



# FEMA



## **SOUTH CAROLINA DNR COOPERATING TECHNICAL PARTNERS MAPPING ACTIVITY STATEMENT 6**

### **Mapping Activity Statement No. 6 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data**

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. 6 is as follows.

#### **SECTION 1—OBJECTIVE AND SCOPE**

The objective of the Flood Map Project documented in this MAS is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Beaufort County (Restudy) and Horry County (Restudy), South Carolina. The DFIRM and FIS report will be produced in the FEMA Countywide Format. These products will be in NAVD 1988. Pre-Scoping and Coordination activities for Georgetown County and Williamsburg County will also be performed as part of this MAS. Pre-Scoping will be conducted by FEMA and/or its contractor for Oconee County, and SCDNR will prepare a Scoping Report for Oconee County as part of this MAS.

Existing GIS data and study needs for the community will be researched, obtained, organized and provided in accordance with Activity 1. Scoping will be necessary to determine the final scope of work for this project.

In addition the Mapping Partners involved in this project will develop new and/or updated flood hazard data, as summarized in the table below.

Flooding Source	Reach Limits	Reach Length Miles	Detailed Riverine		Detailed Coastal					Limited Detail Study	Redelineation of SFHAs Using Effective Profiles	Refine/Establish Zone A
			Hydrology	Hydraulics	Stillwater	Set up	Wave Height	Wave Runup	Erosion			
<b>Beaufort County, SC</b>												
<b>Total</b>		370*	X	X	X	X	X	X	X		X	
<b>Horry County, SC</b>												
<b>Total</b>		660*	X	X	X	X	X	X	X	X	X	

\* - Indicated reach lengths are approximate. Actual reach length per study type will be determined during the Scoping process and is contingent on approval by the FEMA Regional Project Officer of the Scoping Report.

This Flood Map Project will be completed by the following

- South Carolina DNR;
- Watershed Concepts;
- URS Corporation (for QAQC)
- Federal Emergency Management Agency (FEMA)

The CTP shall notify FEMA and its contractor by e-mail of all meetings with community officials at least one week prior to the meeting (with as much notice as possible). FEMA and/or its contractor may or may not attend the community meetings as available.

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in the table below. The sections of this MAS that follow the table below describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Activities	CTP	FEMA
Activity 1 – Scoping	X	

FEMA has developed tools to assist in the development of the flood hazard data studies and the Digital Flood Insurance Rate Maps (DFIRMs) if the CTP wishes to use them. FEMA will, through the NSP, provide all CTPs access to and training in these tools. The tools available at this time include WISE software and the DFIRM production tools. The use of these tools will improve the Map Modernization and efficiency of all mapping partners.

The CTP should evaluate the level of risk and study methodology for each community utilizing the guidance for data quality standards outlined in Chapter 7 of the Multi-Year Flood Hazard Identification Plan (MHIP).

QA/QC review activities may be performed by CTPs or FEMA based on need. If the CTP will be utilizing their staff or contractors to do the QA/QC review, this should be identified during scoping. The CTP will need to submit their QA/QC plan with checklist to the Regional Project Officer for approval before initial QA/QC process. Please note the NSP will also be performing periodic audits and overall study/project management to ensure study quality.

FEMA will be providing download/upload capability for intermediate data submittals through the Management Information Portal (MIP). Data submittals uploaded via the MIP will include the same data required prior to the existence of the MIP.

## **Activity 1 – Scoping**

Responsible Mapping Partner: SCDNR

Scope: This task involves collecting data from a variety of sources including community surveys, other Federal and State Agencies, NFIP State Coordinators, Community Assistance Visits (CAV's) and FEMA archives. SCDNR will evaluate the effective FIS report and FIRM maps to see if it needs to be updated. Lists of mapping needs will be obtained from the MNUSS database, community surveys and CAV's if available.

Data collection will include obtaining the best available base map materials (corporate limits, roads, orthophotos, etc) along with stream centerline files. The acquired data will be imported into the scoping tool and used during the Scoping Task. In the Scoping Tool all streams should have unique names, the limits of the effective FEMA studies should be identified, LOMC areas should be identified, and community requests should be identified. This task also includes populating the streamlines with existing pipeline and scoped studies currently underway.

In cooperation with the FEMA Region, a Project Management Team will be established consisting of the SCDNR, FEMA's regional engineer, Beaufort County, Horry County, and other appropriate officials. The Project Management Team will be responsible for coordinating the activities of this project and completing all tasks identified in this Statement of Work.

Preliminary Research Activities can be separated into two categories—researching effective information and researching available data for the Flood Map Project. The following tasks shall be completed to research effective information: inventory the FEMA archives for effective FIRM panels, FRFM panels, FIS reports, and other flood hazard data or existing study data; summarize the information in the MNUSS database; summarize contiguous community agreement checks; review CAV and CAC files; and develop a “scoping map” and an overview of the results of the research.

SCDNR will co-ordinate, set-up, and hold the Scoping Meeting. This includes identifying a time, place, and all participants. The purpose of this meeting is to present the current information to the local officials

Activities	CTP	FEMA
Activity 2 - Outreach	X	X
Activity 3 – Field Surveys and Reconnaissance	X	
Activity 4 – Topographic Data Development	X	
Activity 5 – Independent QA/QC Review of Topographic Data	X	X
Activity 6 –Hydrologic Analyses	X	
Activity 6A –Coastal Flood Hazard Analyses	X	
Activity 7–Independent QA/QC Review of Hydrologic Analyses	X	X
Activity 7A–Independent QA/QC Review of Coastal Hazard Analyses	X	X
Activity 8 – Hydraulic Analyses	X	
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	X	X
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	X	
Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	X	
Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	X	
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	X	X
Activity 12 – Base Map Acquisition)	X	
Activity 13 – DFIRM Production (Non-Revised Areas)	X	
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	X	X
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	X	
Activity 14A – Application of DFIRM Graphic and Database Specifications	X	
Activity 14A – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	X	X
Activity 15 – Preliminary DFIRM and FIS Report Distribution	X	X
Activity 16 – Post-Preliminary Processing	X	X

Appendix A will be delivered in accordance with the schedule outlined in Section 6 for this Activity to the Regional Project Officer for approval.

- If WISE scoping tool is used, submit data sets for inclusion in the MIP to track the chosen areas to be studied as well as to document areas not chosen as needs.
- MNUSS inputs of all needs identified is scoping in order to track those areas which will still need a study.
- A Final Scoping Report will not be generated for the pre-scoping and coordination activities conducted for Georgetown and Williamsburg Counties. The pre-scoping process will serve to compile existing data available related to the previously identified needs within each county. The information collected will be input through the FEMA Scoping Tool. Information collected and inputted will include: effective stream study types and stream miles, LOMCs, MNUSS needs already identified, general community information, and other local watershed and storm water management studies that contain information that can be used in the mapping project. All available digital topographic information for each county will be gathered and reviewed to determine if it can be used for the mapping projects. If a community needs better topographic data for the mapping project, information will be gathered to provide a justification to FEMA for the acquisition of digital topographic data for the stream corridors of the county where digital topographic information is needed. Knowing the exact mileage of the effective studies and knowing the quality of the existing digital topographic data will allow for better cost estimating up front, prior to the detailed scoping effort. These efforts will allow for more detailed planning and budgeting to be performed for each study in advance. If additional funds become available for pre-scoping, the selected counties for pre-scoping will be changed from pre-scoping to completion of the scoping process for the selected counties.
- QA/QC Plan for the review of the mapping project outlined in this MAS. This will include the checklists developed for that review.

## **Activity 2 – Outreach**

Responsible Mapping Partner: SCDNR

Scope: The outreach activities for a Flood Map Project can best be understood as a process that begins during the Project Scoping phase and continues through the Map Production and Post-preliminary phases. A regulatory overview of required activities is followed by a description of tools that can be used in working with stakeholders to keep them informed and to solicit their input.

The overarching goal for conducting outreach is to create a climate of understanding and ownership of the mapping process at the State and local levels. Well-planned outreach activities 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 Project Team in responding to congressional inquiries.

The SCDNR will work with the Regional Office during the initiation of this activity to determine an Outreach Plan for implementation throughout the Mapping Project. The Regional Office will have access

(state, county and municipal) and coordinate on prioritization and identification of study areas. SCDNR shall be responsible for compiling the necessary information for the meeting. These items may include: FIS and FIRM for affected communities; USGS quads for the study area; best available community base map(s); effective FIRM summary; Available Data Inventory; Scoping Map; Scoping Meeting Agenda/Minutes form; Aerial photos/topographic mapping if available; existing drainage studies or other H&H data; Community master plan(s)/Drainage Master Plan(s); Zoning Maps; Street Maps; As-built plans; and Floodplain Ordinance(s).

The project management team shall review the initial mapping needs list, review the research findings, and make selections of proposed methods for obtaining/producing flood data. Any additions or changes to the needs list shall be discussed with all members. All needs shall also be prioritized. In general, highest priority shall be given to the following areas: areas of dense existing or anticipated development, including areas where new road crossings have been constructed over stream(s); areas affected by flood-control structures and/or channelization; areas where natural physical changes in the floodplain have been significant (due to subsidence or extreme erosion, for example); areas that were studied by approximate methods and unmapped areas, especially those with development pressure; areas where the community has experienced flooding outside mapped floodplains, with severe damage to buildings and/or infrastructure; areas where mapped flood hazards do not match those shown on contiguous FIRMs (unless those FIRMs are not considered to be accurate); and areas where flood data (BFEs, floodplains, and regulatory floodways) are likely to be changed the most by a restudy.

Based on the discussion of mapping needs, SCDNR and FEMA Project Officer will finalize the areas to be included in the project (based on recommendations provided by the Project Team). Areas to be studied by detailed and approximate 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.

The SCDNR will be acting as the Consultation Coordination Officer (CCO) for this flood study as identified in Title 44 of the Code of Federal Regulations Part 66. At this point, the CTP will prepare and set up the Community Case File and Flood Elevation Docket for the maintenance of all communication and coordination as outlined in 44CFR Part 66 and 67.

Pre-Scoping and Coordination activities will be conducted for Georgetown and Williamsburg Counties. Information will be gathered from the community by SCNDR that will help SCDNR determine the mapping needs of the communities and what information that can be used in the mapping project is available from the communities. The information gathered during this Pre-Scoping and Coordination activities will be used to complete mapping projects that would be scheduled should the SCDNR receive additional funding awards in FY06. This data will be logged in the FEMA scoping tool and MNUSS for use when FY06 project funds become available. Should no additional funds become available in the future, this data will be in the FEMA scoping tool for use when future funds become available.

Standards: All work under Activity 1 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables:

- The Final Scoping for Beaufort, Horry and Oconee Counties with all of the components as laid out in the attached "Partner Flood Map Modernization Program Scoping Report" template in

to many outreach tools that have been developed for this process that can be utilized or customized for your use.

All communication with local governments will be done in accordance with Title 44 Code of Federal Regulations Part 66.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon determination of an Outreach and Coordination Approach the SCDNR shall deliver the following to the FEMA Regional Project Officer in accordance with the schedule outlined in Section 6 for this Activity:

- A report detailing outreach and coordination activities
- Backup or supplemental information used in writing this report
- At the completion of the DFIRM process, SCDNR will submit a summary of outreach activities and any changes made in the outreach approach based on the actual implementation

### **Activity 3 - Field Surveys and Reconnaissance**

Responsible Mapping Partner: SCDNR

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, SCDNR 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.

In addition to the initial field reconnaissance, SCDNR shall conduct field surveys, including obtaining channel and floodplain cross sections, identifying or establishing Temporary Bench Marks, and obtaining the physical dimensions of hydraulic and flood-control structures. SCDNR also shall coordinate with other Mapping Partners that are collecting topographic data under Activity 4.

Standards: All work under Activity 3 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. 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; and
- Survey notebook containing cross sections and structural data.

- NSP Format Survey Database or Data Delivery consistent with the NSP Data Capture Standards – Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 4 - Topographic Data Development**

Responsible Mapping Partner: SCDNR

Scope: To supplement the field surveys conducted under Activity 3, SCDNR shall obtain existing topographic data from Beaufort and Horry Counties of the entire county areas for the flooding sources studied to delineate floodplain boundaries. SCDNR shall gather information on what topographic data is available for the given community and what accuracy and currency it meets. SCDNR shall use this topographic data that is better than that of the original study.

Standards: All work under Activity 4 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of topographic data collection for Beaufort and Horry Counties, SCDNR shall upload (if use agreements for the topographic data from Beaufort and Horry Counties allow) the digital data to the MIP or submit by using other digital media if the MIP is unavailable, so that SCDNR or its contractor can access it for an independent QA/QC review under Activity 5 in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall also make the following products available to FEMA by submitting it to the FEMA Regional Office via the digital media identified in the paragraph above, if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. 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 topographic maps;
- Report summarizing methodology and results;
- Mass points and breaklines data;
- Digital work maps with contours;
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of remote-sensing 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; and
- Metadata compliant with Federal Geographic Data Committee standards.

- FEMA Format Terrain Database or Data Delivery consistent with the FEMA Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 5 - Independent QA/QC Review of Topographic Data**

Responsible Mapping Partner: SCDNR and FEMA

Scope: SCDNR shall review the existing mapping data generated by Beaufort County and Horry County to ensure that these data are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. If SCDNR utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Standards: All work under Activity 5 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 6 – Hydrologic Analyses**

Responsible Mapping Partner: SCDNR

Scope: SCDNR shall perform hydrologic analyses for the drainage area for the flooding sources identified through Scoping in Activity 1 of this MAS. SCDNR shall calculate peak flood discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events using the USGS Regional Regression Equations for South Carolina. These flood discharges will be the basis for subsequent hydraulic analyses under Activity 8. In addition, SCDNR shall address all concerns or questions regarding topographic data acquired from Beaufort and Horry Counties that are raised during the independent QA/QC review performed by SCDNR during the QA/QC review under Activity 7.

Standards: All work under Activity 6 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydrologic modeling for Beaufort County and Horry County flooding sources, SCDNR or its contractor shall upload the digital data to the MIP or submit by using other digital

media if the MIP is unavailable, so that SCNDR or its contractor can access it for an independent QA/QC review under Activity 7. SCNDR shall submit the results of the hydrologic analyses for the remaining flooding sources for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCNDR shall make the following products available to FEMA by submitting it to the FEMA Regional Office via the digital media identified in the paragraph above, if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. 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 Summary of Discharges Tables presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital draft text for Section 3.1, Hydrologic Analyses, of the FIS report; and
- Digital versions of all backup data used in the analysis, including work maps.
- NSP Format Hydrology Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners
- For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 6A – Coastal Flood Hazard Analyses**

Responsible Mapping Partner: SCNDR

Scope: SCNDR shall perform coastal flood hazard analyses for approximately 327 transects along 109 miles of shoreline, including the following coastal flooding source: Atlantic Ocean. These analyses are to include: Stillwater Elevations (SWEL), wave setup, wave height analyses, erosion analyses, wave runup and Primary Frontal Dune (PFD). . In addition, SCNDR shall address all concerns or questions regarding Activity 6A that are raised by SCNDR during the independent QA/QC review under Activity 7A.

Standards: All work under Activity 4A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of the analyses for the Atlantic Ocean, SCNDR or its contractor shall upload the digital data to the MIP or submit by using other digital media if the MIP is unavailable, so that SCNDR or its contractor can access it to perform the independent QA/QC review under Activity 7A. The results of the analyses for the remaining flooding sources are to be submitted for QA/QC review at the completion of this activity.

In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCNDR shall make the following products available to FEMA by submitting it to the FEMA Regional Office via the digital media identified in the paragraph above, if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for

this Activity. 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.

- Draft digital work maps showing the 1- and 0.2-percent-annual chance floodplain boundaries, Base Flood Elevations (BFEs), and flood insurance risk zones;
- Digital wave envelope profiles for each transect representing the 1-percent-annual-chance Stillwater elevation including setup wave crest or run-up elevations, location of the heel of the PFD, and ground profile conditions including eroded dune profile;
- Digital FIS report materials;
- Draft work maps showing each transect located accordingly;
- Digital coastal modeling (input and output files);
- Digital versions of any other supporting computations; and
- All backup data used in the analyses.
- NSP Format Hydrology Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

In addition SCDNR shall submit a coastal study technical documentation notebook with all backup data, description of methodology, and input and output files used in the analyses and mapping as discussed in Appendix D of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 7 - Independent QA/QC Review of Hydrologic Analyses**

Responsible Mapping Partner: SCDNR and FEMA

Scope: SCDNR shall review the technical, scientific, and other information submitted by SCDNR under Activity 6 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. If SCDNR utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. 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.

- 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.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 7 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/firm_gsam.pdf).

## **Activity 7A - Independent QA/QC Review of Coastal Hazard Analyses**

Responsible Mapping Partner: SCDNR and FEMA

Scope: SCDNR shall review the technical, scientific, and other information submitted by SCDNR under Activity 6A to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. If SCDNR utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work is to include, at a minimum, the activities listed below.

- 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, if appropriate; and

- Comparison with contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 7A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- 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.
- If the data changed during the QA/QC process, then the updated deliverables from Activity 6A will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 8 – Hydraulic Analyses**

Responsible Mapping Partner: SCDNR

Scope: SCDNR shall perform hydraulic analyses for the flooding sources identified during the scoping process in Activity 1 of this MAS. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges computed under Activity 6. The hydraulic methods used for this analysis will include HEC-RAS.

SCDNR shall use the cross-section and field data collected under Activity 3 to perform the hydraulic analyses. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

SCDNR shall use the FEMA CHECK-2 or CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review under Activity 9, the SCDNR shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, SCDNR shall address all concerns or questions regarding Activity 6 that are raised by SCDNR during the independent QA/QC review under Activity 9.

SCDNR shall document automated data processing and modeling algorithms for GIS-based modeling and provide them to FEMA for review to ensure they 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 SCNDR shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses

Standards: All work under Activity 8 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydraulic modeling for Beaufort County and Horry County, SCDNR and its contractor shall upload the digital data to the MIP or submit by using other digital media if the MIP is unavailable, so that SCDNR and its contractor can access it for the independent QA/QC review under Activity 9. SCDNR shall submit the results of the hydraulic analyses for the remaining flooding sources for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA submitting it to the FEMA Regional Office via the digital media identified in the paragraph above, if the MIP is unavailable. 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 profiles of the 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations representing existing conditions using the FEMA RASLOT 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.
- For GIS-based modeling, deliverables include all input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure.
- NSP Format Hydraulic Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 9 - Independent QA/QC Review of Hydraulic Analyses**

Responsible Mapping Partner: SCDNR and FEMA

Scope: SCDNR shall review the technical, scientific, and other information submitted by SCDNR under Activity 8 to ensure that the data and modeling are consistent with FEMA standards and standard

engineering practice and are sufficient to revise the FIRM. If SCDNR utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. 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.

- 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 them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 9 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- 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.
- If the data changed during the QA/QC process under Activity 7 or this Activity, then the updated and verified deliverables from Activity 6 and 8 will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

### **Activity 10 - Floodplain Mapping (Detailed Riverine or Coastal Analysis)**

Responsible Mapping Partner: SCDNR

Scope: SCDNR shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources for which detailed hydrologic, and/or hydraulic, and/or coastal analyses were performed. SCDNR shall incorporate all new or revised hydrologic, hydraulic, and/or coastal modeling and shall use the topographic data acquired under Activity 4 to delineate the floodplain and regulatory floodway boundaries on a digital work map. In addition, SCDNR shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Also, SCDNR shall address all concerns or questions regarding Activity 10 that are raised by SCDNR during the independent QA/QC review under Activity 11.

### **Activity 10A - Floodplain Mapping (Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data)**

Responsible Mapping Partner: SCDNR

Scope: SCDNR shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries and coastal high hazard zones for the flooding sources listed earlier in this MAS. SCDNR shall use the topographic data acquired under Activity 4 to delineate the floodplain and regulatory floodway boundaries as appropriate on a digital work map. If the new topographic data do not reflect the same hydraulic characteristics as in effective study, SCDNR shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, SCDNR shall contact the FEMA Regional Project Officer identified in Section 12 of this MAS with a recommendation. In addition, SCDNR shall address all concerns or questions regarding Activity 10A that are raised by SCDNR during the independent QA/QC review under Activity 11.

Coastal redelineation involves the following steps: redelineate the landward extent of the coastal flooding based on existing Stillwater elevations and the new topography. All gutters (elevation change lines between open water and the landward extent of the coastal flooding) need to be digitized (these lines are not directly related to the topography so they should be digitized directly). If converting between NGVD and NAVD and the difference is close to 1.0 feet the elevation can just be changed on the map and the gutters will stay at the same location. If the difference between NGVD and NAVD is between 0.1 and 0.9, or greater than 1.1, contact FEMA and the RMC for guidance on how to move the gutters.

If the Primary Frontal Dune (PDF) VE Zone has not been mapped this must also be done during redelineation. PDF involves using the best available topographic data and mapping the heel or landward side of the primary frontal dune. The VE zone shall then be extended landward to that line.

### **Activity 10B - Floodplain Mapping (Refinement or Creation of Zone A)**

Responsible Mapping Partner: SCDNR

Scope: SCDNR shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources listed earlier in this MAS or in the Scoping Report. SCDNR shall use existing topographic data or the topographic data acquired under Activity 2 to delineate the floodplain boundaries on a digital work

map. In addition, SCDNR shall address all concerns or questions regarding Activity 10B that are raised by SCDNR during the independent QA/QC review under Activity 11.

SCDNR may expand on the approaches for analyzing Zone A areas outlined in *Guidelines and Specifications for Flood Hazard Mapping Partners* and in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas* (April 1995), and/or develop new approaches. Such approaches must be coordinated with the FEMA Regional Project Officer identified in Section 12 of this MAS before analysis and mapping begin.

Standards: All work under Activity 10, 10A, and 10B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables for Activities 10 / 10A / 10B: Upon completion of floodplain mapping for Beaufort County and Horry County, SCDNR or its contractor shall upload the digital data to the MIP or submit by using other digital media if the MIP is unavailable, so that SCDNR or its contractor can access it for the independent QA/QC review under Activity 11. The mapping for the remaining flooding sources is to be submitted for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to by submitting it to the FEMA Regional Office via the digital media identified in the paragraph above, if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. 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 work map showing the Coastal High Hazard Area (V zone) delineated along the Atlantic Ocean shorelines, transect locations, BFEs, and flood insurance risk zone designation labels;
- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- 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;
- Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined under Activity 9; and
- An explanation for the use of existing topography for the studied reaches, if appropriate.
- Written summary of the analysis methodologies;
- Any backup or supplemental information, including supporting calculations and assumptions for any computed 1-percent-annual-chance water-surface elevations used in the mapping required for the independent QA/QC review under Activity 11;

- Digital versions of input and output for any computer programs that were used;
- NSP Format Mapping Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 11 - Independent QA/QC Review of Floodplain Mapping (Revised Areas)**

Responsible Mapping Partner: SCDNR and FEMA

Scope: SCDNR shall review the floodplain mapping submitted under Activities 10, 10A, and 10B to ensure that the results of the analyses performed are accurately represented. If SCDNR utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. 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.

- For the coastal flood hazard analyses, review the setup and runoff height elevations shown on the work map to ensure they agree with those shown on the data table(s), and stillwater elevations are shown where coastal and riverine flooding studied in detail join.
- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs shown on the work map for proper location and agreement with the results of the hydraulic modeling.
- 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 boundaries for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths at cross sections as shown on the work maps to ensure they match the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles.
- Review the flood insurance risk zones as shown on the work maps to ensure they are labeled properly.
- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata files to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 11 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products

available to FEMA by uploading the digital data to MIP or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- 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; and
- An annotated work map with all questions and/or concerns indicated, if necessary.
- If the data changed during the QA/QC process, then the updated deliverables from Activity 10, 10A and 10B will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## Activity 12 - Base Map Acquisition

Responsible Mapping Partner: SCDNR

Scope: Activity 10 consists of obtaining the digital base map, vector, for the project. SCDNR shall provide the digital base map. The required activities are as follows:

- Obtain digital files (raster or vector) of the base map.
- 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.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.
- Populate the DFIRM database with the information required by FEMA.

Standards: All work under Activity 12 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to MIP or submitting it to the FEMA Regional Office if the MIP is unavailable in accordance with the schedule outlined in Section 6 for this Activity:

- Written certification that the digital data meet the minimum standards and specifications and
- Documentation that FEMA can use the digital base map.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## Activity 13 – DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: NA (No digitization existing of flood zones to be performed.)

## Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: NA

## Activity 14 –DFIRM Production (Merging Revised and Non-Revised Information)

Responsible Mapping Partner: SCDNR

Scope: Upon completion of the floodplain mapping activities for the revised areas (Activities 10, 10A, and/or 10B) and the DFIRM production for non-revised areas (Activity 13), SCDNR shall merge the digital floodplain data into a single, updated DFIRM. This work is to include tie-in of flood hazard information for areas that were not studied as part of the Flood Map Project documented in this MAS. SCDNR also shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in this MAS. SCDNR shall coordinate with FEMA and those Mapping Partners responsible for Activities 10, 10A, 10B, and 13, as necessary, to resolve any potential tie-in issues.

Standards: All work under Activity 14 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to MIP or submitting it to the FEMA Regional Office if the MIP is unavailable in accordance with the schedule outlined in Section 6 for this Activity:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 14A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)**

Responsible Mapping Partner: SCDNR

Scope: SCDNR shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Activity 14. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, and notes to user). SCDNR will be preparing the database for this project in the Standard format. The database shall be produced in accordance with Appendix L of the Guides and Specifications for Flood Hazard Mapping Partners. SCDNR shall coordinate with those Mapping Partners responsible for Activities 10, 10A, 10B, 13, and 14, as necessary, to resolve any problems that are identified during Activity 14A.

Standards: All work under Activity 14A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the MIP or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. 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 work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; 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.
- NSP Format DFIRM Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the *Guidelines and Specifications for Flood Mapping Partners*

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## **Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications**

Responsible Mapping Partner: SCDNR and FEMA

Scope: Upon completion of the floodplain mapping activities (Activities 10, 10A, and/or 10B) and DFIRM production activities (Activities 13, 14, and 14A), SCDNR shall review the DFIRM to ensure it

meets current FEMA graphic specifications. In addition, SCDNR shall review the DFIRM spatial database to determine if it meets current FEMA database specifications. SCDNR shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. If SCDNR utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs, cross sections, studied streams, 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 *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- All map collar information is complete, correct, and follows the requirements specified in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- Metadata files describing the DFIRM data include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 14B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, SCDNR shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or submitting it to the FEMA Regional Office if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- 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; and
- An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary.
- If the data changed during the QA/QC process, then the updated deliverables from Activities 10, 10A, 10B and Activities 13, 14, and 14A will be resubmitted at this time.

- Preliminary copies 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.
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided by uploading the digital data to the MIP or submitting it by using other digital media if the MIP is unavailable.
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided by uploading the digital data to the MIP or submitting it by using other digital media if the MIP is unavailable.
- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided by uploading the digital data to the MIP or submitting it by using other digital media if the MIP is unavailable.
- 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 shall be provided.

## Activity 16 - Post-Preliminary Processing

Responsible Mapping Partners: SCDNR and FEMA

Scope: Activity 16 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.

*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/or SCDNR shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators.

News release notifications of BFE changes are published in prominent newspapers with local circulation in accordance with 44 CFR.

- The SCDNR shall prepare the appropriate notices (Proposed Rules) which are to be published in the *Federal Register*. The SCDNR shall then deliver those notices to FEMA for publication.
- When SCDNR holds public meetings to present and discuss the results of this Flood Map Project, FEMA may attend the meetings and assist where possible if requested.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## Activity 15 - Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partners: SCDNR

Scope: Activity 15 consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment for Beaufort County and Horry County. 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 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 FEMA and SCDNR signature.

*Final QA/QC Review of Preliminary DFIRM and FIS Report:* The SCDNR shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report. The QA/QC review procedures shall be consistent with the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

*Discrepancy Resolution:* The SCDNR shall work to resolve discrepancies identified during the final QA/QC review.

*Distribution of Preliminary DFIRM and FIS Report:* The SCDNR 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 shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. The SCDNR shall file the notifications for later submittal to FEMA for review.

*Preliminary Summary of Map Actions (SOMA) Preparation:* The SCDNR 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 work under Activity 15 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the *FEMA Document Control Procedures Manual*. The SCDNR shall make the products listed below available to FEMA in accordance with the schedule outlined in Section 6 for this Activity.

- 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*.

*Resolution of Appeals and Protests:* SCDNR 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; and
- Preparation of a draft resolution letter for co-signature with FEMA and SCDNR and revised DFIRM and FIS report materials for FEMA review.

FEMA's Contractor and/or SCDNR shall mail all associated correspondence upon authorization by FEMA.

*Preparation of Special Correspondence:* SCDNR shall support FEMA in responding to comments not received within the 90-day appeal period (referred to as "special correspondence"), including drafting responses for FEMA review when appropriate and finalizing responses for co-signature. SCDNR 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, SCDNR shall work together with FEMA 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 shall prepare Final SOMAs for the affected communities as appropriate.

*Processing of Letter of Final Determination:* The SCDNR shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination (LFDs) for each affected community for FEMA review in accordance with the FEMA *Document Control Procedures Manual*. They also shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs and enclosures upon receipt of authorization from FEMA.

*Processing of Final DFIRM and FIS Report for Printing:* SCDNR shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the FEMA Map Service Center for printing by the U.S. Government Printing Office. The SCDNR and/or FEMA shall 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 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 shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until they are transmitted to the FEMA

Engineering Study Data Package Facility. In addition, the SCDNR will maintain copies of all data for a period of no less than 3 years.

Standards: All work under Activity 16 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the *FEMA Document Control Procedures Manual*, FEMA's Contractor and/or SCDNR shall make the following products available to FEMA in accordance with the schedule outlined in Section 6 for this Activity:

- 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 negatives and final FIS report materials, including all updated data tables and Flood Profiles;
- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report;
- LOMC Revalidation Letters if appropriate; and
- Complete, organized archived technical and administrative support data
- Complete, organized and archived case file and flood elevation docket

## **SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL**

The Project Team members for this Flood Map Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in the TSDN format in accordance with Appendix M of the *FEMA Guidelines and Specifications for Flood*

*Hazard Mapping Partners*, dated April 2003. Appendix M is available for viewing or download on the FEMA Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf). Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

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 Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

**Table 2-1. Mapping Activities and Applicable TSDN Sections**

TSDN Section	Mapping Activities															
	1	2	3	4	5	6, 6 A	7, 7 A	8	9	10, 10 A, 10 B	11	12	13, 13A	14, 14A	15	16
<b>General Documentation</b>																
Special Problem Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting Minutes/Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
General Correspondence	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Engineering Analyses</b>																
Hydrologic Analyses			X			X	X	X	X	X	X					
Hydraulic Analyses			X			X	X	X	X	X	X					
Key to Cross-Section Labeling			X			X	X	X	X	X	X					
Key to Transect Labeling			X			X	X	X	X	X	X					
<b>Draft FIS Report</b>						X	X	X	X							
<b>Mapping Information</b>	X	X		X	X					X	X	X	X	X	X	X

TSDN Section	Mapping Activities															
	1	2	3	4	5	6, 6 A	7, 7 A	8	9	10, 10 A, 10 B	11	12	13, 13A	14, 14A	15	16
Miscellaneous Reference Information	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 begin on after receiving notice to proceed, and will be completed no later than 36 months from notice to proceed. 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; the remaining funds from uncompleted activities, provided by FEMA for this Mapping Activity Statement, will be returned to FEMA.

### SECTION 4—FUNDING/LEVERAGE

FEMA is providing funding, in the amount of \$2,056,000, to SCDNR for the completion of this Flood Map Project. SCDNR shall provide any additional resources required to complete the assigned activities for this Flood Map Project. During the scoping process, additional needs may be identified. Activities associated with any additional needs would be performed based on availability of additional funds. The CTP Leverage listed below includes in-kind services and blue book values for acquired information (i.e. base map data, hydrologic and hydraulic analyses, etc.). More detailed leverage information will be determined during the detailed scoping process and reported back to FEMA at that time.

Funding for Project	FEMA Contribution	CTP Contribution	% Leverage	Total Project Cost
Beaufort County, SC	\$660,607	\$514,350	43.7%	\$1,174,957
Horry County, SC	\$1,365,280	\$537,500	28.2%	\$1,902,780
Scoping Activities for Georgetown, Oconee and Williamsburg Counties	\$30,113	\$0	0%	\$30,113
<b>TOTAL FUNDING AMOUNTS</b>	<b>\$2,056,000</b>	<b>\$1,051,850</b>	<b>33.8%</b>	<b>\$3,107,850</b>

FEMA funds identified above are available to be used for the following activities\*:

Activities	FUNDABLE?
Activity 1 – Scoping	Yes, up to 10% of total cost
Activity 2 - Outreach	Yes, up to 10% of total cost
Activity 3 – Field Surveys and Reconnaissance	Yes
Activity 4 – Topographic Data Development	No, unless approval given during scoping phase by Regional PO
Activity 5 – Independent QA/QC Review of Topographic Data	No, unless approval given during scoping phase by Regional PO
Activity 6 –Hydrologic Analyses	Yes
Activity 6A –Coastal Flood Hazard Analyses	Yes
Activity 7–Independent QA/QC Review of Hydrologic Analyses	Yes
Activity 7A–Independent QA/QC Review of Coastal Hazard Analyses	Yes
Activity 8 – Hydraulic Analyses	Yes
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	Yes
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Yes
Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	Yes
Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	Yes
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Yes
Activity 12 – Base Map Acquisition	No
Activity 13 – DFIRM Production (Non-Revised Areas)	Yes
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	Yes
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	Yes
Activity 14A – Application of DFIRM Graphic and Database Specifications	Yes
Activity 14A – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	Yes
Activity 15 – Preliminary DFIRM and FIS Report Distribution	Yes
Activity 16 – Post-Preliminary Processing	Yes

\*This table is for information purposes only

## SECTION 5—STANDARDS

The standards relevant to this Mapping Activity Statement are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity are summarized in Table 5-2.

These Guidelines are available for viewing or download from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/fhm/dl\\_cgs.shtm](http://www.fema.gov/fhm/dl_cgs.shtm).

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities															
	1	2	3	4	5	6, 6A	7, 7A	8	9	10, 10 A, 10 B	11	12	13, 13A	14, 14A	15	16
<i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> , April 2003	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping Procedures	X		X	X	X											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-510), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X		X	X	X											
Engineer Manual 1110-1-1000, <i>Photogrammetric Mapping</i> (USACE), July 1, 2002	X		X	X	X											
Engineer Manual 1110-2-1003, <i>Hydrographic Surveys</i> (USACE), January 1, 2002	X		X													
"Numerical Models Accepted by FEMA for NFIP Usage," Updated April 2003	X					X	X	X	X							
<i>Content Standard for Digital Geospatial Metadata</i> (Federal Geographic Data Committee), 1998	X	X		X	X					X	X	X	X	X	X	X

		Activities															
Applicable Standards		1	2	3	4	5	6, 6A	7, 7A	8	9	10, 10 A, 10 B	11	12	13, 13A	14, 14A	15	16
<i>Document Control Procedures Manual, December 2000</i>		X	X													X	X
<i>44 Code of Federal Regulations Part 66 and 67</i>			X														

**Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications**

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
1	Scoping	Appendix I, Scoping Report document attached in Appendix A to this Mapping Activity Statement
2	Outreach	44 Code of Federal Regulations Part 66 and 67
3	Field Surveys and Reconnaissance	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.4, A.5, A.6, A.7, and A.8 Appendix F, Section F.3 Appendices B, C, and M
4	Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2, A.3, A.7, and A.8 Appendix M

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
5	Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6) Appendix M
6	Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, and M
6A	Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.2.2) Appendix A, Section A.4 Appendices B, D, and M

**Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)**

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
7	Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendix C, Section C.2 Appendices E, F, G, H, and M
7A	Independent QA/QC Review of	Volume 1, Section 1.4 (specifically Subsection 1.4.1)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
	Coastal Hazard Analyses	Appendix A, Section A.4 Appendices B, D, and M
8	Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, and M
9	Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M
10	Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, and M
10A	Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Appendix C, Section C.6 (specifically Subsection C.6.1.3) Appendices K, L, and M
10B	Floodplain Mapping (Refinement or Creation of Zone A)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M
11	Independent QA/QC	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
	Review of Floodplain Mapping (Revised Areas)	Appendix C, Sections C.4 and C.6 Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, and M
12	Base Map Acquisition and Preparation	Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2) Appendix A, Section A.1 (specifically Subsection A.1.1)
13	DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Appendices K, L, and M
13A	Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Appendices K, L, and M
14	DFIRM Production (Merging Revised and Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Appendices K, L, and M
14A	DFIRM Production (Application of FEMA Graphics and Database Specifications)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, and M
14B	Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, and M
15	Preliminary DFIRM and FIS Report Distribution	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M
16	Post-Preliminary Processing	Volume 1, Section 1.5 (specifically Subsection 1.5.2) Appendices J, K, L, and M

## SECTION 6—SCHEDULE

The activities documented in this MAS shall be completed in accordance with the project schedule below. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

**Schedule 6-1. Beaufort County Restudy**

Activities	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 1 – Scoping	SCDNR	90 Days after Notice to Proceed
Activity 2 - Outreach	SCDNR FEMA	660 Days after Notice to Proceed
Activity 3 – Field Surveys and Reconnaissance	SCDNR	60 Days after approval of Scoping Report
Activity 4 – Topographic Data Development	NA	
Activity 5 – Independent QA/QC Review of Topographic Data	SCDNR	30 Days after receipt of Topographic Data
Activity 6 –Hydrologic Analyses	SCDNR	30 Days after receipt of fully accepted Topographic Data
Activity 6A –Coastal Flood Hazard Analyses	SCDNR	150 Days after receipt of fully accepted Topographic Data
Activity 7–Independent QA/QC Review of Hydrologic Analyses	SCDNR	30 Days after receipt of Hydrologic Analyses
Activity 7A–Independent QA/QC Review of Coastal Hazard Analyses	SCDNR	30 Days after receipt of Coastal Flood Hazard Analyses
Activity 8 – Hydraulic Analyses	SCDNR	30 Days after receipt of approval of Hydrologic Analyses
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	SCDNR	30 Days after receipt of Hydraulic Analyses

Activities	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis) Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data) Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	SCDNR	60 Days after receipt of approval of Hydraulic Analyses, Coastal Flood Hazard Analyses and receipt of Base Map (which ever is later)
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	SCDNR	30 Days after receipt of Floodplain Mapping Data
Activity 12 – Base Map Acquisition	SCDNR	30 Days after receipt of all data from State / FEMA / County / Community for use in Base Map
Activity 13 – DFIRM Production (Non-Revised Areas)	NA	
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	NA	
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	SCDNR	30 Days after approval of all Floodplain Mapping
Activity 14A – Application of DFIRM Graphic and Database Specifications	SCDNR	30 Days after receipt of completed DFIRM Production Information
Activity 14A – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	SCDNR	30 Days after receipt of DFIRM
Activity 15 – Preliminary DFIRM and FIS Report Distribution	SCDNR	30 Days after receipt of approval of DFIRM
Activity 16 – Post-Preliminary Processing	SCDNR	360 Days after PDCC Meeting

**Schedule 6-2. Horry County Restudy**

<b>Activities</b>	<b>RESPONSIBLE PARTNER(S)</b>	<b>DATE DUE</b>
Activity 1 – Scoping	SCDNR	90 Days after Notice to Proceed
Activity 2 - Outreach	SCDNR FEMA	660 Days after Notice to Proceed
Activity 3 – Field Surveys and Reconnaissance	SCDNR	60 Days after approval of Scoping Report
Activity 4 – Topographic Data Development	NA	
Activity 5 – Independent QA/QC Review of Topographic Data	SCDNR	30 Days after receipt of Topographic Data
Activity 6 –Hydrologic Analyses	SCDNR	30 Days after receipt of fully accepted Topographic Data
Activity 6A –Coastal Flood Hazard Analyses	SCDNR	150 Days after receipt of fully accepted Topographic Data
Activity 7–Independent QA/QC Review of Hydrologic Analyses	SCDNR	30 Days after receipt of Hydrologic Analyses
Activity 7A–Independent QA/QC Review of Coastal Hazard Analyses	SCDNR	30 Days after receipt of Coastal Flood Hazard Analyses
Activity 8 – Hydraulic Analyses	SCDNR	30 Days after receipt of approval of Hydrologic Analyses
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	SCDNR	30 Days after receipt of Hydraulic Analyses
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis) Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data) Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	SCDNR	60 Days after receipt of approval of Hydraulic Analyses, Coastal Flood hazard Analyses and receipt of Base Map (which ever is later)
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	SCDNR	30 Days after receipt of Floodplain Mapping Data

Activities	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 12 – Base Map Acquisition	SCDNR	30 Days after receipt of all data from State / FEMA / County / Community for use in Base Map
Activity 13 – DFIRM Production (Non-Revised Areas)	NA	
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	NA	
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	SCDNR	30 Days after approval of all Floodplain Mapping
Activity 14A – Application of DFIRM Graphic and Database Specifications	SCDNR	30 Days after receipt of completed DFIRM Production Information
Activity 14A – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	SCDNR	30 Days after receipt of DFIRM
Activity 15 – Preliminary DFIRM and FIS Report Distribution	SCDNR	30 Days after receipt of approval of DFIRM
Activity 16 – Post-Preliminary Processing	SCDNR	360 Days after PDCC Meeting

**Schedule 6-3. Georgetown, Williamsburg and Oconee Counties Scoping Activities**

Activities	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 1 – Scoping	SCDNR	180 Days after Notice to Proceed

## SECTION 7—CERTIFICATIONS

**Activity 3 (Field Surveys and Reconnaissance) and Activity 4 (Topographic Data Development)**

A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic data, in accordance with 44 CFR 65.5(c). Certification of topographic data by the American Society for Photogrammetry and Remote Sensing is also acceptable.

**Activity 6 (Hydrologic Analyses), Activity 8 (Hydraulic Analyses), Activity 10 (Floodplain Mapping– Detailed Riverine or Coastal Analysis), Activity 10A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Activity 10B (Floodplain Mapping {Refinement or Creation of Zone A})**

- A Registered Professional Engineer shall certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f).
- A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic information in accordance with 44 CFR 65.5(c).
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10(e) in addition to subsequent FEMA guidance via procedure memoranda.

**Activity 10 (Floodplain Mapping– Detailed Riverine or Coastal Analysis), Activity 10A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Activity 10B (Floodplain Mapping {Refinement or Creation of Zone A}), Activity 11 (Independent QA/QC Review of Floodplain Mapping {Revised Areas}), Activity 13 (DFIRM Production {Non-Revised Areas}), Activity 14 (DFIRM Production {Merging Revised and Non-Revised Information}), and Activity 14A (DFIRM Production {Application of FEMA Graphics and Database Specifications})**

The DFIRM metadata files shall include a description of the horizontal and vertical accuracy of the DFIRM base map and floodplain information.

**Activity 12 (Base Map Acquisition and Preparation)**

- 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 will still be 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.

## **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 Process from the NSP, who may be contacted through your Regional Project Officer.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA Web site (<http://www.fema.gov/fhm/>). Specific technical and programmatic support may be provided through the NSP; such assistance should be requested through the FEMA Project Officer specified in Section 12 of this MAS.

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 subcontractors, and GIS-based engineering and modeling training.

## **SECTION 9—CONTRACTORS**

SCDNR intends to use the services of Watershed Concepts and URS Corporation (QA/QC Activities Only) as contractors for this Flood Map Project. SCDNR shall ensure that the procurement for all contractors used for this Flood Map Project complies with the requirements of 44 CFR 13.36.

Part 13 may be downloaded in PDF or text format from the U.S. Government Printing Office Web site at [http://www.access.gpo.gov/nara/cfr/waisidx\\_04/44cfr13\\_04.html](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 V and VI.

### **STATUS REPORTING:**

Status reports will be submitted on a quarterly basis in accordance with the financial reporting submittals. At a minimum these reports will include a summary of the work as outlined in the Cooperative Technical Partner (CTP)/Map Modernization Project Quarterly Report located in Appendix B of this Mapping Activity Statement. The Project Officer, as needed, may request additional information on status.

SCDNR may meet with the FEMA more frequently (up to bi-weekly 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.

## **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 shall include:

- Meetings, teleconferences, and video conferences with FEMA and other Project Team members as needed;
- Telephone conversations with FEMA and other Project Team members on a scheduled basis quarterly 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 *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- E-mail, facsimile transmissions, and letters, as required.

## **SECTION 12—POINTS OF CONTACT**

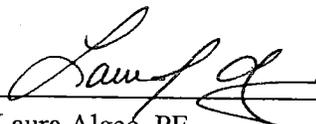
The points of contact for this Flood Map Project are Laura Algeo, the FEMA Regional Project Officer; Lisa Jones, the Project Manager for SCDNR; or subsequent personnel of comparable experience who are

appointed to fulfill these responsibilities. When necessary, the any additional assistance of FEMA should be requested through the FEMA Regional Project Officer.

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

  
\_\_\_\_\_  
John E. Frampton  
Director  
South Carolina Department of Natural Resources

8-5-05  
Date

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

8-10-05  
Date