ability of the project to meet metrics.

- QA/QC Plan for the review of the mapping project outlined in this MAS. This will include the checklists developed for that review in accordance with the schedule included in Section 6 - Schedule.

- Updated list of CEO or local FPA contacts or a report from CIS showing this information has been updated.

- Update leverage data in MIP.

- Report documenting levee information transmitted to the FEMA Regional office and/or the PMT.

- Report from FEMA CNMS, showing needs identified during the Discovery and Project Planning process that will not be addressed in the final scope of project are entered.
- Report showing that, if obtained from non-Federal sources, information on available terrain and ortho-imagery data has been entered into the NDEP and NDOP project tracking Web sites, respectively.
- Other deliverables including reports, correspondence, maps, agenda, meeting summaries, tabular data, and geospatial files to be submitted throughout the Discovery and Project Planning process.
- For leverage data, evidence that the providing partner is aware of the delivery deadlines and scope for deliverable products, and that they are capable of meeting those requirements.

Perform Project Outreach

(NOTE: The performance of outreach takes place throughout the life of the flood study project. Work with your Region to develop a Project Outreach Plan (POP). Therefore, we recommend tracking the outreach budget, in the MIP Workflow, equally between Produce Preliminary Map Products and Post Preliminary Processing. An alternate tracking method is acceptable with approval from the FEMA Regional Office.)

FEMA's outreach program includes the following meetings (on average): Discovery Meeting, Flood Study Review Meeting, Final CCO Meeting/Public Open House, and a Sustainability Meeting.

Four outreach meetings

Risk communication to the state and local officials will begin during the Discovery and Project Planning process. As indicated earlier, SCDNR or its mapping contractor will obtain and review information regarding existing hazard mitigation plans and other data to support risk assessment and potential planning efforts. It will also be used to initiate risk discussions with the community, and obtain critical information regarding local communication protocols. This Risk MAP project will include four in-person opportunities to build risk awareness at the local level. The actual number of meetings will be determined based on the risk and need at the local level and determined as part of developing the project-based communication plan. These opportunities consist of:

- **Discovery Meeting**. The traditional scoping meeting will be enhanced to include members of the enhanced stakeholder group, described in detail above in "Perform Discovery and Project Planning."
- **Flood Study Review Meeting**. This meeting will serve two purposes. First it will provide local stakeholders the opportunity to view and comment on the engineering analyses prior to public release and encourage them to take ownership of the results. Second, it will provide refined risk assessment data and preliminary contributing flood risk factors, thereby increasing risk awareness and providing the local stakeholders with the opportunity to take proactive measures to reduce its risk in the short term.
- **Final CCO meeting(s)/open house**. This meeting will provide local officials an opportunity to verify the appropriate revisions have been made to previously demonstrated information, take ownership of the products, and deliver the results of the project to the local citizenry. Risk MAP production team support will be provided to support the local officials, or deliver the messages, if the local officials are unwilling.
- **Resilience Meeting**. The final Risk MAP project outreach and communication effort will occur sometime between the Letter of Final Determination (LFD) and shortly after adoption. Its purpose

will be to "turn-over" final results of the project to the local stakeholders, develop an action plan for them to use the results of the Risk MAP project to take risk reduction measures, and obtain feedback on how the project could have been implemented better, including how risk communications can be improved in the future.

To facilitate information sharing and a continuing dialogue between the PMT and the community, the SCDNR will provide communities with a monthly status report outlining the current project status, key accomplishments to date, and next steps (template to be provided from FEMA).

The overarching goal is to create a climate of understanding and ownership of the mapping process at the State and local levels. Well-planned and executed community engagement can reduce political stress, confrontation in the media, and public controversy, which can arise from lack of information, misunderstanding, or misinformation. These outreach activities also can assist FEMA and other members of the SCDNR in responding to congressional inquiries.

The SCDNR will work with the Regional Office during the initiation of this activity to develop the Project Communications Plan to support the implementation of the mapping project. The Regional Office will have access to many customizable outreach tools that have been developed for this process to support each touchpoint that the PMT has with the community. Volume 1 of the G&S provides specific outreach goals that can be considered

All communication with local governments will be done in accordance with 44 CFR Part 66.

Deliverables: Upon development of a Project Communications Plan, the SCDNR or its mapping contractor shall deliver the following to the FEMA Regional Project Officer in accordance with the schedule outlined in Section 6 – Schedule and include within the TSDN:

- A report detailing outreach and coordination activities
- Backup or supplemental information used in writing this report

Perform Field Survey

Responsible Mapping Partner: SCDNR

Scope: To supplement any field reconnaissance conducted during the Discovery and Project Planning phase of this project, SCDNR or its mapping contractor shall conduct a detailed field reconnaissance of the specific study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance or lack thereof of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses.

SCDNR or its mapping contractor shall conduct field surveys, including obtaining channel and floodplain cross sections, identifying or establishing temporary or permanent bench marks, and obtaining the physical dimensions of hydraulic and flood-control structures. SCDNR or its mapping contractor also shall coordinate with other Mapping Partners that are involved in the Topographic Data Development process regarding ongoing activities and deliverables.

Standards: All Field Survey work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles

Specifications, must accompany the G&S compliant digital data. Additionally, support documentation and Certification of Work shall be submitted according to Appendix M. Where Technical Support Data Notebook (TSDN) format is used, such shall be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results;
- Survey notebook containing cross section and structure data;
- Documentation of the horizontal and vertical datum;
- Digital versions of draft text for inclusion in the FIS report;
- Digital survey data consistent with the DCS (see draft DCS language and coordinate with the Region regarding its appropriate usage) as described in the G&S, and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

Develop Topographic Data

Responsible Mapping Partner: SCDNR

Scope: Topographic/elevation data may be new or existing. New is defined as data that will be flown and processed for the areas specified in this MAS according to the referenced specifications. Existing topographic/elevation data (previously flown and/or processed) may be used to produce flood studies and related products. However, if new data is not to be collected, the FEMA Region should be consulted before leveraging the best available existing topographic to ensure acceptability for the intended level of flood hazard study.

SCDNR or its mapping contractor shall obtain additional topographic data for the floodplain areas to be studied including overbank areas. These data will be used for hydrologic analysis, hydraulic analysis, floodplain boundary delineation and/or testing of floodplain boundary standard compliance. SCDNR or its mapping contractor shall gather availability, currency, and accuracy information for existing topographic data covering the communities in this MAS. SCDNR or its mapping contractor shall use topographic data for work in this MAS only if it is better quality than that of the original study or effective studies. In coordination with the partner who performed the Discovery and Project Planning task in conjunction with this MAS, ensure that the FEMA Geospatial Data Coordination Policy and Implementation Guide is followed and the data obtained or to be produced are documented properly as per those policies and guidelines.

Requirements for New Topographic Data:

For this activity, SCDNR or its mapping contractor also shall generate the data collected under this Topographic Data Development task and via field surveys to create a best available digital elevation model for the subject flooding sources. In addition, SCDNR or its mapping contractor shall address all concerns or questions regarding the topographic data development and processing that are raised by

SCDNR or its mapping contractor during the independent QA/QC review. SCDNR or its mapping contractor should confirm with the FEMA Project Officer the appropriate data model(s) (i.e. contours, Digital Elevation Models (DEMs), TIN, mass points and breaklines) for the intended use of the data

Requirements for leveraging existing Topographic Data:

SCDNR or its mapping contractor shall use topographic data for the areas described in the Table 1.5 Summary of Topographic Data table. The source of the topographic data must be listed as well. SCDNR or its mapping contractor shall coordinate with other team members conducting field surveys as part of this MAS. Accuracy for the topographic data shall be evaluated based on the current FEMA requirements for flood hazard study level of detail as documented in the G&S.

SCDNR or its mapping contractor also shall update the topographic maps and/or DEMs for the subject flooding sources using the data collected under this Topographic Data Development process and via field surveys. In addition, SCDNR or its mapping contractor shall address all concerns or questions regarding the topographic data development that are raised by SCDNR or its topographic data development QA/QC contractor during the independent QC review, or during the PM 42 defined Validation Process.

Funding and authorization for the acquisition of terrain data for Kershaw, and Sumter Counties were provided in MAS 15. Funding and authorization for the acquisition of terrain data for both Lancaster, and Fairfield Counties were provided in MAS 9 and11.

Table 1.5 Summary of Topographic Data

New/Existing	Study Area	Accuracy & Age	Source	Contact Info	Approximate Footprint	Use Restrictions
New(funding and specs defined in MAS FY10.15)	Kershaw County	≤18.5 cm RMSE	SC LiDAR consortium	James Scurry, PhD, Technology Development Program Director, SCDNR	Kershaw County	None
New(funding and specs defined in MAS FY10.15)	Sumter County	≤18.5 cm RMSE	SC LiDAR consortium	James Scurry	Sumter County	None
New(funding and specs defined in MAS FY10.17)	Richland County	≤18.5 cm RMSE	SC LiDAR consortium	James Scurry	Richland County	None
Existing	Lancaster County	≤18.5 cm RMSE	SC LiDAR consortium	James Scurry	Lancaster County	None
Existing	Fairfield County	≤18.5 cm RMSE	SC LiDAR consortium	James Scurry	Fairfield County	None

Standards: All Topographic Data Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP and submit support documentation and Certification of Work according to Appendix M (where Technical Support Data Notebook (TSDN) format is used, such shall be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal) so that all parties that needs it can access it as needed in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles, must accompany the uploaded G&S compliant digital data. Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

- Digital contour data;
- Report summarizing methodology and results;
- Mass points and breaklines data;
- Gridded digital elevation model data;
- TIN data;
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of data voids and methods used to supplement data voids;
- National Geodetic Survey data sheets for Network Control Points used to control remote-sensing and ground surveys;
- Other supporting files consistent with the DCS in the G&S (see draft DCS language and coordinate with the Region regarding its appropriate use);
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan;
- A narrative from describing the scope of work, direction from FEMA, issues, information for next mapping partner, etc.

Perform Independent QA/QC: Topographic Data

Responsible Mapping Partner: SCDNR

Scope: SCDNR or it mapping contractor shall perform an impartial review of the mapping data generated by SCDNR under Develop Topographic Data to ensure that these data are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The CTP will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

Standards: All Topographic Data Development work shall be reviewed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that are identified during the independent QA/QC review.

Acquire Base Map

Responsible Mapping Partner: SCDNR

Scope: Base Map Acquisition consists of obtaining the digital base map, for Kershaw, Sumter, Lee, Lancaster, and Fairfield counties, for the project and as necessary, preparing the base map for use. SCDNR or its mapping contractor shall provide the digital base map.

Standards: All Base Map Acquisition work shall be performed in accordance with the standards specified in Section 5 - Standards. The DCS must be met for this deliverable to be acceptable.

Requirements: Obtain digital files (raster or vector) of the base map. In coordination with the partner who performed the Discovery and Project Planning task, ensure that the FEMA Geospatial Data Coordination Policy and Implementation Guide are followed.

- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Review and supplement the content of the acquired base map to comply with the requirements of the G&S.
- For the base map components that have a mandatory data structure, convert the base map data to the format required in the G&S.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.

In addition, SCDNR or its mapping contractor shall address all concerns or questions regarding the base map that are raised during the Independent QC review performed by SCDNR or its QA/QC contractor, or during the PTS's Validate Content Submission Process. Optional Table 1.6 Summary of Base Map is useful if multiple counties are involved with this map update. SCDNR or its mapping contractor shall summarize the base map that will be used for each study area in optional Table 1.6 Summary of Base Map.

Table 1.6 Summary of Planned Base Map

Study Area	Description	Source
Kershaw County SC	Digital vector transportation (roads, rail, airports) and corporate boundaries and parks (county, city, state, national, forest, preserves) files	County
Sumter County, SC	Digital vector transportation (roads, rail, airports) and corporate boundaries and parks (county, city, state, national, forest, preserves) files	County
Lee County, SC	Digital vector transportation (roads, rail, airports) and corporate boundaries and parks (county, city, state,	County

	national, forest, preserves) files	
Lancaster County, SC	Digital vector transportation (roads, rail, airports) and corporate boundaries and parks (county, city, state, national, forest, preserves) files	County
Fairfield County, SC	Digital vector transportation (roads, rail, airports) and corporate boundaries and parks (county, city, state, national, forest, preserves) files	County
Richland County, SC	Digital vector transportation (roads, rail, airports) and corporate boundaries and parks (county, city, state, national, forest, preserves) files	County

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP so that SCDNR or its QA/QC contractor can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Digital base map files that comply with the G&S requirements
- Written certification that the digital data meet the minimum standards and specifications;
- Digital versions of draft text for inclusion in the FIS report;
- Documentation that FEMA can use the digital base map; and
- Documentation of the Datum, if appropriate.

Perform Independent QA/QC: Base Map

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its QA/QC contractor shall perform an impartial review of the base map acquired by SCDNR or its mapping contractor to ensure it includes data consistent with FEMA standards and sufficient to include on the DFIRM. Any needed edits should be made to the product to comply with FEMA standards.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The CTP will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review;

- Recommendations to resolve any problems that are identified during the independent QA/QC review; and
- If the data is changed during review, then updated deliverables from previous tasks will be submitted at this time.

Develop Hydrologic Data

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its mapping contractor shall perform hydrologic analyses for approximately 1,255 square miles of drainage area for the flooding source(s) identified in final Discovery Report. SCDNR or its mapping contractor shall calculate peak flood discharges for the 10, 25, 50, 100 and 500 year events using the appropriate USGS Regional Regression Equations for all base and enhanced study streams along with additional checks such as gauging station data analysis. Additionally the peak flood discharges for the 1-percent +- events shall be calculated using appropriate USGS Regional Regression Equations. These flood discharges will be the basis for subsequent Hydraulic Analyses performed under this MAS. In addition, SCDNR or its mapping contractor shall address all concerns or questions regarding the hydrologic analyses that are raised during the independent QA/QC review performed by SCDNR or its QA/QC contractor during the QA/QC review.

If GIS-based modeling is used, SCDNR or its mapping contractor shall document automated data processing and modeling algorithms, and provide the data to FEMA to ensure these are consistent with FEMA standards. Digital datasets (such as elevation, basin, or land use data) are to be documented and provided to FEMA for approval before performing the hydrologic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analysis, then SCDNR or its mapping contractor shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

Standards: All Hydrologic Analyses work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP so that SCDNR or its QA/QC contractor can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Digital copies of all hydrologic modeling (input and output) files for the 10, 25, 50, 100 and 500 year events;
- Digital Summary of Discharges Tables presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital versions of draft text for inclusion in the FIS report;
- Digital versions of all backup data used in the analysis including work maps;
- Format Hydrology Database or Data Delivery consistent with the DCS–in the G&S of all return periods (see draft DCS language and coordinate with the Region regarding its appropriate use);

- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan;
- For GIS-based modeling, deliverables shall include all input and output data, and GIS data layers.
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

Perform Independent QA/QC: Hydrologic Data

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its QA/QC contractor shall perform an impartial review of the technical, scientific, and other information submitted by SCDNR or its mapping contractor specific to the hydrologic analyses to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The CTP will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
    - Use of acceptable models;
    - Use of appropriate methodology(ies);
    - Correctly applied methodology(ies)/model(s), including QC of input parameters;
    - Comparison with gage data and/or regression equations, if appropriate; and
    - Comparison with discharges for contiguous reaches or flooding sources throughout the watershed.

- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA; and
- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review.
- Recommendations to resolve any problems that are identified during the independent QA/QC review.
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

Develop Hydraulic Data

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its mapping contractor shall perform new hydraulic analyses for approximately 30.2 miles of the flooding sources listed in Table 1.7. This is in addition to updating 34.8 miles of effective studies as listed in Table 1.1. The modeling will include the 10, 25, 50, 100 and 500 year events based on peak discharges computed under Hydrologic Analyses. The hydraulic methods used for this analysis will include base level and enhanced level hydraulic modeling. The base level will use an automated hydraulic model, and use the best available elevation data. The enhanced level will include field surveys, floodways, and the 10, 25, 50, 100 and 500 year flood analyses. The hydraulic methods used for this analysis will include HEC-RAS version 4.1 or other approved FEMA model. In addition, a depth grid will be developed for newly studied areas and existing studied areas that are considered valid.

SCDNR or its mapping contractor shall use the cross-section and field data collected during Field Survey and the topographic data collected during the Topographic Data Collection, when appropriate, to perform the hydraulic analyses. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

SCDNR or its mapping contractor shall use the FEMA CHECK-2 or CHECK-RAS checking program to verify the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review, SCDNR or its mapping contractor shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, SCDNR or its mapping contractor shall address all concerns or questions regarding the hydraulic analyses that are raised by SCDNR or its QA/QC contractor during the independent QA/QC review.

SCDNR or its mapping contractor shall document automated data processing and modeling algorithms for GIS-based modeling and provide the data to FEMA for review to ensure these are consistent with the standards outlined above. Digital datasets are to be documented and provided to FEMA for approval before performing the hydraulic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then SCDNR or its mapping contractor shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses.

Any flooding sources associated with a levee that are mapped as providing protection on effective FIRMs, but will not meet certification requirements for the new FIRMs, will require revised hydraulic analysis. This revised analysis should be done in accordance with the G&S, PMs 34, 43 and others that may be appropriate.

Table 1.7 Summary of Hydraulic Data

Study Area	Method	Total Miles of New Base level or Enhanced Level Hydraulics
Wateree Watershed	**HEC-RAS**	**30.2**

Standards: All Hydraulic Data work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP so that SCDNR or its QA/QC contractor can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Digital profiles of the 10, 25, 50, 100 and 500 year events representing existing conditions using the FEMA RASPLOT program or similar software;
- Digital Floodway Data Tables for each flooding source that is compatible with the DFIRM database;
- Digital hydraulic modeling (input and output) files;
- Digital tables with range of Manning's "n" values;
- Explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate;
- Digital versions of all backup data used in the analyses;
- Digital versions of draft text for inclusion in the FIS report;
- Format Hydraulic Database or Data Delivery consistent with the Data Capture Standards–in the G&S (see draft DCS language and coordinate with the Region regarding its appropriate use); and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.
- For GIS-based modeling, deliverables include all input and output data, GIS data layers, and final products in the format of the DFIRM database structure;
- Depth grids for all studied streams for all frequencies as required.
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record. Appropriate leverage information includes who paid for the data and the amount of data used by the Risk MAP Project.

Perform Independent QA/QC: Hydraulic Data

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its QA/QC contractor shall perform an impartial review of the technical, scientific, and other information submitted by SCDNR or its mapping contractor under Hydraulic Analysis to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are

sufficient to revise the FIRM. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The CTP will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
    - Use of acceptable model(s);
    - Starting water-surface elevations;
    - Cross-section geometry;
    - Manning's "n" values and expansion/contraction coefficients;
    - Bridge and culvert modeling;
    - Flood discharges;
    - Regulatory floodway computation methods; and
    - Tie-in to upstream and downstream non-revised Flood Profiles.

- Use the CHECK-2 or CHECK-RAS program, as appropriate, to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library); and
- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review;
- Recommendations to resolve any problems that are identified during the independent QA/QC review; and
- If the data changed during the Hydrologic and/or Hydraulic Analyses QA/QC process, then the updated and verified deliverables from these activities will be resubmitted at this time.

Perform Floodplain Mapping

Responsible Mapping Partner: SCDNR

Scope for Base Level Study: SCDNR or its mapping contractor shall delineate the 1 percent-annual-chance floodplain boundaries and any other applicable elements for the flooding sources for which hydrologic and enhanced hydraulic analyses were performed. These areas will be mapped as Zone AE with appropriate BFEs and other required elements per the G&S. If floodways will not be developed then, community concurrence of that decision will be collected. SCDNR or its mapping contractor shall incorporate all new or revised hydrologic, hydraulic, and/or coastal modeling and shall use the topographic data acquired under Develop Topographic Data to delineate the floodplain and regulatory floodway boundaries on a digital work map.

Scope for Enhanced Riverine Analysis: SCDNR or its mapping contractor shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) and any other applicable elements for the flooding sources for which hydrologic, enhanced hydraulic analyses were performed. These areas will be mapped as Zone AE with appropriate BFEs and other required elements per the G&S. SCDNR or its mapping contractor shall incorporate all new or revised hydrologic, hydraulic, and/or coastal modeling and shall use the topographic data acquired under Develop Topographic Data to delineate the floodplain and regulatory floodway boundaries on a digital work map.

SCDNR or its mapping contractor shall incorporate the results of all effective Letters of Map Change (LOMCs) for all affected communities on the DFIRM and provide to the appropriate PTS the required submittals for incorporation into the National Flood Hazard Layer (NFHL). Also, SCDNR or its mapping contractor shall address all concerns or questions regarding Floodplain Mapping that are raised by SCDNR or its QA/QC contractor during the independent QA/QC review.

The SCDNR or its mapping contractor will provide the data to FEMA, at the time of DFIRM data submission, to update the Mid-Term Levee Inventory (MLI).

Standards: All Floodplain Mapping work shall be performed in accordance with the standards specified in Section 5 - Standards. Mapping quality standards must be consistent with PM 38, dated October 17, 2007. SCDNR or its mapping contractor will perform self-certification audits for the Floodplain Boundary Standards, as described in PM 38 and all subsequent revisions, for all flood hazard areas.

The SCDNR or its mapping contractor assigned the floodplain mapping task will complete all activities pertaining to levees in accordance with the G&S, and all levee PMs.

Deliverables: In accordance with the G&S, and upon completion of floodplain mapping for all flooding sources in this project, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP so that SCDNR or its QA/QC contractor can access it for the independent QA/QC review in accordance with the schedule outlined in Section 6 – Schedule.

- A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the compliant digital data.
- Additionally, support documentation and Certification of Work shall be submitted according to Appendix M. Where Technical Support Data Notebook (TSDN) format is used, such shall be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal. The mapping for the remaining flooding sources including any non-revised digital panels and all

merged revised and non-revised floodplain mapping data is to be submitted for the Independent QA/QC review at the completion of this activity.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- Digital work map showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone designation labels, gutters, and all applicable base map features;
- Draft DFIRM database prepared in accordance with the requirements in G&S;
- Digital versions of input and output for any computer programs that were used consistent with the DCS–in the G&S (see draft language and coordinate with the Region regarding its appropriate usage);
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan;
- Any backup or supplemental information including supporting calculations and assumptions used in the mapping required for the independent QA/QC review of Hydrologic, Coastal and /or Hydraulic Analyses and Floodplain Mapping consistent with the DCS–in the G&S (see draft language and coordinate with the Region regarding its appropriate usage);
- An explanation for the use of existing topography for the studied reaches, if appropriate;
- Written summary of the analysis methodologies;
- Digital versions of draft FIS report, Floodway Data Tables and updated profiles including all profiles and tables converted appropriate datum, as well as any other necessary items for the finalization of the preliminary FIS;
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted consistent with the DCS–in the G&S (see draft language and coordinate with the Region regarding its appropriate usage);
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

Perform Independent QA/QC: Floodplain Mapping

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its QA/QC contractor shall perform impartial review of the floodplain mapping submitted by SCDNR or its mapping contractor under Floodplain Mapping to ensure that the results of the analyses performed are accurately represented, the Redelineation of existing data on new, updated topography is appropriate, and to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the unrevised areas that are mapped. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The CTP will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain widths at cross sections as shown on the work maps to ensure the data matches the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure the data matches the Flood Profiles.
- For non-revised floodplain areas, the 1- and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM, the contour lines, other topographic information, and planimetric information shown on the DFIRM base.
- Road and floodplain relationships are maintained for all unrevised areas.
- Review the flood insurance risk zones as shown on the work maps to ensure the data are labeled properly.
- Review the DFIRM mapping files to ensure the data were prepared in accordance with the requirements in G&S.
- Review the metadata files to ensure the data includes all required information shown in the NFIP Metadata Profiles Specifications.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the QA/QC review, noting any deficiencies in or agreeing with the mapping results;
- Recommendations to resolve any problems that are identified during the independent QA/QC review;
- An annotated work map with all questions and/or concerns indicated, if necessary; and
- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

Develop DFIRM Database

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its mapping contractor shall prepare the database in accordance with G&S, for upload to the MIP. SCDNR or its mapping contractor will be preparing the database for this project in the Standard format. The database shall be produced in accordance with the G&S. SCDNR or its mapping contractor shall coordinate with appropriate Mapping Partners, as necessary, to resolve any problems that are identified during development of the DFIRM Database.

Standards: All DFIRM Database work shall be performed in accordance with the standards specified in Section 5 - Standards. Perform appropriate QR activitie(s).

Deliverables: In accordance with G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the Technical Support Data Notebook format described in G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- DFIRM database files prepared in accordance with the requirements in G&S and in the required format(s).
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications.

Produce Preliminary Map Products

Responsible Mapping Partner: SCDNR

Scope: SCDNR or its mapping contractor shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Floodplain Mapping. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). SCDNR or its mapping contractor shall coordinate with those Mapping Partners responsible for Floodplain Mapping and/or Redelineation, as necessary, to resolve any problems that are identified during development of the DFIRM Database and graphics.

Preliminary Summary of Map Actions (SOMA) Preparation: The SCDNR or its mapping contractor shall prepare Preliminary SOMAs for all affected communities, if appropriate. The SOMA shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Standards: All DFIRM Database work shall be performed in accordance with the standards specified in Section 5 - Standards. All work must pass the automated and visual "National QA/QC" reviews prior to the distribution of the preliminary copies of the DFIRM and FIS report and the Preliminary SOMA. Perform appropriate QR activitie(s).

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- Preliminary DFIRM database or revised Preliminary DFIRM database prepared in accordance with the requirements in G&S;
- Provide assessment products as defined during Discovery and Project Planning process;
- FIS Report and the Preliminary SOMA prepared using the SOMA Tool on the MIP;

- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in approved QA/QC Plan;
- Passing Quality Review report;
- QUALITY REVIEW 2: Auto Validation of Preliminary DFIRM Database;
- QUALITY REVIEW 3: Visual Review of Preliminary Map Panels and FIS; and
- QUALITY REVIEW 4: Validate BFE Notice and CEO Letters; Publish Proposed Base Flood Elevations (BFEs) in Federal Register.
- Update CNMS with the final documentation showing newly validated and/or areas with remaining needs, as appropriate.
- Refined HAZUS deliverable (see Risk Assessment Procedure Memorandum for details)
- Risk Assessment Suite (see Risk Assessment Procedure Memorandum for details)
    - Depth Grids
    - 'Changes Since Last Map' map
    - Contributing Flood Risk Factors
    - Watershed Report and Database

Perform Independent QA/QC: Produce Preliminary Map Products

Responsible Mapping Partner: SCDNR

Scope: Upon completion of the floodplain mapping and redelineation activities, SCDNR or its QA/QC contractor shall perform an impartial review of the DFIRM spatial database to determine if it meets current FEMA database specifications. In addition, SCDNR or its QA/QC contractor shall review the DFIRM to ensure it meets current FEMA graphic specifications. SCDNR or its mapping contractor shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The CTP will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and following the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs, gutters, cross sections, transects, studied streams and shorelines, mapped political entities, and all roads within and adjacent to the 1-percent-annual-chance floodplains.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the requirements in G&S.
- All map collar information is complete, correct, and follows the requirements specified in G&S.
- Preliminary DFIRM database is in a GIS file and database format as specified in FEMA's G&S, and conform to those specifications for content and attribution.

- DFIRM database files are in one of the database formats specified in FEMA's G&S, and conform to those specifications for content and attribution.
- Assess risk assessment products for compliance with Guidance documents.

Standards: All DFIRM Database Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 – Schedule.

- A Summary Report that describes the findings of the QA/QC review noting any deficiencies in or agreeing with the mapping results and the results of all automated or manual QA/QC steps taken during the independent QA/QC review;
- Recommendations to resolve any problems that are identified during the independent QA/QC review;
- An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary; and
- If the data changed during the QA/QC process, then the updated deliverables from Floodplain Mapping and Redelineation will be resubmitted at this time.

Distribute Preliminary Map Products

Responsible Mapping Partners: SCDNR

Scope: Preliminary Map Products consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM; FIS report; the Preliminary SOMA; and Risk Assessment products for community officials and the general public review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

Preliminary Transmittal Letter Preparation: The SCDNR or its mapping contractor shall prepare letters and transmit the Preliminary copies of the DFIRM and FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA. This letter may be prepared for FEMA only or for signature by FEMA and SCDNR .

Distribution of Preliminary DFIRM and FIS Report: The SCDNR or its mapping contractor shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

News Release Preparation: The SCDNR or its mapping contractor shall use the BFEs on the Web tool in accordance with PM 44 to create BFE notices for studies that result in new or modified BFEs. The SCDNR or its mapping contractor shall prepare the BFE determination letters as well as the news release

notifications of BFE changes for all affected communities. The SCDNR or its mapping contractor shall perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. The SCDNR or its mapping contractor shall file the notifications for later submittal to FEMA for review.

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the appropriate deliverables available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. Preliminary transmittal letters shall be prepared and transmitted. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual* and in conjunction with Guidance provided by the Region and/or its contractor.

- A preliminary copy of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the Chief Executive Officer (CEO) and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be provided as appropriate.
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the final preparation of the preliminary DFIRM shall be provided as outlined in the approved QA/QC Plan.
- SCDNR or its mapping contractor will submit a summary of outreach activities and any changes made in the outreach approach based on the actual implementation.

Post-Preliminary Map Production

Responsible Mapping Partners: SCDNR and FEMA.

Scope: Post-Preliminary Map Production includes coordination with FEMA and the Community to schedule a Community Meeting(s) for review of the Preliminary DFIRM, if required. This activity consists of finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued to community officials and the public for review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

Community Coordination Meeting: If a community coordination meeting is required it is recommended that it be held within 60 days of the issuance of the Preliminary DFIRM and, SCDNR or its mapping contractor shall arrange for and verify that the following activities are completed:

- Establish invitee list,
- Schedule meeting date and place,
- Complete and Distribute Meeting Notice/Letter,
- Record Meeting Minutes, and
- Identify any/all communities with BFE changes for required appeal period.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, FEMA and SCDNR or its mapping contractor shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA G&S, appropriate PMs and Document Control Procedures Manual:

- The SCDNR or its mapping contractor shall prepare the appropriate notices (Proposed Rules) that are to be published in the *Federal Register*. The SCDNR or its mapping contractor shall then deliver those notices to FEMA for publication.
- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators.
- Ensure that news release notifications of BFE changes are published in prominent newspapers with local circulation in accordance with 44 CFR.
- When SCDNR or its mapping contractor holds public meetings to present and discuss the results of this Risk MAP Project, FEMA may attend the meetings and assist where possible, if requested.

Resolution of Appeals and Protests: SCDNR or its mapping contractor shall review and resolve appeals and protests received during the 90-day appeal period. For each appeal and protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal;
- Preparation of letter(s) requesting additional supporting data;
- Performance of revised analyses;
- Preparation of a draft resolution letter for appeals and protests for signature with FEMA and revised DFIRM and FIS report materials for FEMA review;
- Update CNMS as appropriate when resolving appeals/protests; and
- Update the Risk Assessment Suite as needed for appeal resolutions.

SCDNR or its mapping contractor shall mail all associated correspondence upon authorization by FEMA. While protests may be signed by a partner only, appeals must have at least a FEMA co-signature.

SCDNR or its mapping subcontractor's role in supporting the appeal and protest process includes up to 80 hours of technical support. If the SCDNR or its mapping subcontractor's required level of effort to resolve appeals and protest exceeds 80 hours total, SCDNR will coordinate with FEMA for resolution options.

Preparation of Special Correspondence: SCDNR shall support FEMA in responding to any technical comments not received within the 90-day appeal period (referred to as "special correspondence") FEMA will draft responses for when appropriate and finalizing responses for signature. FEMA also shall mail the final correspondence (and enclosures, if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from FEMA.

Revision of FIRM and FIS Report: If necessary, FEMA shall work together with SCDNR to revise the DFIRM and FIS report and shall distribute revised Preliminary copies of the DFIRM and FIS report to the CEO and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

Final SOMA Preparation: SCDNR or its mapping contractor shall prepare Final SOMAs for the affected communities with assistance from FEMA, as appropriate.

Processing of Letter of Final Determination: The SCDNR or its mapping contractor shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare Letters of Final Determination (LFDs) for each affected community for FEMA review in coordination with the Region and its contractor, and in accordance with the FEMA *Document Control Procedures Manual.* FEMA or its designated contractor shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs. All work must pass the automated and visual "National QA/QC" reviews and review of LFD prior to the distribution of the LFD.

The SCDNR or its mapping contractor shall prepare the appropriate notices (Final Rules) that are to be published in the *Federal Register.* The SCDNR or its mapping contractor shall then deliver those notices to FEMA for publication.

Resilience Meeting: The final Risk MAP project outreach and communication effort will occur sometime between the LFD and shortly after adoption. Its purpose will be to provide final results of the project to the local stakeholders, develop an action plan so they can use the results of the Risk MAP project to implement risk reduction measures, and obtain feedback on how the project could have been implemented better, including how risk communications could be improved in the future. From a planning perspective, the resilience meeting will be used for future scenario planning, updating of local mitigation plans if they were not updated during the Risk MAP project, and setting the stage for a more process-oriented approach for the next update of flood hazard data. A detailed meeting plans that describes the objective, activities, audiences, timeline, and outcomes this meeting will be provided by FEMA.

Processing of Final DFIRM and FIS Report for Printing: SCDNR or its mapping contractor shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to FEMA in accordance with appropriate Procedure Memorandums for printing by the Map Service Center. SCDNR or its mapping contractor shall also prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

Revalidation Letter Processing: SCDNR or its mapping contractor shall prepare and distribute letters for FEMA signature to the community CEOs and floodplain administrators to notify the affected communities about LOMCs for which determinations will remain in effect after the DFIRM and FIS report become effective.

Archiving Data: SCDNR or its mapping contractor shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until transmitted to the FEMA Engineering Study Data Package Facility. In addition, the SCDNR or its mapping contractor will maintain copies of all data for a period of no less than three years.

Standards: All Post Preliminary DFIRM work shall be performed in accordance with the standards specified in Section 5 - Standards. Perform appropriate QR activitie(s).

Deliverables: In accordance with the G&S, SCDNR or its mapping contractor shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the compliant digital data. Additionally, the

TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- Documentation that the news releases were published in accordance with FEMA requirements;
- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Special Correspondence (and all associated enclosures, backup data, and other related information) for FEMA review and signature, as appropriate;
- Draft and final Appeal and Protest acknowledgment, additional data, and resolution letters (and all associated enclosures, backup data, and other related information) for FEMA review and signature, as appropriate;
- Draft and final LFDs (and all associated enclosures, backup data, and other related information) for FEMA review and signature;
- DFIRM digital files and final FIS report materials including all updated data tables and Flood Profiles;
- Provide one hard copy and digital DFIRM products to the community;
- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report;
- LOMC Revalidation Letters, if appropriate;
- Completed, organized, and archived technical and administrative support data; and
- Completed, organized, and archived case files and flood elevation dockets;
- CNMS updates.

SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL

The Project Team members for this Risk MAP Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below and in appropriate Procedure Memorandums.

All supporting documentation for the activities in this MAS shall be submitted according to Appendix M, include a flood elevation determination docket (FEDD) folder. Where Technical Support Data Notebook (TSDN) format is used, such shall be submitted in accordance with Section 2 – Technical and Administrative Support Data Submittal. Table 2.1 Mapping Activities and Applicable TSDN Sections indicates the sections of the TSDN that apply to each mapping activity. Submittals must be made to the appropriate PTS for a review of required materials. As needed, the CTP will work with the PTS to ensure that all required documents are included in the TSDN and will respond to requests from the PTS for additional information.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to the G&S.)

Table 2.1- Mapping Activities and Applicable TSDN Sections

	X	X	X	X							X	X
	X	X	X	X	X		X	X	X			X
	X	X	X	X							X	X
	X	X	X	X							X	X
	X	X	X	X	X		X	X	X	X	X	X

		X	X	X	X	X		X	X	X	X		X
		X	X	X	X	X		X	X	X	X		X
		X	X	X	X	X		X	X	X	X		X
		X	X	X	X	X		X	X	X	X		X
		X	X	X	X	X		X	X	X		X	X
		X	X	X	X	X		X	X	X		X	X
		X	X	X	X							X	X
		X	X	X	X							X	X

SECTION 3—PERIOD OF PERFORMANCE

The mapping activities outlined in this MAS will be completed as specified in the Agreement Articles of the Cooperative Agreement. The Mapping Activities may be terminated at the option of FEMA or SCDNR in accordance with the provisions of the Partnership Agreement dated September 20, 1999. If these mapping activities are terminated, all products produced to date must be returned and updated into the MIP and the remaining funds from uncompleted activities, provided by FEMA for this MAS, will be returned to FEMA.

SECTION 4—FUNDING/LEVERAGE

FEMA is providing funding, in the amount of 'o SCDNR for the completion of this Risk MAP Project. SCDNR shall provide any additional resources required to complete the assigned activities for this Risk MAP Project. During the Discovery and Project Planning process, additional needs may be identified. Activities associated with any additional needs would be performed based on availability of additional funds. The leverage listed below includes in-kind services and blue book values for acquired information (i.e. base map data, hydrologic and hydraulic analyses, etc.). These values should also be reported in the MIP by the appropriate task owner. The current Blue Book (2.0) is dated January 2009 and can be downloaded from FEMA's Information Resource Library at http://www.fema.gov/plan/prevent/fhm/ctp_info.shtm#4. SCDNR shall complete Table 4.1 Contribution and Leverage.

Table 4.1: Contribution and Leverage

Project Task	FEMA Contribution	Partner Contribution	% Partner Leverage (of total project cost)	Total Project Cost
Wateree Watershed Flood Study				
TOTAL FUNDING AMOUNTS				

Final leverage dollars or units shall be entered as applicable within the Manage Data Development task in the MIP workflow.

SECTION 5—STANDARDS

The standards relevant to this MAS are provided in Tables 5.1 Applicable Standards for Project Activities and 5.2 Project Activities and Applicable Portions of FEMA G&S. Information on the correct volume and appendix of the G&S to be referenced for each mapping activity are summarized in Table 5.2 for convenience. However, all mapping partners working on a Risk MAP Project are responsible for complying with all appropriate requirements in FEMA's G&S including published draft guidelines and PMs.

These guidelines may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm. The Geospatial Data Coordination Policy and the Geospatial Data Coordination Implementation Guide are located at https://hazards.fema.gov under "Tools & Links."

Table 5.1- Applicable Standards for Project Activities

	Activities																	
Applicable Standards	**Discovery and Project Planning**	**Outreach**	**Perform Field Survey**	**Develop Topographic Data**	**Perform Independent QA/QC: Topographic Data**	**Acquire Base Map**	**Coastal Analysis**	**Perform Independent QA/QC: Coastal Analysis**	**Develop Hydrologic Data**	**Perform Independent QA/QC: Hydrologic Data**	**Develop Hydraulic Data**	**Perform Independent QA/QC: Hydraulic Data**	**Perform Floodplain Mapping (inc. Redelineation)**	**Perform Independent QA/QC: Floodplain Mapping**	**Develop DFIRM Database**	**Produce/Distribute Preliminary Map Products**	**Post-Preliminary Map Production**	**Risk Assessment**
Guidelines and Specifications for Flood Hazard Mapping Partners and Procedure Memorandums	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
FEMA's Geospatial Data Coordination Policy	X			X		X												
FEMA's Geospatial Data Coordination Implementation Guide	X			X		X												
Engineer Manual 1110-2-1003, *Hydrographic Surveys* (USACE), January 1, 2002	X		X															
"Numerical Models Accepted by FEMA for NFIP Usage," Updated April 2003	X						X	X	X	X	X	X						
NFIP Metadata Profile Specifications	X			X	X								X	X	X	X	X	X
Document Control Procedures Manual	X	X															X	X
44 Code of Federal Regulations Parts 65, 66 and 67	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Data Sharing Agreement																		

Table 5.2- Project Activities and Applicable Portions of FEMA Guidelines and Specifications

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Discovery and Project Planning	Volume 1 Appendix I Scoping Report document 44 Code of Federal Regulations Part 66 and 67
Outreach	Volume 1 Appendix I
Perform Field Survey	Volume 1 Appendices A, B, C, F, and M
Develop Topographic Data and Perform Independent QA/QC: Topographic Data	Volume 1, Appendices A and M
Acquire Base Map and Perform Independent QA/QC: Base Map	Volume 1 Appendices A, K, L, and M
Develop Hydrologic Data and Perform Independent QA/QC: Hydrologic Data	Volume 1 Appendices A, C, E, F, G, H, and M
Develop Hydraulic Data and Perform Independent QA/QC: Hydraulic Data	Volume 1 Appendices A, B, C, E, F, G, H, and M
Perform Coastal Analysis Hazard Analyses and Perform Independent QA/QC: Coastal Analysis	Volume 1 Appendices A, B, C, D, H, and M Coastal Guidelines Updates" PM 47
Perform Floodplain Mapping and Perform Independent QA/QC: Floodplain Mapping (including Redelineation/Digitization)	Volume 1 Appendices C, D, E, F, G, H, K, L, and M PM 52
Produce Preliminary Map Products and Perform Independent	Volume 1

Activity Description	Applicable Volume, Section/Subsection, and Appendix
QA/QC: Produce Preliminary Map Products	Appendices K, L, and M PM 50, 51
Distribute Preliminary Map Products and Perform Independent QA/QC: Distribute Preliminary Map Products	Volume 1 Appendices J, K, L, and M
Post-Preliminary Map Production	Volume 1 Appendices J, K, L, and M PM 42, 44

SECTION 6— SCHEDULE

The activities documented in this MAS shall be completed in accordance with Table 6.1 Mapping Activities Schedule, which should drive the schedule within the MIP. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner. Please also identify to whom the products associated with each task are to be submitted to (i.e. the MIP, FEMA Regional Office, etc.).

Table 6.1 Mapping Activities Schedule

ACTIVITIES	RESPONSIBLE PARTNER(S)	Estimated START DATE	Estimated END DATE	Estimated COST	Product Submitted to
Discovery	SCDNR/FEMA	Date of MAS signature & funding authorization	120 days after NTP		MIP
Outreach	SCDNR	Ongoing	Ongoing		Community
Perform Field Surveys	SCDNR	120 days after NTP	180 days after NTP		MIP
Develop Topographic Data	SCDNR	120 days after NTP	210 days after NTP		MIP
Perform Independent QA/QC: Topographic Data	SCDNR	120 days after NTP	210 days after NTP		MIP
Acquire Base Map	SCDNR	120 days after NTP	210 days after NTP		MIP
Perform Independent QA/QC: Base Map	SCDNR	120 days after NTP	210 days after NTP		SCDNR or QA/QC contractor
Develop Hydrologic Data	SCDNR	210 days after NTP	270 days after NTP		MIP
Perform Independent QA/QC: Hydrologic Data	SCDNR/FEMA	270 days after NTP	300 days after NTP		SCDNR or QA/QC contractor
Develop Hydraulic Data	SCDNR	270 days after NTP	360 days after NTP		MIP
Perform Independent QA/QC: Hydraulic Data	SCDNR/FEMA	360 days after NTP	390 days after NTP		SCDNR or QA/QC contractor
Perform Floodplain Mapping: Detailed Riverine	SCDNR	390 days after NTP	450 days after NTP		MIP
Perform Floodplain Mapping: Refinement or Creation of Zone A	SCDNR	210 days after NTP	450 days after NTP	Included in Detailed Mapping	MIP
Perform Floodplain Mapping: Merging Revised and Unrevised Areas	SCDNR	210 days after NTP	450 days after NTP	Included in Detailed Mapping	MIP

Perform Floodplain Mapping: Redeliniation	SCDNR	210 days after NTP	450 days after NTP	Included in Detailed Mapping	MIP
Perform Independent QA/QC: Floodplain Mapping	SCDNR/FEMA	450 days after NTP	480 days after NTP		SCDNR or QA/QC contractor
Develop DFIRM Database	SCDNR	480 days after NTP	510 days after NTP		MIP
Produce Preliminary Map Products (including Graphic Specifications) *	SCDNR	510 days after NTP	540 days after NTP		MIP
Perform Independent QA/QC: Produce Preliminary Map Products	SCDNR/FEMA	540 days after NTP	570 days after NTP		SCDNR or QA/QC contractor
Distribute Preliminary Map Products	SCDNR	570 days after NTP	600 days after NTP		Community & MIP
Post-Preliminary Map Production	SCDNR/FEMA	600 days after NTP	1056 days after NTP		Community & MIP
TOTAL COST					

* Includes the cost of $40,000 for the Base Watershed Risk Assessment Suite

SCDNR or its mapping contractor shall upload to the MIP workflow tasks with schedule and cost information within 45 days after the Discovery meeting and once funds are awarded.

SECTION 7—CERTIFICATIONS

Data Capture Standards

- **DCS Certification Form**

FEMA-funded data development tasks must be certified using the DCS Certification form provided in revised version of Appendix M. A PDF of the form with the signature, data, and seal affixed to the form must be submitted digitally. This form must be signed by a registered Professional Engineer (or Surveyor if appropriate) from the firm contracted to perform the work, or by the responsible official of a government agency. A digital version of this form is available at www.fema.gov.

- **Perform Field Surveys and Develop Topographic Data**

A Registered Professional Engineer or Licensed Land Surveyor shall provide an accuracy statement for field surveys and/or topographic data used and shall certify these data meet the accuracy statement provided. Data accuracy should be stated used the Federal Geographic Data Committee National Standards for Spatial Data Accuracy, but the American Society for Photogrammetry and Remote Sensing accuracy reporting standards are acceptable.

Acquire Base Map

- A community official or responsible party shall provide written certification that the digital data meet FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA. Please note that uploading base map data to the MIP does not constitute agreement that the digital base map can be used by FEMA. Documentation that the digital base map can be used by FEMA is still required.
- Certifications must be made at the time the intermediate data is submitted. For example, if hydrologic data is submitted, certification will be required at the time it is submitted.

Develop Hydrologic Data, Develop Hydraulic Data, Perform Coastal Analysis, and Perform Floodplain Mapping

- A Registered Professional Engineer shall certify hydrologic and hydraulic and coastal analyses and data in accordance with 44 CFR 65.6(f).
- Any levee systems to be accredited will be certified by the levee owner or other appropriate entity in accordance with 44 CFR 65.10.

SECTION 8—TECHNICAL ASSISTANCE AND RESOURCES

Project Team members may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the mapping needs assessment and/or CNMS process from FEMA and/or your Regional Project Officer.

General technical and programmatic information can be downloaded from the FEMA website at http://www.fema.gov/plan/prevent/fhm/frm_soft.shtm Specific technical and programmatic support may be provided through FEMA and/or its contractor; such assistance should be requested through the FEMA Project Officer specified in Section 12 – Points of Contact.

Project Team members also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or contractors, and GIS-based engineering and modeling training.

Assistance with the MIP may be requested at miphelp@riskmapcds.com

SECTION 9—CONTRACTORS

SCDNR intends to use the services of URS Corporation and AECOM as the contractors for this Risk MAP Project. SCDNR shall ensure that the procurement for all contractors used for this Risk MAP Project complies with the requirements of 44 CFR 13.36.

Part 13 may be downloaded in PDF or text format from the United States Government Printing Office website at http://www.access.gpo.gov/nara/cfr/waisidx_04/44cfr13_04.html.

SECTION 10—REPORTING

Financial Reporting: Because funding has been provided to SCDNR by FEMA, financial reporting requirements for SCDNR will be in accordance with Cooperative Agreement Articles. SCDNR shall also refer to 44 CFR 13.41.

SCDNR shall provide financial reports to the FEMA Regional Project Officer and Assistance Officer in

accordance with the terms of the signed Cooperative Agreement for this MAS.

Status Reporting: Status reports will be submitted on a quarterly basis in accordance with the financial reporting submittals. SCDNR shall refer to 44 CFR 13.4 to obtain minimum requirements for status reporting. The Project Officer, as needed, may request additional information on status.

SCDNR may meet with FEMA and/or its contractor up to bi-weekly, or more frequently if needed, to review the progress of the project in addition to the quarterly financial and status submittals. These meetings will alternate between FEMA's Regional Office, the SCDNR office, and conference calls, as necessary.

Earned Value Data Entry: The MIP Workflow is designed to track the Earned Value of mapping projects. This information is automatically calculated by the MIP, using the Actual cost and schedule of work performed, or "actuals" and comparing them to the expected cost and schedule of work performed, or "baseline".

Once the FEMA Regional office has funded a project FEMA will complete the "Obligate Project Funds" screen in the MIP. This step establishes the baseline for the project iri the MIP, using the cost and schedule information for each task as outlined in this document and agreed to at the completion of the Discovery and Project Planning process.

The MIP study workflow allows SCDNR to report on the status of these projects at a task level. The cost and schedule information, updated by the SCDNR for each contracted task, is compared to the baseline established for those tasks. This information is rolled up to a project level and monitored by the FEMA Region to assess progress and Earned Value.

Earned Value reporting involves the reporting of cost, schedule and performance (physical percent complete) in the MIP by the SCDNR Once the baseline has been established in the MIP, the SCDNR shall input the performance and actual cost to date for each contracted task for each project. This must be completed at minimum every thirty days and at the completion of the task. The "As of' date must be updated not less than every thirty days even if the reported percent complete and money spent have not changed from previous month. When a task is completed, including all QA/QC activities in this MAS plus the Quality Control Reviews established in PM 42. The SCDNR shall enter 100% complete, enter the actual completion cost, and the actual completion date within the Manage Data Development, Manage Preliminary Map Production, or Manage Post Preliminary Processing, as applicable.

The Project Officer, as needed, may request additional information on status on an ad hoc basis.

SECTION 11—PROJECT COORDINATION

Throughout the project, all members of the Project Team will coordinate, as necessary, to ensure the products meet the technical and format specifications required and contain accurate, up-to-date information. Coordination activities may include:

- Meetings, teleconferences, and video conferences with FEMA and other Project Team members monthly;
- Telephone conversations with FEMA and other Project Team members on a scheduled basis monthly and an ad hoc basis, as required;
- Updates to the MIP and other FEMA status information systems in accordance with requirements in Volumes 1 and 3 of G&S; and
- E-mail, facsimile transmissions, and letters, as required.

SECTION 12—POINTS OF CONTACT

The points of contact for this Risk MAP Project are Laura Algeo, the FEMA Regional Project Officer; Maria Cox Lamm, the Project Manager for SCDNR; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, any additional FEMA assistance should be requested through the FEMA Regional Project Officer.

Each party has caused this MAS to be executed by its duly authorized representative.

Maria Cox Lamm

Maria Cox Lamm
Director, Flood Mitigation Program
South Carolina Department of Natural Resources

Date

Laura Algeo
Regional Project Officer
Federal Emergency Management Agency, Region IV

8/26/2010
Date