State of South Carolina
Cooperating Technical Partners
Mapping Activity Statement
Number 1
For York and Spartanburg Counties

Statement No. 1 – Digital Flood Insurance Rate Map (DFIRM) Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Memorandum of Agreement dated September 20, 1999, between the State of South Carolina and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement No. 1 is as follows:

1. **Statement Objective:** The objective of this Mapping Activity for the State of South Carolina is to develop a new or updated Digital Flood Insurance Rate Map(s) (DFIRM) and Flood Insurance Study (FIS) report(s) for York and Spartanburg Counties. The FIS and DFIRM will be produced in countywide DFIRM format. The DFIRM product will be referenced to the North American Vertical Datum of 1988 (NAVD 88).

Additionally, this project will include developing new and/or updated flood hazard data, as summarized in the following tables:

SPARTANBURG COUNTY

Stream Name	Miles	Detailed Riverine		Detailed Coastal				Redelineation of SFHAs Using Effective Profiles	Refine/ Establish Zone A
		Hydrology	Hydraulics	Stillwater	Wave Height	Wave Runup	Erosion		
Chinquepin Creek	1.5	X	X						
Jimmies Creek	3.3	X	X						
Lyman Lake	3.4	X	X						
North Pacolet River	9.6	X	X						
Ransom Creek	2.6	X	X						
Middle Tyger River	4.5	X	X						
Beaverdam Creek	2.2	X	X						
South Tyger River	1.7	X	X						
North Tyger River	5.5	X	X						
Limited Detail Study and Redelineation – TBD*	293							X	X

*These areas will be determined based on detailed scoping activities

YORK COUNTY

Stream Name	Miles	Detailed Riverine		Detailed Coastal				Redelineation of SFHAs Using Effective Profiles	Refine/ Establish Zone A
		Hydrology	Hydraulics	Stillwater	Wave Height	Wave Runup	Erosion		
Catawba River	21	X	X						
Wildcat Creek	1.1	X	X						
Lake Wylie	29.8	X	X						
Limited Detail Study and Redelineation – TBD*	247							X	X

*These areas will be determined based on detailed scoping activities

The Mapping Partners listed below will complete this project:
1) State of South Carolina Department of Natural Resources (SCDNR)
2) FEMA
3) Local Governments and Communities

The activities, and who will complete them, are summarized in the table below. The flooding sources listed in Activity 1 could be revised as part of the detailed scoping process. The watershed sizes in the table above include the entire watershed lying within the study area. Precise estimates of watershed areas and linear miles of streams to be studied will be determined based on detailed scoping activities.

The following sections describe the specific mapping activities associated with this mapping project. Each activity description identifies the responsible Mapping Partners, the Standards that must be met, and resultant map component.

Activity	SCDNR	FEMA	Other
Activity 1A – Scoping	X		
Activity 1B – Outreach	X	X	
Activity 1C – Field Surveys and Reconnaissance	X		
Activity 2 – Topographic Data Procurement	X		
Activity 3 – Independent QA/QC of Topographic Data	X	X	
Activity 4 – Hydrologic Analyses	X		
Activity 4A – Coastal Hazard Analysis			
Activity 5 – Independent QA/QC of Hydrologic Analyses	X	X	

Activity	SCDNR	FEMA	Other
Activity 5A – Independent QA/QC of Coastal Hazard Analysis			
Activity 6 – Hydraulic Analyses	X		
Activity 7 – Independent QA/QC of Hydraulic Analyses	X	X	
Activity 8 – Floodplain Mapping (Detailed Riverine and Redelineation Using Effective Profiles)	X		
Activity 9– Independent QA/QC of Floodplain Mapping	X	X	
Activity 10 – Base Map Acquisition and Preparation	X		
Activity 11 – DFIRM Production (Non-Revised Areas)			
Activity 11A – Independent QA/QC of DFIRM Production (Non-Revised Areas)			
Activity 12 – Merging of Revised and Non-Revised Information			
Activity 12A – Application of DFIRM Graphic Specifications	X		
Activity 12B – Independent QA/QC of DFIRM Graphics	X	X	
Activity 13 – Preparation and Issuance of Preliminary FIS and FIRM	X	X	
Activity 14 – Post-Preliminary Processing		X	

Activity 1A – Scoping

The scoping of each County will provide a refined scope of work based on the statement objective and scoping process. This refined scope of work will refine the statement objective with the written approval of the Director of SCDNR and FEMA's Regional Project Officer. This Scoping will be completed in accordance with the Scoping Guidelines outlined in the Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix I.

Activity 1B – Outreach

Education and Outreach will be conducted through local and county governments, SCDNR and FEMA in order to properly inform the citizens and provide the due process requirements. In an effort to further describe the Flood Map Modernization Program to the public, outreach activities may include but not be limited to speaking engagements, mail outs, public service announcements, radio spots, development of a website, and meetings with local communities. All communication with local governments will be done in accordance with Title 44 Code of Federal Regulations Part 66.

Activity 1C – Field Surveys and Reconnaissance

Responsible Entity: SCDNR

Scope: To supplement any field reconnaissance conducted during the scoping phase of this Flood Map Project, SCDNR shall conduct a detailed field reconnaissance of the specified study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures,

apparent maintenance status 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, this activity includes conducting field surveys, including obtaining channel and floodplain cross sections, identifying or establishing elevation reference marks (ERMs), and obtaining the physical dimensions of hydraulic and flood-control structures. SCDNR is responsible for coordinating with other team members that may need field survey and reconnaissance data.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the Technical Support Data Notebook (TSDN) format described in Section 2, SCDNR shall make the following products available to FEMA:

- 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.

Activity 2 - Topographic Data Procurement

Responsible Entity: SCDNR

Scope: To supplement the field surveys conducted under Activity 1C, additional topographic data of the overbank areas of flooding sources will be acquired using LIDAR technology and/or obtained from local communities and governments to delineate floodplain boundaries. SCDNR is responsible for coordinating with other team members that may need or have questions about the data collected. Contour interval and/or accuracy for the topographic data used will be based on the existing FEMA guidelines and specifications. In this study area, the topographic data obtained as part of this project is primarily from LIDAR. Topographic data obtained from local sources is primarily, aerial photography and/or conventional surveys. New topographic data will be acquired for Spartanburg County and approximately 50% of York County. This data is being acquired because topographic data meeting the FEMA standards does not exist for these areas. Final processing to bare earth will be performed along the stream corridors for 400 to 600 miles of stream in these two counties. During the detailed scoping process outlined in Section 1a, the need for this additional topographic data collection and processing will be verified in greater detail and final areas of interest will be determined. Approval of the use of FEMA funds from this Mapping Activity Statement in the completion of this Activity will be agreed upon at that time by FEMA and SCDNR.

Unless directed to do otherwise by FEMA, all new topographic data must be developed and submitted in digital format. Upon completion of topographic data collection and processing for flooding sources listed in Section 1C, this data will be submitted to FEMA for an independent Quality Assurance/Quality Control (QA/QC) review under Activity 3. Data for the remaining flooding sources will be submitted for an independent QA/QC review at the completion of this Activity. SCDNR will be responsible for addressing all concerns or questions regarding this Activity raised during the QA/QC review outlined in Activity 3.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA.

- Hardcopy topographic maps;

- Completed Form No. 5 of *Revisions to National Flood Insurance Program Maps, Application/Certification Forms and Instructions* (MT-2). Complete set of MT-2 forms are available from FEMA web site at http://www.fema.gov/mit/tsd/DL_MT-2.htm;
- Report summarizing methodology and results;
- Mass points and breaklines data on CD-ROM;
- Digital workmap with contours;
- Checkpoint analyses to assess the accuracy of data including Root Mean Square Error (RMSE) calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey (NGS) data sheets for Network Control Points (NCPs) used to control remote sensing and ground surveys;
- Metadata compliant with Federal Geographic Data Committee standards.

Activity 3 - Independent QA/QC of Topographic Data

Responsible Entity: SCDNR and FEMA

Scope: FEMA and SCDNR or their contractor(s) shall review the mapping data obtained under Activity 2 of this Mapping Activity Statement to ensure that these data are consistent with FEMA standards as well as standard engineering practice and are sufficient to prepare or revise the FIRM. A list of what was reviewed by SCDNR or their contractor(s) as QA/QC will be submitted to FEMA.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA.

- A Summary Report that describes the findings of the independent QA/QC review.
- Recommendations to resolve any problems that arise as a result of the internal QA/QC review.

Activity 4 – Hydrologic Analysis

Responsible Entity: SCDNR

Scope: Hydrologic analyses will be completed drainage areas for the watershed(s) listed in Section 1 of this Mapping Activity Statement. The hydrologic methods to be used in this analysis will include: HEC-HMS, Regional Equations, statistical gage analysis and/or other FEMA approved models and methodologies. In addition, SCDNR will be responsible for addressing all concerns or questions regarding this Activity raised during the QA/QC review outlined in Activity 5.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: Upon completion of hydrologic modeling for the flooding sources listed in Section 1, SCDNR and FEMA will perform an independent QA/QC review as described in Activity 5.

In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA.

- Digital copies of all hydrologic modeling (input and output) files for the 10%, 2%, 1%, and 0.2% annual chance storm events for detailed study streams and 1% annual chance storm event for limited detail study areas.
- "Summary of Discharges" table(s) presenting discharge data for each flooding source.
- Draft text for Section 3.1, Hydrologic Analyses, of FIS report.
- Appropriate SC application/certification form for hydrology.
- All backup data used in the analysis, including work maps.
- For GIS-based modeling, products include all input and output data, intermediate data processing products, GIS data layers, and final products.

Activity 4A – Coastal Hazard Analyses

Responsible Entity: N/A

Activity 5 - Independent QA/QC Review of Hydrologic Analyses

Responsible Entity: SCDNR and FEMA

Scope: FEMA and SCDNR or one of its contractors shall review the technical, scientific, and other information completed under Activity 4 of this Mapping Activity Statement to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to revise the FIRM. A list of what was reviewed by SCDNR or their contractor, as QA/QC will be submitted to FEMA. The contractor who performs the QA/QC shall not be the contractor who performed the Hydrologic Analyses. This work will include, at a minimum, the following activities:

- Review submittal for technical and regulatory adequacy, completeness of required information, application/certification forms, and supporting data and documentation. The technical review will focus on:
  - 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 should be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that arise as a result of the QA/QC review.

Activity 5A – Independent QA/QC of Coastal Hazard Analyses

Responsible Entity: N/A

Activity 6 – Hydraulic Analyses

Responsible Entity: SCDNR

Scope: SCDNR or one of its contractors will perform hydraulic analyses for the flooding sources listed in the Section 1 of this Mapping Activity Statement. The hydraulic methods to be used in this analysis will include: HEC-RAS, and/or other FEMA approved models. The modeling will include the 10%, 2%, 1% and 0.2% annual chance storm events (or 1% annual chance storm event for limited detail study streams) based on peak discharges computed under Activity 4. SCDNR will use cross-section, field data and topographic data developed under Activity 1C and Activity 2 to perform the hydraulic analysis. The hydraulic analysis will be used to establish flood elevations and regulatory floodways for the subject flooding sources. FEMA approved methods will be used for hydrologic analysis. In addition, SCDNR will address all concerns or questions regarding this Activity raised during the independent QA/QC review under Activity 7.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: Upon completion of hydraulic modeling for the flooding sources listed in Section 1, SCDNR will perform an internal QA/QC review as described in Activity 7.

In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA:

- Digital profiles of the 10%, 2%, 1% and 0.2% annual chance water-surface elevations representing existing conditions (or 1% annual chance storm event for limited detail study streams)using FEMA's RASPLOT program or similar software;
- Floodway Data Table(s) for each subject-flooding source. The Floodway Data Table(s) must be compatible with the DFIRM database;
- Digital copies of all hydraulic modeling (input and output) files;
- Table with range of Manning's "n" values;
- An explanation for each unresolved message from CHECK-2 or CHECK-RAS program, as appropriate;
- All backup data used in the analyses;
- Draft text for inclusion in Section 3.2, Hydraulic Analyses, of FIS report; and
- For GIS-based modeling, products include all input and output data, intermediate data processing products, GIS data layers, and final products.

Activity 7 - Independent QA/QC Review of Hydraulic Analyses

Responsible Entity: SCDNR and FEMA

Scope: SCDNR or one of its contractors and FEMA shall review the technical, scientific, and other information completed under Activity 6 of this Mapping Activity Statement to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to revise the FIRM. A list of what was reviewed by SCDNR or their contractor as QA/QC will be submitted to FEMA. The contractor who performs the QA/QC shall not be the contractor who performed the Hydraulic Analyses. This internal QA/QC review of the hydraulic analyses will include, at a minimum, the following activities:

- Review submittal for technical and regulatory adequacy, completeness of required information, application/certification forms, and supporting data and documentation. The technical review will focus on:
  - Use of acceptable models;
  - Starting water-surface elevations;
  - Cross section geometry;
  - Manning's "n" values and expansion/contraction coefficients;
  - Bridge and culvert modeling;
  - Discharges;
  - Regulatory floodway computation methods; and
  - Tie-in to upstream and downstream non-revised profiles.
- Use the CHECK-RAS (when HEC-RAS model was used) programs 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 conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review and
- Recommendations to resolve any problems that arise as a result of the independent QA/QC review.

Activity 8 – Floodplain Mapping (Detailed Riverine, Limited Detail Riverine and Redelineation Using Effective Profiles and Updated Topographic Data)

Responsible Entity: SCDNR

Scope: SCDNR will delineate digital floodplain and regulatory floodway boundaries for the watersheds listed Section 1 of this Mapping Activity Statement. The mapping will incorporate all revised hydraulic modeling and newly acquired topographic information. SCDNR will incorporate all of the final Letters of Map Change as necessary. SCDNR will delineate the floodplain boundaries for the 1% and 0.2% annual chance recurrence intervals and the regulatory floodway boundaries on a digital work map based on. If new topography does not reflect the same hydraulic characteristics as in the effective study, SCDNR will evaluate the topography to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. Also, SCDNR will contact Laura Algeo, FEMA Regional Project Officer, with a recommendation. In addition, SCDNR will address all concerns or questions regarding this Activity raised during the independent QA/QC review outlined in Activity 10.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: Upon completion of floodplain mapping for the watersheds identified in Section 1, SCDNR and FEMA will perform an independent QA/QC review as outlined under Activity 9.

In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA:

- Digital work maps, with 1% and 0.2% annual chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, zone designation labels and all applicable base map features;
- DFIRM mapping files, in one of the GIS file and database formats specified in FEMA's DFIRM Specifications;
- Metadata files describing the DFIRM data, including the required information shown in the examples shown in FEMA's DFIRM Specifications;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- A QA/QC report that includes a description and the results of all automated or manual QA/QC steps taken during the preparation of the DFIRM; and

Activity 9 - Independent QA/QC Review of Floodplain Mapping

Responsible Entity: SCDNR and FEMA

Scope: SCDNR or one of its contractors and FEMA shall review the floodplain work maps completed under Activities 8 and 9 of this Mapping Activity Statement to ensure that the results of the hydraulic analyses are accurately represented on the work maps. A list of what was reviewed by SCDNR or their contractor as QA/QC will be submitted to FEMA. The contractor who performs the QA/QC shall not be the contractor who performs the floodplain mapping. This work will include, at a minimum, the following activities:

- 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.
- Floodplain widths at cross section must match floodway data table. Floodplain boundaries as shown on work maps match profiles.
- Ensure zone designations are indicated properly.
- Ensure DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's DFIRM Specifications and conform to those specifications for content and attribution.
- Ensure metadata files describing the DFIRM data include the required information and follow the examples shown in FEMA's DFIRM specifications.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review noting any deficiencies and providing recommendations to resolve them or agreeing with the mapping results; and

- An annotated work map with all questions and/or concerns indicated if necessary.

Activity 10 - Base Map Acquisition and Preparation

Responsible Entity: SCDNR

Scope: This is a required activity when Activities 8 and 9, are performed. This activity consists of obtaining the digital base map for the project. SCDNR shall:

- 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;
- Document that the digital data meet the minimum standards and specifications that FEMA requires for DFIRM production; and
- Populate the DFIRM database for base map features and applicable data.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA:

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

Activity 11 – DFIRM Production (Non-Revised Areas)

Responsible Entity: N/A

Activity 11A – Independent QA/QC of DFIRM Production (Non-Revised Areas)

Responsible Entity: N/A

Activity 12 – Merging of Effective and Revised Information

Responsible Entity: N/A

Activity 12A – Application of DFIRM Graphic Specifications

Responsible Entity: SCDNR

Scope: Upon completion of the DFIRM mapping (Activity 8), SCDNR shall apply the final FEMA DFIRM graphic specifications to the DFIRM mapping files. This work will include adding all required annotation, line patterns, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user).

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, SCDNR shall make the following products available to FEMA.

- DFIRM mapping files in one of the GIS file and database formats specified in FEMA's DFIRM Specifications, provided on CD-ROM;
- DFIRM database files in one of the database formats specified in FEMA's DFIRM Specifications, provided on CD-ROM;
- Metadata files describing the DFIRM data including the required information based on the examples shown in FEMA's DFIRM Specifications, provided on CD-ROM;
- Complete set of plots of the DFIRM panels showing all the detailed flood hazard information at a suitable scale;
- A QA/QC report that includes a description and the results of all automated or manual quality assurance steps taken during the preparation of the DFIRM.

Activity 12B - Independent QA/QC Review of DFIRM Graphics

Responsible Entity: FEMA

Scope: FEMA shall review the DFIRM panels submitted by SCDNR under Activity 15 of this Mapping Activity Statement to ensure that the DFIRM panels conform to FEMA's DFIRM graphic standards. This work will include, at a minimum, the following:

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in FEMA's DFIRM Specifications. This includes all flood hazard zones, BFEs, cross sections, coastal transects, studied streams, mapped political entities, and all roads within and adjacent to the 1% annual chance flood hazard areas.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the examples shown in FEMA's DFIRM Specifications.
- All map collar information is complete, correct, and follows the examples shown in FEMA's DFIRM Specifications.
- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's DFIRM Specifications and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's DFIRM Specifications and conform to those specifications for content and attribution.
- Metadata files describing the DFIRM data include the required information and follow the examples shown in FEMA's DFIRM Specifications.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, FEMA shall make the following products available:

- A Summary Report that describes the findings of the independent QA/QC review, noting any deficiencies and providing recommendations to resolve them or agreeing with the mapping results; and
- Annotated DFIRM panels with all questions and/or concerns indicated, if necessary.

Activity 13 – Preparation and Issuance of Preliminary FIS and DFIRM

Responsible Entity: SCDNR and FEMA

Scope: This Activity consists of the final preparation, review, and distribution of the Preliminary copies of the FIRM and FIS report for community and public review and comment. The activities to be performed are summarized below.

- *FIS Report Preparation:* Unless instructed otherwise by FEMA, SCDNR will prepare the revised FIS report in the format of the existing FIS report, revising the report only to reflect current conditions and include updated data tables and flood profiles. At a minimum, the FIS report will include the following: text; cover; vicinity map; data tables; photographs (if available); flood profiles; floodway schematic; and, when necessary, transect schematic and transect location map.
- *Quality Assurance/Quality Control:* Final QA/QC review of the FIS report, including all data tables, profiles, and other components of the FIS, as appropriate, and the news release will be conducted. The QA/QC procedures will be consistent with FEMA standards outlined below for this activity.
- *Discrepancy Resolution:* SCDNR will be responsible for working with York and Spartanburg Counties, SCDNR, and FEMA who are responsible for performing the activities of this project to resolve discrepancies identified during QA/QC.
- *Distribution of Preliminary DFIRM and FIS Report:* SCDNR will distribute the preliminary copies of the FIS report and DFIRM to the affected communities, State agencies, and others as identified by FEMA.
- *News Release and Federal Register Notice Preparation:* FEMA will prepare the news release notifications of BFE changes. The news release will summarize newly proposed BFEs, modifications to existing BFEs, and any changes to the community's floodplain management ordinances to be NFIP compliant. Upon completion of a 30-day community comment period and/or final meeting with the community, and upon initiation of the 90-day appeal period, SCDNR will arrange for and verify that the news release is published in the prominent newspaper(s) with local circulation within each affected community identified by the community and FEMA. SCDNR also will arrange for and verify that a similar notice is published in the *Federal Register*.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, shall make the following products available to FEMA:

- One set of printed preliminary DFIRMs and FIS reports, including all updated data tables and flood profiles for mailing to the CEO of each community, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA;
- Preliminary transmittal letter(s);
- DFIRM mapping files in one of the database formats specified in FEMA's DFIRM Specifications;
- DFIRM database files in one of the database formats specified in FEMA's DFIRM Specifications;
- Metadata files describing the DFIRM data, including the required information as presented in the examples shown in FEMA's DFIRM Specifications;
- A QA/QC report that includes a description and the results of all automated or manual QA/QC steps taken during the preparation of the preliminary copies of the DFIRM and FIS report; and

- Documentation showing that the news release(s) was published correctly in accordance with FEMA requirements and that a similar notice was published correctly in the *Federal Register* in accordance with FEMA requirements.

Activity 14 - Post-Preliminary Processing

Responsible Entity: SCDNR and FEMA

Scope: This Activity consists of finalizing the DFIRM and FIS report after the preliminary FIS and DFIRM has been issued for public review and comment. The activities to be performed include:

- *Participating in Public Meetings:* When SCDNR holds public meetings to present and discuss the results of this Flood Map Project, FEMA will attend the meetings and assist SCDNR in the presentation as required.
- *Resolving Appeals and Protests:* Appeals and protests received during the 90-day appeal period will be reviewed and resolved prior to finalizing the FIRMs and FIS report. FEMA will be responsible for resolving appeals and protests. Activities may include, but not limited to, attending community meetings and assisting FEMA in addressing any issues that may arise in resolving appeals and protests from affected communities. For a typical appeal and protest, the following activities will be conducted: initial processing of the appeal/protest, performing a technical review of the appeal/protest, preparing letters to request additional data, performing revised analyses, and preparing a proposed resolution for FEMA's review. FEMA will mail all associated correspondence.
- *Special Correspondence:* Comments received within the 90-day appeal period (referred to as "special correspondence") will be reviewed, and responses will be drafted and mailed by FEMA.
- *Revise DFIRMs and FIS Report:* If necessary, FEMA will work with those parties responsible for preparing the DFIRM to prepare revised preliminary copies of the DFIRMs and FIS report, including all data tables and flood profiles. FEMA will mail all revised preliminary copies of DFIRMs and associated correspondence.
- *Letter of Final Determination:* FEMA will work with SCDNR to establish an effective date for the DFIRM and FIS report. FEMA will prepare a Letter of Final Determination (LFD) and a final notice for publication in the *Federal Register,* FEMA will mail the LFD with appropriate enclosures and coordinate publication of the final notice in the *Federal Register.*
- *GPO Processing:* FEMA will prepare final copies of the DFIRM and FIS report. This will include preparing camera-ready film negatives of the DFIRM and paper copies of the FIS report, including flood profiles; preparing appropriate paperwork to be included with DFIRM and FIS report materials, including the transmittal letter to the community CEO, the print processing worksheet, the Printing Requisition Form, and the Community Map Action Form; and delivering the final materials and paperwork to FEMA in the format prescribed by FEMA.
- *Archiving Data:* SCDNR will maintain and archive all the technical data for at least 3 years.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, FEMA shall make the following products available as required:

- Draft LFD and associated backup data and information;
- Draft Special Correspondence and backup data and information;
- Appeal and Protest resolution letters, and all backup data and information;
- One set of DFIRM negatives and paper FIS reports, including all updated data tables and flood profiles;
- Paperwork required for printing of DFIRM panels and FIS report;

- Complete DFIRM spatial database; and
- Completed and organized Engineering Study Data Packages.

2. **Technical and Administrative Support Data Submittal:** The Project Team members for this project that have responsibilities for activities included in this Mapping Activity Statement shall comply with the following data submittal requirements:
   - All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in accordance with Appendix M, Section M.2.1 of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, available at FEMA's website at **www.fema.gov/fhm/gs_main.shtm**. The following table indicates the sections of the TSDN that apply to each activity.

TSDN—Applicable Sections

Section of TSDN	Activities												
	1	2	3	4	5	6	7	8, 9	10	11	14, 15, and 16	17	18
General Documentation													
Special Problem Reports	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
Meeting Minutes/Reports	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
Engineering Analyses													
Hydrologic and Hydraulic Analyses	X	X		X	X	X	X						
Key to Cross-section Labeling and Key to Transect Labeling	X	X				X	X	X	X				
Draft FIS Report				X		X						X	X
Mapping Information		X						X	X	X	X	X	X
Miscellaneous Reference Materials	X	X	X	X	X	X	X	X	X	X	X	X	X

- If any issues arise that could affect the completion of an activity within the proposed scope or budget, the party responsible for that activity must complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR should describe the issue and propose possible resolutions.

Additionally, SCDNR and FEMA will be responsible for collecting and maintaining a set of products for all Activities and shall compile a comprehensive TSDN for the entire project.

3. **Period of Performance:** The mapping activities outlined in this Mapping Activity Statement will be completed within 24 months from notice to proceed not to extend beyond December 31, 2005. The Mapping Activities may be terminated at the option of FEMA or SCDNR in accordance with the provisions of the September 20, 1999, CTP Partnership Agreement. 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.

   The period of performance will be in accordance with Cooperative Agreement Article II.

4. **Funding/Leverage:**

5. **Standards:** Table 5-1 indicates the standards and documentation relevant to this Mapping Activity Statement. Table 5-2 shows the applicable sections of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* for each activity.

Table 5-1 Applicable Standards per Activity

Applicable Standards	Activities													
	1	2	3	4, 4A	5, 5A	6	7	8, 8A, 8B	9	10	11, 11A	12, 12A, 12B	13	14
Guidelines and Specifications for Flood Hazard Mapping Partners	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping (ACSM) procedures	X	X	X											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X	X	X											
EM 1000-1-1000, "Photogrammetric Mapping," March 31, 1993	X	X	X											
EM 1110-2-1003, "Hydrographic Surveys," October 31, 1994	X		X											
Numerical Models Accepted by FEMA for NFIP Usage, January 11, 2002				X	X	X	X							
Content Standards for Digital Geospatial Metadata (Federal Geographic Data Committee, 1998)		X	X					X	X	X	X	X	X	X
Document Control Procedures Manual dated October 1993.													X	X

Table 5-2. Mapping Activities and Applicable Sections of Guidelines and Specifications for Flood Hazard Mapping Partners.

Activity	Applicable Volume, Section/Subsection, and Appendix of Guidelines and Specifications
Activity 1 – Field Surveys and Reconnaissance	Volume 1, Sections 1.2, 1.3, 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.5, A.6, A.7, and A.8 Appendices B, C, and M
Activity 2 – Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2 and A.3 Appendix M
Activity 3 – Independent QA/QC 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
Activity 4 –Hydrology	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, and M
Activity 4A – Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.2.2) Appendix A, Section A.4 Appendices B, D, and M
Activity 5 – Independent QA/QC of Hydrology	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix C, Section C.2 Appendices E, F, G, H, and M
Activity 5A – Independent QA/QC of Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendices B, D, H, and M
Activity 6 – Hydraulics	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
Activity 7 – Independent QA/QC of Hydraulics	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

Activity	Applicable Volume, Section/Subsection, and Appendix of Guidelines and Specifications
Activity 8 – 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 Appendices K, L, and M
Activity 8A – Floodplain Mapping (Redelineation Using Effective Profiles)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Appendices K. L, and M
Activity 9 – Independent QA/QC of Floodplain Mapping	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices D, K, L, and M
Activity 10 – Base Map Acquisition and Preparation	Volume 1, Sections 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsection 1.4.3) Appendices A and B
Activity 11 – DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.2) Appendices K, L, and M
Activity 11A - Independent QA/QC of DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K, L, and M
Activity 12 – Merge Effective and Revised Information	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Appendices K and L
Activity 12A -- Apply DFIRM Graphic Specifications	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K and L
Activity 12B -- Independent QA/QC of DFIRM Graphics	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K, L, and M
Activity 13 – Issue Preliminary FIS and FIRM	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
Activity 14 – Post-Preliminary Processing	Volume 1, Section 1.5 Appendices J, K, L, and M

6. Schedule and Milestones:

The submittals from each activity that are due on the dates indicated are the products that were listed in the individual Activity details.

ACTIVITY	RESPONSIBLE ENTITY	DAYS FROM NOTICE TO PROCEED
Activity 1A – Scoping	SCDNR	60
Activity 1B – Outreach	SCDNR and FEMA	120
Activity 1C – Field Surveys and Reconnaissance	SCDNR	120
Activity 2 – Topographic Data Procurement	SCDNR	180
Activity 3 – Independent QA/QC of Topographic Data	SCDNR and FEMA	210
Activity 4 –Hydrologic Analysis	SCDNR	270
Activity 5 – Independent QA/QC of Hydrology	SCDNR and FEMA	300
Activity 6 – Hydraulic Analyses	SCDNR	360
Activity 7 – Independent QA/QC of Hydraulic Analyses	SCDNR and FEMA	390
Activity 8 – Floodplain Mapping (Detailed Riverine and Redelineation Using Effective Profiles)	SCDNR	450
Activity 9 – Independent QA/QC of Floodplain Mapping	SCDNR and FEMA	450
Activity 10 – Base Map Acquisition and Preparation	SCDNR	480
Activity 14 – Merge Effective and Revised Information	FEMA	450
Activity 12A – Apply DFIRM Graphic Specifications	SCDNR	510
Activity 12B – Independent QA/QC of DFIRM Graphics	FEMA	540
Activity 13 – Issue Preliminary FIS and FIRM	SCDNR and FEMA	570
Activity 14 – Post-Preliminary Processing	SCDNR and FEMA	720

7. Certification: The following certifications apply to this Mapping Activity Statement (as appropriate):

Activity 1 (Field Surveys and Reconnaissance) and Activity 2 (Topographic Data Development)

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

Activity 11 (Base Map Acquisition and Preparation)

- Community official or responsible party will provide written certification that the digital data meet FEMA's minimum standards and specifications.

- Responsible Mapping Partner will provide documentation that the digital base map can be used by FEMA.

Activities 8 and 9 (Floodplain Mapping)

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

Activity 4 (Hydrology), Activity 6 (Hydraulics), and Activities 8 and 9 (Floodplain Mapping)

- Hydrologic and/or hydraulic analyses and data will be certified by a Registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.6(f).
- Topographic information will be certified by a Registered Professional Engineer or Licensed Land Surveyor 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).

8. **Technical Assistance and Resources**: York and Spartanburg Counties may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from FEMA's contractor. FEMA's contractor may be contacted at 1-877 FEMA MAP (1-877-336-2627). General technical and programmatic information, such as FEMA 265, the Quick-2 computer program, and the MT-2 forms, can be downloaded from FEMA's Flood Hazard Mapping website (www.fema.gov/fhm). Specific technical and programmatic support may be provided through FEMA's contractor; such assistance should be requested through the FEMA Regional Project Officer.

   SCDNR may also 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 sub-contractors, and GIS-based engineering and modeling training.

9. **Contractors**: SCDNR will ensure that procurement of contractors as part of this Mapping Activity Statement complies with the requirements of 44 CFR 13.36. SCDNR has enlisted the help of Watershed Concepts, URS, Inc., and Woolpert, LLC.

10. **Reporting**

    Financial Reporting: Financial reporting requirements will be in accordance with Cooperative Agreement Articles V & VI.

    STATUS REPORTING: Status reports will be submitted on a quarterly basis from the Notice to Proceed. At a minimum these reports will include a summary of the work that was completed during the quarter and a comparison for the % work completed to the % of funds expended. The Project Officer as needed may request additional information on status.

11. **Points of Contact:** The FEMA Regional Project Officer is Laura Algeo, and the CTP Project Manager is Lisa Jones, or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, any additional assistance from FEMA should be requested through the FEMA Regional Project Officer.

Each party has caused this Mapping Activity Statement to be executed by its duly authorized representative.

John E. Frampton, Director
South Carolina Department of Natural Resources

9/23/03
Date

Laura Algeo, P.E.
FEMA Regional Project Officer
Federal Emergency Management Agency

9/24/03
Date